MDEQ Response to Comments

Facility: MZX Tech, LLC

Physical Address: 2875 Stanton Road, Southaven, Desoto County, MS

Permit Action: Prevention of Significant Deterioration Permit to Construct Air Emissions Equipment

Permit No.: 0680-00119

Agency Interest No.: 12592

The Mississippi Department of Environmental Quality (MDEQ) provided a public comment period from January 16, 2026, to February 17, 2026, regarding the proposed issuance of a Prevention of Significant Deterioration (PSD) Permit to Construct Air Emissions Equipment ("PSD Permit") to MZX Tech, LLC ("MZX Tech"). To ensure meaningful public involvement for local community members to express concern regarding the proposed permit action, the Air Division initially coordinated with the Office of Community Engagement to hold a public hearing on February 17, 2026, at the M.R. Davis Public Library (located at 8554 Northwest Drive; Southaven, Mississippi 38671). However, upon evaluation of a request from the Safe and Sound Coalition for an alternative location (dated January 20, 2026), the Air Division decided to relocate the public hearing to the Ranger Conference Center on Northwest Mississippi Community College – Desoto Campus (located at 1210 Church Road West; Southaven, Mississippi 38671).

On February 2, 2026, MDEQ received a request from the Southern Environmental Law Center (SELC) regarding a proposed extension of the overall public comment period by an additional thirty (30) days. However, after reviewing the merits of the request, MDEQ formally denied this request on February 4, 2026, citing that the 32-day public comment period was adequate and appropriate for review. Thereafter, on February 6, 2026, MDEQ received a request from the Safe and Sound Coalition for a reconsideration of the aforementioned denied public comment period extension. Upon further review, MDEQ formally denied the requested reconsideration on February 16, 2026.

During the overall public comment period, approximately one hundred ninety-nine (199) separate parties submitted written comments expressing concern against MZX Tech regarding various issues. At the public hearing on February 17, 2026, thirty-one (31) separate parties verbally expressed comments of concern opposing the draft permit requested by MZX Tech.

This document contains a summary of the written comments received during the public comment period, oral comments conveyed during the public hearing, and MDEQ's corresponding responses. The comments provided by SELC have been specifically addressed given their technical nature in addressing alleged issues with the permit application, conditions within the draft permit, and the application of air permitting regulations. All other comments received have been grouped under appropriate categories for the purpose of clarity and brevity.

The attached appendices contain the following information:

- **Appendix A:** Comments Received from the Southern Environmental Law Center (SELC), Memphis Community Against Pollution, Young, Gifted & Green, Sierra Club, Safe and Sound Coalition, and the Climate Reality Project: Memphis and Mid-South Region Chapter (collectively);
- **Appendix B:** Comments Received from National Association for the Advancement of Colored People (NAACP);
- **Appendix C:** Comments Received from Various Individuals Expressing Concerns;
- **Appendix D:** Public Notice Documents and Associated Requests
- **Appendix E:** Certified Transcript of Public Hearing
- **Appendix F:** Comments Received During the Public Hearing
- **Appendix G:** Updated Draft PSD Permit to Construct Air Emissions Equipment
- **Appendix H:** Preliminary Determination ("Statement of Basis")

Written Comments from SELC, Memphis Community Against Pollution, Young, Gifted & Green, Sierra Club, Safe and Sound Coalition, and the Climate Reality Project: Memphis and Mid-South Region Chapter

- **Comment No. 1:** *The Application's first deficiency, carried into the Draft Permit: its failure to address the 27 existing turbines operating onsite, which are part of the same stationary source permitted here. Those 27 turbines are part of the same stationary source for which MZX seeks a permit here, and MZX was required to wait for issuance of this Permit before commencing construction of those turbines.*

  MDEQ Response: In a determination dated July 29, 2025, MDEQ determined that the referenced twenty-seven (27) combustion turbines currently at MZX Tech are considered "mobile sources" instead of "stationary sources". The following excerpt is from that determination:

  > ***"****In reference to your e-mail received on July 25, 2025, the Mississippi Department of Environmental Quality (MDEQ) has reviewed your request regarding the temporary use of portable natural gas-fired combustion turbines during construction of the separate standalone "MZX Tech, LLC" project. Based on the information provided in the e-mail and at the associated meeting, MDEQ understands that the referenced turbines will be "mobile" as each will remain affixed to a portable unit (i.e., a flatbed trailer) and "temporary" as it is intended for each to*

remain on-site (2875 Stanton Road South; Southaven, MS) for less than twelve (12) months. Therefore, contingent upon the two (2) denoted criteria remaining valid, MDEQ acknowledges that the referenced turbines are exempt from permitting requirements pursuant to 11 Mississippi Administrative Code Part 2, Chapter 2, Rule 2.13.D."

As noted in 11 Mississippi Administrative Code, Part 2, Chapter 2, Rule 2.13.D, MDEQ exempts mobile sources from the requirements to obtain a Permit to Construct and a Permit to Operate operating permit. However, MDEQ must note that the denoted mobile combustion turbines are being controlled with the same control devices [i.e., selective catalytic reduction (SCR) for control of NO_X and oxidation catalyst for the control of CO] that are required by the PSD Permit to Construct for the forty-one (41) stationary combustion turbines.

- **Comment No. 2:** *As described throughout these comments, the deeply flawed Application contains erroneous emissions estimates and a defective air quality modeling analysis. The Application thus profoundly understates the likely air quality impacts of the Stanton Road Gas Plant. These errors are made more alarming by the fact that even using MZX and MDEQ's own flawed estimates, emissions from the 41 permanent turbines at the Stanton Road Gas Plant are likely to result in premature deaths, increased hospital visits, and lost productivity. According to a study commissioned by the Southern Environmental Law Center and conducted by public health professionals at EmPower Analytics Group LLC, 7 these health impacts will cost $30–$44 million and will be borne primarily by communities in Mississippi and Tennessee.*

  The communities with the highest increase in fine particulate matter exposure will be Whitehaven and Westwood in South Memphis, where average annual increases are projected to exceed 0.5 micrograms per cubic meter (μg/m³), as well as nearby communities in DeSoto County, such as Horn Lake. At a population level, the risk of death from this level of increased exposure to fine particulate matter is linked to an increase in per-person mortality risk comparable in scale to the average annual risk of death from alcohol-impaired driving in the United States.

  MDEQ Response: MDEQ disagrees with the commentor's claim that the project will increase fine particulate matter ($PM_{2.5}$) exposure by 0.5 $\mu g/m^3$ annually. As documented in the Modeling Report and verified in the Significance modeling files (i.e., filename "*PM25ASIL5yrv05.aml*"), the maximum annual $PM_{2.5}$ impact from MZX Tech is only 0.058 $\mu g/m^3$. The commenter appears to have mistakenly cited a value closer to the project's 24-hour impact (i.e., 0.58 $\mu g/m^3$ in Table 5-1) and characterized it as an annual increase.

  Furthermore, all modeled $PM_{2.5}$ impacts remain significantly below the EPA's health-based Significant Impact Levels (SILs):

  - *Annual Impact*: 0.058 $\mu g/m^3$ (SIL = 0.13 $\mu g/m^3$)
  - *24-Hour Impact:* 0.58 $\mu g/m^3$ (SIL = 1.2 $\mu g/m^3$)

Because the project's impacts are below these health-based thresholds, the project is demonstrated to have an insignificant impact on regional air quality and public health.

- **Comment No. 3:** *MDEQ Must Impose More Stringent Requirements, Including Emissions Offsets.*

MZX's turbines have the potential to emit at least 423 tons per year ('tpy') of NOX and 417 tons per year ('tpy') of volatile organic compounds (VOCs) in an area already measuring ambient air quality worse than the federal health-based standard for ozone. NO_X reacts with VOCs, heat, and sunlight to form ground-level ozone, also known as smog. Exposure to ozone pollution is known to cause a variety of adverse health effects, including inflammation of the airways, increased risk of lung infection, aggravated respiratory diseases such as emphysema and chronic bronchitis, and increased frequency of asthma attacks. Ozone pollution is a major problem in the Memphis MSA, including in DeSoto County. In 2024, the Asthma and Allergy Foundation of America designated Memphis as an 'Asthma Capital' of the nation due to the City's high rates of emergency room visits and asthma-related deaths, and DeSoto County received an 'F' from the American Lung Association due to ozone pollution—the only county in Mississippi to receive this grade. Certified monitoring data support these characterizations: ambient air data collected across the Memphis MSA show that ozone concentrations in the area are in violation of the applicable National Ambient Air Quality Standard ('NAAQS') – jand the problem is only getting worse with each passing year.

MDEQ Response: The commenter argues that Mississippi Rule 2.5(E)(4) ("the Offset Rule") requires the MZX Tech to obtain emissions offsets for NO_X and VOCs because DeSoto County is an area where a NAAQS "*is being or will be exceeded but for which no nonattainment areas implementation plan has been adopted*". However, MDEQ believes this is a misinterpretation of the regulation and runs afoul of MDEQ's characterization of the intent of the regulatory language when the requirement was adopted into Mississippi's State Implementation Plan (SIP). MDEQ determined that the MZX Tech does not require offsets because DeSoto County is not an area that "is or will be" exceeding the ozone NAAQS, and, even if it were, the Offset Rule only applies to major sources that significantly impact the area, and MZX Tech's application shows that it does not.

Mississippi's Offset Rule was adopted as part of the state's revisions to its SIP regarding nonattainment areas in 1981. At that time, there were no designated nonattainment areas in Mississippi. Mississippi's Offset Rule was written in direct response to EPA's 1980 regulations, which required states to modify their SIPs to "*preclude sources outside designated nonattainment areas from causing or exacerbating [NAAQS] violations; and preclude sources from significantly impacting newly discovered nonattainment areas*". Mississippi's new rule reflected EPA offset requirements for certain sources located "*in a nonattainment area or in an area that impacts a nonattainment area*". Mississippi's Offset Rule went further to also apply to sources "locating in or near areas where an air quality standard is being or will be exceeded but for which no nonattainment area implementing plan has been adopted by Mississippi."

According to the Federal Register notice approving Mississippi's new Offset Rule into its SIP, Mississippi clarified that this additional provision "*applies to sources in Mississippi which impact*

designated nonattainment areas in other states even if a Part D nonattainment plan has been adopted by the neighboring state". Mississippi's new rule adopts EPA's Offset Policy (Appendix S, the Interpretative Ruling) by reference, and "causes no change in the way sources outside nonattainment areas are treated" compared to EPA's Offset Policy. Furthermore, EPA stated that the Offset Rule's reference to areas where the NAAQS is being or will be exceeded, but for which Mississippi has not adopted a nonattainment area SIP means the following types of areas: "*(a) a newly designated nonattainment area in Mississippi, (b) any designated nonattainment area outside Mississippi which is impacted by a source in Mississippi, (c) an area which is violating NAAQS, but has not yet been designated nonattainment, and (d) an area which would violate NAAQS due to the new or modified source.*"

DeSoto County does not quality for any of these categories of areas to which the Offset Rule applies – it is not newly designated nonattainment, it is not outside Mississippi, it is not currently violating the NAAQS, and MZX Tech will not result in a violation of the NAAQS as demonstrated by the modeling included in the permit application. As noted above, DeSoto County and the Memphis MSA are currently designated as attainment with the 2015 ozone NAAQS. The chart referenced by the commenter shows only one (1) three-year average design value (for the three-year period ending in 2024) exceeding the NAAQS. However, this single value does not mean the ozone NAAQS "is being" exceeded or "will be" exceeded, particularly given that it was influenced by the exceptional events identified above.

In fact, recent monitoring data shows that air quality in DeSoto County is improving, as shown above. According to MDEQ's State of Mississippi Air Quality Data Summary for Calendar Year 2024 ("2024 Air Quality Summary"), discussed in the Draft Preliminary Determination, the annual data for DeSoto County shows that the 4th highest 8-hour ozone values recorded in the county are trending down; the 4th highest value for 2024 was 69 ppb, which is below the 8-hour ozone standard. For 2024, the ozone NAAQS is not "being exceeded." Publicly available data from U.S. EPA shows the same downward trend. The number of days where DeSoto County's daily maximum ozone measurement exceeded the 8-hour standard has steadily decreased since 2022.

Additionally, MDEQ has undertaken voluntary efforts to ensure the Memphis MSA will not exceed the NAAQS, despite the 2024 design value for the DeSoto County monitor. In the 2024 Air Quality Summary, MDEQ states that, in response to ozone levels at the DeSoto County monitor in 2024 that were "slightly above the standard (71 ppb compared to the 70 ppb standard)", "MDEQ is actively participating in the EPA's Ozone Advance Program with the Memphis MSA to implement measures aimed at reducing ozone values below the 70 ppb threshold".

Importantly, the Offset Rule does not specify how to determine when "an air quality standard is being or will be exceeded," thereby leaving MDEQ with discretion to make this determination. In relevant part, the Offset Rule focuses on areas "where an air quality standard is being or will be exceeded but for which no nonattainment area implementation plan has been adopted". As it appears the commenter would prefer for MDEQ to interpret the phrase "is being or will be exceeded" in a way that would require offsets even if a single design value shows that ozone was measured above the 8-

hour ozone standard. But the Offset Rule does not mandate a specific method for making that determination. MDEQ has discretion to interpret its own regulations where language is ambiguous, such as the Offset Rule. MDEQ properly exercised its discretion to find that DeSoto County is not an area "where an air quality standard is being or will be exceeded" by considering all relevant data, including more recent monitoring data and air quality trends, as well as the voluntary actions MDEQ is taking through its participation in EPA's Ozone Advance Program to ensure the area continues to attain the 2015 ozone standard.

Finally, even if the area could be considered in exceedance of the standard, MZX Tech would not significantly impact the area, and therefore would not be subject to the Offset Rule. Mississippi's Offset Rule only applies to sources that have a significant impact on an area's air quality, when the area is either designated as nonattainment or where a NAAQS is being or will be exceeded. The Offset Rule is located within Section (E) of Rule 2.5, which is titled as follows: "*Additional Requirements for a permit to construct or a State Operating Permit for a New Major Stationary Source or Major Modification Significantly Impacting an Area in which a National Ambient Air Quality Standard is being exceeded or will be exceeded*". Given the Offset Rule's location within a section of Mississippi regulations governing sources significantly impacting areas where the NAAQS are being exceeded or will be exceeded, the Offset Rule applies only to sources that "significantly impact" those areas. Subsection (1) of Section E contains similar language indicating that the requirements of Section E apply only to sources that significantly impact attainment of the NAAQS: "*Notwithstanding Appendix S [EPA's Offset Policy], the requirements for Offsets and Lowest Achievable Emission Rate will apply to all major stationary sources and major modifications which have a significant impact on nonattainment of the applicable ambient air quality standard.*" Section E in which Mississippi's Offset Rule is located is clear: offsets are required only for major sources or major modifications which have a significant impact on nonattainment of NAAQS.

Whether or not a source has a significant impact is determined with reference to EPA's Significant Impact Levels (SILs). Section E(2)(e) defines "significant impact" as an "*air quality impact which exceeds the significance level*" and Section E(2)(d) defines "significance levels" to mirror EPA's SILs:

- ***'Significance Levels.'*** *Concentrations of pollutants against which air quality contributions of a stationary source are compared to determine whether the stationary source significantly impacts air quality in an area. The levels are as follows:*
  1. *SO_2: 1.0 $\mu g/m^3$, annual average; 5 $\mu g/m^3$, 24-hour average; 25 $\mu g/m^3$, 3-hour average*
  2. *PM_{10}: 1.0 $\mu g/m^3$, annual average; 5 $\mu g/m^3$, 24-hour average*
  3. *NO_2: 1.0 $\mu g/m^3$, annual average*
  4. *CO: 0.5 mg/m^3, 8-hour average; 2.0 mg/m^3, 1-hour average*

As outlined in the permit application, MZX Tech will not have a significant impact on any NAAQS (including ozone). Accordingly, offsets are not required under Mississippi's Offset Rule.

In short, the DeSoto County is not the type of area and MZX Tech is not the type of facility targeted by the offset rule because DeSoto County is not in violation of the NAAQS and MZX Tech does not have the potential to significantly impact ozone concentrations in the area – modeling conducted in accordance with EPA-approved procedures confirms that the maximum impact of the facility on ozone concentrations is expected to be only 0.797 ppb, below the 1.0 ppb significant impact level developed by EPA. Because both the offset rule itself and the preamble to EPA's approval of Mississippi's Offset Rule indicate that the rule is aimed at sources "*significantly impacting newly discovered nonattainment areas*", which does not apply to MZX Tech.

- **Comment No. 4:** *Mississippi's rules and Mississippi's EPA-Approved State Implementation Plan prohibit permitting MZX without requiring emissions offsets.*

  As set out above, the Memphis MSA has been exceeding the NAAQS for ozone for nearly five years; this area includes DeSoto County, where the most recent EPA-approved design value (i.e., official monitor reading) for 2022–2024 is 0.071 parts per million (ppm), in excess of the 0.07 ppm standard. Thus, xAI and MZX's facility is located both in a county and a larger MSA that are violating the ozone NAAQS.

  Although Memphis and DeSoto County have not been formally designated as nonattainment areas, Mississippi's rules and the state's EPA-approved SIP contain provisions severely limiting construction of new major sources in areas such as DeSoto County that are violating the NAAQS but have not yet been designated nonattainment areas. In short, unless new major sources that are locating in violating areas obtain emissions offsets, they are barred from construction. The following are the relevant provisions of the SIP, which are mirrored identically in Mississippi's current rules.

  To summarize this SIP provision, as relevant here, then, in areas where the NAAQS are being exceeded but 'no nonattainment area implementation plan has been adopted,' any new source is subject to the requirement to obtain offsets (i.e., the Offset Policy) if it 'is a major stationary source…for the pollutant for which the standard is…exceeded' and 'the stationary source is within…the area where the standard is…exceeded.' The SIP provision then states that 'the stationary source shall not be granted a construction permit' unless the owner or operator demonstrates that the 'emissions reductions to offset the new stationary source emissions' will be effective and that 'the emissions reductions have been achieved.'

  MDEQ Response: Please see the response to Comment No. 3.

- **Comment No. 5:** *MZX's vastly underestimated $PM_{2.5}$ emissions, rendering the $PM_{2.5}$ modeling worthless.*

  MZX's PSD Permit Application calculates that the 41 turbines will emit only 19.5 tpy of $PM_{2.5}$ while generating well over a gigawatt of power. This is simply not plausible; as just one initial example, the gas turbines at the Tennessee Valley Authority's ("TVA") nearby Southaven power plant—which is considerably smaller than MZX by generating capacity—emit up to 316 tons of $PM_{2.5}$. The problem stems from MZX's reliance on a single set of source testing from just one turbine in

California, testing which was conducted while assessing efforts to reduce $PM_{2.5}$ emissions from turbines—efforts which MZX is not proposing to undertake. Based on this inappropriate source of emissions data, MZX proposes an emission factor of 3.6E-04 (or 0.00036) pounds per million British thermal units (lb./MMBtu) for all three types of turbines it intends to operate. Remarkably, Solar, the turbine manufacturer for the majority of MZX's turbines, only warrants an emission rate of 0.015 lb./MMBtu—more than 40 times higher than the rate used by MZX. The following is an excerpt from Solar's Product Information Letter 171 (a document MZX itself cites to in its emissions calculations).

In other words, the manufacturer of 35 out of 41 turbines proposed to be used by xAI and MZX recommends an emission rate two orders of magnitude higher than that proposed by xAI and MZX. And again, this discrepancy arises because MZX relies on experimental testing that is simply not relevant to the proposed permitted turbines; not only did the studied turbines take efforts to reduce $PM_{2.5}$, the California turbine was also a different make, model, and size of turbine.

MDEQ Response: The emission factor selected for use in the MZX Tech permit application was obtained from a peer-reviewed article published in an 2016 academic journal (i.e., "Brewer et al."). The purpose of the research was to characterize emissions from new natural gas-fired turbines, and a General Electric (GE) LMS100 (100 MW) turbine was selected as the study candidate with testing conducted a in August 2013 with oversight from the South Coast Air Quality Management District ("SCAQMD").

Nevertheless, the commenter instead asks MDEQ to use either an older, less representative emission factor that does not even rely on $PM_{2.5}$ test data or an emission estimate prepared by the vendor for some of the proposed turbines that contains a significant margin to reflect the possibility of inaccurate test results. Specifically, the commenter asks MDEQ to use either EPA's generic AP-42 emission factors published in 2000 using test results that did not specifically measure $PM_{2.5}$, or the Solar Turbines Product Information Letter 171 ("PIL 171"), which offers a conservatively high $PM_{2.5}$ estimate that Solar is willing to guarantee regardless of potential measurement errors. Both options are inferior to the emission factor relied upon in the MZX application.

EPA's AP-42 emission factors are old and unrepresentative because they are based on eighteen (18) tests conducted between 1988 and 1996 using a variety of historical test methods and older gas turbine models that differ significantly from today's turbines. None of the tests that underline the AP-42 emission factor reported emission rates for $PM_{2.5}$. Also, during the period in which these tests were conducted, EPA had very little confidence in the ability of then-available test methods to accurately measure $PM_{2.5}$ or the accuracy of emission factors developed from available test data. In fact, EPA even issued a memorandum in 1997 – just after the AP-42 tests were conducted – suspending implementation of $PM_{2.5}$ permitting due to "*the lack of necessary tools to calculate emissions of $PM_{2.5}$…*"

EPA had good reason to question the validity of tests conducted prior to 1997 because the test methods available at that time were known to have positive bias. Sources of positive bias included oxidation of stack gas sulfur dioxide (SO_2) in impinger solutions (SO_2 artifact), stopcock grease

dissolved in methylene chloride reagent, filter adsorption of gaseous pollutants, dilution ratio in dilution-based methods, and background particulate (present in ambient air). AP-42 factors are based on historical test results that were almost certainly affected by positive bias from one or more of these sources, resulting in an emission factor that is erroneously high.

The emission factor provided in Solar's PIL 171 is also unrealistically high for a similar reason. Recognizing that the test methods for $PM_{2.5}$ have historically had a positive bias for the reasons noted above, Solar recommends a factor of 0.015 lb./MMBtu based on the need to provide customers with a large cushion or margin to allow for test method and tester error, which can be considerable. Solar notes specifically that the turbine combustion process has little effect on the particulate matter generated and measured because the largest contributor to measured $PM_{2.5}$ values is typically measurement technique and error. In essence, PIL 171 recommends that customers err on the high side given the prevalence of positive biases in the measurement techniques available. Accordingly, that emission factor is not intended to be a realistic estimate of actual $PM_{2.5}$ emitted from the turbine to the atmosphere.

In contrast, the emission factor selected by MZX Tech is more recent. Brewer et al. used a wet impinger-based method for condensable particulate (SCAQMD Method 5.1), which corrects for SO_2 artifact. The report notes that its results agree with a dilution-based study, an impinger-based study, and an unpublished 2014 study by the same authors using EPA Method 202 (with results 20% lower than those reported in the 2016 study). Consistent with these findings, EPA has independently released a spreadsheet of emission factors for gas-fired combustion sources for use by States that states the following: "*The revision will decrease the emissions of [Particulate Matter] by about 95%. The reason for this adjustment is that EPA believes that the current AP-42 factors for condensable emissions are too high."* The EPA revised emission factor for $PM_{2.5}$ from natural gas-fired electric generating turbines is 0.00042 lb./MMBtu, which agrees closely with the emission factor used in the permit application.

In summation, EPA has confirmed that its original AP-42 particulate emission factors is biased high by as much as 95% due to well-recognized challenges associated with the measurement techniques available at the time, and the prevalence of those same errors prompted Solar to issue PIL 171 with a conservatively-high emission factor, so neither of those factors is the best data available, contrary to the commenter's claims. Instead, MZX Tech relied on emission factors developed from more recent and accurate test data that agrees with other contemporaneous authorities, which MDEQ reasonably approved.

Even if emission rates were increased to the levels suggested by the commenter, the project's impact is so far below the SIL (only 26% of the threshold) that the conclusion of insignificance would remain unchanged. MDEQ verified that the factors used were based on stack testing of identical Solar turbines, which is more accurate for natural gas combustion than generic manufacturer "maximum" ratings.

- **Comment No. 6:** *Use of actual rather than maximum allowable emissions from nearby sources was improper for nitrogen dioxide (NO2) modeling.*

  Texas Gas Transmission LLC operates a gas compressor station in DeSoto County and is currently the largest emitter of NO_X in the county per EPA's 2020 National Emissions Inventory ("NEI"). For the cumulative NO_2 modeling, MZX utilizes maximum permitted emission rates for all sources except Texas Gas Transmission. For this source—again, the largest emitter of NOX in the county—MZX instead utilized actual emission rates. In response to a question from EPA, MZX explains: 'All sources were modeled at permitted allowable emission rates except for Texas Gas Transmissions LLC (MSNOX1-MSNOX18), which used actual emissions from the emissions inventory (EI) data reviewed for this project.' MZX does not provide further justification for this decision.

  Although it is unclear what emissions inventory data MZX utilized, there appears to be a substantial gap between reported actual emissions and permitted emissions. MDEQ's permit for Texas Gas Transmission caps NO_X emissions at 2,296 tpy,44 while the most recent EPA NEI data (from 2020) reports the facility emitting 488 tons of NO_X; this is just 21% of the permitted maximum and would mean the modeling omitted about 1,800 tons of NOX from this source alone. Alternatively, in a separate response to EPA, MZX addresses discrepancies between what they listed as emission rates for Texas Gas Transmission (point sources MSNOX3 through MSNOX9) and what they modeled; this discrepancy amounts to 304 tons of NO_X per year that MZX apparently did not include in its modeling.

  In short, the apparent omission of at least 304 tons of NO_X and perhaps as much as 1,800 tons is remarkable given that all other sources in DeSoto County emitted 3,407 tons of NOX in the same 2020 NEI (2,719 tons from area source/mobile sources and 688 tons from point sources), meaning the omitted NO_X would be a substantial quantity in the scheme of county-wide emissions.

  MDEQ Response: Under EPA's 2014 "NO_2 Modeling Memo", actual emissions are preferred for nearby sources in cumulative modeling to ensure the results reflect "real-world" conditions rather than "mathematical exercises untethered to reality". The modeling correctly used verified 2020 NEI actuals for sources MSNOX1 – MSNOX18 to prevent the model from artificially predicting violations that do not exist in the physical environment.

- **Comment No. 7:** *MZX omitted numerous significant nearby sources from the NO_2 modeling.*

  As discussed above, as part of the NO_2 cumulative impacts modeling requirement, MZX was required to include emissions from nearby sources; in particular, consistent with 40 C.F.R. Part 51, Appendix W, MZX was to include all sources within the Significant Impact Area ("SIA") and certain larger sources outside of the SIA, but within 50 kilometers of the SIA. The SIA from MZX's modeling report is shown here, covering a large portion of DeSoto County and Shelby County, plus parts of Arkansas:

MZX then provides a list of all such sources that it included, 50 but this list is missing at least the following significant sources within the SIA:

- ***xAI's Colossus I**: MZX's sister facility, operated by CTC Property LLC, is permitted to emit more than 80 tons of NO_X and is located well within the SIA;*

- ***TVA Allen's New Turbines**: While TVA Allen was included in MZX's source list, the units listed do not include six new 35 MW turbines for which TVA recently received a PSD permit. It is unclear whether they are operating yet (although the turbines were delivered in the summer of 2025), but given that they are subject to an existing permit, MZX should have included their maximum allowable emissions (approximately 47 tons of NO_X);*

- ***Memphis International Airport**: Although MZX does have one line addressing "[Memphis-Shelby County ('MSC')] Airport Authority," this entry does not represent the entirety of the Memphis Airport's emissions. In particular, the listing from MZX amounts to about 29 tons of NO_X per year, while the airport is listed in EPA's NEI as a 'facility' (as opposed to 'area' or 'mobile source') that emitted 1,077 tons of NO_X in 2020. These emissions are not included in the list of sources included in the modeling.*

- ***Memphis Train Yards**: EPA's NEI lists two train yards, both listed as 'facility-sources' (as opposed to 'area' or 'mobile sources') in southwest Memphis (Facility ID Nos. 19756111 and 14461311). The two train yards emitted a combined total of 353 tons of NO_X.*

- ***Other sources within the SIA omitted from modeling**: Based on a survey of EPA's ECHO database, the following are industrial sources of significant NO_X emissions within the SIA that are not included in the MZX source list:* [referenced table found on Page 15 of actual SELC comment document]

In total then, MZX omitted at least 14 sources (the nine identified from the ECHO database and the other five discussed above, including its own sister facility Colossus I) of NO_X located within the SIA from its cumulative impacts modeling. The total NO_X emissions from these 14 sources amounts to about 1,700 tons of NO_X, although we note most of these emission rates are based on reported actual emissions, and not total allowable emissions (which, as discussed above, is the appropriate emission rate for sources within the SIA).

MDEQ Response: Sources such as the Memphis International Airport and Train Yards were excluded because their impacts are already captured by the ambient background monitors (Memphis/DeSoto monitors). Modeling these sources individually and adding the monitor background would result in "double counting", which makes the model factually inaccurate. In addition, xAI Colossus I was "screened out" via the "Q/D < 20 threshold", as its distance relative to its emissions does not significantly impact the MZX study area.

- **Comment No. 8:** *Reliance on Significant Impact Levels to evade more stringent modeling demonstrations was improper.*

  MDEQ cannot lawfully issue a permit authorizing construction of a project that would 'caus[e] a violation' of the NAAQS or 'interfer[e] with the attainment and maintenance of [a NAAQS]' in Mississippi or neighboring states. Because the Memphis MSA (which includes other counties in Tennessee, Mississippi, and Arkansas) is already in violation of the ozone NAAQS, and because the construction of MZX would significantly increase emissions of ozone precursors, it is undeniable that the project would (1) be constructed in an area where a NAAQS violation is predicted; (2) contribute to the ongoing NAAQS violation in DeSoto County; and (3) interfere with the ability of two neighboring states to attain the NAAQS.

  Although MZX is proposing to construct a major source subject to PSD's modeling requirements to demonstrate it will not cause or contribute to NAAQS or other PSD violations, in numerous instances MZX has opted out of conducting full cumulative impacts demonstrations, relying instead on a legally dubious concept known as "significant impact levels," or SILs. This omission is particularly concerning in light of the area's ongoing violation of the ozone NAAQS.

  Moreover, even when MZX's modeling showed substantial exceedances of the SIL for NO_2, and cumulative modeling then showed violations of the 1-hour NO_2 standard, MZX relied on SILs to argue that despite showing a NAAQS violation, its facility's contribution to that violation was too insignificant to matter. This practice is not legally justified, and MDEQ must prohibit construction unless MZX modifies its plans in a way that avoids causing NAAQS exceedances.

  MDEQ Response: The use of Significant Impact Levels (SILs) is not an "evasion" of modeling requirements but rather a fundamental component of the PSD permitting process as established by EPA guidance and legal precedent (e.g., *Sierra Club v. EPA, 705 F.3d 458*). SILs are used to determine if a source's contribution to a potential NAAQS violation is "de minimis". If a project's impact is below the SIL, it is scientifically and legally concluded that the project does not "cause or contribute" to a violation. MZX Tech conducted a full cumulative impact analysis for all pollutants that exceeded the SILs (i.e., the "1-hour NO_2" and "Annual NO_2"), which fulfilled the requirement for a stringent demonstration.

- **Comment No. 9:** *MDEQ must not utilize SILs for ozone when DeSoto County is already violating the ozone NAAQS. MZX's ozone impacts exceed the SIL using more conservative MERPs as required in Memphis and Tennessee.*

  MZX did not conduct any modeling to assess impacts on ozone; instead, MZX relied on an equation that estimates impacts based on figured known as modeled emission rates for precursors ("MERPS"). MZX then compared the output of this equation to the SIL to determine that impacts to ozone would not cause or contribute to exceedances of the ozone NAAQS. At no point in this minimal

process does MZX account for the fact that the ozone NAAQS are already being violated in DeSoto County.

As set out below, as an initial matter, it's not clear that MZX's ozone impacts are actually below the SIL. Yet even if they are, reliance on the SILs to ignore impacts in a county that is already exceeding the ozone NAAQS was improper.

As set out below, as an initial matter, it's not clear that MZX's ozone impacts are actually below the SIL. Yet even if they are, reliance on the SILs to ignore impacts in a county that is already exceeding the ozone NAAQS was improper.

MZX relied on a MERPs value that EPA recommends for Memphis, yet the Tennessee Department of Environment and Conservation ('TDEC') and the Shelby County Health Department (which handles air permitting in Memphis) require a different, more conservative default MERP value. Critically, had MZX used the same MERP value that would be required if it were located just a few blocks north, across the state line, the ozone analysis would have indeed shown ozone impacts well above the SIL. The following equation was utilized by TVA in its recent PSD permit application for TVA Allen (submitted to the Shelby County Health Department), utilizing the more conservative MERPS: [referenced table and equation found on Page 18 of actual SELC comment document]

MDEQ Response: The assessment of ozone impacts was conducted using modeled emission rates for precursors ("MERPs") in accordance with EPA's "*Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$*". As such, MDEQ utilized the MERP values recommended by EPA for this region. While the commenter suggests usage of the more conservative values required by the state of Tennessee, MZX Tech is in Mississippi, and MDEQ is the primary regulatory authority. Therefore, MDEQ has verified that with usage of the EPA-recommended MERP values, the proposed project's impact on ozone remains below the associated SIL; as such, a full photochemical grid model run is not required.

- **Comment No. 10:** <u>*MDEQ cannot allow utilization of SILs to ignore violations of the ozone NAAQS.*</u>

MDEQ cannot lawfully issue a permit authorizing construction of a project that would "result in a violation" of the NAAQS, "interfere with attainment or maintenance of a [NAAQS] in a neighboring state," or "cause, or contribute to, air pollution in excess of any" NAAQS. Because the Memphis MSA (which includes other counties in Tennessee, Mississippi, and Arkansas as well as Shelby County) is already in violation of the ozone NAAQS, and because the construction of MZX would significantly increase emissions of ozone precursors, it is undeniable that the project would (1) be constructed in an area where a NAAQS violation is predicted; (2) contribute to the ongoing NAAQS violation in DeSoto County; and (3) interfere with the ability of two neighboring states to attain the NAAQS.

MDEQ's determination that MZX will not cause or contribute to the ongoing NAAQS violation is premised on the use of EPA's ozone SIL, which is set forth in non-binding guidance. published by the U.S. Environmental Protection Agency ("EPA").

This guidance suggests that permitting agencies may issue a PSD permit by relying on SILs to find, on a case-by-case basis, that a project's emissions will not contribute "significantly" to a modeled or existing NAAQS violation.

MDEQ Response: MDEQ acknowledges that the Memphis MSA, including portions of DeSoto County, has monitored ozone concentrations near or above the NAAQS. However, under the PSD program, a permit cannot be denied based on regional air quality alone if the individual project's impact is demonstrated to be insignificant. The EPA's 2018 SIL guidance specifically supports the use of SILs even in areas where the NAAQS is being exceeded. Because MZX Tech's modeled impact on ozone is below the SIL, the project is demonstrated to not "contribute" to the regional ozone issue as defined under 40 CFR 51.165(b)(2).

- **Comment No. 11:** *MZX cannot excuse violations of the 1-hour NO_2 NAAQS via SILs.*

As to the 1-hour NO_2 standard, MZX could not pass initial SILs screening and ultimately showed violations of the NO_2 NAAQS, but then dismissed these violations based on SILs. In particular, MZX's initial modelling showed massive exceedances of the SIL, with impacts of 71.3 $\mu g/m^3$ compared to the SIL of 7.5 $\mu g/m^3$. This initial modeling also showed that exceedances of the SIL occurred up to 30 kilometers from the facility and covered a substantial portion of Memphis.

MZX then moved to the cumulative modeling phase, including nearby sources (although, as noted above, it does not appear MZX actually included all relevant sources in this step). After conducting the cumulative impacts analysis, MZX's modeling showed that there would be substantial exceedances of the NO2 NAAQS: where the standard is 188 µg/m3, the modeling showed impacts as high as 325.6 $\mu g/m^3$.

Despite showing clear violations of the NAAQS, MDEQ then claimed MZX wasn't sufficiently culpable for the violations: according to a three-sentence analysis, MDEQ determined MZX only contributed 4.87 $\mu g/m^3$ to the violation, which is below the SIL of 7.5 $\mu g/m^3$, and therefore it could excuse the facility's contribution to the NAAQS violation.

MDEQ Response: The cumulative modeling for 1-hour NO_2 did identify potential exceedances of the NAAQS (reaching a total of 325.6 $\mu g/m^3$). However, a source is only prohibited from being permitted if it "causes or contributes" to those exceedances. MZX Tech performed a culpability analysis using the "Round 3 Modeling" data (i.e., filename "*NO2o5yrNAAQS_CULP.ami*"), which verified that MZX Tech's maximum contribution at the time and location of any modeled exceedance was only 4.87 $\mu g/m^3$. As this is less than the 7.5 mg/m^3 SIL, the proposed project complies with the regulatory requirement to demonstrate that it does not significantly contribute to a NAAQS violation.

- **Comment No. 12:** *Intermittent sources of NO_X were not modeled in a manner that demonstrates their actual contribution to the 98th percentile of the 1-hour daily maximum concentrations.*

  MDEQ Response: In evaluating this comment, it is MDEQ' assumption that it is in reference to Table C-6 ("Offsite NO_2 Point Sources") of the "Ambient Air Modeling Analysis" document. With consideration to this assumption, sources "MSNOX13" and "MSNOX14" are emergency stationary internal combustion engines that operate only 11 and 9.5 hours per year, respectively. As such, EPA guidance specifically allows the exclusion of these intermittent sources from 1-hour NO_2 modeling because the statistical probability of them operating simultaneously with "worst-case" weather is nearly zero.

- **Comment No. 13:** *The modeling of offsite sources, as conducted by Trinity Consultants, is unrealistic, based on incorrect treatments of release specifications and downwash effects, such that the results are not reliable.*

  MDEQ Response: MDEQ believes this claim – as it relates to the final modeling – is factually incorrect. The "Round 3 Modeling" data [i.e., filename "*Round_Three_Modeling/NO2o5yrNAAQS.ami*" (Line 409)] specifically corrected off-site source parameters. Moreover, Baptist Hospital was modeled at 31.09 meters (reflecting its actual 10-story height) with building downwash included, which ensures the results are realistic and reliable.

  Building downwash is a localized effect and generally only considered for nearby sources when those source buildings are close enough to the proposed facility to have a downwash influence on the applicant stacks. Buildings at more distant facilities are not generally included in cumulative modeling analyses.

- **Comment No. 14:** *The gas exit velocities of some of the sources, as modeled by Trinity Consultants, are clearly too high and incorrect, thereby understating the impacts of pollutant releases from those sources.*

  MDEQ Response: Upon review, MDEQ acknowledges the input error for off-site source "TNNOX50" that was modeled with an unrealistic exit velocity of 917.24 meters per second. An artificially high exit velocity causes the plume from that offsite source to rise higher into the atmosphere, which may result in an understatement of the total (cumulative) concentration at receptors in the study area.

  As a point of clarity, TNNOX50 is an "*inventory source*" (i.e., a nearby facility), and part of the proposed project outlined by MZX Tech. While the total regional concentration might be slightly higher if this off-site source were corrected, the individual contribution to air quality from MZX Tech will remain the same. The culpability analysis isolates MZX Tech's impact from the other sources in the inventory. Moreover, the facility's NO_2 contribution was verified at 4.87 $\mu g/m^3$, which is

independent of the exit velocity for TNNOX50. Therefore, this inventory error does not change the concluded determination that MZX Tech does not significantly contribute to any NAAQS violations.

- **Comment No. 15:** *The modeling domain (distance from source) used by Trinity Consultants exceeds the regulatory requirements, as established by the United States Environmental Protection Agency.*

  MDEQ Response: MDEQ disagrees that the modeling domain is insufficient or improperly defined. Pursuant to EPA's "*Guideline on Air Quality Models*" (Appendix W), the modeling domain must encompass the significant impact area (SIA), which is the area in which the proposed project's impact exceeds the SIL.

  Within the "Round 3 Modeling" data (i.e., filename "*NO2o5yrNAAQS.aml*"), MZX Tech utilized a receptor grid that extended to 30 km. By evaluating a span of 30 km, the analysis covered an area 43% larger than the required SIA. MDEQ has verified that at the 30 km boundary, the modeled concentrations from MZX Tech are well below the SIL and the grid is sufficiently large to capture all significant impacts. This expanded domain ensures a conservative and comprehensive evaluation of the project's impact on regional air quality, exceeding the minimum regulatory distance requirements.

- **Comment No. 16:** *The NO_X BACT limit is not sufficiently enforceable to constitute BACT; MDEQ must require Continuous Emissions Monitoring Systems (CEMS) to enforce short-term averaging periods.*

  The Draft Permit primarily relies on initial and annual emissions testing (i.e., stack testing) to demonstrate compliance with the BACT limits, and this is the case for the NO_X BACT limit of 2 ppm. BACT limits must apply on a continuous basis, and the limit must be expressed in terms of averaging times that protect the underlying NAAQS. Here, the NO_X BACT limit is intended to be protective of both the short-term ozone NAAQS (the 8-hour standard) and the NO_2 NAAQS (the 1-hour standard). The Draft Permit establishes that the short-term BACT limit of 2 ppm shall apply over a three-hour period.

  In short, testing once per year is not adequate to ensure the SCR maintains NO_X emission rates below 2 ppm over either the course of the year or over any individual three-hour period. Indeed, PSD permits for comparable simple-cycle turbines typically require Continuous Emissions Monitoring Systems (CEMS) for NO_X; for instance, TVA recently permitted six 35 megawatt simple-cycle turbines with SCR as BACT in Tennessee, and regulators there appropriately set a three-hour averaging period and required CEMS.

  In sum, in order to protect the short-term ozone and NO_2 NAAQS, MDEQ must likewise require the use of CEMS. Especially given the raised stacks and other technical issues referenced herein, annual source tests alone, which are announced ahead of time, allowing fine-tuning of operation, and are

conducted under optimal operating conditions, are inadequate to demonstrate continuous compliance and protection of the short-term NAAQS. Therefore, CEMS should be required.

MDEQ Response: Upon review of the referenced EPA memo "*Need For a Short-Term Best Available Control Technology (BACT) Analysis for the Proposed William A. Zimmer Power Plant*", MDEQ believes that the existing short-term NO_X emission limits within the draft PSD Permit to Construct are consistent with the averaging periods of applicable NAAQS. Moreover, MDEQ believes that the draft PSD Permit to Construct invokes the appropriate compliance assurance mechanisms (including continuous parametric monitoring) for each NO_X emission standard as outlined in the following:

- Conditions 5.12 through 5.14 require MZX Tech to either conduct initial and subsequent stack testing or to install and maintain a continuous emission monitoring system (CEMS).

- Condition 5.15 requires that the parameter ranges be established during each stack test for key operational parameters associated the selective catalytic reduction (SCR) control device – such as the catalyst bed exhaust temperature and ammonia solution injection rate.

- Condition 5.18 requires that, during operations subsequent to the stack test, the catalyst bed temperature and ammonia injection rate be continuously monitored and that any excursions outside of the parameters attested during the stack test be recorded, including a record of corrective action.

Regarding the commentors' claim on an accelerated degradation of the SCR catalyst due to higher exhaust temperatures and/or increased stack height, MDEQ must point out that the commentor fails to elaborate as to why the implementation of 50-foot stacks should be considered "*particularly tall*" (despite the height appearing to comply with MDEQ's "good engineering practice [GEP] stack height provisions found in 11 Mississippi Administrative Code, Part 2, Chapter 1, Rule 1.9) and how such a height would change the behavior of the catalyst within the SCR.

As it pertains to concerns on the potential life of the catalyst within the SCR, MDEQ will note that EPA has released documentation ("Selective Catalytic Reduction", June 2019) that indicates an assumed life of up to 40,000 hours for catalyst within a SCR utilized for control of a gas or oil-fired unit. In addition, EPA outlined that catalyst replacement is driven by a progressive loss of catalyst activity over time (with associated performance indicators such as increasing ammonia slip) and is not a rapid / instantaneous failure. Therefore, MDEQ believes that the existing requirement of stack testing on an annual frequency – should MZX Tech not opt to employ CEMS – is an appropriate tool to confirm ongoing SCR performance and identify meaningful degradation before an exceedance of an established short-term NO_X emission limit.

- **Comment No. 17:** *The proposed NO_X limit does not represent LAER*.

As an initial matter, although MZX claims it is implementing LAER voluntarily, we believe MDEQ should independently require LAER as a legal requisite given the de facto nonattainment status of DeSoto County. Remarkably, neighboring Arkansas apparently concurs, with the Arkansas Department of Environmental Quality having commented to Shelby County that it should require LAER for Colossus I in light of the ozone problem in the Memphis area.

More to the point, LAER limits must be at least as stringent as the "most stringent emissions limitation which is achieved in practice." While 2 ppm may represent BACT, MDEQ should implement a more stringent LAER limit in light of recent testing on Solar 130 turbines testing on eight of these turbines, which of course will also be used by MZX—showed NOX emissions for all eight turbines were below 1.5 ppm; in fact seven of the eight were below 1 ppm. As such, MDEQ should implement LAER limits based on these lowest emission rates that have been achieved in practice on nearly identical turbines.

MDEQ Response: As previously discussed, the Memphis, TN-MS-AR area (which includes DeSoto County) is designated as "in-attainment" with all NAAQS and has been since the area was redesignated to "in-attainment" under the 2008 Ozone NAAQS in 2016. Mississippi's State Implementation Plan (SIP) only requires a "lowest achievable emission rate" (LAER) for sources that are in a nonattainment area or that affect a nonattainment area. As such, the proposed project is not located in a nonattainment area, and the PSD permit application as well as MDEQ's analyses demonstrate that there will be no significant impact at any location, whether attainment, unclassifiable, or nonattainment. Therefore, MZX is only required to meet the standard of BACT and not LAER.

- **Comment No. 18:** *The volatile organic compound (VOC) and carbon monoxide (CO) BACT limits for the ProEnergy turbines are unjustified.*

MZX will operate three different makes and models of turbines; two different sizes of turbines manufactured by Solar (16.5 and 35 MW versions) and a third batch, 50 MW ProEnergy PE6000 turbines. For reasons that are not explained in the application, MZX is proposing significantly less stringent BACT limits for the largest turbines.

In particular, MZX proposes BACT for CO from the ProEnergy PE6000 turbines at 4.0 ppm at 15% O2 achieved with an oxidation catalyst. This CO BACT limit is twice as high as that for the Solar Turbines, which MZX has proposed at 2.0 ppm. Likewise, MZX proposed a BACT limit of 2.5 ppm for VOCs, which is 25% higher than the 2.0 ppm VOC limits for the Solar turbines.

To justify the less stringent emission limits, MZX concedes these turbines are inherently dirtier than comparable turbines because they are 'overhauled aircraft engines' and are 'a relatively recent addition to the market.' On this basis alone, MZX then proposes BACT limits that are twice as high (for CO) and 25% higher (for VOCs) than the BACT limits for the other turbines.

This is not an appropriate justification for selecting less-stringent BACT limits, and MZX's BACT analysis is fundamentally flawed for failing to even consider cleaner alternatives. In particular, EPA has always been clear that the first step of the BACT analysis involves the identification of 1.) all 'inherently lower-emitting processes/practices,' 2.) add on pollution controls, and 3.) 'combinations of inherently lower emitting processes and add-on controls.'

MDEQ Response: MDEQ must clarify that a BACT analysis is a "case-by-case" determination of an emissions limitation that is based on the maximum degree of reduction of a pollutant for a specific emission unit. Therefore, regarding the proposed stationary turbines proposed by MZX Tech, MDEQ acknowledges that each type of turbine is a "specific emission unit". MDEQ believes it is incorrect to characterize every proposed turbine as the "same type of turbine" given the realization that the respective types and models have different specifications.

Regarding the BACT analysis, MDEQ believes that MZX effectively implemented the top-down method was used to determine BACT for each regulated NSR pollutant. Specifically, at Step 5 of the analysis (i.e., "Select BACT"), MDEQ acknowledges that the ProEnergy 6000PE units have higher inlet concentrations of CO and VOC than the Solar units. Thus, add-on controls with comparable emission reductions result in differing post-control exhaust concentrations.

- **Comment No. 19:** *MZX is a Major Source of Hazardous Air Pollutants.*

MZX calculates that the 41 turbines will emit 9.49 tons of carcinogenic and toxic formaldehyde (a pollutant listed as a Hazardous Air Pollutant (HAP) under the Clean Air Act) per year; this is just shy of the 10 ton per year major source threshold for individual HAP emissions. Major sources of HAPs must comply with Maximum Achievable Control Technology requirements, and for turbines, those standards are set out in 40 CFR 63's Subpart YYYY. By estimating that formaldehyde emissions are below 10 tons per year, xAI is avoiding the more stringent Subpart YYYY requirements applicable to major sources.

Unfortunately, it appears that xAI is underestimating formaldehyde emissions and should be classified as a major source. As an initial matter, we note that when xAI permitted Colossus I, which included 15 SMT-130 turbines, it likewise estimated those turbines that would emit formaldehyde at just under 10 tons per year; it is therefore inconsistent that Colossus II—with 17 SMT-130s and 24 other, larger turbines—would emit nearly the exact same rate of formaldehyde.

MDEQ Response: MDEQ must initially note that it is not aware of the contents within the application associated with the mentioned "Colossus I" project (including any emissions estimates or other supporting information). Be that as it may, MDEQ must denote that the HAP major source avoidance limits within the draft PSD Permit to Construct will be federally enforcement – contingent upon approval of the draft permit by the Permit Board – that MZX Tech must comply with despite the commenter's claim of underestimated HAP emissions.

Moreover, the draft PSD Permit to Construct contains corresponding compliance assurance measures for the mentioned avoidance limits (such as stack testing, monitoring, and recordkeeping requirements) that MDEQ believes will adequately demonstrate compliance. However, if MZX Tech were ever to become a HAP major source, it would immediately be subject to enforcement action from MDEQ's Environmental Compliance and Enforcement Division.

- **Comment No. 20:** *xAI underestimates formaldehyde emissions from at least the ProEnergy turbines.*

  Unlike with Colossus I, xAI now apparently believes the Solar turbines will be compliant with an emission rate of 91 ppb emission (i.e., compliant with the emission standard from 40 CFR 63's Subpart YYYY) based on information from Solar itself, and uses this emission rate as the basis for all 41 turbines. While this is plausible for newer Solar units, it is far from clear that the eight largest turbines, the 50 MW ProEnergy 6000PE turbines, can meet this limit.

  In particular, the ProEnergy turbines are apparently refurbished jet engines, and quite obviously were not manufactured by Solar—it is therefore not appropriate to rely, as xAI has done, on Solar's manufacturer information for these turbines. Notably, ProEnergy has not provided any manufacturer information or guarantees—or at least such documents are not in the Permit record.

  Most critically, however, is the fact that xAI has estimated that carbon monoxide emissions from the ProEnergy turbines will be twice as high compared to the Solar turbines. In particular, as discussed above, while xAI states that the Solar turbines will be able to achieve a BACT limit of 2 ppm, it believes the ProEnergy turbines will only be able to achieve 4 ppm. As EPA and other sources have consistently explained, '[c]arbon monoxide is a good surrogate for formaldehyde and other HAPs.'

  In the absence of such information (and we note any additional submittals should be made available for public notice and comment), MDEQ must instead calculate the formaldehyde emissions from these ProEnergy turbines consistently with the CO emission rate—i.e., twice as high as the Solar units. Doing so means each ProEnergy turbine has the potential to emit 0.92 tons of formaldehyde per year (as opposed to 0.46 tpy), and results in a facility-wide PTE of 13.25 tpy. As such, MDEQ should permit MZX as a major source of HAPs and implement the more stringent Subpart YYYY requirements.

  MDEQ Response: In evaluating this comment, MDEQ referred to Trinity Consultants (i.e., the contracted environmental consulting firm for MZX Tech) regarding additional context on the ProEnergy turbines. From such conversations, MDEQ has come to realize that formaldehyde emissions are not a contractual guarantee and ProEnergy does not have a separate document that indicates pollutant concentrations other than the estimates previously provided. Therefore, it appears that ProEnergy's estimated formaldehyde emission profile can sufficiently attain the formaldehyde emission standard promulgated within 40 CFR Part 63, Subpart YYYY [i.e., 91 parts per billion by volume (ppbv)]. MZX Tech further justifies this estimation based on information found in a February

2006 document published by the Electric Power Research Institute (EPRI) (i.e., "*Formaldehyde and VOC Emissions from a General Electric LM6000 Combustion Turbine with SCR and CO Catalysts*") under the acknowledged assumption that ProEnergy PE6000 is equivalent to a GE LM6000PC (with catalyst).

Therefore, while MZX Tech is not subject to Subpart YYYY, MDEQ believes an equivalent level of stringency has been created through incorporation of the associated formaldehyde emission standard as an short-term limit.

- **Comment No. 21:** *xAI underestimates formaldehyde emission rates from startups and shutdowns.*

The Applicant's SSM emissions estimates for all turbine models also rely on the 91-ppb formaldehyde emission factor, same as for normal operation at 100% load, however, without applying the 30% control efficiency. However, Solar does not guarantee this emission factor for startup/shutdown operations, and no information regarding the ProEnergy turbines was provided.

Formaldehyde emission factors for turbines at lower loads (<50%) vary but are generally considerably higher than at high loads (>80%). Vendor data suggests 2,000 ppb at low loads, contrasting with EPA high-load averages around 65 ppb. A study from the Electric Power Research Institute showed that at loads between 0–18%, formaldehyde emissions are, on average, 10,000 times higher than at full load.

Because the annual formaldehyde emissions are so close to the 10 ton/yr threshold for individual HAP emissions even setting aside the underestimate ProEnergy turbines, discussed above, SSM emissions deserve closer scrutiny. Assuming formaldehyde concentrations of 10,000 ppb for 10 minutes during startup and 91 ppb for 50 minutes and otherwise relying on the Applicant's assumptions, total annual formaldehyde emissions from all turbines attributable to SSM activities are 0.12 ton/yr. For formaldehyde concentrations of 20,000 ppb for 10 minute, annual formaldehyde emissions are 0.24 ton/yr and for 40,000 ppb, annual formaldehyde emissions are 0.48 ton/yr.

MDEQ Response: Based on the EPRI document "*Formaldehyde and VOC Emissions from a General Electric LM6000 Combustion Turbine with SCR and CO Catalysts*" (February 2006), it appears that commenter's claim of formaldehyde emissions at low loads being 2,000 ppb is unfounded. As indicated in Table 2-1 of the EPRI document, low load cold weather conditions, formaldehyde emissions averaged 121 ppb at low load, cold weather conditions. Moreover, in Table 2-2 of the same document, formaldehyde emissions averaged 33 ppb at low load, warm weather conditions.

As low load conditions reflect SUSD emission rates, a simple average of low load cold and warm weather concentrations is 77 ppb and still less than the proposed formaldehyde emissions basis of 91 ppb. This averaging illustrates that MZX Tech utilized conservative estimations given that SUSD

events will only comprise a small percentage of operations. Therefore, MDEQ believes the commenter's assertion of "significant formaldehyde emissions (e.g., 10,000 ppb) is unfounded.

- **Comment No. 22:** *xAI May Conduct Far More Startups and Shutdowns than Stated, Increasing Emissions*

In xAI's emissions calculations, they warrant a remarkably low number of startups and shutdowns: just six per year for the Solar 130s and four per year for each of the other turbines. Because turbines emit many pollutants, including NO_X and formaldehyde, at higher rates during startup and shutdowns, any increase in the number of these events would increase emissions—with potential implications for the adequacy of modeling results, and, for formaldehyde and other HAPs, the applicability of major source requirements.

In contrast to the low number of startups and shutdowns used to calculate emissions, however, the company also includes the following language in the BACT analysis for CO_2, whereby the company dismissed considering potential control technology due to the facility's intended operations:

> *'Here, the use of the selected gas turbines (operating in simple cycle mode and providing electricity directly to an industrial customer) is driven by a project need for* ***scalable, rapidly dispatchable****, and* ***highly reliable generation based on a defined but highly variable and subject-to-change demand scenario****. Add-on CO_2 controls, to the extent they may be deemed demonstrated control technology, are not compatible with these basic project criteria and are not considered…'*

Application at 5-3 (emphasis added). The foregoing language is simply not consistent with turbines that only turn on and off four or six times per year.

To the extent this language is inconsistent with xAI's intended operations, MDEQ should require xAI to reassess CO_2 control technology as part of its BACT analysis; on the other hand, if this description is accurate, then xAI must provide a revised set of emissions calculations based on a realistic number of startups and shutdowns along with a new ambient air quality analysis based on the revised emissions calculations.

MDEQ Response: The commenter's concern regarding the number of start-ups and shutdown (SUSD) may be attributable to the low number of events proposed in MZX Tech's permit application. MDEQ recognizes that the number of SUSD events proposed by MZX Tech proposed is lower than traditionally observed in applications for traditional electric generating facilities. However, given that MZX Tech is expected to provide continuous power generation capacity for associated data centers (which demand uninterrupted power reliability), it seems appropriate that SUSD events will be minimized to the most practicable extent. Moreover, MDEQ must emphasize that the draft PSD Permit to Construct restricts the number of SUSD events to effectively limit the emission of all applicable NSR pollutants (as well as formaldehyde).

- **Comment No. 23:** *The Permit Board Must Deny the Permit Because It Fails to Include All of the Gas Turbines at the Stanton Road Gas Plant.*

  Mississippi law requires all new stationary sources of pollution to obtain a construction permit prior to operating, subject to exemptions that do not apply here. Sources that do not obtain a construction permit are deemed a public nuisance and the air pollution they emit is "a menace to public health and welfare." Miss. Code § 49-17-3. The 27 unpermitted turbines already installed at the Stanton Road Gas Plant are stationary sources of pollution that require a permit, as set out below. MDEQ is simply mistaken in reading its own SIP and the Clean Air Act as authorizing MZX to install and operate these turbines without a preconstruction and operating permit.

  Yet both the Application and the Draft Permit improperly omit any discussion let alone proposed emissions limits or pollution controls for the 27 unpermitted turbines. As a result, MZX has not complied with all Applicable Rules and Regulations and the Board cannot make required findings based on the incomplete information presented in the Application and the Draft Permit. The Board must therefore deny the Permit.

  MDEQ Response: Pursuant to 11 Mississippi Administrative Code, Part 2, Chapter 2.13.D.(3) (which is an element of Mississippi's EPA-approved SIP), the owner / operator of a "mobile source" is not required to obtain a Permit to Construct and a Permit to Operate. As there is no associated rule or guidance that explicitly outlines terms for defining a "mobile source", the characterization of such a source falls within the regulatory purview of the applicable permitting authority. Therefore, MDEQ's stance remains unchanged in that MZX Tech is not required to obtain a Permit to Construct or Permit to Operate to operate the referenced twenty-seven (27) combustion turbines given that they have not been installed "in a permanent nature", maintain a reasonable means for portability (i.e., affixed to a portable trailer bed), and will be operate in tandem with the forty-one (41) permanent combustion turbines [i.e., there is **no scenario** in which MZX will operate sixty-eight (68) combustion turbines]

  Accordingly, as the referenced turbines do not require a Permit to Construct, the denoted units are outside of the scope of the PSD project proposed by MZX Tech and not under consideration by the Mississippi Environmental Quality Permit Board.

- **Comment No. 24:** *MDEQ Must Not Allow xAI to Engage in Sham Permitting Related to Colossus III*

  As MDEQ is aware, the 41 turbines that would be authorized under this Permit are intended to provide 1.2 gigawatts of power to xAI's Colossus II data center just across the state line in Tennessee. In December, meanwhile, xAI announced plans for Colossus III, also apparently known as MACROHARDRR, acquiring an 800,000 square foot warehouse adjacent to the Colossus II data center. Although xAI has yet to announce how it plans to power Colossus III, given the proximity to

Colossus II and the Stanton Road turbine site encompassed by this Draft PSD Permit, it seems likely that xAI intends to install additional generating capacity at the Stanton Road site in the near future.

If xAI does indeed intend to install additional, permanent turbines or other generating capacity at the Stanton Road site, then it is engaged in improper sham permitting currently. In particular, EPA explains sham permitting as '[p]ermits with conditions that do not reflect a source's planned mode of operation" and that such permits 'may be considered void and cannot shield the source from the requirement to undergo major source preconstruction review.'

MDEQ Response: While MDEQ acknowledges that EPA's "sham permitting" policy prohibits a facility from intentionally seeking a permit for only part of a complete project that it has already decided to implement, there is no creditable evidence as to the certainty of a "Colossus III" facility to a level that warrants EPA's policy.

Based on further research, the concept of "sham permitting" originates from a 1989 EPA guidance document titled "*Guidance on Limiting Potential to Emit in New Source Permitting*" that outlines the process for determining when a permitting approach is essentially fraudulent. Specifically, EPA sets forth four (4) types of evidence that may be relevant in determining if a permit application may be a sham:

1. Filing a "*major source or major modification permit application*" simultaneously with or at approximately the same time as the minor source permit, before operation commences, or after less than a year of operation;

2. Applications for loans in which the source "*guaranteed a certain level of operation*" higher than permitted and the project would not be funded or economically viable if operated at the permitted level for a year;

3. Reports to stockholders, the Securities and Exchange Commission, utility boards, or other business permit applications containing "*projected operation or production levels … necessary to meet projected consumer demand*" that are "*higher than permitted levels*"; and

4. Statements by source representatives to U.S. EPA or other agencies that "s*how intent to circumvent*" major source preconstruction review.

Based on the information provided by the commenter and the realization that MZX Tech applied for a PSD Permit to Construct, MDEQ does not believe MZX Tech is attempting to invoke "sham permitting". Moreover, the modeling concerns asserted by the commenter appear to have no basis because the modeling required for any future permitting would need to account for the currently proposed project to the extent the analysis indicated any possibility of a significant impact.

- **Comment No. 25:** *The Permit Board Must Disapprove and Deny the Permit Because Even with Respect to the 41 Proposed Turbines, MZX Has Not Complied with All Applicable Rules and Regulations and the Board Cannot Make Required Findings.*

The Permit Board's regulations make clear that it cannot issue a permit unless the applicant has complied with all of the relevant Applicable Rule and Regulations.

As detailed in Sections II-VI above, even with respect to the 41 turbines it disclosed in the Application, MZX has not complied with all Applicable Rules and Regulations. For example, MZX has failed to provide accurate emissions estimates, modeling adequate to demonstrate NAAQS compliance, offsets to address ongoing ozone NAAQS violations, and has also failed to demonstrate that it meets BACT or LAER for each criteria pollutant and MACT for relevant Hazardous Air Pollutants.

MDEQ Response: Please see the responses provided for Comment No. 1 through 24.

Written Comments from NAACP

- **Comment No. 26:** *MZX Tech and xAI installed 27 turbines without a permit, disregarding federal requirements.*

  The community has been experiencing many negative impacts including noise and air pollution as a result of these turbines. MZX claims these 27 turbines and impacts are temporary, but now are asking to permanently install and operate 41 gas turbines at the same site. The draft Permit does not mention the 27 unpermitted turbines, nor includes them in emission estimates. The failure of the draft Permit to include these emissions units on the Site renders it deficient and makes it impossible for the community to understand the full scale of the Site's impact on air quality and public health.

  MDEQ Response: In a determination dated July 29, 2025, MDEQ determined that the 27 temporary mobile turbines currently at the MZX Tech facility are mobile sources instead of stationary sources. The following excerpt is from that determination:

  - *"In reference to your e-mail received on July 25, 2025, the Mississippi Department of Environmental Quality (MDEQ) has reviewed your request regarding the temporary use of portable natural gas-fired combustion turbines during construction of the separate standalone "MZX Tech, LLC" project. Based on the information provided in the e-mail and at the associated meeting, MDEQ understands that the referenced turbines will be "mobile" as each will remain affixed to a portable unit (i.e., a flatbed trailer) and "temporary" as it is intended for each to remain on-site (2875 Stanton Road South; Southaven, MS) for less than twelve (12) months. Therefore, contingent upon the two (2) denoted criteria remaining valid, MDEQ acknowledges that the referenced turbines are exempt from permitting requirements pursuant to 11 Mississippi Administrative Code Part 2, Chapter 2, Rule 2.13.D."*

  As noted in 11 Mississippi Administrative Code Part 2, Chapter 2, Rule 2.13.D, MDEQ exempts mobile sources from the requirements to obtain a permit to construct and/or operating permit. However, the 27 temporary mobile turbines are being controlled with the same control devices (Selective Catalytic Reduction for Control of NO_X and Oxidation Catalyst for the Control of CO) that are required by the PSD Construction permit for the 41 turbines that are stationary sources.

- **Comment No. 27:** *NAACP argues the draft permit fails to accurately characterize air pollution from the turbines and underestimates particular matter and formaldehyde emissions.*

  - *Even with the draft Permit, MZX Tech and xAI fail to be transparent with the community.*

- *The draft Permit does not provide accurate information characterizing the air pollution caused by the 41 turbines, which would require sufficient safeguards. The draft Permit also dismisses the fact that there is an ongoing violation of the minimum federal ozone standard, it underestimates the amount of harmful particulate matter emissions from the turbine, and it underestimates toxic formaldehyde emissions limits. For all of these reasons, the draft Permit fails to meet applicable requirements, and the Permit Board must disapprove the Permit.*

- *The draft permit also fails to require strict pollution controls and offsets for NO_X.*

MDEQ Response: Please see the responses provided for Comment No. 19 through 21.

- **Comment No. 28:** *NAACP argues that the draft permit ignores ongoing violations of the federal ozone standards.*

  - *The Memphis-Southaven metro area already fails to meet federal smog standards and has high asthma-related emergency room visits and deaths.*

  - *The NAACP cites longstanding environmental justice concerns and references poor air quality in DeSoto County, which received an "F" for ozone from the American Lung Association.*

  - *The Memphis-Southaven area already fails federal smog standards and has among the highest asthma emergency room visit and death rates in the U.S.*

  - *The draft permit also downplays existing ozone nonattainment in the Memphis metro area.*

  MDEQ Response: As previously stated within this document, DeSoto County – as part of the Memphis, Tennessee-Mississippi-Arkansas Metropolitan Statistical Area (MSA) – is currently designated by EPA as "in-attainment" for the 2015 8-hour ozone NAAQS. As a result of the area's formal "in-attainment" designation, there is no statutory authority under the Clean Air Act for MDEQ to impose "non-attainment"-related requirements (such as emission offsets).

  Be that as it may, MDEQ recognizes the regional nature of ozone formation and is actively engaged in addressing precursor emissions without waiting for formal nonattainment designation. Reductions are being driven through the "Memphis Area Ozone Group", a multi-agency coalition that consists of the following:

  - U.S. EPA Regions 4 and 6;
  - Shelby County Health Department;
  - MDEQ;
  - Arkansas Department of Energy and Environment (ADEQ); and
  - Tennessee Department of Environment and Conservation (TDEC)

  The outlined group is actively developing and implementing voluntary strategies to reduce NO_X and VOCs across the tri-state area. This collaborative federal-state approach is the legally appropriate mechanism for addressing regional background ozone levels and improving air quality for all

communities rather than arbitrarily imposing non-attainment penalties on a single facility in a designated attainment area.

- **Comment No. 29:** *NAACP argues the permit lacks sufficient safeguards to protect public health.*

  - *The facility is located near neighborhoods including Colonial Hills and Horn Lake and within one mile of an elementary school, raising concerns about children's exposure to pollution.*

  - *The projected health impacts include increased respiratory illness, missed school and work days, and millions of dollars in annual health-related damages, particularly affecting Shelby and DeSoto counties.*

  - *The NAACP argues that approving the permit would continue a pattern of concentrating environmental harms in marginalized communities and urges the Permit Board to reject the permit due to incomplete and inaccurate information.*

  - *The turbines would emit nitrogen oxides (NO_X), particulate matter, and hazardous air pollutants linked to asthma, cardiovascular disease, and other respiratory illnesses—disproportionately affecting Black communities with existing health disparities.*

  MDEQ Response*:* MDEQ must clarify that the NAAQS are health-based standards established by the EPA specifically to protect public health – including sensitive populations such as children, the elderly, and individuals with respiratory conditions like asthma – with an adequate margin of safety. Therefore, compliance with the NAAQS is the Federal benchmark for ensuring air quality is safe for all citizens. Based on all information provided to MDEQ, the emissions generated from the project proposed by MZX Tech comply with all established NAAQS.

Generalized Comments from the Public Hearing and Public Comment Period

- **Comment No. 30:** Several comments were received expressing concern about the level of "noise pollution" generated by MZX Tech. Some of the comments are as follows:

  – *"Noise is another concern. Gas turbines are very loud. The noise can run day and night. Low-frequency noise can travel far and go through walls. This can affect sleep, stress levels, and overall health."*

  – *"I lived under the Mphs airport flight paths in Greenbrier subdivision for many years. I now live in colonial hills 100 yards off hwy 51 n I can stand on my front porch at night or early morning. The turbine noise is very noticeable."*

  – *"Day and night the turbines can be heard, sometimes changing in frequency or*

  occasionally startling neighbors into action on community pages. I have seen them impact my life in this way for a while now. The first time, it woke me up in the middle of the night, a loud boom could be heard and then the turbines sounded as if they were roaring. I went room to room trying to find the source only to discover the roaring noise was coming from outside when at last I checked there. For hours after, that roaring kept me up until I finally fell asleep from

exhaustion. I wish I could say that was the only time that happened, but the noise has only grown more noticeable and unbearable as the weeks and months progressed."

- *Our community is worried about the noise and air pollution these turbines would bring to our backyards.*

- *These turbines are very disruptive in terms of pollution and noise. This needs to stop. No matter the possible technological advancements xAI can accomplish (which I honestly don't see its benefits) it is not worth the destruction.*

- *The continuous turbine noise, increased air pollution, and excessive industrial lighting will continue to directly affect the daily lives, health, and well-being of the families who live nearby. Residents should not have to live with constant industrial noise, degraded air quality, and loss of the quiet environment that once defined our neighborhood.*

- *Noise is another concern. Gas turbines are very loud. The noise can run day and night. Low-frequency noise can travel far and go through walls. This can affect sleep, stress levels, and overall health.*

MDEQ Response: While "noise pollution" is typically considered an aspect of environmental matters, MDEQ has no authority in the regulation of decibel levels (i.e., noise pollution). Such authority within the State of Mississippi resides solely with the local jurisdictional government (i.e., city or county) through the issuance of ordinances and local requirements.

- **Comment No. 31:** Several comments were received that expressed concern about the proximity of the facility to the surrounding community in Southaven. Some of the comments are as follows:

  - *"The draft Permit defines an 'ambient air boundary' based on physical barriers around the current Site. However, according to DeSoto County land records, MZX Tech has purchased multiple additional parcels, including parcels adjacent to the Site, that are not effectively excluded from public access. Under EPA's regulatory definition, ambient air extends to areas where the public can access the outdoor air, and impacts in those areas must be included in air quality modeling. Because the Permit relies on a boundary that does not correspond to true ambient air, the emissions impacts to the surrounding community could be underestimated. MDEQ must clarify the actual ambient air boundary, include all owned or controlled land in modeling, and reevaluate impacts accordingly.*

  - *"I am concerned that the xAI turbines are operating so close to residential areas. Health impacts from $PM_{2.5}$ and NOx emissions are most pronounced for children and older adults, particularly when exposure occurs close to residential" neighborhoods. These turbines need to be further way from people's homes. If you expand this site you will increase the danger to nearby residents including children.*

  - *"A disservice was done to nearby communities including ten schools, three daycares, 27 churches, eleven parks, and countless residents when the plant was introduced without public comment knowing it was going to be so close to our community without thought or care as to how loud the turbines are to those nearby and the effects that would have on their work and daily life."*

– *"I know this is progress for the future but please don't allow this to happen so close to our homes."*

MDEQ Response: It must be initially stated that MDEQ has no regulatory authority over the zoning of land parcels for purpose of "residential", "commercial", or "industrial" use. Such authority within the State of Mississippi resides solely with the local jurisdictional government (i.e., city or county).

However, pursuant to MDEQ Regulation 11 Miss. Admin. Code Pt. 2, R. 2.2.B.(14)(a), MZX Tech is required to maintain a buffer zone of at least 150 feet from the nearest residential area or recreational area for all equipment that will cause the issuance of air contaminants. For MDEQ's air regulations [specifically Regulation 11 Miss. Admin. Code Pt.2, R. 2.1.C.(23)], a "*residential area*" is defined as one of the following:

- a group of 20 or more single-family dwelling units on contiguous property and having an average density of two or more units per acre;

- a group of 40 or more single-family dwelling units on contiguous property and having an average density of one or more units per acre; or

- a subdivision containing at least 20 constructed houses, in which the subdivision plat is recorded in the chancery clerk's office of the appropriate county.

Based on MDEQ's evaluation of the specific area for which MZX Tech will locate the proposed stationary combustion turbines (based on modeling data and the permit application), the facility complies with the required buffer zone criteria for not only the nearest "residential area" but for all residential housings in the immediate surrounding area.

- **Comment No. 31:** Several comments were received that expressed concern about the "F" designation by the American Lung Association (ALA) for the Desoto County / Shelby County area. Some of the comments are as follows:

  – *But the air pollution from both the 27 unpermitted turbines and the proposed 41 turbines will extend far beyond the immediately adjacent neighborhoods. Southaven and Memphis share the air—and that air is already not meeting minimum federal smog standards. The greater Memphis-Clarksdale-Forrest City metro area, which includes Memphis and Southaven, also received an "F" for high ozone days for the most recent reporting period.*

  – *The American Lung Association has given the Memphis area—including both Memphis,Tenn. And Southaven, Miss., an "F" for smog pollution. There must be strong demands to MDEQ to protect the residents of Mississippi, and given the location, to consider the continued harm of the residents in Memphis for their air quality.*

  – *I live in Shelby County. Both DeSoto and Shelby Counties already hold failing grades for ozone pollution from the American Lung Association. Authorizing additional pollution, especially from unpermitted sources, is reckless and unacceptable.*

  – *-Regional "F" Grades: Both DeSoto County (MS) and Shelby County (TN) received "F" grades for high-ozone days from the American Lung Association (2025). The Memphis-Clarksdale-Forrest City metro area also earned an "F."*

– *The American Lung Association has given the Memphis area, including Southaven, MS, an "F" for smog pollution.*

MDEQ Response: Much like ALA, MDEQ has a commitment to protecting air quality and public health in Mississippi through awareness. However, MDEQ objects to the "F" grade assigned to DeSoto County given that this grade creates an unnecessarily alarming picture of air quality within an area that meets all NAAQS. While MDEQ understands that the ALA's grading methodology differs from ambient air compliance determinations developed by EPA, MDEQ believes this difference creates a potentially misleading perception of air quality that could cause undue public concern.

MDEQ must also refute ALA's grading methodology, as it appears the grading system significantly diverges from EPA's established approaches for determining NAAQS compliance [or ozone – ALA's weighted average system counts and weights all exceedance days rather than using EPA's design value approach based on the fourth highest annual eight-hour daily average, averaged over three (3) years.]. More specifically, ALA's grading system often uses a different methodology than the EPA's regulatory framework. The ALA typically counts the number of days with high ozone readings, whereas regulatory compliance is determined by a "Design Value" – a statistical metric calculated as the 3-year average of the annual 4th-highest daily maximum 8-hour ozone concentration. This federal metric accounts for meteorological variability and ensures that regulatory decisions are based on sustained trends rather than isolated events.

Lastly, MDEQ must emphasize that 2025 ozone design value for Desoto County was 70 parts per billion (ppb), which complies with the current ozone NAAQS established by EPA.

APPENDIX A

Comments Received from SELC, Memphis Community Against Pollution, Young, Gifted & Green, Sierra Club, Safe and Sound Coalition, and the Climate Reality Project: Memphis and Mid-South Region Chapter

From:	Patrick Anderson
To:	Jeffrey Bland
Cc:	Amanda Garcia; Sarah Al-Zhyri
Subject:	Comments on MZX Tech, LLC Draft Permit (Air Ref. No. 0680-00119) from SELC, et al.
Date:	Tuesday, February 17, 2026 11:37:13 PM
Attachments:	2026-02-17 Community Groups" Comments re xAI PSD Permit with NAACP.pdf

This Message Is From an External Sender
This message came from outside your organization.

Dear Mr. Bland,
Earlier this evening, we filed public comments on the draft MZX permit, along with three volumes of attachments to those comments (in three emails due to file size; see email below). We are now submitting the attached comments to replace the version submitted earlier, however attachments remain the same (i.e., please consider this latest version of the comments together with the attachments submitted earlier this evening).

Thank you,
Patrick

Patrick Anderson
Senior Attorney

Southern Environmental Law Center
Ten 10th St NW, Suite 1050
Atlanta, GA 30309

Office (404) 521-9900
Fax (404) 521-9909

[southernenvironment.org]southernenvironment.org

From: Sarah Al-Zhyri <salzhyri@selc.org>
Sent: Tuesday, February 17, 2026 7:17 PM
To: jbland@mdeq.ms.gov <jbland@mdeq.ms.gov>
Cc: Amanda Garcia <agarcia@selc.org>; Patrick Anderson <panderson@selc.org>
Subject: Comments on MZX Tech, LLC Draft Permit (Air Ref. No. 0680-00119) from SELC, et al. (Email 1 of 3)

Dear Mr. Bland:

Please find attached comments and Volume I of attachments to comments of Southern Environmental Law Center, Memphis Community Against Pollution, Young, Gifted & Green, Sierra Club, Safe and Sound Coalition, and the Climate Reality Project: Memphis and Mid-South Region Chapter in response to the Mississippi Department of Environmental Quality's public comment

period regarding the Draft Air Pollution Control and Prevention of Significant Deterioration (PSD) Authority Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC. This email is the first of three emails that contain the attachments referenced in these comments.

Sincerely,

Sarah Al-Zhyri (she/her)
Legal Administrative Assistant II

Southern Environmental Law Center
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February 17, 2026

Via email at jbland@mdeq.ms.gov

Mr. Jeffrey Bland
Office of Pollution Control Air Permit Manager
Mississippi Department of Environmental Quality
OPC-EPD-Air I Branch
P.O. Box 2261
Jackson, MS 39225

RE: Community Groups' Comments on the Mississippi Department of Environmental Quality's Draft Air Pollution Control and Prevention of Significant Deterioration (PSD) Authority Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Dear Mr. Bland:

The Southern Environmental Law Center, the National Association for the Advancement of Colored People (NAACP), Memphis Community Against Pollution, Young, Gifted & Green, Sierra Club, Safe and Sound Coalition, and the Climate Reality Project: Memphis and Mid-South Region Chapter (collectively, "Community Groups") respectfully submit these comments on the Mississippi Department of Environmental Quality's ("MDEQ") Draft Prevention of Significant Deterioration Air Construction Permit (Air Ref. No. 0680-00119) ("Permit" or "Draft Permit") for MZX Tech, LLC ("MZX"), an entity closely related to the artificial intelligence ("AI") company xAI. Community Groups also submit, and incorporate by reference, an AERMOD modeling report review prepared by Sullivan Environmental Consulting, Inc.[1]

The Permit would authorize permanent installation and operation of 41 methane-fired turbines to produce 1.2 gigawatts of electricity, making it the one of the largest fossil fuel-fired power plants in the state of Mississippi. xAI and MZX's massive power plant will not provide electricity to communities or the public, but rather xAI's enormous data center located just across the state line in Tennessee.

xAI and MZX have submitted a deeply flawed Prevention of Significant Deterioration ("PSD") Air Construction Permit Application ("Application") that cannot be approved. Among other errors, the Application contains implausible emissions estimates that appear to undercount fine particulate matter ($PM_{2.5}$) by *hundreds of tons per year*. Moreover, its modeling either omits or severely undercounts emissions from *more than a dozen* significant local sources of nitrogen

[1] **Attachment ("Att.") 1**, Ryan Sullivan, et al., Sullivan Env't Consulting, LLC, *Independent Review of the Trinity Consultants Air Quality Analysis and Modeling Report Related to the Proposed Greenfield Simple-Cycle Combustion Turbine Project Proposed by MZX Tech LLC in Southaven, Mississippi*, (Feb. 17, 2026).

oxide (NOx) pollution. Most glaringly, both the Application and Draft Permit flatly ignore the plain mandates of Mississippi law that require MZX to obtain emissions offsets (*i.e.*, permanent emissions reductions from other nearby sources) in light of ongoing violations of the U.S. Environmental Protection Agency's ("EPA") smog standard in DeSoto County, Mississippi and Shelby County, Tennessee, both of which are within the Memphis metropolitan area.

All of those errors pile on top of the Application's first deficiency, carried into the Draft Permit: its failure to address the 27 existing turbines operating onsite, which are part of the same stationary source permitted here. Those 27 turbines are part of the same stationary source for which MZX seeks a permit here, and MZX was required to wait for issuance of this Permit before commencing construction of those turbines.

Importantly, all of this activity is occurring in the county with the worst air quality in Mississippi, where EPA-certified monitors showed unsafe levels of smog existed *before* the company began illegally constructing and operating the 27 onsite turbines.

In short, the Mississippi Environmental Quality Permit Board ("Board") must deny the Permit because MZX has not complied with all Applicable Rules and Regulations, and the Board cannot make required findings based on incomplete information. MDEQ must, at minimum, withdraw the Draft Permit from consideration and require MZX to both obtain permanent emissions offsets and address each of the serious deficiencies in the Application and PSD modeling set out below.

Background

Even before xAI sited its first operations in Memphis, the City and Tri-State Region had the worst air quality in the area. EPA's air monitors across the Memphis Metropolitan Statistical Area ("MSA") have shown violations of EPA's health-based smog standard for several years, and the MSA has previously been formally designated as a nonattainment area for smog.[2] Moreover, as MDEQ's own Permit analysis shows, the smog levels have been sharply increasing since 2021 after being relatively stagnant since over the past decade.[3] As discussed below, these smog levels and other high levels of air pollution already have real and substantial health impacts in the Memphis MSA.

Against this background, in June 2024, xAI announced that it was constructing the world's largest AI supercomputer, now known as Colossus I, in the Boxtown community in southwest Memphis. Within days, xAI began installing uncontrolled methane-fired turbines to power the data center, without obtaining an air permit and apparently without even notifying local permitting authorities. xAI ultimately installed 35 turbines in the midst of intense community opposition: Boxtown and southwest Memphis more broadly, historically Black communities that already faced disproportionate exposure to pollution and experienced amongst the worst health outcomes from asthma in the nation, held numerous protests and community meetings and submitted hundreds of

[2] *8-Hour Ozone (2008) Designated State/Area Information, with Design Values*, ENV'T PROT. AGENCY (Jan. 31, 2026), https://www3.epa.gov/airquality/greenbook/hbtcw.html.
[3] MISS. DEP'T ENV'T QUALITY, Pre-Construction Review and Preliminary Determination of Approval for MZX Tech LLC, at 17 (erroneously dated Feb. 14, 2026) ("MDEQ Preliminary Determination").

letters and comments asking the Shelby County Health Department to shut down xAI's unpermitted turbines.

After it was clear that regulators would not take action regarding the unpermitted turbines, NAACP, on behalf of its local members, filed a notice of intent to sue xAI under the Clean Air Act's citizen suit provisions. Soon after this notice letter was sent, xAI ceased operating unpermitted turbines at Colossus I. Unfortunately, the community soon learned that many of these turbines were merely being relocated just across the state border at a new site in Mississippi, and these turbines—now totaling 27 turbines with a generating capacity of nearly 500 megawatts (MW)—are currently operating on the same property where MZX is attempting to permit a whopping 41 turbines.

Given the ongoing violations of the Clean Air Act, now repeated for a second time by xAI, on February 13, 2026, NAACP once again sent a notice of intent to sue xAI and its affiliates under the Clean Air Act's citizen suit provisions.[4] In short, this letter demonstrates that xAI is operating without any permit in contravention of Mississippi's federally approved state implementation plan, is operating without the requisite major source PSD permit and related Best Available Control Technology (BACT) limits in contravention of Mississippi's SIP and the Clean Air Act, and is operating a major source of toxic Hazardous Air Pollutants (HAPs) without complying with Clean Air Act HAP standards.

At the same time xAI and MZX were asking to install unpermitted turbines in Mississippi, it also submitted this PSD Application for the permanent use of 41 turbines at the same site; the Permit would authorize seventeen Solar PGM-130 turbines, each rated at 16.5 MW; sixteen Solar Titan 350 turbines (35 MW apiece), and eight ProEnergy 6000PE turbines (50 MW each). This facility stands to be the second-largest fossil fuel-fired power plant in Mississippi, but unlike a traditional power plant, it would consist of 41 individual turbines with relatively low smokestacks (as compared to a smaller number of large turbines at a traditional power plant, equipped with much taller stacks), likely worsening impacts to nearby communities.

Finally, we note that the applicants appear to have expedited this permitting process to the maximum extent possible, while MDEQ appears to be under immense pressure to both approve the Draft Permit and to do so as quickly as possible. For example, On December 22, 2025, MDEQ's Air 1 Branch Chief wrote to EPA that "the directive from my upper management is that this permit needs to be at public notice by January 15th of [2026]," requesting further that EPA provide any input by January 6, 2026.[5] EPA staff, meanwhile, commented in a separate thread

[4] *See* **Att. 2**, Letter from Patrick Anderson, S. ENV'T LAW CTR., et al., to Elon Musk, XAI, titled "Notice of Intent to Sue for Violations of the Clean Air Act at the Gas Turbines Power Plant Located at 2875 Stanton Road S., Southaven, MS, that Powers xAI's Colossus II Data Center," (Feb. 13, 2026), https://southernenvironment.sharefile.com/d-s117434c28c6044eba99ac7cb6c8ac0f6 ("NAACP's xAI Southaven Notice of Intent").

[5] Email from Jeffrey Bland, MISS. DEP'T OF ENV'T QUALITY, to Lorinda Shepard, ENV'T PROT. AGENCY, titled "MZX Draft and Preliminary Determination" (Dec. 22, 2025) (on file with author).

about the "rush to get this permit finalized," going so far as to say that certain discrepancies with the PSD modeling "can be resolved during the public comment period."[6]

Health Impacts Analysis

As described throughout these comments, the deeply flawed Application contains erroneous emissions estimates and a defective air quality modeling analysis. The Application thus profoundly understates the likely air quality impacts of the Stanton Road Gas Plant. These errors are made more alarming by the fact that even using MZX and MDEQ's own flawed estimates, emissions from the 41 permanent turbines at the Stanton Road Gas Plant are likely to result in premature deaths, increased hospital visits, and lost productivity. According to a study commissioned by the Southern Environmental Law Center and conducted by public health professionals at EmPower Analytics Group LLC,[7] these health impacts will cost $30–$44 million and will be borne primarily by communities in Mississippi and Tennessee.[8]

The communities with the highest increase in fine particulate matter exposure will be Whitehaven and Westwood in South Memphis, where average annual increases are projected to exceed 0.5 micrograms per cubic meter (μg/m³), as well as nearby communities in DeSoto County, such as Horn Lake.[9] At a population level, the risk of death from this level of increased exposure to fine particulate matter is linked to an increase in per-person mortality risk comparable in scale to the average annual risk of death from alcohol-impaired driving in the United States.[10]

[6] Email from Sunday Gotvald, ENV'T PROT. AGENCY REGION 4, to Rodney Cuevas, MISS. DEP'T OF ENV'T QUALITY, titled "MZX Tech Modeling Files and Air Quality Analysis (AQA)" (Jan. 14, 2026) (on file with author).
[7] **Att. 3**, Michael Cork & Francesca Dominici, *Air Quality, Health, and Economic Impacts of the Proposed MZX Tech Facility*, EMPOWER ANALYTICS GROUP (Feb. 13, 2026), at 2.
[8] *Id.* at 2, 11–24.
[9] *Id.* at 17–18, fig.4, tbl.2.
[10] *Id.* at 2, 9–10.

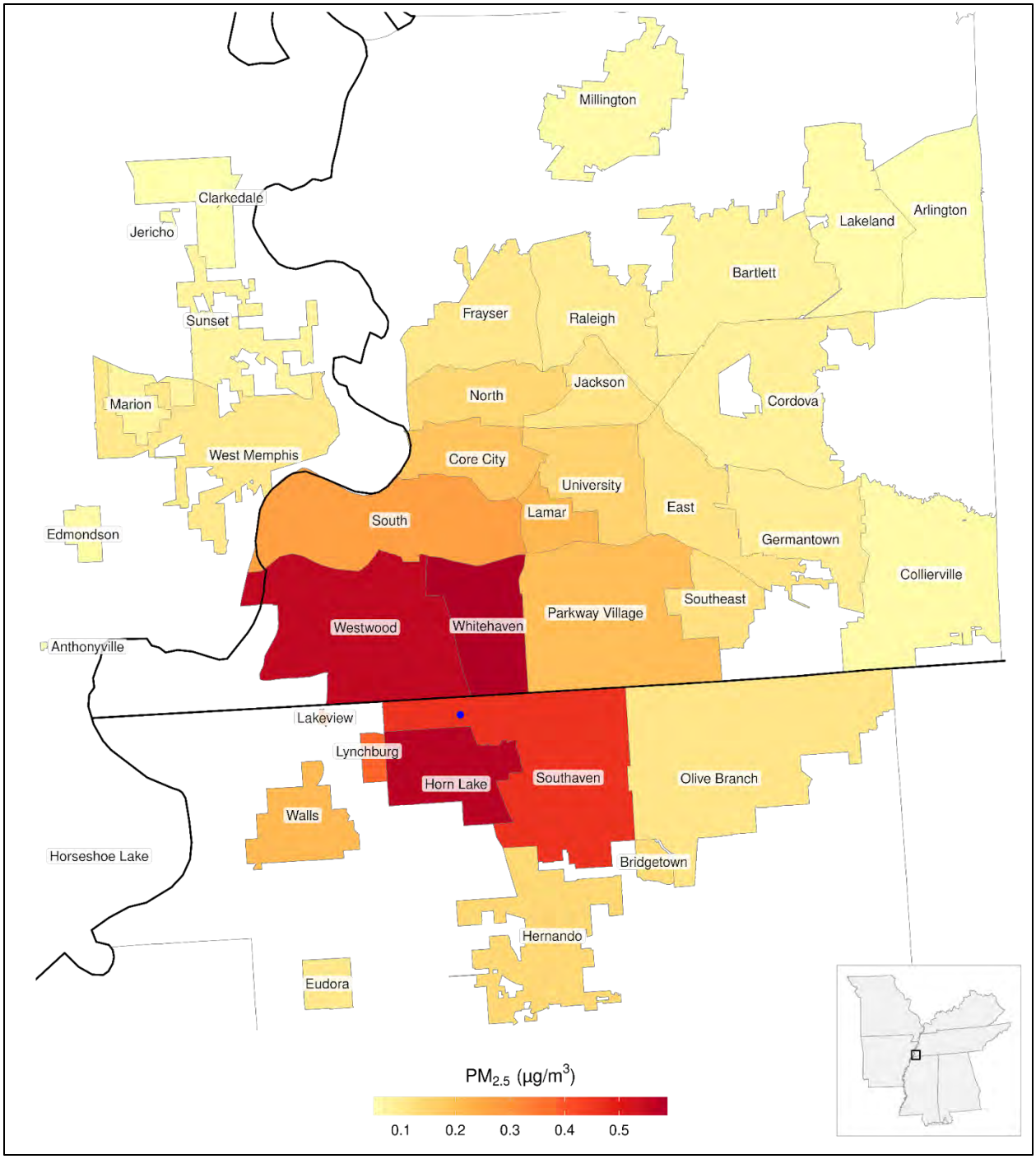


***Figure 4**: EmPower Analytics Group LLC, Air Quality, Health, and Economic Impacts of the Proposed MZX Facility (Feb. 13, 2026). Zoomed-in view of community-level $PM_{2.5}$ increases near the proposed MZX facility, highlighting impacts across neighboring towns and multiple neighborhoods within Memphis. Colors show the estimated increase in long-term $PM_{2.5}$ exposure ($\mu g/m^3$) that residents would experience on average within each community. Communities include census-designated places (such as towns and small cities) as well as neighborhood-scale planning districts within the City of Memphis. Only communities with estimated increases of 0.1 $\mu g/m^3$ or greater are displayed and labeled. The blue dot marks the facility's location in*

DeSoto County, Mississippi. The inset map shows the regional context within the southern United States.

The largest estimated $PM_{2.5}$ increases are concentrated in communities that are disproportionately Black, highly socially vulnerable, and have elevated baseline asthma prevalence.[11] In other words, xAI's operations at the Stanton Road Gas Plant and Colossus II are likely to continue to impose substantial air pollution burdens on predominantly Black and lower-wealth communities in Mississippi and Tennessee.

For several reasons, the EmPower Analytics health impact analysis likely represents a conservative estimate of total health impacts, as it evaluates only long-term annual-average $PM_{2.5}$ and ozone-related effects and does not capture short-term exposure impacts or health effects from pollutants outside the scope of this analysis.[12].

We provide the EmPower Analytics analysis to underscore how important it is for the Board to dismiss unreasonable demands for expedited approval of this Permit and to require MZX and MDEQ to get this permitting process right. What is at stake is the health and well-being of Memphis-area communities for decades to come.

I. Because DeSoto County Already Suffers from Unhealthy Levels of Ozone Pollution, MDEQ Must Impose More Stringent Requirements, Including Emissions Offsets.

MZX's turbines have the potential to emit at least 423 tons per year ("tpy") of NO_X and 417 tons per year ("tpy") of volatile organic compounds (VOCs)[13] in an area already measuring ambient air quality worse than the federal health-based standard for ozone. NO_X reacts with VOCs, heat, and sunlight to form ground-level ozone, also known as smog.[14] Exposure to ozone pollution is known to cause a variety of adverse health effects, including inflammation of the airways, increased risk of lung infection, aggravated respiratory diseases such as emphysema and chronic bronchitis, and increased frequency of asthma attacks.[15]

Ozone pollution is a major problem in the Memphis MSA, including in DeSoto County. In 2024, the Asthma and Allergy Foundation of America designated Memphis as an "Asthma Capital" of the nation due to the City's high rates of emergency room visits and asthma-related

[11] *Id.* at 2, 20.
[12] Further, as discussed in these comments, the Draft Permit omits any estimate of emissions from the 27 unpermitted turbines already operating at the xAI and MZX site and profoundly underestimates the likely fine particulate matter emissions for the 41 proposed permanent turbines, among other flaws.
[13] MISS. DEP'T ENV'T QUALITY, Pre-Construction Review and Preliminary Determination of Approval for MZX Tech LLC, tbl.1, 'PSD Applicability' (erroneously dated Feb. 14, 2026) ("MDEQ Preliminary Determination").
[14] *Ground-level Ozone Basics*, ENV'T PROT. AGENCY (Mar. 11, 2025), https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics.
[15] *Health Effects of Ozone Pollution*, ENV'T PROT. AGENCY (Mar. 13, 2025), https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution; *see also* National Ambient Air Quality Standards for Ozone, 80 Fed. Reg. 65,292, 65,303–08 (Oct. 26, 2015).

deaths,[16] and DeSoto County received an "F" from the American Lung Association due to ozone pollution—the only county in Mississippi to receive this grade.[17] Certified monitoring data support these characterizations: ambient air data collected across the Memphis MSA show that ozone concentrations in the area are in violation of the applicable National Ambient Air Quality Standard ("NAAQS")—and the problem is only getting worse with each passing year.[18]

MDEQ cannot lawfully issue a permit authorizing construction of a project that would "caus[e] a violation" of the NAAQS or "interfere[e] with the attainment and maintenance of [a NAAQS]."[19] Because the Memphis MSA (which includes DeSoto County and other counties in Mississippi, Tennessee, and Arkansas) is already in violation of the ozone NAAQS, and because xAI's proposed project would significantly increase emissions of an ozone precursors, it is undeniable that the modification would contribute to the ongoing NAAQS violation and interfere with the ability of neighboring states to attain the NAAQS. As a result, MDEQ cannot issue the Permit as currently drafted.

Separately, as set out below, Mississippi's regulations and EPA-approved State Implementation Plan ("SIP") already contain provisions meant to prevent the kind of harms presented by xAI and MZX. In particular, the rules and SIP require applicants to obtain emissions offsets that reduce emissions from other nearby sources to more than compensate for xAI's new emissions. Unfortunately, xAI, MZX, and MDEQ are improperly ignoring these provisions. If MDEQ follows the law, however, it cannot issue this Permit until the applicant has obtained these offsets.

A. Mississippi's rules and Mississippi's EPA-Approved State Implementation Plan prohibit permitting MZX without requiring emissions offsets.

As set out above, the Memphis MSA has been exceeding the NAAQS for ozone for nearly five years; this area includes DeSoto County, where the most recent EPA-approved design value (*i.e.*, official monitor reading) for 2022–2024 is 0.071 parts per million (ppm), in excess of the 0.07 ppm standard.[20] Thus, xAI and MZX's facility is located both in a county and a larger MSA that are violating the ozone NAAQS.

Although Memphis and DeSoto County have not been formally designated as nonattainment areas, Mississippi's rules and the state's EPA-approved SIP contain provisions severely limiting construction of new major sources in areas such as DeSoto County that are

[16] *See* **Att. 4**, ASTHMA & ALLERGY FOUND. OF AM., *2024 Asthma Capitals, The Most Challenging Places to Live with Asthma* 6, 12–13 (2024), https://aafa.org/wp-content/uploads/2024/09/aafa-2024-asthma-capitals-report.pdf.
[17] *See* **Att. 5**, AM. LUNG ASS'N, *State of the Air,* 100 (2025) https://www.lung.org/getmedia/5d8035e5-4e86-4205-b408-865550860783/State-of-the-Air-2025.pdf.
[18] *See* **Att. 6**, S. ENV'T LAW CTR., et al., *Petition to Redesignate the Memphis Metropolitan Statistical Area as In Nonattainment* at 15–23 (Jun. 5, 2025) ("Ozone Petition") (attachments on file with author).
[19] 11 Pt. 2 Ch. 2 Miss. Code R. 2.5(A)(1)–(2) (2013).
[20] MDEQ Preliminary Determination at 17 (chart titled "10 Year Ozone Monitoring Trends at all Mississippi Sites").

violating the NAAQS but have not yet been designated nonattainment areas. In short, unless new major sources that are locating in violating areas obtain emissions offsets, they are barred from construction. The following are the relevant provisions of the SIP, which are mirrored identically in Mississippi's current rules:[21]

> (4) A new major stationary source which proposes to locate in or near an area where an air quality standard is being or will be exceeded but for which no nonattainment area implementation plan has been adopted shall be subject to the following:
>
> (a) The stationary source shall be subject to the Offset Policy if:
>
> (1) The stationary source is a major stationary source or major modification for the pollutant for which the standard is or will be exceeded; and
>
> (2) The stationary source is within or has significant impact in the area where the standard is or will be exceeded.
>
> (b) In addition to the requirements of the Offset Policy, the stationary source shall not be granted a construction permit or a State Operating Permit unless the owner or operator demonstrates that:
>
> (1) emissions reductions to offset the new stationary source emissions will compensate for the adverse ambient impact caused by the new stationary source; and
>
> (2) the emissions reductions have been achieved.

To summarize this SIP provision, as relevant here, then, in areas where the NAAQS are being exceeded but "no nonattainment area implementation plan has been adopted," any new source is subject to the requirement to obtain offsets (i.e., the Offset Policy) if it "is a major stationary source . . . for the pollutant for which the standard is . . . exceeded" and "the stationary source is within . . . the area where the standard is . . . exceeded."[22] The SIP provision then states that "the stationary source shall not be granted a construction permit" unless the owner or operator demonstrates that the "emissions reductions to offset the new stationary source emissions" will be effective and that "the emissions reductions have been achieved."[23]

As to MZX, all of the requisites mandating compliance with the Offsets Policy are met:

- DeSoto County and the Memphis MSA are areas where an "air quality standard is being exceeded," namely ozone;
- MZX proposes to construct a "stationary source" "within . . . the area where the standard is exceeded," and

[21] 11 Pt. 2 Ch. 2 Miss. Code R. 2.5(E)(4) (2013).
[22] *Id.* at 2.5(E)(4)(a).
[23] *Id.* at 2.5(E)(4)(b).

- MZX is proposing to construct a major new source[24] of the ozone-precursors NO_X and volatile organic compounds (and under the Clean Air Act's rules, "[a] major source that is major for volatile organic compounds or NO_X shall be considered major for ozone"[25]).

As such, MDEQ must require compliance with the Offset Policy—which is Appendix S to 40 C.F.R Part 51. Appendix S, in turn, requires different levels of mandatory offset requirements depending on the severity of the NAAQS exceedance.[26] Here, the Memphis and DeSoto County design values show that the area is in marginal nonattainment, and Appendix S therefore requires an offset ratio of at least 1.1 to 1;[27] because MZX is asking to increase NO_X emissions by 423 tpy and VOC emissions by 417 tpy, to comply with the 1.1:1 offset ratio, it must obtain enforceable offsets of at least 465 tons of NO_X and 459 tons of VOCs.

Setting aside Appendix S requirements, under the terms of the SIP itself, MDEQ may not issue this Permit until (1) these emissions reductions have been achieved, and (2) MZX demonstrates that these offsets are sufficient to compensate for the adverse impacts caused by the new stationary source.[28] Because MZX has not met these requirements nor those of Appendix S, under this SIP provision, MDEQ is prohibited from issuing this Permit.

Finally, we note that the SIP provision does use the phrase "significant impact,"[29] which other parts of the SIP relate to Significant Impact Levels, or SILs. While we dispute that SILs are lawful in this context and additionally whether MZX's impacts are actually below the SILs, as discussed below, this SIP provision does not require offsets only when emissions or impacts are above the SILs. Instead, the provision states that sources *within* areas that are exceeding standards are subject to the offsets requirement, while sources outside those areas are only subject to the offsets requirement if they have a "significant impact within the area." In short, any major source is subject to the offsets policy if it is within the area with NAAQS exceedances, and any question of "significance" is only relevant to major sources outside the relevant area.

[24] We note that MZX is both major under the PSD definition of major source, *i.e.*, greater than 250 tons of NO_X or VOCs per year, and a major source under the lower nonattainment major source thresholds, *i.e.*, 100 tons of NO_X or VOCs.
[25] 40 C.F.R. § 51.166(b)(1)(ii).
[26] *Id.* pt. 51, App. S, Section IV(G)(2).
[27] *Id.* pt. 51, App. S, Section IV(G)(2)(i).
[28] 11 Pt. 2 Ch. 2 Miss. Code R. 2.5(E)(4)(b) (2013).
[29] 11 Pt. 2 Ch. 2 Miss. Code R. 2.5(E)(4)(a)(2) (2013) ("The stationary source is within or has significant impact in the area where the standard is or will be exceeded.").

II. MZX's Air Quality Analysis is Deeply Flawed and Realistic Modeling Would Show Inexcusable NAAQS Violations.

A. MZX's vastly underestimated $PM_{2.5}$ emissions, rendering the $PM_{2.5}$ modeling worthless.

MZX's PSD Permit Application calculates that the 41 turbines will emit only 19.5 tpy of $PM_{2.5}$ while generating well over a gigawatt of power.[30] This is simply not plausible; as just one initial example, the gas turbines at the Tennessee Valley Authority's ("TVA") nearby Southaven power plant—which is considerably smaller than MZX by generating capacity—emit up to 316 tons of $PM_{2.5}$.[31]

The problem stems from MZX's reliance on a single set of source testing from just one turbine in California, testing which was conducted while assessing efforts to reduce $PM_{2.5}$ emissions from turbines—*efforts which MZX is not proposing to undertake*.[32] Based on this inappropriate source of emissions data, MZX proposes an emission factor of 3.6E-04 (or 0.00036) pounds per million British thermal units (lb/MMBtu) for all three types of turbines it intends to operate.[33] Remarkably, Solar, the turbine manufacturer for the majority of MZX's turbines, only warrants an emission rate of 0.015 lb/MMBtu—**more than 40 times higher than the rate used by MZX**. The following is an excerpt from Solar's Product Information Letter 171 (a document MZX itself cites to in its emissions calculations):[34]

Recommended Particulate Matter Emission Factors

When necessary to support the air permitting process Solar recommends the following $PM_{10/2.5}$ emission factors:

- Natural Gas: 0.015 lb/MMBtu fuel input (HHV)
- Landfill Gas: 0.03 lb/MMBtu fuel input (HHV)
- Liquid Fuel: 0.06 lb/MMBtu fuel input (HHV). The liquid fuel emission factor assumes fuel sulfur content is <500 ppm and ash content is <0.005% by wt.

The emission levels cited above are only for engine operation with the fuels listed. Other fuels may not yield similar results.

In other words, the manufacturer of 35 out of 41 turbines proposed to be used by xAI and MZX recommends an emission rate two orders of magnitude higher than that proposed by xAI and MZX. And again, this discrepancy arises because MZX relies on experimental testing that is

[30] MZX Tech LLC, PSD Permit Application, at Appendix D (July 2025) ("PSD Application").
[31] MISS. DEP'T OF ENV'T QUALITY, *Title V Permit No. 0680-00095, Condition 3.B.1(a)* (Sep. 23, 2025), https://opcgis.deq.state.ms.us/ensearchonline/ai_info.aspx?ai=12199 (limiting each of three turbines to 105.6 tpy for a total of 316.8 tons of NO_X).
[32] *See* PSD Application at Appendix D, at 5-7. *See also* **Att. 7**, Eli Brewer et al., *$PM_{2.5}$ and Ultrafine Particulate Matter Emissions from Natural Gas-Fired Turbine for Power Generation*, 131 ATMOSPHERIC ENV'T 141, 142 (2016) ("The first phase (FERCo et al., 2009) of this project entailed an assessment of technologies to reduce $PM_{2.5}$ and ultrafine particles from gas turbine engines; the second phase (FERCo et al., 2014) of the project entailed pilot scale evaluations of technologies recommended from the first phase. This paper reports part of the results from the second phase of the project with the main objective of characterizing and quantifying $PM_{2.5}$ and ultrafine particles . . . .").
[33] PSD Application at Appendix D, at 5-7.
[34] **Att. 8**, Solar Turbines, Product Information Letter 171 (Feb. 10, 2014) ("PIL 171").

simply not relevant to the proposed permitted turbines; not only did the studied turbines take efforts to reduce $PM_{2.5}$, the California turbine was also a different make, model, and size of turbine.[35]

To further underscore the flawed nature of MZX's emission factor for $PM_{2.5}$, Solar will not even warrant compliance with EPA's AP-42 emission rates for turbines. That emission factor is 6.6E-03 lb/MMBtu (or 0.0066 lb/MMBtu),[36] which is still 18 times higher than the emission factor proposed by MZX. In particular, Solar explains in the same Product Information Letter that "[h]istorically, Solar did not recommend using AP-42 because while some source test firms have measured below AP-42 levels, others have measured higher."[37] Solar then explains, "[a]ny Solar warranty on particulate matter would be at the recommended levels above, e.g. 0.015 lb/MMBtu (HHV) for natural gas."[38] If Solar does not believe that its turbines can reliably comply with the AP-42 emission factor, it is simply not reasonable to believe MZX's turbines will comply with a vastly lower emission rate.

Despite the remarkably low emission factor proposed by MZX, the company does not provide one iota of technical justification for its emission factor. The Application makes no attempt to argue why *its* Solar turbines are capable of performing 40 times better than the Solar warranty, nor why the non-Solar turbines (*i.e.*, the eight ProEnergy 6000 PE turbines, which appear to be refurbished airplane engines) would somehow also be so much lower-emitting than the Solar warranty and the AP-42 emission factor.

Most critically, the different emission factors have a profound impact on the facility's potential $PM_{2.5}$ emissions, with potential emissions exceeding 800 tons per year (compared to MZX's estimate of just 19.5 tpy) using the Solar warranty. In particular, the table below lists turbine-specific and facility-wide potential $PM_{2.5}$ emissions for MZX based on MZX's emission factor, EPA's AP-42 emission factor, and finally Solar's warranted emission factor:

$PM_{2.5}$ Emissions Comparison: MZX vs. AP-42 vs. Solar Warranty						
				MZX Application	**AP-42**	**Solar Warranty**
Unit No.	Make/ Model	Heat Input (MMBtu/hr)	Turbine Count	3.60E-04 (lb/MMBtu)	6.60E-03 (lb/MMBtu)	1.50E-02 (lb/MMBtu)
Turbines 1-17	Solar PGM130	170.9	17	4.58	83.99	190.88
Turbines 18-33	Solar Titan 350	347.24	16	8.76	160.61	365.02
Turbines 34-41	ProEnergy 6000PE	471.97	8	5.95	109.15	248.07
			Total PTE (tpy):	19.30	353.74	803.96

[35] Brewer et al., *supra* note 32. The turbine tested was a 100 MW GE LMS100 turbine.
[36] *AP 42 Compilation of Air Pollutant Emission Factors*, Chapter 3.1, tbl.3.1-2a, ENV'T PROT. AGENCY (5th ed. 2010).
[37] PIL 171 at 2.
[38] *Id.*

As this table confirms, using even the AP-42 emission factor results in facility-wide emissions that are more than an order of magnitude larger than those estimated by MZX. And we note further that MZX's sister entity, CTC, relied on the AP-42 emission factor when permitting Solar 130 turbines at Colossus I in Tennessee.[39]

Given the foregoing, MDEQ cannot approve the Draft Permit for MZX based on this substantial underestimation of $PM_{2.5}$ emissions. Most critically, the company's PSD modeling, which is of course based on the $PM_{2.5}$ emission rate of just 19.3 tpy, is simply not credible, and the deficiency is fatal to the adequacy of the modeling results. In particular, MZX's modeling and analysis showed 24-hour and annual $PM_{2.5}$ impacts that were approximately 50% of the relevant Significant Impact Levels ("SILs"),[40] and because these impacts were below the SILs, MZX avoided more comprehensive air quality demonstration requirements.[41]

Although we recognize modeled impacts are not necessarily linear with primary $PM_{2.5}$ emissions, had MZX utilized a more realistic emission rate, such as that warranted its own turbine manufacturer (803 tpy of $PM_{2.5}$ emissions instead of 19.3 tpy), it seems certain that impacts would, at minimum, exceed the SILs and require additional demonstrations, if not show unacceptable violations of the $PM_{2.5}$ NAAQS.

B. Use of actual rather than maximum allowable emissions from nearby sources was improper for nitrogen dioxide (NO_2) modeling.

Texas Gas Transmission LLC operates a gas compressor station in DeSoto County and is currently the largest emitter of NO_X in the county per EPA's 2020 National Emissions Inventory ("NEI").[42] For the cumulative NO_2 modeling, MZX utilizes maximum permitted emission rates for all sources *except* Texas Gas Transmission. For this source—again, the largest emitter of NO_X in the county—MZX instead utilized actual emission rates. In response to a question from EPA, MZX explains: "*All sources were modeled at permitted allowable emission rates except for Texas Gas Transmissions LLC (MSNOX1-MSNOX18), which used actual emissions from the emissions inventory (EI) data reviewed for this project.*"[43] MZX does not provide further justification for this decision.

Although it is unclear what emissions inventory data MZX utilized, there appears to be a substantial gap between reported actual emissions and permitted emissions. MDEQ's permit for

[39] **Att. 9**, CTC Property LLC, Synthetic Minor Operating Permit Application, Appendix D (Jan. 2025).
[40] PSD Application, Volume II (revised) at 5-1 (showing modeled concentrations of annual $PM_{2.5}$ at 0.06 micrograms compared to the SIL of 0.13 micrograms, and 24-hour $PM_{2.5}$ at 0.59 micrograms compared to the SIL of 1.2 micrograms).
[41] As discussed below, we dispute that SILs are legal or technically justified in the first place.
[42] *National Emissions Inventory for 2020*, ENV'T PROT. AGENCY (the most recent data available), https://www.epa.gov/air-emissions-inventories/2020-national-emissions-inventory-nei-data.
[43] Letter from Shannon Lynn, TRINITY CONSULTANTS, to Rodney Cuevas, MISS. DEP'T OF ENV'T QUALITY, titled "RE: EPA Region 4 Comments on PSD Air Quality Modeling Application – MZX Tech LLC" (Dec. 27, 2025) (on file with author).

Texas Gas Transmission caps NO_X emissions at 2,296 tpy,[44] while the most recent EPA NEI data (from 2020) reports the facility emitting 488 tons of NO_X; this is just 21% of the permitted maximum and would mean the modeling omitted about 1,800 tons of NO_X from this source alone. Alternatively, in a separate response to EPA, MZX addresses discrepancies between what they listed as emission rates for Texas Gas Transmission (point sources MSNOX3 through MSNOX9) and what they modeled; this discrepancy amounts to 304 tons of NO_X per year that MZX apparently did not include in its modeling.[45]

In short, the apparent omission of at least 304 tons of NO_X and perhaps as much as 1,800 tons is remarkable given that all other sources in DeSoto County emitted 3,407 tons of NO_X in the same 2020 NEI (2,719 tons from area source/mobile sources and 688 tons from point sources),[46] meaning the omitted NO_X would be a substantial quantity in the scheme of county-wide emissions.

Use of actual emissions rather than allowable emissions is not generally authorized in PSD modeling, especially for modeling to demonstrate compliance with short-term standards—for instance, the 1-hour NO_2 standard at issue here. EPA's draft New Source Review Workshop Manual explains "[f]or those existing point sources that must be explicitly modeled, i.e., 'nearby' sources, the NAAQS inventory must contain the maximum allowable values for the emissions limit, and operating level."[47] EPA then explains that "[t]he operating factor may be adjusted to account for representative, historical operating conditions only when modeling for the annual . . . averaging period," and then sets out detailed criteria on how to do so.[48] Likewise, the foregoing is set out in Appendix W to 40 C.F.R. Part 51 ("Guideline on Air Quality Models"), *see* Table 8-2.

In short, it was improper for MZX to rely on actual rather than "maximum allowable" emissions in its modeling, especially for the 1-hour NO_2 standard, and even if it were acceptable to use some other rate based on an adjusted operating factor, MZX has not claimed this is what it did or provided the requisite technical justification for doing so. Further, as discussed above, it appears that the tonnage of NO_X omitted from the modeling (likely at least 304 tons and perhaps as much as 1,800 tons) would materially impact the modeling results for at least the 1-hour NO_2 modeling. MDEQ must require MZX to conduct new modeling in full compliance with Appendix

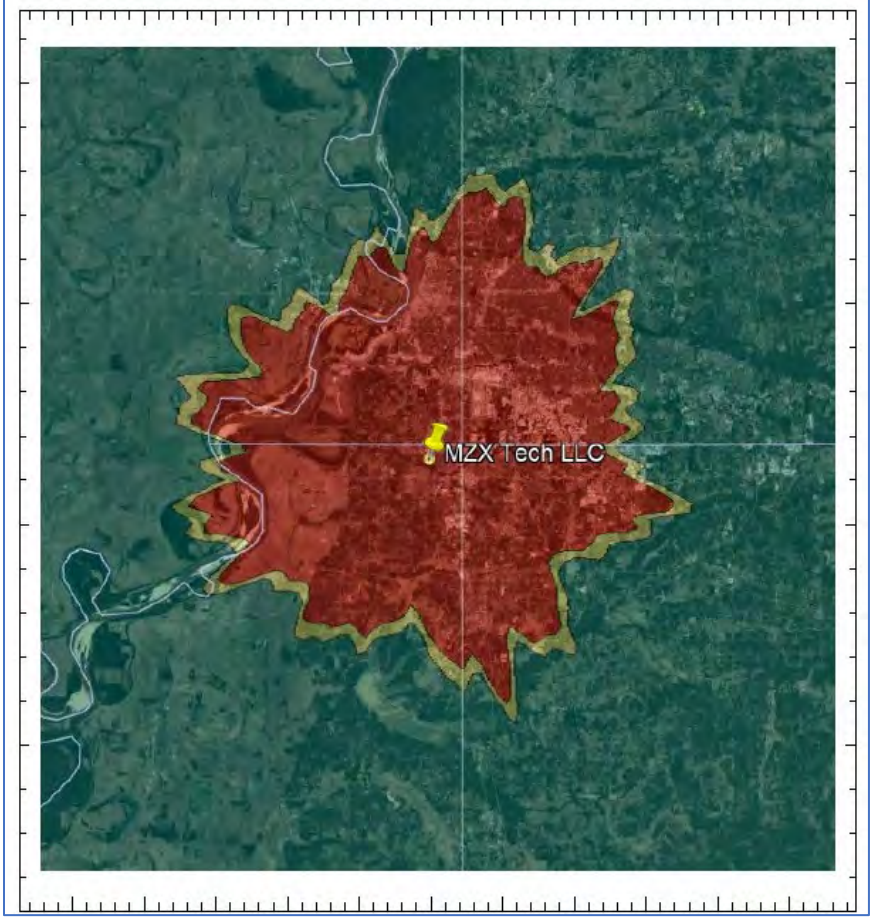
[44] *Information Relative to the Draft Title V Operating Permit (Draft Technical Support Document)*, ENV'T PROT. AGENCY at 3 (Oct. 12, 2023; EPA Submittal Apr. 23, 2025), https://permitsearch.epa.gov/oms-permit-hub/permit/2c83051b-4850-f011-8779-001dd80aa9ff.
[45] Letter from Shannon Lynn, *supra* note 43. The table, referred to as "Table C.6," lists emission rates in grams/second (g/s), which we have converted to pounds per hour (lb/hr). For instance, for source MSNOX3, the maximum emission rate is listed as 9.17 g/s, or 72.8 lb/hr; this same table lists the emission rate used in the modeling as 6.7872 g/s, or 53.9 lb/hr. This amounts to a discrepance of 18.9 lb/hr and 82.8 tpy. This same method was used for all seven sources (MSNOX3 through MSNOX 9) and totals 304 tpy.
[46] *National Emissions Inventory for 2020*, ENV'T PROT. AGENCY (the most recent data available), https://www.epa.gov/air-emissions-inventories/2020-national-emissions-inventory-nei-data.
[47] *NSR Workshop Manual (Draft October 1990)*, ENV'T PROT. AGENCY at C.47 (Oct. 1990), https://www.epa.gov/sites/default/files/2015-07/documents/1990wman.pdf.
[48] *Id.*

W—namely that the modeling utilize the maximum allowable emission rates when conducting short term modeling.

C. MZX omitted numerous significant nearby sources from the NO_2 modeling.

As discussed above, as part of the NO_2 cumulative impacts modeling requirement, MZX was required to include emissions from nearby sources; in particular, consistent with 40 C.F.R. Part 51, Appendix W, MZX was to include all sources within the Significant Impact Area ("SIA") and certain larger sources outside of the SIA, but within 50 kilometers of the SIA. The SIA from MZX's modeling report is shown here,[49] covering a large portion of DeSoto County and Shelby County, plus parts of Arkansas:

Figure A-2. 1-Hour NO_2 SIL Results
(SIL = 7.5 µg/m^3)



[49] PSD Application, Volume II at Appendix A.

MZX then provides a list of all such sources that it included,[50] but this list is missing at least the following significant sources within the SIA:

- **xAI's Colossus I:** MZX's sister facility, operated by CTC Property LLC, is permitted to emit more than 80 tons of NO_X and is located well within the SIA;
- **TVA Allen's New Turbines:** While TVA Allen was included in MZX's source list, the units listed do not include six new 35 MW turbines for which TVA recently received a PSD permit. It is unclear whether they are operating yet (although the turbines were delivered in the summer of 2025), but given that they are subject to an existing permit, MZX should have included their maximum allowable emissions (approximately 47 tons of NO_X);
- **Memphis International Airport:** Although MZX does have one line addressing "[Memphis-Shelby County ("MSC")] Airport Authority," this entry does not represent the entirety of the Memphis Airport's emissions. In particular, the listing from MZX amounts to about 29 tons of NO_X per year, while the airport is listed in EPA's NEI as a "facility" (as opposed to "area" or "mobile source") that emitted 1,077 tons of NO_X in 2020. These emissions are not included in the list of sources included in the modeling.
- **Memphis Train Yards:** EPA's NEI lists two train yards, both listed as "facility-sources" (as opposed to "area" or "mobile sources") in southwest Memphis (Facility ID Nos. 19756111 and 14461311). The two train yards emitted a combined total of 353 tons of NO_X.
- **Other sources within the SIA omitted from modeling:** Based on a survey of EPA's ECHO database,[51] the following are industrial sources of significant NO_X emissions within the SIA that are not included in the MZX source list:

Facility Name	Facility Street	Facility City	State	RegistryID (FRS ID No.)	NO_X Emissions (tpy) per NEI
KTG USA	400 MAHANNAH AVE	MEMPHIS	TN	110001857697	**41**
PENNAKEM, LLC	3324 CHELSEA AVENUE	MEMPHIS	TN	110009446643	**26**
SOUTH SHELBY LANDFILL	5494 MALONE RD	MEMPHIS	TN	110022884887	**21**
CARGILL WET CORN MILLING DIVISION	2330 BUOY STREET	MEMPHIS	TN	110000496838	**17**

[50] *Id.* at Appendix C, Table C.6 "Offsite NO_2 Point Sources."
[51] *Enforcement and Compliance History Online*, ENV'T PROT. AGENCY, https://echo.epa.gov/ (last visited Feb. 16, 2026).

Facility Name	Facility Street	Facility City	State	RegistryID (FRS ID No.)	NO_X Emissions (tpy) per NEI
RICHARDSON MEMPHIS FACILITY	1351 WILLIAMS AVENUE	MEMPHIS	TN	110000373872	**15**
ST. JUDE CHILDREN'S RESEARCH HOSPITAL	332 N LAUDERDALE	MEMPHIS	TN	110000820559	**14**
OWENS CORNING MEMPHIS ASPHALT PLANT	2301 CHANNEL AVENUE	MEMPHIS	TN	110001857866	**11**
FLEISCHMANN'S YEAST	2743 RIVERPORT ROAD	MEMPHIS	TN	110000374041	**4**
THE BRYCE COMPANY, LLC	4505 OLD LAMAR AVENUE	MEMPHIS	TN	110000745560	**3**

These nine sources identified from ECHO are mapped out below (left) and compared to MZX's SIA map:



In total then, MZX omitted at least 14 sources (the nine identified from the ECHO database and the other five discussed above, including its own sister facility Colossus I) of NO_X located within the SIA from its cumulative impacts modeling. The total NO_X emissions from these 14 sources amounts to about 1,700 tons of NO_X, although we note most of these emission rates are based on reported actual emissions, and not total allowable emissions (which, as discussed above, is the appropriate emission rate for sources within the SIA).

These omissions yet again render MZX's cumulative impacts modeling fatally defective; MDEQ must require MZX to redo its modeling analysis with these and any other sources MZX may have omitted, and the revised modeling must undergo additional public notice and comment.

D. Reliance on Significant Impact Levels to evade more stringent modeling demonstrations was improper.

MDEQ cannot lawfully issue a permit authorizing construction of a project that would "caus[e] a violation" of the NAAQS or "interfer[e] with the attainment and maintenance of [a NAAQS]" in Mississippi or neighboring states.[52] Because the Memphis MSA (which includes other counties in Tennessee, Mississippi, and Arkansas) is already in violation of the ozone NAAQS, and because the construction of MZX would significantly increase emissions of ozone precursors, it is undeniable that the project would (1) be constructed in an area where a NAAQS violation is predicted; (2) contribute to the ongoing NAAQS violation in DeSoto County; and (3) interfere with the ability of two neighboring states to attain the NAAQS.

Although MZX is proposing to construct a major source subject to PSD's modeling requirements to demonstrate it will not cause or contribute to NAAQS or other PSD violations, in numerous instances MZX has opted out of conducting full cumulative impacts demonstrations, relying instead on a legally dubious concept known as "significant impact levels," or SILs.[53] This omission is particularly concerning in light of the area's ongoing violation of the ozone NAAQS.

Moreover, even when MZX's modeling showed substantial exceedances of the SIL for NO_2, and cumulative modeling then showed violations of the 1-hour NO_2 standard, MZX relied on SILs to argue that despite showing a NAAQS violation, its facility's contribution to that violation was too insignificant to matter. This practice is not legally justified, and MDEQ must prohibit construction unless MZX modifies its plans in a way that avoids causing NAAQS exceedances.

1. MDEQ must not utilize SILs for ozone when DeSoto County is already violating the ozone NAAQS.

MZX did not conduct any modeling to assess impacts on ozone; instead, MZX relied on an equation that estimates impacts based on figured known as modeled emission rates for precursors ("MERPS").[54] MZX then compared the output of this equation to the SIL to determine that impacts to ozone would not cause or contribute to exceedances of the ozone NAAQS.[55] At no point in this minimal process does MZX account for the fact that the ozone NAAQS are *already* being violated in DeSoto County.

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[52] 11 Pt. 2 Ch. 2 Miss. Code R. 2.5(A)(1)–(2) (2013); *see also generally Cross-State Air Pollution*, ENV'T PROT. AGENCY (Jan. 28, 2026), https://www.epa.gov/Cross-State-Air-Pollution/cross-state-air-pollution.
[53] *See* PSD Application, Revised Volume II (SILs discussed and utilized throughout).
[54] *Id.* at 4-14.
[55] *Id.*

As set out below, as an initial matter, it's not clear that MZX's ozone impacts are actually below the SIL. Yet even if they are, reliance on the SILs to ignore impacts in a county that is already exceeding the ozone NAAQS was improper.

i. MZX's ozone impacts exceed the SIL using more conservative MERPs as required in Memphis and Tennessee.

MZX relied on a MERPs value that EPA recommends for Memphis, yet the Tennessee Department of Environment and Conservation ("TDEC") and the Shelby County Health Department (which handles air permitting in Memphis) require a different, more conservative default MERP value.[56] Critically, had MZX used the same MERP value that would be required if it were located just a few blocks north, across the state line, the ozone analysis would have indeed shown ozone impacts well above the SIL. The following equation was utilized by TVA in its recent PSD permit application for TVA Allen (submitted to the Shelby County Health Department),[57] utilizing the more conservative MERPS:

Table 5-11. O_3 Inputs for the Class II SIL Analysis [1]

O_3 Impacts	8-hr Average
O_3 Class II SIL ($\mu g/m^3$) [2]	1.0
NO_X EMs (tons/yr) [3]	47
NO_X MERP [4]	156
VOC EMs (tons/yr) [3]	11
VOC MERP [4]	1,542

Notes:
1. EPA, 2019a.
2. The Class II SIL for the NAAQS.
3. Emission inputs are in Appendix F.
4. TDEC default values.

Combined impacts for 8-hr O_3 for the SIL in Class II areas:

$$\left[\left(\frac{47}{156}\right)+\left(\frac{11}{1542}\right)\right] = 0.31 < 1$$

Using these same MERP values (*i.e.*, the "TDEC default values") with MZX's emission rates produces the following result:

$$\left[\left(\frac{423.39\ tpy\ (NOx)}{156\ (NOx\ MERP)}\right)+\left(\frac{417.4\ tpy\ (VOC)}{1{,}542\ (VOC\ MERP)}\right)\right] = 2.98 > 1$$

[56] *Tennessee Guidance on the Use of EPA's MERPs to Account for Secondary Ozone and Fine Particulate Formation in Tennessee Under the New Source Review (NSR) Prevention of Significant Deterioration Program (PSD)*, TENN. DEP'T OF ENV'T & CONSERVATION at 4 (Nov. 22, 2019).
[57] **Att. 10**, TENN. VALLEY AUTHORITY, *Allen Combustion Turbine Project PSD Permit Application*, at 5-10 (Dec. 10, 2024).

((NOx: 423.39 tons/year)/(NOx MERP: 156)) + ((VOC: 417.4 tons/year)/(VOC MERP: 1,542)) = 2.98 > 1

As this result exceeds the SIL of 1.0 μg/m^3, MZX's impacts (2.98 μg/m^3) would plainly be considered significant under TDEC and SCHD's PSD requirements.

Translated to plain language, if MZX were permitting these turbines just a few blocks north in Tennessee, the requisite ozone analysis would show that MZX's emissions are indeed a significant contributor to the ongoing ozone violation; we fail to see how MZX could obtain a permit without substantial mitigation like offsets in Tennessee. Although we again believe SILs are unlawful in this context, to the extent MDEQ disagrees, it should at least implement the more protective ozone MERPs utilized in Tennessee and either deny the Permit or require mitigating steps such that impacts are reduced to below the SIL.

E. MDEQ cannot allow utilization of SILs to ignore violations of the ozone NAAQS.

MDEQ cannot lawfully issue a permit authorizing construction of a project that would "result in a violation" of the NAAQS, "interfere with attainment or maintenance of a [NAAQS] in a neighboring state," or "cause, or contribute to, air pollution in excess of any" NAAQS.[58] Because the Memphis MSA (which includes other counties in Tennessee, Mississippi, and Arkansas as well as Shelby County) is already in violation of the ozone NAAQS, and because the construction of MZX would significantly increase emissions of ozone precursors, it is undeniable that the project would (1) be constructed in an area where a NAAQS violation is predicted; (2) contribute to the ongoing NAAQS violation in DeSoto County; and (3) interfere with the ability of two neighboring states to attain the NAAQS.

MDEQ's determination that MZX will not cause or contribute to the ongoing NAAQS violation is premised on the use of EPA's ozone SIL, which is set forth in non-binding guidance. published by the U.S. Environmental Protection Agency ("EPA").[59] This guidance suggests that permitting agencies may issue a PSD permit by relying on SILs to find, on a case-by-case basis, that a project's emissions will not contribute "significantly" to a modeled or existing NAAQS violation.[60]

As an initial matter, EPA's ozone SILs guidance is unlawful and cannot be relied upon by MZX or the Department because it conflicts with the plain language of the Clean Air Act.The Act

[58] 11 Pt. 2 Ch. 2 Miss. Code R. 2.5(A)(1)–(2) (2013); *see also generally Cross-State Air Pollution*, ENV'T PROT. AGENCY, (Jan. 28, 2026), https://www.epa.gov/Cross-State-Air-Pollution/cross-state-air-pollution.
[59] Peter Tsirigotis, Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program, ENV'T PROT AGENCY at 2, 8–10 (Apr. 17, 2018), https://perma.cc/HP94-5V94 ("EPA SIL Guidance"). We note further that it is not clear that MDEQ even has authority to utilize SILs other than those listed in its SIP. In particular, Mississippi's SIP defines SILs to include only four pollutants, and this definition does not include an ozone SIL nor a 1-hour NO_2 SIL. Because MDEQ is utilizing SILs that have not been approved into the SIP, the agency appears to be acting beyond its authority to implement SILs.
[60] *Id.* at 3, 7–8, 15.

unambiguously requires a PSD applicant to demonstrate that its project's emissions "will not cause, *or contribute to,* air pollution in excess of any . . . national ambient air quality standard in any air quality control region[.]"[61] EPA's guidance improperly inserts the term "significantly" where it does not appear in the statute. Notably, Congress chose to explicitly qualify the verb "contribute" with the adverb "significantly" *elsewhere* in the Clean Air Act—not just once, but repeatedly.[62] In contrast, the absence of the term "significantly" in 42 U.S.C. § 7475(a)(3) demonstrates clear legislative intent to prohibit construction of a major source or modification if its emissions would contribute *in any way* to a NAAQS violation.[63] As a result, because the Memphis area and DeSoto County are already in violation of the ozone NAAQS, *any* increase in emissions of ozone precursors from a source in the Memphis MSA will necessarily "contribute to" that ongoing violation. This is especially so in a case like this, where the project would result in *substantial* increases in emissions of ozone precursors: MZX will increase the total NO_X emitted by *all* sources (including automobiles, fires, and other industrial emitters) in DeSoto County by 12%.[64]

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[61] 42 U.S.C. § 7475(a)(3) (emphasis added).

[62] *See, e.g.*, *id.* § 7426(a)(1)(B) (establishing notification requirements for a major source or modification "which may *significantly contribute to* levels of air pollution in excess of the national ambient air quality standards in any air quality control region outside the State"); *id.* § 7506a(a) (providing authority for EPA to establish interstate transport regions when "the interstate transport of air pollutants from one or more States *contributes significantly to* a violation of a national ambient air quality standard in one or more other States"); *id.* § 7547(a)(1) (requiring EPA to evaluate whether emissions from nonroad engines and nonroad vehicles "cause, or *significantly contribute to,* air pollution which may reasonably be anticipated to endanger public health or welfare"); *id.* § 7411(b)(1)(A) (requiring EPA to include in the list of categories of stationary sources any category that "causes, or *contributes significantly to*, air pollution which may reasonably be anticipated to endanger public health or welfare"); *id.* § 7492(c)(1) (providing authority for EPA to establish visibility transport regions when "the current or projected interstate transport of air pollutants from one or more States *contributes significantly to* visibility impairment in class I areas"); *id.* § 7512a(c)(1) (discussing state implementation plan requirements for "Serious Areas in which stationary sources *contribute significantly to* carbon monoxide levels"); *id.* § 7410(a)(2)(D)(i)(I) (requiring state implementation plans to prohibit activities that "*contribute significantly to* nonattainment in, or interference with maintenance by, any other State with respect to any such national primary or secondary ambient air quality standard"); *id.* § 7491(a)(3) (requiring EPA to complete a study that identifies the types of sources and pollutants that "may reasonably be anticipated to cause *or contribute significantly to* impairment of visibility"); *id.* § 7671a(a) (requiring EPA to "add to the list of class I substances any other substance that the Administrator finds causes *or contributes significantly to* harmful effects on the stratospheric ozone layer") (emphasis added).

[63] *See, e.g.*, *Polselli v. Internal Revenue Serv.*, 598 U.S. 432, 439 (2023) ("We assume that Congress 'acts intentionally and purposely' when it 'includes particular language in one section of a statute but omits it in another section of the same Act.'" (quoting *Sebelius v. Cloer*, 569 U.S. 369, 378 (2013)); *Bryant v. Genco Stamping & Mfg. Co., Inc.*, 33 S.W.3d 761, 765 (Tenn. 2000) ("[W]here the legislature includes particular language in one section of the statute but omits it in another section of the same act, it is presumed that the legislature acted purposefully in including or excluding that particular subject.").

[64] As discussed above, all sources of NO_X (both point and otherwise) in DeSoto County emitted 3,407 tons of NO_X according to the most recent NEI, meaning MZX's NO_X emissions amount to a 12.5% increase in total emissions.

It is no accident that the SILs relied upon by MZX and the Department in this case appear only in unenforceable EPA guidance rather than a binding federal rule or the State's own SIP. In 2010, EPA adopted what it ultimately conceded was an unlawful rule establishing SILs for $PM_{2.5}$.[65] During the rulemaking process, EPA asserted it was relying on "*de minimis* authority to establish exemptions from statutory commands."[66] The Sierra Club filed a petition for review, after which "EPA concede[d] that the SIL provisions, as codified, were flawed" because they "d[id] not allow permitting authorities the discretion to require a cumulative impact analysis, notwithstanding that the source's impact below the SIL, where there is information that shows the proposed source would lead to a violation of the NAAQS[.]"[67]

The D.C. Circuit Court of Appeals agreed with EPA that the rule "d[id] not allow a permitting authority sufficient discretion" and granted EPA's request to vacate and remand those rule provisions "based on the EPA's lack of authority to exempt sources from the requirements of the Act."[68] In doing so, the court specifically rejected industry's request to uphold the SIL provisions on the basis that the Clean Air Act provides alternative mechanisms for addressing NAAQS violations. The Court held:

> The PSD provisions Congress enacted may not have specified how the owner or operator of a proposed source or modification must demonstrate compliance, but they do require demonstration that the source will not cause or contribute to a violation of the NAAQS . . . as a precondition to construction. *See* 42 U.S.C. § 7475(a)(3). As the Sierra Club notes, relying on permitting authorities to address violations, rather than to prevent violations by requiring demonstration that a proposed source or modification will not cause a violation, conflicts with this statutory command.[69]

Nevertheless, based on EPA's concession regarding its lack of authority and its request to vacate and remand the rule's SIL provisions, the court declined to rule on the merits of whether the use of SILs in any form is unlawful under the Clean Air Act.[70] Instead, the court noted that if EPA chose to promulgate new SIL provisions on remand and another challenge were filed, the court could "consider the lawfulness of those SIL provisions" at that time.[71]

On remand, EPA ultimately chose not to promulgate a new rule authorizing the use of SILs as a screening tool in PSD permitting. Instead, in 2018, EPA published an unenforceable guidance document setting forth "recommended, non-binding SIL values for the $PM_{2.5}$ and ozone NAAQS[.]"[72] EPA characterized this guidance "as the first of a two-step approach," in which it would "first obtain experience" with implementation of the guidance, and then "assess, refine and,

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[65] *See Sierra Club v. EPA*, 705 F.3d 458 (2013).
[66] *Id.* at 461–62.
[67] *Id.* at 463–64.
[68] *Id.* at 464–66.
[69] *Id.* at 465.
[70] *Id.* at 464.
[71] *Id.*
[72] *Sierra Club v. EPA*, 955 F.3d 56, 60 (D.C. Cir. 2020).

as appropriate, codify SIL values and specific applications of those values in a future, potentially binding rulemaking."[73] Yet to date, EPA has not even published such a proposal, much less adopted a final, binding rule.

Sierra Club filed a petition seeking judicial review of EPA's SILs guidance. In response, EPA argued the guidance was not subject to review because it did not constitute final agency action. In particular, EPA argued that "permitting authorities retain the discretion not to use the SILs as described here, either in specific cases or programmatically"; that "the Guidance does not in any legal or regulatory sense 'authorize' a determination that any specific proposed source will not cause or contribute to a violation"; and that "EPA's Guidance cannot, by itself, be the basis for a permit decision."[74] In addition, EPA argued:

> The Guidance is *not* binding in any particular permit application review, has no legal effect, and does not substitute for or reduce the discretion that individual permitting authorities have in reviewing each permit application and in making permitting decisions subject to review. The decision each permitting authority makes must stand or fall on the record developed in that permitting proceeding and based on the justification that the permitting authority provides.[75]

The D.C. Circuit Court of Appeals ultimately declined to rule on the merits, agreeing with EPA that the guidance was "not final agency action subject to review by this Court under the Clean Air Act[.]"[76] But the parties had already briefed the merits of their positions, and the content of EPA's briefing is instructive here. In particular, EPA confirmed that it was no longer relying on "inherent agency authority to exempt *de minimis* circumstances from regulation."[77] Instead, EPA's legal justification for the use of SILs as a screening tool in PSD permitting now relies entirely on purported statutory ambiguity and "deference" to which EPA claims it is entitled.[78] Notably, EPA specifically relied on the theory of *Chevron* deference, arguing that the Court could only consider whether EPA's guidance was "based on a permissible construction" of ambiguous statutory language and that the Court "may not substitute its own construction . . . for [EPA's] reasonable

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[73] *Id.*

[74] **Att. 11**, Excerpts of Final Br. of Resp'ts at 27, 35, *Sierra Club v. U.S. Env't Prot. Agency*, 955 F.3d 56 (D.C. Cir. 2020) (No. 18-1167) ("EPA's 2019 Brief").

[75] *Id.* at 24.

[76] *Sierra Club*, 955 F.3d at 58.

[77] EPA's 2019 Brief at 50.

[78] *See, e.g.*, *id.* at 3 ("If the Court has jurisdiction, whether the Act is ambiguous regarding the degree of air quality impact from a proposed source that will 'cause, or contribute to' a violation, and whether EPA has reasonably interpreted that statutory phrase in light of the text, purposes, and structure of the Act?"); *id.* at 25 ("Petitioner fails to overcome the extreme deference owed to EPA[.]); *id.* at 38 ("The Act is Ambiguous Regarding The Degree of Air Quality Impact That 'Causes, or Contributes to' a Violation and Leaves EPA and Permitting Authorities Discretion in Making That Judgment"); *id.* at 44 ("[I]f the Court reaches the merits, it should find that the statutory text is ambiguous and subject to reasonable interpretation.").

interpretation."[79] This doctrine of *Chevron* deference, however, has since been overruled by the U.S. Supreme Court.[80] Courts may no longer "defer to an agency interpretation of the law simply because a statute is ambiguous."[81] Instead, "[c]ourts must exercise their independent judgment in deciding whether an agency has acted within its statutory authority" and may not affirm a merely "permissible" agency interpretation if it "is not the one the court, after applying all relevant interpretive tools, concludes is best."[82] As a result, because Congress demonstrated clear legislative intent that the phrase "contribute to" as used in 42 U.S.C. 7475(a)(3) *not* be qualified by the term "significantly"—as it expressly did elsewhere in the Act—the use of SILs as described in EPA's guidance plainly conflicts with the "best reading" of the Act and cannot be lawfully relied upon by permitting agencies, including the Department.

Moreover, even EPA's unlawful guidance recognizes that reliance on SILs is not appropriate in all permitting actions. It specifically provides that where a permitting authority has reason to be concerned that modeled impacts below the SILs may nevertheless cause or contribute to a NAAQS violation, the agency "should require additional information from the permit applicant to make the required air quality impact demonstration."[83] In its 2012 briefing before the D.C. Circuit Court of Appeals, EPA stated that it did not intend for permitting authorities to rely on SILs "where a number of *de minimis* impacts could collectively create air quality problems" and clarified that it was "not [EPA's] intent that the SILs be used as a means of allowing known adverse air quality situations to be ignored just because they are small."[84]

Most critically, EPA's brief also emphasized that **permitting agencies should not rely on SILs "in circumstances where the ambient air quality in an area is close to the NAAQS**," in which case such agencies "should determine when it may be appropriate to conclude that even a *de minimis* impact will 'cause or contribute' to an air quality problem and to seek remedial action from the proposed new source or modification."[85]

In addition, EPA's guidance provides that the use of SIL values should be justified in the record for each permit.[86] While the Department cites this EPA guidance document as the source of the SIL values used for ozone and $PM_{2.5}$,[87] it does not provide any reasoning for how the use of

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[79] *Id.* at 23 (citing *Chevron, U.S.A., Inc. v. NRDC*, 467 U.S. 837, 842–43 (1984)); *see also* **Att. 12**, Excerpts of Final Br. of Resp't at 21–22, *Sierra Club v. U.S. Envtl. Prot. Agency*, 705 F.3d 458 (D.C. Cir. 2013) (No. 10-1413) (citing *Chevron*, 467 U.S. at 842–43) ("EPA's 2012 Brief"); *id.* at 27 (citing *Chevron*, 467 U.S. at 843); *id.* at 37 ("EPA's interpretation of section 165(a)(3) to allow sources with *de minimis* impacts to demonstrate compliance with NAAQS and increments without a comprehensive cumulative impact analysis . . . reflects a permissible construction of the statute under *Chevron*.").
[80] *See Loper Bright Enterp. v. Raimondo*, 603 U.S. 369, 413 (2024).
[81] *Id.*
[82] *Id.* at 412, 400.
[83] EPA SIL Guidance at 18.
[84] Attachment E to EPA's 2012 Brief at 18.
[85] *Id.* at 33; *see also id.* at 42 ("EPA agrees with Petitioner that SILs should not be used to justify permitting a source without a cumulative analysis in circumstances where there is information to suggest that use of the SIL in this manner would lead to a violation of the NAAQS[.]").
[86] EPA SIL Guidance at 19.
[87] *See* MDEQ Preliminary Determination at 18–19, 38–39.

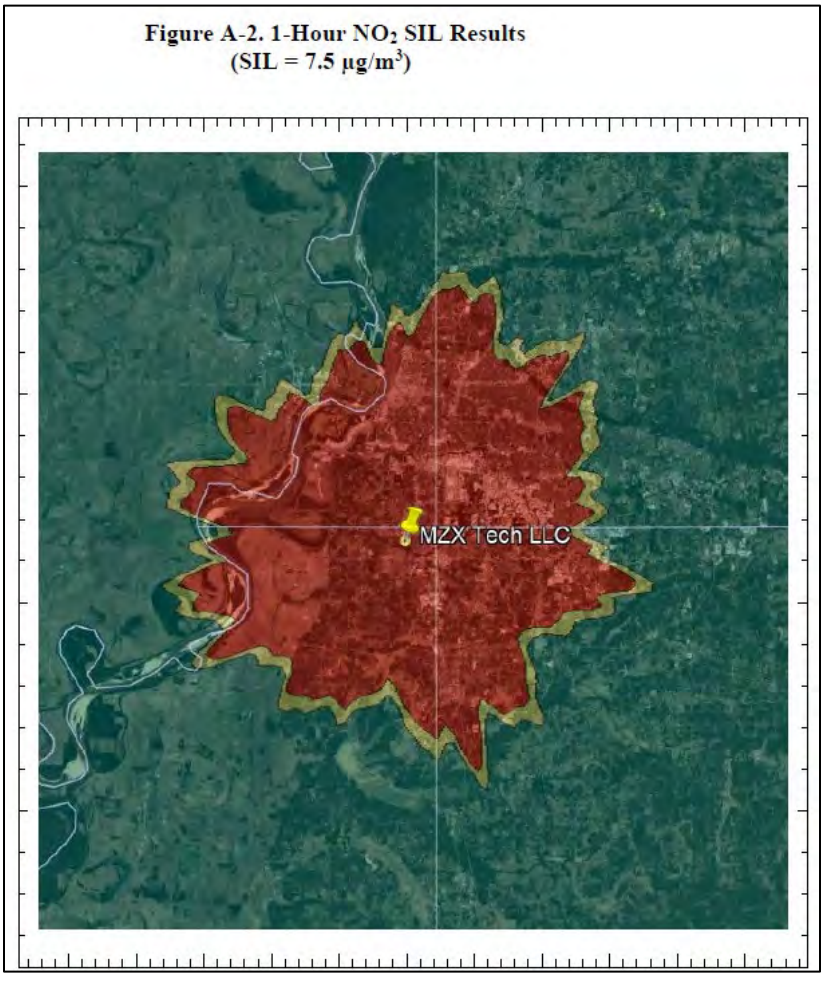
EPA's generic SIL values is appropriate for this particular project—especially considering that it is located in an area that is already violating the ozone NAAQS.

For all these reasons, it was patently unreasonable for the Department to rely exclusively on the ozone SIL set forth in EPA's unlawful guidance to summarily conclude that MZX will not contribute to the area's ongoing NAAQS violation.

1. MZX cannot excuse violations of the 1-hour NO2 NAAQS via SILs**.**

As to the 1-hour NO_2 standard, MZX could not pass initial SILs screening[88] and ultimately showed violations of the NO_2 NAAQS,[89] but then dismissed these violations based on SILs.[90] In particular, MZX's initial modelling showed massive exceedances of the SIL, with impacts of 71.3 μg/m^3 compared to the SIL of 7.5 μg/m^3.[91] This initial modeling also showed that exceedances of the SIL occurred up to 30 kilometers from the facility and covered a substantial portion of Memphis:

Figure A-2. 1-Hour NO_2 SIL Results (SIL = 7.5 μg/m^3)



[88] *Id.* at 47.
[89] *Id.* at 48–49.
[90] *Id.*
[91] *Id.* at 47.

MZX then moved to the cumulative modeling phase, including nearby sources (although, as noted above, it does not appear MZX actually included all relevant sources in this step). After conducting the cumulative impacts analysis, MZX's modeling showed that there would be substantial exceedances of the NO_2 NAAQS: where the standard is 188 $\mu g/m^3$, the modeling showed impacts as high as 325.6 $\mu g/m^3$.[92]

Despite showing clear violations of the NAAQS, MDEQ then claimed MZX wasn't sufficiently culpable for the violations: according to a three-sentence analysis, MDEQ determined MZX only contributed 4.87 $\mu g/m^3$ to the violation, which is below the SIL of 7.5 $\mu g/m^3$, and therefore it could excuse the facility's contribution to the NAAQS violation.[93]

For many of the same reasons set out above, the use of SILs in this manner—to excuse clear violations of the NAAQS—is contrary to the plain language of the Clean Air Act. The Act unambiguously requires a PSD applicant to demonstrate that its project's emissions "will not cause, *or contribute to,* air pollution in excess of any . . . national ambient air quality standard in any air quality control region[.]"[94] EPA's SILs guidance improperly inserts the term "significantly" where it does not appear in the statute. Here, even MZX concedes it is contributing to a violation of the NAAQS, but merely claims its contribution is sufficiently small to be ignored.

Moreover, the NO_2 SIL is itself particularly dubious. In 2010—before EPA's attempt to codify SILs was abandoned after the court challenge discussed above—EPA issued nonbinding, *interim* guidance recommending a SIL that was arbitrarily set at 4% of the NO_2 NAAQS (i.e., 4% of 188 $\mu g/m^3$, which is 7.5 $\mu g/m^3$).[95] EPA did not offer any scientific rationale for this 4% threshold, instead referencing EPA's thinking from 1980 that any level above 5% would result "administrative burden."[96]

Worse yet, in the 2010 interim guidance, EPA explained that the agency "will consider other possible alternatives for developing a 1-hour NO_2 SIL in a future rulemaking that will provide an opportunity for public participation in the development of a SIL as part of the PSD regulations."[97] After EPA's other attempts to codify SILs went awry in court, EPA has never revisited this 2010 interim guidance.

As to MDEQ's use of the NO_2 SIL, while we are skeptical that MZX's contribution to the NO_2 violation are truly as low as 4.87 $\mu g/m^3$ (especially because their initial modeling showed MZX's impacts as high as 71.3 $\mu g/m^3$ and otherwise showed impacts above the 7.5 $\mu g/m^3$ SIL across the vast region shown above), even if the contribution is only 4.87 $\mu g/m^3$, this is still a substantial contribution to the violation, representing 2.6% of the NO_2 NAAQS.

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[92] *Id.* at 48.
[93] *Id.* at 49.
[94] 42 U.S.C. § 7475(a)(3) (emphasis added).
[95] *Guidance Concerning the Implementation of the I-hour NO_2 NAAQS for the Prevention of Significant Deterioration Program*, ENV'T PROT. AGENCY, at 12 (June 29, 2010), https://www.epa.gov/sites/default/files/2015-07/documents/appwno2.pdf.
[96] *Id.* at 12–13.
[97] *Id.* at 13.

Because SILs themselves are contrary to the plain language of the Clean Air Act as set out above in the discussion on ozone SILs, and because this particular SIL was established in an arbitrary manner through interim guidance (which was not subject to public participation and EPA never followed through on its promise to revisit the SIL in formal rulemaking), MDEQ cannot ignore the fact that MZX will contribute 4.87 $\mu g/m^3$, or 2.6%, to the violation of the 188 $\mu g/m^3$ standard.

Finally we note that even under the EPA guidance, agencies that choose to rely on their SIL still must provide technical rationale for why it believes using the particular SIL (here, 4% of the standard or 7.5 $\mu g/m^3$) is justified and will not cause 'significant' degradation to air quality (and again, we reiterate that this discussion of significance is not authorized under the Act in the first place), neither MZX nor MDEQ have done so. The Permit record merely states, without any support, that because the measured contribution is below 7.5 $\mu g/m^3$, MZX is not contributing to the exceedance.

F. Additional modeling deficiencies

Given the existing air quality issues in DeSoto County, SELC retained an expert air modeling consultant to review MZX's PSD modeling. The full report is attached as Attachment 1 and incorporated by reference into these comments. A few of the major issues are highlighted herein:

- Intermittent sources of NO_X were not modeled in a manner that demonstrates their actual contribution to the 98th percentile of the 1-hour daily maximum concentrations.
- The modeling of offsite sources, as conducted by Trinity Consultants, is unrealistic, based on incorrect treatments of release specifications and downwash effects, such that the results are not reliable.
- The gas exit velocities of some of the sources, as modeled by Trinity Consultants, are clearly too high and incorrect, thereby understating the impacts of pollutant releases from those sources.
- The modeling domain (distance from source) used by Trinity Consultants exceeds the regulatory requirements, as established by the United States Environmental Protection Agency.

III. The Draft Permit Does Not Contain Adequate BACT and LAER Limits.

As a new proposed major source, MZX must at minimum utilize Best Available Control Technology ("BACT"), which is applicable to major sources located in areas attaining the NAAQS standards. As discussed above, however, DeSoto County is not currently attaining the NAAQS, even if it has yet to be formally designated as in nonattainment (and we note that a petition is pending with EPA to make that redesignation). In light of this existing air quality problem, "MZX has elected to voluntarily install emission controls on the combustion turbines that will meet the

Lowest Achievable Emission Rate ("LAER") for NO_X that would apply if the area were to be designated as nonattainment for ozone."[98]

As set out below, however, the Draft Permit's proposed limits are not sufficient even as BACT limits, let alone the more stringent LAER limits. In particular, MDEQ must at least require Continuous Emissions Monitoring Systems ("CEMS") as part of BACT/LAER, and, more fundamentally, the proposed NO_X limit is not sufficiently stringent to meet LAER requirements.

A. The NO_X BACT limit is not sufficiently enforceable to constitute BACT; MDEQ must require Continuous Emissions Monitoring Systems (CEMS) to enforce short-term averaging periods.

The Draft Permit primarily relies on initial and annual emissions testing (i.e., stack testing) to demonstrate compliance with the BACT limits, and this is the case for the NO_X BACT limit of 2 ppm. BACT limits must apply on a continuous basis, and the limit must be expressed in terms of averaging times that protect the underlying NAAQS.[99] Here, the NO_X BACT limit is intended to be protective of both the short-term ozone NAAQS (the 8-hour standard) and the NO_2 NAAQS (the 1-hour standard). The Draft Permit establishes that the short-term BACT limit of 2 ppm shall apply over a three-hour period.

For several reasons, once-per-year testing for NO_X is not adequate to demonstrate compliance with the 2 ppm BACT limit that applies over a three-hour period. In particular, achieving this emission rate is largely dependent on the effectiveness of the selective catalytic reduction technology, which in turn relies on the control technology's catalyst beds. Notably, simple cycle turbines like these have considerably hotter exhaust with more aggressive turbulence and velocities than combined cycle units, making it harder to keep SCR catalyst beds in their optimal temperature range. We also note that MZX may be using particularly tall smokestacks for these turbines (perhaps in an effort to comply with PSD modeling requirements);[100] taller stacks are also likely to demand higher exhaust temperatures, which will negatively impact catalyst life.

In short, testing once per year is not adequate to ensure the SCR maintains NO_X emission rates below 2 ppm over either the course of the year or over any individual three-hour period. Indeed, PSD permits for comparable simple-cycle turbines typically require Continuous Emissions Monitoring Systems (CEMS) for NO_X; for instance, TVA recently permitted six 35 megawatt simple-cycle turbines with SCR as BACT in Tennessee, and regulators there appropriately set a three-hour averaging period and required CEMS.

In sum, in order to protect the short-term ozone and NO_2 NAAQS, MDEQ must likewise require the use of CEMS. Especially given the raised stacks and other technical issues referenced

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[98] MDEQ Preliminary Determination at 5.

[99] *Need For a Short-Term Best Available Control Technology (BACT) Analysis for the Proposed William A. Zimmer Power Plant*, ENV'T PROT. AGENCY (Nov. 24, 1986), https://www.epa.gov/sites/default/files/2015-07/documents/shrtterm.pdf.

[100] For example, the Solar 130 turbines at Colossus I have a stack height of 35 feet, *see* CTC Application, *supra* note 39, while the Solar 130 turbines at MZX are listed as having 15.2 meter, or 50 foot, stacks.

herein, annual source tests alone, which are announced ahead of time, allowing fine-tuning of operation, and are conducted under optimal operating conditions, are inadequate to demonstrate continuous compliance and protection of the short-term NAAQS. Therefore, CEMS should be required.

B. The proposed NO_X limit does not represent LAER.

As an initial matter, although MZX claims it is implementing LAER voluntarily, we believe MDEQ should independently require LAER as a legal requisite given the de facto nonattainment status of DeSoto County. Remarkably, neighboring Arkansas apparently concurs, with the Arkansas Department of Environmental Quality having commented to Shelby County that it should require LAER for Colossus I in light of the ozone problem in the Memphis area.[101]

More to the point, LAER limits must be at least as stringent as the "most stringent emissions limitation which is achieved in practice."[102] While 2 ppm may represent BACT, MDEQ should implement a more stringent LAER limit in light of recent testing on Solar 130 turbines—testing on eight of these turbines, which of course will also be used by MZX—showed NO_X emissions for all eight turbines were below 1.5 ppm; in fact seven of the eight were below 1 ppm.[103] As such, MDEQ should implement LAER limits based on these lowest emission rates that have been achieved in practice on nearly identical turbines.

C. The volatile organic compound (VOC) and carbon monoxide (CO) BACT limits for the ProEnergy turbines are unjustified.

MZX will operate three different makes and models of turbines; two different sizes of turbines manufactured by Solar (16.5 and 35 MW versions) and a third batch, 50 MW ProEnergy PE6000 turbines. For reasons that are not explained in the application, MZX is proposing significantly less stringent BACT limits for the largest turbines.

In particular, MZX proposes BACT for CO from the ProEnergy PE6000 turbines at 4.0 ppm at 15% O_2 achieved with an oxidation catalyst.[104] This CO BACT limit is twice as high as that for the Solar Turbines, which MZX has proposed at 2.0 ppm.[105] Likewise, MZX proposed a BACT limit of 2.5 ppm for VOCs, which is 25% higher than the 2.0 ppm VOC limits for the Solar turbines.[106]

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[101] Letter from Shane Khoury, ARK. DEP'T OF ENERGY AND ENVIRONMENT, to Dr. Michelle Taylor, SHELBY CNTY. HEALTH DEP'T (Apr. 30, 2025) (on file with author). This comment was also submitted to MDEQ by Trinity Consultants after MDEQ apparently requested all public comments received on the CTC draft permit in Shelby County.
[102] 40 CFR § 51.165(a)(1)(xiii)(B).
[103] **Att. 13**, MONTROSE AIR QUALITY SERVS., *Compliance Test Report, Eight Turbines, Vantage Data Centers VA2, LLC* 25–29 (Sep. 27, 2024).
[104] PSD Application at 5-2.
[105] *Id.* at 5-1.
[106] *Id.* at 5-1–5-2.

To justify the less stringent emission limits, MZX concedes these turbines are inherently dirtier than comparable turbines because they are "overhauled aircraft engines" and are "a relatively recent addition to the market."[107] On this basis alone, MZX then proposes BACT limits that are twice as high (for CO) and 25% higher (for VOCs) than the BACT limits for the other turbines.

This is not an appropriate justification for selecting less-stringent BACT limits, and MZX's BACT analysis is fundamentally flawed for failing to even consider cleaner alternatives. In particular, EPA has always been clear that the first step of the BACT analysis involves the identification of 1.) all "inherently lower-emitting processes/practices," 2.) add on pollution controls, and 3.) "combinations of inherently lower emitting processes and add-on controls."[108]

MZX utterly failed to assess "inherently lower-emitting processes," i.e., cleaner, more traditional turbines (like the 30+ other turbines it will employ) in its BACT analysis. The fact that these refurbished turbines are new to the market is particularly relevant; if applicants are allowed to ignore long-existing and lower-emitting options (like traditional turbines) in favor of dirtier-but-newer (and presumably cheaper: ProEnergy markets the refurbished turbines as a "low cost" alternative[109]) options during the BACT analysis, the entire technology-forcing intent of BACT will be subverted, i.e. BACT is meant to drive sources to select cleaner and cleaner options over time, such that "what represents BACT today may not be BACT in the future."[110]

We note that considering cleaner gas turbines at Step 1 of BACT is well within the scope of the source at hand—i.e., MZX could readily generate the equivalent electricity (400 MW, i.e. eight 50 MW ProEnergy turbines) with cleaner gas turbines—as just one example, instead of eight ProEnergy Turbines, MZX could instead opt for twelve of the 35 MW Solar turbines.

Because MZX has totally failed to assess inherently cleaner turbines as part of the BACT analysis for the eight largest turbines it will operate, the PSD Application and resulting BACT analysis is deficient. MDEQ must, at minimum, require MZX to conduct a new BACT analysis for these turbines that properly includes cleaner turbines and lower BACT limits. This analysis must undergo additional public notice and comments.

IV. MZX is a Major Source of Hazardous Air Pollutants.

MZX calculates that the 41 turbines will emit 9.49 tons of carcinogenic and toxic formaldehyde (a pollutant listed as a Hazardous Air Pollutant (HAP) under the Clean Air Act) per year;[111] this is just shy of the 10 ton per year major source threshold for individual HAP

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[107] *Id.* at 5-8.
[108] *Draft NSR Workshop Manual*, *supra* note 47, at B-10.
[109] ProEnergy, *PROENERGY Unveils New 48-MW PE6000 Turbine* (Nov. 21, 2023), https://www.proenergyservices.com/2023/11/proenergy-unveils-new-48-mw-pe6000-turbine/.
[110] *Clean Air Act Compliance Monitoring*, ENV'T PROT. AGENCY, (Sep. 23, 2025), https://www.epa.gov/compliance/clean-air-act-caa-compliance-monitoring ("These controls [BACT and LAER] are "technology-forcing" in that the best controls keep improving, so what represents BACT/LAER today may not be BACT/LAER in the future.").
[111] PSD Application, Appendix D at 3.

emissions.[112] Major sources of HAPs must comply with Maximum Achievable Control Technology requirements, and for turbines, those standards are set out in 40 CFR 63's Subpart YYYY. By estimating that formaldehyde emissions are below 10 tons per year, xAI is avoiding the more stringent Subpart YYYY requirements applicable to major sources.

Unfortunately, it appears that xAI is underestimating formaldehyde emissions and should be classified as a major source. As an initial matter, we note that when xAI permitted Colossus I, which included 15 SMT-130 turbines, it likewise estimated those turbines that would emit formaldehyde at just under 10 tons per year; it is therefore inconsistent that Colossus II—with 17 SMT-130s and 24 other, larger turbines—would emit nearly the exact same rate of formaldehyde.

A. xAI underestimates formaldehyde emissions from at least the ProEnergy turbines.

Unlike with Colossus I, xAI now apparently believes the Solar turbines will be compliant with an emission rate of 91 ppb emission (i.e., compliant with the emission standard from 40 CFR 63's Subpart YYYY) based on information from Solar itself, and uses this emission rate as the basis for all 41 turbines. While this is plausible for newer Solar units, it is far from clear that the eight largest turbines, the 50 MW ProEnergy 6000PE turbines, can meet this limit.

In particular, the ProEnergy turbines are apparently refurbished jet engines, and quite obviously were not manufactured by Solar—it is therefore not appropriate to rely, as xAI has done, on Solar's manufacturer information for these turbines. Notably, ProEnergy has not provided any manufacturer information or guarantees—or at least such documents are not in the Permit record.

Most critically, however, is the fact that xAI has estimated that carbon monoxide emissions from the ProEnergy turbines will be *twice* as high compared to the Solar turbines. In particular, as discussed above, while xAI states that the Solar turbines will be able to achieve a BACT limit of 2 ppm, it believes the ProEnergy turbines will only be able to achieve 4 ppm.[113] As EPA and other sources have consistently explained, "[c]arbon monoxide is a good surrogate for formaldehyde and other HAPs."[114]

In other words, despite estimating that the ProEnergy turbines will emit twice as much carbon monoxide (and 25% more VOCs[115]) compared to the Solar turbines, xAI still calculates

[112] 42 U.S.C. § 7412(a)(1).
[113] While we believe, as discussed above, that this renders the BACT determination for CO for these turbines deficient, if MDEQ believes these turbines cannot achieve 2 ppm, then it must also consider the impacts of the higher CO emission rates on formaldehyde and other HAPs, as discussed herein.
[114] Sims Roy, *Hazardous Air Pollutant (HAP) Emission Control Technology for New Stationary Combustion Turbines*, ENV'T PROT. AGENCY at 2 (Aug. 21, 2001), https://www.mdeq.ms.gov/wp-content/uploads/2017/06/CT_HAP.pdf.
[115] xAI states that the Solar turbines will meet a BACT limit of 2 ppm, while the ProEnergy units will only be able to meet a limit of 2.5 ppm.

that that turbines will emit essentially the same rate of formaldehyde—91 ppb.[116] This is inappropriate—at least without additional technical justification from the manufacturer, such as source testing on ProEnergy turbines.

In the absence of such information (and we note any additional submittals should be made available for public notice and comment), MDEQ must instead calculate the formaldehyde emissions from these ProEnergy turbines consistently with the CO emission rate—i.e., twice as high as the Solar units. Doing so means each ProEnergy turbine has the potential to emit 0.92 tons of formaldehyde per year (as opposed to 0.46 tpy), and results in a facility-wide PTE of 13.25 tpy. As such, MDEQ should permit MZX as a major source of HAPs and implement the more stringent Subpart YYYY requirements.

B. xAI underestimates formaldehyde emission rates from startups and shutdowns.

The Applicant's SSM emissions estimates for all turbine models also rely on the 91-ppb formaldehyde emission factor, same as for normal operation at 100% load, however, without applying the 30% control efficiency. However, Solar does not guarantee this emission factor for startup/shutdown operations,[117] and no information regarding the ProEnergy turbines was provided.

Formaldehyde emission factors for turbines at lower loads (<50%) vary but are generally considerably higher than at high loads (>80%). Vendor data suggests **2,000 ppb** at low loads, contrasting with EPA high-load averages around **65 ppb**. A study from the Electric Power Research Institute showed that at loads between 0–18%, formaldehyde emissions are, on average, 10,000 times higher than at full load.[118]

Because the annual formaldehyde emissions are so close to the 10 ton/yr threshold for individual HAP emissions even setting aside the underestimate ProEnergy turbines, discussed above, SSM emissions deserve closer scrutiny. Assuming formaldehyde concentrations of 10,000 ppb for 10 minutes during startup and 91 ppb for 50 minutes and otherwise relying on the Applicant's assumptions, total annual formaldehyde emissions from all turbines attributable to SSM activities are 0.12 ton/yr. For formaldehyde concentrations of 20,000 ppb for 10 minute, annual formaldehyde emissions are 0.24 ton/yr and for 40,000 ppb, annual formaldehyde emissions are 0.48 ton/yr.

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[116] We do recognize that xAI has not assumed any emissions reduction from the oxidation catalyst controls for these ProEnergy turbines, in contrast to the Solar turbines. It is unclear why xAI calculates that these controls will be effective for formaldehyde from the Solar Turbines but not the ProEnergy turbines; however, even applying a 30% reduction—the same assumption used for the Solar Turbines—to the ProEnergy turbines but using our emissions estimates based on CO emission rates results in a formaldehyde emission rate of 0.644 tpy for each of the ProEnergy turbines (compared to the 0.46 tpy in the Application); this totals to over 11 tpy with the other turbines.

[117] *See* **Att. 14,** Solar Turbines, Product Information Letter 168 2–3 (June 20, 2022).

[118] **Att. 15**, ELEC. POWER RES. INST., *Formaldehyde and VOC Emissions from a General Electric LM6000 Combustion Turbine with SCR and CO Catalysts* 1-1 to 5-2 (Feb. 2006).

Finally, as discussed below, xAI's Application is internally inconsistent with regards to the number of startups and shutdowns, meaning that the facility's total number of startups and shutdowns—and the resulting emissions—may be far higher than estimated here.

V. xAI May Conduct Far More Startups and Shutdowns than Stated, Increasing Emissions.

In xAI's emissions calculations, they warrant a remarkably low number of startups and shutdowns: just six per year for the Solar 130s and four per year for each of the other turbines. Because turbines emit many pollutants, including NO_X and formaldehyde, at higher rates during startup and shutdowns, any increase in the number of these events would increase emissions—with potential implications for the adequacy of modeling results, and, for formaldehyde and other HAPs, the applicability of major source requirements.

In contrast to the low number of startups and shutdowns used to calculate emissions, however, the company also includes the following language in the BACT analysis for CO2, whereby the company dismissed considering potential control technology due to the facility's intended operations:

> Here, the use of the selected gas turbines (operating in simple cycle mode and providing electricity directly to an industrial customer) is driven by a project need for **scalable**, **rapidly dispatchable**, and highly reliable generation based on a defined but **highly variable and subject-to-change demand scenario**. Add-on CO_2 controls, to the extent they may be deemed demonstrated control technology, are not compatible with these basic project criteria and are not considered . . .

Application at 5-3 (emphasis added). The foregoing language is simply not consistent with turbines that only turn on and off four or six times per year.

To the extent this language is inconsistent with xAI's intended operations, MDEQ should require xAI to reassess CO2 control technology as part of its BACT analysis; on the other hand, if this description is accurate, then xAI must provide a revised set of emissions calculations based on a realistic number of startups and shutdowns along with a new ambient air quality analysis based on the revised emissions calculations.

VI. The Permit Board Must Deny the Permit Because It Fails to Include All of the Gas Turbines at the Stanton Road Gas Plant.

Mississippi law requires all new stationary sources of pollution to obtain a construction permit prior to operating, subject to exemptions that do not apply here. Sources that do not obtain a construction permit are deemed a public nuisance and the air pollution they emit is "a menace to public health and welfare." Miss. Code § 49-17-3. The 27 unpermitted turbines already installed at the Stanton Road Gas Plant are stationary sources of pollution that require a permit, as set out below. MDEQ is simply mistaken in reading its own SIP and the Clean Air Act as authorizing MZX to install and operate these turbines without a preconstruction and operating permit.

Yet both the Application and the Draft Permit improperly omit any discussion—let alone proposed emissions limits or pollution controls for—the 27 unpermitted turbines. As a result, MZX has not complied with all Applicable Rules and Regulations and the Board cannot make required findings based on the incomplete information presented in the Application and the Draft Permit. The Board must therefore deny the Permit.

A. The Draft Permit improperly omits the 27 unpermitted turbines.

The Draft Permit itself also fails to include the 27 unpermitted turbines already installed at the MZX site. This is improper because the Draft Permit incorrectly defines, describes and analyzes the actual stationary source that requires a permit. The 27 unpermitted turbines are a stationary source that requires a permit before they are built, erected, or operated.[119] Further, under the Mississippi PSD regulations, a stationary source is "any building, structure, facility, or installation which emits or may emit a regulated NSR pollutant."[120] "Building, structure, facility, or installation means all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control) except the activities of any vessel."[121] The 27 unpermitted turbines are pollutant-emitting activities that belong to the same industrial grouping and are located on the same property and under the control of the same person. Accordingly, they are part of the stationary source and must be taken into account in the Permit.[122]

B. MZX's Application also improperly omits the 27 unpermitted turbines.

The Application makes no mention of the 27 unpermitted turbines. This omission has profound implications for the amount of pollution emitted at the Stanton Road site. In particular, the omission of the 27 unpermitted turbines means that the Application understates the potential to emit of the stationary source,[123] and fails to provide information necessary to establish that the Best Available Control Technology has been applied for the 27 unpermitted turbines.[124]

---

[119] EPA confirmed in a recently-published rule that temporary combustion turbines are stationary sources, not nonroad engines, regardless of whether they are portable, and therefore require preconstruction permits. *See* **Att. 16,** EPA, Final Rule, New Source Performance Standards Review for Stationary Combustion Turbines and Stationary Gas Turbines, 91 Fed. Reg. 1910, 1925–27 (Jan. 15, 2026).
[120] 40 C.F.R. § 52.21(b)(5) (adopted and incorporated by reference at 11 Pt. 2 Ch. 5 Miss. Code R. 5.2 (2024)).
[121] *Id*. § 52.21(b)(6)(i).
[122] The 27 unpermitted turbines are also "emissions units" and "new emissions units" under the Mississippi regulations. *See* 40 C.F.R. § 52.21(b)(7) and *id.* § 52.21 (b)(7)(i).
[123] 11 Pt. 2 Ch. 2 Miss. Code R. 2.2(B)(8) (2013).
[124] 40 C.F.R. § 52.21(n)(1)(iii).

The Permit Board's PSD regulations, which incorporate EPA's PSD regulations with a few exceptions not relevant here,[125] require that "[t]he owner or operator of a proposed source or modification shall submit all information necessary to perform any analysis or make any determination required under this section." 40 C.F.R. § 52.21(n). This information includes:

> (i) A description of the nature, location, design capacity, and typical operating schedule of the source or modification, including specifications and drawings showing its design and plant layout;
>
> (ii) A detailed schedule for construction of the source or modification;
>
> (iii) A detailed description as to what system of continuous emission reduction is planned for the source or modification, emission estimates, and any other information necessary to determine that best available control technology would be applied.

Id. § 52.21(n)(1)(i–iii).

MZX did not submit *any* of this information regarding the 27 unpermitted turbines to MDEQ in connection with the Application. Below is a non-exclusive list of information required by MDEQ's permit form for which MZX did not include information regarding the 27 unpermitted turbines:

- Page 137 of the Application: "This form should list all the of the Emission Points and descriptions as proposed or as otherwise identified in an existing permit."
- Page 142 of the Application: "Maximum Uncontrolled Emissions are the emissions at maximum capacity and prior to (in the absence of) pollution control, emission-reducing process equipment, or any other emission reduction."
- Page 144 of the Application: "Proposed Allowable Emissions (Potential to Emit) are those emissions the facility is currently permitted to emit as limited by a specific permit requirement or federal/state standard (e.g., a MACT standard); or the emission rate at which the facility proposes to emit considering emissions control devices, restrictions to operating rates/hours, or other requested permit limits that reduce the maximum emission rates."
- Page 146: "Proposed Allowable HAPs (Potential to Emit) are those emissions the facility is currently permitted to emit as limited by a specific permit requirement or federal/state standard (e.g., a MACT standard); or the emission rate at which the facility proposes to emit considering emissions control devices, restrictions to operating rates/hours, or other requested permit limits that reduce the maximum emission rates."

[125] 11 Pt. 2 Ch. 5 Miss. Code R. 5.2 (2024) ("Other than the subsections listed below and except for the changes set forth in Rule 5.3 of this regulation, the provisions of 40 C.F.R. § 52.21, as amended and promulgated by [Start date of public notice], are incorporated herein and adopted by reference by the Mississippi Commission on Environmental Quality as official regulations of the State of Mississippi and shall hereafter be enforceable as such.")

- Page 148: "Section B.4: Greenhouse Gas (GHG) Emissions This form is required for facilities that have or will require a Title V Operating Permit and for all industries in the energy and oil and gas sectors (i.e., SIC codes beginning with 13, 29, 46, and 49). Proposed Allowable GHGs (Potential to Emit) are those emissions the facility is currently permitted to emit as limited by a specific permit requirement or federal/state standard; or the emission rate at which the facility proposes to emit considering emissions control devices, restrictions to operating rates/hours, or other requested permit limits that reduce the maximum emission rates."

Despite these material omissions, on Form 5, page 136 of the Application, MZX's representative Brent Mayo made the following certification:

> *I certify to the best of knowledge and belief formed after reasonable inquiry; the statements and information in this application are true, complete, and accurate, and that as a responsible official, my signature shall constitute an agreement that the applicant assumes the responsibility for any alteration, additions, or changes in operation that may be necessary to achieve and maintain compliance with all applicable Rules and Regulations. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.*
>
> *Brent Mayo 1/14/2026*

The Permit Board's regulations authorize the Board to revoke a permit for "obtaining the permit by misrepresentation or failure to disclose fully all relevant facts."[126] The regulations also state that "[t]he knowing submittal of a permit application with false information" can subject an owner/operator to penalties for operating without a valid permit.[127] xAI and MZX have been on notice since at least June 2025 that its installation and operation of unpermitted turbines is unlawful. There is no excuse for omitting information about the 27 unpermitted turbines in the Application, and the Board should not countenance this failure to disclose fully all relevant facts before a permit issuance any more than it would afterward.

Further, the failure of MZX to provide "all information necessary to perform any analysis or make any determination required under this section"[128] prevented MDEQ from preparing an adequate permit, and, as described in the sections below, requires the Permit Board to disapprove and deny the Permit.

[126] 11 Pt. 2 Ch. 2 Miss. Code R. 2.2(C)(2) (2013).
[127] 11 Pt. 2 Ch. 2 Miss. Code R. 2.2(B)(5) (2013).
[128] 40 C.F.R. § 52.21(n).

C. The Permit Board must disapprove and deny the Permit because MZX has not complied with all Applicable Rules and Regulations and the Board cannot make required findings based on incomplete information.

The Permit Board's regulations make clear that it cannot issue a permit unless the applicant has complied with all of the relevant Applicable Rule and Regulations:

> Except as provided for in the "Air Emissions Operating Permit Regulations for the Purposes of Title V of the Federal Clean Air Act", Miss Admin. Code, Title 11, Part 2, Chapter 6, no permit shall be issued unless the applicant has complied with applicable requirements of the Commission "Air Emission Regulations for the Prevention, Abatement, and Control of Air Contaminants", Miss. Admin. Code, Title 11, Part 2, Chapter 1; the Commission "Permit Regulations for the Construction and/or Operation of Air Emissions Equipment", Miss. Admin. Code, Title 11, Part 2, Chapter 2 the Commission "Regulations for the Prevention of Air Pollution Emergency Episodes", Miss. Admin. Code, Title 11, Part 2, Chapter 3; the Commission "Ambient Air Quality Standards", Miss. Admin. Code, Title 11, Part 2, Chapter 4 except as provided for in Rule 2.5.E. herein; the Commission "Regulations for the Prevention of Significant Deterioration of Air Quality", Miss. Admin. Code, Title 11, Part 2, Chapter 5, any amendments to these Rules and Regulations, and additional relevant Rules and Regulations promulgated by the Commission and/or Permit Board.

11 Pt. 2. Ch. 2 Miss. Code R. 2.2(A) (2013). As detailed above, MZX has not complied with all Applicable Rules and Regulations. For example, MZX has failed to obtain a permit for the 27 unpermitted turbines before beginning construction as required by 11 Pt. 2 Ch. 2 Miss. Code R. 2.1 (D)(2) (2013). MZX has also failed to provide all information necessary for the Board to make a determination, as required by 40 C.F.R. § 52.21(n) (adopted and incorporated by reference at 11 Pt. 2 Ch. 5 Miss. Code R. 5.2 (2024)).

The omission of the 27 unpermitted turbines also makes it impossible for the Board to make determinations regarding the standards required for approving an application for a permit to construct. Under the Board's regulations, these standards include:

> (1) The stationary source shall be designed and constructed so as to operate without causing a violation of any Applicable Rules and Regulations.
>
> (2) The stationary source shall be designed and constructed so as to operate without interfering with the attainment and maintenance of State and National Ambient Air Quality Standards.

> (3) The stationary source shall be designed and constructed so as to operate such that the emission of air toxics does not result in an ambient concentration sufficient to adversely affect human health and well-being or unreasonably and adversely affect plant or animal life beyond the stationary source boundaries.

11 Pt. 2 Ch. 2 Miss. Code R. 2.5(A)(1)–(3) (2013). Neither the Application nor the Permit address the 27 unpermitted turbines, and for all the reasons set forth in above, the Board cannot determine whether those turbines have been designed and constructed to achieve the required standards. In particular, the Board has no basis on which to make any findings related to compliance with major source standards such as the use of BACT or LAER for criteria pollutants and MACT for Hazardous Air Pollutants (air toxics).

For all of these reasons, the Board must disapprove and deny the Permit.[129]

VII. MDEQ Must Not Allow xAI to Engage in Sham Permitting Related to Colossus III.

As MDEQ is aware, the 41 turbines that would be authorized under this Permit are intended to provide 1.2 gigawatts of power to xAI's Colossus II data center just across the state line in Tennessee. In December, meanwhile, xAI announced plans for Colossus III, also apparently known as MACROHARDRR, acquiring an 800,000 square foot warehouse adjacent to the Colossus II data center:[130]

[129] *See* Miss. Code § 49-17-29(3)(c) (Board authorized to deny a permit).

[130] Katie Bieri, *Dozens of GZO Employees Lose Jobs as xAI Expands*, FOX13 MEMPHIS (Jan. 14, 2026), https://www.fox13memphis.com/news/dozens-of-gxo-employees-lose-jobs-as-xai-expands/article_55f4387f-dd01-4e04-9e7d-0dbd2f2d8fd1.html.



Although xAI has yet to announce how it plans to power Colossus III, given the proximity to Colossus II and the Stanton Road turbine site encompassed by this Draft PSD Permit, it seems likely that xAI intends to install additional generating capacity at the Stanton Road site in the near future.

If xAI does indeed intend to install additional, permanent turbines or other generating capacity at the Stanton Road site, then it is engaged in improper sham permitting currently. In particular, EPA explains sham permitting as "[p]ermits with conditions that do not reflect a source's planned mode of operation" and that such permits "may be considered void and cannot shield the source from the requirement to undergo major source preconstruction review."[131]

Here, the primary concern related to sham permitting would be the major source ambient air quality modeling requirements. For example, if xAI receives this PSD Permit for Colossus II and then applies to modify it to include new turbines, the PSD modeling requirements for the new

[131] *Draft NSR Workshop Manual*, *supra* note 47, at C-6.

turbines would not necessarily account for emissions from the existing turbines to be permitted currently. Simply put, xAI cannot be allowed to escape complete PSD review for the full facility it presently intends to build by improperly segmenting the project into multiple permits that undergo piecemeal PSD or other air permitting review.

VIII. The Permit Board Must Disapprove and Deny the Permit Because Even with Respect to the 41 Proposed Turbines, MZX Has Not Complied with All Applicable Rules and Regulations and the Board Cannot Make Required Findings.

The Permit Board's regulations make clear that it cannot issue a permit unless the applicant has complied with all of the relevant Applicable Rule and Regulations.[132] As detailed in Sections II-VI above, even with respect to the 41 turbines it disclosed in the Application, MZX has not complied with all Applicable Rules and Regulations. For example, MZX has failed to provide accurate emissions estimates, modeling adequate to demonstrate NAAQS compliance, offsets to address ongoing ozone NAAQS violations, and has also failed to demonstrate that it meets BACT or LAER for each criteria pollutant and MACT for relevant Hazardous Air Pollutants.

Further, the omissions and errors detailed in Sections II-VI above also make it impossible for the Board to make determinations regarding the standards required for approving an application for a permit to construct. Under the Board's regulations, these standards include:

> (1) The stationary source shall be designed and constructed so as to operate without causing a violation of any Applicable Rules and Regulations.
>
> (2) The stationary source shall be designed and constructed so as to operate without interfering with the attainment and maintenance of State and National Ambient Air Quality Standards.
>
> (3) The stationary source shall be designed and constructed so as to operate such that the emission of air toxics does not result in an ambient concentration sufficient to adversely affect human health and well-being or unreasonably and adversely affect plant or animal life beyond the stationary source boundaries.

11 Pt. 2 Ch. 2 Miss. Code R. 2.5(A) (2013). For all the reasons set forth in Sections II through VI above, the Board cannot determine whether the stationary source—even it includes only the 41 turbines described in the Application and Draft Permit—has been designed and constructed to achieve the required standards.

For all of these reasons, the Board must disapprove and deny the Permit.[133]

Mississippi law recognizes that air pollution is a "menace to public health and welfare" and that "the problem of air [] pollution in this state is closely related to the problem of air []

[132] 11 Pt. 2. Ch. 2 Miss. Code R. 2.2(A) (2013).
[133] Miss. Code § 49-17-29(3)(c).

pollution in adjoining states." Community Groups share the air that is already being affected and will be affected by the operation of MZX's Stanton Road Gas Plant. We strongly urge the Board to deny the Permit as proposed and ensure that the deficiencies in the Permit are addressed so that the health and well-being of communities on both sides of the Mississippi-Tennessee border do not suffer unnecessarily.

Respectfully submitted,

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Volume I of Attachments to Community Groups' Comments on the Mississippi Department of Environmental Quality's Draft Air Pollution Control and Prevention of Significant Deterioration (PSD) Authority Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Attachments 1-5

Attachment 1

Independent Review of the Trinity Consultants Air Quality Analysis and Modeling Report Related to the Proposed Greenfield Simple-Cycle Combustion Turbine Project Proposed by MZX Tech LLC in Southaven, Mississippi

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1.0 EXECUTIVE SUMMARY

Sullivan Environmental Consulting, Inc. (Sullivan Environmental) was contracted by the Southern Environmental Law Center (SELC) to conduct a review of the AERMOD dispersion modeling report titled: "*PSD PERMIT APPLICATION Volume II – Modeling Report",* a report that was authored by Trinity Consultants (referred to as the "*Trinity Report*" in this review document). The Trinity Report was generated with the intent of meeting the permitting requirements for a proposed data center facility to be owned by MZX Tech LLC in Southaven, Mississippi. The Southern Environmental Law Center provided the Trinity Report and modeling files, as available, related to this report. The procedure used by Trinity Consultants, the meteorological data used, and the individual modeling files, as available, related to the Trinity Report were assessed independently by Sullivan Environmental. Examples of deficiencies in the Trinity modeling that will need to be resolved before comparing the results with applicable National Ambient Air Quality Standards (NAAQS) and Prevention of Significant Deterioration (PSD) increments include the following:

1. Offsite intermittent sources of NO_x were not modeled to demonstrate their actual contribution to the 98th percentile of the 1-hour daily maximum concentrations.
2. The modeling of offsite sources, as conducted by Trinity Consultants, is unrealistic, based on incorrect treatments of release specifications and downwash effects, such that the results are not reliable.
3. The gas exit velocities of some of the sources, as modeled by Trinity Consultants, are clearly too high and incorrect, thereby understating the impacts of pollutant releases from those sources.
4. Actual emissions rather than allowable emissions were used for Texas Gas Transmissions LLC, rather than the permitted allowable emissions, with no justification for this deviation from standard practice.

This independent review of the Trinity Consultants modeling report is structured as follows:

- Section 2 of this review addresses EPA comments and specific issues discovered, as well as recommended items that require clarification.
- Section 3 of this review further summarizes Trinity's modeling approach and our assessment of their approach.
- Section 4 of this review describes warnings and errors in the Trinity Consultants modeling files.
- Section 5 of this review provides a summary of findings and conclusions regarding the Trinity Consultants modeling assessment.

2.0 REVIEW OF EPA COMMENTS AND THE APPLICANT RESPONSES TO THE EPA COMMENTARY

In reviewing the document: "*EPA Region 4 Comments on PSD Air Quality Modeling Application – MZX Tech LLC*" (electronic pages 3-6 of 114 in the Trinity Modeling Report), we found the following points lack a sufficient response from the applicant (MZX):

2.1 Trinity Consultants Report Section 3.6.1 – Development of Initial Inventory Source List [1]

EPA Comment: *"This section also indicates that the total annual emission rate will be utilized for the purposes of the Q/D screening analysis. For the sources that were selected for inclusion in the cumulative EPA Region 4 suggests clarifying whether allowable, typical actual (see Table 8.2 in 40 CFR Part 51, Appendix W for a description of "typical actual" emissions), or true actual emissions were used in the modeling".*

MZX Response: *"All sources were modeled at permitted allowable emission rates except for Texas Gas Transmissions LLC (MSNOX1-MSNOX18), which used actual emissions from the emissions inventory (EI) data reviewed for this project".*

Sullivan Environmental Response: The applicant's response clarifies that permit allowable rates were used for all, except that actual emissions were used for Texas Gas Transmissions. MZX needs to provide a sufficient justification for using "*actuals*" for the gas facility rather than "*allowable*," especially if there is a large difference between actual and allowable emissions. Their approach is less conservative than standard methodology.

[1] Pg. 3 of the Trinity Modeling Report.

2.2 Trinity Section 4.2 – Modeled Sources [2]

EPA Comment: *"This section describes that 15 of the 41 turbines will be modeled in startup mode for short-term averaging periods. Based on Table 4-2, the 15 turbines will include TUR2, TUR4, TUR11, TUR6, TUR13, TUR27, TUR18, TUR26, TUR20, TUR28, TUR35, TUR37, TUR38, TUR36, and TUR41. EPA Region 4 recommends providing calculations for estimating the SUSD emission rate for each of the three turbine types".*

MZX Response: *"These calculations were presented with Volume I of the application. To summarize, for the ten (10) Solar units (the 5 worst PGM-130 units and 5 worst Titan 350 units), modeled hourly emissions would be the SUSD emissions occurring in 10 minutes, summed with 50/60 minutes of normal operating conditions. For the Pro energy worst 5 units, this would be the SUSD emissions over 30 minutes, summed with 30/60 minutes of normal operating conditions."*

Sullivan Environmental Response: The weighted average of the 10-minute SUSD emissions and emissions over 50 minutes of normal operation and similar treatment, weighting 30 minutes of SUSD and 30 minutes of normal operation, is reasonable on an hourly basis. The Excel files, or other computational software, that were used for the specific weighted averaging, including the emission rates during SUSD versus normal operations, are needed to confirm their assessment.

Trinity also needs to address the potential issue if the startup plume characteristics of the source (e.g., exit temperature and velocity) are also drastically different during those first 30 minutes during startup. Our review of the short-term AERMOD model files versus the annual AERMOD

[2] Pg. 4 of the Trinity Modeling Report.

model files shows that these source parameters were modeled with the same parameters in both runs despite the noted difference in emission rates.

In general, for combustion turbines, both the exit velocity and exit temperature will be lower during startup compared to normal operations. During startup, the turbine is not yet at its optimal operating temperature. The combustion process is still ramping up. Also, during startup, the mass flow of air and fuel is significantly reduced compared to full-load operations. At full load, the turbine is gulping maximum air and burning maximum fuel, forcing a much larger volume of gas out of the stack at a high velocity. This combination of lower temperature and lower velocity creates a dual problem for air dispersion modeling (especially in the short-term modeling): the plume has less thermal buoyancy and less momentum, causing it to stay closer to the ground, resulting in higher concentrations.

The modeling of off-site sources does not include building downwash and accurate release specifications. Here is the EPA quote that is in the Trinity Consultants modeling protocol: "*The number of nearby sources to be explicitly modeled in the air quality analysis is expected to be few except in unusual situations. In most cases, the few nearby sources will be located within the first 10 to 20 km from the source(s) under consideration. Owing to both the uniqueness of each modeling situation and the large number of variables involved in identifying nearby sources, no attempt is made here to comprehensively define a "significant concentration gradient." Rather,* MZX Tech LLC / Modeling Protocol 2-16 *identification of nearby sources calls for the exercise of professional judgment by the appropriate reviewing authority*…" Here, substantial NO_2 concentrations are modeled at off-site locations, with no consideration of downwash effects, and in some cases, improper release specifications. Some of these off-site sources have collocated or nearly collocated sources with > 30 g/sec emission rates and low stack heights of 12 to 14 m, which have a high probability of downwash that would be expected to increase modeled concentrations.

For example, consider the 8th-highest 1-hour daily maximum NO_2 concentration of 7,121 ug/m^3. This source is Baptist Memorial Hospital, which provides an example of poor release specifications and no treatment of building downwash. The coordinates for this source location are shown at the top of a 10-story hospital building, but were modeled 3 meters (approximately 10 feet) above ground level. No meaningful consideration was performed of release specifications since the modeled temperature was 255°K (-18°C or -1°F) and a minimal exit velocity of 0.01 m/sec. No building downwash was considered. It is more likely than not that this example grossly overstates actual concentrations, while other off-site sources modeled in a similar, unrealistic manner may understate actual concentrations. If these modeled concentrations were believed, patients and visitors going to Baptist Memorial Hospital would be exposed to extremely high NO_2 concentrations nearly 40-fold over the standard. More importantly, the off-site modeling is a paper exercise that bears little resemblance to reality.

2.3 Trinity Consultants Appendix C [3]

EPA Comment: *"Table C-6 provides the modeling parameters for the off-site NO_2 point sources. However, the input file for the 1-hour and annual NO_2 cumulative modeling does not include several sources, MSNOX2, MSNOX13, MSNOX14, and MSNOX17. EPA Region 4 recommends clarifying why those sources were not included in the modeling".*

MZX Response: *"These sources operate intermittently and were excluded from the modeling. They have been removed from the revised Table C.6. MSNOX13 and MSNOX14 are emergency engines (reported 11 and 9.5 hours of operation, respectively, in EI). MSNOX17 is an auxiliary air compressor engine (reported 52 actual hours of operation in EI). MSNOX2 is a compressor turbine with zero actual hours reported in the emissions inventory (i.e., did not operate). All*

[3] Pg. 5 of the Trinity Modeling Report.

sources with 60 or more hours of operation in the EI were included in the model for this source".

Sullivan Environmental Response: MZX says it excluded sources with < 60 hours of annual operation. The March 2011 EPA Memo (Tyler Fox) allows for the exclusion of intermittent sources (such as emergency engines) when appropriate. The threshold for 1-hour NO_2 modeling is the 8th-highest 1-hour daily maximum concentration, i.e., only 8 hours per year. MZX has not provided any basis to support their position that these source operations are too infrequent to affect the 98th percentile of the maximum daily 1-hour concentrations. These Texas Gas Transmissions LLC emission rates, when these four sources are operating, were not specified. If these emission rates when operating are sufficiently high, further review is needed to determine what effect these sources have on the 1-hour NO_2 98th percentile. Monte Carlo analysis of intermittent sources (onsite and offsite as applicable) should be quantitatively addressed by creating an hourly emissions file based on the given frequency (events/year), event duration (hours/event), and total annual duration (hours/year) for each source. This would provide a meaningful and quantitative basis for assessing the significance of intermittent sources on the 98th percentile of 1-hour daily maximum NO_2 concentrations.

2.4 General Comments Related to EPA Commentary

Sullivan Environmental Commentary: Based on Table 5-1 [4] of the Trinity Consultants modeling report, only NO_2 exceeded the corresponding annual and 1-hour SILs, with the 1-hour SIL being exceeded out to a distance of approximately 20.9 km, defined by EPA as the facility's Significant Impact Area (SIA). This large distance means that the facility's emissions are high enough to potentially influence air quality over a significantly large area of the Memphis metropolitan area. This is a large SIA that is important regarding our comments noted on Figure

[4] Pg. 62 of the Trinity Modeling Report.

2 of this report about the extremely high concentrations predicted on the grounds of the Baptist Memorial Hospital. That hospital is within this 20.9 km SIA and therefore indicates that the MZX facility does significantly contribute to the predicted maximum impact on the hospital grounds.

One error message we noticed at the end of one of the Trinity Consultants AERMOD output files identified a mismatch in the upper-air data file number. [5] (*See the Trinity Consultants file: NO2ASIL2019.aml).* According to the first line of the surface meteorological file, the upper air station number is 72340, but the Trinity Consultants AERMOD input file uses 3952 for the upper air station.

Based on the Trinity Consultants model protocol, they said they would use the upper air station 3952 (North Little Rock). The upper air station 72340 in their processed AERMET is for a NWS station in the Little Rock area, call letters KLZK, as spelled out in their modeling report. The reason and significance, if any, of this discrepancy need to be addressed by the Applicant. This is unlikely to be a material issue; however, the documentation should be corrected.

2.5 Additional Sullivan Environmental Commentary

In Section 3.6.1 of the Trinity Consultants modeling report (electronic page 41 of 114), MZX stated the following regarding how they developed their offsite source inventory: "*A comprehensive emissions inventory of all nearby point sources was requested from MDEQ. Nearby sources were also requested from the Shelby County Health Department (SCHD) and the Arkansas Division of Environmental Quality (ADEQ). This inventory was used to determine which nearby sources to include in the cumulative impact modeling. For nearby sources within*

[5] AERMOD Model Warning:
ME W530 17736 MEOPEN: CAUTION! Met Station ID Mismatch with SURFFILE for UAIRDATA

50 km of the proposed MZX site, a Q/D (emission rate/distance) screening assessment was used to identify additional sources to be modeled. Application of the Q/D assessment involves determining the total annual emission rate (Q) of all sources at a nearby facility and dividing by its distance (D) from the proposed MZX site. If the ratio is greater than or equal to 20, the nearby source was included in the NAAQS/Increment analysis. Sources with a Q/D less than 20 and sources beyond 50 km are indirectly accounted for in the background monitored concentration and do not need to be modeled explicitly. No building downwash was included for these sources."

Sullivan Environmental Commentary: When reviewing the Trinity Consultants NAAQS AERMOD model input files for annual NO_2 (e.g. NO2A2019.AMI), we noticed that three sources (MSNOX22, MSNOX23 and MSNOX24) (as examples) are located north of the facility boundary but within their Significant Impact Area (SIA) defined receptor grid, defined as being 1.5 km (see Table 5-1 of MZX's modeling report) from MZX's facility for the annual NO_2 assessment (see Figure 1) and 20.9 km for the NO_2 1-hour assessment (see Figure 2), where the black dots indicate the location of Trinity Consultants' receptors for the 1-hour NO_2 assessment. These three sources do not have any defined building downwash parameters in that one AERMOD input file (all building downwash parameters are set to zero). If actual buildings exist that may result in building downwash for these sources and all off-site sources, MZX is likely under-predicting the cumulative impact for this annual NO_2 run, on this basis. In fact, none of the modeled off-site facilities within that AERMOD input file have building downwash parameters defined. Therefore, the SIA for the 1-hour and annual NO_2 NAAQS run likely needs to be expanded.

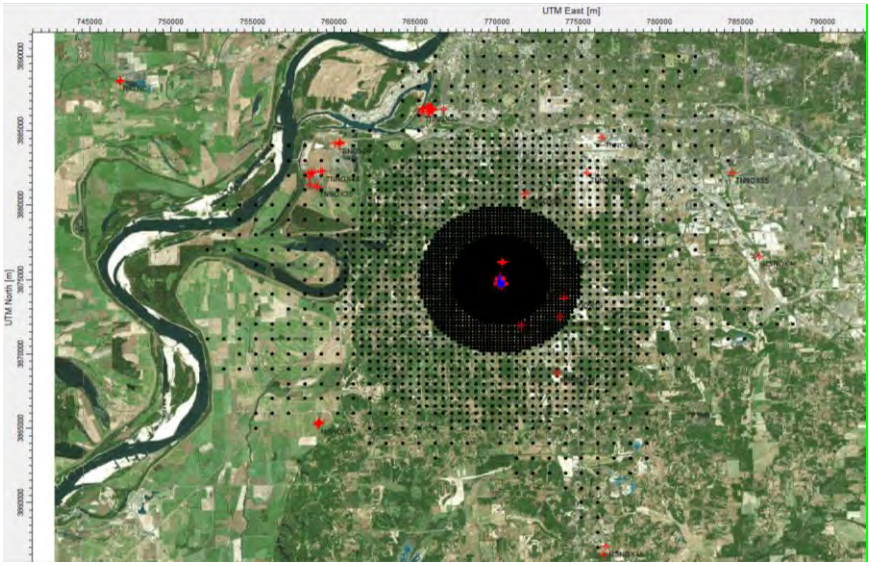
Figure 1. Trinity Consultants Receptor Grid [6]
(Black Dots Represent the Receptor Annual NO_2 Grid)



Figure 2 shows the off-site facilities (identified in red) that are either directly within or in close proximity to MZX's defined modeling grid (black dots) for the 1-hour NO_2. This again raises concern that MXZ may be under-predicting the cumulative impact in the 1-hour NO_2 run.

[6] The 1.5 km grid was used for the annual NO_2 while the 20.9 grid is for the 1-hour NO_2. This is based on the SIA modeling using the SIL concentrations associated with those averaging times. The modeling grids shown in Figures 1 and 2 show the modeling grid generated by Trinity Consultants and the sources associated with the representative modeling runs.

Figure 2. Offsite Facilities (Trinity Modeling Input Locations) For the 1-hour NO_2 Grid



- As an example, the MZX modeling shows a modeled concentration of 7,121 ug/m^3. This location is at Baptist Memorial Hospital, located ~ 4 km ESE of the facility. While it is correct that this receptor is on that facility's property, it is located in the ambient air. As a hospital, patients and visitors have access to this location[7]. The modeling of offsite sources in the Trinity report is a mathematical exercise untethered to reality (See Figures 3A and 3B, which represent this hospital facility as extracted from Google Earth).

[7] Note that it was brought to the attention of Sullivan Environmental that there was correspondence between Trinity Consultants and the State regarding a modeling approach related to the hospital; any possible modifications to the modeling approach related to the hospital were not presented to us (in terms of model inputs or results).

Figure 3-A. Baptist Memorial Hospital (General Geographic Region)



Figure 3-B. Baptist Memorial Hospital (3-Dimensional Google Earth Render) [8]



[8] This figure shows the modeled NO_2 source, MSNOX19, relative to the receptor with the 8th highest 1-hour NO_2 concentration of 7,121.8 µg/m^3

- While Appendix W *(*the *Guideline on Air Quality Models)* allows for some simplification of the nearby inventory, if a source is deemed important enough to be modeled explicitly (i.e., Q/D ≥ 20), it should be modeled accurately, including its release specifications, GEP (Good Engineering Practice), stack height, and with appropriate downwash parameters.

- In Section 4-2 of the Trinity Modeling Report (electronic page 45 of 114), MZX stated the following regarding how they modeled their onsite sources: "*Modeling analysis for each ambient-air standard utilized inputs that represent the most conservative, or a "worst-case", operating scenario. The "worst-case" operating scenario, for modeling purposes, represents the load and ambient temperature conditions when worst-case concentrations occur because combustion turbine performance varies with generation load and temperature. Rather than modeling various individual load scenarios (e.g., 50%, 75%, 100%), MZX presents a single, conservative modeling case. This case pairs the highest potential emission rates (which typically occur at high loads) with the poorest plume dispersion characteristics (e.g., the lowest exhaust temperature and velocity, which typically occur at lower loads). This hybrid approach intends to create a scenario that is more conservative than any single, real-world operating condition. With compliance demonstrated under this overly conservative scenario, it can be assumed that the facility complies with all other operating loads*."

- **Sullivan Environmental Commentary:** It is unclear whether MZX conducted a load screening analysis (e.g., modeling 50%, 75%, and 100% loads) to identify the true "*worst-case*" scenario. Simply mixing parameters from different loads into a single "*hybrid*" source is not a standard regulatory default. MZX has not provided any proof of their claim that it is indeed a "*worst-case*" scenario. Also, MZX mentions turbine

performance varies with ambient temperature but presents a "*single conservative case*."

- Turbine emissions (especially NOx) and exhaust flow are often highest during cold winter days. MZX needs to confirm that their "*single case*" used the site's lowest annual ambient temperature (e.g., a "*Winter/High Load*" case) to ensure mass emissions are truly maximized. MZX needs to justify their worst-case scenario by providing example test runs where they applied seasonally varying emission rates along with representative meteorological conditions for each of those seasons to prove that the "*worst-case*" scenario was indeed clearly defined. Their assertion that the hybrid approach conservatively addresses modeled impacts needs further documentation to confirm this position.

- On Page 4-6 (electronic page 49 of 114), MZX stated the following regarding their processing of receptor elevations for input into the AERMOD model: "*Receptor elevations and hill heights required by AERMOD were determined using the AERMAP terrain preprocessor (version 24142). Terrain elevations from the USGS 1-arc-second NED were used for AERMAP processing. In all modeling data files, the location of emission sources, structures, and receptors are represented in the UTM coordinate system, zone 15, NAD-83.*"

  Sullivan Environmental Commentary: While AERMAP version 24142 still supports older GeoTIFF formats, such as the 1-arc-second (30-meter) data, it is not clear why the applicant did not rely on the more recently available 1/3 arc-second (approximately 10-meter resolution) data. In Section 4.3 of the AERMOD Implementation Guide, while not using the exact words "*low resolution*," it notes that 1/3-arc second NED data is the highest resolution available nationally and is "*preferred*" for AERMAP to ensure that the

elevations of sources and receptors are as accurate as possible, especially in areas with significant terrain features or building downwash. No rationale was provided for selecting the lower-resolution terrain data.

- In Section 4.4 of the Trinity Modeling Report (electronic page 49 of 114), MZX stated the following regarding the land use data set used in AERSURFACE (version 24142): "*Each USGS NLCD 2016 land use class was compared to the most appropriate Auer land use category to quantify the total urban and rural area. Table 4-1 summarizes the results of this land use analysis. As shown, approximately 82% of the area can be classified as rural, which is well in excess of the 50% threshold established in the Auer procedure. Therefore, rural dispersion coefficients will be used in AERMOD*."

  Sullivan Environmental Commentary: While the applicant uses the correct regulatory framework to evaluate urban versus rural land use (i.e., the Auer Method), they relied on outdated land use datasets. MZX should have conducted the analysis using the most recent land-use data, but we note that this factor is unlikely to change the rural status.

3.0 REVIEW OF THE TRINITY CONSULTANTS AERMOD MODELING

3.1 Review of Trinity Meteorological Data (The Meteorological Data that Trinity Consultants Relied on for the Modeling Years: 2019, 2020, 2021, 2022, and 2023).

Sullivan Environmental agrees with selecting the meteorological station (Station WBAN ID # 13893 / Memphis International Airport) as the most representative data source. This meteorological station reasonably represents the meteorological conditions at the facility.

Sullivan Environmental also agrees with the selection of upper air data presented in the Trinity Report and in the upper air file: KMEM_KLTR_2019-2023.PFL. Trinity Consultants used a recent 5-year meteorological dataset (years 2019-2023), which is standard practice for this type of assessment. Although Sullivan Environmental was provided with the surface-level and upper-level AERMOD input files generated using the AERMOD pre-processor AERMET, we were not provided with the AERSURFACE and AERMET input files. The AERMET file contains the meteorological inputs used to generate the surface and upper-level AERMOD input files. Since this file was not made available in the shared link to the modeling-related files, Sullivan Environmental was not able to provide an independent review of Trinity's assumptions and processing of the meteorological data, and was unable to check what assumptions Trinity relied on when generating the surface and upper-level meteorological data. We recommend that Trinity provide the AERMET file for independent review to promote transparency in the process. Figures 4 through 9 present wind roses showing the wind speed and direction from which the wind is blowing for the years Trinity modeled on an annual basis, and a composite 5-year wind rose. The wind roses show a lot of preferential flow towards the NNE sector. Due to the tightly clustered wind rose (See Figure 4 for example) with a high frequency of flow from the SSW sectors, the likelihood of one-hour maximum values affecting common receptors is increased as compared to more uniformly distributed wind roses.

Figure 4. Year 2019 Wind Rose Generated based on the Trinity Meteorological Data

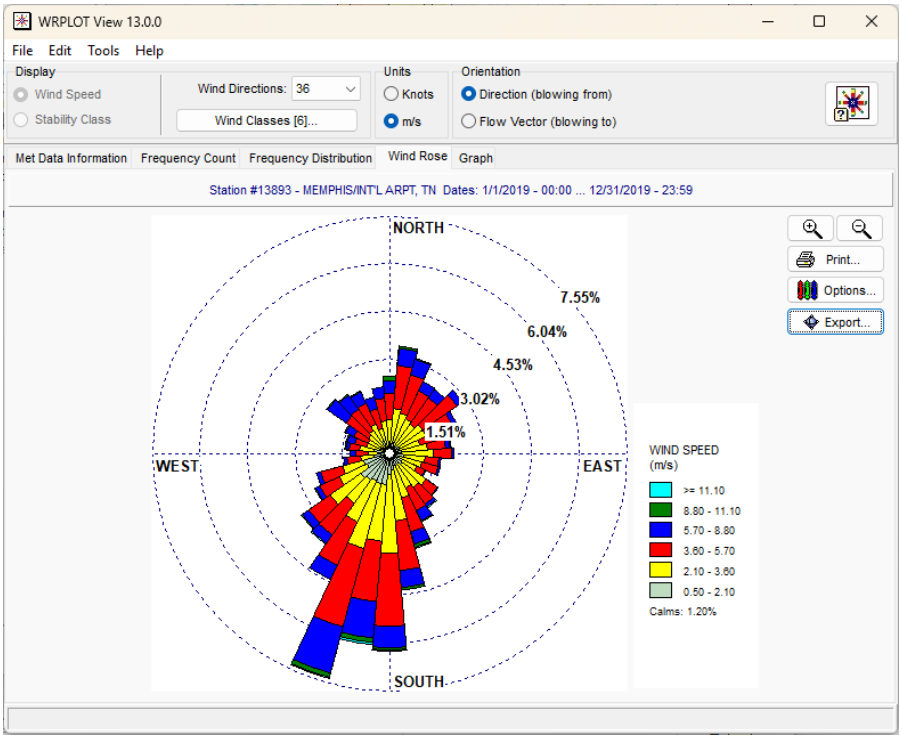


Figure 5. Year 2020 Wind Rose Generated based on the Trinity Meteorological Data

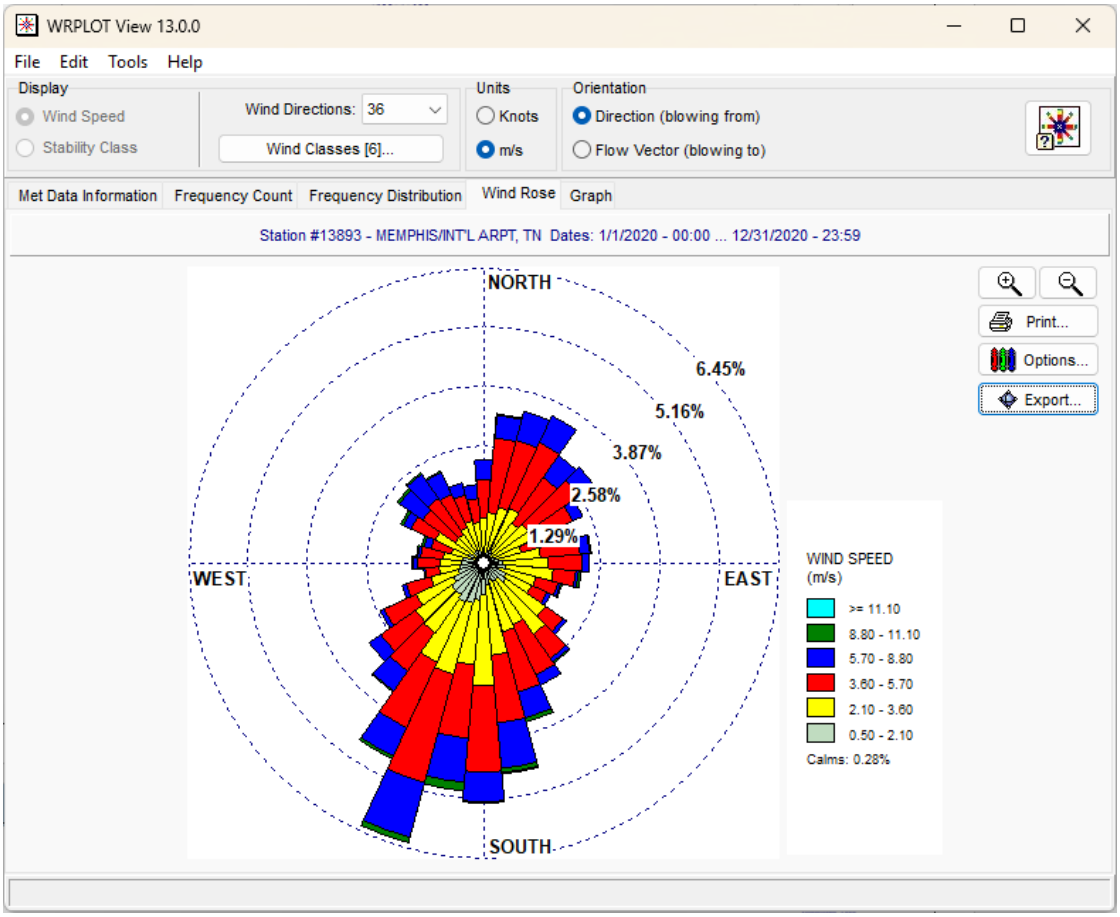


Figure 6. Year 2021 Wind Rose Generated based on the Trinity Meteorological Data

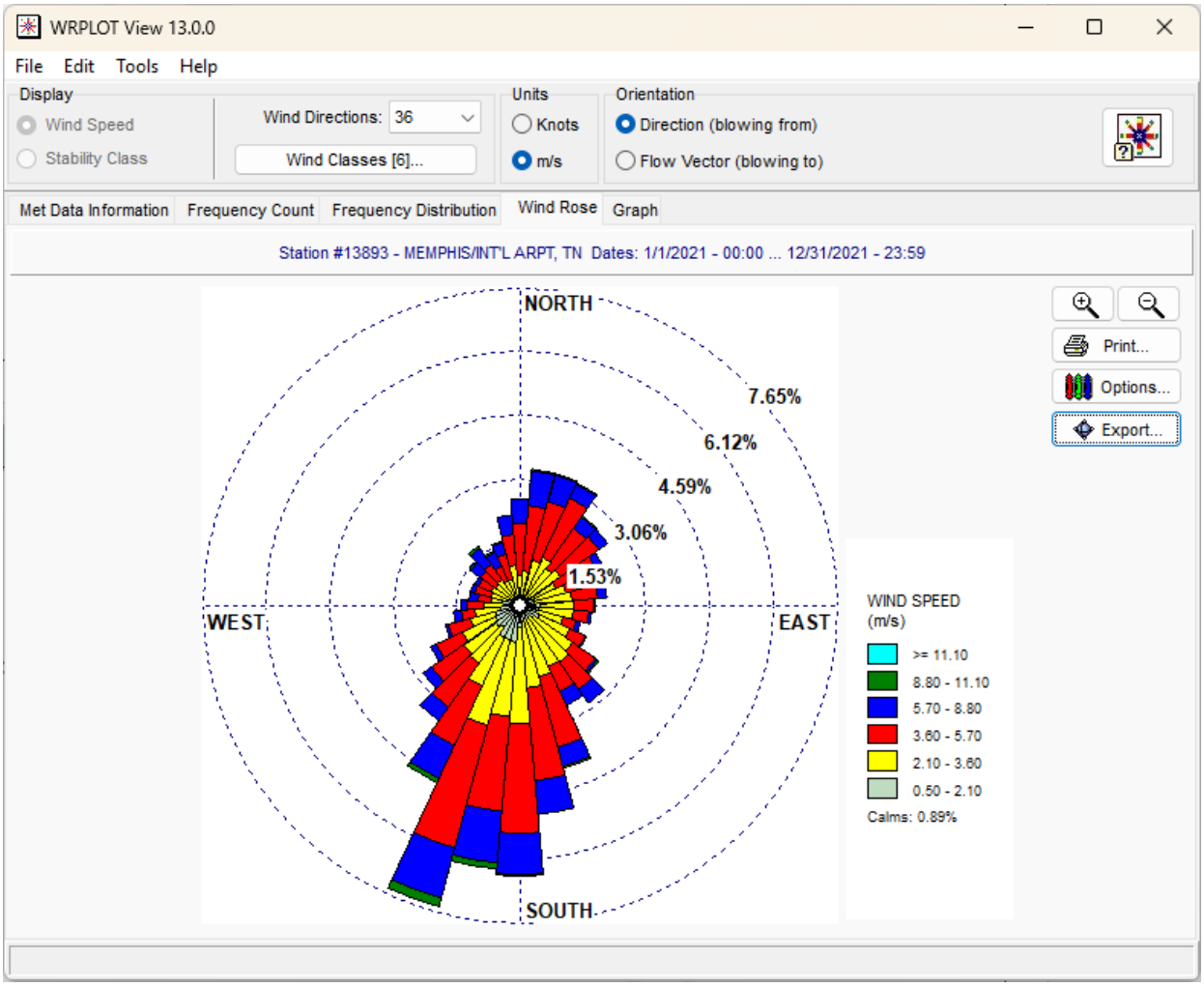


Figure 7. Year 2022 Wind Rose Generated based on the Trinity Meteorological Data

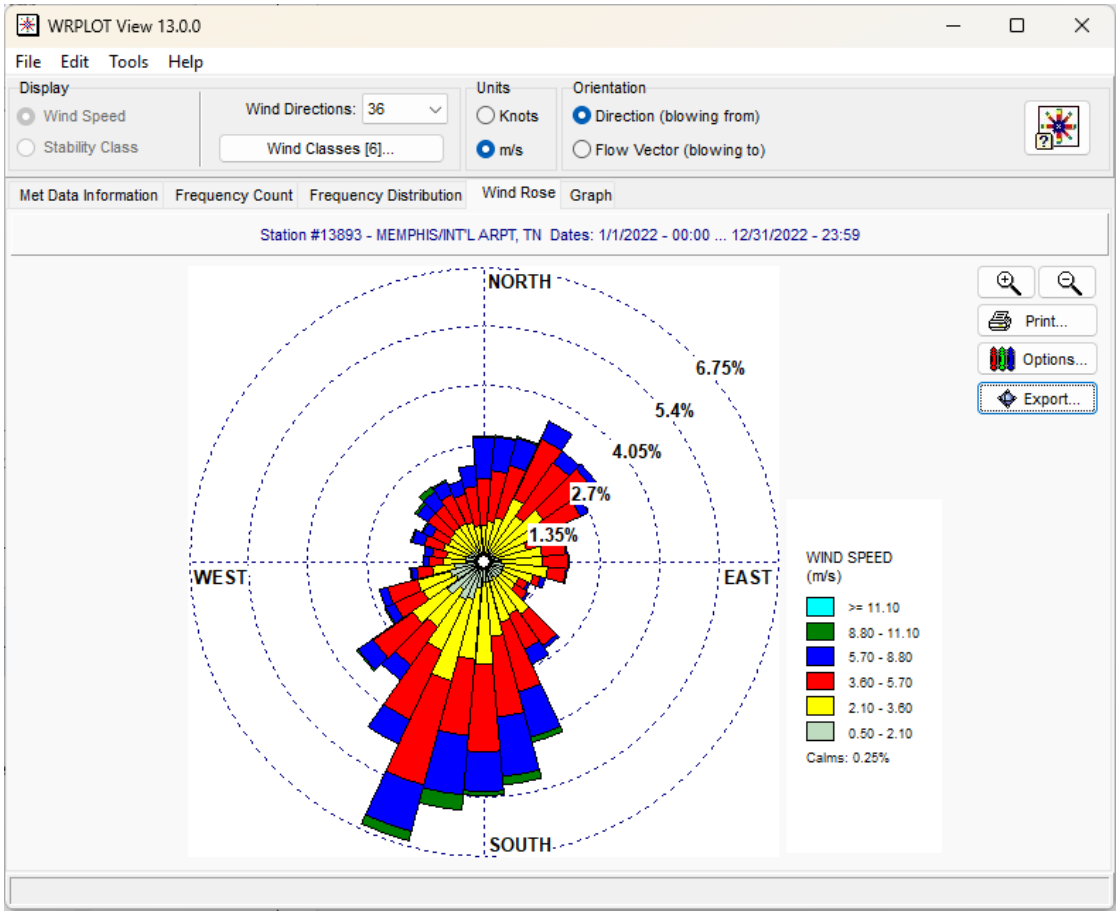


Figure 8. Year 2023 Wind Rose Generated based on the Trinity Meteorological Data

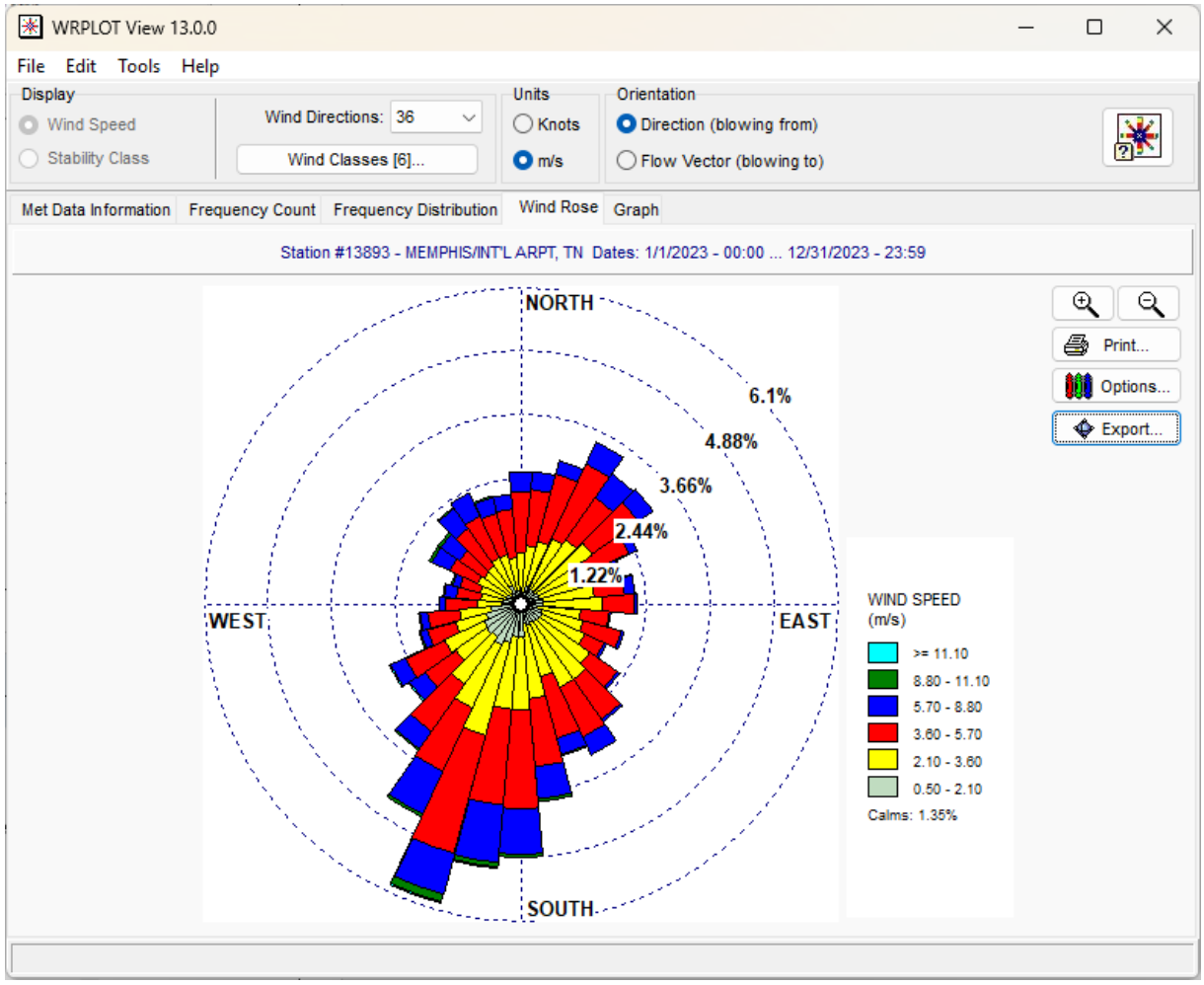
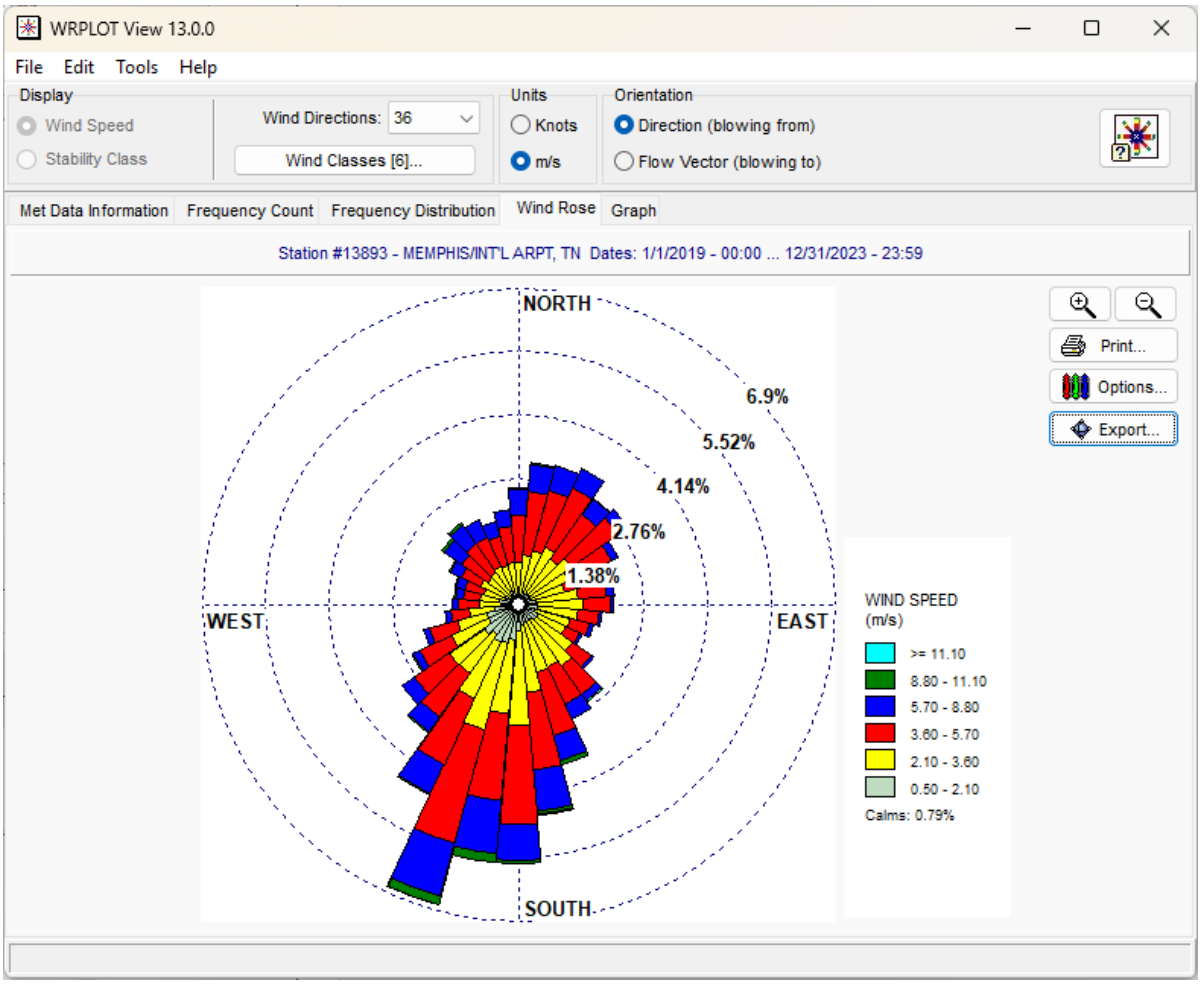


Figure 9. Years 2019-2023 Composite Wind Rose Generated based on the Trinity Meteorological Data (5-Year Wind Rose)



3.2 Review of Trinity Terrain Data and Urban vs Rural Dispersion Options

On electronic page 49 of 114 in the Trinity Modeling Report document, Trinity states, "*Receptor elevations and hill heights required by AERMOD were determined using the AERMAP terrain preprocessor (version 24142). Terrain elevations from the USGS 1-arc second NED were used for AERMAP processing (this can be refined to 1/3rd arc – ref point, which is the most accurate and preferred.* On electronic page 49 of 114 in the Trinity Modeling Report document, Trinity states*, "Receptor elevations and hill heights required by AERMOD were determined using the AERMAP terrain preprocessor (version 24142). Terrain elevations from the USGS 1-arc (30m) NED were used for AERMAP processing."* 1-arc (30m) lower resolution elevation data may smooth out elevation changes that affect plume-to-terrain impacts. This can be refined to 1/3 arc (10m), which is the most accurate and preferred terrain data resolution currently available. This is especially important when the terrain transitions from more flat terrain to the west of the MZX facility, typically around 60 meters in height, to the increased terrain areas like the Memphis bluffs east of the facility, which rise to over 80-120 meters.

3.3 Review of Background Data

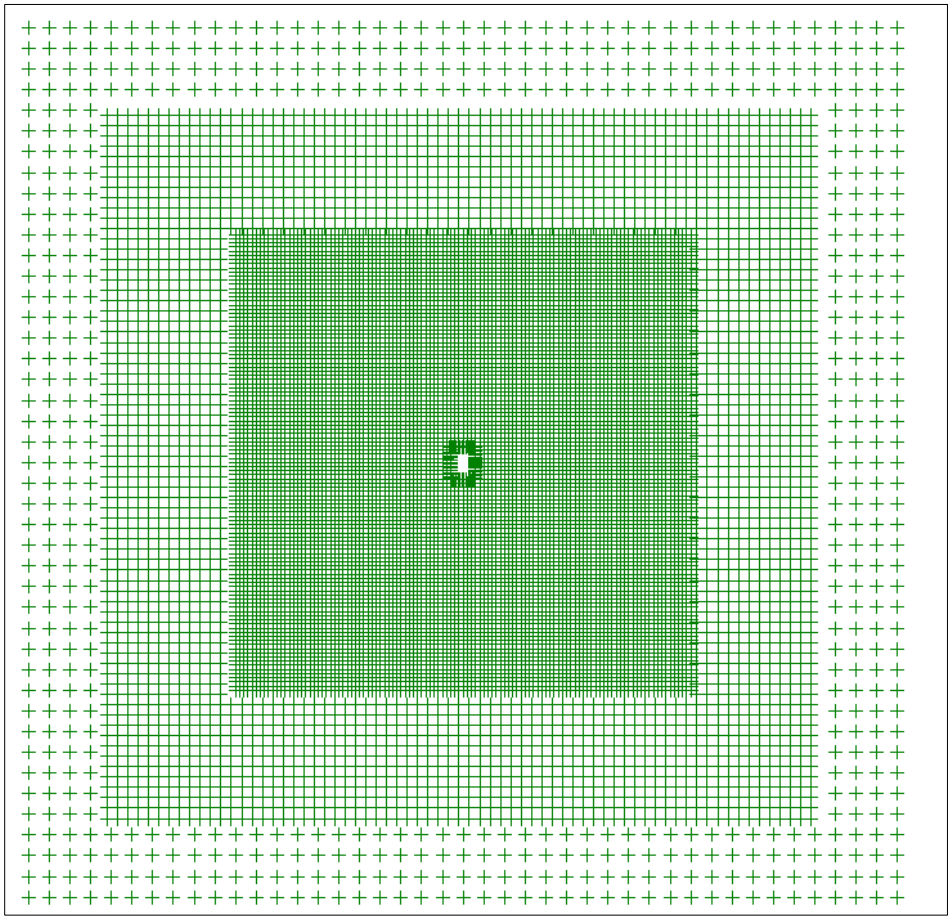
Sullivan Environmental reviewed the background sections of the Trinity report, including section 2.4.2 "*Ambient Background Monitors*" of the Trinity report, as well as section 2.4.2.1 "*NO_2 Background Monitor*", 2.4.2.2 "*PM2.5 Background Monitor"*, 2.4.2.3 "*Ozone Background Monitor*", and found no issues with the Trinity assessment of background concentrations. Trinity selected the most representative monitors, in our opinion.

3.4 Review of the Trinity Receptor Grid

In dispersion modeling, receptors are the locations where the model produces concentration or deposition results. These locations are programmed into the model and can be spaced in terms of vertical and horizontal positions at the modeler's discretion. Typically, as you get closer to the

source, the receptors are placed closer together, since a higher level of resolution is generally used near the source(s), where pollutant concentrations are typically highest. Figure 10 presents the general geometry of the receptor grid used by Trinity Consultants. Sullivan Environmental agrees with the grid selection used by Trinity Consultants.

Figure 10. General Geometry of the Trinity Receptor Grid



3.5 Review of the Trinity Modeling Input Files

Sullivan Environmental agrees that all sources in this assessment can be represented as point sources, as was done in the Trinity Consultants modeling. Additionally, the source files were compared for the different years (2019, 2020, 2021, 2022, 2023), and the data sources seemed to be consistent for all meteorological years modeled for both the SIL and NAAQS runs. Sullivan Environmental agrees that the BPIP data appear to be reasonable, although the building plans were not made available to confirm the BPIP results.

3.6 Review of the Modeling Output Files

There were issues with some of Trinity Consultant's modeling assumptions, most notably the exit velocities of some stacks. Details of this are presented in Section 4, which details clear errors and potential errors identified by Sullivan Environmental when reviewing the input and output files provided by Trinity Consultants.

4.0 DESCRIPTION OF ERRORS AND WARNINGS DISCOVERED IN THE TRINITY AERMOD MODELING ASESSMENT

4.1 AERMOD Gas Exit Velocity Input Error Discussion

In the files "*NO2o5yrNAAQS.ami, NO2o5yrNAAQS_CULP.ami, NO2A2019.ami, NO2A2020.ami, NO2A2021.ami, NO2A2022.ami, and NO2A2023.ami*", the following sources have "*Gas Exit Velocity*" values outside the AERMOD model range and are likely erroneous (Figures 11-15). Note that the gas exit velocity is the speed at which the pollutants are emitted from the stack. Most of the results in Figures 11-15 are so high that they are likely incorrect inputs. **Source TNN0X50, for example, lists an exit velocity of 917.24 m/sec, which equals 2,052 mph (nearly three times the speed of sound).** The gas exit flow rate produced by Trinity Consultants (as shown in Figure 15) is clearly a modeling input error. High exit velocities, including 50.899 m/sec (114 mph), lead to anomalously high effective plume heights, which can substantially understate modeled concentrations. Quality control appears to be deficient in the modeling analysis.

Figure 11. Source: MSNOX31 Gas Exit Velocity Run at 50.899 m/s (or) 113.858 miles per hour

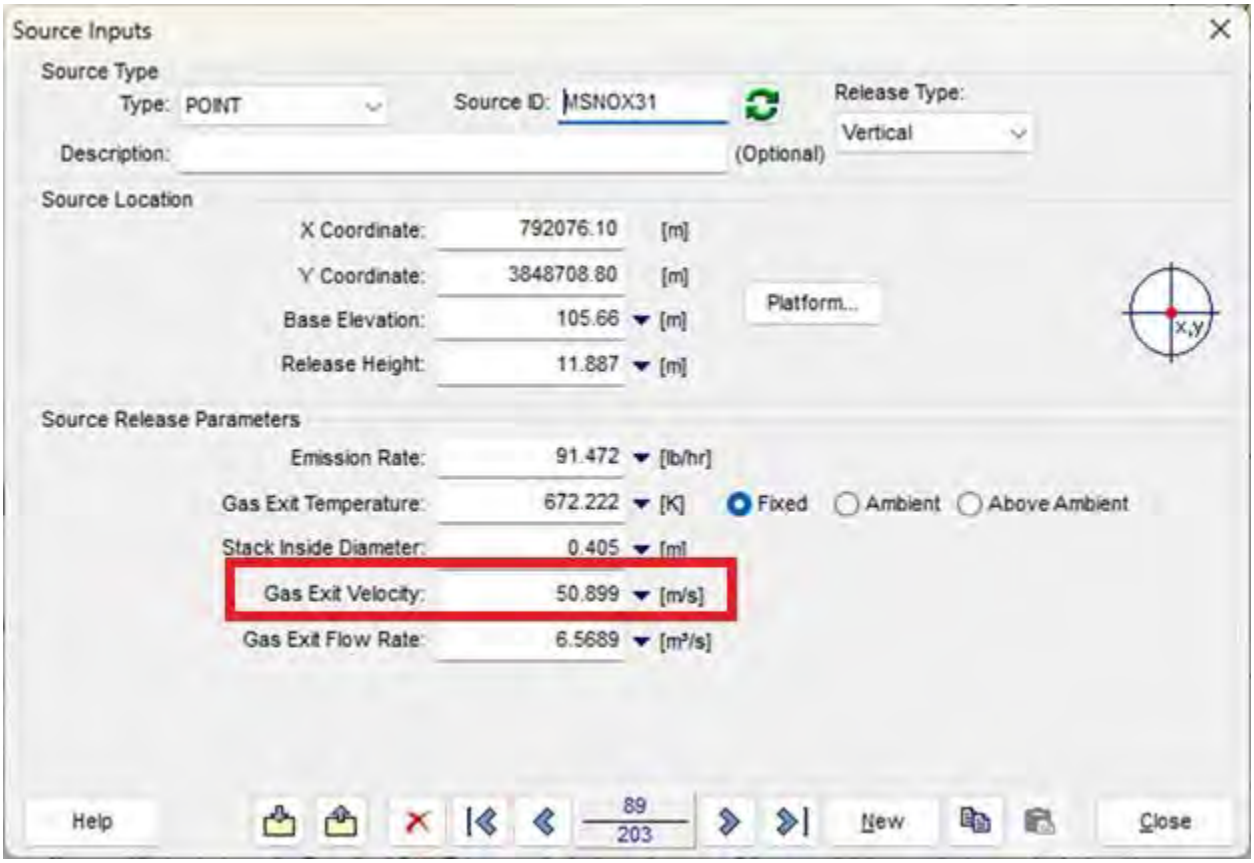


Figure 12. Source: MSNOX32 Gas Exit Velocity Run at 50.899 m/s (or) 113.858 miles per hour

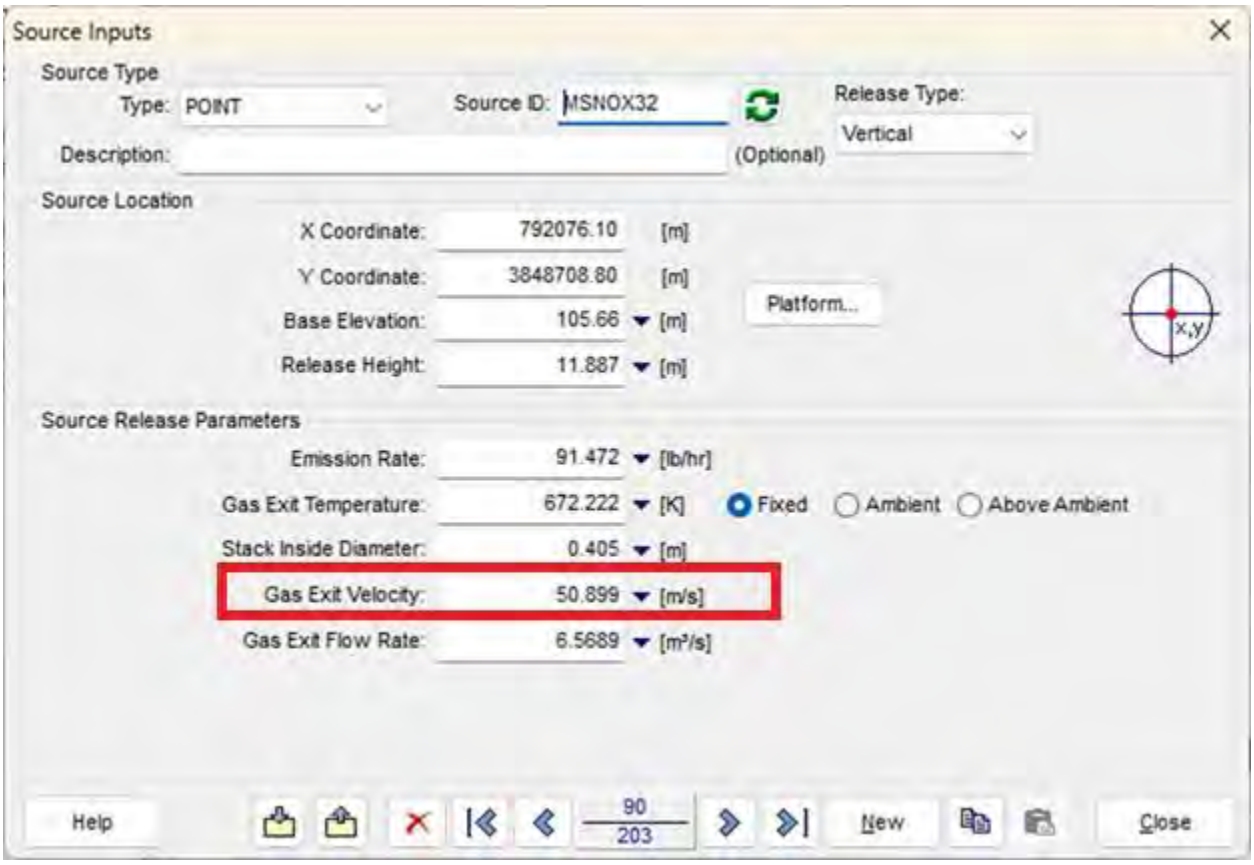


Figure 13. Source: MSNOX33 Gas Exit Velocity Run at 50.899 m/s (or) 113.858 miles per hour

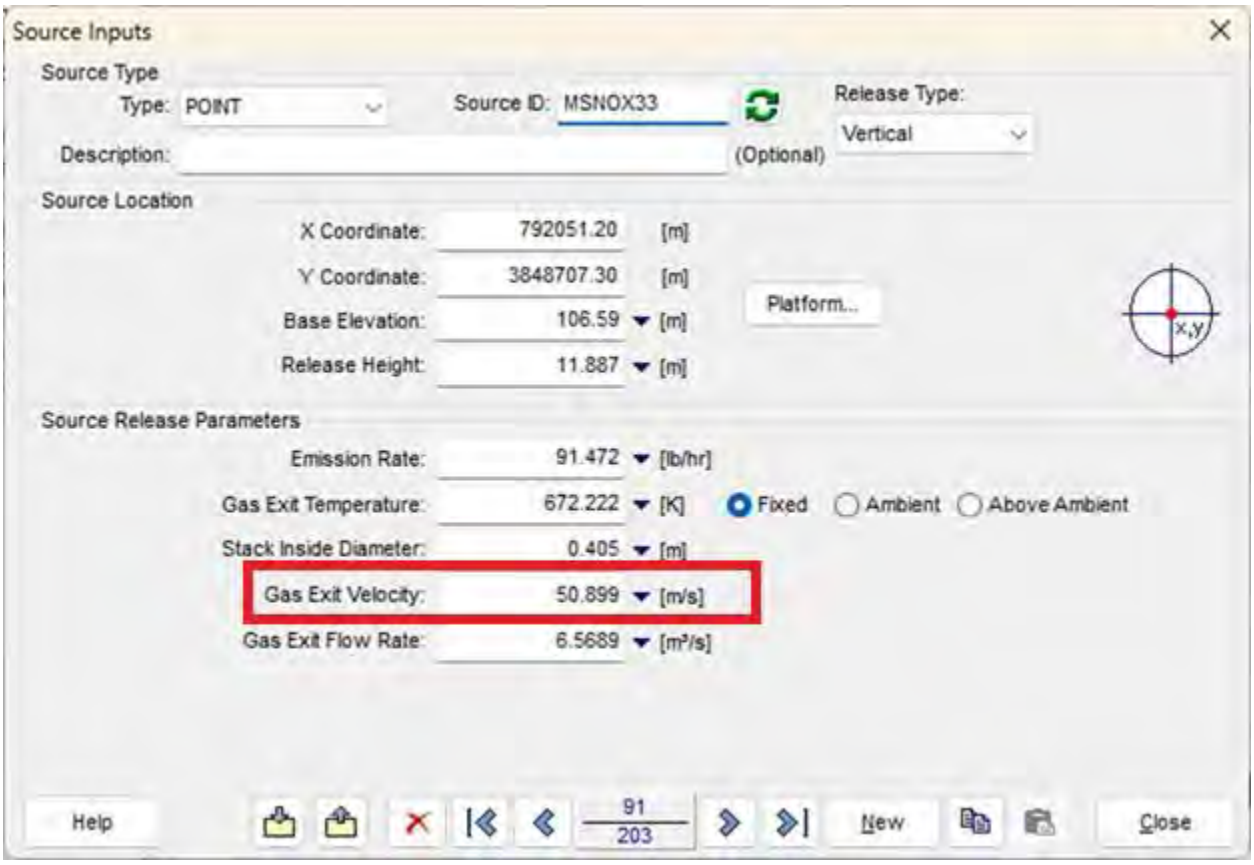


Figure 14. Source: TNNOX49 Gas Exit Velocity Run at 87.31 m/s (or) 195.31 miles per hour

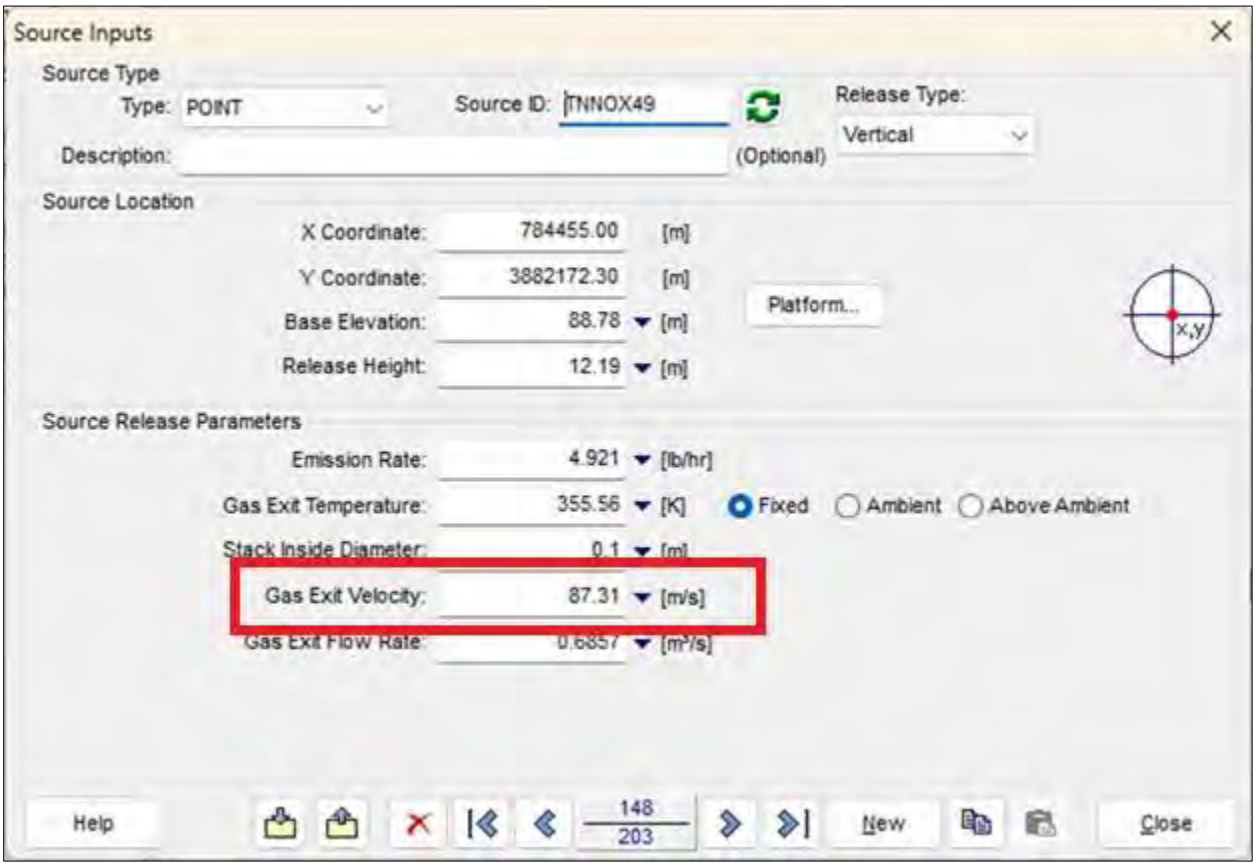
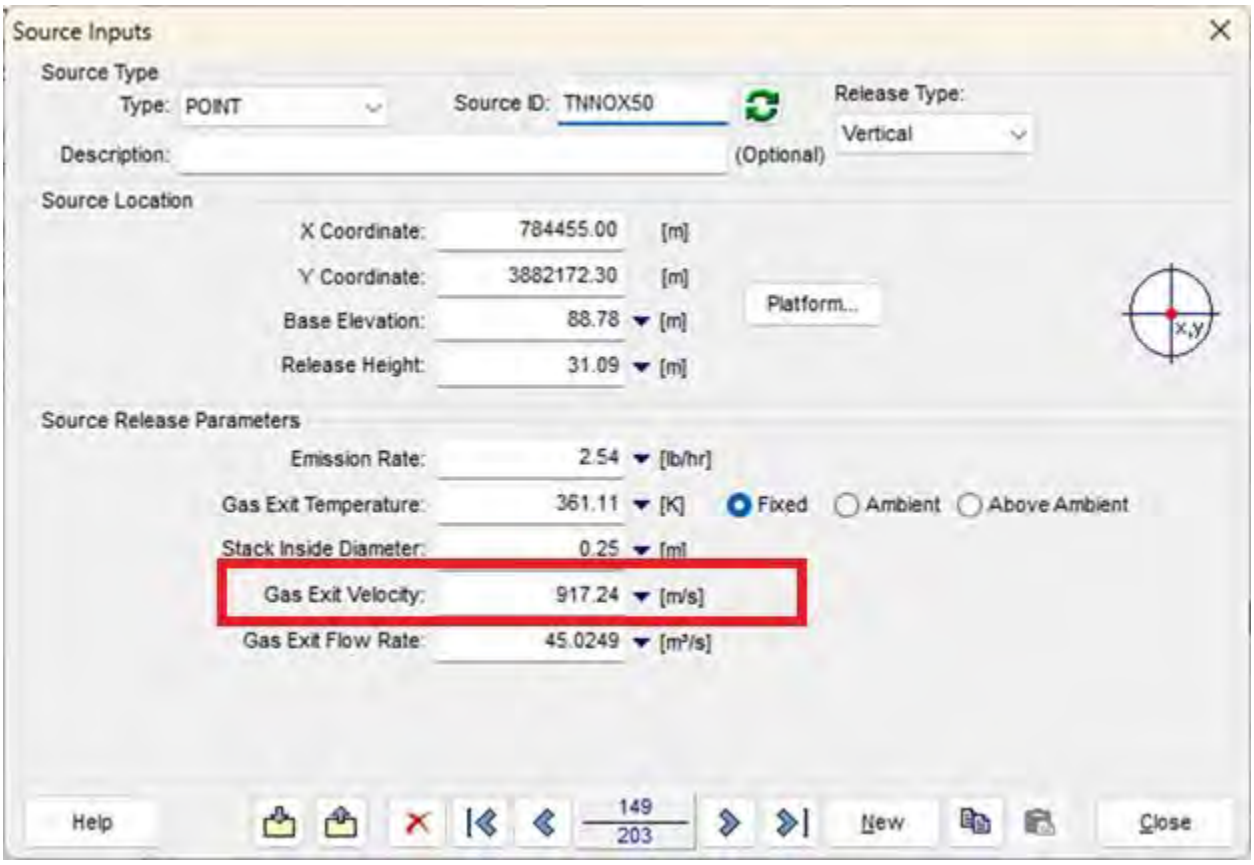


*Figure 15. Source: TNNOX50 Gas Exit Velocity Run at 917.24 m/s (or) 2051.81 miles per hour (or) **Mach 2.77 (2.77 times the speed of sound).***



4.2 Emissions Omitted from the Trinity Modeling Analysis

A comprehensive review of the MZX air quality modeling report reveals a systematic failure to account for significant Nitrogen Oxide (NOx) sources within the Significant Impact Area (SIA). In total, approximately 1,700 tons of emissions per year from multiple facilities (see Table 1) were omitted from the MZX source list. These omissions may lead to an inaccurate assessment of local air quality impacts. Can MZX provide a justification as to why these sources were omitted in their modeling? See Table 1 for a description of these source facilities.

Table 1. Sources Omitted from the Trinity Consultants Modeling Analysis [9]

Facility Name	Street Address	Registry ID (FRS)	NOx (Tons/Year)	Notes / Status
Memphis Int'l Airport	2491 Winchester Rd	*Multiple*	**1,077**	MZX underreported by ~1,048 tons. MZX only listed 29 tons. Listed as facility sources in NEI.
Memphis Train Yards	SW Memphis	19756111 / 14461311	**353**	Omitted; listed as facility sources in NEI.
xAI Colossus I	4150 Port St	110071271114	**> 80**	Entirely omitted; sister facility.
TVA Allen (New Turbines)	2577 Plant Rd	110000374184	**~ 47**	Six new 35 MW turbines were omitted despite their existing permit status.
KTG USA[1]	400 Mahannah Ave	110001857697	**41**	New industrial source; omitted.
Pennakem, LLC[1]	3324 Chelsea Ave	110009446643	**26**	New industrial source; omitted.
South Shelby Landfill[1]	5494 Malone Rd	110022884887	**21**	New industrial source; omitted.
Cargill Corn Milling[1]	2330 Buoy St	110000496838	**17**	Confirmed omitted.
Richardson Memphis[1]	1351 Williams Ave	110000373872	**15**	Also listed as Conagra; omitted.
St. Jude Children's Research Hospital[1]	332 N Lauderdale	110000820559	**14**	New institutional source; omitted.
Owens Corning Memphis Asphalt[1]	2301 Channel Ave	110001857866	**11**	Confirmed omitted.
Fleischmann's Yeast[1]	2743 Riverport Rd	110000374041	**4**	Confirmed omitted.
The Bryce Company[1]	4505 Old Lamar Ave	110000745560	**3**	New industrial source; omitted.

[1] EPA, Enforcement and Compliance History Online, https://echo.epa.gov/.

[9] These sources were identified by Sullivan Environmental or the SELC.

5.0 SUMMARY AND CONCLUSIONS

Sullivan Environmental provided a review of the modeling work conducted by Trinity Consultants. We focused on the main priorities of review, as detailed by the Southern Environmental Law Center (SELC), and also reviewed the modeling inputs and outputs in detail. Our primary findings are:

- Offsite Intermittent sources of NOx were not modeled in a manner that demonstrates their actual contribution to the 98th percentile of the 1-hour daily maximum concentrations.

- The modeling of offsite sources, as conducted by Trinity Consultants, is unrealistic, based on incorrect treatments of release specifications in some cases, and without consideration for downwash effects, such that the results are not reliable.

- The gas exit velocities of some of the sources, as modeled by Trinity Consultants, are clearly too high and incorrect, thereby understating the impacts of pollutant releases from those sources.

Attachment 2

February 13, 2026

VIA CERTIFIED MAIL, RETURN RECEIPT REQUESTED

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d/b/a xAI
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Corporation Service Company
Registered Agent for X.AI Corp.
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Registered Agent for Space Exploration Technologies Corp.
211 E. 7th Street, Suite 620
Austin, TX 78701

RE: Notice of Intent to Sue for Violations of the Clean Air Act at the Gas Turbines Power Plant Located at 2875 Stanton Road S., Southaven, MS, that Powers xAI's Colossus II Data Center

To All Recipients:

This letter provides notice that the National Association for the Advancement of Colored People and the NAACP Mississippi State Conference (collectively, "NAACP") intend to file suit

against MZX Tech LLC and X.AI Corp. (hereafter and jointly, "xAI") for their past and ongoing violations of the federal Clean Air Act occurring at 2875 Stanton Road S., Southaven, Mississippi.

On August 1, 2025, xAI began installing and then operating combustion turbines at the Stanton Road site without obtaining the necessary preconstruction or operating air permits, in violation of the Clean Air Act.

As of the date of this letter, xAI has installed at least 27 turbines with a generating capacity of 495 MW—functionally, an unpermitted power plant. These turbines were evidently installed to power xAI's new Colossus II data center at 5400 Tulane Road, Whitehaven, Tennessee. Combined, the turbines have the potential to emit a significant amount of smog-forming nitrogen oxides ("NOx") per year—well above the Clean Air Act's major source threshold—and numerous other harmful pollutants, such as fine particulate matter and carcinogenic formaldehyde. Pollution from these turbines is worsening and will continue to worsen the already poor air quality in Southaven, Mississippi and the Memphis metropolitan area.

The NAACP advocates for environmental and climate justice, and it is committed to ensuring that local communities and its members—including in Mississippi and Tennessee—are protected from harmful pollution from fossil fuel combustion. Unless the violations detailed below are fully addressed, the NAACP intends to file suit under Section 304 of the Clean Air Act, 42 U.S.C. § 7604, in the United States District Court for the Northern District of Mississippi after the applicable notice period has expired. The NAACP will seek injunctive relief, civil penalties, mitigation, fees and costs of litigation, and such other relief as the Court deems appropriate to address the violations.

If you would like to discuss any factual or legal issues set forth in this letter, or a possible resolution of this matter during the notice period, please contact the undersigned attorneys.

I. FACTUAL BACKGROUND

A. xAI's data center footprint in the Memphis and Southaven areas

xAI—a private, multibillion dollar company founded by Elon Musk[1]—is rapidly constructing a large-scale data center footprint in the greater Memphis and Southaven area. These data centers are used by xAI to train Grok—an AI chatbot integrated into the social media platform

[1] In February 2026, SpaceX—another Elon Musk company—acquired xAI, combining the two privately held companies into one with an estimated $1.25 trillion valuation. Echo Wang & Joey Roulette, *SpaceX Acquires xAI in Record-Setting Deal as Musk Looks to Unify AI and Space Ambitions*, REUTERS (Feb. 2, 2026), https://www.reuters.com/business/musks-spacex-merge-with-xai-combined-valuation-125-trillion-bloomberg-news-2026-02-02/ [https://perma.cc/67UH-DKK6].

X (formerly Twitter).[2] Each data center requires a large amount of power.[3] That power is, at least in part, unlawfully obtained from unpermitted gas turbines.

In June 2024, xAI announced that it was building the world's largest AI supercomputer, a data center now known as Colossus I at 3231 Paul R. Lowry Road in Memphis, Tennessee, beside the historically Black community of Boxtown.[4] Within a few months, members of the public uncovered that xAI was powering Colossus I with 35 unpermitted turbines. Over the course of the next year, neighbors and community groups in the greater Memphis area raised concerns about the turbines' harmful emissions, as well as the lack of transparency and accountability from xAI and regulators. NAACP and its members, among groups such as Young, Gifted, and Green, Memphis Community Against Pollution, Protect Our Aquifer, and others, held and attended numerous large public meetings and town hall events, wrote hundreds of letters and public comments, and repeatedly called for action to stop the operation of the unpermitted turbines and advocated for broader reduction in harmful pollution in southwest Memphis—an area long over-burdened by industrial emitters. Despite this advocacy, xAI continued to operate, so on June 17, 2025, the NAACP sent a Notice of Intent to sue xAI for its past and ongoing violations of the Clean Air Act at the Colossus I site. By the end of the summer of 2025, both permitted turbines and the Tennessee Valley Authority provided power for Colossus I.

In the midst of community resistance for Colossus I's operations, in March 2025, xAI acquired property to build a second data center—Colossus II—at 5420 Tulane Road in Whitehaven, Tennessee.[5] Soon thereafter, xAI's senior manager for infrastructure explained that

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[2] Brian Butnz, *How xAI turned a factory shell into an AI 'Colossus' to power Grok 3 and beyond*, R&D WORLD (Feb. 18, 2025), https://www.rdworldonline.com/how-xai-turned-a-factory-shell-into-an-ai-colossus-to-power-grok-3-and-beyond/ [https://perma.cc/R62X-XEZC]; Elon Musk (@elonmusk), X (Jan. 17, 2026) https://x.com/elonmusk/status/2012500968571637891 [https://perma.cc/CB7S-Z9VW] (posting "The Colossus 2 supercomputer for @Grok is now operational. First Gigawatt training cluster in the world. Upgrades to 1.5GW in April").

[3] *Data Centers and Servers,* U.S. DEP'T. OF ENERGY (last visited Feb. 8, 2026), https://www.energy.gov/eere/buildings/data-centers-and-servers [https://perma.cc/ZA2K-NQA7]; Bhargs Srivathsan et al., *AI Power: Expanding Data Center Capacity to Meet Growing Demand*, MCKINSEY & CO. (Oct. 29, 2024), https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/ai-power-expanding-data-center-capacity-to-meet-growing-demand [https://perma.cc/JVS2-VBU6].

[4] *xAI Marks Its Spot In Memphis,* GREATER MEMPHIS CHAMBER (June 5, 2024), https://memphischamber.com/economic-development/xai/ [https://perma.cc/6LZX-LPSP].

[5] Neil Strebig, *Elon Musk's xAI Acquires Southwest Memphis Property, Plans for Further Expansion*, MEMPHIS COM. APPEAL (Mar. 7, 2025), https://www.commercialappeal.com/story/money/business/development/2025/03/07/elon-musk-xai-supercomputer-memphis-tn/81965304007/?gnt-cfr=1&gca-cat=p&gca-uir=true&gca-epti=z116335p119650c119650d00----v116335b0041xxd004165&gca-ft=134&gca-ds=sophi [https://perma.cc/LC8V-CUN8]. At the time, xAI had not disclosed how it planned to power Colossus II, but soon thereafter, Memphis Light, Gas, and Water stated that it had discussed with xAI a range of grid power options for the Tulane Road facility for up to 1.1 GW of power, although no final request had been submitted or was under consideration at that time. *MLGW is providing this update to the public regarding utility support for xAI*, MEMPHIS LIGHT, GAS & WATER (May 5, 2025),

xAI would be "copying and pasting" what it did at Colossus I, indicating the company would again rely on unpermitted turbines.[6]

MZX Tech LLC acquired 2875 Stanton Road S. in Southaven, Mississippi in July 2025. During the summer of 2025, xAI met with Mississippi Department of Environmental Quality ("MDEQ") to discuss xAI's plans for building a 1.2 GW simple-cycle combustion turbine power plant located at that site. Approximately 39 percent of the Southaven population is Black.[7]

To provide power to Colossus II in the interim, before xAI had a permit for that future power plant, xAI decided to "use portable gas-fired combustion turbines" at the Stanton Road site in Southaven, Mississippi.[8] While xAI recognized pre-construction permits would be required for "the permanent emission units comprising the facility," it made plans to bring "temporary turbines on site to be used prior to receiving the air permit."[9] In a July 25, 2025 email to MDEQ, xAI claimed that, in its view, this strategy was "allowed."[10]

On July 29, 2025, MDEQ responded to xAI, agreeing with xAI's legal conclusion that the turbines were "exempt" from permitting requirements, subject to certain conditions.[11] MDEQ's response was contingent upon two criteria: "the referenced turbines will be [1] 'mobile' as each will remain affixed to a portable unit (i.e., a flatbed trailer) and [2] 'temporary' as it is intended for each to remain on-site (2875 Stanton Road South; Southaven, MS) for less than twelve (12) months."[12] Citing the existing air quality problems in DeSoto County, MDEQ "implore[d]" xAI to operate the turbines "in a manner that minimizes the emissions of nitrogen oxides (NOx) and

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https://www.mlgw.com/images/content/files/pdf/new/5-5-25%20xAI%20Update.pdf [https://perma.cc/JHS2-96YD].

[6] Neil Strebig, *xAI offical updates Colossus 2 plans in Memphis, but not how site will be powered*, MEMPHIS COM. APPEAL (July 15, 2025) [https://perma.cc/G8FV-PSPY].

[7] *QuickFacts Southaven City, Mississippi*, U.S CENSUS BUREAU, https://www.census.gov/quickfacts/fact/table/southavencitymississippi/INC110224 [https://perma.cc/T2Z6-Y27D] (last visited Feb. 12, 2026)

[8] Email from Brent Mayo, xAI, to Chris Wells & Jaricus Whitlock, MISS. DEP'T OF ENV'T QUALITY, RE: Permit Follow Up (July 25, 2025) (on file with author). Correspondence to or from Miss. Dep't Env't Quality that is referenced in this notice letter was obtained through public records requests.

[9] *Id.*

[10] *Id.*

[11] Letter from Jaricus Whitlock, Chief, Air Div., MISS. DEP'T OF ENV'T QUALITY, to Brent Mayo, Vice President of Operations, xAI, RE: Determination on Portable Gas-Fired Combustion Turbines (July 29, 2025) (on file with author).

[12] *Id.* In support, MDEQ cited 11 Mississippi Administrative Code Part 2, Chapter 2, Rule 2.13.D. *Id.*

particulate matter less than 2.5 microns in diameter (PM2.5)."[13] xAI promptly began installing and operating turbines at the Stanton Road site to provide power to Colossus II.[14]

Continuing to expand its data center operations in the area, in December 2025, xAI announced plans to construct and operate yet another data center—Colossus III—at 2400 Stateline Rd W., Southaven, Mississippi. This data center will bring xAI's Memphis-area power demands to nearly 2 GW—approximately the output of the Hoover Dam.[15] The public has yet to learn details on how xAI will power Colossus III.

B. xAI's facility in Southaven, Mississippi

At MDEQ's request, xAI has been providing the agency with information about the turbines it is using at the Stanton Road site in Southaven, Mississippi.[16] Although xAI first notified MDEQ that it was preparing to bring turbines on the Colossus II power station site in Southaven in July of 2025, it did not include any details about the number, make and model, generating capacity, or potential air emissions of the turbines; xAI described them only as "portable gas-fired combustion turbines."[17]

Correspondence from August and September shows that xAI kept increasing the number of turbines it planned to have on-site. By early August 2025, according to xAI's consultant, xAI had installed three SMT-130s on the site.[18] xAI's consultant told MDEQ that the plan was to eventually increase to six SMT-130s and ten TM2500s on the site.[19] By September 6, 2025, xAI's plan grew to encompass 17 total turbines (10 TM2500s and 7 SMT-130s), and xAI's consultant reported that selective catalytic reduction ("SCR") system construction was complete on 6 of the

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[13] *Id.*

[14] *See* Email from Shannon Lynn, Trinity Consultants, to Jaricus Whitlock, MISS. DEP'T OF ENV'T QUALITY, RE: Request for Additional Information - Portable Turbines (Nov. 25, 2025) (on file with author) (reflecting the turbines being brought to the site starting August 1, 2025).

[15] Elon Musk (@elonmusk), X (Dec. 30, 2025), https://x.com/elonmusk/status/2006108047609930069 [https://perma.cc/3DFT-Q85H] (posting "xAI has bought a third building called MACROHARDRR. Will take @xAI training compute to almost 2GW"); *Hoover Dam*, ENCYCLOPEDIA BRITANNICA, https://www.britannica.com/topic/Hoover-Dam [https://perma.cc/NX9R-9B7V] (last visited Feb. 9, 2026).

[16] Email from Jaricus Whitlock, MISS. DEP'T OF ENV'T QUALITY, to Shannon Lynn, Trinity Consultants, RE: Request for Update - Portable Turbines (Oct. 30, 2025) (on file with the author); Email from Jaricus Whitlock, MISS. DEP'T OF ENV'T QUALITY, to Shannon Lynn, Trinity Consultants, RE: Portable Turbine Information (Aug. 14, 2025) on file with the author); Email from Jaricus Whitlock, MISS. DEP'T OF ENV'T QUALITY, to Shannon Lynn, Trinity Consultants, RE: Portable Turbine Information (Sept. 8, 2025) (on file with the author).

[17] Email from Brent Mayo, xAI, to Chris Wells & Jaricus Whitlock, MISS. DEP'T OF ENV'T QUALITY, RE: Permit Follow Up (July 25, 2025) (on file with author).

[18] Email from Shannon Lynn, Trinity Consultants, to Jaricus Whitlock, MISS. DEP'T OF ENV'T QUALITY, RE: Portable Turbine Information (Aug. 18, 2025) (on file with author).

[19] *Id*.

7 SMT-130 units.[20] A few days later, xAI's consultant reported that an additional turbine, an M35, would be brought on-site, increasing the total to 18 turbines (10 TM2500s, 7 SMT-130s, and 1 M35) with a combined total output of 400.5 MW.[21] On November 4, 2025, the consultant informed MDEQ, "[a]ll Solar units are operating with SCR and oxidation catalyst. All TM2500's are operating with demin [demineralized] water."[22] In other words, only the SMT-130s were using selective catalytic reduction to control for smog-forming pollution; the larger TM2500 and M35 turbines were not.

Aerial photographs confirm that there were 18 gas turbines on-site as of October 31, 2025.



Figure 1: Aerial view of xAI's Stanton Road S. facility (Oct. 31, 2025; Steve Jones/SouthWings).

[20] Email from Shannon Lynn, Trinity Consultants, to Jaricus Whitlock, MISS. DEP'T OF ENV'T QUALITY, RE: Portable Turbine Information (Sept. 6, 2025) (on file with author).

[21] Email from Shannon Lynn, Trinity Consultants, to Jaricus Whitlock, MISS. DEP'T OF ENV'T QUALITY, RE: Portable Turbine Information (Sept. 10, 2025) (on file with author). In later correspondence, xAI's consultant provided MDEQ with different generating capacity information for the turbines, indicating that the first 18 turbines on-site had a combined generating capacity of at least 354 MW. Unit Type and Generating Capacity derived from Email from Shannon Lynn, Trinity Consultants, to Jaricus Whitlock, MISS. DEP'T OF ENV'T QUALITY, RE: Request for Additional Information - Portable Turbines (Nov. 4, 2025) (on file with author).

[22] Email from Shannon Lynn, Trinity Consultants, to Jaricus Whitlock, MISS. DEP'T OF ENV'T QUALITY, RE: Request for Update - Portable Turbines (Nov. 5, 2025) (on file with author).

Thermal imaging captured on October 31, 2025, demonstrates that at least 9 of those 18 turbines were operating at the time, including five of the SMT-130 turbines (circular smoke stacks) and four of the TM2500 turbines (rectangular smoke stacks).

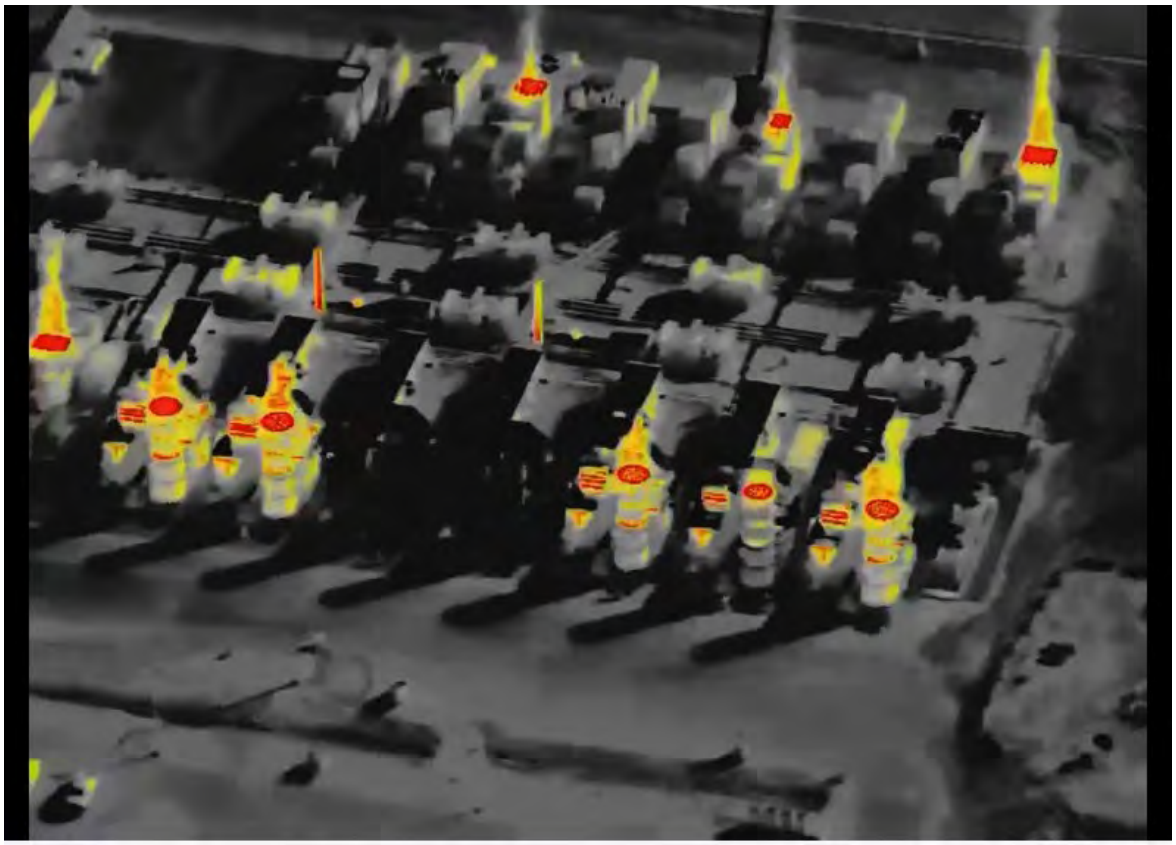


Figure 2: Thermal camera image of xAI's Stanton Road S. facility (Oct. 31, 2025; Steve Jones/SouthWings).

In December 2025, xAI's consultant informed MDEQ that nine additional turbines would be brought on-site by December 18, bringing the total number turbines to 27.[23] As of December 11, 2025, xAI's consultant represented that the first 18 turbines were operational, and that the additional nine turbines would not operate until the SMT 130s were outfitted with SCR and the TM 2500s were outfitted with water injection.[24]

[23] Email from Shannon Lynn, Trinity Consultants, to Jaricus Whitlock, MISS. DEP'T OF ENV'T QUALITY, RE: Updated count (Dec. 11, 2025) (on file with author).

[24] *Id.*

Satellite photographs from February of 2026 confirm that there were at least 27 turbines on-site.



Figure 3: Aerial image of xAI's Stanton Road S. facility (lower left quadrant), the Colossus II Data Center (top center building with "MACROHARD" on its roof), and the Colossus III Data Center (center, south adjacent to Colossus II) (Feb. 9, 2026).



Figure 4: Close-up aerial image of xAI's Stanton Road S. facility showing 27 turbines (Feb. 9, 2026).

Based on representations by xAI's consultant to MDEQ about the 27 turbines on-site, and information and belief, these turbines have a combined generating capacity of at least 495 MW, and, specifically, the 27 turbines include: 14 SMT-130s, 1 M35, 4 Gen 6 TM2500s, 5 Gen 7 TM2500s, and 3 Gen8 TM2500s.[25] Each of these turbines has a heat input greater than 10 MMBtu/h.[26] Collectively, these 27 turbines have the potential to emit multiples of 250 tons of

[25] Turbine type and generating capacity information is derived from correspondence with MDEQ and assumes that xAI's consultant (Trinity Consultants) was accurate in its representations. *See, e.g.*, Email from Shannon Lynn, Trinity Consultants, to Jaricus Whitlock, MISS. DEP'T OF ENV'T QUALITY, RE: Updated Count (Dec. 11, 2025) (on file with author); Email from Shannon Lynn, Trinity Consultants, to Jaricus Whitlock, MISS. DEP'T OF ENV'T QUALITY, RE: Request for Update - Portable Turbines (Nov. 4, 2025) (on file with author). However, earlier, Trinity Consultants provided higher generating capacity amounts for the first 18 turbines, for a total of 400.5 MW (16.5 MW per SMT130, 25 MW per TM2500, and 35 MW per M35). *See* Email from Shannon Lynn, Trinity Consultants, to Jaricus Whitlock, MISS. DEP'T OF ENV'T QUALITY, RE: Portable Turbine Information (Sept. 10, 2025) (on file with author).

[26] *See* Exhibit A (collected manufacturer specification sheets).

NOx[27] per year and at least 10 tons of formaldehyde[28] per year, in addition to numerous other regulated pollutants.

Neither xAI nor MDEQ have made any public announcements or statements concerning the existence of this growing and unregulated ad hoc power plant or its emissions.[29] Nor did xAI or MDEQ seek public input on the existence of this colossal power plant now operating in their community. Ignoring the concerns expressed by community members and groups who opposed Colossus I, xAI has again kept entirely in the dark the families who will be most harmed by the turbines' daily operation.

C. xAI's Turbines emit harmful pollutants

The turbines at xAI's Stanton Road Facility in Southaven, Mississippi emit a variety of

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[27] That the turbines have the potential to emit significantly more than 250 tons of NOx per year is based on consideration of the following information: NOx emissions rates provided by xAI's consultant to MDEQ (and with review of emissions rates in EPA's AP-42); turbine information provided by xAI's consultant to MDEQ; and turbine manufacturer specifications for the turbine makes and models identified by xAI's consultant in communications with MDEQ. *See, e.g.*, Email from Shannon Lynn, Trinity Consultants, to Jaricus Whitlock, MISS. DEP'T OF ENV'T QUALITY, RE: Request for Update - Portable Turbines (Nov. 5, 2025) (on file with author) (representing NOx emissions rates as 25 ppm for the TM2500s, and emissions rates analogous to xAI's air permit application for "Solar units" (i.e., SMT 130s)); *see also* MZX Tech LLC PSD Permit Application at 5-1 (July 2025) (reflecting a NOx rate for Solar turbines utilizing SCR of 2 ppm); Exhibit A (collected manufacturer specification sheets); *see also AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources: Natural Gas Combustion*, ENV'T PROT. AGENCY, https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-fifth-edition-volume-i-chapter-1-external-1 [https://perma.cc/WQ6U-NUCK] (last updated Aug. 28, 2025). Given that the turbines are not subject to any air permit or requisite emissions monitoring, there exists no publicly available documentation to confirm that the emission rates represented by xAI's consultant reflect actual emissions; actual emission rates could be higher. Additionally, to the extent that some of the turbines are models that the manufacturer no longer sells (on information and belief, the Gen 6 and Gen 7 TM2500s, for example), these turbines' actual emissions may not reflect the emission rates provided in the manufacturer's specifications.

[28] This estimate is derived from the formaldehyde emission rate available in EPA's AP-42, with consideration of information from xAI's consultant to MDEQ about the turbines' make, model, and emission controls. *See AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources: Natural Gas Combustion*, ENV'T PROT. AGENCY, https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-fifth-edition-volume-i-chapter-1-external-1 [https://perma.cc/WQ6U-NUCK] (last updated Aug. 28, 2025). Notably, for the turbine facility permit at Colossus I, xAI-affiliate CTC used the AP-42 emission factor to calculate formaldehyde emissions of 9.5 tpy from a total of 15 turbines. Here, in comparison, the site has 14 turbines of the same make and model as Colossus I, as well as 13 additional, larger, turbines. Trinity Consultants, CTC Property LLC, Synthetic Minor Operating Permit Application at 1-1 (Jan. 2025) (on file with author).

[29] While a draft major source permit for a future power plant at the same Stanton Road location was published for comment on January 16, 2026, that permit does not apply to the unpermitted turbines currently operating at this site. *See EPD Permits at Public Notice*, MISS. DEP'T OF ENV'T QUALITY, https://www.mdeq.ms.gov/ensearch/epd-permits-at-public-notice/ [https://perma.cc/QD2A-FSTP] (last visited Feb. 9, 2026).

pollutants known to cause human health impacts. Those pollutants include nitrogen oxides ("NOx"), a harmful pollutant on its own and a precursor pollutant to particulate matter and ozone, as well as fine particulate matter, sulfur dioxide, volatile organic compounds, and toxic and carcinogenic chemicals like formaldehyde.

Nitrogen dioxide ("NO_2"), a significant component of the NOx emitted by turbines, can irritate airways in the human respiratory system and can lead, in the short term, to respiratory symptoms (such as coughing, wheezing or difficulty breathing), hospital admissions and visits to emergency rooms.[30] Longer exposures to elevated concentrations of NO_2 may contribute to the development of asthma and potentially increase susceptibility to respiratory infections.[31]

NOx reacts with other chemicals, including volatile organic compounds, in the air to form both particulate matter and ozone, and it is a primary cause of smog. Among other harmful health effects, smog irritates people's lungs and causes asthma attacks.[32] Particulate matter exposure through inhalation can impact human lungs and hearts. Exposure to such particle pollution has been linked to premature death in people with heart or lung disease; nonfatal heart attacks; aggravated asthma; decreased lung function; and increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing.[33]

Formaldehyde can cause irritation to human respiratory tracts and eyes and has been characterized as a human carcinogen by the Department of Health and Human Services.[34]

xAI's emissions contribute to already high levels of ozone in the surrounding area. In 2024, both Shelby County and DeSoto County received an "F" for their ozone pollution from the American Lung Association.[35] DeSoto County was the only county in Mississippi to receive an

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[30] *Basic Information about NO2*, ENV'T PROT. AGENCY (July 10, 2025), https://www.epa.gov/no2-pollution/basic-information-about-no2 [https://perma.cc/46RV-G6WQ].

[31] *Id*.

[32] *Health Effects of Ozone Pollution*, ENV'T PROT. AGENCY, https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution [https://perma.cc/4P3V-Q7BE] (last updated Mar. 13, 2025).

[33] *Health and Env't Effects of Particulate Matter (PM)*, ENV'T PROT. AGENCY, https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm#:~:text=Particulate%20matter%20(PM)%20can%20have%20both%20health,(haze)%20in%20parts%20of%20the%20United%20States [https://perma.cc/S5EY-5DXN] (last updated May 23, 2025).

[34] *Public Health Statement for Formaldehyde,* AGENCY FOR TOXIC SUBSTANCES DISEASE REGISTRY (May 17, 2021), https://wwwn.cdc.gov/TSP/PHS/PHS.aspx?phsid=218&toxid=39 [https://perma.cc/N4MT-4VN7].

[35] *Tennessee: Shelby*, AM. LUNG ASS'N (2025), https://www.lung.org/research/sota/city-rankings/states/tennessee/shelby [https://perma.cc/4UF2-MP8Q]; *Mississippi: Desoto*, AM. LUNG ASS'N, (2025), https://www.lung.org/research/sota/city-rankings/states/mississippi/desoto [https://perma.cc/8AW6-W9ZM]. Also, Memphis was deemed an asthma capital of the nation by the Asthma and Allergy Foundation of America due to high rates of emergency room visits and deaths from asthma. ASTHMA & ALLERGY FOUND. OF AM., *2024 Asthma Capitals, The Most Challenging Places to*

"F."[36] The number of high ozone days in DeSoto County has been increasing since 2019.[37]

xAI's unpermitted turbines are likely one of the largest industrial sources of NOx in the 11-county Memphis Metropolitan Statistical Area ("MSA"), which includes Desoto County.[38] For example, EPA's National Emissions Inventory lists the largest industrial emitter in the Memphis MSA as the Dupont Chemical plant in Shelby County, TN, which emitted 743 tons of NOx in the most recent reporting year;[39] meanwhile, based on available information, including the representations of xAI's consultant, xAI's turbines in Southaven likely will emit well over double that amount of NOx each year.

II. APPLICABLE CLEAN AIR ACT REQUIREMENTS

The Clean Air Act is a broad remedial statute designed to "protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and productive capacity of its population."[40] In general, the Act regulates emissions both by type of source (i.e., whether the source is "stationary" or "mobile") and by type of air pollutant (i.e., whether the emissions are "criteria pollutants" or "hazardous air pollutants").

The Act requires the Environmental Protection Agency ("EPA") to regulate emissions of air pollutants that "cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare."[41] These are referred to as "criteria pollutants," and include

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Live with Asthma, 6–7, 12–13 (2024), https://aafa.org/wp-content/uploads/2024/09/aafa-2024-asthma-capitals-report.pdf [https://perma.cc/CK5S-54PH].

[36] *Report Card: Mississippi*, AM. LUNG ASS'N (2025), https://www.lung.org/research/sota/city-rankings/states/mississippi [https://perma.cc/J482-BC2K].

[37] *Mississippi: Desoto*, AM. LUNG ASS'N (2025), https://www.lung.org/research/sota/city-rankings/states/mississippi/desoto [https://perma.cc/7QCB-6JFR]. For example, the past several years of ambient air monitoring data in DeSoto County, where Southaven is located, and Memphis, which is the nearest urban area, show that concentrations of ground-level ozone—also known as smog—exceed the applicable federal air quality standard for ozone (the National Ambient Air Quality Standards, or "NAAQS"). *See* Katherine Burgess, *SELC petitions EPA to say Memphis area in violation of ozone standards*, MLK50: JUSTICE THROUGH JOURNALISM (June 6, 2025), https://mlk50.com/2025/06/06/selc-petitions-epa-to-say-memphis-area-in-violation-of-ozone-standards/[https://perma.cc/E8US-GM7S].

[38] *2020 National Emissions Inventory (NEI) Data*, ENV'T PROT. AGENCY (2020), https://www.epa.gov/air-emissions-inventories/2020-national-emissions-inventory-nei-data [https://perma.cc/N6MM-NN6X]. According to this most recent National Emissions Inventory, the largest source of NOx in the 11 counties that make up the Memphis MSA was the Memphis International Airport (1,077 tons of NOx), followed by the Draslovka (also known as Dupont) chemical plant (743 tons of NOx), which is the largest industrial emitter in the MSA, as well as the Valero refinery (342 tons of NOx), and the TVA Allen power plant (230 tons of NOx). Even with pollution controls, xAI's 15 permitted turbines at Colossus 1 are permitted to emit 87.14 tons of NOx.

[39] *Id.*

[40] 42 U.S.C. § 7401(b)(1).

[41] *Id.* §§ 7408, 7409.

NOx, NO_2, fine particulate matter, and ozone.[42] EPA sets National Ambient Air Quality Standards ("NAAQS") to limit concentrations of criteria pollutants to levels "requisite to protect the public health."[43] Each state, in turn, must develop a State Implementation Plan ("SIP") setting forth how the NAAQS will be achieved and maintained within the state.[44] SIPs must be submitted to and approved by the EPA.[45] Through SIPs, state agencies are responsible for ensuring compliance with federal air quality standards.[46] Once approved by EPA, a SIP is federally enforceable under the Clean Air Act.[47]

EPA has approved the Mississippi SIP,[48] and the EPA-approved sections of the SIP and the Clean Air Act are the federally enforceable law governing air pollution sources in the state.

Separately, for hazardous air pollutants, the Clean Air Act requires EPA to issue emissions standards for categories of stationary sources and a list of 188 air pollutants determined by Congress and EPA to be particularly harmful to human health.[49] The emissions standards set by EPA are federally enforceable.

Generally, with few exceptions not relevant here, new stationary sources of criteria and hazardous air pollutants in Mississippi must obtain permits prior to construction and operation. These permits are meant to ensure that emissions from new sources do not impair air quality, cause or contribute to NAAQS violations, or otherwise harm the public and the environment. In addition, certain source categories are subject to performance and emissions standards set by federal law.

Combustion turbines, like the gas turbines xAI uses in Southaven to power its data center, are stationary sources. In addition to the relevant permitting requirements, they are subject to stationary source emission and performance standards under the Clean Air Act for controlling criteria pollutants and hazardous air pollutants.

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[42] 40 C.F.R. §§ 50 et. seq.

[43] 42 U.S.C. § 7409(b)(1).

[44] 42 U.S.C. § 7407(a). In some areas, not at issue here, the local jurisdiction adopts and submits to EPA a Local Implementation Plan rather than a SIP.

[45] *See id.* § 7410.

[46] *Id.* §§ 7410(a)(2)(A), 7502(c)(6). In this way, the Clean Air Act operates as a "cooperative federalism" scheme; EPA sets standards for pollutants, states implement those standards. *Sierra Club v. La. Dep't of Env't Quality*, 100 F.4th 555 (5th Cir. 2024).

[47] *See* 42 U.S.C. §§ 7413, 7604.

[48] *See* 40 C.F.R. § 52.1270(c) – Table 1. This table identifies the effective date for each EPA approved provision of the Mississippi SIP within the Mississippi Administrative Code - and cites the most recent Federal Register Notice for EPA's approval. *See*, *e.g.*, 83 Fed. Reg. 50014 (Oct. 4, 2018); 85 Fed. Reg. 10070 (Feb. 21, 2020); and at 89 Fed. Reg. 86751 (Oct. 31, 2024). Unless otherwise noted, all citations below to the Mississippi Annotated Code are to EPA-approved SIP provisions.

[49] 42 U.S.C. § 7412.

A. Preconstruction and operating permits for stationary sources

Mississippi's EPA-approved SIP requires that any new stationary sources of air pollution, like the gas turbines here, obtain both a preconstruction permit and an operating permit. "Stationary source" is defined as "any building, structure, facility, or installation which emits or may emit a regulated air pollutant."[50] This includes both major and minor sources.

Rule 2.1 D of the Mississippi SIP requires new or modified stationary sources to have a permit to construct before beginning construction.[51] Applicants for permits to construct must specify in their application the rate of air emission reasonably anticipated from operation of their proposed source.[52] That rate—or a more stringent emission limit set by MDEQ—then becomes the limitation on the source's operation.[53]

Once the construction is complete, the permittee must provide the Mississippi Permit Board with certification of construction verifying it "was performed in accordance with the approved plans and specifications on file with the Permit Board" before it may begin operation.[54] Rule 2.5 D also requires new stationary sources to apply for a State Permit to Operate or a Title V permit within 12 months of beginning operations.[55] After submitting a certificate of construction, but prior to applying for a State Permit to Operate or Title V permit, the permit to construct functions as the permit to operate.[56]

Finally, the SIP makes clear that the eventual issuance of any permit "does not release the permittee from liability for constructing or operating air emissions equipment in violation of any applicable statute, rule, or regulation of state or federal environmental authorities."[57]

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[50] 11 Pt. 2 Ch. 2 Miss. Code R. 2.1 C (28) (2013).

[51] 11 Pt. 2 Ch. 2 Miss. Code R. 2.1 D (2) (2013). Inapplicable here, the EPA-approved Mississippi SIP provides for pre-permit construction for some sources according to a proscribed procedure that includes public notice, a ten-day public comment period, proposed emission limits, process description, and equipment lists, among other things. 11 Pt. 2 Ch. 2 Miss. Code R. 2.15 B (2013). The EPA-approved SIP also provides for some categorical exclusions to the requirement for construction and operation permits—none of which are applicable here, as explained further below. 11 Pt. 2 Ch. 2 Miss. Code R. 2.13 D (2013).

[52] 11 Pt. 2 Ch. 2 Miss. Code R. 2.2 B (8) (2013).

[53] 11 Pt. 2 Ch. 2 Miss. Code R. 2.2 B (10) (2013).

[54] 11 Pt. 2 Ch. 2 Miss. Code R 2.5 D (1) (2013).

[55] 11 Pt. 2 Ch. 2 Miss. Code R 2.5 D (5) (2013). A permit applicant may begin operations under its permit to construct, which contains emissions limits and control technology requirements, until the application to operate is due. *Id* at 2.5 D (4). However, a new stationary source *cannot* begin operation under their permit to construct until the permittee provides certification of construction. *Id.* at 2.5 D (3).

[56] 11 Pt. 2 Ch. 2 Miss. Code R. 2.5 D (4) (2013); *see also id.,* Rule 2.5 D (6) ("Upon submittal of a timely and complete application for issuance . . . of a Title V permit, . . . the applicant may continue to operate under the terms and conditions of the permit to construct.").

[57] 11 Pt. 2 Ch. 2 Miss. Code R. 2.2 B (7) (2013).

B. New Source Review program and permitting for major sources of air pollution

A key part of the Clean Air Act—and Mississippi's SIP—is the New Source Review program, which generally prohibits the building or expansion of a major source of air pollution, like the gas turbines here, without first obtaining a permit and applying the best possible pollution controls.[58] New Source Review has two sets of provisions, and which one applies depends on whether an area is in attainment with federal air quality standards (i.e., the NAAQS). The program for attainment areas, like DeSoto County, is called Prevention of Significant Deterioration ("PSD").[59] Key purposes of the PSD program are to "protect public health" and to assure that any increase in air pollution, and a state's decision to permit it, "is made only after careful evaluation of all the consequences of such a decision."[60] The PSD program is part of the Mississippi SIP.[61]

The PSD program prohibits the construction of a "major emitting facility" unless "a permit has been issued for such proposed facility."[62] A "major" source is one that "emits, or has the potential to emit" regulated pollutants, including NOx, at a rate equal to or greater than 250 tons per year.[63] No permit may be issued unless the owner or operator of the facility can demonstrate through air modeling that its construction or operation will not cause or contribute to air pollution in excess of the NAAQS.[64] EPA regulations implementing the PSD program also require permit applicants to provide a "detailed description" of "what system of continuous emission reduction is planned for the source or modification."[65] Information about applications for permits to construct a new major stationary source must be made available to the public for review and comment.[66]

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[58] *See* 42 U.S.C. § 7475; *see also* 42 U.S.C. § 7410 (providing that states implement New Source Review through their SIPs).

[59] *See generally* 42 U.S.C. 7470 et seq. While Mississippi is currently designated as in attainment for all criteria pollutants, recent monitoring shows that DeSoto County has recorded ozone levels slightly above the NAAQS. *See* MISS. DEP'T OF ENV'T QUALITY, *State of Mississippi Air Quality Data Summary for Calendar Year 2024*, https://www.mdeq.ms.gov/wp-content/uploads/2025/03/2024-Air-Quality-Data-Summary-1.pdf [https://perma.cc/J5MD-LWSF].

[60] 42 U.S.C. § 7470(1), (5).

[61] 11 Pt. 2 Ch. 5 Miss. Code R. 5.2 (2024) (incorporating and adopting relevant provisions of 40 C.F.R. § 52.21). The Mississippi SIP adopts 40 C.F.R. § 52.21. 40 C.F.R. § 52.21, in turn, is the "Prevention of significant deterioration of air quality" rule.

[62] 42 U.S.C. § 7475(a)(1); 11 Pt. 2 Ch. 2 Miss. Code R. 2.1 D (2) (2013); 11 Pt. 2 Ch. 5 Miss. Code R. 5.2 (2024).

[63] 40 C.F.R. § 51.166(b)(1)(i); *see also* 42 U.S.C. § 7479(1); 11 Pt. 2 Ch. 5 Miss. Code R. 5.2 (2024). A major source for NOx "shall be considered major for ozone," as well. 40 C.F.R. § 51.166(b)(1)(ii). While the 250 tons per year threshold is relevant here, there are other stationary sources subject to a 100 tons per year threshold. 40 C.F.R. § 51.166(b)(1)(i).

[64] 42 U.S.C. § 7475(a)(3); *see also* 40 C.F.R. § 51.166(k)(1).

[65] 40 C.F.R. § 51.166(n)(2)(iii).

[66] 11 Pt. 2 Ch. 2 Miss. Code R. 2.4 A, C (2013).

Critically, PSD permits must impose emission limits that reflect the maximum degree of reduction achievable through the use of stringent pollution controls on an ongoing basis. This standard is known as Best Available Control Technology ("BACT").[67] BACT is defined as "an emission limitation based on the maximum degree of reduction of each pollutant . . . which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility."[68] Such emission limitations remain in place "on a continuous basis" during the operation of a source.[69] Thus, after construction, a permitted facility must continue to comply with the emissions limits established as BACT.

C. Regulations that apply to major sources of hazardous air pollutants

Hazardous air pollutants (or "HAPs") are the approximately 190 toxic air pollutants, including formaldehyde, that Congress specifically identified in Section 112 of the Clean Air Act.[70] For each pollutant, Section 112 requires EPA to identify the sources of—and set emissions standards for—the pollutants.[71] The list of hazardous air pollutants incudes known carcinogens as well as substances causing serious non-cancer health effects to bodily organs and systems, as well as to fetal development.[72]

As with New Source Review for criteria pollutants, Section 112 of the Act sets a threshold of actual or potential hazardous air pollutant emissions for a source to be identified as a "major" source. A major source is one that emits or has the potential to emit at least 10 tons of any single hazardous air pollutant per year or 25 tons of total aggregate hazardous air pollutant emissions per year.[73] Most major sources are subject to EPA standards known as National Emission Standards for Hazardous Air Pollutants ("NESHAPs"). Each NESHAP is specific to a particular kind of air pollution source and establishes limits for each listed hazardous air pollutant emitted by the relevant kind of source, as well as related monitoring, recordkeeping, and reporting requirements.[74] Limits are based on the "maximum degree of reduction in emissions" (i.e.,

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[67] 42 U.S.C. § 7475(a)(4) (prohibiting construction of a major emitting facility unless it is subject to BACT, among other requirements); *see also* 40 C.F.R. § 51.166(b)(12), (j)(2).

[68] 42 U.S.C. § 7479(3).

[69] 42 U.S.C. § 7602(k) (defining "emission limitation"). *See also Nat'l Parks Conservation Ass'n, Inc. v. Tenn. Valley Ass'n*, 480 F.3d 410, 419 (6th Cir. 2007).

[70] 42 U.S.C. §§ 7412(a)(6), (b).

[71] *Id.*

[72] *La. Env't Action Network v. Env't Prot. Agency*, 955 F.3d 1088, 1092 (D.C. Cir. 2020).

[73] 42 U.S.C. § 7412(a)(1); *see also* 40 C.F.R. § 63.2 ("Major source means any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants[.]").

[74] 42 U.S.C. § 7412(d)(1)-(3); *see also La. Env't Action Network v. Env't Prot. Agency*, 955 F.3d at 1092. Mississippi's SIP and Mississippi's "Air Toxics Regulations" require major sources of hazardous air pollutants to obtain construction and operations permits. *See* 11 Pt. 2. Ch. 8 Miss. Code R. 8.1 B (1) (2013); *see also* 11 Pt. 2 Ch. 2 Miss. Code R. 2.13 E (2013) (excluding major sources of hazardous air pollutants

Maximum Achievable Control Technology or "MACT") that EPA has determined are achievable for that type of source.[75]

Under Section 112 of the Act, "no person may construct or reconstruct any major source of hazardous air pollutants unless the [EPA] Administrator (or the State) determines that the maximum achievable control technology emissions limitation . . . for new sources will be met."[76] Likewise, a source must submit an "application for approval of construction" prior to commencing construction of a new major source of hazardous air pollutants.[77] Sources may also satisfy the foregoing requirements by obtaining state-level preconstruction approval if it is sufficiently similar to the federal requirements.[78]

EPA has identified stationary combustion turbines as a substantial source of hazardous air pollutants such as formaldehyde, toluene, benzene, and acetaldehyde, and it has promulgated a NESHAP—40 C.F.R. Part 63, Subpart YYYY—for these turbines.[79] Subpart YYYY defines stationary combustion turbines subject to the standard as such: "[s]tationary means that the combustion turbine is not self propelled or intended to be propelled while performing its function."[80] Subpart YYYY requires turbines to comply with a maximum achievable control technology emission limit for formaldehyde emissions,[81] to conduct initial and periodic emissions testing,[82] to continuously monitor operations,[83] to make various reports and notifications, and to undertake recordkeeping.[84]

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from an exclusion to a permit to construct); 11 Pt. 2 Ch. 2 Miss. Code R. 2.15 B (9) (2013) (same). The Mississippi Air Toxics Regulations incorporate and adopt as enforceable regulations of Mississippi all NESHAPs. 11 Pt. 2. Ch. 8 Miss. Code R. 8.1 A (2013); *id.* at R. 8.1 B(a).

[75] 42 U.S.C. § 7412(d)(2).

[76] 42 U.S.C. § 7412(g)(2)(B); *see also* 40 C.F.R. § 63.5(b)(3)(i) ("[N]o person may, without obtaining written approval in advance from the [EPA] Administrator . . . [c]onstruct a new affected source that is major-emitting.").

[77] 40 C.F.R. § 63.5(d)(1)(i).

[78] 40 C.F.R. § 63.5(f).

[79] 40 C.F.R. §§ 63.6080–60.6175.

[80] 40 C.F.R. § 63.6175. An EPA spreadsheet listing stationary combustion turbines that are subject to Subpart YYYY from November 2025 includes TM 2500s, for example. *Updated List of Stationary Combustion Turbines Subject to the Stationary Combustion Turbine NESHAP – November 2025 (xlsx)*, ENV'T PROT. AGENCY, https://www.epa.gov/stationary-sources-air-pollution/stationary-combustion-turbines-national-emission-standards [https://perma.cc/8GKJ-EBAV] (last updated Nov. 20, 2025).

[81] 40 C.F.R. § 63.6100; Table 1 to Subpart YYYY. Subpart YYYY identifies the emission limitation for the concentration of formaldehyde to 91 ppbvd or less at O_2, *id.*, which would require catalytic oxidation for compliance.

[82] 40 C.F.R. §§ 63.6110, 63.6115.

[83] 40 C.F.R. § 63.6125(a)–(b).

[84] 40 C.F.R. §§ 63.6145, 63.6150, 63.6155, 63.6160.

D. Gas turbines are subject to permitting and pollution control requirements, and no exemptions apply here

Combustion turbines, like these, are stationary sources subject both to permitting requirements and emission and performance standards. xAI's turbines are not exempt from these requirements. While MDEQ sent a letter to xAI agreeing with xAI's legal conclusion that it need not obtain a permit, that conclusion is wrong, as detailed below. Further, MDEQ lacks the power to simply give a company a free pass to pollute.[85]

None of the Mississippi SIP's categorical exclusions to the requirement for construction and operation permits apply here. Subsection D of Rule 2.13 includes fifteen exclusions, such as for "recreational heaters" and equipment used to prepare food for retail sale.[86] Critically, the Mississippi SIP does not identify a categorical exclusion based on duration, i.e., for "temporary" use.[87] Additionally, although one exclusion is for "[m]obile sources,"[88] in context, "mobile source" does not create an exemption for any stationary-source-on-wheels. The SIP does not define mobile sources, and under the Clean Air Act regulations governing the preparation of SIPs, the term "[m]obile sources" generally refers to motor vehicles, such as passenger cars, trucks, and motorcycles that are used on highways, as well as trains, airplanes, and construction equipment.[89] Thus, the exclusion for "mobile sources" denotes a type of emission source subject to its own regulatory regime under the Clean Air Act.

That gas turbines are distinct from mobile sources is further underscored by EPA subjecting gas turbines to a New Source Performance Standard ("NSPS") under Section 111 of the Act.[90] NSPS are federally enforceable, technology-based emission standards for controlling criteria pollutants that apply to stationary sources. Promulgated by EPA and applied by MDEQ, NSPS set the floor for emissions controls on certain types of sources.[91] EPA regulates NOx and sulfur dioxide emissions from stationary combustion turbines with a heat-input capacity greater than 10

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[85] *See Ass'n to Protect Hammersley, Eld, & Totten Inlets v. Taylor Res., Inc.,* 299 F.3d 1007, 1011–12 (9th Cir. 2002); *United States v. S. Ind. Gas & Elec. Co.*, No. IP99-1692-CMF, 2002 WL 1760699, at *4 (S.D. Ind. July 26, 2002).

[86] 11 Pt. 2 Ch. 2 Miss. Code R. 2.13 D (2013).

[87] 11 Pt. 2 Ch. 6 Miss. Code R. 6.3 (2022), which is not part of the EPA-approved SIP, does set out standards for the permitting of "temporary" sources in the state–meaning that "temporary" sources as defined in the Administrative Code are actually not exempt from permitting generally. Any exemption based on temporary-ness would be in violation of MDEQ's own regulations.

[88] 11 Pt. 2 Ch. 2 Miss. Code R. 2.13 D (2013).

[89] Under the federal Clean Air Act, the "Control of Air Pollution from Mobile Sources" is governed by 40 C.F.R. §§ 85.501 – 85.2401 which applies generally to motor vehicles like cars, boats, and airplanes.

[90] *See generally* 42 U.S.C. § 7411.

[91] 11 Pt. 2 Ch. 1 Miss. Code R. 1.6 (2018). This rule, which is not part of the EPA-approved SIP, adopts the federal NSPS promulgated by EPA and requires compliance for all facilities subject to those standards, enforceable by MDEQ.

MMBtu/h under 40 C.F.R. Part 60, Subpart KKKK ("NSPS KKKK").[92] NSPS KKKK defines "stationary" in the context of gas turbines to mean "the combustion turbine is not self-propelled or intended to be propelled while performing its function. It may, however, be mounted on a vehicle for portability."[93] In other words, as with HAPs, unless the turbine is intended to be in motion while operating—such as a turbine on a plane—it is considered a stationary source of criteria pollutants even if it is portable.

Finally, while the Clean Air Act exempts "nonroad engines" from its definition of "stationary source," these turbines are not nonroad engines.[94] Any internal combustion engines that are subject to an NSPS do not qualify as nonroad engines under the Act's definition of nonroad engines.[95] Here, because the turbines have a heat-input capacity greater than 10 MMBtu/hr, they are subject to NSPS KKKK and are therefore subject to the Act's stationary source air permitting requirements.

III. VIOLATIONS OF THE CLEAN AIR ACT

A. Claim 1: xAI has constructed and operated, and continues to operate, a new stationary source in violation of Mississippi SIP Rules 2.1 D and 2.5 D and the Clean Air Act.

Under the Mississippi SIP, "any new stationary source or modification of a stationary source must have a permit to construct . . . before beginning construction," with some limited, inapplicable exceptions.[96] Even a stationary source that has been issued a permit to construct "cannot begin operation until certification of construction by the permittee."[97]

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[92] 40 C.F.R. § 60.4305. NSPS KKKK regulates the turbines by requiring the "best system of emission reduction" for limiting NOx and identifying the pollution control technology and/or emission rate that the turbine must comply with, depending on its size, in terms of heat input, as well as whether it will be in the same location for more or less than 24 months. "Temporary" turbines are not exempt from NSPS KKKK; they are a subcategory with an emission limit. 40 C.F.R. Part 60, Subpart KKKK. NSPS KKKK also sets out testing, monitoring, recordkeeping, and reporting requirements.

[93] *Id.* Additionally, The EPA recently confirmed that stationary combustion turbines, even when mounted for portability, are subject to the NSPS and not nonroad engines. As the EPA says in the preamble to Rule KKKK, "The current definition of "nonroad engine" at 40 C.F.R. 1068.30 excludes engines that are subject to an NSPS. All combustion turbines meeting the applicability criteria of the NSPS for combustion turbines are subject to those NSPS standards (including portable turbines) and thus have been excluded from the definition of nonroad engines." Prepublication Rule KKKK at 69.

[94] *See* 42 U.S.C. § 7602(z).

[95] 42 U.S.C. § 7550(10) (defining "nonroad engine"); *see also* 40 C.F.R. § 1068.30 (excluding from the definition of "nonroad engine" an engine that meets "any of [three] criteria," one of which is that the engine is regulated "by a federal New Source Performance Standard").

[96] 11 Pt. 2 Ch. 2 Miss. Code R. 2.1 D (2) (2013). There are limited exemptions, none of which apply here.

[97] 11 Pt. 2 Ch. 2 Miss. Code R. 2.5 D (3) (2013).

All major and synthetic minor sources in Mississippi must obtain either a State Permit to Operate or Title V permit.[98] The Mississippi SIP requires sources to obtain operating permits within 12 months of submitting a certificate of construction, or at any earlier time as stated in the permit to construct.[99] At that time, the source may continue operations under both "the terms and conditions of the permit to construct and in compliance with the submitted application until the Permit Board issues, modifies, or denies the Permit to Operate."[100] In short, all stationary sources must obtain a permit to construct prior to beginning construction, and that permit stays in effect until a permit to operate is issued.

The turbines here are a new stationary source. Construction began on or about August 1, 2025, and on information and belief, xAI began operating them soon thereafter. xAI did not obtain a permit to construct prior to either of those dates, and it still has not obtained a permit to construct. xAI has not submitted, nor obtained, a certification of construction. And xAI has not obtained an operating permit for the turbines currently on-site.

The construction and operation of the turbine facility without a state construction or operating permit violates the relevant Mississippi regulations as incorporated into the SIP. These violations constitute violations of the Clean Air Act. Each day that xAI constructs or operates without a permit—from the start of construction forward—constitutes a separate violation, subjecting xAI to a civil penalty per day, per violation.

B. Claim 2: xAI has constructed and operated, and continues to operate, a major emitting facility without a Prevention of Significant Deterioration permit or Best Available Control Technology in violation of Mississippi SIP Rule 5.2 and the Clean Air Act.

Under the Clean Air Act, and as incorporated in the Mississippi SIP, "[n]o major emitting facility . . . may be constructed . . . unless . . . a permit has been issued for such proposed facility in accordance with this part [Prevention of Significant Deterioration]."[101] A "major" source is one that "emits, or has the potential to emit" regulated pollutants, including NOx, at rates greater than 250 tons per year.[102] A major source for NOx emissions is also a major source for ozone.[103]

Based on conservative estimates and using information provided by xAI's consultants and the Environmental Protection Agency's compilation of air emissions factors, xAI's Southaven energy installation has the potential to emit NOx in an amount far greater than 250 tons per year.

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[98] 11 Pt. 2 Ch. 2 Miss. Code R. 2.1 D (1) (2013).

[99] 11 Pt. 2 Ch. 2 Miss. Code R. 2.5 D (5) (2013).

[100] 11 Pt. 2. Ch. 2 Miss. Code R. 2.5 D (6) (2013).

[101] 42 U.S.C. § 7475(a)(1); 11 Pt. 2 Ch. 5 Miss. Code R. 5.2 (2024) (adopting and incorporating the Prevention of Significant Deterioration regulations, 40 C.F.R. 52.21, as of December 27, 2023, as official regulations of Mississippi and enforceable as such).

[102] 40 C.F.R. 52.21(b)(1)(i)(B). Certain sources are subject to a 100 tpy threshold instead of this 250 tpy threshold, but the 100 tpy threshold is inapplicable here.

[103] 40 C.F.R. 52.21(b)(1)(ii).

It is therefore, at a minimum, a major source of NOx and ozone, and it may also be a major source of other regulated pollutants.

Also under the Clean Air Act, and as incorporated in the Mississippi SIP, no major emitting facility may be constructed unless "the proposed facility is subject to the best available control technology ["BACT"] for each pollutant subject to regulation under this chapter emitted from, or which results from, such facility."[104] BACT for these turbines would be a source-specific emission limit based on, at minimum, use of low-NOx burners, selective catalytic reduction, and catalytic oxidation add-on pollution controls to reduce NOx, volatile organic compounds, and carbon monoxide emissions.[105]

While xAI's consultant represents that 14 of the turbines are operating with selective catalytic reduction and achieving a NOx emission rate of 2ppm, xAI makes no representation of the same pollution controls for the other 13 turbines, instead stating that they operate with an emission rate of 25ppm.[106] Thus, about half of the turbines are not operating with the technology that would satisfy BACT, and *none* of the turbines have been subject to a full BACT analysis consistent with the requirements of the PSD program. Nor is any voluntary use of controls equivalent to a legal requirement to operate them continuously. As such, xAI's failure to comply with the BACT requirement constitutes a significant and ongoing violation that is resulting in substantial amounts of harmful excess emissions.

In sum, xAI has not applied for nor obtained a major source Prevention of Significant Deterioration ("PSD") permit for the turbines currently installed and operating on-site. xAI is not operating the Southaven facility with BACT, as it would be required to under a PSD permit. Every day from the start of construction without a PSD permit through its ongoing operation of the turbines without a permit and corresponding BACT pollution controls, xAI is and has been in violation of the Mississippi SIP and Clean Air Act. Each day constitutes a separate violation, subjecting xAI to a civil penalty per day, per violation.

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[104] 42 U.S.C. 7475(a)(4).

[105] For instance, TVA's Allen Combined Cycle Plant, located a few miles north of the xAI facility, has recently applied for a major source PSD permit to add six GE Vernova 2500 turbines—xAI's Mississippi operations include 12 GE Vernova 2500 turbines (four are Gen 6, five are Gen 7, and three are Gen 8). Notably, TVA has proposed installing SCR for NOx control on its new turbines, as well as other emission controls to achieve compliance with their proposed BACT emission limit. *See* SHELBY CNTY. HEALTH DEP'T, *Draft PSD Construction Permit Application Evaluation and Review (Permit No.01280-03PC) for TVA – Allen Combined Cycle Plant (ACC) Allen Combustion Turbine (ACT) Project*, at 13 (May 2025) (https://southernenvironment.sharefile.com/d-s5d99ae9619144e288f6884dbc57f2d08) [https://perma.cc/S9MG-86XJ].

[106] Email from Shannon Lynn, Trinity Consultants, to Jaricus Whitlock, MISS. DEP'T OF ENV'T QUALITY, RE: Request for Update - Portable Turbines (Nov. 5, 2025) (on file with author).

C. Claim 3: xAI has constructed and operated, and continues to operate, a major source of hazardous air pollutants without using the maximum achievable control technology in violation of NESHAP Subpart YYYY.

Stationary combustion turbines that are major sources of hazardous air pollutants are required to comply with NESHAP Subpart YYYY and comply with emission limits established therein.[107] NESHAP Subpart YYYY establishes national emission limitations and operating limitations for hazardous air pollutants emissions from stationary combustion turbines located at major sources of hazardous air pollutants emissions, as well as imposes requirements to demonstrate initial and continuous compliance with the emission and operating limitations.[108] Operators of such turbines are required to install control equipment (typically catalytic oxidation systems) and comply with other requirements in order to reduce carbon monoxide as well as air toxic emissions, including formaldehyde.[109]

Based on estimates drawn from information provided by xAI's consultants and the Environmental Protection Agency's compilation of air emissions factors[110], xAI's Southaven energy installation has the potential to emit formaldehyde, a hazardous air pollutant, in an amount greater than 10 tons per year. It is therefore a major source of hazardous air pollutants, without accounting for other hazardous air pollutants that it may emit.

Given all available information and upon information and belief, the turbines here are subject to NESHAP Subpart YYYY as stationary combustion turbines and are not in compliance with the requirements to meet emission and operating limits and maintain and report compliance with this Subpart. As such, xAI's failure to comply with the MACT requirement constitutes a significant and ongoing violation that is resulting in substantial amounts of harmful excess emissions.

The construction and operation of the turbine facility without complying with NESHAP Subpart YYYY constitutes a violation of the Clean Air Act. Every day xAI operates the unpermitted turbines without use of MACT in violation of the CAA constitutes a separate violation, subjecting xAI to a civil penalty per day, per violation.

IV. AUTHORITY TO BRING SUIT

The NAACP has authority to bring a citizen suit under Section 304 of the Clean Air Act. Section 304, subsection (a)(1) authorizes citizens to sue for violations of an "emission standard or limitation under this chapter."[111] That section defines "emission standard or limitation under this

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[107] 40 C.F.R. §§ 63.6080–60.6175.

[108] 40 C.F.R. § 63.6080.

[109] 40 C.F.R. §§ 63.6100, 60.6125.

[110] *See AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources: Natural Gas Combustion*, ENV'T PROT. AGENCY, https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-fifth-edition-volume-i-chapter-1-external-1 [https://perma.cc/WQ6U-NUCK] (last updated Aug. 28, 2025).

[111] 42 U.S.C. § 7604(a)(1).

chapter" in part as any standard established "under any applicable State implementation plan approved by the [EPA]" and "any requirement to obtain a permit as a condition of operations."[112]

As set out above, the Mississippi SIP and relevant sections of the Clean Air Act require a source to obtain a permit to construct before construction, to certify compliance with it before beginning operation, and then to continue complying with that permit until a permit to operate is issued.[113] EPA has approved the Mississippi SIP.[114] xAI has not obtained a permit to construct, certified compliance therewith, or obtained an operating permit, and it constructed and is operating an air pollution source in violation of those provisions of the SIP and the Clean Air Act.

In addition to being defined as any "standard, limitation, or schedule established . . . under any applicable State implementation plan approved by the [EPA] Administrator,"[115] an "emission standard or limitation under this chapter" also includes an "emission limitation, standard of performance or emission standard."[116] The requirement to limit emissions to levels that are achievable when utilizing Best Available Control Technology is an "emission limitation," "standard of performance," and an "emission standard" which is set forth under the Clean Air Act and adopted and incorporated into the federally approved Mississippi SIP.[117] As set out above, xAI has constructed and is operating a new major emitting facility without using Best Available Control Technology.

An "emission standard or limitation under this chapter" is further defined to include "any requirement under section 7411 or 7412 of this title (without regard to whether such requirement is expressed as an emission standard or otherwise)."[118] Section 7412 sets out requirements for major sources of hazardous air pollutants. As set out above, xAI has constructed and is operating a major source of hazardous air pollutants, specifically formaldehyde, without complying with the relevant emissions standard for gas turbines to control formaldehyde emissions.

Section 304, subsection (a)(3) of the Act authorizes citizens to sue "any person who proposes to construct or constructs any new or modified major emitting facility without a permit required under part C of subchapter I (relating to significant deterioration of air quality)."[119] This

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[112] *Id.* § 7604(f)(4).

[113] 11 Pt. 2 Ch. 2 Miss. Code R. 2.1 D (2) (2013). 11 Pt. 2 Ch. 2 Miss. Code R. 2.5 D (3) (2013); 11 Pt. 2 Ch. 2 Miss. Code R. 2.5 D (4) (2013); 11 Pt. 2 Ch. 2 Miss. Code R. 2.5 D (6).

[114] *See* 40 C.F.R. § 52.1270(c) – Table 1. This table identifies the effective date for each EPA-approved provision of the Mississippi SIP within the Mississippi Administrative Code - and cites the most recent Federal Register Notice for EPA's approval.

[115] 42 U.S.C. § 7604(f)(4).

[116] 42 U.S.C. § 7604(f)(1).

[117] 11 Pt. 2 Ch. 5 Miss. Code R. 5.2 (2024) (adopting and incorporating by reference federal PSD program regulations, including BACT requirements).

[118] 42 U.S.C. § 7604(f)(3).

[119] 42 U.S.C. § 7604(a)(3).

provides for citizen enforcement of failure to obtain a PSD permit. As set out above, xAI has constructed and is operating a new major emitting facility without obtaining a PSD permit.

An action under Section 304, subsection (a)(1), may only proceed after a 60-day notice period.[120] However, an action under subsection (a)(3), for a claim of construction of a major emitting facility without a PSD permit may proceed immediately, without a notice period.

V. PERSONS GIVING NOTICE AND LEGAL COUNSEL

This letter provides notice of intent to sue on behalf of the National Association for the Advancement of Colored People (NAACP) and the NAACP Mississippi State Conference. The names and addresses of the persons giving notice are:

NAACP
4805 Mount Hope Avenue
Baltimore, MD 21215

NAACP Mississippi State Conference
1072 JR Lynch Street
Jackson, MS 39203

The NAACP is a national non-profit organization with the mission to ensure the political, educational, social, and economic equality of rights of all persons and to eliminate race-based discrimination. The NAACP's Center for Environmental and Climate Justice addresses environmental and climate injustices—including the siting of polluting facilities and the adverse impacts of fossil fuel combustion—that have a disproportionate impact on Black and other frontline and fenceline communities.

The NAACP Mississippi State Conference represents over 11,000 members across the State of Mississippi, and clean air is of paramount importance to the health and well-being of its members. The State Conference has an established history of environmental justice advocacy across Mississippi.

Members of NAACP and the NAACP Mississippi State Conference include residents living in the communities surrounding 2875 Stanton Road S., Southaven, Mississippi. Members live, work, attend church, and recreate in the area, and they are concerned about their health and the health of their loved ones and neighbors. They are deeply frustrated that xAI is functionally operating a power plant in their backyard without a Clean Air Act permit.

Earthjustice, Southern Environmental Law Center, and Mr. Carroll Rhodes are legal counsel for NAACP and the NAACP Mississippi State Conference in this matter and can be contacted at the mailing and email addresses provided below.

[120] 42 U.S.C. § 7604(b)(1).

VI. LOCATION OF THE VIOLATIONS.

The violations alleged herein occurred, or are continuing to occur, at or near 2875 Stanton Road S., Southaven, Mississippi.

VII. PERSONS RESPONSIBLE FOR VIOLATIONS.

MZX Tech LLC and X.AI Corp. (d/b/a xAI) are the persons responsible for the violations listed herein. They are the owners and/or operators of the unpermitted turbine facility in Southaven, Mississippi.

Upon information and belief, as of early-January 2026, xAI was acquired by SpaceX and is now a wholly owned subsidiary of SpaceX.[121] As the details of the acquisition are not public, SpaceX is included in this letter to ensure that all potentially responsible entities are properly noticed and to preserve claims against any entity that may bear responsibility for the conduct at issue following the acquisition of xAI.

xAI is the entity that discussed with MDEQ "our plans to build energy resources at our property in DeSoto County" (i.e., 2875 Stanton Road S., Southaven, Mississippi).[122] The follow-up email relaying those plans to use portable combustion turbines without a permit is signed by Brent Mayo, with xAI in his email signature.[123] xAI controls the ad hoc power plant that is the subject of this notice letter, including control over environmental decision-making and operations at the property.

MZX Tech LLC is a limited liability company that formed on May 16, 2026 with a principal address at 2110 Ranch Road 620 S, Unit 341886, Lakeway, TX 78734.[124] MZX Tech LLC purchased and, on information and belief, still owns the property at 2875 Stanton Road S., Southaven, Mississippi, where the unpermitted turbines are operating.[125] MZX Tech LLC is also

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[121] Echo Wang, Milana Vinn, and Matt Tracy, *Exclusive The sale of xAI comes with tax, financial, and legal benefits for xAI and SpaceX investors*, REUTERS (Feb. 5, 2026), https://www.reuters.com/business/finance/sale-xai-comes-with-tax-financial-legal-benefits-xai-spacex-investors-2026-02-06/ [https://perma.cc/XAG7-W6M2].

[122] Email from Brent Mayo, xAI, to Chris Wells & Jaricus Whitlock, MISS. DEP'T OF ENV'T QUALITY, RE: Permit Follow Up (July 25, 2025) (on file with author).

[123] *Id*.

[124] *Application to Register Foreign Limited Liability Company*, MISS. SEC'Y OF STATE (May 16, 2025), https://corp.sos.ms.gov/corp/portal/c/page/corpbusinessidsearch/portal.aspx# [https://perma.cc/4WGL-BRXC]. More recent MDEQ correspondence reflects that the agency understands that MZX Tech continues to own the facility with the unpermitted turbines. *See, e.g.*, Email from Jaricus Whitlock, MISS. DEP'T OF ENV'T QUALITY, to Shannon Lynn, Trinity Consultants, RE: Request for Update - Portable Turbines (Oct. 30, 2025) (on file with author).

[125] Matthew Gooding, *Elon Musk's xAI buys former gas power plant site in Southaven, Mississippi*, DATA CENTER DYNAMICS (July 21, 2025), https://www.datacenterdynamics.com/en/news/elon-musks-xai-buys-former-gas-power-plant-site-in-southaven-mississippi/ [https://perma.cc/XE2J-DLAM].

the entity that has applied for a permit for a future power plant on the same site, to provide energy resources to xAI's data centers just as the current unpermitted turbines do.[126]

VIII. DATES OF THE VIOLATIONS

The violations set forth above are ongoing. They began on or before the following dates, and specific information about the dates is in the possession of xAI:

- Claims 1 and 2 began at the first date of construction, which was on or before August 1, 2025,[127] and remain ongoing.

- Claim 3 began on or before October 31, 2025 as the facility was operating with turbines that collectively had the potential to emit more than 10 tons of formaldehyde per year by that date.[128]

Section 113 of the Clean Air Act provides that violators may be assessed a civil penalty "per day for each violation."[129] The amount of this statutory civil penalty is subject to a mandatory inflation adjustment.[130] Federal regulations provide that a penalty of $124,426 per day of violation may be imposed. Until xAI achieves compliance with the Act, the days of violation will continue to accrue.

IX. CONCLUSION

xAI has violated and continues to violate the Clean Air Act and Mississippi's federally-approved SIP by failing to obtain necessary permits and failing to use the necessary pollution controls. If litigation is necessary, NAACP will seek redress for the violations described herein, including injunctive relief, civil penalties, costs, attorneys' fees, and any other appropriate relief pursuant to 42 U.S.C. § 7604(a).

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[126] MZX Tech LLC PSD Permit Application at 1-3 (July 2025).

[127] Construction began on or before the date of the first turbine being installed on-site. Date on-site information for turbines 1-18 derived from Email from Shannon Lynn, Trinity Consultants, to Jaricus Whitlock, MISS. DEP'T OF ENV'T QUALITY, RE: Request for Additional Information - Portable Turbines (Nov. 25, 2025) (on file with author).

[128] On information and belief, there were sufficient turbines on-site to constitute a major source of hazardous air pollutants by August 29, 2025. Date on-site information for turbines 1-18 derived from an email from xAI's consultant to MDEQ, in which the consultant represented that the first 18 turbines were all on-site as of August 29, 2025. Email from Shannon Lynn, Trinity Consultants, to Jaricus Whitlock, MISS. DEP'T OF ENV'T QUALITY, RE: Request for Additional Information - Portable Turbines (Nov. 25, 2025) (on file with author). Formaldehyde emissions calculations are explained in footnote 28, *supra*. The turbines were operating sometime on or before October 31, 2025.

[129] 42 U.S.C. § 7413(b).

[130] Fed. Civ. Penalties Inflation Adjustment Act, 28 U.S.C. § 2461, as amended by 31 U.S.C. § 3701; 40 C.F.R. § 19.4; 90 Fed. Reg. 1375, 1377 (Jan. 8, 2025).

During the relevant notice period, NAACP is willing to discuss the factual assertions set forth in this letter as well as effective remedies for the violations. If you wish to pursue negotiations in lieu of litigation, please initiate such negotiations with the undersigned counsel within 20 days so that they may be completed prior to completion of the notice period. For the failure to obtain a Prevention of Significant Deterioration permit prior to construction claim, NAACP reserves the right to file suit at any time prior to the expiration of the 60-day notice period for the remaining claims. NAACP has retained the assistance of the counsel listed below, and all responses to this Notice Letter should be directed to the undersigned counsel.

Thank you for your prompt attention to this matter.

Sincerely,

/s/ Mary Rock
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D.C. Regional Office
1250 I Street, 4th Floor
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Counsel for NAACP and Mississippi State Conference NAACP

DATED: February 13, 2026

Exhibit A

LIFE CYCLE POWER



MOBILE TURBINE

LCP M35

The LCP M35 Turbine is an extremely versatile turbine package capable of delivering 35MW of power. With dual fuel (liquid or gaseous) capabilities, 50/60Hz operable and with a water injection ring fitted as standard it can meet multiple applications. Additionally, it has quick setup times, allowing it to be a good fit for frequent move applications.

PERFORMANCE INFO-ELECTRICAL*			
Exhaust Water Injection		**YES**	**NO**
Frequency Options	Hz	60	60
Power Output (Standby)	kW	35,020	34,500
Power Output (Prime)	kW	35,020	34,500
Power Output (Continuous)	kW	35,020	34,500
Voltages(s) Output	V	13,800 +/- 10%	13,800 +/- 10%
Maximum Amps/Phase	Amps	1,400	1,400
Black Start Power Requirement	kW(V)	1,000kW (480V)	1,000kW (480V)
Max Transient Load (Load Step)	kW	25,000	25,000
Startup Time (From Ready to Start)	mins	5	5
Cool Down Time Before Restart	mins	15 Controlled	4 Hrs. Uncontrolled
Max Altitude	ft	8,000	8,000
Max Ambient Temperature	deg F	130	130
Min Ambient Temp W/O Winterization	deg F	-40	-40

PERFORMANCE INFO-FUEL**			
Specific Energy Consumption (Heat Rate)	btu/kW-hr	9,105	8,877
Specific Fuel Consumption – NG	scf/kW-hr	9.1	8.9
Ng Fuel Pressure Range (Limits)	psi	385-575	385-575
Ng Fuel Pressure Range (Preferred)	psi	480-520	480-520

** Power output is based on iso conditions (sea level and 59°F), 60Hz, for actual performance, refer to derate tables below or contact Lifecycle Power, 50Hz performance (if available) are provided on request*

*** Fuel consumptions are based on 100% loading at ISO conditions utilizing commercial spec fuels, for detailed performance refer to derate table below or contact Life Cycle Power*

Key Features of the M35

- GE LM2500+G4 turbine
- Capability of installation in less than 24hrs from arrival on site
- 60Hz, 13.8kV generator (Auxiliary transformer to run at 12.47kV or 13.8kV). Oversized for future insertion of the LM2500+G5
- 99.9% GE LM2500+G4 reliability, Thousands of gas turbine installations globally
- Transported as four trailers (Turbine, Generator, Air inlet. Exhaust)
- Integrated ATS and low Voltage transformer for control power. Allows Black start to be switched off once turbine is operational
- Integrated control room on trailer
- Hydraulic turbine starter
- Dual frequency available (50/60Hz)
- Optional water injection provided for reduced emissions
- Accepts Diesel, LNG, CNG, pipeline, hydrogen blends or field gas as fuel
- Can be paralleled with all other LCP models to give microgrids capable of 100's of MW
- Proven capabilities operating on high BTU gas fuels- 1,400btu/ft3 standard, 1,900 btu/ft3 with treatment
- No oil or spark plug changes required (unlike engines) means no shutdown requirements until annual borescope and inspection
- No concrete pad required

FROM PIPELINE TO POWERLINE. WE DELIVER.

MOBILE TURBINE

LCP M35

LIFE CYCLE POWER

PERFORMANCE INFO-NOISE

Noise Level (3ft)	dBa	87
Noise Level (100)	dBa	84

PERFORMANCE INFO-EMISSIONS***

		YES	NO
Specific Water Consumption	Gal/kW-hr	0.052	0
Emission - NOX	g/kW-hr (g/bhp-hr)	0.4 (0.3)	3.72 (2.77)
Emission - CO	g/kW-hr (g/bhp-hr)	0.77 (0.57	0.04 (0.03)
Emission - THC	g/kW-hr (g/bhp-hr)	0.12 (0.09)	0.01 (0.01)
Emission - NMHC	g/kW-hr (g/bhp-hr)	0 (0)	0 (0)
Emission - PM	g/kW-hr (g/bhp-hr)	0.05 (0)	0.05 (0)
Emission - SO	g/kW-hr (g/bhp-hr)	0 (0)	0 (0)
Emission – CO2	g/kW-hr (g/bhp-hr)	522 (389)	509 (379)

PHYSICAL INFORMATION

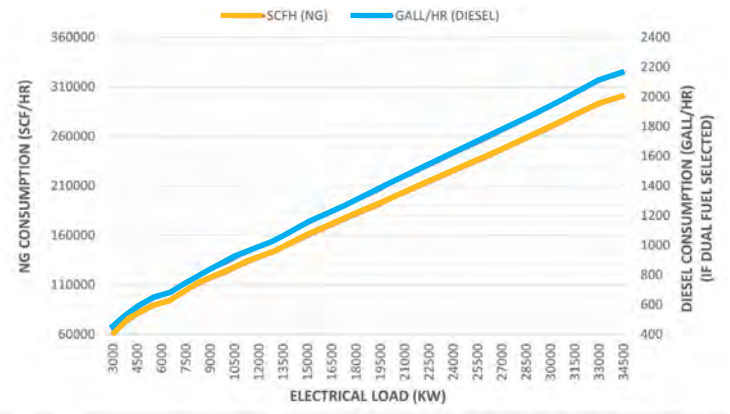
Qty Of Trailers Required		4
Weight (Trailer 1) Generator	lbs.	224,000
Weight (Trailer 2) Turbine	lbs.	107,000
Weight (Trailer 3) Air Inlet	lbs.	80,000
Weight (Trailer 2) Exhaust *(Transport)*	lbs.	73,000
Total Weight	lbs.	484,000
Ground Preparation Requirements	Compacted Base	
Dimensions (Trailer 1)	LxWxH (ft)	71x8.5x13.5
Dimensions (Trailer 2) Liquid Fuel Skid	LxWxH (ft)	59 x 2 x 23
Dimensions (Trailer 3)	LxWxH (ft)	24 x 8.5 x 14
Dimensions (Trailer 4)	LxWxH (ft)	24 x 8.5 x 14
Total Installed Footprint	LxW (ft)	90 x 40
Average Install Man Hours	hrs	12

ONSITE CONNECTIONS**

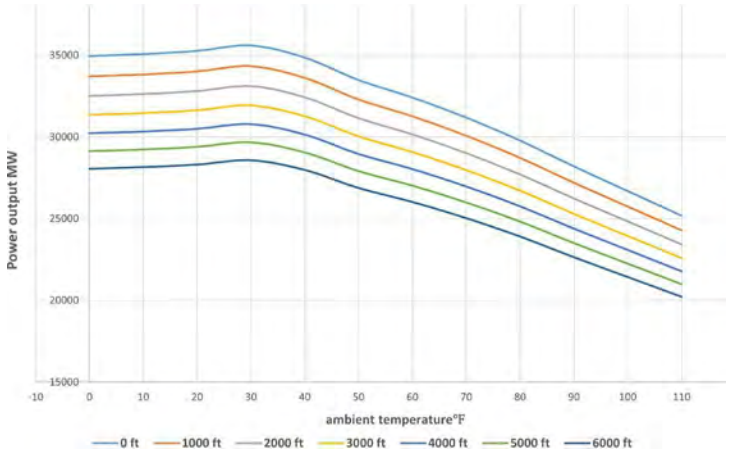
Fuel NG	3” 600lb ANSI Flange
Fuel Diesel	1.5” 600lb ANSI Flange
Electrical Load Out	Dead Break Connections 2 Run/Phase 750mcm
Grounding	High Resistance Grounding System
Black Start	MELTERIC DR400
Water Exhaust Injection (If installed)	1” 600lb Ansi Flange

*** Emissions based on pipeline quality NG fueled & iso conditions. For site-specific emissions performance contact Life Cycle Power*

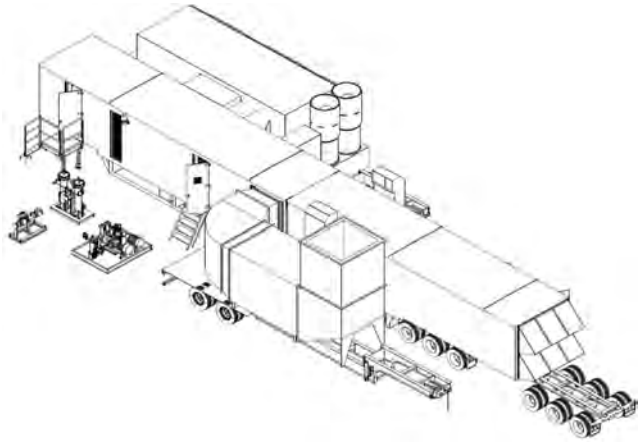
LCP M35 FUEL CONSUMPTION VS. LOAD



M35 MAX AVAILABLE POWER



MAJOR COMPONENTS



Solar® Turbines
A Caterpillar Company

SOLAR® MOBILE TURBOMACHINERY
SMT130 – Powered by Titan™ 130

Powering the Future Through Sustainable, Innovative Energy Solutions



The SMT130 is the economic and sustainable solution for mobile and rapid deployment power generation. The 16 MWe complete power plant is designed around the proven Titan™ 130 gas turbine for quick setup, global transportability and reliable operation. The SMT130 is ready to go anywhere, anytime.

COMPLETE SOLUTION

- Fully-Integrated Mobile Power Plant
- 13.8KV/12.47KV (60 Hz) Generator
- Dual Fuel System (Natural Gas and Diesel #2)
- Low Emissions SoLoNOx™ Combustion System
- Lightweight, Dual Frame Design with Separate Air Filtration Module
- Compact Footprint for High Power Density
- Low-Profile Modular Design to Minimize Installed Height
- Easily Relocatable via Highway or Rugged Terrain
- Transcontinental Transportability by Ocean Freight
- World-Class Global Customer Support Network

PARK, PLUG AND POWER

- Quick and Innovative Setup – Less Than 12 Hours
- No Concrete Foundation Required
- No Crane Lifts Required at Site
- Hydraulic Leveling System
- Rapid Alignment Technology

STANDARD FEATURES

- Wide Fuel Flexibility (Field Gas, CNG, LPG, etc.)
- Temperature Range from -18°C to 49°C (0°F to 120°F)
- Complete Electrical Equipment Compartment with Motor Control Center and HVAC
- Utility Grade Switchgear and Protective Relay Module
- Compact Medium Voltage Compartment
- Internal 120V Outlet
- Optional Sound Attenuation System
- Add-On Option for Multi-Unit Power Management and Microgrid Control with Solar® StationEdge
- InSight™ Platform Compatible
- Digital Load Sharing Capability Across Solar Fleet
- Standard Offering at 25 PPM NOx with Optional Configurations Down to 15 and 9 PPM NOx

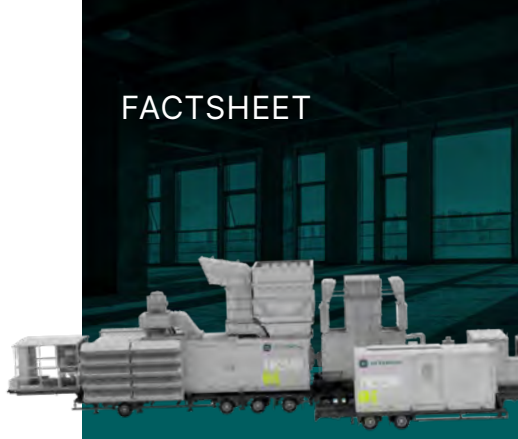
SMT 130

GE VERNOVA

FACTSHEET

TM2500

AERODERIVATIVE PACKAGE



SWITCHING FROM A DIESEL ENGINE AND ELECTRIC GENERATOR (DIESEL GENSET) TO A TM2500 BURNING NATURAL GAS CAN SAVE UP TO $8 MILLION PER YEAR IN OPERATING COSTS.

		TM2500 SAC	TM2500 DLE
SC PLANT PERFORMANCE	SC Net Output (MW)	34.6/36.9††	34.5/34.4††
	SC Net Heat Rate (Btu/kWh, LHV)	9814/9377††	8648/8557††
	SC Net Heat Rate (kJ/kWh, LHV)	10354/9893††	9124/9028††
	SC Net Efficiency (%, LHV)	34.8% 36.4%††	39.5%/39.9%††
	Fast Start Capability (Minutes)	5	5
1X CC PLANT PERFORMANCE	CC Net Output (MW)	49.5/51.5††	47.9/47.5††
	CC Net Heat Rate (Btu/kWh, LHV)	6833/6701††	6209/6175††
	CC Net Heat Rate (kJ/kWh, LHV)	7209/7070††	6551/6515††
	CC Net Efficiency (%, LHV)	49.9%/50.9%††	55.0%/55.3%††
	Plant Turndown – Minimum Load (%)	35.0%	35.0%
	Ramp Rate (MW/min)	30	30
	Startup Time (RR Hot†, Minutes)	30	30
2X CC PLANT PERFORMANCE	CC Net Output (MW)	99.9/103.9††	96.5/95.8††
	CC Net Heat Rate (Btu/kWh, LHV)	6776/6640††	6160/6124††
	CC Net Heat Rate (kJ/kWh, LHV)	7149/7006††	6499/6461††
	CC Net Efficiency (%, LHV)	50.4%/51.4%††	55.4%/55.7%††
	Plant Turndown – Minimum Load (%)	35.0%	35.0%
	Ramp Rate (MW/min)	60	60
	Startup Time (RR Hot†, Minutes)	30	30

NOTE: Net Plant ratings are based on ISO conditions, natural gas, inlet and exhaust losses included and balance of plant equipment excluded. Actual performance will vary with project specific conditions, fuel and ambient conditions. 2PNRH = Two pressure, non-reheat.
† Rapid Response/Hot Start
†† 50 Hz/60 Hz

~37 MW
SIMPLE CYCLE OUTPUT

~40%
SIMPLE CYCLE EFFICIENCY

50/60
HZ

The TM2500 package is ideal for providing a baseload bridge to permanent power installations or for generating backup power in the wake of emergencies like natural disasters, plant shutdowns, or grid instability. Our complete solutions, including a trailer-mounted gas turbine generator set and containerized balance-of-plant, can put power on the grid within as little as 30 days of the contract signature. This fast power provides the greatest power density among gas turbine trailer-mounted offerings.

Up to **35%** Hydrogen (H_2) Capability

TO LEARN MORE ABOUT THIS OFFERING, CONTACT YOUR SALES REPRESENTATIVE OR VISIT

gevernova.com

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The TM2500 is a registered product of GE Vernova.

GEA35745 (09/2025)

GE Power

GE's TM2500 solution offers fast, mobile and flexible power



a product of
ecomagination

35 MW
power potential on wheels

79 MILLION HOURS
accumulated hours of successful heritage operation

~1 MONTH
from contract signing to commissioning

11 DAYS
from parking first trailer to commissioning

10 MINUTES
full power production in less than 10 minutes

The ultimate solution for fast power needs in the 21st century

Currently, more than 1.3 billion people globally lack access to electricity. GE, whose technologies already help deliver a quarter of the world's electricity, is working to bridge the gap through a portfolio of distributed power solutions. These technologies enable industrial businesses, developing communities and governments to meet their energy needs by positioning power at, or near, the point of use. The TM2500* fast power solution from GE Power's Gas Power Systems business enables governments, utilities, and businesses around the world to fulfill their generation requirements within days. Thanks to their modular concept, fast installation features and quick production schedules, these units typically can be ready to enter into commercial operation approximately 30 days after your order is placed.

The TM2500 fast power solution harnesses the highly successful LM2500* aeroderivative gas turbine with more than 2,196 units deployed worldwide and more than 79 million hours of operation.

Features of the TM2500 fast power solution



Quick lead times

On-demand power plants delivered in weeks, not months



Fuel flexibility

Can operate on gas and/or distillate liquid fuel



Lower emissions

50 percent lower emissions than diesel generators when operating on gas



Proven technology

More than 2,196 LM2500 gas turbines deployed with 79 million operational hours of experience



Enhanced design

Two-trailer footprint for high power density



Scalable, reliable power

Able to add 35 MW blocks of power as demand increases



Distributed power

Localized power supply, eliminating the need for additional transmission and generation infrastructure



Project experience

More than 15 years of experience in providing fast and emergency power



Turnkey design

Delivery of complete energy solution

Benefits of a TM2500 solution

Speed

The development of a new power plant could entail months of construction and commissioning. We can shorten that time from months to days under most conditions. Once on the ground, these mobile units can generate power in about 11 days.

Reliability and availability

Due to our aviation legacy with the LM2500+G4 gas turbine, GE's TM2500 fast power solution represents some of the most reliable distributed power units available. That means consumers will not face frequent interruptions and instabilities due to technical problems related to faulty equipment or an unstable electricity grid.

Dual fuel capability

TM2500 solutions are capable of running on both natural gas and/or distillate or condensate liquid fuel at an output of up to 35 MW with water injection for NOx abatement.

Mobility

Mounted on a mobile, two-trailer assembly, TM2500 generator sets can be transported via land, sea, and air to some of the most remote places in the world. Their mobile nature means that they can be swiftly deployed to other sites within days when they are no longer required at the original site.

Flexibility

Extremely flexible, they have a sub 10-minute start cycle to full power.

Scalability

The technology is also scalable, allowing the purchase of the number of units needed with the option of adding more power quickly as demand increases.

Gradual financing

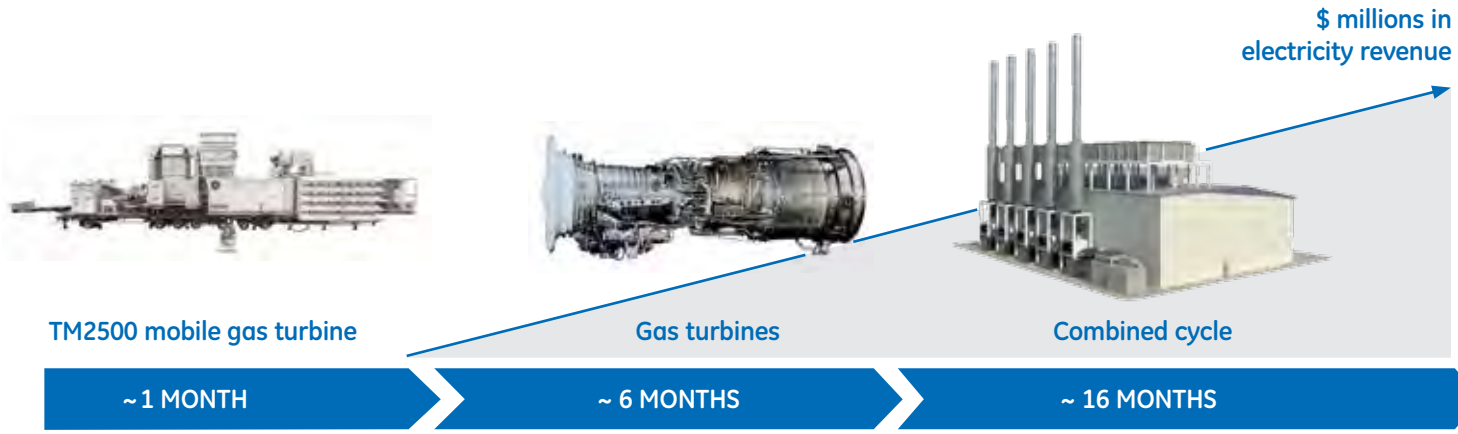
Because large capital expenditure costs can be a barrier for some projects, these units can be purchased gradually for financing ease. In addition, they can be deployed where ever demand exists without the need to invest in capital-intensive transmission and distribution infrastructure.

Rental

For rental solutions, contact our partner APR Energy at +1 904 223 2278 or visit www.aprenergy.com.

The TM2500 solution can be deployed more than six times faster than other technologies

Customers may immediately generate incremental electricity revenue.



The TM2500 can be in commercial operation approximately 30 days after an order is placed, but these times may vary based on project location, site readiness, permitting process, and other variables.

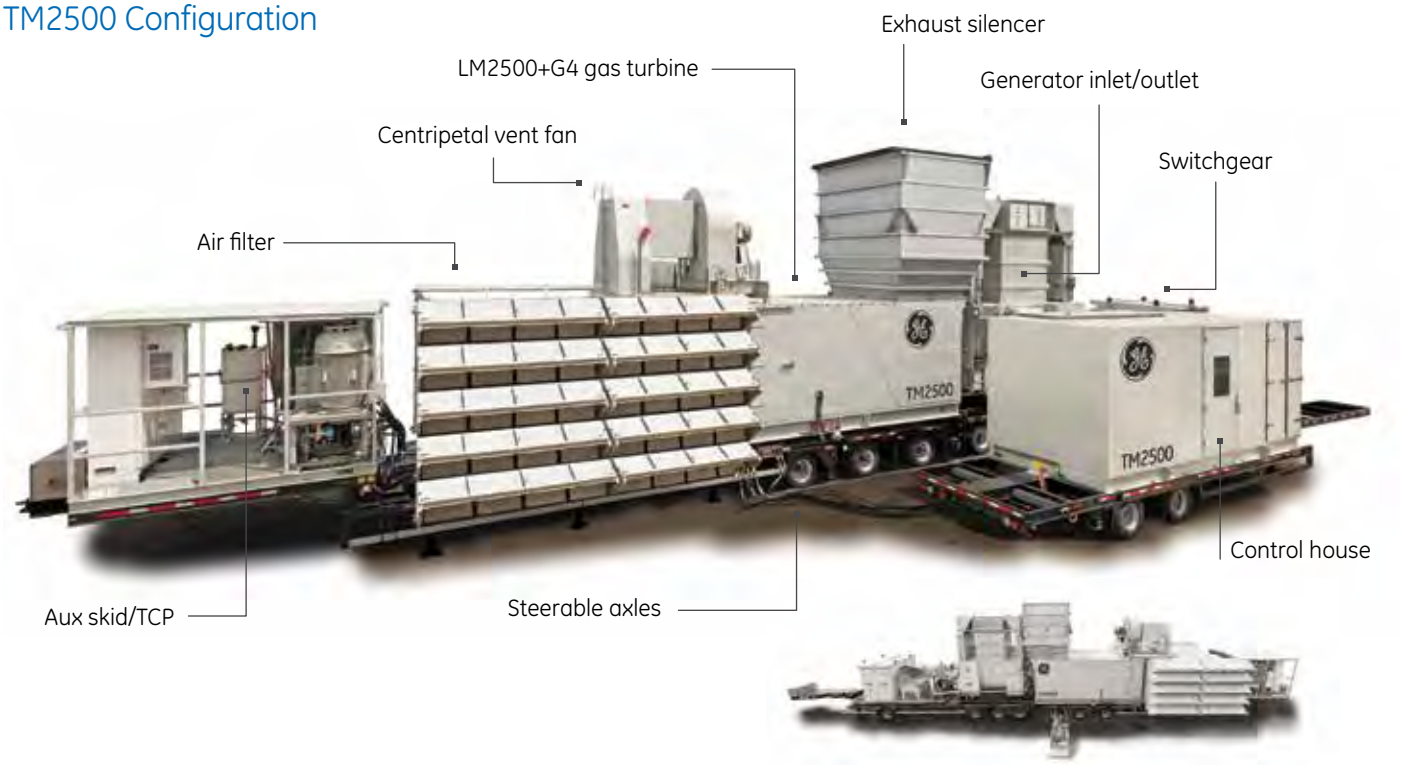
Multiple applications in a wide range of industries

The TM2500 solution can solve a number of industry challenges. These include, but are not limited to, difficult access to the electric grid, an unstable grid, emergencies and natural disasters, rapid demand growth such as large construction projects, as well as escalating electricity prices and seasonal shortages.

The Challenge	Description	Potential Industries	TM2500 as a solution
Limited or no access to the electric grid	Cases with challenging access to the electric grid include: • Lack of robust transmission and distribution network • Delayed grid access • Remote, islanded and mobile operations	Oil and gas Mining General industry Power generation	**Speed, mobility, and reliability** Can deliver power where and when it is needed and bring power online within 10 minutes to stabilize the grid
Rapid energy demand growth	High and rapid demand for electricity in cases with restricted power availability such as new, large off-grid construction projects	Government Utilities General industry	**Speed, reliability** Can fulfill power demand in the face of growing needs in a fast and reliable way
Lengthy buildout of electricity generation infrastructure	Construction lead times on new generation facilities as well as unanticipated delays—meaning pressing electricity needs are not met	Government Utilities General industry	**Speed, reliability** Can bridge power until new facilities are completed and go online
Escalating electricity prices	Escalating electricity rates during seasonal or peak periods requiring technologies that enable peak shaving	Government Utilities General industry	**Fuel flexibility** Can be used as a peak shaving application to help transition off the grid during seasonal or peak periods
Natural disaster and emergencies	Cases of emergency where power generation sources are impacted and direly needed	Government Utilities	**Speed, mobility** Can provide emergency power in a fast, reliable and mobile way
Flare gas	Natural gas flared in oil fields leading to billions of dollars wasted and millions of tons of greenhouse gas emissions	Oil and gas	**Fuel flexibility, mobility** Can help monetize gas flaring for power generation and help reduce diesel consumption

Performance you can count on for mobile power

TM2500 Configuration



Model	Frequency (Hz)	Output (MW)	Heat Rate (Btu/kWh)	Heat Rate (kJ/kWh)	Efficiency (%)	Pressure Ratio	Exhaust Temp (F)	Exhaust Temp (C)	Exhaust Energy (MMBtu/hr)	Exhaust Energy (MMkJ/hr)
TM2500	50	30.7	9,832	10,374	34.7	24.5	963.0	517.0	187	191
TM2500	60	34.9	9,341	9,856	36.5	24.7	950.0	510.0	185	195

NOTE: The performance data shown above is at standard ISO (International Organization for Standardization) conditions. The ISO has defined the following standard conditions for comparing gas turbine engines Ambient air: 59°F/15°C, 60% RH; Barometric pressure (14.696 psia / 101.4 kPa); Sea level altitude

ASSUMPTIONS: Expected inlet/exhaust losses, ISO conditions, Air-cooled generator, with brushless excitation @ 0.90 PF (60 Hz @13.8 kV, 50 Hz @ 11.5 kV)
Gas fuel, 100% CH_4 @ 80F, Water injection to 25 ppm NO_X @ 15% O_2

The TM2500 total solution and services support

A TM2500 fast power solution project may include:

- Installation
- Commissioning
- Project management
- Decommissioning
- Consumable parts kit (filters/lubricants for operation needs)

In addition, GE offers many services to support the ongoing operation and performance of the units including, but not limited to the following:

- On-call technical advisory services
- Maintenance planning and training
- On-site hot section, combustor, and other modular exchanges
- Depot Repair Services for scheduled overhauls and unscheduled repairs
- Performance testing

Cases in point



Egypt

500 MW of power, delivered in six months

With rapid economic growth and an expanding population, Egypt is a country in transition. Its desert climate necessitates a massive amount of power generation, and while GE's products currently generate nearly 30% of the country's total installed capacity, its electricity demand is expected to grow at 4.1% per year.

Beginning in December 2014, GE and the Egyptian government took vital steps towards meeting the sharp increase in the country's electricity demand. GE provided 20 TM2500 generator sets – totaling 500 MW of total power – and promised to install and commission all units within six months in order to meet 2015's hot summer months.

The mobile, flexible power provided by the TM2500, combined with the rapid installation and support provided by GE in the region, allows Egypt to meet the challenge of new energy frontiers and support its growing economy. Each unit was able to be delivered to where it needed to be, quickly and safely, saving the Egyptian government tremendous costs and time before power was available to be added to the grid.

By working quickly to get the TM2500 generator sets up and running byJune 2015, GE predicts that Egypt will avoid $24.7 million in economic losses per day—which will add up to $4.1 billion over the course of the demanding summer season.







Algeria

480 MW† of on-demand power for Algeria

Algeria faces a drastic need for more power, particularly during the hot summer months when there is close to ten percent annual growth in electricity demand.

GE delivered 24 TM2500 mobile gas turbine generators that provided more than 480 MW of power. The units were commissioned, delivered and operational in time to meet the northern districts of M'Sila and Fkirina's 2013 summer peak electricity demand. After the seasonal peaks, some of the units were deployed to other cities in the south of the country to serve as permanent power.



Greece

23 MW† for peak shaving in ten days for Greece

The Greek island of Rhodes is a prime tourist destination. During the summer months, an influx of more than two million people from all over the world swells demand for power to the breaking point.

To avert blackouts, the island purchased a TM2500 generator set, which was delivered before the summer season and commissioned within a few days of arrival onsite. This provided 23 MW of power generation in tandem with water injection to lower NOx levels to below 25 ppm.



Angola

120 MW for bridging power for Angola

Only 26 percent of Angola's population of 19 million have access to power. Rich in natural resources, the country is engaged in a priority program to create a modern energy infrastructure.

The government of Angola ordered five TM2500 mobile gas turbine generator sets. 120 MW of onsite power is bridging the energy gap during ongoing plant construction, improving grid reliability and countering the rising cost of diesel fuel.

†Power output is based in site conditions.

"GE's TM2500 systems offer the right combination of efficiency and reliability needed to help the Angolan state utility, Empresa Nacional Electricidade-E.P. (ENE), reduce its fuel costs and increase the reliability of grid service in order to support continued economic growth in Angola."

— NYEMBO ILUNGA
PRESIDENT, LS ENERGIA AFRICA

GAS POWER SYSTEMS

GE Power's Gas Power Systems is the global industry leader in efficient, reliable, and cost-effective conversion of a broad range of gas and liquid fuels to power—serving diverse applications from small, mobile power to highly efficient, utility-scale power plants. With a rich heritage of innovation and technology leadership—and the world's largest delivered fleet of gas and steam turbines serving the power needs of more than 130 countries—our specialized plant solutions can provide the increased performance, fuel efficiency, lower emissions and operational flexibility that our customers depend on for their success.

For rental solutions, contact our partner,
APR Energy at +1 904 223 2278.

powergen.gepower.com

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GEA31885 (11/2015)

Attachment 3

February 13, 2026
Prepared for SELC

Prepared by:
EmPower Analytics Group LLC
Independent Environmental Health & Infrastructure Analysis

Air Quality, Health, and Economic Impacts of the Proposed MZX Tech Facility

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Executive Summary

- This report evaluates the estimated public-health impacts and economic damages attributable to increased exposure to fine particulate matter ($PM_{2.5}$) from the proposed 1.2-GW MZX Tech gas-fired power facility in DeSoto County, Mississippi.
- $PM_{2.5}$ is one of the most harmful air pollutants to human health. Extensive scientific evidence supports a causal relationship between long-term exposure to $PM_{2.5}$, including concentrations well below current federal air quality standards, and increased risks of heart disease, stroke, respiratory illness, asthma exacerbation, and premature death.
- At the county level, we found that DeSoto County, where the facility would be located, experiences the largest estimated $PM_{2.5}$ exposure increase (up to 0.29 μg/m³) attributable to the gas-fired facility. Shelby County, Tennessee, home to Memphis, bears the largest share of the population exposure (63.8%). Those additional $PM_{2.5}$ exposures occur in areas that already experience elevated $PM_{2.5}$ levels; recent EPA monitoring and estimated data indicate annual-average $PM_{2.5}$ exposure near or above the current annual standard of 9 μg/m³ across DeSoto County, Shelby County, and the Memphis metropolitan area.
- At the neighborhood level, the highest estimated $PM_{2.5}$ exposure increases due to the plant occur in South Memphis neighborhoods, including Whitehaven and Westwood, where average annual increases exceed 0.5 μg/m³, as well as nearby communities in DeSoto County such as Horn Lake. When translated into population-level health risk, a sustained increase in exposure of this size (~0.5 μg/m³) corresponds to an increase in per-capita mortality risk of similar magnitude to the annual per-capita risk of death from alcohol-impaired driving in the United States.
- Using the U.S. Environmental Protection Agency's COBRA health impact model, emissions from the proposed MZX Tech facility are estimated to result in $30–$44 million per year in health-related damages, including costs from premature deaths, hospital visits, and lost productivity. Over a typical 30-year operating life, these impacts would amount to approximately $588–$862 million in cumulative discounted public-health costs, borne largely by residents of Tennessee and Mississippi.
- The largest estimated $PM_{2.5}$ increases are concentrated in communities that are disproportionately Black, highly socially vulnerable, and have elevated baseline asthma prevalence. In the highest-exposure tracts, Black residents comprise 73% of the population—approximately double the Mississippi average and several times higher than both Tennessee and national averages. These tracts rank more vulnerable than roughly three-quarters of U.S. census tracts, and adult asthma prevalence exceeds state and national levels.

Introduction

This report evaluates the potential air-quality and public-health impacts of the proposed MZX Tech LLC's behind-the-meter electric power generation facility in Southaven, Mississippi (DeSoto County). MZX Tech has applied for an initial Prevention of Significant Deterioration (PSD) air permit to construct and operate a large natural-gas-fired generation facility intended to supply electricity for the nearby xAI data center campus.

According to the PSD permit application, the facility would include 41 simple-cycle natural gas combustion turbines—17 Solar PGM-130 units (16.5 MW each), 16 Solar Titan 350 units (35 MW each), and 8 ProEnergy 6000PE units (50 MW each)—with a combined continuous generating capacity of approximately 1.2 gigawatts. The project also includes ten natural-gas-fired pressure reduction systems (PRS) units associated with fuel delivery infrastructure. Based on its size and emissions potential, the facility would be classified as a major stationary source under the Clean Air Act, subject to PSD permitting requirements.

To date, there has been no comprehensive analysis that translates the facility's proposed permitted emissions into estimates of additional exposure to ambient pollution levels and therefore additional public-health burden. This report addresses that gap by providing a transparent, screening-level assessment of the potential long-term public-health impacts attributable to the facility's permitted emissions.

Specifically, this report uses the maximum annual emissions authorized under the PSD permit to estimate how operation of the MZX Tech facility could affect long-term ambient $PM_{2.5}$ concentrations in surrounding communities and across the broader downwind region. These estimated concentration changes are then used to calculate changes in population-level $PM_{2.5}$ exposure, attributable health outcomes, and economic damages using established air-quality and public-health assessment methods.

Scientific foundation and independence

This assessment was conducted by independent scientific experts and was not prepared by or on behalf of the project proponent, permitting agency, or any regulatory authority. The analysis relies on publicly available permit documentation and peer-reviewed air-quality modeling and health-impact assessment methods. It follows established scientific frameworks used to evaluate (1) how emissions disperse and chemically transform in the atmosphere to form fine particulate matter ($PM_{2.5}$), and (2) how increases in $PM_{2.5}$ exposure attributable to the plant translate into adverse health outcomes and economic damages. The approach is consistent with methods widely applied in the academic literature and by federal agencies to assess population-level health impacts of industrial air pollution, and builds on decades of epidemiological research linking long-term $PM_{2.5}$ exposure to increased risks of premature mortality and other adverse health outcomes.[1]

[1] Wu et al., "Evaluating the Impact of Long-Term Exposure to Fine Particulate Matter on Mortality among the Elderly"; Di et al., "Air Pollution and Mortality in the Medicare Population"; Cork et al., "Methods for

The analysis was conducted by an environmental health scientist and air pollution epidemiologist trained at Harvard University. All assumptions, inputs, and analytical steps are documented to support transparency and reproducibility. This report is intended to provide an independent, policy-relevant assessment of potential long-term public-health impacts attributable to the facility's permitted emissions. The analysis is focused on population-level health impacts and does not replace regulatory compliance modeling conducted as part of the permitting process.

What is $PM_{2.5}$ and why does it matter?

Fine particulate matter smaller than 2.5 micrometers in diameter ($PM_{2.5}$) is one of the most harmful forms of air pollution.[2] $PM_{2.5}$ includes all particles this small, whether they are released directly into the air or formed later through chemical reactions in the atmosphere. Because of its microscopic size (roughly 30 times smaller than the width of a human hair), $PM_{2.5}$ can penetrate deep into the lungs and enter the bloodstream, triggering inflammation throughout the body.[3]

A large body of scientific evidence links exposure to $PM_{2.5}$ with a wide range of adverse health outcomes, including asthma exacerbation, respiratory and cardiovascular disease, heart attack, stroke, and premature death.[4] According to major public-health assessments, $PM_{2.5}$ accounts for the majority of the roughly eight million global deaths each year attributed to air pollution, making it a leading environmental risk factor worldwide.[5] High-risk groups include children, asthmatics, and older adults with pre-existing heart and lung conditions.

$PM_{2.5}$ originates from both direct and indirect sources. Primary $PM_{2.5}$ is emitted directly into the air from combustion processes such as power generation, vehicle exhaust, and industrial activity. Secondary $PM_{2.5}$ forms in the atmosphere when precursor pollutants—including sulfur dioxide (SO_2), nitrogen oxides (NO_x), ammonia (NH_3), and volatile organic compounds (VOCs)—undergo chemical reactions to form sulfates, nitrates, and organic aerosols. These chemically formed particles are also considered $PM_{2.5}$ and often make up a large share of the fine particulate matter people breathe. Together, these pathways contribute to ambient $PM_{2.5}$ concentrations that affect regional air quality and public health.

Importantly, there is no known safe level of exposure to $PM_{2.5}$.[6] Health risks increase continuously as ambient concentrations—and therefore population exposure—rise, with no threshold below which exposure is considered harmless. Large national studies, including analyses of more than 60 million U.S. Medicare beneficiaries, demonstrate that even very small

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Estimating the Exposure-Response Curve to Inform the New Safety Standards for Fine Particulate Matter"; Henneman et al., "Mortality Risk from United States Coal Electricity Generation."

[2] American Lung Association, "Particle Pollution."

[3] US Environmental Protection Agency, "Particulate Matter (PM) Basics."

[4] Birnbaum et al., "Measuring The Impact Of Air Pollution On Health Care Costs"; Di et al., "Association of Short-Term Exposure to Air Pollution With Mortality in Older Adults"; Wu et al., "Evaluating the Impact of Long-Term Exposure to Fine Particulate Matter on Mortality among the Elderly."

[5] Health Effects Institute and IHME, "State of Global Air Report 2025."

[6] American Lung Association, "Particle Pollution."

long-term increases in $PM_{2.5}$ (fractions of a microgram per cubic meter) are linked with measurable increases in mortality and hospitalization rates, even at levels far below current federal air-quality standards.[7] In practical terms, this means that modest incremental increases in pollution can still produce meaningful population-level health impacts when large numbers of people are exposed.

Emissions Inputs and Scope of Analysis

Facility and Emissions Scope

This analysis evaluates potential air-quality and public-health impacts attributable to the proposed MZX Tech LLC power generation facility, as described in the PSD permit application and supporting documentation. The assessment focuses on emissions from the facility's combustion turbines and fuel-conditioning equipment, which are the primary sources of fine particulate matter ($PM_{2.5}$) and $PM_{2.5}$ precursor pollutants at the site.

Emissions inputs are based on the allowable emissions used by the permitting agency to determine PSD applicability, as documented in the permit record. These values represent maximum annual emissions and provide an appropriate basis for a bounding, screening-level analysis of potential long-term impacts. Using maximum allowable emissions enables this report to characterize the potential magnitude and geographic extent of $PM_{2.5}$ impacts if the facility were operated at its permitted limits; the analysis does not attempt to predict typical operating conditions, dispatch patterns, or short-term variability.

Pollutants Included

Based on the PSD permit, the facility is authorized to emit up to 19.56 tons per year of primary $PM_{2.5}$, including emissions from steady-state operation as well as startup and shutdown events. The permit also authorizes annual emissions of 156.53 tons of sulfur dioxide (SO_2), 423.39 tons of nitrogen oxides (NO_x), and 417.40 tons of volatile organic compounds (VOCs), all of which contribute to secondary $PM_{2.5}$ formation.

Ammonia (NH_3) is an additional $PM_{2.5}$ precursor associated with the use of selective catalytic reduction (SCR) systems for NO_x control. While the permit does not specify a single facility-wide annual NH_3 cap, it includes enforceable per-turbine NH_3 limits on a rolling 12-month basis. Based on these limits and the turbine configuration described in the permit application, the implied maximum facility-wide NH_3 emissions total approximately 485.5 tons per year. Consistent with a bounding screening approach, this value was used in modeling scenarios that include NH_3 to represent a maximum-allowable precursor-emissions case. Details of this calculation and the relevant permit provisions are provided in the Appendix.

[7] Di et al., "Air Pollution and Mortality in the Medicare Population"; Wu et al., "Evaluating the Impact of Long-Term Exposure to Fine Particulate Matter on Mortality among the Elderly"; Cork et al., "Methods for Estimating the Exposure-Response Curve to Inform the New Safety Standards for Fine Particulate Matter"; Josey et al., "Air Pollution and Mortality at the Intersection of Race and Social Class."

Scope of the Assessment

The scope of this report is limited to air-quality impacts and resulting health and economic effects attributable to increases in annual-average ambient $PM_{2.5}$ exposure from the facility's permitted emissions. These exposure increases are based on estimated changes in outdoor $PM_{2.5}$ concentrations experienced by residents. The analysis does not evaluate other potential impacts such as water use, noise, traffic, construction emissions, land-use change, grid-system effects, or short-term peak pollution levels.

Analytical Approach and Methodology

Overview

To estimate potential air-quality and public-health impacts attributable to operation of the MZX Tech facility, this analysis applies a multi-step framework that translates permitted emissions into long-term changes in ambient fine particulate matter ($PM_{2.5}$), population exposure, and attributable health and economic impacts. Emissions inputs and scope are defined in the preceding section; this section describes how those inputs are estimated and evaluated.

1. Source representation and release assumptions

The geographic location of the modeled source was defined using the facility latitude and longitude reported in the PSD permit application. Facility emissions were represented as a single, aggregated elevated point source, consistent with a regional screening application of the Intervention Model for Air Pollution (InMAP). This aggregated representation enables the analysis to characterize regional patterns in annual-average $PM_{2.5}$ contributions and population exposure without requiring detailed assumptions about unit-specific operations, turbine dispatch, or temporal variability. This approach is appropriate for evaluating long-term exposure and health impacts rather than near-field plume behavior.

Stack and release parameters were drawn from the PSD permit application and associated dispersion modeling materials. For the primary analysis, this report uses a turbine stack configuration corresponding to the Solar PGM-130 units. The stack parameters applied are a height of 50 feet (15.24 meters), an inside diameter of 9 feet (2.74 meters), an exhaust temperature of 920°F (766.5 K), and an exit velocity of 70.42 feet per second (21.47 meters per second).

2. Dispersion and atmospheric chemistry modeling

The analysis uses the Intervention Model for Air Pollution (InMAP) to estimate how emissions from the facility disperse and chemically transform in the atmosphere, resulting in downwind increases in annual-average $PM_{2.5}$ concentrations and corresponding population exposure.[8] InMAP incorporates long-term meteorological conditions, terrain, and key atmospheric chemistry

[8] Tessum et al., "InMAP."

processes to estimate both primary $PM_{2.5}$ impacts and secondary $PM_{2.5}$ formation from precursor emissions. Model outputs consist of gridded estimates of incremental annual-average $PM_{2.5}$ exposure attributable solely to the proposed facility.

Why InMAP is the appropriate dispersion model

The objective of this analysis is to estimate population-level $PM_{2.5}$ exposure and attributable health impacts, including secondary particulate matter formed from precursor emissions. InMAP is a peer-reviewed, reduced-complexity atmospheric chemistry model designed specifically to estimate marginal changes in annual-average $PM_{2.5}$ exposure at regional scales, including secondary $PM_{2.5}$ formation.[9] "Reduced complexity" refers to computational efficiency rather than scientific validity; InMAP is calibrated against more complex chemical transport models and retains the processes necessary for health-impact assessment. Accordingly, InMAP is well-suited for screening-level, decision-relevant estimation of population-level $PM_{2.5}$ exposure attributable to a single source, which is the objective of this analysis.[10]

AERMOD is the EPA-preferred model for regulatory permitting and compliance demonstrations, particularly for evaluating near-field concentrations at specific receptors and shorter averaging times.[11] However, AERMOD does not simulate atmospheric chemical reactions or gas-to-particle conversion and therefore does not explicitly account for secondary $PM_{2.5}$ formation. For combustion sources, secondary formation from precursor emissions such as NO_x and SO_2 can represent a substantial—and in some cases dominant—portion of total annual-average $PM_{2.5}$ exposure.[12] As EPA acknowledges, secondary $PM_{2.5}$ formation is chemically complex and is not represented in dispersion models that do not simulate atmospheric chemistry.[13] Because precursor emissions can form fine particles downwind over regional scales, EPA guidance emphasizes that model selection should reflect the nature of the source and its emissions.[14] When the objective is to estimate regional, annual-average exposure attributable to those precursors, the use of a model that incorporates both dispersion and chemical transformation is scientifically appropriate and well aligned with EPA guidance.

3. Estimating community exposure and exposure burden

Gridded estimated $PM_{2.5}$ exposure increments produced by InMAP were aggregated to policy-relevant geographic units, including census tracts, counties, cities, and towns. Aggregation was performed using population-weighted averaging, meaning areas where more people live contribute more to the reported exposure values than sparsely populated areas. In simple terms, we calculate the average pollution level experienced by residents, not the average pollution level across land area.

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[9] Tessum et al., "InMAP."
[10] Henneman et al., "Mortality Risk from United States Coal Electricity Generation."
[11] US Environmental Protection Agency, "Air Quality Dispersion Modeling - Preferred and Recommended Models."
[12] US Environmental Protection Agency, *Integrated Science Assessment (ISA) for Particulate Matter.*
[13] US Environmental Protection Agency, Guidance for PM2.5 Permit Modeling.
[14] US Environmental Protection Agency, *Guidance for PM2.5 Permit Modeling*.

Population weights at the grid-cell level are provided internally by InMAP. For all tract-, county-, and state-level population totals and exposure burden calculations, this analysis uses 2022 American Community Survey (ACS) 5-year population estimates, ensuring consistency with authoritative demographic data.[15]

In addition to estimating the increases in average exposure, the analysis also estimates population-level $PM_{2.5}$ exposure burden attributable to the facility. Exposure burden is defined as the product of the estimated exposure increase and the number of people exposed within a given geographic area. This metric captures both the magnitude of pollution increases and the size of the affected population, providing a measure of where the facility's emissions contribute most to total population exposure. Exposure burden was calculated and reported at the county and state levels, allowing identification of the regions that account for the largest share of total facility-attributable population exposure.

4. Demographic and Socioeconomic Assessment

To characterize the populations most affected by estimated $PM_{2.5}$ increases due to the facility, this analysis includes a demographic and socioeconomic assessment using publicly available data from the American Community Survey (ACS) and Centers for Disease Control and Prevention (CDC).[16] Census tracts were grouped based on estimated increases in annual-average $PM_{2.5}$ exposure (e.g., ≥0.01 μg/m³, ≥0.1 μg/m³, and ≥0.5 μg/m³), and population-weighted averages were calculated for key demographic and health indicators.

Demographic and socioeconomic indicators—including race and ethnicity, poverty rate, median household income, median property value, and age distribution—were derived from ACS 5-year estimates. Health and vulnerability indicators include adult asthma prevalence from CDC PLACES and the CDC/ATSDR Social Vulnerability Index (SVI).[17] Results describe the characteristics of populations living in tracts experiencing different levels of estimated $PM_{2.5}$ increase. These tract-level characteristics were compared with state and national averages to identify potential environmental justice concerns, including whether estimated $PM_{2.5}$ impacts disproportionately affect lower-income or historically marginalized communities.

5. Health and Economic Impact Estimation

Estimates of health impacts and economic damages attributable to the facility were generated using the U.S. Environmental Protection Agency's Co-Benefits Risk Assessment (COBRA) tool.[18] COBRA is a nationally recognized, screening-level public-health assessment model used to estimate population-level health and economic effects attributable to changes in fine particulate matter. COBRA applies peer-reviewed concentration–response functions linking long-term $PM_{2.5}$ exposure to outcomes such as premature mortality, hospital admissions,

[15] US Census Bureau, "American Community Survey 5-Year Data (2009-2023)."
[16] US Census Bureau, "American Community Survey 5-Year Data (2009-2023)"; CDC, "Health Outcomes."
[17] CDC, "Social Vulnerability Index."
[18] US Environmental Protection Agency, "CO-Benefits Risk Assessment (COBRA) Web Edition."

cardiovascular events, asthma exacerbations, and lost workdays. These impacts are monetized using standard valuation methods to estimate annual health-related damages.

For this analysis, COBRA was run using a scenario representing a gas-fired electricity-generating facility located in DeSoto County, Mississippi, emitting primary $PM_{2.5}$ and $PM_{2.5}$ precursor pollutants at levels consistent with the PSD permit. The model estimates annual changes in health outcomes and economic damages across the contiguous United States. COBRA is used here to address a policy-relevant question: *What is the expected magnitude of population-level health and economic impacts attributable to the facility's permitted $PM_{2.5}$ emissions?* Results represent screening-level estimates of long-term impacts rather than predictions of individual risk or regulatory compliance outcomes.

Interpretation and visualization thresholds

For visualization and summary purposes, this report uses practical exposure thresholds to help readers interpret estimated increases in annual-average exposure to $PM_{2.5}$ attributable to the proposed facility. The maps display areas with increases of 0.01 and 0.05 μg/m³ or more, allowing readers to see the full spatial footprint of the plant's emissions, including smaller but still detectable downwind impacts. These thresholds are not health-based cutoffs and should not be interpreted as separating "safe" from "unsafe" conditions. Rather, they are used to clearly present estimated increases in exposure attributable to a facility of this size and to pinpoint areas experiencing relatively larger exposure increments. As such, the thresholds are intended to support interpretation and communication, not to imply the absence of risk below any specific value.

To help readers understand what these estimated increases in $PM_{2.5}$ exposure represent in terms of adverse effects, the report provides additional context for commonly referenced exposure ranges. Although changes on the order of tenths of a microgram per cubic meter may appear small, large long-term epidemiological studies consistently show that persistent increases of this magnitude can translate into meaningful population-level impacts when experienced across large numbers of people.

For example, using a standard log-linear relationship between long-term $PM_{2.5}$ exposure and all-cause mortality, and applying the U.S. baseline all-cause mortality rate, a sustained increase of approximately 0.15 μg/m³ in annual-average $PM_{2.5}$ exposure corresponds to roughly one additional death per 100,000 people per year. At the population level, this is similar in magnitude to the average annual number of deaths per-capita in the United States attributed to influenza (approximately 1.2 deaths per 100,000 people per year).[19]

A sustained increase of 0.5 μg/m³ corresponds to approximately three additional deaths per 100,000 people per year. At the population level, this is comparable to the average annual death rate in the United States attributable to alcohol-impaired driving (approximately 3–4 deaths per

[19] Centers for Disease Control and Prevention (CDC), "Influenza (Flu) Deaths."

100,000 people per year).[20] In other words, sustained exposure at this level would be expected to contribute to premature deaths at a per-capita rate similar to the national death rate from alcohol-impaired driving.

These comparisons are provided solely to clarify magnitude using familiar population-level rates, and do not imply equivalence in cause, biological mechanism, timing (acute versus chronic), or preventability. Additional methodological details, assumptions, and data sources are provided in the Appendix.

[20] National Highway Traffic Safety Administration (NHTSA), “Traffic Safety Facts 2023: Alcohol-Impaired Driving.”

Results: Estimated Air Pollution Impacts from the Proposed MZX Tech facility

Regional Distribution of $PM_{2.5}$ Increases

Figures 1 and 2 show the estimated increase in annual-average $PM_{2.5}$ exposure attributable to emissions from the proposed MZX Tech power generation facility in DeSoto County, Mississippi. The highest increases in $PM_{2.5}$ exposure occur in census tracts closest to the facility, with peak increments concentrated in northern DeSoto County and extending across the state line into southern Shelby County, Tennessee.

At the regional scale (Figure 1), elevated $PM_{2.5}$ increments extend beyond the immediate vicinity of the facility into surrounding areas of northwest Mississippi and southwestern Tennessee, with exposure decreasing with distance from the source. Figure 2 provides a zoomed-in view of the highest-exposure tracts, highlighting that the largest per-person exposure increases are localized near the facility, particularly along the Mississippi–Tennessee border. Table 1 summarizes these regional patterns at the county level, ranking counties by their average estimated $PM_{2.5}$ increment. DeSoto County experiences the largest average increase (0.292 μg/m³), followed by Shelby County, Tennessee (0.162 μg/m³), and neighboring counties in Arkansas and Tennessee. These counties are geographically closest to the facility and align with the core plume corridor identified in Figures 1 and 2.

Regional $PM_{2.5}$ Increases in Areas with Elevated Background Pollution

Several of the highest-impact areas identified here overlap with communities that already experience elevated background $PM_{2.5}$ levels based on the most recently available EPA monitoring data. According to EPA's 2023 Air Quality Statistics, the weighted annual mean $PM_{2.5}$ concentration was 10.6 μg/m³ in DeSoto County, Mississippi and 9.6 μg/m³ in Shelby County, Tennessee, both above the current annual $PM_{2.5}$ standard of 9.0 μg/m³.[21] For the Memphis metropolitan area as a whole, the 2023 weighted annual mean $PM_{2.5}$ concentration was 11.8 μg/m³, indicating particularly high regional background levels. Under EPA's regulatory framework, formal attainment determinations rely on three-year design values and subsequent rulemaking rather than single-year monitored averages. Nonetheless, these EPA-reported 2023 values demonstrate that much of the region has little remaining margin relative to current air-quality benchmarks, providing important context for interpreting the estimated $PM_{2.5}$ increases shown in Figures 1 and 2.

[21] US Environmental Protection Agency, "Air Quality - Cities and Counties."

Table 1. *Estimated increases in annual-average $PM_{2.5}$ attributable to the proposed MZX Tech facility, summarized by county. Values represent the estimated increase in long-term $PM_{2.5}$ exposure experienced by residents of each county (μg/m³). Population estimates are from the 2022 American Community Survey, rounded to the nearest 500. Counties are ordered from highest to lowest average increase.*

County	State	Population	Average annual plant-attributable $PM_{2.5}$ exposure (μg/m³)
DeSoto County	Mississippi	186,000	0.292
Shelby County	Tennessee	926,500	0.162
Crittenden County	Arkansas	48,000	0.091
Fayette County	Tennessee	42,000	0.036
Tipton County	Tennessee	61,000	0.035
Tate County	Mississippi	28,000	0.03
Marshall County	Mississippi	34,000	0.028
Tunica County	Mississippi	10,000	0.024
Haywood County	Tennessee	18,000	0.018
Lauderdale County	Tennessee	25,000	0.016

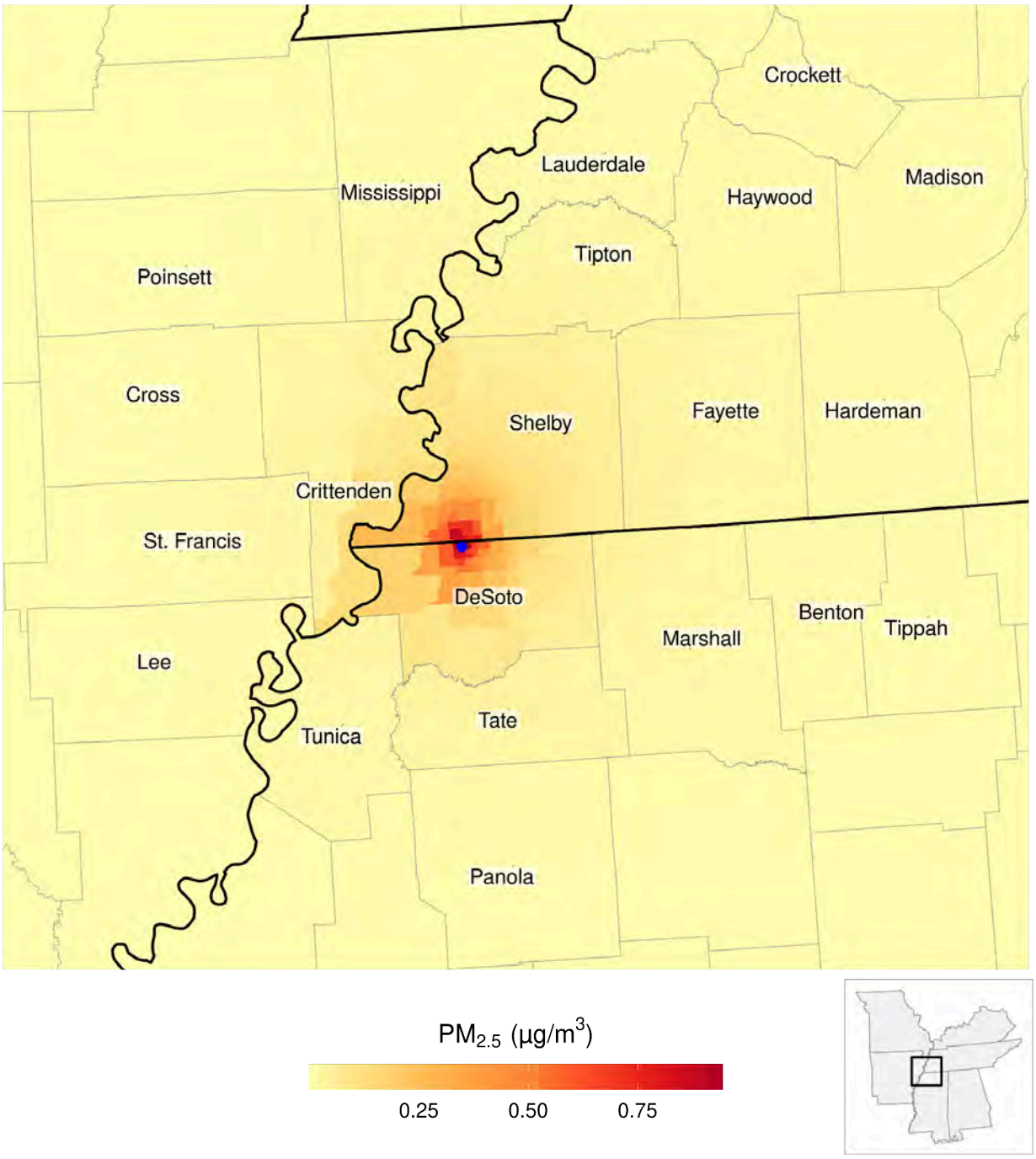


Figure 1. Estimated regional distribution of annual-average $PM_{2.5}$ increases attributable to the proposed MZX Tech facility. *Colors show the estimated increase in long-term $PM_{2.5}$ exposure across census tracts (µg/m³), representing the average additional pollution residents would experience due to facility emissions. The blue dot marks the facility location in DeSoto County, Mississippi. County boundaries are shown for reference, and county names are labeled where at least one census tract shows an increase of 0.01 µg/m³ or greater. The inset map shows the study area's location and extent in the southern United States.*

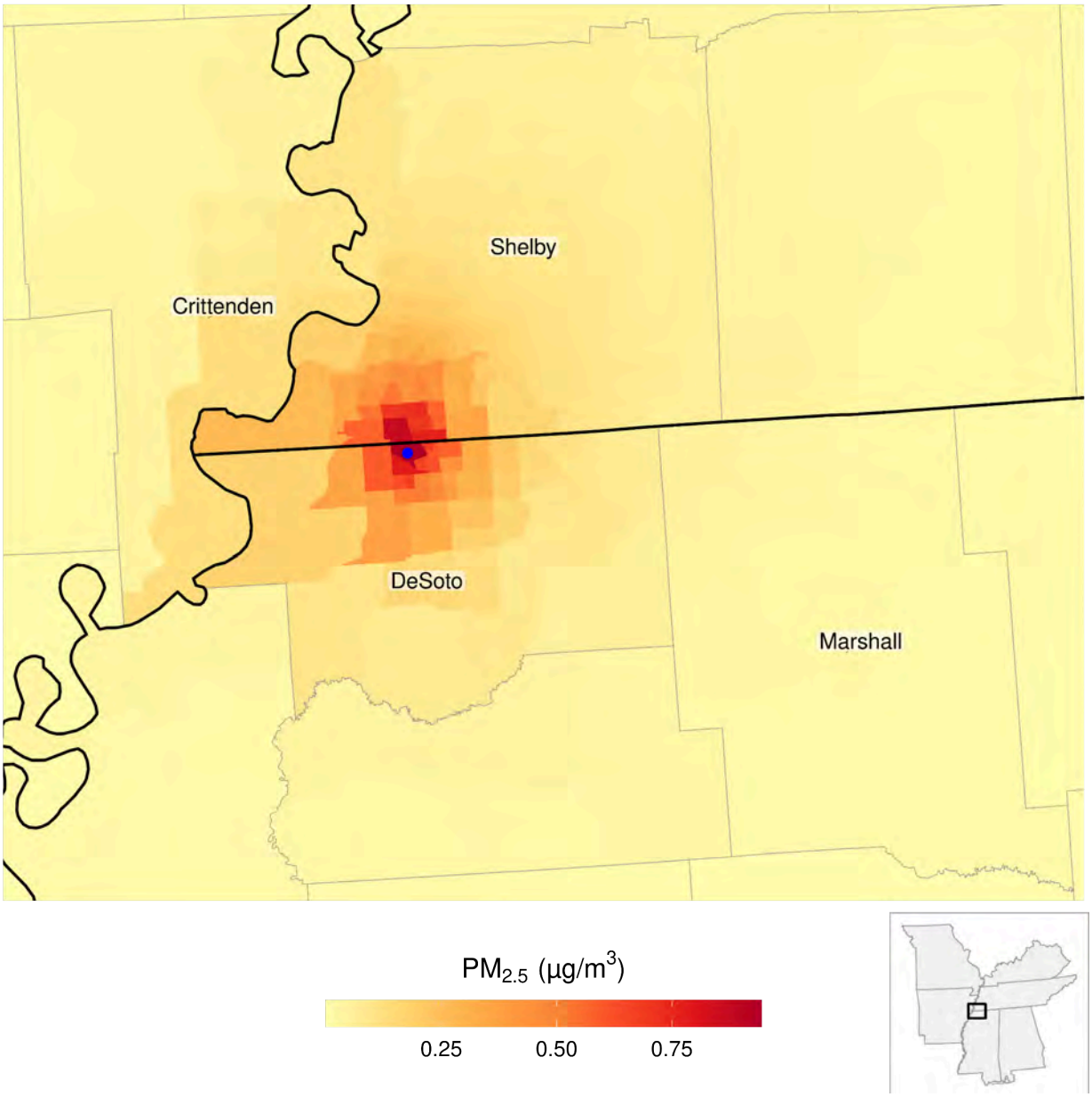


Figure 2: Zoomed-in view of census tracts with the highest estimated increases in annual-average $PM_{2.5}$ attributable to the proposed MZX Tech facility. *Colors show the estimated increase in long-term $PM_{2.5}$ exposure across census tracts (µg/m³), representing the average additional pollution residents would experience due to facility emissions. The blue dot marks the facility location in DeSoto County, Mississippi. County boundaries are shown for reference, and county names are labeled where at least one census tract shows an increase of 0.05 µg/m³ or greater. The inset map shows the study area's location and extent in the southern United States.*

Community-Level Exposure Patterns

While county- and census tract-level maps illustrate the regional dispersion of pollution, community-level results provide a clearer picture of how residents in specific towns, cities, and neighborhoods would experience exposure. Figures 3 and 4 present estimated increases in annual-average $PM_{2.5}$ exposure for local communities, including Census-designated places as well as neighborhoods within the City of Memphis.

Several of the largest estimated $PM_{2.5}$ increases occur in densely populated areas near and downwind of the facility, including multiple neighborhoods within Memphis. Table 2 highlights the communities with the highest estimated $PM_{2.5}$ increases, including several Memphis neighborhoods—such as Whitehaven, Westwood, and Parkway Village—each with populations comparable to or larger than nearby towns in Mississippi.

Because Memphis encompasses a large and diverse urban area, reporting results for the city as a single aggregated unit would obscure meaningful variation in exposure across neighborhoods. To provide a more informative, locally relevant depiction of impacts within the city, we disaggregate Memphis using the Memphis 3.0 planning districts.[22] These districts group together nearby neighborhoods based on geographic proximity, land-use patterns, and community identity, and are widely used by the City of Memphis for planning, transportation, and community engagement. This approach allows estimated $PM_{2.5}$ impacts to be interpreted at a scale that more closely reflects how residents experience and understand their neighborhoods.

Many of the communities identified in this analysis have substantial populations and lie directly within the predominant downwind pathway from the proposed facility, contributing meaningfully to the overall regional exposure burden. Taken together, these results demonstrate that the facility's estimated air-quality impacts would extend into populated urban neighborhoods, underscoring the importance of its location relative to the Memphis metropolitan area.

[22] Memphis 30, "Memphis 3.0 Comprehensive Plan."

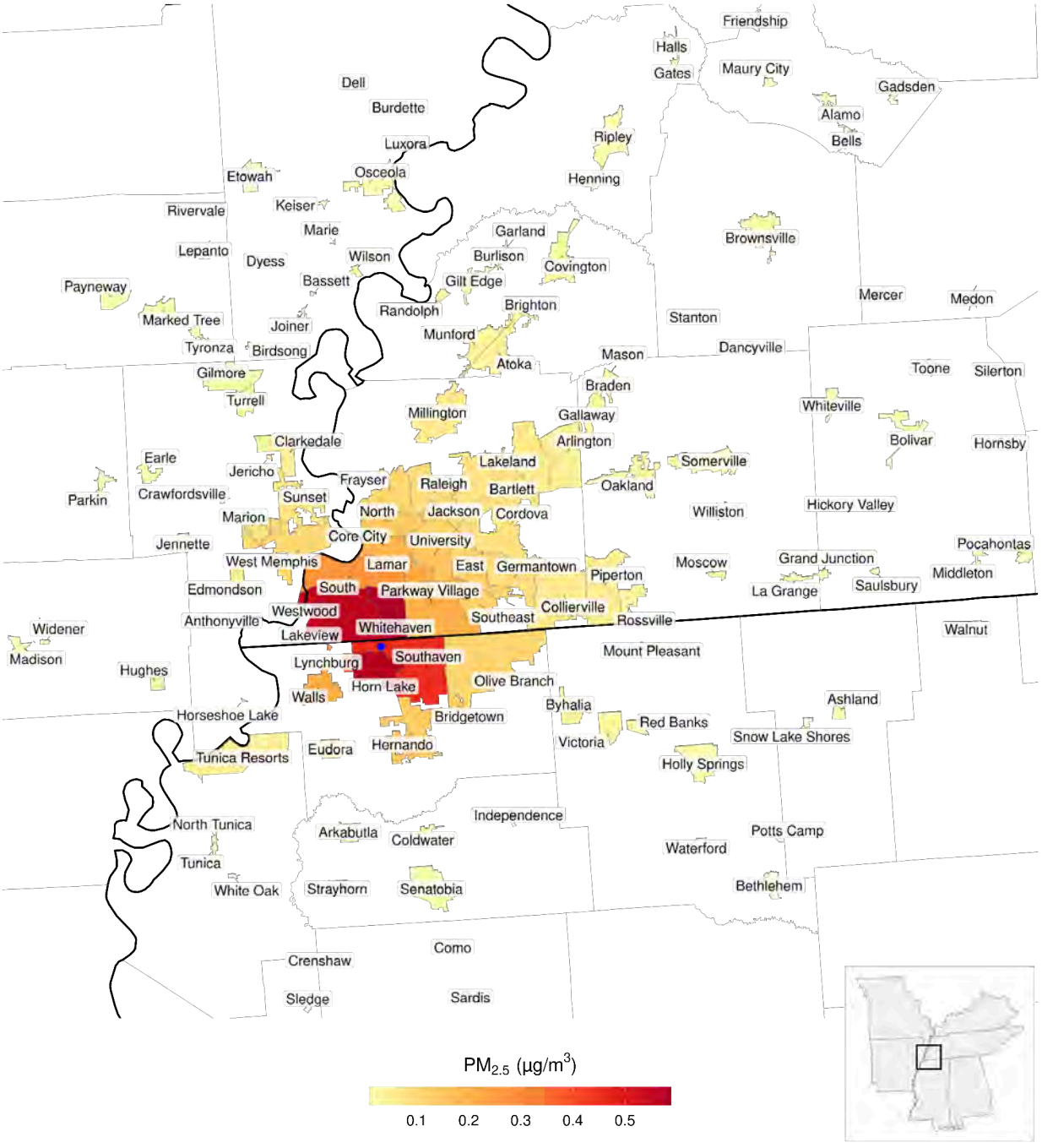


Figure 3. Estimated community-level increases in annual-average $PM_{2.5}$ attributable to the proposed MZX Tech facility. *Colors show the estimated increase in long-term $PM_{2.5}$ exposure (µg/m³) that residents would experience on average within each community. Communities include Census-designated places (such as towns and small cities) and neighborhood-scale planning districts within the City of Memphis. Only communities with estimated increases of 0.01 µg/m³ or greater are displayed and labeled. The blue dot marks the facility location in DeSoto County, Mississippi. The inset map shows the regional context within the southern United States.*

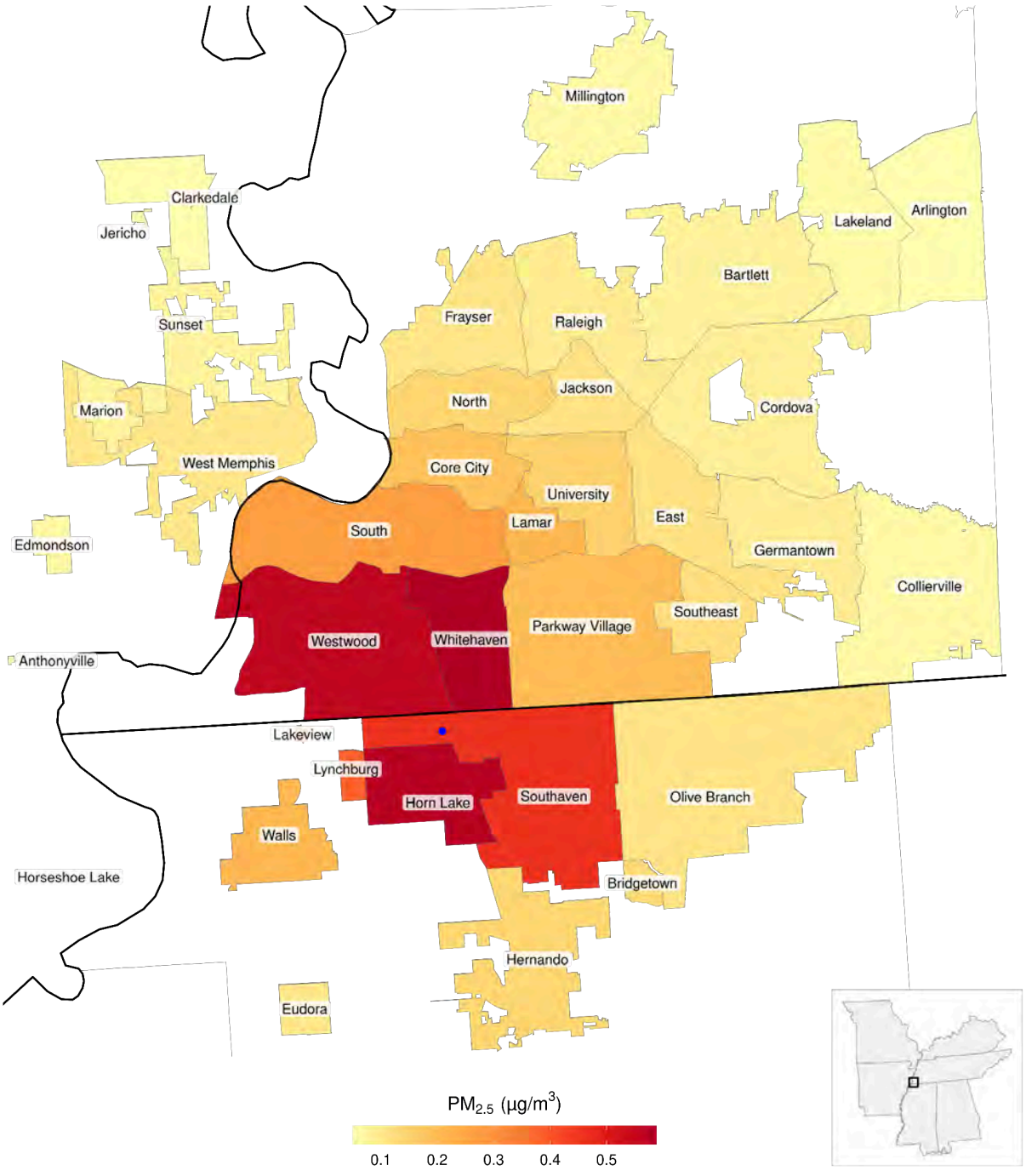


Figure 4. Zoomed-in view of community-level $PM_{2.5}$ increases near the proposed MZX Tech facility, highlighting impacts across neighboring towns and multiple neighborhoods within Memphis. *Colors show the estimated increase in long-term $PM_{2.5}$ exposure (µg/m³) that residents would experience on average within each community. Communities include Census-designated places (such as towns and small cities) as well as neighborhood-scale planning districts within the City of Memphis. Only communities with estimated increases of 0.1 µg/m³ or greater are displayed and labeled. The blue dot marks the facility location in DeSoto County, Mississippi. The inset map shows the regional context within the southern United States.*

Table 2. *Communities in the region with the highest increases in estimated annual-average $PM_{2.5}$ attributable to the proposed MZX Tech facility. Communities include towns, small cities, and neighborhood-scale planning districts within Memphis. Values represent the estimated increase in long-term $PM_{2.5}$ exposure ($\mu g/m^3$) experienced on average by residents of each community.*

Town	State	Population	Annual increases in $PM_{2.5}$ ($\mu g/m^3$)
Whitehaven (Memphis)	Tennessee	40,100	0.588
Horn Lake	Mississippi	26,700	0.572
Westwood (Memphis)	Tennessee	40,900	0.558
Southaven	Mississippi	54,900	0.463
Lynchburg	Mississippi	2,000	0.383
Lakeview	Mississippi	400	0.294
South (Memphis)	Tennessee	33,900	0.274
Lamar (Memphis)	Tennessee	26,600	0.216
Walls	Mississippi	1,400	0.213
Parkway Village (Memphis)	Tennessee	50,300	0.202
Core City (Memphis)	Tennessee	51,700	0.189
University (Memphis)	Tennessee	56,800	0.153
North (Memphis)	Tennessee	30,300	0.145
Hernando	Mississippi	17,300	0.142
Bridgetown	Mississippi	2,900	0.134

Population Pollution Exposure Burden and Distribution of Impacts

While understanding where there is an increase in annual exposure to $PM_{2.5}$ is important, overall public health relevance also depends on where people live and how many people are exposed. To capture this, we assess relative population exposure burden, which reflects the combined

effect of pollution magnitude and the number of people affected. In practical terms, this measure shows which areas account for the largest share of the total population exposure attributable to the proposed facility, highlighting where increased $PM_{2.5}$ affects the largest share of people.

Table 3 ranks counties by their share of the total estimated $PM_{2.5}$ exposure burden attributable to the proposed MZX Tech facility. Although DeSoto County experiences the largest average increase in $PM_{2.5}$ exposure, Shelby County, Tennessee, accounts for the largest share of overall exposure burden (63.8%). This is primarily due to the presence of the Memphis metropolitan area and the subsequent larger population. DeSoto County accounts for an additional 22% of the total burden, with smaller shares in neighboring counties in Mississippi, Tennessee, and Arkansas (Table 3). Overall, the estimated exposure burden is concentrated in three states: Tennessee (70.3%), Mississippi (24.6%), and Arkansas (2.7%). Thus, while the proposed facility is located in Mississippi, the majority of the population exposure burden occurs across state lines due to the size of the Memphis metropolitan population.

These results highlight an important distinction between where the exposure to air pollution is highest and where cumulative exposure experienced by the population is greatest. Because the proposed facility is located in close proximity to the Memphis metropolitan region, Shelby County bears a substantial share of the overall exposure burden. Assessing not only where pollution levels are highest, but also where large populations live, is critical for interpreting the potential public health implications of the proposed facility and provides important context for the health impact estimates presented in subsequent sections.

Table 3. *Distribution of population exposure burden from estimated $PM_{2.5}$ increases attributable to the proposed MZX Tech facility, summarized by county. "Share of $PM_{2.5}$ exposure burden" represents each county's percentage of the total population exposure across the study region, accounting for both the size of the $PM_{2.5}$ increase and the number of people exposed.*

County	State	Population	Share of plant-attributable annual $PM_{2.5}$ exposure burden (%)	Average plant-attributable annual $PM_{2.5}$ exposure ($\mu g/m^3$)
Shelby County	Tennessee	926500	63.79	0.162
DeSoto County	Mississippi	186000	22.5	0.292
Crittenden County	Arkansas	48000	1.87	0.091
Tipton County	Tennessee	61000	0.93	0.035
Fayette County	Tennessee	42000	0.63	0.036
Davidson County	Tennessee	710000	0.57	0.002
Marshall County	Mississippi	34000	0.41	0.028

Madison County	Tennessee	98500	0.41	0.01
Tate County	Mississippi	28000	0.36	0.03
Rutherford County	Tennessee	343500	0.29	0.002

Demographic and Socioeconomic Profile of Exposed Communities

Table 4 summarizes demographic and socioeconomic characteristics of residents living in census tracts with higher estimated increases in annual-average $PM_{2.5}$ attributable to the proposed facility. Approximately 1.50 million people live in tracts with estimated increases above 0.01 μg/m³, about 683,100 live in tracts above 0.1 μg/m³, and approximately 89,200 live in tracts above 0.5 μg/m³.

Across exposure thresholds, the communities experiencing larger estimated $PM_{2.5}$ exposure increases are more socioeconomically vulnerable than Mississippi and national averages. Tracts above 0.1 μg/m³ have a poverty rate of 22.1% (vs. 19.5% statewide and 12.5% nationally) and lower median household income relative to the national average ($59,300 vs. $75,100), though modestly higher than the statewide median ($56,500). In the highest-exposure tracts (>0.5 μg/m³), median household income is lower still ($49,000), and the Social Vulnerability Index rises to 75.8, indicating these communities rank more vulnerable than roughly three-quarters of U.S. census tracts. These patterns suggest that the largest estimated exposure increases are concentrated in communities with fewer economic resources and greater baseline vulnerability.

The racial composition of the highest-exposure tracts differs sharply from state and national benchmarks. In tracts with estimated increases above 0.5 μg/m³, Black residents comprise 73% of the population, compared with 37.2% in Mississippi and 12.5% nationally. This disparity is also present at >0.1 μg/m³, where Black residents comprise 59% of the population. Adult asthma prevalence is higher in the more exposed tracts (12.6% at >0.1 and >0.5 μg/m³), compared with 10.5% statewide and nationally, suggesting additional sensitivity to air quality changes in the populations experiencing the largest estimated increases. The Memphis metropolitan area has been ranked among the highest in the nation for asthma-related emergency department visits and asthma mortality in recent AAFA “Asthma Capitals” reports, reflecting elevated asthma burden in the broader region.[23] While these rankings measure health outcomes rather than prevalence alone, they provide additional context for understanding baseline respiratory vulnerability in the area.

Taken together, Table 4 indicates that the greatest estimated $PM_{2.5}$ exposure increases are concentrated in communities with substantially higher shares of Black residents that also face higher socioeconomic vulnerability, lower household incomes, and higher asthma prevalence.

[23]Asthma & Allergy Foundation of America, “2025 Asthma Capitals.”

This context is important for interpreting potential public health implications of the proposed facility and for understanding how air quality impacts may intersect with existing community conditions.

Table 4. *Average demographic and socioeconomic characteristics of census tracts with estimated annual-average $PM_{2.5}$ increases above selected thresholds*

Metric	>0.01 µg/m³	>0.1 µg/m³	>0.5 µg/m³	Mississippi	National Average
Total Population Affected	1,502,600	683,100	89,200	2,958,800	331,097,600
Poverty Rate (%)	16.8	22.1	22.6	19.5	12.5
White (%)	45.4	32.5	22.1	56.9	65.9
Black (%)	46.1	59	73	37.2	12.5
Hispanic (%)	5.8	7.1	3.7	3.3	18.7
Asian (%)	2.1	1.3	0.4	1	5.8
Age 65+ (%)	14.8	14.3	15.4	16.5	16.5
Median Household Income ($)	69,200	59,300	49,000	56,500	75,100
Median Property Value ($)	196,600	164,800	116,500	153,400	281,900
SVI* (0-100)	55.1	62.6	75.8	58.9	*
Adult Asthma Prevalence (%)	12	12.6	12.6	10.5	10.5

**SVI (Social Vulnerability Index) is a CDC/ATSDR metric ranging from 0–100 that reflects community vulnerability based on socioeconomic conditions, household characteristics, minority status, and housing and transportation factors.[24] No single national mean is reported*

Health related economic impacts from proposed gas plant

To estimate the health-related economic impacts attributable to increased air pollution from the proposed MZX Tech facility, we used the U.S. EPA's Co-Benefits Risk Assessment (COBRA) model. COBRA is a nationally recognized, screening-level tool that links changes in air pollution to health outcomes using peer-reviewed epidemiological concentration–response functions. Given user-specified emissions, the model estimates annual changes in health outcomes—such as premature mortality and illness—and assigns associated monetary values.

[24] CDC, "Social Vulnerability Index."

For this analysis, we ran COBRA using a scenario representing a gas-fired electricity-generating unit in DeSoto County, Mississippi emitting 19.6 tons of primary $PM_{2.5}$, 156.5 tons of SO_2, 423.4 tons of NO_x, and 417.4 tons of VOCs per year. COBRA estimates health impacts nationwide based on estimated changes in $PM_{2.5}$ exposure, county-level population data, and baseline incidence rates. Although impacts are calculated across the contiguous United States, the majority of projected health burden is concentrated in Mississippi and Tennessee, consistent with the spatial distribution of exposure increases and regional population patterns. All results represent annual impacts under continued exposure and are reported in 2023 dollars.

Using these emissions inputs, COBRA projects $30–44 million in additional health-related damages per year. The reported “low” and “high” estimates reflect alternative mortality concentration-response relationships drawn from the epidemiological literature. They represent uncertainty in health risk valuation rather than differences in emissions or exposure assumptions. Most of these damages are driven by premature mortality, with the model estimating 1.9–2.8 additional premature deaths annually, corresponding to $27–41 million in monetized mortality impacts (Appendix A). Additional $PM_{2.5}$-related outcomes—including nonfatal heart attacks, respiratory and cardiovascular hospital admissions, asthma symptoms, stroke, and restricted activity days—contribute roughly $2 million per year.

COBRA also estimates health impacts attributable to ozone (O_3) formation from NO_x emissions, including asthma-related emergency-room visits, school-loss days, and additional mortality. These ozone-related impacts amount to approximately $19 million annually and are included in the overall $30–44 million estimate. In total, $PM_{2.5}$ contributes an estimated $11–25 million of the annual damages, with the remaining impacts attributable to ozone exposure.

These annual health-damage estimates provide the basis for assessing longer-term cumulative impacts. Following common EPA practice, we report annual damages as the primary result and provide cumulative (undiscounted) and discounted present-value estimates for context. Using a 30-year operating life, a standard screening assumption for large gas-fired generation facilities, annual damages of $30–44 million correspond to an undiscounted cumulative total of approximately $900 million to $1.32 billion. Discounting future damages to present value reduces these totals; using a 3% discount rate yields a present value of approximately $588 million to $862 million. To illustrate sensitivity to alternative assumptions, we also report results using 20- and 40-year operating lives and an alternative range of discount rates in Table 5.

Table 5. *Cumulative health-related damages from the proposed MZX Tech facility under alternative operating-life assumptions. Assuming annual health damages of $30–44 million, the table reports undiscounted cumulative damages and discounted present values for illustrative operating lives.*

Assumed Operating Life	**Undiscounted Cumulative Damages** ($)	**Discounted Cumulative Damages** (3% discount rate; $)
20 years	$600 million – $880 million	$446 million – $655 million
30 years	$900 million – $1,320 million	$588 million – $862 million
40 years	$1,200 million– $1,760 million	$693 million – $1,017 million

Conclusion

This analysis provides a screening-level, data-driven assessment of the potential air-quality, health, and economic impacts directly attributable to emissions from the proposed MZX Tech facility. Fine particulate matter ($PM_{2.5}$) is a well-established contributor to adverse cardiovascular and respiratory outcomes, and epidemiological evidence shows that even modest long-term increases can result in meaningful population-level health effects.

We found the permitted emissions from the facility would lead to an increase in annual-average $PM_{2.5}$ exposure across portions of northwestern Mississippi and southwestern Tennessee, with the highest increases occurring near the facility and along the primary downwind pathway. Because this region includes both smaller communities and the Memphis metropolitan area, the resulting exposure extends beyond the immediate vicinity of the site into densely populated urban neighborhoods.

The estimated $PM_{2.5}$ increases occur in a region that already experiences elevated background air pollution. The most recent EPA monitoring data show weighted annual mean $PM_{2.5}$ concentrations above the current annual standard across much of the study area, including DeSoto County, Shelby County, and the Memphis metropolitan region. Although formal attainment status is determined through EPA's three-year design value process, these monitored exposure levels indicate that the region is already operating with little margin relative to federal air-quality benchmarks. In this context, additional emissions from the proposed facility would increase the existing pollution burden in communities already highly exposed.

Applying EPA-standard health impact methods, the COBRA model estimates $30–44 million in annual health-related damages, driven primarily by premature mortality, with additional contributions from respiratory and cardiovascular outcomes, asthma, and lost work and school days. These annual impacts imply substantial cumulative costs over plausible operating lifetimes.

This assessment reflects emissions consistent with operation at permitted limits and focuses on health impacts attributable to $PM_{2.5}$ and ozone formation from precursor emissions. While subject to uncertainty inherent in screening-level analyses, the findings indicate that the proposed facility would contribute to measurable air pollution and health burdens across surrounding communities, including areas with substantial populations and existing socioeconomic vulnerabilities.

Appendix A. EPA COBRA Health Impact Results for the Proposed MZX Data Center Power Facility

Estimates reflect the U.S. EPA's CO-Benefits Risk Assessment (COBRA) model[25] applied to the proposed MZX on-site power generation facility in DeSoto County, Mississippi, assuming annual emissions consistent with the draft PSD permit and Statement of Basis. Modeled emissions include 19.6 tons of primary $PM_{2.5}$, 156.5 tons of SO_2, 423.4 tons of NO_x, and 417.4 tons of VOCs per year, reflecting facility-wide allowable emissions.

Results represent estimated health impacts across the contiguous United States, though the majority of the health burden is expected to fall on northwest Mississippi, the Memphis metropolitan area, and downwind populations. Estimates are reported on an annual basis and reflect EPA's standard concentration–response functions and valuation assumptions as implemented in COBRA.

Notes:

- *Note: For clarity, this table presents COBRA-estimated impacts as positive "additional" cases and positive "monetized damages." The EPA COBRA web tool reports these same changes using a negative sign convention to indicate increased adverse outcomes (i.e., negative "health benefits").*
- *For mortality outcomes, COBRA reports a range of estimates reflecting alternative peer-reviewed epidemiological concentration–response functions ("Low" and "High").*
- *All monetary values are expressed in 2023 dollars and rounded, consistent with standard COBRA output conventions.*
- *Health impacts reflect contributions from both $PM_{2.5}$ exposure and ozone (O_3) formation, with ozone-related impacts driven primarily by elevated NO_x emissions.*
- *For clarity and consistency with EPA COBRA web outputs, changes in incidence are rounded to one decimal place (or whole numbers where appropriate), and monetary values are rounded to the nearest thousand or million dollars.*

Health Endpoint	Pollutant	Additional cases (annual)	Monetary Damages (annual dollars)
Mortality (All Cause)	$PM_{2.5}$ | O_3	1.9 to 2.8	$27M to $41M
Nonfatal Heart Attacks	$PM_{2.5}$	0.7	$62,000
Infant Mortality	$PM_{2.5}$	0.008	$128,000

[25] US Environmental Protection Agency, "CO-Benefits Risk Assessment (COBRA) Web Edition."

Hospital Admissions, All Respiratory	$PM_{2.5}$ | O_3	0.33	$6,800
Emergency Room Visits, Respiratory	$PM_{2.5}$ | O_3	3.6	$5,800
Asthma Onset	$PM_{2.5}$ | O_3	9.6	$730,000
Asthma Symptoms	$PM_{2.5}$ | O_3	1500	$450,000
Emergency Room Visits, Asthma	O_3	0.02	$12
Lung Cancer Incidence	$PM_{2.5}$	0.05	$2,200
Hospital Admissions, Cardio-/Cerebrovascular Disease	$PM_{2.5}$	0.1	$2,900
Hospital Admissions, Alzheimer's Disease	$PM_{2.5}$	0.6	$13,000
Hospital Admissions, Parkinson's Disease	$PM_{2.5}$	0.04	$1,000
Stroke Incidence	$PM_{2.5}$	0.04	$2,700
Hay Fever / Rhinitis	$PM_{2.5}$ | O_3	62	$69,000
Cardiac Arrest, Out of Hospital	$PM_{2.5}$	0.01	$640
Emergency Room Visits, All Cardiac	$PM_{2.5}$	0.2	$510
Minor Restricted Activity Days	$PM_{2.5}$	560	$71,000
School Loss Days	O_3	720	$1.2M
Work Loss Days	$PM_{2.5}$	95	$30,000
Total $PM_{2.5}$ Health Effects	**—**	**—**	**$11M to $25M**
Total O_3 Health Effects	**—**	**—**	**$19M**
Total Combined Health Effects	**—**	**—**	**$30M to $44M**

Appendix B. Derivation of Ammonia (NH_3) Emissions

Ammonia (NH_3) emissions were included in this analysis because NH_3 is a key precursor to secondary $PM_{2.5}$ formation, particularly through the formation of ammonium sulfate and ammonium nitrate, and because the draft Prevention of Significant Deterioration (PSD) permit for the proposed facility contains enforceable limits on NH_3 emissions ("ammonia slip") from the combustion turbines. Including NH_3 allows the modeling to more fully represent the potential for secondary $PM_{2.5}$ formation under permitted operating conditions.

Unlike $PM_{2.5}$, nitrogen oxides (NO_x), sulfur dioxide (SO_2), and volatile organic compounds (VOCs)—which are presented in the permit as facility-wide annual emission totals for PSD applicability—NH_3 is regulated differently. In the draft permit, NH_3 limits are primarily specified as operational constraints associated with selective catalytic reduction (SCR) systems used for NO_x control. These limits are expressed as a combination of slip concentration (ppmv), short-term mass emission rates (lb/hr), and a rolling 12-month mass total on a per-turbine basis. This structure reflects the role of NH_3 as a control-system byproduct rather than a SIP-regulated criteria pollutant or precursor subject to National Ambient Air Quality Standards.

To develop a facility-wide NH_3 emission value suitable for regional screening dispersion modeling, we converted the permit's per-turbine rolling 12-month NH_3 limits into an aggregate facility total. This was done by multiplying each per-turbine NH_3 cap by the number of turbines in each equipment group and summing across all turbine types included in the permit application. The proposed facility configuration consists of 17 Solar PGM-130 units, 16 Solar Titan 350 units, and 8 ProEnergy 6000PE units. The draft permit specifies rolling 12-month NH_3 limits of 5.18 tons per year per turbine for the PGM-130 group, 10.53 tons per year per turbine for the Titan 350 group, and 28.62 tons per year per turbine for the ProEnergy 6000PE group. Applying these limits and summing across turbine groups yields an implied maximum facility-wide NH_3 slip of 485.5 tons per year on a rolling 12-month basis.

Appendix C. Converting estimated $PM_{2.5}$ increments to population mortality rates and selecting scale anchors

This appendix describes how estimated changes in annual-average $PM_{2.5}$ ($\Delta PM_{2.5}$, μg/m³) were translated into an expected change in all-cause mortality expressed as deaths per 100,000 people per year, and how two widely recognized public-health scale anchors, influenza mortality and alcohol-impaired driving mortality, were selected and quantified. These anchors are presented solely to help interpret the magnitude of estimated impacts using comparable units, not to imply equivalence in cause, mechanism, or timing.

To estimate population-level health impacts, we applied a standard log-linear concentration–response relationship between long-term $PM_{2.5}$ exposure and all-cause mortality, consistent with common practice in U.S. health impact assessment and regulatory analyses.[26] The central effect estimate used in this report assumes a 7.3 percent increase in all-cause mortality per 10 μg/m³ increase in long-term annual-average $PM_{2.5}$, based on the large Medicare cohort analysis by Di et al. (2017).[27] This relationship has been widely used in policy-relevant assessments and reflects evidence that mortality risk increases approximately proportionally with long-term $PM_{2.5}$ exposure, even at exposure levels below current regulatory standards.

To express relative risk changes in absolute population terms, we applied the U.S. all-cause mortality rate reported by the Centers for Disease Control and Prevention's National Center for Health Statistics for 2023, which is 922.9 deaths per 100,000 people per year.[28] For each estimated $PM_{2.5}$ increment, the estimated relative change in mortality risk was multiplied by this baseline rate to obtain an expected change in deaths per 100,000 people per year. Note that the mortality risk in Tennessee and Mississippi is greater than the national average, so this is a conservative measure.

Using this approach, a sustained increase of 0.15 μg/m³ in annual-average $PM_{2.5}$ corresponds to an expected increase of approximately 1 additional death per 100,000 people per year, while a sustained increase of 0.5 μg/m³ corresponds to approximately 3.3 additional deaths per 100,000 people per year. These estimates represent expected population-average changes attributable to persistent exposure over time and should not be interpreted as predictions of identifiable deaths in specific individuals.

To help contextualize these magnitudes, two population-level scale anchors were selected based on widely recognized and well-documented national mortality rates expressed in the same units. Influenza mortality was taken from CDC/NCHS FastStats for 2023, which reports 1.2 deaths per 100,000 people per year based on death certificate data from the National Vital Statistics System.[29] This value reflects deaths in which influenza was recorded as an underlying

[26] US Environmental Protection Agency, "CO-Benefits Risk Assessment (COBRA) Web Edition."
[27] Di et al., "Air Pollution and Mortality in the Medicare Population."
[28] Centers for Disease Control and Prevention (CDC), "Deaths and Mortality."
[29] Centers for Disease Control and Prevention (CDC), "Influenza (Flu) Deaths."

or contributing cause and is distinct from higher, model-based estimates of influenza-associated mortality that vary by methodology and season.

Alcohol-impaired driving mortality was drawn from the National Highway Traffic Safety Administration, which reported 12,429 alcohol-impaired driving traffic deaths in the United States in 2023.[30] Dividing this count by the U.S. resident population estimate for the same year (334,914,895) yields a national mortality rate of approximately 3.7 deaths per 100,000 people per year.[31]

These reference risks are included to provide unit-consistent benchmarks for understanding the scale of estimated $PM_{2.5}$ impacts. Influenza and alcohol-impaired driving are largely acute causes of death, whereas $PM_{2.5}$-related impacts reflect chronic, population-level risk accumulated over time. National rates are used as familiar reference points for comparison; actual local mortality rates may differ.

[30] National Highway Traffic Safety Administration (NHTSA), “Traffic Safety Facts 2023: Alcohol-Impaired Driving.”
[31] US Census Bureau, “Population and Housing Unit Estimates.”

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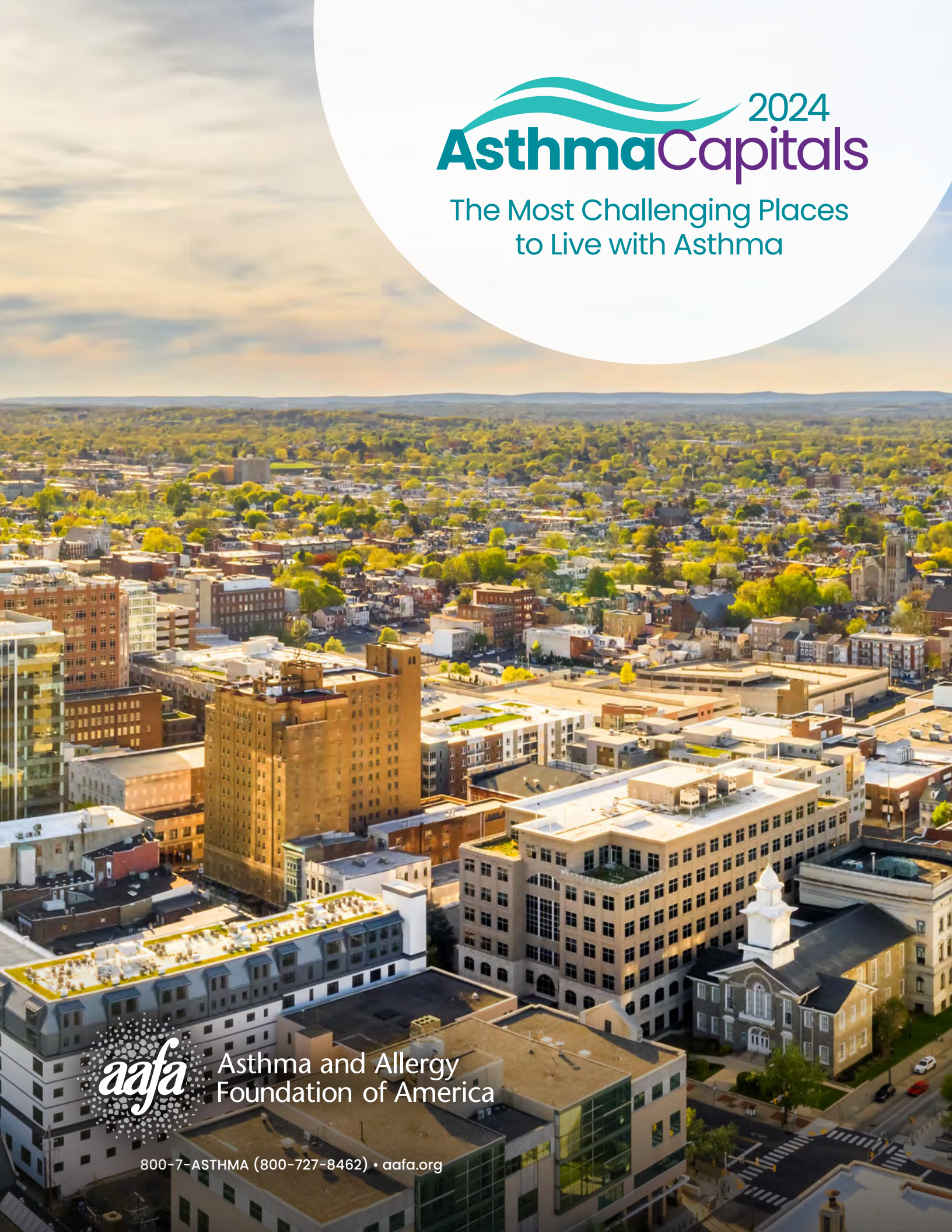
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Attachment 4

2024 Asthma Capitals

The Most Challenging Places to Live with Asthma



Asthma and Allergy Foundation of America

800-7-ASTHMA (800-727-8462) • aafa.org

2024 Asthma Capitals

Available online at asthmacapitals.com

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About the Asthma and Allergy Foundation of America (AAFA)
Founded in 1953, AAFA is the oldest and largest non-profit patient organization dedicated to saving lives and reducing the burden of disease for people with asthma, allergies, and related conditions through research, education, advocacy, and support. AAFA offers extensive support for individuals and families affected by asthma and allergic diseases, such as food allergies and atopic dermatitis (eczema). Through its online patient support communities, network of regional chapters, and collaborations with community-based groups, AAFA empowers patients and their families by providing practical, evidence-based information and community programs and services. AAFA is the only asthma and allergy patient advocacy group that is certified to meet the standards of excellence set by the National Health Council. For more information, visit **aafa.org**.

About This Report
AAFA publishes the Asthma Capitals™ report to raise awareness about the nationwide impacts of asthma. The report analyzes data from across the contiguous United States and ranks the 100 largest cities where it is challenging to live with asthma. The report ranks cities by the most critical of health outcomes – asthma prevalence, emergency department visits due to asthma attacks, and asthma-related mortality. The outcomes are not weighted equally. The report also examines asthma risk factors that influence the outcomes.

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AMGEN sanofi REGENERON

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The views and opinions expressed in this report are those of the AAFA authors and do not necessarily reflect the policies or positions of other individuals, organizations, or companies.

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Introduction

The Asthma and Allergy Foundation of America (AAFA) publishes the Asthma Capitals™ report each year to raise awareness about the nationwide impacts of asthma and highlight how location may influence asthma in cities across the country.

The Asthma Capitals report ranks 100 cities in the contiguous U.S. based on these health outcomes: **asthma prevalence, emergency department (ED) visits for asthma, and deaths due to asthma**.

The report also discusses risk factors that contribute to these outcomes: poverty, indoor and outdoor air quality, access to specialist medical care, pollen allergy, medicine use, tobacco policies, and the rate of uninsured residents. The data in this report includes the 100 most populated U.S. cities (metro areas), and does not include information from Alaska, Hawaii, Puerto Rico, or tribal nations. The residents of these areas are greatly affected by asthma, but more data is needed to get a better picture of the impact.

In addition to the annual rankings, this year's report includes:

- Sample resolutions for designating "Asthma Peak Week" and "Asthma and Allergy Awareness Month" in your state
- A toolkit to help advocates champion better policies for people living with asthma
- A spotlight on policies to support better access to asthma medicines and asthma care
- An update on the work AAFA is supporting to address asthma disparities in local communities—including in Allentown, the #1 Asthma Capital for the second year in a row

This report is published in September in recognition that September is a peak month for people with asthma and allergies, especially children. Each September, doctors treat more people for **asthma episodes and attacks**, and asthma ED visits and hospitalizations increase **(see page 5)**. [1]

Risk factors such as poverty, exposure to pollutants, and access to health care play an important role in asthma outcomes. But these aren't the only reasons a person may experience asthma exacerbations. Where people live may influence whether or not they have this common chronic lung disease and how successfully they can manage it.

Asthma remains one of the most common chronic diseases in our nation. But most asthma-related ED visits and deaths are preventable. We hope the 2024 Asthma Capitals report inspires states, communities, and stakeholders to take action. This report highlights where we can combine and focus our efforts through advocacy, awareness, and interventions.

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September Is a Peak Month for Asthma

September is a challenging month for people with asthma. September brings a number of asthma triggers that cause more asthma attacks, ED visits, and hospital stays in this month than any other during the year. This makes it the "Asthma Peak Month." The third week of September is "Asthma Peak Week," when asthma episodes typically hit their highest point of the year.

In September, people with asthma come in contact with several asthma triggers at once:

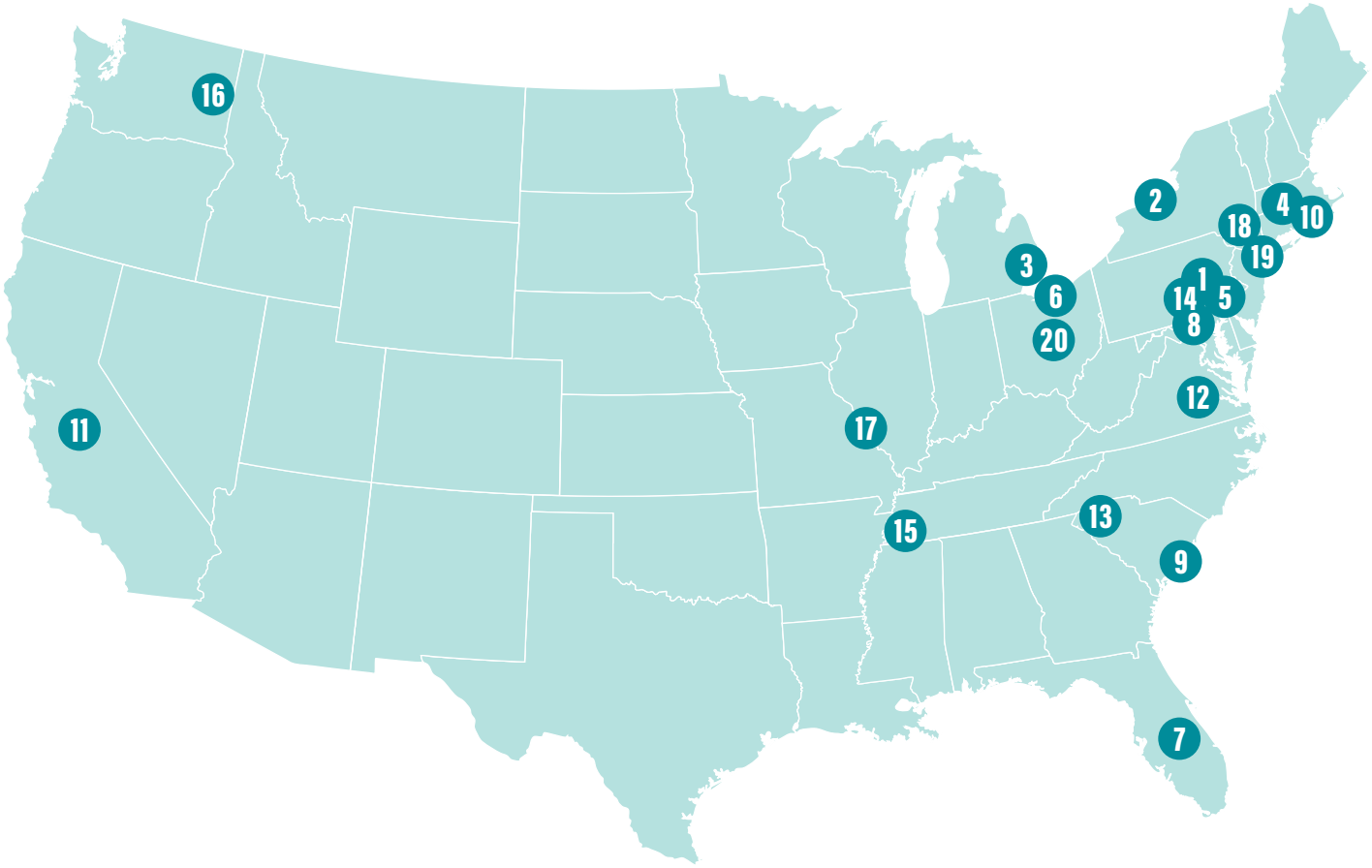
- **Ragweed**, the most common fall pollen allergy, peaks in September throughout much of the United States. For people with allergic asthma and an allergy to ragweed, ragweed pollen can cause asthma symptoms.
- **Mold counts** tend to go up as leaves begin to collect on the ground. Mold grows in wet conditions. For the West Coast states, September marks the return of the rainy season. In some parts of the South, humidity can still be high in the fall too. Mold irritates airways and can cause asthma and allergy symptoms.
- Children return to school and are exposed to **respiratory illnesses** such as the flu, COVID-19, respiratory syncytial virus (RSV), and colds. These illnesses spread easily in crowded indoor spaces such as schools. Children returning to school in the fall tend to get sick first and then bring illnesses home to their families and older adults. Getting sick with a respiratory illness can make it harder for someone with asthma to breathe.
- **Poor indoor air quality** is a serious concern in schools as well. Many school buildings are older and in poor condition. They need repair, but the schools may not have money to fix their buildings. This impacts children with asthma because they come in contact with irritants and allergens every school day. (For example: air pollution, mold, animal dander, pollen, dust mites, cleaning products, and more)
- **Extreme weather** and **wildfires** can occur in September in as well. Weather changes such as extreme heat and humidity, thunderstorms, and the later transition to cooler fall temperatures are all asthma triggers.

With these events all happening at the same time, people with asthma are exposed to a lot of asthma triggers. This can make it hard to keep airway inflammation under control. The September asthma peak tends to affect children first as they start a new school year and come into contact with a lot of these asthma triggers.

If you'd like to work on an Asthma Peak Week resolution for your state, contact **advocacy@aafa@org**. AAFA has also included sample language on **pages 38-39**.

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Map of the Top 20 Most Challenging Places to Live with Asthma in 2024



These are the top 20 Asthma Capitals for 2024 based on estimated asthma prevalence, emergency department visits due to asthma, and asthma-related fatalities. The burden of asthma falls heavily on Northeastern and Southern states. The full list of top 100 cities can be found on page 7 in this report.

1. Allentown, PA
2. Rochester, NY
3. Detroit, MI
4. Springfield, MA
5. Philadelphia, PA
6. Cleveland, OH
7. Lakeland, FL
8. Baltimore, MD
9. Charleston, SC
10. Providence, RI
11. Fresno, CA
12. Richmond, VA
13. Greenville, SC
14. Harrisburg, PA
15. Memphis, TN
16. Spokane, WA
17. St. Louis, MO
18. Poughkeepsie, NY
19. New York, NY
20. Columbus, OH

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2024 Asthma Capitals™

Overall Rankings ■ **Worse Than Average** ▲ **Average** ● **Better Than Average**

(Factors are not weighted equally. Total scores are rounded for the purposes of this chart.)

2024 Overall Ranking	Overall	Metropolitan Area	Total Score *(Avg. 56.08)*	Subtotal: Estimated Asthma Prevalence	Subtotal: Crude Death Rate for Asthma	Subtotal: ED Visits for Asthma
1	■	Allentown, PA	100.00	■	▲	■
2	■	Rochester, NY	92.98	■	▲	▲
3	■	Detroit, MI	88.81	■	■	■
4	■	Springfield, MA	87.56	■	■	▲
5	■	Philadelphia, PA	86.72	■	■	■
6	■	Cleveland, OH	83.24	■	■	■
7	■	Lakeland, FL	81.41	■	▲	■
8	■	Baltimore, MD	76.99	▲	■	▲
9	■	Charleston, SC	74.68	■	▲	■
10	■	Providence, RI	74.31	■	▲	▲
11	■	Fresno, CA	71.89	■	■	●
12	■	Richmond, VA	71.47	▲	■	■
13	■	Greenville, SC	69.60	■	●	▲
14	■	Harrisburg, PA	68.95	■	▲	●
15	■	Memphis, TN	68.44	●	■	■
16	■	Spokane, WA	68.17	■	▲	▲
17	■	St. Louis, MO	68.11	▲	■	▲
18	■	Poughkeepsie, NY	67.92	■	▲	▲
19	■	New York, NY	67.91	■	■	▲
20	■	Columbus, OH	67.06	▲	▲	■
21	■	Phoenix, AZ	66.69	■	▲	▲
22	■	Sacramento, CA	66.49	■	▲	▲
23	▲	Worcester, MA	65.66	■	▲	▲
24	▲	Washington, DC	63.79	▲	■	▲
25	▲	Syracuse, NY	63.60	■	▲	●
26	▲	Albany, NY	63.31	■	▲	●
27	▲	Tucson, AZ	63.07	▲	■	▲
28	▲	Dallas, TX	62.75	▲	▲	■
29	▲	Miami, FL	62.72	▲	▲	▲
30	▲	Columbia, SC	62.64	▲	▲	▲
31	▲	Virginia Beach, VA	62.07	▲	●	■
32	▲	Nashville, TN	61.62	■	▲	▲

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Overall Rankings ■ Worse Than Average ▲ Average ● Better Than Average

(Factors are not weighted equally. Total scores are rounded for the purposes of this chart.)

2024 Overall Ranking	Overall	Metropolitan Area	Total Score *(Avg. 56.08)*	Subtotal: Estimated Asthma Prevalence	Subtotal: Crude Death Rate for Asthma	Subtotal: ED Visits for Asthma
33	▲	Orlando, FL	61.55	■	●	▲
34	▲	Omaha, NE	61.34	▲	■	▲
35	▲	Stockton, CA	61.27	▲	▲	■
36	▲	Hartford, CT	61.15	■	■	●
37	▲	Cincinnati, OH	60.07	▲	▲	▲
38	▲	Las Vegas, NV	59.20	▲	▲	▲
39	▲	Dayton, OH	58.85	▲	▲	■
40	▲	Louisville, KY	58.28	▲	●	■
41	▲	Toledo, OH	57.52	▲	▲	▲
42	▲	Jacksonville, FL	57.13	●	▲	■
43	▲	Atlanta, GA	57.09	▲	▲	▲
44	▲	Greensboro, NC	56.76	●	▲	■
45	▲	Pittsburgh, PA	56.57	▲	▲	▲
46	▲	Chattanooga, TN	56.40	●	■	▲
47	▲	Minneapolis, MN	56.10	▲	▲	●
48	▲	Jackson, MS	55.79	▲	■	▲
49	▲	Los Angeles, CA	55.53	▲	▲	▲
50	▲	San Diego, CA	55.12	▲	●	▲
51	▲	Daytona Beach, FL	54.54	▲	▲	▲
52	▲	Akron, OH	54.31	●	▲	■
53	▲	Chicago, IL	54.25	▲	■	▲
54	▲	Albuquerque, NM	54.13	▲	▲	▲
55	▲	New Orleans, LA	53.74	●	▲	■
56	▲	Buffalo, NY	53.18	▲	▲	▲
57	▲	San Antonio, TX	52.43	▲	▲	▲
58	▲	Bridgeport, CT	52.41	▲	▲	▲
59	▲	Seattle, WA	52.18	▲	▲	▲
60	▲	Palm Bay, FL	51.99	■	●	●
61	▲	Indianapolis, IN	51.28	▲	▲	▲
62	▲	Raleigh, NC	50.33	●	●	■
63	▲	McAllen, TX	50.25	■	●	●
64	▲	San Francisco, CA	50.20	▲	●	▲
65	▲	Kansas City, MO	49.63	●	▲	▲
66	▲	Oklahoma City, OK	49.51	●	■	▲

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Overall Rankings ■ Worse Than Average ▲ Average ● Better Than Average

(Factors are not weighted equally. Total scores are rounded for the purposes of this chart.)

2024 Overall Ranking	Overall	Metropolitan Area	Total Score *(Avg. 56.08)*	Subtotal: Estimated Asthma Prevalence	Subtotal: Crude Death Rate for Asthma	Subtotal: ED Visits for Asthma
67	▲	Wichita, KS	49.46	●	▲	▲
68	▲	El Paso, TX	49.42	▲	●	▲
69	▲	Riverside, CA	49.29	▲	●	▲
70	▲	Houston, TX	48.99	▲	●	▲
71	▲	Sarasota, FL	47.97	▲	▲	▲
72	▲	Tampa, FL	47.64	▲	●	▲
73	▲	Oxnard, CA	47.59	▲	●	▲
74	▲	Boston, MA	47.48	●	■	▲
75	▲	Baton Rouge, LA	47.29	▲	●	▲
76	▲	Milwaukee, WI	47.15	●	■	▲
77	▲	San Jose, CA	47.09	▲	●	▲
78	▲	Bakersfield, CA	46.37	▲	▲	▲
79	●	Ogden, UT	45.89	●	▲	●
80	●	Cape Coral, FL	45.19	▲	●	●
81	●	Grand Rapids, MI	43.76	●	●	▲
82	●	Tulsa, OK	43.57	▲	●	●
83	●	New Haven, CT	43.52	●	■	▲
84	●	Birmingham, AL	43.28	●	▲	▲
85	●	Denver, CO	43.26	▲	●	●
86	●	Salt Lake City, UT	42.94	●	▲	▲
87	●	Augusta, GA	42.00	●	●	■
88	●	Portland, OR	41.56	●	▲	●
89	●	Austin, TX	41.24	▲	●	●
90	●	Boise, ID	40.07	▲	●	●
91	●	Durham, NC	38.77	●	▲	▲
92	●	Knoxville, TN	38.22	●	▲	▲
93	●	Charlotte, NC	37.35	●	▲	●
94	●	Little Rock, AR	34.89	●	●	▲
95	●	Colorado Springs, CO	32.78	●	▲	●
96	●	Fayetteville, AR	32.61	●	●	●
97	●	Madison, WI	32.56	●	●	▲
98	●	Winston-Salem, NC	30.54	●	▲	●
99	●	Provo, UT	30.35	●	●	●
100	●	Des Moines, IA	27.15	●	●	●

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Regional Rankings ■ Worse Than Average ▲ Average ● Better Than Average

(Factors are not weighted equally. Total scores are rounded for the purposes of this chart.)

NORTHEAST						
2024 Regional Rankings	**Overall**	**Metropolitan Area**	**Total Score**	Subtotal: Estimated Asthma Prevalence	Subtotal: Crude Death Rate for Asthma	Subtotal: ED Visits for Asthma
1	■	Allentown, PA	100.00	■	▲	■
2	■	Rochester, NY	92.98	■	▲	▲
3	■	Springfield, MA	87.56	■	■	▲
4	■	Philadelphia, PA	86.72	■	■	■
5	■	Providence, RI	74.31	■	▲	▲

SOUTH						
2024 Regional Rankings	**Overall**	**Metropolitan Area**	**Total Score**	Subtotal: Estimated Asthma Prevalence	Subtotal: Crude Death Rate for Asthma	Subtotal: ED Visits for Asthma
1	■	Lakeland, FL	81.41	■	▲	■
2	■	Baltimore, MD	76.99	▲	■	▲
3	■	Charleston, SC	74.68	■	▲	■
4	■	Richmond, VA	71.47	▲	■	■
5	■	Greenville, SC	69.60	■	●	▲

MIDWEST						
2024 Regional Rankings	**Overall**	**Metropolitan Area**	**Total Score**	Subtotal: Estimated Asthma Prevalence	Subtotal: Crude Death Rate for Asthma	Subtotal: ED Visits for Asthma
1	■	Detroit, MI	88.81	■	■	■
2	■	Cleveland, OH	83.24	■	■	■
3	■	St. Louis, MO	68.11	▲	■	▲
4	■	Columbus, OH	67.06	▲	▲	■
5	▲	Omaha, NE	61.34	▲	■	▲

WEST						
2024 Regional Rankings	**Overall**	**Metropolitan Area**	**Total Score**	Subtotal: Estimated Asthma Prevalence	Subtotal: Crude Death Rate for Asthma	Subtotal: ED Visits for Asthma
1	■	Fresno, CA	71.89	■	■	●
2	■	Spokane, WA	68.17	■	▲	▲
3	■	Phoenix, AZ	66.69	■	▲	▲
4	■	Sacramento, CA	66.49	■	▲	▲
5	▲	Tucson, AZ	63.07	▲	■	▲

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Asthma Health Outcomes

AAFA ranks cities based on 3 health outcomes: asthma prevalence (how many people have asthma), asthma-related emergency department (ED) visits, and asthma-related mortality (death) rates. The outcomes are not weighted equally.

Estimated Asthma Prevalence

Nearly 28 million people living in the United States have asthma.[2,3] This equals about 1 in 12 people. Nationally, the prevalence of "current asthma" has increased from 20.3 million people in 2001.

Prevalence rates differ significantly by socioeconomic status, race, ethnicity, age and sex:

- Socioeconomic status is highly associated with asthma prevalence. Persons living below 100% of the Federal Poverty Level (FPL) are more likely to have asthma than those living at any percentage above the poverty level. Around 12.5% of persons with family income below 100% of the FPL have asthma, compared to 11.1% of persons with family income of 100%–199% of the FPL and 7.9% of persons with family income of at least 200% of the FDL.[2]
- Puerto Ricans have the highest rate of asthma prevalence compared to any other racial or ethnic group in the United States.[4]
- Black people in the U.S. are also disproportionally diagnosed with asthma compared to White people.[4] Around 11.7% of Black people in the U.S. have asthma, compared to 8.9% of White Americans people.[2]
- While there are more adults with asthma than children, asthma is a leading chronic disease in children.[5] Only dental cavities are more common in kids than asthma.[6]
- Asthma is more common in female adults than male adults. Around 11.0% of female adults have asthma, compared to 6.8% of male adults.[2]

The cities with the highest estimated asthma prevalence† are:

Asthma Prevalence Ranking	Metropolitan Area	Overall Asthma Capital National Ranking
1	Rochester, NY	2
2	Springfield, MA	4
3	Detroit, MI	3
4	Allentown, PA	1
5	Harrisburg, PA	14
6	Philadelphia, PA	5
7	Albany, NY	26
8	Providence, RI	10
9	Cleveland, OH	6
10	Fresno, CA	11


Rochester, NY

†For each city included in the 2024 Asthma Capitals, AAFA obtained an estimated asthma prevalence for its respective MSA. For this report, asthma prevalence is estimated using claims data for individuals who sought asthma care at any point in the 2023 calendar year. While this is not an exact measure of prevalence, it helps provide data that can be compared from city to city. Other prevalence estimates, such as those from the CDC, use self-reported data through surveys.

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Emergency Department Visits

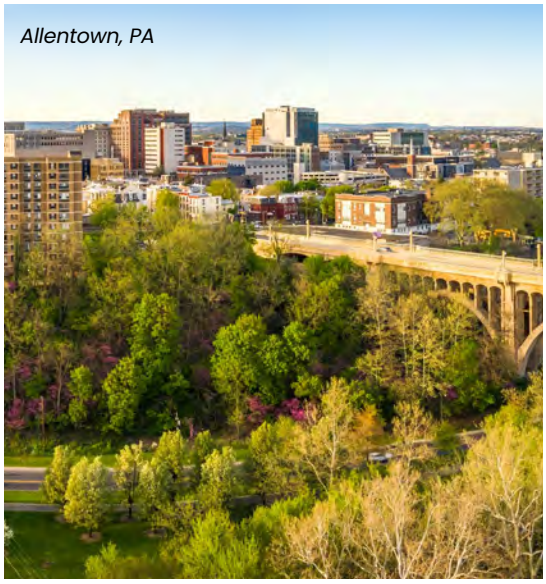
Asthma can trigger severe symptoms that require a visit to the ED. Increased ED visits are a sign of poor asthma control. Nationally, asthma accounts for nearly 1 million emergency department visits each year.[7]

Most asthma-related ED visits can be prevented. Effective asthma management—including reducing exposure to asthma triggers, having access to and taking prescribed asthma medicine, and following an Asthma Action Plan—may help reduce ED visits and hospitalizations.

Asthma-related ED visits are 6 times higher for Black patients than for White patients. Children are more likely than adults to have asthma-related ED visits, with children ages 0 to 4 having the highest rates of asthma-related ED visits.[7]

The cities with the highest asthma-related ED visits† are:

Emergency Department Visits Ranking	Metropolitan Area	Overall Asthma Capital National Ranking
1	Allentown, PA	1
2	Memphis, TN	15
3	Lakeland, FL	7
4	Columbus, OH	20
5	Raleigh, NC	62
6	Virginia Beach, VA	31
7	Stockton, CA	35
8	Dayton, OH	39
9	Augusta, GA	87
10	Jacksonville, FL	42


Allentown, PA

†For each city included in the 2024 Asthma Capitals, AAFA obtained the total number of ED visits where an asthma ICD-10 code was included in a diagnosis field, for the respective census-designated metropolitan statistical area, or MSA, for calendar year 2023. Analyses included estimating the ED rate per 10,000 asthma patients.

To prevent asthma emergencies, people with asthma must:

- Avoid (or reduce) exposure to known asthma triggers, and
- Use medicines to keep their airways open.

It can be difficult to fully avoid all asthma triggers. When exposed to asthma triggers, the airways begin to swell, constrict, and fill with mucus. Asthma control medicines treat and prevent airway inflammation but are only effective if people have access to them and use them.

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Asthma-Related Mortality

Around 10 people in the U.S. die from asthma each day. Nationally, there were 3,602 deaths attributed to asthma in 2022.[8] There hasn't been meaningful improvement in these numbers in the last decade. In 2020, deaths due to asthma rose for the first time in 20 years and rose again slightly from 2021 to 2022.[9]

Some populations are at higher risk for dying from asthma than others. The causes of higher asthma death rates are complex but must be addressed to save lives. The top 10 cities for asthma-related deaths must take action to prevent more tragedies.

The cities with the most asthma-related deaths† are:

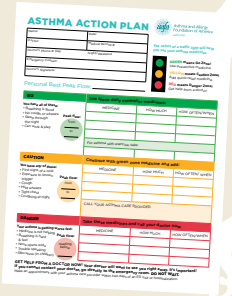
Asthma-Related Deaths Ranking	Metropolitan Area	Overall Asthma Capital National Ranking
1	St. Louis, MO	17
2	Baltimore, MD	8
3	Richmond, VA	12
4	Jackson, MS	48
5	Chattanooga, TN	46
6	Fresno, CA	11
7	Memphis, TN	15
8	New York, NY	19
9	Springfield, MA	4
10	Tucson, AZ	27


St. Louis, MO

†For each city included in the 2024 Asthma Capitals, AAFA obtained the estimated asthma-related crude death rate per 100,000 people for its respective county from 2018-2022 (most recent available data).

To reduce the risk of death from asthma, it is important to:

- Have access to asthma medicines and take them as prescribed
- Seek medical care if symptoms occur more than twice per week
- Avoid or reduce exposure to asthma triggers
- Learn the signs and symptoms of asthma, including early warning signals
- Have an Asthma Action Plan and take quick action according to the plan



If someone's life is in danger, seek emergency care immediately. An Asthma Action Plan can help identify when asthma is a medical emergency. Visit **aafa.org/actionplan** to download a sample plan.

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Risk Factors That Can Worsen Asthma or Influence Asthma Rates

A risk factor is any attribute, characteristic, or exposure of an individual that increases the likelihood of developing a disease, like asthma. While the risk factors outlined in this report are not calculated as part of the overall ranking, they are important to address as they contribute to rates of asthma prevalence, emergency department visits, and mortality. These are some of the top risk factors for asthma:

- Poverty
- Lack of health insurance
- Exposure to air pollution
- Poor indoor air quality (poor housing quality)
- Pollen allergy
- Smoking (cigarettes, cigars, vapes)
- Lack of access to specialists
- Asthma quick-relief medicine use*
- Asthma control medicine use*

**High numbers of prescriptions for asthma medicines can indicate a larger population managing persistent asthma or more frequent severe or uncontrolled asthma.*

Social and Structural Determinants of Health

Social determinants of health (SDOH) can affect how people control their asthma or gain access to health care. Inequities in SDOH are key drivers in asthma disparities.

Historically, local and federal policies and programs negatively affected these factors. To improve asthma health outcomes, policies and programs must address and remove barriers to:

- Access to quality, affordable health care
- Food and economic security
- Good quality housing
- Clean and safe air
- Access to job and educational opportunities
- Access to technology, such as the internet
- Access to transportation
- Climate-resilient communities

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Risk Factor: Poverty

Socioeconomic status plays a major role in the development of asthma and a person's ability to manage it. Persons living below 100% of the Federal Poverty Level (FPL) are more likely to have asthma than people living at any percentage above the poverty level.[2]

Numerous studies have explored and confirmed the link between poverty and poor asthma outcomes. For example, living in poverty directly affects:

- Housing quality and increased exposure to indoor asthma triggers
- Physical environment and increased exposure to outdoor asthma triggers
- Ability to pay for asthma care due to competing priorities and basic needs
- Access to quality asthma care due to suboptimal health care coverage

Many cities in our report have poverty as a top risk factor. Good asthma management can be difficult when families are worried about paying for housing, clothing, utilities, and food. The cost of care may affect the decision to seek medical care. A lack of reliable transportation and paid sick leave may influence a person's ability to attend regular health care appointments.

These cities have the highest rates of poverty†:

Poverty Ranking	Metropolitan Area	Overall Asthma Capital National Ranking
1	McAllen, TX	63
2	Jackson, MS	48
3	New Orleans, LA	55
4	Richmond, VA	12
5	Philadelphia, PA	5
6	St. Louis, MO	17
7	Detroit, MI	3
8	El Paso, TX	68
9	Baltimore, MD	8
10	Fresno, CA	11



McAllen, TX

†For each city included in the 2024 Asthma Capitals, AAFA obtained the poverty rate for its respective county. The estimates range from 7.5% to 27.4%.

2024 Poverty Guidelines for the 48 Contiguous States and the District of Columbia:[10]

- 1 person in household: $15,060
- 2 persons in household: $20,440
- 3 persons in household: $25,820
- 4 persons in household: $31,200
- 5 persons in household: $36,580

For resources to help with the costs of some asthma medicines, visit: **aafa.org/asthma-assistance**

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Risk Factor: Lack of Health Insurance

Access to health care plays an important role in managing asthma symptoms, preventing exacerbations, and promoting better quality of life. For patients managing a chronic condition like asthma that requires medicine year-round, having insurance is often a big help. However, insurance itself can also be costly. These costs may vary depending on employment status and whether the job offers health insurance as a benefit and pays any of the costs. Other options include marketplace health insurance and government-sponsored insurance, like Medicare or Medicaid. Some states have expanded health insurance options for their residents while others have not. Racial and ethnic minority populations disproportionately experience barriers to health insurance, contributing to racial and ethnic disparities in health care.

These cities have the highest number of uninsured residents†:

Lack of Insurance Ranking	Metropolitan Area	Overall Asthma Capital National Ranking
1	McAllen, TX	63
2	Dallas, TX	28
3	El Paso, TX	68
4	Houston, TX	70
5	San Antonio, TX	57
6	Cape Coral, FL	80
7	Miami, FL	29
8	Oklahoma City, OK	66
9	Lakeland, FL	7
10	Tulsa, OK	82



Dallas, TX

Texas is home to the largest number of uninsured people of any state in the country.[11]

†For each city included in the 2024 Asthma Capitals, AAFA obtained the uninsured rate for its respective county. The estimates range from 3% to 30%.

Numerous studies have shown that the Affordable Care Act's (ACA) Medicaid expansion has improved access to coverage and care since states began implementing expansion in 2014.[12,13]

In fact, coverage expansions put in place by the ACA served as a safety net for people who lost jobs or health insurance coverage during the COVID-19 pandemic.[14] As of 2024, only 10 states have yet to expand their Medicaid programs: Alabama, Florida, Georgia, Kansas, Mississippi, South Carolina, Tennessee, Texas, Wisconsin, and Wyoming.[15] For the millions of uninsured people in these states, the decision not to expand has left them without an option for affordable health insurance.

In previous research conducted by AAFA, the top 3 reasons people cited as reasons why they didn't take their prescribed asthma treatments were due to not being able to afford the medicines, the cost of the medicines, and the lack of health insurance coverage.[16]

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Risk Factor: Exposure to Air Pollution

Poor air quality can negatively affect everyone's health. Research shows that air pollution can make asthma worse and trigger asthma symptoms.[17] It also causes increased rates of emergency room visits, hospital admissions, and school absenteeism related to asthma. Air pollution includes gases, smoke from fires, volcanic ash, dust particles, emissions from transportation, and other substances that can harm the lungs.

The U.S. Air Quality Index (AQI) is EPA's way of reporting air quality. Major pollutants tracked in the AQI are:

- Harmful gases (ground-level ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide)
- Particle pollution (also called particulate matter or soot pollution, reported by size: PM2.5 and PM10)

Ground-level ozone, a gas, is one of the most common air pollutants. Ozone contributes to what we typically experience as smog or haze. Ozone triggers asthma because it is irritating to the lungs and airways. Other forms of air pollution can also trigger asthma. Small particles in the air found in haze, smoke, and airborne dust can pass through your nose or mouth and get into your lungs. People with asthma are at greater risk from breathing in small particles. The particles can make asthma worse.

More than 40% of the U.S. population lives in areas with unhealthy levels of ozone or particle pollution, and this number has increased in recent years.[18] Climate change—a public health emergency—is one of the most critical explanations for this increase in pollution.

These cities all received an F rating from the American Lung Association's 2024 State of the Air Report for high ozone days and particle pollution†:

Metropolitan Area	Overall Asthma Capital National Ranking
Phoenix, AZ	21
Bakersfield, CA	78
Fresno, CA	11
Los Angeles, CA	49
Riverside, CA	69
Sacramento, CA	22
San Diego, CA	50
San Jose, CA	77
Denver, CO	85
Detroit, MI	3
Albuquerque, NM	54
Las Vegas, NV	38
Provo, UT	99
Salt Lake City, UT	86
Seattle, WA	59

In 2024—thanks in part to advocacy by AAFA's community—the EPA released an updated standard for the National Ambient Air Quality Standards (NAAQS) for Particulate Matter (PM), also known as soot pollution.

The updated standard makes efforts to improve air quality by tightening the annual standard from 12 micrograms per cubic meter to 9 micrograms per cubic meter. Children, seniors, and people with chronic conditions like asthma will benefit from today's action. Per EPA's estimates, the new standard will save 4,500 lives, avoid 5,700 cases of asthma onset, and avoid 800,000 cases of asthma symptoms.

While this updated annual standard will improve air quality and reduce health harms, there is more progress to be made. AAFA continues to advocate for stronger limits on spikes in soot pollution.

†For each city included in the 2024 Asthma Capitals report, AAFA obtained the grades for high ozone days and particle pollution for the respective county. Grades were averaged to produce an overall grade, ranging from A to F.

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RESEARCH HIGHLIGHT: Unlocking a Respiratory Revolution in Children's Healthcare with Environmental Data

To provide the highest quality care, healthcare systems and professionals must adapt to the challenges posed by extreme weather and environmental factors, such as air quality.

Children's Hospital Los Angeles (CHLA), the largest pediatric provider of hospital care for children in California, is integrating environmental data with electronic health records to develop the necessary research and patient care foundations for the next generation. As a first step, the multidisciplinary team at CHLA and University of Southern California's (USC) Spatial Sciences Institute is integrating unique air quality data from award-winning **Plume Labs by AccuWeather** with patient data across CHLA.

Air quality is recognized as one of the most significant risks to health, with children more vulnerable than adults. Reducing air pollution levels can help reduce the burden from many acute and chronic respiratory diseases, including asthma.[19]

"By understanding the disparity and magnitude of exposure to poor air quality and subsequently identifying patients most at risk, we can unlock the ability for healthcare professionals and systems to implement targeted, evidence-based strategies to mitigate the negative impact of environmental exposures on health," shares Dr. Jonathan M. Tan, a pediatric anesthesiologist and Vice Chair of Analytics and Clinical Effectiveness at Children's Hospital Los Angeles.

Dr. Tan and his team from CHLA and USC partnered with AccuWeather's atmosphere and data science experts to reimagine what the future of pediatric health and healthcare delivery looks like when environmental data is incorporated into their hospital, research, practice, and advocacy efforts.

The partnership allows the research team to:

1. Integrate AccuWeather's high-resolution data on air quality and other environmental determinants of health with electronic health records.
2. Use the power of data and analytics to answer the fundamental question: "What is the outdoor air quality exposure for all of our children who receive care at our hospital?"
3. Unlock the ability to study the impact of extreme weather and environmental exposures for children across the United States. The team from CHLA and USC, together with AccuWeather are now taking the next steps to expand the scope of research to other leading children's hospitals.

"We've made remarkable strides at CHLA, integrating environmental determinants of health into our patient records for research," says Dr. Tan. "For the first time, we can see how environmental exposures affect children across an entire pediatric health system, allowing us to identify disparities and opportunities to intervene and reduce risks."

But this is just the beginning. To build a healthcare system ready to tackle the environmental and climate challenges facing today's children, research efforts like this one need to expand to reach more patients and health systems with more data.

AAFA applauds these research efforts by the teams at CHLA, USC, and AccuWeather.

"We are excited to expand this research to children's hospitals nationwide," Dr. Tan shares. "The future is bright, and we're just getting started!"

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RESEARCH HIGHLIGHT: Impact of Wildfire Smoke Waves on Asthma Emergencies in Children

Wildfires are becoming more common, more intense, and more widespread due to climate change and land use changes. Wildfire smoke—an asthma trigger—contributes to air pollution in many communities across the United States and is directly linked to poor health impacts.

Wildfire smoke is a complex mixture of harmful gases and small particulate matter known as PM2.5.[20] Exposure to PM2.5 is associated with increased risk of respiratory disease. The small particles can get deep into the lungs and cause injury and inflammation to lung tissue.

California often experiences the most wildfires and acres burned of any state. The most destructive wildfire in the state was in Northern California's Butte County in 2018. Smoke waves from this fire affected the San Francisco Bay Area and surrounding counties.

Researchers at Komodo Health set out to examine the impact of wildfire-associated air pollution on pediatric asthma. **Their analysis** included approximately 1.6 million children with asthma living in areas affected by the Butte wildfire smoke waves. Using **Komodo's Healthcare Map™**, which tracks the healthcare journeys of more than 330 million patients in the U.S., researchers looked at asthma-related ED visits and asthma exacerbations during the 14-day wildfire smoke-wave period in 2018 compared to data from a 14-day period when no wildfires and associated elevations in PM2.5 were observed.

The study found that among children in areas impacted by the Butte wildfire:[21]

- Pediatric asthma exacerbations increased 76% during the smoke wave
- Asthma-related ED visits increased 27% during the smoke wave
- Risk of asthma exacerbation was highest in the Hispanic/Latino population
- Children living in regions with less home ownership and education had a 51% and 45% greater risk of asthma-related ED visits, respectively
- Children residing in regions with the highest poverty levels had a 38% greater risk of pediatric asthma-related ED visits

The study presents real-world evidence of the effects of wildfire smoke on pediatric asthma emergencies. It also highlights how socioeconomic factors—such as education, poverty, and home ownership—are associated with negative impacts of wildfire-associated air pollution.

Working together, stakeholders in these communities can mitigate adverse outcomes associated with exposure to air pollution from wildfire smoke. This is critical as the challenges posed by climate change and extreme weather continue to impact health, particularly among children with asthma.

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Risk Factor: Poor Indoor Air Quality

Indoor air quality is just as important as outdoor air quality. We spend about 90% of our time indoors, whether at school, home, or in the workplace.[22]

Indoor air can be up to 5 times more polluted than outdoor air. Buildings can trap harmful air pollution and other asthma triggers inside. Reducing asthma triggers in homes, schools, and workplaces is an important part of asthma management.



The following can negatively affect indoor air quality:

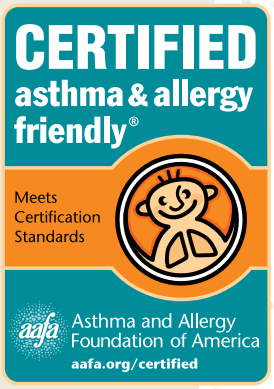
- Allergens, such as dust mites, animal dander, cockroaches, and mold
- Scents and fragrances from candles, scent diffusers, cleaning products, and personal hygiene products
- Chemicals and volatile organic compounds (VOCs) from building materials, cleaning products, and new furniture
- Burning fuels and wood (from cooking food or heating the indoor space)
- Emissions from vehicles, gas-powered generators, and other machinery
- Outdoor air pollution that enters the building (like from wildfire smoke)
- High levels of humidity that encourage mold growth and dust mites

Due to limited data on the MSA level, AAFA's Asthma Capitals report does not rank cities based on indoor air quality (IAQ) or housing quality as a risk factor for asthma. But this is a critical area to address in housing policy, building maintenance, school environmental policies, and workplace accommodations.

Controlling Asthma Triggers and Allergens

Asthma management involves more than just taking medicine. People with asthma also need to reduce exposure to asthma triggers like air pollution, animal dander, pollen, dust mites, or mold.

There are ways to improve indoor air quality and reduce exposure to allergens and airway irritants. Many products make claims, such as being "hypoallergenic." But there are no federal regulations on these claims. To improve indoor environments for people with asthma and allergies, AAFA and Allergy Standards Limited developed strict standards and certify only the products that meet all the standards.



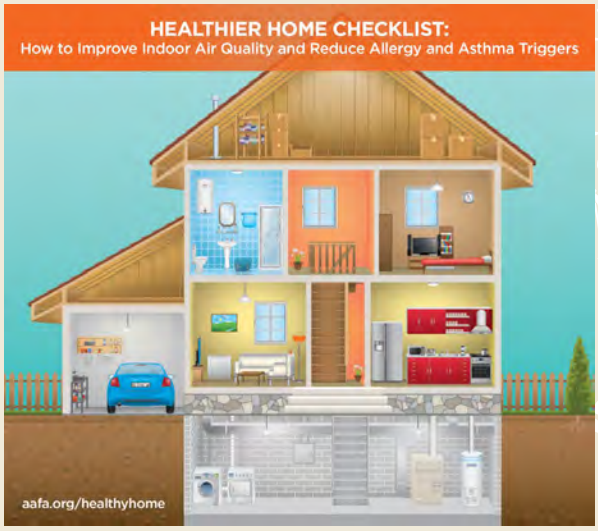
Look for the CERTIFIED **asthma & allergy friendly®** mark to confirm which products meet the standards to reduce exposure to allergens and improve air quality. Visit **aafa.org/certified** to search for CERTIFIED products and learn more about the **asthma & allergy friendly®** Certification Program.

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Healthy Buildings for People with Asthma and Allergies

AAFA supports policies that promote healthy environments for people with asthma and allergies in various settings, including homes, housing, schools, child care centers, and workplaces.

Healthy Homes and Housing: There are many factors that can affect a home's health. Mold from a leaky roof or lead from old paint are some examples. For people with asthma, triggers and allergens in the home (such as dust, pests, and mold) can cause asthma and allergy symptoms. AAFA offers various resources to help improve indoor air quality (IAQ) in the home. Homeowners and rental tenants can use **AAFA's Healthier Home Checklist** to identify areas of their living spaces that may be contributing to asthma. It can be expensive to remediate an entire home, so AAFA recommends focusing on the areas where the person with asthma spends most of their time. This is usually the bedroom or sleeping areas.



Families living in low-income housing are more likely to be exposed to harmful asthma triggers and are at a greater risk of having severe asthma. These families often don't have the resources to address health issues in the home. AAFA supports reimbursement for preventative services and home assessments that provide asthma education for people with severe asthma.

AAFA is a member of several coalitions that also support improving housing on a national and community level, including the National Safe and Healthy Housing Coalition (NSHHC), DC Healthy Housing Collaborative (DCHHS), and California Asthma Financing Workgroup.

Healthy Schools and Child Care Centers: Clean air in every school should be a national priority for all K-12 schools and child care facilities. Improving IAQ in schools is especially important. Since children spend much of their time in the school environment, school IAQ can significantly influence their respiratory health. Research links key environmental factors to health outcomes and students' ability to perform. Improvements in school environmental quality can enhance academic performance, as well as teacher and staff productivity and retention. Poor indoor air quality is a particular health concern for those with asthma and allergies because indoor triggers increase the risks of severe asthma attacks and allergic reactions.[19] Nearly 1 in 13 school-aged children have asthma, which is the leading cause of school absenteeism due to chronic illness.

Factors that contribute to poor indoor air quality in schools include:

- Exposure to indoor environmental allergens (such as dust mites, pests, and molds)[23]
- Poor Ventilation and HVAC Systems
- Aging Buildings
- Schools Located Near Sources of Pollution

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Risk Factor: Pollen Allergy

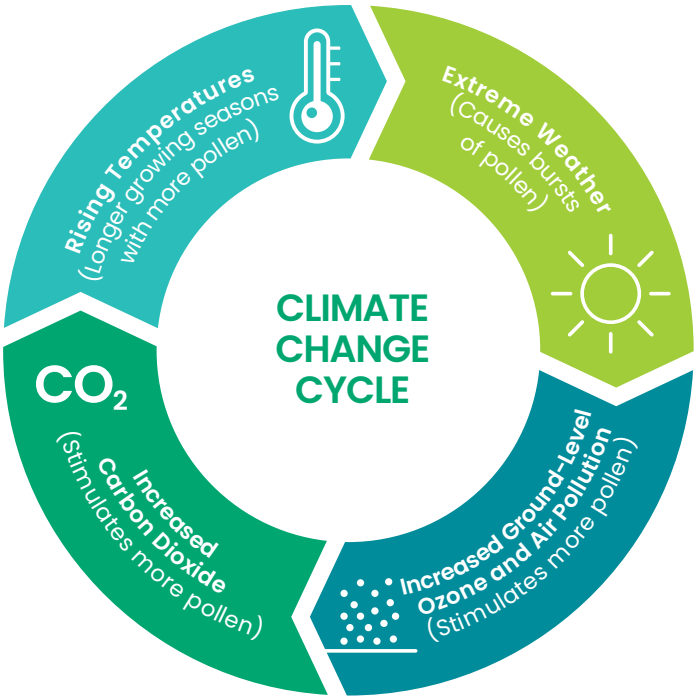
In the U.S., about 1 in 4 adults and 1 in 5 children have seasonal allergies such as pollen allergy.[24] That number could rise in the coming years due to climate change.[25] Many people have been experiencing worsening pollen allergy symptoms over the years.

Pollen is a common allergen that can cause allergic asthma (asthma triggered by allergens). Allergic asthma is most common in early childhood and steadily decreases through adulthood.

Pollen allergy seasons start earlier and end later in the year than they did previously. Research shows pollen seasons now start 20 days earlier and last 10 days longer, compared to 30 years ago.[26,27]

With warmer, longer seasons, allergy-causing plants can move into new areas. Ragweed, for example, is migrating northward due to climate change.[28]

Warmer temperatures and increased levels of CO_2 lead to longer growing seasons that change flowering time and increase pollen. Higher concentrations of pollen are linked to increased CO_2 levels. This is often worse in urban areas. One study on ragweed pollen found that it could be 7 times higher in a city that averaged 3.6 F warmer and had 30% more CO_2 than the city's rural surrounding area.



Pollen Counting

Pollen reports are valuable tools in helping people manage their seasonal allergies. But not all reports are equal. Some reports are pollen counts and some are pollen forecasts. Pollen counts are taken from samples of pollen at monitoring sites (using pollen counters or sensors) and are based on actual data. Pollen forecasts are predictions of expected pollen counts based on historical data. While pollen forecasts can be helpful, pollen counts are more accurate. Most pollen counting sites use manual systems, where pollen is collected and placed on a microscopic slide and then counted by hand.

More recently, automated pollen sensors are available for capturing pollen data. Automated sensors—such as the APS400 from Pollen Sense—may reach areas manual counting cannot. Though this is a relatively new technology, pollen sensors continue to improve. There are several ways automated sensors can work, including using digital images or electric signals.[29] Automated pollen counting allows pollen information to be captured in a reliable and timely manner. They can produce hourly counts instead of daily counts.[30] Automated sensors also help remove some of the challenges that come with manual counting, like differences between counters, inaccurate samples caused by changes in airflow, and uncertainty with low pollen concentrations.[31]

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Risk Factor: Smoking Cigarettes, Cigars, and Vapes

Tobacco smoke and e-cigarette aerosol can be especially harmful to people who have asthma.

About 1 in 5 adults with asthma smoke tobacco products.[32] Children who live with smokers have more frequent asthma attacks. More than 40% of children who go to the emergency department for asthma live with smokers.[33]

According to the CDC, smoking is the leading cause of preventable death in the U.S.[34] Smoking is not only harmful to the person doing the smoking but also to people nearby who inhale secondhand smoke or come into contact with thirdhand smoke. People with asthma are at greater risk of harm from tobacco products. Many chemicals, gases, and small particles in secondhand and thirdhand smoke can irritate the lungs and airways, causing additional inflammation and swelling.

Secondhand smoke—also known as environmental tobacco smoke (ETS)—refers to smoke that is released in the air when a smoker exhales, as well as smoke released from a burning cigarette, cigar, or pipe. Secondhand aerosols are also released by electronic smoking devices (e-cigarettes, hookahs, vapes).

Thirdhand smoke is residue from tobacco smoke. When a nicotine product is smoked, chemicals in the smoke stick to surfaces and dust for months after the smoke is gone. The chemicals in the residue then react to other pollutants in the air, like ozone, to create harmful particles you can easily inhale or ingest.[35]

Tobacco smoke and aerosols (including secondhand and thirdhand smoke) are unhealthy for everyone. There is no safe level of exposure to secondhand or thirdhand smoke. But many non-smokers are exposed to ETS in public places, homes, vehicles, and workplaces.

These cities do the least to protect their residents and visitors from tobacco smoke and have fewer smoke-free laws†, comparatively:

Metropolitan Area	Overall Asthma Capital National Ranking
Oklahoma City, OK	66
Tulsa, OK	82
Chattanooga, TN	46
Memphis, TN	15
Harrisburg, PA	14
Knoxville, TN	92
Nashville, TN	32
Virginia Beach, VA	31

Prohibiting smoking in indoor spaces protects nonsmokers (including children) from ETS. Many state and local jurisdictions have passed laws that ban smoking in some places. These smoke-free zones may include workplaces, restaurants, hotels, parks, public housing, and transit systems. Research your state or county to see what the laws are in your area.

†For each city included in the 2024 Asthma Capitals, AAFA obtained data on whether there was a 100% smoking ban for cars with minors, non-hospitality workplaces, restaurants, bars, and multi-unit housing.

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Risk Factor: Lack of Access to Specialists

Successful asthma management requires coordination of care between the person with asthma and their health care team. In addition to a primary care doctor, a person with persistent asthma might need to be in the care of a specialist. Pulmonologists, allergists, and immunologists, for example, can provide specialized care for people with asthma and may have more experience treating patients with severe asthma or allergic asthma than a primary care physician.

Access to appropriate medical care is dependent upon different factors, including socioeconomic status, insurance status, and availability of specialists in nearby locations. The lack of availability of nearby asthma specialists may be associated with poor asthma outcomes.

Living in an area where there are fewer specialists can mean traveling long distances for care. This can be a burden on personal finances and time, especially when frequent trips are needed. And it may take months to get an appointment.

These cities have the fewest asthma specialists per asthma patient†:

Fewest Specialists Ranking	Metropolitan Area	Overall Asthma Capital National Ranking
1	Poughkeepsie, NY	18
2	Ogden, UT	79
3	Lakeland, FL	7
4	Springfield, MA	4
5	McAllen, TX	63
6	Rochester, NY	2
7	Las Vegas, NV	38
8	Provo, UT	99
9	El Paso, TX	68
10	Spokane, WA	16


Poughkeepsie, NY

†For each city included in the 2024 Asthma Capitals, AAFA obtained data on specialists per 10,000 asthma patients.

Find an Allergist

People managing asthma and allergies can find specialists in their area using the Find an Allergist tool from the American College of Allergy, Asthma & Immunology (ACAAI). The tool finds specialists by ZIP code and shows office locations and phone numbers. Use the Find an Allergist tool at **acaai.org/find-an-allergist**.



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Risk Indicator: Asthma Medicine Use

Both control medicines (sometimes called "controllers") and quick-relief medicines (sometimes called "rescue inhalers") may be necessary for optimal asthma management.

Quick-relief medicines help relieve asthma symptoms as they are happening. These medicines act fast to relax the constricting smooth muscles around the airways. This allows the airways to open up so air can flow through them.

Frequent use of a quick-relief medicine (like albuterol) may indicate a higher number of asthma episodes and lack of asthma control.

Quick-relief medicine use is highest in these cities†:

Asthma Quick-Relief Medicine Use Ranking	Metropolitan Area	Overall Asthma Capital National Ranking
1	Toledo, OH	41
2	Springfield, MA	4
3	Detroit, MI	3
4	Louisville, KY	40
5	Columbus, OH	20
6	Providence, RI	10
7	Greenville, SC	13
8	Boston, MA	74
9	Indianapolis, IN	61
10	Atlanta, GA	43

†For each city included in the 2024 Asthma Capitals, AAFA obtained the total number of quick-relief medicine prescriptions for the respective census-designated metropolitan statistical area, or MSA, from 2023. Analysis included estimating the prescription rate per patient prevalence.

Control, or controller, medicines help prevent and control asthma symptoms. There are several kinds of asthma control medicines, including inhaled corticosteroids (ICS) and biologics. Asthma control medicines are prescribed for persistent cases of asthma.

A high number of these prescriptions may indicate that a city's residents have more severe or uncontrolled cases of asthma.

Asthma control medicine use is highest in these cities†:

Asthma Control Medicine Use Ranking	Metropolitan Area	Overall Asthma Capital National Ranking
1	Toledo, OH	41
2	Ogden, UT	79
3	Louisville, KY	40
4	Indianapolis, IN	61
5	Jackson, MS	48
6	Pittsburgh, PA	45
7	Harrisburg, PA	14
8	Greenville, SC	13
9	Detroit, MI	3
10	New Haven, CT	83

†For each city included in the 2024 Asthma Capitals, AAFA obtained the total number of controller medicine prescriptions for the respective census-designated metropolitan statistical area, or MSA, from 2023. Analyses included estimating the prescription rate per patient prevalence.

Biologics are a newer type of controller medicine used to treat moderate to severe asthma. They can be a treatment option for people whose asthma remains uncontrolled even on high doses of other control medicines. Currently, there are 6 asthma biologics approved by the FDA, including biologics for severe asthma, eosinophilic asthma, allergic asthma, OCS-dependent asthma, and asthma with no phenotype (e.g. eosinophilic or allergic).

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SPOTLIGHT: Access to Asthma Medicines and Care

People with asthma need access to comprehensive, affordable health care that covers all necessary medications without causing financial hardship. This access is critical for asthma management and overall health, ensuring that individuals get treatments they need at prices that are manageable and fair. Access to care supports better health outcomes and empowers individuals to lead active, fulfilling lives without the burden of high medical costs.

AAFA advocates for:

- Access to health coverage with meaningful drug coverage
- Reducing barriers caused by "utilization management"
- Transparent and affordable drug pricing

Access to health coverage with meaningful drug coverage

AAFA advocates for access to comprehensive health insurance coverage regardless of pre-existing conditions, socioeconomic status, gender, age, race, or ethnicity. Comprehensive coverage relies on laws and policies that protect access in the private health insurance market, as well as in Medicaid, Medicare and other public programs.

AAFA supports policies that:

- Reduce barriers to access to care, including maintaining the cost of prescription drugs outside a plan deductible
- Minimize cost sharing for patients; for example, when feasible, AAFA supports the use of low copayments instead of coinsurance
- Enforce nondiscrimination requirements that prevent plans from "discriminatory tiering," which refers to placing most or all drugs for certain conditions in high-cost tiers
- Prohibit "copay accumulators" that limit how much patients can benefit from manufacturer assistance programs (When plans apply a "copay accumulator," they disregard the amount of any coupon used when calculating a member's deductible. This makes it harder for patients to ever reach the deductible, keeping out-of-pocket costs high.)

Within the Medicare program, AAFA supports a patient-centric implementation of the $2,000 out-of-pocket maximum in the Part D benefit. AAFA also supports policies that would reduce financial liability for Part D enrollees, including a price ceiling for each Part D drug and requiring more information about drug pricing and alternatives in Part D Explanation of Benefits (EOBs). In addition, AAFA opposes restrictive medication utilization management policies in Part D that pose unwarranted barriers to patient access to needed medications.

Medicare Prescription Payment Plan

Beginning in 2025, the Medicare Prescription Payment Plan, part of the Inflation Reduction Act, will allow Medicare Part D beneficiaries to spread their out-of-pocket prescription drug costs over the year in monthly payments instead of all at once at the pharmacy. This aims to reduce the financial burden on beneficiaries by offering predictable monthly payments and an annual out-of-pocket spending cap of $2,000. Beneficiaries will be able to opt into the payment plan during their coverage year and adjust payments based on changes in their drug costs. For more information, visit **CMS.gov**.

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Reducing barriers caused by "utilization management"

AAFA opposes the use of utilization management (UM) techniques that hinder medically appropriate access to medication for asthma. UM is a broad term that refers to tools an insurer might use to help ensure access to proper care and required services while controlling costs.[36]

In 2020, the U.S. was estimated to spend over $358 billion on prescription drugs. Given this, and projections that expenditures will continue to increase, issuers and pharmacy benefit managers (PBMs) are increasingly using UM techniques to manage costs.[37] Today, more than 94 percent of plans report using UM to manage costs and access.[38] While UM interventions have seen some cost-savings and increased promotion of evidence-based care, UM tools may increase administrative burden for patients and providers, create barriers to care and limit patient choice.[39,40] Three of the most common UM tools are:

- **Prior Authorization**, sometimes called precertification or prior approval, is the most common form of utilization management. Prior authorization prospectively seeks to control the utilization of items or services, including prescription drugs, by requiring approval of a medically necessary service or treatment from the patient's health plan.
- **Step therapy**, also known as "fail first" protocols, is a technique used by insurance payors in which patients are required to try – and fail – one medication or regimen before getting approval to try another. The approach is typically used to reduce plan costs by steering patients toward less expensive treatment. A typical approach is to require patients to first demonstrate over a specific time (e.g. 30 days) that less expensive, often generic, therapies are clinically ineffective, prior to authorizing coverage for the more expensive prescribed treatments.[41,42] Though providers are usually able to file successful appeals and exception forms for patients, not every issuer allows for such an appeal.[43]
- **Mid-year formulary changes** generally occur when new prescription drugs come to market and a health plan and/or pharmacy benefit manager (PBM) change their preferred drug and/or remove coverage of the existing treatment from their formulary altogether.[44] Issuers and PBMs argue these changes are necessary to allow patients access to the most innovative and effective treatments.[45] For patients, however, mid-year formulary changes may result in non-medical switching (NMS). NMS happens when a patient and provider are forced to change the prescribed treatment solely for financial considerations placed by the health plan.[46]

Common Utilization Management (UM) Tools	
UM is a broad term that refers to tools an insurer might use to help ensure access to proper care and required services while controlling costs	
Prior Authorization	A process that requires approval from the health plan (insurance company) before a service or prescription can be provided.
Step Therapy	A process that requires patients to "fail" on less expensive (often generic) drugs before getting access to newer, more expensive drugs.
Mid-year Formulary Changes	Occurs when health plans or pharmacy benefit managers change their preferred drug(s) and/or remove coverage of existing treatments when new drugs come to market.

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Members of AAFA's patient community need medications to treat asthma and related conditions. Often, patients have to work closely under the guidance of their providers to identify the right medication for them. AAFA strongly opposes UM techniques, in public or private insurance, that hinder access to the safest and most effective medication for any given individual, as determined by the patient and prescriber.

Where UM policies are in place, AAFA supports the following principles:

- Protocols should be based on evidence-based treatment guidelines. Treatment should begin with the recognized standard of care under these guidelines, even if that treatment is not the least expensive.
- Patients currently using effective therapy must be permitted to maintain that treatment under an existing or new insurance policy even if the therapy is not the least expensive.
- Providers must be able to request a waiver of step therapy requirements for patients who tried a drug at an earlier date, including in a different plan year, to avoid having patients repeat a treatment known to be ineffective for them.
- There must be a simple and timely exceptions and appeals process to ensure rapid consideration of providers' documented reasons for recommending access to a drug otherwise subject to UM.
- Enrollees and providers should receive clear and timely information about any UM requirements and the exceptions and appeals process.

Transparent and affordable drug pricing

People with asthma may face large financial barriers to certain drugs. In AAFA's study of 804 adults with asthma, only 1 in 4 respondents always used their asthma treatments as prescribed.[16] The top 3 reported reasons for not using treatments were related to cost: inability to afford treatment, treatment was too expensive, and lack of insurance coverage for the treatment. High out-of-pocket costs can impact adherence, threaten the health of people with asthma, and worsen disparities.

AAFA supports policies that reduce the cost burden of drugs for patients:

- Increase price transparency from pharmacy benefit managers (PBMs) and drug manufacturers.
- Include data on patient experience (such as quality of life, social impact, and caregiver impact) when evaluating the cost-effectiveness of drugs.

Within the context of Medicare drug pricing negotiation, AAFA supports policies that would help lower the list prices of drugs without stifling innovation. AAFA is concerned about policies that set arbitrary costs which could suppress innovation and potentially jeopardize access to new medicines.

AAFA Leads the Way to Lower Costs of Asthma Inhalers

AAFA is pushing to lower the costs of asthma medicines, including inhalers. We know the high cost of medicine can be a barrier to treatment. In 2024, several major asthma inhaler manufacturers—AstraZeneca, Boehringer Ingelheim, and GSK—announced $35 a month caps on out-of-pocket costs. The price cap will apply to people with commercial/private insurance or no insurance.

AAFA continues to raise the voice of the patient community and **draw attention to the ways America's complex drug pricing ecosystem makes asthma medications more expensive** for people who need them most. Drug manufacturers, pharmacy benefit managers (PBMs), insurers, employers, and the government must work together to improve affordability and access.

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Health Equity

The Asthma Capitals report acknowledges that where a person lives can significantly impact their health. Social, economic, and environmental disadvantages play a role in determining asthma outcomes. Many of the top Asthma Capitals are also facing major challenges and inequities that lead to health disparities.

In 2020, AAFA published the **Asthma Disparities in America** report, which examines serious gaps in asthma rates, care and outcomes. The report also provides a roadmap and strategies to address racial and ethnic disparities in asthma.[4]

In 2022, AAFA launched its **Health Equity Advancement and Leadership (HEAL)** program to address findings from the report and reduce asthma deaths and illness among high-risk populations. The HEAL program employs a dual strategy, combining AAFA national leadership with locally tailored community-driven initiatives. HEAL reinforces AAFA's commitment to drastically reduce health disparities in communities that bear the heaviest burden of asthma.

Through the HEAL program, AAFA provides funding and resources to local pilot programs tailored to at-risk populations most impacted by asthma. During the initial launch of the HEAL program in 2022, AAFA announced support for community-based programs in **Detroit**, **St. Louis**, **Los Angeles**, and **Chicago**. In 2023 and 2024, AAFA expanded the HEAL program by supporting additional programs in **New York City**, **Alabama**, **Allentown**, and **Saginaw**.

AAFA's 2022-2024 community-based HEAL interventions for asthma:



HEAL
HEALTH EQUITY
Advancement and Leadership

Though each program site is conducting different interventions, the programs feature similar components that are proven to improve asthma outcomes and health:

- Care Coordination and Support
- Asthma Self-Managment Education
- Environmental Home Assessment and Tools
- General Health and Wellness
- Other Tools and Resource Connections



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The **Allentown (#1 Asthma Capital)** program, in partnership with the Health Promotion Council of Southeastern Pennsylvania, is developing a community-based asthma management program and outreach campaign focused on older adults with asthma. The project will expand current programs for older adults living with chronic health conditions, including asthma, and build new referral pipelines with local partners. **(see page 33)**

The **Detroit (#3 Asthma Capital)** program, in partnership with the AAFA Michigan Chapter, provides a holistic asthma management intervention. Participants are provided with comprehensive self-management asthma education, connected with an asthma specialist and a nutritionist, and receive a virtual home environmental assessment from a certified community health worker. Participants are also provided with a local farmers market food box, a membership to a local YMCA, and asthma-friendly products for their homes.

The **Saginaw** program, in partnership with the AAFA Michigan Chapter, will build upon the positive outcomes shown for residents in Detroit. The AAFA Michigan Chapter will offer their holistic asthma management intervention to Saginaw County residents.

The **St. Louis (#17 Asthma Capital)** program, in partnership with the AAFA St. Louis Chapter, provides an intervention for adults ages 50+ with asthma. The program provides group asthma management education in virtual and in-person settings. Home visits are also provided to support asthma and allergy trigger remediation.

The **New York City (#19 Asthma Capital)** program, in partnership with AIRnyc, provides a unique asthma care program to help the Hispanic population in the Bronx and surrounding areas. In several high-poverty neighborhoods of the South Bronx—where the majority of residents are Hispanic or Black—rates of asthma deaths and burden are consistently higher than the rest of New York City.

The **Los Angeles (#49 Asthma Capital)** program, in partnership with Breathe Southern California, provides an asthma management and education program that includes 3 visits with a health educator. The home visits include an in-home assessment for environmental asthma triggers and resources to reduce barriers to care. The focus of the program is on underserved communities of Southeast Los Angeles County that bear some of the heaviest burden of asthma due to their low socioeconomic status, proximity to high-polluting industrial facilities, and the presence of several major freeways.

The **Chicago (#53 Asthma Capital)** program, in partnership with the American Lung Association, provides a virtual home assessment program for individuals with asthma. The home visit includes asthma management education and offers support to help households reduce their exposure to asthma triggers.

The **Alabama** program, in partnership with Virtual Young Teen Asthma & Wellness Camp and the Alabama Asthma Coalition, is expanding an existing virtual model to include asthma management home visits and provide asthma health education. The program will build a community health worker network to address the rural health disparity needs through collaborations with schools, local and state departments of health, and other state-based organizations and partners.

AAFA's Health Equity Advancement and Leadership (HEAL) program sites listed above are supported by generous contributions from the American College of Allergy, Asthma, & Immunology (ACAAI), Amgen, AstraZeneca, Genentech, Novartis, Pegasus Home Fashions, Rabbit Air, Renegade Brands, Sanofi, Regeneron, and Viatris.

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Across all HEAL sites, program participants complete a voluntary self-reported survey at baseline, 6-, 12-, and 24-months post-intervention. The survey collects data including:

- Participant demographics
- Asthma severity and control (using the AIRQ® tool)
- Asthma exacerbations and healthcare utilization
- Asthma-related quality of life
- Experience with asthma treatments
- Understanding of the participant's healthcare team
- Perceived provider bias
- Asthma knowledge and confidence
- Comorbid conditions
- Social determinants of health

Though the HEAL interventions are ongoing, enrollment and evaluation data to date show that HEAL is reaching and serving people experiencing a disproportionate burden of asthma. Many participants in the programs report having competing priorities and needs relating to their health. Food security, the risk of losing utilities, and the lack of reliable transportation are a few of the competing priorities households are facing that can conflict with their asthma management. Additionally, exposure to outdoor and indoor pollution continues to be a barrier to asthma management.

Among all participants enrolled in the HEAL program to date*:

Demographics

52% identify as Black or African American and **25%** identify as Hispanic or Latino	**44%** are covered through Medicaid and **29%** through Medicare	**44%** report an annual household income of under $25,000

Exposure to Outdoor Pollution	Exposure to Indoor Triggers	Competing Needs and Priorities
77% say they live within 5 miles of an area with heavy traffic	**28%** say they are exposed to mold in their homes	**40%** say they have worried food would run out in the past 12 months
24% live within 5 miles of a manufacturing plant	**22%** say they are exposed to pests such as mice, ants, or bugs	**24%** say their utilities have been threatened to be shut off in the past 12 months
14% live within 5 miles of gas or oil refinery	**18%** say they have been exposed to smoking in the home in the past 7 days	**23%** say lack of reliable transportation has kept them from medical appointments, work, or from getting necessities

**Data as of September 5, 2024; n=170 participants who have completed the baseline survey*

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Data from 6-month follow-up evaluations show that the HEAL program continues to meet its goals of improving asthma care and outcomes for participants.

Among participants who have been in the HEAL program for over 6 months*:



93% increase in participants who were "very sure" they understood how their asthma medicines work

86% increase in participants who were "very sure" they knew how to manage their asthma overall

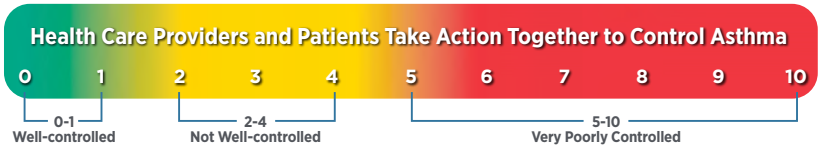
62% increase in participants "well-controlled" asthma

44% reduction in daily use of rescue inhaler or nebulizer

53% reduction in unplanned ER and healthcare provider visits

56% reduction in feeling it was difficult to control their asthma

AIRQ: Validated Tool for Asthma Control



Average baseline score: **3.9**
Average 6-month score: **2.7**

Data as of September 5, 2024; n=73 participants who completed both the baseline and 6-month surveys

From the time she was a child, La Fondria, PhD—a **St. Louis (#17 Asthma Capital)** resident—recalls having trouble breathing. Her asthma symptoms were often brought on by strong scents or cigarette smoke.

La Fondria spoke with her doctors many times about her trouble breathing. After much self-advocacy, she was diagnosed with asthma and given a quick-relief inhaler. At first, that seemed to be enough. She experienced better breathing and could manage her symptoms.

While La Fondria felt she had her asthma under control, she often wondered if there was more to asthma management than using just a quick-relief inhaler. La Fondria wanted to learn more, so she joined the HEAL program in St. Louis.

Through a connection with HEAL, La Fondria found a community of people living with asthma. And she learned new ways to manage her asthma. She also worked with a health care provider to develop an Asthma Action Plan.

Now, La Fondria knows she has all the tools she needs to manage her asthma.

"I'm so glad I kept looking for answers," La Fondria said. "And I would encourage anyone to take advantage of a program like HEAL. My life was great before, but it's even better now that I have all the tools to manage my asthma."

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SPOTLIGHT: Supporting a New Program in Allentown, the #1 Asthma Capital

Allentown, Pennsylvania, takes the top spot for the second year in a row. Allentown is the #1 Asthma Capital in 2024 due to higher-than-average asthma prevalence and emergency department (ED) visits. In fact, Allentown has the highest rate of asthma-related ED visits of all 100 cities analyzed.

AAFA is supporting the Allentown community with developing and launching the EASE Allentown: Empowering Asthma Self-Management and Education program. This project will be led by the **Health Promotion Council of Southeastern Pennsylvania, Inc. (HPC)**, a subsidiary of **Public Health Management Corporation**, in collaboration with local partners. The goal is to develop a community-based asthma management program and outreach campaign focused on older adults with asthma. The project will expand current programs for older adults living with chronic health conditions, including asthma, and build new referral pipelines with local partners.

HPC has more than 35 years of experience in chronic disease prevention, education and management, focused on health equity and culturally responsive services to empower individuals to improve their health. HPC was recently awarded one of twenty grants nationwide to implement a **Community Care Hub (CCH)** model to address health-related social needs and expand reimbursement for evidence-based programs. In the long term, HPC aims to integrate and expand EASE into its services as part of its expansion.

"Allentown has been on AAFA's radar for some time as a promising community for closer collaboration," said Lynne G. Bosma, AAFA's Health Equity and Outreach Program Manager. "HPC's innovative and collaborative approach makes them an ideal partner as we extend the reach of AAFA's Health Equity Advancement and Leadership (HEAL) program. By working with local organizations like HPC, AAFA aims to help communities such as Allentown develop effective strategies to reduce health disparities."



Joani Schmeling, MPH, MCHES, the Training and Capacity Building Manager at HPC, leads the organization's chronic disease self-management education program. This program equips older adults with the knowledge and tools they need to effectively manage chronic conditions.

"We are deeply honored to receive this grant from AAFA, as it empowers us to make a lasting impact in Allentown, the community with one of the highest rates of asthma in the country," said Ayana Bradshaw, Executive Director of HPC. "This opportunity brings us one step closer to our mission of providing everyone with the tools and resources needed to effectively manage chronic diseases. Together, we can create a healthier future for all residents of Allentown."

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Taking Action through Advocacy and Policy

Advocacy is a critical pillar of AAFA's mission to save lives and reduce the burden of disease for people with asthma, allergies, and related diseases. In previous years, AAFA has used our Asthma Capitals reports to educate public officials on the challenges of living with asthma. We have primarily shared the reports with Congress to help promote policy solutions to improve the health and safety of people with asthma. This year, AAFA is calling on our community to join us in these advocacy efforts—including at the state and local level.

This report outlines significant risk factors that impact asthma outcomes. There is no single policy solution to address the complex and structural issues the asthma community faces. AAFA therefore supports a "health in all policies" approach that recognizes the health implications of policy decisions in all sectors—including health, education, environment, labor, housing, social services, and city planning.

Keys areas of advocacy to improve asthma outcomes include:

Key Issues	Examples of Policy Strategies
Access to health care	Expand health insurance coverage. Reduce drug costs for patients. Reduce financial and insurance-related barriers to medically appropriate care and treatments. Provide free vaccinations.
Physical environment	Strengthen clean air policies, reduce transportation-related emissions, restrict zoning of polluting sources, and transition to a clean energy economy. Support carbon reduction programs and other climate change mitigation strategies.
Healthy schools	Improve school building conditions and air quality in and around schools. Improve school nurse to student ratios to ensure students have support to effectively manage their asthma and allergies.
Healthy homes	Reduce the use of building materials that contribute to poor indoor air quality. Promote green-building principles. Support tenant's rights to remediation of health hazards in rental properties. Build climate-resilient homes.

Your voice is critical to help build awareness in your community and to educate your elected officials who can lead change. On the following pages, we've included:

- Tips for identifying and contacting your state legislators **(page 35)**
- Tips for communicating and advocating effectively **(page 37)**
- Sample letter to your legislator **(page 38)**
- Sample Asthma Peak Week resolution for states **(page 39)**
- Sample Asthma and Allergy Awareness resolution for states **(page 40)**

Sign up to receive AAFA's Advocacy Action Alerts!

Would you like to help us advocate on behalf of people with asthma and allergies? **Join our online community** to receive Advocacy Action Alerts. Through the community, you'll also be able to use our support forums, get alerts about other news, learn about research opportunities, and more.



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How to Advocate for People with Asthma to Lawmakers

Find Your Legislators (Lawmakers)

If you live in one of the 50 states, you have one U.S. senator and one U.S. representative that represent you in the U.S. Congress. You also have legislators (state senators and representatives or assembly members) who represent your local district in your state's government. You can find your senator and representative by going to openstates.org and entering your home address in the search bar. The results will include both your state and federal legislators. The state results will say either "upper" or "lower" chamber. Your state senator is a member of the upper chamber, and your state representative is a member of the lower chamber.

If you live in the District of Columbia or a U.S. territory, you can still use openstates.org to find your local representatives. You also have non-voting members of Congress at the federal level.

Call Your Legislator

Calling elected officials is an extremely easy and effective way to raise important issues. First, you will want to introduce yourself and let the staff member know that you are a constituent (someone who lives in their district). Do not be surprised if they ask for your zip code. This is because constituent concerns are prioritized. You will then want to briefly raise your concern or request for your legislator using our communication tips on **page 37**.

You may also ask to speak to the appropriate legislative assistant based on the topic. Here is a brief example: "Hi, my name is Jane Doe from Virginia, zip code 22202. As a mother of child with asthma, I am calling to encourage the senator to support legislation to combat environmental injustice in our community and to clean up polluting sources near our schools. Is there a legislative assistant who covers these types of issues that I could speak with?" You can also ask to talk about topics like access to medicines, health insurance, or funding for local asthma programs.

Write to Your Legislators

Writing to legislators is another advocacy tool you can use whether by physical mail or by email. Again, you will want to identify yourself as a constituent and make your request for support clear and concise at the beginning of the letter or email. You should then provide any relevant background information and personal stories related to the request. We have provided a sample letter in support of asthma policies on **page 38**, as well as sample resolutions for Asthma Peak Week **(page 39)** and Asthma and Allergy Awareness Month **(page 40)** that you can share with your legislators.

Request a Meeting with Legislators

The easiest way to request a meeting is by phone or email. Legislators all have public email addresses and/or contact forms on their websites. Using the tips above, contact your lawmaker's office and request a meeting. You may need to be flexible on timing but be persistent. You will most likely meet with a member of staff and not the lawmaker themself.

Once a virtual or in-person meeting is scheduled, be prepared, on time, and concise. Review communication tips on **page 37** prior to a meeting and be prepared with any additional background "leave-behind" materials, such as a copy of the Asthma Capitals report. It is also important to follow-up with a thank you note or email after the meeting.

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Addressing Legislators

When addressing legislators in writing or in conversation, refer to the chart below:

	State Senator	State Representative
Formal Address	The Honorable (Full Name) (Name of State Legislature Upper Chamber) (Address of State Legislature)	The Honorable (Full Name) (Name of State Legislature Lower Chamber) (Address of State Legislature)
Salutation	Dear Senator (Last Name)	Dear "Mr./Ms./Mrs." or "Representative" or "Assemblyman, Assemblywoman, Assemblymember" or "Delegate" (Last Name)
Conversation	Senator (Last Name)	"Mr./Ms./Mrs." or "Representative" or "Assemblyman, Assemblywoman, Assemblymember" or "Delegate" (Last Name)

	United States Senator	United States Representative
Formal Address	The Honorable (Full Name) United States Senate Washington, DC 20510	The Honorable (Full Name) United States House of Representatives Washington, DC 20515
Salutation	Dear Senator (Last Name)	Dear "Mr./Ms./Mrs." or "Representative" (Last Name)
Conversation	Senator (Last Name)	"Congressman, Congresswoman" or "Representative" (Last Name)

Note: The names of upper and lower chambers of state legislatures vary by state. You can find information on your state legislatures by clicking on your state at **congress.gov/state-legislature-websites**.

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Tips for Communicating with Legislators and Their Staff

Legislators serve many constituents and address a wide range of policy issues. Here are some important points to keep in mind when communicating with legislators.

1. **Remember that Legislators and Their Staff are Human Beings**
   - Conversations should not be argumentative or confrontational.
   - In advocacy, respectful relationships build the foundation for change.
2. **Share Personal Stories**
   - Personal stories are extremely powerful and are often remembered.
   - Keep stories very brief (under two minutes) and tied to legislation and policy issues.
3. **Identify Yourself as a Constituent**
   - Let your legislator know that you live in their district and identify yourself as a constituent.
   - Legislators are more likely to focus on issues pertaining to their district and constituents.
4. **Increase Number of Communications**
   - Advocates should craft key messages and consider asking friends and family to help in contacting legislators on important issues.
   - The more communications a legislator receives about an issue the more likely they will act.
5. **Repeat Your Main Points**
   - The frequency legislators hear about an issue plays a role in whether they favor a cause.
6. **Keep Materials Brief, Straightforward, and Simple**
   - When sharing printed materials with a legislator, try to keep it to a one-page, bulleted fact sheet that reinforces the key points on the issue.
   - Lengthy materials are often not read.
7. **Clearly Communicate What You are Asking for**
   - Be specific on the action you want taken, such as support for a bill or policy. For example, you can say "I'm asking you to support Bill number XX because it will help improve health outcomes for people in our community."
   - Stay informed on where legislators stand on issues and actions they have taken.
8. **Follow Up**
   - Thank legislators when they support the issue or take a public stance on it.
9. **Share Media Coverage**
   - If a media story covers an issue you have previously raised with the legislator, share a copy of the article and remind them about the previous communication on the topic.
10. **Take Notes**
    - Keep a record of your communications to maintain dialogues and foster relationships.

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Sample Letter to Your Legislator

[Date]

Dear ***[Legislator Title and Name]***:

On behalf of the Asthma and Allergy Foundation of America (AAFA) and as your constituent, I am writing to urge you to sponsor a resolution designating ***[Asthma Peak Week or Asthma and Allergy Awareness Month]*** in ***[your state's name]***. Recognizing ***[Asthma Peak Week or Asthma and Allergy Awareness Month]*** helps to raise public awareness about the challenges faced by people with asthma and promote efforts to improve asthma care in ***[your state's name]***. I have included a sample resolution with this letter for your consideration.

Nearly 28 million people in the United States have asthma and it is one of the most common chronic diseases in children. Asthma causes your airways to become inflamed, making it hard to breathe. There is no cure for asthma. Over 3,500 people in the U.S. die each year from asthma—that's about 10 people a day. These are preventable deaths.

Every year, AAFA releases its **Asthma Capitals Report** (**asthmacapitals.com**) which ranks the largest 100 U.S. metropolitan cities by how challenging they are to live in with asthma. This year, ***[your city name]*** ranked as the ***[your city's ranking]*** most challenging city to live with asthma in the contiguous United States. This ranking is based on asthma prevalence, asthma-related emergency department visits, and asthma-related deaths. The report also examines risk factors that can influence asthma outcomes: poverty, lack of health insurance, air pollution, poor indoor air quality, pollen, medicine use, smoking, and access to asthma specialists.

Additionally, the burden of asthma falls disproportionately on the Black, Hispanic, and Indigenous populations in the United States. These groups have disproportionately high rates of poor asthma outcomes, including hospitalizations and deaths. In fact, as documented in **AAFA's 2020 Asthma Disparities in America Report** (**aafa.org/asthmadisparities**), Black Americans are 3 times more likely to die from asthma than White Americans and 5 times more likely to be treated in an emergency room. Black women also have the highest death rates from asthma versus any other group.

To address the complex social and structural determinants of health that impact asthma outcomes, AAFA's Asthma Disparities in America Report suggests 19 public policy solutions. These policy strategies aim to improve access to affordable, quality health care; promote economic stability; ensure safe learning environments for children; and address environmental harms that impact people with asthma. In addition to sponsoring the ***[Asthma Peak Week or Asthma and Allergy Awareness Month]*** resolution, I ask you to consider championing legislation drawn from these recommendations.

Thank you for prioritizing the health of your constituents and I look forward to seeing improvements in asthma care and outcomes in our community.

Sincerely,

[your name]
[your home address, optional]

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Sample Asthma Peak Week Resolution for States

September is a peak month for people with asthma and allergies, especially children. September brings a number of asthma triggers that cause more asthma attacks, ED visits, and hospital stays in this month than any other during the year. This makes it the "Asthma Peak Month." The third week of September is "Asthma Peak Week," when asthma episodes typically hit their highest point of the year.

The resolution below can be adapted for your state. If you'd like to work on an Asthma Peak Week resolution for 2025, contact **advocacy@aafa.org**.

A resolution to declare September 14-20, 2025, as Asthma Peak Week in the state of *[state name]*.

Whereas, according to the Centers for Disease Control, nearly 28 million people in the United States have asthma, a long-term disease that causes a person's airways to become swollen and inflamed, making it difficult to breathe;

Whereas, ***[asthma prevalence in state]*** adults and children in ***[state name]*** have asthma;

Whereas, the burden of asthma in the United States falls disproportionately on people with low-income, senior adults, and Black, Hispanic and American Indian/Alaska Native people;

Whereas, asthma is responsible for nearly five million doctors' office visits and 1.5 million emergency department visits each year, additionally, ten people in the United States die each day from asthma;

Whereas, the annual economic costs of asthma include $3 billion as a result of missed days of work, $29 billion due to asthma-related mortality, and $50 billion in medical costs;

Whereas, many people lead healthy lives with asthma if the disease is well-managed, including with a treatment plan developed with a medical professional; and

Whereas, every September, asthma hospital visits rise, with the third week of the month being the worst due to fall allergies caused by ragweed and mold and exposure to respiratory illnesses and other asthma triggers as children return to school. This week is often referred to as "Asthma Peak Week."

Therefore, be it resolved, the week of September 14th through the 20th, 2025 is hereby designated "Asthma Peak Week" in the state of ***[state name]*** for the purposes of raising awareness of the impact of asthma and calling attention to treatment and management options for this long-term disease.

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Sample Asthma and Allergy Awareness Month Resolution for States

Each year, AAFA asks the President to declare May to be National Asthma and Allergy Awareness Month. AAFA can also support resolutions for Asthma and Allergy Awareness Month in your state.

The resolution below can be adapted for your state. If you'd like to work on an Asthma and Allergy Awareness resolution for 2025, contact **advocacy@aafa.org**.

A resolution to declare May 2025 as Asthma and Allergy Awareness Month in the state of *[state name]*.

Whereas, Approximately 4.5 million children in the United States currently have asthma; and

Whereas, Nearly 28 million people in the United States, have asthma and the numbers are increasing each year; and

Whereas, ***[asthma prevalence in state]*** adults and children in ***[state name]*** have asthma;

Whereas, Asthma is one of the most common noncommunicable diseases among children; and

Whereas, Nearly 1 million individuals per year visit emergency departments because of asthma's effects; and

Whereas, Asthma is a leading cause of hospitalizations and school absences due to a chronic disease among children; and

Whereas, The total economic cost of asthma in the United States was $81,900,000,000 per year from 2008 to 2013; and

Whereas, Black, Hispanic, and Indigenous individuals in the United States face the highest burden of asthma; and

Whereas, Asthma is a manageable disease that claims the lives of over 3,500 Americans each year, including ***[asthma deaths in state]*** in ***[state name]***; and

Whereas, People with asthma and food allergies need access to affordable health insurance and to the medications and devices they need at affordable prices; and

Whereas, Over 20 million people in the United States have food allergies, including about 4.3 million children; and

Whereas, Food allergy has increased among U.S. children over the past 20 years, with the greatest increase in Black children; and

Whereas, Children with food allergies are two to four times more likely to have asthma or other allergic diseases; and

Whereas, May is an appropriate month to designate as Asthma and Allergy Awareness Month; now, therefore, be it

Therefore, be it resolved, the month of May 2025 is hereby declared Asthma and Allergy Awareness Month in the state of ***[state name]***. We recognize residents who live with asthma and allergies and to be compassionate of those living with these conditions.

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SPOTLIGHT: AAFA's Asthma Capitals Report in Action!

Each year, AAFA publishes the Asthma Capitals reports to raise awareness of asthma, identify cities and communities to partner with, and educate public officials on the challenges of living with asthma.

Our goal is that this annual report encourages local advocates and leaders to take action.

Over the years that we've been publishing this report, we've seen real-world examples of the report doing what we always wanted it to do—fuel change and lasting impact to help communities highly burdened by asthma.

Springfield, Massachusetts

In 2018 and 2019, Springfield, MA, ranked as the #1 Asthma Capital. Since then, data from the Asthma Capitals report has been used to raise awareness about how asthma triggers can impact asthma outcomes and led to actions aimed at reducing asthma prevalence and burden in the greater Springfield area.

A major victory for Springfield advocates was the prevention of a biomass power plant that had been proposed for the city.[45] Citing the Asthma Capitals report, local residents, health professionals, and environmental activists united against the plant, which they argued would worsen air quality and increase respiratory issues, including asthma.[46] This coalition raised public awareness about the potential health impacts, mobilized community members to attend public hearings, and lobbied local and state government officials. The campaign also highlighted the disproportionate impact the plant would have on low-income and minority communities, framing the plant's construction as not only a health issue but also an environmental justice issue.

In 2021, the Massachusetts Department of Environmental Protection revoked the plant's permit, citing the significant potential harm to air quality and public health.[45]



A 2019 protest in Springfield against a biomass plant. (Photo courtesy of Rene Theberge. Source: WBUR)

In addition to stopping the biomass plant, Springfield has launched several air quality monitoring projects to provide real-time data on air pollution levels. These projects involve the installation of air quality sensors throughout the city, particularly in areas with high asthma rates and near potential sources of pollution like industrial sites and heavy traffic corridors.

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The data collected from these sensors is used to inform residents about current air quality conditions through various platforms, including online dashboards and mobile apps. This real-time information allows individuals, especially those with respiratory conditions, to make informed decisions about outdoor activities, helping them avoid exposure during high pollution periods.

Additionally, the city has implemented stricter regulations on other sources of air pollution, promoted greener infrastructure projects, expanded access to asthma management programs, and integrated asthma education into school curriculums.[47]

Community engagement has been key to the success of Springfield's initiatives. Local groups have worked to ensure that residents are informed and involved in advocacy efforts. Educational campaigns and workshops are regularly conducted to raise awareness about asthma and the importance of clean air.

These comprehensive efforts in Springfield demonstrate a strong, community-backed response to its asthma burden, emphasizing environmental justice, public health, and empowerment of residents. Through these actions, Springfield continues to work towards reducing asthma rates and improving the quality of life for all residents.

New York State

In 2023, three New York cities ranked in the top 20 Asthma Capitals (Rochester, Poughkeepsie, and New York City). These three cities remain in the top 20 in this year's report.

Following the release of the 2023 Asthma Capitals report, Earthjustice issued a call to action to support New York's Green Transit Green Jobs bill, citing cities in New York that ranked in the report.[48] Additionally, a coalition of over 50 organizations called on the Governor to include the bill in her executive budget.[49]

The proposed bill would mandate that all state transit authorities transition to purchasing only zero-emission buses by 2029. The bill aimed to cut down the emissions from diesel buses that serve as a significant source of urban air pollution. It also outlined protections for existing workers, ensuring that they are not left behind as the state moves towards more sustainable transit solutions. Additionally, the bill addressed environmental justice concerns by specifically aiming to reduce pollution in low-income communities and communities of color, which often bear the brunt of environmental hazards.



Despite efforts by many advocates to improve asthma outcomes in New York—with a clear focus on sustainability, public health, and social and environmental equity—the Green Transit, Green Jobs bill has not yet passed in New York as of 2024.[50]

Local advocates have pledged to continue efforts to improve climate-friendly and sustainable transportation legislation. AAFA supports ongoing efforts by Earthjustice, the ElectrifyNY coalition, and many other organizations that continue to advocate for better environmental policies in New York.

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San Joaquin Valley, California

Several California cities in the San Joaquin Valley (Fresno, Stockton, and Bakersfield) frequently rank high in our Asthma Capitals. Between 2021 and 2024, Fresno was ranked in the top 20 each year. Air pollution—a significant trigger for asthma—remains an especially challenging reality in the San Joaquin Valley. In recent years, local leaders, advocates, and health organizations have collaborated on a series of initiatives aimed at reducing asthma triggers, particularly those related to environmental and air quality factors.

Citing the Asthma Capitals report, Representative Josh Harder (CA-9) announced that Stockton Unified School District will receive $6.9 million in federal funds to replace 20 diesel school buses with new clean electric buses.[51]

"I grew up with childhood asthma because of our poor air quality and I don't want my daughters to have to deal with it too," said Rep. Harder in the statement. "These 20 new electric buses will help our kids breathe cleaner air, save taxpayer dollars, and combat climate change. A real win-win-win. Excited to bring this funding home."

Additionally, Rep. Harder spoke with KCRA 3 about asthma challenges in his district. "Hopefully this report can spur more action because it's long overdue to make sure we address the root causes of why our air quality is so bad," Rep. Harder said, referring to AAFA's Asthma Capitals report.[52]

At the state level, California leads the way in targeted actions to combat poor air quality. Coalitions of environmental organizations, health advocates, and government agencies have implemented initiatives to reduce air pollution across the state, with a particular focus on urban areas most affected by asthma.

Ongoing state and local policy initiatives in California focus on:

- Stricter regulations that target major sources of air pollution
- Zero-emission technologies
- Increased air quality monitoring
- Improved air filtration systems for schools and public buildings
- Community outreach and education programs
- Reduction of wildfire risks

Proactive steps taken by California to address the asthma burden and poor air quality highlight the state's commitment to public health and environmental justice. California—and the San Joaquin Valley in particular—continues to set an example for other states facing similar challenges with asthma.

Allentown, Pennsylvania

Allentown, PA, was the #1 Asthma Capital in 2021, 2023, and again this year in 2024. Following the publication of the 2023 report, local leaders and health officials in the Lehigh Valley (where Allentown sits) reached out to AAFA to learn more about the report.

Beginning in late 2024, AAFA will be supporting the Allentown community with developing and launching the EASE Allentown: Empowering Asthma Self-Management and Education program. This project will be led by the Health Promotion Council of Southeastern Pennsylvania, Inc. (HPC), a subsidiary of Public Health Management Corporation, in collaboration with local partners. See **page 33** for more information about this new partnership.

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Cleveland, Ohio

In 2021, Cleveland, OH, was the #6 Asthma Capital—and it has remained in the top 10 each year since then. In 2022, the city initiated the deployment of a mobile air-monitoring unit and approximately 30 lower-cost sensors capable of detecting fine particulates and ground-level ozone. These sensors were placed in historically redlined areas that lacked coverage by existing permanent air-monitoring stations. This initiative aimed to provide a more comprehensive understanding of air quality issues in disadvantaged neighborhoods.[53]

By 2024, the data collected from these new monitoring tools had begun to influence local health policies. The Cleveland Division of Air Quality used this data to inspect factories for compliance with emissions permits and to identify specific causes of poor air quality, enabling them to recommend effective mitigation strategies. This proactive approach has been instrumental in addressing the root causes of air pollution in the city.[54]

The CLEANinCLE project, launched as part of these efforts, plays a crucial role in empowering residents and improving public health.[55] By providing real-time data on air quality, the project enables residents to make informed decisions about their health and activities. It also supplies the Cleveland Division of Air Quality with valuable information needed to identify pollution hotspots and implement corrective actions.

Detroit, Michigan

In 2022, Detroit, MI, was the #1 Asthma Capital. It came in at #3 the following year. Since 2022, AAFA has been funding a local health equity program in Detroit and nearby areas—led by the AAFA Michigan Chapter.

Additionally, advocates in the state are working toward improved air quality. Smoke originating from the 2023 wildfires in Canada significantly impacted air quality in Wayne County, where Detroit sits. With funding provided by the American Rescue Plan Act, the Wayne County Community Air Quality Project launched in 2023 and will span over three years. The project will provide 500 mobile air quality monitors to children and families and install 100 stationary air monitors in 43 communities across the county. Some of the mobile monitors will be placed on top of quick-relief inhalers used by children with asthma. The mobile monitor on the inhaler—as well as the nearest stationary monitor—will measure air quality at the time of an asthma exacerbation. The data will be used to help advocate for additional clean air standards for local industries contributing to poor air quality.

The county contracted with JustAir, a Michigan-based air quality monitoring company. JustAir's co-founder and CEO, Darren Riley, developed asthma as a young adult when he moved into the southwest Detroit community.

Do you have a local story about the Asthma Capitals report supporting action and advocacy in your community? We want to hear! Let us know at advocacy@aafa.org.

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Methodology

The 2024 Asthma Capitals™ research and ranking is reported by the Asthma and Allergy Foundation of America (AAFA). The ranking is based on analysis of data from the 100 most-populated Metropolitan Statistical Areas (MSAs) in the contiguous 48 states as determined by the most recent U.S. Census Bureau population estimates (2022). The three (3) individual factors analyzed for the 2024 rankings are: estimated asthma prevalence; crude death rate from asthma; and emergency department visits due to asthma. Weights are applied to each factor and factors are not weighted equally. Total scores are calculated as a composite of all 3 factors, and cities are ranked from highest total score (city rank #1) to lowest total score (city rank #100).

Estimated Asthma Prevalence

For each MSA, AAFA estimated asthma prevalence using claims data for individuals who sought asthma care at any point in the 2023 calendar year. Data were obtained from the Komodo Health Prism Health Care Database for the most recent calendar year (2023). While this is not an exact measure of prevalence, it helps provide data that can be compared from city to city. Other prevalence estimates, such as those from the CDC, use self-reported data through surveys.

Crude Death Rate From Asthma

For each city, AAFA obtained the estimated asthma-related crude death rate per 100,000 people for the respective county using asthma ICD-10 codes as the underlying cause of death. Data were obtained from the CDC's WONDER Online Database for the most recent 5-year period (2018-2022).

Emergency Department Visits Due to Asthma

For each MSA, AAFA obtained the total number of emergency department visits where an asthma ICD-10 code was included as a diagnosis. Data were obtained from the Komodo Health Prism Health Care Database for the most recent calendar year (2023). Emergency department visits were calculated per 10,000 asthma patients using prevalence estimates.

Risk Factors

Data on the following asthma-related risk factors were obtained and analyzed; however, these data did NOT factor into the scores or rankings. Data are from the most recently available calendar year.

- Annual Air Quality - Pollution levels and number of unhealthy outdoor ozone days, scored on a scale of A (best) to F (worst). Data were obtained from the American Lung Association 2024 State of the Air Report, which analyzed air quality monitoring data from 2020-2022.
- Medication Use – Number of long-term controller and quick-relief medication prescriptions per patient prevalence. Data were obtained from the Komodo Health Prism Health Care Database for the most recent calendar year (2023).
- Public Smoking Laws – Number of "100% smoke-free" public smoking bans as of July 1, 2024. Data were obtained from the American Nonsmokers Rights Foundation.
- Poverty rate - Estimated population living in poverty. Data were obtained from the United States Census Bureau Small Area Income and Poverty Estimates (2022).
- Uninsured rate - Estimated population without health insurance. Data were obtained from the United States Census Bureau Small Area Health Insurance Estimates (2022).
- Access to specialists - The number of asthma specialists per patient prevalence. Data were obtained from the Komodo Health Prism Health Care Database for the most recent calendar year (2023).

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Resources

Get general information on asthma:
aafa.org/asthma

Get general information on allergies:
aafa.org/allergies

Join AAFA's patient support community for emotional support and asthma education:
aafa.org/join

Follow our blog for news on asthma and allergies:
aafa.org/blog

Find products to help you create a healthier home through our **asthma & allergy friendly**® Certification Program:
aafa.org/certified

Learn how to improve your indoor air quality:
aafa.org/iaq

Learn how to manage pollen allergies:
aafa.org/pollen

Find school resources for managing your child's asthma:
aafa.org/school

Download an Asthma Action Plan:
aafa.org/asthmaactionplan

Learn more about September Asthma Peak:
aafa.org/asthmapeak

AAFA's Allergy Capitals™ Report:
allergycapitals.com

AAFA's COVID Resource Center:
aafa.org/covid-19

Continuing Education for Health Care Professionals:
aafa.org/ameo

AAFA's Asthma Disparities Report:
aafa.org/asthmadisparities

National Asthma and Allergy Awareness Month:
aafa.org/awarenessmonth

Find an allergist or immunologist:
acaai.org/find-an-allergist

Follow the EPA's air quality reports:
airnow.gov

Follow daily local pollen counts:
pollen.aaaai.org

Find an automated pollen sensor:
pollensense.com

ALA's State of the Air Report:
stateoftheair.org

For help to quit or reduce smoking:
smokefree.gov
CDC.gov/quit



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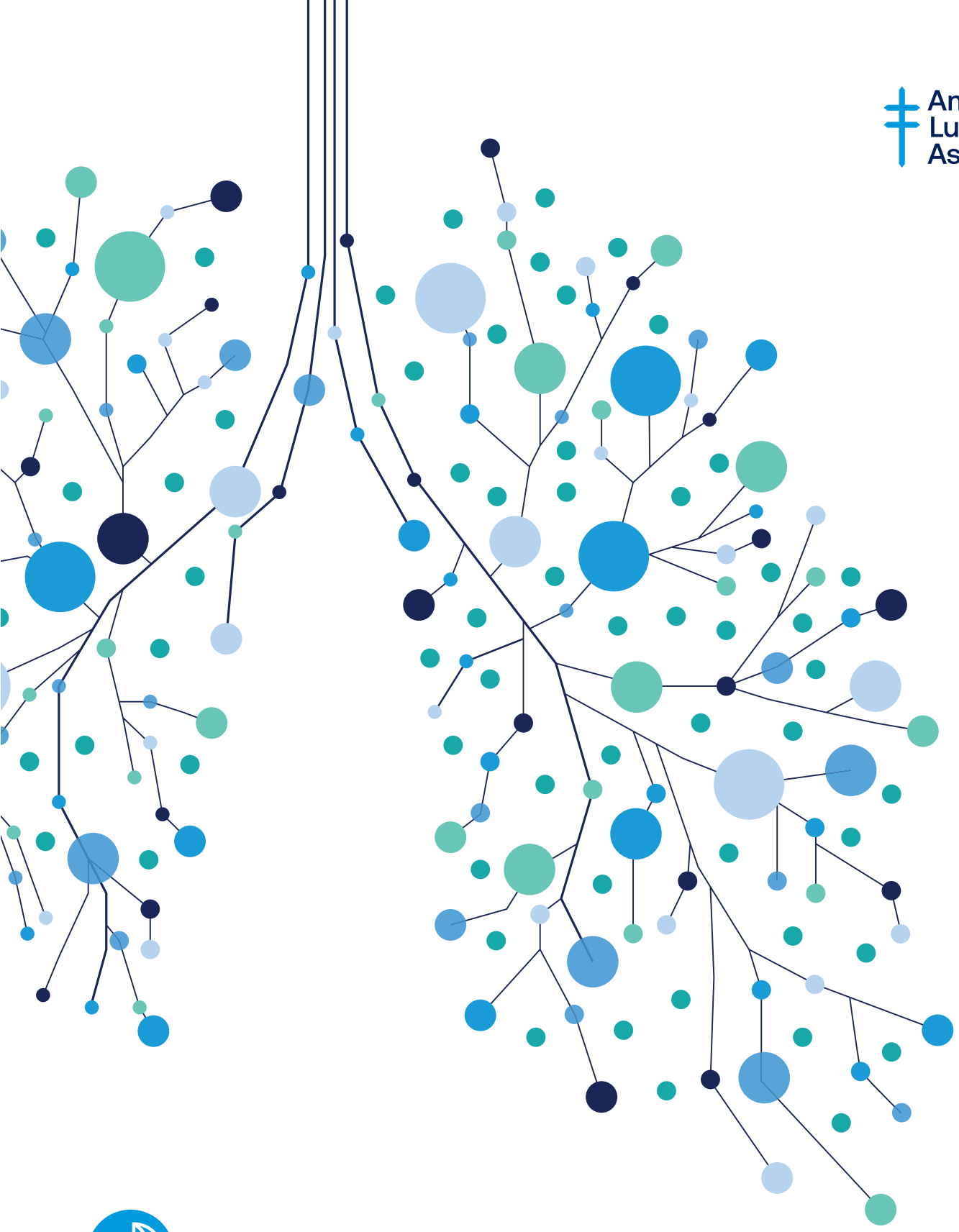
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Attachment 5

American Lung Association.



State of the Air

2025 Report

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"State of the Air" 2025 would not have been possible but for the first twenty formative years of inspiration, dedication and hard work of the late Janice E. Nolen. Her spirit still guides us all.

The American Lung Association assumes sole responsibility for the content of "State of the Air" 2025.

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Why "State of the Air"?

The Clean Air Act requires the U.S. Environmental Protection Agency (EPA) to set health-based limits, called National Ambient Air Quality Standards (NAAQS), for six dangerous outdoor air pollutants: particulate matter, ozone, nitrogen dioxide, sulfur dioxide, carbon monoxide and lead. "State of the Air" looks at two of the most widespread and dangerous pollutants from this group, fine particulate matter and ozone.

The NAAQS identify what is considered a safe level of each pollutant to breathe, based on the most recent health and medical science, including an adequate margin of safety for those most at risk. These standards require states and local governments to take steps to reduce emissions to attain the standards. The standards also serve to alert families with children, seniors, individuals with lung or heart conditions, and others about dangerous air pollution levels through color-coded air quality alerts. This enables them to take necessary precautions to minimize their exposure. Under the Clean Air Act, the standards must be based solely on what is needed to protect health and must be periodically updated as the science evolves.

Setting national health-based standards and requiring states that violate the standards to enact plans to clean up their air pollution problems have been a great benefit to the public health of the nation. Since the Clean Air Act was passed in 1970, the combined emissions of six key air pollutants have fallen by 78%, according to EPA. But as "State of the Air" 2025 shows, many millions of people in this country are still breathing unhealthy air.

Purpose and history of "State of the Air"

In the year 2000, the American Lung Association launched its annual "State of the Air" report to provide the public with easy-to-understand information about the quality of the air in their communities based on the credible data and sound science that EPA is required to use to set and enforce the air quality standards.

For the first several years, "State of the Air" focused solely on ozone pollution and included data for five populations at increased risk—children, older adults, children with asthma, adults with asthma and people with emphysema. In 2004, changes to the air quality standards and the deployment of air pollution monitoring enabled the addition of short-term and year-round fine particle pollution ($PM_{2.5}$) to the report. Over time, accumulating scientific evidence has shown significant health harms from both ozone and particle pollution among other groups of vulnerable individuals. "State of the Air" has accommodated this new information by gradually adding populations-at-risk categories to its reporting. "State of the Air" 2025 now includes data for 10 vulnerable groups.

Since its inception, "State of the Air" has been tremendously successful in raising awareness about particle pollution and ozone, two of the most dangerous and pervasive air pollutants nationwide. The American Lung Association is proud and grateful that the public, the media, clean air advocates and decision-makers have used this report every day, year after year, to call attention to the work that remains to be done to protect the public from the threat of air pollution.

How "State of the Air" can be used

We write and release "State of the Air" every year to make information on air quality and health clear and accessible to everyone. We show the progress each community has made and how much more needs to be done to achieve healthy air. In this report, you'll find information on local air quality nationwide. You'll also find the latest research on how air pollution affects health. With these tools, you can take proactive steps to safeguard both your lungs and your family's lungs from unhealthy air.

Every year, "State of the Air" also includes recommendations for actions that both policymakers and individual people can take to improve air quality. This year, the report highlights threats to the staff, funding and work of the U.S. Environmental Protection Agency that put clean air at risk for people across the country. We ask that you join

us in taking advocacy action to protect EPA and its clean air progress. Your voice and your individual perspective are more powerful now than ever. Please share your story and add your name to our petition – and then, take the next step. Reach out to your representatives at every level of government, share the "State of the Air" results for your community, and call on them to take action to protect EPA in the interest of public health.

State of the Air 2025 Methodology

Statistical Methodology: The Air Quality Data

Data Sources

Ozone and short-term particle pollution. The data on air quality throughout the United States were obtained from the U.S. Environmental Protection Agency's Air Quality System (AQS). The American Lung Association contracted with Dr. Allen S. Lefohn, A.S.L. & Associates, Montana, to characterize the hourly averaged ozone concentration information and the 24-hour averaged $PM_{2.5}$ concentration information for the three-year period for 2021-2023 for each monitoring site.

Year-round particle pollution. Design values for the annual $PM_{2.5}$ concentrations by county for the period 2021-2023 were retrieved November 18, 2024 from data posted on August 8, 2024 at the U.S. Environmental Protection Agency's website at https://www.epa.gov/air-trends/air-quality-design-values.

The Lung Association received critical assistance from members of the National Association of Clean Air Agencies and the Association of Air Pollution Control Agencies. With their assistance, all state and local agencies were provided the opportunity to review and comment on the data in draft tabular form. The Lung Association reviewed any discrepancies with the agencies and, if needed, with Dr. Lefohn at A.S.L. & Associates. The American Lung Association wishes to express its continued appreciation to the state and local air directors for their willingness to assist in ensuring that the characterized data used in this report are correct.

Ozone Data Analysis

The 2021, 2022 and 2023 AQS hourly ozone data were used to calculate the daily 8-hour maximum concentration for each ozone-monitoring site. The hourly averaged ozone data were downloaded on June 26, 2024, following the close of the authorized period for quality review and assurance certification of data. Only the hourly average ozone concentrations derived from FRM and FEM monitors were used in the analysis. The data were considered for a three-year period for the same reason that EPA uses three years of data to determine compliance with the ozone standard: to prevent a situation in which anomalies of weather or other factors in any single year create air pollution levels that inaccurately reflect normal conditions. For each county, the highest 8-hour daily maximum concentration was identified for each day with sufficient data based on the EPA-defined ozone season for 2021, 2022, and 2023.

The current national ambient air quality standard for ozone is 70 parts per billion (ppb) measured over eight hours. The EPA's Air Quality Index (AQI) reflects the 70 ppb standard. A.S.L. & Associates prepared a table by county that summarized, for each of the three years, the number of days the ozone level was within the ranges identified by EPA based on the Air Quality Index:

8-hour Ozone Concentration	Air Quality Index Levels
0-54 ppb	Good (Green)
55-70 ppb	Moderate (Yellow)
71-85 ppb	Unhealthy for Sensitive Groups (Orange)
86-105 ppb	Unhealthy (Red)
106-200 ppb	Very Unhealthy (Purple)
>200 ppb	Hazardous (Maroon)

For this report, the objective was to identify the number of days that 8-hour daily maximum concentrations in each county occurred within the defined ranges. This approach provided an indication of the level of pollution for all monitored days, not just those days that fell under the requirements for attaining the national ambient air quality standards. Therefore, no data capture criteria were applied to eliminate monitoring sites or to require a number of valid days for the ozone season.

The daily maximum 8-hour average concentration for a given day is derived from the highest of the 17 consecutive 8-hour averages beginning with the 8-hour period from 7:00 a.m. to 3:00 p.m. and ending with the 8-hour period from 11:00 p.m. to 7:00 a.m. the following day. This follows the process EPA uses for the current ozone standard adopted in 2015. All valid days of data within the ozone season were used in the analysis. However, for computing an 8-hour average, at least 75 percent of the hourly concentrations (i.e., 6-8 hours) had to be available for the 8-hour period. In addition, an 8-hour daily maximum average was identified if valid 8- hour averages were available for at least 75 percent of possible hours in the day (i.e., at least 13 of the possible 17 8-hour averages). Because EPA includes days with inadequate data (i.e., not 75 percent complete) if the standard value is exceeded, our data capture methodology also included the site's 8-hour value if at least one valid 8-hour period were available, and it was 71 ppb or higher.

As instructed by the Lung Association, A.S.L. & Associates included the exceptional (e.g., wildfires) and natural events (e.g., stratospheric intrusions) that were identified in the database and identified for the Lung Association the dates and monitoring sites that experienced such events. Some data have been flagged by the state or local air pollution control agency to indicate that they had raised issues with EPA about those data. For each day across all sites within a specific county, the highest daily maximum 8-hour average ozone concentration was recorded and then the results were summarized by county for the number of days the ozone levels were within the ranges identified above.

Following receipt of the above information, the American Lung Association identified the number of days each county, with at least one ozone monitor, experienced air quality designated as orange (Unhealthy for Sensitive Groups), red (Unhealthy) or purple (Very Unhealthy). When some monitored data were collected sometime during the three-year period, but insufficient data were available in any year, an "incomplete" was identified for the 3-year period. Insufficient data exist for various reasons. For example, when a specific monitor was used for a special study and the monitor was then discontinued in other years, an "incomplete" is assigned.

ii Analysis of the daily $PM_{2.5}$ data for "State of the Air" 2024 was completed in January 2024, before EPA announced the finalization of the revised $PM_{2.5}$ NAAQS and Air Quality Index. The values used in this report are based on the 2012 Air Quality Index.

Short-Term Particle Pollution Data Analysis

For each county, A.S.L. & Associates identified the maximum daily 24-hour AQS $PM_{2.5}$ concentration for each day with sufficient monitoring information in 2021, 2022 and 2023. The 24-hour averaged $PM_{2.5}$ data were downloaded on August 27, 2024 from the EPA website following the correction of the hourly values by the EPA of the $PM_{2.5}$ data associated with monitors using method codes 236 and 238. Using the downloaded $PM_{2.5}$ daily data from the EPA website, A.S.L. & Associates prepared a table by county that summarized, for each of the three years, the number of days the $PM_{2.5}$ concentration was within the ranges identified by EPA based on the Air Quality Index, as adopted by the EPA on February 7, 2024:

24-hour $PM_{2.5}$ Concentration	Air Quality Index Levels
0.0 µg/m³ to 9.0 µg/m³	Good (Green)
9.1 µg/m³ to 35.4 µg/m³	Moderate (Yellow)
35.5 µg/m³ to 55.4 µg/m³	Unhealthy for Sensitive Groups (Orange)
55.5 µg/m³ to 125.4 µg/m³	Unhealthy (Red)
125.5 µg/m³ to 225.4 µg/m³	Very Unhealthy (Purple)
greater than or equal to 225.5 µg/m³	Hazardous (Maroon)

All previous data collected for 24-hour average $PM_{2.5}$ were characterized using the AQI thresholds listed above.

For this report, the objective was to identify the number of days that the maximum in each county of the daily $PM_{2.5}$ concentration occurred within the defined ranges. This approach provided an indication of the level of pollution for all monitored days, not just those days that fell under the requirements for attaining the national ambient air quality standards. Therefore, no data capture criteria were used to eliminate monitoring sites. Included in the analysis are data collected using only FRM and FEM methods, which reported 24-hour averaged data.

As instructed by the Lung Association, A.S.L. & Associates included the exceptional and natural events that were identified in the database and identified for the Lung Association the dates and monitoring sites that experienced such events. Some data have been flagged by the state or local air pollution control agency to indicate that they had raised issues with EPA about those data. For each day across all sites within a specific county, the highest daily maximum 24-hour $PM_{2.5}$ concentration was recorded and then the results were summarized by county for the number of days the concentration levels were within the ranges identified above.

Following receipt of the above information, the American Lung Association identified the number of days each county, with at least one $PM_{2.5}$ monitor, experienced air quality designated as orange (Unhealthy for Sensitive Groups), red (Unhealthy), purple (Very Unhealthy) or maroon (Hazardous).

Description of County Grading System

Ozone and Short-Term Particle Pollution (24-hour $PM_{2.5}$)

The grades for ozone and short-term particle pollution (24-hour $PM_{2.5}$) were based on a weighted average calculation. To determine weighted averages, the Lung Association followed these four steps separately for each pollutant in each county:

1. Assigned weighting factors to each category of the Air Quality Index. Days of poor air quality were given the following weighting factors:

   Orange days 1.0
   Red days 1.5
   Purple days 2.0
   Maroon days 2.5

   This ensured that days when the air pollution levels were worse received appropriately greater weight.

2. Multiplied the total number of days within each AQI category by its assigned factor, and added all the categories to calculate a total:

   Total = [Orange days x 1] + [Red days x 1.5] + [Purple days x 2] + [Maroon days x 2.5]

3. Divided the total by three to determine the weighted average, since the monitoring data were collected over a three-year period:

   Weighted Average = Total ÷ 3

Weighted average was then used to determine each county's grades for ozone and 24-hour $PM_{2.5}$ according to the following table:

Weighted Average	Grade
0.0	A
0.3 to 0.9	B
1.0 to 2.0	C
2.1 to 3.2	D
3.3 or higher	F

All counties with a weighted average of zero (corresponding to no exceedances of the standard over the three-year period) were given a grade of "A."

For ozone, an "F" grade was set to generally correlate with the number of unhealthy air days that would place a county in nonattainment for the ozone standard.

For short-term particle pollution, fewer unhealthy air days are required for an F than for nonattainment under the $PM_{2.5}$ standard. The 2006 24-hour $PM_{2.5}$ standard is set to allow two percent of the days during the three years to exceed 35 $\mu g/m^3$ (called a "98th percentile" form) before violating the standard. That would be roughly 21 unhealthy days in three years. The grading used in this report would allow only about one percent of the days to be over 35 $\mu g/m^3$ (called a "99th percentile" form) of the $PM_{2.5}$. The American Lung Association supports using the tighter limits in a 99th percentile form as a more appropriate standard that is intended to protect the public from short-term episodes or spikes in pollution.

Weighted averages allow comparisons to be drawn based on severity of air pollution. For example, if one county had nine orange days and no red days, it would earn a weighted average of 3.0 and a D grade. However, another county that had only seven orange days but also two red days, which signify days with more serious air pollution, would have a weighted average of 3.3, and would receive an F.

Note that this system differs significantly from the methodology EPA uses to determine violations of both the ozone and the 24-hour $PM_{2.5}$ standards. EPA determines whether a county violates the ozone standard based on the fourth maximum daily 8-hour ozone reading each year averaged over three years. Multiple days of unhealthy air beyond the highest four in each year are not considered. By contrast, the system used in this report recognizes when a community's air quality repeatedly results in unhealthy air throughout the three years. Consequently, some counties will receive grades of "F" in this report, showing repeated instances of unhealthy air, while still meeting the EPA's 2015 ozone standard. The American Lung Association's position is that the evidence shows that the 2015 ozone standard fails to adequately protect public health.

Counties were ranked by weighted average. Metropolitan areas were ranked by the highest weighted average among the counties within a given Metropolitan Statistical Area as of 2023 as defined by the White House Office of Management and Budget (OMB).

Weighted average values that appeared in prior reports may not be directly comparable to values in the current report as standards and the AQI may have changed. Therefore, for use in the Lung Association's online resources for the "State of the Air" report at Lung.org/sota, values from earlier years are updated according to the current standard and Air Quality Index.

Year-Round Particle Pollution (Annual $PM_{2.5}$)

Since no comparable Air Quality Index exists for year-round particle pollution (annual $PM_{2.5}$), the grading was based on the 2024 National Ambient Air Quality Standard for annual $PM_{2.5}$ of 9.0 µg/m^3. Counties that EPA listed as being at or below 9.0 µg/m^3 were given grades of "Pass." Counties that EPA listed as being at or above 9.1 µg/m^3 were given grades of "Fail." Where insufficient data existed for EPA to determine a design value, those counties received a grade of "Incomplete."

A design value is the calculated concentration of a pollutant based on the form of the national ambient air quality standard and is used by EPA to determine whether the air quality in a county meets the standard. Counties were ranked by design value. Metropolitan areas were ranked by the highest design value among the counties within a given Metropolitan Statistical Area as of 2023 as defined by the OMB.

Statistical Methodology: Population Data

The Lung Association calculates the county populations at risk from these pollutants based on the population from the entire county where the monitor is located. The Lung Association then calculates the metropolitan populations at risk based upon the largest metropolitan area that contains that county. Not only do people from that county or metropolitan area circulate within the county and the metropolitan area, but the air pollution also circulates to that monitor from throughout the county and metropolitan area.

Details about how the populations-at-risk numbers are derived can be found in Understanding Grades and Tables.

Key Findings



Nearly half of the U.S. population live with unhealthy levels of air pollution



A changing climate is making the job of cleaning up the air more difficult

The "State of the Air" 2025 report finds that even after decades of successful efforts to reduce sources of air pollution, 46% of Americans—156.1 million people—are living in places that get failing grades for unhealthy levels of ozone or particle pollution. This is nearly 25 million more people breathing unhealthy air compared to last year's report, and more than in any other "State of the Air" report in the last ten years.

Extreme heat, drought and wildfires are contributing to worsening levels of air pollution across much of the U.S., exposing a growing proportion of the population to ozone and particle pollution that put their health at risk.

The "State of the Air" report looks at two of the most widespread and dangerous air pollutants, fine particles and ozone. The air quality data used in the report are collected at official monitoring sites across the United States by federal, state, local and Tribal governments. The Lung Association calculates values reflecting the air pollution problem and assigns grades for daily and long-term measures of particle pollution and daily measures of ozone. Those values are also used to rank cities (metropolitan areas) and counties. This year's report presents data from 2021, 2022 and 2023, the most recent three years of quality-assured nationwide air pollution data publicly available. See ***About This Report*** for more detail about the methodology for data collection and analysis.

"State of the Air" 2025 is the 26th edition of this annual report, which was first published in 2000. From the beginning, the findings in "State of the Air" have reflected the successes of the Clean Air Act, as emissions from transportation, power plants and manufacturing have been reduced over time. Over the last decade, however, the findings of the report have added to the extensive evidence that a changing climate is making it harder to protect this hard-fought progress on air quality and human health. Increases in high ozone days and spikes in particle pollution related to extreme heat, drought and wildfires are putting millions of people at risk and adding challenges to the work that states and cities are doing across the nation to clean up air pollution.

After several years of reporting that the worst of the nation's air quality problems were increasingly concentrated in western states, "State of the Air" 2025 finds the geographic distribution of air pollution shifting back East. The year 2023, which is included in this year's report for the first time, brought improved conditions to the west coast but also a deadly heat wave in Texas and an unprecedented blanket of smoke from wildfires in Canada that drove levels of ozone and particle pollution in dozens of central and eastern states higher than they have been in many years.

Again this year, "State of the Air" finds that the burden of living with unhealthy air is not shared equally. Research has shown that communities of color are disproportionately exposed to unhealthy air and are also more likely to be living with one or more chronic conditions that make them more vulnerable to air pollution, including asthma, diabetes and heart disease. Although people of color make up 41.2% of the overall population of the U.S., they are 50.2% of the people living in a county with at least one failing grade. Notably, Hispanic individuals are nearly three times as likely as white individuals to live in a community with three failing grades.

In "State of the Air" 2025, the metropolitan areas that ranked worst in the country for each of the three pollutant measures are unchanged from last year's report. Bakersfield, California tops the list for worst short-term particle pollution for the third straight year. Bakersfield also continues to be the metropolitan area with the worst level of year-round particle pollution for the 6th year in a row. Los Angeles is the city with the worst ozone pollution in the nation, as it has been in 25 of the 26 years of reporting in "State of the Air"—although city residents are exposed to an average of 77 fewer days of unhealthy levels of ozone each year than they were in 2000.

More than 125 million people live in counties with **F grades** for ozone smog.



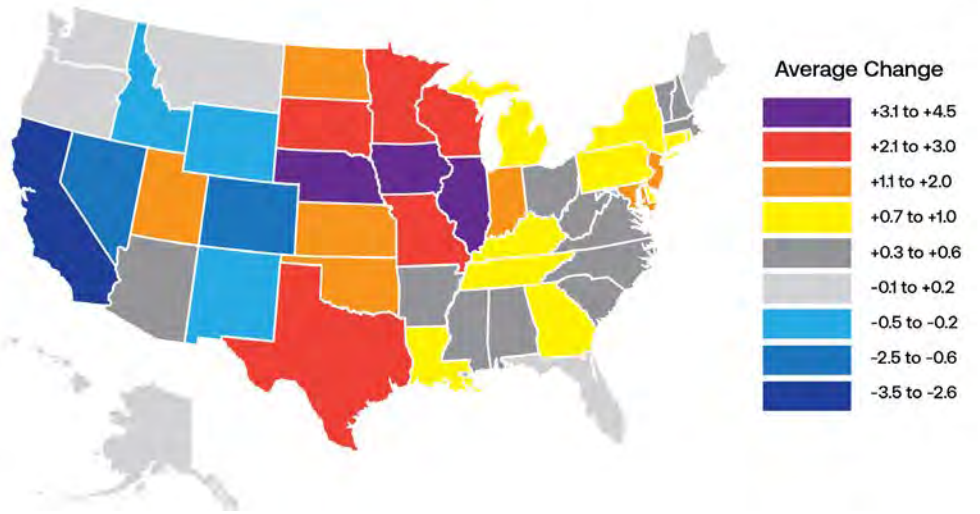
Ozone Pollution Trends

Ozone air pollution is making breathing difficult for more people living in the U.S. than any other single pollutant. In the years 2021, 2022, and 2023, 37% of the population, some 125.2 million people, were exposed to levels of ozone that put their health at risk. This is an increase of 24.6 million people over last year's figure, and includes tens of millions of infants and children, people age 65 or older and others whose conditions make them especially vulnerable to health harm from air pollution.

After several years of successful reductions in ozone pollution in many parts of the country thanks to clean-up measures enacted under the Clean Air Act, the results in "State of the Air" 2025 are a distressing reversal of that progress. The places that earned an "F" grade for ozone in this year's report were spread across 211 counties in 35 states and Washington DC. Ninety-three more counties earned an "F" grade than in last year's report, and 10 more states saw at least one of their counties added to the list. Many places that were considered untroubled by ozone smog in recent years of the report saw their air quality worsen, sometimes by quite a lot—137 counties lost their A grade, including 10 that went from an A to an F.

The hardest hit region of the country for this change is a large swath of states extending north to south from the Midwest and the Plains down to Texas. The worsening ozone was due in large part to two factors that came together in 2023—in the North, the transport of ozone-forming pollutants generated by the extensive, climate change-driven wildfires in Canada, and in the South, high temperatures combined with emissions creating ideal conditions for ozone formation.

Average Change in Ozone Weighted Average by State 2020-2022 to 2021-2023



The severity of the problem and the abruptness of the change are unprecedented in magnitude. Nationwide, nearly five times as many counties' ozone levels worsened as improved. Nine states saw the number of unhealthy days for ozone get worse in every one of their counties monitored for this pollutant, including all 27 monitored counties in Indiana, all 23 in Illinois, and all 17 in Missouri.

The Role of Wildfires in Ozone Formation

In May and June of 2023, Canada experienced its worst wildfire season on record. Smoke plumes from those fires spread across the states of the Upper Midwest and Northeast. In addition to smoke blanketing those states with high levels of particle pollution, the Upper Midwest experienced the highest regional-scale surface ozone levels ever recorded so early in the season. By analyzing findings from air quality monitors, satellites and measurements of atmospheric chemistry taken from research aircraft, scientists found a clear link between the fires and the extreme levels of ozone pollution hundreds of miles downwind.

Wildfire smoke is a very visible and well-recognized source of unhealthy levels of particle pollution. As worsening heat and drought driven by a changing climate have increased the number, size and intensity of wildfires in the U.S. and neighboring Canada, the number and severity of high particle pollution days have also been increasing.

At the same time, the role of wildfires in the development of ozone smog has been less obvious and less well-documented. The chemistry of ozone formation is complex and variable. Many different potential emission sources contribute its precursor components. That complexity, together with the variable mixture of pollutants in wildfire smoke, have made understanding and quantifying the relationship between wildfires and ozone a challenge for atmospheric scientists.

Burning of plants and other organic material, known as biomass, in wildland fires produces particulate matter along with hundreds of reactive gases, including nitrogen dioxide (NO_2), volatile organic compounds (VOCs) and carbon monoxide. All of these gases can play a role in ozone formation, especially in sunny and hot conditions. These emissions undergo a series of chemical reactions as the smoke plume moves away from the source of the fire. In general, ozone production increases as the plume ages and moves downwind. Plumes that drift over reservoirs of NO_2 pollution, such as urban centers and industrial corridors with highways, railroads and ports, are also more likely to produce elevated ozone levels.

Whether or not a particular wildfire event produces significantly elevated levels of ozone depends on a number of factors that affect the emission and transport of precursor gases. This includes the temperature of the combustion, the duration of active flame production (more NO_2 is produced during periods of active flaming than when a fire is smoldering), wind direction and how close to the surface the plume is transported.

Years of successful cleanup of emissions from transportation, energy generation and industrial processes have contributed to falling ozone levels across much of the country since the first “State of the Air” report was published in 2000. Unfortunately, as was shown in 2023, one bad fire season has the potential to offset that progress, at least temporarily, creating new challenges for air pollution control efforts and putting the health of the communities affected at increased risk.

Sources

Cooper O.R. et al. Early surface 2023 wildfires generated record-breaking surface ozone anomalies across the U.S. Upper Midwest. Geophysical Research Letters. 2024; 51:e2024GL111481.

Lin M et.al. Reactive nitrogen partitioning enhances the contribution of Canadian wildfire plumes to U.S. ozone air quality. Geophysical Research Letters. 2024; 51:e2024GL10969.

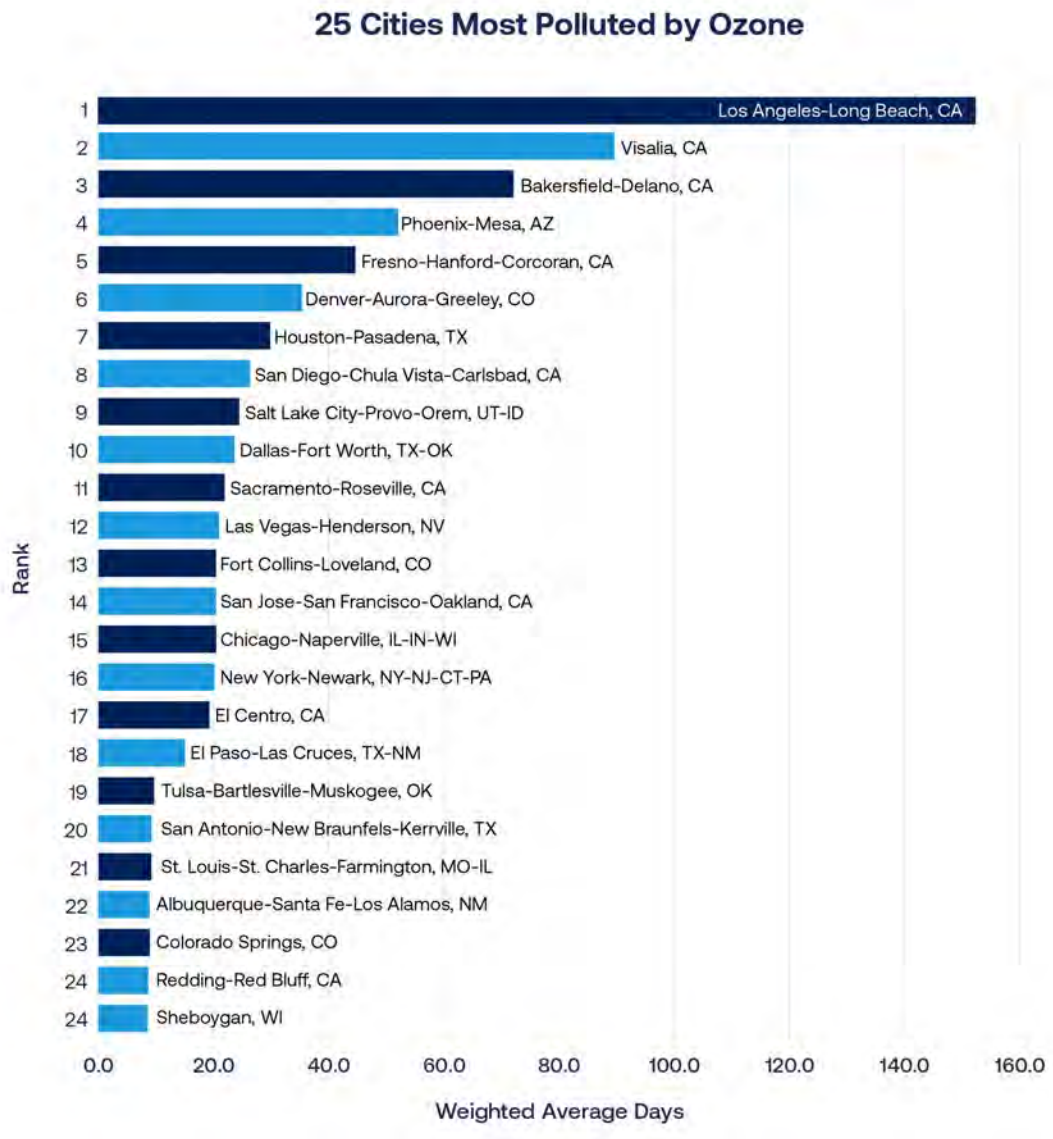
In spite of these startling results, it is worthwhile pointing out that a handful of western states experienced something of a respite in this year's report. More counties improved than worsened in California, Idaho, Nevada, New Mexico and Wyoming, even though ozone levels in many of their counties continued to be unhealthy on many days.

Despite the widespread worsening in parts of the country, the list of the Worst 25 cities for ozone pollution in "State of the Air" 2025 and their order of ranking remains relatively stable compared with last year's report.

The largest changes in rank are for Tulsa, OK, worsening from 31st to 19th worst, and for St. Louis, MO, from 30th to 21st worst. Both were most recently on the Worst 25 list in the 2016 report. Sheboygan, WI is the only other city to join the list this year, having last appeared on the 2021 most polluted list. Those three new cities take the places of San Luis Obispo, CA and Reno, NV, which improved enough to move off the worst 25 list, and Grand Rapids, MI, which worsened significantly, but not enough to remain on the list.

In one small piece of good news, none of the cities on the Worst 25 list reported a worst-ever average number of days of ozone smog. In fact, four cities, all in California—Fresno (for its fifth year in a row), Bakersfield, Sacramento, and Visalia—recorded their fewest-ever number of unhealthy days for ozone, though they all still earned "F" grades.

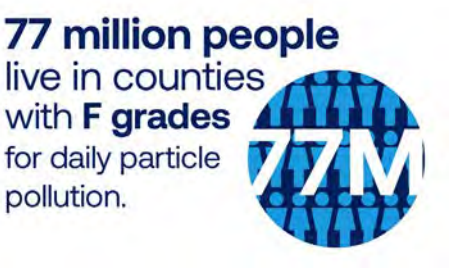
The geographical distribution of cities on the Worst 25 list repeats the pattern seen over



the last decade—the highest levels of ozone air pollution continue to occur in the West. California retains its position of being the state with the most metro areas on the list with 9 of the 25 most-polluted cities. Arizona, Colorado, Nevada, New Mexico, Oklahoma, Texas and Utah account for 12 others. They are joined this year by four more easterly cities, Chicago, New York, St. Louis, and Sheboygan.

Although cleanup of ozone precursor pollutants from industrial, power generation, and mobile sources has been working to reduce ozone concentrations, the impact of climate change has resulted in widespread wildfire disasters and has also meant higher temperatures, dry, sunny skies and more frequent stagnation events. Taken together, these conditions produced much higher numbers of unhealthy ozone days than would otherwise be the case.

Short-term Particle Pollution Trends

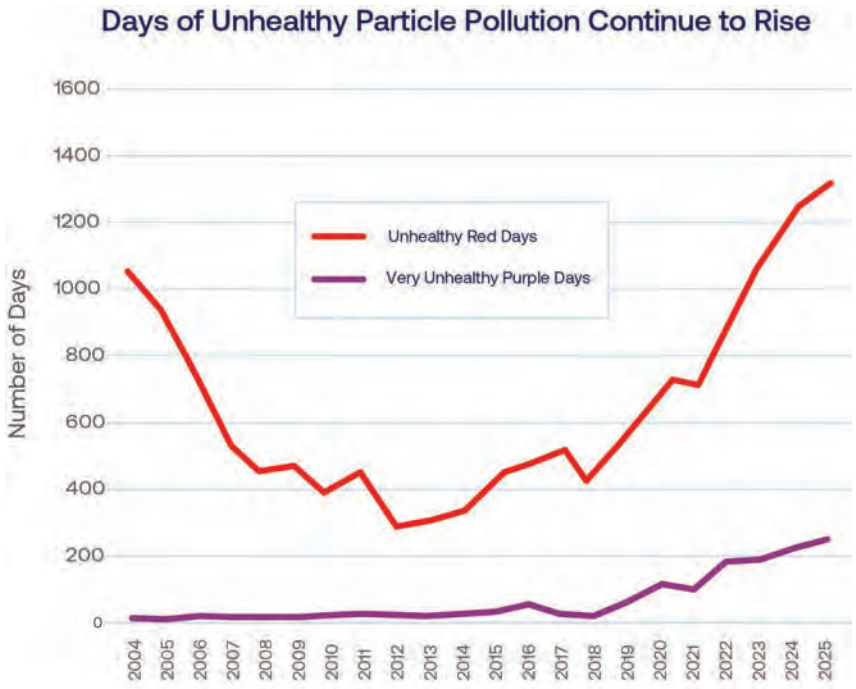


In the years 2021, 2022 and 2023, there were 77.2 million people living in counties across the U.S. that earned an F grade for unhealthy spikes in particle pollution. This represents an increase of 12.1 million more people than in last year's report, the seventh straight year of increasing health threat from this deadly pollutant.

Even compared with the past several years of "State of the Air" reports—in which many cities and counties experienced their highest weighted average number of days ever reported for fine particle pollution—results this year are again worse. In "State of the Air" 2025, 154 counties in 27 states get failing grades for short-term particle pollution. This is 44 more counties and 8 more states, plus Washington DC, than in last year's report. Although 27 counties in the West, including 17 counties in California, improved enough to get passing grades this year, those improvements are more than offset by the 68 counties that have been added, many of them in the Midwest and East. Connecticut, DC, Georgia, Illinois, New York, Ohio, South Dakota, Virginia and Wisconsin are all represented on the F list for the first time in years.

Wildfire has clearly emerged as a major driving factor in determining where in the country people are being exposed to unhealthy spikes in particle pollution. As states and counties experience shifting conditions of heat and precipitation—"good fire years" and "bad fire years"—their levels of air pollution can vary significantly. For example, compared to the disastrous 2020 fire year in California, the three years included in "State of the Air" 2025 were relatively better in the state, allowing counties like Santa Barbara and Marin to go from an F to an A grade in this year's report. In contrast, smoke from extensive wildfires in Canada in 2023 resulted in extremely high levels of fine particle pollution on many days throughout parts of the northeastern and north central U.S. that have not historically been thought of as "fire country."

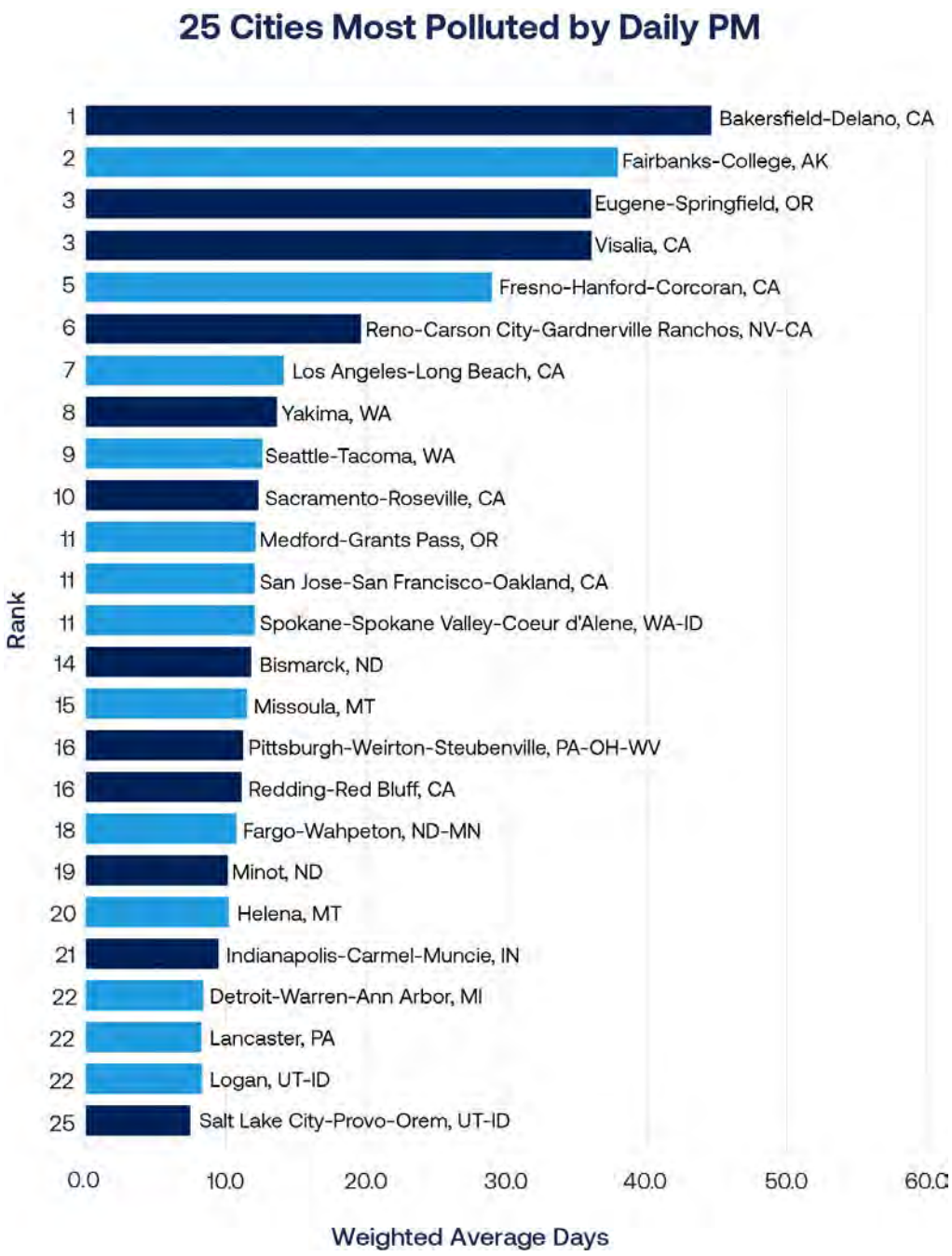
Wildfires are also continuing to increase the severity of pollution, with smoke in eastern states resulting in this report's highest ever number of red and purple days for particle pollution (1,280 and 231 days, respectively). These are levels on the Air Quality Index that carry strong health warnings. On red Unhealthy days, not only are members of sensitive groups likelier to "experience more serious health effects," but also "some members of the general public may experience health effects." On purple Very Unhealthy days, "the risk of health effects is increased for everyone."



There were also 27 maroon Hazardous days, the highest category, days on which a health warning of emergency conditions is issued, saying, "Everyone is more likely to be affected." Although this is fewer maroon days than in "State of the Air" 2023 and 2024, it is a sharp change from the fewer than ten maroon days reported from 2004 to 2016.

This year's report finds that the health of 56.3 million people across 140 counties in 25 states was put at risk on severely polluted Very Unhealthy (purple) and Hazardous (maroon) days for fine particle pollution. This is 24 million more people than in last year's report. This is drastically worse than the findings in last year's "State of the Air" and a shocking demonstration of a trend that not only is continuing but worsening as a consequence of climate change.

In better news, comparing cities ranked the worst 25 in last year's report with those in this year's, the average number of days per year that residents were exposed to high levels of fine particle pollution decreased by about three days. (However, it was to a still seriously poor weighted average of 16.5 days.) All but one of the ten worst cities on the list improved in this year's report, including Bakersfield, California, which experienced a weighted average of 17.5 fewer bad air days in 2021-2023 for spikes in particle pollution. The exception was Visalia, California, which recorded its highest level of particle pollution spikes in the history of the report—for the third year in a row.



As a result of the geographic shifts in high levels of particle pollution, eight of last year's Worst 25 cities have been replaced in this year's report. Medford, Oregon and Lancaster and Pittsburgh, Pennsylvania rejoined the list after a one-year hiatus. Worsened air quality in Indianapolis, Indiana; Detroit, Michigan; and Bismarck, North Dakota led to them being added to the list. Helena, Montana and Minot, North Dakota, both newly designated Metropolitan Statistical Areas in 2023, join the list for the first time, though Helena's air quality would have put it among the worst 25 in last year's report had it been classified as a metro region.

Improved enough to leave the Worst 25 list this year are the western cities of Phoenix, Arizona; Chico, Salinas, and San Diego, California; Denver, Colorado; Boise City, Idaho; Las Vegas, Nevada and Portland, Oregon.

Year-round Particle Pollution Trends

85 million people
live in counties with failing grades for year-round particle pollution



"State of the Air" 2025 finds that 85 million people living in 115 counties across 31 states have been exposed to year-round levels of particle pollution that do not meet the annual air quality standard. This is a small improvement over the 90.7 million people living in places that got failing marks in last year's report, but still a sobering reminder of the widespread, chronic nature of this deadly form of air pollution.

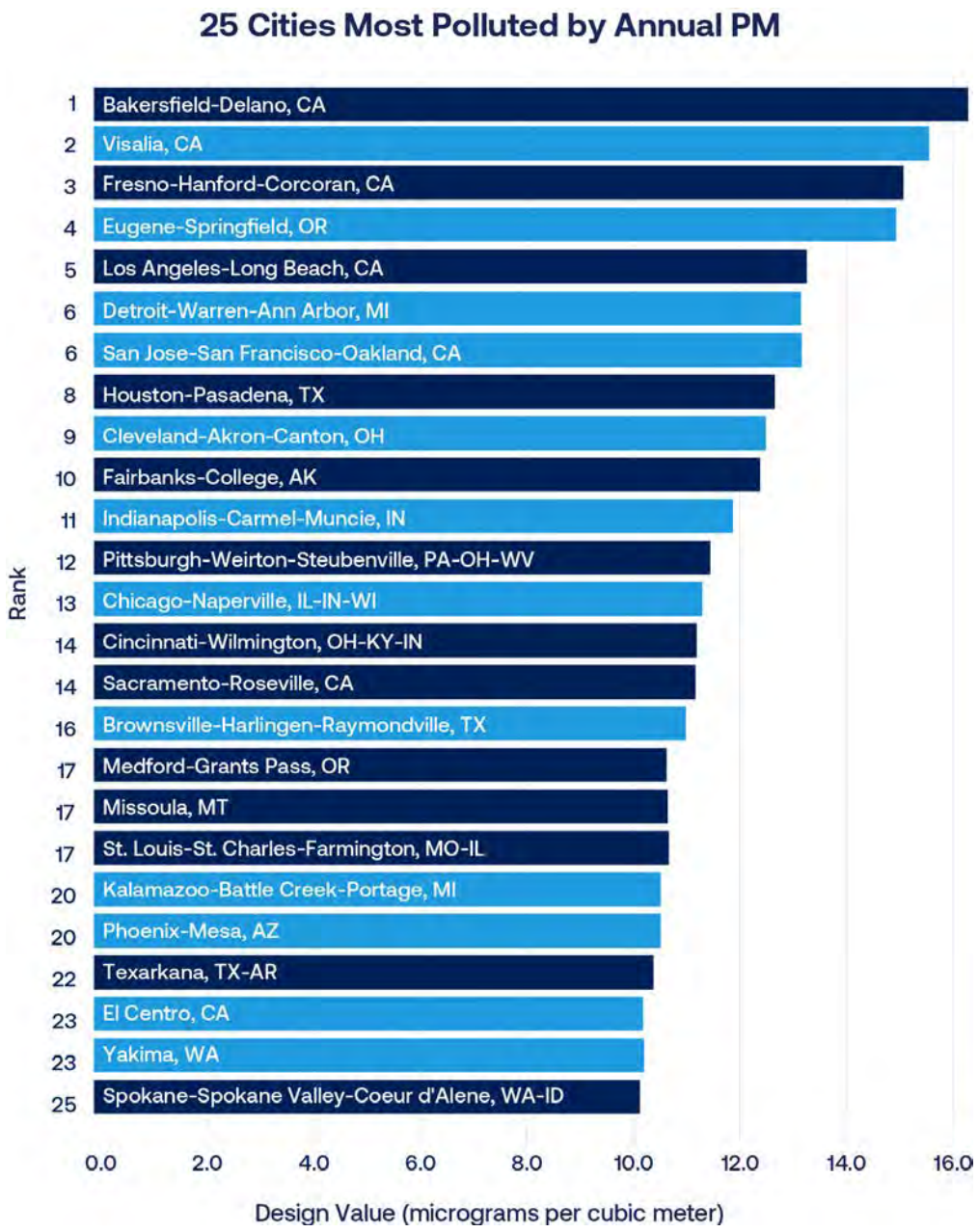
When looking nationwide at all the counties with measurements for this pollutant, the average severity of annual particle pollution is effectively unchanged since last year's report. By its nature, the year-round measure of average particle pollution is not as changeable from year to year as the daily measure. Variations over time may look smaller, but because they typically represent recurring exposures over many days and weeks, seemingly minor differences can have a big impact on public health.

Annual particle pollution levels are most often highest in places that are subject to multiple sources of emissions all year long, such as from highways, oil and gas extraction, power generation and industry. The additional pollution load from wildfire smoke, though comparatively short-lived in any one location, can strongly influence that location's annual average. In this year's report, this influence can be seen reflected in geographic shifts similar to that seen with short-term particle pollution.

Unsurprisingly, given the transport of wildfire smoke across the country, the states with the worst changes from last year's report are mainly in the north central and eastern parts of the U.S. Ten states, ranging from North Dakota to Maryland, saw the year-round average for fine particle pollution get worse in every one of their counties monitored for this pollutant.

In contrast, though California still ranks near the top for worst statewide average, there were 37 million more people living with improved levels than with worse levels compared with last year's report. All but one of California's 42 counties for which comparisons could be made show improvement.

In "State of the Air" 2025, the 25 most polluted cities for year-round particle pollution bucked the worsening trend of recent years by improving an average of about 0.4 micrograms per cubic meter (from 12.35 to 11.98 $\mu g/m^3$). Thirteen of them, all in western states, improved. Fresno-Hanford-Corcoran and Los Angeles-Long Beach, California, posted their lowest levels ever, though they are still among the worst five. Eleven metro areas worsened compared with their levels in last year's report. One (Indianapolis-Carmel-Muncie, IN) was unchanged. None of the 25 most polluted cities for this measure posted their worst-ever levels of year-round particle pollution.



Because of the geographic shift in areas of worse or improved particle pollution, there are more shifts in the rankings on the Worst 25 list than usual. Though the four worst metro areas keep their same ranks as in last year's report, most of the others on the list have moved up or down quite a bit.

Six metro areas experienced levels of air pollution that moved them onto the Worst 25 list. Cleveland, Ohio posted the most dramatic shift in the country, resulting in its rank dropping from 54th to 9th worst. Kalamazoo, Michigan and Brownsville and Texarkana, Texas are all making an appearance on this list for the first time. Missoula, Montana rejoins the list after a three-year absence. St. Louis, Missouri rounds out the additions this year.

Improving enough to leave the list are Augusta, Georgia; Chico, California; Kansas City, Missouri; Las Vegas and Reno, Nevada; Oklahoma City, Oklahoma and Corpus Christi, Texas.

Populations at Risk

More than 265 million people live in the 885 counties with enough monitoring data to be assigned a grade for at least one pollutant in this year's report. The majority of U.S. counties actually don't have monitors—which means that many communities, especially rural ones, don't have official monitored information on their air quality.

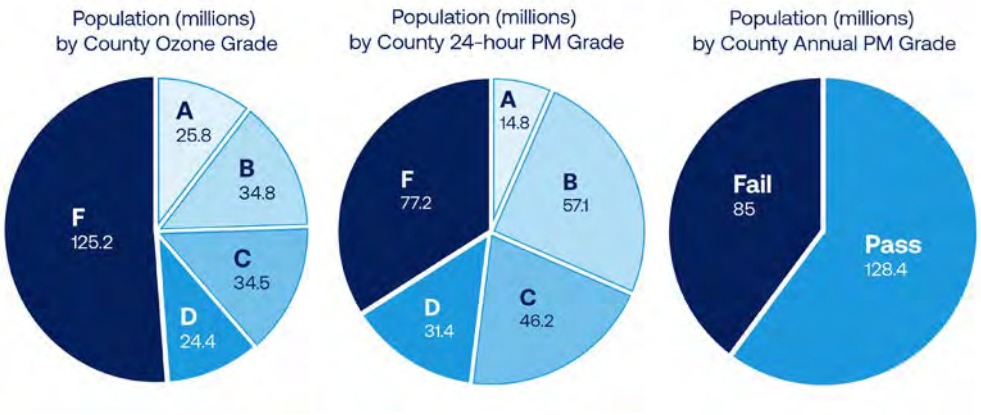
Addressing Data Gaps in Unmonitored Counties

"State of the Air" has long served as a trusted resource for tracking national trends in ozone and particle pollution, but many counties remain unmonitored, leaving communities without access to vital air quality information. To help close these gaps, the American Lung Association's "Something in the Air" reports explore the potential of using emerging technologies to expand the understanding of pollution exposure in under-monitored regions.

The "Something in the Air" series is intended to supplement the "State of the Air" report, providing a clearer picture of air quality where monitoring is limited. By utilizing satellite data and other emerging data tools to complement monitoring networks and expand air quality assessment, community members and decision-makers can better identify pollution hotspots, strengthen research and advocate for more comprehensive clean air protections. Together, these efforts work toward the same goal of ensuring all communities, especially those most at risk, have the information needed to fight for cleaner, healthier air. Learn more at Lung.org/something-in-the-air.

It is important to note that the population numbers included in this section are only for those places that collect air pollution data, and do not reflect the entire population of these groups in the U.S. The availability of data, and hence the population that is included in this report, differs for each pollutant.

All 156.1 million people in the U.S. living in places with failing grades for unhealthy levels of ozone or particle pollution are at risk of harm to their health. But some groups of people are especially vulnerable to illness and death from their exposure. See ***People at Risk*** for more detail about the factors that contribute to increased risk.



The number of people in these high-risk groups in "State of the Air" 2025 are as follows:

- **Children and older adults—**More than 34.6 million children under age 18 and some 25.2 million adults age 65 and over live in counties that received an F for at least one pollutant. Close to 9.5 million children and more than 6.7 million seniors live in counties failing all three measures.
- **People with underlying health conditions**
  - **Asthma—**More than 2.5 million children and nearly 11.8 million adults with asthma live in counties that received an F for at least one pollutant. More than 638,000 children and some 3.1 million adults with asthma live in counties failing all three measures.
  - **Chronic Obstructive Pulmonary Disease (COPD)—**Some 6.8 million people with COPD live in counties that received an F for at least one pollutant. Close to 1.7 million people with COPD live in counties failing all three measures.
  - **Lung Cancer—**Nearly 72,000 people diagnosed with lung cancer as of 2021 live in counties that received an F for at least one pollutant, and about 17,500 people ever diagnosed with lung cancer live in counties failing all three measures.
  - **Cardiovascular Disease—**Close to 9.7 million people with cardiovascular disease live in counties that received an F for at least one pollutant. Nearly 2.5 million people live in counties failing all three measures.
  - **Pregnancy—**Adverse impacts from air pollution have been shown both for those who are pregnant as well as for the developing fetus. More than 1.7 million pregnancies were recorded in 2023 in counties that received at least one failing grade for air pollution. Of those, close to 453,000 were in counties that received failing grades for all three measures.
- **People experiencing poverty**—Nineteen million people with incomes meeting the federal poverty definition live in counties that received an F for at least one pollutant. Close to 5.7 millig grade for ozone and/or particle pollution. Over 26.0 million people of color live in counties that received failing grades on all three measures, including some 15.2 million Hispanics.

For more detail about the number of people at risk by grade and by pollutant, see ***Data Table 1***. The populations at risk are also included by county in the ***State Data Tables***.

Most Polluted Places to Live

In addition to the 25 worst cities for each pollutant listed above, the 25 most polluted counties for ozone and particle pollution are ranked in the tables below.

Ozone Ranking	State	County	WA	PM Ranking	State	County	WA	Annual PM Ranking	State	County	DV
1	California	San Bernardino	153.7	1	California	Kern	44.3	1	California	Kern	16.2
2	California	Riverside	113.7	2	Alaska	Fairbanks North Star Borough	38.7	2	California	Tulare	15.7
3	California	Los Angeles	98.5	3	California	Tulare	36.5	3	California	Fresno	14.8
4	California	Tulare	88.7	3	Oregon	Lane	36.5	4	Oregon	Lane	14.4
5	California	Kern	72.8	5	California	Fresno	28.8	5	California	Kings	14.1
6	Arizona	Maricopa	54.8	6	California	Kings	26.5	6	California	Plumas	14
7	California	Fresno	46.8	7	California	Siskiyou	26.2	7	California	San Bernardino	13.1
8	Colorado	Jefferson	36.7	8	Oregon	Klamath	20.8	8	California	Stanislaus	13
9	Texas	Harris	34.8	9	Nevada	Douglas	19.2	8	Michigan	Wayne	13
10	California	San Diego	27.5	10	California	Inyo	18.7	10	Montana	Lincoln	12.8
11	Utah	Salt Lake	25.7	11	Nevada	Washoe	18.5	11	California	Riverside	12.6
12	Texas	Denton	25.5	12	Nevada	Carson City	17.5	12	Texas	Harris	12.5
13	Colorado	Douglas	25.2	13	California	Plumas	17.3	13	Washington	Okanogan	12.3
14	Utah	Uintah	24.5	14	Montana	Ravalli	14.5	14	California	Los Angeles	12.2
15	New Mexico	Eddy	24.3	15	California	Riverside	14	14	Ohio	Cuyahoga	12.2
16	California	Placer	22.5	16	Washington	Yakima	13.8	16	Alaska	Fairbanks North Star Borough	12.1
17	Nevada	Clark	22.2	17	Washington	Okanogan	13.3	17	Oregon	Klamath	12
18	Texas	Tarrant	21.5	18	Idaho	Lemhi	12.8	18	Indiana	Marion	11.9
19	Colorado	Larimer	20.8	19	Montana	Silver Bow	12.3	19	California	Siskiyou	11.7
20	California	Stanislaus	20.5	19	Washington	Snohomish	12.3	20	Pennsylvania	Allegheny	11.6
21	Illinois	Cook	20.3	21	California	Nevada	12.2	21	Illinois	Cook	11.3
22	Connecticut	Fairfield	20.2	22	California	Stanislaus	12	22	California	San Joaquin	11.2
23	Colorado	Arapahoe	19.5	22	Oregon	Jackson	12	22	California	Sutter	11.2
24	California	Imperial	19.3	22	Washington	Stevens	12	22	Ohio	Butler	11.2
25	Arizona	Pinal	19.2	25	North Dakota	Burleigh	11.7	25	California	Mendocino	11

Twenty-seven counties, listed alphabetically by state below, received failing grades for all three measures of pollution:

Arizona	Maricopa, Pinal
California	Fresno, Imperial, Kern, Kings, Los Angeles, Madera, Merced, Orange, Riverside, Sacramento, San Bernardino, Stanislaus, Sutter, Tulare
Illinois	Cook
Indiana	Lake, Marion
Michigan	Wayne
Ohio	Butler, Cuyahoga
Pennsylvania	Philadelphia
Nevada	Washoe
Utah	Salt Lake
Wisconsin	Milwaukee, Waukeshaw

Cleanest Places to Live

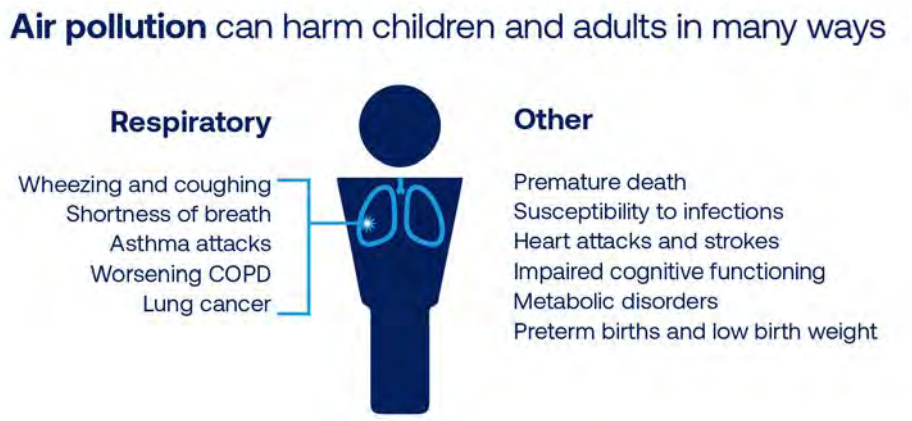
Many cities in the U.S. enjoy air that is considered clean for one or more of the pollution measures tracked in "State of the Air." In this year's report, 35 of the cities for which there is monitoring data had zero high ozone days and 22 cities had zero days with high levels of short-term particle pollution. This is a considerable worsening from last year's report, when 55 cities had no days of high ozone and 75 had no spikes in particle pollution. Because year-round particle pollution is scored differently, the cleanest cities for this measure can be ranked, and the best 25 are considered cleanest. See ***Data Tables 3a-c.***

In another grim indicator of the deterioration of air quality nationwide in this year's report, only two cities—Bangor, Maine and San Juan-Bayamón, Puerto Rico—rank on all three cleanest cities lists. They both earned an A for ozone and short-term particle pollution and are among the 25 cities with the lowest year-round particle levels.

The other four cities that made the Cleanest Places to Live list last year, Johnson City-Kingsport-Bristol, TN-VA, Lincoln-Beatrice, NE, Urban Honolulu, HI and Wilmington NC, all had at least one bad particle pollution day that cost them an A and a return to the cleanest cities list.

Health Impact of Air Pollution

Years of scientific research have clearly established that particle pollution and ozone are a threat to human health at every stage of life, increasing the risk of premature birth, causing or worsening lung and heart disease, and shortening lives. Some groups of people are more at risk of illness and death than others, because they are more likely to be exposed, or are more vulnerable to health harm, or often both.



Health Effects of Particle Pollution

Particle pollution – also known as particulate matter or soot – is a deadly and growing threat to public health in communities around the country. The more researchers learn about the health effects of particle pollution, the more dangerous it is recognized to be.

What is particle pollution?

Particle pollution refers to a mixture of tiny bits of solids and liquids in the air we breathe. Particle pollution comes from many sources. Factories, power plants, and diesel- and gasoline-powered vehicles and equipment either directly emit fine particles or generate other pollutants, such as nitrogen oxides (NO_X) and sulfur oxides (SO_X), known as precursors because they can then form into fine particles in the atmosphere. Other sources of particle pollution include wildfires, burning wood in wood stoves or residential fireplaces and burning biomass for electricity.

Researchers and regulators categorize particles according to size, grouping them as coarse, fine and ultrafine. Coarse particles, called PM_{10}, can include wind-blown dust, ash, pollen and smoke. Fine particles, $PM_{2.5}$, are most often a by-product of burning wood or fossil fuels, and may include components such as toxic compounds, salts and metals. The tiniest are called ultrafine particles, or $PM_{0.1}$. They are also produced by combustion and are included in the larger category of $PM_{2.5}$.

Individual fine particles are too small to be visible, but when pollution levels are high, they can make the air appear thick and hazy.



The differences in size make a difference in how particles affect our health. Our bodies' natural defenses help us to keep the coarse particles we inhale out of the deepest parts of our lungs, although these particles do deposit in the larger airways. However, those defenses do not keep smaller fine or ultrafine particles from penetrating deep into the lungs and even all the way into the air sacs. Many of these particles get trapped there, while the smallest are so tiny that they can pass from the air sacs into the bloodstream and disperse to other organs of the body.

What can particles do to your health?

Particle pollution can be very dangerous to breathe, especially at higher concentrations. It can trigger illness, hospitalization and premature death. Researchers estimate that $PM_{2.5}$ is responsible for more than 50,000 premature deaths in the United States every year.[1]

Short-Term Exposure

Short-term spikes in fine particle pollution that last from a few hours to a few days can kill. Premature deaths from breathing these particles can occur on the very day that particle levels are high, or up to a month or two afterward. Most premature deaths are from respiratory and cardiovascular causes. Fine particle pollution does not just make people die a few days earlier than they might otherwise—in many cases these deaths would not have occurred for years if the air were cleaner.[2]

Studies linking short-term exposure to $PM_{2.5}$ to death from all causes have been accumulating for a number of years. Taken together, this body of research provides consistent evidence of positive associations between fine particle pollution and mortality across diverse geographic locations and in populations with a wide range of demographic characteristics. In 2019, an international study looking at 499 cities across the globe reinforced these consistent findings.[3]

Exposure to even low levels of fine particles can be deadly. Looking nationwide in a 2017 study, researchers found that older adults faced a higher risk of premature death even when levels of short-term particle pollution remained well below the current national standard. This was consistent whether the older adults lived in cities, suburbs or rural areas.[4] Another study published in 2018 using data from 135 U.S. cities found a causal relationship between mortality and exposure to $PM_{2.5}$ at concentrations below the federal standard.[5]

Particle pollution also has many other harmful effects, ranging from decreased lung function to heart attacks. Extensive research has linked short-term increases in particle pollution to:

- increased mortality in infants;[6]
- increased hospital admissions for cardiovascular disease, including heart attacks and strokes;[7]
- increased hospital admissions and emergency department visits for chronic obstructive pulmonary disease (COPD);[8]
- increased severity of asthma attacks and hospitalization for asthma among children.[9,10]

Year-Round Exposure

Decades of research have firmly established that breathing particle pollution day in and day out can also be deadly. Across numerous seminal studies that looked at different groups of people living in different parts of the country, the results consistently showed a clear relationship between long-term exposure to particulate matter and mortality.[11]

Research using publicly available data on a cohort of more than one million adults in the U.S. reconfirmed that long-term exposure to $PM_{2.5}$ was associated with elevated risk of early death. The increased risk was primarily associated with death from cardiovascular and respiratory causes, including heart disease, stroke, influenza and pneumonia. Researchers also found a similar association between exposure to fine particle pollution and an increased risk of death from lung cancer among never-smokers.[12] Another study of 68.5 million Medicare-enrolled adults in the United States between 2000 and 2016 found a 6-8% increase in risk of all-cause mortality for every 10μg/m^3 increase in the annual average $PM_{2.5}$.[13]

Research has also linked year-round exposure to particle pollution to a wide array of serious health effects at every stage of life, from conception through old age. Among

individuals who are pregnant, fetuses and children, long-term particle pollution exposure is linked to:

- Increased risk of preterm birth and low birth weight;[14]
- Increased fetal and infant mortality;[15]
- Impaired neurological development and cognition;[16]
- Reduced lung development and impaired lung function in children;[17]
- Higher likelihood of children developing asthma.[18]

In adults, long-term particle pollution exposure is linked to:

- Increased risk from existing cardiovascular and respiratory disease, including a worsening of heart disease, atherosclerosis and COPD;[19,20]
- Higher likelihood of developing diabetes and subsequent complications;[21,22]
- Higher likelihood of getting lung cancer and of dying from it;[23]
- Impaired cognitive functioning and an increased risk of Parkinson's disease, Alzheimer's disease and other dementias later in life;[24,25]
- Increased risk of clinical depression and anxiety.[26]

The good news is that cleaning up particle pollution makes a difference. Research has shown a consistent relationship between decreasing $PM_{2.5}$ concentrations and improving respiratory health in children and reduced mortality of adults in communities that have reduced their levels of year-round particle pollution.[27,28]

Who is most at risk from particle pollution?

Anyone who lives where particle pollution levels are high is at risk. Some people face greater risk, however, based on their underlying health and other characteristics. [See the ***People at Risk*** section for more information about vulnerable groups] Research has shown that the groups at the greatest risk from particle pollution include:

- Pregnant people and fetuses;[29]
- Infants, children and people age 65 and older;[30]
- People with lung disease, especially asthma, but also people with COPD;[31]
- People with cardiovascular disease;[32]
- People with lung cancer;[33]
- People of color;[34]
- Current or former smokers;[35]
- People with low incomes;[36] and
- People who are obese or have diabetes.[37]

Health Effects of Ozone Pollution

Ground-level ozone, sometimes known as smog, is one of the most widespread and dangerous pollutants in the United States. Scientists have studied the effects of ozone on human health for decades. Hundreds of studies have confirmed that ozone harms people at levels currently found in many parts of the United States.

What is Ozone Pollution?

Ozone is a gas composed of molecules with three oxygen atoms. (The oxygen we need for life is made up of molecules with two oxygen atoms.) Ozone forms in the lower atmosphere when a combination of pollutants, usually nitrogen oxides (NOx) and volatile organic compounds (VOCs), "cook" together in sunlight through a series of chemical reactions. NOx and VOCs are produced primarily when fossil fuels such as gasoline, diesel, oil, natural gas or coal are burned or when solvents and some other chemicals evaporate. NOx is emitted from power plants, motor vehicles and other sources of

high-heat combustion. VOCs are emitted from motor vehicles, oil and gas operations, chemical plants, refineries, factories, gas stations, paint, consumer products and other sources. If these ingredients are present under the right conditions, they react to form ozone. Sunlight is key, with higher temperatures increasing ozone production. Because the reactions take place in the atmosphere, ozone often shows up downwind of the sources of the original emissions, sometimes many miles from where it formed.



Ozone air pollution is sometimes called ground-level ozone, to distinguish it from the much higher-altitude stratospheric ozone layer that protects people from damaging ultraviolet rays from the sun.

What Can Ozone Pollution Do to Your Health?

Ozone gas is a powerful lung irritant. When it is inhaled into the lungs, it reacts with the delicate lining of the small airways, causing inflammation and other damage that can impact multiple body systems. Ozone exposure can also shorten lives.

Ozone has a serious effect on the respiratory system, both in the short term and over the course of years of exposure.

When ozone levels are high, many people experience breathing problems such as chest tightness, coughing and shortness of breath, often within hours of exposure. Even healthy young adults may experience respiratory symptoms and decreased lung function.[38]

Other breathing problems that have been tied to short-term exposure to ozone include:

- Worsening of symptoms, increased medication use, and increased emergency department visits and hospital admissions for people with asthma and COPD;[39]
- Susceptibility to respiratory infections such as pneumonia, resulting in an increased likelihood of emergency department visits and hospitalizations.[40]

Living with ozone pollution long term may cause lasting damage to respiratory health, including:

- Development of new cases of asthma in children;[41]
- Damage to the airways, leading to development of COPD;[42]
- Increased allergic response.[43]

The inflammation and oxidative stress caused by short- and long-term exposure to ozone can also do damage to tissues, genes and proteins throughout the body, which can cause or worsen other disease conditions over time. These include:

- Potential increased risk of metabolic disorders, including glucose intolerance, hyperglycemia and diabetes;[44]
- Potential impact on the central nervous system, including brain inflammation, structural changes and increased risk of cognitive decline;[45,46]
- Increased likelihood of reproductive and developmental harm, including reduced fertility, pregnancy complications, preterm birth, stillbirth and low birth weight;[47,48]
- Possible cardiovascular effects.[49]

The damage ozone does to the body can be deadly. Recent research has affirmed earlier findings that short-term exposure to ozone, even at levels below the current standard, likely increases the risk of premature death, particularly for older adults.[50]

There is also a growing body of evidence that long-term exposures to ambient ozone may be associated with an increased risk of cardiovascular and respiratory disease mortality.[51]

Who is Most at Risk from Ozone Pollution?

Anyone who spends time outdoors where ozone pollution levels are high may be at risk. Some people face a higher-than-average risk, however, because of their underlying health and other characteristics. [See the ***People at Risk*** section for more information about vulnerable groups.] Research has shown that the groups at greatest risk from ozone pollution include:

- Pregnant people and fetuses;[52]
- Children;
- Anyone 65 and older;
- People with existing lung disease such as asthma and COPD;
- People who work or exercise outdoors.[53]

People at Risk

The health burden of air pollution is not evenly shared. Some people are more at risk of illness and death from air pollution than others. Several key factors affect an individual's level of risk:

- Exposure – Where someone lives, where they go to school and where they work makes a big difference in how much air pollution they breathe. In general, the higher the exposure, the greater the risk of harm.
- Susceptibility – Individuals who are pregnant and their fetuses, children, older adults and people living with chronic conditions, especially heart and lung disease, may be physically more susceptible to the health impacts of air pollution than other adults.
- Access to healthcare – Whether or not a person has health coverage, a healthcare provider, and access to linguistically and culturally appropriate health information may influence their overall health status and how they are impacted by environmental stressors like air pollution.
- Psychosocial stress – There is increasing evidence that non-physical stressors such as poverty, racial/ethnic discrimination and residency status can amplify the harmful effects of air pollution.

These risk factors are not mutually exclusive and often interact in ways that lead to significant health inequities among subgroups of the population. Taken all together, these high-risk categories account for a large proportion of the U.S. population.

People of color

Research has shown that people of color are more likely to be exposed to air pollution and more likely to suffer harm to their health from air pollution than white people.[54,55] Much of this inequity can be traced to the long history of systemic racism in the United States. Practices such as redlining, the discriminatory outlining of so-called "riskier" neighborhoods by mortgage lenders, institutionalized residential segregation in the 20th century, impairing the ability of many people of color to build wealth and limiting their mobility and political power. Over the years, decision-makers have found it easier to place sources of pollution such as power plants, industrial facilities, landfills and highways, in economically disadvantaged communities of color than in more affluent, predominantly white neighborhoods. The resulting disproportionate exposure to air pollution has contributed to high rates of emergency department visits for asthma and other diseases.[56,57]

People of color are also more likely than white people to be living with one or more

chronic conditions that make them more susceptible to the health impacts of air pollution, including asthma and diabetes.[58]

People experiencing poverty

There is evidence that having low income or living in lower income areas puts people at increased risk from air pollution, although the correlation is not as strong as with race and ethnicity.[59,60] People living in poverty are more likely to live in close proximity to sources of pollution and have fewer resources to relocate than people with more financial security.[61] Poverty itself, along with the problems that beset many low-income communities, such as lack of safety, green space, and high-quality food access, have been associated with increased psychosocial distress and chronic stress, which in turn make people more vulnerable to pollution-related health effects.[62] People with low income also have lower rates of health coverage and less access to quality and affordable health care to provide relief to them when they get sick.

Children

Children are both more susceptible to harm from air pollution and more likely to be exposed than adults. The growth and development of a child's lungs and breathing ability start in utero and continue into early adulthood. Long-term exposure to particle pollution during pregnancy and early childhood has been linked to reduced lung growth and long-term exposure to ozone has been linked to increased potential for the development of asthma. The developing brain and heart may also be affected, with life-long consequences.[63] In addition, the body's defenses that help adults fight off infections are still developing in children. Children have more respiratory infections than adults, which also seem to increase their susceptibility to air pollution.[64]

Children breathe more rapidly and inhale more air relative to their size than do adults. They are more likely to spend time outdoors, running around, being active and breathing hard. Consequently, they are more exposed to polluted outdoor air than adults typically are.

Older adults

Much of the illness and premature death caused by air pollution occurs in older adults, who are at increased risk of harm for several reasons. As a person ages, the normal process of thinning and weakening of the lung tissue and the supporting muscle and bones of the ribcage results in diminishing lung function over time. The impairment that results from exposure to air pollutants then has an add-on effect, putting stress on the lungs and heart. Older people are also more likely to be living with chronic diseases, and there is evidence that co-existing chronic lung, heart or circulatory conditions may worsen following exposure to environmental pollutants.[65]

The strength of the immune system also declines with age, leaving older people at greater risk of contracting infections and less able to get them under control before they become serious. Because exposure to air pollution increases susceptibility to respiratory infections, it also increases the risk of severe illness and death in older adults.

People with underlying health conditions

For the millions of people in the U.S. living with illnesses such as asthma, COPD, diabetes, heart disease and lung cancer, exposure to air pollution places them at greater risk of harm to their health than those without disease. The cellular injury and systemic inflammation triggered by breathing ozone and particle pollution put additional stress on people's lungs, heart and other organs already compromised by disease. This can result in a worsening of symptoms, increased medication use, more frequent emergency department visits and hospitalizations, an overall reduced quality of life and far too often premature death.

Individuals who are pregnant and fetuses

Pregnancy is always a susceptible time for both the person who is pregnant and the developing fetus. The pregnant body undergoes dramatic physiological changes in hormone levels, metabolism and circulation throughout the months of gestation. The rapid and complex development of the fetus is a precisely timed and sequenced process. The inflammation and oxidative stress resulting from exposure to air pollution during pregnancy can increase the risk of hypertensive disorders, including preeclampsia, and lead to intrauterine inflammation and damage to the placenta that can disrupt the growth and development of the fetus. Fetal health may also be impacted in a number of ways by environmental contaminants that have been shown to cross the placenta.[66]

Exposure to both ozone and particle pollution during pregnancy is associated with premature birth, low birth weight and stillbirth. These risks are amplified when the individual who is pregnant is also at higher risk of health harm from air pollution in other ways, such living in poverty or having asthma.[67]

People with a smoking history

There is some evidence suggesting that current and former smokers are at greater risk of health harm from exposure to fine particle pollution compared with never-smokers. They are more likely to develop lung cancer and to die prematurely.[68] Smoking damages the lungs, heart, blood vessels and other organs.[69] This impairment leaves the person with a smoking history more vulnerable to the health impact of air pollution than a never-smoker.

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Recommendations for Action

"State of the Air" 2025 illustrates the profound impact that climate change is having on air quality and the continued urgency of reducing the sources of emissions that contribute to ozone and particle pollution.

Under the Clean Air Act, the U.S. Environmental Protection Agency has driven decades of progress in cleaning up the transportation, electricity, buildings and industrial sectors. At the same time, EPA has tracked, analyzed and expanded the nation's understanding of air pollution at the community level. Now, however, all of that progress is at risk.

Sweeping staff cuts and reduction of federal funding are stymieing the agency's ability to ensure that people have clean air to breathe. This year's "State of the Air" focuses on an overarching clarion call to people nationwide: support and defend EPA.

Defend EPA Staff and Funding

EPA is, first and foremost, a public health agency. The agency works at every level to address air pollution. People breathe easier every day because of the work of EPA's staff, but they may not realize just how much these workers matter.

EPA staff are the reason the nation has access to air quality data in the first place, including through "State of the Air." A team of environmental scientists, modelers and statisticians and other experts enable the Airnow.gov site to work, which allows people across the country to get air quality forecasts online. They work with state and local governments to share those forecasts with communities across the country. They review the health science and write and update guidance on what people should do to protect themselves when the air quality index hits yellow, orange, red, purple and maroon. They share resources with schools that help them keep students safe when air pollution reaches unhealthy levels.

EPA staff are vital to ensuring that unhealthy levels of air pollution are not just monitored but also cleaned up. This is done in part by writing strong, sound safeguards under the Clean Air Act. For example, EPA is required to regularly update the National Ambient Air Quality Standards – the national limits on ozone and particle pollution on which this report is based. The scientific staff keep abreast of what the scientific research shows about air pollution, come up with different policy options, lead the work of analyzing the benefits to health of each option, and gather public input. For other types of standards, like limits on specific pollutants from power plants and vehicles, EPA staff do complex technical analyses of what technologies are available to reduce pollution, how and where they're being used, and what the impacts would be to health and to industry of pursuing different options.

Another part of ensuring pollution cleanup is making sure these strong safeguards are enforced. EPA staff do that too. They work with state and local governments to make sure new facilities are reviewed before they get built so that they don't add to the burden of unhealthy air in a place that's already too polluted. They test cars and trucks in labs to make sure they're not emitting more pollutants than they're supposed to. They inspect facilities to ensure their compliance with air quality standards to protect communities in the area. They bring cases against companies that violate the laws that protect public health.

EPA also gives grants and other funding to state and local governments, community organizations, businesses and more to help them monitor and reduce air pollution. Many of these grants are from programs to reduce emissions and invest in clean transportation and clean electricity under the Inflation Reduction Act. Many more are under longstanding programs that fund the everyday efforts that state and local governments make to ensure clean air. Without these funds, state and local governments would have a hard time running local air quality monitors, tracking where pollution is coming from and writing and implementing plans to reduce that pollution.

For all of these funds, EPA staff work hand-in-hand with these partners to make sure the funding goes where it needs to go and supports the work that needs to be done.

EPA's key principles are to follow the science, follow the law, and be transparent. Those principles have guided decades of progress toward cleaner air. But efforts to undercut them put the agency's core mission at risk.

The bottom line is this: EPA staff, working in communities across country, are doing crucial work to keep your air clean. Staff cuts are already impacting people's health across the country. Further cuts mean more dirty air.

Defend EPA Rules

In "State of the Air" 2024, we celebrated the fact that several lifesaving new air pollution safeguards were finalized by EPA, thanks to the hard work of agency staff and the health and environmental advocates who supported them. Now, that progress is at risk.

Executive orders issued in January 2025 and EPA announcements in March seek to overturn regulatory policies that reduce pollution from electricity generation and transportation. But a regulation cannot be overturned simply by an executive order or a press statement. That means that the clean air safeguards are still on the books, still the law of the land, and still need to be defended and protected, especially as new actions are announced to reconsider these lifesaving programs. They include:

Updated national particle pollution standards. EPA strengthened the annual fine particulate matter pollution standards from 12 $\mu g/m^3$ to 9 $\mu g/m^3$. States have submitted to EPA their recommendations for which areas should be cleaned up. Now the agency is required to review those recommendations and conduct its own analyses to finalize the areas that need additional pollution control by February 6, 2026.

Rules to clean up methane and other air pollutants from the oil and gas industry. EPA finalized rules to address leaks of methane from the oil and gas production process, like drilling operations. This is a crucial climate measure and will also reduce emissions of dangerous volatile organic compounds (VOCs). While Congress voted in February to overturn a separate methane prevention rule, these limits are still on the books.

Stronger standards for future cars. EPA finalized a rule that will make future light- and medium-duty vehicles cleaner. The rule will help get more zero-emission vehicles on the road and make new gasoline-powered cars less polluting too.

Stronger carbon pollution limits on future trucks and buses. EPA finalized a rule that will make sure future heavy-duty vehicles emit fewer greenhouse gases, including trucks and buses. A separate, 2023 rule also ensures future trucks and buses emit less nitrogen oxide emissions.

Stronger limits on mercury and air toxics from power plants. EPA tightened limits on toxic emissions from coal- and oil-fired power plants and strengthened monitoring requirements to help ensure that cleanup happens quickly.

Limits on carbon pollution from power plants. EPA set limits on carbon emissions from future gas-fired power plants, current coal-fired power plants and some current gas plants.

These rules are on the books. They were adopted by following the law, and EPA must uphold the rule of law now. The rules must stay in place and be implemented and enforced. Anything less means people will suffer health harms from dirty air that could have been prevented.

Move Forward at the State, City, Community and Individual Levels

States and cities still have many tools in their toolbox to reduce emissions that harm people's health, like cleaning up vehicles by adopting the Advanced Clean Cars II and Advanced Clean Trucks policies, investing in charging infrastructure for electric vehicles, and requiring more electricity to come from truly clean sources like wind, solar, geothermal and tidal. They can also adopt policies to reduce emissions from buildings, manufacturing facilities and freight activities.

Cities, communities and individuals can also adopt a suite of "smart surfaces" solutions – things like cool roofs, porous pavement, more green space and solar panels that help reduce heat in their neighborhoods and protect health from the combined health harms of pollution and dangerously high temperatures.

Individuals can keep themselves safe and help their friends and families do the same – things like checking daily air pollution forecasts at Airnow.gov, preparing for wildfires, floods and other disasters at Lung.org/disaster, and reducing emissions from their vehicle or home energy use in their own lives.

Above all: you can also use the power of your personal voice. Even in a time when clean air protections are under threat, the fact remains: people nationwide want clean air. The need for clean air is universal, nonpartisan and knows no boundaries. And sharing a story is powerful–whether it's a time when you had asthma symptoms on a smoggy day, your child spent days indoors because of wildfire smoke, or the concerns you have about how losses of staff and funding at EPA may impact the air you breathe. That's true when you take your story to your elected officials, but it's also true with family, friends, and other members of your community.

Understanding Grades and Tables

*See **Methodology** for a full explanation of data sources and calculations made for state grades.*

Notes for state grades tables

1. Not all counties have monitors for either ozone or particle pollution. If a county does not have any monitoring data for either pollutant, that county's name is not on the list in these tables. The decision about siting monitors in a county is made by the state and the U.S. Environmental Protection Agency, not by the American Lung Association.
2. **INC** (Incomplete) indicates that monitoring data is available for at least one year in that county, but not all three years.
3. **DNC** (Data Not Collected) indicates that data on that particular pollutant was not collected in that county during the three years covered in the report.
4. The **Weighted Average (Wgt. Avg.)** is derived by adding the three years of individual level data (2021-2023), multiplying the sums of each level by the assigned standard weights (i.e., 1=orange, 1.5=red, 2.0=purple and 2.5=maroon) and calculating the average. Grades are assigned based on the weighted averages as follows: A=0.0, B=0.3-0.9, C=1.0-2.0, D=2.1-3.2, F=3.3+.
5. The **Design Value** is the calculated concentration of a pollutant based on the annual National Ambient Air Quality Standard for $PM_{2.5}$, which is 9.0 $\mu g/m^3$. Counties with design values of 9.0 or lower received a grade of "Pass" for Annual $PM_{2.5}$. Counties with design values of 9.1 or higher received a grade of "Fail."

Notes for at-risk groups tables

1. Adding across rows does not produce valid estimates. Adding the at-risk categories (asthma, COPD, poverty, etc.) will double-count people who fall into more than one category.
2. **Total Population** is based on 2023 U.S. Census and represents the at-risk populations in counties with ozone or $PM_{2.5}$ pollution monitors; it does not represent the entire state's sensitive populations.
3. Those **18 & under** and **65 & over** are vulnerable to ozone and $PM_{2.5}$. Do not use them as population denominators for disease estimates—that will lead to incorrect estimates.
4. **Pediatric asthm**a estimates are for those under 18 years of age and represent the estimated number of people in that age group who had asthma in 2023 based on the state rates, when available, or national rates when not (Behavioral Risk Factor Surveillance System, or BRFSS), applied to county population estimates (U.S. Census).
5. **Adult asthma** estimates are for those 18 years of age and older and represent the estimated number of people in that age group who had asthma during 2023 based on state rates (BRFSS) applied to county population estimates (U.S. Census).
6. **COPD** estimates are for adults 18 and over who had ever been diagnosed with chronic obstructive pulmonary disease, which includes chronic bronchitis and emphysema, based on state rates (BRFSS) applied to county population estimates (U.S. Census).
7. **Lung cancer** estimates are for all ages and represent the estimated number of people newly diagnosed with lung cancer in 2021 based on state rates (StateCancerProfiles.gov) applied to county population estimates (U.S. Census).
8. **Cardiovascular (CV) disease** estimates are for adults 18 and over who have been diagnosed within their lifetime, based on state rates (BRFSS) applied to county population estimates (U.S. Census). CV disease includes coronary heart disease, stroke and heart attack.
9. **Pregnancy** estimates are for females 18-49 and based on state rates of pregnancies resulting in live births applied to population estimates (U.S. Census).
10. **Poverty** estimates include all ages and come from the U.S. Census Bureau's Small Area Income and Poverty Estimates program. The estimates are derived from a model using estimates of income or poverty from the Annual Social and Economic Supplement and the Current Population Survey, 2023. Puerto Rico poverty estimates come from the U.S. Census Bureau's American Community Survey, 2019-2023.
11. **People of color** are defined as anyone Hispanic or as non-Hispanic Black, Asian, American Indian/Alaska Native, Native Hawaiian and Other Pacific Islander, or two or more races, based on 2023 county population estimates (U.S Census). Puerto Rico race and ethnicity estimates come from the U.S. Census Bureau's American Community Survey, 2019-2023.
12. Based on a request from Connecticut, the Census Bureau shifted from providing population estimates by county to county-equivalent Planning Regions for the state starting with 2022 data. As air quality data continues to be county-based and Planning Regions are incompatible with historic Connecticut counties, Census Bureau population estimates from 2021 are used in this year's report. Disease rates are still from the latest year available.

Table 1 Populations at Risk by Grade and by Pollutant

People at Risk from Short-Term Particle Pollution (Daily $PM_{2.5}$)

	Chronic Diseases					Age Groups							
In Counties Where the Grades Were:	Adult Asthma	Pediatric Asthma	COPD	Lung Cancer	CV Disease	Under 18	65 and Over	Pregnancies	Poverty	People of Color	Total Population	Number of Counties
Grade A (0.0)	1,124,915	247,119	762,250	7,208	1,092,866	3,102,575	2,727,090	157,238	2,130,229	6,588,285	14,764,458	62
Grade B (0.3-0.9)	4,289,395	902,647	2,777,553	28,165	3,969,488	12,088,644	9,863,933	633,944	7,077,114	27,984,148	57,142,408	160
Grade C (1.0-2.0)	3,578,296	777,059	2,115,172	22,314	2,924,564	10,284,615	7,315,386	518,938	5,392,423	22,628,156	46,214,218	132
Grade D (2.1-3.2)	2,494,526	488,473	1,516,172	16,743	2,033,166	6,701,796	5,520,433	333,157	3,772,420	12,136,398	31,357,228	100
Grade F (3.3+)	5,957,863	1,188,978	3,262,762	33,910	4,724,253	16,774,897	12,669,711	822,523	9,432,925	39,123,137	77,178,968	154
National Population in Counties with $PM_{2.5}$ Monitors	17,961,644	3,707,933	10,774,444	111,852	15,242,636	50,483,527	39,407,042	2,541,883	28,671,471	111,697,262	233,762,815	648

People at Risk from Year-Round Particle Pollution (Annual $PM_{2.5}$)

	Chronic Diseases					Age Groups						
In Counties Where the Grades Were:	Adult Asthma	Pediatric Asthma	COPD	Lung Cancer	CV Disease	Under 18	65 and Over	Pregnancies	Poverty	People of Color	Total Population	Number of Counties
Pass	10,122,909	2,011,982	6,078,482	63,610	8,596,829	26,953,506	22,409,791	1,381,553	15,058,221	55,546,609	128,380,895	426
Fail	6,258,046	1,379,394	3,663,712	38,256	5,202,276	19,216,717	13,211,682	946,632	11,101,103	48,309,996	84,997,574	115
National Population in Counties with $PM_{2.5}$ Monitors	17,961,644	3,707,933	10,774,444	111,852	15,242,636	50,483,527	39,407,042	2,541,883	28,671,471	111,697,262	233,762,815	648

People at Risk from Ozone

	Chronic Diseases				Age Groups						
In Counties Where the Grades Were:	Adult Asthma	Pediatric Asthma	COPD	CV Disease	Under 18	65 and Over	Pregnancies	Poverty	People of Color	Total Population	Number of Counties
Grade A (0.0)	1,948,670	361,826	1,370,724	2,035,209	5,050,342	5,443,296	255,197	3,091,849	10,345,036	25,758,934	137
Grade B (0.3-0.9)	2,702,269	568,383	1,781,636	2,536,346	7,307,754	6,368,314	364,608	4,330,183	14,141,417	34,802,173	148
Grade C (1.0-2.0)	2,789,756	579,640	1,821,933	2,442,236	7,631,976	6,005,211	364,325	3,849,007	12,587,711	34,492,823	174
Grade D (2.1-3.2)	1,977,825	394,791	1,186,794	1,635,315	5,233,078	4,212,129	266,456	2,646,545	9,154,408	24,448,296	81
Grade F (3.3+)	9,392,704	1,980,591	5,322,148	7,585,423	27,684,476	19,946,133	1,379,521	15,054,422	66,483,656	125,231,723	211
National Population in Counties with Ozone Monitors	19,014,829	3,932,701	11,597,147	16,401,883	53,502,295	42,448,315	2,657,497	29,329,395	113,897,030	247,396,139	780

Table 2a People at Risk in 25 U.S. Cities Most Polluted by Short-Term Particle Pollution (Daily $PM_{2.5}$)

2025 Rank	Metropolitan Statistical Areas	Total Population	Under 18	65 and Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	People of Color	Poverty
1	Bakersfield-Delano, CA	913,820	259,728	111,264	16,473	57,210	25,454	313	42,581	9,148	639,578	169,857
2	Fairbanks-College, AK	94,840	22,535	12,395	1,565	7,941	3,951	49	4,980	1,202	30,209	7,015
3	Eugene-Springfield, OR	381,181	65,661	81,956	4,563	37,332	20,889	159	26,719	3,537	78,370	54,725
3	Visalia, CA	479,468	140,917	58,469	8,938	29,621	13,260	164	22,217	4,853	355,437	83,050
5	Fresno-Hanford-Corcoran, CA	1,332,702	364,673	175,198	23,129	84,749	38,374	457	64,440	13,466	972,180	229,167
6	Reno-Carson City-Gardnerville Ranchos, NV-CA	699,307	139,687	141,044	9,992	49,010	41,135	289	44,011	6,481	258,037	67,410
7	Los Angeles-Long Beach, CA	18,316,743	3,923,848	2,876,482	248,870	1,263,845	602,613	6,262	1,025,571	189,174	13,036,866	2,228,294
8	Yakima, WA	256,643	73,483	37,805	5,371	19,664	7,921	121	12,204	2,502	154,962	40,910
9	Seattle-Tacoma, WA	4,993,725	1,019,521	804,469	74,525	426,849	171,424	2,352	263,032	53,000	1,964,673	453,095
10	Sacramento-Roseville, CA	2,706,315	593,708	474,959	37,656	185,863	91,589	924	156,808	27,170	1,368,720	297,127
11	Medford-Grants Pass, OR	308,589	61,414	76,999	4,268	29,192	18,034	129	23,597	2,417	62,148	40,445
11	San Jose-San Francisco-Oakland, CA	9,001,024	1,861,823	1,497,266	118,086	627,407	303,409	3,078	517,775	91,577	5,990,798	872,151
11	Spokane-Spokane Valley-Coeur d'Alene, WA-ID	785,302	168,696	148,630	12,182	65,934	30,875	359	45,908	8,007	126,868	90,163
14	Bismarck, ND	135,786	31,657	25,018	2,060	10,507	5,524	72	8,727	1,606	17,796	10,229
15	Missoula, MT	126,939	22,681	22,869	1,532	12,369	6,916	57	7,793	1,473	15,909	14,224
16	Pittsburgh-Weirton-Steubenville, PA-OH-WV	2,727,866	508,773	605,974	50,022	227,806	173,588	1,468	250,600	25,746	410,735	313,183
16	Redding-Red Bluff, CA	245,262	54,424	52,782	3,452	16,873	8,997	84	15,642	2,158	65,965	33,160
18	Fargo-Wahpeton, ND-MN	285,484	64,560	40,164	3,994	22,676	9,854	150	15,535	3,909	47,884	28,800
19	Minot, ND	75,742	18,142	11,835	1,180	5,912	2,825	40	4,353	931	13,526	5,684
20	Helena, MT	96,091	20,040	20,545	1,354	8,952	5,576	44	6,602	891	9,097	8,618
21	Indianapolis-Carmel-Muncie, IN	2,651,953	629,614	417,423	42,718	234,648	164,452	1,645	195,165	31,238	763,082	292,453
22	Detroit-Warren-Ann Arbor, MI	5,361,927	1,139,647	989,127	82,844	467,408	359,574	2,846	405,547	53,288	1,795,028	739,466
22	Lancaster, PA	558,589	127,940	112,749	12,689	43,953	32,546	298	46,971	5,306	111,949	46,567
22	Logan, UT-ID	157,887	45,666	16,972	2,851	12,407	4,168	41	6,457	2,211	26,848	15,751
25	Salt Lake City-Provo-Orem, UT-ID	2,805,734	771,304	314,357	47,547	225,519	74,264	690	121,225	37,296	720,985	235,887

Notes:

Cities are ranked using the highest weighted average for any county within that Combined Metropolitan Statistical Area or Metropolitan Statistical Area.

Adding across rows does not produce valid estimates. Adding the disease categories (asthma, COPD, etc.) will double-count people who fall into more than one category.

Table 2b People at Risk in 25 U.S. Cities Most Polluted by Year-Round Particle Pollution (Annual $PM_{2.5}$)

2025 Rank	Metropolitan Statistical Areas	Total Population	Under 18	65 and Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	People of Color	Poverty
1	Bakersfield-Delano, CA	913,820	259,728	111,264	16,473	57,210	25,454	313	42,581	9,148	639,578	169,857
2	Visalia, CA	479,468	140,917	58,469	8,938	29,621	13,260	164	22,217	4,853	355,437	83,050
3	Fresno-Hanford-Corcoran, CA	1,332,702	364,673	175,198	23,129	84,749	38,374	457	64,440	13,466	972,180	229,167
4	Eugene-Springfield, OR	381,181	65,661	81,956	4,563	37,332	20,889	159	26,719	3,537	78,370	54,725
5	Los Angeles-Long Beach, CA	18,316,743	3,923,848	2,876,482	248,870	1,263,845	602,613	6,262	1,025,571	189,174	13,036,866	2,228,294
6	Detroit-Warren-Ann Arbor, MI	5,361,927	1,139,647	989,127	82,844	467,408	359,574	2,846	405,547	53,288	1,795,028	739,466
6	San Jose-San Francisco-Oakland, CA	9,001,024	1,861,823	1,497,266	118,086	627,407	303,409	3,078	517,775	91,577	5,990,798	872,151
8	Houston-Pasadena, TX	7,706,626	1,967,004	990,110	148,098	486,725	282,905	3,288	429,147	97,728	5,106,048	1,058,803
9	Cleveland-Akron-Canton, OH	3,732,803	773,498	767,567	52,388	326,574	241,288	2,289	300,854	38,634	928,916	477,528
10	Fairbanks-College, AK	94,840	22,535	12,395	1,565	7,941	3,951	49	4,980	1,202	30,209	7,015
11	Indianapolis-Carmel-Muncie, IN	2,651,953	629,614	417,423	42,718	234,648	164,452	1,645	195,165	31,238	763,082	292,453
12	Pittsburgh-Weirton-Steubenville, PA-OH-WV	2,727,866	508,773	605,974	50,022	227,806	173,588	1,468	250,600	25,746	410,735	313,183
13	Chicago-Naperville, IL-IN-WI	9,794,558	2,121,326	1,642,328	135,642	747,355	491,566	5,583	611,557	99,967	4,756,478	1,066,086
14	Cincinnati-Wilmington, OH-KY-IN	2,313,417	530,030	395,801	38,809	197,431	151,078	1,509	177,422	25,551	527,325	251,071
14	Sacramento-Roseville, CA	2,706,315	593,708	474,959	37,656	185,863	91,589	924	156,808	27,170	1,368,720	297,127
16	Brownsville-Harlingen-Raymondville, TX	446,747	125,079	64,917	9,417	27,393	16,644	191	25,463	5,200	406,406	103,978
17	Medford-Grants Pass, OR	308,589	61,414	76,999	4,268	29,192	18,034	129	23,597	2,417	62,148	40,445
17	Missoula, MT	126,939	22,681	22,869	1,532	12,369	6,916	57	7,793	1,473	15,909	14,224
17	St. Louis-St. Charles-Farmington, MO-IL	2,900,730	625,580	538,402	47,592	224,152	182,663	1,746	229,436	30,409	777,225	302,295
20	Kalamazoo-Battle Creek-Portage, MI	456,459	100,251	80,613	7,287	39,453	29,110	242	32,526	4,841	105,192	58,511
20	Phoenix-Mesa, AZ	5,124,113	1,127,488	883,602	90,893	412,019	217,161	1,942	303,431	55,017	2,382,001	562,977
22	Texarkana, TX-AR	145,907	34,333	26,385	2,511	10,172	7,693	75	11,124	1,592	52,952	23,723
23	El Centro, CA	179,057	50,348	25,158	3,193	11,282	5,219	61	8,804	1,651	163,029	29,810
23	Yakima, WA	256,643	73,483	37,805	5,371	19,664	7,921	121	12,204	2,502	154,962	40,910
25	Spokane-Spokane Valley-Coeur d'Alene, WA-ID	785,302	168,696	148,630	12,182	65,934	30,875	359	45,908	8,007	126,868	90,163

Notes:

Cities are ranked using the highest design value for any county within that Combined Metropolitan Statistical Area or Metropolitan Statistical Area.

Adding across rows does not produce valid estimates. Adding the disease categories (asthma, COPD, etc.) will double-count people who have been diagnosed with more than one disease.

Table 2c People at Risk in 25 Most Ozone-Polluted Cities

2025 Rank	Metropolitan Statistical Areas	Total Population	Under 18	65 and Over	Pediatric Asthma	Adult Asthma	COPD	CV Disease	Pregnancies	People of Color	Poverty
1	Los Angeles-Long Beach, CA	18,316,743	3,923,848	2,876,482	248,870	1,263,845	602,613	1,025,571	189,174	13,036,866	2,228,294
2	Visalia, CA	479,468	140,917	58,469	8,938	29,621	13,260	22,217	4,853	355,437	83,050
3	Bakersfield-Delano, CA	913,820	259,728	111,264	16,473	57,210	25,454	42,581	9,148	639,578	169,857
4	Phoenix-Mesa, AZ	5,124,113	1,127,488	883,602	90,893	412,019	217,161	303,431	55,017	2,382,001	562,977
5	Fresno-Hanford-Corcoran, CA	1,332,702	364,673	175,198	23,129	84,749	38,374	64,440	13,466	972,180	229,167
6	Denver-Aurora-Greeley, CO	3,691,404	766,337	542,420	53,221	334,291	129,858	182,148	39,810	1,355,755	321,700
7	Houston-Pasadena, TX	7,706,626	1,967,004	990,110	148,098	486,725	282,905	429,147	97,728	5,106,048	1,058,803
8	San Diego-Chula Vista-Carlsbad, CA	3,269,973	675,125	520,284	42,820	227,652	107,004	181,254	34,028	1,859,156	319,714
9	Salt Lake City-Provo-Orem, UT-ID	2,805,734	771,304	314,357	47,547	225,519	74,264	121,225	37,296	720,985	235,887
10	Dallas-Fort Worth, TX-OK	8,654,750	2,133,317	1,119,043	160,881	554,301	322,518	488,815	110,764	4,832,096	895,943
11	Sacramento-Roseville, CA	2,706,315	593,708	474,959	37,656	185,863	91,589	156,808	27,170	1,368,720	297,127
12	Las Vegas-Henderson, NV	2,392,293	521,126	397,842	37,280	164,626	130,769	138,996	24,076	1,450,276	305,770
13	Fort Collins-Loveland, CO	370,771	66,613	65,986	4,626	34,727	14,077	19,851	4,094	72,996	36,698
14	San Jose-San Francisco-Oakland, CA	9,001,024	1,861,823	1,497,266	118,086	627,407	303,409	517,775	91,577	5,990,798	872,151
15	Chicago-Naperville, IL-IN-WI	9,794,558	2,121,326	1,642,328	135,642	747,355	491,566	611,557	99,967	4,756,478	1,066,086
16	New York-Newark, NY-NJ-CT-PA	22,731,508	4,585,113	4,014,254	380,490	1,720,642	881,039	1,353,213	240,627	12,232,605	2,789,907
17	El Centro, CA	179,057	50,348	25,158	3,193	11,282	5,219	8,804	1,651	163,029	29,810
18	El Paso-Las Cruces, TX-NM	1,098,541	274,904	156,492	20,500	72,104	39,813	61,937	13,219	940,363	202,525
19	Tulsa-Bartlesville-Muskogee, OK	1,165,140	282,064	195,327	27,637	99,871	68,921	91,038	13,481	448,694	168,495
20	San Antonio-New Braunfels-Kerrville, TX	2,785,647	667,183	406,533	50,232	180,151	107,861	164,557	34,720	1,836,422	367,038
21	St. Louis-St. Charles-Farmington, MO-IL	2,900,730	625,580	538,402	47,592	224,152	182,663	229,436	30,409	777,225	302,295
22	Albuquerque-Santa Fe-Los Alamos, NM	1,168,363	229,761	243,368	16,413	91,815	47,095	79,693	11,425	717,410	158,778
23	Colorado Springs, CO	768,832	173,860	114,069	12,074	68,042	26,518	37,167	7,835	251,164	55,091
24	Redding-Red Bluff, CA	245,262	54,424	52,782	3,452	16,873	8,997	15,642	2,158	65,965	33,160
24	Sheboygan, WI	117,752	25,055	23,936	1,543	10,063	5,698	8,928	1,088	21,989	10,197

Notes:

Cities are ranked using the highest weighted average for any county within that Combined Metropolitan Statistical Area or Metropolitan Statistical Area.

Adding across rows does not produce valid estimates. Adding the disease categories (asthma, COPD, etc.) will double-count people who have been diagnosed with more than one disease.

Table 3a Cleanest U.S. Cities for Short-Term Particle Pollution (Daily $PM_{2.5}$)

Metropolitan Statistical Area	Population
Asheville-Waynesville-Brevard, NC	513,720
Bangor, ME	155,312
Burlington-Fort Madison, IA-IL	76,906
Charleston-North Charleston, SC	849,417
College Station-Bryan, TX	281,445
Fayetteville-Springdale-Rogers, AR	590,337
Gadsden, AL	103,241
Gulfport-Biloxi, MS	421,916
Hot Springs-Malvern, AR	133,042
Killeen-Temple, TX	501,333
Little Rock-North Little Rock, AR	913,536
Midland-Odessa-Andrews, TX	365,482
Mobile-Daphne-Fairhope, AL	665,147
Montgomery-Selma, AL	421,645
Pensacola-Ferry Pass-Brent, FL	530,090
Peoria-Canton, IL	394,781
Ponce-Coamo, PR	319,592
San Juan-Bayamón, PR	2,360,082
San Luis Obispo-Paso Robles, CA	281,639
Santa Maria-Santa Barbara, CA	441,257
Shreveport-Bossier City-Minden, LA	418,533
Tuscaloosa, AL	278,290

Note:
Monitors in these cities reported no days when $PM_{2.5}$ levels reached the unhealthful range using the Air Quality Index based on the 2012 NAAQS.

Table 3b Top 25 Cleanest U.S. Cities for Year-Round Particle Pollution (Annual $PM_{2.5}$)

2025 Rank	Design Value	Metropolitan Statistical Area	Population
1	3.7	Casper, WY	79,941
1	3.7	Urban Honolulu, HI	989,408
3	4.0	Kahului-Wailuku, HI	164,264
4	4.1	Bozeman, MT	126,409
5	4.8	Bangor, ME	155,312
6	5.1	St. George, UT	202,452
6	5.1	Anchorage, AK	401,314
8	5.2	Cheyenne, WY	100,984
9	5.3	Colorado Springs, CO	768,832
9	5.3	Grand Junction, CO	159,681
11	5.4	Wilmington, NC	467,337
12	5.7	Lubbock-Plainview, TX	396,955
13	5.9	Elmira-Corning, NY	173,487
13	5.9	Salinas, CA	430,723
15	6.0	Duluth-Grand Rapids, MN-WI	326,968
15	6.0	Gainesville-Lake City, FL	425,189
15	6.0	Amarillo-Borger, TX	292,428
18	6.1	Syracuse-Auburn, NY	727,441
19	6.2	Santa Rosa-Petaluma, CA	481,812
20	6.3	Asheville-Waynesville-Brevard, NC	513,720
21	6.4	Burlington-South Burlington-Barre, VT	288,084
22	6.6	Pittsfield, MA	126,818
23	6.7	San Juan-Bayamón, PR	2,360,082
23	6.7	Portland-Vancouver-Salem, OR-WA	3,286,669
23	6.7	Lynchburg, VA	264,590

Notes:
Cities are ranked by using the highest design value for any county within that metropolitan area.

Table 3c Cleanest U.S. Cities for Ozone Air Pollution

Metropolitan Statistical Area	Population
Augusta-Richmond County, GA-SC	629,429
Bangor, ME	155,312
Bellingham, WA	231,919
Brunswick-St. Simons, GA	116,074
Charleston-Huntington-Ashland, WV-OH-KY	643,394
Charlottesville, VA	225,127
Crestview-Fort Walton Beach-Destin, FL	304,818
Fairbanks-College, AK	94,840
Florence, SC	199,630
Gadsden, AL	103,241
Gainesville-Lake City, FL	425,189
Grand Junction, CO	159,681
Greenville-Washington, NC	219,600
Johnson City-Kingsport-Bristol, TN-VA	598,800
Mayagüez-Aguadilla, PR	458,312
Middlesborough-Corbin, KY	172,880
Missoula, MT	126,939
Monroe-Ruston, LA	269,847
Montgomery-Selma, AL	421,645
Myrtle Beach-Conway, SC	463,209
North Port-Bradenton, FL	1,152,221
Palm Bay-Melbourne-Titusville, FL	643,979
Panama City-Panama City Beach, FL	216,371
Pocatello, ID	90,400
Prescott Valley-Prescott, AZ	249,081
Roanoke, VA	314,314
Rocky Mount-Wilson-Roanoke Rapids, NC	288,366
Salinas, CA	430,723
San Juan-Bayamón, PR	2,360,082
Santa Rosa-Petaluma, CA	481,812
Tallahassee-Bainbridge, FL-GA	421,732
Tuscaloosa, AL	278,290
Urban Honolulu, HI	989,408
Victoria-Port Lavaca, TX	118,504
Wilmington, NC	467,337

Notes:

1. This list represents cities with no monitored ozone air pollution in unhealthful ranges using the Air Quality Index based on 2015 NAAQS.

Table 4a Cleanest Counties for Short-Term Particle Pollution (Daily $PM_{2.5}$)

County	State	Metropolitan Statistical Area
Juneau City and Borough	AK	
Baldwin	AL	Mobile-Daphne-Fairhope, AL
Clay	AL	
DeKalb	AL	Huntsville-Decatur-Albertville, AL-TN
Etowah	AL	Gadsden, AL
Mobile	AL	Mobile-Daphne-Fairhope, AL
Montgomery	AL	Montgomery-Selma, AL
Sumter	AL	
Tuscaloosa	AL	Tuscaloosa, AL
Arkansas	AR	
Crittenden	AR	Memphis-Clarksdale-Forrest City, TN-MS-AR
Garland	AR	Hot Springs-Malvern, AR
Jackson	AR	
Polk	AR	
Pulaski	AR	Little Rock-North Little Rock, AR
Washington	AR	Fayetteville-Springdale-Rogers, AR
Apache	AZ	
Pima	AZ	Tucson-Nogales, AZ
Marin	CA	San Jose-San Francisco-Oakland, CA
San Francisco	CA	San Jose-San Francisco-Oakland, CA
San Luis Obispo	CA	San Luis Obispo-Paso Robles, CA
Santa Barbara	CA	Santa Maria-Santa Barbara, CA
Ventura	CA	Los Angeles-Long Beach, CA
Escambia	FL	Pensacola-Ferry Pass-Brent, FL
Polk	FL	Orlando-Lakeland-Deltona, FL
Clayton	GA	Atlanta--Athens-Clarke County--Sandy Springs, GA-AL
Hawaii	HI	
Lee	IA	Burlington-Fort Madison, IA-IL
Madison	IL	St. Louis-St. Charles-Farmington, MO-IL
Peoria	IL	Peoria-Canton, IL
Caddo Parish	LA	Shreveport-Bossier City-Minden, LA
Iberville Parish	LA	Baton Rouge-Hammond, LA
Orleans Parish	LA	New Orleans-Metairie-Slidell, LA-MS
St. Bernard Parish	LA	New Orleans-Metairie-Slidell, LA-MS
Tangipahoa Parish	LA	Baton Rouge-Hammond, LA
Androscoggin	ME	Portland-Lewiston-South Portland, ME
Hancock	ME	
Kennebec	ME	
Penobscot	ME	Bangor, ME
Allegan	MI	Grand Rapids-Wyoming, MI
Manistee	MI	
Cedar	MO	
Hancock	MS	Gulfport-Biloxi, MS
Harrison	MS	Gulfport-Biloxi, MS
Jackson	MS	Gulfport-Biloxi, MS
Buncombe	NC	Asheville-Waynesville-Brevard, NC
Essex	NY	
Suffolk	NY	New York-Newark, NY-NJ-CT-PA
Bayamón	PR	San Juan-Bayamón, PR
Caguas	PR	San Juan-Bayamón, PR
Fajardo	PR	San Juan-Bayamón, PR
Guaynabo	PR	San Juan-Bayamón, PR
Ponce	PR	Ponce-Coamo, PR
Charleston	SC	Charleston-North Charleston, SC
Edgefield	SC	Augusta-Richmond County, GA-SC
Lawrence	TN	Nashville-Davidson--Murfreesboro, TN
Shelby	TN	Memphis-Clarksdale-Forrest City, TN-MS-AR
Bell	TX	Killeen-Temple, TX
Brazos	TX	College Station-Bryan, TX
Ector	TX	Midland-Odessa-Andrews, TX
Carbon	UT	
Norfolk City	VA	Virginia Beach-Chesapeake, VA-NC

Notes:

Monitors in these counties reported no days when $PM_{2.5}$ levels reached the unhealthful range using the Air Quality Index based on the 2012 NAAQS.

Table 4b Top 25 Cleanest Counties for Year-Round Particle Pollution (Annual $PM_{2.5}$)

2024 Rank	County	State	Design Value	Metropolitan Statistical Area
1	Fremont	WY	2.1	
2	Cook	MN	2.7	
3	La Paz	AZ	3.4	
4	Hughes	SD	3.6	
5	Honolulu	HI	3.7	Urban Honolulu, HI
5	Hancock	ME	3.7	
5	Carlton	MN	3.7	Duluth-Grand Rapids, MN-WI
5	Natrona	WY	3.7	Casper, WY
5	Sublette	WY	3.7	
10	Hillsborough	NH	3.9	Boston-Worcester-Providence, MA-RI-NH
11	Maui	HI	4.0	Kahului-Wailuku, HI
11	Essex	NY	4.0	
11	Teton	WY	4.0	
14	Gallatin	MT	4.1	Bozeman, MT
15	Matanuska-Susitna Borough	AK	4.3	Anchorage, AK
16	Hawaii	HI	4.4	
17	Park	WY	4.5	
18	Juneau City and Borough	AK	4.6	
18	Scotts Bluff	NE	4.6	
18	Custer	SD	4.6	Rapid City-Spearfish, SD
21	Penobscot	ME	4.8	Bangor, ME
21	Belknap	NH	4.8	Boston-Worcester-Providence, MA-RI-NH
23	Lake	CA	4.9	
23	San Benito	CA	4.9	San Jose-San Francisco-Oakland, CA
23	Litchfield	CT	4.9	New Haven-Hartford-Waterbury, CT
23	Lake	MN	4.9	
23	Taos	NM	4.9	
23	Kent	RI	4.9	Boston-Worcester-Providence, MA-RI-NH

Notes:
Counties are ranked by Design Value.

Table 4c Cleanest Counties for Ozone Air Pollution

County	State	Metropolitan Statistical Area
Denali Borough	AK	
Fairbanks North Star Borough	AK	Fairbanks-College, AK
Baldwin	AL	Mobile-Daphne-Fairhope, AL
Elmore	AL	Montgomery-Selma, AL
Etowah	AL	Gadsden, AL
Montgomery	AL	Montgomery-Selma, AL
Russell	AL	Columbus-Auburn-Opelika, GA-AL
Sumter	AL	
Tuscaloosa	AL	Tuscaloosa, AL
Clark	AR	
Yavapai	AZ	Prescott Valley-Prescott, AZ
Colusa	CA	
Glenn	CA	
Humboldt	CA	
Lake	CA	
Marin	CA	San Jose-San Francisco-Oakland, CA
Mendocino	CA	
Monterey	CA	Salinas, CA
San Benito	CA	San Jose-San Francisco-Oakland, CA
San Francisco	CA	San Jose-San Francisco-Oakland, CA
San Mateo	CA	San Jose-San Francisco-Oakland, CA
Santa Cruz	CA	San Jose-San Francisco-Oakland, CA
Siskiyou	CA	
Sonoma	CA	Santa Rosa-Petaluma, CA
Archuleta	CO	
Mesa	CO	Grand Junction, CO
Alachua	FL	Gainesville-Lake City, FL
Baker	FL	Jacksonville-Kingsland-Palatka, FL-GA
Bay	FL	Panama City-Panama City Beach, FL
Brevard	FL	Palm Bay-Melbourne-Titusville, FL
Broward	FL	Miami-Port St. Lucie-Fort Lauderdale, FL
Collier	FL	Cape Coral-Fort Myers-Naples, FL
Columbia	FL	Gainesville-Lake City, FL
Flagler	FL	Orlando-Lakeland-Deltona, FL
Holmes	FL	
Indian River	FL	Miami-Port St. Lucie-Fort Lauderdale, FL
Lake	FL	Orlando-Lakeland-Deltona, FL
Leon	FL	Tallahassee-Bainbridge, FL-GA
Liberty	FL	
Manatee	FL	North Port-Bradenton, FL
Martin	FL	Miami-Port St. Lucie-Fort Lauderdale, FL
Okaloosa	FL	Crestview-Fort Walton Beach-Destin, FL
Osceola	FL	Orlando-Lakeland-Deltona, FL
Palm Beach	FL	Miami-Port St. Lucie-Fort Lauderdale, FL
Pasco	FL	Tampa-St. Petersburg-Clearwater, FL
Santa Rosa	FL	Pensacola-Ferry Pass-Brent, FL
Sarasota	FL	North Port-Bradenton, FL
Seminole	FL	Orlando-Lakeland-Deltona, FL
St. Lucie	FL	Miami-Port St. Lucie-Fort Lauderdale, FL
Volusia	FL	Orlando-Lakeland-Deltona, FL
Wakulla	FL	Tallahassee-Bainbridge, FL-GA
Chattooga	GA	Chattanooga-Cleveland-Dalton, TN-GA-AL
Columbia	GA	Augusta-Richmond County, GA-SC
Glynn	GA	Brunswick-St. Simons, GA
Richmond	GA	Augusta-Richmond County, GA-SC
Sumter	GA	
Honolulu	HI	Urban Honolulu, HI
Bannock	ID	Pocatello, ID
Neosho	KS	
Bell	KY	Middlesborough-Corbin, KY
Boyd	KY	Charleston-Huntington-Ashland, WV-OH-KY
Carter	KY	Charleston-Huntington-Ashland, WV-OH-KY
Greenup	KY	Charleston-Huntington-Ashland, WV-OH-KY
Morgan	KY	
Perry	KY	
Pike	KY	
Pulaski	KY	
Bossier Parish	LA	Shreveport-Bossier City-Minden, LA
Ouachita Parish	LA	Monroe-Ruston, LA
Garrett	MD	
Androscoggin	ME	Portland-Lewiston-South Portland, ME
Aroostook	ME	
Kennebec	ME	
Oxford	ME	
Penobscot	ME	Bangor, ME
Washington	ME	
Carlton	MN	Duluth-Grand Rapids, MN-WI
Lake	MN	
Lauderdale	MS	
Flathead	MT	
Missoula	MT	Missoula, MT
Avery	NC	
Buncombe	NC	Asheville-Waynesville-Brevard, NC
Caldwell	NC	Charlotte-Concord, NC-SC
Caswell	NC	
Durham	NC	Raleigh-Durham-Cary, NC
Edgecombe	NC	Rocky Mount-Wilson-Roanoke Rapids, NC
Macon	NC	
Martin	NC	
Montgomery	NC	
New Hanover	NC	Wilmington, NC

Note:
This list represents counties with no monitored ozone air pollution in unhealthful ranges using the Air Quality Index based on 2015 NAAQS.

Table 4c Cleanest Counties for Ozone Air Pollution (cont.)

County	State	Metropolitan Statistical Area
Pitt	NC	Greenville-Washington, NC
Yancey	NC	
Belknap	NH	Boston-Worcester-Providence, MA-RI-NH
Grafton	NH	
Atlantic	NJ	Philadelphia-Reading-Camden, PA-NJ-DE-MD
Warren	NJ	Allentown-Bethlehem-East Stroudsburg, PA-NJ
Hamilton	NY	
Lawrence	OH	Charleston-Huntington-Ashland, WV-OH-KY
Washington	OH	Parkersburg-Marietta-Vienna, WV-OH
Washington	OR	Portland-Vancouver-Salem, OR-WA
Somerset	PA	Johnstown-Somerset, PA
Tioga	PA	
Bayamón	PR	San Juan-Bayamón, PR
Mayagüez	PR	Mayagüez-Aguadilla, PR
Aiken	SC	Augusta-Richmond County, GA-SC
Anderson	SC	Greenville-Spartanburg-Anderson, SC
Charleston	SC	Charleston-North Charleston, SC
Chesterfield	SC	
Darlington	SC	Florence, SC
Edgefield	SC	Augusta-Richmond County, GA-SC
Horry	SC	Myrtle Beach-Conway, SC
DeKalb	TN	
Knox	TN	Knoxville-Morristown-Sevierville, TN
Loudon	TN	Knoxville-Morristown-Sevierville, TN
Sullivan	TN	Johnson City-Kingsport-Bristol, TN-VA
Polk	TX	
Rockwall	TX	Dallas-Fort Worth, TX-OK
Victoria	TX	Victoria-Port Lavaca, TX
Albemarle	VA	Charlottesville, VA
Charles City	VA	Richmond, VA
Hampton City	VA	Virginia Beach-Chesapeake, VA-NC
Prince Edward	VA	
Roanoke	VA	Roanoke, VA
Rockbridge	VA	
Wythe	VA	
Rutland	VT	
Clallam	WA	
Columbia	WA	
Pierce	WA	Seattle-Tacoma, WA
Skagit	WA	Seattle-Tacoma, WA
Whatcom	WA	Bellingham, WA
Cabell	WV	Charleston-Huntington-Ashland, WV-OH-KY
Greenbrier	WV	
Kanawha	WV	Charleston-Huntington-Ashland, WV-OH-KY
Tucker	WV	
Weston	WY	

Note:
This list represents counties with no monitored ozone air pollution in unhealthful ranges using the Air Quality Index based on 2015 NAAQS.

ALABAMA

American Lung Association in Alabama

	HIGH OZONE DAYS 2021–2023					HIGH PARTICLE POLLUTION DAYS 2021–2023							
						24-Hour						Annual	
County	Orange	Red	Purple	Wgt. Avg.	Grade	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Baldwin	0	0	0	0.0	A	0	0	0	0	0.0	A	7.4	Pass
Clay	DNC	DNC	DNC	DNC	DNC	0	0	0	0	0.0	A	7.3	Pass
DeKalb	2	0	0	0.7	B	0	0	0	0	0.0	A	7.8	Pass
Elmore	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Etowah	0	0	0	0.0	A	0	0	0	0	0.0	A	INC	INC
Jefferson	15	0	0	5.0	F	2	0	0	0	0.7	B	9.6	Fail
Madison	4	0	0	1.3	C	1	0	0	0	0.3	B	7.7	Pass
Mobile	1	0	0	0.3	B	0	0	0	0	0.0	A	8.1	Pass
Montgomery	0	0	0	0.0	A	0	0	0	0	0.0	A	8.6	Pass
Morgan	2	0	0	0.7	B	1	0	0	0	0.3	B	7.8	Pass
Russell	0	0	0	0.0	A	3	0	0	0	1.0	C	9.5	Fail
Shelby	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Sumter	0	0	0	0.0	A	0	0	0	0	0.0	A	6.2	Pass
Tuscaloosa	0	0	0	0.0	A	0	0	0	0	0.0	A	7.8	Pass

ALABAMA

American Lung Association in Alabama

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Baldwin	253,507	53,110	55,923	4,547	17,840	19,436	145	27,152	2,512	24,942	44,952
Clay	14,111	2,954	3,084	253	995	1,088	8	1,517	138	2,337	2,818
DeKalb	72,569	17,272	13,132	1,479	4,911	5,075	42	6,935	744	15,494	16,441
Elmore	90,441	19,431	15,445	1,664	6,291	6,301	52	8,510	1,038	10,562	25,360
Etowah	103,241	22,589	20,695	1,934	7,162	7,554	59	10,433	1,087	19,921	24,165
Jefferson	662,895	151,180	114,194	12,944	45,093	44,486	376	60,275	7,914	103,120	344,111
Madison	412,600	88,468	66,539	7,575	28,627	27,931	236	37,431	4,759	41,983	154,711
Mobile	411,640	95,366	73,219	8,165	27,932	28,064	234	38,218	4,704	65,684	184,204
Montgomery	224,980	54,247	37,666	4,645	15,047	14,810	127	20,036	2,661	39,395	158,506
Morgan	125,133	29,034	23,040	2,486	8,530	8,821	72	12,070	1,275	14,759	34,132
Russell	58,744	14,401	9,408	1,233	3,923	3,885	33	5,230	674	10,957	32,660
Shelby	233,000	52,318	40,691	4,480	16,031	16,294	133	22,111	2,610	19,207	61,029
Sumter	11,727	2,293	2,408	196	825	818	7	1,130	148	3,607	8,618
Tuscaloosa	237,373	48,286	34,292	4,134	16,491	14,799	135	19,472	3,275	41,429	97,183

ALASKA

American Lung Association in Alaska

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Anchorage Municipality	DNC	DNC	DNC	DNC	DNC
Denali Borough	0	0	0	0.0	A
Fairbanks North Star Borough	0	0	0	0.0	A
Juneau City and Borough	DNC	DNC	DNC	DNC	DNC
Matanuska-Susitna Borough	DNC	DNC	DNC	DNC	DNC

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Anchorage Municipality	3	0	0	0	1.0	C	5.1	Pass
Denali Borough	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Fairbanks North Star Borough	51	39	2	1	38.7	F	12.1	Fail
Juneau City and Borough	0	0	0	0	0.0	A	4.6	Pass
Matanuska-Susitna Borough	3	1	0	0	1.5	C	4.3	Pass

ALASKA

American Lung Association in Alaska

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Anchorage Municipality	286,075	66,690	38,032	4,632	24,072	12,385	149	15,882	3,771	24,807	128,186
Denali Borough	1,584	293	213	20	142	76	1	100	19	123	407
Fairbanks North Star Borough	94,840	22,535	12,395	1,565	7,941	3,951	49	4,980	1,202	7,015	30,209
Juneau City and Borough	31,555	6,288	5,356	437	2,762	1,553	16	2,075	395	2,815	11,610
Matanuska-Susitna Borough	115,239	29,114	16,390	2,022	9,433	5,087	60	6,672	1,362	10,906	26,141

ARIZONA

American Lung Association in Arizona

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Apache	DNC	DNC	DNC	DNC	DNC
Cochise	4	0	0	1.3	C
Coconino	2	0	0	0.7	B
Gila	31	2	0	11.3	F
La Paz	2	0	0	0.7	B
Maricopa	149	9	1	54.8	F
Navajo	1	0	0	0.3	B
Pima	13	0	0	4.3	F
Pinal	56	1	0	19.2	F
Santa Cruz	DNC	DNC	DNC	DNC	DNC
Yavapai	0	0	0	0.0	A
Yuma	8	0	0	2.7	D

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Apache	0	0	0	0	0.0	A	INC	INC
Cochise	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Coconino	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Gila	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
La Paz	1	0	0	0	0.3	B	3.4	Pass
Maricopa	8	6	1	0	6.3	F	10.1	Fail
Navajo	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Pima	0	0	0	0	0.0	A	6.2	Pass
Pinal	14	1	0	0	5.2	F	10.4	Fail
Santa Cruz	3	1	0	0	1.5	C	9.4	Fail
Yavapai	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Yuma	5	2	0	0	2.7	D	8.5	Pass

ARIZONA

American Lung Association in Arizona

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Apache	65,036	16,671	11,219	1,344	4,976	2,711	25	3,798	632	18,929	52,439
Cochise	124,640	25,421	31,957	2,049	10,149	6,423	47	9,081	1,073	19,759	55,187
Coconino	144,472	27,607	21,678	2,226	12,139	5,635	55	7,780	1,891	23,888	67,256
Gila	54,003	10,035	17,047	809	4,467	3,183	20	4,532	407	9,431	20,312
La Paz	16,710	2,554	7,281	206	1,429	1,182	6	1,693	107	3,097	6,923
Maricopa	4,585,871	1,013,496	762,598	81,703	368,476	191,419	1,738	267,191	50,097	498,844	2,145,576
Navajo	109,175	27,120	22,446	2,186	8,414	4,958	41	6,983	988	26,533	61,677
Pima	1,063,162	205,102	234,094	16,534	88,255	50,455	403	70,848	11,131	144,676	516,317
Pinal	484,239	103,957	103,957	8,381	39,076	22,559	184	31,708	4,513	54,702	216,113
Santa Cruz	49,158	12,346	9,762	995	3,781	2,173	19	3,055	484	9,831	41,385
Yavapai	249,081	37,931	86,556	3,058	21,401	15,827	94	22,584	1,780	31,465	52,930
Yuma	213,221	52,032	44,803	4,195	16,613	9,363	81	13,124	1,994	32,657	150,663

ARKANSAS

American Lung Association in Arkansas

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Arkansas	DNC	DNC	DNC	DNC	DNC
Ashley	DNC	DNC	DNC	DNC	DNC
Clark	0	0	0	0.0	A
Crittenden	12	1	0	4.5	F
Garland	DNC	DNC	DNC	DNC	DNC
Jackson	DNC	DNC	DNC	DNC	DNC
Newton	1	0	0	0.3	B
Polk	2	0	0	0.7	B
Pulaski	6	0	0	2.0	C
Union	DNC	DNC	DNC	DNC	DNC
Washington	8	0	0	2.7	D

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Arkansas	0	0	0	0	0.0	A	8.0	Pass
Ashley	1	0	0	0	0.3	B	8.1	Pass
Clark	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Crittenden	0	0	0	0	0.0	A	8.2	Pass
Garland	0	0	0	0	0.0	A	INC	INC
Jackson	0	0	0	0	0.0	A	INC	INC
Newton	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Polk	0	0	0	0	0.0	A	8.3	Pass
Pulaski	0	0	0	0	0.0	A	10.0	Fail
Union	1	0	0	0	0.3	B	9.3	Fail
Washington	0	0	0	0	0.0	A	7.7	Pass

ARKANSAS

American Lung Association in Arkansas

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Arkansas	16,307	3,758	3,342	261	1,248	1,194	11	1,624	171	2,697	5,272
Ashley	18,262	4,157	4,035	289	1,398	1,375	12	1,891	181	3,338	5,905
Clark	21,274	4,309	3,579	299	1,683	1,389	14	1,780	291	3,512	6,782
Crittenden	47,139	12,725	7,303	884	3,444	3,009	31	3,939	555	9,578	29,052
Garland	99,784	19,595	25,335	1,361	7,889	7,961	65	11,077	984	18,604	19,905
Jackson	16,784	3,318	3,071	230	1,340	1,178	11	1,549	192	3,513	4,136
Newton	7,071	1,313	1,970	91	565	592	5	836	61	1,313	484
Polk	19,436	4,295	4,578	298	1,495	1,493	13	2,067	184	3,619	2,586
Pulaski	400,009	92,612	68,573	6,432	30,633	26,789	261	35,145	4,846	61,392	204,294
Union	37,397	8,976	7,472	623	2,821	2,653	24	3,587	388	6,969	15,026
Washington	261,549	60,562	32,950	4,206	20,133	15,598	171	19,313	3,489	34,017	83,294

CALIFORNIA

American Lung Association in California

	HIGH OZONE DAYS 2021–2023					HIGH PARTICLE POLLUTION DAYS 2021–2023							
						24-Hour						Annual	
County	Orange	Red	Purple	Wgt. Avg.	Grade	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Alameda	15	1	0	5.5	F	6	0	0	0	2.0	C	8.9	Pass
Amador	5	0	0	1.7	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Butte	9	0	0	3.0	D	8	7	0	0	6.2	F	8.9	Pass
Calaveras	6	0	0	2.0	C	4	3	0	0	2.8	D	6.7	Pass
Colusa	0	0	0	0.0	A	10	6	1	0	7.0	F	8.9	Pass
Contra Costa	6	0	0	2.0	C	5	0	0	0	1.7	C	9.6	Fail
El Dorado	37	2	0	13.3	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Fresno	121	13	0	46.8	F	71	9	1	0	28.8	F	14.8	Fail
Glenn	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Humboldt	0	0	0	0.0	A	6	1	4	0	5.2	F	6.9	Pass
Imperial	52	4	0	19.3	F	17	3	0	0	7.2	F	10.2	Fail
Inyo	14	0	0	4.7	F	28	13	3	1	18.7	F	7.4	Pass
Kern	172	31	0	72.8	F	104	18	1	0	44.3	F	16.2	Fail
Kings	46	2	0	16.3	F	66	9	0	0	26.5	F	14.1	Fail
Lake	0	0	0	0.0	A	0	1	0	0	0.5	B	4.9	Pass
Los Angeles	169	79	4	98.5	F	22	5	0	0	9.8	F	12.2	Fail
Madera	41	4	0	15.7	F	17	4	0	0	7.7	F	10.9	Fail
Marin	0	0	0	0.0	A	0	0	0	0	0.0	A	6.4	Pass
Mariposa	26	3	0	10.2	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Mendocino	0	0	0	0.0	A	12	2	0	0	5.0	F	11.0	Fail
Merced	42	1	0	14.5	F	19	2	0	0	7.3	F	10.4	Fail
Mono	DNC	DNC	DNC	DNC	DNC	11	11	0	0	9.2	F	8.0	Pass
Monterey	0	0	0	0.0	A	1	0	0	0	0.3	B	5.9	Pass
Napa	INC	INC	INC	INC	INC	INC	INC	INC	INC	INC	INC	INC	INC
Nevada	47	6	0	18.7	F	6	15	4	0	12.2	F	6.5	Pass
Orange	21	3	0	8.5	F	11	0	0	0	3.7	F	10.2	Fail
Placer	60	5	0	22.5	F	7	10	5	0	10.7	F	8.9	Pass
Plumas	DNC	DNC	DNC	DNC	DNC	30	12	2	0	17.3	F	14.0	Fail
Riverside	205	84	5	113.7	F	24	12	0	0	14.0	F	12.6	Fail
Sacramento	46	3	0	16.8	F	19	5	1	1	10.3	F	9.9	Fail
San Benito	0	0	0	0.0	A	1	0	0	0	0.3	B	4.9	Pass
San Bernardino	190	150	23	153.7	F	14	7	0	0	8.2	F	13.1	Fail
San Diego	81	1	0	27.5	F	1	0	0	0	0.3	B	9.2	Fail
San Francisco	0	0	0	0.0	A	0	0	0	0	0.0	A	INC	INC
San Joaquin	3	0	1	1.7	C	26	1	0	0	9.2	F	11.2	Fail
San Luis Obispo	13	0	0	4.3	F	0	0	0	0	0.0	A	8.0	Pass
San Mateo	0	0	0	0.0	A	1	0	0	0	0.3	B	7.0	Pass
Santa Barbara	1	0	0	0.3	B	0	0	0	0	0.0	A	7.5	Pass
Santa Clara	13	0	0	4.3	F	4	0	0	0	1.3	C	9.1	Fail

CALIFORNIA (cont.)

American Lung Association in California

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Santa Cruz	0	0	0	0.0	A
Shasta	15	0	0	5.0	F
Siskiyou	0	0	0	0.0	A
Solano	3	0	0	1.0	C
Sonoma	0	0	0	0.0	A
Stanislaus	57	3	0	20.5	F
Sutter	17	1	0	6.2	F
Tehama	29	0	0	9.7	F
Tulare	209	38	0	88.7	F
Tuolumne	5	0	0	1.7	C
Ventura	32	0	0	10.7	F
Yolo	6	0	0	2.0	C

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Santa Cruz	1	0	0	0	0.3	B	5.4	Pass
Shasta	5	3	0	0	3.2	D	INC	INC
Siskiyou	15	31	6	2	26.2	F	11.7	Fail
Solano	1	0	0	0	0.3	B	7.3	Pass
Sonoma	2	0	0	0	0.7	B	6.2	Pass
Stanislaus	30	4	0	0	12.0	F	13.0	Fail
Sutter	9	5	0	0	5.5	F	11.2	Fail
Tehama	10	15	0	0	10.8	F	7.5	Pass
Tulare	64	26	2	1	36.5	F	15.7	Fail
Tuolumne	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Ventura	0	0	0	0	0.0	A	7.5	Pass
Yolo	1	0	0	0	0.3	B	8.2	Pass

CALIFORNIA

American Lung Association in California

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Alameda	1,622,188	315,933	261,127	20,038	114,690	54,586	554	92,845	17,467	151,872	1,169,893
Amador	41,811	6,512	11,749	413	3,139	1,823	14	3,219	271	4,400	10,582
Butte	207,172	42,199	38,881	2,676	14,503	7,075	71	12,053	2,167	40,532	69,617
Calaveras	46,565	8,156	13,834	517	3,425	2,062	16	3,663	334	5,639	10,667
Colusa	22,037	5,915	3,519	375	1,417	689	8	1,177	207	2,677	15,235
Contra Costa	1,155,025	250,439	204,829	15,884	79,697	40,145	394	69,177	11,214	95,369	708,220
El Dorado	192,215	37,109	46,788	2,354	13,764	7,746	66	13,622	1,566	13,438	49,095
Fresno	1,017,162	280,038	134,321	17,761	64,544	29,306	348	49,247	10,334	177,171	748,856
Glenn	28,129	7,470	4,853	474	1,819	908	10	1,559	254	3,769	14,758
Humboldt	133,985	24,839	27,304	1,575	9,615	4,851	46	8,330	1,398	21,856	38,892
Imperial	179,057	50,348	25,158	3,193	11,282	5,219	61	8,804	1,651	29,810	163,029
Inyo	18,527	3,668	4,751	233	1,319	747	6	1,312	149	2,169	7,602
Kern	913,820	259,728	111,264	16,473	57,210	25,454	313	42,581	9,148	169,857	639,578
Kings	152,682	40,721	17,031	2,583	9,770	4,163	53	6,884	1,409	23,950	109,842
Lake	67,878	14,900	16,670	945	4,702	2,653	23	4,660	538	11,790	23,796
Los Angeles	9,663,345	1,952,770	1,520,769	123,854	676,891	321,289	3,302	546,261	102,191	1,299,957	7,221,232
Madera	162,858	43,914	23,846	2,785	10,435	4,905	56	8,309	1,723	28,046	113,482
Marin	254,407	48,217	62,745	3,058	18,319	10,472	87	18,488	1,972	21,535	83,352
Mariposa	16,919	3,036	5,243	193	1,239	753	6	1,338	122	2,899	4,129
Mendocino	89,108	18,532	22,654	1,175	6,266	3,552	30	6,241	739	12,295	33,870
Merced	291,920	82,900	34,885	5,258	18,274	8,064	100	13,461	2,981	53,192	223,791
Mono	13,066	2,257	2,520	143	952	481	4	829	123	1,013	4,555
Monterey	430,723	109,668	66,686	6,956	28,193	13,461	147	22,887	4,142	58,136	313,544
Napa	133,216	25,378	29,031	1,610	9,534	5,076	46	8,831	1,206	11,581	67,693
Nevada	102,037	17,159	30,744	1,088	7,567	4,544	35	8,064	783	10,990	17,386
Orange	3,135,755	645,880	529,921	40,965	219,019	107,518	1,072	184,240	31,411	284,696	1,962,915
Placer	423,561	91,096	88,767	5,778	29,391	15,629	145	27,189	3,820	27,088	139,188
Plumas	19,131	3,233	6,306	205	1,421	887	7	1,584	137	2,418	3,459
Riverside	2,492,442	593,261	392,274	37,628	166,819	79,992	853	136,219	24,848	278,442	1,719,040
Sacramento	1,584,288	357,753	250,123	22,690	107,691	51,284	541	87,181	16,417	185,867	936,276
San Benito	68,175	17,040	9,503	1,081	4,484	2,090	23	3,540	675	6,204	48,484
San Bernardino	2,195,611	553,808	283,489	35,125	143,727	64,943	751	109,152	22,803	284,772	1,656,876
San Diego	3,269,973	675,125	520,284	42,820	227,652	107,004	1,119	181,254	34,028	319,714	1,859,156
San Francisco	808,988	110,389	149,189	7,001	61,356	29,395	277	49,982	8,980	95,298	505,899
San Joaquin	800,965	207,474	110,407	13,159	52,028	24,103	274	40,743	8,082	99,266	587,263
San Luis Obispo	281,639	48,467	64,370	3,074	20,582	10,717	96	18,502	2,703	34,227	95,701
San Mateo	726,353	139,218	135,673	8,830	51,727	26,063	248	44,880	7,100	52,747	468,135
Santa Barbara	441,257	98,119	75,338	6,223	30,126	14,357	151	24,344	4,585	62,891	258,914
Santa Clara	1,877,592	374,375	289,344	23,745	131,880	61,922	643	105,005	19,418	139,084	1,359,960

CALIFORNIA (CONT.)

American Lung Association in California

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Santa Cruz	261,547	47,101	51,848	2,987	18,889	9,494	89	16,308	2,684	31,840	117,201
Shasta	180,366	38,814	39,483	2,462	12,516	6,683	62	11,618	1,607	23,527	42,035
Siskiyou	42,905	8,468	12,308	537	3,067	1,820	15	3,222	319	7,273	11,133
Solano	449,218	97,528	80,908	6,186	30,961	15,423	154	26,470	4,292	45,402	299,076
Sonoma	481,812	90,254	107,472	5,724	34,625	18,507	165	32,207	4,431	43,143	196,911
Stanislaus	551,430	145,831	77,777	9,249	35,568	16,576	189	28,045	5,506	68,761	351,831
Sutter	97,948	24,291	16,478	1,541	6,479	3,186	33	5,451	940	14,849	57,146
Tehama	64,896	15,610	13,299	990	4,357	2,314	22	4,024	551	9,633	23,930
Tulare	479,468	140,917	58,469	8,938	29,621	13,260	164	22,217	4,853	83,050	355,437
Tuolumne	54,204	9,352	15,553	593	3,989	2,324	19	4,099	399	5,390	11,882
Ventura	829,590	178,129	150,029	11,298	57,389	28,871	284	49,699	7,921	80,427	476,803
Yolo	220,544	43,139	30,613	2,736	15,494	6,717	75	11,132	2,779	31,960	125,905

COLORADO

American Lung Association in Colorado

	HIGH OZONE DAYS 2021–2023					HIGH PARTICLE POLLUTION DAYS 2021–2023							
						24-Hour						Annual	
County	Orange	Red	Purple	Wgt. Avg.	Grade	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Adams	38	0	0	12.7	F	3	3	0	0	2.5	D	8.5	Pass
Alamosa	DNC	DNC	DNC	DNC	DNC	INC	INC	INC	INC	INC	INC	INC	INC
Arapahoe	54	3	0	19.5	F	1	0	0	0	0.3	B	5.9	Pass
Archuleta	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Boulder	41	2	0	14.7	F	10	2	0	0	4.3	F	7.3	Pass
Chaffee	11	0	0	3.7	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Clear Creek	34	2	0	12.3	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Delta	INC	INC	INC	INC	INC	INC	INC	INC	INC	INC	INC	INC	INC
Denver	38	2	0	13.7	F	8	4	0	0	4.7	F	8.7	Pass
Douglas	65	7	0	25.2	F	4	2	0	0	2.3	D	5.5	Pass
El Paso	30	0	0	10.0	F	2	1	0	0	1.2	C	5.3	Pass
Garfield	12	0	0	4.0	F	INC	INC	INC	INC	INC	INC	INC	INC
Gilpin	26	1	0	9.2	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Grand	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Gunnison	3	0	0	1.0	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Jackson	INC	INC	INC	INC	INC	INC	INC	INC	INC	INC	INC	INC	INC
Jefferson	92	12	0	36.7	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
La Plata	4	0	0	1.3	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Larimer	55	5	0	20.8	F	3	0	0	0	1.0	C	7.1	Pass
Mesa	0	0	0	0.0	A	3	0	0	0	1.0	C	5.3	Pass
Montezuma	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Park	19	1	0	6.8	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Prowers	DNC	DNC	DNC	DNC	DNC	INC	INC	INC	INC	INC	INC	INC	INC
Pueblo	INC	INC	INC	INC	INC	1	0	0	0	0.3	B	INC	INC
Rio Blanco	8	1	0	3.2	D	3	1	0	0	1.5	C	7.2	Pass
San Miguel	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Weld	49	1	0	16.8	F	8	1	0	0	3.2	D	8.1	Pass

COLORADO

American Lung Association in Colorado

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Adams	533,365	129,601	61,708	9,001	46,373	16,768	183	23,155	5,802	51,247	289,604
Alamosa	16,655	3,983	2,583	277	1,452	567	6	793	181	3,416	9,062
Arapahoe	656,061	145,860	97,962	10,130	58,188	23,070	224	32,527	6,857	65,646	287,559
Archuleta	14,189	2,363	4,130	164	1,310	711	5	1,061	103	1,577	3,116
Boulder	326,831	55,707	55,764	3,869	30,918	12,462	112	17,599	3,548	34,478	77,878
Chaffee	20,617	3,008	5,401	209	1,973	975	7	1,431	162	1,829	3,203
Clear Creek	9,147	1,209	2,234	84	887	433	3	636	76	704	1,225
Delta	31,746	5,974	9,087	415	2,864	1,535	11	2,281	238	4,071	5,766
Denver	716,577	126,866	91,876	8,811	68,121	23,789	245	32,374	9,028	73,632	319,343
Douglas	383,906	87,740	55,644	6,093	33,580	13,727	131	19,581	3,748	14,173	83,231
El Paso	744,215	169,937	107,504	11,802	65,747	25,314	255	35,375	7,658	53,047	247,868
Garfield	62,707	15,110	9,523	1,049	5,410	2,209	21	3,139	596	5,606	22,824
Gilpin	5,926	765	1,271	53	575	276	2	408	52	425	891
Grand	15,935	2,431	3,473	169	1,519	700	5	1,018	140	1,311	2,299
Gunnison	17,321	2,697	2,633	187	1,676	635	6	885	188	1,741	2,462
Jackson	1,309	237	359	16	119	63	0	95	9	174	205
Jefferson	576,366	103,852	105,941	7,212	53,623	22,710	197	32,437	5,820	42,071	135,494
La Plata	56,407	9,598	12,270	667	5,275	2,418	19	3,505	539	6,305	12,113
Larimer	370,771	66,613	65,986	4,626	34,727	14,077	127	19,851	4,094	36,698	72,996
Mesa	159,681	32,013	34,642	2,223	14,405	6,621	55	9,586	1,488	18,546	32,051
Montezuma	26,531	5,499	6,665	382	2,351	1,185	9	1,744	215	3,664	7,454
Park	18,117	2,607	4,488	181	1,724	871	6	1,291	135	1,457	2,373
Prowers	11,751	3,007	2,226	209	989	442	4	637	104	2,286	5,252
Pueblo	169,422	36,514	33,884	2,536	15,012	6,747	58	9,741	1,568	22,336	81,610
Rio Blanco	6,569	1,527	1,282	106	569	256	2	370	58	688	1,082
San Miguel	7,868	1,226	1,484	85	748	331	3	479	73	618	1,269
Weld	359,442	90,702	47,427	6,299	30,758	11,713	123	16,359	3,716	32,284	133,581

CONNECTICUT

American Lung Association in Connecticut

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Fairfield	44	11	0	20.2	F
Hartford	9	0	0	3.0	D
Litchfield	8	0	0	2.7	D
Middlesex	20	1	0	7.2	F
New Haven	26	1	0	9.2	F
New London	15	0	0	5.0	F
Tolland	5	1	0	2.2	D
Windham	3	0	0	1.0	C

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Fairfield	3	3	1	0	3.2	D	7.4	Pass
Hartford	4	3	0	0	2.8	D	7.0	Pass
Litchfield	3	4	0	0	3.0	D	4.9	Pass
Middlesex	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
New Haven	5	2	1	0	3.3	F	7.4	Pass
New London	3	3	0	0	2.5	D	6.3	Pass
Tolland	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Windham	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

CONNECTICUT

American Lung Association in Connecticut

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Fairfield	959,768	195,188	158,603	15,463	81,758	35,190	537	56,117	9,064	85,452	386,212
Hartford	896,854	71,422	158,512	5,658	77,334	33,422	502	53,235	8,649	92,542	371,285
Litchfield	185,000	28,968	42,169	2,295	16,300	8,046	104	13,154	1,494	15,713	25,753
Middlesex	164,759	91,898	35,695	7,280	14,744	6,991	92	11,344	1,462	10,537	29,067
New Haven	863,700	17,576	156,201	1,392	75,199	32,671	483	52,088	8,557	100,433	345,820
New London	268,805	20,138	51,843	1,595	23,561	10,518	150	16,857	2,420	23,102	69,656
Tolland	150,293	110,222	25,398	8,732	13,667	5,537	84	8,685	1,598	15,039	26,007
Windham	116,418	53,152	20,814	4,211	10,221	4,456	65	7,117	1,097	13,043	21,471

DELAWARE

American Lung Association in Delaware

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Kent	5	0	0	1.7	C
New Castle	6	0	0	2.0	C
Sussex	2	0	0	0.7	B

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Kent	3	2	1	0	2.7	D	INC	INC
New Castle	4	1	2	0	3.2	D	7.5	Pass
Sussex	2	2	1	0	2.3	D	INC	INC

DELAWARE

American Lung Association in Delaware

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Kent	189,789	42,989	35,338	2,986	16,588	9,479	103	12,377	2,043	21,471	82,407
New Castle	578,592	122,260	101,888	8,491	51,927	28,904	315	37,406	6,279	61,487	272,580
Sussex	263,509	46,689	82,092	3,243	22,776	17,525	143	24,189	1,987	26,244	68,739

DISTRICT OF COLUMBIA

American Lung Association in the District of Columbia

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
District of Columbia	15	1	0	5.5	F

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
District of Columbia	5	4	0	0	3.7	F	8.9	Pass

DISTRICT OF COLUMBIA

American Lung Association in the District of Columbia

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
District of Columbia	678,972	126,592	88,732	12,235	59,581	21,881	293	30,313	7,799	98,811	423,333

FLORIDA

American Lung Association in Florida

	HIGH OZONE DAYS 2021–2023					HIGH PARTICLE POLLUTION DAYS 2021–2023							
						24-Hour						Annual	
County	Orange	Red	Purple	Wgt. Avg.	Grade	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Alachua	0	0	0	0.0	A	1	0	0	0	0.3	B	6.0	Pass
Baker	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Bay	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Brevard	0	0	0	0.0	A	1	0	0	0	0.3	B	6.8	Pass
Broward	0	0	0	0.0	A	4	0	0	0	1.3	C	8.8	Pass
Collier	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Columbia	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Duval	1	0	0	0.3	B	1	0	0	0	0.3	B	7.8	Pass
Escambia	2	0	0	0.7	B	0	0	0	0	0.0	A	8.7	Pass
Flagler	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Highlands	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Hillsborough	4	0	0	1.3	C	1	0	0	0	0.3	B	7.4	Pass
Holmes	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Indian River	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lake	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lee	1	0	0	0.3	B	INC	INC	INC	INC	INC	INC	INC	INC
Leon	0	0	0	0.0	A	1	0	0	0	0.3	B	7.4	Pass
Liberty	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Manatee	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Marion	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Martin	0	0	0	0.0	A	INC	INC	INC	INC	INC	INC	INC	INC
Miami-Dade	1	1	0	0.8	B	1	1	0	0	0.8	B	7.3	Pass
Okaloosa	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Orange	1	0	0	0.3	B	INC	INC	INC	INC	INC	INC	INC	INC
Osceola	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Palm Beach	0	0	0	0.0	A	1	0	0	0	0.3	B	6.3	Pass
Pasco	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Pinellas	2	0	0	0.7	B	1	0	0	0	0.3	B	6.9	Pass
Polk	1	0	0	0.3	B	0	0	0	0	0.0	A	7.1	Pass
St. Lucie	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Santa Rosa	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Sarasota	0	0	0	0.0	A	1	0	0	0	0.3	B	6.9	Pass
Seminole	0	0	0	0.0	A	1	0	0	0	0.3	B	6.5	Pass
Volusia	0	0	0	0.0	A	1	0	0	0	0.3	B	7.4	Pass
Wakulla	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

FLORIDA

American Lung Association in Florida

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Alachua	285,994	50,729	45,118	3,108	19,999	12,755	146	19,578	3,810	49,524	117,957
Baker	28,368	7,073	4,308	433	1,834	1,266	15	1,986	275	3,328	5,785
Bay	190,769	40,382	35,303	2,474	12,934	9,494	98	14,968	1,857	22,023	50,842
Brevard	643,979	115,705	160,285	7,089	45,234	37,187	330	59,000	5,608	65,640	182,935
Broward	1,962,531	403,240	362,776	24,704	134,226	98,466	1,005	155,355	19,882	247,799	1,324,897
Collier	404,310	65,028	138,906	3,984	28,753	27,329	207	43,547	2,915	41,998	151,513
Columbia	73,063	16,043	15,098	983	4,883	3,742	38	5,900	645	11,715	21,075
Duval	1,030,822	229,643	161,965	14,069	68,732	46,700	528	72,890	11,445	146,043	518,317
Escambia	326,928	68,296	59,553	4,184	22,137	15,807	168	24,742	3,357	43,284	120,414
Flagler	131,439	20,919	41,510	1,282	9,428	8,652	67	13,812	1,002	11,598	34,599
Highlands	107,614	17,869	38,978	1,095	7,568	7,377	55	11,739	767	19,796	38,775
Hillsborough	1,535,564	329,560	235,977	20,190	103,675	70,074	787	109,540	17,133	198,734	831,761
Holmes	19,944	4,118	4,095	252	1,359	1,038	10	1,639	161	3,324	2,951
Indian River	169,795	25,228	60,382	1,546	12,252	11,798	87	18,820	1,200	19,049	44,487
Lake	424,462	80,409	113,393	4,926	29,331	24,891	217	39,461	3,732	44,765	150,267
Lee	834,573	142,314	242,429	8,719	58,929	51,559	428	81,859	7,004	99,505	306,723
Leon	296,913	54,405	45,376	3,333	20,641	13,098	152	20,118	4,050	49,251	136,258
Liberty	7,706	1,364	1,363	84	544	379	4	594	57	1,292	2,194
Manatee	441,095	75,946	127,826	4,653	31,138	27,383	226	43,552	3,616	45,410	136,259
Marion	409,959	76,633	118,006	4,695	28,341	24,867	210	39,454	3,446	60,125	139,442
Martin	163,315	25,995	53,457	1,593	11,676	10,854	84	17,305	1,151	20,806	39,244
Miami-Dade	2,686,867	532,595	467,615	32,629	185,663	132,611	1,376	208,939	27,715	372,520	2,313,925
Okaloosa	218,464	49,218	37,044	3,015	14,497	10,139	112	15,848	2,176	21,517	63,592
Orange	1,471,416	310,911	198,456	19,048	99,811	64,014	754	99,565	17,538	177,726	909,255
Osceola	437,784	103,922	59,260	6,367	28,758	18,841	224	29,418	4,899	47,450	314,515
Palm Beach	1,533,801	286,032	389,700	17,524	106,532	88,130	785	139,570	13,788	163,357	739,381
Pasco	632,996	128,089	138,120	7,847	43,281	33,824	324	53,475	6,064	65,506	205,127
Pinellas	961,596	145,573	259,872	8,919	69,791	58,692	492	93,213	8,600	106,728	266,166
Polk	818,330	179,846	158,775	11,018	54,600	40,317	419	63,265	8,366	103,623	404,542
St. Lucie	373,586	73,315	92,491	4,492	25,656	21,117	191	33,449	3,324	38,539	180,917
Santa Rosa	203,162	44,333	34,610	2,716	13,681	9,767	104	15,379	1,931	15,981	40,197
Sarasota	469,013	65,140	177,167	3,991	34,185	33,866	240	54,096	3,216	43,818	87,735
Seminole	484,271	98,743	82,400	6,049	33,136	23,250	248	36,474	5,284	44,094	215,475
Volusia	590,357	102,443	151,689	6,276	41,687	34,481	302	54,638	5,247	68,507	187,757
Wakulla	36,449	7,573	6,301	464	2,489	1,783	19	2,811	327	3,501	8,053

GEORGIA

American Lung Association in Georgia

	HIGH OZONE DAYS 2021–2023					HIGH PARTICLE POLLUTION DAYS 2021–2023							
						24-Hour						Annual	
County	Orange	Red	Purple	Wgt. Avg.	Grade	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Bibb	4	0	0	1.3	C	1	1	0	0	0.8	B	9.4	Fail
Chatham	1	0	0	0.3	B	1	0	0	0	0.3	B	INC	INC
Chattooga	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Clarke	2	0	0	0.7	B	3	0	0	0	1.0	C	8.7	Pass
Clayton	DNC	DNC	DNC	DNC	DNC	0	0	0	0	0.0	A	8.9	Pass
Cobb	1	0	0	0.3	B	2	0	0	0	0.7	B	8.9	Pass
Coffee	DNC	DNC	DNC	DNC	DNC	1	0	0	0	0.3	B	7.3	Pass
Columbia	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Dawson	3	0	0	1.0	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
DeKalb	8	0	0	2.7	D	3	0	0	0	1.0	C	8.7	Pass
Dougherty	DNC	DNC	DNC	DNC	DNC	14	0	0	0	4.7	F	9.0	Pass
Douglas	9	0	0	3.0	D	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Fulton	12	3	0	5.5	F	2	0	0	0	0.7	B	9.7	Fail
Glynn	0	0	0	0.0	A	1	0	0	0	0.3	B	7.9	Pass
Gwinnett	6	0	0	2.0	C	5	0	0	0	1.7	C	INC	INC
Hall	DNC	DNC	DNC	DNC	DNC	3	0	0	0	1.0	C	8.2	Pass
Henry	10	0	0	3.3	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Houston	DNC	DNC	DNC	DNC	DNC	2	1	0	0	1.2	C	8.7	Pass
Lowndes	DNC	DNC	DNC	DNC	DNC	3	0	0	0	1.0	C	8.6	Pass
Murray	4	0	0	1.3	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Muscogee	2	0	0	0.7	B	3	2	0	0	2.0	C	10.0	Fail
Pike	5	0	0	1.7	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Richmond	0	0	0	0.0	A	7	0	0	0	2.3	D	9.7	Fail
Rockdale	4	0	0	1.3	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Sumter	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Walker	DNC	DNC	DNC	DNC	DNC	5	0	0	0	1.7	C	10.0	Fail
Washington	DNC	DNC	DNC	DNC	DNC	6	1	0	0	2.5	D	10.0	Fail

GEORGIA

American Lung Association in Georgia

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Bibb	156,512	38,212	26,499	3,310	11,103	7,467	83	10,445	1,748	33,515	102,345
Chatham	303,655	62,024	52,167	5,372	22,699	14,849	161	20,703	3,596	44,111	162,886
Chattooga	25,222	5,504	4,844	477	1,845	1,313	14	1,852	231	4,958	4,611
Clarke	129,933	21,551	16,791	1,867	10,262	5,501	69	7,432	2,000	28,637	58,323
Clayton	298,300	78,701	33,424	6,817	20,835	12,421	158	16,783	3,650	50,474	275,007
Cobb	776,743	172,922	109,539	14,978	57,050	36,258	413	49,739	9,015	67,115	401,555
Coffee	43,317	10,716	6,393	928	3,073	1,983	23	2,739	433	9,093	19,084
Columbia	165,162	40,674	25,637	3,523	11,717	7,708	88	10,695	1,812	11,211	60,694
Dawson	31,732	6,420	6,401	556	2,366	1,703	17	2,408	314	2,534	4,298
DeKalb	762,992	171,061	108,754	14,817	55,889	34,962	404	48,016	9,360	100,015	544,259
Dougherty	82,645	20,027	14,694	1,735	5,867	4,000	44	5,620	966	21,140	63,844
Douglas	149,160	37,458	18,617	3,245	10,581	6,677	79	9,094	1,730	17,596	103,998
Fulton	1,079,105	222,303	141,433	19,255	81,123	49,036	574	66,709	13,616	136,621	674,918
Glynn	86,172	17,677	20,059	1,531	6,364	4,877	46	6,996	847	13,245	32,083
Gwinnett	983,526	252,540	115,777	21,874	69,318	42,799	524	58,041	11,180	111,168	685,238
Hall	217,267	50,878	36,099	4,407	15,638	10,593	116	14,768	2,253	23,740	90,408
Henry	254,613	63,307	32,259	5,484	18,116	11,499	135	15,677	2,970	26,087	176,387
Houston	171,974	43,682	24,130	3,784	12,107	7,689	91	10,582	1,958	21,823	83,566
Lowndes	120,712	29,648	16,370	2,568	8,597	5,117	64	7,014	1,490	22,576	59,281
Murray	41,035	9,594	6,583	831	2,959	2,004	22	2,784	429	5,870	8,184
Muscogee	201,877	50,137	30,911	4,343	14,282	9,169	107	12,714	2,307	40,634	126,853
Pike	20,461	4,755	3,345	412	1,478	1,020	11	1,418	215	2,248	2,808
Richmond	205,414	46,852	32,308	4,058	14,922	9,503	109	13,178	2,371	43,227	140,711
Rockdale	95,987	22,493	15,433	1,948	6,917	4,733	51	6,576	1,044	12,310	73,950
Sumter	28,890	6,510	5,305	564	2,096	1,426	15	2,006	322	7,187	17,765
Walker	69,489	14,691	13,877	1,273	5,123	3,711	37	5,248	683	10,248	7,437
Washington	19,820	4,212	3,651	365	1,463	1,025	11	1,439	176	3,878	11,5250

HAWAII

American Lung Association in Hawaii

	HIGH OZONE DAYS 2021–2023					HIGH PARTICLE POLLUTION DAYS 2021–2023							
						24-Hour						Annual	
County	Orange	Red	Purple	Wgt. Avg.	Grade	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Hawaii	DNC	DNC	DNC	DNC	DNC	0	0	0	0	0.0	A	4.4	Pass
Honolulu	0	0	0	0.0	A	1	0	0	0	0.3	B	3.7	Pass
Kauai	DNC	DNC	DNC	DNC	DNC	INC	INC	INC	INC	INC	INC	INC	INC
Maui	DNC	DNC	DNC	DNC	DNC	0	1	0	0	0.5	B	4.0	Pass

HAWAII

American Lung Association in Hawaii

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Hawaii	207,615	42,623	50,726	2,857	16,268	7,544	78	14,156	2,011	33,847	143,184
Honolulu	989,408	201,494	199,441	13,505	77,456	32,970	371	60,750	10,329	87,196	815,942
Kauai	73,851	15,577	17,034	1,044	5,755	2,615	28	4,890	719	6,851	52,320
Maui	164,183	33,913	35,277	2,273	12,917	5,709	62	10,629	1,646	15,300	114,782

IDAHO

American Lung Association in Idaho

	HIGH OZONE DAYS 2021–2023				
County	Orange	Red	Purple	Wgt. Avg.	Grade
Ada	17	0	0	5.7	F
Bannock	0	0	0	0.0	A
Benewah	DNC	DNC	DNC	DNC	DNC
Butte	1	0	0	0.3	B
Canyon	DNC	DNC	DNC	DNC	DNC
Franklin	DNC	DNC	DNC	DNC	DNC
Idaho	3	0	0	1.0	C
Lemhi	DNC	DNC	DNC	DNC	DNC
Shoshone	DNC	DNC	DNC	DNC	DNC

	HIGH PARTICLE POLLUTION DAYS 2021–2023							
	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Ada	3	1	0	0	1.5	C	INC	INC
Bannock	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Benewah	15	10	0	0	10.0	F	9.9	Fail
Butte	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Canyon	10	3	0	0	4.8	F	8.9	Pass
Franklin	8	0	0	0	2.7	D	6.6	Pass
Idaho	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lemhi	22	11	0	0	12.8	F	10.2	Fail
Shoshone	15	12	0	0	11.0	F	10.3	Fail

IDAHO

American Lung Association in Idaho

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Ada	524,673	112,818	88,036	7,835	43,445	24,581	219	30,321	6,393	40,703	93,346
Bannock	90,400	22,442	14,099	1,559	7,149	3,917	38	4,822	1,140	10,518	16,391
Benewah	10,369	2,305	2,486	160	859	566	4	743	95	1,341	1,570
Butte	2,758	632	722	44	227	153	1	205	26	402	309
Canyon	257,674	67,745	37,917	4,705	19,993	10,967	107	13,381	3,138	25,683	79,819
Franklin	15,494	4,647	2,290	323	1,144	646	6	795	172	1,084	1,551
Idaho	17,890	3,610	5,285	251	1,527	1,071	7	1,458	142	2,382	1,805
Lemhi	8,441	1,537	2,655	107	739	526	4	722	73	1,090	635
Shoshone	14,026	2,945	3,287	205	1,179	761	6	993	138	2,175	1,376

ILLINOIS

American Lung Association in Illinois

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Adams	12	0	0	4.0	F
Champaign	11	0	0	3.7	F
Clark	6	0	0	2.0	C
Cook	52	6	0	20.3	F
DuPage	15	3	0	6.5	F
Effingham	10	0	0	3.3	F
Hamilton	10	0	0	3.3	F
Jersey	23	0	0	7.7	F
Jo Daviess	8	1	0	3.2	D
Kane	21	3	0	8.5	F
Lake	24	2	0	9.0	F
McHenry	20	3	0	8.2	F
McLean	13	0	0	4.3	F
Macon	16	0	0	5.3	F
Macoupin	12	0	0	4.0	F
Madison	30	1	0	10.5	F
Peoria	21	1	0	7.5	F
Randolph	13	2	0	5.3	F
Rock Island	18	0	0	6.0	F
St. Clair	14	2	0	5.7	F
Sangamon	20	0	0	6.7	F
Will	18	1	0	6.5	F
Winnebago	14	1	0	5.2	F

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Adams	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Champaign	1	1	1	0	1.5	C	8.2	Pass
Clark	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Cook	5	1	2	0	3.5	F	11.3	Fail
DuPage	1	1	2	0	2.2	D	9.7	Fail
Effingham	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Hamilton	3	1	0	0	1.5	C	8.4	Pass
Jersey	2	1	0	0	1.2	C	7.9	Pass
Jo Daviess	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Kane	1	2	0	0	1.3	C	9.7	Fail
Lake	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
McHenry	3	2	1	0	2.7	D	8.9	Pass
McLean	2	2	1	0	2.3	D	9.0	Pass
Macon	3	1	1	0	2.2	D	8.8	Pass
Macoupin	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Madison	0	0	0	0	0.0	A	10.5	Fail
Peoria	0	0	0	0	0.0	A	INC	INC
Randolph	1	0	0	0	0.3	B	7.7	Pass
Rock Island	2	3	1	0	2.8	D	9.1	Fail
St. Clair	0	1	0	0	0.5	B	10.1	Fail
Sangamon	2	1	1	0	1.8	C	8.9	Pass
Will	2	2	2	0	3.0	D	9.8	Fail
Winnebago	4	1	2	0	3.2	D	9.0	Pass

ILLINOIS

American Lung Association in Illinois

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Adams	64,441	14,469	13,635	920	4,671	3,367	37	4,358	563	7,631	6,137
Champaign	205,644	39,095	29,852	2,487	16,280	8,991	117	10,849	2,510	30,821	74,617
Clark	15,088	3,317	3,117	211	1,099	803	9	1,034	126	1,769	701
Cook	5,087,072	1,055,492	843,021	67,132	385,934	246,446	2,878	305,759	53,889	662,898	3,019,519
DuPage	921,213	201,578	166,141	12,821	68,137	46,391	522	58,474	8,718	59,722	340,338
Effingham	34,331	8,116	6,626	516	2,466	1,729	19	2,210	294	3,320	1,779
Hamilton	7,911	1,767	1,800	112	569	428	4	561	65	887	374
Jersey	21,091	4,157	4,525	264	1,581	1,157	12	1,492	184	2,204	1,114
Jo Daviess	21,756	3,879	6,704	247	1,607	1,379	12	1,879	148	1,849	1,621
Kane	514,982	120,525	83,142	7,666	37,558	24,959	292	31,028	4,875	42,685	232,110
Lake	708,760	162,209	116,830	10,317	51,993	34,694	402	43,222	6,602	56,595	305,714
McHenry	312,800	70,217	53,759	4,466	22,967	15,771	177	19,760	2,830	19,499	72,233
McLean	170,441	35,719	25,682	2,272	13,035	7,771	96	9,492	1,932	17,831	39,582
Macon	100,591	22,687	21,743	1,443	7,271	5,269	57	6,847	932	15,303	26,528
Macoupin	44,018	8,927	9,817	568	3,261	2,434	25	3,163	378	5,596	2,073
Madison	262,752	55,202	50,082	3,511	19,606	13,457	149	17,080	2,539	28,487	45,975
Peoria	177,513	42,247	33,157	2,687	12,795	8,665	100	11,024	1,709	29,050	58,384
Randolph	29,815	5,925	6,433	377	2,234	1,612	17	2,082	223	3,225	4,285
Rock Island	141,236	31,552	29,420	2,007	10,284	7,281	80	9,400	1,283	20,292	45,045
St. Clair	251,018	56,902	45,137	3,619	18,381	12,489	142	15,759	2,424	32,969	100,186
Sangamon	193,491	41,612	38,731	2,647	14,269	10,067	109	12,890	1,827	22,654	42,791
Will	700,728	163,101	105,745	10,374	51,377	33,629	397	41,388	6,788	49,733	287,900
Winnebago	280,922	65,428	53,385	4,161	20,307	14,108	159	17,981	2,603	40,617	100,140

INDIANA

American Lung Association in Indiana

	HIGH OZONE DAYS 2021–2023					HIGH PARTICLE POLLUTION DAYS 2021–2023							
						24-Hour						Annual	
County	Orange	Red	Purple	Wgt. Avg.	Grade	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Allen	7	0	0	2.3	D	INC	INC	INC	INC	INC	INC	INC	INC
Bartholomew	7	0	0	2.3	D	2	0	1	0	1.3	C	7.6	Pass
Boone	10	1	0	3.8	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Brown	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Carroll	6	0	0	2.0	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Clark	6	0	0	2.0	C	5	1	0	0	2.2	D	9.8	Fail
Delaware	5	0	0	1.7	C	1	0	0	0	0.3	B	8.2	Pass
Dubois	DNC	DNC	DNC	DNC	DNC	1	0	0	0	0.3	B	8.9	Pass
Elkhart	4	0	0	1.3	C	5	2	0	0	2.7	D	8.9	Pass
Floyd	3	1	0	1.5	C	INC	INC	INC	INC	INC	INC	INC	INC
Greene	10	0	0	3.3	F	1	1	1	0	1.5	C	7.9	Pass
Hamilton	5	0	0	1.7	C	4	2	0	0	2.3	D	10.0	Fail
Hendricks	4	0	0	1.3	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Henry	DNC	DNC	DNC	DNC	DNC	6	2	0	0	3.0	D	8.1	Pass
Howard	12	0	0	4.0	F	3	2	0	0	2.0	C	8.0	Pass
Knox	10	0	0	3.3	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lake	21	0	0	7.0	F	6	2	1	0	3.7	F	10.5	Fail
LaPorte	19	0	0	6.3	F	1	0	0	0	0.3	B	8.3	Pass
Madison	9	0	0	3.0	D	6	1	1	0	3.2	D	8.7	Pass
Marion	12	2	0	5.0	F	23	3	1	0	9.8	F	11.9	Fail
Monroe	DNC	DNC	DNC	DNC	DNC	3	1	1	0	2.2	D	7.9	Pass
Perry	3	0	0	1.0	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Porter	24	0	0	8.0	F	6	2	1	0	3.7	F	9.0	Pass
Posey	7	0	0	2.3	D	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
St. Joseph	14	0	0	4.7	F	4	2	1	0	3.0	D	9.4	Fail
Shelby	6	0	0	2.0	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Spencer	DNC	DNC	DNC	DNC	DNC	0	1	0	0	0.5	B	8.4	Pass
Tippecanoe	DNC	DNC	DNC	DNC	DNC	3	1	1	0	2.2	D	8.3	Pass
Vanderburgh	7	0	0	2.3	D	1	1	0	0	0.8	B	9.4	Fail
Vigo	7	0	0	2.3	D	2	1	1	0	1.8	C	9.5	Fail
Wabash	5	0	0	1.7	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Warrick	9	0	0	3.0	D	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Whitley	DNC	DNC	DNC	DNC	DNC	5	2	1	0	3.3	F	8.6	Pass

INDIANA

American Lung Association in Indiana

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Allen	394,545	99,640	63,254	6,760	34,124	23,965	245	28,659	4,596	50,579	116,597
Bartholomew	84,003	20,215	14,485	1,372	7,369	5,315	52	6,404	917	8,261	17,912
Boone	76,120	19,240	11,702	1,305	6,617	4,737	47	5,599	850	3,502	10,721
Brown	15,653	2,588	4,263	176	1,490	1,304	10	1,646	132	1,538	839
Carroll	20,525	4,422	4,343	300	1,852	1,467	13	1,805	201	1,881	1,426
Clark	125,467	27,311	21,563	1,853	11,376	8,240	78	9,851	1,450	11,588	24,791
Delaware	112,321	20,365	20,083	1,382	10,597	7,261	70	8,755	1,502	20,252	16,715
Dubois	43,546	10,529	8,429	714	3,806	2,942	27	3,592	422	3,281	5,497
Elkhart	206,409	55,809	32,658	3,786	17,439	12,421	128	14,852	2,267	23,765	60,641
Floyd	80,809	17,837	14,612	1,210	7,283	5,388	50	6,492	911	8,065	11,369
Greene	31,196	6,704	6,426	455	2,822	2,217	19	2,715	311	3,665	1,432
Hamilton	371,645	92,760	53,693	6,294	32,535	22,887	231	26,775	4,376	17,814	76,201
Hendricks	186,387	45,504	28,842	3,087	16,380	11,628	116	13,748	2,102	10,215	43,687
Henry	48,929	9,815	9,698	666	4,512	3,434	31	4,177	468	5,752	3,665
Howard	83,831	19,245	16,886	1,306	7,420	5,683	52	6,989	893	10,491	14,267
Knox	36,070	7,788	6,920	528	3,253	2,392	22	2,920	379	5,378	3,409
Lake	500,598	115,228	91,656	7,818	44,502	33,097	310	40,060	5,616	70,594	240,769
LaPorte	111,706	23,540	22,343	1,597	10,147	7,700	70	9,419	1,080	14,984	24,875
Madison	132,504	28,216	25,091	1,914	12,035	8,977	82	10,887	1,420	16,422	23,019
Marion	968,460	240,626	131,576	16,326	84,645	55,558	600	64,893	12,472	148,329	485,628
Monroe	139,342	21,960	21,295	1,490	13,557	8,314	87	9,820	2,089	22,533	25,823
Perry	19,209	3,927	3,820	266	1,760	1,328	12	1,621	173	2,513	1,398
Porter	175,335	37,031	33,101	2,512	15,968	11,911	109	14,429	1,969	15,959	34,991
Posey	25,040	5,355	5,431	363	2,260	1,800	16	2,224	244	2,315	1,245
St. Joseph	272,848	63,119	47,027	4,282	24,197	17,091	169	20,615	3,270	36,928	83,013
Shelby	45,231	10,025	8,774	680	4,064	3,121	28	3,794	465	4,945	4,526
Spencer	19,910	4,284	4,182	291	1,799	1,429	12	1,754	193	1,712	1,291
Tippecanoe	188,792	38,169	23,795	2,590	17,477	10,292	118	11,902	2,610	29,604	51,966
Vanderburgh	179,810	38,818	33,660	2,634	16,234	11,804	111	14,360	2,092	23,903	34,290
Vigo	106,153	21,784	18,749	1,478	9,721	6,739	66	8,140	1,253	19,591	16,106
Wabash	30,670	6,457	6,819	438	2,773	2,202	19	2,736	311	3,472	2,078
Warrick	65,867	14,969	12,635	1,016	5,871	4,469	41	5,437	706	5,365	6,205
Whitley	34,742	7,877	6,920	534	3,094	2,389	22	2,923	352	2,919	2,057

IOWA

American Lung Association in Iowa

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Black Hawk	DNC	DNC	DNC	DNC	DNC
Bremer	9	1	0	3.5	F
Clinton	12	1	0	4.5	F
Harrison	16	0	0	5.3	F
Johnson	DNC	DNC	DNC	DNC	DNC
Lee	DNC	DNC	DNC	DNC	DNC
Linn	14	0	0	4.7	F
Montgomery	5	0	0	1.7	C
Muscatine	DNC	DNC	DNC	DNC	DNC
Palo Alto	12	1	0	4.5	F
Polk	9	0	0	3.0	D
Pottawattamie	DNC	DNC	DNC	DNC	DNC
Scott	19	0	0	6.3	F
Van Buren	3	0	0	1.0	C
Woodbury	DNC	DNC	DNC	DNC	DNC

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Black Hawk	0	1	0	0	0.5	B	8.4	Pass
Bremer	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Clinton	3	2	1	0	2.7	D	9.2	Fail
Harrison	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Johnson	3	3	1	0	3.2	D	8.4	Pass
Lee	0	0	0	0	0.0	A	INC	INC
Linn	2	3	1	0	2.8	D	8.6	Pass
Montgomery	1	0	0	0	0.3	B	7.2	Pass
Muscatine	1	2	1	0	2.0	C	8.6	Pass
Palo Alto	2	1	0	0	1.2	C	INC	INC
Polk	4	3	0	0	2.8	D	8.2	Pass
Pottawattamie	1	1	0	0	0.8	B	8.7	Pass
Scott	1	3	1	0	2.5	D	8.9	Pass
Van Buren	1	0	0	0	0.3	B	7.5	Pass
Woodbury	0	3	0	0	1.5	C	8.6	Pass

IOWA

American Lung Association in Iowa

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Black Hawk	130,471	28,522	23,549	1,642	9,183	5,779	77	7,795	1,620	17,837	27,765
Bremer	25,307	5,690	5,067	328	1,758	1,188	15	1,634	285	1,848	1,573
Clinton	46,158	10,509	9,622	605	3,183	2,282	27	3,152	468	6,040	4,744
Harrison	14,670	3,419	3,025	197	1,004	728	9	1,004	142	1,414	694
Johnson	157,528	30,155	21,803	1,736	11,594	6,320	93	8,052	2,342	22,903	38,005
Lee	32,565	6,942	7,307	400	2,283	1,663	19	2,324	314	4,509	3,033
Linn	228,972	50,973	40,961	2,934	16,009	10,540	136	14,152	2,657	22,062	38,339
Montgomery	10,139	2,266	2,333	130	700	518	6	729	97	1,286	701
Muscatine	42,218	9,944	7,893	572	2,895	1,979	25	2,685	440	4,852	10,337
Palo Alto	8,810	2,031	2,030	117	603	439	5	621	83	911	673
Polk	505,255	121,524	72,542	6,995	34,746	21,161	300	27,386	6,200	57,161	131,322
Pottawattamie	93,179	21,132	17,944	1,216	6,458	4,429	55	6,032	1,004	10,542	13,847
Scott	174,270	39,970	31,566	2,301	12,068	8,029	103	10,821	1,986	18,741	38,387
Van Buren	7,266	1,738	1,678	100	491	368	4	520	65	1,064	303
Woodbury	105,951	27,116	16,871	1,561	7,110	4,521	63	5,990	1,192	13,286	34,443

KANSAS

American Lung Association in Kansas

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Johnson	6	1	0	2.5	D
Leavenworth	12	0	0	4.0	F
Neosho	0	0	0	0.0	A
Sedgwick	8	0	0	2.7	D
Shawnee	7	0	0	2.3	D
Sherman	DNC	DNC	DNC	DNC	DNC
Sumner	5	0	0	1.7	C
Trego	2	0	0	0.7	B
Wyandotte	19	1	0	6.8	F

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Johnson	5	0	0	0	1.7	C	8.3	Pass
Leavenworth	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Neosho	3	1	0	0	1.5	C	9.3	Fail
Sedgwick	4	1	0	0	1.8	C	9.7	Fail
Shawnee	3	2	0	0	2.0	C	INC	INC
Sherman	INC	INC	INC	INC	INC	INC	8.8	Pass
Sumner	4	1	0	0	1.8	C	8.9	Pass
Trego	5	1	0	0	2.2	D	6.8	Pass
Wyandotte	3	1	0	0	1.5	C	9.6	Fail

KANSAS

American Lung Association in Kansas

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Johnson	622,237	144,378	102,852	9,925	47,852	30,206	309	39,981	7,375	32,942	141,047
Leavenworth	83,518	19,682	13,788	1,353	6,392	4,028	42	5,335	858	6,431	17,974
Neosho	15,420	3,722	3,216	256	1,150	805	8	1,102	156	2,224	1,766
Sedgwick	528,469	130,091	86,384	8,943	39,916	24,743	263	32,798	6,265	70,379	180,527
Shawnee	177,746	40,606	35,517	2,791	13,555	9,189	88	12,479	1,981	21,878	49,524
Sherman	5,844	1,415	1,272	97	435	299	3	413	59	768	1,029
Sumner	22,334	5,348	4,571	368	1,672	1,172	11	1,599	225	2,464	2,649
Trego	2,731	524	754	36	212	168	1	237	24	289	182
Wyandotte	165,281	44,637	22,709	3,068	12,189	7,213	82	9,380	1,966	27,891	103,974

KENTUCKY

American Lung Association in Kentucky

	HIGH OZONE DAYS 2021–2023					HIGH PARTICLE POLLUTION DAYS 2021–2023							
						24-Hour						Annual	
County	Orange	Red	Purple	Wgt. Avg.	Grade	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Bell	0	0	0	0.0	A	4	0	0	0	1.3	C	9.1	Fail
Boone	6	1	0	2.5	D	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Boyd	0	0	0	0.0	A	2	2	0	0	1.7	C	7.5	Pass
Bullitt	8	0	0	2.7	D	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Campbell	3	0	0	1.0	C	3	2	0	0	2.0	C	7.6	Pass
Carter	0	0	0	0.0	A	1	1	0	0	0.8	B	6.3	Pass
Christian	3	0	0	1.0	C	2	0	0	0	0.7	B	8.6	Pass
Daviess	7	0	0	2.3	D	2	1	0	0	1.2	C	INC	INC
Edmonson	4	0	0	1.3	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Fayette	1	0	0	0.3	B	2	1	0	0	1.2	C	7.8	Pass
Greenup	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Hancock	7	0	0	2.3	D	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Hardin	3	0	0	1.0	C	2	0	0	0	0.7	B	7.8	Pass
Jefferson	23	1	0	8.2	F	5	1	0	0	2.2	D	9.5	Fail
Jessamine	3	0	0	1.0	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Livingston	7	0	0	2.3	D	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
McCracken	8	0	0	2.7	D	4	0	0	0	1.3	C	INC	INC
Morgan	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Oldham	4	0	0	1.3	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Perry	0	0	0	0.0	A	5	2	0	0	2.7	D	8.0	Pass
Pike	0	0	0	0.0	A	2	1	0	0	1.2	C	6.8	Pass
Pulaski	0	0	0	0.0	A	2	0	0	0	0.7	B	7.5	Pass
Simpson	7	0	0	2.3	D	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Trigg	INC	INC	INC	INC	INC	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Warren	1	0	0	0.3	B	3	1	0	0	1.5	C	7.4	Pass
Washington	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

KENTUCKY

American Lung Association in Kentucky

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Bell	23,317	5,161	4,699	488	1,960	2,261	19	2,410	242	6,547	1,639
Boone	140,496	35,434	21,519	3,353	11,490	12,201	113	12,631	1,585	10,333	23,048
Boyd	47,826	10,134	9,896	959	4,064	4,691	39	5,016	487	8,249	3,530
Bullitt	84,863	17,812	15,254	1,686	7,292	8,122	68	8,493	948	7,130	7,131
Campbell	93,702	19,066	17,096	1,804	8,115	8,672	75	9,171	1,105	9,417	8,116
Carter	26,366	5,855	5,339	554	2,213	2,567	21	2,736	274	4,922	922
Christian	72,032	20,511	9,382	1,941	5,667	5,082	58	5,347	808	11,900	25,813
Daviess	103,458	25,134	18,874	2,378	8,491	9,323	83	9,903	1,138	16,349	14,511
Edmonson	12,448	2,235	2,689	212	1,101	1,302	10	1,385	133	1,968	680
Fayette	320,154	66,445	49,329	6,288	27,822	27,121	258	28,345	4,265	48,315	103,824
Greenup	35,221	7,370	8,002	697	2,985	3,586	28	3,876	359	5,522	1,539
Hancock	8,920	2,076	1,715	196	740	854	7	904	91	1,049	424
Hardin	112,273	27,780	17,403	2,629	9,239	9,663	90	10,049	1,278	15,567	28,006
Jefferson	772,144	170,854	137,441	16,168	65,385	69,832	620	73,828	9,191	122,737	289,234
Jessamine	55,017	12,919	9,384	1,223	4,584	4,937	44	5,182	643	5,485	7,501
Livingston	8,892	1,821	2,052	172	757	935	7	1,006	85	1,263	555
McCracken	67,428	14,581	14,120	1,380	5,692	6,543	54	7,032	735	10,425	12,350
Morgan	14,283	2,613	2,563	247	1,272	1,365	12	1,429	125	3,019	1,528
Oldham	70,183	16,986	10,604	1,607	5,826	6,304	57	6,466	724	3,801	9,188
Perry	27,133	6,351	5,025	601	2,252	2,560	22	2,698	289	7,849	1,325
Pike	55,973	11,384	11,629	1,077	4,810	5,614	45	5,978	581	12,737	2,025
Pulaski	66,191	14,387	13,415	1,361	5,591	6,500	53	6,917	699	11,056	4,617
Simpson	20,195	4,684	3,484	443	1,688	1,842	16	1,930	220	2,691	3,214
Trigg	14,369	3,089	3,381	292	1,205	1,505	12	1,627	132	1,939	1,855
Warren	142,229	33,475	19,422	3,168	11,972	11,395	114	11,780	1,872	19,312	36,297
Washington	12,267	2,847	2,366	269	1,019	1,173	10	1,243	124	1,582	1,508

LOUISIANA

American Lung Association in Louisiana

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Ascension Parish	3	2	0	2.0	C
Bossier Parish	0	0	0	0.0	A
Caddo Parish	1	0	0	0.3	B
Calcasieu Parish	4	1	0	1.8	C
East Baton Rouge Parish	10	1	0	3.8	F
Iberville Parish	21	2	0	8.0	F
Jefferson Parish	5	0	0	1.7	C
Lafayette Parish	2	0	0	0.7	B
Lafourche Parish	1	0	0	0.3	B
Livingston Parish	5	0	0	1.7	C
Orleans Parish	DNC	DNC	DNC	DNC	DNC
Ouachita Parish	0	0	0	0.0	A
Pointe Coupee Parish	4	0	0	1.3	C
Rapides Parish	DNC	DNC	DNC	DNC	DNC
St. Bernard Parish	3	0	0	1.0	C
St. James Parish	2	0	0	0.7	B
St. John the Baptist Parish	5	0	0	1.7	C
St. Martin Parish	1	0	0	0.3	B
St. Tammany Parish	1	0	0	0.3	B
Tangipahoa Parish	DNC	DNC	DNC	DNC	DNC
Terrebonne Parish	DNC	DNC	DNC	DNC	DNC
West Baton Rouge Parish	14	0	0	4.7	F

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Ascension Parish	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Bossier Parish	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Caddo Parish	0	0	0	0	0.0	A	9.6	Fail
Calcasieu Parish	1	0	0	0	0.3	B	7.6	Pass
East Baton Rouge Parish	3	0	0	0	1.0	C	8.9	Pass
Iberville Parish	0	0	0	0	0.0	A	7.9	Pass
Jefferson Parish	1	0	0	0	0.3	B	7.7	Pass
Lafayette Parish	1	0	0	0	0.3	B	7.9	Pass
Lafourche Parish	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Livingston Parish	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Orleans Parish	0	0	0	0	0.0	A	7.8	Pass
Ouachita Parish	1	0	0	0	0.3	B	7.8	Pass
Pointe Coupee Parish	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Rapides Parish	1	0	0	0	0.3	B	7.9	Pass
St. Bernard Parish	0	0	0	0	0.0	A	8.2	Pass
St. James Parish	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
St. John the Baptist Parish	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
St. Martin Parish	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
St. Tammany Parish	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Tangipahoa Parish	0	0	0	0	0.0	A	7.7	Pass
Terrebonne Parish	2	1	0	0	1.2	C	7.9	Pass
West Baton Rouge Parish	2	0	0	0	0.7	B	9.1	Fail

LOUISIANA

American Lung Association in Louisiana

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Ascension Parish	131,632	34,316	18,017	3,003	10,519	8,144	78	10,638	1,604	13,963	47,560
Bossier Parish	129,795	31,948	20,693	2,796	10,527	8,280	77	10,956	1,551	17,641	48,249
Caddo Parish	226,386	52,592	44,291	4,602	18,384	15,721	133	21,319	2,620	50,737	129,974
Calcasieu Parish	203,761	50,425	34,222	4,412	16,399	13,317	121	17,758	2,371	35,387	68,727
East Baton Rouge Parish	448,467	100,971	70,903	8,835	37,655	28,332	265	37,200	6,060	86,425	259,410
Iberville Parish	29,617	6,190	5,300	542	2,501	2,051	18	2,741	334	5,422	15,842
Jefferson Parish	421,777	93,320	82,284	8,166	34,753	29,743	250	40,269	4,795	71,376	218,348
Lafayette Parish	249,750	60,283	38,539	5,275	20,424	15,928	148	20,984	3,091	41,666	93,475
Lafourche Parish	95,056	21,505	16,421	1,882	7,846	6,477	56	8,650	1,087	17,950	23,922
Livingston Parish	150,145	38,300	21,341	3,351	12,087	9,336	89	12,222	1,855	20,924	29,102
Orleans Parish	364,136	70,990	66,128	6,212	31,411	25,159	214	33,543	4,904	80,769	251,398
Ouachita Parish	157,568	38,561	25,711	3,374	12,762	10,225	93	13,578	1,917	32,634	69,144
Pointe Coupee Parish	20,000	4,256	4,633	372	1,638	1,514	12	2,093	202	3,978	7,910
Rapides Parish	126,260	31,500	22,178	2,756	10,084	8,403	75	11,280	1,423	24,624	50,376
St. Bernard Parish	44,463	11,455	6,131	1,002	3,575	2,728	26	3,559	568	7,958	19,748
St. James Parish	19,191	4,196	3,921	367	1,578	1,386	11	1,888	209	2,879	9,635
St. John the Baptist Parish	39,592	9,458	6,479	828	3,217	2,655	23	3,535	457	6,589	27,846
St. Martin Parish	51,057	12,116	9,074	1,060	4,135	3,495	30	4,695	566	9,158	18,401
St. Tammany Parish	275,583	64,546	52,409	5,648	22,294	19,286	163	26,110	3,028	32,491	73,355
Tangipahoa Parish	138,064	33,831	21,576	2,960	11,232	8,762	82	11,561	1,715	25,447	53,651
Terrebonne Parish	103,616	25,668	17,018	2,246	8,326	6,837	62	9,109	1,157	16,450	36,406
West Baton Rouge Parish	28,266	6,893	4,331	603	2,302	1,807	17	2,381	335	3,749	13,486

MAINE

American Lung Association in Maine

	HIGH OZONE DAYS 2021–2023				
County	Orange	Red	Purple	Wgt. Avg.	Grade
Androscoggin	0	0	0	0.0	A
Aroostook	0	0	0	0.0	A
Cumberland	5	0	0	1.7	C
Hancock	4	0	0	1.3	C
Kennebec	0	0	0	0.0	A
Knox	2	0	0	0.7	B
Oxford	0	0	0	0.0	A
Penobscot	0	0	0	0.0	A
Sagadahoc	INC	INC	INC	INC	INC
Washington	0	0	0	0.0	A
York	5	0	0	1.7	C

	HIGH PARTICLE POLLUTION DAYS 2021–2023							
	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Androscoggin	0	0	0	0	0.0	A	5.3	Pass
Aroostook	3	1	0	0	1.5	C	5.5	Pass
Cumberland	3	0	0	0	1.0	C	7.0	Pass
Hancock	0	0	0	0	0.0	A	3.7	Pass
Kennebec	0	0	0	0	0.0	A	5.8	Pass
Knox	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Oxford	1	0	0	0	0.3	B	5.3	Pass
Penobscot	0	0	0	0	0.0	A	4.8	Pass
Sagadahoc	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Washington	INC	INC	INC	INC	INC	INC	INC	INC
York	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

MAINE

American Lung Association in Maine

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Androscoggin	113,765	23,176	21,935	1,669	11,855	7,375	72	8,702	1,007	14,094	13,462
Aroostook	67,351	12,654	17,619	911	6,988	4,975	43	6,239	477	7,949	4,657
Cumberland	310,230	55,120	65,145	3,970	33,294	21,049	197	25,080	2,815	20,708	35,848
Hancock	56,526	8,937	15,485	644	6,089	4,301	36	5,392	431	5,586	3,619
Kennebec	127,259	23,651	27,641	1,703	13,453	8,759	81	10,558	1,075	14,132	8,674
Knox	40,977	6,829	11,729	492	4,350	3,143	26	3,982	291	3,414	2,341
Oxford	59,905	10,476	14,705	755	6,349	4,390	38	5,426	452	8,529	3,192
Penobscot	155,312	27,076	32,201	1,950	16,739	10,572	99	12,571	1,370	18,810	11,660
Sagadahoc	37,513	6,648	9,447	479	3,967	2,734	24	3,387	290	3,229	2,285
Washington	31,555	5,838	8,516	420	3,281	2,353	20	2,965	227	6,178	3,513
York	218,586	38,068	50,517	2,742	23,357	15,514	139	18,882	1,793	17,462	15,886

MARYLAND

American Lung Association in Maryland

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Anne Arundel	3	0	0	1.0	C
Baltimore	19	1	1	7.5	F
Calvert	2	0	0	0.7	B
Carroll	6	0	0	2.0	C
Cecil	7	0	0	2.3	D
Charles	3	0	0	1.0	C
Dorchester	7	0	0	2.3	D
Frederick	8	0	0	2.7	D
Garrett	0	0	0	0.0	A
Harford	17	0	0	5.7	F
Howard	DNC	DNC	DNC	DNC	DNC
Kent	6	0	0	2.0	C
Montgomery	7	0	0	2.3	D
Prince George's	14	1	0	5.2	F
Washington	3	0	0	1.0	C
Baltimore City	5	1	0	2.2	D

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Anne Arundel	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Baltimore	2	3	0	0	2.2	D	8.3	Pass
Calvert	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Carroll	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Cecil	1	4	0	0	2.3	D	7.4	Pass
Charles	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Dorchester	1	3	0	0	1.8	C	6.9	Pass
Frederick	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Garrett	0	2	0	0	1.0	C	5.6	Pass
Harford	1	3	0	0	1.8	C	7.3	Pass
Howard	1	3	0	0	1.8	C	7.4	Pass
Kent	1	3	0	0	1.8	C	6.0	Pass
Montgomery	0	3	0	0	1.5	C	7.1	Pass
Prince George's	0	3	0	0	1.5	C	6.5	Pass
Washington	3	2	0	0	2.0	C	7.0	Pass
Baltimore City	1	3	0	0	1.8	C	INC	INC

MARYLAND

American Lung Association in Maryland

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Anne Arundel	594,582	133,550	97,887	8,017	49,905	25,216	276	35,742	6,188	36,637	225,578
Baltimore	844,703	183,157	157,919	10,995	71,368	37,440	391	53,932	9,053	80,251	408,996
Calvert	94,728	21,783	16,037	1,308	7,850	4,079	44	5,861	920	4,626	24,039
Carroll	176,639	39,177	32,310	2,352	14,759	7,843	82	11,375	1,678	11,031	25,901
Cecil	105,672	23,340	18,651	1,401	8,852	4,644	49	6,700	1,038	10,384	19,344
Charles	171,973	40,744	24,347	2,446	14,193	7,003	80	9,835	1,823	13,202	117,874
Dorchester	32,879	6,783	7,760	407	2,776	1,611	15	2,418	308	5,094	12,731
Frederick	293,391	68,563	45,824	4,116	24,347	12,180	136	17,192	3,071	18,475	101,464
Garrett	28,423	4,943	7,163	297	2,487	1,472	13	2,226	242	2,993	1,256
Harford	264,644	58,594	47,686	3,517	22,169	11,657	123	16,826	2,627	19,117	73,524
Howard	336,001	79,057	53,280	4,746	27,756	14,059	156	19,966	3,517	18,652	180,155
Kent	19,303	2,910	5,519	175	1,741	1,050	9	1,597	176	2,349	4,444
Montgomery	1,058,474	238,759	187,319	14,333	88,234	46,193	491	66,553	10,861	75,263	628,434
Prince George's	947,430	206,709	148,087	12,409	80,237	39,944	439	56,260	10,190	101,680	843,359
Washington	155,813	33,592	28,617	2,017	13,160	6,919	72	9,984	1,457	16,984	42,227
Baltimore City	565,239	117,753	89,474	7,069	48,947	23,522	261	32,486	7,045	110,261	414,893

MASSACHUSETTS

American Lung Association in Massachusetts

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Barnstable	6	0	0	2.0	C
Berkshire	1	0	0	0.3	B
Bristol	7	0	0	2.3	D
Dukes	6	0	0	2.0	C
Essex	5	0	0	1.7	C
Franklin	1	0	0	0.3	B
Hampden	5	0	0	1.7	C
Hampshire	2	0	0	0.7	B
Middlesex	1	0	0	0.3	B
Norfolk	7	0	0	2.3	D
Plymouth	3	0	0	1.0	C
Suffolk	3	0	0	1.0	C
Worcester	2	0	0	0.7	B

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Barnstable	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Berkshire	5	3	0	0	3.2	D	6.6	Pass
Bristol	4	0	0	0	1.3	C	5.9	Pass
Dukes	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Essex	3	0	0	0	1.0	C	7.2	Pass
Franklin	6	1	0	0	2.5	D	7.2	Pass
Hampden	4	2	0	0	2.3	D	5.8	Pass
Hampshire	5	0	0	0	1.7	C	6.0	Pass
Middlesex	0	1	0	0	0.5	B	5.8	Pass
Norfolk	1	0	0	0	0.3	B	INC	INC
Plymouth	3	0	0	0	1.0	C	7.9	Pass
Suffolk	1	0	0	0	0.3	B	7.1	Pass
Worcester	5	0	0	0	1.7	C	8.2	Pass

MASSACHUSETTS

American Lung Association in Massachusetts

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Barnstable	231,735	31,794	78,708	1,866	23,240	14,827	109	20,227	1,457	20,388	26,633
Berkshire	126,818	20,097	33,191	1,179	12,556	7,053	60	9,306	1,013	15,266	17,347
Bristol	581,841	118,224	106,264	6,938	55,135	27,207	275	34,369	5,282	72,670	129,345
Dukes	20,819	3,633	5,836	213	2,010	1,200	10	1,603	145	1,755	2,792
Essex	810,089	167,210	154,361	9,813	76,385	38,179	382	48,541	7,241	76,541	273,889
Franklin	70,836	11,591	18,241	680	6,974	3,895	33	5,131	570	8,325	7,989
Hampden	460,291	95,008	86,320	5,576	43,484	21,290	217	27,000	4,261	78,475	185,452
Hampshire	162,502	22,556	32,314	1,324	16,755	7,709	77	9,732	1,896	17,279	29,995
Middlesex	1,623,952	313,933	273,933	18,424	156,598	72,696	766	90,577	16,035	120,838	517,572
Norfolk	727,473	147,400	133,070	8,651	69,011	33,925	343	42,856	6,787	54,608	215,816
Plymouth	535,308	109,171	109,361	6,407	50,442	26,311	253	33,776	4,463	42,087	111,833
Suffolk	768,425	121,787	106,606	7,148	78,242	31,030	362	37,206	9,552	109,289	422,523
Worcester	866,866	176,462	152,994	10,356	82,218	39,902	409	50,163	7,883	91,666	236,561

MICHIGAN

American Lung Association in Michigan

	HIGH OZONE DAYS 2021–2023					HIGH PARTICLE POLLUTION DAYS 2021–2023							
						24-Hour						Annual	
County	Orange	Red	Purple	Wgt. Avg.	Grade	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Allegan	23	3	0	9.2	F	0	0	0	0	0.0	A	INC	INC
Bay	DNC	DNC	DNC	DNC	DNC	3	3	0	0	2.5	D	7.3	Pass
Benzie	4	2	0	2.3	D	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Berrien	18	1	0	6.5	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Cass	12	0	0	4.0	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Clinton	3	0	0	1.0	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Genesee	11	1	0	4.2	F	3	3	0	0	2.5	D	8.1	Pass
Huron	7	0	0	2.3	D	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Ingham	2	1	0	1.2	C	5	4	0	0	3.7	F	8.9	Pass
Kalamazoo	5	0	0	1.7	C	5	2	1	0	3.3	F	10.4	Fail
Kent	14	0	0	4.7	F	4	2	1	0	3.0	D	9.3	Fail
Lenawee	4	0	0	1.3	C	3	2	0	0	2.0	C	INC	INC
Macomb	13	0	0	4.3	F	2	4	0	0	2.7	D	8.7	Pass
Manistee	12	2	0	5.0	F	0	0	0	0	0.0	A	INC	INC
Mason	6	1	0	2.5	D	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Missaukee	6	0	0	2.0	C	0	1	1	0	1.2	C	9.4	Fail
Muskegon	24	2	0	9.0	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Oakland	10	1	0	3.8	F	1	1	0	0	0.8	B	INC	INC
Ottawa	9	2	0	4.0	F	4	2	1	0	3.0	D	INC	INC
St. Clair	15	0	0	5.0	F	5	4	0	0	3.7	F	8.4	Pass
Schoolcraft	5	0	0	1.7	C	1	0	0	0	0.3	B	INC	INC
Tuscola	7	1	0	2.8	D	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Washtenaw	8	1	0	3.2	D	3	1	2	0	2.8	D	9.3	Fail
Wayne	17	1	0	6.2	F	19	3	1	0	8.5	F	13.0	Fail
Wexford	8	0	0	2.7	D	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

MICHIGAN

American Lung Association in Michigan

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Allegan	121,939	28,000	23,125	2,035	10,382	8,208	65	9,331	1,113	11,987	15,769
Bay	102,500	19,742	22,983	1,435	9,100	7,494	54	8,653	935	12,966	11,390
Benzie	18,441	3,124	5,392	227	1,665	1,528	10	1,824	143	1,765	1,245
Berrien	152,261	32,181	33,509	2,339	13,201	10,892	81	12,586	1,376	20,324	38,590
Cass	51,642	10,336	11,910	751	4,536	3,842	27	4,466	440	6,256	7,404
Clinton	79,720	16,777	15,530	1,220	6,956	5,495	42	6,248	763	5,502	9,245
Genesee	401,522	88,219	77,829	6,413	34,608	27,275	213	31,019	3,898	70,895	115,357
Huron	30,927	5,835	8,590	424	2,732	2,484	16	2,955	230	4,377	1,779
Ingham	284,637	54,858	43,269	3,988	25,577	17,017	151	18,392	3,542	42,961	89,923
Kalamazoo	262,215	55,388	43,432	4,026	22,954	16,144	139	17,784	3,004	33,110	63,610
Kent	661,354	153,510	102,130	11,159	56,468	39,958	351	43,920	7,184	68,064	185,978
Lenawee	97,520	19,807	20,515	1,440	8,564	6,911	52	7,925	876	9,887	13,944
Macomb	875,101	179,163	164,492	13,024	77,031	59,914	464	67,734	8,599	91,776	221,044
Manistee	25,562	4,256	7,368	309	2,317	2,090	14	2,488	182	3,434	2,956
Mason	29,159	5,553	7,830	404	2,574	2,286	15	2,706	235	4,204	2,764
Missaukee	15,311	3,381	3,460	246	1,309	1,101	8	1,279	127	1,741	1,050
Muskegon	176,564	39,294	33,437	2,856	15,171	11,772	94	13,336	1,685	24,094	42,722
Oakland	1,270,426	254,657	242,408	18,511	112,385	87,516	675	99,032	12,391	103,791	381,452
Ottawa	303,372	68,744	52,010	4,997	26,005	19,012	161	21,176	3,217	26,507	51,856
St. Clair	159,874	32,050	33,468	2,330	14,098	11,575	85	13,295	1,408	18,488	15,190
Schoolcraft	8,149	1,465	2,386	106	726	684	4	820	57	1,162	1,308
Tuscola	52,826	10,517	11,856	764	4,652	3,897	28	4,513	446	7,469	3,922
Washtenaw	365,536	65,633	60,189	4,771	33,331	23,031	194	25,199	4,313	50,467	113,670
Wayne	1,751,169	411,479	299,646	29,911	148,527	111,710	929	125,092	17,911	357,796	897,563
Wexford	34,122	7,738	7,189	562	2,904	2,375	18	2,736	301	4,520	2,387

MINNESOTA

American Lung Association in Minnesota

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Anoka	15	1	0	5.5	F
Becker	3	0	0	1.0	C
Beltrami	DNC	DNC	DNC	DNC	DNC
Carlton	0	0	0	0.0	A
Cass	DNC	DNC	DNC	DNC	DNC
Cook	DNC	DNC	DNC	DNC	DNC
Crow Wing	5	0	0	1.7	C
Dakota	DNC	DNC	DNC	DNC	DNC
Goodhue	5	0	0	1.7	C
Hennepin	6	1	0	2.5	D
Lake	0	0	0	0.0	A
Lyon	4	0	0	1.3	C
Mille Lacs	5	0	0	1.7	C
Olmsted	10	0	0	3.3	F
Ramsey	DNC	DNC	DNC	DNC	DNC
St. Louis	2	0	0	0.7	B
Scott	9	1	0	3.5	F
Stearns	6	1	0	2.5	D
Washington	9	0	0	3.0	D
Wright	13	1	0	4.8	F

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Anoka	5	3	0	0	3.2	D	7.4	Pass
Becker	10	6	1	0	7.0	F	8.6	Pass
Beltrami	9	3	2	0	5.8	F	6.9	Pass
Carlton	8	1	0	0	3.2	D	3.7	Pass
Cass	10	4	1	0	6.0	F	8.9	Pass
Cook	4	1	0	0	1.8	C	2.7	Pass
Crow Wing	5	3	1	0	3.8	F	6.7	Pass
Dakota	7	5	0	0	4.8	F	8.0	Pass
Goodhue	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Hennepin	6	5	0	0	4.5	F	8.6	Pass
Lake	4	1	0	0	1.8	C	4.9	Pass
Lyon	9	7	0	0	6.5	F	7.8	Pass
Mille Lacs	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Olmsted	8	1	0	0	3.2	D	7.2	Pass
Ramsey	10	3	0	0	4.8	F	9.0	Pass
St. Louis	11	3	0	0	5.2	F	6.0	Pass
Scott	3	4	0	0	3.0	D	7.8	Pass
Stearns	6	4	1	0	4.7	F	INC	INC
Washington	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Wright	5	4	0	0	3.7	F	7.9	Pass

MINNESOTA

American Lung Association in Minnesota

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Anoka	372,441	87,993	59,551	4,696	28,154	12,310	194	22,591	3,938	23,998	93,875
Becker	35,283	8,068	8,263	431	2,627	1,348	18	2,630	317	4,094	4,774
Beltrami	46,718	11,425	8,358	610	3,459	1,524	24	2,862	501	7,612	13,377
Carlton	36,825	7,980	6,978	426	2,831	1,314	19	2,468	336	3,194	4,617
Cass	31,446	6,234	8,662	333	2,410	1,338	16	2,658	246	4,571	5,089
Cook	5,639	809	1,820	43	457	262	3	530	49	598	930
Crow Wing	68,304	13,759	17,067	734	5,253	2,745	35	5,380	605	6,191	3,909
Dakota	447,440	106,392	73,682	5,678	33,685	14,823	232	27,350	4,795	26,470	119,487
Goodhue	48,035	10,428	10,212	557	3,662	1,788	25	3,423	455	3,433	4,469
Hennepin	1,258,713	269,227	204,631	14,368	97,823	41,290	654	75,754	14,770	125,382	422,128
Lake	10,855	2,036	3,080	109	841	468	6	933	87	927	598
Lyon	25,427	6,694	4,614	357	1,834	838	13	1,581	260	2,758	4,706
Mille Lacs	27,427	6,337	5,134	338	2,070	970	14	1,823	260	2,893	3,074
Olmsted	164,784	38,963	28,679	2,079	12,372	5,443	85	10,145	1,850	12,929	39,113
Ramsey	536,075	122,184	87,785	6,521	40,831	17,183	278	31,682	6,333	62,146	221,832
St. Louis	200,514	36,720	43,779	1,960	15,937	7,502	104	14,365	2,146	25,750	19,020
Scott	155,814	39,577	20,368	2,112	11,618	4,843	81	8,640	1,701	8,230	37,037
Stearns	160,977	37,887	26,736	2,022	12,129	5,174	84	9,575	1,777	16,996	31,135
Washington	278,936	66,121	48,070	3,529	20,978	9,487	145	17,620	2,881	13,645	61,956
Wright	151,150	40,678	21,247	2,171	10,986	4,681	79	8,475	1,577	8,100	16,379

MISSISSIPPI

American Lung Association in Mississippi

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Bolivar	3	0	0	1.0	C
DeSoto	11	0	0	3.7	F
Forrest	DNC	DNC	DNC	DNC	DNC
Hancock	1	0	0	0.3	B
Harrison	1	0	0	0.3	B
Hinds	2	0	0	0.7	B
Jackson	3	0	0	1.0	C
Lauderdale	0	0	0	0.0	A
Lee	2	0	0	0.7	B
Yalobusha	1	0	0	0.3	B

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Bolivar	1	0	0	0	0.3	B	8.2	Pass
DeSoto	2	0	0	0	0.7	B	8.7	Pass
Forrest	1	0	0	0	0.3	B	9.2	Fail
Hancock	0	0	0	0	0.0	A	7.8	Pass
Harrison	0	0	0	0	0.0	A	8.0	Pass
Hinds	2	0	0	0	0.7	B	9.3	Fail
Jackson	0	0	0	0	0.0	A	7.6	Pass
Lauderdale	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lee	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Yalobusha	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

MISSISSIPPI

American Lung Association in Mississippi

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Bolivar	28,968	7,131	5,139	494	1,563	1,661	19	2,415	331	10,583	19,603
DeSoto	193,247	47,541	26,803	3,293	10,506	10,738	129	15,040	2,393	17,574	85,740
Forrest	78,208	17,784	11,055	1,232	4,262	4,138	52	5,775	1,114	13,807	34,448
Hancock	46,159	8,692	10,727	602	2,718	3,125	31	4,692	463	7,157	7,387
Harrison	210,612	49,023	36,304	3,396	11,599	12,272	141	17,716	2,429	32,963	80,941
Hinds	214,870	49,758	36,389	3,447	11,796	12,299	143	17,697	2,677	43,453	165,373
Jackson	146,389	33,114	26,026	2,294	8,166	8,764	98	12,698	1,645	19,431	49,038
Lauderdale	70,527	16,383	13,596	1,135	3,888	4,234	47	6,223	754	15,955	34,862
Lee	82,799	20,572	13,144	1,425	4,479	4,697	55	6,715	964	11,003	30,973
Yalobusha	12,386	2,605	2,794	180	705	801	8	1,203	126	2,493	5,190

MISSOURI

American Lung Association in Missouri

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Andrew	7	0	0	2.3	D
Boone	5	0	0	1.7	C
Buchanan	DNC	DNC	DNC	DNC	DNC
Callaway	5	0	0	1.7	C
Cass	5	0	0	1.7	C
Cedar	4	0	0	1.3	C
Clay	23	0	0	7.7	F
Clinton	12	0	0	4.0	F
Greene	4	0	0	1.3	C
Jackson	DNC	DNC	DNC	DNC	DNC
Jasper	4	0	0	1.3	C
Jefferson	20	2	0	7.7	F
Lincoln	16	0	0	5.3	F
Monroe	3	0	0	1.0	C
Perry	13	0	0	4.3	F
St. Charles	24	0	0	8.0	F
Ste. Genevieve	12	0	0	4.0	F
St. Louis	19	2	0	7.3	F
St. Louis City	14	2	0	5.7	F

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Andrew	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Boone	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Buchanan	5	0	0	0	1.7	C	8.6	Pass
Callaway	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Cass	1	0	0	0	0.3	B	INC	INC
Cedar	0	0	0	0	0.0	A	6.8	Pass
Clay	1	0	0	0	0.3	B	6.0	Pass
Clinton	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Greene	1	0	0	0	0.3	B	INC	INC
Jackson	5	1	0	0	2.2	D	7.6	Pass
Jasper	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Jefferson	1	1	0	0	0.8	B	8.2	Pass
Lincoln	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Monroe	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Perry	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
St. Charles	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Ste. Genevieve	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
St. Louis	0	1	0	0	0.5	B	7.2	Pass
St. Louis City	5	1	0	0	2.2	D	9.6	Fail

MISSOURI

American Lung Association in Missouri

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Andrew	18,127	4,075	3,787	326	1,390	1,285	11	1,623	174	1,504	1,247
Boone	189,463	37,878	26,784	3,035	15,456	10,752	116	13,341	2,621	25,749	44,114
Buchanan	82,956	18,451	14,958	1,478	6,450	5,442	51	6,814	851	11,962	15,646
Callaway	44,731	9,216	8,273	738	3,546	3,031	28	3,790	453	5,393	4,922
Cass	111,732	25,852	20,521	2,071	8,551	7,503	69	9,381	1,140	7,698	16,723
Cedar	14,672	3,574	3,439	286	1,089	1,073	9	1,371	122	2,163	971
Clay	259,772	60,538	40,778	4,850	20,026	16,144	160	20,005	2,918	20,019	58,322
Clinton	21,548	4,905	4,162	393	1,651	1,498	13	1,876	205	2,041	1,580
Greene	304,611	62,952	53,107	5,043	24,324	19,265	187	24,163	3,608	41,389	44,732
Jackson	718,560	165,358	117,328	13,248	55,629	44,568	441	55,534	8,284	84,520	285,225
Jasper	125,056	30,541	20,724	2,447	9,488	7,725	77	9,648	1,366	18,915	23,146
Jefferson	231,230	51,611	39,902	4,135	17,929	15,412	142	19,135	2,382	20,986	16,455
Lincoln	64,699	16,151	9,728	1,294	4,877	3,960	40	4,889	682	5,382	5,035
Monroe	8,698	1,911	2,181	153	664	672	5	859	71	1,049	706
Perry	18,950	4,185	3,907	335	1,461	1,347	12	1,697	180	1,869	1,124
St. Charles	416,659	92,794	73,375	7,434	32,367	27,474	256	34,262	4,419	22,647	66,609
Ste. Genevieve	18,642	3,994	4,052	320	1,447	1,353	11	1,713	164	1,708	1,077
St. Louis	987,059	215,244	194,144	17,244	76,830	67,372	605	84,869	10,585	94,080	360,289
St. Louis City	281,754	50,849	45,784	4,074	23,357	17,655	173	21,981	3,689	54,810	153,057

MONTANA

American Lung Association in Montana

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Beaverhead	DNC	DNC	DNC	DNC	DNC
Custer	INC	INC	INC	INC	INC
Fergus	5	0	0	1.7	C
Flathead	0	0	0	0.0	A
Gallatin	DNC	DNC	DNC	DNC	DNC
Glacier	DNC	DNC	DNC	DNC	DNC
Hill	DNC	DNC	DNC	DNC	DNC
Lewis and Clark	1	0	0	0.3	B
Lincoln	DNC	DNC	DNC	DNC	DNC
Missoula	0	0	0	0.0	A
Phillips	1	0	0	0.3	B
Powder River	2	0	0	0.7	B
Ravalli	DNC	DNC	DNC	DNC	DNC
Richland	1	0	0	0.3	B
Rosebud	INC	INC	INC	INC	INC
Silver Bow	DNC	DNC	DNC	DNC	DNC
Yellowstone	DNC	DNC	DNC	DNC	DNC

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Beaverhead	INC	INC	INC	INC	INC	INC	INC	INC
Custer	INC	INC	INC	INC	INC	INC	INC	INC
Fergus	16	3	0	0	6.8	F	5.4	Pass
Flathead	16	4	0	0	7.3	F	8.6	Pass
Gallatin	6	0	0	0	2.0	C	4.1	Pass
Glacier	INC	INC	INC	INC	INC	INC	INC	INC
Hill	INC	INC	INC	INC	INC	INC	INC	INC
Lewis and Clark	19	8	0	0	10.3	F	8.7	Pass
Lincoln	17	10	0	0	10.7	F	12.8	Fail
Missoula	24	7	0	0	11.5	F	10.5	Fail
Phillips	7	7	0	0	5.8	F	INC	INC
Powder River	16	8	0	0	9.3	F	8.3	Pass
Ravalli	20	13	2	0	14.5	F	7.8	Pass
Richland	8	4	1	0	5.3	F	6.2	Pass
Rosebud	INC	INC	INC	INC	INC	INC	INC	INC
Silver Bow	25	8	0	0	12.3	F	8.3	Pass
Yellowstone	13	3	0	0	5.8	F	7.8	Pass

MONTANA

American Lung Association in Montana

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Beaverhead	9,885	1,729	2,393	117	949	604	4	724	95	1,224	1,063
Custer	11,985	2,348	2,520	159	1,136	697	5	819	113	1,571	1,163
Fergus	11,772	2,456	2,969	166	1,080	721	5	881	100	1,292	843
Flathead	113,679	24,449	24,164	1,651	10,497	6,535	51	7,737	1,064	11,138	9,976
Gallatin	126,409	23,541	17,634	1,590	12,350	6,304	57	6,747	1,519	10,694	13,377
Glacier	13,609	4,025	1,863	272	1,151	630	6	699	135	3,754	9,564
Hill	16,276	4,571	2,709	309	1,387	799	7	914	154	3,004	5,212
Lewis and Clark	75,011	15,806	15,560	1,068	6,978	4,284	34	5,041	716	6,827	7,351
Lincoln	21,895	3,885	6,690	262	2,061	1,499	10	1,892	163	3,287	1,734
Missoula	121,849	21,725	21,390	1,467	11,894	6,578	55	7,370	1,435	13,548	15,370
Phillips	4,249	1,004	1,013	68	378	252	2	308	33	700	744
Powder River	1,743	306	537	21	164	119	1	150	12	200	148
Ravalli	47,738	8,813	13,140	595	4,495	3,105	21	3,843	382	5,076	4,118
Richland	11,173	2,815	1,969	190	994	587	5	677	101	1,059	1,325
Rosebud	8,160	2,357	1,438	159	688	414	4	482	72	1,633	3,712
Silver Bow	36,360	7,295	7,097	493	3,440	2,042	16	2,364	348	5,634	3,643
Yellowstone	170,843	38,840	31,795	2,623	15,630	9,208	77	10,629	1,724	16,465	26,230

NEBRASKA

American Lung Association in Nebraska

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Douglas	23	1	0	8.2	F
Gage	DNC	DNC	DNC	DNC	DNC
Hall	DNC	DNC	DNC	DNC	DNC
Knox	18	1	0	6.5	F
Lancaster	2	0	0	0.7	B
Sarpy	DNC	DNC	DNC	DNC	DNC
Scotts Bluff	DNC	DNC	DNC	DNC	DNC
Washington	DNC	DNC	DNC	DNC	DNC

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Douglas	4	1	0	0	1.8	C	8.1	Pass
Gage	3	1	0	0	1.5	C	INC	INC
Hall	2	3	0	0	2.2	D	6.8	Pass
Knox	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lancaster	0	1	0	0	0.5	B	7.2	Pass
Sarpy	3	1	0	0	1.5	C	7.8	Pass
Scotts Bluff	0	0	1	0	0.7	B	4.6	Pass
Washington	4	1	0	0	1.8	C	6.6	Pass

NEBRASKA

American Lung Association in Nebraska

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Douglas	589,540	147,751	85,827	6,067	37,699	22,671	312	30,480	7,658	66,643	196,737
Gage	21,634	4,879	4,877	200	1,393	1,030	11	1,461	220	2,198	1,520
Hall	62,197	16,992	9,935	698	3,833	2,457	33	3,356	708	6,595	24,148
Knox	8,298	2,023	2,137	83	514	410	4	595	75	1,121	1,254
Lancaster	326,716	72,610	51,559	2,982	21,606	12,927	173	17,514	4,418	33,770	69,022
Sarpy	199,886	51,804	26,484	2,127	12,698	7,481	106	9,940	2,557	9,803	44,497
Scotts Bluff	35,699	8,546	7,654	351	2,261	1,619	19	2,290	395	5,374	10,117
Washington	21,152	4,959	4,155	204	1,360	954	11	1,329	224	1,276	1,418

NEVADA

American Lung Association in Nevada

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Churchill	9	1	0	3.5	F
Clark	65	1	0	22.2	F
Douglas	DNC	DNC	DNC	DNC	DNC
Elko	7	1	0	2.8	D
Lyon	8	0	0	2.7	D
Washoe	24	2	0	9.0	F
White Pine	2	0	0	0.7	B
Carson City	9	0	0	3.0	D

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Churchill	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Clark	8	3	0	0	4.2	F	8.7	Pass
Douglas	8	25	6	0	19.2	F	8.4	Pass
Elko	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lyon	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Washoe	8	14	12	1	18.5	F	9.7	Fail
White Pine	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Carson City	13	14	8	1	17.5	F	7.5	Pass

NEVADA

American Lung Association in Nevada

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Churchill	25,803	5,886	5,062	421	1,744	1,468	11	1,570	225	2,736	7,399
Clark	2,336,573	511,912	380,462	36,621	160,644	126,738	966	134,643	23,693	297,404	1,434,103
Douglas	49,545	7,170	16,804	513	3,613	3,778	20	4,085	328	4,047	9,904
Elko	54,293	14,200	7,346	1,016	3,546	2,674	22	2,833	518	4,834	19,050
Lyon	62,583	12,885	13,823	922	4,329	3,803	26	4,074	526	5,991	18,197
Washoe	498,022	101,584	91,139	7,267	34,864	28,196	206	30,082	4,880	48,394	200,329
White Pine	8,522	1,719	1,807	123	593	513	4	549	65	959	2,382
Carson City	58,036	11,461	12,429	820	4,063	3,513	24	3,758	485	5,757	20,983

NEW HAMPSHIRE

American Lung Association in New Hampshire

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Belknap	0	0	0	0.0	A
Cheshire	1	0	0	0.3	B
Coos	4	0	0	1.3	C
Grafton	0	0	0	0.0	A
Hillsborough	2	0	0	0.7	B
Merrimack	1	0	0	0.3	B
Rockingham	4	0	0	1.3	C

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Belknap	2	0	0	0	0.7	B	4.8	Pass
Cheshire	3	0	0	0	1.0	C	7.0	Pass
Coos	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Grafton	1	0	0	0	0.3	B	5.1	Pass
Hillsborough	4	0	0	0	1.3	C	3.9	Pass
Merrimack	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Rockingham	1	0	0	0	0.3	B	5.6	Pass

NEW HAMPSHIRE

American Lung Association in New Hampshire

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Belknap	65,027	11,037	16,232	789	6,260	4,074	36	4,572	482	5,139	3,803
Cheshire	77,703	13,767	17,814	984	7,554	4,622	42	5,033	654	6,709	5,526
Coos	31,372	5,070	8,223	362	3,029	2,007	17	2,283	213	4,051	1,864
Grafton	93,146	14,179	22,235	1,013	9,341	5,670	51	6,185	821	8,045	9,778
Hillsborough	427,354	82,637	76,503	5,905	41,844	23,859	234	24,149	3,789	27,070	78,765
Merrimack	157,103	28,516	32,117	2,038	15,401	9,101	86	9,564	1,353	11,623	13,663
Rockingham	320,689	58,396	67,810	4,173	31,116	19,036	175	20,317	2,577	17,152	28,099

NEW JERSEY

American Lung Association in New Jersey

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Atlantic	0	0	0	0.0	A
Bergen	13	1	0	4.8	F
Camden	7	0	0	2.3	D
Cumberland	4	0	0	1.3	C
Essex	INC	INC	INC	INC	INC
Gloucester	11	1	0	4.2	F
Hudson	7	0	0	2.3	D
Hunterdon	5	1	0	2.2	D
Mercer	13	2	0	5.3	F
Middlesex	9	2	0	4.0	F
Monmouth	6	2	0	3.0	D
Morris	3	1	0	1.5	C
Ocean	10	0	0	3.3	F
Passaic	4	0	0	1.3	C
Union	DNC	DNC	DNC	DNC	DNC
Warren	0	0	0	0.0	A

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Atlantic	3	2	1	0	2.7	D	6.7	Pass
Bergen	2	3	0	0	2.2	D	8.5	Pass
Camden	4	2	1	0	3.0	D	9.8	Fail
Cumberland	3	1	1	0	2.2	D	INC	INC
Essex	INC	INC	INC	INC	INC	INC	INC	INC
Gloucester	0	2	0	0	1.0	C	7.4	Pass
Hudson	1	3	1	0	2.5	D	7.8	Pass
Hunterdon	1	3	1	0	2.5	D	8.1	Pass
Mercer	3	3	1	0	3.2	D	INC	INC
Middlesex	3	3	1	0	3.2	D	8.4	Pass
Monmouth	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Morris	1	1	0	0	0.8	B	6.1	Pass
Ocean	5	1	1	0	2.8	D	7.4	Pass
Passaic	INC	INC	INC	INC	INC	INC	INC	INC
Union	2	3	1	0	2.8	D	9.4	Fail
Warren	2	4	0	0	2.7	D	8.4	Pass

NEW JERSEY

American Lung Association in New Jersey

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Atlantic	275,213	56,590	56,571	3,839	18,454	10,200	129	15,859	2,806	32,219	124,335
Bergen	957,736	198,334	179,022	13,453	64,310	34,486	449	52,774	10,170	62,866	460,757
Camden	527,196	119,354	89,335	8,096	34,386	17,699	247	26,770	5,933	64,241	246,915
Cumberland	152,326	37,110	24,690	2,517	9,711	4,951	72	7,462	1,541	24,394	88,843
Essex	851,117	198,853	125,156	13,488	55,132	27,203	398	40,256	9,924	117,764	603,125
Gloucester	308,423	65,192	53,605	4,422	20,545	10,653	144	16,127	3,423	25,292	78,955
Hudson	705,472	137,155	92,495	9,303	47,582	21,539	331	31,009	9,328	106,193	502,487
Hunterdon	130,183	24,726	28,277	1,677	8,957	5,105	61	7,975	1,242	6,126	24,766
Mercer	381,671	83,627	63,220	5,673	25,195	12,904	179	19,411	4,239	38,798	217,264
Middlesex	863,623	183,504	144,285	12,447	57,417	29,297	405	44,075	9,717	72,101	536,859
Monmouth	642,799	132,784	127,345	9,007	43,246	23,818	301	36,787	6,420	42,424	171,196
Morris	514,423	105,264	96,546	7,140	34,685	18,655	241	28,549	5,288	24,591	170,039
Ocean	659,197	164,894	151,535	11,185	41,476	24,413	309	39,090	5,834	65,276	115,858
Passaic	513,395	120,459	84,482	8,171	33,151	16,972	240	25,590	5,636	70,313	315,874
Union	572,726	133,643	89,297	9,065	37,178	18,828	268	28,126	6,294	50,389	363,120
Warren	111,252	21,390	22,536	1,451	7,617	4,198	52	6,489	1,106	9,107	27,812

NEW MEXICO

American Lung Association in New Mexico

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Bernalillo	29	1	0	10.2	F
Doña Ana	38	5	0	15.2	F
Eddy	70	2	0	24.3	F
Lea	12	1	0	4.5	F
Rio Arriba	2	0	0	0.7	B
Sandoval	4	0	0	1.3	C
San Juan	14	0	0	4.7	F
Santa Fe	2	0	0	0.7	B
Taos	DNC	DNC	DNC	DNC	DNC
Valencia	2	0	0	0.7	B

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Bernalillo	10	4	0	0	5.3	F	8.0	Pass
Doña Ana	6	2	1	0	3.7	F	8.6	Pass
Eddy	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lea	2	0	0	0	0.7	B	6.6	Pass
Rio Arriba	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Sandoval	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
San Juan	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Santa Fe	1	0	0	0	0.3	B	INC	INC
Taos	1	0	0	0	0.3	B	4.9	Pass
Valencia	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

NEW MEXICO

American Lung Association in New Mexico

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Bernalillo	671,586	133,049	126,639	9,504	53,038	25,715	203	43,624	6,983	89,525	414,492
Doña Ana	225,210	50,882	39,142	3,634	17,204	7,840	68	13,532	2,420	43,762	164,360
Eddy	60,275	15,891	9,104	1,135	4,409	2,000	18	3,394	587	9,810	34,092
Lea	72,101	20,738	8,619	1,481	5,155	2,129	22	3,625	721	11,871	49,724
Rio Arriba	39,876	8,888	9,052	635	3,003	1,659	12	2,798	343	7,359	34,048
Sandoval	155,936	33,287	31,878	2,378	11,999	6,232	47	10,495	1,479	18,196	91,273
San Juan	120,675	29,703	21,005	2,122	8,972	4,337	36	7,337	1,183	23,759	76,643
Santa Fe	155,956	24,194	45,205	1,728	12,579	7,599	47	12,853	1,310	18,759	84,597
Taos	34,405	5,277	10,764	377	2,760	1,761	10	2,969	266	6,340	20,305
Valencia	79,141	18,054	15,042	1,290	6,000	3,028	24	5,099	741	13,484	54,710

NEW YORK

American Lung Association in New York

	HIGH OZONE DAYS 2021–2023					HIGH PARTICLE POLLUTION DAYS 2021–2023							
						24-Hour						Annual	
County	Orange	Red	Purple	Wgt. Avg.	Grade	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Albany	2	0	0	0.7	B	4	3	0	0	2.8	D	6.8	Pass
Bronx	13	0	0	4.3	F	0	4	1	0	2.7	D	7.9	Pass
Chautauqua	9	0	0	3.0	D	1	0	0	0	0.3	B	6.7	Pass
Dutchess	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Erie	2	0	0	0.7	B	3	0	0	0	1.0	C	7.7	Pass
Essex	5	0	0	1.7	C	0	0	0	0	0.0	A	4.0	Pass
Hamilton	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Jefferson	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Kings	DNC	DNC	DNC	DNC	DNC	0	1	0	0	0.5	B	8.0	Pass
Monroe	2	0	0	0.7	B	2	3	0	0	2.2	D	7.2	Pass
New York	12	0	0	4.0	F	1	1	0	0	0.8	B	7.8	Pass
Niagara	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Onondaga	2	0	0	0.7	B	2	3	1	0	2.8	D	6.1	Pass
Orange	INC	INC	INC	INC	INC	1	0	0	0	0.3	B	6.6	Pass
Oswego	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Putnam	4	0	0	1.3	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Queens	18	0	0	6.0	F	2	4	1	0	3.3	F	8.1	Pass
Richmond	9	0	0	3.0	D	2	0	0	0	0.7	B	8.3	Pass
Rockland	4	1	0	1.8	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Saratoga	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Steuben	1	0	0	0.3	B	3	4	1	0	3.7	F	5.9	Pass
Suffolk	28	1	0	9.8	F	0	0	0	0	0.0	A	7.0	Pass
Tompkins	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Wayne	4	0	0	1.3	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Westchester	8	1	0	3.2	D	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

NEW YORK

American Lung Association in New York

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Albany	316,659	56,536	59,276	5,193	25,880	13,148	163	20,358	3,591	38,586	97,208
Bronx	1,356,476	324,773	207,403	29,833	103,208	51,037	697	77,966	14,782	367,107	1,233,915
Chautauqua	124,891	25,610	27,416	2,352	9,871	5,629	64	8,778	1,136	20,232	18,888
Dutchess	297,150	54,124	58,558	4,972	24,271	13,138	153	20,255	2,934	22,541	96,547
Erie	946,147	189,430	188,291	17,401	75,335	40,602	487	62,977	9,512	130,014	254,274
Essex	36,775	5,652	10,087	519	3,086	1,925	19	3,028	289	4,587	2,607
Hamilton	5,082	627	1,767	58	439	307	3	489	34	534	309
Jefferson	114,787	27,507	17,943	2,527	8,684	4,150	59	6,404	1,103	14,427	21,846
Kings	2,561,225	557,288	413,894	51,191	199,904	98,006	1,316	150,569	29,439	482,728	1,607,724
Monroe	748,482	150,962	144,644	13,867	59,504	31,600	385	48,947	7,729	95,055	233,144
New York	1,597,451	216,031	299,787	19,844	137,407	67,661	821	104,641	20,381	255,002	850,108
Niagara	209,457	41,366	44,893	3,800	16,741	9,462	108	14,701	1,939	28,300	34,648
Onondaga	467,873	97,236	90,044	8,932	36,918	19,684	241	30,483	4,783	61,032	117,436
Orange	407,470	104,208	61,204	9,572	30,387	15,264	210	23,260	4,023	50,244	168,428
Oswego	118,162	24,083	21,895	2,212	9,399	4,999	61	7,693	1,138	16,742	8,710
Putnam	98,060	18,967	19,472	1,742	7,914	4,403	51	6,773	885	7,076	27,811
Queens	2,252,196	430,689	422,104	39,562	181,958	96,420	1,159	148,390	23,223	307,761	1,712,219
Richmond	490,687	105,259	87,117	9,669	38,570	20,423	253	31,315	4,869	63,638	218,903
Rockland	340,807	101,965	54,364	9,366	23,844	12,441	176	19,154	3,066	50,990	132,622
Saratoga	238,711	45,085	49,297	4,141	19,327	10,775	123	16,657	2,252	17,032	26,767
Steuben	92,162	19,739	19,755	1,813	7,212	4,129	48	6,420	812	12,857	6,538
Suffolk	1,523,170	312,783	281,959	28,731	121,143	65,346	785	100,284	14,439	104,291	568,305
Tompkins	103,558	14,445	17,448	1,327	8,847	4,030	53	6,235	1,387	14,034	24,976
Wayne	90,829	18,894	19,540	1,736	7,170	4,121	47	6,398	785	9,922	10,436
Westchester	990,817	207,881	185,878	19,095	78,298	42,446	510	65,266	9,711	90,348	489,572

NORTH CAROLINA

American Lung Association in North Carolina

	HIGH OZONE DAYS 2021–2023					HIGH PARTICLE POLLUTION DAYS 2021–2023							
						24-Hour						Annual	
County	Orange	Red	Purple	Wgt. Avg.	Grade	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Alexander	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Avery	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Buncombe	0	0	0	0.0	A	0	0	0	0	0.0	A	6.3	Pass
Caldwell	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Carteret	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Caswell	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Catawba	DNC	DNC	DNC	DNC	DNC	3	0	0	0	1.0	C	8.5	Pass
Cumberland	1	0	0	0.3	B	2	0	0	0	0.7	B	8.4	Pass
Davidson	DNC	DNC	DNC	DNC	DNC	3	0	0	0	1.0	C	9.2	Fail
Durham	0	0	0	0.0	A	3	0	0	0	1.0	C	7.6	Pass
Edgecombe	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Forsyth	3	0	0	1.0	C	8	1	0	0	3.2	D	8.0	Pass
Graham	7	0	0	2.3	D	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Granville	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Guilford	1	0	0	0.3	B	3	0	0	0	1.0	C	8.6	Pass
Haywood	4	0	0	1.3	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Jackson	DNC	DNC	DNC	DNC	DNC	INC	INC	INC	INC	INC	INC	INC	INC
Johnston	1	0	0	0.3	B	1	0	0	0	0.3	B	7.7	Pass
Lenoir	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lincoln	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Macon	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Martin	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Mecklenburg	8	0	0	2.7	D	4	0	0	0	1.3	C	9.2	Fail
Mitchell	DNC	DNC	DNC	DNC	DNC	1	0	0	0	0.3	B	6.3	Pass
Montgomery	0	0	0	0.0	A	4	0	0	0	1.3	C	8.2	Pass
New Hanover	0	0	0	0.0	A	1	0	0	0	0.3	B	5.4	Pass
Northampton	DNC	DNC	DNC	DNC	DNC	1	0	0	0	0.3	B	7.2	Pass
Person	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Pitt	0	0	0	0.0	A	2	0	0	0	0.7	B	6.8	Pass
Rockingham	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Rowan	1	0	0	0.3	B	3	0	0	0	1.0	C	8.2	Pass
Swain	1	0	0	0.3	B	2	0	0	0	0.7	B	6.4	Pass
Union	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Wake	1	0	0	0.3	B	5	0	0	0	1.7	C	8.3	Pass
Yancey	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

NORTH CAROLINA

American Lung Association in North Carolina

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Alexander	36,473	7,132	7,554	820	2,943	2,183	21	3,180	330	4,350	5,350
Avery	17,561	2,550	4,248	293	1,512	1,152	10	1,674	152	2,469	2,195
Buncombe	275,901	48,293	60,275	5,550	22,827	16,780	161	23,990	3,043	34,611	50,204
Caldwell	80,574	15,754	17,365	1,810	6,516	4,922	47	7,216	757	10,843	11,885
Carteret	69,615	11,545	19,399	1,327	5,912	4,865	41	7,239	577	7,295	9,467
Caswell	22,807	4,238	5,356	487	1,873	1,445	13	2,114	189	3,564	8,862
Catawba	164,645	35,247	31,389	4,050	12,937	9,366	96	13,540	1,651	19,276	44,768
Cumberland	337,890	85,264	44,854	9,798	24,853	15,441	197	20,542	3,931	49,047	202,831
Davidson	174,804	37,458	33,888	4,305	13,745	10,038	102	14,573	1,734	24,163	41,498
Durham	336,892	65,434	50,717	7,519	26,769	17,039	196	23,009	4,422	33,994	192,197
Edgecombe	48,832	11,179	10,519	1,285	3,789	2,860	28	4,133	493	10,936	31,811
Forsyth	392,921	87,995	68,335	10,112	30,343	21,047	228	29,748	4,460	56,249	180,591
Graham	8,052	1,535	2,046	176	660	524	5	769	71	1,344	1,228
Granville	62,192	12,611	11,428	1,449	4,948	3,543	37	5,140	593	6,722	27,644
Guilford	549,866	119,813	89,625	13,768	42,648	28,732	319	40,161	6,629	77,550	294,931
Haywood	62,969	10,864	16,420	1,248	5,281	4,204	37	6,168	578	6,869	5,865
Jackson	44,574	7,292	9,174	838	3,720	2,607	26	3,620	528	6,787	9,261
Johnston	241,955	59,373	33,935	6,823	18,052	11,981	141	17,000	2,652	25,952	93,021
Lenoir	54,895	12,496	11,901	1,436	4,268	3,233	32	4,684	533	12,425	28,743
Lincoln	95,675	19,527	18,924	2,244	7,629	5,640	56	8,274	909	10,126	16,534
Macon	38,412	7,018	11,200	806	3,207	2,677	22	3,950	319	5,155	5,540
Martin	21,447	4,322	5,624	497	1,740	1,407	12	2,067	194	4,173	10,245
Mecklenburg	1,163,701	262,068	143,690	30,116	88,527	54,727	678	74,511	14,912	116,447	652,485
Mitchell	14,999	2,716	3,835	312	1,245	993	9	1,466	131	2,203	1,347
Montgomery	26,085	5,380	5,934	618	2,088	1,606	15	2,348	246	3,955	9,494
New Hanover	238,852	41,794	46,870	4,803	19,652	13,817	139	19,465	2,838	28,150	56,594
Northampton	16,715	2,957	5,096	340	1,409	1,200	10	1,782	131	3,395	10,064
Person	39,737	8,196	8,542	942	3,172	2,401	23	3,515	375	5,646	14,115
Pitt	175,119	37,244	26,398	4,280	13,606	8,709	102	11,754	2,326	32,930	84,429
Rockingham	92,518	18,702	20,123	2,149	7,426	5,637	54	8,262	883	12,424	27,058
Rowan	151,661	33,377	27,394	3,836	11,796	8,363	89	11,989	1,550	21,559	48,260
Swain	13,916	3,010	2,795	346	1,093	802	8	1,156	140	2,125	5,694
Union	256,452	64,733	35,466	7,439	18,970	12,757	150	18,383	2,730	21,166	84,702
Wake	1,190,275	270,737	159,366	31,112	90,615	58,185	694	81,028	14,339	85,051	510,380
Yancey	18,938	3,356	5,034	386	1,582	1,275	11	1,879	167	2,984	1,636

NORTH DAKOTA

American Lung Association in North Dakota

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Billings	4	0	0	1.3	C
Burke	5	0	0	1.7	C
Burleigh	7	0	0	2.3	D
Cass	3	0	0	1.0	C
Dunn	4	0	0	1.3	C
McKenzie	3	0	0	1.0	C
Mercer	4	0	0	1.3	C
Oliver	6	0	0	2.0	C
Ward	6	0	0	2.0	C

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Billings	7	3	1	0	4.5	F	6.1	Pass
Burke	13	10	1	0	10.0	F	7.6	Pass
Burleigh	15	12	1	0	11.7	F	8.8	Pass
Cass	15	10	1	0	10.7	F	9.2	Fail
Dunn	14	8	0	1	9.5	F	7.1	Pass
McKenzie	13	6	1	0	8.0	F	INC	INC
Mercer	12	9	0	1	9.3	F	6.6	Pass
Oliver	14	12	0	1	11.5	F	8.0	Pass
Ward	16	9	1	0	10.5	F	7.2	Pass

NORTH DAKOTA

American Lung Association in North Dakota

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Billings	1,034	222	261	14	80	48	1	79	10	108	84
Burke	2,134	535	494	35	157	95	1	156	19	192	188
Burleigh	100,012	23,179	18,506	1,508	7,755	4,073	53	6,436	1,184	7,402	13,278
Cass	196,362	43,407	25,873	2,824	15,929	6,943	104	10,384	2,846	18,222	35,045
Dunn	4,019	1,044	786	68	297	165	2	264	39	440	785
McKenzie	14,252	4,547	1,496	296	1,008	445	8	660	167	1,141	3,711
Mercer	8,309	1,938	1,933	126	626	379	4	620	80	663	707
Oliver	1,879	445	492	29	139	89	1	148	16	202	128
Ward	68,332	16,387	10,204	1,066	5,354	2,494	36	3,815	860	4,874	13,023

OHIO

American Lung Association in Ohio

	HIGH OZONE DAYS 2021–2023					HIGH PARTICLE POLLUTION DAYS 2021–2023							
						24-Hour						Annual	
County	Orange	Red	Purple	Wgt. Avg.	Grade	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Allen	4	0	0	1.3	C	3	3	0	0	2.5	D	7.5	Pass
Ashtabula	9	0	0	3.0	D	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Athens	DNC	DNC	DNC	DNC	DNC	0	1	0	0	0.5	B	6.1	Pass
Belmont	DNC	DNC	DNC	DNC	DNC	0	1	0	0	0.5	B	7.8	Pass
Butler	11	0	0	3.7	F	8	4	0	0	4.7	F	11.2	Fail
Clark	3	0	0	1.0	C	4	3	0	0	2.8	D	8.8	Pass
Clermont	3	0	0	1.0	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Clinton	5	0	0	1.7	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Cuyahoga	13	2	0	5.3	F	6	3	1	0	4.2	F	12.2	Fail
Delaware	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Fayette	INC	INC	INC	INC	INC	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Franklin	3	0	0	1.0	C	6	3	1	0	4.2	F	9.3	Fail
Geauga	3	0	0	1.0	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Greene	5	0	0	1.7	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Hamilton	17	2	0	6.7	F	6	2	0	0	3.0	D	10.1	Fail
Harrison	DNC	DNC	DNC	DNC	DNC	INC	INC	INC	INC	INC	INC	INC	INC
Jefferson	2	0	0	0.7	B	2	1	2	0	2.5	D	10.0	Fail
Knox	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lake	16	0	0	5.3	F	1	2	0	0	1.3	C	7.2	Pass
Lawrence	0	0	0	0.0	A	2	2	0	0	1.7	C	7.9	Pass
Licking	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lorain	1	0	0	0.3	B	INC	INC	INC	INC	INC	INC	INC	INC
Lucas	21	0	0	7.0	F	1	1	0	0	0.8	B	9.4	Fail
Madison	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Mahoning	3	0	0	1.0	C	3	2	1	0	2.7	D	INC	INC
Medina	6	0	0	2.0	C	4	2	1	0	3.0	D	7.4	Pass
Miami	5	0	0	1.7	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Montgomery	8	0	0	2.7	D	4	3	0	0	2.8	D	9.0	Pass
Noble	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Portage	6	2	0	3.0	D	INC	INC	INC	INC	INC	INC	INC	INC
Preble	4	0	0	1.3	C	5	2	1	0	3.3	F	8.0	Pass
Scioto	DNC	DNC	DNC	DNC	DNC	4	2	0	0	2.3	D	7.7	Pass
Stark	8	0	0	2.7	D	6	1	2	0	3.8	F	9.4	Fail
Summit	8	0	0	2.7	D	3	2	1	0	2.7	D	8.6	Pass
Trumbull	3	1	0	1.5	C	7	2	1	0	4.0	F	8.7	Pass
Warren	10	0	0	3.3	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Washington	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Wood	4	0	0	1.3	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

OHIO

American Lung Association in Ohio

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Allen	100,838	23,604	19,555	1,599	8,523	6,190	62	7,697	1,009	13,724	20,230
Ashtabula	96,845	21,061	19,969	1,426	8,378	6,329	60	7,899	884	16,603	11,620
Athens	62,706	9,037	9,631	612	5,936	3,507	39	4,184	900	13,648	6,701
Belmont	64,918	12,060	14,655	817	5,818	4,439	40	5,580	575	9,327	5,536
Butler	393,043	90,755	64,335	6,147	33,566	22,658	241	27,572	4,412	45,064	96,444
Clark	134,610	30,242	27,727	2,048	11,514	8,638	83	10,799	1,343	19,949	23,908
Clermont	211,972	46,229	40,271	3,131	18,365	13,311	130	16,452	2,162	18,649	17,160
Clinton	41,938	9,432	8,122	639	3,595	2,623	26	3,255	425	5,080	3,269
Cuyahoga	1,233,088	250,704	247,380	16,980	108,355	78,178	755	97,180	13,571	193,220	524,954
Delaware	231,636	56,566	35,858	3,831	19,572	13,520	142	16,353	2,483	11,360	46,454
Fayette	28,817	6,766	5,314	458	2,447	1,780	18	2,197	294	4,064	2,524
Franklin	1,326,063	306,699	179,213	20,773	113,480	69,674	814	82,862	16,622	195,004	548,099
Geauga	95,407	20,964	21,927	1,420	8,198	6,551	59	8,287	824	5,953	5,001
Greene	169,691	34,620	32,428	2,345	14,904	10,433	104	12,898	1,873	15,986	29,039
Hamilton	827,058	188,768	140,997	12,785	70,638	47,714	507	58,368	9,456	109,421	303,975
Harrison	14,159	2,913	3,277	197	1,239	983	9	1,242	130	2,011	819
Jefferson	64,026	12,462	14,672	844	5,666	4,360	39	5,501	639	9,884	6,854
Knox	63,320	14,395	12,635	975	5,394	3,949	39	4,924	647	6,835	3,478
Lake	231,640	44,026	51,878	2,982	20,673	15,836	142	19,895	2,281	23,146	33,500
Lawrence	56,118	11,982	11,163	812	4,890	3,640	34	4,519	569	9,382	3,297
Licking	183,201	41,512	32,774	2,812	15,732	11,192	112	13,748	1,926	17,281	26,211
Lorain	317,910	68,131	65,110	4,615	27,602	20,637	195	25,731	3,162	34,018	74,796
Lucas	425,484	96,339	77,039	6,525	36,432	25,587	261	31,506	4,661	75,810	140,928
Madison	44,602	8,762	7,548	593	3,996	2,755	28	3,345	406	3,714	5,990
Mahoning	225,596	45,617	51,997	3,090	19,749	15,243	138	19,275	2,191	42,602	56,560
Medina	184,042	38,831	37,648	2,630	16,088	12,172	113	15,152	1,775	13,795	13,857
Miami	110,876	25,246	22,034	1,710	9,463	7,016	68	8,735	1,097	10,565	10,496
Montgomery	533,796	117,960	101,018	7,990	45,907	32,498	327	40,221	5,822	79,116	169,376
Noble	14,311	2,747	4,346	186	1,257	1,135	9	1,480	98	1,733	929
Portage	162,665	29,230	30,494	1,980	14,767	10,199	100	12,525	1,910	20,077	20,349
Preble	40,556	8,961	8,429	607	3,494	2,664	25	3,329	386	4,192	1,824
Scioto	71,969	15,499	13,847	1,050	6,248	4,516	44	5,590	728	12,775	5,309
Stark	372,716	79,977	78,127	5,417	32,266	24,141	229	30,210	3,768	45,043	57,178
Summit	535,733	109,966	107,060	7,448	47,054	34,339	328	42,646	5,664	68,166	136,577
Trumbull	200,373	41,176	45,598	2,789	17,497	13,546	123	17,101	1,916	33,696	28,423
Warren	252,148	59,494	41,173	4,030	21,500	15,052	155	18,301	2,573	14,544	43,166
Washington	58,577	11,400	13,486	772	5,185	4,007	36	5,058	572	7,334	3,287
Wood	132,650	26,558	22,544	1,799	11,732	7,686	81	9,362	1,600	12,420	18,011

OKLAHOMA

American Lung Association in Oklahoma

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Adair	2	0	0	0.7	B
Canadian	12	0	0	4.0	F
Carter	INC	INC	INC	INC	INC
Cleveland	7	0	0	2.3	D
Comanche	6	0	0	2.0	C
Creek	6	0	0	2.0	C
Dewey	3	0	0	1.0	C
Jefferson	INC	INC	INC	INC	INC
Johnston	INC	INC	INC	INC	INC
Kay	DNC	DNC	DNC	DNC	DNC
Kiowa	INC	INC	INC	INC	INC
Love	INC	INC	INC	INC	INC
McClain	15	0	0	5.0	F
Mayes	3	0	0	1.0	C
Nowata	INC	INC	INC	INC	INC
Oklahoma	13	0	0	4.3	F
Osage	11	2	0	4.7	F
Ottawa	10	0	0	3.3	F
Pittsburg	10	0	0	3.3	F
Pontotoc	INC	INC	INC	INC	INC
Sequoyah	1	0	0	0.3	B
Tulsa	25	5	0	10.8	F
Washington	INC	INC	INC	INC	INC

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Adair	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Canadian	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Carter	1	1	0	0	0.8	B	7.4	Pass
Cleveland	3	0	0	0	1.0	C	9.3	Fail
Comanche	1	0	0	0	0.3	B	7.1	Pass
Creek	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Dewey	1	0	0	0	0.3	B	6.9	Pass
Jefferson	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Johnston	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Kay	6	1	0	0	2.5	D	9.0	Pass
Kiowa	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Love	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
McClain	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Mayes	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Nowata	INC	INC	INC	INC	INC	INC	INC	INC
Oklahoma	2	0	0	0	0.7	B	9.1	Fail
Osage	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Ottawa	14	4	0	0	6.7	F	INC	INC
Pittsburg	6	0	0	0	2.0	C	8.2	Pass
Pontotoc	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Sequoyah	1	0	0	0	0.3	B	8.1	Pass
Tulsa	5	1	0	0	2.2	D	8.8	Pass
Washington	INC	INC	INC	INC	INC	INC	INC	INC

OKLAHOMA

American Lung Association in Oklahoma

	AT-RISK GROUPS										
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Adair	19,627	5,270	3,135	516	1,627	1,150	12	1,511	208	4,480	11,842
Canadian	175,829	44,698	24,208	4,380	14,861	9,572	108	12,336	2,165	13,705	52,302
Carter	48,596	12,073	8,324	1,183	4,131	2,914	30	3,860	543	8,208	15,792
Cleveland	301,193	60,379	46,474	5,916	27,236	17,302	185	22,511	3,986	37,151	96,990
Comanche	121,574	28,859	17,249	2,828	10,491	6,577	75	8,513	1,419	21,799	55,117
Creek	73,332	16,997	13,781	1,665	6,369	4,657	45	6,223	780	11,405	19,202
Dewey	4,286	1,141	826	112	355	265	3	358	42	581	847
Jefferson	5,347	1,317	1,151	129	454	352	3	481	51	1,277	1,270
Johnston	10,216	2,365	1,945	232	886	639	6	858	112	1,953	3,397
Kay	43,641	10,799	8,557	1,058	3,703	2,702	27	3,658	459	8,006	12,336
Kiowa	8,398	2,032	1,785	199	718	553	5	754	82	1,795	2,369
Love	10,296	2,447	1,961	240	886	646	6	867	110	1,468	3,334
McClain	47,072	11,636	7,458	1,140	4,016	2,787	29	3,645	534	4,458	11,341
Mayes	39,889	9,330	7,608	914	3,453	2,537	25	3,400	424	6,652	14,808
Nowata	9,438	2,203	1,862	216	818	615	6	826	96	1,628	3,322
Oklahoma	808,866	203,852	119,648	19,974	68,477	44,759	497	58,298	10,001	127,113	382,919
Osage	46,130	9,589	10,132	940	4,121	3,159	28	4,300	457	6,328	17,112
Ottawa	30,287	7,750	5,457	759	2,545	1,814	19	2,428	327	6,322	11,391
Pittsburg	43,479	9,923	8,792	972	3,786	2,799	27	3,787	431	7,603	14,022
Pontotoc	38,396	9,676	6,641	948	3,244	2,258	24	3,005	442	5,238	14,373
Sequoyah	40,291	9,652	7,582	946	3,464	2,559	25	3,423	425	8,866	15,797
Tulsa	682,868	169,744	105,691	16,632	58,065	38,746	420	50,717	8,233	101,475	288,317
Washington	53,706	12,945	10,884	1,268	4,593	3,382	33	4,597	570	7,954	15,802

OREGON

American Lung Association in Oregon

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Clackamas	4	1	0	1.8	C
Columbia	1	0	0	0.3	B
Crook	DNC	DNC	DNC	DNC	DNC
Deschutes	DNC	DNC	DNC	DNC	DNC
Harney	DNC	DNC	DNC	DNC	DNC
Jackson	3	0	0	1.0	C
Josephine	DNC	DNC	DNC	DNC	DNC
Klamath	DNC	DNC	DNC	DNC	DNC
Lake	DNC	DNC	DNC	DNC	DNC
Lane	1	0	0	0.3	B
Marion	4	0	0	1.3	C
Multnomah	2	0	0	0.7	B
Umatilla	1	0	0	0.3	B
Washington	0	0	0	0.0	A

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Clackamas	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Columbia	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Crook	8	6	0	0	5.7	F	7.5	Pass
Deschutes	INC	INC	INC	INC	INC	INC	INC	INC
Harney	8	4	0	0	4.7	F	10.0	Fail
Jackson	5	14	5	0	12.0	F	10.5	Fail
Josephine	9	7	4	0	9.2	F	10.2	Fail
Klamath	21	25	2	0	20.8	F	12.0	Fail
Lake	9	2	0	0	4.0	F	9.1	Fail
Lane	21	29	10	10	36.5	F	14.4	Fail
Marion	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Multnomah	2	1	0	0	1.2	C	6.7	Pass
Umatilla	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Washington	2	1	0	0	1.2	C	6.6	Pass

OREGON

American Lung Association in Oregon

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Clackamas	423,173	86,933	86,560	6,042	39,990	23,179	177	29,252	3,562	29,176	91,582
Columbia	53,880	10,849	11,260	754	5,122	3,014	23	3,803	429	5,248	7,608
Crook	26,952	5,254	6,951	365	2,566	1,628	11	2,130	199	3,416	3,469
Deschutes	208,513	38,766	45,403	2,694	20,144	11,736	87	14,949	1,776	17,944	30,889
Harney	7,440	1,465	2,027	102	704	455	3	603	51	1,111	1,084
Jackson	220,768	44,562	52,660	3,097	20,824	12,588	92	16,378	1,792	27,404	48,532
Josephine	87,821	16,852	24,339	1,171	8,368	5,446	37	7,219	625	13,041	13,616
Klamath	70,003	15,165	15,989	1,054	6,487	3,887	29	5,034	546	13,321	16,689
Lake	8,293	1,667	2,129	116	784	502	3	656	53	1,317	1,557
Lane	381,181	65,661	81,956	4,563	37,332	20,889	159	26,719	3,537	54,725	78,370
Marion	346,741	80,631	59,193	5,604	31,645	16,914	145	21,011	3,059	47,544	131,988
Multnomah	789,698	136,429	120,183	9,482	77,908	38,833	330	46,890	8,424	99,712	264,489
Umatilla	80,053	19,425	13,339	1,350	7,212	3,840	34	4,762	642	12,500	29,847
Washington	598,865	126,504	91,767	8,792	56,355	28,925	250	35,114	5,746	48,317	233,724

PENNSYLVANIA

American Lung Association in Pennsylvania

	HIGH OZONE DAYS 2021–2023					HIGH PARTICLE POLLUTION DAYS 2021–2023							
						24-Hour						Annual	
County	Orange	Red	Purple	Wgt. Avg.	Grade	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Adams	4	0	0	1.3	C	6	3	1	0	4.2	F	8.7	Pass
Allegheny	6	1	0	2.5	D	26	3	1	0	10.8	F	11.6	Fail
Armstrong	6	0	0	2.0	C	2	2	1	0	2.3	D	8.3	Pass
Beaver	3	0	0	1.0	C	5	0	2	0	3.0	D	8.8	Pass
Berks	13	0	0	4.3	F	2	3	2	0	3.5	F	8.3	Pass
Blair	2	0	0	0.7	B	2	4	1	0	3.3	F	7.9	Pass
Bradford	1	0	0	0.3	B	1	0	0	0	0.3	B	INC	INC
Bucks	16	1	0	5.8	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Cambria	1	0	0	0.3	B	1	3	0	0	1.8	C	8.8	Pass
Centre	2	0	0	0.7	B	2	5	0	0	3.2	D	7.6	Pass
Chester	3	0	0	1.0	C	3	2	2	0	3.3	F	8.1	Pass
Clearfield	INC	INC	INC	INC	INC	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Cumberland	DNC	DNC	DNC	DNC	DNC	5	2	2	0	4.0	F	7.8	Pass
Dauphin	8	0	0	2.7	D	5	3	2	0	4.5	F	9.8	Fail
Delaware	7	0	0	2.3	D	3	2	2	0	3.3	F	8.5	Pass
Elk	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Erie	3	0	0	1.0	C	1	3	0	0	1.8	C	INC	INC
Fayette	2	0	0	0.7	B	1	0	0	0	0.3	B	INC	INC
Franklin	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Greene	2	0	0	0.7	B	1	0	0	0	0.3	B	INC	INC
Indiana	4	0	0	1.3	C	4	2	1	0	3.0	D	7.3	Pass
Lackawanna	3	0	0	1.0	C	2	4	1	0	3.3	F	7.5	Pass
Lancaster	3	0	0	1.0	C	15	4	1	1	8.5	F	9.5	Fail
Lawrence	3	0	0	1.0	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lebanon	4	0	0	1.3	C	4	3	2	0	4.2	F	8.4	Pass
Lehigh	1	0	0	0.3	B	0	5	0	1	3.3	F	INC	INC
Luzerne	INC	INC	INC	INC	INC	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Lycoming	3	0	0	1.0	C	1	0	0	0	0.3	B	INC	INC
Mercer	5	0	0	1.7	C	3	2	0	0	2.0	C	INC	INC
Monroe	3	0	0	1.0	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Montgomery	6	0	0	2.0	C	2	3	2	0	3.5	F	8.1	Pass
Northampton	4	1	0	1.8	C	3	4	0	1	3.8	F	8.3	Pass
Philadelphia	16	2	0	6.3	F	7	4	1	1	5.8	F	10.0	Fail
Somerset	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Susquehanna	DNC	DNC	DNC	DNC	DNC	1	0	0	0	0.3	B	INC	INC
Tioga	0	0	0	0.0	A	1	0	0	0	0.3	B	INC	INC
Washington	3	0	0	1.0	C	6	1	2	0	3.8	F	9.0	Pass
Westmoreland	1	0	0	0.3	B	1	0	0	0	0.3	B	INC	INC
Wyoming	DNC	DNC	DNC	DNC	DNC	1	0	0	0	0.3	B	INC	INC
York	2	0	0	0.7	B	4	3	1	0	3.5	F	9.3	Fail

PENNSYLVANIA

American Lung Association in Pennsylvania

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Adams	106,748	20,487	23,904	2,032	8,760	6,751	57	9,899	947	9,485	12,911
Allegheny	1,224,825	226,158	254,947	22,429	102,122	74,462	652	106,710	12,505	137,660	284,276
Armstrong	64,074	12,053	15,796	1,195	5,249	4,237	34	6,366	525	7,512	2,339
Beaver	165,631	31,791	38,555	3,153	13,564	10,601	88	15,704	1,451	17,014	20,018
Berks	432,821	94,177	79,873	9,340	34,671	25,150	231	35,348	4,199	50,100	142,390
Blair	120,273	24,008	26,630	2,381	9,782	7,497	64	10,985	1,086	16,835	7,684
Bradford	59,695	13,194	13,704	1,309	4,706	3,719	32	5,543	493	8,189	2,809
Bucks	645,984	127,508	137,710	12,646	52,686	40,506	344	58,766	5,751	42,929	120,302
Cambria	130,668	24,985	32,112	2,478	10,683	8,497	70	12,765	1,112	16,576	11,855
Centre	157,795	22,922	25,891	2,273	13,997	9,032	85	11,965	1,807	23,648	24,506
Chester	549,784	119,592	101,244	11,861	44,009	32,157	293	45,198	5,291	33,085	127,918
Clearfield	77,090	14,170	17,430	1,405	6,381	4,974	41	7,296	616	11,254	4,742
Cumberland	270,738	55,072	52,515	5,462	22,084	15,956	144	22,590	2,700	21,063	52,086
Dauphin	289,234	64,271	53,618	6,374	23,040	16,650	154	23,453	2,870	36,562	112,333
Delaware	576,720	126,232	103,693	12,519	46,206	33,012	307	46,081	5,905	60,085	213,940
Elk	30,198	5,762	7,416	571	2,464	2,004	16	3,010	232	2,988	968
Erie	267,571	54,886	54,370	5,443	21,722	16,017	143	22,975	2,568	36,783	45,838
Fayette	123,915	23,360	28,839	2,317	10,187	7,991	66	11,825	1,055	22,787	11,147
Franklin	157,854	34,496	32,571	3,421	12,557	9,513	84	13,773	1,441	12,729	23,004
Greene	34,357	6,417	7,390	636	2,844	2,154	18	3,119	291	4,880	2,436
Indiana	83,094	14,854	17,482	1,473	6,981	5,067	44	7,267	850	12,709	5,967
Lackawanna	216,123	44,107	45,269	4,374	17,530	13,150	115	19,014	2,041	33,535	41,988
Lancaster	558,589	127,940	112,749	12,689	43,953	32,546	298	46,971	5,306	46,567	111,949
Lawrence	84,472	16,745	20,172	1,661	6,853	5,415	45	8,092	729	11,209	8,024
Lebanon	144,252	32,290	29,944	3,202	11,399	8,612	77	12,506	1,316	12,219	30,659
Lehigh	377,754	83,731	68,317	8,304	30,139	21,645	201	30,293	3,765	44,748	153,783
Luzerne	327,388	66,543	66,598	6,599	26,606	19,850	175	28,483	3,013	51,977	85,350
Lycoming	112,724	22,853	23,837	2,266	9,160	6,859	60	9,936	1,063	13,762	12,088
Mercer	108,503	20,454	25,728	2,029	8,919	6,994	58	10,399	939	12,920	11,215
Monroe	166,053	31,246	33,856	3,099	13,728	10,401	89	14,878	1,510	15,684	63,434
Montgomery	868,742	183,193	168,332	18,168	70,048	51,589	463	73,278	8,412	58,209	238,410
Northampton	319,091	60,437	66,409	5,994	26,394	19,606	170	28,164	3,064	29,639	87,359
Philadelphia	1,550,542	324,477	235,398	32,180	127,049	83,258	824	110,525	18,640	304,389	1,023,238
Somerset	72,197	12,995	17,700	1,289	5,982	4,779	39	7,149	548	8,149	4,095
Susquehanna	38,109	7,103	9,914	704	3,120	2,565	20	3,906	292	4,509	1,969
Tioga	40,840	7,958	9,791	789	3,327	2,630	22	3,930	350	5,091	1,821
Washington	210,232	41,042	47,424	4,070	17,167	13,310	112	19,576	1,869	19,620	18,860
Westmoreland	351,163	63,299	87,503	6,278	29,070	23,319	187	35,039	2,941	37,249	25,921
Wyoming	25,902	4,943	6,013	490	2,124	1,660	14	2,456	226	3,417	1,459
York	464,640	100,940	89,418	10,011	37,141	27,491	248	39,073	4,334	38,942	93,615

PUERTO RICO

American Lung Association in Puerto Rico

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Adjuntas	DNC	DNC	DNC	DNC	DNC
Bayamón	0	0	0	0.0	A
Caguas	DNC	DNC	DNC	DNC	DNC
Cataño	INC	INC	INC	INC	INC
Fajardo	DNC	DNC	DNC	DNC	DNC
Guayama	DNC	DNC	DNC	DNC	DNC
Guaynabo	DNC	DNC	DNC	DNC	DNC
Mayagüez	0	0	0	0.0	A
Ponce	DNC	DNC	DNC	DNC	DNC

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Adjuntas	INC	INC	INC	INC	INC	INC	INC	INC
Bayamón	0	0	0	0	0.0	A	6.7	Pass
Caguas	0	0	0	0	0.0	A	INC	INC
Cataño	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Fajardo	0	0	0	0	0.0	A	INC	INC
Guayama	INC	INC	INC	INC	INC	INC	INC	INC
Guaynabo	0	0	0	0	0.0	A	INC	INC
Mayagüez	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Ponce	0	0	0	0	0.0	A	INC	INC

PUERTO RICO

American Lung Association in Puerto Rico

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Adjuntas	17,900	2,945	4,204	472	1,801	786	3	1,584	107	11,107	56
Bayamón	180,835	27,017	45,194	4,333	18,414	8,017	27	16,077	950	61,516	1,641
Caguas	124,608	19,031	28,789	3,052	12,538	5,441	18	10,848	727	46,022	1,407
Cataño	22,108	3,553	5,593	570	2,209	966	3	1,954	119	10,066	218
Fajardo	31,166	5,042	7,555	809	3,130	1,367	5	2,762	178	13,114	188
Guayama	34,765	5,603	7,415	899	3,497	1,491	5	2,858	193	16,414	174
Guaynabo	89,039	11,901	23,596	1,909	9,335	4,096	13	8,353	485	21,393	889
Mayagüez	69,798	10,611	18,873	1,702	7,394	3,193	10	6,274	401	37,469	534
Ponce	130,251	21,642	33,887	3,471	13,194	5,776	19	11,716	689	66,952	699

RHODE ISLAND

American Lung Association in Rhode Island

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Kent	4	0	0	1.3	C
Providence	7	0	0	2.3	D
Washington	12	1	0	4.5	F

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Kent	3	0	0	0	1.0	C	4.9	Pass
Providence	3	0	0	0	1.0	C	7.7	Pass
Washington	4	0	0	0	1.3	C	5.1	Pass

RHODE ISLAND

American Lung Association in Rhode Island

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Kent	171,278	30,557	35,957	2,608	17,359	9,758	96	12,730	1,423	15,274	26,476
Providence	660,615	131,950	111,084	11,260	65,594	33,297	369	42,422	6,178	80,793	279,234
Washington	129,982	19,503	31,550	1,664	13,506	7,879	73	10,505	1,080	11,250	13,150

SOUTH CAROLINA

American Lung Association in South Carolina

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Aiken	0	0	0	0.0	A
Anderson	0	0	0	0.0	A
Berkeley	2	0	0	0.7	B
Charleston	0	0	0	0.0	A
Chesterfield	0	0	0	0.0	A
Darlington	0	0	0	0.0	A
Edgefield	0	0	0	0.0	A
Florence	DNC	DNC	DNC	DNC	DNC
Greenville	1	0	0	0.3	B
Horry	0	0	0	0.0	A
Lexington	DNC	DNC	DNC	DNC	DNC
Richland	4	0	0	1.3	C
Spartanburg	3	0	0	1.0	C
York	3	0	0	1.0	C

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Aiken	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Anderson	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Berkeley	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Charleston	0	0	0	0	0.0	A	INC	INC
Chesterfield	1	0	0	0	0.3	B	6.8	Pass
Darlington	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Edgefield	0	0	0	0	0.0	A	8.1	Pass
Florence	1	0	0	0	0.3	B	7.7	Pass
Greenville	2	0	0	0	0.7	B	8.4	Pass
Horry	INC	INC	INC	INC	INC	INC	INC	INC
Lexington	1	0	0	0	0.3	B	INC	INC
Richland	2	0	0	0	0.7	B	7.4	Pass
Spartanburg	2	0	0	0	0.7	B	8.4	Pass
York	1	0	0	0	0.3	B	7.5	Pass

SOUTH CAROLINA

American Lung Association in South Carolina

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Aiken	177,130	38,104	37,638	2,569	12,298	10,927	93	14,842	1,780	24,516	63,330
Anderson	213,076	47,938	39,704	3,232	14,627	12,520	112	16,816	2,229	28,239	51,554
Berkeley	255,217	59,484	38,856	4,010	17,188	13,676	135	17,952	2,852	24,616	98,568
Charleston	424,367	81,669	78,368	5,506	30,062	24,913	224	33,140	4,914	45,722	143,272
Chesterfield	44,031	9,792	8,639	660	3,046	2,668	23	3,607	430	8,818	18,301
Darlington	62,416	13,895	12,541	937	4,300	3,771	33	5,103	657	13,658	29,049
Edgefield	27,607	4,567	5,677	308	2,038	1,755	15	2,361	245	4,264	11,485
Florence	137,214	32,289	25,047	2,177	9,271	7,886	72	10,573	1,499	25,245	69,316
Greenville	558,036	127,137	95,536	8,571	37,960	31,389	295	41,718	6,179	61,870	188,663
Horry	397,478	66,411	107,430	4,477	29,517	28,340	210	39,315	3,589	50,083	91,047
Lexington	309,528	70,740	54,364	4,769	21,142	17,778	163	23,748	3,285	34,255	90,124
Richland	425,138	91,073	61,710	6,140	29,096	22,332	224	28,964	5,400	63,343	256,494
Spartanburg	356,698	83,262	58,315	5,613	24,100	19,712	188	26,106	3,923	48,674	121,794
York	298,320	69,973	47,392	4,717	20,231	16,570	158	21,949	3,303	28,093	98,193

SOUTH DAKOTA

American Lung Association in South Dakota

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Brookings	6	0	0	2.0	C
Brown	DNC	DNC	DNC	DNC	DNC
Clay	INC	INC	INC	INC	INC
Codington	11	0	0	3.7	F
Custer	1	1	0	0.8	B
Hughes	DNC	DNC	DNC	DNC	DNC
Jackson	1	0	0	0.3	B
Meade	8	0	0	2.7	D
Minnehaha	23	1	0	8.2	F
Pennington	DNC	DNC	DNC	DNC	DNC
Union	INC	INC	INC	INC	INC

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Brookings	5	3	1	0	3.8	F	5.6	Pass
Brown	7	3	1	0	4.5	F	6.0	Pass
Clay	INC	INC	INC	INC	INC	INC	INC	INC
Codington	6	3	1	0	4.2	F	8.5	Pass
Custer	6	2	1	0	3.7	F	4.6	Pass
Hughes	3	4	2	0	4.3	F	3.6	Pass
Jackson	2	5	2	0	4.5	F	5.6	Pass
Meade	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Minnehaha	4	5	0	0	3.8	F	INC	INC
Pennington	6	4	1	0	4.7	F	7.8	Pass
Union	INC	INC	INC	INC	INC	INC	INC	INC

SOUTH DAKOTA

American Lung Association in South Dakota

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Brookings	35,980	7,467	5,048	519	2,544	1,447	19	2,066	553	3,659	4,554
Brown	37,733	8,849	7,082	615	2,849	1,805	20	2,611	472	3,680	5,663
Clay	15,431	2,668	1,988	185	1,107	603	8	857	286	2,266	2,113
Codington	28,971	6,533	5,890	454	2,248	1,462	15	2,118	335	3,243	2,678
Custer	9,117	1,267	3,161	88	843	663	5	967	76	763	956
Hughes	17,624	4,288	3,329	298	1,338	849	9	1,231	217	1,455	3,458
Jackson	2,776	977	379	68	176	105	1	151	30	814	1,737
Meade	30,954	6,408	5,434	445	2,370	1,445	16	2,085	392	2,363	4,295
Minnehaha	206,930	52,235	29,185	3,628	15,011	8,541	107	12,320	2,704	19,711	43,173
Pennington	115,903	25,374	23,722	1,762	9,071	5,893	60	8,539	1,330	13,052	24,087
Union	17,183	4,082	3,394	283	1,326	854	9	1,238	198	970	1,822

TENNESSEE

American Lung Association in Tennessee

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Anderson	1	0	0	0.3	B
Blount	6	0	0	2.0	C
Claiborne	2	0	0	0.7	B
Davidson	6	0	0	2.0	C
DeKalb	0	0	0	0.0	A
Dyer	DNC	DNC	DNC	DNC	DNC
Hamilton	3	0	0	1.0	C
Jefferson	2	0	0	0.7	B
Knox	0	0	0	0.0	A
Lawrence	DNC	DNC	DNC	DNC	DNC
Loudon	0	0	0	0.0	A
McMinn	DNC	DNC	DNC	DNC	DNC
Madison	DNC	DNC	DNC	DNC	DNC
Maury	DNC	DNC	DNC	DNC	DNC
Montgomery	DNC	DNC	DNC	DNC	DNC
Putnam	DNC	DNC	DNC	DNC	DNC
Roane	DNC	DNC	DNC	DNC	DNC
Sevier	2	0	0	0.7	B
Shelby	21	2	0	8.0	F
Sullivan	0	0	0	0.0	A
Sumner	9	0	0	3.0	D
Williamson	4	0	0	1.3	C
Wilson	5	0	0	1.7	C

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Anderson	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Blount	5	0	0	0	1.7	C	7.4	Pass
Claiborne	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Davidson	3	0	0	0	1.0	C	9.6	Fail
DeKalb	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Dyer	2	0	0	0	0.7	B	7.7	Pass
Hamilton	2	0	0	0	0.7	B	8.4	Pass
Jefferson	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Knox	6	0	0	0	2.0	C	9.1	Fail
Lawrence	0	0	0	0	0.0	A	6.8	Pass
Loudon	1	0	0	0	0.3	B	6.9	Pass
McMinn	2	0	0	0	0.7	B	7.8	Pass
Madison	2	0	0	0	0.7	B	8.1	Pass
Maury	1	0	0	0	0.3	B	7.3	Pass
Montgomery	2	0	0	0	0.7	B	7.2	Pass
Putnam	1	0	0	0	0.3	B	7.2	Pass
Roane	2	1	0	0	1.2	C	7.3	Pass
Sevier	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Shelby	0	0	0	0	0.0	A	8.9	Pass
Sullivan	2	0	0	0	0.7	B	6.7	Pass
Sumner	1	0	0	0	0.3	B	7.6	Pass
Williamson	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Wilson	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

TENNESSEE

American Lung Association in Tennessee

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Anderson	80,234	16,840	16,165	1,640	6,951	6,721	50	7,951	845	11,386	10,042
Blount	141,456	27,869	30,401	2,714	12,452	12,332	88	14,716	1,454	13,528	15,096
Claiborne	32,654	6,230	6,721	607	2,898	2,807	20	3,321	351	5,818	1,861
Davidson	712,334	145,337	95,020	14,155	62,304	50,749	442	55,736	10,109	85,007	323,504
DeKalb	21,225	4,568	4,034	445	1,829	1,773	13	2,086	218	3,408	2,703
Dyer	36,498	8,805	6,521	858	3,040	2,870	23	3,354	402	6,368	8,196
Hamilton	379,864	80,074	71,134	7,799	32,876	30,583	236	35,690	4,414	47,922	115,769
Jefferson	57,838	11,090	12,105	1,080	5,130	5,080	36	6,040	591	7,279	5,388
Knox	500,669	104,121	82,873	10,141	43,533	38,648	311	44,146	6,205	67,213	99,972
Lawrence	46,114	11,562	8,170	1,126	3,794	3,608	29	4,223	478	6,770	3,453
Loudon	60,591	11,318	17,024	1,102	5,378	5,802	38	7,210	517	6,316	8,756
McMinn	55,678	11,849	11,441	1,154	4,806	4,713	35	5,601	581	8,141	6,573
Madison	99,193	22,186	18,285	2,161	8,447	7,895	61	9,220	1,137	17,629	46,064
Maury	110,760	25,217	19,670	2,456	9,387	8,691	69	10,101	1,257	11,685	25,548
Montgomery	239,872	63,729	24,720	6,207	19,384	15,175	149	16,249	3,160	29,603	97,042
Putnam	83,844	17,394	14,021	1,694	7,291	6,432	52	7,346	995	13,884	12,043
Roane	56,096	10,539	13,363	1,026	4,989	5,119	35	6,201	543	7,448	4,684
Sevier	99,415	20,634	20,860	2,010	8,639	8,554	62	10,195	1,005	12,045	14,174
Shelby	910,042	231,052	139,302	22,503	74,584	66,442	563	75,799	10,988	163,297	609,321
Sullivan	162,135	30,752	36,430	2,995	14,394	14,395	101	17,271	1,656	21,649	12,932
Sumner	207,994	47,358	35,517	4,612	17,649	16,416	129	19,013	2,336	18,409	41,623
Williamson	264,460	67,157	40,744	6,541	21,724	20,417	164	23,528	2,877	12,845	46,754
Wilson	163,674	37,990	26,449	3,700	13,817	12,694	102	14,598	1,855	10,673	32,304

TEXAS

American Lung Association in Texas

	HIGH OZONE DAYS 2021–2023					HIGH PARTICLE POLLUTION DAYS 2021–2023							
						24-Hour						Annual	
County	Orange	Red	Purple	Wgt. Avg.	Grade	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Atascosa	DNC	DNC	DNC	DNC	DNC	2	0	0	0	0.7	B	9.0	Pass
Bell	12	0	0	4.0	F	0	0	0	0	0.0	A	7.3	Pass
Bexar	32	0	0	10.7	F	2	0	0	0	0.7	B	8.9	Pass
Bowie	DNC	DNC	DNC	DNC	DNC	2	0	0	0	0.7	B	10.3	Fail
Brazoria	35	2	0	12.7	F	INC	INC	INC	INC	INC	INC	INC	INC
Brazos	DNC	DNC	DNC	DNC	DNC	0	0	0	0	0.0	A	7.9	Pass
Brewster	1	0	0	0.3	B	1	0	0	0	0.3	B	INC	INC
Cameron	1	0	0	0.3	B	7	0	0	0	2.3	D	10.9	Fail
Collin	33	3	0	12.5	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Culberson	INC	INC	INC	INC	INC	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Dallas	45	2	0	16.0	F	1	0	0	0	0.3	B	9.9	Fail
Denton	63	9	0	25.5	F	1	0	0	0	0.3	B	7.7	Pass
Ector	DNC	DNC	DNC	DNC	DNC	0	0	0	0	0.0	A	7.3	Pass
Ellis	3	0	0	1.0	C	INC	INC	INC	INC	INC	INC	INC	INC
El Paso	42	0	0	14.0	F	1	0	0	0	0.3	B	9.0	Pass
Galveston	27	3	0	10.5	F	1	0	0	0	0.3	B	8.3	Pass
Gregg	2	1	0	1.2	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Harris	71	21	1	34.8	F	4	0	0	0	1.3	C	12.5	Fail
Harrison	2	0	0	0.7	B	3	2	0	0	2.0	C	9.5	Fail
Hidalgo	1	0	0	0.3	B	4	0	0	0	1.3	C	9.6	Fail
Hood	23	0	0	7.7	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Hunt	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Jefferson	14	0	0	4.7	F	2	1	0	0	1.2	C	8.8	Pass
Johnson	27	1	0	9.5	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Kaufman	11	0	0	3.7	F	INC	INC	INC	INC	INC	INC	INC	INC
Kleberg	DNC	DNC	DNC	DNC	DNC	5	0	0	0	1.7	C	9.9	Fail
Lubbock	DNC	DNC	DNC	DNC	DNC	2	1	0	0	1.2	C	5.7	Pass
McLennan	7	0	0	2.3	D	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Maverick	DNC	DNC	DNC	DNC	DNC	2	0	0	0	0.7	B	7.9	Pass
Montgomery	16	1	0	5.8	F	1	0	0	0	0.3	B	INC	INC
Navarro	1	0	0	0.3	B	INC	INC	INC	INC	INC	INC	INC	INC
Nueces	4	0	0	1.3	C	1	0	0	0	0.3	B	8.4	Pass
Orange	2	0	0	0.7	B	1	0	0	0	0.3	B	8.3	Pass
Parker	22	0	0	7.3	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Polk	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Potter	DNC	DNC	DNC	DNC	DNC	3	0	0	0	1.0	C	6.0	Pass
Randall	8	0	0	2.7	D	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Rockwall	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Smith	10	0	0	3.3	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Tarrant	52	7	1	21.5	F	3	0	0	0	1.0	C	9.6	Fail
Travis	17	0	0	5.7	F	2	0	0	0	0.7	B	9.6	Fail
Victoria	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Webb	3	0	0	1.0	C	3	0	0	0	1.0	C	9.7	Fail

TEXAS

American Lung Association in Texas

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Atascosa	51,784	13,776	7,812	1,037	3,253	2,010	22	3,092	602	9,468	35,721
Bell	393,193	107,999	47,818	8,131	23,963	13,510	168	20,266	5,052	44,369	224,642
Bexar	2,087,679	510,639	273,263	38,446	133,156	76,581	891	115,628	27,102	301,255	1,531,649
Bowie	91,687	21,746	16,221	1,637	6,025	3,887	39	6,033	1,014	12,857	35,400
Brazoria	398,938	101,544	52,042	7,645	25,285	14,841	170	22,584	4,909	36,476	233,478
Brazos	244,703	49,477	26,002	3,725	16,018	8,043	105	11,601	3,849	52,926	112,090
Brewster	9,513	1,607	2,292	121	688	481	4	758	107	1,233	4,699
Cameron	426,710	120,413	61,905	9,066	26,095	15,878	182	24,302	4,992	99,161	388,270
Collin	1,195,359	291,387	142,320	21,939	76,750	43,964	510	66,627	15,442	75,716	598,755
Culberson	2,196	521	433	39	145	98	1	153	21	448	1,662
Dallas	2,606,358	645,638	317,636	48,610	165,385	93,581	1,112	140,880	34,226	354,670	1,913,958
Denton	1,007,703	231,932	120,688	17,462	65,705	37,306	430	56,368	13,452	60,723	474,566
Ector	164,494	50,301	16,473	3,787	9,547	5,152	70	7,649	1,992	18,966	118,317
Ellis	222,829	58,582	29,218	4,411	13,983	8,263	95	12,597	2,753	16,224	107,228
El Paso	869,880	223,607	117,006	16,835	54,651	31,851	371	48,230	10,763	157,986	773,227
Galveston	361,744	84,684	58,751	6,376	23,830	14,998	154	23,194	4,295	41,008	163,516
Gregg	126,243	32,477	20,557	2,445	8,030	5,041	54	7,771	1,489	19,723	56,407
Harris	4,835,125	1,239,210	586,125	93,301	303,648	172,540	2,063	260,118	62,795	764,979	3,529,941
Harrison	70,895	17,004	12,705	1,280	4,649	3,021	30	4,696	821	11,735	27,372
Hidalgo	898,471	274,020	106,589	20,631	52,661	30,095	383	45,359	11,031	239,489	843,534
Hood	67,774	13,788	17,530	1,038	4,772	3,547	29	5,658	657	5,455	12,522
Hunt	113,347	27,979	17,498	2,107	7,305	4,506	48	6,929	1,360	13,951	39,448
Jefferson	251,496	61,829	40,050	4,655	16,239	10,102	108	15,553	2,763	47,706	159,577
Johnson	202,906	52,074	28,653	3,921	12,866	7,747	87	11,852	2,406	19,799	72,333
Kaufman	185,690	53,451	19,347	4,024	11,107	6,091	79	9,099	2,441	17,588	99,079
Kleberg	30,069	7,202	4,149	542	1,910	1,077	13	1,607	409	6,341	23,761
Lubbock	320,940	74,957	43,685	5,644	20,628	11,708	137	17,552	4,432	52,974	154,171
McLennan	268,583	64,148	41,797	4,830	17,352	10,487	114	15,995	3,458	43,162	121,464
Maverick	57,762	17,819	6,891	1,342	3,371	1,934	25	2,918	681	13,047	56,091
Montgomery	711,354	183,341	99,841	13,804	45,120	27,259	303	41,777	8,565	71,419	292,967
Navarro	55,635	14,873	9,263	1,120	3,511	2,252	24	3,493	619	8,526	27,181
Nueces	352,289	83,141	57,765	6,260	23,031	14,359	150	22,105	4,251	59,695	247,875
Orange	85,722	21,966	14,023	1,654	5,482	3,477	37	5,381	978	12,295	19,106
Parker	173,494	42,478	28,026	3,198	11,303	7,179	74	11,134	1,952	14,141	35,352
Polk	54,186	11,127	10,265	838	3,757	2,509	23	3,938	489	9,090	15,518
Potter	114,647	30,535	16,643	2,299	7,160	4,328	49	6,615	1,306	19,265	65,549
Randall	148,255	35,123	23,864	2,644	9,651	5,950	63	9,129	1,836	12,644	49,325
Rockwall	131,307	34,701	16,728	2,613	8,237	4,861	56	7,417	1,591	6,600	49,741
Smith	245,209	58,935	43,372	4,437	16,008	10,279	104	15,919	2,942	31,655	102,942
Tarrant	2,182,947	547,594	276,400	41,229	138,502	79,901	930	120,970	28,337	236,391	1,262,658
Travis	1,334,961	263,112	152,219	19,810	89,634	48,279	572	71,667	19,125	133,858	695,488
Victoria	91,664	22,941	16,078	1,727	5,901	3,787	39	5,862	1,070	12,747	52,154
Webb	269,148	83,126	28,470	6,259	15,642	8,679	115	12,998	3,282	59,745	258,642

UTAH

American Lung Association in Utah

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Box Elder	4	0	0	1.3	C
Cache	2	1	0	1.2	C
Carbon	4	0	0	1.3	C
Davis	37	2	0	13.3	F
Duchesne	28	10	1	15.0	F
Garfield	INC	INC	INC	INC	INC
Grand	INC	INC	INC	INC	INC
Iron	2	0	0	0.7	B
Salt Lake	65	8	0	25.7	F
San Juan	2	0	0	0.7	B
Tooele	12	0	0	4.0	F
Uintah	39	19	3	24.5	F
Utah	18	0	0	6.0	F
Washington	1	1	0	0.8	B
Weber	17	0	0	5.7	F

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Box Elder	INC	INC	INC	INC	INC	INC	INC	INC
Cache	18	5	0	0	8.5	F	7.9	Pass
Carbon	0	0	0	0	0.0	A	INC	INC
Davis	13	0	0	0	4.3	F	7.3	Pass
Duchesne	14	1	0	0	5.2	F	7.0	Pass
Garfield	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Grand	INC	INC	INC	INC	INC	INC	INC	INC
Iron	2	1	0	0	1.2	C	5.7	Pass
Salt Lake	19	4	0	0	8.3	F	9.3	Fail
San Juan	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Tooele	10	2	0	0	4.3	F	6.4	Pass
Uintah	4	1	0	0	1.8	C	6.3	Pass
Utah	11	0	0	0	3.7	F	7.0	Pass
Washington	1	1	0	0	0.8	B	5.1	Pass
Weber	10	0	0	0	3.3	F	6.7	Pass

UTAH

American Lung Association in Utah

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Box Elder	62,684	18,839	8,255	1,161	4,839	1,687	15	2,884	738	5,272	8,739
Cache	142,393	41,019	14,682	2,528	11,263	3,522	35	5,662	2,039	14,667	25,297
Carbon	20,609	5,180	4,021	319	1,688	647	5	1,197	237	2,853	3,600
Davis	373,207	109,915	42,481	6,774	29,155	9,778	92	16,136	4,736	22,191	72,172
Duchesne	20,477	6,472	2,818	399	1,543	549	5	954	232	2,513	3,020
Garfield	5,314	1,177	1,262	73	450	182	1	350	53	521	703
Grand	9,706	1,984	2,027	122	845	324	2	601	118	1,018	2,150
Iron	64,211	17,084	9,040	1,053	5,204	1,773	16	3,045	851	7,283	10,506
Salt Lake	1,185,813	292,797	146,590	18,045	98,862	33,184	291	54,967	15,875	110,632	382,865
San Juan	14,358	3,991	2,268	246	1,139	420	4	743	162	2,651	7,703
Tooele	82,051	25,121	7,727	1,548	6,322	2,059	20	3,276	1,056	5,573	17,782
Uintah	37,747	11,500	4,783	709	2,899	1,002	9	1,700	456	4,165	6,947
Utah	719,174	223,925	58,010	13,801	55,200	16,620	177	25,543	10,168	63,310	154,280
Washington	202,452	48,734	45,347	3,003	16,757	6,603	50	12,628	2,233	21,205	36,606
Weber	271,926	70,898	34,556	4,369	22,232	7,566	67	12,664	3,499	22,794	69,128

VERMONT

American Lung Association in Vermont

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Bennington	1	0	0	0.3	B
Chittenden	1	0	0	0.3	B
Rutland	0	0	0	0.0	A

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Bennington	6	1	0	0	2.5	D	5.4	Pass
Chittenden	5	1	0	0	2.2	D	6.4	Pass
Rutland	3	0	0	0	1.0	C	6.7	Pass

VERMONT

American Lung Association in Vermont

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Bennington	37,183	6,821	9,402	522	3,434	2,094	20	2,570	254	4,272	2,823
Chittenden	169,481	28,587	29,744	2,190	15,811	7,991	89	9,285	1,607	12,459	22,670
Rutland	60,271	10,337	15,271	792	5,643	3,410	32	4,179	408	6,900	3,365

VIRGINIA

American Lung Association in Virginia

	HIGH OZONE DAYS 2021–2023					HIGH PARTICLE POLLUTION DAYS 2021–2023							
						24-Hour						Annual	
County	Orange	Red	Purple	Wgt. Avg.	Grade	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Albemarle	0	0	0	0.0	A	4	2	0	0	2.3	D	7.1	Pass
Arlington	7	0	0	2.3	D	0	2	0	0	1.0	C	7.9	Pass
Caroline	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Charles City	0	0	0	0.0	A	3	0	0	0	1.0	C	6.7	Pass
Chesterfield	1	0	0	0.3	B	1	0	0	0	0.3	B	6.9	Pass
Fairfax	7	0	0	2.3	D	5	2	1	0	3.3	F	8.5	Pass
Fauquier	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Frederick	2	0	0	0.7	B	4	3	0	0	2.8	D	7.8	Pass
Giles	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Hanover	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Henrico	1	0	0	0.3	B	4	1	0	0	1.8	C	7.6	Pass
Loudoun	5	0	0	1.7	C	1	2	0	0	1.3	C	7.3	Pass
Madison	1	0	0	0.3	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Prince Edward	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Prince William	4	0	0	1.3	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Roanoke	0	0	0	0.0	A	4	1	0	0	1.8	C	7.1	Pass
Rockbridge	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Rockingham	1	0	0	0.3	B	2	1	0	0	1.2	C	7.4	Pass
Stafford	2	1	0	1.2	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Wythe	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Bristol City	DNC	DNC	DNC	DNC	DNC	2	0	0	0	0.7	B	7.3	Pass
Hampton City	0	0	0	0.0	A	1	1	0	0	0.8	B	6.9	Pass
Lynchburg City	DNC	DNC	DNC	DNC	DNC	2	0	0	0	0.7	B	6.7	Pass
Norfolk City	DNC	DNC	DNC	DNC	DNC	0	0	0	0	0.0	A	7.1	Pass
Richmond City	DNC	DNC	DNC	DNC	DNC	3	2	0	0	2.0	C	8.1	Pass
Salem City	DNC	DNC	DNC	DNC	DNC	1	0	0	0	0.3	B	7.2	Pass
Suffolk City	2	0	0	0.7	B	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Virginia Beach City	DNC	DNC	DNC	DNC	DNC	0	1	0	0	0.5	B	7.3	Pass

VIRGINIA

American Lung Association in Virginia

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Albemarle	115,676	22,094	24,602	1,737	9,599	6,737	56	9,550	1,250	8,610	29,423
Arlington	234,162	42,055	29,077	3,306	19,160	11,534	114	14,865	3,110	16,535	95,152
Caroline	32,640	7,436	5,673	585	2,583	1,764	16	2,452	320	2,993	12,649
Charles City	6,610	953	1,809	75	597	461	3	681	51	748	3,589
Chesterfield	383,876	90,352	63,434	7,103	30,001	20,224	186	27,907	4,077	26,042	166,304
Fairfax	1,141,878	257,792	177,855	20,266	90,143	59,773	556	81,609	12,135	69,309	597,071
Fauquier	75,165	17,416	13,440	1,369	5,953	4,144	37	5,811	703	4,570	18,891
Frederick	95,994	21,439	18,557	1,685	7,686	5,406	47	7,642	908	7,040	21,587
Giles	16,457	3,226	3,654	254	1,377	1,008	8	1,453	146	1,835	967
Hanover	114,148	24,439	22,514	1,921	9,272	6,570	56	9,315	1,074	5,891	21,006
Henrico	334,760	72,241	58,689	5,679	26,828	18,172	162	25,172	3,636	30,898	166,980
Loudoun	436,347	113,954	49,711	8,958	32,684	20,636	213	27,217	4,772	17,860	212,530
Madison	14,128	2,777	3,356	218	1,185	883	7	1,286	126	1,409	2,301
Prince Edward	22,049	3,517	3,788	276	1,858	1,183	11	1,590	260	4,430	8,696
Prince William	489,640	128,216	57,805	10,079	36,545	23,008	239	30,361	5,293	32,529	302,454
Roanoke	97,026	18,712	21,875	1,471	8,122	5,906	47	8,505	936	6,804	16,521
Rockbridge	22,358	3,670	6,320	289	1,965	1,525	11	2,269	185	2,480	2,032
Rockingham	86,568	19,113	17,765	1,503	6,956	4,944	42	7,040	840	8,476	13,306
Stafford	165,428	43,026	19,491	3,382	12,368	7,769	81	10,240	1,756	8,608	77,799
Wythe	28,104	5,454	6,375	429	2,360	1,736	14	2,510	251	3,757	1,937
Bristol City	16,807	3,356	3,797	264	1,394	1,015	8	1,463	159	3,601	2,238
Hampton City	137,098	29,512	23,421	2,320	10,916	7,235	66	9,922	1,541	17,827	88,616
Lynchburg City	79,535	15,519	11,538	1,220	6,359	3,872	38	5,066	1,102	13,198	30,319
Norfolk City	230,930	46,629	31,305	3,666	18,370	11,201	113	14,613	2,750	38,185	134,075
Richmond City	229,247	39,809	33,293	3,129	18,916	11,646	111	15,291	3,147	38,475	130,899
Salem City	25,600	4,999	5,170	393	2,112	1,470	12	2,071	274	2,459	4,634
Suffolk City	100,659	23,582	15,699	1,854	7,856	5,213	49	7,124	1,058	11,033	53,990
Virginia Beach City	453,649	98,433	74,911	7,738	36,116	23,941	220	32,775	4,919	38,630	183,519

WASHINGTON

American Lung Association in Washington

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Benton	3	0	0	1.0	C
Clallam	0	0	0	0.0	A
Clark	0	1	0	0.5	B
Columbia	0	0	0	0.0	A
King	12	2	0	5.0	F
Kitsap	DNC	DNC	DNC	DNC	DNC
Kittitas	DNC	DNC	DNC	DNC	DNC
Okanogan	DNC	DNC	DNC	DNC	DNC
Pierce	0	0	0	0.0	A
Skagit	0	0	0	0.0	A
Snohomish	DNC	DNC	DNC	DNC	DNC
Spokane	3	0	0	1.0	C
Stevens	DNC	DNC	DNC	DNC	DNC
Thurston	INC	INC	INC	INC	INC
Whatcom	0	0	0	0.0	A
Yakima	DNC	DNC	DNC	DNC	DNC

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Benton	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Clallam	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Clark	4	1	0	0	1.8	C	6.6	Pass
Columbia	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
King	10	2	0	0	4.3	F	8.3	Pass
Kitsap	5	0	0	0	1.7	C	5.5	Pass
Kittitas	5	3	2	0	4.5	F	6.6	Pass
Okanogan	18	8	5	0	13.3	F	12.3	Fail
Pierce	8	5	0	0	5.2	F	7.3	Pass
Skagit	2	1	0	0	1.2	C	INC	INC
Snohomish	18	7	3	1	12.3	F	8.2	Pass
Spokane	6	9	1	1	8.0	F	8.1	Pass
Stevens	14	12	2	0	12.0	F	10.1	Fail
Thurston	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Whatcom	4	2	0	0	2.3	D	INC	INC
Yakima	13	15	3	0	13.8	F	10.2	Fail

WASHINGTON

American Lung Association in Washington

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Benton	215,219	55,701	34,934	4,072	17,116	7,065	101	11,003	2,091	23,890	74,506
Clallam	77,616	12,334	25,603	902	6,937	3,743	37	6,495	574	9,120	14,312
Clark	521,150	115,802	89,049	8,465	43,527	18,304	245	28,462	5,257	38,572	138,400
Columbia	4,053	728	1,180	53	354	183	2	312	32	546	688
King	2,271,380	434,851	329,254	31,787	197,458	75,587	1,069	113,475	25,763	197,703	1,050,595
Kitsap	277,658	53,588	56,397	3,917	23,996	10,462	131	16,727	2,569	23,273	72,442
Kittitas	45,508	7,903	8,642	578	4,030	1,670	21	2,630	491	6,869	8,038
Okanogan	43,712	9,507	10,420	695	3,655	1,754	21	2,901	354	7,229	15,621
Pierce	928,696	211,883	141,379	15,488	77,015	30,669	437	46,828	9,687	89,696	351,945
Skagit	131,417	27,014	30,591	1,975	11,159	5,237	62	8,605	1,172	12,671	36,010
Snohomish	844,761	184,346	129,207	13,475	71,002	28,539	398	43,455	8,751	73,606	315,377
Spokane	551,455	117,592	98,180	8,596	46,534	19,468	259	30,504	5,601	67,235	99,581
Stevens	48,837	10,151	12,667	742	4,131	2,080	23	3,477	380	5,791	6,818
Thurston	299,003	61,434	57,785	4,491	25,459	10,982	141	17,438	3,040	29,265	86,531
Whatcom	231,919	42,135	44,643	3,080	20,328	8,491	109	13,433	2,542	29,187	54,112
Yakima	256,643	73,483	37,805	5,371	19,664	7,921	121	12,204	2,502	40,910	154,962

WEST VIRGINIA

American Lung Association in West Virginia

	HIGH OZONE DAYS 2021–2023					HIGH PARTICLE POLLUTION DAYS 2021–2023							
						24-Hour						Annual	
County	Orange	Red	Purple	Wgt. Avg.	Grade	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Berkeley	4	0	0	1.3	C	1	1	0	0	0.8	B	9.1	Fail
Brooke	DNC	DNC	DNC	DNC	DNC	1	1	0	0	0.8	B	8.7	Pass
Cabell	0	0	0	0.0	A	1	0	0	0	0.3	B	7.6	Pass
Gilmer	INC	INC	INC	INC	INC	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Greenbrier	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Hancock	4	0	0	1.3	C	1	1	0	0	0.8	B	8.3	Pass
Harrison	DNC	DNC	DNC	DNC	DNC	0	1	0	0	0.5	B	7.5	Pass
Kanawha	0	0	0	0.0	A	0	1	0	0	0.5	B	8.1	Pass
Marion	DNC	DNC	DNC	DNC	DNC	0	1	0	0	0.5	B	INC	INC
Marshall	DNC	DNC	DNC	DNC	DNC	2	1	1	0	1.8	C	8.9	Pass
Monongalia	1	0	0	0.3	B	0	1	0	0	0.5	B	7.7	Pass
Ohio	3	0	0	1.0	C	1	1	0	0	0.8	B	8.3	Pass
Tucker	0	0	0	0.0	A	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Wood	3	0	0	1.0	C	0	1	0	0	0.5	B	8.1	Pass

WEST VIRGINIA

American Lung Association in West Virginia

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Berkeley	132,440	30,454	20,592	2,867	14,378	11,883	99	12,634	1,348	14,758	26,061
Brooke	21,373	3,633	5,495	342	2,468	2,354	16	2,681	181	2,910	1,195
Cabell	92,082	18,223	18,487	1,716	10,230	8,725	69	9,651	979	17,413	9,852
Gilmer	7,254	1,107	1,348	104	856	702	6	760	51	1,477	1,486
Greenbrier	32,149	6,188	8,112	583	3,616	3,472	24	3,957	274	5,769	2,415
Hancock	28,145	5,162	7,010	486	3,210	3,069	21	3,480	238	3,933	2,046
Harrison	64,639	13,638	13,527	1,284	7,139	6,440	48	7,146	594	9,135	4,501
Kanawha	174,805	34,395	39,460	3,238	19,578	17,936	131	20,113	1,635	26,860	22,699
Marion	55,807	11,048	11,428	1,040	6,227	5,428	42	6,008	553	7,962	4,309
Marshall	29,405	5,494	7,187	517	3,340	3,171	22	3,588	240	4,309	1,286
Monongalia	107,718	17,291	15,092	1,628	12,512	9,059	81	9,437	1,365	18,255	14,025
Ohio	41,194	8,038	9,555	757	4,599	4,203	31	4,744	386	5,689	3,644
Tucker	6,604	942	1,888	89	790	787	5	905	53	1,137	209
Wood	83,052	17,296	18,279	1,628	9,201	8,469	62	9,464	744	11,200	4,643

WISCONSIN

American Lung Association in Wisconsin

	HIGH OZONE DAYS 2021–2023					HIGH PARTICLE POLLUTION DAYS 2021–2023							
						24-Hour						Annual	
County	Orange	Red	Purple	Wgt. Avg.	Grade	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Ashland	1	0	0	0.3	B	6	1	0	0	2.5	D	5.4	Pass
Brown	8	0	0	2.7	D	7	5	0	0	4.8	F	7.7	Pass
Columbia	16	2	0	6.3	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Dane	18	1	0	6.5	F	6	1	3	0	4.5	F	8.7	Pass
Dodge	15	0	0	5.0	F	4	2	2	0	3.7	F	7.7	Pass
Door	14	1	0	5.2	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Eau Claire	8	0	0	2.7	D	10	5	0	0	5.8	F	7.9	Pass
Fond du Lac	5	0	0	1.7	C	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Forest	4	0	0	1.3	C	8	4	0	0	4.7	F	5.9	Pass
Grant	DNC	DNC	DNC	DNC	DNC	4	2	1	0	3.0	D	8.6	Pass
Jackson	DNC	DNC	DNC	DNC	DNC	5	2	0	0	2.7	D	INC	INC
Jefferson	16	0	0	5.3	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Kenosha	33	4	0	13.0	F	1	2	1	0	2.0	C	7.6	Pass
Kewaunee	11	3	0	5.2	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
La Crosse	6	1	0	2.5	D	2	5	0	0	3.2	D	7.8	Pass
Manitowoc	9	3	0	4.5	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Marathon	8	1	0	3.2	D	INC	INC	INC	INC	INC	INC	INC	INC
Milwaukee	23	2	0	8.7	F	6	1	2	0	3.8	F	9.2	Fail
Monroe	DNC	DNC	DNC	DNC	DNC	4	2	0	0	2.3	D	INC	INC
Outagamie	8	0	0	2.7	D	7	5	0	0	4.8	F	8.1	Pass
Ozaukee	23	2	1	9.3	F	3	2	1	0	2.7	D	INC	INC
Racine	24	3	0	9.5	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Rock	20	2	0	7.7	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Sauk	13	2	0	5.3	F	5	2	1	0	3.3	F	7.5	Pass
Sheboygan	24	2	1	9.7	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Taylor	5	0	0	1.7	C	5	7	0	0	5.2	F	6.8	Pass
Vilas	6	0	0	2.0	C	7	2	0	0	3.3	F	5.5	Pass
Walworth	21	0	0	7.0	F	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Waukesha	21	0	0	7.0	F	5	1	2	0	3.5	F	9.1	Fail

WISCONSIN

American Lung Association in Wisconsin

		AT-RISK GROUPS									
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Ashland	16,079	3,325	3,624	205	1,380	809	8	1,286	145	2,185	2,863
Brown	271,417	61,506	45,825	3,788	22,889	12,031	142	18,355	2,822	25,827	59,214
Columbia	58,091	11,715	11,792	722	5,040	2,873	30	4,495	528	4,496	5,128
Dane	575,347	111,383	89,584	6,861	50,669	24,438	300	36,410	6,992	56,180	132,826
Dodge	88,231	16,855	17,213	1,038	7,769	4,337	46	6,730	777	7,118	10,548
Door	30,562	4,714	10,207	290	2,759	1,888	16	3,160	221	2,654	2,290
Eau Claire	107,903	21,116	18,868	1,301	9,448	4,729	56	7,177	1,271	11,136	12,203
Fond du Lac	103,948	21,702	21,168	1,337	8,928	5,033	54	7,881	1,008	9,301	13,593
Forest	9,325	1,822	2,422	112	809	514	5	834	72	1,452	1,846
Grant	51,409	10,873	9,749	670	4,403	2,333	27	3,605	494	6,609	3,192
Jackson	20,855	4,417	4,467	272	1,782	1,034	11	1,633	165	2,479	2,923
Jefferson	85,743	16,578	16,543	1,021	7,527	4,145	45	6,420	867	7,607	10,571
Kenosha	167,488	35,829	27,739	2,207	14,379	7,600	87	11,553	1,753	18,389	45,518
Kewaunee	20,690	4,280	4,739	264	1,776	1,064	11	1,696	176	1,785	1,492
La Crosse	120,486	23,093	22,316	1,422	10,591	5,460	63	8,365	1,397	14,068	14,339
Manitowoc	81,331	16,250	18,868	1,001	7,041	4,226	42	6,745	702	7,436	9,771
Marathon	138,612	30,980	27,302	1,908	11,692	6,586	72	10,291	1,292	13,122	18,268
Milwaukee	916,205	215,270	139,123	13,259	76,546	37,953	477	56,910	10,635	153,720	472,541
Monroe	46,151	11,665	8,516	718	3,750	2,096	24	3,262	415	5,848	5,099
Outagamie	193,234	43,816	33,166	2,699	16,290	8,670	101	13,269	1,937	11,991	28,111
Ozaukee	93,460	19,366	20,870	1,193	8,021	4,714	49	7,486	845	4,403	9,540
Racine	196,613	44,050	36,578	2,713	16,602	9,171	103	14,211	1,901	20,528	60,331
Rock	164,278	36,388	30,234	2,241	13,922	7,632	86	11,799	1,624	18,138	31,667
Sauk	65,920	14,542	13,589	896	5,573	3,182	34	5,004	609	6,097	7,313
Sheboygan	117,752	25,055	23,936	1,543	10,063	5,698	61	8,928	1,088	10,197	21,989
Taylor	20,058	4,594	4,412	283	1,675	1,009	10	1,608	163	2,254	1,087
Vilas	23,885	3,825	7,756	236	2,146	1,490	12	2,486	150	2,941	3,269
Walworth	105,822	20,174	21,892	1,243	9,298	5,199	55	8,129	1,038	10,790	16,604
Waukesha	412,591	85,573	86,963	5,271	35,480	20,508	215	32,295	3,836	22,694	57,432

WYOMING

American Lung Association in Wyoming

HIGH OZONE DAYS 2021–2023

County	Orange	Red	Purple	Wgt. Avg.	Grade
Albany	9	1	0	3.5	F
Big Horn	1	0	0	0.3	B
Campbell	10	0	0	3.3	F
Converse	3	0	0	1.0	C
Fremont	7	0	0	2.3	D
Johnson	7	0	0	2.3	D
Laramie	10	0	0	3.3	F
Lincoln	3	0	0	1.0	C
Natrona	4	0	0	1.3	C
Park	DNC	DNC	DNC	DNC	DNC
Sheridan	DNC	DNC	DNC	DNC	DNC
Sublette	11	0	0	3.7	F
Sweetwater	12	0	0	4.0	F
Teton	1	0	0	0.3	B
Weston	0	0	0	0.0	A

HIGH PARTICLE POLLUTION DAYS 2021–2023

	24-Hour						Annual	
County	Orange	Red	Purple	Maroon	Wgt. Avg.	Grade	Design Value	Pass/ Fail
Albany	2	0	0	0	0.7	B	INC	INC
Big Horn	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Campbell	12	1	0	0	4.5	F	INC	INC
Converse	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Fremont	3	0	0	0	1.0	C	2.1	Pass
Johnson	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Laramie	4	1	0	0	1.8	C	5.2	Pass
Lincoln	2	0	0	0	0.7	B	INC	INC
Natrona	3	0	0	0	1.0	C	3.7	Pass
Park	1	0	0	0	0.3	B	4.5	Pass
Sheridan	2	1	0	0	1.2	C	7.0	Pass
Sublette	3	0	0	0	1.0	C	3.7	Pass
Sweetwater	1	0	0	0	0.3	B	INC	INC
Teton	10	0	0	0	3.3	F	4.0	Pass
Weston	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC

WYOMING

American Lung Association in Wyoming

				AT-RISK GROUPS							
				Lung Diseases							
County	Total Population	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	COPD	Lung Cancer	CV Disease	Pregnancies	Poverty	People of Color
Albany	38,257	5,761	5,287	387	3,297	2,008	13	2,145	545	5,922	7,104
Big Horn	12,018	2,838	2,657	191	918	719	4	887	107	1,479	1,621
Campbell	47,498	12,477	6,560	838	3,557	2,406	17	2,716	505	3,987	6,748
Converse	13,809	3,306	2,625	222	1,058	791	5	948	133	1,422	1,674
Fremont	39,815	9,665	8,164	649	3,024	2,300	14	2,793	370	5,248	11,888
Johnson	8,759	1,737	2,437	117	697	589	3	754	73	730	768
Laramie	100,984	22,278	17,994	1,496	7,941	5,666	35	6,634	1,048	9,587	22,718
Lincoln	20,880	5,171	4,257	347	1,578	1,219	7	1,487	188	1,450	1,891
Natrona	79,941	18,562	14,209	1,247	6,191	4,443	28	5,218	849	8,266	11,587
Park	30,735	6,241	7,882	419	2,438	1,984	11	2,498	277	2,930	2,968
Sheridan	32,519	6,710	7,575	451	2,581	2,033	11	2,512	306	2,993	2,973
Sublette	8,969	1,909	2,196	128	704	570	3	713	80	681	1,066
Sweetwater	41,249	10,087	6,463	678	3,155	2,197	14	2,527	440	4,056	8,814
Teton	23,232	3,892	4,304	261	1,954	1,393	8	1,627	256	1,429	4,690
Weston	6,808	1,265	1,585	85	555	434	2	535	54	710	794

From:	Sarah Al-Zhyri
To:	Jeffrey Bland
Cc:	Amanda Garcia; Patrick Anderson
Subject:	Comments on MZX Tech, LLC Draft Permit (Air Ref. No. 0680-00119) from SELC, et al. (Email 2 of 3)
Date:	Tuesday, February 17, 2026 6:21:55 PM
Attachments:	Vol. II - Att. 6-9.pdf

This Message Is From an External Sender
This message came from outside your organization.

Dear Mr. Bland:

Please find attached Volume II of attachments to comments of Southern Environmental Law Center, Memphis Community Against Pollution, Young, Gifted & Green, Sierra Club, Safe and Sound Coalition, and the Climate Reality Project: Memphis and Mid-South Region Chapter in response to the Mississippi Department of Environmental Quality's public comment period regarding the Draft Air Pollution Control and Prevention of Significant Deterioration (PSD) Authority Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC. This email is the second of three emails that contain the attachments referenced in these comments.

Sincerely,

Sarah Al-Zhyri (she/her)
Legal Administrative Assistant II

Southern Environmental Law Center
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Volume II of Attachments to Community Groups' Comments on the Mississippi Department of Environmental Quality's Draft Air Pollution Control and Prevention of Significant Deterioration (PSD) Authority Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Attachments 6-9

Attachment 6

BEFORE THE ADMINISTRATOR
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

In the Matter of:	)	**PETITION TO REDESIGNATE**
	)	**THE MEMPHIS METROPOLITAN**
Attainment of the 8-Hour Primary National	)	**STATISTICAL AREA AS**
Ambient Air Quality Standard for Ozone	)	**IN NONATTAINMENT**
	)	

INTRODUCTION

Pursuant to the Administrative Procedure Act, 5 U.S.C. § 553(e), and the Clean Air Act, 42 U.S.C. § 7401 *et seq.*, Memphis Community Against Pollution, the Sierra Club, and Young, Gifted and Green (collectively, "Petitioners") respectfully submit this Petition to the Administrator of the U.S. Environmental Protection Agency ("EPA") to redesignate the Memphis Metropolitan Statistical Area ("Memphis MSA" or "MSA") as in nonattainment of the 8-hour primary national ambient air quality standard for ozone that was adopted in 2015 ("2015 Ozone NAAQS") and require the Shelby County Health Department to revise its local implementation plan to include adequate measures to attain and maintain compliance with the standard.

The purpose of the 2015 Ozone NAAQS is to provide "protection against health effects associated with long- and short-term exposures."[1] Ozone exposure is known to cause "the formation of secondary oxidation products in the respiratory tract," which "initiate numerous responses at the cellular, tissue, and whole organ level of the respiratory system."[2] This can lead to a variety of adverse health effects, including difficulty breathing, inflammation of the airways, increased risk of lung infection, aggravated respiratory diseases such as emphysema and chronic bronchitis, and increased frequency of asthma attacks.[3] These respiratory symptoms may be caused by exposure to ozone "even at relatively low levels and for brief periods of time."[4] Ozone exposure is particularly harmful for "people with asthma, children, older adults, and people who are active outdoors, especially outdoor workers."[5]

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[1] National Ambient Air Quality Standards for Ozone, 80 Fed. Reg. 65,292, 65,294 (Oct. 26, 2015).
[2] *Id.* at 65,302.
[3] *Health Effects of Ozone Pollution*, ENV'T PROT. AGENCY (Mar. 13, 2025), https://perma.cc/LN7X-22DX; *see also* 80 Fed. Reg. at 65,303–08.
[4] Designation of Areas for Air Quality Planning Purposes; State of California; Redesignation of the San Francisco Bay Area to Nonattainment for Ozone, 63 Fed. Reg. 37,258, 37,265 (July 10, 1998).
[5] *Health Effects of Ozone Pollution*, ENV'T PROT. AGENCY (Mar. 13, 2025), https://perma.cc/LN7X-22DX; *see also* 80 Fed. Reg. at 65,310–11.

The Memphis MSA—comprised of nine counties in Tennessee, Mississippi, and Arkansas[6]—has a long history of failing to attain the applicable 8-hour national ambient air quality standard for ozone.[7] As a result, residents of Memphis and the surrounding areas have long suffered from exposure to unhealthy levels of ozone. In 2024, the Asthma and Allergy Foundation of America designated Memphis as an "Asthma Capital" of the nation due to the city's high rates of emergency room visits and deaths from asthma.[8] For the past two years, Shelby County—within which Memphis is located—received an "F" grade from the American Lung Association due to its ozone pollution.[9]

While most of the country has successfully minimized ozone pollution by reducing emissions of pollutants that react with heat and sunlight to form ground-level ozone—nitrogen oxides ("NO_X") and volatile organic compounds ("VOC") (both known as "ozone precursors")—ambient air monitoring data collected across the Memphis MSA show that ozone concentrations in this area are once again exceeding the applicable health-based standard. In fact, multiple monitors in the Memphis MSA have recorded data showing clear violations of the 2015 Ozone NAAQS.[10] And the problem is only getting worse with each passing year.[11]

The Memphis MSA is home to nearly one million people, 70% of whom reside in the urban areas within Shelby County, Tennessee.[12] Three agencies are responsible for the implementation and enforcement of air quality laws in this area: the Shelby County Health Department ("SCHD"), the Mississippi Department of Environmental Quality, and the Arkansas Department of Energy and Environment (collectively, "MSA Regulators").[13] In August 2023, the MSA Regulators signed up to participate in EPA's Ozone Advance program,[14] which provides a

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[6] LORI LINDGREN, PATH FORWARD PLAN 1 (Nov. 2024), Attachment ("Att.") 1 (draft version) ("November 2024 Path Forward").
[7] *See infra* Section III.
[8] ASTHMA & ALLERGY FOUND. OF AM., 2024 ASTHMA CAPITALS, THE MOST CHALLENGING PLACES TO LIVE WITH ASTHMA 6, 12–13 (2024), https://perma.cc/CK5S-54PH.
[9] *See* AM. LUNG ASS'N, STATE OF THE AIR 144 (2024), https://perma.cc/FWB8-SU6T; *Tennessee: Shelby*, AM. LUNG ASS'N (2025), https://perma.cc/4UF2-MP8Q.
[10] *See infra* Section III.A–B.
[11] *See infra* Section III.C.
[12] November 2024 Path Forward, Att. 1 at 1.
[13] *Id.*
[14] *See* Letter from Scott Mathias, Air Quality Pol'y Div. Dir., Env't Prot. Agency, to Kasia Smith-Alexander, Env't Health Servs. Dir., Shelby Cnty. Health Dep't at 1 (Sept. 5, 2023), Att. 2.

voluntary framework for improving air quality in areas that are designated as in attainment but have ozone concentrations that are "close" to violating the 2015 Ozone NAAQS.[15]

According to EPA's guidance for the Ozone Advance program, participating agencies must develop a "Path Forward" document that describes a detailed plan for implementation of measures to reduce the area's ozone concentrations.[16] EPA's guidance states that a complete Path Forward plan should be developed within a year of signing up for the program, and the resulting emissions reductions "should be achieved as expeditiously as practicable."[17] However, almost two years have passed since the MSA Regulators signed up to participate in the program, and they have yet to develop a complete Path Forward plan—much less one that contains adequate measures to expeditiously bring the area into attainment of the 2015 Ozone NAAQS.[18]

EPA's Ozone Advance program guidance recognizes that "success in the program depends largely on [the regulators'] level of commitment and the effectiveness of the actions taken."[19] Unfortunately, the MSA Regulators have demonstrated a complete lack of commitment to taking timely and meaningful action necessary to ensure that residents of the area are no longer exposed to unhealthy levels of ozone pollution. The inadequacy of their draft Path Forward plan, and their lack of urgency and diligence in preparing it, indicate that the Memphis MSA is not currently on a path to success under this voluntary program.

Section 107(d)(3) of the Clean Air Act authorizes EPA to revise an area's attainment designation "at any time" on the basis of air quality monitoring data.[20] Because the data show that ozone concentrations throughout the Memphis MSA are in violation of the 2015 Ozone NAAQS and steadily increasing, and because there is no reasonable basis to expect the MSA Regulators will voluntarily implement the full extent of emission-reducing measures necessary to achieve attainment expeditiously, EPA must take action to ensure that emissions of ozone precursors will be reduced as needed to protect public health. Accordingly, Petitioners respectfully request that EPA redesignate the Memphis MSA as in nonattainment of the 2015 Ozone NAAQS and require revision of the federally-approved local implementation plan to include adequate measures to attain and maintain compliance with the standard.

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[15] Env't Prot. Agency, *Ozone Advance* 2, 10 (2016), https://perma.cc/6YVC-YFLG ("Ozone Advance Guidance").
[16] *See id.* at 9–10.
[17] *Id.* at 9, 24.
[18] *See infra* Section IV.
[19] Ozone Advance Guidance at 13.
[20] 42 U.S.C. § 7407(d)(3)(A).

I. The Purpose of the Clean Air Act's Requirement to Establish National Ambient Air Quality Standards Is to Protect Public Health and Welfare.

The Clean Air Act requires EPA to adopt a "primary" ambient air quality standard for each criteria air pollutant by establishing a maximum ambient concentration that EPA determines is "requisite to protect the public health," while allowing for "an adequate margin of safety."[21] EPA must also adopt a "secondary" ambient air quality standard for each criteria pollutant at a level that is "requisite to protect the public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air."[22]

The Clean Air Act also requires EPA to "complete a thorough review" of each national ambient air quality standard every five years and to "make such revisions" to the standards "as may be appropriate."[23] EPA must convene an "independent scientific review committee" to provide technical support for these periodic reviews.[24] The scientific review committee is charged with completing its own five-year reviews and "shall recommend to the [EPA] Administrator any new national ambient air quality standards and revisions of existing criteria and standards as may be appropriate."[25] In addition, the scientific review committee is required to "advise the Administrator of areas in which additional knowledge is required to appraise the adequacy and basis of existing, new, or revised national ambient air quality standards" and to "advise the Administrator of any adverse public health, welfare, social, economic, or energy effects which may result from various strategies for attainment and maintenance of such national ambient air quality standards."[26]

The "Official Designation (Title)" of the scientific review committee established by the Clean Air Act is the Clean Air Scientific Advisory Committee ("CASAC").[27] CASAC operates under a charter that is renewed every two years pursuant to the Federal Advisory Committee Act.[28] The charter authorizes EPA to establish "subcommittees or workgroups" to provide

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[21] 42 U.S.C. § 7409(b)(1); *see also* 40 C.F.R. § 50.2(b) (2024) ("National primary ambient air quality standards define levels of air quality which the [EPA] Administrator judges are necessary, with an adequate margin of safety, to protect the public health.").
[22] 42 U.S.C. § 7409(b)(2).
[23] *Id.* § 7409(d)(1).
[24] *Id.* § 7409(d)(2)(A).
[25] *Id.* § 7409(d)(2)(B).
[26] *Id.* § 7409(d)(2)(C)(i), (iv).
[27] Env't Prot. Agency Charter, Clean Air Scientific Advisory Committee §§ 1–2 (May 19, 2023).
[28] *See id.* §§ 2, 11 (citing 5 U.S.C. §§ 1001–1014).

"recommendations and advice to the chartered CASAC for full deliberation and discussion."[29] EPA typically establishes pollutant-specific subcommittees "[t]o provide the appropriate range of expertise needed for the review of the criteria and standards for each pollutant for which NAAQS are established."[30] When forming these subcommittees, EPA seeks nominations of "scientific experts" to form "a balanced review panel" comprised of individuals "who possess the necessary domains of knowledge, the relevant scientific perspectives (which, among other factors, can be influenced by work history and affiliation), and the collective breadth of experience of adequately address the charge."[31] EPA has historically convened an "Ozone Panel" to provide technical support for its periodic reviews of the national ambient air quality standards for ozone.[32]

A. EPA Strengthened the Primary National Ambient Air Quality Standard for Ozone in 2015 Based on a Finding that the 2008 Standard Was Insufficient to Protect Public Health.

In 2015, EPA increased the stringency of the primary ambient air quality standard for ozone, from 75 parts per billion ("ppb") to 70 ppb.[33] The agency explained that the revised standard would help protect "children, older adults, and people with asthma or other lung diseases, and other at-risk populations against an array of adverse health effects that include reduced lung function, increased respiratory symptoms and pulmonary inflammation; effects that contribute to emergency department visits or hospital admissions; and mortality."[34]

EPA's 2015 decision to revise the primary ozone standard to 70 ppb was "based on an integrative assessment of an extensive body of new scientific evidence" and "a quantitative risk

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[29] *Id.* § 13.
[30] Clean Air Scientific Advisory Committee (CASAC) Ozone Review Panel; Request for Nominations, 68 Fed. Reg. 35,212, 35, 212 (June 12, 2003); *see also* Decl. of Joseph Goffman ¶ 15, *New York v. Env't Prot. Agency*, No. 21-1028 (D.C. Cir. Jan. 3, 2024) ("In light of the breadth of scientific issues covered by each review and the potential for multiple simultaneous reviews, the EPA has historically had a practice of establishing pollutant-specific review panels to assist [CASAC] in fulfilling its review and advisory functions for a particular pollutant.").
[31] Request for Nominations for the Clean Air Scientific Advisory Committee (CASAC) Ozone Panel, 89 Fed. Reg. 56,749, 56,749 (July 10, 2024).
[32] *See, e.g.*, *id.*; 68 Fed. Reg. at 35,212.
[33] 80 Fed. Reg. at 65,293, 65,294, 65,296 n.6.
[34] *Id.* at 65,294.

assessment."[35] In particular, EPA's scientific analysis—which was subject to "extensive peer review" by CASAC[36]—made the following conclusions:

- "a 'causal' relationship exists between short-term exposure to [ozone] in ambient air and effects on the respiratory system";
- "a 'likely to be causal' relationship exists between long-term exposure to [ozone] in ambient air and respiratory effects";
- "the relationships between short-term exposures to [ozone] in ambient air and both total mortality and cardiovascular effects are likely to be causal"; and
- "the currently available evidence for additional endpoints is 'suggestive' of causal relationships with short-term (central nervous system effects) and long-term exposures (cardiovascular effects, reproductive and developmental effectives, central nervous system effects and total mortality) to ambient [ozone]."[37]

EPA noted that the causal relationship between ozone exposure and adverse respiratory effects has long been documented by "a very large amount of evidence spanning several decades."[38] In contrast, EPA explained that the 2008 primary ozone standard was adopted before there were many scientific studies regarding the potential effects of ozone exposure on the cardiovascular system.[39] By 2015, there was "an emerging body of animal toxicological evidence demonstrating that short-term exposure to [ozone] can lead to autonomic nervous system alterations (in heart rate and/or heart rate variability)," and "[c]ontrolled human exposure studies" were beginning to reveal that ozone exposure could lead to "systemic inflammation and oxidative stress, as well as . . . the potential for increased clotting."[40]

Based on the scientific evidence available at the time, EPA estimated that the "total risk" associated with the 2008 primary ozone standard was allowing "thousands of [ozone]-associated deaths per year in the urban study areas."[41] EPA also estimated that the revised standard of 70 ppb would "reduce the number of premature deaths associated with short-term [ozone] concentrations" by up to 70%.[42]

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[35] *Id.*
[36] *Id.* at 65,337; *see also id.* at 65,293 (describing EPA's preparation of the Integrated Science Assessment, the Health and Welfare Risk and Exposure Assessments, and the Policy Assessment, drafts of which "were subject to public review and comment, and . . . peer-reviewed by [CASAC]" between 2008 and 2014).
[37] *Id.* at 65,302.
[38] *Id.*
[39] *Id.* at 65,308.
[40] *Id.*
[41] *Id.* at 65,320.
[42] *Id.* at 65,341.

EPA's 2015 decision to revise the primary ozone standard to 70 ppb was also based on CASAC's finding that the 75-ppb standard was "not protective of human health" and its "unanimous[] recommend[ation]" to revise the primary standard downward.[43] CASAC specifically found that "[s]ome healthy individuals have been shown to have clinically relevant responses, even at 60 ppb" and noted that "the 60 ppb-8hr exposure benchmark is relevant for consideration with respect to adverse effects on asthmatics."[44] Nevertheless, CASAC recommended setting the primary ozone standard "within the 60–70 ppb range."[45] In the preamble to the final rule adopting the revised primary standard, EPA explained that its selection of 70 ppb was "within the range that CASAC advised [EPA] to consider"[46] and noted that CASAC itself "acknowledged that the choice of a level within the range recommended based on scientific evidence is a policy judgment."[47]

B. EPA's Scientific Advisory Committee Recently Found that the 2015 Ozone NAAQS is Not Sufficiently Protective of Public Health.

In 2020, EPA completed the required five-year review of the national ambient air quality standards for ozone and decided to "retain the current standards, without revision."[48] As EPA has since acknowledged, its 2020 decision to retain the existing ozone standards was not the product of a "traditional review process."[49] Instead of convening an Ozone Panel to support CASAC in performing an independent scientific review, EPA staff conducted their own "quantitative analyses of the risks to public health and the environment from exposure to ozone" and presented their conclusions directly to CASAC.[50] Then, "[r]ather than forming a traditional ozone-specific review panel, EPA provided [CASAC] with a pool of expert consultants to respond to written questions."[51] The Chair of CASAC wrote a letter to the Administrator recommending that EPA "consider restoring a traditional interactive discussion process" with "a pollutant-specific review

[43] *Id.* at 65,326, 65,346.
[44] *Id.* at 65,322.
[45] *Id.*
[46] *Id.* at 65,294.
[47] *Id.* at 65,355.
[48] *See* Review of the Ozone National Ambient Air Quality Standards, 85 Fed. Reg. 87,256, 87,257 (Dec. 31, 2020).
[49] Unopposed Mot. for Voluntary Remand Without Vacatur at 4, *New York v. Env't Prot. Agency*, No. 21-1028 (D.C. Cir. Jan. 3, 2024).
[50] *Id.* at 3–4.
[51] *Id.* at 4.

panel."[52] The Chair explained that restoring the traditional process would "enable[] significantly more discussion and deliberation among experts with differing backgrounds and opinions, potentially resulting in a more comprehensive examination of some controversial topics."[53] EPA did not implement the Chair's recommendation.

Nevertheless, EPA explained that its 2020 decision to retain the current ozone standards was based in part on its "consideration of CASAC advice."[54] In particular, EPA relied upon CASAC's conclusion "that the newly available health effects evidence does not differ substantially from that available in the last review when the standard was set."[55] However, EPA acknowledged at the time that a "part of CASAC expressed concern regarding the margin of safety provided by the current standard" and "provided policy advice expressing support for a lower standard."[56]

In October 2021, EPA initiated a process to "reconsider" its 2020 decision to retain the current ozone standards.[57] Notably, EPA restored its historical practice of convening an "ozone-specific review panel," comprised of eighteen technical experts, to support CASAC's independent scientific review.[58] In forming the Ozone Panel, EPA specifically sought nominations of "nationally and internationally recognized scientists with demonstrated expertise and research . . . in the following fields, especially with respect to ozone: Air quality, atmospheric science and chemistry; exposure assessment; toxicology; controlled clinical exposure; epidemiology; biostatistics; risk assessment; ecology, including of forests and terrestrial systems; and effects on welfare and the environment."[59]

The Ozone Panel assisted CASAC in performing a thorough review of the analyses EPA relied upon in 2020, a revised Policy Assessment developed by EPA staff in 2022, and "several new studies that were published recently and were not included in the 2020 Science

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[52] *Id.*(quoting Letter from Louis Anthony Cox, Jr., Chair, Clean Air Sci. Advisory Comm., to Andrew R. Wheeler, Adm'r, Env't Prot. Agency (Feb. 19, 2020)).
[53] *Id.*
[54] 85 Fed. Reg. at 87,257.
[55] *Id.*
[56] *Id.*
[57] Unopposed Mot. for Voluntary Remand Without Vacatur at 5, *New York v. Env't Prot. Agency*, No. 21-1028 (D.C. Cir. Jan. 3, 2024).
[58] *Id.*; *see also* Request for Nominations of Candidates for the Clean Air Scientific Advisory Committee (CASAC) Ozone Panel, 86 Fed. Reg. 63,024, 63,024–25 (Nov. 15, 2021).
[59] 86 Fed. Reg. at 63,024.

Assessment."[60] In June 2023, CASAC transmitted its final report on EPA's revised Policy Assessment.[61] This report documented CASAC's finding that although a "large amount of data [had been] collected and analyzed[,] . . . this wealth of information was not fully utilized" in the Policy Assessment.[62] The cover letter to the final report noted that "all of the CASAC Ozone Panel members" and "[a]ll CASAC members, except for one, are concerned that the approach taken in the [Policy Assessment] may substantially underestimate public health risk."[63] These experts raised particular concern with EPA's "failure to give appropriate weight to the epidemiological data in assessing the adequacy of the standard" and the omission of controlled human exposure data for specific "at-risk populations" such as children and outdoor workers.[64] Based upon a full review of the available scientific evidence, the entire eighteen-member Ozone Panel and six of the seven CASAC members concluded "that the level of the current primary standard is not sufficiently protective of public health" and that it should be revised to a "level in the range of 55 to 60 ppb to be protective of public health."[65]

In response to CASAC's report, the Administrator announced that EPA would initiate a new periodic review of the ozone standards.[66] EPA's news release announcing the decision included the following quote from the Administrator: "After carefully reviewing the advice of the independent scientific panel, I am convinced that a full and complete review of the ozone [national ambient air quality standards] is warranted to ensure a thorough and transparent assessment of the latest science."[67] EPA has since described the Administrator's decision to initiate a new periodic review as being based on CASAC's "advice that the draft Policy Assessment is missing important analyses and information, and its advice on the importance of new studies not [previously] evaluated."[68]

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[60] Unopposed Mot. for Voluntary Remand Without Vacatur at 5–7, *New York v. Env't Prot. Agency*, No. 21-1028 (D.C. Cir. Jan. 3, 2024).
[61] Clean Air Sci. Advisory Comm., EPA-CASAC-23-002, CASAC Review of the EPA's Policy Assessment (PA) for the Reconsideration of the Ozone National Ambient Air Quality Standards (External Review Draft Version 2) at 1 (June 9, 2023), https://perma.cc/L4G9-XHL9 ("2023 CASAC Report").
[62] *Id.* at 2.
[63] *Id.*
[64] *Id.*
[65] *Id.* at 2–3.
[66] News Release, Env't Prot. Agency, EPA Initiates New Review of the Ozone National Ambient Air Quality Standards to Reflect the Latest Science (Aug. 21, 2023), https://perma.cc/6FP6-TD59.
[67] *Id.*
[68] Decl. of Joseph Goffman ¶ 28, *New York v. Env't Prot. Agency*, No. 21-1028 (D.C. Cir. Jan. 3, 2024).

That periodic review process is ongoing.[69] As of the date of this filing, EPA has not yet published a proposed rule to revise the ozone standards. As a result, the current primary ambient air quality standard for ozone remains at 70 ppb—a level that scientific experts largely agree is insufficient to protect public health, but which multiple air quality monitors show is being exceeded throughout the Memphis MSA.[70]

II. EPA Has Authority to Revise Attainment Designations Based on Air Quality Data.

The Clean Air Act establishes two separate processes for designating areas as being in attainment or nonattainment of a national ambient air quality standard. First, Section 107(d)(1) of the Act requires EPA to promulgate designations of all areas throughout the country following the adoption of a new or revised standard.[71] Second, Section 107(d)(3) of the Act authorizes EPA to revise an area's designation "at any time" if monitoring data or other "available information"[72] indicates that redesignation is appropriate:

> [O]n the basis of air quality data, planning and control considerations, or any other air quality-related considerations the Administrator deems appropriate, the Administrator may at any time notify the Governor of any State that available information indicates that the designation of any area or portion of an area within the State or interstate area should be revised.[73]

Upon notification to a state, the Governor of that state must respond to EPA by submitting "such redesignation, if any, of the appropriate area (or areas) or portion thereof within the State or interstate area, as the Governor considers appropriate."[74] EPA must then promulgate the redesignation submitted by the Governor, after "making such modifications as the

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[69] *See, e.g.*, 89 Fed. Reg. at 56,749; Call for Information on the Integrated Science Assessment for Ozone and Related Photochemical Oxidants, 88 Fed. Reg. 58,264, 58,264 (Aug. 25, 2023).
[70] *See infra* Section III.
[71] 42 U.S.C. § 7407(d)(1).
[72] *Id.* § 7407(d)(3). In making this determination, EPA may consider any available information that "relates to air quality considerations." Designation of Areas for Air Quality Planning Purposes; State of Iowa, 59 Fed. Reg. 11,193, 11,193–94 (Mar. 10, 1994). When certified ambient air quality monitoring data is not available, EPA may rely on "air dispersion modeling [as] an appropriate tool to determine whether an area is in attainment." Redesignation of Portions of Westmoreland and Cambria Counties, Pennsylvania for the 2010 Sulfur Dioxide (SO2) National Ambient Air Quality Standards (NAAQS), 89 Fed. Reg. 101,910, 101,911 (Dec. 17, 2024). In contrast, it is not appropriate for EPA to consider the potential for "economic hardship on the sources and the community" as a factor in determining whether an area should be redesignated. 59 Fed. Reg. at 11,194.
[73] 42 U.S.C. § 7407(d)(3)(A).
[74] *Id.* § 7407(d)(3)(B).

Administrator may deem necessary."[75] If the Governor fails to submit any redesignation, EPA "shall promulgate such redesignation, if any, that the Administrator deems appropriate."[76]

EPA's "significant authority" to redesignate an area at any time based on air quality data was established by the Clean Air Act Amendments of 1990.[77] Congress added Section 107(d)(3) to the Act "in order to overcome the deficiencies in [then-]current law that have failed to allow the Administrator to respond to new information about pollution levels and control needs."[78] In particular, EPA's authority to redesignate was previously limited to instances in which a Governor requested such action.[79] By enacting Section 107(d)(3), Congress specifically intended to ensure that EPA would "not have to wait for a request from a State before making a redesignation."[80]

In addition to EPA's authority to redesignate an area as in nonattainment at any time, Section 110(k)(5) of the Clean Air Act provides that "[w]henever the Administrator finds that the applicable implementation plan for any area is substantially inadequate to attain or maintain the relevant national ambient air quality standard . . . the Administrator shall require the State to revise the plan as necessary to correct such inadequacies."[81] As demonstrated below, the applicable implementation plan is plainly inadequate to ensure the Memphis MSA attains and maintains compliance with the 2015 Ozone NAAQS.[82]

EPA has previously exercised its authority under Section 107(d)(3) of the Act to revise the designation of an attainment area based on data showing that ambient concentrations of a regulated pollutant increased above the applicable standard following the area's attainment designation. On several occasions, EPA has exercised this redesignation authority on its own initiative after reviewing certified monitoring data submitted by states or local governments that showed violations of an applicable national ambient air quality standard.[83]

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[75] *Id.* § 7407(d)(3)(C).
[76] *Id.*
[77] S. REP. NO. 101-228 at 14 (1989); *see also* Clean Air Act Amendments of 1990, Pub. L. 101-549, § 101(a), 104 Stat. 2399, 2399–2404 (1990).
[78] S. REP. NO. 101-228 at 14 (1989).
[79] *Id.* at 14–15 (citing *Bethlehem Steel v. Env't Prot. Agency*, 723 F.2d 1303 (7th Cir. 1983)).
[80] *Id.* at 15.
[81] 42 U.S.C. § 7410(k)(5).
[82] *See infra* Section III.
[83] *See, e.g.*, Air Quality Redesignation for the 2008 Lead National Ambient Air Quality Standards; Canton, Ohio; Stark County, Ohio, 88 Fed. Reg. 14,920, 14,921 (Mar. 10, 2023) (describing EPA's redesignation of an area in Ohio after reviewing ambient air quality data from one monitoring site that "showed that the area was violating" the

EPA has also exercised its authority to redesignate attainment areas as nonattainment in response to requests from members of the public.[84] For example, in 1997, EPA received two petitions requesting redesignation of the San Francisco Bay Area Air Quality Management District in California as in nonattainment of the one-hour ozone standard.[85] The area had been designated as in attainment two years beforehand, but local air monitors subsequently recorded ozone concentrations that violated the applicable standard.[86] In response to the petitions, EPA reviewed the available monitoring data and proposed redesignating the area as in nonattainment.[87] Notably, EPA proposed this redesignation in spite of its finding that, unlike ozone concentrations in the Memphis MSA,[88] "the Bay Area's emissions appear to be on a downward trend based on currently available information."[89]

California's Governor at the time opposed EPA's proposed redesignation, in part due to subsequent monitoring data showing there were no exceedances of the standard in 1997.[90] Nevertheless, in July 1998, EPA finalized the redesignation of the Bay Area as in nonattainment of the one-hour ozone standard.[91] In its final rule, EPA explained:

> When the federal ozone standard is exceeded, people, and in particular children, the elderly, and those with respiratory diseases, may experience ozone's ill effects, such as chest pain, cough, lung inflammation, respiratory infection, and chronic bronchitis. In light of these significant health concerns, EPA believes that

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applicable standard for lead); Designation of Areas for Air Quality Planning Purposes; State of Arizona; Pinal County; PM_{10}, 77 Fed. Reg. 32,024, 32,025 (May 31, 2012) (describing EPA's decision to "initiate the redesignation process" for an area in Arizona after reviewing ambient air quality data from multiple monitors that showed "widespread, frequent" exceedances of the applicable standard for coarse particulate matter); Designation of Area for Air Quality Planning Purposes; Utah; Designation of Ogden City PM_{10} Nonattainment Area, 60 Fed. Reg. 38,726, 38,727 (July 28, 1995) (describing EPA's decision to redesignate an area in Utah "based upon six exceedances" of the applicable standard for coarse particulate matter that were recorded during a two-year period); 59 Fed. Reg. at 11,194 (describing EPA's decision to redesignate an area in Iowa based on data from one monitor showing that for two years in a row, there was "at least one violation" of the applicable standard for sulfur dioxide); Designation of Areas for Air Quality Planning Purposes, 58 Fed. Reg. 67,334, 67,335–36 (Dec. 21, 1993) (describing EPA's redesignation of twelve areas in nine states based on monitored exceedances of the applicable standards for coarse particulate matter and sulfur dioxide).

[84] *See, e.g.*, 89 Fed. Reg. at 101,911 (describing EPA's decision to redesignate an area in Pennsylvania in response to the Sierra Club's submission of "a modeling analysis" during a public comment period, which showed that sources in that area were contributing to a violation of the applicable standard for sulfur dioxide in a nearby nonattainment area); 63 Fed. Reg. at 37,261, 37,263 (describing EPA's decision to redesignate an area in California in response to petitions filed by two non-profit organizations and a coalition of elected officials requesting such redesignation).

[85] Designation of Areas for Air Quality Planning Purposes; State of California; Redesignation of the San Francisco Bay Area to Nonattainment for Ozone, 62 Fed. Reg. 66,578, 66,579–80 (Dec. 19, 1997).

[86] *Id.* at 66,579.

[87] *Id.* at 66,579–80.

[88] *See infra* Section III.C.

[89] 62 Fed. Reg. at 66,581.

[90] *See* 63 Fed. Reg. at 37,261–262.

[91] *See id.* at 37,259.

> it is important to provide the public with accurate information and the correct message that ozone pollution is still a problem.
>
> EPA is compelled to redesignate the Bay Area to nonattainment because of the numerous widespread violations of the 1-hour ozone standard, a standard that was designed to protect public health. . . .
>
> . . . .
>
> EPA concluded that a redesignation to nonattainment not only accurately describes air quality in the Bay Area, but also provides an opportunity for reevaluating the causes of the Bay Area's ozone violations, the quantity of emission reductions needed to attain the health-based standard, and the measures that will achieve those reductions quickly. . . . It is the public's right, and EPA's obligation, to be assured that current health standards are met now.[92]

In response to comments regarding the lack of exceedances in 1997, EPA noted that "the meteorological conditions prevailing on the West Coast during 1997 were unusually favorable to good air quality."[93] EPA noted in contrast that there had been seventeen exceedances of the standard during the previous three years and that "the ozone-conducive meteorology that occurred in 1995 and 1996 is likely to recur."[94] EPA explained that the primary reason for measuring compliance with the standard "over a 3-year period, not on an annual basis" is to "account for the effects of weather and other meteorological conditions," and that "residents must be assured of clean air under all weather conditions."[95]

In response to public comments criticizing the proposed redesignation as a mere "labeling exercise," EPA explained:

> Moreover, EPA does not believe that the Bay Area's current attainment designation is appropriate since it tells the affected public, the regulated community, local agencies, and the District that ozone pollution is no longer a problem. This inaccurate message tends to undercut collaborative and progressive actions in the near term, and contributes to confusion and dissension both within the Bay Area and in downwind populations.
>
> EPA remains convinced that near-term action is needed to protect the health and welfare of the State's residents.[96]

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[92] *Id.* at 37,259–260.
[93] *Id.* at 37,265.
[94] *Id.*
[95] *Id.*
[96] *Id.* at 37,267.

The enforceable measures triggered by EPA's redesignation were ultimately successful in reducing ozone concentrations in the Bay Area. In April 2004, EPA announced that the area had achieved attainment of the one-hour ozone standard "over the past three consecutive years."[97]

Petitioners are aware of just one instance in which EPA denied a petition requesting the redesignation of an area based on monitoring data showing violations of an applicable national ambient air quality standard. In 2013, the Sierra Club petitioned EPA to redesignate fifty-seven separate areas across the country as in nonattainment of the 8-hour ozone standard that was in effect at the time.[98] The petition relied on EPA's publication of 2012 design values, which showed that 103 monitors in twenty-two states had recorded violations of the applicable standard.[99] EPA denied the petition based on its consideration of "air quality trends and expected emissions reductions in the near term."[100] EPA explained that ozone concentrations had been declining nationwide since 2002 and that the agency expected "this overall long-term trend to continue as additional emissions reductions are achieved through existing regulations."[101] EPA also noted that the most recent design value data from 2013 showed that ozone concentrations in twenty-two of the fifty-seven identified areas no longer exceeded the applicable standard.[102]

In this case, as described below, the most recent monitoring data show that ozone concentrations throughout the Memphis MSA continue to exceed the applicable ambient air quality standard.[103] And in stark contrast to the circumstances under which EPA denied the Sierra Club's 2013 petition, the available monitoring data show that ozone concentrations throughout the Memphis MSA have been steadily *increasing* over the past several years.[104] There is also no reasonable basis to expect that the MSA Regulators will voluntarily implement the full extent of emission-reducing measures that is needed to bring the area back into attainment.[105] Instead, as

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[97] Press Release, Env't Prot. Agency, U.S. EPA Announces Bay Area Attains Federal Ozone Standard, 2004 WL 1621065 (Apr. 2, 2004).
[98] Sierra Club, *Petition to the Administrator of the U.S. Environmental Protection Agency to Redesignate as Nonattainment 57 Areas with 2012 Design Values Violating the 2008 8-Hour National Ambient Air Quality Standards for Ozone* at 1–11 (Nov. 14, 2013), https://perma.cc/XV8G-PDHH ("Sierra Club Petition").
[99] *Id.* at 3 & nn.11, 13.
[100] Env't Prot. Agency, *Response to Petition from Sierra Club to Redesignate as Nonattainment 57 Areas with 2012 Design Values Violating the 2008 8-Hour National Ambient Air Quality Standards for Ozone* at 1 (Aug. 14, 2014), https://perma.cc/H4CP-MNE4 ("Sierra Club Petition Denial").
[101] *Id.* at 2. EPA predicted the continued downward trend in ozone concentrations by comparing the 2011 National Emissions Inventory and EPA's "projected 2018 emission inventory." *Id.* at 2–3.
[102] *Id.* at 2.
[103] *See infra* Section III.A–B.
[104] *See infra* Section III.C.
[105] *See infra* Section IV.

in the case of the Bay Area in the 1990s, a nonattainment designation is the best way to ensure that emissions of ozone precursors will be reduced as needed to protect public health, as expeditiously as practicable.

III. Ozone Concentrations in the Memphis MSA Currently Violate the 2015 Ozone NAAQS and Are Increasing.

The Memphis MSA has a long history of failing to attain the applicable 8-hour national ambient air quality standard for ozone. In 2004, Shelby County and Crittenden County were designated nonattainment for the 8-hour ozone standard that was adopted in 1997.[106] The area failed to achieve compliance with the standard by the 2007 attainment deadline[107] and remained designated as nonattainment until 2010.[108] Two years later, Shelby County, Crittenden County, and a portion of DeSoto County were designated nonattainment for the revised 8-hour ozone standard that was adopted in 2008.[109] The area remained designated nonattainment until 2016.[110]

In 2017, the Memphis MSA was designated attainment for the revised 8-hour ozone standard that was adopted in 2015.[111] However, in the years since that attainment designation, the data collected by multiple air quality monitors reveal that ozone concentrations in the area have been steadily increasing and currently exceed the 2015 Ozone NAAQS. As a result, local communities are being exposed to levels of ozone pollution that EPA has deemed presumptively unhealthy—and the problem is only getting worse with each passing year.

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[106] Air Quality Designations and Classifications for the 8-Hour Ozone National Ambient Air Quality Standards; Early Action Compact Areas with Deferred Effective Dates, 69 Fed. Reg. 23,858, 23,880, 23,934 (Apr. 30, 2004).
[107] Determination of Nonattainment and Reclassification of the Memphis, TN/Crittenden County, AR 8-Hour Ozone Nonattainment Area, 73 Fed. Reg. 16,547, 16,550 (Mar. 28, 2008).
[108] Approval and Promulgation of Implementation Plans and Designation of Areas for Air Quality Planning Purposes; Tennessee; Redesignation of the Shelby County, Tennessee Portion of the Memphis, TN-Arkansas 1997 8-Hour Ozone Nonattainment Area to Attainment, 75 Fed. Reg. 56, 58 (Jan. 4, 2010).
[109] Air Quality Designations for the 2008 Ozone National Ambient Air Quality Standards, 77 Fed. Reg. 30,088, 30,098, 30,129, 30,145 (May 21, 2012).
[110] Air Plan Approval and Air Quality Designation; TN; Redesignation of the Shelby County 2008 8-Hour Ozone Nonattainment Area to Attainment, 81 Fed. Reg. 40,816, 40,817 (June 23, 2016).
[111] *See* Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards (NAAQS), 82 Fed. Reg. 54,232, 54,237, 54,256, 54,274 (Nov. 16, 2017).

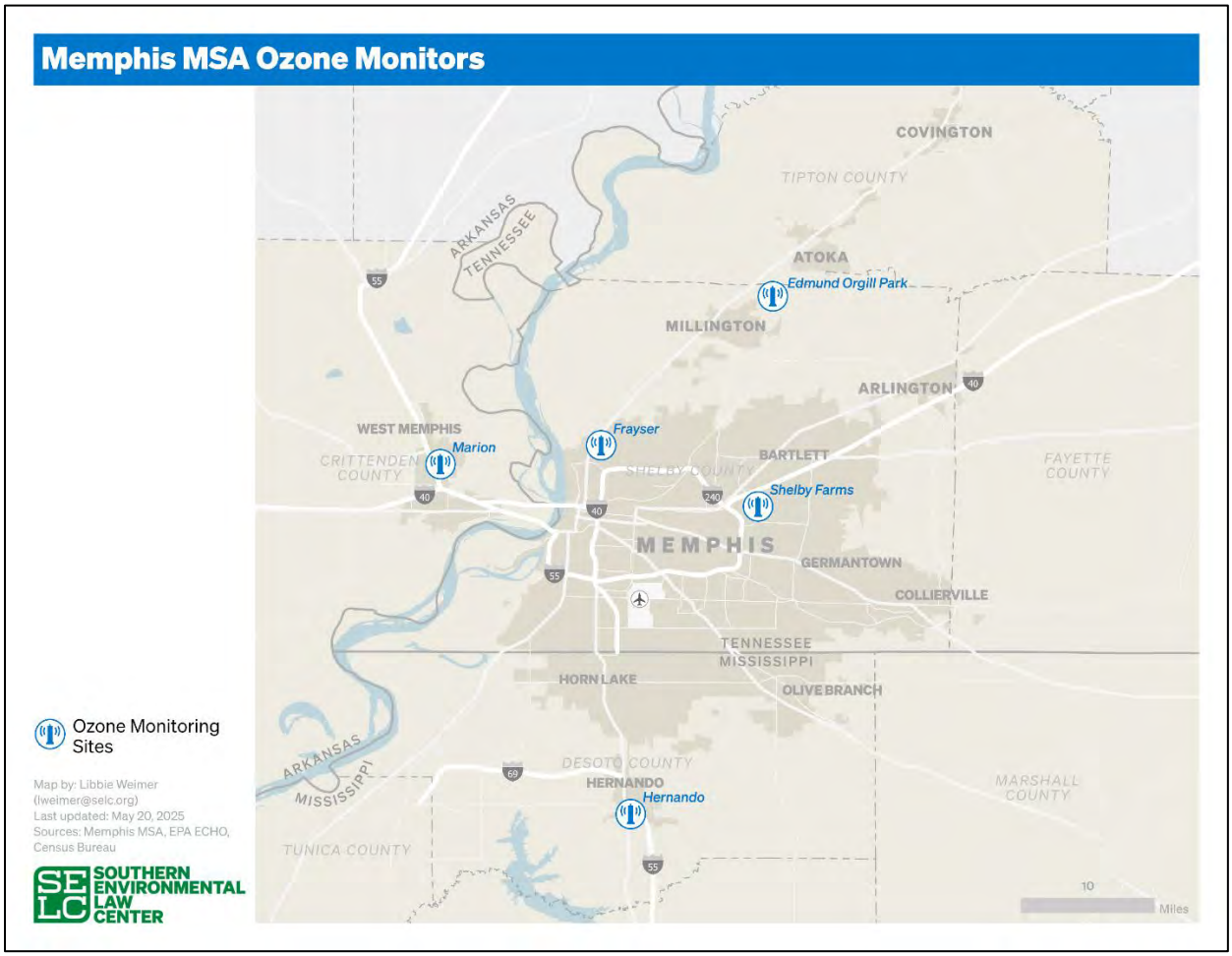
A. Certified Monitoring Data Show that Two Monitors within the MSA Recorded 2021–2023 Design Values that Violate the 2015 Ozone NAAQS.

An area is in violation of the 2015 Ozone NAAQS if a local ambient air quality monitor collects certified data that yields a "design value" of more than 70 ppb.[112] The design value is determined by calculating the "3-year average of the annual fourth-highest daily maximum 8-hour average [ozone] concentration."[113]

There are five ambient air monitoring sites for ozone in the Memphis MSA. Three of these sites are located in Shelby County, Tennessee; the fourth site is located in Crittenden County, Arkansas; and the fifth site is located in DeSoto County, Mississippi.

Figure 1: Ozone Monitoring Sites in the Memphis MSA

Source: Map by Libbie Weimer, S. Env't Law Ctr. (May 20, 2025)



[112] *See* 40 C.F.R. § 50.19(a); 40 C.F.R. pt. 50, App. U(1)(c), (3)(e). "A design value is a statistic that describes the air quality status of a given location relative to the level of the [national ambient air quality standards]." 80 Fed. Reg. at 65,300 n.12.

[113] 40 C.F.R. § 50.19(b); 40 C.F.R. pt. 50, App. U(1)(c), (3)(e).

Notably, there are no ozone monitors located in South Memphis, the most heavily industrialized area within the MSA. As a result, it is possible that currently available air monitoring data underrepresents the scale of the ozone pollution problem in Memphis.

According to EPA's published compilation of site-level design values for ozone,[114] two monitoring sites within the Memphis MSA recorded 2021–2023 design values that violate 70 ppb: the Shelby Farms site in Shelby County, Tennessee and the Marion site in Crittenden County, Arkansas. Both sites have a "valid 2021–2023 design value" of 72 ppb.[115] EPA's own spreadsheet describes both of these sites as "violating" the 2015 Ozone NAAQS.[116]

Notably, the 2021–2023 design value for the Shelby Farms site would be even higher if SCHD had not invalidated the site's data for August 24, 2023. This monitoring site recorded an 8-hour average concentration of 80 ppb on August 24 and 76 ppb on August 25.[117] According to e-mails between SCHD and EPA officials produced in response to a request made under the Freedom of Information Act ("FOIA"), these "were the second- and third-highest 8-hour max days for the 2023 ozone season."[118] SCHD initially proposed invalidating the data for both of these dates.[119] However, in response to EPA's concerns,[120] SCHD did not ultimately invalidate

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[114] *See* Env't Prot. Agency, *Ozone Design Values, 2023 (xlxs)* at tbls.2, 5 (June 4, 2024), https://www.epa.gov/system/files/documents/2024-06/o3_designvalues_2021_2023_final_06_04_24.xlsx (Microsoft Excel Spreadsheet), Att. 3 ("2023 Ozone Design Values").

[115] *Id.* at tbl.5. These design values were "computed using Federal Reference Method or equivalent data reported by State, Tribal, and Local monitoring agencies to EPA's Air Quality System (AQS) as of May 7, 2024," excluding any data that EPA concurred was "affected by an exceptional event." *Id.* at tbl.5 n.2. These design values are "considered valid" because the monitors have at least "75% annual data capture and 90% 3-year average data capture." *Id.* at tbl.5 n.1.

[116] *See id.* at tbl.2 ("Violating Sites in Areas Not Previously Designated Nonattainment for the 2015 8-Hour Ozone NAAQS").

[117] *See* E-mail from Michael Goldstein, Shelby Cnty. Health Dep't, to Keith Harris, Env't Prot. Agency (Apr. 24, 2024), Att. 4 at 5–6.

[118] *Id.* at 6.

[119] *Id.* at 5.

[120] SCHD proposed invalidating the data on the basis of "moisture intrusion in the inlet tubing" of the site. *Id.* EPA had serious concerns with this purported basis and advised SCHD to "make sure that you are making your data decisions based on real tangible evidence." E-mail from Gillian Walshe-Langford, Env't Prot. Agency, to Michael Goldstein, Shelby Cnty. Health Dep't (Apr. 24. 2024), Att. 4 at 4. While declining to "tell [SCHD] directly whether or not to reinstate this data," EPA stated its opinion in no uncertain terms:

> Your proposed method is theoretical and without objective evidence (i.e. images of water in line or clear oscillation in the minute data trace) and therefore not sufficient grounds for invalidation. So, basing invalidation of any data from any pollutant on what you have presented in your spreadsheet is not enough without other evidence.

Id. at 4–5.

the data for August 25, 2023.[121] Instead, SCHD pursued an alternative basis to invalidate the site's data for August 24—which had shown an 8-hour ozone concentration of 80 ppb.[122] Had this data not been invalidated, the 2021–2023 design value for the Shelby Farms monitoring site would be 73 ppb.[123]

In addition to the confirmed NAAQS violations at the Shelby Farms and Marion sites, the other three monitoring sites within the Memphis MSA recorded 2021–2023 design values that are equal to or just below 70 ppb:

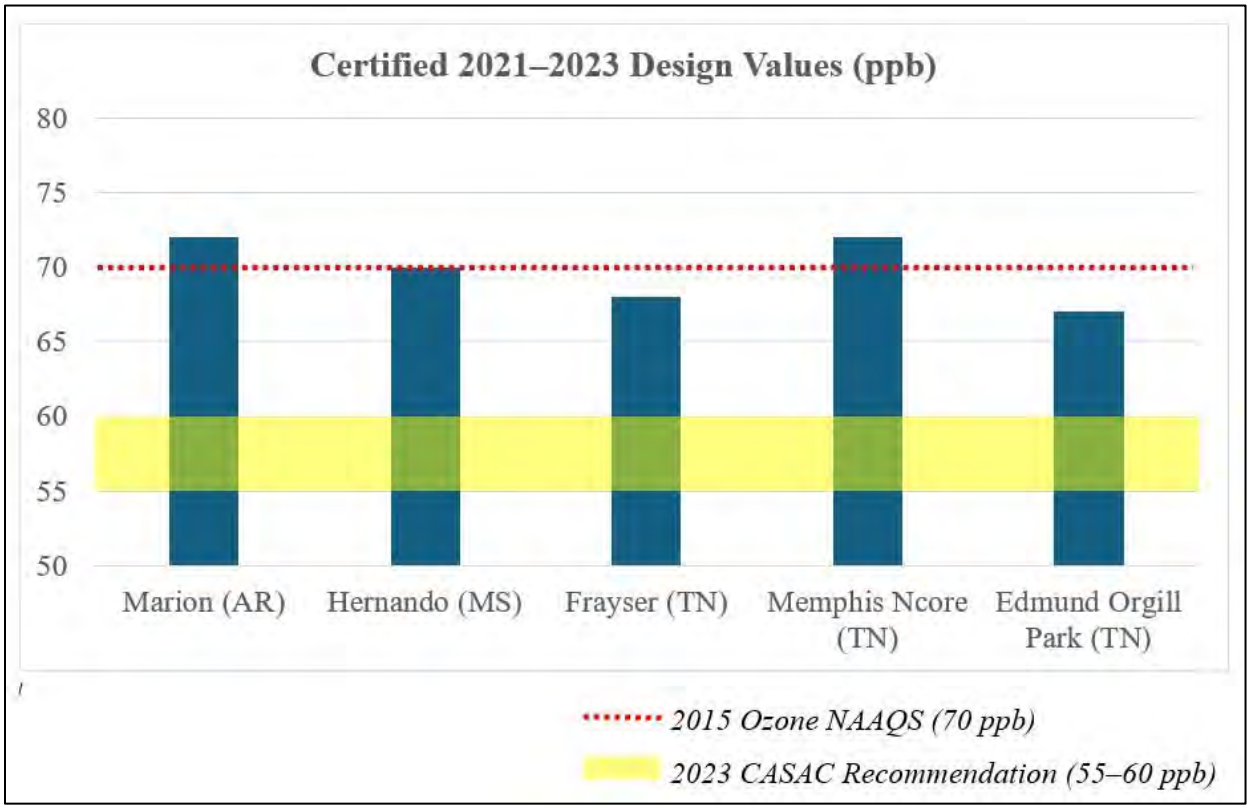
- Hernando site (DeSoto County, Miss.): 70 ppb;
- Frayser site (Shelby County, Tenn.): 68 ppb; and
- Edmund Orgill Park site (Shelby County, Tenn.): 67 ppb.[124]

Although the design values for these three monitors are not in violation of the 2015 Ozone NAAQS, they are well above the range of 55–60 ppb that EPA's independent scientific advisors recommended adopting as a revised standard to protect public health.[125]

[121] SCHD acknowledged that "the weight of evidence would not allow us to move forward with the calculations showing a likelihood of moisture." E-mail from Michael Goldstein, Shelby Cnty Health Dep't, to Gillian Walshe-Langford, Env't Prot. Agency (May 2, 2024), Att. 4 at 3.
[122] SCHD conducted a "study" of the monitor's automatic overnight check on that date. *Id.* Despite concluding that "the check appeared valid," SCHD staff decided to invalidate the data, which "eliminated the [data from August 24] along with the exceedance." *Id.* Internally, EPA expressed serious concern with this approach: "if the check is valid then what grounds do they have to invalidate the data??" E-mail from Gillian Walshe-Langford, Env't Prot. Agency, to Keith Harris, Anthony Bedel, & Marhsall Varnum, Env't Prot. Agency (May 3, 2024), Att. 5 at 2. Nevertheless, EPA ultimately concurred with SCHD's invalidation of the August 24 data on the basis that the automatic overnight check was "valid but failed their critical criteria" and that staff at SCHD were "following their procedures." E-mail from Gillian Walshe-Langford, Env't Prot. Agency, to Daniel Garver, Env't Prot. Agency (May 3, 2024), Att. 4 at 2.
[123] E-mail from Michael Goldstein, Shelby Cnty. Health Dep't, to Keith Harris, Env't Prot. Agency (Apr. 24, 2024), Att. 4 at 6.
[124] *See* 2023 Ozone Design Values, Att. 3 at tbl.5.
[125] 2023 CASAC Report at 2–3.

Figure 2: 2021–2023 Design Values Compared to NAAQS and Healthy Range

Source: 2023 Ozone Design Values, Att. 3 at tbl.5



In sum, the certified 2021–2023 design values for all five of the monitors in the Memphis MSA show that ozone concentrations throughout the entire area exceeded the level that the latest scientific evidence shows is harmful to public health and welfare, and two of the monitors recorded concentrations that clearly violate the 2015 Ozone NAAQS.

B. Certified Monitoring Data Show that Four Monitors Within the MSA Recorded 2022–2024 Design Values that Violate the 2015 Ozone NAAQS.

According to EPA's published compilation of site-level design values for ozone,[126] *four* of the five sites within the Memphis MSA recorded "valid" 2022–2024 design values that violate the 2015 Ozone NAAQS:

- Marion site (Crittenden County, Ark.): 72 ppb;
- Hernando site (DeSoto County, Miss.): 71 ppb;

[126] *See* Env't Prot. Agency, *Ozone Design Values, 2024 (xlxs)* at tbls.2, 5 (May 29, 2025), https://www.epa.gov/system/files/documents/2025-05/o3_designvalues_2022_2024_final_05_28_25.xlsx (Microsoft Excel Spreadsheet), Att. 6 ("2024 Ozone Design Values").

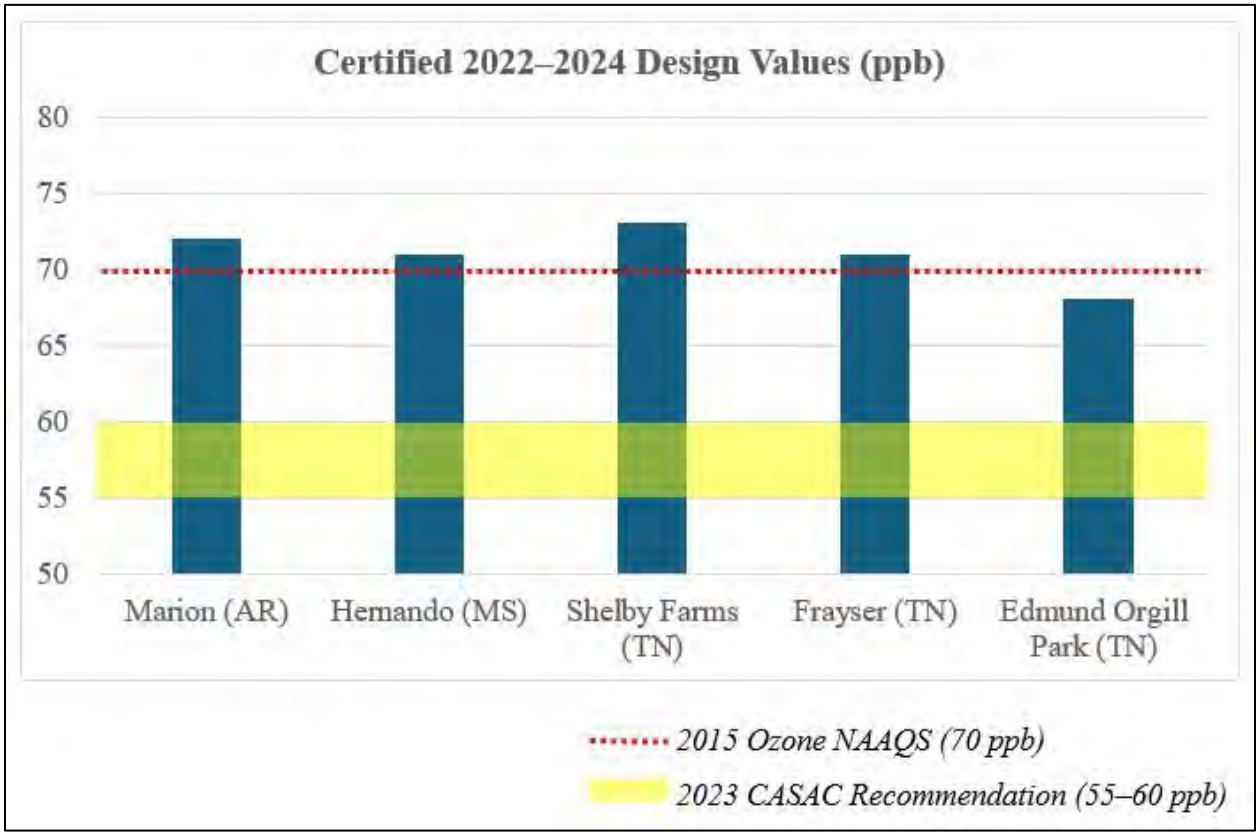
- Shelby Farms site (Shelby County, Tenn.): 73 ppb;
- Frayser site (Shelby County, Tenn.): 71 ppb.[127]

Again, EPA's own spreadsheet describes these four monitoring sites in the Memphis MSA as "violating" the 2015 Ozone NAAQS.[128]

In addition, the certified 2022–2024 design value for the Edmund Orgill Park site (Shelby County, Tenn.) is 68 ppb.[129] Although this value does not exceed the 2015 Ozone NAAQS, it is well above the range of 55–60 ppb that EPA's independent scientific advisors recommended adopting as a revised standard to protect public health.[130]

Figure 3: 2022–2024 Design Values Compared to NAAQS and Healthy Range

Source: 2024 Ozone Design Values, Att. 6 at tbl.5



[127] *Id.* at tbl.5. These design values were "computed using Federal Reference Method or equivalent data reported by State, Tribal, and Local monitoring agencies to EPA's Air Quality System (AQS) as of May 28, 2025," excluding any data that EPA concurred was "affected by an exceptional event." *Id.* at tbl.5 n.2. These design values are "considered valid" because the monitors have at least "75% annual data capture and 90% 3-year average data capture." *Id.* at tbl.5 n.1.

[128] *See id.* at tbl.2 ("Violating Sites in Areas Not Previously Designated Nonattainment for the 2015 8-Hour Ozone NAAQS").

[129] *See id.* at tbl.5.

[130] 2023 CASAC Report at 2–3.

In addition to showing clear violations of the 2015 Ozone NAAQS at four monitoring sites within the Memphis MSA, certified emissions data show that all five sites recorded multiple exceedances of the 8-hour standard in 2024. In particular, the Hernando and Edmond Orgill Park sites each recorded three exceedances, the Marion site recorded five exceedances, and the Shelby Farms and Frayser sites each recorded six exceedances.[131] These data also reveal that 8-hour ozone concentrations reached and even exceeded *80 ppb* at four of these sites during the summer of 2024.[132] Notably, the Shelby Farms site recorded an 8-hour ozone concentration of 89 ppb[133]—more than 27% higher than the current standard and more than 48% higher than the upper end of the range that CASAC identified as sufficient to protect public health.

In sum, the certified 2022–2024 design values for all five of the monitors in the Memphis MSA show, once again, that ozone concentrations throughout the entire area exceeded the level that the latest scientific evidence shows is harmful to public health and welfare. And the latest monitoring data shows the problem is getting worse, not better: the number of monitors with recorded concentrations that clearly violate the 2015 Ozone NAAQS has now doubled since the 2021–2023 values, from two to four.

C. Ozone Concentrations in the Memphis MSA Are Increasing, Not Decreasing.

As described above, EPA denied a 2013 petition to redesignate certain areas as in nonattainment for the 2008 ozone standard on the basis that ozone concentrations and emissions of ozone precursors were decreasing nationwide and that the specified areas would likely achieve attainment in the near future without further action.[134] That rationale does not apply in this case. While ozone pollution may still be decreasing in many parts of the country, the exact opposite is true of the Memphis MSA.

Ozone concentrations have been steadily increasing at all five monitoring stations within the Memphis MSA. Three years ago, all five sites had design values below 70 ppb, whereas four of these sites now have design values that violate the 2015 Ozone NAAQS.

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[131] *See Monitor Values Report*, ENV'T PROT. AGENCY, https://www.epa.gov/outdoor-air-quality-data/monitor-values-report (last visited June 4, 2025) (table generated on EPA's website using 2024 air monitoring data from the Air Quality System ("AQS") database), Att. 7.

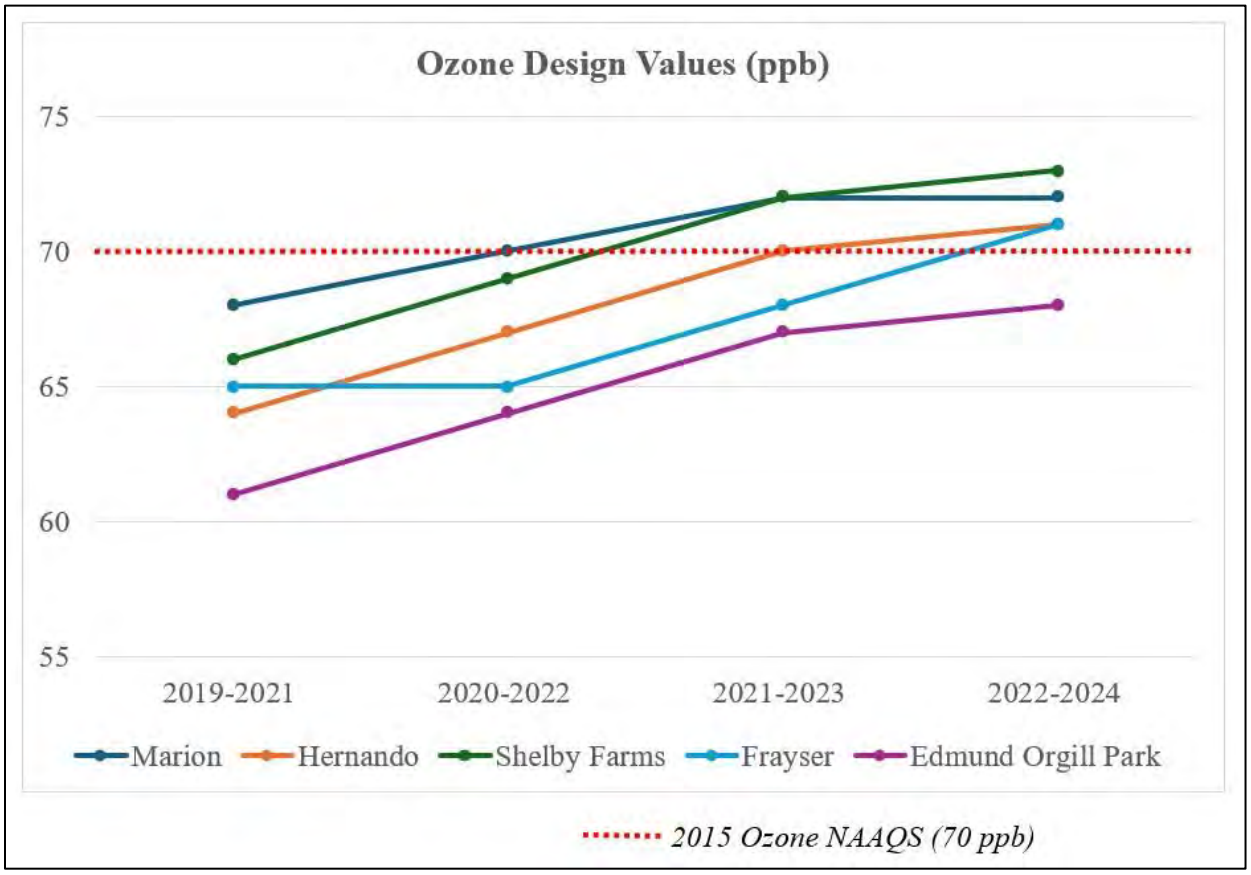
[132] *See id.* (showing the Marion site recorded ozone concentrations of 80 ppb on two occasions; the Hernando site recorded 81 ppb; the Frayser site recorded 80 ppb on one occasion and 87 ppb on another; and the Shelby Farms site (also known as the Memphis NCore site) recorded 88 ppb on one occasion and 89 ppb on another).

[133] *See id.*

[134] Sierra Club Petition Denial at 2–3.

Figure 4: Memphis MSA Ozone Design Values Over Time

Sources: 2023 Ozone Design Values, Att. 3 at tbl.5; 2024 Ozone Design Values, Att. 6 at tbl.5



This upward trend in ozone concentrations throughout the Memphis MSA demonstrates that the status quo is not working. The MSA Regulators have clearly failed to establish or enforce limits on emissions of ozone precursors as needed to maintain attainment of the 2015 Ozone NAAQS. Instead, they have enabled a continuing degradation of air quality that is increasing the risk of adverse health effects for local residents every year.

In addition, the meteorological conditions that contribute to higher concentrations of ground-level ozone are likely to recur with increasing frequency as the global climate continues to warm. Because ground-level ozone is formed by chemical reactions driven by heat and sunlight, ozone concentrations are "most likely to reach unhealthy levels on hot sunny days in

urban environments."[135] In 2015, EPA estimated that climate change may cause an increase in an area's average ozone concentrations during the summer "by as much as 1–5 ppb by 2030."[136]

Climate change will have a particularly severe impact on the Memphis MSA as the frequency and intensity of summer heat waves is projected to increase. Thirty-five years ago, the Memphis area experienced temperatures above 96.9 degrees Fahrenheit on an average of just seven days per year.[137] By 2050, such high temperatures are expected to occur on an average of fifty-one days per year: a seven-fold increase in the number of days the Memphis area will experience extreme heat.[138] In addition, Memphis is known to be an urban heat island, in which the prevalence of buildings and paved surfaces—and the lack of open greenspace—serves to absorb heat and radiate it back into the air, causing the most urbanized areas of the Memphis MSA to suffer from even more extreme summer temperatures.[139]

As summer temperatures in and around Memphis continue to rise, so will concentrations of ground-level ozone—unless meaningful action is taken to reduce local emissions of ozone precursors. As EPA has recognized, communities "must be assured of clean air under all weather conditions."[140] But as demonstrated below, the MSA Regulators are failing residents of the Memphis MSA by not acting swiftly to implement enforceable measures to ensure that local sources of ozone precursors reduce their emissions as needed for the area to achieve attainment of EPA's health-based ambient standard for ozone.

IV. Voluntary Participation in the Advance Program Is Insufficient to Bring the Memphis MSA into Attainment as Expeditiously as Practicable.

The Clean Air Act requires areas designated nonattainment for a primary national ambient air quality standard to implement "enforceable emission limitations" and other measures as needed to achieve attainment "as expeditiously as practicable."[141]

EPA established the Ozone Advance program as a voluntary framework for improving air quality in areas that have been designated attainment but have ozone concentrations that are

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[135] *Ground-level Ozone Basics*, ENV'T PROT. AGENCY (Mar. 11, 2025), https://perma.cc/WUV6-7F9G.
[136] 80 Fed. Reg. at 65,300.
[137] *Memphis, TN: Top Climate Change Risks*, CLIMATECHECK (2025), https://perma.cc/6A7B-ART2.
[138] *Id.*
[139] *See, e.g.*, Cory Smith, *Memphis' Urban Heat Island and Who it Impacts the Most*, ABC24 (July 19, 2024), https://perma.cc/A6TP-2PTF; Matt Yarosewick, *Urban Heat Island: Why Memphis Feels Nearly 10 Degrees Hotter on Summer Days*, FOX13 (July 17, 2024), https://perma.cc/3C2E-EABE.
[140] 63 Fed. Reg. at 37,265.
[141] 42 U.S.C. § 7502(a)(2)(A), (c)(6).

"close" to exceeding the national ambient air quality standard.[142] The program is intended to provide "a structure for local actions that reduce emissions" as needed to "maintain" attainment with the current national ambient air quality standard for ozone.[143] Local governments are eligible to participate in the program with respect to areas within their jurisdiction "that are not currently designated nonattainment."[144]

The stated goals of the Ozone Advance program are to:

(1) help attainment areas take action in order to keep ozone levels below the level of the ozone [national ambient air quality standard] to ensure continued health protection for their citizens;

(2) better position areas to remain in attainment, and

(3) efficiently direct available resources toward actions to address ozone problems quickly.[145]

Similar to the Clean Air Act's timeline for nonattainment areas to achieve attainment, EPA's guidance for the Ozone Advance program states that emissions reductions "should be achieved as expeditiously as practicable."[146] In accordance with this guidance, participating agencies work with EPA to develop a "Path Forward" plan for implementation of measures and programs to reduce the area's ozone concentrations and then provide periodic updates to EPA on the status of their implementation.[147]

Participation in the Ozone Advance program is entirely voluntary and "does not establish any regulatory requirements."[148] It also "does not shield an area from being redesignated nonattainment if the area eventually violates the ozone NAAQS."[149]

A. The MSA Regulators Are Not Complying with Applicable Deadlines or EPA Recommendations.

EPA's guidance for participation in the Ozone Advance program states that a "Path Forward" document should be submitted to EPA "[n]o later than one year after signing up for the program."[150] The guidance specifies the "minimum" content that should be included in this

[142] Ozone Advance Guidance at 2.
[143] *Id.* at 2.
[144] *Id.* at 4.
[145] *Id.* at 1.
[146] *Id.* at 24.
[147] *See id*. at 9–10.
[148] *Id.* at 10.
[149] *Id.*
[150] *Id.* at 9.

submission.[151] First, the Path Forward submission should "fully describe the measures and/or programs the area will implement."[152] Second, it should "provide a schedule for the implementation" of each measure and/or program described.[153] The guidance also encourages participants to "consider providing additional information beyond this minimum."[154]

On August 1, 2023, the MSA Regulators submitted a letter to EPA requesting to join the Ozone Advance program.[155] On September 5, 2023, EPA notified the MSA Regulators that the "first milestone under the Advance Program is to develop a 'Path Forward' plan within a year."[156] Accordingly, the deadline for submission of a complete Path Forward plan was "[n]o later than" September 5, 2024.[157]

On December 20, 2023, an environmental consultant for the Tennessee Department of Environment and Conservation's Air Pollution Control Division ("Division") sent "an update on the Memphis Advance effort" to the Division's Director, Deputy Director, and Manager of the Regulatory Development and Planning Program.[158] The consultant explained that EPA "indicated in an earlier meeting that this [Advance Program] area should proceed on an expedited track (not the one year to put together a plan), and should shoot for 6 months to have a plan together and start implementing measures."[159] However, the consultant noted that he was "afraid we'll miss that goal," given that the lead agency, SCHD, "does not yet have a draft of a plan."[160]

On January 9, 2024, the Division's Manager of the Regulatory Development and Planning Program responded that she thought SCHD would "need additional guidance/encouragement to move forward with specific [Advance Program] efforts."[161] She explained that although the Division had "started engaging with [SCHD] on a photochemical

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[151] *Id.*
[152] *Id.*
[153] *Id.*
[154] *Id.*
[155] *See* Letter from Scott Mathias, Air Quality Pol'y Div. Dir., Env't Prot. Agency, to Kasia Smith-Alexander, Env't Health Servs. Dir., Shelby Cnty. Health Dep't at 1 (Sept. 5, 2023), Att. 2. This request was submitted "on behalf of the Shelby County Health Department (SCHD), the Mississippi Department of Environmental Quality (MDEQ), and the Arkansas Department of Energy and Environment." *Id.*
[156] *Id.*
[157] Ozone Advance Guidance at 9.
[158] *See* E-mail from Marc Corrigan, Tenn. Dep't Env't & Conservation, to Michelle B. Walker, James Johnston, & Michelle Oakes, Tenn. Dep't Env't & Conservation (Dec. 20, 2023), Att. 8 at 2–3.
[159] *Id.*
[160] *Id.*
[161] *See* E-mail from Michelle Oakes, Tenn. Dep't Env't & Conservation, to Michelle B. Walker, James Johnston, & Marc Corrigan, Tenn. Dep't Env't & Conservation (Jan. 9, 2024), Att. 8 at 2.

modeling study to help them identify key strategies for reducing ozone," SCHD was "moving slower on other [Advance Program] efforts, arguably the most important ones."[162]

In July 2024, the Division produced a preliminary draft of the MSA Regulators' Path Forward plan in response to a public records request.[163] This document revealed that the MSA Regulators had provided EPA with an incomplete and deficient draft plan. The draft summarized information about meteorological conditions,[164] the "sources of ozone precursors,"[165] and "current local voluntary control measures."[166] But the sections on "current local mandatory control measures" and "potential" control measures were extremely sparse, and there was no text whatsoever under the section entitled "Path Forward Implementation Plan."[167]

In November 2024, EPA produced a more recent draft of the MSA Regulators' Path Forward plan in response to a subsequent FOIA request.[168] This draft—the latest version available to Petitioners—included more detail regarding emissions data[169] and the area's largest sources of ozone precursors.[170] However, no information had been added to the sparse sections on "current local mandatory control measures" and "potential" control measures, and there is still no text whatsoever under Section VIII, the "Path Forward Implementation Plan."[171] As a result, this latest draft does not even come close to meeting the "minimum" standard described in EPA's guidance: it utterly fails to "fully describe the measures and/or programs the area will implement" and it does not provide any "schedule for the implementation" of such measures.[172]

As of the date of this filing, Petitioners are not aware of any further updates to the version of the draft plan that EPA produced in November 2024. Thus, to Petitioners' knowledge, the MSA Regulators have yet to develop and submit a complete Path Forward document to EPA—nine months after the program's one-year deadline, and more than a year after EPA's recommended six-month deadline.

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[162] *Id.*
[163] *See* E-mail from Katherine Watts, Tenn. Dep't of Env't & Conservation, to Samantha Harrell, S. Env't L. Ctr. (July 26, 2024), Att. 9.
[164] *See* LORI LINDGREN, PATH FORWARD PLAN 4–7 (July 2024), Att. 10 ("July 2024 Path Forward").
[165] *See id.* at 7–12.
[166] *See id.* at 15–28.
[167] *See id.* at 28–30.
[168] *See* E-mail from LaNeesha Scott, Office of FOIA, Env't Prot. Agency, to Samantha Harrell, S. Env't L. Ctr. (Nov. 14, 2024), Att. 11.
[169] *See* November 2024 Path Forward, Att. 1 at 5–9, 14.
[170] *See id.* at 22–25.
[171] *See id.* at 46–47.
[172] Ozone Advance Guidance at 9.

B. The MSA Regulators' Draft Path Forward Plan Demonstrates a Lack of Commitment to Achieving Meaningful or Durable Emission Reductions.

EPA's guidance for the Ozone Advance program recognizes that "success in the program depends largely on [the regulators'] level of commitment and the effectiveness of the actions taken."[173] The inadequacy of the November 2024 draft of the Path Forward plan for the Memphis MSA—and the MSA Regulators' complete lack of urgency and diligence in preparing it—indicates that the area is not currently on a path to success under this voluntary program.

The draft plan contains no new control measures that will be effective in reducing ozone concentrations in the area. Instead, it merely summarizes a laundry list of ongoing, voluntary measures that various entities have implemented—many of which are only tangentially related (if at all) to reducing emissions of NO_X and VOC.

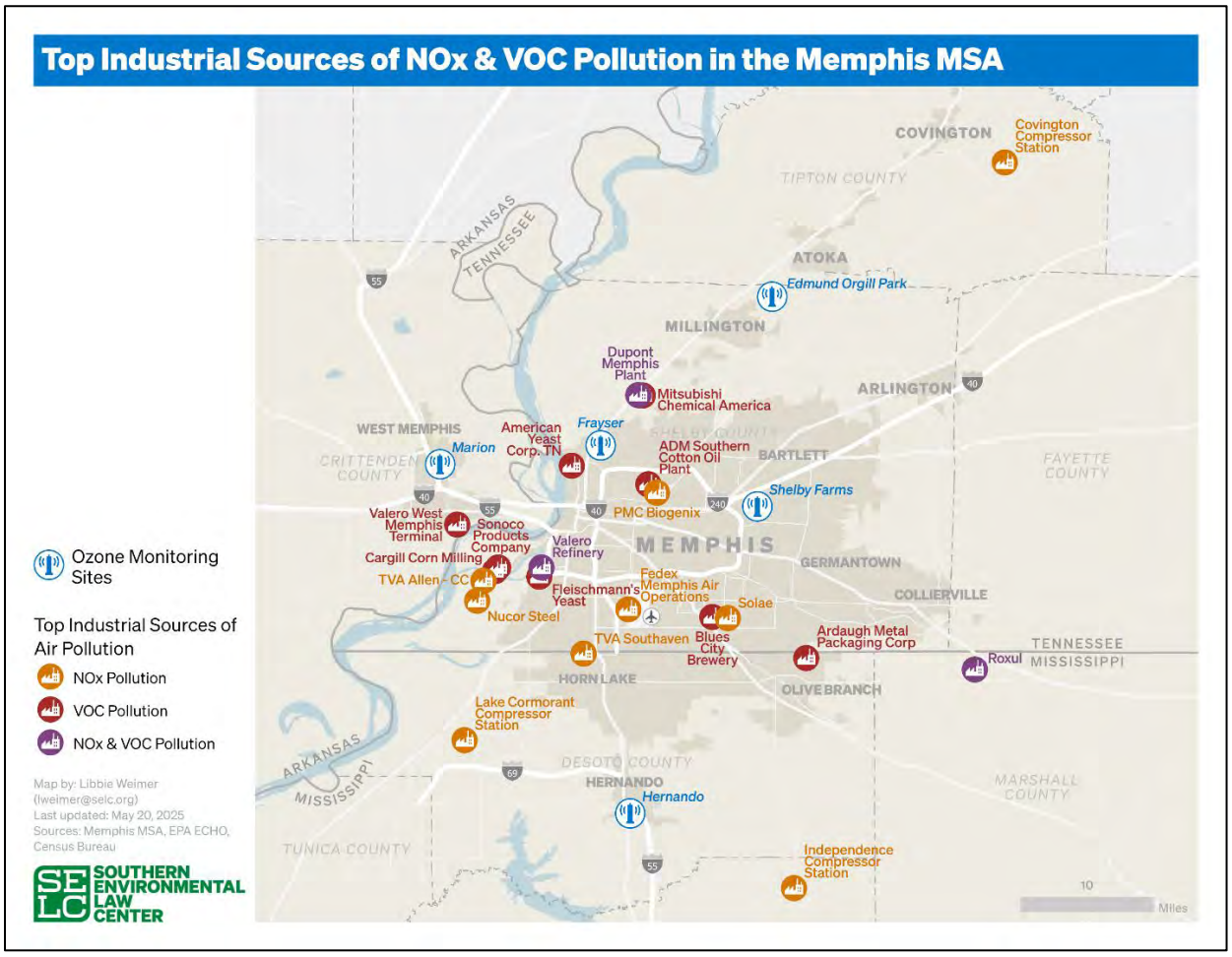
The draft Path Forward identifies the MSA's largest[174] stationary sources of NO_X and VOC emissions as follows:

	Highest NOx Emitters[175]	**Highest VOC Emitters[176]**
1	E I Dupont De Nemours & Company	Valero Refining Company
2	Covington Compressor Station	Valero West Memphis Terminal
3	Lake Cormorant Compressor Station	Southern Cotton Oil Company
4	Valero Refining Company	Cargill Corn Milling
5	Trunkline Gas Company, Independence	Sonoco Products Company
6	PMC Biogenix	Lucite International
7	TVA Allen Combined-Cycle Plant	ROXUL USA
8	TVA Southaven Combined-Cycle Plant	Ardagh Metal Beverage USA
9	Nucor Steel Memphis	Blues City Brewery
10	Solae	Fleischmanns Yeast
11	ROXUL USA	American Yeast Corporation, TN
12	FedEx Memphis Air Operations Complex	E I Dupont De Nemours & Company

[173] *Id.* at 13.
[174] The draft Path Forward characterizes these lists as identifying the "Top 10" stationary emitters of NO_X and VOC, but the corresponding figures show twelve facilities for each pollutant. *See* November 2024 Path Forward, Att. 1 at 22–23.
[175] *Id.* at 22 fig.14.
[176] *Id.* at 23 fig.15.

Three facilities appear on the list of largest emitters for both NO_X and VOC emissions: E I Dupont De Nemours & Company (formerly known as Chemours), Valero Refining Company, and ROXUL USA.[177] The first two are located in Memphis, and the third is located just across the Tennessee state border from southeast Memphis in Byhalia, Mississippi.

Figure 5: Top Industrial Sources of NOx & VOC Pollution in the Memphis MSA
Source: Map by Libbie Weimer, S. Env't Law Ctr. (May 20, 2025)



Notably, the draft Path Forward does not document any plans for—or even consideration of—imposing new, enforceable restrictions on any of the highest-emitting facilities in the MSA, including the three facilities that appear on the top-emitters list for both NO_X and VOC. This reflects the MSA Regulators' complete lack of commitment to achieving the emission reductions that are needed to achieve and maintain attainment of the 2015 Ozone NAAQS.

[177] *Id.* at 22–23 figs.14–15.

Figure 6: Top Sources of NOx Pollution in the Memphis MSA

Source: Map by Libbie Weimer, S. Env't Law Ctr. (May 20, 2025)

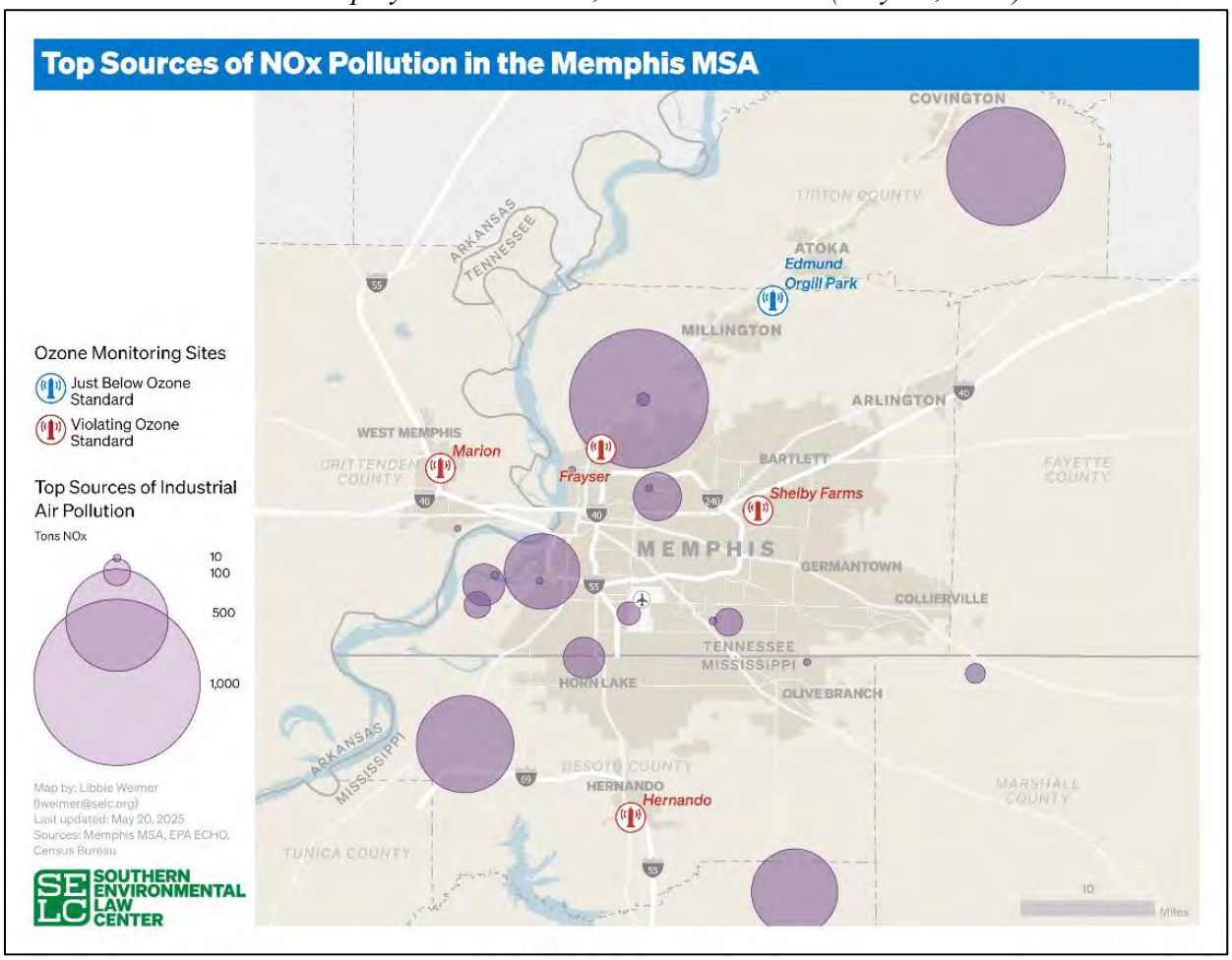
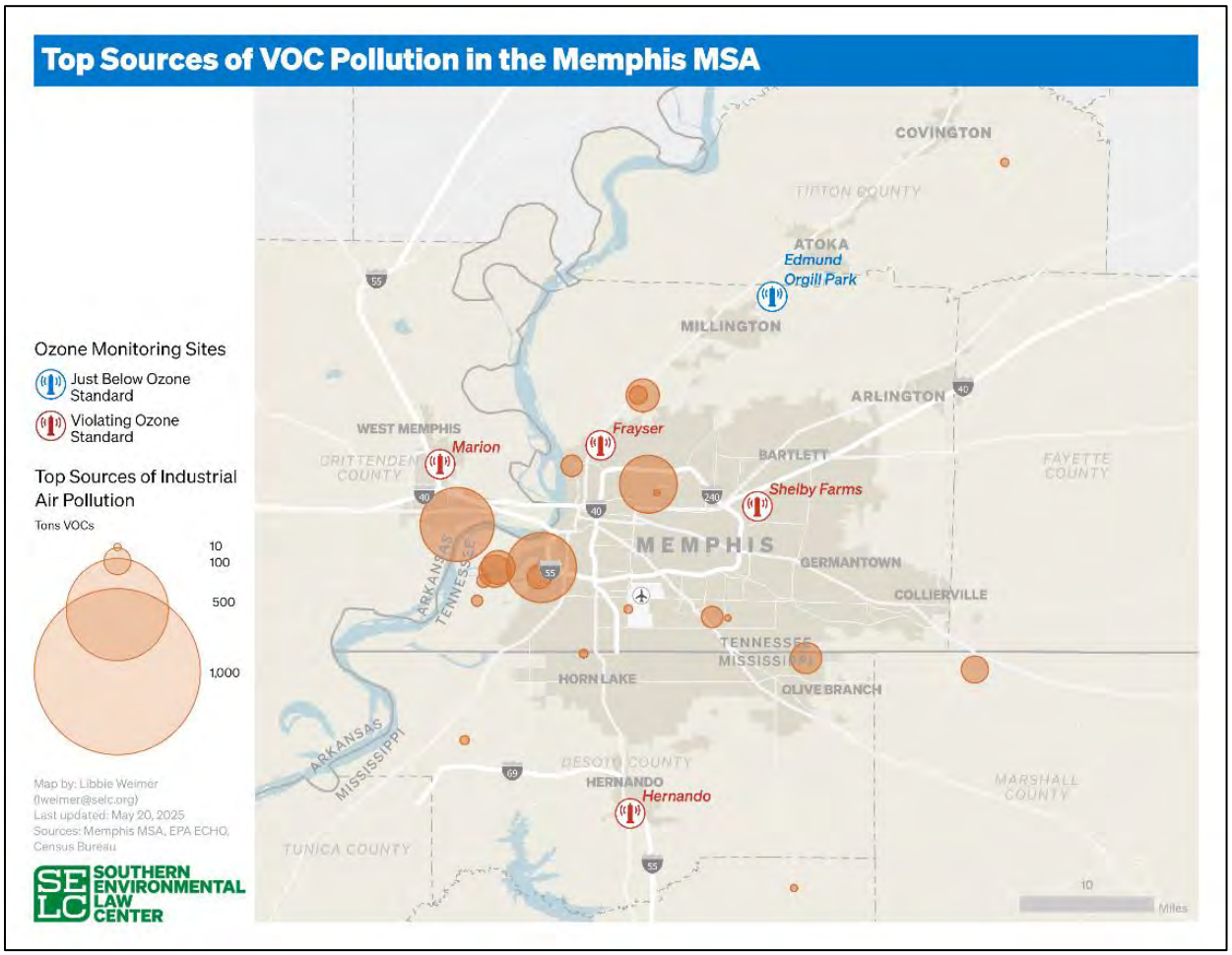


Figure 73: Top Sources of VOC Pollution in the Memphis MSA

Source: Map by Libbie Weimer, S. Env't Law Ctr. (May 20, 2025)



For example, the draft Path Forward describes a few minor measures that the Valero Refinery "voluntarily implemented" or was previously required to implement,[178] but it contains no new, enforceable control measures to ensure the refinery reduces its emissions of ozone precursors below current levels—despite the fact that this facility is listed as the MSA's largest stationary source of VOC emissions, as well as the fourth largest stationary source of NO_X

[178] *See* November 2024 Path Forward, Att. 1 at 33. The draft Path Forward describes the refinery's change in internal work practices to improve VOC leak detection but then explains that the change was implemented in May 2023, "in preparation for" the facility becoming subject to an updated New Source Performance Standard under 40 C.F.R. Part 60, Subpart GGGa. *Id.* The draft Path Forward also describes the refinery's practice of monitoring and cleaning its burners "to improve efficiency which reduces NO_X and CO emissions," but it does not indicate that such measures will be incorporated into the facility's permit or otherwise imposed as enforceable and permanent requirements. *See id.*

emissions.[179] For the other two facilities that appear on the top-emitters list for both NO_X and VOC (E I Dupont de Nemours & Company and ROXUL USA), the draft Path Forward contains no description whatsoever of any existing or potential measures to reduce their emissions, much less a commitment to require either facility to implement control measures that are new and enforceable.

Perhaps even more egregious is the fact that the draft Path Forward does not even mention what is likely the largest stationary source of NO_X emissions in Shelby County: the Colossus data center in Southwest Memphis (also known as "xAI"). In 2024, the xAI facility installed and began operating up to thirty-five methane gas-fired turbines to power its supercomputer, without any air permit coverage or advanced pollution controls.[180] According to Petitioners' calculations, the thirty-five unpermitted turbines have the potential to emit between 1,200 and 2,100 tons of NO_X per year[181]—far more than the annual NO_X emissions of the facility that the draft Path Forward identifies as the largest stationary source of NO_X in the Memphis MSA.[182] Not only has SCHD failed to enforce federal and local air quality laws with respect to this unpermitted facility, it has also failed to fully account for the facility's contributions to the

[179] *See id.* at 22–23. Similarly, the draft Path Forward describes Nucor Steel's practice of rejecting loads of scrap metal that contain certain materials in order to reduce VOC emissions, but it does not indicate that this voluntary practice will be incorporated into the facility's permit or otherwise imposed as an enforceable and permanent requirement. *See id.* at 34. It also says nothing whatsoever about measures to reduce the facility's NO_X emissions, despite the fact that it is listed as the MSA's ninth largest stationary source of NO_X. *See id.* at 22 fig.14, 34.

[180] *See, e.g.*, Myracle Wicks et. al., *Elon Musk's xAI to Build Multi-Billion-Dollar Supercomputer Project in Memphis*, ACTION NEWS 5 (June 5, 2024), https://perma.cc/4XKA-S6L4; Dara Kerr, *How Memphis Became a Battleground Over Elon Musk's xAI Supercomputer*, NAT'L PUB. RADIO (Sept. 11, 2024), https://perma.cc/Y95F-J67X; Dara Kerr, *Elon Musk's xAI Accused of Pollution Over Memphis Supercomputer*, THE GUARDIAN (Apr. 24, 2025), https://perma.cc/7FJ2-GD5N. In January 2025, the facility applied for an air permit to authorize fifteen on-site turbines (eight of the existing thirty-five turbines in addition to seven new turbines), and SCHD has proposed permitting this subset of the facility's turbines as a new synthetic minor source. *See* SHELBY CNTY. HEALTH DEP'T, CONSTRUCTION PERMIT APPLICATION EVALUATION AND REVIEW (PERMIT NO. 01156-01PC) 3–5 (Mar. 2025), Att. 12. Petitioners submitted comments during the public comment period for the draft permit, urging SCHD to deny xAI's request for a synthetic minor source permit and to order the facility to cease all turbine operations unless and until it obtains a valid major source permit for all emission units that comprise the facility. *See* S. Env't L. Ctr. et al., Comment Letter on Shelby County Health Department's Draft Construction Permit No. 01156-01PC for CTC Property LLC at 1–29 (Apr. 30, 2025), Att. 13.

[181] *See* S. Env't L. Ctr. et al., Comment Letter on Shelby County Health Department's Draft Construction Permit No. 01156-01PC for CTC Property LLC at 11 (Apr. 30, 2025), Att. 13.

[182] *See* November 2024 Path Forward, Att. 1 at 22 fig.14 (identifying E I Dupont De Nemours & Company as the largest stationary source of NO_X emissions in the Memphis MSA); *Enf't & Compliance Hist. Online (ECHO), Air Pollutant Report*, ENV'T PROT. AGENCY (May 13, 2024), https://perma.cc/ZLM2-KF7Y (listing National Emissions Inventory data showing that E I Dupont De Nemours & Company's Memphis facility emitted 1,486,908 pounds—or 743.45 tons—of NO_X in 2020).

area's ongoing violation of the 2015 Ozone NAAQS and to consider all measures that the facility could be required to implement in order to minimize those contributions.

The draft Path Forward also relies heavily on voluntary measures to reduce greenhouse gas emissions that do not address emissions from the transportation sector and are thus largely unrelated to reducing ozone pollution. For example, it goes into great detail about municipal public utility Memphis Light, Gas, and Water's plans to convert streetlights to use more efficient lightbulbs, to offer grants for builders to use more environmentally responsible construction practices, and to provide information to its employees and customers about energy-efficient products.[183] The draft plan also discusses the Tennessee Valley Authority's goal to achieve net-zero greenhouse gas emissions by 2050, Nike's program to use more sustainable materials and recycle waste into its products, and a local ordinance that requires landlords to maintain energy-efficiency standards for rental properties.[184] Strangely, the draft plan also discusses the work of a "Nashville-based solar installation company" but does not reference a single solar project the company has installed in or even near the Memphis MSA.[185] While these efforts are beneficial from a climate perspective, they do little if anything to achieve the purpose of participation in the Advance Program: achieving and maintaining attainment of the 2015 Ozone NAAQS. The inclusion of so many inapt measures in the draft Path Forward stands in stark contrast to the complete lack of any new, enforceable measures designed to reduce emissions of NO_X and VOC from the area's largest stationary sources of ozone precursors.

In some cases, the draft Path Forward discusses potential measures that are not only ineffective at reducing ozone pollution but may also prove to be counterproductive to protecting public health. For example, the draft plan describes the Tennessee Valley Authority's "plan" to submit a request for "a waiver of the requirement to perform formaldehyde stack testing on an annual basis to comply with Subpart YYYY of 40 CFR Part 63 while operating in bypass mode," in order to reduce NOx and VOC emissions from the Allen power plant during ozone season.[186] But granting an outright exemption from the federal requirement to monitor the Allen power plant's formaldehyde emissions is not necessary to achieve those reductions. The draft plan states

[183] *See* November 2024 Path Forward, Att. 1 at 34, 45.
[184] *See id.* at 35, 37, 44.
[185] *See id.* at 34–35.
[186] *Id.* at 34.

that the stack testing is currently performed each August,[187] but it does not discuss or even mention the obvious option of simply rescheduling the stack testing to be performed outside of the "ozone season" rather than exempting the power plant from the requirement altogether. This suggests that the Tennessee Valley Authority's plan to request a waiver from a requirement designed to assure compliance with the plant's limit on toxic formaldehyde emissions has little if anything to do with reducing emissions of ozone precursors.

The fact that the Path Forward plan remains deficient nine months after the deadline to submit a complete plan is evidence of a complete lack of commitment by the MSA Regulators to implement effective measures as needed to bring the area into attainment expeditiously. In the absence of enforceable requirements and deadlines, there is no reason to expect this will change. As demonstrated above, ozone concentrations are steadily increasing throughout the area while the MSA Regulators continue to drag their feet. Clearly, the status quo is not working.

CONCLUSION

EPA's guidance for the Ozone Advance program emphasizes that participation in the program "does not shield an area from being redesignated nonattainment if the area eventually violates the ozone NAAQS."[188] Ambient air monitoring data collected across the Memphis MSA clearly show that ozone concentrations in this area are in violation of the 2015 Ozone NAAQS, and that the problem is getting worse each year. In addition, Petitioners have shown that the MSA Regulators' voluntary participation in the Ozone Advance program is not sufficient to protect the nearly one million residents of the Memphis MSA from the adverse health effects of ozone concentrations that exceed this federal standard. EPA must take action to ensure that meaningful, enforceable control measures are implemented as needed to bring the area back into attainment of the health-based ambient standard for ozone as expeditiously as practicable. Accordingly, for the reasons described herein, Petitioners respectfully request that EPA exercise its authority under the Clean Air Act to redesignate the Memphis MSA as in nonattainment of the

[187] *Id.*

[188] Ozone Advance Guidance at 10. The guidance also provides that redesignation to nonattainment may be deferred for some period of time if EPA finds that effective control measures are being diligently implemented by the participating regulator(s). *See id.* at 10–11. In this case, however, SCHD is not actively implementing any effective control measures that would warrant deferring redesignation of the Memphis MSA to nonattainment for ozone.

2015 Ozone NAAQS and require SCHD to revise its local implementation plan to include adequate measures to attain and maintain compliance with the standard.[189]

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[189] 42 U.S.C. §§ 7407(d)(3), 7410(k)(5).

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Attachment 7

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$PM_{2.5}$ and ultrafine particulate matter emissions from natural gas-fired turbine for power generation☆

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HIGHLIGHTS

- Emissions from the latest natural gas-fired turbine technologies.
- Tests include $PM_{2.5}$, wet chemical tests for SO_2/SO_3 & NH_3, and ultrafine PM.
- Strong presence of high concentrations of nanoparticles.
- Two orders of magnitude higher turbine particle emissions than background.

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ABSTRACT

The generation of electricity from natural gas-fired turbines has increased more than 200% since 2003. In 2007 the South Coast Air Quality Management District (SCAQMD) funded a project to identify control strategies and technologies for $PM_{2.5}$ and ultrafine emissions from natural gas-fired turbine power plants and test at pilot scale advanced $PM_{2.5}$ technologies to reduce emissions from these gas turbine-based power plants. This prompted a study of the exhaust from new facilities to better understand air pollution in California. To characterize the emissions from new natural gas turbines, a series of tests were performed on a GE LMS100 gas turbine located at the Walnut Creek Energy Park in August 2013. These tests included particulate matter less than 2.5 μm in diameter ($PM_{2.5}$) and wet chemical tests for SO_2/SO_3 and NH_3, as well as ultrafine (less than 100 nm in diameter) particulate matter measurements. After turbine exhaust was diluted sevenfold with filtered air, particle concentrations in the 10–300 nm size range were approximately two orders of magnitude higher than those in the ambient air and those in the 2–3 nm size range were up to four orders of magnitude higher. This study also found that ammonia emissions were higher than expected, but in compliance with permit conditions. This was possibly due to an ammonia imbalance entering the catalyst, some flue gas bypassing the catalyst, or not enough catalyst volume. SO_3 accounted for an average of 23% of the total sulfur oxides emissions measured. While some of the SO_3 is formed in the combustion process, it is likely that the majority formed as the SO_2 in the combustion products passed across the oxidizing CO catalyst and SCR catalyst.

The 100 MW turbine sampled in this study emitted particle loadings of 3.63E-04 lb/MMBtu based on Methods 5.1/201A and 1.07E-04 lb/MMBtu based on SMPS method, which are similar to those previously measured from turbines in the SCAQMD area (FERCo et al., 2014), however, the turbine exhaust contained orders of magnitude higher particles than ambient air.

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1. Introduction

Natural gas turbines (NGTs) are critical for meeting the demand of U.S. electrical power generation because they are uniquely suited to fulfill the energy gap left by hydroelectric, nuclear, and renewable energy sources. NGTs have a relatively quick start-up and shutdown time compared to other sources of electricity, making them ideal for supplying energy to the grid when the demand changes rapidly. New shale gas mining techniques have lowered the price of natural gas and allowed greater access to the United States' shale gas resources. The overnight capital cost (the cost of the project if no interest were accrued during its construction) of a NGT is low compared to other electrical generating sources (EIA, 2013b) and can be rapidly installed to cover unexpected situations like the shutdown of the San Onofre Nuclear Generating Station (Sewell, 2013).

Since 2003 California has seen an increase of over 200% in electrical generation from natural gas (CEC, 2014). The decreasing price and stable domestic supply of natural gas have strongly influenced its increased use, and the use of NGTs has been projected to increase until at least 2040 (EIA, 2013a). Studying the exhaust from these new facilities is critical to our understanding of air pollution in California.

Particulate Matter (PM) emissions from NGTs have been studied by several groups. England et al. (2007) investigated a compact dilution sampler (CDS) methodology to characterize fine particle emissions from stationary sources including three turbines. They found that the CDS method had lower detection limits compared to the regulatory methods for PM emissions. Tamura (2013) recently conducted a gap analysis of the filterable and condensable PM emission factors from stationary external and internal combustion sources fired by gaseous and liquid fuel to evaluate the accuracy of the sampling methodology. PM emission studies have covered many of the power plant combustors, however, there is still only limited research on emissions from aeroderivative turbines burning natural gas. Each fuel type emits a distinct chemical composition and particle range, based on combustion characteristics and the chemical nature of the fuel (Klippel et al., 2002; Mohr et al., 1995; Schmatloch, 2000). NGTs emit a wide range of particles, however PM is regulated on a mass concentration basis (SCAQMD, 2002) and the vast majority of particles from combustion sources are in the nanometer range. Ultrafine PM (particles < 100 nm in diameter) has not been regulated separately by the EPA.

Ultrafine particles have recently become a cause for concern, as our understanding of their effect on the human body has improved. They were hypothesized to have potentially increased health risks from those of larger particles due to their higher lung deposition rate, clearance mechanism, and ability to translocate to extrapulmonary locations e.g. lymph, and blood circulation (Elder and Oberdörster, 2005). Current knowledge on the health effects of ultrafine PM are uncertain. A Health Effects Institute review in 2013 concluded that the state of science was inconclusive regarding the toxicity of ultrafine PM due to inconsistencies and limitations in the findings from both short- and long-term studies (HEI, 2013). Current U.S. EPA regulations measure $PM_{2.5}$ emissions using mass based methods, however larger particles, which are usually generated by incomplete combustion, make up a much higher mass fraction than ultrafine particles.

SCAQMD funded a two stage project to technically and economically assess a variety of control strategies and technologies that could potentially be used to reduce $PM_{2.5}$ and ultrafine emissions from NGT power plants. In 2007 SCAQMD amended rule 1309.1 to allow prospective gas turbine-based power plants conditional access to its Priority Reserve account to procure reduction credits to offset $PM_{2.5}$ emissions. At the same time, SCAQMD initiated a project to identify and test at pilot scale advanced $PM_{2.5}$ technologies to reduce emissions from these gas turbine-based power plants. The first phase (FERCo et al., 2009) of this project entailed an assessment of technologies to reduce $PM_{2.5}$ and ultrafine particles from gas turbine engines; the second phase (FERCo et al., 2014) of the project entailed pilot scale evaluations of technologies recommended from the first phase. This paper reports part of the results from the second phase of the project with the main objective of characterizing and quantifying $PM_{2.5}$ and ultrafine particles that are emitted by modern aeroderivative NGTs during daily operation. The $PM_{2.5}$ test methods selected for this project were chosen from currently available methods. SCAQMD Method 5.1 (1989) combined with EPA Method 201A (2010) were chosen as the test methods because recent projects in the SCAQMD jurisdiction have utilized this combination of methods for the determination of $PM_{2.5}$ including condensable PM. Methods 5.1/201A are detailed in section 2.2.2.

2. Experimental

2.1. Test site, turbine, fuel, and lubricant

Tests were conducted at the Walnut Creek Energy Park (WCEP) in the City of Industry, CA in August 2013. The test site was selected because it was representative of new aeroderivative turbines and had the newest commercial NO_x control system. WCEP was designed as a peaking plant to provide electrical generation during high demand periods i.e. Southern California's hot summer months.

WCEP consists of five GE LMS100 combustion turbines in simple cycle operation. The LMS100 is an aeroderivative gas turbine rated nominally at 100 MW (GE, 2015). The LMS100 derives its high efficiency and increased power output from its innovative intercooling system between the low-pressure and high-pressure compressors. WCEP uses reclaimed water for cooling; each LMS100 employs Selective Catalytic Reduction (SCR) system (from Haldor-Topsoe), using aqueous ammonia as the reagent, and water injection for NO_x control. They are also equipped with a CO catalyst (from BASF). The test unit for this study was WCEP Unit 2 and its exhaust layout is shown in Fig. 1.

Specific fuel analysis was not performed for this study. In general, the average Wobbe number for California pipeline natural gas is in the range of 1335–1340 Btu/scf with sulfur content in the range of 0.25–1 grain/100scf (CEC, 2008). The LMS 100s at WCEP uses two types of oil: Mobil DTE Light lubrication oil and Mobil Jet Oil II.

The ultrafine PM tests were conducted before turbine operation, during plant warm-up, and during normal operation. A record was kept of which turbines were running to track how ambient conditions changed with energy park operation. WCEP is located adjacent to a train yard and the associated diesel locomotive traffic influenced the ambient conditions. Energy park operation is controlled by Southern California Edison (SCE) and is dictated by the demand on the electrical grid.

2.2. Measurement setup

2.2.1. Ultrafine particle measurement setup

Samples were pulled from the middle of the stack through an unheated, uninsulated, 73″ long, 3/8″ stainless steel tube inserted into a sample port that was located on the side of the stack above the platform. The sample probe was connected via silicon conductive tubing to a critical orifice upstream of an ejector pump (Air-Vac, model TD110H). A mixing tunnel was connected downstream of the ejector pump to mix the dilution air with the sample maintaining a dilution ratio of 7.1:1. Dimensions and details of the

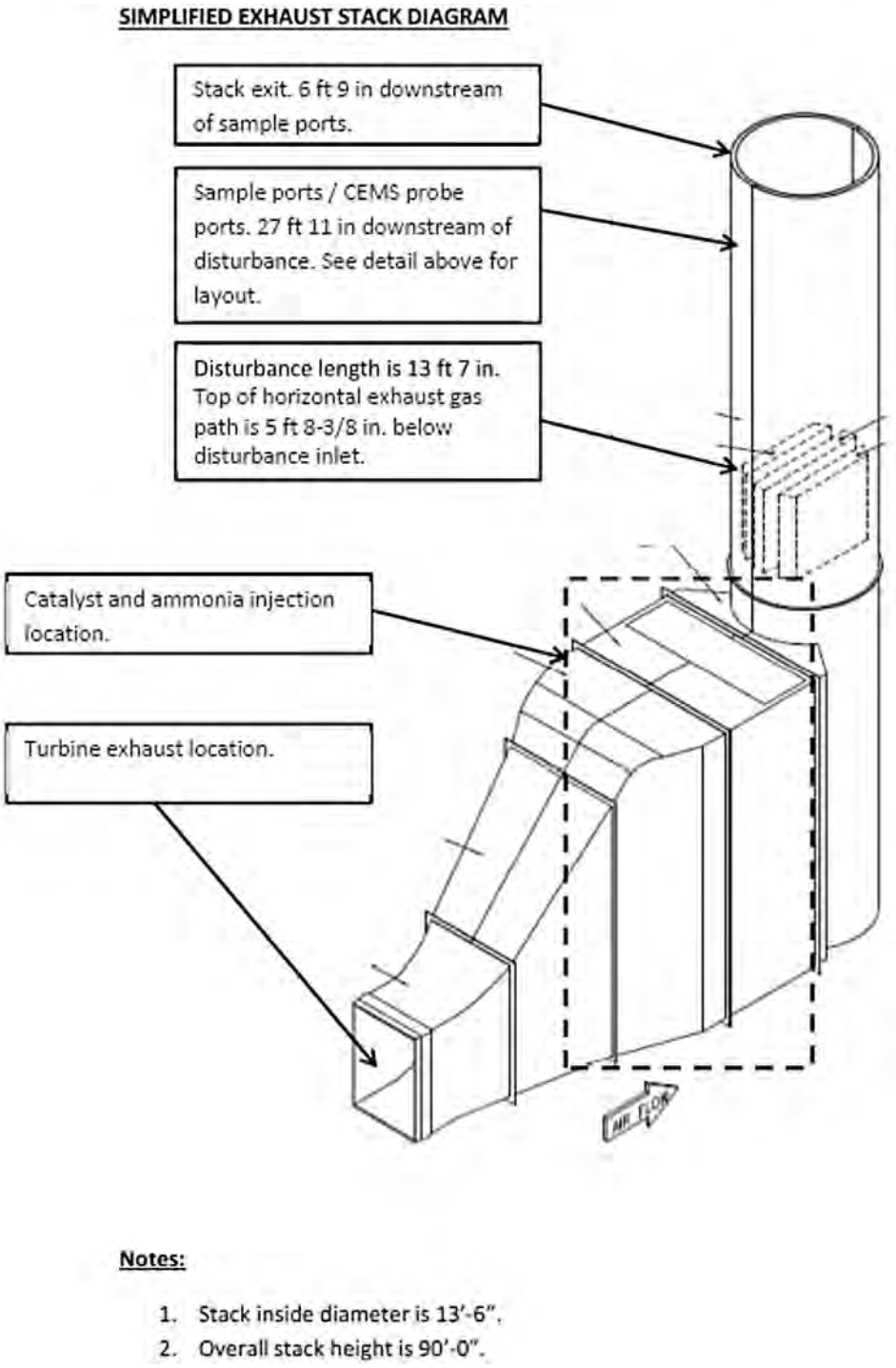


Fig. 1. WCEP unit 2 stack diagram.

mixing tunnel can be found at the reference (Abdul-Khalek, 1996). Compressed air (maintained at 30 *psi*) was supplied by the power plant and filtered to particle free air by a clean air system (TSI model 3074). The ultrafine particle measurement setup (seen in Fig. 2) had the sample passing through the dilution tunnel to the SMPS (TSI model 3936), EAD (TSI model 3070A), Transmission Electron Microscope (TEM) sampler, and Catalytic Stripper (CS). The thermophoretic TEM sampler separately directly sampled the turbine exhaust. The CS was connected in-line, before the SMPS, during part of the tests to determine a portion of the sample that was made of Volatile Organic Compounds (VOCs).

Two types of classifiers were used for the SMPS: the long column DMA (model 3081) sampled over a range of 7–290 nm, and the Nano DMA (model 3085) sampled over a range of 2.5–80 nm. The SMPS used an ultrafine Condensation Particle Counter (TSI, CPC 3776), which has a cut point of 2.5 nm. Due to the warm ambient temperatures during the test, the CPC was placed in a small cardboard box where a portable air conditioner supplied cool air. This was necessary to keep the CPC's condenser temperature below its operating maximum.

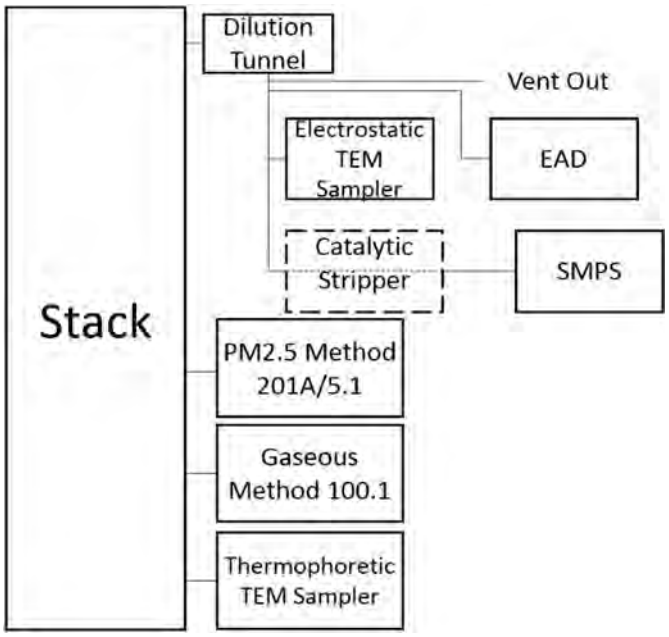


Fig. 2. Experimental setup diagram, the Catalytic Stripper was used only on certain tests, and when it was not used the SMPS received a direct line from the diluted sample. It should be noted that a thermophoretic TEM sampler was used to directly sample stack flow.

Two types of samplers were used to collect particles on TEM grids. The thermophoretic sampler was inserted into the stack with a residence time of a fraction of a second. A guiding tube was used so that the TEM grids were only exposed to particles in the stack. This is the same thermophoretic sampler used by Murphy et al. (2009). The electrostatic particle sampler (FHNW TEM Sampler, Switzerland) was also used to collect particle samples after the sample flow was diluted. Typical sampling time ranged from 30 to 120 min for the electrostatic particle sampler. Both Silicon Oxide (SiO) and Carbon coated 200 mesh copper grids were used.

A custom built CS (similar in design to Abdul-Khalek and Kittelson (1995), and Stenitzer (2003)) was used in-line upstream of the SMPS to measure the fraction of the PM that were Volatile Organic Compounds (VOCs). The CS has two catalysts that are heated to 300 °C: the first oxidizes hydrocarbon components (Oxicat), and the second removes sulfur components (S-trap) from the sample flow. The sample flow passes through a cooling coil to decrease the flow to ambient temperature before exiting the CS. A flow rate of 1.5 lpm was used to match the flow rate of the SMPS, and thermophoretic and diffusion losses were accounted for.

The EAD detects diameter concentration load using the principle of diffusion charging. It then calculates the concentration based on a TSI propriety linear relationship. Diameter concentration is correlated with the degree that tracheobronchial and alveolar regions have been covered by ultrafine particles (TSI, 2012; Wilson et al., 2007).

2.2.2. $PM_{2.5}$ measurement setup

$PM_{2.5}$ was measured using both U.S. EPA method 201A/SCAQMD method 5.1 and U.S. EPA methods 201A/202 for the SCAQMD project. This paper mainly reports results by method 201A/5.1, however, the full report (FERCo et al., 2014) contains results by the other method that are outside the scope of this paper. For more details see the full report. Method 201A/5.1 was further explained in the supplemental document along with Fig. S1.

Sampling times for the Method 201A/5.1 tests ranged from 4.04 to 8.38 h, and averaged 6.23 h. Meter sampling volumes averaged 161.7 scf and varied from 106.4 to 219.5 scf. Sample times for the Method 201A/202 tests ranged from 4.09 to 8.27 h and averaged 6.01 h. Corresponding sample volumes varied from 108.2 to 223.5 scf and averaged 160.4 scf. One field blank was collected and daily reagent blanks were collected with each $PM_{2.5}$ sample. Average $PM_{2.5}$ mass was 3–10 times larger than field and reagent blanks for Method 201A/5.1.

2.2.3. Gas measurement setup

NO_x, CO, O_2 and CO_2 concentrations were measured using SCAQMD Method 100.1 and a dry extractive continuous emissions monitoring (CEM) system. The CEM has a heated probe, a heat traced Teflon sample line connected to a thermo-electrically cooled sample dryer to minimize loss of NO_2. The gas analysis portion is composed of a chemiluminescent NO_x analyzer (CAI Model 600), a gas filter correlation CO analyzer (Thermo-Fisher Model 48i), an electrochemical O_2 analyzer (AMI Model 201), and a non-dispersive infrared CO_2 analyzer (Horiba Model PIR-2000). A low temperature carbon converter was used to convert NO_2 to NO for measurement of total NO_x and converter efficiency was tested daily.

The ammonia slip (the amount of ammonia that escapes the SCR system unreacted) was measured using SCAQMD Method 207.1 (shown and detailed in Fig. S2). NCASI Method 8A was used to measure the concentrations of SO_2 and SO_3 (see and detailed in Fig. S3).

3. Results and discussion

3.1. Particle size distributions and morphology

Fig. 3 shows the average SMPS results using both the Long and Nano DMA columns. Ambient particle size distributions are shown as averages of five test days and turbine exhaust particle size distributions are averages of two test days. Due to the relatively low dilution ratio, the sampling condition was close to the ion depletion condition of the bipolar neutralizer on the SMPS. The data were screened to ensure that the measurements presented in this paper were not conducted under the ion depletion condition, averaged data are also provided in Fig. S4. The SMPS data shows good agreement over the range of overlap between 7 nm and 80 nm. The particle size distribution of the exhaust showed a bimodal distribution, with peaks around 2.8 and 17 nm. The ultrafine particle emissions from the stack were at least an order of magnitude higher than ambient air over the entire size range. At the 100 nm size, stack particle concentrations were 20 times higher than ambient particle concentrations. This increased to an average of 3.9×10^4 times higher in the 2.5–3 nm range. Overall, dilution ratio corrected stack particle concentrations were over 6.9×10^2 times higher than ambient particle concentrations. Total ambient particle concentrations were in the range of 3.5×10^4 particles/cm^3, which is higher than typical background particle concentration in the region. It should be noted that England et al. (2007) reported particle size distribution and total concentration were affected by dilution ratio when it was lower than 20:1. In general this dependence is source specific and further investigation at higher dilution ratio will warrant representativeness of the particle size distribution presented in this study.

Nguyen and Jung (2015) has reported total ambient particle concentrations of 8×10^3–10^4particles/cm^3 for a background location in Riverside California, while others have reported higher total ambient particle concentrations of ~10^4–10^5 particles/cm^3 for measurements taken near a major highway (Grady et al., 2013; Zhu et al., 2007). Total ambient particle concentrations are higher than expected for an urban area and this is attributed to the close

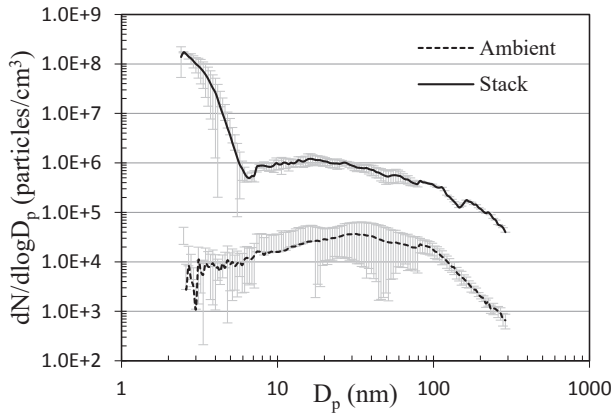


Fig. 3. Particle size distributions from the stack of the turbine engine in comparison to those from ambient air. Particle concentrations were corrected for dilution ratio. Total stack and ambient concentrations are 2.4×10^7 and 3.5×10^4particles/cm^3 respectively.

proximity (less than a kilometer) to a major highway (California State Route 60) and the adjacent train yard. The results of our study contradict what Klippel et al. (2002, 2004) reported that gas-fired turbine exhaust particle concentrations were lower than those of ambient air. They found similar results for both 260 MW and 7.9 MW turbines. The 260 MW turbine has water injection for NO_x control, similar to the turbine sampled in this study. They did not measure particles below 10 *nm*, therefore the presence of nanoparticles in the exhaust of their turbines cannot be ruled out. Their particle size distributions show significantly lower accumulation mode (>30 nm in diameter) particle concentrations than those in this study. We speculate that the post combustion temperatures of their turbines were much higher than those of the turbine sampled in this study, leading to further oxidation or gasification of accumulation mode particles. Information on the sulfur content of the fuel could provide an improved explanation of nucleation mode particles (<30 nm in diameter), however, neither of the studies measured fuel sulfur content. It should be noted that the dilution ratio of the Klippel (2002, 2004)'s study was 75 which was 10 times higher than this study.

The CS was inserted between the dilution tunnel and the SMPS to remove semi-volatiles and sulfur compounds from the aerosol sample streams in order to quantify the amount of VOCs in the exhaust. The fraction of particles that were semi-volatile can be determined from the difference between cold and hot particle counts (accounting for thermophoretic and diffusion losses). Thermophoretic losses are less dependent on particle size than diffusion losses (for particle sizes between 10 and 100 nm). Size independent thermophoretic losses were not observed in our measurements for particles between 10 and 40 nm. We assume that a fraction of the 100 nm particles were semi-volatile because of the lower particle counts measured downstream of the hot CS in that size range (see Fig. S5). Further study is required to confirm this observation due to a lack of robust CS test data and high diffusion losses within the CS.

Researches have investigated particle size distributions from combustion sources and have found a variety of factors that impact the shape of the distribution. Gysel et al. (2015) varied the dilution conditions (temperature, humidity, and residence time) of nucleation mode particles from a NGT and showed that they were highly hygroscopic, and sulfur compounds in the exhaust combined with the various dilution conditions could significantly affect the peak diameter of the particles. Wey et al. (2007) reported that particle size distributions from aircraft turbine burning jet fuels. Their particle size distributions were different compared to our study. Lobo et al. (2011) reported unimodal particle size distributions with the mode diameters ranging from 20 to 30 *nm*, while Herndon et al. (2008) reported bimodal particle size distributions with the mode of the nucleation mode around 10 *nm* and the larger peak in the 40–70 nm range. England and McGrath (2004) showed particle size distributions measured by SMPS from a 48 MW aeroderivative cogeneration turbine burning refinery fuel. They reported bimodal particle size distributions which are similar to the current study. However the concentrations of their particle size distributions were much lower. They reported 1.8×10^5 to 3.5×10^5 particles/cm^3 in total particle concentration. Nucleation mode diameters were around 20 nm and nucleation mode concentrations accounted for ~98% of total number count. Chang and England (2004) showed particle size distribution measured by SMPS, and PM measured by Method 201A/202 for a 234 kW pilot scale combustion facility, which is significantly different from the aeroderivative turbine in this study. Wien et al. (2004), and England et al. (2004) measured PM with methods 201A/202 on a 240 and 554 MW, respectively, cogenerative supplementary-fired natural gas combined cycle power plants, which is a different type of turbine. England et al. (2007) found that both residence time and dilution ratio affect the particle distribution from burning natural gas, however these changes were all within the same order of magnitude. These papers have distinct differences from this study and cannot be directly compared with the result of this study.

This study found significant concentrations of nanoparticles with smaller peak diameter than those found in the emissions from jet fuels. Despite the relatively short lifetime (minutes to hours) of nanoparticles in the atmosphere, they can become a concern for public health when they coagulate onto accumulation mode particles, which have lifetimes on the order of days (Buseck and Adachi, 2008; Friedlander, 2000).

TEM samples were taken to study the morphology and chemical composition of particles emitted from the turbine. These grids were analyzed on a Philips CM300 TEM at UCR's Central Facility for Advanced Microscopy and Microanalysis (CFAMM). Four TEM images of the particles are shown in Fig. 4. There is a consistently dominant presence of 2–3 nm diameter particles due to the significantly higher concentration (four orders of magnitude) of nanoparticles in the turbine exhaust. Although a few larger particles were observed, they were not photographed due to our interest in the smaller particles. Energy-dispersive X-ray spectroscopy (EDX) analysis was inconclusive because the volume of nanoparticles was small and the signal to noise ratio was low. The low contrast particles shown in Fig. 4 are assumed to be non-metallic because metal particles typically have high contrast in TEM images. It is unlikely that the particles seen on the TEM grids were semi-volatile due to the presence of a CO catalyst in the turbine (the CO catalyst is designed to remove hydrocarbons, much like our CS). Further testing is necessary to determine their exact chemical composition and formation process.

The particle mass concentration was estimated based on the particle size distribution. Two different effective density profiles for particles were used and results are shown in Fig. S6. Initially, a constant density of 1 g/cm^3 was used (assuming a spherical particle shape). Most organic aerosols have densities in the range from 1.22 to 1.43 g/cm^3 (Kuwata et al., 2011; Nakao et al., 2013), while representative particle phase inorganics (e.g. ammonium nitrate and ammonium sulfate) have densities of 1.72 and 1.77 g/cm^3 respectively. The effective density distribution from Maricq and Xu (2004) was utilized for accumulation mode particles as shown in Equation (1). A density of 1.46 g/cm^3 (equal to that of hydrated sulfuric acid) was assumed following Zheng et al.'s (2012) calculation for nucleation mode particles.

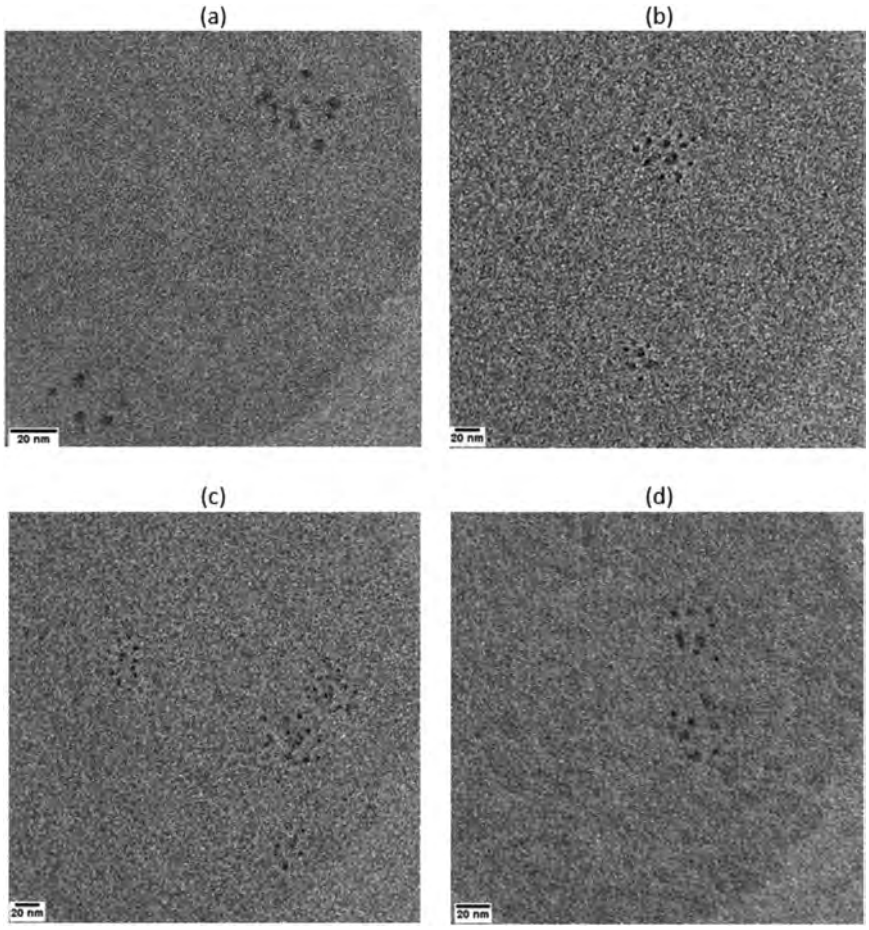


Fig. 4. TEM images of sampled particles from unit 2 by thermophoretic TEM sampler (a) Day 6 (b) Day 7 (c) Day 8 (d) Day 9.

$$\rho_{eff} = 1.2378 * e^{-0.048 D_p} \quad (D_p > 30 \text{ nm}) \qquad \text{Equation 1}$$

Integration of the particle mass, obtained from each size bin, yielded an ambient PM mass of 5.7 μg/m^3 (for a constant density of 1 g/cc), and 4.0 μg/m^3 (for the complex density profile). Our calculation was approximately in the similar range with the air quality index (AQI) reported during the test days (49 ± 2.7, or 11.75 ± 0.57 μg/m^3).

The CPC and EAD were used to monitor changes in particle number and diameter concentration during the load variations (see Table S1 for operating data summary and details). The CPC periodically counted sample flow (bypassing the SMPS), however the sample flow often surpassed the instrument's concentration limit because of the high particle concentration of the turbine exhaust and useful monitoring data could not be obtained. The EAD recorded the transient response of particle emissions from the stack during the load variations (Fig. 5). While particle emissions decreased with no time-delay when the load decreased from 100 to 50 MW, there was a 10–15 min time-delay when the load was increased from 50 to 100 MW. There were spikes in the particle concentration when the turbine operated at either 50 MW or 100 MW. It should be noted that the EAD has low penetration and charging efficiencies for particles below 10 nm, however we speculate that the EAD may have responded to sub-10 nm particles because of the high concentrations recorded.

3.2. $PM_{2.5}$ measured by the method 201A/5.1

The loading of $PM_{2.5}$ in the exhaust, measured using Method 201A/5.1 (Table 1), was 0.000296 grain/dscf (677 μg/m^3). Of the total $PM_{2.5}$: 8.1% (55 μg/m^3) was condensable organic PM, 84.8% (574 μg/m^3) was condensable inorganic PM, and 7.1% (48 μg/m^3) was solid $PM_{2.5}$ (Fig. 6). The PM mass estimated from particle size distributions (assuming a unit density) was 200 μg/m^3, and is on the same order of magnitude to the 654 μg/m^3 of PM measured by the Method 201A/5.1. It should be noted the difference may have come from uncertainties in particle effective density and condensable PM captured by the Method 201A/5.1. The SMPS-derived

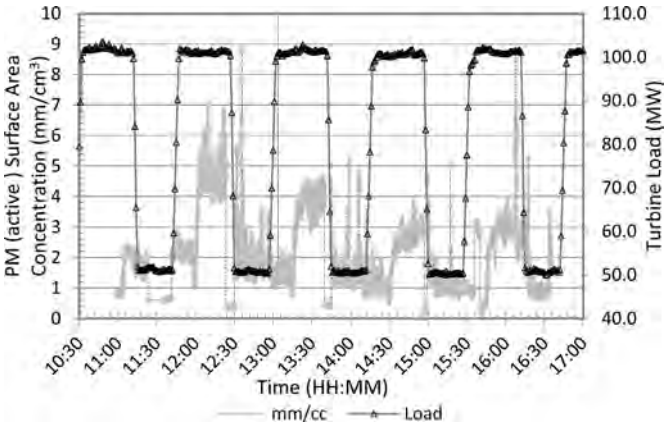


Fig. 5. EAD aerosol diameter concentration vs varying turbine load.

mass emission factor (200 μg/m^3 = 1.07E-04 lb/MMBtu) was comparable to the dilution sampling data of England (2004) (See their Tables 3 and 4) which were taken from several tests conducted on gas turbines equipped with SCR and oxidation catalysts. The impinger based data (677 μg/m^3 = 3.63E-04 lb/MMBtu and 654 μg/m^3 = 3.51E-04 lb/MMBtu) appear to agree with the impinger-based data summarized by Tamura (2013) in their Figs. 4-1. These values are much lower than those emission factors in AP-42 (EPA, 2015), which are still commonly used.

Ionic analyses were performed for seven anions (sulfate, chloride, fluoride, nitrite, nitrate, bromide, and phosphate) and six cations (ammonium, calcium, lithium, magnesium, potassium, and sodium) for the impinger catch solutions to examine chemical composition of condensable inorganic PM.

Sulfate was the largest fraction of the condensable inorganic $PM_{2.5}$ (averaging around 47%, Fig. 7), ammonium accounted for 12%, and sodium accounted for 4.4%. Chloride, nitrate, fluoride, bromide, potassium, calcium, lithium, and magnesium were present in small quantities. The remaining portion of the condensable inorganic PM (29%) could not be identified. The large contributions of ammonium and sulfate to the total $PM_{2.5}$ indicate that control of these two species could significantly reduce $PM_{2.5}$ emissions from NGT power plants. Further analysis gives insight to the nature of PM. The stack SO_3 concentration (0.017 ppmv) is equivalent to ~90 μg/m^3 as either $H_2SO_4(H_2O)_2$ or $(NH_4)_2SO_4$ as SO_3 reacts with H_2O and converts to H_2SO_4 very quickly at these stack temperatures and moisture concentrations. This is about twice of the solid PM measured with Method 201A/5.1 suggesting half of the SO_3 was captured onto the filter while the rest ended up in the impingers. The proportion of ammonium and sulfate in the impinge catch shown in Fig. 7 suggests ammonium sulfate. Stack SO_2 concentration is equivalent to about 330 μg/m^3 as ammonium sulfate. Adding SO_3 in the impinger catch leads to total 370 μg/m^3 ammonium sulfate. This suggests that much of the inorganic condensable PM measured with Method 201A/5.1 could be explained by capture of SO_2 and conversion to ammonium sulfate within the impinger.

The water in the exhaust was also analyzed to determine whether water injected into the system affected PM. Water condensed in the impingers included the injected water, the water formed when natural gas was burned, and a small amount (about 0.1%) of dilution water from the aqueous ammonia. On average, the injected water accounted for 22% of the total water in the combustion products. Anion analysis of the injection water indicated concentrations of sulfate, chloride, and total nitrogen (i.e. nitrites and nitrates) were 0.099, 0.068, and 0.30 ppm respectively. No fluoride, bromide, or phosphate was found.

Total organic carbon (TOC) was measured from the impinger catch solution using a GE Sievers 900 portable TOC analyzer. TOC was obtained by subtracting total inorganic carbon (TIC) from total carbon. TOC averaged 5.4 ppm while TIC was much lower, averaging 0.18 ppm.

The result from Method 201A/202 showed a similar trend to those from the Method 201A/5.1. Detailed comparison of the results by the two methods are beyond the scope of this paper. Readers who are interested in this comparison should see our report (FERCo et al., 2014). Total $PM_{2.5}$ emissions measured using Methods 201A/202 were 20% lower than those measured using Methods 201A/5.1. For both methods, the condensable inorganic fraction was by far the largest fraction of the $PM_{2.5}$.

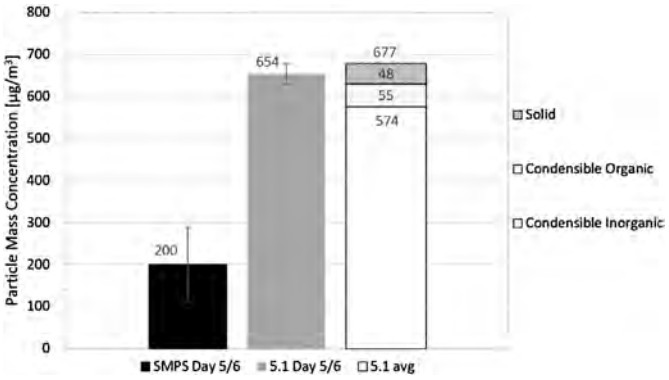


Fig. 6. $PM_{2.5}$ measured using SMPS, Methods 201A/5.1.

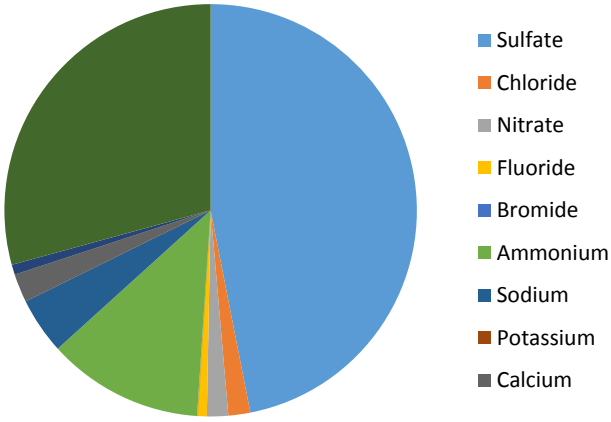


Fig. 7. Average contribution of ion to condensable inorganic $PM_{2.5}$ mass measured using Method 201A/5.1 from the AAC laboratory.

3.3. Gaseous emissions

We monitored O_2, CO_2, NO_x and CO in the NGT exhaust (Summary data shown in Table 2). Measurements were taken from a stationary point in the stack throughout the $PM_{2.5}$ testing. The data shows that O_2 levels were generally between 13.0 and 13.1%, except during the two test days with the greatest number of turbine load changes on which it increased to 13.3%. As expected, CO_2 levels tracked O_2 levels. NO_x emissions averaged 2.1 ppmc (ppmc = ppm, dry corrected to 15% O_2). CO emissions averaged 1.0 ppmc, with daily averages varying from 0.7 to 1.3 ppmc.

Ammonia (NH_3) slip tests were performed to determine whether the turbine was injecting the correct amount of NH_3 into the SCR unit. Measurements were made at each of the 12 sample

Table 1
Summary of $PM_{2.5}$ emissions measurements using Method 201A/5.1.

PM	Avg, gr/dscf (μg/m^3)	Stdev	RMS	Uncertainty at 99% C.L.	Uncertainty, %	LOD	Percent of total PM
Solid>2.5 μm	2.30E-05 (52.63)	1.40E-05	60.1	1.60E-05	70.4	4.20E-05	
Solid<2.5 μm	2.10E-05 (48.06)	1.00E-05	50.0	1.20E-05	58.6	3.10E-05	7.1
Condensible inorganic<2.5 μm	2.51E-04 (574.37)	4.60E-05	18.5	5.40E-05	21.7	1.39E-04	84.8
Condensible organic<2.5 μm	2.40E-05 (54.92)	1.40E-05	58.7	1.70E-05	68.8	4.20E-05	8.1
Total <2.5 μm	2.96E-04 (677.35)	5.80E-05	19.5	6.80E-05	22.8	1.73E-04	

Table 2
Summary of gaseous emissions, ammonia slip measurements, & SO_2/SO_3 (Daily data can be seen in the supplementary file).

O_2, % dry	CO_2, % dry	NO_x, ppm dry	CO, ppm dry	NH_3, ppm flue gas	SO_2, ppm dry	SO_3, ppm dry	SO_3/SO_x ratio, %	Moisture fraction
		NO_x, ppm @ 15% O_2	CO, ppm @ 15% O_2	NH_3, ppm @15% O_2	SO_2, ppm dry @ 15% O_2	SO_3 ppm dry @ 15% O_2		
13.11	4.44	2.74	1.35	4.8	0.060	0.017	23	0.108
		2.07	1.02	3.6	0.045	0.013		

points, and samples were taken for 5 min at each point. NH_3 slip measured in the stack averaged 4.8 ppm, or 3.6 ppmc, in compliance with permit conditions. NH_3 slip for a GT SCR system with a 5 ppm slip end of life guarantee (like the one in the Walnut Creek facility) will be near zero (i.e., less than 0.1 ppm) at start-up, if the system was properly designed and the AIG (ammonia injection grid) has been tuned. The average measured slip of 3.6 ppmc would be expected at over 80% of the catalyst's life (i.e., greater than 80,000 operating hours). NH_3 slip higher than usual for a new combined cycle SCR system was possibly due to a NH_3 slip imbalance entering the catalyst, some flue gas bypassing the catalyst, or low catalyst volume.

SO_x were measured because of their ability to form sulfuric acid in the atmosphere. The SO_x triplicate tests were performed (one per day) on three days with target run times of 8 h. All of the SO_x were created by the oxidation of sulfur compounds present in the natural gas when it was burned. Measured SO_2 emissions averaged 0.060 ppm. When corrected to 15% O_2, SO_2 emissions averaged 0.045 ppmc. Measured SO_3 emissions averaged 0.017 ppm at the stack. SO_3 emissions averaged 0.013 ppmc. SO_3 accounted for an average of 23% of the total SO_x emissions. SO_2 is a dominant species under both fuel lean and even fuel rich combustion conditions. SO_3 concentrations are usually higher than equilibrium calculations (due to slow reaction to reduce SO_3 to SO_2), and are usually in the range of few percentages of SO_x emissions (Glassman and Yetter, 2007). A report by GE (Pavri and Moore, 2001) shows about 95% of SO_x is SO_2. While some of the SO_3 was formed in the combustion process, it is likely that more was formed as the SO_2 (a product of combustion) passed across the oxidizing CO and SCR catalysts. If we assume that all of the 0.060 ppm SO_x (at STP T = 298 K) measured in the exhaust was converted from sulfur in the fuel then there is about 0.34 grain/100scf of sulfur in the fuel, this is within the average range of sulfur concentrations for California pipeline natural gas (0.25–1 grain/100scf).

4. Discussion and conclusion

NGTs currently supply over half of the electricity used in California and this percentage has been increasing due to a decrease of hydroelectric and nuclear power generation. This study furthers our understanding of particle size distributions and the nature of particles at different modes for this NGT and results may not apply to all NGTs.

After turbine exhaust was diluted sevenfold with filtered air, particle concentrations in the 10–300 nm size range were approximately two orders of magnitude higher than those in the ambient air and those in the 2–3 nm size range were up to four orders of magnitude higher. The ambient air PM mass calculated from the SMPS data was in the range of the AQI PM mass reported that day for the region. Ambient air particle concentrations were slightly higher than average urban Southern California levels due to the test site being located next to a train yard and near a major highway. The loading of $PM_{2.5}$ in the exhaust, measured using Method 201A/5.1, was 0.000296 grain/dscf (677 μg/m^3). Of the total $PM_{2.5}$: 8.1% was condensable organic PM, 84.8% was condensable inorganic PM, and 7.1% was solid PM, and PM mass calculated by the SMPS data was within a factor of three compared to the mass reported by Method 201A/5.1.

This study found that the exhaust from the turbine contained higher concentrations of nanoparticles than they were present in ambient air. Further research to determine the nature and volatility of the (sub-10 *nm*) ultrafine particles observed in this study is essential to understand their potential harm to human health.

Acknowledgments

The SCAQMD funded the study to investigate potential technologies to reduce $PM_{2.5}$ from gas-fired turbine power plants. Ultrafine particle measurement was conducted by a UCR team while the rest of measurements were conducted by Delta. FERCo oversaw the project and coordinated the test in collaboration with UCR, Delta, WCEP and SCAQMD. HSJ would like to acknowledge Dr. Wayne Miller who led him to this interesting field. EB and HSJ would like to thank Dr. Jian Xue, and Maynard Havlicek for technical advice and references. Authors are grateful to Rick McPherson and his crew at WCEP for their cooperation. Authors are also thankful to anonymous reviewers for their constructive comments.

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.atmosenv.2015.11.048.

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Attachment 8

Particulate Matter Emission Estimates

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Solar Turbines Incorporated

PURPOSE

This document summarizes Solar's recommended $PM_{10/2.5}$ emission levels for our combustion turbines. The recommended levels are based on an analysis of emissions tests collected from customer sites.

Particulate Matter Definition

National Ambient Air Quality Standards (NAAQS) for particulate matter were first set in 1971. Total suspended particulate (TSP) was the first indicator used to represent suspended particles in the ambient air. Since July 1, 1987, the Environmental Protection Agency (EPA) has used the indicator PM_{10}, which includes only the particles with aerodynamic diameter smaller than 10 micrometers. PM_{10} (coarse particles) come from sources such as windblown dust from the desert or agricultural fields and dust kicked up on unpaved roads by vehicle traffic.

The EPA added a $PM_{2.5}$ ambient air standard in 1997. $PM_{2.5}$ includes particles with an aerodynamic diameter less than 2.5 micrometers. $PM_{2.5}$ (fine particles) are generally emitted from activities such as industrial and residential combustion and from vehicle exhaust. Fine particles are also formed in the atmosphere when gases such as sulfur dioxide, nitrogen oxides, and volatile organic compounds, emitted by combustion activities, are transformed by chemical reactions.

Nearly all particulate matter from gas turbine exhaust is less than one micrometer (micron) in diameter. Thus the emission rates of TSP, PM_{10}, and $PM_{2.5}$ from gas turbines are theoretically equivalent although source testing will show variation due to test method detection levels and processes.

TESTING FOR PARTICULATE MATTER

The turbine combustion process has little effect on the particulate matter generated and measured. The largest contributor to particulate matter emissions for gas and liquid fired combustion turbines is measurement technique and error. Other, minor contributing, sources of particulate matter emissions include carbon, ash, fuel-bound sulfur, artifact sulfate formation, compressor/lubricating oils, and inlet air.

Historical customer particulate matter source test data show that there is significant variability from test to test. The source test results support the common industry argument that particulate matter from natural gas fired combustion sources is difficult to measure accurately. The reference test methods for particulate matter were developed primarily for measuring emissions from coal-fired power plants and other major emitters of particulates. Particulate concentrations from gas turbine can be 100 to 10,000 times lower than the "traditional" particulate sources. The test methods were not developed or verified for low emission levels. There are interferences, insignificant at higher exhaust particulate matter concentrations that result in emissions greater than the actual emissions from gas turbines. New methods are being developed to address this problem.

Due to measurement and procedural errors, the measured results, in most cases, may not be representative of actual particulate matter emitted. There are many potential error sources in measuring particulate matter. Most of these have to do with contamination of the samples, material from the sampling apparatus getting into the samples, and general human error in samples and analysis.

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Recommended Particulate Matter Emission Factors

When necessary to support the air permitting process Solar recommends the following $PM_{10/2.5}$ emission factors:

- Natural Gas: 0.015 lb/MMBtu fuel input (HHV)
- Landfill Gas: 0.03 lb/MMBtu fuel input (HHV)
- Liquid Fuel: 0.06 lb/MMBtu fuel input (HHV). The liquid fuel emission factor assumes fuel sulfur content is <500 ppm and ash content is <0.005% by wt.

The emission levels cited above are only for engine operation with the fuels listed. Other fuels may not yield similar results.

Recent customer source testing has shown that AP-42 (EPA AP-42 "Compilation of Air Pollutant Emission Factors.") emission factors for natural gas are achievable in the field, when the test method recommendations shown below are followed. Historically, Solar did not recommend using AP-42 because while some source test firms have measured below AP-42 levels, others have measured higher. Because particulate matter emissions levels are highly dependent on the test firm and have very little to do with the turbine, Solar does not warrant AP-42 levels but does recognize they are achievable in the field. Customers generally choose a particulate matter emissions factor at or above the AP-42 level that works for their site permitting recognizing that the lower the emissions factor the higher the risk for source testing. Any Solar warranty on particulate matter would be at the recommended levels above, e.g. 0.015 lb/MMBtu (HHV) for natural gas.

Test Method Recommendation

Solar recommends that EPA Methods 201/201A[1] be used to measure the “front half”. “Front half” represents filterable particulate matter.

EPA Method 202[2] (with nitrogen purge and field blanks) should be used to measure the “back half”. “Back half” measurements represent the condensable portion of particulate matter.

EPA Method 5[3], which measures the front and back halves may be substituted (e.g. where exhaust temperatures do not allow the use of Method 202).

Testing should include three test runs of 4 hours each.

Solar recommends using the aforementioned test methods until more representative test methods are developed and made commercially available.

References

[1] EPA Method 201, Determination of PM10 Emissions, Exhaust Gas Recycle Procedure. EPA Method 201A, Determination of PM10 Emissions, Constant Sampling Rate Procedure, 40 CFR 60, Part 60, Appendix A.

[2] EPA Method 202, Determination of Condensible Particulate Emissions from Stationary Sources, 40 CFR 60, Part 60, Appendix A.

[3] EPA Method 5, Determination of Particulate Emissions from Stationary Sources, 40 CFR 60, Part 60, Appendix

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PREDICTED EMISSION PERFORMANCE

Customer	Engine Model: CENTAUR 40-4700 CS/MD 80F MATCH
Job ID	
Inquiry Number	Fuel Type: SD NATURAL GAS; Water Injection: NO
Run By: Javier Marquez; Date Run: 9-Jul-20	Engine Emissions Data: REV. 1.2

	NOx EMISSIONS	CO EMISSIONS	UHC EMISSIONS
1 — 4111 HP, 100.0% Load, Elev. 3075 ft, Rel. Humidity 60.0%, Temperature 20.0 Deg. F			
PPMvd at 15% O2	165.00	50.00	50.00
ton/yr	112.54	20.76	11.89
lbm/MMBtu (Fuel LHV)	0.661	0.122	0.070
lbm/(MW-hr)	8.38	1.55	0.89
(gas turbine shaft pwr) lbm/hr	25.69	4.74	2.71
2 — 3583 HP, 100.0% Load, Elev. 3075 ft, Rel. Humidity 60.0%, Temperature 80.0 Deg. F			
PPMvd at 15% O2	165.00	50.00	50.00
ton/yr	100.38	18.52	10.61
lbm/MMBtu (Fuel LHV)	0.652	0.120	0.069
lbm/(MW-hr)	8.58	1.58	0.91
(gas turbine shaft pwr) lbm/hr	22.92	4.23	2.42

Notes

1. For short-term emission limits such as lbs/hr., Solar recommends using "worst c conditions specific to the application and the site conditions. Worst case for necessarily the same for another.
2. Solar's typical SoLoNOx warranty, for ppm values, is available for greater than and between 50% and 100% load for gas fuel, and between 65% and 100% load for the Centaur 40). An emission warranty for non-SoLoNOx equipment is available or -20 deg F and between 80% and 100% load.
3. Fuel must meet Solar standard fuel specification ES 9-98. Emissions are based composition, or, San Diego natural gas or equivalent.
4. If needed, Solar can provide Product Information Letters to address turbine ope warranty ranges, as well as non-warranted emissions of SO2, PM10/2.5, VOC, and
5. Solar can provide factory testing in San Diego to ensure the actual unit(s) mee the tolerances quoted. Pricing and schedule impact will be provided upon reque
6. Any emissions warranty is applicable only for steady-state conditions and does shut-down, malfunction, or transient event.

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PREDICTED ENGINE PERFORMANCE

Customer	Model: CENTAUR 40-4700
Job ID	Package Type: CS/MD
Run By: Javier Marquez / Date Run: 9-Jul-20	Match: 80F MATCH
Engine Performance Code: REV. 4.20.1.25.13 / Engine Performance Data: REV. 2.1	Fuel System: GAS
	Fuel Type: SD NATURAL GAS

DATA FOR MINIMUM PERFORMANCE

Elevation	feet	3075
Inlet Loss	in H2O	3.5
Exhaust Loss	in H2O	2.0
Accessory on GP Shaft	HP	15.5

		1	2
Engine Inlet Temperature	deg F	20.0	80.0
Relative Humidity	%	60.0	60.0
Driven Equipment Speed	RPM	15500	15500
Specified Load	HP	FULL	FULL
Net Output Power	HP	4111	3583
Fuel Flow	mmBtu/hr	38.90	35.14
Heat Rate	Btu/HP-hr	9462	9809
Therm Eff	%	26.891	25.938
Engine Exhaust Flow	lbm/hr	143144	126652
PT Exit Temperature	deg F	771	850
Exhaust Temperature	deg F	771	850

Fuel Gas Composition (Volume Percent)

Methane (CH4)	92.79
Ethane (C2H6)	4.16
Propane (C3H8)	0.84
N-Butane (C4H10)	0.18
N-Pentane (C5H12)	0.04
Hexane (C6H14)	0.04
Carbon Dioxide (CO2)	0.44
Hydrogen Sulfide (H2S)	0.0001
Nitrogen (N2)	1.51

Fuel Gas Properties

LHV (Btu/Scf)	939.2	Specific Gravity	0.5970	Wobbe Index at 60F	1215.6

This performance was calculated with a basic inlet and exhaust system. Special noise silencers, special filters, heat recovery systems or cooling devices will Performance shown is "Expected" performance at the pressure drops stated, not g

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PREDICTED EMISSION PERFORMANCE

Customer: **Enterprise**	Engine Model: **CENTAUR 40-4700S CS/MD 80F MATCH**
Job ID: **S.Carlsbad**	
Inquiry Number:	Fuel Type: **SD NATURAL GAS** / Water Injection: **NO**
Run By: **Jose Guillen** / Date Run: **1-Sep-20**	Engine Emissions Data: **REV. 0.1**

	NOx EMISSIONS	CO EMISSIONS	UHC EMISSIONS
1 — 4329 HP, 100.0% Load, Elev. 3070 ft, Rel. Humidity 60.0%, Temperature 0 Deg. F			
PPMvd at 15% O2	25.00	50.00	25.00
ton/yr	17.64	21.48	6.15
lbm/MMBtu (Fuel LHV)	0.100	0.122	0.035
lbm/(MW-hr)	1.25	1.52	0.44
(gas turbine shaft pwr) lbm/hr	4.03	4.90	1.40
2 — 4056 HP, 100.0% Load, Elev. 3070 ft, Rel. Humidity 60.0%, Temperature 40.0 Deg. F			
PPMvd at 15% O2	25.00	50.00	25.00
ton/yr	16.54	20.14	5.77
lbm/MMBtu (Fuel LHV)	0.100	0.122	0.035
lbm/(MW-hr)	1.25	1.52	0.44
(gas turbine shaft pwr) lbm/hr	3.78	4.60	1.32
3 — 3666 HP, 100.0% Load, Elev. 3070 ft, Rel. Humidity 60.0%, Temperature 80.0 Deg. F			
PPMvd at 15% O2	25.00	50.00	25.00
ton/yr	15.19	18.50	5.30
lbm/MMBtu (Fuel LHV)	0.099	0.120	0.034
lbm/(MW-hr)	1.27	1.54	0.44
(gas turbine shaft pwr) lbm/hr	3.47	4.22	1.21

Notes

1. For short-term emission limits such as lbs/hr., Solar recommends using "worst c conditions specific to the application and the site conditions. Worst case for necessarily the same for another.
2. Solar's typical SoLoNOx warranty, for ppm values, is available for greater than and between 50% and 100% load for gas fuel, and between 65% and 100% load for the Centaur 40). An emission warranty for non-SoLoNOx equipment is available or -20 deg F and between 80% and 100% load.
3. Fuel must meet Solar standard fuel specification ES 9-98. Emissions are based composition, or, San Diego natural gas or equivalent.
4. If needed, Solar can provide Product Information Letters to address turbine ope warranty ranges, as well as non-warranted emissions of SO2, PM10/2.5, VOC, and
5. Solar can provide factory testing in San Diego to ensure the actual unit(s) mee the tolerances quoted. Pricing and schedule impact will be provided upon reque
6. Any emissions warranty is applicable only for steady-state conditions and does shut-down, malfunction, or transient event.

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PREDICTED EMISSION PERFORMANCE

Customer: **Enterprise**	Engine Model: **CENTAUR 40-4700S CS/MD 80F MATCH**
Job ID: **S.Carlsbad**	
Inquiry Number:	Fuel Type: **SD NATURAL GAS** / Water Injection: **NO**
Run By: **Jose Guillen** / Date Run: **1-Sep-20**	Engine Emissions Data: **REV. 0.1**

	NOx EMISSIONS	CO EMISSIONS	UHC EMISSIONS
4 — **3163 HP 100.0% Load** — **Elev. 3070 ft** — **Rel. Humidity 60.0%** — **Temperature 105.0 Deg. F**			
PPMvd at 15% O2	**25.00**	**50.00**	**25.00**
ton/yr	**13.55**	**16.50**	**4.72**
lbm/MMBtu (Fuel LHV)	**0.097**	**0.118**	**0.034**
lbm/(MW-hr)	**1.31**	**1.60**	**0.46**
(gas turbine shaft pwr) lbm/hr	**3.09**	**3.77**	**1.08**

Notes

1. For short-term emission limits such as lbs/hr., Solar recommends using "worst c conditions specific to the application and the site conditions. Worst case for necessarily the same for another.
2. Solar's typical SoLoNOx warranty, for ppm values, is available for greater than and between 50% and 100% load for gas fuel, and between 65% and 100% load for the Centaur 40). An emission warranty for non-SoLoNOx equipment is available or -20 deg F and between 80% and 100% load.
3. Fuel must meet Solar standard fuel specification ES 9-98. Emissions are based composition, or, San Diego natural gas or equivalent.
4. If needed, Solar can provide Product Information Letters to address turbine ope warranty ranges, as well as non-warranted emissions of SO2, PM10/2.5, VOC, and
5. Solar can provide factory testing in San Diego to ensure the actual unit(s) mee the tolerances quoted. Pricing and schedule impact will be provided upon reque
6. Any emissions warranty is applicable only for steady-state conditions and does shut-down, malfunction, or transient event.

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PREDICTED ENGINE PERFORMANCE

Customer: *Enterprise*	Model: **CENTAUR 40-4700S**
Job ID: **S.Carlsbad**	Package Type: **CS/MD**
Run By: **Jose Guillen** / Date Run: **1-Sep-20**	Match: **80F MATCH**
Engine Performance Code: **REV. 4.20.1.25.13** / Engine Performance Data: **REV. 2.2**	Fuel System: **GAS**
	Fuel Type: **SD NATURAL GAS**

DATA FOR NOMINAL PERFORMANCE

Elevation	feet	3070
Inlet Loss	in H2O	4.0
Exhaust Loss	in H2O	4.0
Accessory on GP Shaft	HP	15.5

		1	2	3	4
Engine Inlet Temperature	deg F	0	40.0	80.0	105.0
Relative Humidity	%	60.0	60.0	60.0	60.0
Driven Equipment Speed	RPM	15500	15500	15500	15042
Specified Load	HP	FULL	FULL	FULL	FULL
Net Output Power	HP	4329	4056	3666	3163
Fuel Flow	mmBtu/hr	40.20	37.80	35.10	31.87
Heat Rate	Btu/HP-hr	9286	9321	9574	10075
Therm Eff	%	27.400	27.299	26.575	25.255
Engine Exhaust Flow	lbm/hr	147450	138006	126500	115569
PT Exit Temperature	deg F	754	800	852	876
Exhaust Temperature	deg F	754	800	852	876

Fuel Gas Composition (Volume Percent)

Methane (CH4)	92.79
Ethane (C2H6)	4.16
Propane (C3H8)	0.84
N-Butane (C4H10)	0.18
N-Pentane (C5H12)	0.04
Hexane (C6H14)	0.04
Carbon Dioxide (CO2)	0.44
Hydrogen Sulfide (H2S)	0.0001
Nitrogen (N2)	1.51

Fuel Gas Properties

LHV (Btu/Scf)	939.2	Specific Gravity	0.5970	Wobbe Index at 60F	1215.6

This performance was calculated with a basic inlet and exhaust system. Special noise silencers, special filters, heat recovery systems or cooling devices will Performance shown is "Expected" performance at the pressure drops stated, not g

Notes
3070 FT

Attachment 9

SYNTHETIC MINOR OPERATING PERMIT

Synthetic Minor Operating Permit Application

CTC Property LLC

TRINITY CONSULTANTS
1701 Centerview Drive
Suite 109
Little Rock, AR 72211
(501) 225-6400

January 2025

Project 240401.0165

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1. INTRODUCTION

CTC Property LLC "CTC" proposes to operate a data center at 3231 Paul R Lowry Road, Memphis, Shelby County, Tennessee. The facility was formerly an Electrolux factory.

The site is currently operating a battery of mobile units to supply the necessary 300 megawatts (MW) of power to the site while Memphis Light, Gas and Water (MLGW) is constructing a substation to provide necessary power. After an expectation of 300 MW, CTC is now aware that MLGW will only be able to provide 150 MW of permanent power. Thus, this will require CTC to cover the shortfall by permitting the additional power generation by converting portions of the temporary supply and replacing other temporary units until MLGW can supply the additional 150 MW of power. CTC has been operating under an exemption pending permanent power solutions.

While not required by current regulations, CTC is voluntarily proposing to install the equivalent of Lowest Achievable Emission Rate (LAER) control technology, refer to Section 5.0, on 100% of the turbines to remain and/or be brought on-site. This will ensure an emission concentration of 2 ppm nitrogen oxides (NO_X), while also providing for 2 ppm volatile organic compounds (VOC) and 2.5 ppm carbon monoxide (CO). As such, emissions from the source will qualify for synthetic minor permitting and the site will be an area source for hazardous air pollutants (HAPs).

This application requests an initial synthetic minor operating permit.

1.1 Summary of Permit Request

CTC has identified the regulatory requirements pertaining to synthetic minor sources applicable to the facility. These requirements are summarized below:

1. Permitting operation of Solar SMT-130 turbines (EU-1 through EU-15) equipped with selective catalytic reduction (SCR) and oxidation catalyst.
2. Applicable requirements under 40 CFR 60 Subpart KKKK, *Standards of Performance for Stationary Combustion Turbines (NSPS KKKK).*

2. DESCRIPTION OF FACILITY

2.1 Process Description

CTC owns and operates the Colossus data center located in Memphis, Tennessee and is considered a synthetic minor source under the Title V operating permits program. This application for an initial synthetic minor source permit requests approval to operate fifteen (15) Solar SMT-130 turbines to provide a continuous power source with a capacity of approximately 150 MW.

CTC has designed this data center to provide the efficient, resilient service that is necessary while minimizing the data center's environmental footprint. This site houses cloud computer systems and associated components such as telecommunications and data storage systems. Equipment includes security systems, data communications equipment, and environmental controls. Electrical power systems are designed to be fully redundant so that in the event of a disruption, Tesla battery packs provide back-up power for uninterrupted continuous data center operations. Appendix B presents a plot plan which also indicates the site boundary. This site houses networked computer servers that store, process and distribute large amounts of data. Energy is used to power both the IT hardware (e.g., servers, drives and network devices) and the supporting infrastructure such as HVAC systems and cooling equipment.

2.1.1 Equipment to be Utilized

The equipment to be utilized on-site includes the aforementioned Solar SMT-130 turbines, each equipped with Solar's DLE/SoLoNO$_X$ control technology followed by SCR. There are no additional sources of air emissions. CTC will charge Tesla battery packs during off-peak hours which can then be used to supply power back to the grid during peak hours. While CTC is considered an electric generating unit (EGU), it is exempt from acid rain regulations and associated New Source Performance Standards rules since each of the turbines generate less than 25 MW of power.

2.1.2 General Description of Power Demand

Data centers produce structured data (the result of computations) from electricity feedstock. As no mechanical work is performed, all electricity is ultimately dissipated as heat. A data center's capacity may therefore be expressed in terms of MW dissipated. Electricity is distributed from the electrical substation transformers to the uninterruptable power supply system. The uninterruptible power supply system consists of MLGW supplied power and the on-site turbines to enable the equipment to operate continuously. Power distribution units distribute power to the various equipment in the data center, while also providing monitoring capabilities to ensure efficient power utilization. The servers use the majority of the electricity at the site. The amount of electricity required to power servers depends on their size, configuration, and workload. Size and workload also determine the electricity usage by the storage devices and network equipment, such as switches and routers.

In order to operate the site, CTC requires a continuous electrical supply. CTC works closely with local and regional utilities, including the Tennessee Valley Authority (TVA) and MLGW, to secure this supply. Despite these efforts, at the time of this application CTC is limited to 150 MW of electricity at the site, which is significantly less than nameplate capacity at the site. The ability to serve the nameplate capacity for CTC needs in the region requires significant infrastructure upgrades. The additional 150 MW provided by on-site generation is proposed to offset this shortfall while various transmission infrastructure improvements in the region are advanced.

Without additional on-site power generation, CTC cannot efficiently utilize existing equipment to serve planned CTC customer needs. On-site power generation beyond the 150 MW currently being provided by local and regional utilities is necessary to maintain the operations and is not intended to reduce or eliminate the amount of electricity currently supplied by the TVA and MLGW.

CTC is in the process of deploying other mitigations in addition to this project, but they are not the subject of this air permit application. CTC has a number of requirements that limit the selection of viable on-site power generation solutions including the following:

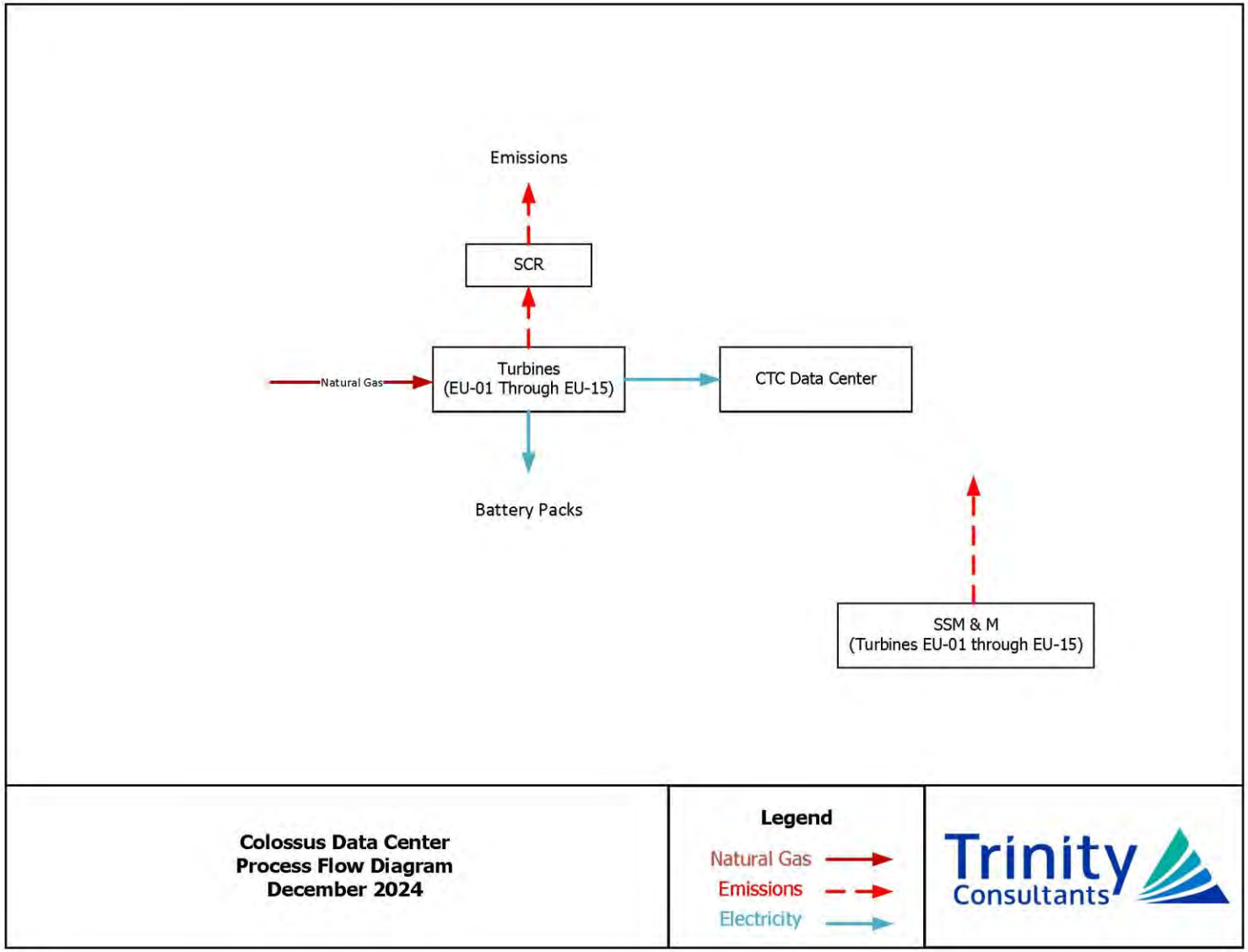
- The site requires a supply of power generation on site to address the energy gap that currently exists.
- The site requires 100% uptime.
- The site requires the ability to service the power generation while still producing power.

2.1.3 Battery Packs for Peak Demand

CTC utilizes Tesla battery packs to lower peak demand to the electrical grid. A battery energy storage system (BESS) can store energy when demand on the electric grid is low and release it when demand is high. A BESS is the most direct and flexible strategy for achieving peak shaving. It can respond quickly to changes in demand and supply, ensuring critical loads are running without straining the electric grid at peak periods. The BESS is equally beneficial when dealing with the intermittency of renewable energy sources by storing excess energy to be released later. The BESS reduces the amount of generation capacity otherwise required from the grid and from on-site generators. As CTC is a significant system-wide load, its use of a BESS will promote stability of the larger grid.

2.2 Process Flow Diagram

Figure 2-1. Process Flow Diagram



3. ENVIRONMENTAL JUSTICE REVIEW

3.1 EJ Assessment Overview

An Environmental Justice (EJ) assessment was performed for the CTC facility. The EJ assessment for the CTC facility incorporates the following elements in support of the goal of EJ:

- an analysis of environmental and socioeconomic indicators for the area surrounding the facility,
- mitigation and compliance assurance considerations,
- community engagement and public involvement.

In this analysis, the Census Block Group encompassing the CTC facility was analyzed using 13 EJ Indexes and 13 Supplemental Indexes provided in EPA's EJScreen online tool. The CTC facility will be employing stringent emissions controls to minimize emissions and compliance assurance procedures, and community engagement and public involvement will occur as part of the permitting process. The results of this review indicate EJ concerns are not present in the area surrounding the CTC facility and additional review for EJ is not needed.

3.2 Introduction

The Tennessee Department of Health[1] defines Environmental Justice (EJ) as constituting protecting human health and the environment for everyone, as well as ensuring that all people are treated fairly and given the opportunity to participate meaningfully in the development, implementation and enforcement of environmental laws, regulations and policies. The Tennessee Department of Environment and Conservation (TDEC) states that EJ is based on the principle that all people should be protected from environmental pollution and have the right to a clean and healthy environment. TDEC sums up EJ as:

- protection of the health of the people of Tennessee and its environment,
- equity in the administration of the State's environmental programs, and
- provisions of adequate opportunities for meaningful involvement of all people with respect to the development, implementation and enforcement of environmental laws, regulations and policies.

To aid operators, the public, and state regulatory agencies such as TDEC, EPA developed the EJScreen online tool. EJScreen provides a nationally consistent dataset and approach for combining environmental and socioeconomic indicators for a specific geographical area to help assess whether surrounding communities may be disproportionately affected by environmental hazards. EPA's screening tool calculates 13 EJ Indexes and 13 Supplemental Indexes. The EJ Indexes are calculated by combining socioeconomic data on low income and people of color populations with a single environmental indicator (e.g. Ozone). The Supplemental Indexes are calculated in a similar manner, by combining a single environmental indicator with a more extensive socioeconomic dataset, which includes low income, persons with disabilities, less than high school education, limited English speaking, and low life expectancy. The resulting Index values for each Census Block Group are then ranked on a state and national level using a percentile basis. As noted in EPA's Frequent Questions for EJScreen,

> "*EPA has found it helpful to establish a suggested Agency starting point for the purpose of identifying geographic areas that may warrant further consideration, analysis or outreach.*

[1] https://www.tn.gov/health/cedep/environmental/healthy-places/healthy-places/health-equity/he/environmental-justice.html

The use of an initial filter promotes consistency and provides a pragmatic first step for EPA programs and regions when interpreting screening results. For early applications of EJScreen, EPA identified the 80th percentile filter for one or more of the EJ or supplemental indexes when compared to the nation and/or state as that initial starting point."[2]

It should be noted that EJScreen is not intended to provide a definitive assessment of risk, as there is substantial uncertainty in the socioeconomic and environmental data. However, areas exceeding the 80th percentile can help stakeholders identify communities that may warrant further review.

3.3 EJ Assessment Area

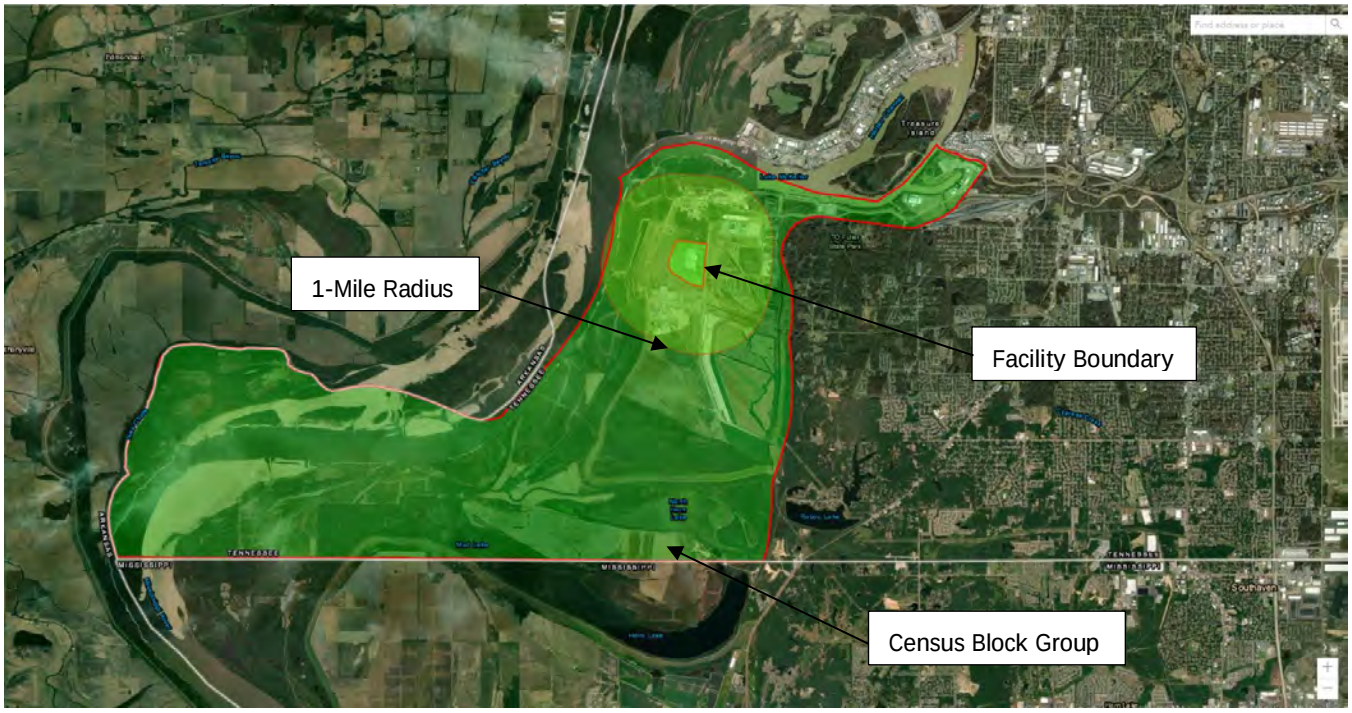
To perform an EJ assessment, an EJ area should first be defined. No uniform guidance has been established for defining an EJ assessment area and many local and state jurisdictions throughout the country at present have not established EJ analysis criteria to define the area in need of assessment.

Currently, neither the state of Tennessee nor Shelby County has established distance criteria for determining an EJ assessment area. A review of other jurisdictions was performed to serve as a surrogate for defining an appropriate EJ area. Currently at least seven states (Alabama, Illinois, New Mexico, New York, Oklahoma, Pennsylvania, and Minnesota) have proposed or adopted EJ community identification criteria that considers a 0.5- or 1-mile radius when determining an affected EJ area. Additionally, EPA's Enforcement and Compliance History Online (ECHO) database analyzes EJ data on a Census Block Group basis and EPA's Office of Enforcement and Compliance Assurance (OECA) uses Census Block Group or a 1-mile radius for analysis.

The CTC facility is located at 3231 Riverport Rd, Memphis, Shelby County, TN 38109. In the case of the CTC facility, the Census Block Group that the site is located in encompasses a larger area than a 1-mile radius. For the purposes of this analysis a Census Block Group encompassing the site is used for the EJ assessment. A satellite image of the facility and Census Block Group evaluated is shown below in Figure 3-1.

[2] Frequent Questions about EJScreen | US EPA

Figure 3-1. CTC EJ Area Map – Blockgroup 471579803001



3.4 EJScreen Results

Based on the Census Block Group encompassing the CTC facility (Block Group 471579803001), a review was performed on the 13 EJ Indexes and 13 Supplemental Indexes. The results show that all Indexes are either below the 50th percentile or data is not available. Based on EPA's guidance that further consideration is warranted when the EJ and Supplemental Indexes exceed the 80th percentile, additional evaluation is not necessary for the CTC facility. Table 3-1 shows the results of the EJScreen analysis. Figure 3-2 to Figure 3-27 display the results for EJ and Supplemental Indexes.

Table 3-1. EJScreen Results

Index	EJ Index (%ile)	Supplemental Index (%ile)	Greater than 80th %ile?
Particulate Matter 2.5 ($PM_{2.5}$)	0	20	No
Ozone	0	14	No
Nitrogen Dioxide (NO_2)	0	2	No
Diesel Particulate Matter	N/A	N/A	No
Toxic Releases to Air	0	26	No
Traffic Proximity	N/A	N/A	No
Lead Paint	0	0	No
Superfund Proximity	N/A	N/A	No
RMP Facility Proximity	N/A	N/A	No
Hazardous Waste Proximity	N/A	N/A	No
Underground Storage Tanks	0	27	No
Wastewater Discharge	N/A	N/A	No
Drinking Water Non-Compliance	N/A	N/A	No

American Community Survey (ACS) data indicates the Census Block Group is not populated. As such, the surrounding Census Block Group is not populated by (nor is characterized by a higher socioeconomic representation of) disadvantaged or vulnerable populations. Additionally, there are no schools, hospitals, places of worship, prisons, public housing, or standardized housing located within the surrounding Census Block Group area.

Since the Census Block Group surrounding the proposed CTC facility has no indexes exceeding the 80th percentile (or even the 50th percentile), EJScreen indicates the surrounding area represents an area where further review is not warranted and it does not present EJ concerns.

3.5 Additional EJ Considerations

3.5.1 Mitigation and Compliance Assurance

Even though the facility is located in a Census Block Group in which the EJ Indexes and Supplemental Indexes do not exceed the 80th percentile, CTC will implement emissions mitigation measures to help protect the local air quality and reduce the data centers' emission footprint. CTC will be implementing selective catalytic reduction (SCR) on all proposed turbines. The SCR installation will represent a multi-million dollar investment to help reduce NOx emissions, a precursor to ozone. SCR represents the most stringent Best Available Control Technology (BACT) and can qualify as Lowest Achievable Emission Rate (LAER) for turbines.

In addition to installing SCR, the permit application qualifies for a Synthetic Minor Operating Permit, with the turbines being subject to New Source Performance Standards (NSPS) Subpart KKKK - Standards of Performance for Stationary Combustion Turbines. This demonstrates that the project's overall emissions footprint remains relatively small and compliance with permitted emission rates will be demonstrated the required through NSPS KKKK performance tests conducted initially and on an annual basis.

3.5.2 Community Engagement / Public Involvement

As part of its commitment to EJ community engagement and public involvement, CTC will be posting public notice and will make the draft air operating permit available for public comment. Both actions will help ensure the local community remains informed about the scope of the project and what measures are being taken to reduce emissions of air pollution.

3.5.3 Southern Environmental Law Center (SELC) Response

In an objection issued on August 26, 2024, the SELC voiced their concern regarding CTC's impact on the local air quality, focusing on how ozone pollution affects the health of children in the area. EJScreen presents information related to these issues which include the "Under Age 5" Socioeconomic Indicator, the "Ozone" EJ Index and Supplemental Index, and the "Asthma" Heath Disparity. The EJScreen Socioeconomic Indicators indicate a vulnerable population is not present in the Census Block Group that the facility is located in. There is no population under the age of 5, the Ozone EJ Index is 0, the Ozone Supplemental Index is in the 14th percentile (well below the 80th percentile), and the Asthma Health Disparity information is N/A (because the area is too small, too sparsely populated, or the data is not available in the national dataset). Therefore, these indexes and indicators denote very low EJ impacts exist for the community surrounding the Census Block Group.

3.6 Conclusion

For the purposes of this analysis, the Census Block Group surrounding the CTC facility was conservatively selected as the area for evaluating EJ Index data as provided by EPA's EJScreen tool. EJScreen results indicate that EJ concerns do not exist for the unpopulated Census Block Group surrounding the CTC facility as all EJ and Supplemental Indexes are below the 50th percentile. Furthermore, CTC will: install SCR controls on the turbines to minimize its emissions footprint, demonstrate compliance with NSPS Subpart KKKK requirements through annual performance testing, and involve the public in the permitting process via public notice while providing copies of the draft air operating permit for public comment. Based on the EJ Analysis for the CTC facility, further evaluation for the purpose of EJ is not necessary.

Figure 3-2. Environmental Justice Index – $PM_{2.5}$

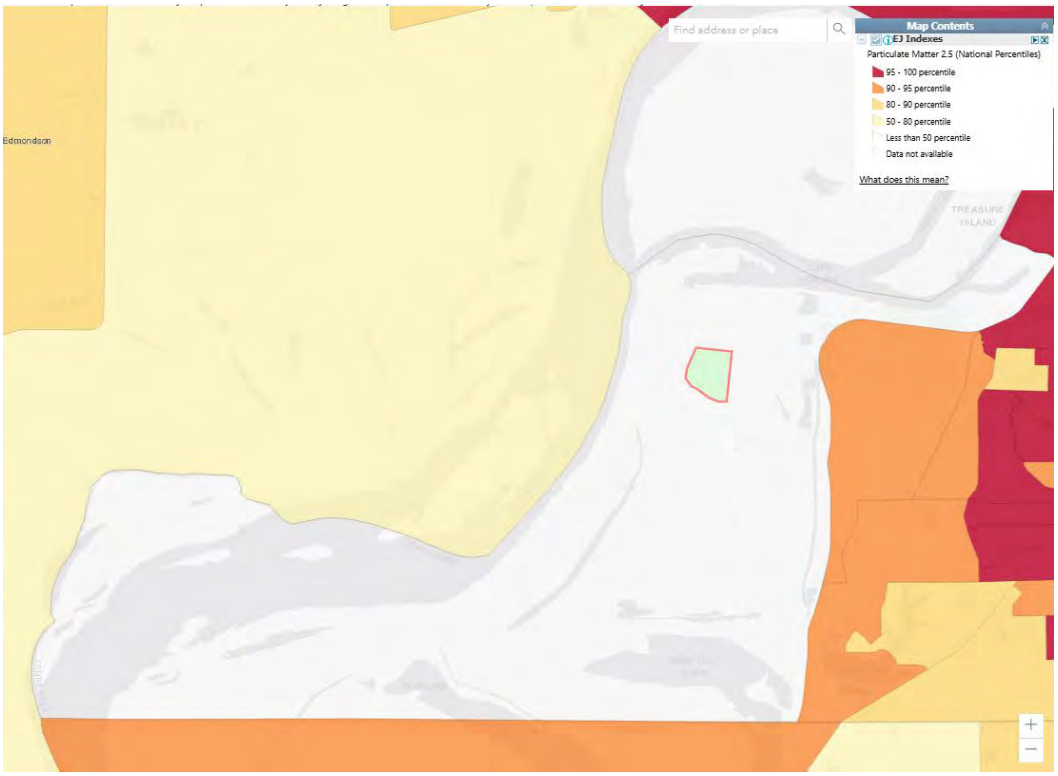


Figure 3-3. Supplemental Index – $PM_{2.5}$

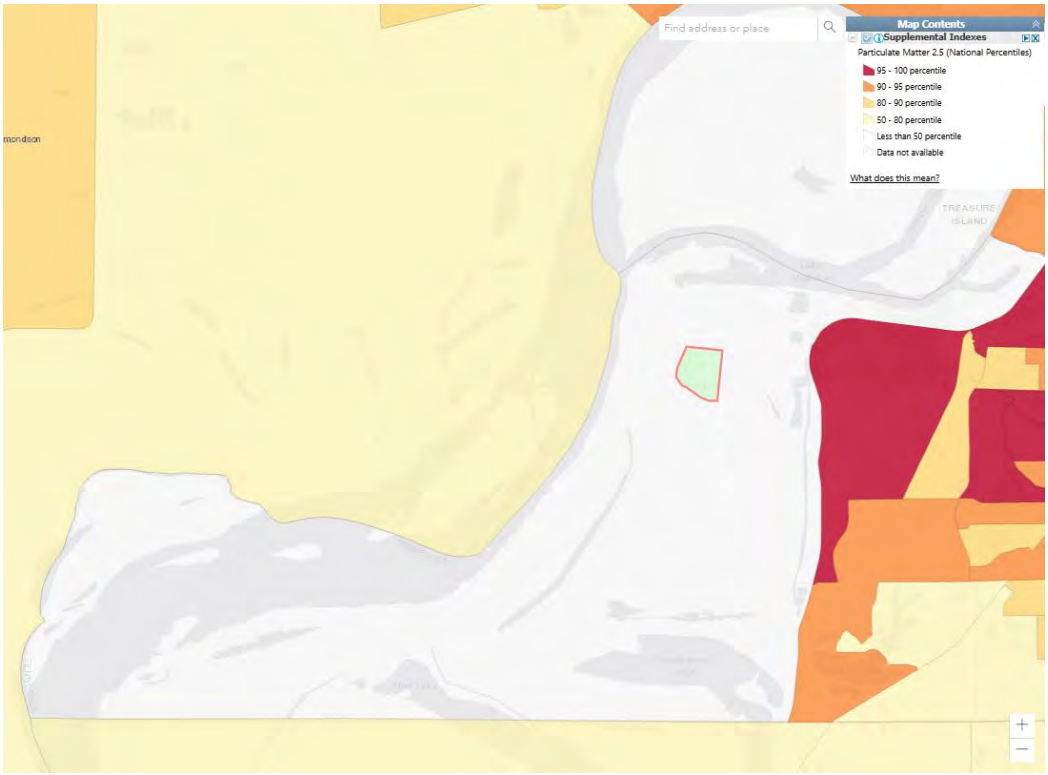


Figure 3-4. Environmental Justice Index – Ozone

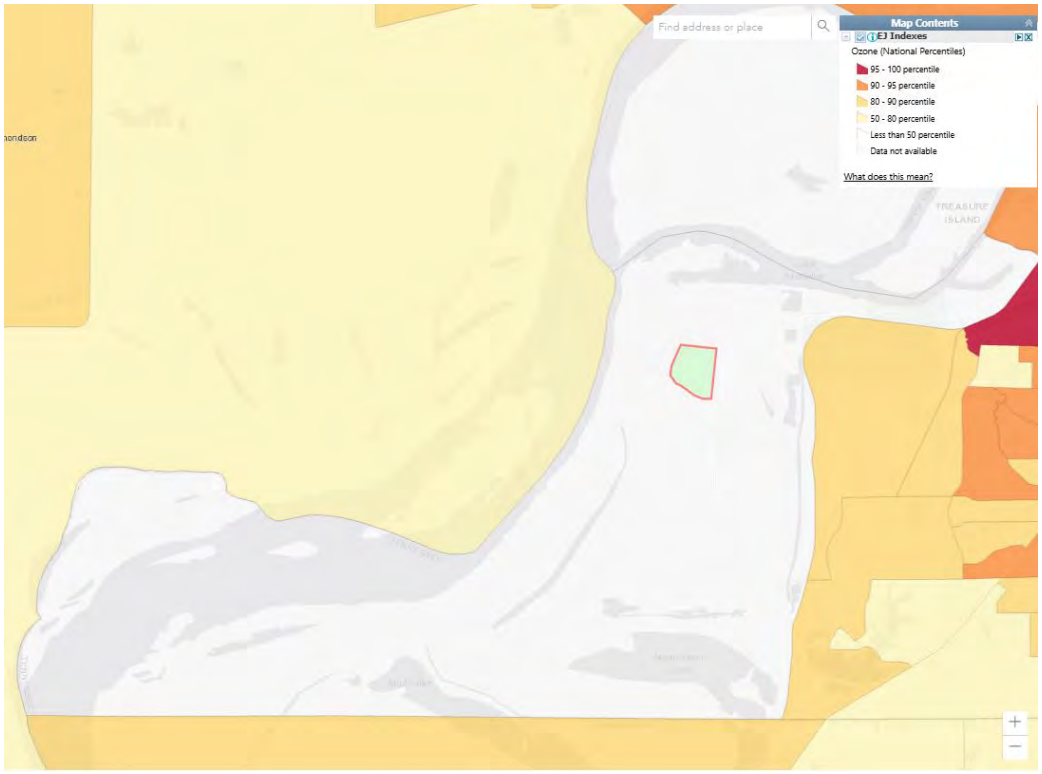


Figure 3-5. Supplemental Index – Ozone

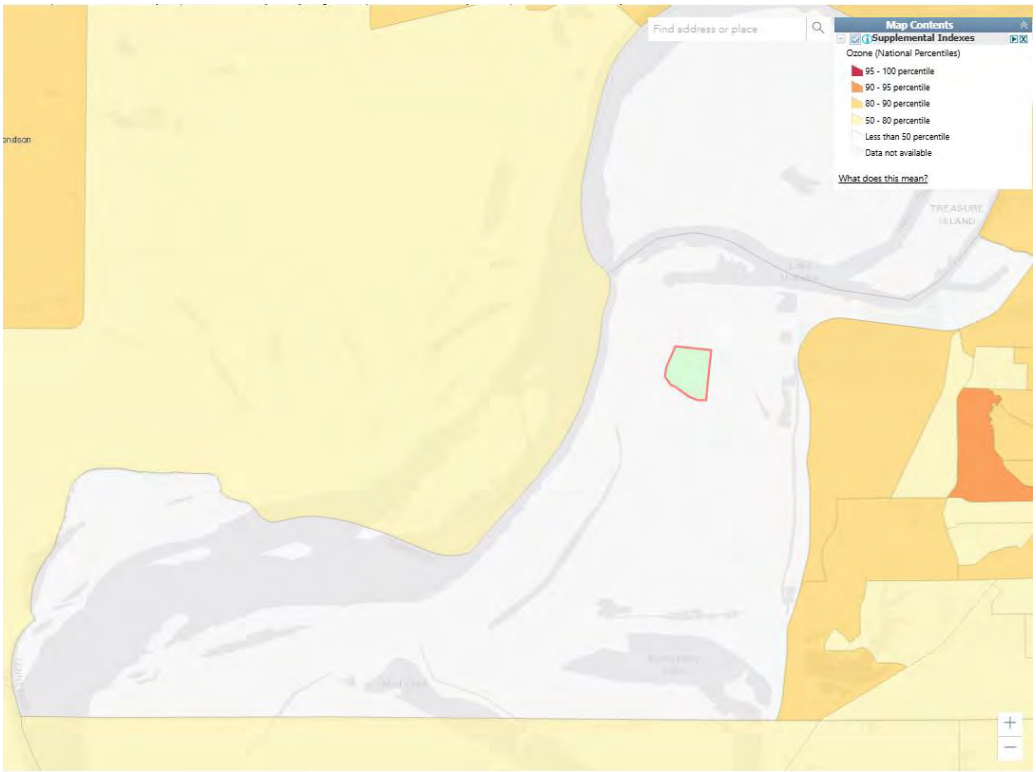


Figure 3-6. Environmental Justice Index – NO_2

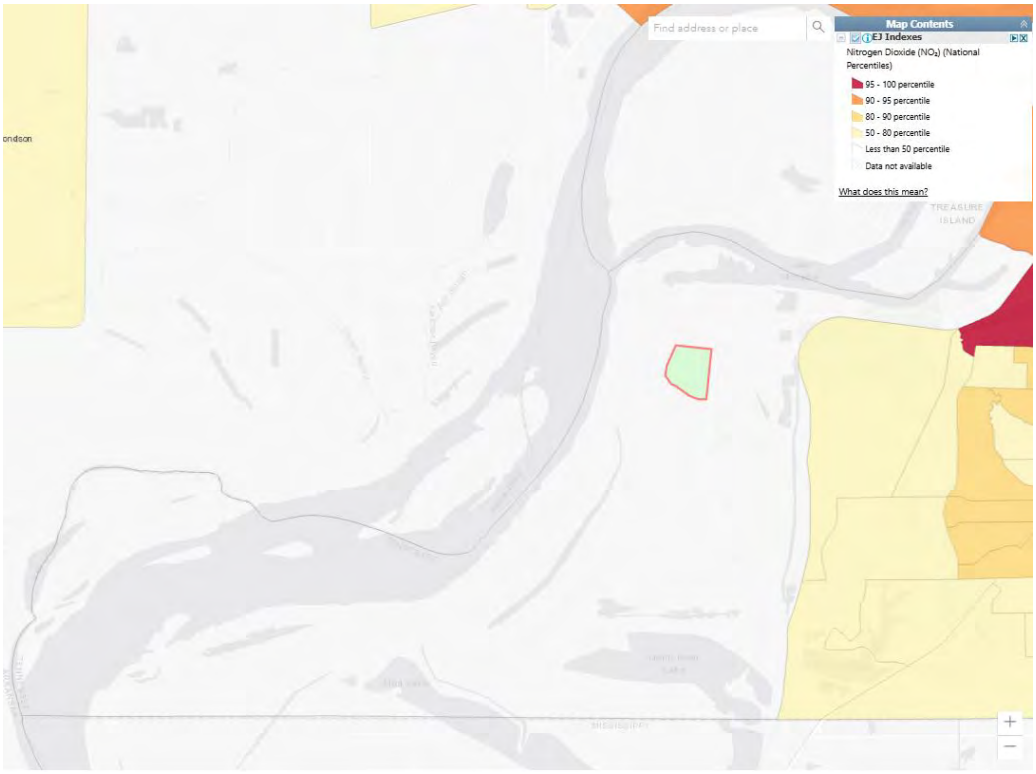


Figure 3-7. Supplemental Index – NO_2

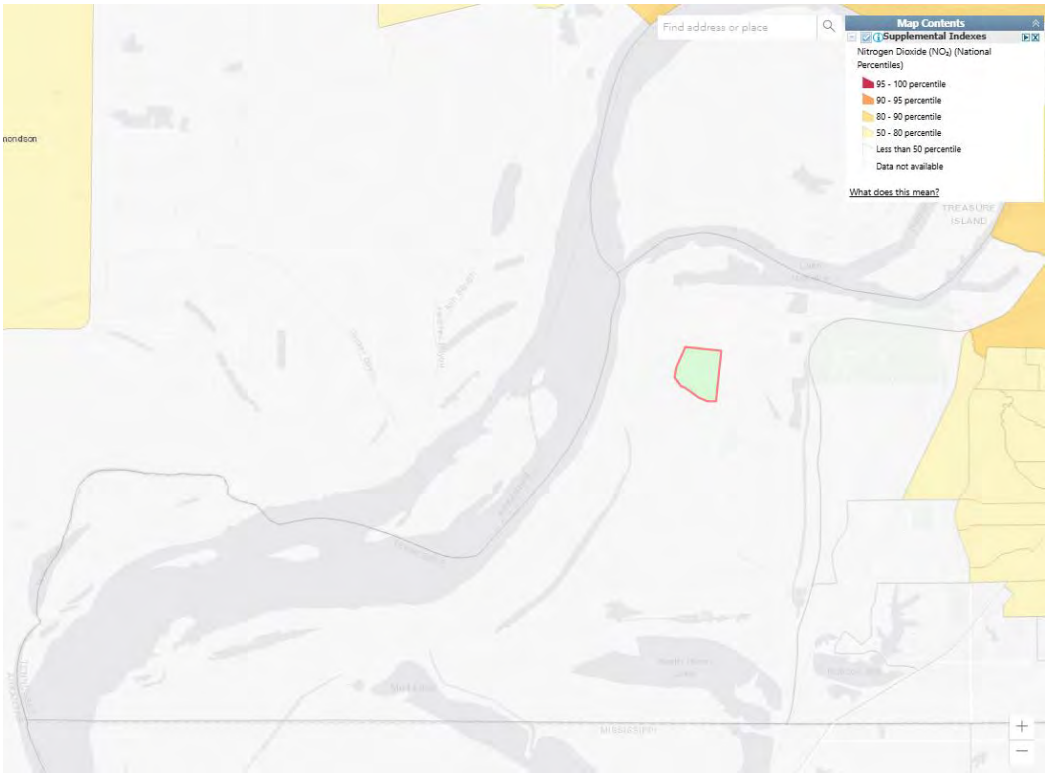


Figure 3-8. Environmental Justice Index – Diesel Particulate Matter

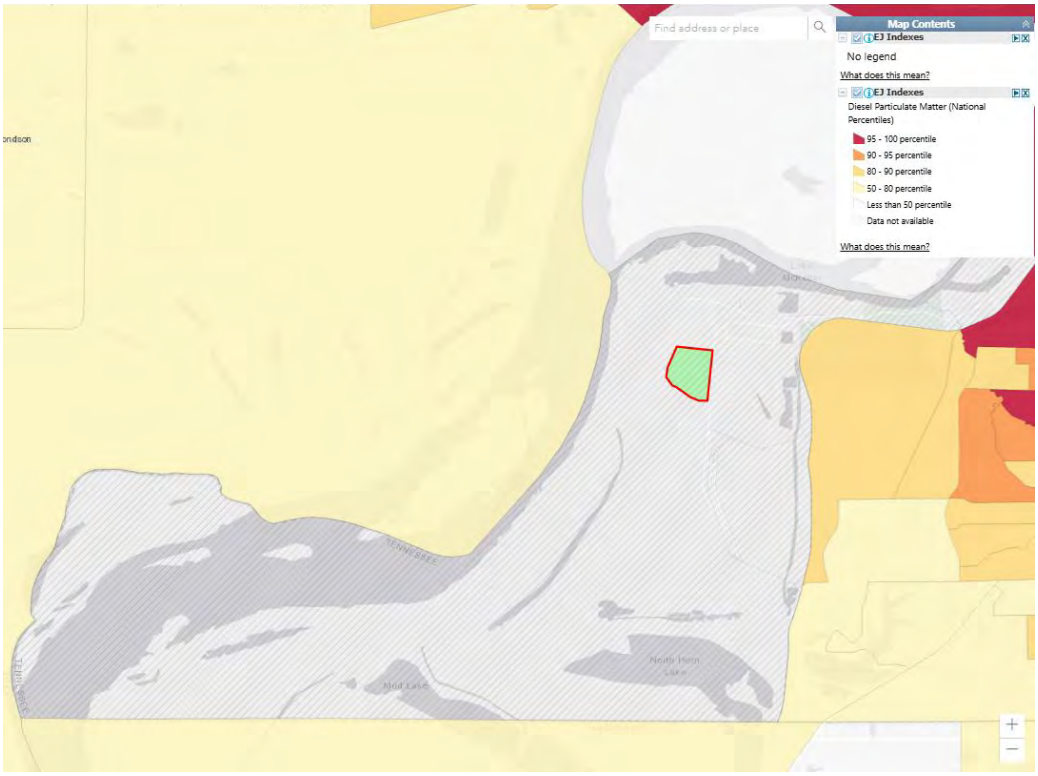


Figure 3-9. Supplemental Index – Diesel Particulate Matter

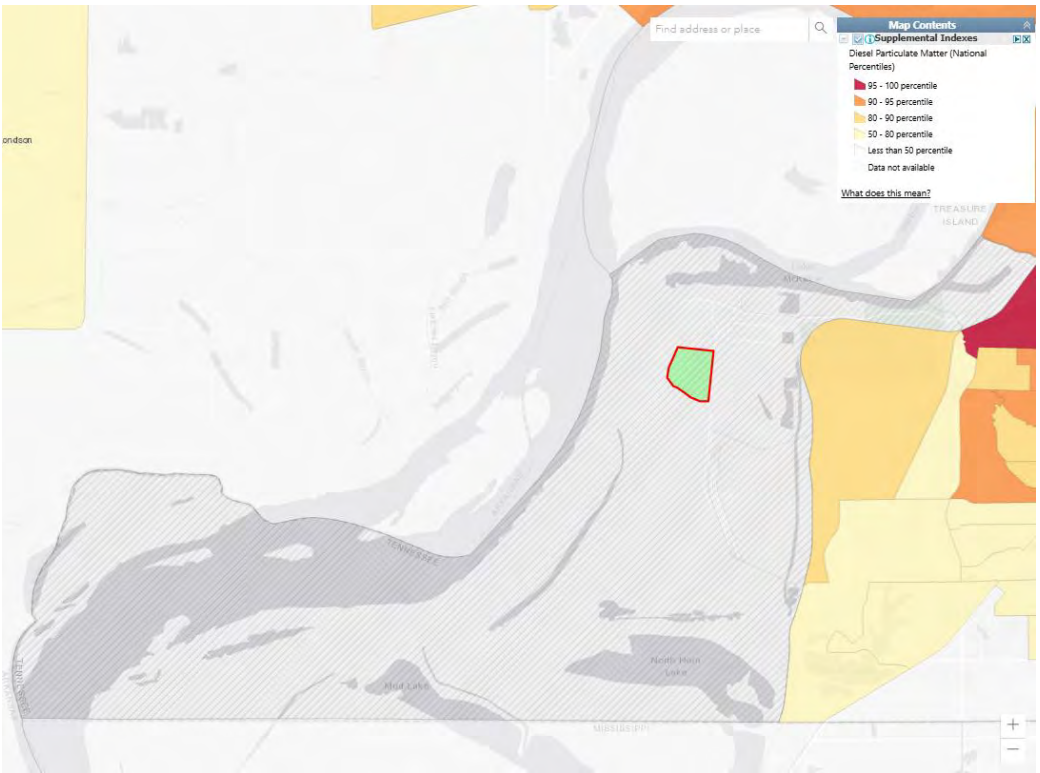


Figure 3-10. Environmental Justice Index – Toxic Releases to Air

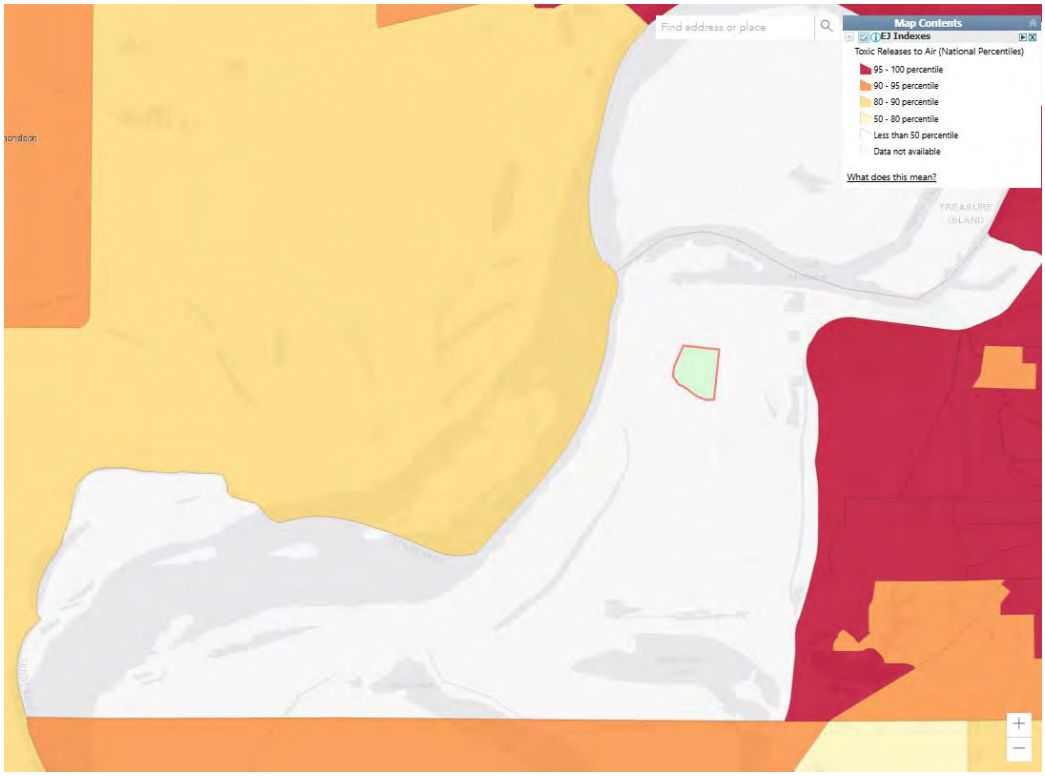


Figure 3-11. Supplemental Index – Toxic Releases to Air

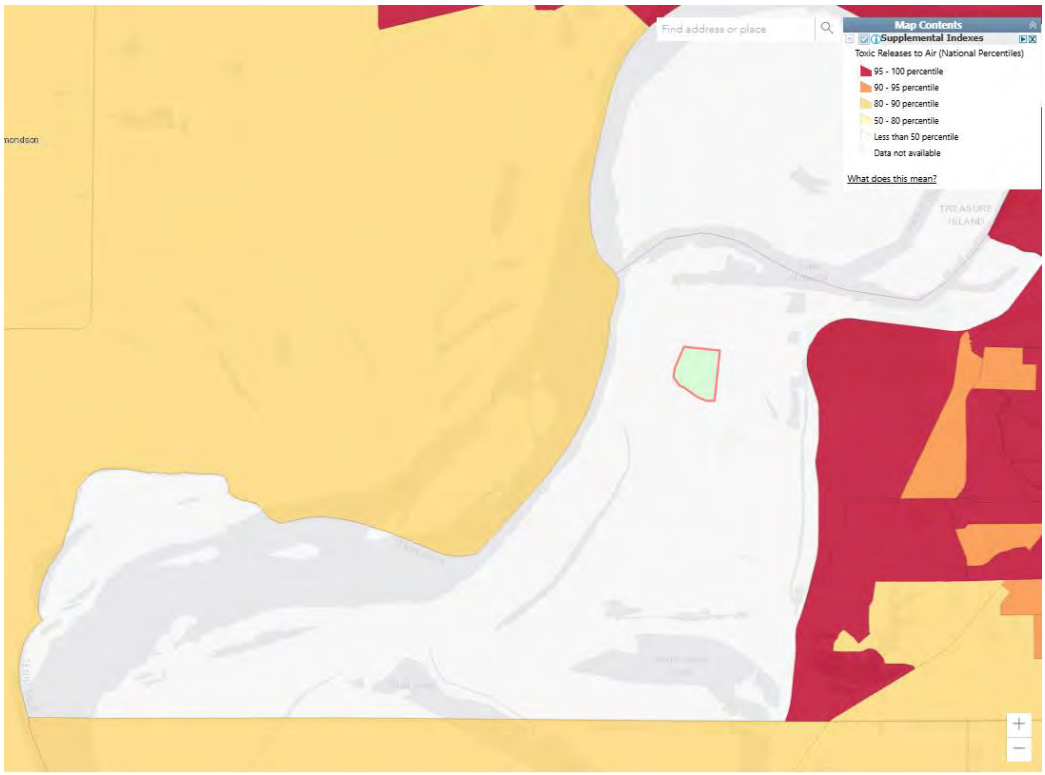


Figure 3-12. Environmental Justice Index – Traffic Proximity

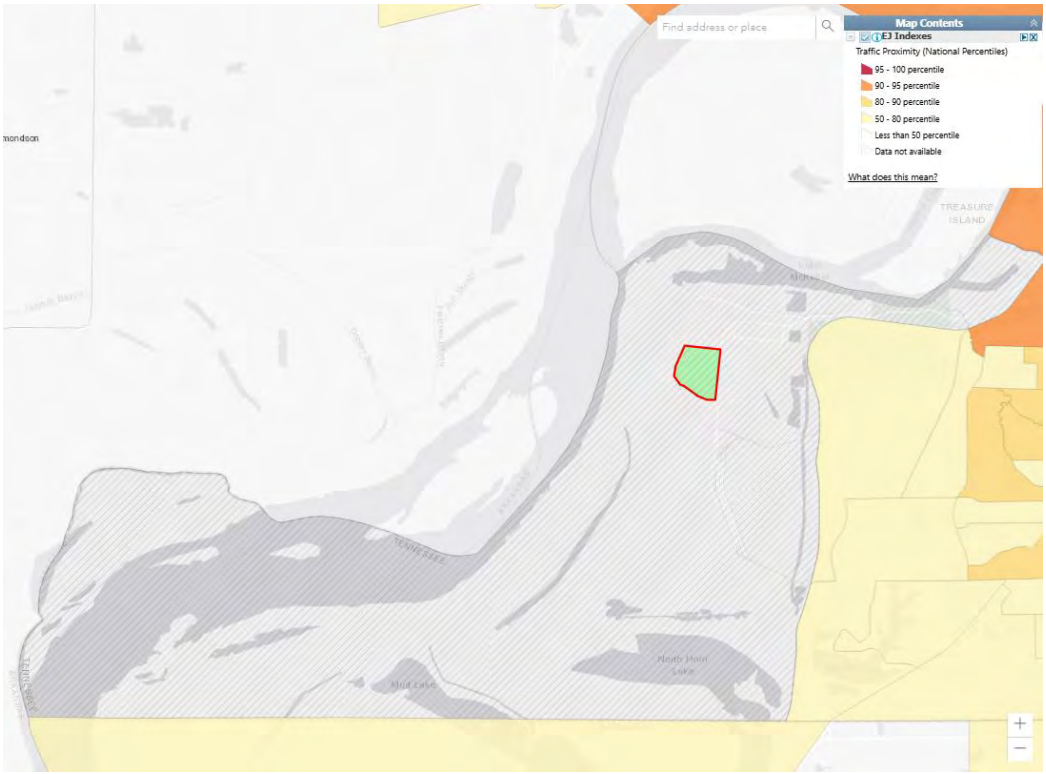


Figure 3-13. Supplemental Index – Traffic Proximity

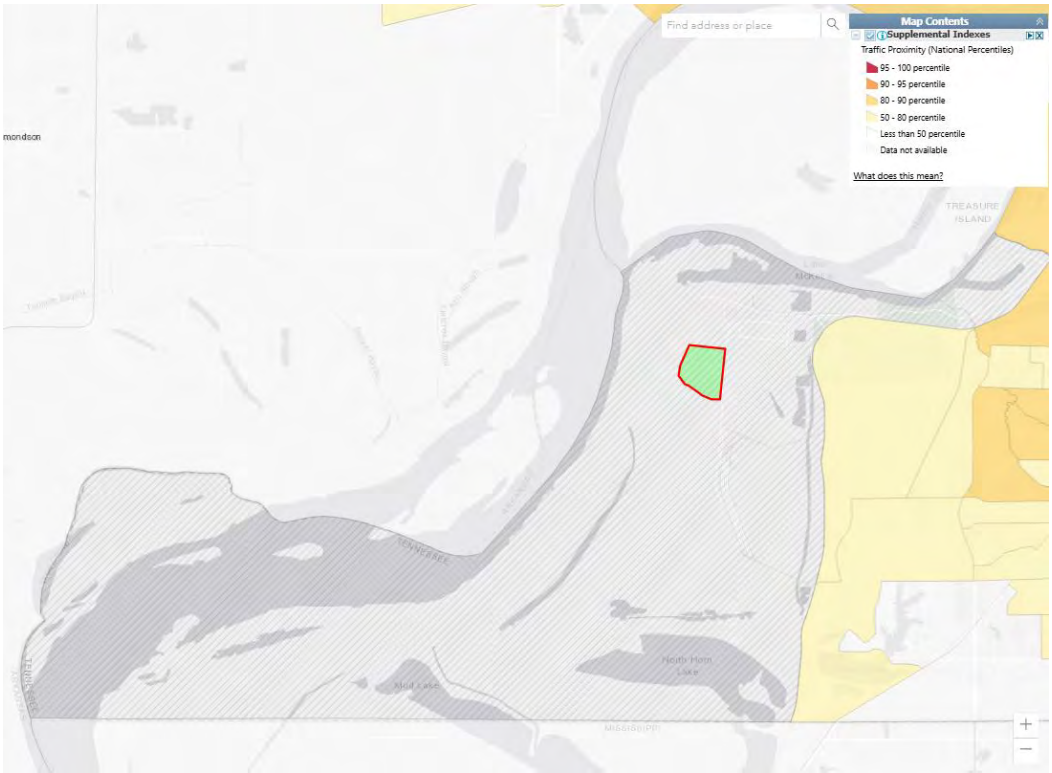


Figure 3-14. Environmental Justice Index – Lead Paint

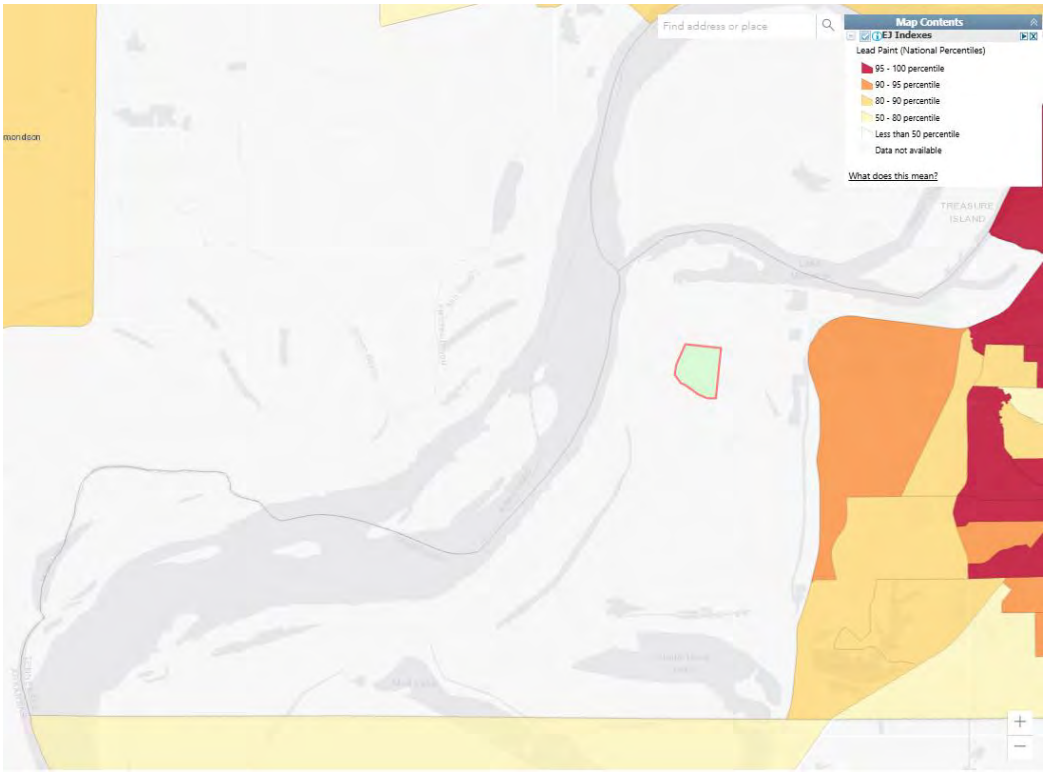


Figure 3-15. Supplemental Index – Lead Paint

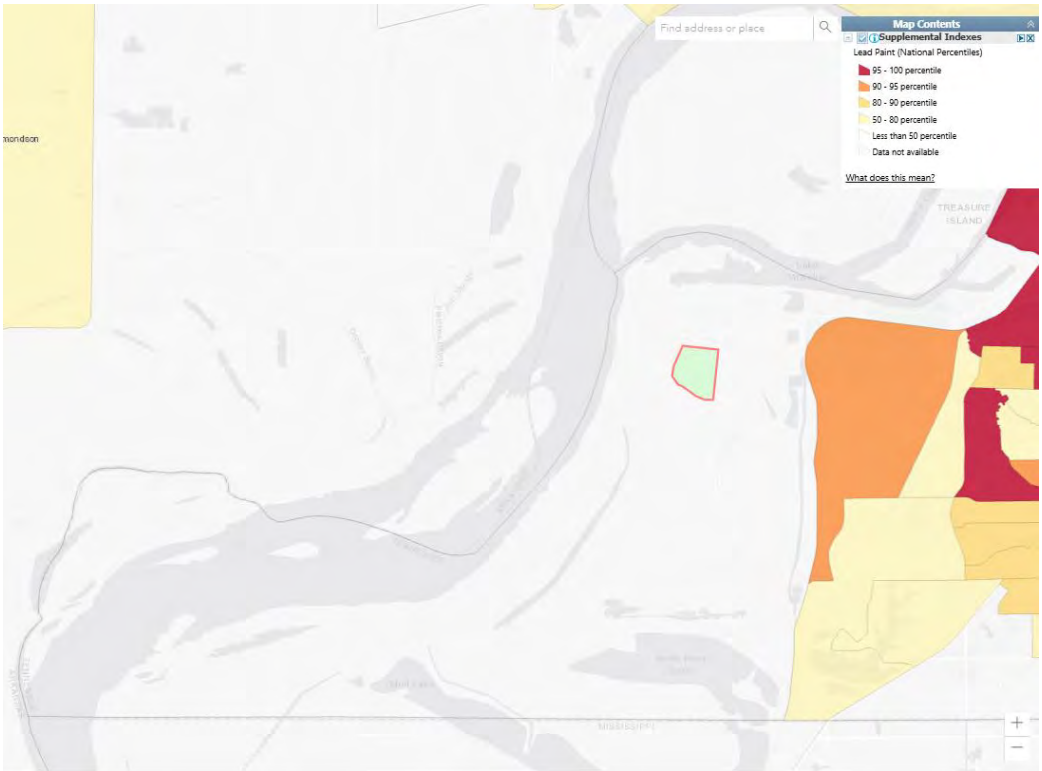


Figure 3-16. Environmental Justice Index – Superfund Proximity

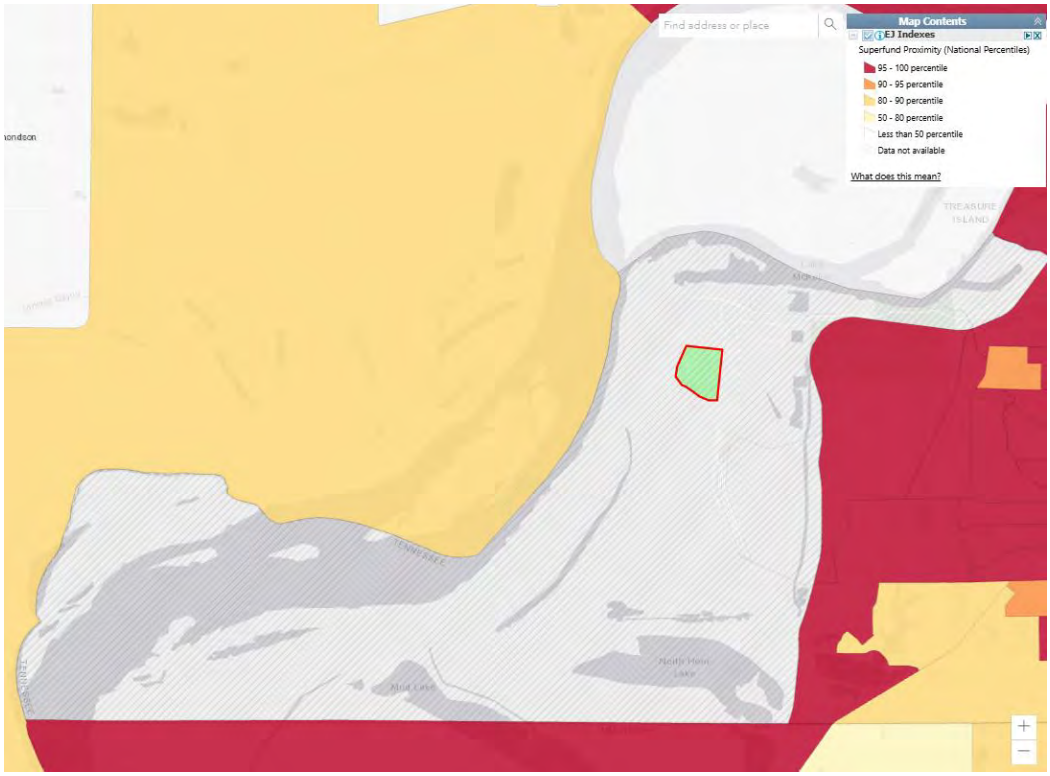


Figure 3-17. Supplemental Index – Superfund Proximity

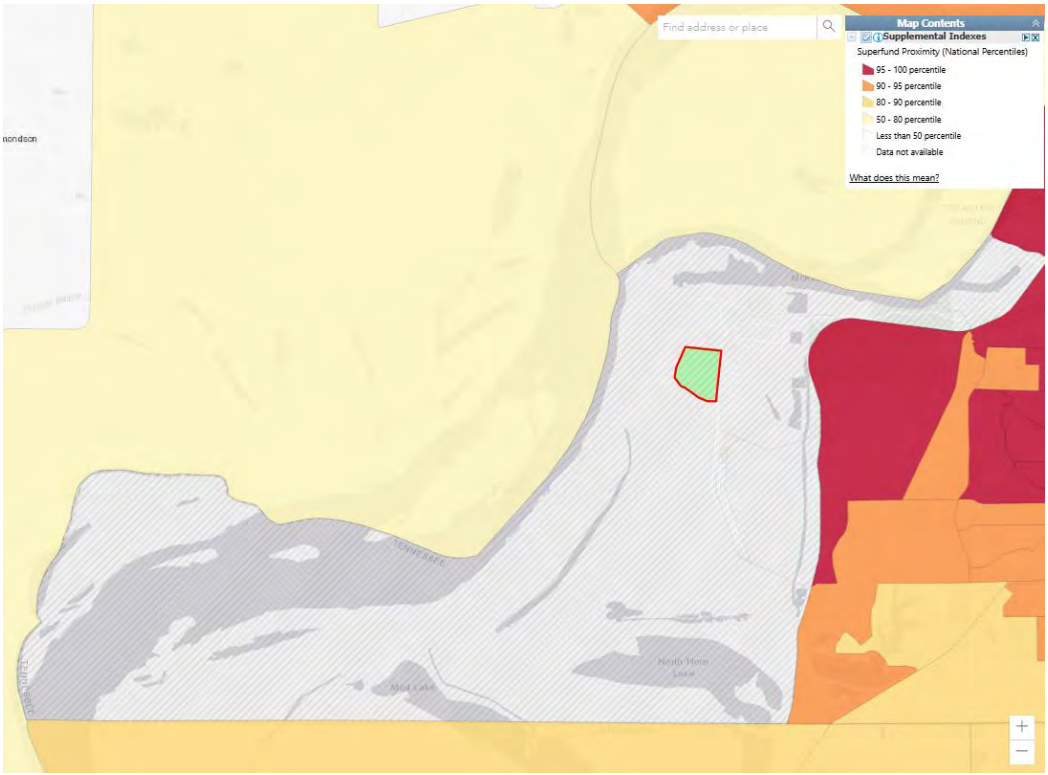


Figure 3-18. Environmental Justice Index – RMP Facility Proximity

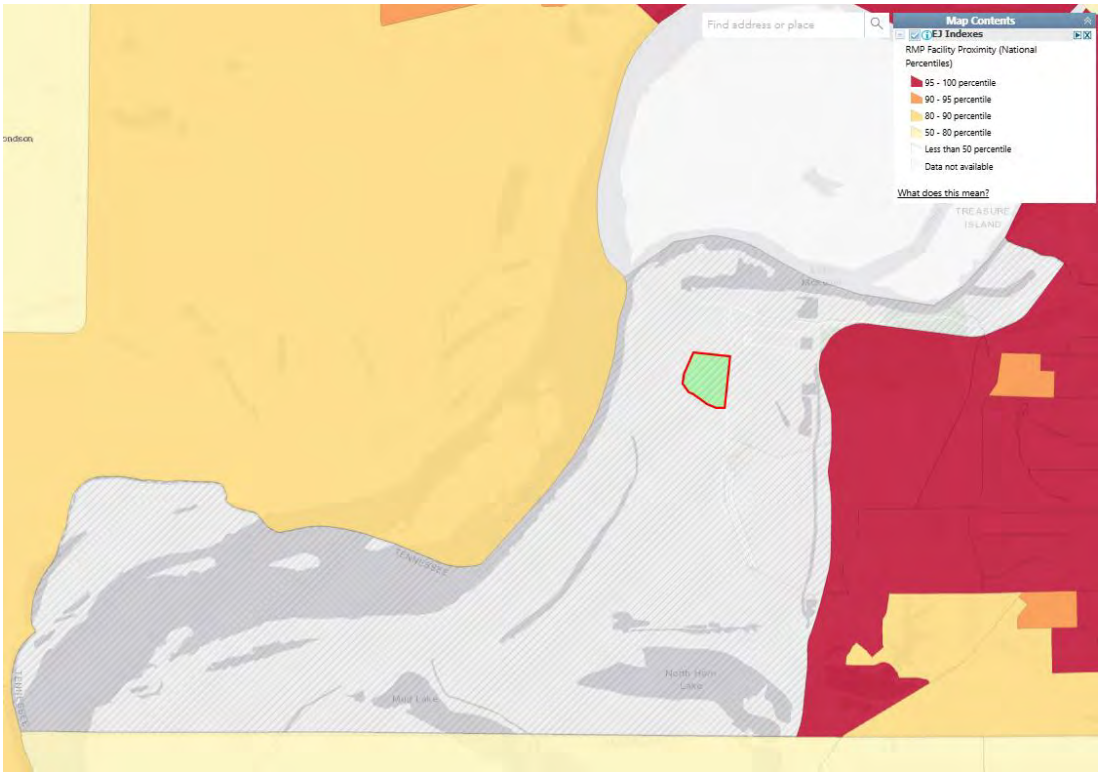


Figure 3-19. Supplemental Index – RMP Facility Proximity

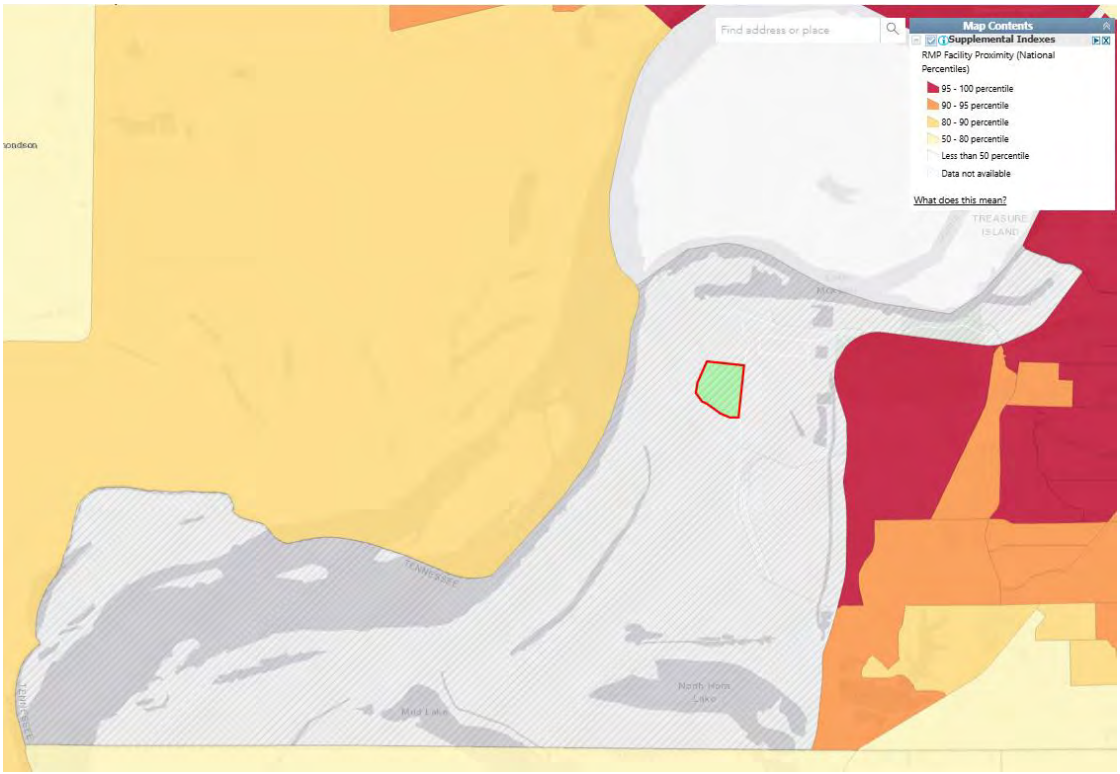


Figure 3-20. Environmental Justice Index – Hazardous Waste Proximity

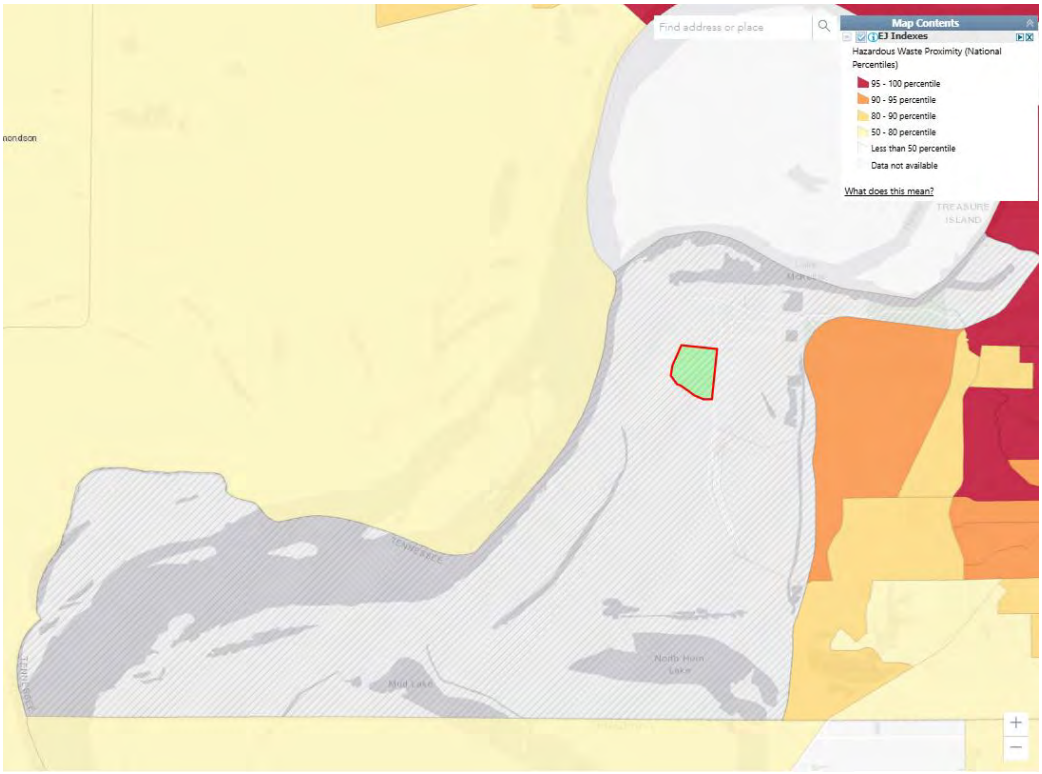


Figure 3-21. Supplemental Index – Hazardous Waste Proximity

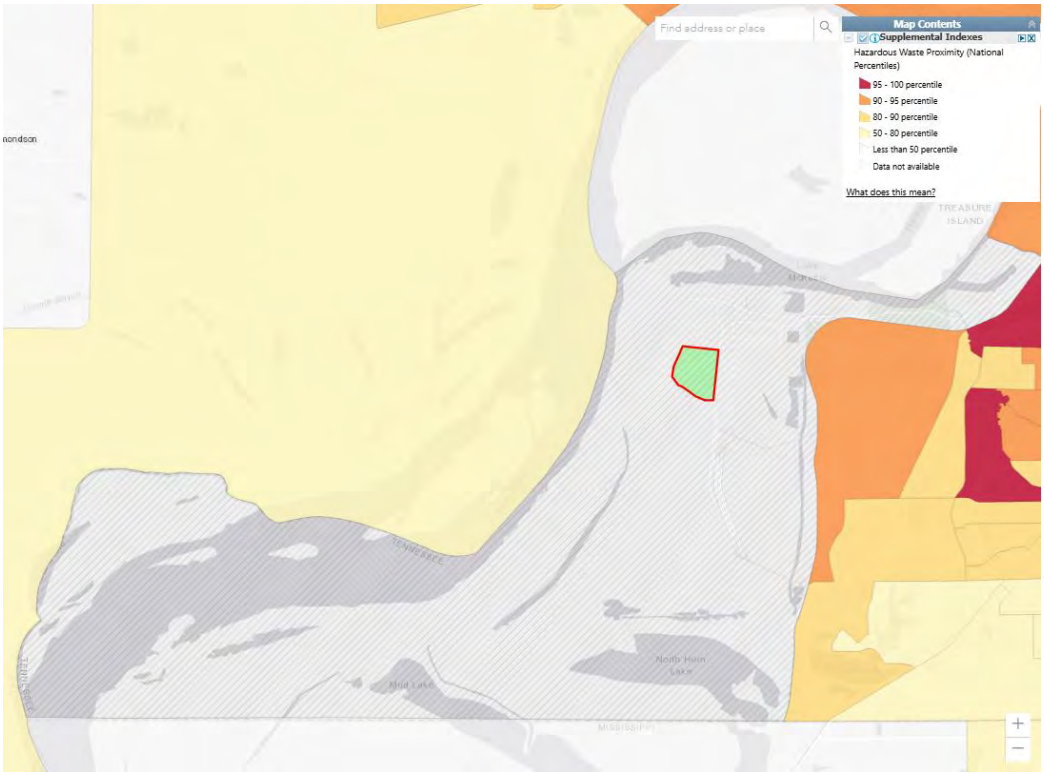


Figure 3-22. Environmental Justice Index – Underground Storage Tanks

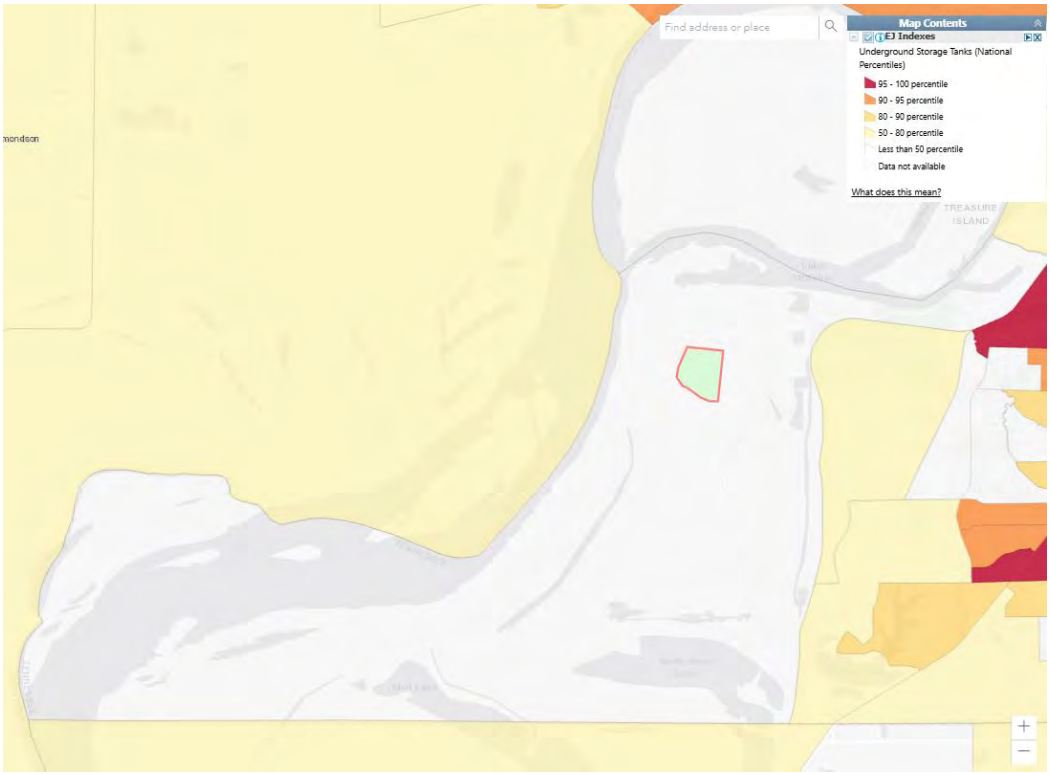


Figure 3-23. Supplemental Index – Underground Storage Tanks

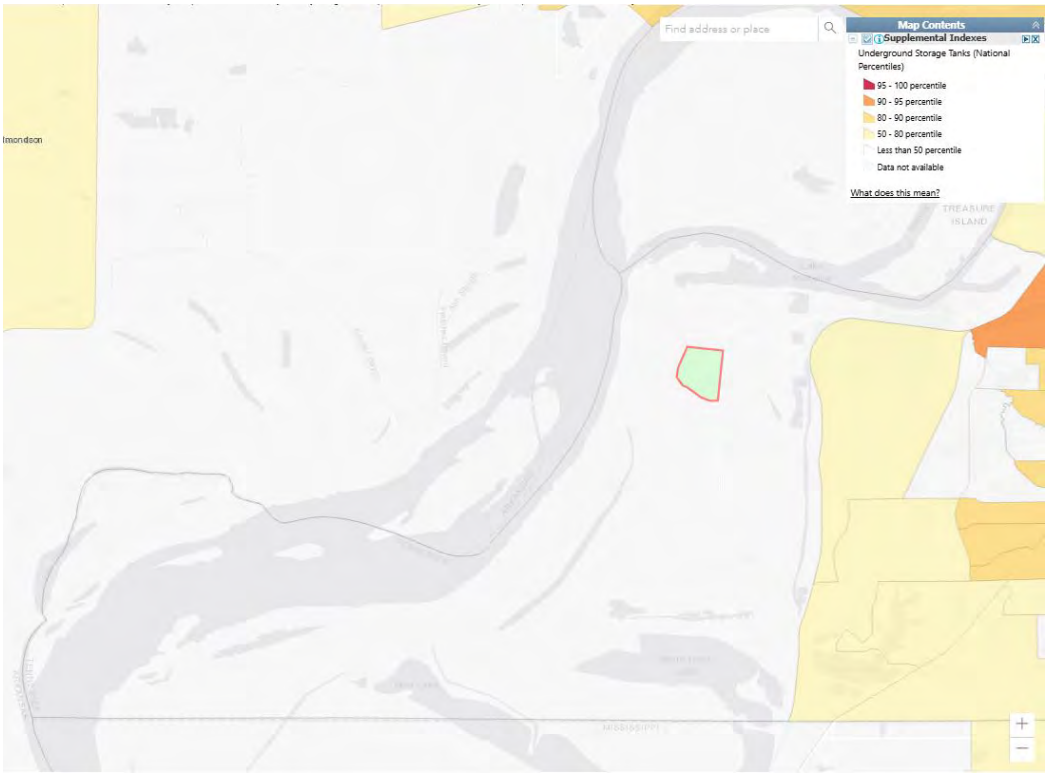


Figure 3-24. Environmental Justice Index – Wastewater Discharge

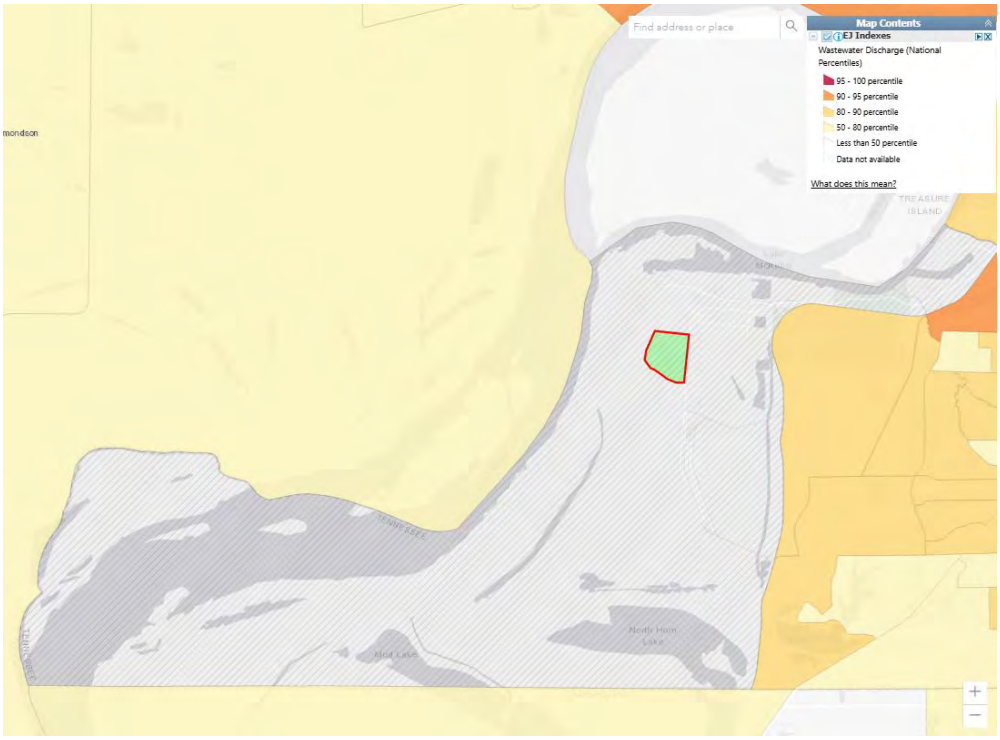


Figure 3-25. Supplemental Index – Wastewater Discharge

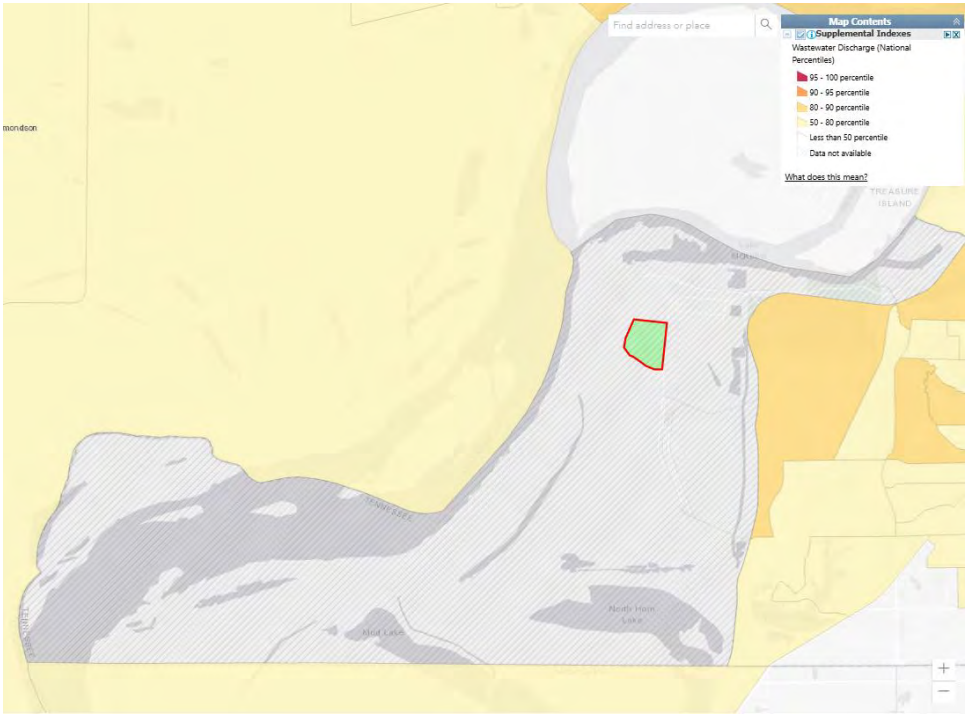


Figure 3-26. Environmental Justice Index – Drinking Water Non-Compliance

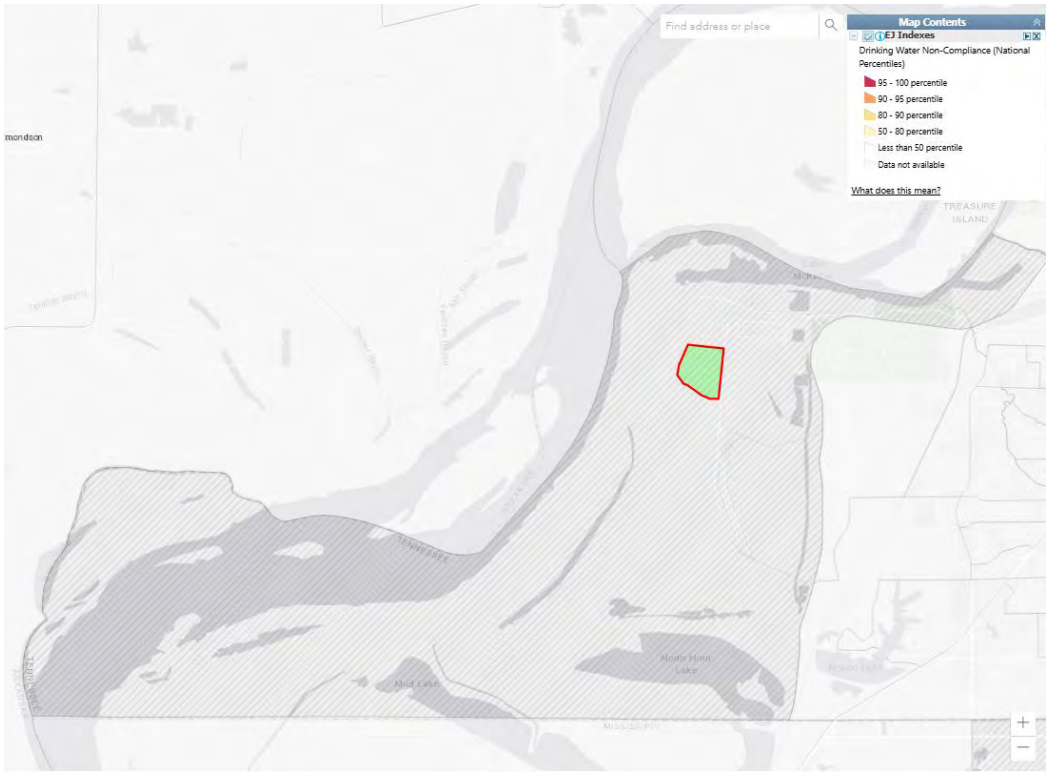


Figure 3-27. Supplemental Index – Drinking Water Non-Compliance

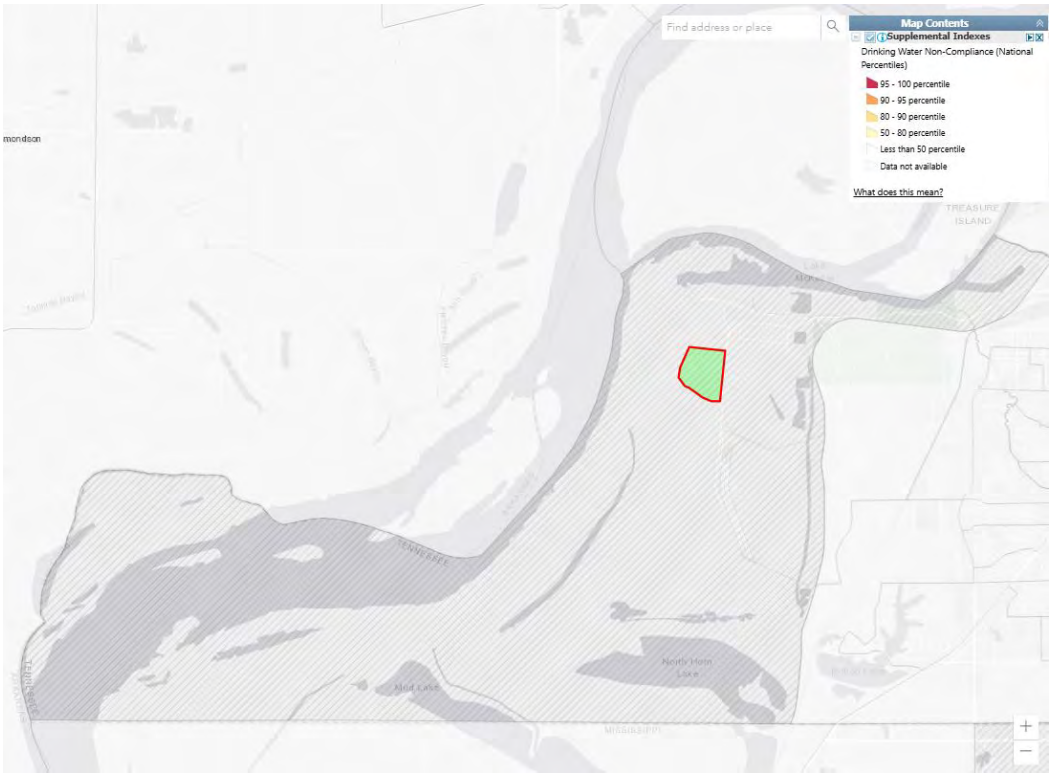


Figure 3-28. ACS Summary

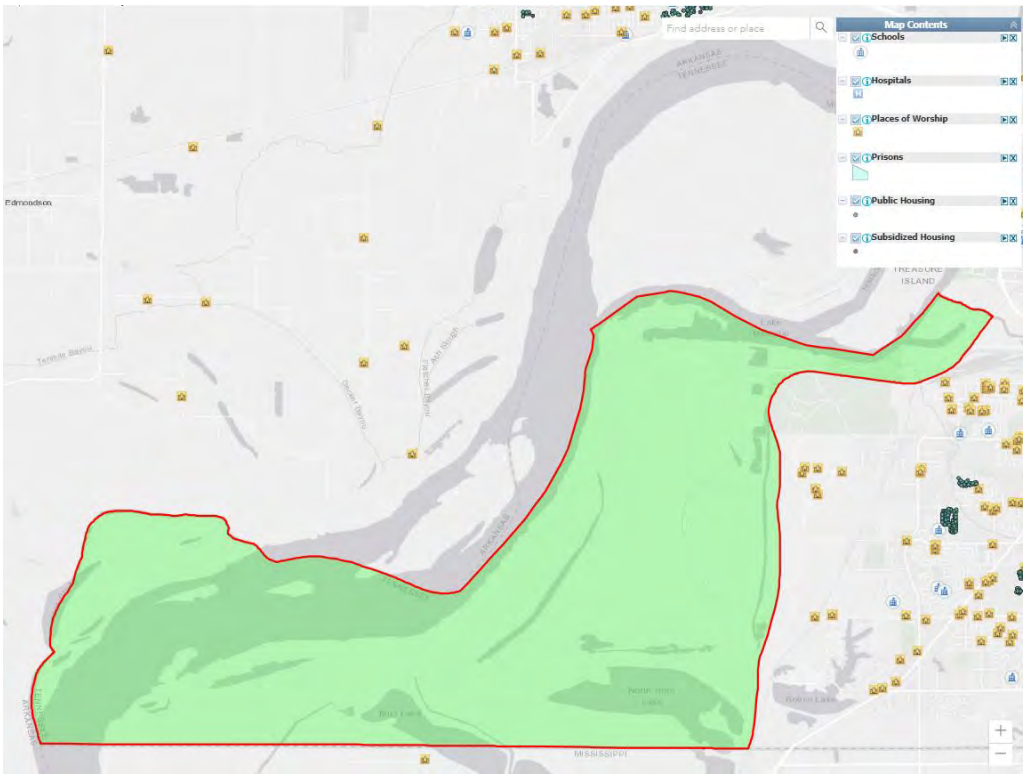
EPA United States Environmental Protection Agency

EJSCREEN ACS Summary Report

Location: Blockgroup: 471579803001
Ring (buffer): 0-mile radius
Description:

Summary of ACS Estimates	2018 - 2022
Population	0
Population Density (per sq. mile)	0
People of Color Population	0
% People of Color Population	0%
Households	0
Housing Units	0
Housing Units Built Before 1950	0
Per Capita Income	N/A
Land Area (sq. miles) (Source: SF1)	35.84
% Land Area	96%
Water Area (sq. miles) (Source: SF1)	1.45
% Water Area	4%

Figure 3-29. Community Landmarks



4. REGULATORY REVIEW

CTC is subject to certain federal and state air regulations. This section of the application summarizes the air permitting requirements and key air quality regulations that apply to CTC under both federal and state permitting programs. A summary of federal, state, and local regulations applicable is included as Appendix A.

4.1 Shelby County Health Department Operating Permit Program

"Major source" is defined as:[2]

> *"Major source" means any stationary source (or any group of stationary sources that are located on one or more contiguous or adjacent properties, and are under common control of the same person [or persons under common control]) belonging to a single major industrial grouping and that are described in subparts (i), (ii), (iii) or (iv) of this definition. For the purposes of defining "major source," a stationary source or group of stationary sources shall be considered part of a single industrial grouping if all of the pollutant emitting activities at such source or group of sources on contiguous or adjacent properties belong to the same Major Group (i.e., all have the same two-digit code) as described in the Standard Industrial Classification Manual, 1987….*

4.2 Shelby County Health Department Growth Policy

TAPCR 1200-03-09.01(5), as incorporated by SCAC 3-5, is the Growth Policy for construction or modifications of sources in attainment and unclassified areas or nonattainment areas. Shelby County is currently designated as an area of attainment or unclassified for all National Ambient Air Quality Standards (NAAQS).

Pursuant to 1200-03-09.01(5)(a) and 1200-03-09.01(5)(b)(2), the Growth Policy applies to permits for:

- Construction or modification of air contaminant source(s).

This application for CTC is for a synthetic minor operating permit for existing sources in an attainment area. The application does not request construction or modification authorization and is therefore not subject to review under the Growth Policy.

4.3 Tennessee Ambient Air Quality Standards

TAPCR 1200-3-3.03(1)(a) as incorporated by SCAC 3-6 are the Ambient Air Quality Standards for total suspended particulates (TSP), PM_{10}, sulfur dioxide (SO_2), carbon monoxide (CO), ozone, NO_X, and lead.

The State of Tennessee uses NAAQS and Acceptable Ambient Levels (AALs)[3] to ensure that air quality is maintained, through the ambient monitoring as well as ambient prediction (modeling) activities of the Division. The state of Tennessee may require externally provided air quality dispersion modeling submittals from industries seeking to obtain Air Pollution Control construction permits in order to demonstrate ambient

[2] TAPCR 1200-03-09-.02(11)(b)14 as incorporated by SCAC Section 3-5.

[3] Tennessee Division of Air Pollution Control Dispersion Modeling Guidance last updated November 9, 2022.

compliance with the NAAQS standards for criteria pollutants defined by USEPA (Criteria Air Pollutants | US EPA) as well as the State AALs for air toxic pollutants defined by the USEPA National Emission Standards for Hazardous Air Pollutants (NESHAP) program (Initial List of Hazardous Air Pollutants with Modifications | US EPA).

Specifically, the Tennessee Air Pollution Control Division (TAPCD) uses dispersion modeling analyses in combination with Tennessee's AALs for certain toxic air contaminants, and several NAAQS for federally designated criteria air pollutants, to protect air quality in the state, by requiring dispersion modeling analyses through the following two main programs:

1. Prevention of Significant Deterioration (PSD) and Non-attainment New Source Review (NNSR) for new and modified emission sources of criterial pollutants, as well as State Implementation Plan (SIP) revisions for existing sources near areas of measured or modeled pollutant concentrations which exceed NAAQS levels.

2. Air Toxics related to HCl and HF emissions to test for compliance with AAL's prescribed in TDEC APCD Rule 1200-03-03-.03(1)(b) and (c).

Since CTC does not meet either of these criteria, an air dispersion modeling analysis is not required.

4.4 New Source Performance Standards (NSPS)

4.4.1 40 CFR Part 60 Subpart A – General Provisions

All affected sources are subject to the general provisions of NSPS Subpart A unless specifically excluded by the source-specific NSPS. Subpart A requires initial notification and performance testing, recordkeeping, monitoring, provides reference methods, and mandates general control device requirements for all other subparts as applicable.

4.4.2 40 CFR Part 60 Subpart GG – Standards of Performance for Stationary Gas Turbines

CTC is exempt from the requirements of NSPS GG since it will become subject to the requirements of NSPS KKKK following the installation of stationary combustion turbines. as stated at § 60.4305(b), "Stationary combustion turbines regulated under this subpart are exempt from the requirements of Subpart GG of this part. Heat recovery steam generators and duct burners regulated under this subpart are exempted from the requirements of Subparts Da, Db, and Dc of this part."

4.4.3 40 CFR Part 60 Subpart KKKK - Standards of Performance for Stationary Combustion Turbines (EU01 – EU15)

CTC expects to install and operate the following sources as stationary combustion turbines. Because they were constructed after the applicability date for NSPS KKKK, they are subject to the standard.

SOURCES

Solar SMT-130 Turbines (EU01 through EU15).

SUMMARY

The turbines at CTC are subject to NSPS KKKK.

EMISSION LIMITS AND CALCULATIONS

The NO_X emission limit for each *new turbine firing natural gas is* 25 ppm at 15 percent O_2 or 150 ng/J of useful output (1.2 lb/MWh).

The SO_2 emission limit is 110 nanograms per Joule (ng/J) (0.90 pounds per megawatt-hour (lb/MWh)) gross output.

WORK PRACTICE STANDARDS

Operate and maintain the combustion turbines, air pollution control equipment, and monitoring equipment in a manner consistent with good air pollution control practices for minimizing emissions at all times including during startup, shutdown, and malfunction.

PERFORMANCE TESTING

By using SCR control technology, CTC will conduct annual performance testing on each turbine to demonstrate continuous compliance. If testing indicates that emissions are less than or equal to 75% of the NO_X limit, testing may be reduced to every 2 years. If testing indicates that emissions are greater than 75% of the NO_X limit, annual testing must resume.

RECORDKEEPING

Keep the following records:

- All submitted notifications and reports
- All startup and shutdown information
- All malfunction information
- Natural gas certificate of analysis for sulfur content
- Performance test notifications and reports

Maintain all records for at least five years.

REPORTING

Applicable reporting dates:

- Performance Test Notifications – due 30 days before the test date
- Performance Test Reports – due within 60 days after the test date

Submit all reports to SCHD.

§ 60.4300 What is the purpose of this subpart?
This subpart establishes emission standards and compliance schedules for the control of emissions from stationary combustion turbines that commenced construction, modification or reconstruction after February 18, 2005.

The turbines at CTC were constructed after February 18, 2005 and are affected sources.

§ 60.4305 Does this subpart apply to my stationary combustion turbine?

(a) If you are the owner or operator of a stationary combustion turbine with a heat input at peak load equal to or greater than 10.7 gigajoules (10 MMBtu) per hour, based on the higher heating value of the fuel, which commenced construction, modification, or reconstruction after February 18, 2005, your turbine is subject to this subpart. Only heat input to the combustion turbine should be included when determining whether or not this subpart is applicable to your turbine. Any additional heat input to associated heat recovery steam generators (HRSG) or duct burners should not be included when determining your peak heat input. However, this subpart does apply to emissions from any associated HRSG and duct burners.

The heat input for all turbines at CTC are greater than 10 MMBtu/hr.

(b) Stationary combustion turbines regulated under this subpart are exempt from the requirements of subpart GG of this part. Heat recovery steam generators and duct burners regulated under this subpart are exempted from the requirements of subparts Da, Db, and Dc of this part.

Based on this paragraph, CTC is exempt from NSPS GG.

§ 60.4310 What types of operations are exempt from these standards of performance?

(a) Emergency combustion turbines, as defined in § 60.4420(i), are exempt from the nitrogen oxides (NO_X) emission limits in § 60.4320.

(b) Stationary combustion turbines engaged by manufacturers in research and development of equipment for both combustion turbine emission control techniques and combustion turbine efficiency improvements are exempt from the NO_X emission limits in § 60.4320 on a case-by-case basis as determined by the Administrator.

(c) Stationary combustion turbines at integrated gasification combined cycle electric utility steam generating units that are subject to subpart Da of this part are exempt from this subpart.

(d) Combustion turbine test cells/stands are exempt from this subpart.

The turbines at CTC do not meet any exemption criteria.

§ 60.4315 What pollutants are regulated by this subpart?

The pollutants regulated by this subpart are nitrogen oxide (NO_X) and sulfur dioxide (SO_2).

§ 60.4320 What emission limits must I meet for nitrogen oxides (NO_X)?

(a) You must meet the emission limits for NO_X specified in Table 1 to this subpart.

The Table 1 applicable category for CTC is *New turbine firing natural gas*. As such, the NSPS KKKK NO_X emission limit is 25 ppm at 15 percent O_2 or 150 ng/J of useful output (1.2 lb/MWh).

CTC is using SCR to control NO_X emissions to 2 ppm NO_X at 15 percent O_2.

(b) If you have two or more turbines that are connected to a single generator, each turbine must meet the emission limits for NO_X.

CTC does not have two or more turbines that are connected to a single generator.

§ 60.4325 What emission limits must I meet for NO_X if my turbine burns both natural gas and distillate oil (or some other combination of fuels)?

You must meet the emission limits specified in Table 1 to this subpart. If your total heat input is greater than or equal to 50 percent natural gas, you must meet the corresponding limit for a natural gas-fired turbine when you are burning that fuel. Similarly, when your total heat input is greater than 50 percent distillate oil and fuels other than natural gas, you must meet the corresponding limit for distillate oil and fuels other than natural gas for the duration of the time that you burn that particular fuel.

CTC only combusts natural gas. Thus, this paragraph is not applicable.

§ 60.4330 What emission limits must I meet for sulfur dioxide (SO_2)?

(a) If your turbine is located in a continental area, you must comply with either paragraph (a)(1), (a)(2), or (a)(3) of this section. If your turbine is located in Alaska, you do not have to comply with the requirements in paragraph (a) of this section until January 1, 2008.

(1) You must not cause to be discharged into the atmosphere from the subject stationary combustion turbine any gases which contain SO_2 in excess of 110 nanograms per Joule (ng/J) (0.90 pounds per megawatt-hour (lb/MWh)) gross output;

CTC will meet the SO_2 emission limit of 110 nanograms per Joule (ng/J) (0.90 pounds per megawatt-hour (lb/MWh)) gross output by only combusting natural gas.

(2) You must not burn in the subject stationary combustion turbine any fuel which contains total potential sulfur emissions in excess of 26 ng SO_2/J (0.060 lb SO_2/MMBtu) heat input. If your turbine simultaneously fires multiple fuels, each fuel must meet this requirement; or

CTC will only combust natural gas and meets this requirement.

(3) For each stationary combustion turbine burning at least 50 percent biogas on a calendar month basis, as determined based on total heat input, you must not cause to be discharged into the atmosphere from the affected source any gases that contain SO_2 in excess of 65 ng SO_2/J (0.15 lb SO2/MMBtu) heat input.

This paragraph is not applicable, as CTC will only combust natural gas.

(b) If your turbine is located in a noncontinental area or a continental area that the Administrator determines does not have access to natural gas and that the removal of sulfur compounds would cause more environmental harm than benefit, you must comply with one or the other of the following conditions:

This paragraph is not applicable and the remainder has been omitted for brevity.

§ 60.4333 What are my general requirements for complying with this subpart?

(a) You must operate and maintain your stationary combustion turbine, air pollution control equipment, and monitoring equipment in a manner consistent with good air pollution control practices for minimizing emissions at all times including during startup, shutdown, and malfunction.

CTC will operate and maintain its stationary combustion turbines, air pollution control equipment, and monitoring equipment in a manner consistent with good air pollution control practices for minimizing emissions at all times including during startup, shutdown, and malfunction.

(b) When an affected unit with heat recovery utilizes a common steam header with one or more combustion turbines, the owner or operator shall either:

CTC does not utilize heat recovery nor steam. This paragraph is not applicable and the remainder has been omitted for brevity.

§ 60.4335 How do I demonstrate compliance for NO_X if I use water or steam injection?

CTC will demonstrate compliance by using SCR technology. This paragraph is not applicable and the remainder has been omitted for brevity.

§ 60.4340 How do I demonstrate continuous compliance for NO_X if I do not use water or steam injection?

(a) If you are not using water or steam injection to control NO_X emissions, you must perform annual performance tests in accordance with § 60.4400 to demonstrate continuous compliance. If the NO_X emission result from the performance test is less than or equal to 75 percent of the NO_X emission limit for the turbine, you may reduce the frequency of subsequent performance tests to once every 2 years (no more than 26 calendar months following the previous performance test). If the results of any subsequent performance test exceed 75 percent of the NO_X emission limit for the turbine, you must resume annual performance tests.

By using SCR control technology, CTC will conduct annual performance testing on each turbine to demonstrate continuous compliance. If testing indicates that emissions are less than or equal to 75% of the NO_X limit, testing may be reduced to every 2 years. If testing indicates that emissions are greater than 75% of the NO_X limit, annual testing must resume.

(b) As an alternative, you may install, calibrate, maintain and operate one of the following continuous monitoring systems:

CTC is aware that it may alternatively opt for one of the following continuous monitoring options instead of annual performance testing.

(1) Continuous emission monitoring as described in §§ 60.4335(b) and 60.4345, or

(2) Continuous parameter monitoring as follows:

(i) For a diffusion flame turbine without add-on selective catalytic reduction (SCR) controls, you must define parameters indicative of the unit's NO_X formation characteristics, and you must monitor these parameters continuously.

(ii) For any lean premix stationary combustion turbine, you must continuously monitor the appropriate parameters to determine whether the unit is operating in low-NO_X mode.

(iii) For any turbine that uses SCR to reduce NO_X emissions, you must continuously monitor appropriate parameters to verify the proper operation of the emission controls.

(iv) For affected units that are also regulated under part 75 of this chapter, with state approval you can monitor the NO_X emission rate using the methodology in appendix E to part 75 of this chapter, or the low mass emissions methodology in § 75.19, the requirements of this paragraph (b) may be met by performing the parametric monitoring described in section 2.3 of part 75 appendix E or in § 75.19(c)(1)(iv)(H).

§ 60.4345 What are the requirements for the continuous emission monitoring system equipment, if I choose to use this option?

At this time CTC does not propose to utilize continuous emission monitoring. The remaining paragraphs have been omitted for brevity.

§ 60.4350 How do I use data from the continuous emission monitoring equipment to identify excess emissions?

At this time CTC does not propose to utilize continuous emission monitoring. The remaining paragraphs have been omitted for brevity.

§ 60.4355 How do I establish and document a proper parameter monitoring plan?

At this time CTC does not propose to utilize parameter monitoring. The remaining paragraphs have been omitted for brevity.

§ 60.4360 How do I determine the total sulfur content of the turbine's combustion fuel?

You must monitor the total sulfur content of the fuel being fired in the turbine, except as provided in § 60.4365. The sulfur content of the fuel must be determined using total sulfur methods described in § 60.4415. Alternatively, if the total sulfur content of the gaseous fuel during the most recent performance test was less than half the applicable limit, ASTM D4084, D4810, D5504, or D6228, or Gas Processors Association Standard 2377 (all of which are incorporated by reference, see § 60.17), which measure the major sulfur compounds, may be used.

CTC utilizes pipeline quality natural gas with a rating of 1 grain of sulfur per 100 scf.

§ 60.4365 How can I be exempted from monitoring the total sulfur content of the fuel?

You may elect not to monitor the total sulfur content of the fuel combusted in the turbine, if the fuel is demonstrated not to exceed potential sulfur emissions of 26 ng SO_2/J (0.060 lb SO_2/MMBtu) heat input for units located in continental areas and 180 ng SO_2/J (0.42 lb SO_2/MMBtu) heat input for units located in noncontinental areas or a continental area that the Administrator determines does not have access to natural gas and that the removal of sulfur compounds would cause more environmental harm than benefit. You must use one of the following sources of information to make the required demonstration:

(a) The fuel quality characteristics in a current, valid purchase contract, tariff sheet or transportation contract for the fuel, specifying that the maximum total sulfur content for oil use in continental areas is 0.05 weight percent (500 ppmw) or less and 0.4 weight percent (4,000 ppmw) or less for noncontinental areas, the total sulfur content for natural gas use in continental areas is 20 grains of sulfur or less per 100 standard cubic feet and 140 grains of sulfur or less per 100 standard cubic feet for noncontinental areas, has potential sulfur emissions of less than less than 26 ng SO_2/J (0.060 lb SO_2/MMBtu) heat input for continental areas and has potential sulfur emissions of less than less than 180 ng SO_2/J (0.42 lb SO2/MMBtu) heat input for noncontinental areas; or

CTC will be exempt from monitoring total sulfur by maintaining documentation that the maximum total sulfur content will be 20 grains of sulfur or less per 100 standard cubic feet.

The remaining paragraphs have been omitted for brevity.

§ 60.4370 How often must I determine the sulfur content of the fuel?

Per § 60.4365, CTC is exempt from determining sulfur content by using pipeline quality natural gas.

The remaining paragraphs have been omitted for brevity.

§ 60.4375 What reports must I submit?

(a) For each affected unit required to continuously monitor parameters or emissions, or to periodically determine the fuel sulfur content under this subpart, you must submit reports of excess emissions and monitor downtime, in accordance with § 60.7(c). Excess emissions must be reported for all periods of unit operation, including start-up, shutdown, and malfunction.

This paragraph is not applicable since CTC will demonstrate compliance utilizing annual performance testing.

(b) For each affected unit that performs annual performance tests in accordance with § 60.4340(a), you must submit a written report of the results of each performance test before the close of business on the 60th day following the completion of the performance test.

CTC will submit a written report of the results of each performance test before the close of business on the 60th day following the completion of the performance test.

§ 60.4380 How are excess emissions and monitor downtime defined for NO_X?

For the purpose of reports required under § 60.7(c), periods of excess emissions and monitor downtime that must be reported are defined as follows:

(a) For turbines using water or steam to fuel ratio monitoring:

CTC is not using water nor steam to fuel ratio monitoring. The remaining paragraphs have been omitted for brevity.

(b) For turbines using continuous emission monitoring, as described in §§ 60.4335(b) and 60.4345:

CTC does not implement continuous emission monitoring. The remaining paragraphs have been omitted for brevity.

(c) For turbines required to monitor combustion parameters or parameters that document proper operation of the NO_X emission controls:

CTC does not implement parametric monitoring. The remaining paragraphs have been omitted for brevity.

§ 60.4385 How are excess emissions and monitoring downtime defined for SO_2?

CTC is exempt from sulfur content monitoring. The remaining paragraphs have been omitted for brevity.

§ 60.4390 What are my reporting requirements if I operate an emergency combustion turbine or a research and development turbine?

CTC does not operate an emergency combustion turbine nor a research and development turbine. The remaining paragraphs have been omitted for brevity.

§ 60.4395 When must I submit my reports?

All reports required under § 60.7(c) must be postmarked by the 30th day following the end of each 6-month period.

All reports required under § 60.7(c) will be postmarked by the 30th day following the end of each 6-month period.

§ 60.4400 How do I conduct the initial and subsequent performance tests, regarding NO_X?

(a) You must conduct an initial performance test, as required in § 60.8. Subsequent NO_X performance tests shall be conducted on an annual basis (no more than 14 calendar months following the previous performance test).

CTC will conduct the initial performance test and subsequent performance tests, as required.

(1) There are two general methodologies that you may use to conduct the performance tests. For each test run:

(i) Measure the NO_X concentration (in parts per million (ppm)), using EPA Method 7E or EPA Method 20 in appendix A of this part. For units complying with the output based standard, concurrently measure the stack gas flow rate, using EPA Methods 1 and 2 in appendix A of this part, and measure and record the electrical and thermal output from the unit. Then, use the following equation to calculate the NO_X emission rate:

$$E = \frac{1.194 \times 10^{-7} * (NO_x)_c * Q_{std}}{P} \quad (Eq. 5)$$

Where:
E = NO_X emission rate, in lb/MWh
1.194 × 10−7 = conversion constant, in lb/dscf-ppm
$(NO_X)c$ = average NO_X concentration for the run, in ppm
Qstd = stack gas volumetric flow rate, in dscf/hr
P = gross electrical and mechanical energy output of the combustion turbine, in MW (for simple-cycle operation), for combined-cycle operation, the sum of all electrical and mechanical output from the combustion and steam turbines, or, for combined heat and power operation, the sum of all electrical and

mechanical output from the combustion and steam turbines plus all useful recovered thermal output not used for additional electric or mechanical generation, in MW, calculated according to § 60.4350(f)(2); or

(ii) Measure the NO_X and diluent gas concentrations, using either EPA Methods 7E and 3A, or EPA Method 20 in appendix A of this part. Concurrently measure the heat input to the unit, using a fuel flowmeter (or flowmeters), and measure the electrical and thermal output of the unit. Use EPA Method 19 in appendix A of this part to calculate the NO_X emission rate in lb/MMBtu. Then, use Equations 1 and, if necessary, 2 and 3 in § 60.4350(f) to calculate the NO_X emission rate in lb/MWh.

(2) Sampling traverse points for NO_X and (if applicable) diluent gas are to be selected following EPA Method 20 or EPA Method 1 (non-particulate procedures), and sampled for equal time intervals. The sampling must be performed with a traversing single-hole probe, or, if feasible, with a stationary multi-hole probe that samples each of the points sequentially. Alternatively, a multi-hole probe designed and documented to sample equal volumes from each hole may be used to sample simultaneously at the required points.
(3) Notwithstanding paragraph (a)(2) of this section, you may test at fewer points than are specified in EPA Method 1 or EPA Method 20 in appendix A of this part if the following conditions are met:

(i) You may perform a stratification test for NO_X and diluent pursuant to
(A) [Reserved], or

(B) The procedures specified in section 6.5.6.1(a) through (e) of appendix A of part 75 of this chapter.

(ii) Once the stratification sampling is completed, you may use the following alternative sample point selection criteria for the performance test:

(A) If each of the individual traverse point NO_X concentrations is within ±10 percent of the mean concentration for all traverse points, or the individual traverse point diluent concentrations differs by no more than ±5ppm or ±0.5 percent CO_2 (or O_2) from the mean for all traverse points, then you may use three points (located either 16.7, 50.0 and 83.3 percent of the way across the stack or duct, or, for circular stacks or ducts greater than 2.4 meters (7.8 feet) in diameter, at 0.4, 1.2, and 2.0 meters from the wall). The three points must be located along the measurement line that exhibited the highest average NO_X concentration during the stratification test; or

(B) For turbines with a NO_X standard greater than 15 ppm @ 15% O_2, you may sample at a single point, located at least 1 meter from the stack wall or at the stack centroid if each of the individual traverse point NO_X concentrations is within ±5 percent of the mean concentration for all traverse points, or the individual traverse point diluent concentrations differs by no more than ±3ppm or ±0.3 percent CO_2 (or O_2) from the mean for all traverse points; or

CTC has a NO_X standard greater than 15 ppm @ 15% O_2, and may sample at a single point, located at least 1 meter from the stack wall or at the stack centroid if each of the individual traverse point NO_X concentrations is within ±5 percent of the mean concentration for all traverse points, or the individual traverse point diluent concentrations differs by no more than ±3ppm or ±0.3 percent CO_2 (or O_2) from the mean for all traverse points.

(C) For turbines with a NO_X standard less than or equal to 15 ppm @ 15% O_2, you may sample at a single point, located at least 1 meter from the stack wall or at the stack centroid if each of the individual traverse point NO_X concentrations is within ±2.5 percent of the mean concentration for all traverse points, or the individual traverse point diluent concentrations differs by no more than ±1ppm or ±0.15 percent CO_2 (or O_2) from the mean for all traverse points.

(b) The performance test must be done at any load condition within plus or minus 25 percent of 100 percent of peak load. You may perform testing at the highest achievable load point, if at least 75 percent of peak load cannot be achieved in practice. You must conduct three separate test runs for each performance test. The minimum time per run is 20 minutes.

(1) If the stationary combustion turbine combusts both oil and gas as primary or backup fuels, separate performance testing is required for each fuel.

(2) For a combined cycle and CHP turbine systems with supplemental heat (duct burner), you must measure the total NO_X emissions after the duct burner rather than directly after the turbine. The duct burner must be in operation during the performance test.

(3) If water or steam injection is used to control NO_X with no additional post-combustion NO_X control and you choose to monitor the steam or water to fuel ratio in accordance with § 60.4335, then that monitoring system must be operated concurrently with each EPA Method 20 or EPA Method 7E run and must be used to determine the fuel consumption and the steam or water to fuel ratio necessary to comply with the applicable § 60.4320 NO_X emission limit.

(4) Compliance with the applicable emission limit in § 60.4320 must be demonstrated at each tested load level. Compliance is achieved if the three-run arithmetic average NO_X emission rate at each tested level meets the applicable emission limit in § 60.4320.

(5) If you elect to install a CEMS, the performance evaluation of the CEMS may either be conducted separately or (as described in § 60.4405) as part of the initial performance test of the affected unit.

(6) The ambient temperature must be greater than 0 °F during the performance test.

§ 60.4405 How do I perform the initial performance test if I have chosen to install a NO_X-diluent CEMS?

CTC does not utilize a CEMS. The remaining paragraphs have been omitted for brevity.

§ 60.4410 How do I establish a valid parameter range if I have chosen to continuously monitor parameters?

CTC does not utilize parametric monitoring. The remaining paragraphs have been omitted for brevity.

§ 60.4415 How do I conduct the initial and subsequent performance tests for sulfur?

(a) You must conduct an initial performance test, as required in § 60.8. Subsequent SO_2 performance tests shall be conducted on an annual basis (no more than 14 calendar months following the previous performance test). There are four methodologies that you may use to conduct the performance tests.

(1) The use of a current, valid purchase contract, tariff sheet, or transportation contract for the fuel specifying the maximum total sulfur content of all fuels combusted in the affected facility. Alternately, the fuel sampling data specified in section 2.3.1.4 or 2.3.2.4 of appendix D to part 75 of this chapter may be used.

CTC will obtain a valid purchase contract, tariff sheet, or transportation contract for natural gas specifying the maximum total sulfur content annually.

The remaining paragraphs and options have been omitted for brevity.

§ 60.4420 What definitions apply to this subpart?

As used in this subpart, all terms not defined herein will have the meaning given them in the Clean Air Act and in subpart A (General Provisions) of this part.

Biogas means gas produced by the anaerobic digestion or fermentation of organic matter including manure, sewage sludge, municipal solid waste, biodegradable waste, or any other biodegradable feedstock, under anaerobic conditions. Biogas is comprised primarily of methane and CO_2.
Combined cycle combustion turbine means any stationary combustion turbine which recovers heat from the combustion turbine exhaust gases to generate steam that is only used to create additional power output in a steam turbine.
Combined heat and power combustion turbine means any stationary combustion turbine which recovers heat from the exhaust gases to heat water or another medium, generate steam for useful purposes other than additional electric generation, or directly uses the heat in the exhaust gases for a useful purpose.
Combustion turbine model means a group of combustion turbines having the same nominal air flow, combustor inlet pressure, combustor inlet temperature, firing temperature, turbine inlet temperature and turbine inlet pressure.
Combustion turbine test cell/stand means any apparatus used for testing uninstalled stationary or uninstalled mobile (motive) combustion turbines.
Diffusion flame stationary combustion turbine means any stationary combustion turbine where fuel and air are injected at the combustor and are mixed only by diffusion prior to ignition.
Duct burner means a device that combusts fuel and that is placed in the exhaust duct from another source, such as a stationary combustion turbine, internal combustion engine, kiln, etc., to allow the firing of additional fuel to heat the exhaust gases before the exhaust gases enter a heat recovery steam generating unit.
Efficiency means the combustion turbine manufacturer's rated heat rate at peak load in terms of heat input per unit of power output—based on the higher heating value of the fuel.
Emergency combustion turbine means any stationary combustion turbine which operates in an emergency situation. Examples include stationary combustion turbines used to produce power for critical networks or equipment, including power supplied to portions of a facility, when electric power from the local utility is interrupted, or stationary combustion turbines used to pump water in the case of fire or flood, etc. Emergency stationary combustion turbines do not include stationary combustion turbines used as peaking units at electric utilities or stationary combustion turbines at industrial facilities that typically operate at low capacity factors. Emergency combustion turbines may be operated for the purpose of maintenance checks and readiness testing, provided that the tests are required by the manufacturer, the vendor, or the insurance company associated with the turbine. Required testing of such units should be minimized, but there is no time limit on the use of emergency combustion turbines.
Excess emissions means a specified averaging period over which either
(1) the NO_X emissions are higher than the applicable emission limit in § 60.4320;
(2) the total sulfur content of the fuel being combusted in the affected facility exceeds the limit specified in § 60.4330; or
(3) the recorded value of a particular monitored parameter is outside the acceptable range specified in the parameter monitoring plan for the affected unit.
Gross useful output means the gross useful work performed by the stationary combustion turbine system. For units using the mechanical energy directly or generating only electricity, the gross useful work performed is the gross electrical or mechanical output from the turbine/generator set. For combined heat and power units, the gross useful work performed is the gross electrical or mechanical output plus the useful thermal output (i.e., thermal energy delivered to a process).

Heat recovery steam generating unit means a unit where the hot exhaust gases from the combustion turbine are routed in order to extract heat from the gases and generate steam, for use in a steam turbine or other device that utilizes steam. Heat recovery steam generating units can be used with or without duct burners.
Integrated gasification combined cycle electric utility steam generating unit means a coal-fired electric utility steam generating unit that burns a synthetic gas derived from coal in a combined-cycle gas turbine. No solid coal is directly burned in the unit during operation.
ISO conditions means 288 Kelvin, 60 percent relative humidity and 101.3 kilopascals pressure.
Lean premix stationary combustion turbine means any stationary combustion turbine where the air and fuel are thoroughly mixed to form a lean mixture before delivery to the combustor. Mixing may occur before or in the combustion chamber. A lean premixed turbine may operate in diffusion flame mode during operating conditions such as startup and shutdown, extreme ambient temperature, or low or transient load.
Natural gas means a naturally occurring fluid mixture of hydrocarbons (e.g., methane, ethane, or propane) produced in geological formations beneath the Earth's surface that maintains a gaseous state at standard atmospheric temperature and pressure under ordinary conditions. Additionally, natural gas must either be composed of at least 70 percent methane by volume or have a gross calorific value between 950 and 1,100 British thermal units (Btu) per standard cubic foot. Natural gas does not include the following gaseous fuels: landfill gas, digester gas, refinery gas, sour gas, blast furnace gas, coal-derived gas, producer gas, coke oven gas, or any gaseous fuel produced in a process which might result in highly variable sulfur content or heating value.
Noncontinental area means the State of Hawaii, the Virgin Islands, Guam, American Samoa, the Commonwealth of Puerto Rico, the Northern Mariana Islands, or offshore platforms.
Peak load means 100 percent of the manufacturer's design capacity of the combustion turbine at ISO conditions.
Regenerative cycle combustion turbine means any stationary combustion turbine which recovers heat from the combustion turbine exhaust gases to preheat the inlet combustion air to the combustion turbine.
Simple cycle combustion turbine means any stationary combustion turbine which does not recover heat from the combustion turbine exhaust gases to preheat the inlet combustion air to the combustion turbine, or which does not recover heat from the combustion turbine exhaust gases for purposes other than enhancing the performance of the combustion turbine itself.
Stationary combustion turbine means all equipment, including but not limited to the turbine, the fuel, air, lubrication and exhaust gas systems, control systems (except emissions control equipment), heat recovery system, and any ancillary components and sub-components comprising any simple cycle stationary combustion turbine, any regenerative/recuperative cycle stationary combustion turbine, any combined cycle combustion turbine, and any combined heat and power combustion turbine based system. Stationary means that the combustion turbine is not self propelled or intended to be propelled while performing its function. It may, however, be mounted on a vehicle for portability.
Unit operating day means a 24-hour period between 12 midnight and the following midnight during which any fuel is combusted at any time in the unit. It is not necessary for fuel to be combusted continuously for the entire 24-hour period.
Unit operating hour means a clock hour during which any fuel is combusted in the affected unit. If the unit combusts fuel for the entire clock hour, it is considered to be a full unit operating hour. If the unit combusts fuel for only part of the clock hour, it is considered to be a partial unit operating hour.
Useful thermal output means the thermal energy made available for use in any industrial or commercial process, or used in any heating or cooling application, i.e., total thermal energy made available for processes and applications other than electrical or mechanical generation. Thermal output for this subpart means the energy in recovered thermal output measured against the energy in the thermal output at 15 degrees Celsius and 101.325 kilopascals of pressure.

Table 1 to Subpart KKKK of Part 60 – Nitrogen Oxide Emission Limits for New Stationary Combustion Turbines

Combustion turbine type	Combustion turbine heat input at peak load (HHV)	NO_X emission standard
New turbine firing natural gas, electric generating	≤ 50 MMBtu/h	42 ppm at 15 percent O_2 or 290 ng/J of useful output (2.3 lb/MWh).
New turbine firing natural gas, mechanical drive	≤ 50 MMBtu/h	100 ppm at 15 percent O_2 or 690 ng/J of useful output (5.5 lb/MWh).
New turbine firing natural gas	**> 50 MMBtu/h and ≤ 850 MMBtu/h**	**25 ppm at 15 percent O2 or 150 ng/J of useful output (1.2 lb/MWh).**
New, modified, or reconstructed turbine firing natural gas	> 850 MMBtu/h	15 ppm at 15 percent O_2 or 54 ng/J of useful output (0.43 lb/MWh)
New turbine firing fuels other than natural gas, electric generating	≤ 50 MMBtu/h	96 ppm at 15 percent O_2 or 700 ng/J of useful output (5.5 lb/MWh).
New turbine firing fuels other than natural gas, mechanical drive	≤ 50 MMBtu/h	150 ppm at 15 percent O_2 or 1,100 ng/J of useful output (8.7 lb/MWh).
New turbine firing fuels other than natural gas	> 50 MMBtu/h and ≤ 850 MMBtu/h	74 ppm at 15 percent O_2 or 460 ng/J of useful output (3.6 lb/MWh).
New, modified, or reconstructed turbine firing fuels other than natural gas	> 850 MMBtu/h	42 ppm at 15 percent O_2 or 160 ng/J of useful output (1.3 lb/MWh).
Modified or reconstructed turbine	≤ 50 MMBtu/h	150 ppm at 15 percent O_2 or 1,100 ng/J of useful output (8.7 lb/MWh).
Modified or reconstructed turbine firing natural gas	> 50 MMBtu/h and ≤ 850 MMBtu/h	42 ppm at 15 percent O_2 or 250 ng/J of useful output (2.0 lb/MWh).
Modified or reconstructed turbine firing fuels other than natural gas	> 50 MMBtu/h and ≤ 850 MMBtu/h	96 ppm at 15 percent O_2 or 590 ng/J of useful output (4.7 lb/MWh).
Turbines located north of the Arctic Circle (latitude 66.5 degrees north), turbines operating at less than 75 percent of peak load, modified and reconstructed offshore turbines, and turbine operating at temperatures less than 0 °F	≤ 30 MW output	150 ppm at 15 percent O_2 or 1,100 ng/J of useful output (8.7 lb/MWh).

Combustion turbine type	Combustion turbine heat input at peak load (HHV)	NO_X emission standard
Turbines located north of the Arctic Circle (latitude 66.5 degrees north), turbines operating at less than 75 percent of peak load, modified and reconstructed offshore turbines, and turbine operating at temperatures less than 0 °F	> 30 MW output	96 ppm at 15 percent O_2 or 590 ng/J of useful output (4.7 lb/MWh).
Heat recovery units operating independent of the combustion turbine	All sizes	54 ppm at 15 percent O_2 or 110 ng/J of useful output (0.86 lb/MWh).

4.5 National Emissions Standards for Hazardous Air Pollutants (NESHAP)

NESHAP, federal regulations found in CFR Title 40 Parts 61 and 63, are emission standards for HAP and are generally only applicable to HAP major sources (facilities that exceed the major source thresholds of 10 tpy of a single HAP or 25 tpy of any combination of HAP) or specifically designated area sources. CTC is located at an area source for HAPs. The NESHAPs apply specifically listed industrial source categories (CAA Section 112(d)) or on a case-by-case basis (CAA Section 112(g)) for facilities not regulated under a specific industrial category. Pollutant-specific NESHAP under 40 CFR Part 61 may also be applicable to Part 63 sources.

4.5.1 40 CFR 63 Subpart A – General Provisions

All affected sources are subject to the general provisions of Part 63 NESHAP Subpart A unless specifically excluded by the source-specific NESHAP. Subpart A requires initial notification and performance testing, recordkeeping, monitoring, provides reference methods, and mandates general control device requirements for all other subparts as applicable. Because various other Part 63 subparts are applicable, the provisions of Subpart A also apply.

4.5.2 40 CFR 63 Subpart YYYY – National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines

CTC is exempt from this rule, as it only applies to HAP major sources.

4.6 Acid Rain Provisions

CTC is not subject to the federal acid rain regulations found at 40 CFR Parts 72 through 77 as the fifteen (15) Solar SMT-130 turbines are exempt from these requirements. These units serve generators with a total nameplate capacity of 25 MW or less.

5. EMISSION CONTROL SYSTEMS

Shelby County was reclassified as attainment under the 2008 8-hr Ozone NAAQS effective June 23, 2016, and reclassified as attainment under the 1997 8-hr Ozone NAAQS effective January 4, 2010. The area is classified as attainment/unclassifiable under the 2015 Ozone NAAAQS.[4] The area is not otherwise a "nonattainment area" with respect to any NAAQS pollutant. Therefore, the requirements of the Growth Policy with respect to nonattainment areas[5] do not apply. In particular, the requirement to apply LAER[6] do not apply.

Notwithstanding, however, CTC proposes to apply emission controls comparable to what would be required for a source actually subject to LAER for the ozone precursors NO_X (and also for NO_2, measured as NO_X). For pollutants other than NO_X, the LAER emission rate generally would not differ from a Best Available Control Technology (BACT)-level emission rate for this category of source, as turbines are mainly regulated *qua* NO_X sources in nonattainment areas (and are not regulated in nonattainment SIPs for other pollutants except under generally applicable control rules). Because comprehensive LAER information is not reasonably available for pollutants for which there are few nonattainment areas (and few or no gas turbines which are major sources for the nonattainment pollutant), the most stringent limit identified in a state-issued permit for an attainment area is used as the basis for identifying control technology proposals for VOC, CO, SO_2, and particulate matter.

5.1 Lowest Achievable Emission Rate

LAER is defined as the most stringent emission limitation contained in any State Implementation Plan for the particular class or category of stationary source (unless such limitation is not achievable); or the most stringent emission limitation achieved in practice for the particular class or category of stationary source, whichever is more stringent. In no case can LAER be less stringent than the level of control required under an applicable NSPS standard.[7] A LAER control technology review therefore consists of surveying the following types of information for applicable limits:

- Available state implementation plans;
- Preconstruction or operating permits issued in other nonattainment areas;
- The RACT/BACT/LAER Clearinghouse (RBLC); and
- Proposed or promulgated NSPS standards.

The most stringent limits identified for the type of source being permitted are selected as LAER, unless the applicant has information demonstrating that the limits are not complied with in practice, or that it would be unachievable for the source based on site-specific information.[8] The cost of implementing controls is

[4] 40 CFR § 81.343.

[5] TAPCR 1200-03-09.01(5)(b).2 as incorporated by SCAC Section 3-5.

[6] Id. at ¶ 2(iii)(III).

[7] TAPCR 1200-03-09.02(5)(b).1(xxviii). *Cf.* CAA § 171(3).

[8] EPA OAQPS, 1990 NSR Workshop Manual at G.2–4. ("A SIP limit's credibility diminishes if a) no sources exist to which it applies; b) it is generally acknowledged that sources are unable to comply with the limit and the State is in the process of changing the limit; or c) the State has relaxed the original SIP limit.")

generally not considered as part of a LAER review, unless the cost is prohibitive.[9] The four sources of information identified above are surveyed in turn.

5.1.1 Available State Implementation Plans (SIPs)

SIPs covering ozone nonattainment areas are required to specify a control strategy that requires at least reasonably available control technology (RACT) for major sources of ozone precursors, where the degree of emissions reduction required is greater, the more serious the area's nonattainment classification is. Therefore, the survey of available SIPs focuses on areas of the country that have a significant industrial base as well as persistent ozone nonattainment problems.

SIPs for California, Texas, and Louisiana, as well as Tennessee, were consulted to identify potentially applicable limits that apply to simple cycle gas turbines in the size range proposed (~ 25 MW electrical output). These states (other than Tennessee) were selected because they have large industrial bases and a continuous history of SIP development for ozone nonattainment areas. The following limits were identified:

- For major sources of NO_X in the Houston-Galveston-Brazoria (**Texas**) nonattainment area (other than electric utilities), a cap-and-trade program applies which specifies reference emission specifications representing RACT for specified categories of combustion sources. For stationary gas turbines rated at 10 MW or greater, the applicable specification is 0.032 lb/MMBtu,[10] which equates to approximately 9 ppm NO_X (15% O_2) for a unit operating at a heat rate of approximately 10,000 Btu/kW-hr (typical for a simple cycle turbine).
- The same standard applies in the Dallas-Fort Worth (**Texas**) nonattainment area, except that it is an enforceable emissions limit (applicable on a block 1-hr average for units that demonstrate compliance through stack testing) rather than a reference RACT level for purposes of allocating cap-and-trade allowances.[11]
- For the Baton Rouge (**Louisiana**) nonattainment area, stationary gas turbines in other than peaking service are subject to a NO_X limit of 0.16 lb/MMBtu, which is equivalent to 43 ppmvd (15% O_2).[12] This is less stringent than the standard identified above for Texas.
- For the South Coast Air Quality Control Region (**California**), stationary, natural gas-fired, simple cycle turbines (other than compressor gas turbines) are subject to a NO_X limit of 2.5 ppmvd (15% O_2) on a 60-minute average.[13]
- For the Bay Area Air Quality Control Region (**California**), natural gas-fired stationary gas turbines with a fuel consumption between 250–500 MMBtu/hr are subject to a NO_X limit of 9 ppmvd (15% O_2), or an output-based standard of 0.43 lb/MW-hr. A limit of 5 ppmvd (15% O_2) (or an output-based standard of 0.15 lb/MW-hr) applies for turbines with a fuel consumption above 500 MMBtu/hr[14] (the subject turbines have a fuel consumption 168–275 MMBtu/hr per unit).

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[9] Id. at G.3. ("A LAER is not considered achievable if the cost of control is so great that a major new source could not be built or operated… Thus, for a new source, LAER costs are considered only to the degree that they reflect unusual circumstances which in some manner differentiate the cost of control for that source from control costs for the rest of the industry.")

[10] Title 30 Texas Administrative Code, Chapter 117, Section 117.310(a)(10)(A) (30 TAC § 117.310(a)(10)(A)).

[11] 30 TAC §§ 117.410(a)(5)(A), (b)(2).

[12] Louisiana Administrative Code (LAC) 33:III.2201.D.1.

[13] South Coast Air Quality Management District (SCAQMD) Rule 1134, ¶(d)(3).

[14] Bay Area Air Quality Management District (BAAQMD) Rule 9, § 9-9-301.2.

- The **Tennessee** SIP contains a NO_X SIP call cap-and-trade program requirement for stationary boilers and combustion turbines, providing a "new set-aside" budget of 5,666 tons per year, and allowing for new sources to request an allowance no more than the allowable NO_X emission rate under any applicable NSPS standard or permit requirement.[15]

The most stringent emission limitation identified in the survey of SIP requirements is that in the SCAQMD SIP. As the SCAQMD requirement became applicable January 1, 2024, and the South Coast Air Quality Control Region is generally considered the area of the country with the most serious and refractory ozone problem, it is unlikely that any SIP not surveyed contains a more stringent requirement.

5.1.2 Preconstruction or Operating Permits in Nonattainment Areas

A survey of recently-approved permits for new simple cycle gas turbines in the relevant size range was conducted, again with a focus on states containing a large industrial base and a history of ozone nonattainment problems.

5.1.2.1 Texas

Texas has the largest and fastest-growing electricity market in the U.S., two large nonattainment areas, readily accessible data on new installations, and relatively stringent air pollution control regulations. Therefore, this State was used as the primary focus for reviewing preconstruction or operating permits.

The Texas Commission on Environmental Quality (TCEQ) maintains and regularly updates a list of all gas turbines with an electric power output greater than 20 MW, with the most recent version of the list having been published in November 2024.[16] The permits on that list with the lowest represented NO_X emission rates are:

- Standard Permit registration 177263 (Nov. 2024), covering (6) 35 MW Titan 350 turbines and (6) 35 MW GE LM2500 turbines achieving an emission rate of approximately 3 ppm NO_X (15% O_2) through use of SCR, and an emission rate of approximately 5 ppm CO (15% O_2).[17]
- Standard Permit registration 177854 (Aug. 2024), covering (8) 50 MW GE LM6000 turbines achieving an emission rate of 2 ppm NO_X (15% O2) on an annual average and an output-based standard of 0.14 lb/MW-hr (equivalent to 4 ppm @ 9,500 Btu/kW-hr) on a 24-hr average.

The limit of 0.14 lb/MW-hr is reflected in the TCEQ standard permit for electric generating units, and is a threshold at or below which an electric generating unit can qualify for a standard permit rather than applying for an individual permit. Therefore, a limit of 4–5 ppm (as applied to a simple cycle unit operating at a typical heat rate)[18] is a quasi-SIP limit in the sense that it is a general requirement that new sources in the State elect to comply with.

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[15] TAPCR 1200-03-27-.12.

[16] TCEQ: Issued Air Permits for Gas Turbines with Electric Output Rated 20 MW or Greater. Version 2024.11.01. https://www.tceq.texas.gov/downloads/permitting/air/memos/turbine-lst.xlsx

[17] Registration represents NOX emissions of 3.15 lb/hr based on an output of 35 MW and a heat rate of 8500–8800 Btu/kW-hr

[18] The turbine list lists 48 general permits for simple cycle units (mostly GE LM6000's) that comply with a limit of 4–5 ppmvd (with higher limits achievable through heat rate improvements) through use of SCR.

5.1.2.2 Other States

Air permits for new gas turbines in the applicable size range (other than those reflected in the RBLC) were not surveyed because they are unable to result in emission limits lower than those identified through a review of SIP materials and TCEQ-issued permits.

5.1.3 RACT/BACT/LAER Clearinghouse (RBLC)

An RBLC search was performed for natural gas-fired simple cycle gas turbines with an output greater than 25 MW (process code 15.110) for permits listed between 2019 and 2024, with the following results.

Table 5-1. RBLC Search Results

RBLC ID	Site Name	Service
TX-0975	Freestone Peakers	Electric Utility
LA-0324	Commonwealth LNG	Compression
MI-0454	Lansing Board of Water and Light	Electric Utility
TN-0187	TVA Johnsonville	Electric Utility
AK-0088	Alaska Gasoline Development	Compression
TX-0933	Nacero Penwell	Industrial Electric
AL-0329	TVA Colbert	Electric Utility
MI-0447	Lansing Board of Water and Light	Electric Utility
LA-0383	Lake Charles LNG	Compression
TX-0900	Ector County Energy	Electric Utility
AK-0085	Alaska Gasoline Development	Compression

Emission limits (concentration- or output-based) listed in the RBLC for NO_X, CO, and VOC are as follows. The limits all apply to PSD sources. No LAER limits were identified through the RBLC search.

Table 5-2. RBLC Emission Limits

RBLC ID	NO_X (15% O_2)	CO (15% O_2)	VOC (15% O_2)
TX-0975	9 ppmvd	9 ppmvd	2 ppmvd
LA-0324	2.5 ppm	1.7 ppm	3 ppm
MI-0454	25 ppm	9 ppm	—
TN-0187	5 ppm	5 ppm	—
AK-0088	2 ppm	5 ppm	2 ppm
TX-0933	9 ppm	9 ppm	1.7 ppm
AL-0329	9 ppm	9 ppm	—
MI-0447	25 ppm	—	—
LA-0383	3.1 ppm	10 ppm	—
TX-0900	9 ppm	—	—
AK-0085	15 ppm	15 ppm	—

5.1.4 New Source Performance Standards

The most recent effective NSPS for gas turbines is Subpart KKKK, which specifies a limit of 25 ppm NO_X (15% O_2) or an output based-standard of 1.2 lb/MW-h for new turbines firing natural gas with a fuel

consumption between 50 and 850 MMBtu/hr.[19] NSPS KKKK regulates emissions of NO_X and SO_2 from gas turbines. For the latter pollutant, a sulfur limit of 0.06 lb/MMBtu applies for sources in continental areas.[20] The SO_2 limit is easily satisfied by any unit burning pipeline natural gas.

On November 22, 2024, the EPA Administrator signed a proposed amendment to the NSPS for stationary combustion turbines (to be codified as Subpart KKKKa if finalized). As of the time of writing, EPA has not provided actual regulatory text for public inspection. However, the prepublication Federal Register notice posted on the agency's website states the EPA is proposing an emissions standard of 3 ppm NO_X for stationary gas turbines operating at intermediate or base loads based on use of SCR as the Best System of Emission Reduction (BSER), and is soliciting comment on emission rates in the range of 2 to 5 ppm.[21]

Proposed NSPS KKKKa would become applicable for purposes of determining LAER once finalized, effective, and actually applicable to a particular permitted source subject to nonattainment NSR.

5.1.5 Other Pollutants (Particulate and SO_2)

The majority of permits surveyed do not specify a numerical emission limit for particulate matter different from a reference emission factor published in a compilation such as AP-42. Combustion turbines firing gaseous fuel and utilizing good combustion techniques, as evidenced through compliance with a visible emissions standard, generally have very low particulate loadings in their exhaust. Given the high exhaust flow rate and low particulate loading, a work practice standard and visible emissions standard is the preferred form of control technology (major or minor NSR BACT) requirement for a gas turbine. The most stringent visible emissions standard identified is a standard of 5% opacity during routine operations (5% is the lowest level of opacity that a trained observer can identify).[22]

As noted above, gas turbines fired with pipeline quality natural gas have negligible SO_2 emissions. BACT requirements for SO_2 are where a permit specifies a BACT limit for SO_2, this is customarily expressed as a limit on the sulfur content of the natural gas, with a nominal amount of sulfur being required as an odorant. Limits of 0.2–5 grains of sulfur per 100 scf of natural gas are attested in permits. For sources other than refineries, gas processing plants, LNG facilities, or similar facilities, however, it is not feasible for a source to obtain natural gas with a lower sulfur content than what the local distribution company offers.

Ammonia (NH_3) is a pollutant of interest only for gas turbines equipped with SCR systems. NH_3 must be injected at a rate sufficient to ensure compliance with the permitted NO_X limit, consistent with proper operation of the control device. A typical permit guideline for ammonia slip is 5–10 ppm.

5.2 Proposed Emission Limits

CTC proposes the following emission limits during routine operations based on the information surveyed above. The proposed emission limits are technically feasible, represent use of the best attested control technologies and/or control techniques for all pollutants, and will ensure operation of the facility as a synthetic minor source.

[19] 40 CFR Part 60, Subpart KKKK. Table 1.

[20] 40 CFR § 60.4330(a)(2).

[21] Prepublication Federal Register Notice Text at 72.

[22] TCEQ Draft Permit No. 175173 and PSDTX1636. Sep. 9, 2024.

Table 5-3. Proposed Emission Limits

Pollutant	Proposed Emission Limit	Comment
NO_X	2 ppm (15% O_2), achieved with SCR	Lowest limit attested in the RBLC or in any State-issued permit. Lower than any SIP limit.
CO	2.5 ppm (15% O_2)	Lower than all RBLC limits for non-compression turbines.
VOC	2 ppm (15% O_2)	Lower than all RBLC limits (except TX-0933).
Particulate	5% opacity	Visible emissions standard consistent with no visible emissions.
SO_2	Use pipeline natural gas not to exceed 1 gr S per 100 scf.	Operational/work practice standard.
NH_3	5 ppm (0% O_2)	Consistent with SCR vendor recommendations for NH_3 injection rate.

6. EMISSION CALCULATION METHODOLOGY

This section provides a description of the basis for the estimation of emissions from these sources.

6.1 Combustion Turbines

The proposed natural gas-fired turbines to be installed at CTC will be equipped with Solar's SoLoNO$_X$ dry low NO$_X$ combustor technology as well as add-on emission controls including SCR for NO$_X$ and oxidation catalyst for CO and VOC.

Emissions for the Solar turbines assume that the units will operate up to 8,760 hours per year and up to 100% rated output. Pre-control (SCR and oxidation catalyst) emissions of NO$_X$, CO, and VOC are based on emission rates provided by Solar. VOC emissions are conservatively estimated as 10% of uncombusted hydrocarbons (UHC).

The only times when low-load operation (non-normal SoLoNO$_X$ operation) is expected to occur are during periods of startup and shutdown. Solar has provided emissions estimates during 10 minute start-up and shutdown events (see Solar Product Information Letter (PIL) 170, included as part of the vendor attachments to this application for more detail).

Potential turbine emissions conservatively assumed uncontrolled potential emissions from start-up and shutdown events calculated using emission data provided by Solar. Although these emissions are proved as uncontrolled for the purposes of potential to emit estimations, CTC expects that some control may be achieved by the combustion turbine control devices during the start-up and shutdown events.

Ton per year potential emission estimates are based on an assumed count of 22 start-up and 22 shutdown events per year per turbine. The duration of each start-up and shutdown is expected to be approximately 10 minutes per event. Thus, it is assumed that there will be approximately 110 hours of combined start-up and shutdown event time when the unit may not be operating in SoLoNO$_X$ mode.

To practically track these events and associated emissions, CTC proposes to keep track of the total number of hours of non-SoLoNO$_X$ mode (a parameter monitored by the turbine control logic) and utilize an average start-up /shutdown emission rate (equivalent lb/hr based on 10 minutes per event).

Emissions from the proposed facility were calculated under the conservative assumption that the facility will operate 24 hours per day, 7 days per week, and 52 weeks per year. Start-up and shutdown emissions are based on the conservative assumption that each turbine will have twenty-two (22) start-up and shutdown events, each 10 minutes long, respectively.

APPENDIX A. SUMMARY OF APPLICABLE REGULATIONS

Federal Applicable Requirements Overview

Regulation	Description	Applicable	Notes
40 CFR 50.1 - 50.18	National Primary and Secondary Ambient Air Quality Standards	Yes	Provides ambient air quality standards for six principle pollutants known as criteria pollutants.
40 CFR 51.40	Requirements for Preparation, Adoption, and Submittal of Implementation Plans	No	State requirements.
40 CFR 52.21	Prevention of Significant Deterioration of Air Quality	No	Contains general requirements for PSD sources. This facility is a major source of CO, SO_2, and VOC.
40 CFR 52.2270 – 52.2312	Tennessee	No	Contains agency requirements.
40 CFR 53	Ambient Air Monitoring Reference and Equivalent Methods	No	No applicable requirements.
40 CFR 54	Prior Notice of Citizen Suits	Yes	Contains general facility-wide requirements; however, there are no compliance requirements.
40 CFR 55	Outer Continental Shelf Air Regulations	No	No applicable requirements.
40 CFR 56	Regional Consistency	No	No applicable requirements.
40 CFR 57	Primary Nonferrous Smelter Orders	No	No applicable requirements.
40 CFR 58	Ambient Air Quality Surveillance	No	No applicable requirements.
40 CFR 60 (Subpart A)	Standards of Performance for New Stationary Sources: General Provisions	**Yes**	**There is one 40 CFR Part 60 applicable subpart, NSPS KKKK.**
40 CFR 60 (Subpart B)	Adoption and Submittal of State Plans for Designated Facilities	No	Facility does not have an affected source.
40 CFR 60 (Subpart Ba)	Adoption and Submittal of State Plans for Designated Facilities	No	Facility does not have an affected source.
40 CFR 60 (Subpart C)	Emission Guidelines and Compliance Times	No	Facility does not have an affected source.
40 CFR 60 (Subpart Ca)	[Reserved]	N/A	[Reserved]
40 CFR 60 (Subpart Cb)	Emissions Guidelines and Compliance Times for Large Municipal Waste Combustors That are Constructed on or Before September 20, 1994	No	Facility does not have an affected source.
40 CFR 60 (Subpart Cc)	Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills	No	Facility does not have an affected source.

Federal Applicable Requirements Overview

Regulation	Description	Applicable	Notes
40 CFR 60 (Subpart Cd)	Emissions Guidelines and Compliance Times for Sulfuric Acid Production Units	No	Facility does not have an affected source.
40 CFR 60 (Subpart Ce)	Emission Guidelines and Compliance Times for Hospital/Medical/Infectious Waste Incinerators	No	Facility does not have an affected source.
40 CFR 60 (Subpart Cf)	Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills	No	Facility does not have an affected source.
40 CFR 60 (Subpart D)	Standards of Performance for Fossil-Fuel-Fired Steam Generators	No	Facility does not have an affected source.
40 CFR 60 (Subpart Da)	Standards of Performance for Electric Utility Steam Generating Units	No	Facility does not have an affected source.
40 CFR 60 (Subpart Db)	Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units	No	Facility does not have an affected source.
40 CFR 60 (Subpart Dc)	Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units	No	Facility does not have an affected source.
40 CFR 60 (Subpart E)	Standards of Performance for Incinerators	No	Facility does not have an affected source.
40 CFR 60 (Subpart Ea)	Standards of Performance for Municipal Waste Combustors for Which Construction Is Commenced After December 20, 1989 and On or Before September 20, 1994	No	Facility does not have an affected source.
40 CFR 60 (Subpart Eb)	Standards of Performance for Large Municipal Waste Combustors for Which Construction is Commenced After September 20, 1994 or for Which Modification or Reconstruction is Commenced After June 19, 1996	No	Facility does not have an affected source.
40 CFR 60 (Subpart Ec)	Standards of Performance for New Stationary Sources: Hospital/Medical/Infectious Waste Incinerators	No	Facility does not have an affected source.
40 CFR 60 (Subpart F)	Standards of Performance for Portland Cement Plants	No	Facility does not have an affected source.
40 CFR 60 (Subpart G)	Standards of Performance for Nitric Acid Plants	No	Facility does not have an affected source.
40 CFR 60 (Subpart Ga)	Standards of Performance for Nitric Acid Plants for Which Construction, Reconstruction, or Modification Commenced After October 14, 2011	No	Facility does not have an affected source.
40 CFR 60 (Subpart H)	Standards of Performance for Sulfuric Acid Plants	No	Facility does not have an affected source.
40 CFR 60 (Subpart I)	Standards of Performance for Hot Mix Asphalt Facilities	No	Facility does not have an affected source.
40 CFR 60 (Subpart J)	Standards of Performance for Petroleum Refineries	No	Facility does not have an affected source.

Federal Applicable Requirements Overview

Regulation	Description	Applicable	Notes
40 CFR 60 (Subpart Ja)	Standards of Performance for Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007	No	Facility does not have an affected source.
40 CFR 60 (Subpart K)	Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973, and Prior to May 19, 1978	No	Facility does not have an affected source.
40 CFR 60 (Subpart Ka)	Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984	No	Facility does not have an affected source.
40 CFR 60 (Subpart Kb)	Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984, and On or Before October 4, 2023	No	Facility does not have an affected source.
40 CFR 60 (Subpart Kc)	Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After October 4, 2023	No	Facility does not have an affected source.
40 CFR 60 (Subpart L)	Standards of Performance for Secondary Lead Smelters for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973, and On or Before December 1, 2022	No	Facility does not have an affected source.
40 CFR 60 (Subpart La)	Standards of Performance for Secondary Lead Smelters for Which Construction, Reconstruction, or Modification Commenced After December 1, 2022	No	Facility does not have an affected source.
40 CFR 60 (Subpart M)	Standards of Performance for Secondary Brass and Bronze Production Plants	No	Facility does not have an affected source.
40 CFR 60 (Subpart N)	Standards of Performance for Primary Emissions from Basic Oxygen Process Furnaces for Which Construction is Commenced After June 11, 1973	No	Facility does not have an affected source.
40 CFR 60 (Subpart Na)	Standards of Performance for Secondary Emissions from Basic Oxygen Process Steelmaking Facilities for Which Construction is Commenced After January 20, 1983	No	Facility does not have an affected source.
40 CFR 60 (Subpart O)	Standards of Performance for Sewage Treatment Plants	No	Facility does not have an affected source.
40 CFR 60 (Subpart P)	Standards of Performance for Primary Copper Smelters	No	Facility does not have an affected source.

Federal Applicable Requirements Overview

Regulation	Description	Applicable	Notes
40 CFR 60 (Subpart Q)	Standards of Performance for Primary Zinc Smelters	No	Facility does not have an affected source.
40 CFR 60 (Subpart R)	Standards of Performance for Primary Lead Smelters	No	Facility does not have an affected source.
40 CFR 60 (Subpart S)	Standards of Performance for Primary Aluminum Reduction Plants	No	Facility does not have an affected source.
40 CFR 60 (Subpart T)	Standards of Performance for the Phosphate Fertilizer Industry: Wet-Process Phosphoric Acid Plants	No	Facility does not have an affected source.
40 CFR 60 (Subpart U)	Standards of Performance for the Phosphate Fertilizer Industry: Superphosphoric Acid Plants	No	Facility does not have an affected source.
40 CFR 60 (Subpart V)	Standards of Performance for the Phosphate Fertilizer Industry: Diammonium Phosphate Plants	No	Facility does not have an affected source.
40 CFR 60 (Subpart W)	Standards of Performance for the Phosphate Fertilizer Industry: Triple Superphosphate Plants	No	Facility does not have an affected source.
40 CFR 60 (Subpart X)	Standards of Performance for the Phosphate Fertilizer Industry: Granular Triple Superphosphate Storage Facilities	No	Facility does not have an affected source.
40 CFR 60 (Subpart Y)	Standards of Performance for Coal Preparation and Processing Plants	No	Facility does not have an affected source.
40 CFR 60 (Subpart Z)	Standards of Performance for Ferroalloy Production Facilities	No	Facility does not have an affected source.
40 CFR 60 (Subpart AA)	Standards of Performance for Steel Plants: Electric Arc Furnaces Constructed After October 21, 1974, and On or Before August 17, 1983	No	Facility does not have an affected source.
40 CFR 60 (Subpart AAa)	Standards of Performance for Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarbonization Vessels Constructed After August 17, 1983, and On or Before May 16, 2022	No	Facility does not have an affected source.
40 CFR 60 (Subpart AAb)	Standards of Performance for Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarbonization Vessels Constructed After May 16, 2022	No	Facility does not have an affected source.
40 CFR 60 (Subpart BB)	Standards of Performance for Kraft Pulp Mills	No	Facility does not have an affected source.
40 CFR 60 (Subpart BBa)	Standards of Performance for Kraft Pulp Mill Affected Sources for Which Construction, Reconstruction, or Modification Commenced After May 23, 2013	No	Facility does not have an affected source.
40 CFR 60 (Subpart CC)	Standards of Performance for Glass Manufacturing Plants	No	Facility does not have an affected source.
40 CFR 60 (Subpart DD)	Standards of Performance for Grain Elevators	No	Facility does not have an affected source.

Federal Applicable Requirements Overview

Regulation	Description	Applicable	Notes
40 CFR 60 (Subpart EE)	Standards of Performance for Surface Coating of Metal Furniture	No	Facility does not have an affected source.
40 CFR 60 (Subpart FF)	[Reserved]	No	Facility does not have an affected source.
40 CFR 60 (Subpart GG)	Standards of Performance for Stationary Gas Turbines	**No**	**Facility is exempt from NSPS GG since applicable to NSPS KKKK.**
40 CFR 60 (Subpart HH)	Standards of Performance for Lime Manufacturing Plants	No	Facility does not have an affected source.
40 CFR 60 (Subpart KK)	Standards of Performance for Lead-Acid Battery Manufacturing Plants for Which Construction, Reconstruction, or Modification Commenced After January 14, 1980, and On or Before February 23, 2022	No	Facility does not have an affected source.
40 CFR 60 (Subpart KKa)	Standards of Performance for Lead Acid Battery Manufacturing Plants for Which Construction, Modification or Reconstruction Commenced After February 23, 2022	No	Facility does not have an affected source.
40 CFR 60 (Subpart LL)	Standards of Performance for Metallic Mineral Processing Plants	No	Facility does not have an affected source.
40 CFR 60 (Subpart MM)	Standards of Performance for Automobile and Light Duty Truck Surface Coating Operations for which Construction, Modification or Reconstruction Commenced After October 5, 1979, and On or Before May 18, 2022	No	Facility does not have an affected source.
40 CFR 60 (Subpart MMa)	Standards of Performance for Automobile and Light Duty Truck Surface Coating Operations for which Construction, Modification or Reconstruction Commenced After May 18, 2022	No	Facility does not have an affected source.
40 CFR 60 (Subpart NN)	Standards of Performance for Phosphate Rock Plants	No	Facility does not have an affected source.
40 CFR 60 (Subpart PP)	Standards of Performance for Ammonium Sulfate Manufacture	No	Facility does not have an affected source.
40 CFR 60 (Subpart QQ)	Standards of Performance for the Graphic Arts Industry: Publication Rotogravure Printing	No	Facility does not have an affected source.
40 CFR 60 (Subpart RR)	Standards of Performance for Pressure Sensitive Tape and Label Surface Coating Operations	No	Facility does not have an affected source.
40 CFR 60 (Subpart SS)	Standards of Performance for Industrial Surface Coating: Large Appliances	No	Facility does not have an affected source.
40 CFR 60 (Subpart TT)	Standards of Performance for Metal Coil Surface Coating	No	Facility does not have an affected source.
40 CFR 60 (Subpart UU)	Standards of Performance for Asphalt Processing and Asphalt Roofing Manufacture	No	Facility does not have an affected source.

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Regulation	Description	Applicable	Notes
40 CFR 60 (Subpart VV)	Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry (SOCMI) for which Construction, Reconstruction, or Modification commenced after January 5, 1981, but before November 7, 2006	No	Facility does not have an affected source.
40 CFR 60 (Subpart VVa)	Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006, and on or Before April 25, 2023	No	Facility does not have an affected source.
40 CFR 60 (Subpart VVb)	Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction, or Modification Commenced After April 25, 2023	No	Facility does not have an affected source.
40 CFR 60 (Subpart WW)	Standards of Performance for the Beverage Can Surface Coating Industry	No	Facility does not have an affected source.
40 CFR 60 (Subpart XX)	Standards of Performance for Bulk Gasoline Terminals That Commenced Construction, Modification, or Reconstruction After December 17, 1980, and On or Before June 10, 2022	No	Facility does not have an affected source.
40 CFR 60 (Subpart XXa)	Standards of Performance for Bulk Gasoline Terminals that Commenced Construction, Modification, or Reconstruction After June 10, 2022	No	Facility does not have an affected source.
40 CFR 60 (Subparts YY-ZZ)	[Reserved]	N/A	[Reserved]
40 CFR 60 (Subpart AAA)	40 CFR (Subpart AAA)	No	Facility does not have an affected source.
40 CFR 60 (Subpart BBB)	40 CFR (Subpart BBB)	No	Facility does not have an affected source.
40 CFR 60 (Subpart CCC)	[Reserved]	N/A	[Reserved]
40 CFR 60 (Subpart DDD)	Standards of Performance for Volatile Organic Compound (VOC) Emissions from the Polymer Manufacturing Industry	No	Facility does not have an affected source.
40 CFR 60 (Subpart EEE)	[Reserved]	N/A	[Reserved]
40 CFR 60 (Subpart FFF)	Standards of Performance for Flexible Vinyl and Urethane Coating and Printing	No	Facility does not have an affected source.

Federal Applicable Requirements Overview

Regulation	Description	Applicable	Notes
40 CFR 60 (Subpart GGG)	Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries for which Construction, Reconstruction, or Modification Commenced After January 4, 1983, and on or Before November 7, 2006	No	Facility does not have an affected source.
40 CFR 60 (Subpart GGGa)	Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006	No	Facility does not have an affected source.
40 CFR 60 (Subpart HHH)	Standards of Performance for Synthetic Fiber Production Facilities	No	Facility does not have an affected source.
40 CFR 60 (Subpart III)	Standards of Performance for Volatile Organic Compound (VOC) Emissions From the Synthetic Organic Chemical Manufacturing Industry (SOCMI) Air Oxidation Unit Processes After October 21, 1983, and on or Before April 25, 2023	No	Facility does not have an affected source.
40 CFR 60 (Subpart IIIa)	Standards of Performance for Volatile Organic Compound (VOC) Emissions From the Synthetic Organic Chemical Manufacturing Industry (SOCMI) Air Oxidation Unit Processes for Which Construction, Reconstruction, or Modification Commenced After April 25, 2023	No	Facility does not have an affected source.
40 CFR 60 (Subpart JJJ)	Standards of Performance for Petroleum Dry Cleaners	No	Facility does not have an affected source.
40 CFR 60 (Subpart KKK)	Standards of Performance for Equipment Leaks of VOC From Onshore Natural Gas Processing Plants for Which Construction, Reconstruction, or Modification Commenced After January 20, 1984, and on or Before August 23, 2011	No	Facility does not have an affected source.
40 CFR 60 (Subpart LLL)	Standards of Performance for SO2 Emissions From Onshore Natural Gas Processing for Which Construction, Reconstruction, or Modification Commenced After January 20, 1984, and on or Before August 23, 2011	No	Facility does not have an affected source.
40 CFR 60 (Subpart MMM)	[Reserved]	N/A	[Reserved]
40 CFR 60 (Subpart NNN)	Standards of Performance for Volatile Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations After December 30, 1983, and on or Before April 25, 2023	No	Facility does not have an affected source.

Federal Applicable Requirements Overview

Regulation	Description	Applicable	Notes
40 CFR 60 (Subpart NNNa)	Standards of Performance for Volatile Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations for Which Construction, Reconstruction, or Modification Commenced After April 25, 2023	No	Facility does not have an affected source.
40 CFR 60 (Subpart OOO)	Standards of Performance for Nonmetallic Mineral Processing Plants	No	Facility does not have an affected source.
40 CFR 60 (Subpart PPP)	Standard of Performance for Wool Fiberglass Insulation Manufacturing Plants	No	Facility does not have an affected source.
40 CFR 60 (Subpart QQQ)	Standards of Performance for VOC Emissions From Petroleum Refinery Wastewater Systems	No	Facility does not have an affected source.
40 CFR 60 (Subpart RRR)	Subpart RRR—Standards of Performance for Volatile Organic Compound Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes After June 29, 1990, and on or Before April 25, 2023	No	Facility does not have an affected source.
40 CFR 60 (Subpart RRRa)	Standards of Performance for Volatile Organic Compound Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes for Which Construction, Reconstruction, or Modification Commenced After April 25, 2023	No	Facility does not have an affected source.
40 CFR 60 (Subpart SSS)	Standards of Performance for Magnetic Tape Coating Facilities	No	Facility does not have an affected source.
40 CFR 60 (Subpart TTT)	Standards of Performance for Industrial Surface Coating: Surface Coating of Plastic Parts for Business Machines	No	Facility does not have an affected source.
40 CFR 60 (Subpart TTTa)	Standards of Performance for Industrial Surface Coating: Surface Coating of Plastic Parts for Business Machines for Which Construction, Reconstruction, or Modification Commenced After June 21, 2022	No	Facility does not have an affected source.
40 CFR 60 (Subpart UUU)	Standards of Performance for Calciners and Dryers in Mineral Industries	No	Facility does not have an affected source.
40 CFR 60 (Subpart VVV)	Standards of Performance for Polymeric Coating of Supporting Substrates Facilities	No	Facility does not have an affected source.

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Regulation	Description	Applicable	Notes
40 CFR 60 (Subpart WWW)	Standards of Performance for Municipal Solid Waste Landfills That Commenced Construction, Reconstruction, or Modification on or After May 30, 1991, but Before July 18, 2014	No	Facility does not have an affected source.
40 CFR 60 (Subpart XXX)	Standards of Performance for Municipal Solid Waste Landfills That Commenced Construction, Reconstruction, or Modification After July 17, 2014	No	Facility does not have an affected source.
40 CFR 60 (Subparts YYY-ZZZ)	[Reserved]	N/A	[Reserved]
40 CFR 60 (Subpart AAAA)	Standards of Performance for Small Municipal Waste Combustion Units for Which Construction is Commenced After August 30, 1999 or for Which Modification or Reconstruction is Commenced After June 6, 2001	No	Facility does not have an affected source.
40 CFR 60 (Subpart BBBB)	Emission Guidelines and Compliance Times for Small Municipal Waste Combustion Units Constructed on or Before August 30, 1999	No	Facility does not have an affected source.
40 CFR 60 (Subpart CCCC)	Standards of Performance for Commercial and Industrial Solid Waste Incineration Units	No	Facility does not have an affected source.
40 CFR 60 (Subpart DDDD)	Emissions Guidelines and Compliance Times for Commercial and Industrial Solid Waste Incineration Units	No	Facility does not have an affected source.
40 CFR 60 (Subpart EEEE)	Standards of Performance for Other Solid Waste Incineration Units for Which Construction is Commenced After December 9, 2004, or for Which Modification or Reconstruction is Commenced on or After June 16, 2006	No	Facility does not have an affected source.
40 CFR 60 (Subpart FFFF)	Emission Guidelines and Compliance Times for Other Solid Waste Incineration Units that Commenced Construction On or Before December 9, 2004	No	Facility does not have an affected source.
40 CFR 60 (Subparts GGGG-HHHH)	[Reserved]	No	Facility does not have an affected source.
40 CFR 60 (Subpart IIII)	Standards of Performance for Stationary Compression Ignition Internal Combustion Engines	No	Facility does not have an affected source.
40 CFR 60 (Subpart JJJJ)	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines	No	Facility does not have an affected source.

Federal Applicable Requirements Overview

Regulation	Description	Applicable	Notes
40 CFR 60 (Subpart KKKK)	**Standards of Performance for Stationary Combustion Turbines**	**Yes**	**The fifteen (15) proposed turbines are affected sources under this subpart. Refer to Section 4.5.3 of this application document for detailed applicability.**
40 CFR 60 (Subpart LLLL)	Standards of Performance for New Sewage Sludge Incineration Units	No	Facility does not have an affected source.
40 CFR 60 (Subpart MMMM)	Emission Guidelines and Compliance Times for Existing Sewage Sludge Incineration Units	No	Facility does not have an affected source.
40 CFR 60 (Subpart NNNN)	[Reserved]	N/A	[Reserved]
40 CFR 60 (Subpart OOOO)	Standards of Performance for Crude Oil and Natural Gas Facilities for Which Construction, Modification, or Reconstruction Commenced After August 23, 2011, and on or Before September 18, 2015	No	Facility does not have an affected source.
40 CFR 60 (Subpart OOOOa)	Standards of Performance for Crude Oil and Natural Gas Facilities for Which Construction, Modification or Reconstruction Commenced After September 18, 2015 and On or Before December 6, 2022	No	Facility does not have an affected source.
40 CFR 60 (Subpart OOOOb)	Standards of Performance for Crude Oil and Natural Gas Facilities for Which Construction, Modification or Reconstruction Commenced After December 6, 2022	No	Facility does not have an affected source.
40 CFR 60 (Subpart OOOOc)	Emissions Guidelines for Greenhouse Gas Emissions From Existing Crude Oil and Natural Gas Facilities	No	Facility does not have an affected source.
40 CFR 60 (Subpart PPPP)	[Reserved]	N/A	[Reserved]
40 CFR 60 (Subpart QQQQ)	Standards of Performance for New Residential Hydronic Heaters and Forced-Air Furnaces	No	Facility does not have an affected source.
40 CFR 60 (Subpart TTTT)	Standards of Performance for Greenhouse Gas Emissions for Electric Generating Units	No	Facility does not have an affected source.

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Regulation	Description	Applicable	Notes
40 CFR 60 (Subpart TTTTa)	Standards of Performance for Greenhouse Gas Emissions for Modified Coal-Fired Steam Electric Generating Units and New Construction and Reconstruction Stationary Combustion Turbine Electric Generating Units	No	Facility does not have an affected source.
40 CFR 60 (Subpart UUUUa)	[Reserved]	N/A	[Reserved]
40 CFR 60 (Subpart UUUUb)	Emission Guidelines for Greenhouse Gas Emissions for Electric Utility Generating Units	No	Facility does not have an affected source.
40 CFR 61 (Subpart A)	General Provisions	**No**	**Contains general requirements applicable to affected sources. The facility has no affected sources.**
40 CFR 61 (Subpart B)	National Emission Standards for Radon Emissions From Underground Uranium Mines	No	Facility does not have an affected source.
40 CFR 61 (Subpart C)	National Emission Standard for Beryllium	No	Facility does not have an affected source.
40 CFR 61 (Subpart D)	National Emission Standard for Beryllium Rocket Motor Firing	No	Facility does not have an affected source.
40 CFR 61 (Subpart E)	National Emission Standard for Mercury	No	Facility does not have an affected source.
40 CFR 61 (Subpart F)	National Emission Standard for Vinyl Chloride	No	Facility does not have an affected source.
40 CFR 61 (Subpart G)	[Reserved]	N/A	[Reserved]
40 CFR 61 (Subpart H)	National Emission Standards for Emissions of Radionuclides Other Than Radon From Department of Energy Facilities	No	Facility does not have an affected source.
40 CFR 61 (Subpart I)	National Emission Standards for Radionuclide Emissions From Federal Facilities Other Than Nuclear Regulatory Commission Licensees and Not Covered by Subpart H	No	Facility does not have an affected source.
40 CFR 61 (Subpart J)	National Emission Standard for Equipment Leaks (Fugitive Emission Sources) of Benzene	No	Facility does not have an affected source.
40 CFR 61 (Subpart K)	National Emission Standards for Radionuclide Emissions From Elemental Phosphorus Plants	No	Facility does not have an affected source.

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Regulation	Description	Applicable	Notes
40 CFR 61 (Subpart L)	National Emission Standard for Benzene Emissions from Coke By-Product Recovery Plants	No	Facility does not have an affected source.
40 CFR 61 (Subpart M)	National Emission Standard for Asbestos	No	Facility does not have an affected source.
40 CFR 61 (Subpart N)	National Emission Standard for Inorganic Arsenic Emissions From Glass Manufacturing Plants	No	Facility does not have an affected source.
40 CFR 61 (Subpart O)	National Emission Standard for Inorganic Arsenic Emissions From Primary Copper Smelters	No	Facility does not have an affected source.
40 CFR 61 (Subpart P)	National Emission Standard for Inorganic Arsenic Emissions From Arsenic Trioxide and Metallic Arsenic Production Facilities	No	Facility does not have an affected source.
40 CFR 61 (Subpart Q)	National Emission Standards for Radon Emissions From Department of Energy Facilities	No	Facility does not have an affected source.
40 CFR 61 (Subpart R)	National Emission Standards for Radon Emissions From Phosphogypsum Stacks	No	Facility does not have an affected source.
40 CFR 61 (Subpart S)	[Reserved]	N/A	[Reserved]
40 CFR 61 (Subpart T)	National Emission Standards for Radon Emissions From the Disposal of Uranium Mill Tailings	No	Facility does not have an affected source.
40 CFR 61 (Subpart U)	[Reserved]	N/A	[Reserved]
40 CFR 61 (Subpart V)	National Emission Standard for Equipment Leaks (Fugitive Emission Sources)	No	Facility does not have an affected source.
40 CFR 61 (Subpart W)	National Emission Standards for Radon Emissions From Operating Mill Tailings	No	Facility does not have an affected source.
40 CFR 61 (Subpart X)	[Reserved]	N/A	[Reserved]
40 CFR 61 (Subpart Y)	National Emission Standard for Benzene Emissions From Benzene Storage Vessels	No	Facility does not have an affected source.
40 CFR 61 (Subparts Z-AA)	[Reserved]	No	Facility does not have an affected source.
40 CFR 61 (Subpart BB)	National Emission Standard for Benzene Emissions From Benzene Transfer Operations	No	Facility does not have an affected source.

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Regulation	Description	Applicable	Notes
40 CFR 61 (Subparts CC-EE)	[Reserved]	N/A	[Reserved]
40 CFR 61 (Subpart FF)	National Emission Standard for Benzene Waste Operations	No	Facility does not have an affected source.
40 CFR 63 (Subpart A)	NESHAP: General Provisions	No	Contains general requirements applicable to affected sources. Facility does not have an affected source.
40 CFR 63 (Subpart B)	Requirements for Control Technology Determinations for Major Sources in Accordance With Clean Air Act Sections, Sections 112(g) and 112(j)	No	Facility does not have an affected source.
40 CFR 63 (Subpart C)	List of Hazardous Air Pollutants, Petitions Process, Lesser Quantity Designations, Source Category List	No	Facility does not have an affected source.
40 CFR 63 (Subpart D)	Regulations Governing Compliance Extensions for Early Reductions of Hazardous Air Pollutants	No	Facility does not have an affected source.
40 CFR 63 (Subpart E)	Approval of State Programs and Delegation of Federal Authorities	No	Facility does not have an affected source.
40 CFR 63 (Subpart F)	National Emission Standards for Hazardous Air Pollutants From the Synthetic Organic Chemical Manufacturing Industry	No	Facility does not have an affected source.
40 CFR 63 (Subpart G)	National Emission Standards for Hazardous Air Pollutants From the Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater	No	Facility does not have an affected source.
40 CFR 63 (Subpart H)	National Emission Standards for Hazardous Air Pollutants for Equipment Leaks and Fenceline Monitoring for All Emission Sources	No	Facility does not have an affected source.
40 CFR 63 (Subpart I)	National Emission Standards for Hazardous Air Pollutants for Certain Processes Subject to the Negotiated Regulation for Equipment Leaks	No	Facility does not have an affected source.
40 CFR 63 (Subpart J)	National Emission Standards for Hazardous Air Pollutants for Polyvinyl Chloride and Copolymers Production	No	Facility does not have an affected source.
40 CFR 63 (Subpart K)	[Reserved]	N/A	[Reserved]
40 CFR 63 (Subpart L)	National Emission Standards for Coke Oven Batteries	No	Facility does not have an affected source.

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Regulation	Description	Applicable	Notes
40 CFR 63 (Subpart M)	National Perchloroethylene Air Emission Standards for Dry Cleaning Facilities	No	Facility does not have an affected source.
40 CFR 63 (Subpart N)	National Emission Standards for Chromium Emissions From Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks	No	Facility does not have an affected source.
40 CFR 63 (Subpart O)	Ethylene Oxide Emissions Standards for Sterilization Facilities	No	Facility does not have an affected source.
40 CFR 63 (Subpart P)	[Reserved]	N/A	[Reserved]
40 CFR 63 (Subpart Q)	National Emission Standards for Hazardous Air Pollutants for Industrial Process Cooling Towers	No	Facility does not have an affected source.
40 CFR 63 (Subpart R)	National Emission Standards for Gasoline Distribution Facilities (Bulk Gasoline Terminals and Pipeline Breakout Stations)	No	Facility does not have an affected source.
40 CFR 63 (Subpart S)	National Emission Standards for Hazardous Air Pollutants from the Pulp and Paper Industry	No	Facility does not have an affected source.
40 CFR 63 (Subpart T)	National Emission Standards for Halogenated Solvent Cleaning	No	Facility does not have an affected source.
40 CFR 63 (Subpart U)	National Emission Standards for Hazardous Air Pollutant Emissions: Group I Polymers and Resins	No	Facility does not have an affected source.
40 CFR 63 (Subpart V)	[Reserved]	N/A	[Reserved]
40 CFR 63 (Subpart W)	National Emission Standards for Hazardous Air Pollutants for Epoxy Resins Production and Non-Nylon Polyamides Production	No	Facility does not have an affected source.
40 CFR 63 (Subpart X)	National Emission Standards For Hazardous Air Pollutants From Secondary Lead Smelting	No	Facility does not have an affected source.
40 CFR 63 (Subpart Y)	National Emission Standards for Marine Tank Vessel Loading Operations	No	Facility does not have an affected source.
40 CFR 63 (Subpart Z)	[Reserved]	N/A	[Reserved]
40 CFR 63 (§§ 63.569-63.599)	[Reserved]	N/A	[Reserved]
40 CFR 63 (Subpart AA)	National Emission Standards for Hazardous Air Pollutants from Phosphoric Acid Manufacturing Plants	No	Facility does not have an affected source.
40 CFR 63 (Subpart BB)	National Emission Standards for Hazardous Air Pollutants from Phosphate Fertilizers Production Plants	No	Facility does not have an affected source.

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Regulation	Description	Applicable	Notes
40 CFR 63 (Subpart CC)	National Emission Standards for Hazardous Air Pollutants From Petroleum Refineries	No	Facility does not have an affected source.
40 CFR 63 (Subpart DD)	National Emission Standards for Hazardous Air Pollutants from Off-Site Waste and Recovery Operations	No	Facility does not have an affected source.
40 CFR 63 (Subpart V)	[Reserved]	N/A	[Reserved]
40 CFR 63 (Subpart EE)	National Emission Standards for Magnetic Tape Manufacturing Operations	No	Facility does not have an affected source.
40 CFR 63 (Subpart FF)	[Reserved]	N/A	[Reserved]
40 CFR 63 (Subpart GG)	National Emission Standards for Aerospace Manufacturing and Rework Facilities	No	Facility does not have an affected source.
40 CFR 63 (Subpart HH)	National Emission Standards for Hazardous Air Pollutants From Oil and Natural Gas Production Facilities	No	Facility does not have an affected source.
40 CFR 63 (Subpart II)	National Emission Standards for Shipbuilding and Ship Repair (Surface Coating)	No	Facility does not have an affected source.
40 CFR 63 (Subpart JJ)	National Emission Standards for Wood Furniture Manufacturing Operations	No	Facility does not have an affected source.
40 CFR 63 (Subpart KK)	National Emission Standards for the Printing and Publishing Industry	No	Facility does not have an affected source.
40 CFR 63 (Subpart LL)	National Emission Standards for Hazardous Air Pollutants for Primary Aluminum Reduction Plants	No	Facility does not have an affected source.
40 CFR 63 (Subpart MM)	National Emission Standards for Hazardous Air Pollutants for Chemical Recovery Combustion Sources at Kraft, Soda, Sulfite, and Stand-Alone Semichemical Pulp Mills	No	Facility does not have an affected source.
40 CFR 63 (Subpart NN)	National Emission Standards for Hazardous Air Pollutants for Wool Fiberglass Manufacturing at Area Sources	No	Facility does not have an affected source.
40 CFR 63 (Subpart OO)	National Emission Standards for Tanks—Level 1	No	Facility does not have an affected source.
40 CFR 63 (Subpart PP)	National Emission Standards for Containers	No	Facility does not have an affected source.
40 CFR 63 (Subpart QQ)	National Emission Standards for Surface Impoundments	No	Facility does not have an affected source.
40 CFR 63 (Subpart RR)	National Emission Standards for Individual Drain Systems	No	Facility does not have an affected source.

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Regulation	Description	Applicable	Notes
40 CFR 63 (Subpart SS)	National Emission Standards for Closed Vent Systems, Control Devices, Recovery Devices and Routing to a Fuel Gas System or a Process	No	Facility does not have an affected source.
40 CFR 63 (Subpart TT)	National Emission Standards for Equipment Leaks—Control Level 1	No	Facility does not have an affected source.
40 CFR 63 (Subpart UU)	National Emission Standards for Equipment Leaks—Control Level 2 Standards	No	Facility does not have an affected source.
40 CFR 63 (Subpart VV)	National Emission Standards for Oil-Water Separators and Organic-Water Separators	No	Facility does not have an affected source.
40 CFR 63 (Subpart WW)	National Emission Standards for Storage Vessels (Tanks)—Control Level 2	No	Facility does not have an affected source.
40 CFR 63 (Subpart XX)	National Emission Standards for Ethylene Manufacturing Process Units: Heat Exchange Systems and Waste Operations	No	Facility does not have an affected source.
40 CFR 63 (Subpart YY)	National Emission Standards for Hazardous Air Pollutants for Source Categories: Generic Maximum Achievable Control Technology Standards	No	Facility does not have an affected source.
40 CFR 63 (Subparts ZZ-BBB)	[Reserved]	N/A	[Reserved]
40 CFR 63 (Subpart CCC)	National Emission Standards for Hazardous Air Pollutants for Steel Pickling—HCl Process Facilities and Hydrochloric Acid Regeneration Plants	No	Facility does not have an affected source.
40 CFR 63 (Subpart DDD)	National Emission Standards for Hazardous Air Pollutants for Mineral Wool Production	No	Facility does not have an affected source.
40 CFR 63 (Subpart EEE)	National Emission Standards for Hazardous Air Pollutants from Hazardous Waste Combustors	No	Facility does not have an affected source.
40 CFR 63 (Subpart FFF)	[Reserved]	N/A	[Reserved]
40 CFR 63 (Subpart GGG)	National Emission Standards for Pharmaceuticals Production	No	Facility does not have an affected source.
40 CFR 63 (Subpart HHH)	National Emission Standards for Hazardous Air Pollutants From Natural Gas Transmission and Storage Facilities	No	Facility does not have an affected source.
40 CFR 63 (Subpart III)	National Emission Standards for Hazardous Air Pollutants for Flexible Polyurethane Foam Production	No	Facility does not have an affected source.

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Regulation	Description	Applicable	Notes
40 CFR 63 (Subpart JJJ)	National Emission Standards for Hazardous Air Pollutant Emissions: Group IV Polymers and Resins	No	Facility does not have an affected source.
40 CFR 63 (Subpart KKK)	[Reserved]	N/A	[Reserved]
40 CFR 63 (Subpart LLL)	National Emission Standards for Hazardous Air Pollutants From the Portland Cement Manufacturing Industry	No	Facility does not have an affected source.
40 CFR 63 (Subpart MMM)	National Emission Standards for Hazardous Air Pollutants for Pesticide Active Ingredient Production	No	Facility does not have an affected source.
40 CFR 63 (Subpart NNN)	National Emission Standards for Hazardous Air Pollutants for Wool Fiberglass Manufacturing	No	Facility does not have an affected source.
40 CFR 63 (Subpart OOO)	National Emission Standards for Hazardous Air Pollutant Emissions: Manufacture of Amino/Phenolic Resins	No	Facility does not have an affected source.
40 CFR 63 (Subpart PPP)	National Emission Standards for Hazardous Air Pollutant Emissions for Polyether Polyols Production	No	Facility does not have an affected source.
40 CFR 63 (Subpart QQQ)	National Emission Standards for Hazardous Air Pollutants for Primary Copper Smelting	No	Facility does not have an affected source.
40 CFR 63 (Subpart RRR)	National Emission Standards for Hazardous Air Pollutants for Secondary Aluminum Production	No	Facility does not have an affected source.
40 CFR 63 (Subpart SSS)	[Reserved]	N/A	[Reserved]
40 CFR 63 (Subpart TTT)	National Emission Standards for Hazardous Air Pollutants for Primary Lead Smelting	No	Facility does not have an affected source.
40 CFR 63 (Subpart UUU)	National Emission Standards for Hazardous Air Pollutants for Petroleum Refineries: Catalytic Cracking Units, Catalytic Reforming Units, and Sulfur Recovery Units	No	Facility does not have an affected source.
40 CFR 63 (Subpart VVV)	National Emission Standards for Hazardous Air Pollutants: Publicly Owned Treatment Works	No	Facility does not have an affected source.
40 CFR 63 (Subpart WWW)	[Reserved]	N/A	[Reserved]
40 CFR 63 (Subpart XXX)	National Emission Standards for Hazardous Air Pollutants for Ferroalloys Production: Ferromanganese and Silicomanganese	No	Facility does not have an affected source.
40 CFR 63 (Subpart AAAA)	National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills	No	Facility does not have an affected source.

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Regulation	Description	Applicable	Notes
40 CFR 63 (Subpart BBBB)	[Reserved]	N/A	[Reserved]
40 CFR 63 (Subpart CCCC)	National Emission Standards for Hazardous Air Pollutants: Manufacturing of Nutritional Yeast	No	Facility does not have an affected source.
40 CFR 63 (Subpart DDDD)	National Emission Standards for Hazardous Air Pollutants: Plywood and Composite Wood Products	No	Facility does not have an affected source.
40 CFR 63 (Subpart EEEE)	National Emission Standards for Hazardous Air Pollutants: Organic Liquids Distribution (Non-Gasoline)	No	Facility does not have an affected source.
40 CFR 63 (Subpart FFFF)	National Emission Standards for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing	No	Facility does not have an affected source.
40 CFR 63 (Subpart GGGG)	National Emission Standards for Hazardous Air Pollutants: Solvent Extraction for Vegetable Oil Production	No	Facility does not have an affected source.
40 CFR 63 (Subpart HHHH)	National Emission Standards for Hazardous Air Pollutants for Wet-Formed Fiberglass Mat Production	No	Facility does not have an affected source.
40 CFR 63 (Subpart IIII)	National Emission Standards for Hazardous Air Pollutants: Surface Coating of Automobiles and Light-Duty Trucks	No	Facility does not have an affected source.
40 CFR 63 (Subpart JJJJ)	National Emission Standards for Hazardous Air Pollutants: Paper and Other Web Coating	No	Facility does not have an affected source.
40 CFR 63 (Subpart KKKK)	National Emission Standards for Hazardous Air Pollutants: Surface Coating of Metal Cans	No	Facility does not have an affected source.
40 CFR 63 (Subpart MMMM)	National Emission Standards for Hazardous Air Pollutants for Surface Coating of Miscellaneous Metal Parts and Products	No	Facility does not have an affected source.
40 CFR 63 (Subpart NNNN)	National Emission Standards for Hazardous Air Pollutants: Surface Coating of Large Appliances	No	Facility does not have an affected source.
40 CFR 63 (Subpart OOOO)	National Emission Standards for Hazardous Air Pollutants: Printing, Coating, and Dyeing of Fabrics and Other Textiles	No	Facility does not have an affected source.
40 CFR 63 (Subpart PPPP)	National Emission Standards for Hazardous Air Pollutants for Surface Coating of Plastic Parts and Products	No	Facility does not have an affected source.
40 CFR 63 (Subpart QQQQ)	National Emission Standards for Hazardous Air Pollutants: Surface Coating of Wood Building Products	No	Facility does not have an affected source.

Federal Applicable Requirements Overview

Regulation	Description	Applicable	Notes
40 CFR 63 (Subpart RRRR)	National Emission Standards for Hazardous Air Pollutants: Surface Coating of Metal Furniture	No	Facility does not have an affected source.
40 CFR 63 (Subpart SSSS)	National Emission Standards for Hazardous Air Pollutants: Surface Coating of Metal Coil	No	Facility does not have an affected source.
40 CFR 63 (Subpart TTTT)	National Emission Standards for Hazardous Air Pollutants for Leather Finishing Operations	No	Facility does not have an affected source.
40 CFR 63 (Subpart UUUU)	National Emission Standards for Hazardous Air Pollutants for Cellulose Products Manufacturing	No	Facility does not have an affected source.
40 CFR 63 (Subpart VVVV)	National Emission Standards for Hazardous Air Pollutants for Boat Manufacturing	No	Facility does not have an affected source.
40 CFR 63 (Subpart WWWW)	National Emissions Standards for Hazardous Air Pollutants: Reinforced Plastic Composites Production	No	Facility does not have an affected source.
40 CFR 63 (Subpart XXXX)	National Emissions Standards for Hazardous Air Pollutants: Rubber Tire Manufacturing	No	Facility does not have an affected source.
40 CFR 63 (Subpart YYYY)	National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines	**No**	**Facility is not a HAP major source. Thus, facility does not have an affected source.**
40 CFR 63 (Subpart AAAAA)	National Emission Standards for Hazardous Air Pollutants for Lime Manufacturing Plants	No	Facility does not have an affected source.
40 CFR 63 (Subpart BBBBB)	National Emission Standards for Hazardous Air Pollutants for Semiconductor Manufacturing	No	Facility does not have an affected source.
40 CFR 63 (Subpart CCCCC)	National Emission Standards for Hazardous Air Pollutants for Coke Ovens: Pushing, Quenching, and Battery Stacks	No	Facility does not have an affected source.
40 CFR 63 (Subpart DDDDD)	National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters	No	Facility does not have an affected source.
40 CFR 63 (Subpart EEEEE)	National Emission Standards for Hazardous Air Pollutants for Iron and Steel Foundries	No	Facility does not have an affected source.
40 CFR 63 (Subpart FFFFF)	National Emission Standards for Hazardous Air Pollutants for Integrated Iron and Steel Manufacturing Facilities	No	Facility does not have an affected source.
40 CFR 63 (Subpart GGGGG)	National Emission Standards for Hazardous Air Pollutants: Site Remediation	No	Facility does not have an affected source.

Federal Applicable Requirements Overview

Regulation	Description	Applicable	Notes
40 CFR 63 (Subpart HHHHH)	National Emission Standards for Hazardous Air Pollutants: Miscellaneous Coating Manufacturing	No	Facility does not have an affected source.
40 CFR 63 (Subpart IIIII)	National Emission Standards for Hazardous Air Pollutants for Mercury Cell Chlor-Alkali Plants	No	Facility does not have an affected source.
40 CFR 63 (Subpart JJJJJ)	National Emission Standards for Hazardous Air Pollutants for Brick and Structural Clay Products Manufacturing	No	Facility does not have an affected source.
40 CFR 63 (Subpart KKKKK)	National Emission Standards for Hazardous Air Pollutants for Clay Ceramics Manufacturing	No	Facility does not have an affected source.
40 CFR 63 (Subpart LLLLL)	National Emission Standards for Hazardous Air Pollutants: Asphalt Processing and Asphalt Roofing Manufacturing	No	Facility does not have an affected source.
40 CFR 63 (Subpart MMMMM)	National Emission Standards for Hazardous Air Pollutants: Flexible Polyurethane Foam Fabrication Operations	No	Facility does not have an affected source.
40 CFR 63 (Subpart NNNNN)	National Emission Standards for Hazardous Air Pollutants: Hydrochloric Acid Production	No	Facility does not have an affected source.
40 CFR 63 (Subpart OOOOO)	[Reserved]	N/A	[Reserved]
40 CFR 63 (Subpart PPPPP)	National Emission Standards for Hazardous Air Pollutants for Engine Test Cells/Stands	No	Facility does not have an affected source.
40 CFR 63 (Subpart QQQQQ)	National Emission Standards for Hazardous Air Pollutants for Friction Materials Manufacturing Facilities	No	Facility does not have an affected source.
40 CFR 63 (Subpart RRRRR)	National Emission Standards for Hazardous Air Pollutants: Taconite Iron Ore Processing	No	Facility does not have an affected source.
40 CFR 63 (Subpart SSSSS)	National Emission Standards for Hazardous Air Pollutants for Refractory Products Manufacturing	No	Facility does not have an affected source.
40 CFR 63 (Subpart TTTTT)	National Emissions Standards for Hazardous Air Pollutants for Primary Magnesium Refining	No	Facility does not have an affected source.
40 CFR 63 (Subpart UUUUU)	National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units	No	Facility does not have an affected source.
40 CFR 63 (Subpart VVVVV)	[Reserved]	N/A	[Reserved]

Federal Applicable Requirements Overview

Regulation	Description	Applicable	Notes
40 CFR 63 (Subpart WWWWW)	National Emission Standards for Hospital Ethylene Oxide Sterilizers	No	Facility does not have an affected source.
40 CFR 63 (Subpart XXXXX)	[Reserved]	N/A	[Reserved]
40 CFR 63 (Subpart YYYYY)	National Emission Standards for Hazardous Air Pollutants for Area Sources: Electric Arc Furnace Steelmaking Facilities	No	Facility does not have an affected source.
40 CFR 63 (Subpart ZZZZZ)	National Emission Standards for Hazardous Air Pollutants for Iron and Steel Foundries Area Sources	No	Facility does not have an affected source.
40 CFR 63 (Subpart AAAAAA)	[Reserved]	N/A	[Reserved]
40 CFR 63 (Subpart BBBBBB)	National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Distribution Bulk Terminals, Bulk Plants, and Pipeline Facilities	No	Facility does not have an affected source.
40 CFR 63 (Subpart CCCCCC)	National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Dispensing Facilities	No	Facility does not have an affected source.
40 CFR 63 (Subpart DDDDDD)	National Emission Standards for Hazardous Air Pollutants for Polyvinyl Chloride and Copolymers Production Area Sources	No	Facility does not have an affected source.
40 CFR 63 (Subpart EEEEEE)	National Emission Standards for Hazardous Air Pollutants for Primary Copper Smelting Area Sources	No	Facility does not have an affected source.
40 CFR 63 (Subpart FFFFFF)	National Emission Standards for Hazardous Air Pollutants for Secondary Copper Smelting Area Sources	No	Facility does not have an affected source.
40 CFR 63 (Subpart GGGGGG)	National Emission Standards for Hazardous Air Pollutants for Primary Nonferrous Metals Area Sources—Zinc, Cadmium, and Beryllium	No	Facility does not have an affected source.
40 CFR 63 (Subpart HHHHHH)	National Emission Standards for Hazardous Air Pollutants: Paint Stripping and Miscellaneous Surface Coating Operations at Area Sources	No	Facility does not have an affected source.
40 CFR 63 (Subpart IIIIII)	[Reserved]	N/A	[Reserved]
40 CFR 63 (Subpart JJJJJJ)	National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources	No	Facility does not have an affected source.

Federal Applicable Requirements Overview

Regulation	Description	Applicable	Notes
40 CFR 63 (Subpart KKKKKK)	[Reserved]	N/A	[Reserved]
40 CFR 63 (Subpart LLLLLL)	National Emission Standards for Hazardous Air Pollutants for Acrylic and Modacrylic Fibers Production Area Sources	No	Facility does not have an affected source.
40 CFR 63 (Subpart MMMMMM)	National Emission Standards for Hazardous Air Pollutants for Carbon Black Production Area Sources	No	Facility does not have an affected source.
40 CFR 63 (Subpart NNNNNN)	National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources: Chromium Compounds	No	Facility does not have an affected source.
40 CFR 63 (Subpart OOOOOO)	National Emission Standards for Hazardous Air Pollutants for Flexible Polyurethane Foam Production and Fabrication Area Sources	No	Facility does not have an affected source.
40 CFR 63 (Subpart PPPPPP)	National Emission Standards for Hazardous Air Pollutants for Lead Acid Battery Manufacturing Area Sources	No	Facility does not have an affected source.
40 CFR 63 (Subpart QQQQQQ)	National Emission Standards for Hazardous Air Pollutants for Wood Preserving Area Sources	No	Facility does not have an affected source.
40 CFR 63 (Subpart RRRRRR)	National Emission Standards for Hazardous Air Pollutants for Clay Ceramics Manufacturing Area Sources	No	Facility does not have an affected source.
40 CFR 63 (Subpart SSSSSS)	National Emission Standards for Hazardous Air Pollutants for Glass Manufacturing Area Sources	No	Facility does not have an affected source.
40 CFR 63 (Subpart TTTTTT)	National Emission Standards for Hazardous Air Pollutants for Secondary Nonferrous Metals Processing Area Sources	No	Facility does not have an affected source.
40 CFR 63 (Subpart UUUUUU)	[Reserved]	N/A	[Reserved]
40 CFR 63 (Subpart VVVVVV)	National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources	No	Facility does not have an affected source.
40 CFR 63 (Subpart WWWWWW)	National Emission Standards for Hazardous Air Pollutants: Area Source Standards for Plating and Polishing Operations	No	Facility does not have an affected source.
40 CFR 63 (Subpart XXXXXX)	National Emission Standards for Hazardous Air Pollutants Area Source Standards for Nine Metal Fabrication and Finishing Source Categories	No	Facility does not have an affected source.
40 CFR 63 (Subpart YYYYYY)	National Emission Standards for Hazardous Air Pollutants for Area Sources: Ferroalloys Production Facilities	No	Facility does not have an affected source.

Federal Applicable Requirements Overview

Regulation	Description	Applicable	Notes
40 CFR 63 (Subpart ZZZZZZ)	National Emission Standards for Hazardous Air Pollutants: Area Source Standards for Aluminum, Copper, and Other Nonferrous Foundries	No	Facility does not have an affected source.
40 CFR 63 (Subpart AAAAAAA)	National Emission Standards for Hazardous Air Pollutants for Area Sources: Asphalt Processing and Asphalt Roofing Manufacturing	No	Facility does not have an affected source.
40 CFR 63 (Subpart BBBBBBB)	National Emission Standards for Hazardous Air Pollutants for Area Sources: Chemical Preparations Industry	No	Facility does not have an affected source.
40 CFR 63 (Subpart CCCCCCC)	National Emission Standards for Hazardous Air Pollutants for Area Sources: Paints and Allied Products Manufacturing	No	Facility does not have an affected source.
40 CFR 63 (Subpart DDDDDDD)	National Emission Standards for Hazardous Air Pollutants for Area Sources: Prepared Feeds Manufacturing	No	Facility does not have an affected source.
40 CFR 63 (Subpart EEEEEEE)	National Emission Standards for Hazardous Air Pollutants: Gold Mine Ore Processing and Production Area Source Category	No	Facility does not have an affected source.
40 CFR 63 (Subparts FFFFFFF and GGGGGGG)	[Reserved]	N/A	[Reserved]
40 CFR 63 (Subpart HHHHHHH)	National Emission Standards for Hazardous Air Pollutant Emissions for Polyvinyl Chloride and Copolymers Production	No	Facility does not have an affected source.
40 CFR 64	Compliance Assurance Monitoring (CAM)	No	EU-BM100 is below the pre-control emissions thresholds.
40 CFR 65 (Subpart A)	Consolidated Federal Air Rule: General Provisions	No	Facility does not have an affected source.
40 CFR 65 (Subpart B)	[Reserved]	N/A	[Reserved]
40 CFR 65 (Subpart C)	Storage Vessels	No	Facility does not have an affected source.
40 CFR 65 (Subpart D)	Process Vents	No	Facility does not have an affected source.
40 CFR 65 (Subpart E)	Transfer Racks	No	Facility does not have an affected source.
40 CFR 65 (Subpart F)	Equipment Leaks	No	Facility does not have an affected source.
40 CFR 65 (Subpart G)	Closed Vent Systems, Control Devices, and Routing to a Fuel Gas System or a Process	No	Facility does not have an affected source.
40 CFR 68 (Subpart A)	Chemical Accident Prevention Provisions: General Provisions	No	Contains general requirements.
40 CFR 68 (Subpart B)	Hazard Assessment	No	
40 CFR 68 (Subpart C)	Program 2 Prevention Program	No	

Federal Applicable Requirements Overview

Regulation	Description	Applicable	Notes
40 CFR 68 (Subpart D)	Program 3 Prevention Program	No	
40 CFR 68 (Subpart E)	Emergency Response	No	
40 CFR 68 (Subpart F)	Regulated Substances for Accidental Release Prevention	No	
40 CFR 68 (Subpart G)	Risk Management Plan	No	
40 CFR 70	State Operating Permit Programs	**No**	**The facility is a synthetic minor.**
40 CFR 71 (Subpart A)	Federal Operating Permit Program — Operating Permits	No	No applicable requirements.
40 CFR 71 (Subpart B)	Permits for Early Reductions Sources	No	No applicable requirements.
40 CFR 72 (Part 72)	Permits Regulation	No	No applicable requirements.
40 CFR 72 (Subpart A)	Acid Rain Program General Provisions	No	No applicable requirements.
40 CFR 72 (Subpart B)	Designated Representative	No	No applicable requirements.
40 CFR 72 (Subpart C)	Acid Rain Permit Applications	No	No applicable requirements.
40 CFR 72 (Subpart D)	Acid Rain Compliance Plan and Compliance Options	No	No applicable requirements.
40 CFR 72 (Subpart E)	Acid Rain Permit Contents	No	No applicable requirements.
40 CFR 72 (Subpart F)	Federal Acid Rain Permit Issuance Procedures	No	No applicable requirements.
40 CFR 72 (Subpart G)	Acid Rain Phase II Implementation	No	No applicable requirements.
40 CFR 72 (Subpart H)	Permit Revisions	No	No applicable requirements.
40 CFR 72 (Subpart I)	Compliance Certification	No	No applicable requirements.
40 CFR 73	Sulfur Dioxide Allowance System	No	No applicable requirements.
40 CFR 82 (Subpart A)	Protection of Stratospheric Ozone – Production and Consumption Controls	**Yes**	**This facility has air conditioners and/or refrigeration units that use ozone depleting substances (ODS). Facility personnel do not maintain, service, repair, and/ or dispose of motor vehicle air conditioners.**
40 CFR 82 (Subpart B)	Servicing of Motor Vehicle Air Conditioners	No	Facility personnel do not maintain, service, repair, and/ or dispose of motor vehicle air conditioners.

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Regulation	Description	Applicable	Notes
40 CFR 82 (Subpart C)	Ban on Nonessential Products Containing Class I Substances and Ban on Nonessential Products Containing or Manufactured with Class II Substances	**Yes**	**Contains general requirements.**
40 CFR 82 (Subpart D)	Federal Procurement	No	No applicable requirements.
40 CFR 82 (Subpart E)	The Labeling of Products Using Ozone Depleting Substances	**Yes**	**Contains general requirements.**
40 CFR 82 (Subpart F)	Recycling and Emissions Reduction	**Yes**	**Contains general requirements.**
40 CFR 82 (Subpart G)	Significant New Alternatives Policy Program	No	Facility is not producing alternative substances for ODS.
40 CFR 82 (Subpart H)	Halon Emissions Reduction	No	No applicable requirements.
40 CFR 82 (Subpart I)	Ban on Refrigeration and Air-Conditioning Appliances Containing HCFCs	**Yes**	**Contains general requirements.**
40 CFR 83	[Reserved]	N/A	[Reserved]
40 CFR 84	Phasedown of Hydrofluorocarbons	No	No applicable requirements.
40 CFR 85 through 89	Regulations governing mobile sources	No	No applicable requirements.
40 CFR 93	Determining conformity of federal actions to state or federal implementation plans	No	No applicable requirements.
40 CFR 95	Mandatory patent licenses	No	No applicable requirements.
40 CFR 96	NO_X Budget Trading Program and CAIR NO_X and SO_2 Trading Programs for State Implementation Plans	No	No applicable requirements.
40 CFR 97	Federal NO_X Budget Trading Program and CAIR NO_X and SO_2 Trading Programs	No	No applicable requirements.
40 CFR 98	Mandatory Greenhouse Gas Reporting Rule	**Yes**	**Contains specific recordkeeping and reporting requirements.**
40 CFR 99	[Reserved]	N/A	[Reserved]

State and Local Applicable Requirements Overview

Shelby County Code	Memphis City Code	TDEC of Air Pollution Regulation	Description	Applicable	Notes
3-1A	16-46	Chapter 1200-3-2	Definitions		
		1200-3-2-.01	General Definitions	N/A	Defines terms used.
		1200-3-2-.02	Abbreviations	N/A	
3-6	16-49	Chapter 1200-3-3	Ambient Air Quality Standards		
		1200-3-3-.01	Primary Air Quality Standard	**Yes**	**Contains general requirements.**
		1200-3-3-.02	Secondary Air Quality Standard	**Yes**	**Contains general requirements.**
		1200-3-3-.03	Tennessee's Ambient Air Quality Standard	**Yes**	**Contains general requirements.**
		1200-3-3-.04	Nondegradation Standard	**Yes**	**Contains general requirements.**
		1200-3-3-.05	Achievement	**Yes**	**Last sentence of 1200-3-3-.05 does not apply; however, the facility is in compliance.**
3-17	16-83	Chapter 1200-3-5	Visible Emissions		
		1200-3-5-.01	General Standards	**Yes**	**Contains general requirements.**
		1200-3-5-.02	Exceptions	**Yes**	**Contains general requirements.**
		1200-3-5-.03	Method of Recording	**Yes**	**Contains general requirements.**
		1200-3-5-.04	Exemption	**Yes**	**Contains general requirements.**
		1200-3-5-.05	Standard for Certain Existing Sources	No	No applicable requirements.
		1200-3-5-0.6	Wood-Fired Fuel Burning Equipment	No	No applicable requirements.
		1200-3-5-0.7	[Reserved]	N/A	[Reserved]
		1200-3-5-0.8	[Reserved]	N/A	[Reserved]

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Shelby County Code	Memphis City Code	TDEC of Air Pollution Regulation	Description	Applicable	Notes
		1200-3-5-0.9	[Reserved]	N/A	[Reserved]
		1200-3-5-10	Choice of Visible Emission Standard for Certain Fuel Burning Equipment	No	No applicable requirements.
		1200-3-5-11	[Reserved]	N/A	[Reserved]
		1200-3-5-12	[Reserved]	N/A	[Reserved]
3-20	16-78	Chapter 1200-3-7	Process Emission Standards (PM)		
		1200-3-7-.01	General Process Particulate Emission Standards	**Yes**	**Contains general requirements.**
		1200-3-7-.02	Choice of Particulate Emission Standards	**Yes**	**Contains specific requirements.**
		1200-3-7-.03	New Processes	**Yes**	**Contains specific requirements.**
		1200-3-7-.04	Limiting Allowable Emissions	**Yes**	**Contains specific requirements.**
		1200-3-7-.05	Specific Process Emission Standards	No	No applicable requirements.
		1200-3-7-.06	Standards of Performance for New Stationary Sources	No	No applicable requirements.
		1200-3-7-.07	General Provisions and Applicability for Process Gaseous Emission Standards	No	No applicable requirements.
		1200-3-7-.08	Specific Process	No	No applicable requirements.
		1200-3-7-.09	Sulfuric Acid Mist	No	No applicable requirements.
		1200-3-7-.10	Grain Loading Limit for Certain Existing Sources	No	No applicable requirements.
		1200-3-7-.11	Carbon Monoxide, Electric Arc Furnaces	No	No applicable requirements.
		1200-3-7-.12	Carbon Monoxide, Catalytic Cracking Units	No	No applicable requirements.
3-5	16-77	Chapter 1200-3-9	Construction and Operating Permits		

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Shelby County Code	Memphis City Code	TDEC of Air Pollution Regulation	Description	Applicable	Notes
		1200-3-9-.01	Construction Permits	**Yes**	**Contains general requirements.**
		1200-3-9-.02	Operating Permits	**Yes**	**Contains specific requirements.**
		1200-3-9-.03	General Provisions	**Yes**	**Contains specific requirements.**
		1200-3-9-.04	Exemptions	**Yes**	**Contains specific requirements.**
		1200-3-9-.05	Appeal of Permit Application Denials and Permit Conditions	**Yes**	**Contains general requirements.**
		1200-3-9-.06	General Permits	N/A	Does not apply.
		1200-3-9-.07	Permits-by-Rule	N/A	Does not apply.
3-7	16-85	Chapter 1200-3-10	Required Sampling, Recording, and Reporting		
		1200-3-10-.01	Sampling Required to Establish Air Contaminant Emissions Levels	**Yes**	**Contains general requirements.**
		1200-3-10-.02	Monitoring of Source Emissions, Recording and Reporting of Same are Required	**Yes**	**Contains general requirements.**
		1200-3-10-.04	Sampling, Recording and Reporting Required for Major Stationary Sources	**Yes**	**Contains specific requirements.**
		1200-3-10-.05	Emissions Inventory Requirements		
3-25	16-81	Chapter 1200-3-11	Hazardous Air Contaminants		[Repealed]
3-8	16-86	Chapter 1200-3-12	Methods of Sampling and Analysis		
		1200-3-12-.01	General Provisions	**Yes**	**Contains general requirements.**
		1200-3-12-.02	Procedures for Ambient Air Sampling and Analysis	**Yes**	**Contains general requirements.**

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Shelby County Code	Memphis City Code	TDEC of Air Pollution Regulation	Description	Applicable	Notes
		1200-3-12-.03	Source Sampling and Analysis	**Yes**	**Contains general requirements.**
		1200-3-12-.04	Monitoring Required for Determining Compliance of Certain Large Sources	No	No applicable requirements.
3-24	16-82	Chapter 1200-3-14	Control of Sulfur Dioxide Emissions		
		1200-03-14-.01	General Provisions	**Yes**	**Contains general requirements.**
		1200-03-14-.02	Non-Process Emission Standards	**Yes**	**Contains requirements for all fuel-burning equipment. Facility is in compliance.**
		1200-03-14-.03	Process Emission Standards	No	No applicable requirements.
		1200-03-14-0.4	[Reserved]	N/A	[Reserved]
3-15	16-76	Chapter 1200-3-16	New Source Performance Standards		
		1200-3-16-.01	General Provisions	**Yes**	**Contains general requirements.**
		1200-3-16-.02	Fossil Fuel-Fired Steam Generating for which Construction is Commenced After April 3, 1972	No	No applicable requirements.
		1200-3-16-.03	Electric Utility Steam Generating Units for which Construction Commenced After September 18, 1978	No	No applicable requirements.
		1200-3-16-.04	Incinerators	No	No applicable requirements.
		1200-3-16-.05	Portland Cement Plants	No	No applicable requirements.
		1200-3-16-.06	Sulfuric Acid Plants	No	No applicable requirements.
		1200-3-16-.07	Nitric Acid Plants	No	No applicable requirements.
		1200-3-16-.08	Hot Mix Asphalt Facilities	No	No applicable requirements.
		1200-3-16-.09	Petroleum Refineries	No	No applicable requirements.
		1200-3-16-.10	[Reserved]	N/A	[Reserved]

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Shelby County Code	Memphis City Code	TDEC of Air Pollution Regulation	Description	Applicable	Notes
		1200-3-16-.11	[Reserved]	N/A	[Reserved]
		1200-3-16-.12	Secondary Lead Smelters	No	No applicable requirements.
		1200-3-16-.13	Secondary Brass and Bronze Ingot Production Plants	No	No applicable requirements.
		1200-3-16-.14	Iron and Steel Plants	No	No applicable requirements.
		1200-3-16-.15	Sewage Treatment Plant Incinerators	No	No applicable requirements.
		1200-3-16-.16	Phosphate Fertilizer Industry Wet Process Phosphoric Acid Plants	No	No applicable requirements.
		1200-3-16-.17	Phosphate Fertilizer Industry Super Phosphoric Acid Plants	No	No applicable requirements.
		1200-3-16-.18	Phosphate Fertilizer Industry Diammonium Phosphate Plants	No	No applicable requirements.
		1200-3-16-.19	Phosphate Fertilizer Industry Triple Superphosphate Plants	No	No applicable requirements.
		1200-3-16-.20	Phosphate Fertilizer Industry Granular Triple Superphosphate Storage Facilities	No	No applicable requirements.
		1200-3-16-.21	Primary Aluminum Reduction Plants	No	No applicable requirements.
		1200-3-16-.22	[Reserved]	N/A	[Reserved]
		1200-3-16-.23	Primary Copper Smelters	No	No applicable requirements.
		1200-3-16-.24	Primary Zinc Smelters	No	No applicable requirements.
		1200-3-16-.25	Primary Lead Smelters	No	No applicable requirements
		1200-3-16-.26	Steel Plants: Electric Arc Furnaces Constructed after February 9, 1977, and on or before August 17, 1983	No	No applicable requirements
		1200-3-16-.27	Ferroalloy Production Facilities	No	No applicable requirements
		1200-3-16-.28	Lime Manufacturing Plants	No	No applicable requirements
		1200-3-16-.29	Kraft Pulp Mills	No	No applicable requirements
		1200-3-16-.30	Grain Elevators	No	No applicable requirements

State and Local Applicable Requirements Overview

Shelby County Code	Memphis City Code	TDEC of Air Pollution Regulation	Description	Applicable	Notes
		1200-3-16-.31	[Reserved]	N/A	[Reserved]
		1200-3-16-.32	Ammonium Sulfate Manufacture	No	No applicable requirements
		1200-3-16-.33	[Reserved]	N/A	[Reserved]
		1200-3-16-.34	Automobile and Light Duty Truck Surface Coating Operations	No	No applicable requirements
		1200-3-16-.35	Asphalt Processing and Asphalt Roofing Manufacture	No	No applicable requirements
		1200-3-16-.37	Surface Coating of Metal Furniture	No	No applicable requirements
		1200-3-16-.38	Metal Coil Surface Coating	No	No applicable requirements
		1200-3-16-.39	Graphic Arts Industry Publication Rotogravure Printing	No	No applicable requirements
		1200-3-16-.40	Beverage Can Surface Coating	No	No applicable requirements
		1200-3-16-.41	Metallic Mineral Processing Plants	No	No applicable requirements
		1200-3-16-.42	Pressure Sensitive Tape and Surface Coating Operations	No	No applicable requirements
		1200-3-16-.43	[Reserved]	N/A	[Reserved]
		1200-3-16-.44	Bulk Gasoline Terminals	No	No applicable requirements
		1200-3-16-.45	Synthetic Fiber Production Facilities	No	No applicable requirements
		1200-3-16-.46	Lead Acid Batter Manufacturing Facilities	No	No applicable requirements
		1200-3-16-.47	Equipment Leaks of VOC in Petroleum Refineries	No	No applicable requirements
		1200-3-16-.48	Flexible Vinyl and Urethane Coating and Printing	No	No applicable requirements
		1200-3-16-.49	Petroleum Dry Cleaners	No	No applicable requirements
		1200-3-16-.50	Phosphate Rock Plants	No	No applicable requirements
		1200-3-16-.51	Equipment Leaks of VOC from Onshore Natural Gas Processing Plants	No	No applicable requirements

State and Local Applicable Requirements Overview

Shelby County Code	Memphis City Code	TDEC of Air Pollution Regulation	Description	Applicable	Notes
		1200-3-16-.52	Electric Arc Furnaces and Argon-Oxygen Decarburitization Vessels	No	No applicable requirements
		1200-3-16-.53	[Reserved]	N/A	[Reserved]
		1200-3-16-.54	Onshore Natural Gas Processing SO2 Emissions	No	No applicable requirements
		1200-3-16-.55	Secondary Emissions from Basic Oxygen Process Steelmaking Facilities	No	No applicable requirements
		1200-3-16-.56	Wool Fiberglass Insulation Manufacturing Plants	No	No applicable requirements
		1200-3-16-.57	Industrial Surface Coating Plastic Parts for Business Machines	No	No applicable requirements
		1200-3-16-.58	[Reserved]	N/A	[Reserved]
		1200-3-16-.59	Industrial-Commercial-Institutional Steam Generating Units	No	No applicable requirements
		1200-3-16-.06 through .73	[Reserved]	N/A	[Reserved]
		1200-3-16-.74	Standards of Performance for Calciners and Dryers in Mineral Industries	No	No applicable requirements
		1200-3-16-.75	[Reserved]	N/A	[Reserved]
		1200-3-16-.76	[Reserved]	N/A	[Reserved]
		1200-3-16-.77 through .99	[Reserved]	N/A	[Reserved]
3-22	16-80	Chapter 1200-3-18	Volatile Organic Compounds		
		1200-3-18-.01	Definitions	**Yes**	**Defines terms in the chapter.**
		1200-3-18-.02	General Provisions and Applicability	**Yes**	**Contains general requirements.**
		1200-3-18-.03	Compliance Certification, Record Keeping, and Reporting Requirements for Coating and Printing Sources	No	No applicable requirements.

State and Local Applicable Requirements Overview

Shelby County Code	Memphis City Code	TDEC of Air Pollution Regulation	Description	Applicable	Notes
		1200-3-18-.04	Compliance Certification, Record Keeping, and Reporting Requirements for Non-Coating and Non-Printing Sources	**Yes**	**Contains specific requirements.**
		1200-3-18-.05	[Reserved]	N/A	[Reserved]
		1200-3-18-.06	Handling, Storage, and Disposal of Volatile Organic Compounds	No	Contains general requirements.
		1200-3-18-.07	Source-Specific Compliance Schedules	No	No applicable requirements.
		1200-3-18.08 through .10	[Reserved]	N/A	[Reserved]
		1200-3-18-.11	Automobile and Light-Duty Truck Coating Operations	No	No applicable requirements.
		1200-3-18-.12	Can Coating	No	No applicable requirements.
		1200-3-18-.13	Coil Coating	No	No applicable requirements.
		1200-3-18-.14	Paper and Related Coating	No	No applicable requirements.
		1200-3-18-.15	Fabric Coating	No	No applicable requirements.
		1200-3-18-.16	Vinyl Coating	No	No applicable requirements.
		1200-3-18-.17	Coating of Metal Furniture	No	No applicable requirements.
		1200-3-18-.18	Coating of Large Appliances	No	No applicable requirements.
		1200-3-18-.19	Coating of Magnet Wire	No	No applicable requirements.
		1200-3-18-.20	Coating of Miscellaneous Metal Parts	No	No applicable requirements.
		1200-3-18-.21	Coating of Flat Wood Paneling	No	No applicable requirements.
		1200-3-18-.22	Bulk Gasoline Plants	No	No applicable requirements.
		1200-3-18-.23	Bulk Gasoline Terminals	No	No applicable requirements.
		1200-3-18-.24	Gasoline Dispensing Facilities — Stage I and Stage II Vapor Recovery	No	No applicable requirements.
		1200-3-18-.25	Leaks from Gasoline Tank Trucks	No	No applicable requirements.
		1200-3-18-.26	Petroleum Refinery Sources	No	No applicable requirements.

State and Local Applicable Requirements Overview

Shelby County Code	Memphis City Code	TDEC of Air Pollution Regulation	Description	Applicable	Notes
		1200-3-18-.27	Leaks from Petroleum Refinery Equipment	No	No applicable requirements.
		1200-3-18-.28	Petroleum Liquid Storage in External Floating Roof Tanks	No	No applicable requirements.
		1200-3-18-.29	Petroleum Liquid Storage in Fixed Roof Tanks	No	No applicable requirements.
		1200-3-18-.30	Leaks from Natural Gas/Gasoline Processing Equipment	No	No applicable requirements.
		1200-3-18-.31	Solvent Metal Cleaning	No	No applicable requirements.
		1200-3-18-.32	Cutback and Emulsified Asphalt	No	No applicable requirements.
		1200-3-18-.33	Manufacture of Synthesized Pharmaceutical Products	No	No applicable requirements.
		1200-3-18-.34	Pneumatic Rubber Tire Manufacturing	No	No applicable requirements.
		1200-3-18-.35	Graphic Arts Systems	No	No applicable requirements.
		1200-3-18-.36	Petroleum Solvent Dry Cleaning	No	No applicable requirements.
		1200-3-18-.37	[Reserved]	N/A	[Reserved]
		1200-3-18-.38	Leaks from Synthetic Organic Chemical, Polymer, and Resin Manufacturing Equipment	No	No applicable requirements.
		1200-3-18-.39	Manufacture of High-Density Polyethylene, Polypropylene, and Polystyrene Resins	No	No applicable requirements.
		1200-3-18-.40	Air Oxidation Processes in the Synthetic Chemical Manufacturing Industry	No	No applicable requirements.
		1200-3-18-.41	[Reserved]	N/A	[Reserved]
		1200-3-18-.42	Wood Furniture Finishing and Cleaning Operation	No	No applicable requirements.
		1200-3-18-.43	Offset Lithographic Printing Operation	No	No applicable requirements.

State and Local Applicable Requirements Overview

Shelby County Code	Memphis City Code	TDEC of Air Pollution Regulation	Description	Applicable	Notes
		1200-3-18-.44	Surface Coating of Plastic Parts	No	No applicable requirements.
		1200-3-18-.45	Standards of Performance for Commercial Motor Vehicle and Mobile Equipment Refinishing Operations	No	No applicable requirements.
		1200-3-18-.46	[Reserved]	N/A	[Reserved]
		1200-3-18-.47	[Reserved]	N/A	[Reserved]
		1200-3-18-.48	Volatile Organic Liquid Storage Tanks	No	This rule does not apply to facilities in Shelby County.
		1200-3-18-.49 through .77	[Reserved]	N/A	[Reserved]
		1200-3-18-.78	Other Facilities that Emit Volatile Organic (VOC'S) of Fifty Tons Per Year	No	This rule does not apply to facilities in Shelby County.
		1200-3-18-.79	Other Facilities that Emit Volatile Organic Compounds (VOC'S) of One Hundred Tons Per Year	No	This rule does not apply to facilities in Shelby County.
		1200-3-18-.80	Test Methods and Compliance Procedures: General Provisions	No	Per 1200-3-18-.80(1) Rules 1200-03-18-.80 through 1200-03-18-.85 applies if a VOC source is required to comply with any Rules found in 1200-03-18-.11 through 1200-03-18-.79.
		1200-3-18-.81	Test Methods and Compliance Procedures: Determining the VOC Content of Coatings and Inks	No	No applicable requirements.
		1200-3-18-.82	Test Methods and Compliance Procedures: Alternative Compliance Methods for Surface Coating	No	No applicable requirements.
		1200-3-18-.83	Test Methods and Compliance Procedures: Emission Capture and Destruction of Removal Efficiency and Monitoring Requirements	No	No applicable requirements.

State and Local Applicable Requirements Overview

Shelby County Code	Memphis City Code	TDEC of Air Pollution Regulation	Description	Applicable	Notes
		1200-3-18-.84	Test Methods and Compliance Procedures: Determining the Destruction or Removal Efficiency of a Control Device	No	No applicable requirements.
		1200-3-18-.85	Test Methods and Compliance Procedures: Leak Detection Methods for VOCs	No	No applicable requirements
		1200-3-18-.87	Quality Control Procedures for Continuous Emission Monitoring Systems	No	No applicable requirements
		1200-3-18.88 through .99	[Reserved]	N/A	[Reserved]
3-9	16-87	Chapter 1200-3-20	Limits on Emissions Due to Malfunctions, Startups, and Shutdowns		
		1200-3-20-.01	Purpose	**Yes**	**Contains general requirements.**
		1200-3-20-.02	Reasonable Measures Required	**Yes**	**Contains general requirements.**
		1200-3-20-.03	Notice Required When Malfunction Occurs	**Yes**	**Contains general requirements.**
		1200-3-20-.04	Logs and Reports	**Yes**	**Contains general requirements.**
		1200-3-20-.05	Copies of Logs Required	**Yes**	**Contains general requirements.**
		1200-3-20-.06	Report Required Upon the Issuance of a Notice of Violation	**Yes**	**Contains general requirements.**
		1200-3-20-.07	Special Reports Required	**Yes**	**Contains general requirements.**
		1200-3-20-.08	Rights Reserved	**Yes**	**Contains general requirements.**
		1200-3-20-.09	Additional Sources Covered	**Yes**	**Contains general requirements.**

State and Local Applicable Requirements Overview

Shelby County Code	Memphis City Code	TDEC of Air Pollution Regulation	Description	Applicable	Notes
3-28	16-90	Chapter 1200-3-21	General Alternate Emission Standard		
		1200-3-21-.01	General Alternate Emission Standard	No	No applicable requirements.
		1200-3-21-.02	Applicability	No	No applicable requirements.
3-29	16-91	Chapter 1200-3-22	Lead Emission Standards		
		1200-3-22-.01	Definitions	No	No applicable requirements.
		1200-3-22-.02	General Lead Emission Standard	No	No applicable requirements.
		1200-3-22-.03	Specific Emission Standards for Existing Sources of Lead	No	No applicable requirements.
		1200-3-22-.04	Standards for New or Modified Sources of Lead	No	No applicable requirements.
		1200-3-22-.05	Source Sampling and Analysis	No	No applicable requirements.
		1200-3-22-.06	Lead Ambient Monitoring Requirements	No	No applicable requirements.
3-40	16-52	Chapter 1200-3-24	Good Engineering Practice Stack Height Regulations		
		1200-3-24-.01	General Provisions	**Yes**	**Contains general requirements.**
		1200-3-24-.02	Definitions	**Yes**	**Defines terms used.**
		1200-3-24-.03	Good Engineering Practice Stack Height Standards	**Yes**	**Contains general requirements.**
		1200-3-24-.04	Specific Emission Standards	**Yes**	**Contains general requirements.**
3-39	16-91.1	Chapter 1200-3-25	Standard for Infectious Waste Incinerators		
		1200-3-25-.01 through .10	Infectious Waste Incinerator Program	No	No applicable requirements.
3-36	16-91.2	Chapter 1200-3-30	Acid Precipitation Standard		
		1200-3-30.-01- through .10	Acid Rain Program	No	No applicable requirements

State and Local Applicable Requirements Overview

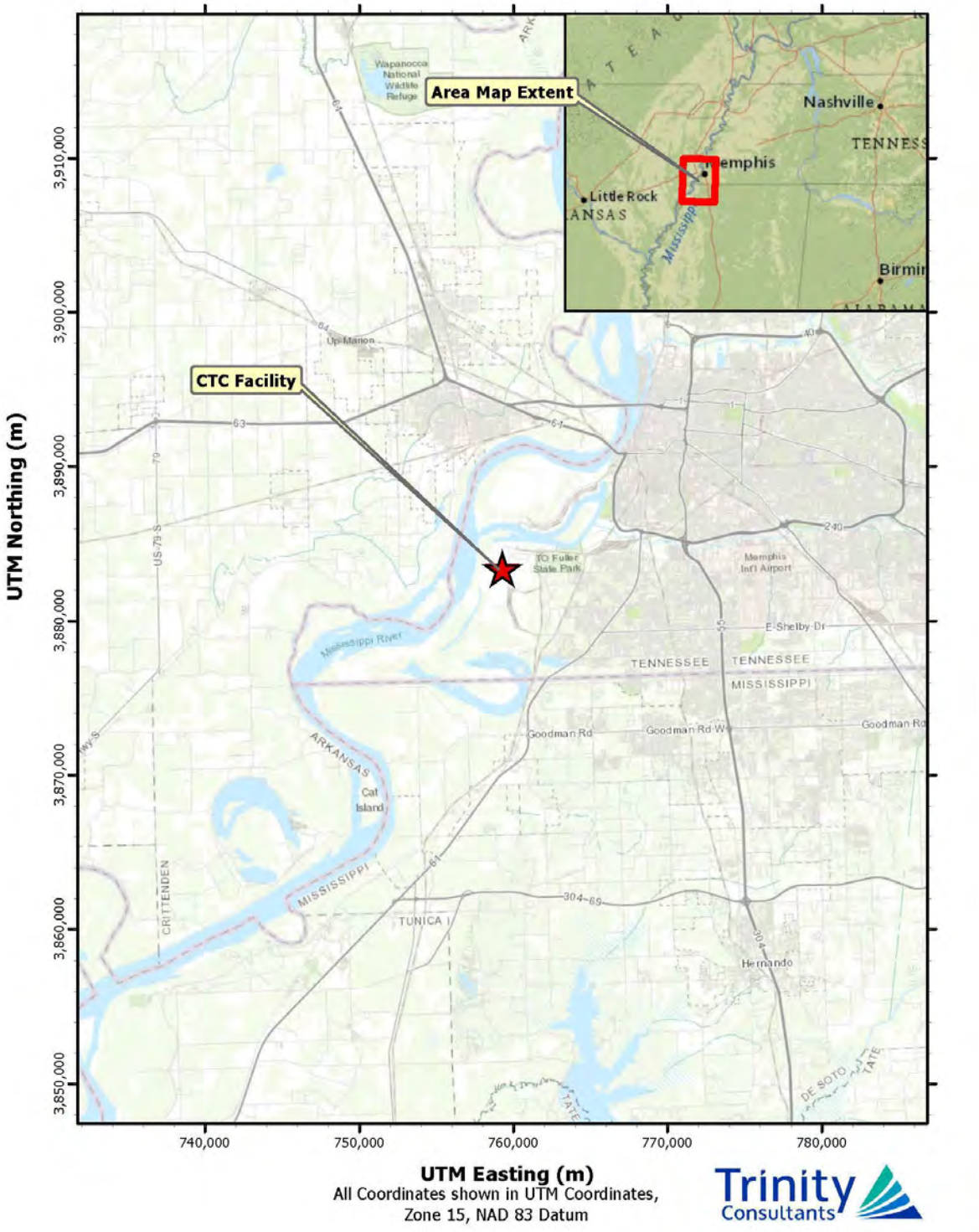
Shelby County Code	Memphis City Code	TDEC of Air Pollution Regulation	Description	Applicable	Notes
3-37	16-91.3	Chapter 1200-3-31	National Emission Standards for Hazardous Air Pollutants for Source Categories		
		1200-3-31-.01	General Provisions [Reserved]	No	No applicable requirements.
		1200-3-31-.02	Definitions	No	No applicable requirements.
		1200-3-31-.03	Intent of the Board for Case by Case Determinations of Hazardous Air Pollutant Control Requirements	No	No applicable requirements.
		1200-3-31-.04	Standard for Existing Sources	No	No applicable requirements.
		1200-3-31-.05	Standard for New Sources	No	No applicable requirements.
		1200-3-31-.06	Opportunity for Early Reductions Schedule	No	No applicable requirements.
		1200-3-31-.07	Residual Risk and Revisions to Maximum Achievable Control Technology	No	No applicable requirements.
		1200-3-31-.08 through .13	[Reserved]	N/A	[Reserved]
3-38	16-91.4	Chapter 1200-3-32	Prevention of Accidental Releases		
		1200-32-.01	Purpose and Intent	No	No applicable requirements.
		1200-32-.02	Definitions	No	No applicable requirements.
		1200-32-.03	Duty to File an Accidental Release Plan and Authority of the Technical Secretary to Request Information	No	No applicable requirements.
		Other Local Only			
3-2	16-56		Notice; Citation; Injunctive Relief	**Yes**	**Contains general requirements.**
3-3	16-57		Penalties - Misdemeanor, Civil, and Noncompliance	**Yes**	**Contains general requirements.**
3-4	16-59		Enforcement - Emergency Powers of Health Officer	**Yes**	**Contains general requirements.**

State and Local Applicable Requirements Overview

Shelby County Code	Memphis City Code	TDEC of Air Pollution Regulation	Description	Applicable	Notes
3-10	16-58		Enforcement -Variances	**Yes**	**Contains general requirements.**
3-11	16-51		Severability	**Yes**	**Contains general requirements.**
3-12	16-48		Words, Phrases Substituted in State Regulations Adopted by Reference	**Yes**	**Contains general requirements.**
3-13			[Reserved]	N/A	[Reserved]
3-16	16-50		Open Burning	**Yes**	**Contains general requirements.**
3-18	16-89		Fugitive Dust	**Yes**	**Contains general requirements.**
3-19	16-88		Nuisance Abatement	**Yes**	**Contains general requirements.**
3-23	16-84		Particulate Matter from Incinerators	No	No applicable requirements.
3-26	16-91.5		Conformity		
3-30 to 3-31			[Reserved]	N/A	[Reserved]
3-35	16-71		Created; Membership; Term of Office; Jurisdiction; Hearings; Appeals	**Yes**	**Contains general requirements.**
14.5-27-28, 30-32, 34-37	16-93 through 100(96.26-96.33)		Permits and Fees (Various)	**Yes**	**Contains general requirements.**
14.5-35	16-101(96.99)		Penalty Provisions	**Yes**	**Contains general requirements.**
14.5-36	16-102 (96.33)		Annual Review of Fee Structure and Financial Need	**Yes**	**Contains general requirements.**

Figure B-1. Area Map

CTC Property LLC - Memphis, Shelby County, Tennessee



APPENDIX C. SITE MAP



APPENDIX D. EMISSION CALCULATIONS

Mobile Energy Rentals LLC. - CTC Data Center Facility

Emission Summary

Uncontrolled Emissions

Unit	Description	NO_x		CO		VOC		SO_2		PM_{10}		$PM_{2.5}$		Ammonia		Total HAPs	
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
TUR-1	SMT130 Turbine	5.95	26.05	6.03	26.43	1.90	8.32	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-2	SMT130 Turbine	5.95	26.05	6.03	26.43	1.90	8.32	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-3	SMT130 Turbine	5.95	26.05	6.03	26.43	1.90	8.32	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-4	SMT130 Turbine	5.95	26.05	6.03	26.43	1.90	8.32	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-5	SMT130 Turbine	5.95	26.05	6.03	26.43	1.90	8.32	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-6	SMT130 Turbine	5.95	26.05	6.03	26.43	1.90	8.32	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-7	SMT130 Turbine	5.95	26.05	6.03	26.43	1.90	8.32	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-8	SMT130 Turbine	5.95	26.05	6.03	26.43	1.90	8.32	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-9	SMT130 Turbine	5.95	26.05	6.03	26.43	1.90	8.32	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-10	SMT130 Turbine	5.95	26.05	6.03	26.43	1.90	8.32	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-11	SMT130 Turbine	5.95	26.05	6.03	26.43	1.90	8.32	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-12	SMT130 Turbine	5.95	26.05	6.03	26.43	1.90	8.32	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-13	SMT130 Turbine	5.95	26.05	6.03	26.43	1.90	8.32	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-14	SMT130 Turbine	5.95	26.05	6.03	26.43	1.90	8.32	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-15	SMT130 Turbine	5.95	26.05	6.03	26.43	1.90	8.32	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
SSM-1	SMT130 SSM	84.38	0.31	7605.00	27.89	435.00	1.60	-	-	-	-	-	-	-	-	-	-
Total		**173.59**	**391.05**	**7695.52**	**424.35**	**463.50**	**126.43**	**6.754**	**29.58**	**16.66**	**72.95**	**16.66**	**72.95**	**17.47**	**76.52**	**2.63**	**11.51**

Controlled Emissions

Unit	Description	NO_x		CO		VOC		SO_2		PM_{10}		$PM_{2.5}$		Ammonia		Total HAPs	
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
TUR-1	SMT130 Turbine	1.32	5.79	1.01	4.41	1.27	5.55	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-2	SMT130 Turbine	1.32	5.79	1.01	4.41	1.27	5.55	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-3	SMT130 Turbine	1.32	5.79	1.01	4.41	1.27	5.55	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-4	SMT130 Turbine	1.32	5.79	1.01	4.41	1.27	5.55	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-5	SMT130 Turbine	1.32	5.79	1.01	4.41	1.27	5.55	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-6	SMT130 Turbine	1.32	5.79	1.01	4.41	1.27	5.55	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-7	SMT130 Turbine	1.32	5.79	1.01	4.41	1.27	5.55	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-8	SMT130 Turbine	1.32	5.79	1.01	4.41	1.27	5.55	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-9	SMT130 Turbine	1.32	5.79	1.01	4.41	1.27	5.55	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-10	SMT130 Turbine	1.32	5.79	1.01	4.41	1.27	5.55	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-11	SMT130 Turbine	1.32	5.79	1.01	4.41	1.27	5.55	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-12	SMT130 Turbine	1.32	5.79	1.01	4.41	1.27	5.55	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-13	SMT130 Turbine	1.32	5.79	1.01	4.41	1.27	5.55	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-14	SMT130 Turbine	1.32	5.79	1.01	4.41	1.27	5.55	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
TUR-15	SMT130 Turbine	1.32	5.79	1.01	4.41	1.27	5.55	0.45	1.97	1.11	4.86	1.11	4.86	1.16	5.10	0.18	0.77
SSM-1	SMT130 SSM	84.38	0.31	7605.00	27.89	435.00	1.60	-	-	-	-	-	-	-	-	-	-
Total		**104.20**	**87.14**	**7620.09**	**93.96**	**454.00**	**84.82**	**6.754**	**29.58**	**16.66**	**72.95**	**16.66**	**72.95**	**17.47**	**76.52**	**2.63**	**11.51**

Mobile Energy Rentals LLC. - CTC Data Center Facility

Emission Summary

HAP Emissions																	
Unit	Description	Total HAPs		Acetaldehyde		Acrolein		Benzene		Ethylbenzene		Formaldehyde		Xylenes		Toluene	
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
TUR-1	SMT130 Turbine	0.18	0.77	7.04E-03	0.031	1.13E-03	4.94E-03	2.11E-03	9.26E-03	5.64E-03	0.025	0.13	0.55	0.011	0.049	0.023	0.10
TUR-2	SMT130 Turbine	0.18	0.77	7.04E-03	0.031	1.13E-03	4.94E-03	2.11E-03	9.26E-03	5.64E-03	0.025	0.13	0.55	0.011	0.049	0.023	0.10
TUR-3	SMT130 Turbine	0.18	0.77	7.04E-03	0.031	1.13E-03	4.94E-03	2.11E-03	9.26E-03	5.64E-03	0.025	0.13	0.55	0.011	0.049	0.023	0.10
TUR-4	SMT130 Turbine	0.18	0.77	7.04E-03	0.031	1.13E-03	4.94E-03	2.11E-03	9.26E-03	5.64E-03	0.025	0.13	0.55	0.011	0.049	0.023	0.10
TUR-5	SMT130 Turbine	0.18	0.77	7.04E-03	0.031	1.13E-03	4.94E-03	2.11E-03	9.26E-03	5.64E-03	0.025	0.13	0.55	0.011	0.049	0.023	0.10
TUR-6	SMT130 Turbine	0.18	0.77	7.04E-03	0.031	1.13E-03	4.94E-03	2.11E-03	9.26E-03	5.64E-03	0.025	0.13	0.55	0.011	0.049	0.023	0.10
TUR-7	SMT130 Turbine	0.18	0.77	7.04E-03	0.031	1.13E-03	4.94E-03	2.11E-03	9.26E-03	5.64E-03	0.025	0.13	0.55	0.011	0.049	0.023	0.10
TUR-8	SMT130 Turbine	0.18	0.77	7.04E-03	0.031	1.13E-03	4.94E-03	2.11E-03	9.26E-03	5.64E-03	0.025	0.13	0.55	0.011	0.049	0.023	0.10
TUR-9	SMT130 Turbine	0.18	0.77	7.04E-03	0.031	1.13E-03	4.94E-03	2.11E-03	9.26E-03	5.64E-03	0.025	0.13	0.55	0.011	0.049	0.023	0.10
TUR-10	SMT130 Turbine	0.18	0.77	7.04E-03	0.031	1.13E-03	4.94E-03	2.11E-03	9.26E-03	5.64E-03	0.025	0.13	0.55	0.011	0.049	0.023	0.10
TUR-11	SMT130 Turbine	0.18	0.77	7.04E-03	0.031	1.13E-03	4.94E-03	2.11E-03	9.26E-03	5.64E-03	0.025	0.13	0.55	0.011	0.049	0.023	0.10
TUR-12	SMT130 Turbine	0.18	0.77	7.04E-03	0.031	1.13E-03	4.94E-03	2.11E-03	9.26E-03	5.64E-03	0.025	0.13	0.55	0.011	0.049	0.023	0.10
TUR-13	SMT130 Turbine	0.18	0.77	7.04E-03	0.031	1.13E-03	4.94E-03	2.11E-03	9.26E-03	5.64E-03	0.025	0.13	0.55	0.011	0.049	0.023	0.10
TUR-14	SMT130 Turbine	0.18	0.77	7.04E-03	0.031	1.13E-03	4.94E-03	2.11E-03	9.26E-03	5.64E-03	0.025	0.13	0.55	0.011	0.049	0.023	0.10
TUR-15	SMT130 Turbine	0.18	0.77	7.04E-03	0.031	1.13E-03	4.94E-03	2.11E-03	9.26E-03	5.64E-03	0.025	0.13	0.55	0.011	0.049	0.023	0.10
SSM-1	SMT130 SSM	40.09	2.21	1.61	0.089	0.26	0.014	0.48	0.027	1.29	0.071	28.63	1.57	2.58	0.14	5.24	0.29
Total		**42.72**	**13.71**	**1.72**	**0.55**	**0.27**	**0.088**	**0.52**	**0.17**	**1.37**	**0.44**	**30.50**	**9.79**	**2.75**	**0.88**	**5.58**	**1.79**

MOBILE ENERGY RENTALS

Mobile Energy Rentals LLC. - CTC Data Center Facility

SMT130 Turbines (16480 kW)

Emission Unit: TUR-1 through TUR-15
Source Description: Solar Mobile Turbomachinery SMT130
Manufacturer: Solar Turbines
Model: Titan 130-23001S Radial
Type: Natural Gas

Fuel Consumption

Site horsepower	16480	kW	Manufacturer Rating
Fuel heat value[1]	1067.65	Btu/scf	Fuel Gas Analysis
Heat input	168.2	MMBtu/hr	Fuel consumption * Fuel heat value
Fuel consumption	157.6	Mscf/hr	Heat input / fuel heat value
Hours of Operation	8760	hrs/yr	
Annual fuel usage	1380.4	MMscf/yr	8760 hrs/yr operation
Fuel Consumption	10209	Btu/kW-hr	Manufacturer Spec Sheet @ Max Rating

Uncontrolled Emissions

	NO_x[2,3]	CO[2,3]	VOC[3,4]	SO_2[5]	PM[6,7]	Total HAPs	Units	Notes
Molecular weight	46.01	28.01	44.10				lb/lbmol	VOC was conservatively set to the molecular weight of propane.
Emission Factors	9.00	15.00	3.00				ppm	Manufacturer expected emission performance
	0.034	0.034	0.011				lb/MMBtu	Calculated value [3]
					6.60E-03		lb/MMBtu	AP-42 Table 3.1-2a
				0.01			gr/scf	Provided by client per MLGW
Emissions	**5.95**	**6.03**	**1.90**	**0.45**	**1.11**	**0.18**	lb/hr	
	26.05	**26.43**	**8.32**	**1.97**	**4.86**	**0.77**	tpy	

Controlled Emissions

	NO_x[3,8]	CO[3,8]	VOC[3,4]	SO_2[5]	PM[6,7]	Ammonia[3,8]	Total HAPs	Units	Notes
Molecular weight	46.01	28.01	44.10			17.03		lb/lbmol	VOC was conservatively set to the molecular weight of propane.
Emission Factors	2.0	2.5	2.00			5.0		ppm	SCR manufacturer guarantee
	7.48E-03	5.69E-03	7.17E-03			6.92E-03		lb/MMBtu	Calculated value [3]
	78%	83%	33%			-		%	% Reduction
					6.60E-03			lb/MMBtu	AP-42 Table 3.1-2a
Emissions	**1.32**	**1.01**	**1.27**	**0.45**	**1.11**	**1.16**	**0.18**	lb/hr	
	5.79	**4.41**	**5.55**	**1.97**	**4.86**	**5.10**	**0.77**	tpy	

Speciated HAP Emission Calculations

	Acetaldehyde[9]	Acrolein[9]	Benzene[9]	Ethylbenzene[9]	Formaldehyde[9]	Xylenes[9]	Toluene[9]	Units	Notes
Emission Factors	4.00E-05	6.40E-06	1.20E-05	3.20E-05	7.10E-04	6.40E-05	1.30E-04	lb/MMBtu	AP-42 Table 3.1-3
	4.19E-05	6.70E-06	1.26E-05	3.35E-05	7.43E-04	6.70E-05	1.36E-04	lb/MMBtu	Adjusted EF [10]
Emissions	**7.04E-03**	**1.13E-03**	**2.11E-03**	**5.64E-03**	**0.13**	**0.01**	**0.023**	lb/hr	
	0.031	**4.94E-03**	**9.26E-03**	**0.025**	**0.55**	**0.049**	**0.100**	tpy	

NOTES

[1] This value is based on the average Btu/scf from the gas analysis received from Memphis Light, Gas and Water.

[2] Inlet NO_x and CO emission factors are taken from the manufacturer expected performance report dated April 4th, 2024. Updated outlet emission factors are taken from Braden Americas Inc. guarentee design. VOC emission factors have been provided from Braden Americas Inc. A safety factor of 5% is applied for emissions.
VOC: Non-ethane and methane are less than 50% saturated.

[3] Emission factors (lb/MMBtu) = ppmv / 10^6 / molar volume * MW (NO_x/CO/VOC/NH_3) * F_d Factor * 20.9 / (20.9 - $\%O_2$)
Molar Volume (dscf/lb-mol) = 379.5
MW (lb/lb-mol) = 46.01 NO_x & 28.01 CO & 44.10 VOC & 17.03 NH_3
F_d (dscf/MMBtu) = 8710 (40 CFR 60 Appendix A Method 19 Table 19-2)
%O2 (Dry) = 15 %

[4] The manufacturer specification sheet contain an emission factor for UHCs (unburned hydrocarbons) which includes Methane and Ethane. It is conservatively assumed all UHCs are VOCs. The molecular weight was conservatively set to the molecular weight of propane (44.10 lb/lb-mol).

[5] SO_2 emissions are based on fuel consumption and fuel sulfur content of 1 grain of sulfur per 100 scf
1 gr S/100 scf * fuel scf/hr * 1 lb/7000 gr * 64 lb-mol SO_2/ 32 lb-mol S = lb/hr SO_2

[6] PM emissions are based AP-42 Table 3.1-2a.

[7] Assumes PM (Filterable + Condensable) = PM_{10} = $PM_{2.5}$

[8] NO_x, CO, and Ammonia (NH_3) emission factors taken from the SCR manufacturer guarentee. Ammonia emissions are a result of ammonia slip with the SCR.

[9] HAPs emissions factors are referenced from AP-42 Table 3.1-3.

[10] AP-42 Table 3.1-3 & adjusted for 1067.65 Btu/scf

Mobile Energy Rentals LLC. - CTC Data Center Facility

Start-Up and Shutdown Emissions

Unit	SSM-1		
Description:	SMT-130 Start-up and Shutdown		
Number of Turbines on Site	15		
Total SSM-1 Annual Hours	110.00	hr/yr	Combined 110 hours of SSM for all turbines
Safety Factor	25%		

SSM Emission Calculations

Pollutant	Startup lb/hr [1]	Shutdown lb/hr [1]	Per Turbine SSM Emissions lb/hr [2,3]	Per Turbine SSM Emissions tpy [2,3]	Total SMT-130 SSM Emissions lb/hr [4]	Total SMT-130 SSM Emissions tpy [4]
NO_x	2.1	2.4	**5.63**	**0.021**	**84.38**	**0.31**
CO	195.6	210.0	**507.00**	**1.86**	**7,605.00**	**27.89**
VOC[2]	11.2	12.0	**29.00**	**0.11**	**435.00**	**1.60**
CO_2	1,194	1,303	**3,121.25**	**11.44**	**46,818.75**	**171.67**

[1] Emission data based on Solar Product Information Letter 170, Table 1. The manufacturer specification sheet contains an emission factor for UHCs (unburned hydrocarbons) which includes Methane and Ethane. It is conservatively assumed all UHCs are VOCs.

[2] Per Turbine Calculations are below:

Per Turbine SSM Emissions (lb/hr) = (Startup (lb/hr) + Shutdown (lb/hr))* (1 + Safety Factor (%))

Per Turbine SSM Emissions (tpy) = Total SSM Emission (lb/hr) * Total SSM-1 Annual Hours (hr/yr) / Number of Turbines / (2000 lb/ton)

[3] A safety factor of 25% is used as data received is not guarenteed.

[4] Total SMT-130 Calculations are below:

Total SSM-1 Emissions (lb/hr) = Per Turbine SSM Emissions (lb/hr) * Number of Turbines

Total SSM-1 Emissions (tpy) = Per Turbine SSM Emissions (tpy) * Number of Turbines

Pollutants	Uncontrolled Emissions	SSM Emissions	
	lb/hr	lb/hr[1]	tpy[2]
VOC	1.90	29.00	0.11
Acetaldehyde	7.04E-03	**1.61**	**0.09**
Acroleine	1.13E-03	**0.26**	**0.01**
Benzene	2.11E-03	**0.48**	**0.03**
Ethylbenzene	5.64E-03	**1.29**	**0.07**
Formaldehyde	0.13	**28.63**	**1.57**
Xylenes	0.011	**2.58**	**0.14**
Toluene	0.023	**5.24**	**0.29**
Total	**0.18**	**40.09**	**2.21**

[1] Total SSM-1 HAP (lb/hr) = Uncontrolled HAP (lb/hr) * (Total SSM-1 VOC (lb/hr) / uncontrolled VOC (lb/hr)) * number of turbines

[2] Total SSM-1 HAP (tpy) = Uncontrolled HAP (lb/hr) * (Total SSM-1 VOC (lb/hr) / uncontrolled VOC (lb/hr)) *Total SSM-1 Annual Hours (hr/yr) / (2000 lb/ton) * number of turbines

APPENDIX E. INSIGNIFICANT ACTIVITIES

CTC has not identified any insignificant activities.

APPENDIX F. SCHD FORMS

2013
APC-INDEX

SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
814 Jefferson Avenue
Memphis, TN 38105
Telephone: (901) 222-9599
FAX: (901) 222-9550

NOT TO BE USED FOR TITLE V APPLICATIONS

INDEX OF AIR POLLUTION PERMIT APPLICATION FORMS FOR NON-TITLE V SOURCES

THIS APPLICATION CONTAINS THE FOLLOWING INFORMATION

SCHD RECEIPT DATE

I. ADMINISTRATION	
1. Form APC-2-01, Permit Application - General Information	

II. EMISSIONS SOURCE DESCRIPTION		TOTAL NUMBER OF THIS FORM
1. Form APC-2-02, Process or Fuel Burning Source Description	(used APC V.5 for turbines)	15
2. Form APC-2-03, Emission Point Description		15
3. Form APC-2-04, Incinerator Source Description		
4. Form APC-2-05, Storage Tank Description		
5. Form APC-2-06, Surface Coating (Non-Printing) Description		
6. Form APC-2-07, Printing Description		
7. Form APC-2-08, Oven/Dryer Description		
8. Form APC-2-09, Degreaser Description		
9. Form APC-2-10, Asphalt Plant Source Description		
10. Form APC-2-11, Rock Crushing Plant Source Description		
11. Form APC-2-12, Concrete Batch Plant Source Description		
12. Form APC-2-13, Coal Preparation Plant Source Description		
13. Form APC-2-14, Perchloroethylene (PERC) Dry Cleaner Description		
14. Form APC-2-15, R.I.C.E. Emergency Generator		

III. AIR POLLUTION CONTROL SYSTEM		TOTAL NUMBER OF THIS FORM
1. Form APC-2-20, Cyclone Description	used APC-11	15

IV. COMPLIANCE DEMONSTRATION	TOTAL NUMBER OF THIS FORM
1. Form APC-2-30, Proposed Schedule of Corrective Action	

PLEASE COMPLETE AND ATTACH THIS FORM IN FRONT OF (ON TOP OF) THE OTHER FORMS SUBMITTED IN THIS APPLICATION.

Docusign Envelope ID: 7C7C888D-D71D-4403-AB97-17090EC661FB

2012
APC-2-01

SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 Sycamore Road
Memphis, TN 38134
Telephone: (901) 222-9942
FAX: (901) 222-9561

NOT TO BE USED FOR TITLE V APPLICATIONS

PERMIT APPLICATION
GENERAL INFORMATION

SCHD RECEIPT DATE

PLEASE TYPE OR PRINT AND SUBMIT IN DUPLICATE FOR EACH EMISSION SOURCE. ATTACH APPROPRIATE SOURCE DESCRIPTION FORMS.

1. ORGANIZATION'S LEGAL NAME: CTC Property LLC

SCHD-APC FACILITY ID.:

2. MAILING ADDRESS (ST/RD/P.O. BOX): 3231 Paul R Lowry Road

TENNESSEE SECRETARY OF STATE REGISTERED BUSINESS NUMBER:

CITY: Memphis | STATE: TN | ZIP CODE: 38109

PHONE WITH AREA CODE:

3. PRINCIPAL TECHNICAL CONTACT AND TITLE: Shannon G. Lynn, P.E.

PHONE WITH AREA CODE: (501) 454-6264

4. SITE ADDRESS (ST/RD/HWY): 3231 Paul R Lowry Road

PHONE: (281) 928-3123 | FAX:

CITY OR DISTANCE/DIRECTION TO NEAREST REFERENCE POINT: Memphis

ZIP CODE: 38109 | E-MAIL: slynn@trinityconsultants.com

5. NORTH AMERICAN INDUSTRIAL CLASSIFICATION SYSTEM (NAICS) 518210

PRIMARY X | SECONDARY | TERTIARY | QUATERNARY

6. BRIEF DESCRIPTION OF EMISSION SOURCE(S). INCLUDE AN OVERALL FACILITY PLOT PLAN INDICATING THE EMISSION SOURCE LOCATION WITHIN THE PLANT:

Please refer to Sections 2.1 and 2.2 of the air permit application document.

7. TYPE OF PERMIT REQUESTED

- ☐ NEW CONSTRUCTION
- ☐ MODIFICATION
- ☑ PERMIT TO OPERATE (INITIALREQUEST-NO PREVIOUS PERMITS)
- ☐ PERMIT TO OPERATE (INITIALREQUEST-CONSTRUCTION PERMIT PREVIOUSLY ISSUED)
- ☐ PERMIT TO OPERATE (RENEWAL REQUEST)
- ☐ CHANGE OF LOCATION (PORTABLE AND/OR PERMANENT)
- ☐ CHANGE OF NAME AND/OR OWNERSHIP

ESTIMATED COST OF EQUIPMENT OR MODIFICATION: $ 223,000,000

AIR POLLUTION CONTROL EQUIPMENT COST: $ 31,000,000

BASIC EQUIPMENT COSTS: $

FOR NEW CONSTRUCTION, MODIFICATION, CHANGE OF LOCATION, CHANGE OF NAME AND/OR OWNERSHIP, PROVIDE THE ESTIMATED STARTING AND COMPLETION DATES

PREVIOUS LOCATION OR LOCATION MOVING FROM, PREVIOUS NAME AND/OR OWNER , IF APPLICABLE (FOR PORTABLE **AND** NON-PORTABLE SOURCES):

PREVIOUS SOURCE NUMBER(S) AND PERMIT NUMBER(S) IF APPLICABLE: not applicable

8. DESCRIBE CHANGES THAT HAVE BEEN MADE TO THIS EQUIPMENT OR OPERATION SINCE THE LAST CONSTRUCTION OR OPERATING PERMIT APPLICATION:

Signed by:

9. SIGNATURE (SEE NOTE): Dan Rowland

DATE: 12/30/2024

10. SIGNER'S NAME (TYPE OR PRINT): Dan Rowland
3D117834530D42B...

TITLE: Authorized Representative

PHONE WITH AREA CODE: (901) 264-5805

NOTE: APPLICATION MUST BE SIGNED TO BE PROCESSED. SIGNATURE VERIFIES THAT INFORMATION ON ALL FORMS PROVIDED IS TRUE, ACCURATE AND COMPLETE TO THE PERSON'S BEST KNOWLEDGE AND BELIEF. APPLICATIONS SHOULD BE SIGNED BY THE OWNER/OPERATOR OR SENIOR MANAGEMENT OFFICIAL

(OVER)

SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
STATIONARY GAS TURBINE OR INTERNAL COMBUSTION ENGINE

1. FACILITY NAME:

CTC Property LLC

2. LIST ALL GAS TURBINES AND INTERNAL COMBUSTION ENGINES AT THIS FACILITY ON A SEPARATE SHEET, AND PLEASE COMPLETE AN APC V.5 FORM FOR EACH PIECE OF EQUIPMENT.

EU-01 through EU-15

3. MANUFACTURER AND MODEL NUMBER:	4. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION(S):
Solar SMT-130	EU-01

5. EQUIPMENT DESCRIPTION:

Solar SMT-130 natutal gas-fired turbine with selective catalytic reduction.

6. DATE OF INSTALLATION OR LAST MODIFICATION OF EQUIPMENT:

2024

7. RATED HEAT INPUT CAPACITY (IN MILLION BTU/HOUR) AND HORSE POWER:

158.0 MMBtu/hr and 21,765 hp

STATE WHICH HEATING VALUE WAS UTILIZED:

_____ HIGHER HEATING VALUE

X LOWER HEATING VALUE

8. IF EQUIPMENT IS GAS TURBINE, LIST TYPE.

☑ SIMPLE CYCLE

☐ REGENERATIVE CYCLE

☐ COMBINED CYCLE

9. FUELS:	PRIMARY FUEL	BACKUP FUEL #1	BACKUP FUEL #2	BACKUP FUEL #3
FUEL NAME	natural gas			
ACTUAL YEARLY CONSUMPTION	1557.9 MMscf			

10. (FOR NSPS TURBINES ONLY) MANUFACTURER'S RATED HEAT RATE AT MANUFACTURER'S RATED PEAK LOAD (KILOJOULES PER WATT HOUR), OR ACTUAL MEASURED HEAT RATE BASED ON LOWER HEATING VALUE OF FUEL AS MEASURED AT ACTUAL PEAK LOAD FOR THE UNIT:

169 kJ/hr (158 MMBtu/hr) - Subject to NSPS KKKK

11. LOCATION OF THIS FUEL BURNING INSTALLATION:

LATITUDE (DECIMAL DEGREES): 759,264 LONGITUDE (DECIMAL DEGREES): 3,883,083

12. NORMAL OPERATING SCHEDULE:

24 HRS/DAY 7 DAYS/WK 365 DAYS/YR

13. PAGE NUMBER:	REVISION NUMBER:	DATE OF REVISION:
3	1	11-24-24

SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
STATIONARY GAS TURBINE OR INTERNAL COMBUSTION ENGINE

1. FACILITY NAME:

CTC Property LLC

2. LIST ALL GAS TURBINES AND INTERNAL COMBUSTION ENGINES AT THIS FACILITY ON A SEPARATE SHEET, AND PLEASE COMPLETE AN APC V.5 FORM FOR EACH PIECE OF EQUIPMENT.

EU-01 through EU-15

3. MANUFACTURER AND MODEL NUMBER:	4. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION(S):
Solar SMT-130	EU-02

5. EQUIPMENT DESCRIPTION:

Solar SMT-130 natutal gas-fired turbine with selective catalytic reduction.

6. DATE OF INSTALLATION OR LAST MODIFICATION OF EQUIPMENT:

2024

7. RATED HEAT INPUT CAPACITY (IN MILLION BTU/HOUR) AND HORSE POWER:

158.0 MMBtu/hr and 21,765 hp

STATE WHICH HEATING VALUE WAS UTILIZED:

_____ HIGHER HEATING VALUE

X LOWER HEATING VALUE

8. IF EQUIPMENT IS GAS TURBINE, LIST TYPE.

☑ SIMPLE CYCLE

☐ REGENERATIVE CYCLE

☐ COMBINED CYCLE

9. FUELS:	PRIMARY FUEL	BACKUP FUEL #1	BACKUP FUEL #2	BACKUP FUEL #3
FUEL NAME	natural gas			
ACTUAL YEARLY CONSUMPTION	1557.9 MMscf			

10. (FOR NSPS TURBINES ONLY) MANUFACTURER'S RATED HEAT RATE AT MANUFACTURER'S RATED PEAK LOAD (KILOJOULES PER WATT HOUR), OR ACTUAL MEASURED HEAT RATE BASED ON LOWER HEATING VALUE OF FUEL AS MEASURED AT ACTUAL PEAK LOAD FOR THE UNIT:

169 kJ/hr (158 MMBtu/hr) - Subject to NSPS KKKK

11. LOCATION OF THIS FUEL BURNING INSTALLATION:

LATITUDE (DECIMAL DEGREES): 759,270 LONGITUDE (DECIMAL DEGREES): 3,883,082

12. NORMAL OPERATING SCHEDULE:

24 HRS/DAY 7 DAYS/WK 365 DAYS/YR

13. PAGE NUMBER:	REVISION NUMBER:	DATE OF REVISION:
4	1	11-24-24

SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
STATIONARY GAS TURBINE OR INTERNAL COMBUSTION ENGINE

1. FACILITY NAME:

CTC Property LLC

2. LIST ALL GAS TURBINES AND INTERNAL COMBUSTION ENGINES AT THIS FACILITY ON A SEPARATE SHEET, AND PLEASE COMPLETE AN APC V.5 FORM FOR EACH PIECE OF EQUIPMENT.

EU-01 through EU-15

3. MANUFACTURER AND MODEL NUMBER:	4. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION(S):
Solar SMT-130	EU-03

5. EQUIPMENT DESCRIPTION:

Solar SMT-130 natutal gas-fired turbine with selective catalytic reduction.

6. DATE OF INSTALLATION OR LAST MODIFICATION OF EQUIPMENT:

2024

7. RATED HEAT INPUT CAPACITY (IN MILLION BTU/HOUR) AND HORSE POWER:

158.0 MMBtu/hr and 21,765 hp

STATE WHICH HEATING VALUE WAS UTILIZED:

_____ HIGHER HEATING VALUE

X LOWER HEATING VALUE

8. IF EQUIPMENT IS GAS TURBINE, LIST TYPE.

☑ SIMPLE CYCLE

☐ REGENERATIVE CYCLE

☐ COMBINED CYCLE

9. FUELS:	PRIMARY FUEL	BACKUP FUEL #1	BACKUP FUEL #2	BACKUP FUEL #3
FUEL NAME	natural gas			
ACTUAL YEARLY CONSUMPTION	1557.9 MMscf			

10. (FOR NSPS TURBINES ONLY) MANUFACTURER'S RATED HEAT RATE AT MANUFACTURER'S RATED PEAK LOAD (KILOJOULES PER WATT HOUR), OR ACTUAL MEASURED HEAT RATE BASED ON LOWER HEATING VALUE OF FUEL AS MEASURED AT ACTUAL PEAK LOAD FOR THE UNIT:

169 kJ/hr (158 MMBtu/hr) - Subject to NSPS KKKK

11. LOCATION OF THIS FUEL BURNING INSTALLATION:

LATITUDE (DECIMAL DEGREES): 759,277 LONGITUDE (DECIMAL DEGREES): 3,883,080

12. NORMAL OPERATING SCHEDULE:

24 HRS/DAY 7 DAYS/WK 365 DAYS/YR

13. PAGE NUMBER:	REVISION NUMBER:	DATE OF REVISION:
5	1	11-24-24

SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
STATIONARY GAS TURBINE OR INTERNAL COMBUSTION ENGINE

1. FACILITY NAME:

CTC Property LLC

2. LIST ALL GAS TURBINES AND INTERNAL COMBUSTION ENGINES AT THIS FACILITY ON A SEPARATE SHEET, AND PLEASE COMPLETE AN APC V.5 FORM FOR EACH PIECE OF EQUIPMENT.

EU-01 through EU-15

3. MANUFACTURER AND MODEL NUMBER:	4. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION(S):
Solar SMT-130	EU-04

5. EQUIPMENT DESCRIPTION:

Solar SMT-130 natutal gas-fired turbine with selective catalytic reduction.

6. DATE OF INSTALLATION OR LAST MODIFICATION OF EQUIPMENT:

2024

7. RATED HEAT INPUT CAPACITY (IN MILLION BTU/HOUR) AND HORSE POWER:

158.0 MMBtu/hr and 21,765 hp

STATE WHICH HEATING VALUE WAS UTILIZED:

_____ HIGHER HEATING VALUE

X LOWER HEATING VALUE

8. IF EQUIPMENT IS GAS TURBINE, LIST TYPE.

☑ SIMPLE CYCLE

☐ REGENERATIVE CYCLE

☐ COMBINED CYCLE

9. FUELS:	PRIMARY FUEL	BACKUP FUEL #1	BACKUP FUEL #2	BACKUP FUEL #3
FUEL NAME	natural gas			
ACTUAL YEARLY CONSUMPTION	1557.9 MMscf			

10. (FOR NSPS TURBINES ONLY) MANUFACTURER'S RATED HEAT RATE AT MANUFACTURER'S RATED PEAK LOAD (KILOJOULES PER WATT HOUR), OR ACTUAL MEASURED HEAT RATE BASED ON LOWER HEATING VALUE OF FUEL AS MEASURED AT ACTUAL PEAK LOAD FOR THE UNIT:

169 kJ/hr (158 MMBtu/hr) - Subject to NSPS KKKK

11. LOCATION OF THIS FUEL BURNING INSTALLATION:

LATITUDE (DECIMAL DEGREES): 759,284 LONGITUDE (DECIMAL DEGREES): 3,883,079

12. NORMAL OPERATING SCHEDULE:

24 HRS/DAY 7 DAYS/WK 365 DAYS/YR

13. PAGE NUMBER:	REVISION NUMBER:	DATE OF REVISION:
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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
STATIONARY GAS TURBINE OR INTERNAL COMBUSTION ENGINE

1. FACILITY NAME:

CTC Property LLC

2. LIST ALL GAS TURBINES AND INTERNAL COMBUSTION ENGINES AT THIS FACILITY ON A SEPARATE SHEET, AND PLEASE COMPLETE AN APC V.5 FORM FOR EACH PIECE OF EQUIPMENT.

EU-01 through EU-15

3. MANUFACTURER AND MODEL NUMBER:	4. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION(S):
Solar SMT-130	EU-05

5. EQUIPMENT DESCRIPTION:

Solar SMT-130 natutal gas-fired turbine with selective catalytic reduction.

6. DATE OF INSTALLATION OR LAST MODIFICATION OF EQUIPMENT:

2024

7. RATED HEAT INPUT CAPACITY (IN MILLION BTU/HOUR) AND HORSE POWER:

158.0 MMBtu/hr and 21,765 hp

STATE WHICH HEATING VALUE WAS UTILIZED:

_____ HIGHER HEATING VALUE

X LOWER HEATING VALUE

8. IF EQUIPMENT IS GAS TURBINE, LIST TYPE.

☑ SIMPLE CYCLE

☐ REGENERATIVE CYCLE

☐ COMBINED CYCLE

9. FUELS:	PRIMARY FUEL	BACKUP FUEL #1	BACKUP FUEL #2	BACKUP FUEL #3
FUEL NAME	natural gas			
ACTUAL YEARLY CONSUMPTION	1557.9 MMscf			

10. (FOR NSPS TURBINES ONLY) MANUFACTURER'S RATED HEAT RATE AT MANUFACTURER'S RATED PEAK LOAD (KILOJOULES PER WATT HOUR), OR ACTUAL MEASURED HEAT RATE BASED ON LOWER HEATING VALUE OF FUEL AS MEASURED AT ACTUAL PEAK LOAD FOR THE UNIT:

169 kJ/hr (158 MMBtu/hr) - Subject to NSPS KKKK

11. LOCATION OF THIS FUEL BURNING INSTALLATION:

LATITUDE (DECIMAL DEGREES): 759,288 LONGITUDE (DECIMAL DEGREES): 3,883,078

12. NORMAL OPERATING SCHEDULE:

24 HRS/DAY 7 DAYS/WK 365 DAYS/YR

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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
STATIONARY GAS TURBINE OR INTERNAL COMBUSTION ENGINE

1. FACILITY NAME:

CTC Property LLC

2. LIST ALL GAS TURBINES AND INTERNAL COMBUSTION ENGINES AT THIS FACILITY ON A SEPARATE SHEET, AND PLEASE COMPLETE AN APC V.5 FORM FOR EACH PIECE OF EQUIPMENT.

EU-01 through EU-15

3. MANUFACTURER AND MODEL NUMBER:	4. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION(S):
Solar SMT-130	EU-06

5. EQUIPMENT DESCRIPTION:

Solar SMT-130 natutal gas-fired turbine with selective catalytic reduction.

6. DATE OF INSTALLATION OR LAST MODIFICATION OF EQUIPMENT:

2024

7. RATED HEAT INPUT CAPACITY (IN MILLION BTU/HOUR) AND HORSE POWER:

158.0 MMBtu/hr and 21,765 hp

STATE WHICH HEATING VALUE WAS UTILIZED:

_____ HIGHER HEATING VALUE

X LOWER HEATING VALUE

8. IF EQUIPMENT IS GAS TURBINE, LIST TYPE.

☑ SIMPLE CYCLE

☐ REGENERATIVE CYCLE

☐ COMBINED CYCLE

9. FUELS:	PRIMARY FUEL	BACKUP FUEL #1	BACKUP FUEL #2	BACKUP FUEL #3
FUEL NAME	natural gas			
ACTUAL YEARLY CONSUMPTION	1557.9 MMscf			

10. (FOR NSPS TURBINES ONLY) MANUFACTURER'S RATED HEAT RATE AT MANUFACTURER'S RATED PEAK LOAD (KILOJOULES PER WATT HOUR), OR ACTUAL MEASURED HEAT RATE BASED ON LOWER HEATING VALUE OF FUEL AS MEASURED AT ACTUAL PEAK LOAD FOR THE UNIT:

169 kJ/hr (158 MMBtu/hr) - Subject to NSPS KKKK

11. LOCATION OF THIS FUEL BURNING INSTALLATION:

LATITUDE (DECIMAL DEGREES): 759,294 LONGITUDE (DECIMAL DEGREES): 3,883,078

12. NORMAL OPERATING SCHEDULE:

24 HRS/DAY 7 DAYS/WK 365 DAYS/YR

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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
STATIONARY GAS TURBINE OR INTERNAL COMBUSTION ENGINE

1. FACILITY NAME:

CTC Property LLC

2. LIST ALL GAS TURBINES AND INTERNAL COMBUSTION ENGINES AT THIS FACILITY ON A SEPARATE SHEET, AND PLEASE COMPLETE AN APC V.5 FORM FOR EACH PIECE OF EQUIPMENT.

EU-01 through EU-15

3. MANUFACTURER AND MODEL NUMBER:	4. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION(S):
Solar SMT-130	EU-07

5. EQUIPMENT DESCRIPTION:

Solar SMT-130 natutal gas-fired turbine with selective catalytic reduction.

6. DATE OF INSTALLATION OR LAST MODIFICATION OF EQUIPMENT:

2024

7. RATED HEAT INPUT CAPACITY (IN MILLION BTU/HOUR) AND HORSE POWER:

158.0 MMBtu/hr and 21,765 hp

STATE WHICH HEATING VALUE WAS UTILIZED:

_____ HIGHER HEATING VALUE

X LOWER HEATING VALUE

8. IF EQUIPMENT IS GAS TURBINE, LIST TYPE.

☑ SIMPLE CYCLE

☐ REGENERATIVE CYCLE

☐ COMBINED CYCLE

9. FUELS:	PRIMARY FUEL	BACKUP FUEL #1	BACKUP FUEL #2	BACKUP FUEL #3
FUEL NAME	natural gas			
ACTUAL YEARLY CONSUMPTION	1557.9 MMscf			

10. (FOR NSPS TURBINES ONLY) MANUFACTURER'S RATED HEAT RATE AT MANUFACTURER'S RATED PEAK LOAD (KILOJOULES PER WATT HOUR), OR ACTUAL MEASURED HEAT RATE BASED ON LOWER HEATING VALUE OF FUEL AS MEASURED AT ACTUAL PEAK LOAD FOR THE UNIT:

169 kJ/hr (158 MMBtu/hr) - Subject to NSPS KKKK

11. LOCATION OF THIS FUEL BURNING INSTALLATION:

LATITUDE (DECIMAL DEGREES): 759,299 LONGITUDE (DECIMAL DEGREES): 3,883,077

12. NORMAL OPERATING SCHEDULE:

24 HRS/DAY 7 DAYS/WK 365 DAYS/YR

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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
STATIONARY GAS TURBINE OR INTERNAL COMBUSTION ENGINE

1. FACILITY NAME:

CTC Property LLC

2. LIST ALL GAS TURBINES AND INTERNAL COMBUSTION ENGINES AT THIS FACILITY ON A SEPARATE SHEET, AND PLEASE COMPLETE AN APC V.5 FORM FOR EACH PIECE OF EQUIPMENT.

EU-01 through EU-15

3. MANUFACTURER AND MODEL NUMBER:	4. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION(S):
Solar SMT-130	EU-08

5. EQUIPMENT DESCRIPTION:

Solar SMT-130 natutal gas-fired turbine with selective catalytic reduction.

6. DATE OF INSTALLATION OR LAST MODIFICATION OF EQUIPMENT:

2024

7. RATED HEAT INPUT CAPACITY (IN MILLION BTU/HOUR) AND HORSE POWER:

158.0 MMBtu/hr and 21,765 hp

STATE WHICH HEATING VALUE WAS UTILIZED:

_____ HIGHER HEATING VALUE

X LOWER HEATING VALUE

8. IF EQUIPMENT IS GAS TURBINE, LIST TYPE.

☑ SIMPLE CYCLE

☐ REGENERATIVE CYCLE

☐ COMBINED CYCLE

9. FUELS:	PRIMARY FUEL	BACKUP FUEL #1	BACKUP FUEL #2	BACKUP FUEL #3
FUEL NAME	natural gas			
ACTUAL YEARLY CONSUMPTION	1557.9 MMscf			

10. (FOR NSPS TURBINES ONLY) MANUFACTURER'S RATED HEAT RATE AT MANUFACTURER'S RATED PEAK LOAD (KILOJOULES PER WATT HOUR), OR ACTUAL MEASURED HEAT RATE BASED ON LOWER HEATING VALUE OF FUEL AS MEASURED AT ACTUAL PEAK LOAD FOR THE UNIT:

169 kJ/hr (158 MMBtu/hr) - Subject to NSPS KKKK

11. LOCATION OF THIS FUEL BURNING INSTALLATION:

LATITUDE (DECIMAL DEGREES): 759,303 LONGITUDE (DECIMAL DEGREES): 3,883,076

12. NORMAL OPERATING SCHEDULE:

24 HRS/DAY 7 DAYS/WK 365 DAYS/YR

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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
STATIONARY GAS TURBINE OR INTERNAL COMBUSTION ENGINE

1. FACILITY NAME:

CTC Property LLC

2. LIST ALL GAS TURBINES AND INTERNAL COMBUSTION ENGINES AT THIS FACILITY ON A SEPARATE SHEET, AND PLEASE COMPLETE AN APC V.5 FORM FOR EACH PIECE OF EQUIPMENT.

EU-01 through EU-15

3. MANUFACTURER AND MODEL NUMBER:	4. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION(S):
Solar SMT-130	EU-09

5. EQUIPMENT DESCRIPTION:

Solar SMT-130 natutal gas-fired turbine with selective catalytic reduction.

6. DATE OF INSTALLATION OR LAST MODIFICATION OF EQUIPMENT:

2024

7. RATED HEAT INPUT CAPACITY (IN MILLION BTU/HOUR) AND HORSE POWER:

158.0 MMBtu/hr and 21,765 hp

STATE WHICH HEATING VALUE WAS UTILIZED:

_____ HIGHER HEATING VALUE

X LOWER HEATING VALUE

8. IF EQUIPMENT IS GAS TURBINE, LIST TYPE.

☑ SIMPLE CYCLE

☐ REGENERATIVE CYCLE

☐ COMBINED CYCLE

9. FUELS:	PRIMARY FUEL	BACKUP FUEL #1	BACKUP FUEL #2	BACKUP FUEL #3
FUEL NAME	natural gas			
ACTUAL YEARLY CONSUMPTION	1557.9 MMscf			

10. (FOR NSPS TURBINES ONLY) MANUFACTURER'S RATED HEAT RATE AT MANUFACTURER'S RATED PEAK LOAD (KILOJOULES PER WATT HOUR), OR ACTUAL MEASURED HEAT RATE BASED ON LOWER HEATING VALUE OF FUEL AS MEASURED AT ACTUAL PEAK LOAD FOR THE UNIT:

169 kJ/hr (158 MMBtu/hr) - Subject to NSPS KKKK

11. LOCATION OF THIS FUEL BURNING INSTALLATION:

LATITUDE (DECIMAL DEGREES): 759,306 LONGITUDE (DECIMAL DEGREES): 3,883,075

12. NORMAL OPERATING SCHEDULE:

24 HRS/DAY 7 DAYS/WK 365 DAYS/YR

13. PAGE NUMBER:	REVISION NUMBER:	DATE OF REVISION:
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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
STATIONARY GAS TURBINE OR INTERNAL COMBUSTION ENGINE

1. FACILITY NAME:

CTC Property LLC

2. LIST ALL GAS TURBINES AND INTERNAL COMBUSTION ENGINES AT THIS FACILITY ON A SEPARATE SHEET, AND PLEASE COMPLETE AN APC V.5 FORM FOR EACH PIECE OF EQUIPMENT.

EU-01 through EU-15

3. MANUFACTURER AND MODEL NUMBER:	4. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION(S):
Solar SMT-130	EU-10

5. EQUIPMENT DESCRIPTION:

Solar SMT-130 natutal gas-fired turbine with selective catalytic reduction.

6. DATE OF INSTALLATION OR LAST MODIFICATION OF EQUIPMENT:

2024

7. RATED HEAT INPUT CAPACITY (IN MILLION BTU/HOUR) AND HORSE POWER:

158.0 MMBtu/hr and 21,765 hp

STATE WHICH HEATING VALUE WAS UTILIZED:

_____ HIGHER HEATING VALUE

X LOWER HEATING VALUE

8. IF EQUIPMENT IS GAS TURBINE, LIST TYPE.

☑ SIMPLE CYCLE

☐ REGENERATIVE CYCLE

☐ COMBINED CYCLE

9. FUELS:	PRIMARY FUEL	BACKUP FUEL #1	BACKUP FUEL #2	BACKUP FUEL #3
FUEL NAME	natural gas			
ACTUAL YEARLY CONSUMPTION	1557.9 MMscf			

10. (FOR NSPS TURBINES ONLY) MANUFACTURER'S RATED HEAT RATE AT MANUFACTURER'S RATED PEAK LOAD (KILOJOULES PER WATT HOUR), OR ACTUAL MEASURED HEAT RATE BASED ON LOWER HEATING VALUE OF FUEL AS MEASURED AT ACTUAL PEAK LOAD FOR THE UNIT:

169 kJ/hr (158 MMBtu/hr) - Subject to NSPS KKKK

11. LOCATION OF THIS FUEL BURNING INSTALLATION:

LATITUDE (DECIMAL DEGREES): 759,311 LONGITUDE (DECIMAL DEGREES): 3,883,074

12. NORMAL OPERATING SCHEDULE:

24 HRS/DAY 7 DAYS/WK 365 DAYS/YR

13. PAGE NUMBER:	REVISION NUMBER:	DATE OF REVISION:
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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
STATIONARY GAS TURBINE OR INTERNAL COMBUSTION ENGINE

1. FACILITY NAME:

CTC Property LLC

2. LIST ALL GAS TURBINES AND INTERNAL COMBUSTION ENGINES AT THIS FACILITY ON A SEPARATE SHEET, AND PLEASE COMPLETE AN APC V.5 FORM FOR EACH PIECE OF EQUIPMENT.

EU-01 through EU-15

3. MANUFACTURER AND MODEL NUMBER:	4. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION(S):
Solar SMT-130	EU-11

5. EQUIPMENT DESCRIPTION:

Solar SMT-130 natutal gas-fired turbine with selective catalytic reduction.

6. DATE OF INSTALLATION OR LAST MODIFICATION OF EQUIPMENT:

2024

7. RATED HEAT INPUT CAPACITY (IN MILLION BTU/HOUR) AND HORSE POWER:

158.0 MMBtu/hr and 21,765 hp

STATE WHICH HEATING VALUE WAS UTILIZED:

_____ HIGHER HEATING VALUE

X LOWER HEATING VALUE

8. IF EQUIPMENT IS GAS TURBINE, LIST TYPE.

☑ SIMPLE CYCLE

☐ REGENERATIVE CYCLE

☐ COMBINED CYCLE

9. FUELS:	PRIMARY FUEL	BACKUP FUEL #1	BACKUP FUEL #2	BACKUP FUEL #3
FUEL NAME	natural gas			
ACTUAL YEARLY CONSUMPTION	1557.9 MMscf			

10. (FOR NSPS TURBINES ONLY) MANUFACTURER'S RATED HEAT RATE AT MANUFACTURER'S RATED PEAK LOAD (KILOJOULES PER WATT HOUR), OR ACTUAL MEASURED HEAT RATE BASED ON LOWER HEATING VALUE OF FUEL AS MEASURED AT ACTUAL PEAK LOAD FOR THE UNIT:

169 kJ/hr (158 MMBtu/hr) - Subject to NSPS KKKK

11. LOCATION OF THIS FUEL BURNING INSTALLATION:

LATITUDE (DECIMAL DEGREES): 759,315 LONGITUDE (DECIMAL DEGREES): 3,883,073

12. NORMAL OPERATING SCHEDULE:

24 HRS/DAY 7 DAYS/WK 365 DAYS/YR

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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
STATIONARY GAS TURBINE OR INTERNAL COMBUSTION ENGINE

1. FACILITY NAME:

CTC Property LLC

2. LIST ALL GAS TURBINES AND INTERNAL COMBUSTION ENGINES AT THIS FACILITY ON A SEPARATE SHEET, AND PLEASE COMPLETE AN APC V.5 FORM FOR EACH PIECE OF EQUIPMENT.

EU-01 through EU-15

3. MANUFACTURER AND MODEL NUMBER:	4. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION(S):
Solar SMT-130	EU-12

5. EQUIPMENT DESCRIPTION:

Solar SMT-130 natutal gas-fired turbine with selective catalytic reduction.

6. DATE OF INSTALLATION OR LAST MODIFICATION OF EQUIPMENT:

2024

7. RATED HEAT INPUT CAPACITY (IN MILLION BTU/HOUR) AND HORSE POWER:

158.0 MMBtu/hr and 21,765 hp

STATE WHICH HEATING VALUE WAS UTILIZED:

_____ HIGHER HEATING VALUE

X LOWER HEATING VALUE

8. IF EQUIPMENT IS GAS TURBINE, LIST TYPE.

☑ SIMPLE CYCLE

☐ REGENERATIVE CYCLE

☐ COMBINED CYCLE

9. FUELS:	PRIMARY FUEL	BACKUP FUEL #1	BACKUP FUEL #2	BACKUP FUEL #3
FUEL NAME	natural gas			
ACTUAL YEARLY CONSUMPTION	1557.9 MMscf			

10. (FOR NSPS TURBINES ONLY) MANUFACTURER'S RATED HEAT RATE AT MANUFACTURER'S RATED PEAK LOAD (KILOJOULES PER WATT HOUR), OR ACTUAL MEASURED HEAT RATE BASED ON LOWER HEATING VALUE OF FUEL AS MEASURED AT ACTUAL PEAK LOAD FOR THE UNIT:

169 kJ/hr (158 MMBtu/hr) - Subject to NSPS KKKK

11. LOCATION OF THIS FUEL BURNING INSTALLATION:

LATITUDE (DECIMAL DEGREES): 759,318 LONGITUDE (DECIMAL DEGREES): 3,883,072

12. NORMAL OPERATING SCHEDULE:

24 HRS/DAY 7 DAYS/WK 365 DAYS/YR

13. PAGE NUMBER:	REVISION NUMBER:	DATE OF REVISION:
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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
STATIONARY GAS TURBINE OR INTERNAL COMBUSTION ENGINE

1. FACILITY NAME:

CTC Property LLC

2. LIST ALL GAS TURBINES AND INTERNAL COMBUSTION ENGINES AT THIS FACILITY ON A SEPARATE SHEET, AND PLEASE COMPLETE AN APC V.5 FORM FOR EACH PIECE OF EQUIPMENT.

EU-01 through EU-15

3. MANUFACTURER AND MODEL NUMBER:	4. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION(S):
Solar SMT-130	EU-13

5. EQUIPMENT DESCRIPTION:

Solar SMT-130 natutal gas-fired turbine with selective catalytic reduction.

6. DATE OF INSTALLATION OR LAST MODIFICATION OF EQUIPMENT:

2024

7. RATED HEAT INPUT CAPACITY (IN MILLION BTU/HOUR) AND HORSE POWER:

158.0 MMBtu/hr and 21,765 hp

STATE WHICH HEATING VALUE WAS UTILIZED:

_____ HIGHER HEATING VALUE

X LOWER HEATING VALUE

8. IF EQUIPMENT IS GAS TURBINE, LIST TYPE.

☑ SIMPLE CYCLE

☐ REGENERATIVE CYCLE

☐ COMBINED CYCLE

9. FUELS:	PRIMARY FUEL	BACKUP FUEL #1	BACKUP FUEL #2	BACKUP FUEL #3
FUEL NAME	natural gas			
ACTUAL YEARLY CONSUMPTION	1557.9 MMscf			

10. (FOR NSPS TURBINES ONLY) MANUFACTURER'S RATED HEAT RATE AT MANUFACTURER'S RATED PEAK LOAD (KILOJOULES PER WATT HOUR), OR ACTUAL MEASURED HEAT RATE BASED ON LOWER HEATING VALUE OF FUEL AS MEASURED AT ACTUAL PEAK LOAD FOR THE UNIT:

169 kJ/hr (158 MMBtu/hr) - Subject to NSPS KKKK

11. LOCATION OF THIS FUEL BURNING INSTALLATION:

LATITUDE (DECIMAL DEGREES): 759,322 LONGITUDE (DECIMAL DEGREES): 3,883,071

12. NORMAL OPERATING SCHEDULE:

24 HRS/DAY 7 DAYS/WK 365 DAYS/YR

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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
STATIONARY GAS TURBINE OR INTERNAL COMBUSTION ENGINE

1. FACILITY NAME:

CTC Property LLC

2. LIST ALL GAS TURBINES AND INTERNAL COMBUSTION ENGINES AT THIS FACILITY ON A SEPARATE SHEET, AND PLEASE COMPLETE AN APC V.5 FORM FOR EACH PIECE OF EQUIPMENT.

EU-01 through EU-15

3. MANUFACTURER AND MODEL NUMBER:	4. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION(S):
Solar SMT-130	EU-14

5. EQUIPMENT DESCRIPTION:

Solar SMT-130 natutal gas-fired turbine with selective catalytic reduction.

6. DATE OF INSTALLATION OR LAST MODIFICATION OF EQUIPMENT:

2024

7. RATED HEAT INPUT CAPACITY (IN MILLION BTU/HOUR) AND HORSE POWER:

158.0 MMBtu/hr and 21,765 hp

STATE WHICH HEATING VALUE WAS UTILIZED:

_____ HIGHER HEATING VALUE

X LOWER HEATING VALUE

8. IF EQUIPMENT IS GAS TURBINE, LIST TYPE.

☑ SIMPLE CYCLE

☐ REGENERATIVE CYCLE

☐ COMBINED CYCLE

9. FUELS:	PRIMARY FUEL	BACKUP FUEL #1	BACKUP FUEL #2	BACKUP FUEL #3
FUEL NAME	natural gas			
ACTUAL YEARLY CONSUMPTION	1557.9 MMscf			

10. (FOR NSPS TURBINES ONLY) MANUFACTURER'S RATED HEAT RATE AT MANUFACTURER'S RATED PEAK LOAD (KILOJOULES PER WATT HOUR), OR ACTUAL MEASURED HEAT RATE BASED ON LOWER HEATING VALUE OF FUEL AS MEASURED AT ACTUAL PEAK LOAD FOR THE UNIT:

169 kJ/hr (158 MMBtu/hr) - Subject to NSPS KKKK

11. LOCATION OF THIS FUEL BURNING INSTALLATION:

LATITUDE (DECIMAL DEGREES): 759,326 LONGITUDE (DECIMAL DEGREES): 3,883,070

12. NORMAL OPERATING SCHEDULE:

24 HRS/DAY 7 DAYS/WK 365 DAYS/YR

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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
STATIONARY GAS TURBINE OR INTERNAL COMBUSTION ENGINE

1. FACILITY NAME:

CTC Property LLC

2. LIST ALL GAS TURBINES AND INTERNAL COMBUSTION ENGINES AT THIS FACILITY ON A SEPARATE SHEET, AND PLEASE COMPLETE AN APC V.5 FORM FOR EACH PIECE OF EQUIPMENT.

EU-01 through EU-15

3. MANUFACTURER AND MODEL NUMBER:	4. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION(S):
Solar SMT-130	EU-15

5. EQUIPMENT DESCRIPTION:

Solar SMT-130 natutal gas-fired turbine with selective catalytic reduction.

6. DATE OF INSTALLATION OR LAST MODIFICATION OF EQUIPMENT:

2024

7. RATED HEAT INPUT CAPACITY (IN MILLION BTU/HOUR) AND HORSE POWER:

158.0 MMBtu/hr and 21,765 hp

STATE WHICH HEATING VALUE WAS UTILIZED:

_____ HIGHER HEATING VALUE

X LOWER HEATING VALUE

8. IF EQUIPMENT IS GAS TURBINE, LIST TYPE.

☑ SIMPLE CYCLE

☐ REGENERATIVE CYCLE

☐ COMBINED CYCLE

9. FUELS:	PRIMARY FUEL	BACKUP FUEL #1	BACKUP FUEL #2	BACKUP FUEL #3
FUEL NAME	natural gas			
ACTUAL YEARLY CONSUMPTION	1557.9 MMscf			

10. (FOR NSPS TURBINES ONLY) MANUFACTURER'S RATED HEAT RATE AT MANUFACTURER'S RATED PEAK LOAD (KILOJOULES PER WATT HOUR), OR ACTUAL MEASURED HEAT RATE BASED ON LOWER HEATING VALUE OF FUEL AS MEASURED AT ACTUAL PEAK LOAD FOR THE UNIT:

169 kJ/hr (158 MMBtu/hr) - Subject to NSPS KKKK

11. LOCATION OF THIS FUEL BURNING INSTALLATION:

LATITUDE (DECIMAL DEGREES): 759,329 LONGITUDE (DECIMAL DEGREES): 3,883,069

12. NORMAL OPERATING SCHEDULE:

24 HRS/DAY 7 DAYS/WK 365 DAYS/YR

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2012
APC-2-03

SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 Sycamore Road
Memphis, TN 38134
Telephone: (901) 222-9942
FAX: (901) 222-9550
NOT TO BE USED FOR TITLE V APPLICATIONS

SCHD RECEIPT DATE

EMISSION POINT DESCRIPTION

PLEASE TYPE OR PRINT AND SUBMIT IN DUPLICATE FOR EACH STACK OR EMISSION POINT. ATTACH TO THE PERMIT APPLICATION

1. ORGANIZATION LEGAL NAME: CTC Property LLC			**SCHD-APC FACILITY ID.:**	
2. EMISSION SOURCE NUMBER: EU-01	FLOW DIAGRAM POINT NUMBER: EU-01		**SCHD-APC PERMIT ID.:**	
3. SOURCE LOCATION	LATITUDE	LONGITUDE	UTM VERTICAL: 759,264	UTM HORIZONTAL: 3,883,083
4. BRIEF EMISSION POINT DESCRIPTION (ATTACH A SKETCH IF APPROPRIATE): Solar SMT-130 Turbine with SCR				DISTANCE TO NEAREST PROPERTY LINE (FT): 50

COMPLET LINES 5 AND 6 IF DIFFERENT FROM THAT ON THE PROCESS OR FUEL BURNING SOURCE DESCRIPTION (APC-2-02)

5. NORMAL OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
6. MAXIMUM OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
7. PERCENT ANNUAL THROUGH PUT	DEC.-FEB.: 25	MAR.-MAY: 25	JUNE-AUG.: 25	SEPT.-NOV.: 25

8. STACK OR EMISSION POINT DATA	HEIGHT ABOVE GRADE(FT): 35.0	DIAMETER (FT): 9.0	TEMPERATURE (°F): 850.0	% OF TIME OVER 125°F: 100	DIRECTION OF EXIT (UP, DOWN, OR HORIZ): UP
DATA AT EXIT CONDITIONS	FLOW (ACTUAL FT^3/MIN): 514,152	VELOCITY (FT/SEC): 73.3	MOISTURE ($GRAINS/FT^3$): ambient	MOISTURE (PERCENT)	
DATA AT STANDARD CONDITIONS	FLOW (DRY STANDARD CUBIC FEET PER MINUTE): 99,107				

9. AIR CONTAMINANTS	AVERAGE (LBS/HR)	MAXIMUM (LBS/HR)	CONCENTRATION	AVERAGE (TONS/YR)	MAXIMUM (TONS/YR)	EMISSION ESTIMATION METHOD*	CONTROL DEVICES*	CONTROL EFFICIENCY (%)
PARTICULATES	1.11	1.11	**	4.86	4.86	3		
SULFUR DIOXIDE	0.45	0.45	***	1.97	1.97	2		
CARBON MONOXIDE	1.01	507.00	PPM 2.5	4.41	4.41	6	999	
ORGANIC COMPOUNDS	1.27	29.00	PPM 2.0	5.55	5.55	6	999	
NITROGEN OXIDES	1.32	5.63	PPM 2.0	5.79	5.79	6	999	
FLUORIDES								
OTHER (SPECIFY) ammonia	1.16	1.16	5.0 ppm	5.10	5.10	6		
OTHER (SPECIFY) total HAP	0.18	40.09		0.77	0.77	3		

* REFER TO THE BACK OF THE PERMIT APPLICATION FORM FOR ESTIMATION METHOD AND CONTROL DEVICE CODES.

** EXIT GAS PARTICULATE CONCENTRATION UNITS: PROCESS – GRAINS PER DRY STANDARD FT^3 (70°F); WOOD FIRED BOILERS – GRAINS PER DRY STANDARD FT^3 (70°F); ALL OTHER BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

*** EXIT GAS SULFUR DIOXIDE CONCENTRATION UNITS: PROCESS – PPM BY VOLUME, DRY BASIS; BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

(OVER)

10. CHECK TYPES OF MONITORING AND RECORDING INSTRUMENTS THAT ARE ATTACHED:

OPACITY MONITOR ( ), SO_2 MONITOR ( ), NO_X MONITOR ( ), OTHER, SPECIFY IN COMMENTS ( )

11. COMMENTS:

Emission factors for NOx, CO, VOC and ammonia are based on vendor data and emission guarantees. Emission factor for particulate is based AP-42. Emission factors for HAP emissions are based on AP-42. Emission factor for SO2 is based on gas analysis from Memphis Light, Gas & Water stating 1 grain sulfur / 100 scf.

The turbine will also be equipped with Solar's SoLoNOx technology followed by selective catalytic reduction (SCR) for controlling NOx and oxidation catalyst for CO and VOC emissions.

Maximum lb/hr rates for NOx, CO, VOC and HAP emissions are determined for startup and shutdown events. Typical startup or shutdown times for these units are 10 minutes each.
Speciated HAP emissions are included in emissions calculations section of the application.

2012
APC-2-03

SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 Sycamore Road
Memphis, TN 38134
Telephone: (901) 222-9942
FAX: (901) 222-9550
NOT TO BE USED FOR TITLE V APPLICATIONS

SCHD RECEIPT DATE

EMISSION POINT DESCRIPTION

PLEASE TYPE OR PRINT AND SUBMIT IN DUPLICATE FOR EACH STACK OR EMISSION POINT. ATTACH TO THE PERMIT APPLICATION

1. ORGANIZATION LEGAL NAME: CTC Property LLC			**SCHD-APC FACILITY ID.:**	
2. EMISSION SOURCE NUMBER: EU-02	FLOW DIAGRAM POINT NUMBER: EU-02		**SCHD-APC PERMIT ID.:**	
3. SOURCE LOCATION	LATITUDE	LONGITUDE	UTM VERTICAL: 759,270	UTM HORIZONTAL: 3,883,082
4. BRIEF EMISSION POINT DESCRIPTION (ATTACH A SKETCH IF APPROPRIATE): Solar SMT-130 Turbine with SCR				DISTANCE TO NEAREST PROPERTY LINE (FT): 50

COMPLET LINES 5 AND 6 IF DIFFERENT FROM THAT ON THE PROCESS OR FUEL BURNING SOURCE DESCRIPTION (APC-2-02)

5. NORMAL OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
6. MAXIMUM OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
7. PERCENT ANNUAL THROUGH PUT	DEC.-FEB.: 25	MAR.-MAY: 25	JUNE-AUG.: 25	SEPT.-NOV.: 25

8. STACK OR EMISSION POINT DATA	HEIGHT ABOVE GRADE(FT): 35.0	DIAMETER (FT): 9.0	TEMPERATURE (°F): 850.0	% OF TIME OVER 125°F: 100	DIRECTION OF EXIT (UP, DOWN, OR HORIZ): UP
DATA AT EXIT CONDITIONS	FLOW (ACTUAL FT^3/MIN): 514,152	VELOCITY (FT/SEC): 73.3	MOISTURE ($GRAINS/FT^3$): ambient	MOISTURE (PERCENT)	
DATA AT STANDARD CONDITIONS	FLOW (DRY STANDARD CUBIC FEET PER MINUTE): 99,107				

9. AIR CONTAMINANTS	AVERAGE (LBS/HR)	MAXIMUM (LBS/HR)	CONCENTRATION	AVERAGE (TONS/YR)	MAXIMUM (TONS/YR)	EMISSION ESTIMATION METHOD*	CONTROL DEVICES*	CONTROL EFFICIENCY (%)
PARTICULATES	1.11	1.11	**	4.86	4.86	3		
SULFUR DIOXIDE	0.45	0.45	***	1.97	1.97	2		
CARBON MONOXIDE	1.01	507.00	PPM 2.5	4.41	4.41	6	999	
ORGANIC COMPOUNDS	1.27	29.00	PPM 2.0	5.55	5.55	6	999	
NITROGEN OXIDES	1.32	5.63	PPM 2.0	5.79	5.79	6	999	
FLUORIDES								
OTHER (SPECIFY) ammonia	1.16	1.16	5.0 ppm	5.10	5.10	6		
OTHER (SPECIFY) total HAP	0.18	40.09		0.77	0.77	3		

* REFER TO THE BACK OF THE PERMIT APPLICATION FORM FOR ESTIMATION METHOD AND CONTROL DEVICE CODES.

** EXIT GAS PARTICULATE CONCENTRATION UNITS: PROCESS – GRAINS PER DRY STANDARD FT^3 (70°F); WOOD FIRED BOILERS – GRAINS PER DRY STANDARD FT^3 (70°F); ALL OTHER BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

*** EXIT GAS SULFUR DIOXIDE CONCENTRATION UNITS: PROCESS – PPM BY VOLUME, DRY BASIS; BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

(OVER)

10. CHECK TYPES OF MONITORING AND RECORDING INSTRUMENTS THAT ARE ATTACHED:

OPACITY MONITOR ( ), SO_2 MONITOR ( ), NO_X MONITOR ( ), OTHER, SPECIFY IN COMMENTS ( )

11. COMMENTS:

Emission factors for NOx, CO, VOC and ammonia are based on vendor data and emission guarantees. Emission factor for particulate is based AP-42. Emission factors for HAP emissions are based on AP-42. Emission factor for SO2 is based on gas analysis from Memphis Light, Gas & Water stating 1 grain sulfur / 100 scf.

The turbine will also be equipped with Solar's SoLoNOx technology followed by selective catalytic reduction (SCR) for controlling NOx and oxidation catalyst for CO and VOC emissions.

Maximum lb/hr rates for NOx, CO, VOC and HAP emissions are determined for startup and shutdown events. Typical startup or shutdown times for these units are 10 minutes each.
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2012
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SCHD RECEIPT DATE

EMISSION POINT DESCRIPTION

PLEASE TYPE OR PRINT AND SUBMIT IN DUPLICATE FOR EACH STACK OR EMISSION POINT. ATTACH TO THE PERMIT APPLICATION

1. ORGANIZATION LEGAL NAME: CTC Property LLC			**SCHD-APC FACILITY ID.:**	
2. EMISSION SOURCE NUMBER: EU-03	FLOW DIAGRAM POINT NUMBER: EU-03		**SCHD-APC PERMIT ID.:**	
3. SOURCE LOCATION	LATITUDE	LONGITUDE	UTM VERTICAL: 759,277	UTM HORIZONTAL: 3,883,080
4. BRIEF EMISSION POINT DESCRIPTION (ATTACH A SKETCH IF APPROPRIATE): Solar SMT-130 Turbine with SCR				DISTANCE TO NEAREST PROPERTY LINE (FT): 50

COMPLET LINES 5 AND 6 IF DIFFERENT FROM THAT ON THE PROCESS OR FUEL BURNING SOURCE DESCRIPTION (APC-2-02)

5. NORMAL OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
6. MAXIMUM OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
7. PERCENT ANNUAL THROUGH PUT	DEC.-FEB.: 25	MAR.-MAY: 25	JUNE-AUG.: 25	SEPT.-NOV.: 25

8. STACK OR EMISSION POINT DATA	HEIGHT ABOVE GRADE(FT): 35.0	DIAMETER (FT): 9.0	TEMPERATURE (°F): 850.0	% OF TIME OVER 125°F: 100	DIRECTION OF EXIT (UP, DOWN, OR HORIZ): UP
DATA AT EXIT CONDITIONS	FLOW (ACTUAL FT^3/MIN): 514,152	VELOCITY (FT/SEC): 73.3	MOISTURE ($GRAINS/FT^3$): ambient		MOISTURE (PERCENT)
DATA AT STANDARD CONDITIONS	FLOW (DRY STANDARD CUBIC FEET PER MINUTE): 99,107				

9. AIR CONTAMINANTS	AVERAGE (LBS/HR)	MAXIMUM (LBS/HR)	CONCENTRATION	AVERAGE (TONS/YR)	MAXIMUM (TONS/YR)	EMISSION ESTIMATION METHOD*	CONTROL DEVICES*	CONTROL EFFICIENCY (%)
PARTICULATES	1.11	1.11	**	4.86	4.86	3		
SULFUR DIOXIDE	0.45	0.45	***	1.97	1.97	2		
CARBON MONOXIDE	1.01	507.00	PPM 2.5	4.41	4.41	6	999	
ORGANIC COMPOUNDS	1.27	29.00	PPM 2.0	5.55	5.55	6	999	
NITROGEN OXIDES	1.32	5.63	PPM 2.0	5.79	5.79	6	999	
FLUORIDES								
OTHER (SPECIFY) ammonia	1.16	1.16	5.0 ppm	5.10	5.10	6		
OTHER (SPECIFY) total HAP	0.18	40.09		0.77	0.77	3		

* REFER TO THE BACK OF THE PERMIT APPLICATION FORM FOR ESTIMATION METHOD AND CONTROL DEVICE CODES.

** EXIT GAS PARTICULATE CONCENTRATION UNITS: PROCESS – GRAINS PER DRY STANDARD FT^3 (70°F); WOOD FIRED BOILERS – GRAINS PER DRY STANDARD FT^3 (70°F); ALL OTHER BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

*** EXIT GAS SULFUR DIOXIDE CONCENTRATION UNITS: PROCESS – PPM BY VOLUME, DRY BASIS; BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

(OVER)

10. CHECK TYPES OF MONITORING AND RECORDING INSTRUMENTS THAT ARE ATTACHED:

OPACITY MONITOR ( ), SO_2 MONITOR ( ), NO_X MONITOR ( ), OTHER, SPECIFY IN COMMENTS ( )

11. COMMENTS:

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SCHD RECEIPT DATE

EMISSION POINT DESCRIPTION

PLEASE TYPE OR PRINT AND SUBMIT IN DUPLICATE FOR EACH STACK OR EMISSION POINT. ATTACH TO THE PERMIT APPLICATION

1. ORGANIZATION LEGAL NAME: CTC Property LLC			**SCHD-APC FACILITY ID.:**	
2. EMISSION SOURCE NUMBER: EU-04	FLOW DIAGRAM POINT NUMBER: EU-04		**SCHD-APC PERMIT ID.:**	
3. SOURCE LOCATION	LATITUDE	LONGITUDE	UTM VERTICAL: 759,284	UTM HORIZONTAL: 3,883,079
4. BRIEF EMISSION POINT DESCRIPTION (ATTACH A SKETCH IF APPROPRIATE): Solar SMT-130 Turbine with SCR				DISTANCE TO NEAREST PROPERTY LINE (FT): 50

COMPLET LINES 5 AND 6 IF DIFFERENT FROM THAT ON THE PROCESS OR FUEL BURNING SOURCE DESCRIPTION (APC-2-02)

5. NORMAL OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
6. MAXIMUM OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
7. PERCENT ANNUAL THROUGH PUT	DEC.-FEB.: 25	MAR.-MAY: 25	JUNE-AUG.: 25	SEPT.-NOV.: 25

8. STACK OR EMISSION POINT DATA	HEIGHT ABOVE GRADE(FT): 35.0	DIAMETER (FT): 9.0	TEMPERATURE (°F): 850.0	% OF TIME OVER 125°F: 100	DIRECTION OF EXIT (UP, DOWN, OR HORIZ): UP
DATA AT EXIT CONDITIONS	FLOW (ACTUAL FT^3/MIN): 514,152	VELOCITY (FT/SEC): 73.3	MOISTURE ($GRAINS/FT^3$): ambient		MOISTURE (PERCENT)
DATA AT STANDARD CONDITIONS	FLOW (DRY STANDARD CUBIC FEET PER MINUTE): 99,107				

9. AIR CONTAMINANTS	AVERAGE (LBS/HR)	MAXIMUM (LBS/HR)	CONCENTRATION	AVERAGE (TONS/YR)	MAXIMUM (TONS/YR)	EMISSION ESTIMATION METHOD*	CONTROL DEVICES*	CONTROL EFFICIENCY (%)
PARTICULATES	1.11	1.11	**	4.86	4.86	3		
SULFUR DIOXIDE	0.45	0.45	***	1.97	1.97	2		
CARBON MONOXIDE	1.01	507.00	PPM 2.5	4.41	4.41	6	999	
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FLUORIDES								
OTHER (SPECIFY) ammonia	1.16	1.16	5.0 ppm	5.10	5.10	6		
OTHER (SPECIFY) total HAP	0.18	40.09		0.77	0.77	3		

* REFER TO THE BACK OF THE PERMIT APPLICATION FORM FOR ESTIMATION METHOD AND CONTROL DEVICE CODES.

** EXIT GAS PARTICULATE CONCENTRATION UNITS: PROCESS – GRAINS PER DRY STANDARD FT^3 (70°F); WOOD FIRED BOILERS – GRAINS PER DRY STANDARD FT^3 (70°F); ALL OTHER BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

*** EXIT GAS SULFUR DIOXIDE CONCENTRATION UNITS: PROCESS – PPM BY VOLUME, DRY BASIS; BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

(OVER)

10. CHECK TYPES OF MONITORING AND RECORDING INSTRUMENTS THAT ARE ATTACHED:

OPACITY MONITOR ( ), SO_2 MONITOR ( ), NO_X MONITOR ( ), OTHER, SPECIFY IN COMMENTS ( )

11. COMMENTS:

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SCHD RECEIPT DATE

EMISSION POINT DESCRIPTION

PLEASE TYPE OR PRINT AND SUBMIT IN DUPLICATE FOR EACH STACK OR EMISSION POINT. ATTACH TO THE PERMIT APPLICATION

1. ORGANIZATION LEGAL NAME: CTC Property LLC			**SCHD-APC FACILITY ID.:**	
2. EMISSION SOURCE NUMBER: EU-05	FLOW DIAGRAM POINT NUMBER: EU-05		**SCHD-APC PERMIT ID.:**	
3. SOURCE LOCATION	LATITUDE	LONGITUDE	UTM VERTICAL: 759,288	UTM HORIZONTAL: 3,883,078
4. BRIEF EMISSION POINT DESCRIPTION (ATTACH A SKETCH IF APPROPRIATE): Solar SMT-130 Turbine with SCR				DISTANCE TO NEAREST PROPERTY LINE (FT): 50

COMPLET LINES 5 AND 6 IF DIFFERENT FROM THAT ON THE PROCESS OR FUEL BURNING SOURCE DESCRIPTION (APC-2-02)

5. NORMAL OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
6. MAXIMUM OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
7. PERCENT ANNUAL THROUGH PUT	DEC.-FEB.: 25	MAR.-MAY: 25	JUNE-AUG.: 25	SEPT.-NOV.: 25

8. STACK OR EMISSION POINT DATA	HEIGHT ABOVE GRADE(FT): 35.0	DIAMETER (FT): 9.0	TEMPERATURE (°F): 850.0	% OF TIME OVER 125°F: 100	DIRECTION OF EXIT (UP, DOWN, OR HORIZ): UP
DATA AT EXIT CONDITIONS	FLOW (ACTUAL FT^3/MIN): 514,152	VELOCITY (FT/SEC): 73.3	MOISTURE (GRAINS/FT^3): ambient		MOISTURE (PERCENT)
DATA AT STANDARD CONDITIONS	FLOW (DRY STANDARD CUBIC FEET PER MINUTE): 99,107				

9. AIR CONTAMINANTS	AVERAGE (LBS/HR)	MAXIMUM (LBS/HR)	CONCENTRATION	AVERAGE (TONS/YR)	MAXIMUM (TONS/YR)	EMISSION ESTIMATION METHOD*	CONTROL DEVICES*	CONTROL EFFICIENCY (%)
PARTICULATES	1.11	1.11	**	4.86	4.86	3		
SULFUR DIOXIDE	0.45	0.45	***	1.97	1.97	2		
CARBON MONOXIDE	1.01	507.00	PPM 2.5	4.41	4.41	6	999	
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NITROGEN OXIDES	1.32	5.63	PPM 2.0	5.79	5.79	6	999	
FLUORIDES								
OTHER (SPECIFY) ammonia	1.16	1.16	5.0 ppm	5.10	5.10	6		
OTHER (SPECIFY) total HAP	0.18	40.09		0.77	0.77	3		

* REFER TO THE BACK OF THE PERMIT APPLICATION FORM FOR ESTIMATION METHOD AND CONTROL DEVICE CODES.

** EXIT GAS PARTICULATE CONCENTRATION UNITS: PROCESS – GRAINS PER DRY STANDARD FT^3 (70°F); WOOD FIRED BOILERS – GRAINS PER DRY STANDARD FT^3 (70°F); ALL OTHER BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

*** EXIT GAS SULFUR DIOXIDE CONCENTRATION UNITS: PROCESS – PPM BY VOLUME, DRY BASIS; BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

(OVER)

10. CHECK TYPES OF MONITORING AND RECORDING INSTRUMENTS THAT ARE ATTACHED:

OPACITY MONITOR ( ), SO_2 MONITOR ( ), NO_X MONITOR ( ), OTHER, SPECIFY IN COMMENTS ( )

11. COMMENTS:

Emission factors for NOx, CO, VOC and ammonia are based on vendor data and emission guarantees. Emission factor for particulate is based AP-42. Emission factors for HAP emissions are based on AP-42. Emission factor for SO2 is based on gas analysis from Memphis Light, Gas & Water stating 1 grain sulfur / 100 scf.

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SCHD RECEIPT DATE

EMISSION POINT DESCRIPTION

PLEASE TYPE OR PRINT AND SUBMIT IN DUPLICATE FOR EACH STACK OR EMISSION POINT. ATTACH TO THE PERMIT APPLICATION

1. ORGANIZATION LEGAL NAME: CTC Property LLC			**SCHD-APC FACILITY ID.:**	
2. EMISSION SOURCE NUMBER: EU-06	FLOW DIAGRAM POINT NUMBER: EU-06		**SCHD-APC PERMIT ID.:**	
3. SOURCE LOCATION	LATITUDE	LONGITUDE	UTM VERTICAL: 759,294	UTM HORIZONTAL: 3,883,078
4. BRIEF EMISSION POINT DESCRIPTION (ATTACH A SKETCH IF APPROPRIATE): Solar SMT-130 Turbine with SCR				DISTANCE TO NEAREST PROPERTY LINE (FT): 50

COMPLET LINES 5 AND 6 IF DIFFERENT FROM THAT ON THE PROCESS OR FUEL BURNING SOURCE DESCRIPTION (APC-2-02)

5. NORMAL OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
6. MAXIMUM OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
7. PERCENT ANNUAL THROUGH PUT	DEC.-FEB.: 25	MAR.-MAY: 25	JUNE-AUG.: 25	SEPT.-NOV.: 25

8. STACK OR EMISSION POINT DATA	HEIGHT ABOVE GRADE(FT): 35.0	DIAMETER (FT): 9.0	TEMPERATURE (°F): 850.0	% OF TIME OVER 125°F: 100	DIRECTION OF EXIT (UP, DOWN, OR HORIZ): UP
DATA AT EXIT CONDITIONS	FLOW (ACTUAL FT^3/MIN): 514,152	VELOCITY (FT/SEC): 73.3	MOISTURE ($GRAINS/FT^3$): ambient		MOISTURE (PERCENT)
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9. AIR CONTAMINANTS	AVERAGE (LBS/HR)	MAXIMUM (LBS/HR)	CONCENTRATION	AVERAGE (TONS/YR)	MAXIMUM (TONS/YR)	EMISSION ESTIMATION METHOD*	CONTROL DEVICES*	CONTROL EFFICIENCY (%)
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FLUORIDES								
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OTHER (SPECIFY) total HAP	0.18	40.09		0.77	0.77	3		

* REFER TO THE BACK OF THE PERMIT APPLICATION FORM FOR ESTIMATION METHOD AND CONTROL DEVICE CODES.

** EXIT GAS PARTICULATE CONCENTRATION UNITS: PROCESS – GRAINS PER DRY STANDARD FT^3 (70°F); WOOD FIRED BOILERS – GRAINS PER DRY STANDARD FT^3 (70°F); ALL OTHER BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

*** EXIT GAS SULFUR DIOXIDE CONCENTRATION UNITS: PROCESS – PPM BY VOLUME, DRY BASIS; BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

(OVER)

10. CHECK TYPES OF MONITORING AND RECORDING INSTRUMENTS THAT ARE ATTACHED:

OPACITY MONITOR ( ), SO_2 MONITOR ( ), NO_X MONITOR ( ), OTHER, SPECIFY IN COMMENTS ( )

11. COMMENTS:

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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 Sycamore Road
Memphis, TN 38134
Telephone: (901) 222-9942
FAX: (901) 222-9550
NOT TO BE USED FOR TITLE V APPLICATIONS

SCHD RECEIPT DATE

EMISSION POINT DESCRIPTION

PLEASE TYPE OR PRINT AND SUBMIT IN DUPLICATE FOR EACH STACK OR EMISSION POINT. ATTACH TO THE PERMIT APPLICATION

1. ORGANIZATION LEGAL NAME: CTC Property LLC			**SCHD-APC FACILITY ID.:**	
2. EMISSION SOURCE NUMBER: EU-07	FLOW DIAGRAM POINT NUMBER: EU-07		**SCHD-APC PERMIT ID.:**	
3. SOURCE LOCATION	LATITUDE	LONGITUDE	UTM VERTICAL: 759,299	UTM HORIZONTAL: 3,883,077
4. BRIEF EMISSION POINT DESCRIPTION (ATTACH A SKETCH IF APPROPRIATE): Solar SMT-130 Turbine with SCR				DISTANCE TO NEAREST PROPERTY LINE (FT): 50

COMPLET LINES 5 AND 6 IF DIFFERENT FROM THAT ON THE PROCESS OR FUEL BURNING SOURCE DESCRIPTION (APC-2-02)

5. NORMAL OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
6. MAXIMUM OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
7. PERCENT ANNUAL THROUGH PUT	DEC.-FEB.: 25	MAR.-MAY: 25	JUNE-AUG.: 25	SEPT.-NOV.: 25

8. STACK OR EMISSION POINT DATA	HEIGHT ABOVE GRADE(FT): 35.0	DIAMETER (FT): 9.0	TEMPERATURE (°F): 850.0	% OF TIME OVER 125°F: 100	DIRECTION OF EXIT (UP, DOWN, OR HORIZ): UP
DATA AT EXIT CONDITIONS	FLOW (ACTUAL FT^3/MIN): 514,152	VELOCITY (FT/SEC): 73.3	MOISTURE ($GRAINS/FT^3$): ambient		MOISTURE (PERCENT)
DATA AT STANDARD CONDITIONS	FLOW (DRY STANDARD CUBIC FEET PER MINUTE): 99,107				

9. AIR CONTAMINANTS	AVERAGE (LBS/HR)	MAXIMUM (LBS/HR)	CONCENTRATION	AVERAGE (TONS/YR)	MAXIMUM (TONS/YR)	EMISSION ESTIMATION METHOD*	CONTROL DEVICES*	CONTROL EFFICIENCY (%)
PARTICULATES	1.11	1.11	**	4.86	4.86	3		
SULFUR DIOXIDE	0.45	0.45	***	1.97	1.97	2		
CARBON MONOXIDE	1.01	507.00	PPM 2.5	4.41	4.41	6	999	
ORGANIC COMPOUNDS	1.27	29.00	PPM 2.0	5.55	5.55	6	999	
NITROGEN OXIDES	1.32	5.63	PPM 2.0	5.79	5.79	6	999	
FLUORIDES								
OTHER (SPECIFY) ammonia	1.16	1.16	5.0 ppm	5.10	5.10	6		
OTHER (SPECIFY) total HAP	0.18	40.09		0.77	0.77	3		

* REFER TO THE BACK OF THE PERMIT APPLICATION FORM FOR ESTIMATION METHOD AND CONTROL DEVICE CODES.

** EXIT GAS PARTICULATE CONCENTRATION UNITS: PROCESS – GRAINS PER DRY STANDARD FT^3 (70°F); WOOD FIRED BOILERS – GRAINS PER DRY STANDARD FT^3 (70°F); ALL OTHER BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

*** EXIT GAS SULFUR DIOXIDE CONCENTRATION UNITS: PROCESS – PPM BY VOLUME, DRY BASIS; BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

(OVER)

10. CHECK TYPES OF MONITORING AND RECORDING INSTRUMENTS THAT ARE ATTACHED:

OPACITY MONITOR ( ), SO_2 MONITOR ( ), NO_X MONITOR ( ), OTHER, SPECIFY IN COMMENTS ( )

11. COMMENTS:

Emission factors for NOx, CO, VOC and ammonia are based on vendor data and emission guarantees. Emission factor for particulate is based AP-42. Emission factors for HAP emissions are based on AP-42. Emission factor for SO2 is based on gas analysis from Memphis Light, Gas & Water stating 1 grain sulfur / 100 scf.

The turbine will also be equipped with Solar's SoLoNOx technology followed by selective catalytic reduction (SCR) for controlling NOx and oxidation catalyst for CO and VOC emissions.

Maximum lb/hr rates for NOx, CO, VOC and HAP emissions are determined for startup and shutdown events. Typical startup or shutdown times for these units are 10 minutes each.
Speciated HAP emissions are included in emissions calculations section of the application.

2012
APC-2-03

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SCHD RECEIPT DATE

EMISSION POINT DESCRIPTION

PLEASE TYPE OR PRINT AND SUBMIT IN DUPLICATE FOR EACH STACK OR EMISSION POINT. ATTACH TO THE PERMIT APPLICATION

1. ORGANIZATION LEGAL NAME: CTC Property LLC			**SCHD-APC FACILITY ID.:**	
2. EMISSION SOURCE NUMBER: EU-08	FLOW DIAGRAM POINT NUMBER: EU-08		**SCHD-APC PERMIT ID.:**	
3. SOURCE LOCATION	LATITUDE	LONGITUDE	UTM VERTICAL: 759,303	UTM HORIZONTAL: 3,883,076
4. BRIEF EMISSION POINT DESCRIPTION (ATTACH A SKETCH IF APPROPRIATE): Solar SMT-130 Turbine with SCR				DISTANCE TO NEAREST PROPERTY LINE (FT): 50

COMPLET LINES 5 AND 6 IF DIFFERENT FROM THAT ON THE PROCESS OR FUEL BURNING SOURCE DESCRIPTION (APC-2-02)

5. NORMAL OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
6. MAXIMUM OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
7. PERCENT ANNUAL THROUGH PUT	DEC.-FEB.: 25	MAR.-MAY: 25	JUNE-AUG.: 25	SEPT.-NOV.: 25

8. STACK OR EMISSION POINT DATA	HEIGHT ABOVE GRADE(FT): 35.0	DIAMETER (FT): 9.0	TEMPERATURE (°F): 850.0	% OF TIME OVER 125°F: 100	DIRECTION OF EXIT (UP, DOWN, OR HORIZ): UP
DATA AT EXIT CONDITIONS	FLOW (ACTUAL FT^3/MIN): 514,152	VELOCITY (FT/SEC): 73.3	MOISTURE ($GRAINS/FT^3$): ambient		MOISTURE (PERCENT)
DATA AT STANDARD CONDITIONS	FLOW (DRY STANDARD CUBIC FEET PER MINUTE): 99,107				

9. AIR CONTAMINANTS	AVERAGE (LBS/HR)	MAXIMUM (LBS/HR)	CONCENTRATION	AVERAGE (TONS/YR)	MAXIMUM (TONS/YR)	EMISSION ESTIMATION METHOD*	CONTROL DEVICES*	CONTROL EFFICIENCY (%)
PARTICULATES	1.11	1.11	**	4.86	4.86	3		
SULFUR DIOXIDE	0.45	0.45	***	1.97	1.97	2		
CARBON MONOXIDE	1.01	507.00	PPM 2.5	4.41	4.41	6	999	
ORGANIC COMPOUNDS	1.27	29.00	PPM 2.0	5.55	5.55	6	999	
NITROGEN OXIDES	1.32	5.63	PPM 2.0	5.79	5.79	6	999	
FLUORIDES								
OTHER (SPECIFY) ammonia	1.16	1.16	5.0 ppm	5.10	5.10	6		
OTHER (SPECIFY) total HAP	0.18	40.09		0.77	0.77	3		

* REFER TO THE BACK OF THE PERMIT APPLICATION FORM FOR ESTIMATION METHOD AND CONTROL DEVICE CODES.

** EXIT GAS PARTICULATE CONCENTRATION UNITS: PROCESS – GRAINS PER DRY STANDARD FT^3 (70°F); WOOD FIRED BOILERS – GRAINS PER DRY STANDARD FT^3 (70°F); ALL OTHER BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

*** EXIT GAS SULFUR DIOXIDE CONCENTRATION UNITS: PROCESS – PPM BY VOLUME, DRY BASIS; BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

(OVER)

10. CHECK TYPES OF MONITORING AND RECORDING INSTRUMENTS THAT ARE ATTACHED:

OPACITY MONITOR ( ), SO_2 MONITOR ( ), NO_X MONITOR ( ), OTHER, SPECIFY IN COMMENTS ( )

11. COMMENTS:

Emission factors for NOx, CO, VOC and ammonia are based on vendor data and emission guarantees. Emission factor for particulate is based AP-42. Emission factors for HAP emissions are based on AP-42. Emission factor for SO2 is based on gas analysis from Memphis Light, Gas & Water stating 1 grain sulfur / 100 scf.

The turbine will also be equipped with Solar's SoLoNOx technology followed by selective catalytic reduction (SCR) for controlling NOx and oxidation catalyst for CO and VOC emissions.

Maximum lb/hr rates for NOx, CO, VOC and HAP emissions are determined for startup and shutdown events. Typical startup or shutdown times for these units are 10 minutes each.
Speciated HAP emissions are included in emissions calculations section of the application.

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SCHD RECEIPT DATE

EMISSION POINT DESCRIPTION

PLEASE TYPE OR PRINT AND SUBMIT IN DUPLICATE FOR EACH STACK OR EMISSION POINT. ATTACH TO THE PERMIT APPLICATION

1. ORGANIZATION LEGAL NAME: CTC Property LLC			**SCHD-APC FACILITY ID.:**	
2. EMISSION SOURCE NUMBER: EU-09	FLOW DIAGRAM POINT NUMBER: EU-09		**SCHD-APC PERMIT ID.:**	
3. SOURCE LOCATION	LATITUDE	LONGITUDE	UTM VERTICAL: 759,306	UTM HORIZONTAL: 3,883,075
4. BRIEF EMISSION POINT DESCRIPTION (ATTACH A SKETCH IF APPROPRIATE): Solar SMT-130 Turbine with SCR				DISTANCE TO NEAREST PROPERTY LINE (FT): 50

COMPLET LINES 5 AND 6 IF DIFFERENT FROM THAT ON THE PROCESS OR FUEL BURNING SOURCE DESCRIPTION (APC-2-02)

5. NORMAL OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
6. MAXIMUM OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
7. PERCENT ANNUAL THROUGH PUT	DEC.-FEB.: 25	MAR.-MAY: 25	JUNE-AUG.: 25	SEPT.-NOV.: 25

8. STACK OR EMISSION POINT DATA	HEIGHT ABOVE GRADE(FT): 35.0	DIAMETER (FT): 9.0	TEMPERATURE (°F): 850.0	% OF TIME OVER 125°F: 100	DIRECTION OF EXIT (UP, DOWN, OR HORIZ): UP
DATA AT EXIT CONDITIONS	FLOW (ACTUAL FT^3/MIN): 514,152	VELOCITY (FT/SEC): 73.3	MOISTURE ($GRAINS/FT^3$): ambient		MOISTURE (PERCENT)
DATA AT STANDARD CONDITIONS	FLOW (DRY STANDARD CUBIC FEET PER MINUTE): 99,107				

9. AIR CONTAMINANTS	AVERAGE (LBS/HR)	MAXIMUM (LBS/HR)	CONCENTRATION	AVERAGE (TONS/YR)	MAXIMUM (TONS/YR)	EMISSION ESTIMATION METHOD*	CONTROL DEVICES*	CONTROL EFFICIENCY (%)
PARTICULATES	1.11	1.11	**	4.86	4.86	3		
SULFUR DIOXIDE	0.45	0.45	***	1.97	1.97	2		
CARBON MONOXIDE	1.01	507.00	PPM 2.5	4.41	4.41	6	999	
ORGANIC COMPOUNDS	1.27	29.00	PPM 2.0	5.55	5.55	6	999	
NITROGEN OXIDES	1.32	5.63	PPM 2.0	5.79	5.79	6	999	
FLUORIDES								
OTHER (SPECIFY) ammonia	1.16	1.16	5.0 ppm	5.10	5.10	6		
OTHER (SPECIFY) total HAP	0.18	40.09		0.77	0.77	3		

* REFER TO THE BACK OF THE PERMIT APPLICATION FORM FOR ESTIMATION METHOD AND CONTROL DEVICE CODES.

** EXIT GAS PARTICULATE CONCENTRATION UNITS: PROCESS – GRAINS PER DRY STANDARD FT^3 (70°F); WOOD FIRED BOILERS – GRAINS PER DRY STANDARD FT^3 (70°F); ALL OTHER BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

*** EXIT GAS SULFUR DIOXIDE CONCENTRATION UNITS: PROCESS – PPM BY VOLUME, DRY BASIS; BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

(OVER)

10. CHECK TYPES OF MONITORING AND RECORDING INSTRUMENTS THAT ARE ATTACHED:

OPACITY MONITOR ( ), SO_2 MONITOR ( ), NO_X MONITOR ( ), OTHER, SPECIFY IN COMMENTS ( )

11. COMMENTS:

Emission factors for NOx, CO, VOC and ammonia are based on vendor data and emission guarantees. Emission factor for particulate is based AP-42. Emission factors for HAP emissions are based on AP-42. Emission factor for SO2 is based on gas analysis from Memphis Light, Gas & Water stating 1 grain sulfur / 100 scf.

The turbine will also be equipped with Solar's SoLoNOx technology followed by selective catalytic reduction (SCR) for controlling NOx and oxidation catalyst for CO and VOC emissions.

Maximum lb/hr rates for NOx, CO, VOC and HAP emissions are determined for startup and shutdown events. Typical startup or shutdown times for these units are 10 minutes each.
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SCHD RECEIPT DATE

EMISSION POINT DESCRIPTION

PLEASE TYPE OR PRINT AND SUBMIT IN DUPLICATE FOR EACH STACK OR EMISSION POINT. ATTACH TO THE PERMIT APPLICATION

1. ORGANIZATION LEGAL NAME: CTC Property LLC			**SCHD-APC FACILITY ID.:**	
2. EMISSION SOURCE NUMBER: EU-10	FLOW DIAGRAM POINT NUMBER: EU-10		**SCHD-APC PERMIT ID.:**	
3. SOURCE LOCATION	LATITUDE	LONGITUDE	UTM VERTICAL: 759,311	UTM HORIZONTAL: 3,883,074
4. BRIEF EMISSION POINT DESCRIPTION (ATTACH A SKETCH IF APPROPRIATE): Solar SMT-130 Turbine with SCR				DISTANCE TO NEAREST PROPERTY LINE (FT): 50

COMPLET LINES 5 AND 6 IF DIFFERENT FROM THAT ON THE PROCESS OR FUEL BURNING SOURCE DESCRIPTION (APC-2-02)

5. NORMAL OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
6. MAXIMUM OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
7. PERCENT ANNUAL THROUGH PUT	DEC.-FEB.: 25	MAR.-MAY: 25	JUNE-AUG.: 25	SEPT.-NOV.: 25

8. STACK OR EMISSION POINT DATA	HEIGHT ABOVE GRADE(FT): 35.0	DIAMETER (FT): 9.0	TEMPERATURE (°F): 850.0	% OF TIME OVER 125°F: 100	DIRECTION OF EXIT (UP, DOWN, OR HORIZ): UP
DATA AT EXIT CONDITIONS	FLOW (ACTUAL FT^3/MIN): 514,152	VELOCITY (FT/SEC): 73.3	MOISTURE ($GRAINS/FT^3$): ambient		MOISTURE (PERCENT)
DATA AT STANDARD CONDITIONS	FLOW (DRY STANDARD CUBIC FEET PER MINUTE): 99,107				

9. AIR CONTAMINANTS	AVERAGE (LBS/HR)	MAXIMUM (LBS/HR)	CONCENTRATION	AVERAGE (TONS/YR)	MAXIMUM (TONS/YR)	EMISSION ESTIMATION METHOD*	CONTROL DEVICES*	CONTROL EFFICIENCY (%)
PARTICULATES	1.11	1.11	**	4.86	4.86	3		
SULFUR DIOXIDE	0.45	0.45	***	1.97	1.97	2		
CARBON MONOXIDE	1.01	507.00	PPM 2.5	4.41	4.41	6	999	
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FLUORIDES								
OTHER (SPECIFY) ammonia	1.16	1.16	5.0 ppm	5.10	5.10	6		
OTHER (SPECIFY) total HAP	0.18	40.09		0.77	0.77	3		

* REFER TO THE BACK OF THE PERMIT APPLICATION FORM FOR ESTIMATION METHOD AND CONTROL DEVICE CODES.

** EXIT GAS PARTICULATE CONCENTRATION UNITS: PROCESS – GRAINS PER DRY STANDARD FT^3 (70°F); WOOD FIRED BOILERS – GRAINS PER DRY STANDARD FT^3 (70°F); ALL OTHER BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

*** EXIT GAS SULFUR DIOXIDE CONCENTRATION UNITS: PROCESS – PPM BY VOLUME, DRY BASIS; BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

(OVER)

10. CHECK TYPES OF MONITORING AND RECORDING INSTRUMENTS THAT ARE ATTACHED:

OPACITY MONITOR ( ), SO_2 MONITOR ( ), NO_X MONITOR ( ), OTHER, SPECIFY IN COMMENTS ( )

11. COMMENTS:

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SCHD RECEIPT DATE

EMISSION POINT DESCRIPTION

PLEASE TYPE OR PRINT AND SUBMIT IN DUPLICATE FOR EACH STACK OR EMISSION POINT. ATTACH TO THE PERMIT APPLICATION

1. ORGANIZATION LEGAL NAME: CTC Property LLC			**SCHD-APC FACILITY ID.:**	
2. EMISSION SOURCE NUMBER: EU-11	FLOW DIAGRAM POINT NUMBER: EU-11		**SCHD-APC PERMIT ID.:**	
3. SOURCE LOCATION	LATITUDE	LONGITUDE	UTM VERTICAL 759,315	UTM HORIZONTAL 3,883073
4. BRIEF EMISSION POINT DESCRIPTION (ATTACH A SKETCH IF APPROPRIATE): Solar SMT-130 Turbine with SCR				DISTANCE TO NEAREST PROPERTY LINE (FT): 50

COMPLET LINES 5 AND 6 IF DIFFERENT FROM THAT ON THE PROCESS OR FUEL BURNING SOURCE DESCRIPTION (APC-2-02)

5. NORMAL OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
6. MAXIMUM OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
7. PERCENT ANNUAL THROUGH PUT	DEC.-FEB.: 25	MAR.-MAY: 25	JUNE-AUG.: 25	SEPT.-NOV.: 25

8. STACK OR EMISSION POINT DATA	HEIGHT ABOVE GRADE(FT): 35.0	DIAMETER (FT) 9.0	TEMPERATURE (°F) 850.0	% OF TIME OVER 125°F: 100	DIRECTION OF EXIT (UP, DOWN, OR HORIZ): UP
DATA AT EXIT CONDITIONS	FLOW (ACTUAL FT^3/MIN): 514,152	VELOCITY (FT/SEC): 73.3	MOISTURE ($GRAINS/FT^3$) ambient	MOISTURE (PERCENT)	
DATA AT STANDARD CONDITIONS	FLOW (DRY STANDARD CUBIC FEET PER MINUTE): 99,107				

9. AIR CONTAMINANTS	AVERAGE (LBS/HR)	MAXIMUM (LBS/HR)	CONCENTRATION	AVERAGE (TONS/YR)	MAXIMUM (TONS/YR)	EMISSION ESTIMATION METHOD*	CONTROL DEVICES*	CONTROL EFFICIENCY (%)
PARTICULATES	1.11	1.11	**	4.86	4.86	3		
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FLUORIDES								
OTHER (SPECIFY) ammonia	1.16	1.16	5.0 ppm	5.10	5.10	6		
OTHER (SPECIFY) total HAP	0.18	40.09		0.77	0.77	3		

* REFER TO THE BACK OF THE PERMIT APPLICATION FORM FOR ESTIMATION METHOD AND CONTROL DEVICE CODES.

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*** EXIT GAS SULFUR DIOXIDE CONCENTRATION UNITS: PROCESS – PPM BY VOLUME, DRY BASIS; BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

(OVER)

10. CHECK TYPES OF MONITORING AND RECORDING INSTRUMENTS THAT ARE ATTACHED:

OPACITY MONITOR ( ), SO_2 MONITOR ( ), NO_X MONITOR ( ), OTHER, SPECIFY IN COMMENTS ( )

11. COMMENTS:

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1. ORGANIZATION LEGAL NAME: CTC Property LLC			**SCHD-APC FACILITY ID.:**	
2. EMISSION SOURCE NUMBER: EU-12	FLOW DIAGRAM POINT NUMBER: EU-12		**SCHD-APC PERMIT ID.:**	
3. SOURCE LOCATION	LATITUDE	LONGITUDE	UTM VERTICAL: 759,318	UTM HORIZONTAL: 3,883,072
4. BRIEF EMISSION POINT DESCRIPTION (ATTACH A SKETCH IF APPROPRIATE): Solar SMT-130 Turbine with SCR				DISTANCE TO NEAREST PROPERTY LINE (FT): 50

COMPLET LINES 5 AND 6 IF DIFFERENT FROM THAT ON THE PROCESS OR FUEL BURNING SOURCE DESCRIPTION (APC-2-02)

5. NORMAL OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
6. MAXIMUM OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
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9. AIR CONTAMINANTS	AVERAGE (LBS/HR)	MAXIMUM (LBS/HR)	CONCENTRATION	AVERAGE (TONS/YR)	MAXIMUM (TONS/YR)	EMISSION ESTIMATION METHOD*	CONTROL DEVICES*	CONTROL EFFICIENCY (%)
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OTHER (SPECIFY) total HAP	0.18	40.09		0.77	0.77	3		

* REFER TO THE BACK OF THE PERMIT APPLICATION FORM FOR ESTIMATION METHOD AND CONTROL DEVICE CODES.

** EXIT GAS PARTICULATE CONCENTRATION UNITS: PROCESS – GRAINS PER DRY STANDARD FT^3 (70°F); WOOD FIRED BOILERS – GRAINS PER DRY STANDARD FT^3 (70°F); ALL OTHER BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

*** EXIT GAS SULFUR DIOXIDE CONCENTRATION UNITS: PROCESS – PPM BY VOLUME, DRY BASIS; BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

(OVER)

10. CHECK TYPES OF MONITORING AND RECORDING INSTRUMENTS THAT ARE ATTACHED:

OPACITY MONITOR ( ), SO_2 MONITOR ( ), NO_X MONITOR ( ), OTHER, SPECIFY IN COMMENTS ( )

11. COMMENTS:

Emission factors for NOx, CO, VOC and ammonia are based on vendor data and emission guarantees. Emission factor for particulate is based AP-42. Emission factors for HAP emissions are based on AP-42. Emission factor for SO2 is based on gas analysis from Memphis Light, Gas & Water stating 1 grain sulfur / 100 scf.

The turbine will also be equipped with Solar's SoLoNOx technology followed by selective catalytic reduction (SCR) for controlling NOx and oxidation catalyst for CO and VOC emissions.

Maximum lb/hr rates for NOx, CO, VOC and HAP emissions are determined for startup and shutdown events. Typical startup or shutdown times for these units are 10 minutes each.
Speciated HAP emissions are included in emissions calculations section of the application.

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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 Sycamore Road
Memphis, TN 38134
Telephone: (901) 222-9942
FAX: (901) 222-9550
NOT TO BE USED FOR TITLE V APPLICATIONS

SCHD RECEIPT DATE

EMISSION POINT DESCRIPTION

PLEASE TYPE OR PRINT AND SUBMIT IN DUPLICATE FOR EACH STACK OR EMISSION POINT. ATTACH TO THE PERMIT APPLICATION

1. ORGANIZATION LEGAL NAME: CTC Property LLC			**SCHD-APC FACILITY ID.:**	
2. EMISSION SOURCE NUMBER: EU-13	FLOW DIAGRAM POINT NUMBER: EU-13		**SCHD-APC PERMIT ID.:**	
3. SOURCE LOCATION	LATITUDE	LONGITUDE	UTM VERTICAL 759,322	UTM HORIZONTAL 3,883,071
4. BRIEF EMISSION POINT DESCRIPTION (ATTACH A SKETCH IF APPROPRIATE): Solar SMT-130 Turbine with SCR				DISTANCE TO NEAREST PROPERTY LINE (FT): 50

COMPLET LINES 5 AND 6 IF DIFFERENT FROM THAT ON THE PROCESS OR FUEL BURNING SOURCE DESCRIPTION (APC-2-02)

5. NORMAL OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
6. MAXIMUM OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
7. PERCENT ANNUAL THROUGH PUT	DEC.-FEB.: 25	MAR.-MAY: 25	JUNE-AUG.: 25	SEPT.-NOV.: 25

8. STACK OR EMISSION POINT DATA	HEIGHT ABOVE GRADE(FT): 35.0	DIAMETER (FT) 9.0	TEMPERATURE (°F) 850.0	% OF TIME OVER 125°F: 100	DIRECTION OF EXIT (UP, DOWN, OR HORIZ): UP
DATA AT EXIT CONDITIONS	FLOW (ACTUAL FT^3/MIN): 514,152	VELOCITY (FT/SEC): 73.3	MOISTURE ($GRAINS/FT^3$) ambient	MOISTURE (PERCENT)	
DATA AT STANDARD CONDITIONS	FLOW (DRY STANDARD CUBIC FEET PER MINUTE): 99,107				

9. AIR CONTAMINANTS	AVERAGE (LBS/HR)	MAXIMUM (LBS/HR)	CONCENTRATION	AVERAGE (TONS/YR)	MAXIMUM (TONS/YR)	EMISSION ESTIMATION METHOD*	CONTROL DEVICES*	CONTROL EFFICIENCY (%)
PARTICULATES	1.11	1.11	**	4.86	4.86	3		
SULFUR DIOXIDE	0.45	0.45	***	1.97	1.97	2		
CARBON MONOXIDE	1.01	507.00	PPM 2.5	4.41	4.41	6	999	
ORGANIC COMPOUNDS	1.27	29.00	PPM 2.0	5.55	5.55	6	999	
NITROGEN OXIDES	1.32	5.63	PPM 2.0	5.79	5.79	6	999	
FLUORIDES								
OTHER (SPECIFY) ammonia	1.16	1.16	5.0 ppm	5.10	5.10	6		
OTHER (SPECIFY) total HAP	0.18	40.09		0.77	0.77	3		

* REFER TO THE BACK OF THE PERMIT APPLICATION FORM FOR ESTIMATION METHOD AND CONTROL DEVICE CODES.

** EXIT GAS PARTICULATE CONCENTRATION UNITS: PROCESS – GRAINS PER DRY STANDARD FT^3 (70°F); WOOD FIRED BOILERS – GRAINS PER DRY STANDARD FT^3 (70°F); ALL OTHER BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

*** EXIT GAS SULFUR DIOXIDE CONCENTRATION UNITS: PROCESS – PPM BY VOLUME, DRY BASIS; BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

(OVER)

10. CHECK TYPES OF MONITORING AND RECORDING INSTRUMENTS THAT ARE ATTACHED:

OPACITY MONITOR ( ), SO_2 MONITOR ( ), NO_X MONITOR ( ), OTHER, SPECIFY IN COMMENTS ( )

11. COMMENTS:

Emission factors for NOx, CO, VOC and ammonia are based on vendor data and emission guarantees. Emission factor for particulate is based AP-42. Emission factors for HAP emissions are based on AP-42. Emission factor for SO2 is based on gas analysis from Memphis Light, Gas & Water stating 1 grain sulfur / 100 scf.

The turbine will also be equipped with Solar's SoLoNOx technology followed by selective catalytic reduction (SCR) for controlling NOx and oxidation catalyst for CO and VOC emissions.

Maximum lb/hr rates for NOx, CO, VOC and HAP emissions are determined for startup and shutdown events. Typical startup or shutdown times for these units are 10 minutes each.
Speciated HAP emissions are included in emissions calculations section of the application.

2012
APC-2-03

SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 Sycamore Road
Memphis, TN 38134
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FAX: (901) 222-9550
NOT TO BE USED FOR TITLE V APPLICATIONS

SCHD RECEIPT DATE

EMISSION POINT DESCRIPTION

PLEASE TYPE OR PRINT AND SUBMIT IN DUPLICATE FOR EACH STACK OR EMISSION POINT. ATTACH TO THE PERMIT APPLICATION

1. ORGANIZATION LEGAL NAME: CTC Property LLC			**SCHD-APC FACILITY ID.:**	
2. EMISSION SOURCE NUMBER: EU-14	FLOW DIAGRAM POINT NUMBER: EU-14		**SCHD-APC PERMIT ID.:**	
3. SOURCE LOCATION	LATITUDE	LONGITUDE	UTM VERTICAL: 759,326	UTM HORIZONTAL: 3,883,070
4. BRIEF EMISSION POINT DESCRIPTION (ATTACH A SKETCH IF APPROPRIATE): Solar SMT-130 Turbine with SCR				DISTANCE TO NEAREST PROPERTY LINE (FT): 50

COMPLET LINES 5 AND 6 IF DIFFERENT FROM THAT ON THE PROCESS OR FUEL BURNING SOURCE DESCRIPTION (APC-2-02)

5. NORMAL OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
6. MAXIMUM OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
7. PERCENT ANNUAL THROUGH PUT	DEC.-FEB.: 25	MAR.-MAY: 25	JUNE-AUG.: 25	SEPT.-NOV.: 25

8. STACK OR EMISSION POINT DATA	HEIGHT ABOVE GRADE(FT): 35.0	DIAMETER (FT): 9.0	TEMPERATURE (°F): 850.0	% OF TIME OVER 125°F: 100	DIRECTION OF EXIT (UP, DOWN, OR HORIZ): UP
DATA AT EXIT CONDITIONS	FLOW (ACTUAL FT^3/MIN): 514,152	VELOCITY (FT/SEC): 73.3	MOISTURE ($GRAINS/FT^3$): ambient		MOISTURE (PERCENT)
DATA AT STANDARD CONDITIONS	FLOW (DRY STANDARD CUBIC FEET PER MINUTE): 99,107				

9. AIR CONTAMINANTS	AVERAGE (LBS/HR)	MAXIMUM (LBS/HR)	CONCENTRATION	AVERAGE (TONS/YR)	MAXIMUM (TONS/YR)	EMISSION ESTIMATION METHOD*	CONTROL DEVICES*	CONTROL EFFICIENCY (%)
PARTICULATES	1.11	1.11	**	4.86	4.86	3		
SULFUR DIOXIDE	0.45	0.45	***	1.97	1.97	2		
CARBON MONOXIDE	1.01	507.00	PPM 2.5	4.41	4.41	6	999	
ORGANIC COMPOUNDS	1.27	29.00	PPM 2.0	5.55	5.55	6	999	
NITROGEN OXIDES	1.32	5.63	PPM 2.0	5.79	5.79	6	999	
FLUORIDES								
OTHER (SPECIFY) ammonia	1.16	1.16	5.0 ppm	5.10	5.10	6		
OTHER (SPECIFY) total HAP	0.18	40.09		0.77	0.77	3		

* REFER TO THE BACK OF THE PERMIT APPLICATION FORM FOR ESTIMATION METHOD AND CONTROL DEVICE CODES.

** EXIT GAS PARTICULATE CONCENTRATION UNITS: PROCESS – GRAINS PER DRY STANDARD FT^3 (70°F); WOOD FIRED BOILERS – GRAINS PER DRY STANDARD FT^3 (70°F); ALL OTHER BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

*** EXIT GAS SULFUR DIOXIDE CONCENTRATION UNITS: PROCESS – PPM BY VOLUME, DRY BASIS; BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

(OVER)

10. CHECK TYPES OF MONITORING AND RECORDING INSTRUMENTS THAT ARE ATTACHED:

OPACITY MONITOR ( ), SO_2 MONITOR ( ), NO_X MONITOR ( ), OTHER, SPECIFY IN COMMENTS ( )

11. COMMENTS:

Emission factors for NOx, CO, VOC and ammonia are based on vendor data and emission guarantees. Emission factor for particulate is based AP-42. Emission factors for HAP emissions are based on AP-42. Emission factor for SO2 is based on gas analysis from Memphis Light, Gas & Water stating 1 grain sulfur / 100 scf.

The turbine will also be equipped with Solar's SoLoNOx technology followed by selective catalytic reduction (SCR) for controlling NOx and oxidation catalyst for CO and VOC emissions.

Maximum lb/hr rates for NOx, CO, VOC and HAP emissions are determined for startup and shutdown events. Typical startup or shutdown times for these units are 10 minutes each.

Speciated HAP emissions are included in emissions calculations section of the application.

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POLLUTION CONTROL SECTION
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FAX: (901) 222-9550
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SCHD RECEIPT DATE

EMISSION POINT DESCRIPTION

PLEASE TYPE OR PRINT AND SUBMIT IN DUPLICATE FOR EACH STACK OR EMISSION POINT. ATTACH TO THE PERMIT APPLICATION

1. ORGANIZATION LEGAL NAME: CTC Property LLC			**SCHD-APC FACILITY ID.:**	
2. EMISSION SOURCE NUMBER: EU-15	FLOW DIAGRAM POINT NUMBER: EU-15		**SCHD-APC PERMIT ID.:**	
3. SOURCE LOCATION	LATITUDE	LONGITUDE	UTM VERTICAL: 759,329	UTM HORIZONTAL: 3,883,069
4. BRIEF EMISSION POINT DESCRIPTION (ATTACH A SKETCH IF APPROPRIATE): Solar SMT-130 Turbine with SCR				DISTANCE TO NEAREST PROPERTY LINE (FT): 50

COMPLET LINES 5 AND 6 IF DIFFERENT FROM THAT ON THE PROCESS OR FUEL BURNING SOURCE DESCRIPTION (APC-2-02)

5. NORMAL OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
6. MAXIMUM OPERATION	HOURS/DAY: 24	DAYS/WEEK: 7	WEEKS/YEAR: 52	DAYS/YEAR: 365
7. PERCENT ANNUAL THROUGH PUT	DEC.-FEB.: 25	MAR.-MAY: 25	JUNE-AUG.: 25	SEPT.-NOV.: 25

8. STACK OR EMISSION POINT DATA	HEIGHT ABOVE GRADE(FT): 35.0	DIAMETER (FT): 9.0	TEMPERATURE (°F): 850.0	% OF TIME OVER 125°F: 100	DIRECTION OF EXIT (UP, DOWN, OR HORIZ): UP
DATA AT EXIT CONDITIONS	FLOW (ACTUAL FT^3/MIN): 514,152	VELOCITY (FT/SEC): 73.3	MOISTURE ($GRAINS/FT^3$): ambient		MOISTURE (PERCENT)
DATA AT STANDARD CONDITIONS	FLOW (DRY STANDARD CUBIC FEET PER MINUTE): 99,107				

9. AIR CONTAMINANTS	AVERAGE (LBS/HR)	MAXIMUM (LBS/HR)	CONCENTRATION	AVERAGE (TONS/YR)	MAXIMUM (TONS/YR)	EMISSION ESTIMATION METHOD*	CONTROL DEVICES*	CONTROL EFFICIENCY (%)
PARTICULATES	1.11	1.11	**	4.86	4.86	3		
SULFUR DIOXIDE	0.45	0.45	***	1.97	1.97	2		
CARBON MONOXIDE	1.01	507.00	PPM 2.5	4.41	4.41	6	999	
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NITROGEN OXIDES	1.32	5.63	PPM 2.0	5.79	5.79	6	999	
FLUORIDES								
OTHER (SPECIFY) ammonia	1.16	1.16	5.0 ppm	5.10	5.10	6		
OTHER (SPECIFY) total HAP	0.18	40.09		0.77	0.77	3		

* REFER TO THE BACK OF THE PERMIT APPLICATION FORM FOR ESTIMATION METHOD AND CONTROL DEVICE CODES.

** EXIT GAS PARTICULATE CONCENTRATION UNITS: PROCESS – GRAINS PER DRY STANDARD FT^3 (70°F); WOOD FIRED BOILERS – GRAINS PER DRY STANDARD FT^3 (70°F); ALL OTHER BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

*** EXIT GAS SULFUR DIOXIDE CONCENTRATION UNITS: PROCESS – PPM BY VOLUME, DRY BASIS; BOILERS – POUNDS PER MILLION BTU HEAT INPUT.

(OVER)

10. CHECK TYPES OF MONITORING AND RECORDING INSTRUMENTS THAT ARE ATTACHED:

OPACITY MONITOR ( ), SO_2 MONITOR ( ), NO_X MONITOR ( ), OTHER, SPECIFY IN COMMENTS ( )

11. COMMENTS:

Emission factors for NOx, CO, VOC and ammonia are based on vendor data and emission guarantees. Emission factor for particulate is based AP-42. Emission factors for HAP emissions are based on AP-42. Emission factor for SO2 is based on gas analysis from Memphis Light, Gas & Water stating 1 grain sulfur / 100 scf.

The turbine will also be equipped with Solar's SoLoNOx technology followed by selective catalytic reduction (SCR) for controlling NOx and oxidation catalyst for CO and VOC emissions.

Maximum lb/hr rates for NOx, CO, VOC and HAP emissions are determined for startup and shutdown events. Typical startup or shutdown times for these units are 10 minutes each.
Speciated HAP emissions are included in emissions calculations section of the application.

SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
CONTROL EQUIPMENT - MISCELLANEOUS

1. FACILITY NAME:	2. EMISSION SOURCE (IDENTIFY):
CTC Property LLC	SMT-130 Turbine with SoLoNOx and SCR

3. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
EU01

4. DESCRIBE THE DEVICE IN USE. LIST THE KEY OPERATING PARAMETERS OF THIS DEVICE AND THEIR NORMAL OPERATING RANGE (e.g., PRESSURE DROP, GAS FLOW RATE, TEMPERATURE):

CTC will utilize a multi-emission catalyst which simultaneously reduces NOx and oxidizes CO, VOCs and THCs while minimizing NH3 slip within one catalyst layer. Specifically designed for use with combustion turbines and internal combustion engines, this catalyst provides enhanced operational efficiency and can simultaneously achieve high NOx removal and high oxidation rates over a wide temperature range.

The typical operating range of the catalyst is 350F to 900F. Full efficiency is between 800F and 850F.

5. MANUFACTURER AND MODEL NUMBER (IF AVAILABLE):
Braden

6. YEAR OF INSTALLATION:
2025

7. LIST OF POLLUTANT (S) TO BE CONTROLLED BY THIS EQUIPMENT AND THE EXPECTED CONTROL EFFICIENCY FOR EACH POLLUTANT.

POLLUTANT	EFFICIENCY (%)	SOURCE OF DATA
NOx	2.0 ppm	Braden Americas Inc.
CO	2.5 ppm	Braden Americas Inc.
VOC	2.0 ppm	Braden Americas Inc.

8. DISCUSS HOW COLLECTED MATERIAL IS HANDLED FOR REUSE OR DISPOSAL.

Catalyst is designed for 43,800 operating hours not to exceed 60 months of operations and is regenerated/recycled by a third party.

9. IF THIS CONTROL EQUIPMENT IS IN SERIES WITH SOME OTHER CONTROL EQUIPMENT, STATE AND SPECIFY THE OVERALL EFFICIENCY.

The Braden SCR follows the built-in Solar SoLoNOx control technology on the SMT-130

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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
CONTROL EQUIPMENT - MISCELLANEOUS

1. FACILITY NAME:	2. EMISSION SOURCE (IDENTIFY):
CTC Property LLC	SMT-130 Turbine with SoLoNOx and SCR

3. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
EU02

4. DESCRIBE THE DEVICE IN USE. LIST THE KEY OPERATING PARAMETERS OF THIS DEVICE AND THEIR NORMAL OPERATING RANGE (e.g., PRESSURE DROP, GAS FLOW RATE, TEMPERATURE):

CTC will utilize a multi-emission catalyst which simultaneously reduces NOx and oxidizes CO, VOCs and THCs while minimizing NH3 slip within one catalyst layer. Specifically designed for use with combustion turbines and internal combustion engines, this catalyst provides enhanced operational efficiency and can simultaneously achieve high NOx removal and high oxidation rates over a wide temperature range.

The typical operating range of the catalyst is 350F to 900F. Full efficiency is between 800F and 850F.

5. MANUFACTURER AND MODEL NUMBER (IF AVAILABLE):
Braden

6. YEAR OF INSTALLATION:
2025

7. LIST OF POLLUTANT (S) TO BE CONTROLLED BY THIS EQUIPMENT AND THE EXPECTED CONTROL EFFICIENCY FOR EACH POLLUTANT.

POLLUTANT	EFFICIENCY (%)	SOURCE OF DATA
NOx	2.0 ppm	Braden Americas Inc.
CO	2.5 ppm	Braden Americas Inc.
VOC	2.0 ppm	Braden Americas Inc.

8. DISCUSS HOW COLLECTED MATERIAL IS HANDLED FOR REUSE OR DISPOSAL.

Catalyst is designed for 43,800 operating hours not to exceed 60 months of operations and is regenerated/recycled by a third party.

9. IF THIS CONTROL EQUIPMENT IS IN SERIES WITH SOME OTHER CONTROL EQUIPMENT, STATE AND SPECIFY THE OVERALL EFFICIENCY.

The Braden SCR follows the built-in Solar SoLoNOx control technology on the SMT-130

10. PAGE NUMBER:	REVISION NUMBER:	DATE OF REVISION:
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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
CONTROL EQUIPMENT - MISCELLANEOUS

1. FACILITY NAME:	2. EMISSION SOURCE (IDENTIFY):
CTC Property LLC	SMT-130 Turbine with SoLoNOx and SCR

3. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
EU03

4. DESCRIBE THE DEVICE IN USE. LIST THE KEY OPERATING PARAMETERS OF THIS DEVICE AND THEIR NORMAL OPERATING RANGE (e.g., PRESSURE DROP, GAS FLOW RATE, TEMPERATURE):

CTC will utilize a multi-emission catalyst which simultaneously reduces NOx and oxidizes CO, VOCs and THCs while minimizing NH3 slip within one catalyst layer. Specifically designed for use with combustion turbines and internal combustion engines, this catalyst provides enhanced operational efficiency and can simultaneously achieve high NOx removal and high oxidation rates over a wide temperature range.

The typical operating range of the catalyst is 350F to 900F. Full efficiency is between 800F and 850F.

5. MANUFACTURER AND MODEL NUMBER (IF AVAILABLE):
Braden

6. YEAR OF INSTALLATION:
2025

7. LIST OF POLLUTANT (S) TO BE CONTROLLED BY THIS EQUIPMENT AND THE EXPECTED CONTROL EFFICIENCY FOR EACH POLLUTANT.

POLLUTANT	EFFICIENCY (%)	SOURCE OF DATA
NOx	2.0 ppm	Braden Americas Inc.
CO	2.5 ppm	Braden Americas Inc.
VOC	2.0 ppm	Braden Americas Inc.

8. DISCUSS HOW COLLECTED MATERIAL IS HANDLED FOR REUSE OR DISPOSAL.

Catalyst is designed for 43,800 operating hours not to exceed 60 months of operations and is regenerated/recycled by a third party.

9. IF THIS CONTROL EQUIPMENT IS IN SERIES WITH SOME OTHER CONTROL EQUIPMENT, STATE AND SPECIFY THE OVERALL EFFICIENCY.

The Braden SCR follows the built-in Solar SoLoNOx control technology on the SMT-130

10. PAGE NUMBER:	REVISION NUMBER:	DATE OF REVISION:
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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
CONTROL EQUIPMENT - MISCELLANEOUS

1. FACILITY NAME:	2. EMISSION SOURCE (IDENTIFY):
CTC Property LLC	SMT-130 Turbine with SoLoNOx and SCR

3. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
EU04

4. DESCRIBE THE DEVICE IN USE. LIST THE KEY OPERATING PARAMETERS OF THIS DEVICE AND THEIR NORMAL OPERATING RANGE (e.g., PRESSURE DROP, GAS FLOW RATE, TEMPERATURE):

CTC will utilize a multi-emission catalyst which simultaneously reduces NOx and oxidizes CO, VOCs and THCs while minimizing NH3 slip within one catalyst layer. Specifically designed for use with combustion turbines and internal combustion engines, this catalyst provides enhanced operational efficiency and can simultaneously achieve high NOx removal and high oxidation rates over a wide temperature range.

The typical operating range of the catalyst is 350F to 900F. Full efficiency is between 800F and 850F.

5. MANUFACTURER AND MODEL NUMBER (IF AVAILABLE):
Braden

6. YEAR OF INSTALLATION:
2025

7. LIST OF POLLUTANT (S) TO BE CONTROLLED BY THIS EQUIPMENT AND THE EXPECTED CONTROL EFFICIENCY FOR EACH POLLUTANT.

POLLUTANT	EFFICIENCY (%)	SOURCE OF DATA
NOx	2.0 ppm	Braden Americas Inc.
CO	2.5 ppm	Braden Americas Inc.
VOC	2.0 ppm	Braden Americas Inc.

8. DISCUSS HOW COLLECTED MATERIAL IS HANDLED FOR REUSE OR DISPOSAL.

Catalyst is designed for 43,800 operating hours not to exceed 60 months of operations and is regenerated/recycled by a third party.

9. IF THIS CONTROL EQUIPMENT IS IN SERIES WITH SOME OTHER CONTROL EQUIPMENT, STATE AND SPECIFY THE OVERALL EFFICIENCY.

The Braden SCR follows the built-in Solar SoLoNOx control technology on the SMT-130

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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
CONTROL EQUIPMENT - MISCELLANEOUS

1. FACILITY NAME:	2. EMISSION SOURCE (IDENTIFY):
CTC Property LLC	SMT-130 Turbine with SoLoNOx and SCR

3. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
EU05

4. DESCRIBE THE DEVICE IN USE. LIST THE KEY OPERATING PARAMETERS OF THIS DEVICE AND THEIR NORMAL OPERATING RANGE (e.g., PRESSURE DROP, GAS FLOW RATE, TEMPERATURE):

CTC will utilize a multi-emission catalyst which simultaneously reduces NOx and oxidizes CO, VOCs and THCs while minimizing NH3 slip within one catalyst layer. Specifically designed for use with combustion turbines and internal combustion engines, this catalyst provides enhanced operational efficiency and can simultaneously achieve high NOx removal and high oxidation rates over a wide temperature range.

The typical operating range of the catalyst is 350F to 900F. Full efficiency is between 800F and 850F.

5. MANUFACTURER AND MODEL NUMBER (IF AVAILABLE):
Braden

6. YEAR OF INSTALLATION:
2025

7. LIST OF POLLUTANT (S) TO BE CONTROLLED BY THIS EQUIPMENT AND THE EXPECTED CONTROL EFFICIENCY FOR EACH POLLUTANT.

POLLUTANT	EFFICIENCY (%)	SOURCE OF DATA
NOx	2.0 ppm	Braden Americas Inc.
CO	2.5 ppm	Braden Americas Inc.
VOC	2.0 ppm	Braden Americas Inc.

8. DISCUSS HOW COLLECTED MATERIAL IS HANDLED FOR REUSE OR DISPOSAL.

Catalyst is designed for 43,800 operating hours not to exceed 60 months of operations and is regenerated/recycled by a third party.

9. IF THIS CONTROL EQUIPMENT IS IN SERIES WITH SOME OTHER CONTROL EQUIPMENT, STATE AND SPECIFY THE OVERALL EFFICIENCY.

The Braden SCR follows the built-in Solar SoLoNOx control technology on the SMT-130

10. PAGE NUMBER:	REVISION NUMBER:	DATE OF REVISION:
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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
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Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
CONTROL EQUIPMENT - MISCELLANEOUS

1. FACILITY NAME:	2. EMISSION SOURCE (IDENTIFY):
CTC Property LLC	SMT-130 Turbine with SoLoNOx and SCR

3. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
EU06

4. DESCRIBE THE DEVICE IN USE. LIST THE KEY OPERATING PARAMETERS OF THIS DEVICE AND THEIR NORMAL OPERATING RANGE (e.g., PRESSURE DROP, GAS FLOW RATE, TEMPERATURE):

CTC will utilize a multi-emission catalyst which simultaneously reduces NOx and oxidizes CO, VOCs and THCs while minimizing NH3 slip within one catalyst layer. Specifically designed for use with combustion turbines and internal combustion engines, this catalyst provides enhanced operational efficiency and can simultaneously achieve high NOx removal and high oxidation rates over a wide temperature range.

The typical operating range of the catalyst is 350F to 900F. Full efficiency is between 800F and 850F.

5. MANUFACTURER AND MODEL NUMBER (IF AVAILABLE):
Braden

6. YEAR OF INSTALLATION:
2025

7. LIST OF POLLUTANT (S) TO BE CONTROLLED BY THIS EQUIPMENT AND THE EXPECTED CONTROL EFFICIENCY FOR EACH POLLUTANT.

POLLUTANT	EFFICIENCY (%)	SOURCE OF DATA
NOx	2.0 ppm	Braden Americas Inc.
CO	2.5 ppm	Braden Americas Inc.
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8. DISCUSS HOW COLLECTED MATERIAL IS HANDLED FOR REUSE OR DISPOSAL.

Catalyst is designed for 43,800 operating hours not to exceed 60 months of operations and is regenerated/recycled by a third party.

9. IF THIS CONTROL EQUIPMENT IS IN SERIES WITH SOME OTHER CONTROL EQUIPMENT, STATE AND SPECIFY THE OVERALL EFFICIENCY.

The Braden SCR follows the built-in Solar SoLoNOx control technology on the SMT-130

10. PAGE NUMBER:	REVISION NUMBER:	DATE OF REVISION:
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SHELBY COUNTY HEALTH DEPARTMENT
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Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
CONTROL EQUIPMENT - MISCELLANEOUS

1. FACILITY NAME:	2. EMISSION SOURCE (IDENTIFY):
CTC Property LLC	SMT-130 Turbine with SoLoNOx and SCR

3. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
EU07

4. DESCRIBE THE DEVICE IN USE. LIST THE KEY OPERATING PARAMETERS OF THIS DEVICE AND THEIR NORMAL OPERATING RANGE (e.g., PRESSURE DROP, GAS FLOW RATE, TEMPERATURE):

CTC will utilize a multi-emission catalyst which simultaneously reduces NOx and oxidizes CO, VOCs and THCs while minimizing NH3 slip within one catalyst layer. Specifically designed for use with combustion turbines and internal combustion engines, this catalyst provides enhanced operational efficiency and can simultaneously achieve high NOx removal and high oxidation rates over a wide temperature range.

The typical operating range of the catalyst is 350F to 900F. Full efficiency is between 800F and 850F.

5. MANUFACTURER AND MODEL NUMBER (IF AVAILABLE):
Braden

6. YEAR OF INSTALLATION:
2025

7. LIST OF POLLUTANT (S) TO BE CONTROLLED BY THIS EQUIPMENT AND THE EXPECTED CONTROL EFFICIENCY FOR EACH POLLUTANT.

POLLUTANT	EFFICIENCY (%)	SOURCE OF DATA
NOx	2.0 ppm	Braden Americas Inc.
CO	2.5 ppm	Braden Americas Inc.
VOC	2.0 ppm	Braden Americas Inc.

8. DISCUSS HOW COLLECTED MATERIAL IS HANDLED FOR REUSE OR DISPOSAL.

Catalyst is designed for 43,800 operating hours not to exceed 60 months of operations and is regenerated/recycled by a third party.

9. IF THIS CONTROL EQUIPMENT IS IN SERIES WITH SOME OTHER CONTROL EQUIPMENT, STATE AND SPECIFY THE OVERALL EFFICIENCY.

The Braden SCR follows the built-in Solar SoLoNOx control technology on the SMT-130

10. PAGE NUMBER:	REVISION NUMBER:	DATE OF REVISION:
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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
CONTROL EQUIPMENT - MISCELLANEOUS

1. FACILITY NAME:	2. EMISSION SOURCE (IDENTIFY):
CTC Property LLC	SMT-130 Turbine with SoLoNOx and SCR

3. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
EU08

4. DESCRIBE THE DEVICE IN USE. LIST THE KEY OPERATING PARAMETERS OF THIS DEVICE AND THEIR NORMAL OPERATING RANGE (e.g., PRESSURE DROP, GAS FLOW RATE, TEMPERATURE):

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5. MANUFACTURER AND MODEL NUMBER (IF AVAILABLE):
Braden

6. YEAR OF INSTALLATION:
2025

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Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
CONTROL EQUIPMENT - MISCELLANEOUS

1. FACILITY NAME:	2. EMISSION SOURCE (IDENTIFY):
CTC Property LLC	SMT-130 Turbine with SoLoNOx and SCR

3. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
EU09

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Braden

6. YEAR OF INSTALLATION:
2025

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MAJOR SOURCE OPERATING PERMIT APPLICATION
CONTROL EQUIPMENT - MISCELLANEOUS

1. FACILITY NAME:	2. EMISSION SOURCE (IDENTIFY):
CTC Property LLC	SMT-130 Turbine with SoLoNOx and SCR

3. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
EU10

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6. YEAR OF INSTALLATION:
2025

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Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
CONTROL EQUIPMENT - MISCELLANEOUS

1. FACILITY NAME:	2. EMISSION SOURCE (IDENTIFY):
CTC Property LLC	SMT-130 Turbine with SoLoNOx and SCR

3. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
EU11

4. DESCRIBE THE DEVICE IN USE. LIST THE KEY OPERATING PARAMETERS OF THIS DEVICE AND THEIR NORMAL OPERATING RANGE (e.g., PRESSURE DROP, GAS FLOW RATE, TEMPERATURE):

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Braden

6. YEAR OF INSTALLATION:
2025

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Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
CONTROL EQUIPMENT - MISCELLANEOUS

1. FACILITY NAME:	2. EMISSION SOURCE (IDENTIFY):
CTC Property LLC	SMT-130 Turbine with SoLoNOx and SCR

3. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
EU12

4. DESCRIBE THE DEVICE IN USE. LIST THE KEY OPERATING PARAMETERS OF THIS DEVICE AND THEIR NORMAL OPERATING RANGE (e.g., PRESSURE DROP, GAS FLOW RATE, TEMPERATURE):

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2025

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1826 SYCAMORE VIEW ROAD
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Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
CONTROL EQUIPMENT - MISCELLANEOUS

1. FACILITY NAME:	2. EMISSION SOURCE (IDENTIFY):
CTC Property LLC	SMT-130 Turbine with SoLoNOx and SCR

3. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
EU13

4. DESCRIBE THE DEVICE IN USE. LIST THE KEY OPERATING PARAMETERS OF THIS DEVICE AND THEIR NORMAL OPERATING RANGE (e.g., PRESSURE DROP, GAS FLOW RATE, TEMPERATURE):

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2025

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FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
CONTROL EQUIPMENT - MISCELLANEOUS

1. FACILITY NAME:	2. EMISSION SOURCE (IDENTIFY):
CTC Property LLC	SMT-130 Turbine with SoLoNOx and SCR

3. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
EU14

4. DESCRIBE THE DEVICE IN USE. LIST THE KEY OPERATING PARAMETERS OF THIS DEVICE AND THEIR NORMAL OPERATING RANGE (e.g., PRESSURE DROP, GAS FLOW RATE, TEMPERATURE):

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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
CONTROL EQUIPMENT - MISCELLANEOUS

1. FACILITY NAME:	2. EMISSION SOURCE (IDENTIFY):
CTC Property LLC	SMT-130 Turbine with SoLoNOx and SCR

3. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
EU15

4. DESCRIBE THE DEVICE IN USE. LIST THE KEY OPERATING PARAMETERS OF THIS DEVICE AND THEIR NORMAL OPERATING RANGE (e.g., PRESSURE DROP, GAS FLOW RATE, TEMPERATURE):

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6. YEAR OF INSTALLATION:
2025

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APPENDIX G. SUGGESTED PERMIT CONDITIONS

SHELBY COUNTY HEALTH DEPARTMENT

Public Health
PtfItet. Proaotw. ProtDerl.
SIlelbyCoamyllrallh

LEE HARRIS
MAYOR

MICHELLE A. TAYLOR, MD DRPH, MPA
HEALTH DIRECTOR & OFFICER

February 8, 2025

Mr. Brent Mayo
CTC Property LLC
3231 Paul R. Lowry Road
Memphis, Tennessee 38109

RE: PERMIT #00XXX-XXX

Dear Mr. Mayo:

Enclosed are your operating permit 00XXX-0XP and a permit application evaluation for the facility located at 3231 Paul R. Lowry Road in Memphis, Tennessee. This permit action includes the initial operating permit for fifteen (15) natural gas-fired turbines. Failure to operate the process according to the permit conditions contained therein may subject a permittee to penalties and/or enforcement action. The permit application evaluation explains many of the underlying decisions made during the permitting process.

If you have any questions, please contact me or Gregg Fortunato at (901) 222-9548 .

Sincerely,

Wasim Khokhar
Technical Manager
Pollution Control Section

WK:GF:JD

SECTION I: EMISSION LIMITS and OPERATIONAL RESTRICTIONS

1. This synthetic minor operating permit is issued for the operation of a data center, which consists of the following process equipment and associated emission control systems:

PROCESS EQUIPMENT DESCRIPTION	NUMBER OF UNITS	CAPACITY	EMISSION CONTROL SYSTEM	EMISSION POINT
Solar SMT-130 Natural Gas-Fired Turbines	EU01 through EU15 (15)	16.5 MW each	SCR with Oxidation Catalyst	15 Exhaust Stacks

2. The facility-wide maximum consecutive 12-month rolling emission rates at this facility shall not exceed the following:

Table #1

Pollutant (tons/12-months)					
HAP (Hazardous Air Pollutants)	**VOC** (Volatile Organic Compounds)	**NO_x** (Nitrogen Oxides)	**CO** (Carbon Monoxide)	**SO_2** (Sulfur Dioxide)	**PM/PM_{10}** (Particulate Matter)
11.51	84.82	87.14	93.96	29.58	72.95

3. Only pipeline quality natural gas shall be used as fuel for the combustion turbine (CT) units, with a sulfur content not to exceed 1 grain per 100 standard cubic feet.

4. Except during periods of startup, shutdown, malfunction and combustion tuning, the CTs shall not exceed the emission limits in Table #1 during simple cycle operation:

Table #2
Simple Cycle Emission Limits

POLLUTANT	EMISSION LIMIT
SO_2	1 grain of sulfur/100 scf
PM_{10}	0.006 lb/MMBtu
VOC	2.0 ppm at 15% O_2
CO	2.5 ppm at 15% O_2
NO_x	2 ppm at 15% O_2

5. For the purposes of compliance with Condition 3 of this section, periods of startup, shutdown and combustion tuning for each CT unit are defined below:
   a) A startup period means the period for each unit from fuel ignition until ten (10) minutes after achieving the final combustion system operational mode in the CT startup sequence and represents optimal CT emission performance. The facility will minimize emissions during startup by following the equipment manufacturer's specifications and/or good engineering practices to attain optimal operation as quickly as the design characteristics of the installed equipment will allow. For the purpose of characterizing emissions, no individual startup event shall exceed one (1) hour in duration.
   b) A shutdown period for a CT unit is defined as the period beginning when the unit leaves optimal operation and ending when the flame is extinguished in the turbine. A shutdown event shall not

exceed one (1) hour in duration.

c) Combustion tuning sessions will normally occur because of seasonal turning, after a combustor change-out, after a major repair or maintenance to a combustor, or other similar maintenance circumstances. Tuning sessions are completed periodically to optimize combustion or emission reductions from the turbine. During the tuning event, all reasonable steps to minimize levels of emissions that exceed the limits of this permit shall be taken.

6. Visible emissions from each emission point at the facility shall not exceed twenty percent (20%) in opacity for more than five (5) minutes in any one (1) hour period or more than twenty (20) minutes in any twenty-four (24) hour period [City of Memphis Code Section 16-83 (Reference Rules and Regulations of Tennessee, Rule 1200-3-5-.01(1))].

PERMIT CONDITIONS

7. Preventative and maintenance records shall be kept on all air pollution control equipment for a period of three (3) years from the date of the records and made available to this Department upon request.

40 CFR Part 60, Subpart KKKK
New Source Performance Standards for Stationary Combustion Turbines

8. The CTs) designated as EU01 through EU15 are subject to and shall comply with applicable requirements of 40 CFR Part 60, Subpart A (General Provisions), and 40 CFR Part 60, Subpart KKKK (Standards of Performance for Stationary Combustion Turbines), with a peak load heat input greater than 10.7 gigajoules (10 MMBtu) per hour, based on the higher heating value of the fuel (natural gas) which commenced construction, modification, or reconstruction after February 18, 2005. *[§60.4305]*

9. The permittee must meet the NO_x emission limits for EU01 through EU15 according to the provisions in §60.4320, Table 1. (More specifically, the NOx emission limit applies to a new combustion turbine firing natural gas having a heat input value at peak load greater than 50 MMBtu/hr and less than or equal to 850 MMBtu/hr and a NO_x emission standard of 25 ppm @ 15% O_2 or 150 ng/J of useful output (1.2 lb NO_x/MWh). *[§60.4320(a)]*

10. The permittee must not burn, in EU01 through EU15, any fuel which contains total potential sulfur emissions in excess of 26 ng SO_2/J (0.060 lb SO_2/MMBtu, which is equivalent to 20 grains of sulfur per 100 standard cubic feet of natural gas) heat input. *[§60.4330(a)(2)]*

11. The permittee must operate and maintain each CT's (EU01 through EU15) air pollution control equipment and monitoring equipment in a manner consistent with good air pollution control practices for minimizing emissions at all times including during startup, shutdown and maintenance. *[§60.4333]*

12. If you are not using water or steam injection to control NO_X emissions, you must perform annual performance testing in accordance with § 60.4400 to demonstrate continuous compliance. If the NO_X emission result from the performance test is less than or equal to 75 percent of the NO_X emission limit for the turbine, you may reduce the frequency of subsequent performance tests to once every 2 years (no more than 26 calendar months following the previous performance test). If the results of any subsequent performance test exceed 75 percent of the NO_X emission limit for the turbine, you must resume annual performance tests. *[§60.4340)]*

13. The permittee must monitor the total sulfur content of the fuel being fired in SN-01 through SN-06, except as provided in §60.4365. *[§60.4360]*

14. If the permittee elects not to monitor the total sulfur content of the fuel combusted in EU01 through EU15,

then the permittee shall demonstrate compliance with this condition (fuel quality characteristics) by maintaining on site a current, valid purchase contract, tariff sheet or transportation contract for the natural gas or other appropriate documentation, specifying that the total sulfur content for the natural gas fuel is 20 grains of sulfur or less per 100 standard cubic feet, has potential sulfur emissions of less than 26 ng SO_2/J (0.060 lb SO_2/MMBtu) heat input. The permittee must use the source of information described under 40 CFR 60.4365 (a) to make the required demonstration. Should the permittee elect to demonstrate compliance as stated in this specific condition, then the permittee is exempt from Conditions #14 and #15. *[§60.4365]*

15. The frequency of determining the sulfur content of the fuel must be demonstrated by the permittee in accordance with §60.4370(b) & (c). The permittee shall maintain documentation on site, and make such documentation available to Department personnel upon request, verifying the fuel used in EU01 to EU15 qualifies as natural gas. *[§60.4370]*

16. The permittee must submit reports of excess emissions and monitor downtime, in accordance with §60.7(c). Excess emissions must be reported for all periods of unit operation, including start-up, shutdown, and malfunction. *[§60.4375]*

17. For each affected unit that performs annual performance tests in accordance with § 60.4340(a), you must submit a written report of the results of each performance test before the close of business on the 60th day following the completion of the performance test. *[§60.4375)]*

18. The permittee must conduct an initial performance test, as required in §60.8, and must use one of the applicable methods outlined in §60.4400(a) & (b). Subsequent NO_x performance tests shall be conducted on an annual basis (no more than 14 calendar months following the previous performance test) unless the units have not operated. *[§60.4400)]*

    a. If a unit has not operated for more than 14 consecutive calendar months since its last performance tests, then testing is not required until that unit operates. If this is the case, then a performance test shall be conducted within 60 days of operation after a downtime period of 14 consecutive months or longer.
    b. CTs EU01 through EU15 have a NO_x standard greater than 15 ppm @ 15% O_2. {New combustion turbines having a heat input value at peak load >50 MMBtu/h and ≤850 MMBtu/h and an emission standard of 25 ppm @ 15% O_2 or 150 ng/J of useful output (1.2 lb NOx/MWh)}. Therefore, the permittee may sample at a single point, located at least 1 meter from the stack wall or at the stack centroid if each of the individual traverse point NO_x concentrations is within ±5 percent of the mean concentration for all traverse points, or the individual traverse point diluent concentrations differs by no more than ±3ppm or ±0.3 percent CO_2 (or O_2) from the mean for all traverse points.
    c. In accordance with §60.4400(b) the performance test must be done at any load condition within plus or minus 25 percent of 100 percent of peak load. Testing may be performed at the highest achievable load point, if at least 75 percent of peak load cannot be achieved in practice. Conduct three separate test runs for each performance test. The minimum time per run is 20 minutes.
    d. Compliance with the applicable emission limit in §60.4320 must be demonstrated at each tested load level. Compliance is achieved if the three-run arithmetic average NO_x emission rate at each tested level meets the applicable emission limit in §60.4320.
    e. The ambient temperature must be greater than 0 °F during the performance test.

[End of 40 CFR Part 60, Subpart KKKK- Section]

19. The issuance of this permit does not exempt the permittee from any requirement of the Environmental Protection Agency (EPA) regarding operation of this source.

20. Sixty (60) calendar days prior to the expiration date of this permit, the permittee shall apply for a permit renewal.

General Permit Conditions for Synthetic Minor Sources

SECTION I: OPERATIONAL REQUIREMENTS

1. The facility owner or operator shall control dust, fumes, gases, mist, vapors, or any combination thereof in such a manner as to not cause a nuisance in accordance with City of Memphis Code Section 16-88(a).

2. The facility owner or operator shall not cause, suffer, allow, or permit any air contaminant source to be operated without employing suitable measures for the control of the emission of objectionable odors in accordance with City of Memphis Code Section 16-88(b).

3. The facility owner or operator shall not discharge from any source whatsoever such quantities of air contaminant, uncombined water, or other materials, which cause a traffic hazard, in accordance with City of Memphis Code Section 16-77 [Reference Rules and Regulations of Tennessee, Rule 1200-3-9-.03(3)].

4. The facility owner or operator shall not cause, suffer, allow, or permit any materials to be handled, transported, or stored; or a building, its appurtenances, or a road to be used, constructed, altered, repaired or demolished without taking reasonable precautions to prevent particulate matter from becoming airborne, in accordance with City of Memphis Code Section 16-89.

5. The open burning of residential, commercial, institutional, or industrial solid waste is prohibited except as specified in this permit or in City of Memphis Code Section 16-50.

6. Air contaminant sources must take all reasonable measures to keep emissions to a minimum during startups, shutdowns, and malfunctions in accordance with City of Memphis Code Section 16-87 [Reference Rules and Regulations of Tennessee, Rule 1200-3-20-.02]. These measures may include installation and use of alternate control systems, changes in operating methods or procedures, cessation of operation until the process equipment and/or air pollution control equipment is repaired, maintaining sufficient spare parts, use of overtime labor, use of outside consultants and contractors, and other appropriate means. Failures that are caused by poor maintenance, careless operation or any other preventable upset condition or preventable equipment breakdown shall not be considered malfunctions and shall be considered in violation of the emission standard exceeded and this rule.

SECTION II: TESTING REQUIREMENTS

7. The facility owner or operator may be required to conduct or have conducted such tests as are necessary to establish the quantity or identity of air contaminants emitted from an air contaminant source. Such tests shall be conducted in a manner approved in advance by the Technical Manager, in accordance with City of Memphis Code Section 16-85.

8. Whenever the Technical Manager has reason to believe that the emission limits of the regulations set forth herein are being violated, the Technical Manager may require the facility owner or operator to conduct or have conducted at the owner's or operator's expense, tests to determine the emission level of specific air contaminants, in accordance with City of Memphis Code Section 16-85.

9. The facility owner or operator of an air contaminant source to be tested shall provide the Technical Manager at least 30 days prior written notice of any performance test and the test protocol form, except as otherwise specified in a promulgated test method, to afford the Technical Manager the opportunity to have an observer present and to approve the test protocol,

in accordance with City of Memphis Code Section 16-85.

10. Performance tests shall be conducted under representative performance conditions of the tested air contaminant source(s) for which compliance is to be demonstrated by the test. Samples shall be taken in such number, duration and location as to be statistically significant and representative of performance conditions for which compliance is to be demonstrated by the test, in accordance with City of Memphis Code Section 16-85. Unless otherwise specified in the test method, each performance test shall be corrected to standard conditions, defined as a temperature of 293 K (68° F) and a pressure of 101.3 kilopascals (29.92 in Hg).

11. The facility owner or operator may be required to retest at the request of the Technical Manager if the maximum production rate that occurred during compliance testing is exceeded by 10 percent or more, in accordance with City of Memphis Code Section 16-86.

12. Unless otherwise specified in the test method, each performance test shall consist of three separate runs using the applicable test method. Each test run shall be conducted for the time and under the conditions specified in the applicable test method. For the purpose of determining compliance with an applicable standard, the arithmetic mean of results of the three runs shall apply. In the event that a sample is accidentally lost or conditions occur in which one of the three runs must be discontinued because of forced shutdown, failure of an irreplaceable portion of the sample train, extreme meteorological conditions, or other circumstances beyond The facility owner or operator's control, compliance may, upon the Technical Manager's approval, be determined using the arithmetic mean of the results of the two other runs, in accordance with City of Memphis Code Section 16-85, [Reference the Rules and Regulations of Tennessee, Rule 12003-10].

13. A log of all malfunctions, startups, and shutdowns resulting in emissions in excess of the standards in the City of Memphis Code or any permit issued thereto must be kept at the facility in accordance with City of Memphis Code Section 16-87 [Reference Rules and Regulations of Tennessee, Rule 1200-3-20-.04]. This log must record at least the following:
    a) Stack or emission point involved;
    b) Time of malfunction, startup, or shutdown or when first noticed;
    c) Type of malfunction and/or reason for shutdown;
    d) Time startup or shutdown was complete or time the air contaminant source returned to normal operation; and
    e) The company employee making entry on the log must sign, date and state the time of each log entry. The information under items (a) and (b) above must be entered into the log by the end of the shift during which the malfunction, startup, or shutdown began.

All information shall be entered in the log no later than twenty-four (24) hours after the startup or shutdown is complete, or the malfunction has ceased or has been corrected. Any later discovered corrections can be added in the log as footnotes with the reason given for the change.

SECTION III: REPORTING and NOTIFICATION REQUIREMENTS

14. When any air contaminant source malfunctions in such a manner as to cause the emission of air contaminants in excess of the applicable emission standards contained in Division 1200-3 or any permit issued thereto, or of sufficient duration to cause damage to property or public health, The facility owner or operator of the air contaminant source shall promptly notify the Technical Manager of such malfunction and provide a statement giving all pertinent facts, including the estimated duration of the malfunction, in accordance with City of Memphis Code Section 16-87 [Reference Rules and Regulations of Tennessee, Rule 1200-3-20-.03]. Violations of the visible emission standard (excluding visible emissions caused by hazardous air pollutants named in Chapter 1200-3-11), which occur for less than 20 minutes in one day (midnight to midnight) need not be reported. Prompt notification will be within 24 hours of the malfunction and shall be provided by telephone to the Shelby County Health Department, Pollution Control Section.

15. The Technical Manager shall be notified when the malfunction has been corrected, in accordance with City of Memphis Code Section 16-87 [Reference Rules and Regulations of Tennessee, Rule 1200-3-20-.03].

16. In attainment and unclassified areas if emissions other than from sources designated as significantly impacting on a nonattainment area in excess of the standards will not and do not occur over more than a 24-hour period (or will not recur over more than a 24-hour period) and no damage to property and/or public health is anticipated, notification is not required. Any malfunction that creates an imminent hazard to health must be reported by telephone immediately to the Shelby County Health Department, Pollution Control Section and the Emergency Management Agency.

17. The facility owner or operator shall submit a report to the Department, on an annual basis, that establishes the amount of actual emissions of each regulated pollutant for the facility according to the provisions in City of Memphis Code Section 16-98. This report shall be submitted no later than February 28th of each calendar year and shall include emissions that occurred during the previous calendar year.

SECTION IV: MISCELLANEOUS GENERAL REQUIREMENTS

18. The facility owner or operator shall apply for a permit renewal at least sixty (60) calendar days prior to the expiration of this permit in accordance with City of Memphis Code Section 16-77 [Reference Rules and Regulations of Tennessee, Rule 1200-3-9-.02(3)(a)].

19. The facility owner or operator shall pay fees in accordance with City of Memphis Code Sections 16-93 through 16-96.

20. This permit is not transferable from one person to another person, nor from one air contaminant source to another air contaminant source, nor from one location to another location pursuant to City of Memphis Code Section 16-77 [Reference Rules and Regulations of Tennessee, Rule 1200-3-9-.03(6)]

21. The facility owner or operator shall maintain this operating permit readily available for inspection by the Technical Manager or his/her designated representative on the operating premises. A person required by regulations to have one or more operating permits shall keep at least one operating permit prominently and conspicuously displayed on the operating premises in accordance with City of Memphis Code Section 16-77 [Reference Rules and Regulations of Tennessee, Rule 1200-3-9-.02(5)].

22. The Shelby County Health Department in conjunction with the Memphis and Shelby County Air Pollution Control Board shall have authority, at their option, to institute and litigate proceedings for violations as set out therein, in accordance with City of Memphis Code Section 16-57. Any person who knowingly:
    a) Violates or fails to comply with any provision of the City of Memphis Code, any board or administrative order or any permit condition;
    b) Makes any false material statement, representation, or certification in any record, report, plan or other document required by permit to be either filed or maintained;
    c) Falsifies, tampers with, renders inaccurate or fails to install any monitoring device or method required to be maintained or followed; or
    d) Fails to pay a fee commits a Class C misdemeanor pursuant to the Tennessee Code Annotated with the fine not to exceed twenty-five thousand dollars ($25,000) per day. For the purpose of this section, each day of continued violation constitutes a separate offense and is punishable as such.

23. The facility owner or operator of any air contaminant source shall be responsible for complying with emission regulations as contained in other chapters of these regulations at the earliest practicable time and for this purpose the Board shall have the authority and responsibility to

require compliance with these regulations at an earlier date than indicated where such earlier compliance may reasonably be accomplished, in accordance with City of Memphis Code Section 16-77 [Reference Rules and Regulations of Tennessee, Rule 1200-3- 9-.03(1)].

24. The facility owner or operator shall not use any plan, activity, device or contrivance which the Technical Manager determines will, without resulting in an actual reduction of air contaminants, conceal or appear to minimize the effects of an emission which would otherwise constitute a violation of these Regulations, in accordance with City of Memphis Code Section 16-77 [Reference Rules and Regulations of Tennessee, Rule 1200-3-9-.03(2)]. Methods considered circumvention of the regulations include but are not limited to the following:
    a) Air (or other gases) introduced for dilution purposes only; or
    b) The staggered installation and operation of a facility to avoid coverage by a standard that applies only to operations larger than a specified size.

25. The Technical Manager may suspend or revoke any construction or operating permit if the permit holder fails to comply with the provisions, stipulations, or compliance schedules specified in the permit; all provisions of these regulations; and all provisions of the Tennessee Air Quality Act, in accordance with City of Memphis Code Section 16-77 [Reference Rules and Regulations of Tennessee, Rule 1200-3-9-.03(7)]. Upon permit suspension or revocation, if the permit holder fails to take remedial action, he shall become immediately subject to enforcement actions prescribed by law.

26. Failure to comply with any of the provisions of the City of Memphis Code shall constitute a violation thereof and shall subject the person or persons responsible therefore to any and all of the penalties provided by law, in accordance with City of Memphis Code Section 16-57 .

27. For the purpose of carrying out the requirements of the City of Memphis Code, the Technical Manager or his/her authorized representatives shall be permitted at all reasonable times to enter into any manufacturing plants, business buildings or other buildings, and all lots, grounds and premises, in order to thoroughly examine any items in relation to public health and air pollution thereon and therein, in accordance with City of Memphis Code Section 16-61.

28. The facility owner or operator shall not begin the construction of a new air contaminant source or the modification of an air contaminant source which may result in the discharge of air contaminants without first having applied for and received from the Technical Manager a construction permit for the construction or modification of such air contaminant source, in accordance with City of Memphis Code Section 16-77 [Reference Rules and Regulations of Tennessee, Rule 1200-3-9-.0l(l)(a)], except as specifically exempted in Rule 1200-3-9-.04 or excluded in subparagraph 1200-3-2-.0l(l)(aa) or subparagraph 1200-3-2-.0l(l)(cc).

29. The application for a construction permit shall be made on forms available from the Technical Manager not less than ninety (90) days prior to the estimated starting date of construction in accordance with City of Memphis Code Section 16-77 [Reference Rules and Regulations of Tennessee, Rule 1200-3-9-.0l(l)(b)]. Sources identified in Paragraph 1200-3-9-.01(4) shall make application for a construction permit not less than one hundred twenty (120) days prior to the estimated date of construction.

From:	Sarah Al-Zhyri
To:	Jeffrey Bland
Cc:	Amanda Garcia; Patrick Anderson
Subject:	Comments on MZX Tech, LLC Draft Permit (Air Ref. No. 0680-00119) from SELC, et al. (Email 3 of 3)
Date:	Tuesday, February 17, 2026 6:23:18 PM
Attachments:	Vol. III - Atts. 10-16.pdf

This Message Is From an External Sender
This message came from outside your organization.

Dear Mr. Bland:

Please find attached Volume III of attachments to comments of Southern Environmental Law Center, Memphis Community Against Pollution, Young, Gifted & Green, Sierra Club, Safe and Sound Coalition, and the Climate Reality Project: Memphis and Mid-South Region Chapter in response to the Mississippi Department of Environmental Quality's public comment period regarding the Draft Air Pollution Control and Prevention of Significant Deterioration (PSD) Authority Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC. This email is the third of three emails that contain the attachments referenced in these comments.

Sincerely,

Sarah Al-Zhyri (she/her)
Legal Administrative Assistant II

Southern Environmental Law Center
1033 Demonbreun Street, Suite 205
Nashville, TN 37203

Office (615) 921-9470
Fax +1 (615) 921-8011
selc.org [selc.org]
salzhyri@selc.org

Volume III of Attachments to Community Groups' Comments on the Mississippi Department of Environmental Quality's Draft Air Pollution Control and Prevention of Significant Deterioration (PSD) Authority Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Attachments 10-16

Attachment 10

TENNESSEE VALLEY AUTHORITY

Allen Combined Cycle Plant, 2480 Hennington Avenue, Memphis, Tennessee 38109

Sent Via Electronic Transmittal

December 10, 2024

Mr. Wasim Khokar (wasim.khokhar@shelbycountytn.gov)
Technical Manager
Shelby County Health Department (SCHD)
Air Pollution Control
1826 Sycamore View Road
Memphis, TN 38134

Dear Mr. Khokar:

TENNESSEE VALLEY AUTHORITY (TVA) – ALLEN COMBUSTION TURBINE (ACT) – PREVENTION OF SIGNIFICANT DETERIORATION (PSD) PERMIT APPLICATION FOR SIX AERODERIVATIVE SIMPLE-CYCLE COMBUSTION TURBINE (CT) UNITS AND TWO BLACK-START DIESEL EMERGENCY GENERATORS

TVA proposes to construct and operate six natural gas-fired aeroderivative simple-cycle CTs and two black-start emergency diesel engines at the Allen Combined Cycle Plant (ACC) site. These new emission units will replace the generation provided by sixteen existing CTs (constructed in 1971-72) and their two associated black-start engines that have been demolished. In addition, TVA seeks to redesignate the ACC site as an area source of Hazardous Air Pollutants (HAPs) with this permitting action.

The proposed aeroderivative units will increase the flexibility and reliability of TVA's power system by improving transmission stability and providing updated black-start capabilities in the western Tennessee region. This will allow TVA to deliver more efficient dispatchable generation to support the continued system load growth experienced over the past few years.

ACC currently operates under Title V Major Source Permit Number 01280-01 TV. The proposed project qualifies as a major modification under City of Memphis Code Section 16-77 and Federal PSD regulations under 40 CFR § 52.21. TVA requests that SCHD issue a PSD permit-to-construct under the City of Memphis Code Section 16-77, which adopts by reference Tennessee Air Pollution Control Regulations Rule 1200-03-09-.01.

TVA appreciates SCHD's review of this PSD permit application. If you have questions about this application, please contact Tracy Stanton (865) 209-6940 or email at tpstanton@tva.gov.

Sincerely,



Michael S. Cashon
Plant Manager

Enclosures

cc (Electronic Distribution with Enclosures):
Gregg Fortunato, gregg.fortunato@shelbycountytn.gov

TENNESSEE VALLEY AUTHORITY

ALLEN COMBUSTION TURBINE PROJECT (ACT)

PREVENTION OF SIGNIFICANT DETERIORATION (PSD) PERMIT APPLICATION

SHELBY COUNTY, TENNESSEE
December 2024

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1.0 INTRODUCTION

The Tennessee Valley Authority (TVA) proposes to construct and operate six aeroderivative simple cycle combustion turbines at the Allen Combined Cycle Plant (ACC) site replacing generation provided by sixteen existing combustion turbines, which have been demolished. Nominal generation capacity is 200 megawatts (MW). Furthermore, TVA seeks to redesignate the ACC site as an area HAP source with this permitting action.

The proposed aeroderivative units will increase the flexibility and reliability of TVA's power system by improving transmission stability and providing updated black-start capabilities in the western Tennessee region and will provide more efficient dispatchable generation to support the continued system load growth experienced over the past few years.

ACC currently operates under Title V – Major Source Permit 01280-01 TV. The proposed qualifies as a major modification under City of Memphis Code Section 16-77 and Federal PSD regulations (40 CFR § 52.21).

This application will provide information to support a construction permit approval based on the following:

- A demonstration that Best Available Control Technology (BACT) is applied to each emissions unit.
- A demonstration that neither PSD ambient air increments nor National Ambient Air Quality Standards (NAAQS) will be violated as a result of the project.
- An analysis of the impact that the proposed project will have on economic growth, soils, and vegetation.

The remainder of the air permit application presents the demonstrations and analysis mentioned above. Section 2 describes the proposed project in greater detail. Section 3 provides a review of the applicable regulations, and Section 4 discusses the required BACT analysis. Sections 5 and 6 provide the air quality analysis and analysis of other impacts, respectively. The permit application forms, emission calculations, BACT survey results, and modeling output and plots are contained in the appendices.

With this application, TVA requests that the Shelby County Health Department issue a Prevention of Significant Deterioration permit-to-construct under the City of Memphis Code Section 16-77, which adopts by reference Rule 1200-03-09-.01 of the Tennessee Air Pollution Control Regulations.

2.0 PROJECT DESCRIPTION

2.1 Site Description

ACC is located near Memphis, Tennessee, and is composed of a combined cycle plant and a simple cycle plant. A site locality map (Figure 1) and a topographic map (Figure 2) provide details of the location and property boundaries.

The simple cycle plant (ACT) consists of 16 General Electric (GE) 5N combustion turbine (CT) units (01280-01 TV, Emission Units 28-43), four GE 7B CT units (01280-01 TV, Emission Units 44 47), and two black-start diesel engines (01280-01 TV, Emission Units 48 and 49). TVA has demolished the 16 pre-EPA New Source Performance Standards, low efficiency GE 5N CT units, which were constructed circa 1971-72, and the two associated black-start diesel engines. TVA proposes to construct six (6) state-of-the-art, natural gas-fired GE LM2500 simple-cycle CT units and two black-start (emergency) generators as a replacement (Figures 3 and 4).

2.2 Proposed Equipment

The six identical natural gas-fired LM2500 CT units have gross electrical generating capacities of 34 MW each (at 59°F). The LM2500 units are equipped with dry low emission (DLE) combustors. An evaporative cooling system is installed at the compressor inlet of each CT. This system allows for increased CT generation at ambient temperatures above 59°F.

Each LM2500 exhaust-path has an oxidation catalyst for CO/VOC emissions control, and an SCR reactor for NO_X emissions control. Each SCR utilizes 19.5 percent aqueous ammonia (NH_3) to achieve NO_X reduction across the SCR reactor's catalyst.

Two (approximately) 1,500 kWe black-start (emergency) generators (BSGs) are to only be used during black start events (i.e., recovery from power transmission network shutdowns). Each generator's prime mover is an approximately 2,200 horsepower (hp) diesel engine. For black start events, the BSGs will energize the switchyard and address transient house-load needs (e.g., ancillary LM2500-equipment electrical loads) until one, or more, LM2500 completes a startup event. Each BSG's operational duration during a black start event is expected to not exceed 30 minutes. Maintenance and readiness testing is expected to occur once per week.

The project will also include balance of plant equipment and systems such as natural gas metering and handling systems; instrumentation and control systems; water treatment, storage, and handling; and administration and warehouse/maintenance buildings.

2.3 Operations And Emissions

The proposed six LM2500 units will provide needed transmission stability and black-start capabilities in the western Tennessee region and will operate during periods of peak demand. Annual operations will be limited by the applicable capacity factor in 40 CFR Part 60, Subpart TTTTa.

Project annual emission estimates are provided in Table 2-1. Because CT performance varies with ambient temperature and generation load, annual emission estimates are based on CT full

load performance at 59°F, which is deemed most representative of site annual average temperature because nearby meteorological towers indicate an average annual temperature range of 61.1°F to 63.4°F. Variation in ambient temperatures has negligible impacts on diesel engine BSG performance; therefore, annual emissions are based on maximum heat input. Appendix B provides a thorough discussion on how annual emissions are determined.

Table 2-1. Project Potential Emissions (Tons/Year)

Pollutant	LM2500 [1]	BSG [2]	Total
Carbon Monoxide (CO)	55	1.3	56
Nitrogen Oxides (NO_X)	44.6	2.2	46.8
Sulfur Dioxide (SO_2)	2.1	0.00	2.1
Particulate Matter (PM)	24.4	0.07	24.5
Total PM $\leq$ 10 microns (TPM_{10})	34	0.15	34
Total PM $\leq$ 2.5 microns ($TPM_{2.5}$)	34	0.15	34
Volatile Organic Compounds (VOC)	11	0.12	11
Lead (Pb)	0.00	0.00	0.00
Sulfuric Acid Mist (H_2SO_4)	0.02	0.00	0.02
Carbon Dioxide Equivalent (CO_2e)[3]	401,503	254	401,757

Notes:
1. "LM2500" emission estimates reflect startup, full load, shutdown operations for six LM2600 units assuming a 40 CFR 60, Subpart TTTTa, capacity factor generation restriction. Startup and shutdown emissions are based on 350 starts/shutdowns per unit-year.
2. "BSG" denotes diesel engine black-start generator. Estimates are based on two BSG with 100 annual hours each.
3. Greenhouse gas emissions are expressed as CO_2 equivalent (CO_2e). CO_2e emissions are the sum of the individual GHG mass emissions adjusted for its global warming potential (see 40 CFR Part 98, Subpart A, Table A-1). For combustion, the individual GHGs are carbon dioxide (CO_2), nitrous oxide (N_2O), and methane (CH_4).

Figure 2-1. Site Locality Map

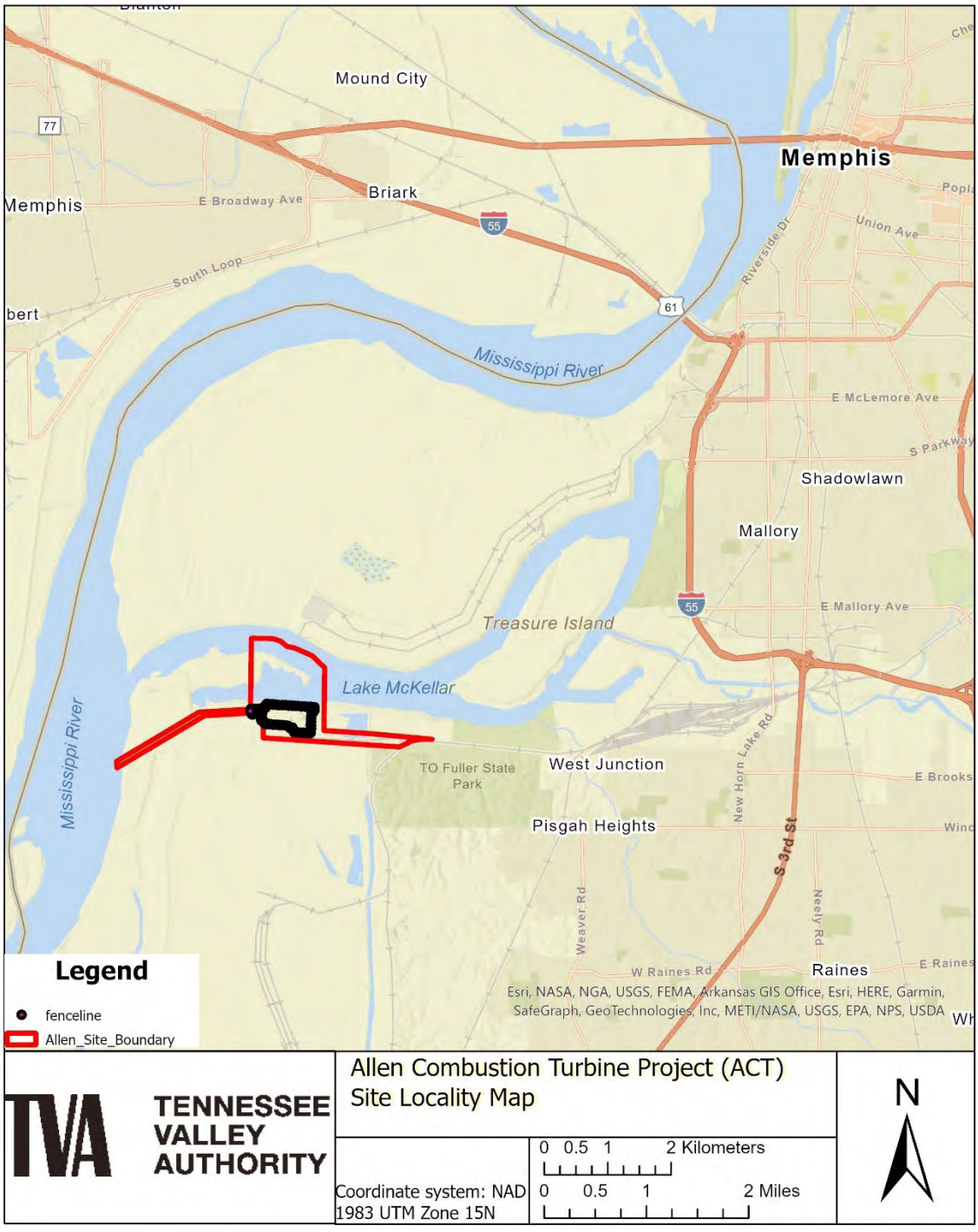


Figure 2-2. Topographical Map

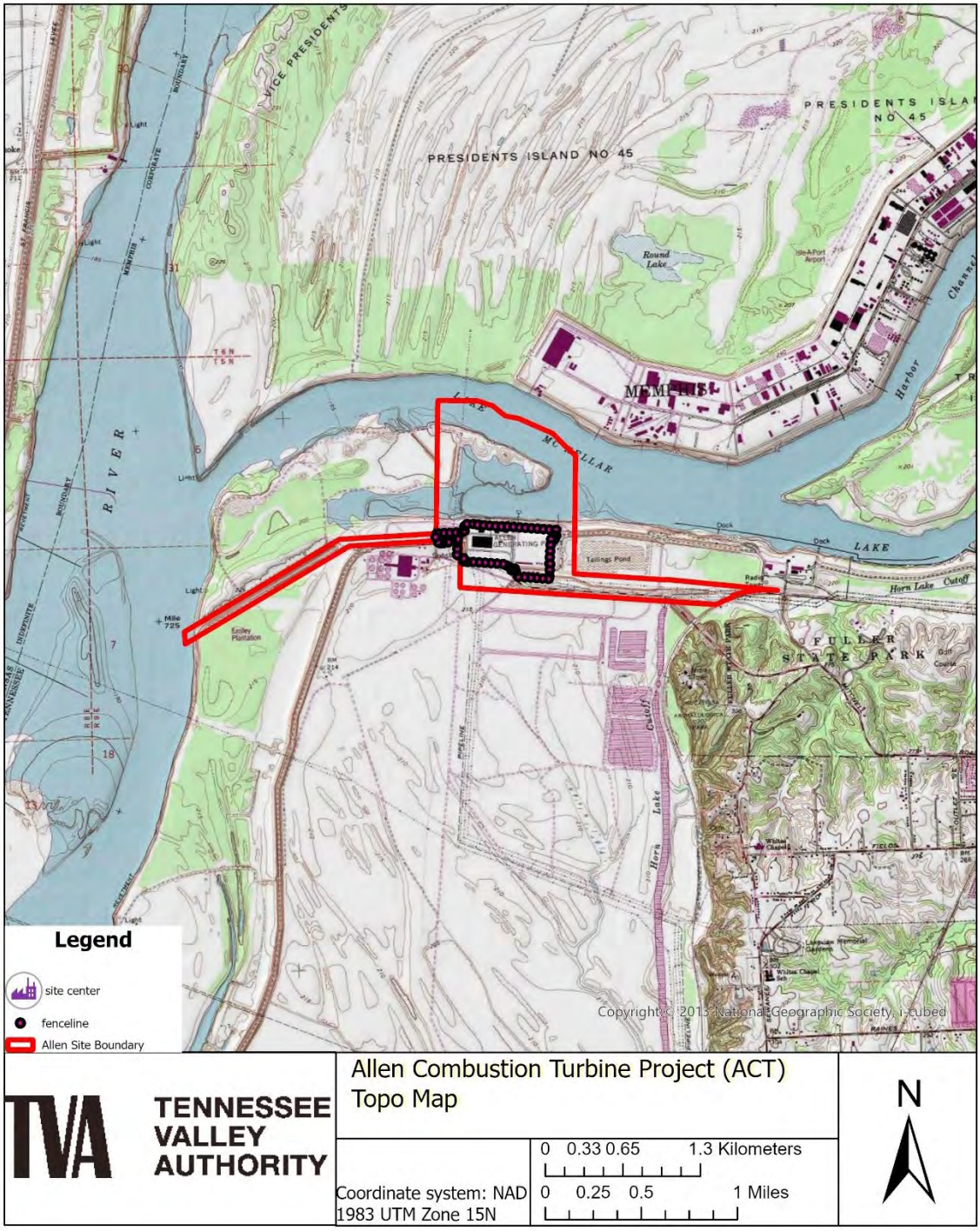
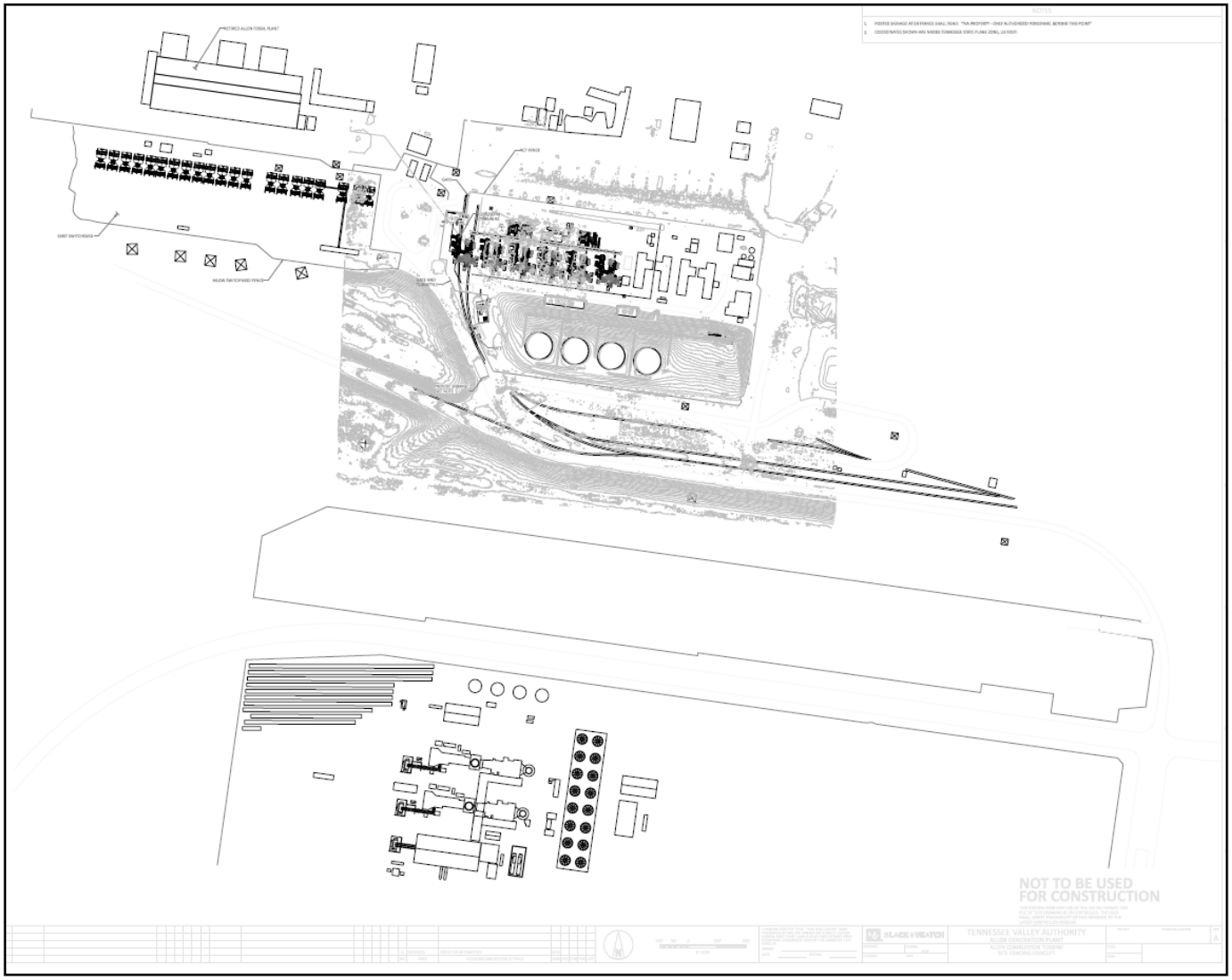


Figure 2-3. General Arrangement



3.0 REGULATORY ANALYSIS

The ACT LM2500 project will be subject to both the City of Memphis Code (which adopts by reference the Tennessee Air Pollution Control Regulations) and federal air quality regulations. Detailed discussions of these regulations are provided in the following sections.

3.1 National Ambient Air Quality Standards

The Clean Air Act of 1970 mandated that the EPA establish NAAQS for six criteria pollutants to protect the public health (primary standards) and welfare (secondary standards). The existing applicable NAAQS are presented in Table 3-1.

Table 3-1. Primary and Secondary NAAQS [1]

Pollutant & Time Period [2]	Units [3]	NAAQS Primary	NAAQS Secondary
Carbon Monoxide (CO)			
1-Hour Average	ppm	35	None
8-Hour Average	ppm	9	None
Lead (Pb)			
3-Month Rolling Average	$\mu g/m^3$	0.15	0.15
Nitrogen Dioxide (NO_2)			
1-Hour Average	ppm	0.100	None
Annual Arithmetic Mean	ppm	0.053	0.053
Particulate Matter < 10 microns (PM_{10})			
24-Hour Average [4]	$\mu g/m^3$	150	150
Particulate Matter < 2.5 microns ($PM_{2.5}$)			
24-Hour, 98th Percentile	$\mu g/m^3$	35	35
Annual Arithmetic Mean	$\mu g/m^3$	9	15
Ozone (O_3)			
Annual Arithmetic Mean	$\mu g/m^3$	12	15
8-Hour Average	ppm	0.070	0.070
Sulfur Dioxide (SO_2)			
1-Hour, 99th Percentile	ppm	0.075	None
3-Hour Average	ppm	--	0.5

Notes:
1. https://www.epa.gov/criteria-air-pollutants/naaqs-table.
2. Unless otherwise noted, short-term standards (24 hours and less) are not to be exceeded more than once a year. Standards for periods longer than 24 hours are maximum permissible concentrations that are never to be exceeded.
3. *ppm* denotes parts per million (by volume); *$\mu g/m^3$* denotes micrograms per cubic meter.
4. Not to be exceeded more than once per year on average over three (3) years.

The proposed ACT project will be located in Shelby County, which is in attainment/unclassifiable for all NAAQS pollutants.

3.2 PSD Applicability

Under the City of Memphis Code (CMC) and federal new source review regulations, all major new or modified sources of air pollutants regulated under the Clean Air Act must be examined. The ACT LM2500 project will be located in an attainment area; consequently, any significant emission increases from the proposed project are subject to PSD requirements [CMC Section 16-77 and 40 CFR § 52.21]. Table 3-2 provides a comparison between the proposed project's emissions with the applicable PSD Significant Emission Rate (SER).

Table 3-2. Potential Emissions (Tons/Year) and PSD Applicability

Pollutant	Emissions	PSD SER	PSD Review?
CO	56	100	No
NO_X	46.8	40	Yes
SO_2	2.1	40	No
PM	24.5	25	No
TPM_{10}	34	15	Yes
$TPM_{2.5}$	34	10	Yes
VOC	11	40	No
Lead (Pb)	0.00	0.6	No
SO_3 as H_2SO_4	0.02	7	No
CO_2e	401,757	75,000	Yes

Because several PSD SER will be exceeded, a PSD review is necessary for each pollutant that exceeds the SER to determine whether significant air quality deterioration will result. The PSD review includes the following:

- BACT analysis (see Section 4),
- Air quality analysis (see Section 5),
- Additional impact analysis (see Section 6).

3.3 New Source Performance Standards

The New Source Performance Standards (NSPS) are national emission standards that apply to specific categories of new sources. As stated in the CAA of 1970, these standards "shall reflect the degree of emission limitation and the percentage reduction achievable through application of the best technological system of continuous emission reduction the Administrator determines has been adequately demonstrated." Unless noted, all NSPS presented as follows are subject to the 40 CFR Part 60, Subpart A - General Provisions, which describes performance testing, recordkeeping, reporting, and monitoring provisions.

3.3.1 LM2500 Units

All stationary CT units with a heat input at peak load equal to or greater than 10 MMBtu/hr for which construction or modification is commenced after February 18, 2005, must comply with 40 CFR Part 60, Subpart KKKK – Standards of Performance for Stationary Gas Turbines. Therein,

NO_X limits are as follows: 25 ppm at 15% O_2 while firing natural gas. SO_2 emissions are limited to 0.06 pounds/MMBtu (i.e., lbs./MMBtu). Both pollutants will be monitored via 40 CFR Part 75 guidelines to satisfy 40 CFR Part 72 (Acid Rain Program) provisions.

The CT units are subject to 40 CFR Part 60, Subpart TTTTa – Standards of Performance for Greenhouse Gas [GHG] Emissions for Modified Coal-Fired Steam Electric Generating Units and New Construction and Reconstruction Stationary Combustion Turbine Electric Generating Units, which establishes GHG standards for CT units constructed after May 23, 2023. Per § 60.5515a(a), the "pollutants regulated by this subpart are greenhouse gases. The greenhouse gas standard in this subpart is in the form of a limitation on emission of carbon dioxide."

The LM2500 units are simple cycle (i.e., exhaust-gas heat content is discarded without heat recovery), and they utilize state of the art combustion design and practices. Because the LM2500 units have a relatively high design energy efficiency and will be operated as needed, they can be subject to two separate standards under Subpart TTTTa:

- Intermediate load combustion turbine – a stationary combustion turbine that supplies >20% but ≤40% of its potential electric output as net-electric sales on both a 12-operating month and a 3-year rolling average basis in which the applicable LM2500 is subject to a 1,170 lbs. of CO2 per megawatt hour (MWh) standard.

- Low load combustion turbine – a stationary combustion turbine that supplies ≤20% of its potential electric output as net-electric sales on both a 12-operating month and a 3-year rolling average basis in which the applicable LM2500 is subject to a 120 lbs. of CO2 per million Btu (MMBtu) [HHV] of heat input standard.

Furthermore, the "potential electric output" for each LM2500 is 118,000 MWh (gross)/year (see Appendix B for calculations). Applicability of the proper Subpart TTTTa category and standard will be determined by comparing the 12-operating month and a 3-year rolling average to the potential electric output.

3.3.2 Black-Start Generators

The two diesel engine black-start (emergency) generators are regulated by 40 CFR 60, Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. Due to its size and operational category, Subpart IIII specifically calls upon 40 CFR Part 1039, Appendix I, standards for new nonroad compression-ignition engines. Therefore, the generators must meet Tier 2 emission standards stipulated in Appendix I of Part 1039.

Each black start generator is limited to 100 hours per year for the purpose of maintenance checks and readiness testing. A non-resettable hour meter must be installed prior to startup and records must be kept indicating the hours of operation and the reasons for operation.

3.4 National Emission Standards For Hazardous Air Pollutants

The EPA has promulgated standards for Hazardous Air Pollutant (HAP) emissions for various industrial categories. These National Emission Standards for Hazardous Air Pollutants (NESHAP) that result from the 1990 CAA Amendments are contained in 40 CFR 63. Sources that emit more

than 10 tons per year of a single HAP or 25 tons per year of total HAPs are considered major sources.

ACC is currently identified as a major HAP source via operating conditions allowed under Title V – Major Source Permit 01280-01 TV. Because ACT 1-16 (01280-01 TV Emission Units 28-43) and the existing two black start diesel engines (01280-01 TV Emission Units 48 and 49) have been removed and ACT 17-18 (01280-01 TV, Emission Units 44 45) are slated for demolition, TVA seeks to limit the two existing ACT GE 7B units (01280-01 TV, Emission Units 46 47) operations as followed: a total of 1,026,700 MWh/year of which only 755,600 MWh/year is for distillate oil firing.

The generation limits provided in this section and in combination with the potential-to-emit from the other proposed and existing sources will reclassify the ACC site as an area HAP source because HAP emissions will not be above major source thresholds. Consequently, any major-source NESHAP will not be applicable – only the area-source NESHAP requirements for the emergency engines (40 CFR 63, Subpart ZZZZ) are applicable. The existing emergency diesel (fire) water pump (01280-01 TV Emission Unit 25) and the proposed black-start generators can satisfy 40 CFR 63, Subpart ZZZZ, by meeting 40 CFR 60, Subpart IIII, requirements [40 CFR § 63.6590(c)].

3.5 City Of Memphis Code

The CMC adopts by reference Tennessee Air Pollution Control Regulations cited in the following discussion.

Neither CMC nor Tennessee Air Pollution Control Board have adopted the EPA's NSPS Subpart KKKK regulations. CT regulations provided in TAPCR 1200-03-16-.31 [CMC Section 16-76] have been repealed as of January 21, 2009. Therefore, the LM2500 units must meet the emissions, performance testing, monitoring, reporting, and record keeping requirements of Subpart KKKK. Furthermore, the pollutants regulated by this subpart are NOX and SO2. PM emissions are regulated by 1200 03 06 .02(2) [CMC Section 16-79]. For new fuel burning equipment, the maximum allowable PM emission rate for sources greater than 250 MMBtu/hour is 0.100 lbs./MMBtu.

3.6 Other Clean Air Act Requirements

3.6.1 Acid Rain Program

The 1990 CAA Amendments established a program to reduce potential precursors of acidic deposition. The Acid Rain Program (incorporated by reference via CMC 16-91.2) was delineated in Title IV of the CAA Amendments and required EPA to develop the program. The EPA regulations would be applicable to the proposed project for the purposes of obtaining a permit and allowances, as well as emission monitoring. New units are required to obtain permits under the program by submitting a complete application 24 months before the date on which the unit begins serving an electric generator (greater than 25 MW).

3.6.2 Risk Management Program

The 1990 CAA Amendments required the EPA to issue regulations which would help prevent accidental releases of hazardous chemicals beyond a facility's property. Consequently, EPA promulgated 40 CFR Part 68 – Chemical Accident Prevention Provisions (incorporated by reference via CMC 16-91.4), whereby all stationary sources that have a regulated substance present in a process in more than the listed threshold quantity would need to develop a risk management plan (RMP).

The proposed ACT project will not utilize hazardous chemicals that will invoke RMP obligations. ACC, which includes ACT, will not be required to prepare an RMP.

3.7 CMC Air Permitting Requirements

The CMC requires any new source to obtain an air permit prior to construction. Major new sources and modifications at major sources must meet the appropriate PSD requirements discussed previously. Required permits and approvals for air pollution sources include NSR for nonattainment areas, PSD, NSPS, NESHAP, Permit to Construct, and Permit to Operate. The requirements for construction permits are contained in CMC Section 16-77.

4.0 BACT ANALYSIS

A BACT analysis must be performed for each air pollutant emitted in net significant amounts (see Table 3-2). BACT is defined in 40 CFR 52.21(b)(12) as a numerical emission limit based on the application of air pollution control equipment reductions, specific production processes, methods, systems or techniques, or fuel cleaning or combustion techniques. In other words, BACT is an emission limitation based on the optimum degree of reduction for each pollutant, on a case by case basis, considering technical feasibility, energy impacts, environmental impacts, and economic impacts. In no event shall the application of BACT result in the emission of any pollutant that would exceed the emissions allowed by an applicable standard in 40 CFR Parts 60 and 61.

Despite EPA's definition of BACT, many of the intricacies of BACT selection have never been formally addressed in actual regulation. Two sources – a December 1987 guidance from the EPA Assistant Administrator for Air and Radiation and EPA's New Source Review Workshop Manual (Draft), October 1990 – present five steps, known as the "top-down" approach, that are involved in determining BACT:

- Step 1: Identify all available control technologies.
- Step 2: Eliminate technically infeasible options.
- Step 3: Rank the remaining control technologies.
- Step 4: Evaluate most effective controls considering energy, environmental, economic, and other costs, and document the results. If the top option is not selected as BACT, evaluate the next most effective control option.
- Step 5: Select BACT.

The "top-down" BACT approach starts with the most stringent (or top) technology and emissions limit that have been applied elsewhere to the same, or a similar, source category. The applicant must next provide a basis for rejecting this technology in favor of the next most stringent technology or propose to use it. Rejection of control alternatives may be based on technical or economic infeasibility. Such decisions are made on the basis of physical differences (e.g., fuel type), locational differences (e.g., availability of water), or significant differences that may exist in the environmental, economic, or energy impacts. The differences between a proposed project and a source on which a specific control technique was applied previously must be justified. Overall, a decision on BACT is to be based on sound judgment, balancing environmental benefits with energy, economic, and other impacts.

The demonstrated technology evaluated in the following sections is determined from a review of the EPA RACT/BACT/LAER Clearinghouse (RBLC). Due to project source-type (simple-cycle electrical generation) having a long history of implementation, the RBLC technology review is regarded as definitive; any innovative emission controls would have been evaluated if it was selected and demonstrated by other, similar sources. There are no innovative emission controls identified by the RBLC review.

4.1 LM2500 Units

4.1.1 CT Nitrogen Oxides (NO_X) BACT

Nitrogen oxides are formed during the fuel combustion process. There are three types of NO_X formation: thermal NO_X, fuel-bound NO_X, and prompt NO_X. Of the three, thermal NO_X is the main mechanism for NO_X formation within the CT units because it is created by the high temperature reaction in the combustion chamber between ambient nitrogen and oxygen. The amount of NO_X produced is a function of time, turbulence, temperature, and fuel-to-air ratios within the combustion flame zone. The LM2500 units will employ good combustion design and practices (GCDP) and dry low-emissions combustors (DLE) to minimize NO_X.

Step 1: Identify All Available Control Technologies

A review of the RBLC (see Appendix C) indicates that the most prevalent NO_X control technology implemented on aeroderivative simple-cycle CT units is GCDP with DLE; both work together to control NO_X formation at the point of fuel combustion.

The following pre-combustion and post-combustion control technologies are evaluated:

1. Steam or Water (S/W) Injection;
2. SCR; and
3. Catalytic Absorption-and-Oxidation (EMX™ [SCONOX™]).

S/W injection effectively suppresses NO_X emissions by reducing peak temperatures in the flame zone, and SCR is a process that involves post-combustion removal of NO_X from flue gas: ammonia (NH_3) is injected into the turbine exhaust gas and reacts on a catalyst bed with NO_X and oxygen (O_2) to form nitrogen (N_2) and water (H_2O).

EMX™ (SCONOX™) is an absorption-and-oxidation technology by which CT-exhaust NO_X is converted to nitrites and nitrates via catalytic beds.

Catalytic (flameless) combustion (XONON [K-Lean]) is not considered because it is proprietary technology utilized only on small (less than 15 MW) Kawasaki CT units. Selective non-catalytic reduction (SNCR), which utilizes urea or ammonia injection for NO_X control, is not considered because the appropriate reaction temperatures and residence times cannot be achieved within a CT.

Step 2: Eliminate Technically Infeasible Options

LM2500 aeroderivative units have annular combustion systems that only allow for one setup: either S/W injection or DLE. TVA has selected DLE, which precludes the installation of S/W injection, because of the impacts to local water supply S/W injection would incur, the less ancillary equipment (e.g., water demineralization process) needed, and the lower long-term maintenance burden. Therefore, S/W injection is deemed technically infeasible.

The application of SCR on simple cycle CT units has been primarily on aeroderivative units. The main technical factor related to installing SCR on simple cycle CT units is achieving optimum SCR

catalyst operating temperatures. If a quenching air system is incorporated into the SCR design to attenuate exhaust temperatures, an SCR is technically feasible.

EMX™ (SCONOX™) is an absorption-and-oxidation technology that claims to reduce CT NO_X emissions to two (2) ppm. CT-exhaust NO_X passes over and "reacts with potassium carbonate that is impregnated onto the platinum catalyst surface. […] NO is oxidized to NO_2 and then reacts with the potassium carbonate coating on the catalyst to form potassium nitrites and nitrates at the surface of the catalyst." EMX™ (SCONOX™) employs mechanical dampers to isolate catalytic beds from CT exhaust gases during necessary regeneration cycles as regeneration must take place in an oxygen-free environment. Consequently, numerous catalytic beds must be utilized for continuous control as catalysts are rotated between oxidation and regeneration status.

EMX™ (SCONOX™) has been operated on several small (i.e., less than 45 MW) CT units. Technical issues with the EMX™ (SCONOX™) control technology include process complexity (multiple catalytic oxidation-absorption-regeneration systems) and reliability issues1, reliance on only one supplier, fuel-sulfur hypersensitivity[1][2][3], large pressure drops[1,3], and the relatively small operating experience across the utility industry[2].

Replacing the established NO_X control technologies/strategies with, or adding, EMX™ (SCONOX™) is not viable due to the EMX™ (SCONOX™) operational history and technical issues. No comparable CT sources have installed EMX™ (SCONOX™) based on the RBLC review (see Appendix C). Consequently, EMX™ (SCONOX™) is deemed not technically feasible.

Step 3: Rank the Remaining Control Technologies

The only technically feasible options are GCDP with DLE and SCR. Table 4-1 ranks the remaining technology by effectiveness that can be achieved during steady-state base load operations.

Table 4-1. Ranked Options for LM2500 NO_X

Rank	Control Option	Estimated % Control
1	GCDP + DLE + SCR	90
2	GCDP + DLE	70

Step 4: Evaluate Most Effective Controls

A review of EPA's RBLC database for the past 10 years for simple cycle turbines shows an approximate even split of BACT determinations with and without SCR. The proposed LM2500 units will utilize the GCDP with DLE and SCR, which is identified in EPA's RBLC (Appendix C) to be the most effective control for achieving low NO_X emissions for aeroderivative simple cycle CT

[1] US Dept. of Energy (DOE), National Energy Technology Laboratory (NETL): https://www.netl.doe.gov/research/Coal/energy-systems/gasification/gasifipedia/nitrogen-oxides

[2] California Air Resources Board, Report to the Legislature: Gas-Fired Power Plant NOx Emission Controls and Related Environmental Impacts, May 2004, Section B, lists seven, less than 45 MW CC and cogeneration sites; of the seven sites, two sites have ceased operating.

[3] M. Schorr and J. Chaflin, *Gas Turbine NO_X Emissions Approaching Zero – Is it Worth the Price?*, GE Power Generation, GER 4172 (9/99), page 4.

units. An exhaust-path air tempering system will be installed to maintain optimal exhaust temperatures maximizing NO_X conversion to N_2 across the SCR catalyst.

While implementing the most effective controls, TVA will adopt as BACT the NO_X stack-exit concentrations that other aeroderivative simple-cycle CT units have used for LAER (Lowest Achievable Emission Rate). A review of EPA's RBLC provides the following LAER concentrations.

Table 4-2. RBLC Natural Gas-Fired Aeroderivative Simple-Cycle NO_X LAER

Facility	Year	Model	Size	Controls	LAER
Bayonne Energy Center, NJ	2016	Rolls Royce Trent WLE 60	64 MW to 66 MW	Wet Injection, SCR	2.5 ppmvd at 15% O_2[1]
Perryman Gen. Station, MD	2014	Rolls Royce Trent WLE 60		Wet Injection, SCR	2.5 ppmvd at 15% O_2[1]

Notes:
1. Via a 3-hour rolling average.

The LM2500 aeroderivatives will maintain 2.5 ppmvd NOx at 15% O_2, which will be achieved via combustion zone NO_X mitigation and SCR. The identified Rolls Royce aeroderivatives utilize wet injection to suppress NO_X formation during combustion by reducing peak temperatures in the flame zone. Similarly, peak flame-zone temperatures are reduced in the proposed GE LM2500 via GCDP and DLE: advanced low-NO_X emission combustors, which enhance air-fuel mixing. An SCR system, also used by the Rolls Royce aeroderivatives, will reside in each GE LM2500 exhaust path.

The RBLC search produced two sites (RBLC ID AK-0088 and TX-0678) with frame (i.e., not aeroderivative) simple cycle turbines that have a NO_X limit of two (2) ppmvd at 15% O_2. Neither are considered comparable sources:

- The frame simple cycle turbines located at the Alaska Gas Line Development Corporation Liquefaction Plant (RBLC ID AK-0088) are used for gas compression as opposed to electrical generation (i.e., subject to different regulatory standards). A simple cycle turbine that is used for gas compression uses power output to drive a compressor while a simple cycle turbine that is used for electrical generation uses power output to spin a generator. Because the AK-0088 simple cycle gas-compression turbines lack a generator, they are not subject to 40 CFR Part 60, Subpart TTTTa; consequently, they are permitted to run continuously. The LM2500 units, which are subject to Subpart TTTTa, will cycle on-and-off to address transmission demands and will have annual operations limited to 40% of the year. The frame turbines located at AK-0088 are operating for a different purpose and in a different industry and should not be compared to this project's aeroderivative simple cycle units.

- The frame (GE 7EA) simple cycle turbine located at the Freeport LNG Development LP Pretreatment Facility (RBLC ID TX-0678) in Texas, does not run on natural gas. Instead, this turbine uses a process waste gas with a different heating value and thus different NO_X profile. The simple cycle turbine located at the Freeport LNG

Development LP Pretreatment Facility in Texas, uses a fuel that has a different nitrogen content than typical pipeline natural gas and should not be compared to the simple cycle units that will be installed as part of this project. Furthermore, the TX-0678 frame simple cycle is not subject to, and thus not constrained, by federal GHG rules.

It should be noted that a similar search for combined cycle units produces a more extensive list of sites with a NO_X limit of 2 ppmvd. However, a combined cycle system is quite a bit different than the proposed simple cycle system. A combined cycle power plant uses both a gas and a steam turbine to produce electricity. Turbines equipped with a heat recovery steam generator (HRSG) can more easily achieve lower NO_X emissions because the HRSG lowers the exhaust temperature, which directly contributes to reduced NO_X formation. Additionally, combined cycle units typically have less frequent load variability, which allows for improved NO_X control. Use of combined-cycle technology is not feasible for this project, as it will remove the turbine's capability to perform its function as a quick starting unit. Combined-cycle and simple-cycle turbines are not considered to be the same source type. The EPA Environmental Appeals Board (EAB) affirmed the determination that simple-cycle and combined-cycle technologies are different source types for BACT determination in its response to comments on a PSD permit application for the Pio Pico Energy Center in August 2013. Therefore, the use of combined-cycle technology is not being considered as it fundamentally changes the scope of the project.

Regarding startup and shutdown emissions, each Table 4-2 facility's permit addresses startup and shutdown (SSD) as follows in Table 4-3, which are similar to the values quoted by GE for this project's proposed turbines.

Table 4-3. NO_X LAER SSD Requirements

Facility	Model	Startup (lbs./event)	Duration	Shutdown (lbs./event)	Duration
Bayonne Energy Center, NJ	Rolls Royce Trent WLE 60	14	≤30 minutes	14	≤30 minutes
Perryman Gen. Station, MD	Rolls Royce Trent WLE 60	36.4	SCR catalyst ≥600°F	9.27	Initiate shutdown until fuel combustion ends

Step 5: Select BACT

GCDP with DLE and SCR will be utilized and will limit NO_X emissions. TVA will adopt the most stringent level of control identified for aeroderivative CT units in EPA's RBLC (Appendix C) as (primary/steady-state) BACT: 2.5 ppmvd at 15% O_2 based on a 3-hour rolling average excluding periods of startup, shutdown, and combustion tuning.

TVA anticipates one SSD event per day for each LM2500. For startup events, GE indicates that the startup time to obtain full load may be ≤10 minutes, but additional time is required to obtain the SCR catalyst temperatures necessary for ammonia injection. The total startup time from ignition to steady state NO_X compliance is expected to last 30 minutes.

To minimize the SSD NO_X emissions, TVA proposes SSD event BACT, which is based on GE data, as followed: 11.3 lbs. per startup event and 3.1 lbs. per shutdown event with neither event lasting more than 30 minutes.

4.1.2 CT Particulate Matter BACT

The emission of PM is a result of incomplete combustion and trace elements in the fuel. All PM emitted from natural gas-fired CT units are expected to be less than 10 micrometers in aerodynamic particle size diameter[4].

Step 1-2: Identification and Feasibility of Control Technologies

A review of the RBLC (see Appendix C) indicates that the most stringent $PM_{10}/PM_{2.5}$ control technology available for CT sources is low-sulfur fuels and GCDP. The review did not reveal any post-combustion particulate control technologies being used on CT units firing natural gas. The maximum $PM_{10}/PM_{2.5}$ concentrations from CT units are much lower than particulate loads normally specified for fabric filters (FF) and electrostatic precipitators (ESP); therefore, FF and ESP controls are not technically feasible.

Step 3-5: Evaluation of Control Technologies and Selection of BACT

The only technically feasible option are low-sulfur fuels (natural gas) and GCDP. The RBLC review accounts particulate-limit variability, which is expected as particulate emissions will be different across various CT makes and models/sizes and locations[5]. TVA proposes 3.4 pounds of total $PM_{10}/PM_{2.5}$ per CT hour as BACT, which is based on GE guarantees and will be applicable at all times.

4.1.3 CT Greenhouse Gases BACT

The primary GHG emissions formed during the combustion of natural gas in the combustion turbine are CO_2, CH_4, and N_2O. CO_2 is by far the largest of these, making up 99.9% of the total CO_2e on a GHG warming potential basis. Accordingly, this GHG BACT focuses primarily on the CO_2 emissions. However, a separate BACT analysis is also provided for CH_4, and N_2O.

The BACT analysis for each of these GHG pollutants is presented in the following sections.

4.1.4 CT CO_2 BACT

CO_2 production from combustion occurs by a reaction between carbon in the fuel and oxygen in the air.

Step 1: Identify All Available Control Technologies

[4] US EPA, Compilation of Air Pollutant Emission Factors (AP-42), Vol. I, 5th Ed., Emission Factor Documentation for AP-42 Section 3.1 Stationary Gas Turbines, April 2000, Page 3.7

[5] "Filterable PM from combustion turbines may derive from airborne PM that passes through the gas turbine inlet air filters, particulate matter (inert solids) in the fuel gas supply, airborne construction debris, metallic rust or oxidation products…", GE, September 2009, White Paper on Gas Turbine Particulate Matter, Page 6 of 9.

A review of the RBLC indicates that the most prevalent CO_2 control technology implemented on aeroderivative simple-cycle CT units is GCDP (e.g., good combustion practices, efficient operation, and/or low carbon emitting fuels such as pipeline-quality natural gas). No add-on control methods for GHGs were described for any simple cycle turbines in the RBLC search shown in Appendix C. Further, good combustion/operating practices and natural gas fuel were identified as BACT for CO_2e emissions from similar GE LM2500+G4 simple cycle turbines for the Nacero Penwell Facility (RBLC ID TX-0933) and the Sabine Pass LNG Terminal (RBLC ID LA-0257).

An online search was conducted by using related key words (simple cycle turbine, greenhouse gases, etc.) to search for possible state-level permits issued inside the United States for similar facilities that were required to install add-on control technologies for control of GHGs. No facilities with similar operations requiring add-on controls were identified in this search.

To TVA's knowledge, there are no permits where add-on emission control technologies for CO_2 were imposed by permitting authorities as BACT on this type of facility. Nevertheless, TVA understands that for power plant projects, a BACT analysis should evaluate the potential feasibility of carbon capture and sequestration (CCS) as an option for reducing CO_2.

The following control strategies are evaluated:

1. Low carbon fuels and good combustion design and practices (GCDP); and
2. Carbon capture and storage (CCS).

Low Carbon Fuels and Good Combustion Design and Practices (GCDP)

Natural gas has significantly lower carbon content than other commercially available turbine fuels and its use provides inherently lower CO_2 emissions per MMBtu than other turbine fuels. The only lower carbon content gaseous fuel is hydrogen (H_2) which, if available, could hypothetically be used as turbine fuel or co-fired with natural gas. (However, as discussed in Step 2 of this analysis, this is not feasible in this case.) The use of pipeline quality natural gas is proposed by this project.

Beside the fuel choice, pollutant formation and emission impacts can be minimized by efficient turbine design and good combustion, operating, and maintenance practices. US EPA in their recent issuance of an NSPS standard for GHG emissions from new combustion turbines (40 CFR 60 Subpart TTTTa) established a generation efficiency standard for new natural gas fired intermediate load turbines of 1,170 pounds CO_2 per MWh-gross[6] which they determined to represent the use of highly efficient turbines combined with best operating and maintenance practices.

Carbon Capture and Sequestration (CCS)

CCS, also known as Carbon Capture and Sequestration, involves cooling, separation and capture of CO_2 emissions from the flue gas prior to being emitted from the stack, compression of the

[6] Intermediate load turbines in NSPS TTTTa are defined as turbines with a capacity factor between 20% and 40% and are required to be highly efficient designs. Low load turbines (<20% utilization) don't have an efficiency standard but are required to use low-carbon fuels.

captured CO_2 and transportation via pipeline, and injection and long-term geologic storage of the captured CO_2.

The first phase in CCS is to separate and capture the CO_2 gas from the exhaust stream. CO_2 capture can be performed via solvents or sorbents. The choice of the precise process varies with the properties of the exhaust stream. CO_2 separation has been well demonstrated in the oil and gas industries, but the characteristics of those streams are very different from a turbine system exhaust. Most carbon capture tests and projects have been on exhaust streams from coal combustion, which has more highly concentrated CO_2 than exhaust from natural gas combustion, or on natural gas combined-cycle systems which have a much cooler exhaust than a simple cycle turbine. Existing CO_2 capture technologies have not been demonstrated in the context of capturing CO_2 from simple cycle combustion turbines in any industry use. (A further discussion of the feasibility and potential economics of carbon capture are discussed in detail in later sections of this BACT). A simple cycle turbine, which does not have a heat recovery steam generator, has higher exit gas temperatures and lower cycle efficiencies than combined cycle units, which has severe negative effects on the efficiency and economics of CCS systems.[7]

Once separated, CO_2 must be compressed to supercritical conditions, where the CO_2 has properties of both a liquid and a gas, for transport and storage. Supercritical CO_2 is dense like a liquid but has a viscosity like a gas. There are no technical challenges with compressing CO_2 to those levels, but specialized technologies with high operating energy requirements are necessary. The CO_2 could be compressed to supercritical either before or after transport.

Transport options could include pipeline, truck, or ship, but for the large quantities of CO_2 from a power plant, truck and ship transport are impractical. Specialized designs may be required for CO_2 pipelines, particularly if supercritical CO_2 is being transported. Transport of CO_2 by pipeline is a demonstrated technology, but most areas of the country do not already have a CO_2 pipeline infrastructure. Obtaining rights-of-way and installing lengthy new CO_2 pipeline infrastructure would be difficult, expensive and time consuming.

There are a variety of theoretical CO_2 storage methods although the only one with potential applicability to this project is geologic storage by injecting CO_2 into deep subsurface formations for long-term storage. Most storage locations for CO_2 are greater than 800 meters deep, where the natural temperatures and pressures are greater than the critical point for CO_2. Potential storage locations would be deep saline aquifers, un-mineable coal seams or use of the captured CO_2 for enhanced oil recovery via injection into oil fields if such sites were accessible to the project site.

Step 2: Eliminate Technically Infeasible Options

Low Carbon Fuels and Good Combustion Design and Practices (GCDP)

Use of natural gas, a low carbon fuel, is technically feasible and is proposed.

[7] *Carbon Capture Opportunities for Natural Gas Fired Power Systems*, US Department of Energy. accessed January 2021.

Use of lower carbon fuels such as hydrogen is not technically feasible. Hydrogen fuel for the turbine is not commercially available in the vicinity of the project. Additionally, even if hydrogen were available, most commercially available turbine designs aren't compatible. Also, although hydrogen co-firing with natural gas has been tested for short periods of time, these test burns do not suggest the technology is available. Lastly, large sources of hydrogen, even in areas where they are available, are generally produced using processes that themselves create more CO_2 emissions per MMBtu of hydrogen produced than would be created by simply burning natural gas. For these reasons, use of hydrogen fuel is not considered feasible.

Efficient turbine operation coupled with good combustion, operating, and maintenance practices is a feasible control option for optimizing the fuel efficiency of the combustion turbines. Combustion turbines typically operate in a lean pre-mix mode to ensure an effective staging of air/fuel ratios in the turbine to maximize fuel efficiency and minimize incomplete combustion. Furthermore, the turbine systems are sufficiently automated to ensure optimal fuel combustion and efficient operation leaving virtually no need for operator tuning of these aspects of operation. Additionally, the proposed turbine selection of the GE LM2500+G4 is a highly efficient turbine design and operated with GCDP that will achieve compliance with the applicable GHG efficiency standards in the recently promulgated NSPS TTTTa.

Carbon Capture and Sequestration (CCS)

For CCS to be technically feasible, all three components (carbon capture, compression and transport, and storage) must be technically feasible.

Carbon capture and sequestration is a feasible technology in some limited situations, although very expensive when feasible. CCS systems are commonly considered as potentially feasible in situations where the CO_2 is present in an exhaust stream at relatively high concentrations such as some industrial settings or coal combustion. Capturing the CO_2 in available solvents or absorbents is difficult at low concentrations and or higher temperatures. As discussed previously, natural gas has a relatively low carbon content and thus its combustion exhaust has relatively low CO_2 concentrations. Nevertheless, carbon capture is beginning to be considered a potential control technology for natural gas combined cycle systems. However, there is little to no research that has been completed on the implementation of CCS systems on simple-cycle turbines. To our knowledge there are no uses of carbon capture on a simple cycle turbine and not even any testing.

One of the main reasons for the lack of CCS applications or testing on simple cycle turbines is because the gases from simple cycle turbines exhaust at very high temperatures, making the process of capturing CO_2 infeasible without significant cooling of the exhaust. Even though this turbine will be equipped with tempering air to cool the exhaust to enable use of an SCR reactor for NO_X control, the exhaust temperature will still be very high (approx. 850 °F) compared to the exhausts of typical combined cycle turbines (e.g. 300 - 350 °F). The lower exhaust temperature of combined cycle turbines is due to their use of a HRSG which makes steam to drive a steam turbine generator. Adding a HRSG to the proposed simple cycle turbine is not feasible because such a configuration would not meet the design need of the facility to meet the quick start peaking load generating needs of the electricity grid. A turbine/HRSG configuration cannot be adequately responsive to electric grid load variations/needs, cannot be started up or shut down quickly enough, and cannot vary its load quickly enough. Such a change would fundamentally redefine the source which would defeat the purpose of the project and is not required by BACT. That said,

cooling could conceptually be achieved by a significant increase in the tempering air but would be inefficient and expensive. It would also dilute the CO_2 concentration and increase the cost of carbon capture so significantly as to be completely impractical, especially on a turbine that is not base-load operated. This is why no one is seriously considering CCS on a simple cycle turbine. Nevertheless, to demonstrate the potential expense and impracticality, Step 4 of this BACT will discuss these technical changes and costs further.

The next step in CCS is compression and transport of the captured CO_2 to a suitable location for storage. This would typically be via pipeline. While pipeline transport is available and demonstrated, although a costly technology, there are no currently available CO_2 pipelines near the project area. TVA would need to construct a CO_2 pipeline to a storage location or to a connection to an existing pipeline if it were to pursue carbon sequestration as a CO_2 control option. While it may be technically feasible to construct a CO_2 pipeline, land use and availability would make it challenging.

After separation and transport, storage would involve sequestering the CO_2 through various means such as enhanced oil recovery, injection into saline aquifers, and sequestration in un-minable coal seams. There are additional potential methods of sequestration that have been studied (e.g., direct ocean injection of CO_2) but none are practical to this site location. Even though availability of a mechanism for permanently storing captured CO_2 from this site is uncertain, for the purposes of this BACT analysis, the storage portion of CCS has been assumed to be feasible.

There are significant technical challenges outlined above that make the feasibility of CCS questionable for a simple cycle turbine. EPA reached a similar conclusion as expressed in their executive summary for the proposed rule NSPS TTTTa where they state:

> *"EPA has not proposed use of CCS as best system of emissions reduction (BSER) for simple cycle combustion turbines because CCS have been generally determined to be not cost effective. Use of high-efficiency simple cycle turbine technology in combination with the best operating and maintenance practices is considered BSER."*[8]

Although TVA does not believe that CCS is technically feasible for the proposed simple cycle turbine for the many reasons discussed above, for the proposes of this BACT analysis, TVA is not excluding CCS as infeasible. Instead, CCS is carried forward in this analysis and an examination of the potential economics of CCS are included in Step 4 below to help illustrate, irrespective of theoretical feasibility, that CCS for this source would be not economically feasible.

Step 3: Rank the Remaining Control Technologies

The only technically feasible options are 1) carbon capture and sequestration (CCS) and 2) low carbon fuels and good combustion design and practices (GCDP). Table 4-4 ranks the remaining technology by effectiveness. CCS, if feasible, is theoretically capable of capturing approximately 90% of the CO_2 emitted. Low-carbon fuel and GCDP are the proposed level of control and can

[8] New Source Performance Standards for Greenhouse Gas Emissions from New, Modified, and Reconstructed Fossil Fuel-Fired Electric Generating Units: Emission Guidelines for Greenhouse Gas Emissions from Existing Fossil Fuel-Fired Electric Generating Units; and Repeal of the Affordable Clean Energy Rule Docket (EPA-HQ-OAR-2023-0072) dated May 23, 2023.

meet an efficiency standard of 1,170 pounds CO_2 per MWhr gross generation (12-operating month average) consistent with the intermediate load turbine standard in NSPS TTTTa.

Table 4-4. Ranked Options for LM2500 CO_2e

Rank	Control Option
1	CCS
2	Low Carbon Fuel & GCDP

Step 4: Evaluate Most Effective Controls

Low Carbon Fuels and Good Combustion Design and Practices (GCDP)

There are no adverse energy, environment, or economic impacts associated with the use of natural gas fuel and use of efficient turbine operation and good combustion, operating, and maintenance practices for reducing CO_2 emissions from the combustion turbine. This is the baseline performance proposed.

Carbon Capture and Sequestration (CCS)

As discussed previously, there are many technical and economic challenges in the use of CCS for a simple cycle turbine. For those reasons it has never been done. Notwithstanding the technical feasibility issues, TVA has generated a cost estimate to illustrate, at a minimum, how much it might cost to implement CCS on the proposed turbine if it were feasible.

Various sources of cost information are available for estimating the theoretical cost of CCS for a combined cycle turbine. As a starting point to estimate the cost for the proposed simple cycle turbine, TVA used cost-factors and system parameters outlined for a 2,000 MMBtu per hour, 279 MW net combined cycle turbine in an EPA technical support document developed as part of the rulemaking for the recently promulgated NSPS TTTTa GHG standards for electric generating units, including combustion turbines.[9] That document had other larger combined cycle unit CCS cost examples, but the 2000 MMBtu/hr unit was the one closest to the size of this project's proposed turbines, although still quite a bit larger. Using that EPA CCS cost as a reference, costs were estimated for the proposed simple cycle turbines by making several adjustments to the combined cycle CCS costs, such as those below. Full details of the cost estimates are provided in Appendix C.

- Capital costs adjusted for size difference: The proposed turbines (LM2500+G4) are approximately seven times smaller (on a MMBtu per hour basis). Accordingly, CCS per ton of CO_2 captured is more expensive merely due to lack of economy of scale.

- Further capital cost adjustment to due increased tempering air volume: As discussed previously, a simple cycle turbine requires additional cooling of the exhaust (vs. a combined cycle unit) which adds significant volume to the exhaust stream requiring much larger carbon capture equipment. The larger equipment

[9] Figure 7, "Cost of CCS for New Combustion Turbine" in US EPA Technical Support Document supporting NSPS TTTTa rulemaking entitled "Greenhouse Gas Mitigation Measures, Carbon Capture and Storage for Combustion Turbines, Technical Support Document", EPA Docket ID No. EPA-HQ-OAR-2023-0072, May 23, 2023.

size is much more expensive even though the tons of carbon available for capture is unaffected by the dilution.

- Variable cost and mass emissions adjustment due to lower capacity utilization: The proposed turbine has a maximum proposed capacity utilization of 40%. The EPA example costs are for turbines with operations of at least 50%-80% utilization. The lower capacity utilization of the proposed simple cycle turbine reduces variable costs, but overall makes the carbon capture more expensive relative to the benefit because the most significant costs of CCS are the one-time capital costs – which relate to the size of the unit, not its utilization.

The primary costs for CCS are the costs for the carbon capture system itself (capital and operating costs). The cost for transportation, storage and monitoring (TS&M) are significant also, but much less significant than the capture costs. The actual storage of the gas at a chosen location requires pore space acquisition, daily expenses, consumables, surface maintenance, and subsurface maintenance.[10] The EPA technical support document includes the costs for TS&M as typically about $10 per tonne ($11 per ton), and for TVA's analysis this TS&M cost was assumed. Because there are no existing CO_2 pipeline infrastructure or sequestration sites near the project location, actual TS&M costs may be greater. The potential sequestration site closest to the project site is the Black Warrior Basin located near Birmingham, Alabama, 217 miles away.

Using the referenced EPA technical support document, TVA generated an estimate for a CCS system for one LM2500. Table 4-5 shows these estimated costs and a detailed breakdown of the costs and basis for adjustments of costs based on size, capacity factors, etc. are explained in Appendix C.

Table 4-5. CCS Cost Effectiveness Summary for a LM2500

Cost	One LM2500 34 MW Simple Cycle Turbine
Capital Costs for Carbon Capture ($)	**$286,364,700**
Capture Capital Cost Annualized	$23,077,100
Capture Annual Costs (Fixed and Variable)	$10,197,340
Transport., Storage, Monit. Costs	$670,700
Total Annual Costs ($)	**$33,945,140**
CO_2 Captured (tons/yr)	60,865
$/Ton for CCS	**$558**

Notes:

1. Based on 30-year life, 7% interest.
2. Does not include cost for tempering air equipment or greater difficulty capturing lower concentrations CO_2 (due to tempering dilution).

Several additional potential costs are not included in these calculations. The capital and operating costs of a tempering air system to cool the exhaust to an acceptable temperature for carbon capture is not included. Additionally, carbon capture will be more difficult due to the lower CO_2

[10] Estimating Carbon Dioxide Transport and Storage Costs, March 2010 National Energy Technology laboratory, U.S. DOE, DOE/NETL-2010/1447, Table 3, March 2010.

concentration in the exhaust due to the large volume of tempering air added. Although the cost for a larger system based on the increased volume is included, extra costs for more difficult removal due to the lower concentration is not included and are likely significant. Also, for the above scenario where the exhausts are combined and routed to a single larger capture system, no additional costs have been included for the extra costs for ductwork or controls to combine the vent streams and to manage the complexities of a system serving multiple turbine units.

The above estimated costs for installing and operating a CCS system on these simple cycle turbines is significantly higher than published estimates for combined cycle systems or other power or industrial applications. This is because of the numerous simple cycle turbine CCS challenges discussed in this analysis; additionally, in TVA's opinion these challenges make CCS technically infeasible. Irrespective of CCS's many feasibility questions, given the economic considerations illustrated in this section, CCS is deemed not cost effective and eliminated as a viable option for BACT.

Step 5: Select BACT

The top feasible CO_2 control option for the proposed LM2500 units is utilization of natural gas fuel, and GCDP. This is consistent with the BACT determinations in EPA's RBLC (Appendix C) and is the most effective control for achieving low CO_2 emissions for aeroderivative simple cycle CT units. Use of natural gas fuel, GCDP along with compliance with 40 CFR 60 Subpart TTTTa is proposed as BACT to limit CO_2 emissions.

4.1.5 CT CH_4 BACT

CH_4 can be emitted when natural gas is not burned completely in combustion.

Step 1: Identify All Available Control Technologies

The RBLC entries do not individually identify BACT determinations for CH_4 separate from CO_2e entries and no individual references to CH_4 were found in a RBLC search of natural gas-fired simple cycle large combustion turbines greater than 25 MW (process type 15.110) for the last 10 years. To TVA's knowledge, the only available control option for minimizing CH_4 emissions from the combustion turbine systems is efficient turbine operation coupled with good combustion, operating, and maintenance practices to minimize unburned fuel. Oxidation catalysts are not considered available for reducing CH_4 emissions because oxidizing the very low concentrations of CH_4 present in the combustion turbine's exhaust would require much higher temperatures, residence times, and catalyst loadings than those offered commercially for CO oxidation catalysts. For these reasons, catalyst providers do not offer products for reducing CH_4 emissions from gas-fired combustion turbines.

The following control strategies are evaluated:

- GCDP

Step 2: Eliminate Technically Infeasible Options

GCDP is the only technically feasible control options for reducing CH_4 emissions from the combustion turbines.

Step 3: Rank the Remaining Control Technologies

Since GCDP is evaluated in the remaining steps of the BACT analysis, no ranking of control options is required.

Step 4: Evaluate Most Effective Controls

No adverse energy, environment, or economic impacts are associated with GCDP for reducing CH_4 emissions from the combustion turbine.

Step 5: Select BACT

GCDP is selected as BACT for minimizing CH_4 emissions from the combustion turbine systems.

4.1.6 CT N_2O BACT

N_2O formation is limited during complete gas combustion, as most oxides of nitrogen will tend to oxidize completely to NO or NO_2, which are not a GHG. There are five primary pathways of nitrogen oxidation in gas-fired combustion turbines: thermal NO_X, prompt NO_X, NO_X from N_2O intermediate reactions, fuel NO_X, and NO_X formed through reburning. For turbines using DLE combustors, the N_2O pathway is an important mechanism of NO_X formation. Flame radicals produced in the high temperature and pressure DLE combustion zone react with the N_2O molecule, creating N_2 and NO.[11] In premixed gas flames, N_2O is primarily formed in the flame front or oxidation zone. Once formed, the N_2O is readily destroyed due to the relatively high concentration of H radicals, and therefore, the N_2O emissions from premixed gas flames like DLE combustor flames are found experimentally to be very small (generally less than 1 ppm). However, any mechanisms which decrease the H atom concentration in the N_2O formation zone can increase N_2O emissions. These mechanisms include lowering the flame combustion temperature, air-to-fuel staging, and injection of ammonia, urea, or other amine or cyanide species into the exhaust stream which are all common NO_X control measures.[12] Therefore, there is a tradeoff between NO_X and N_2O emissions when developing a combustion control strategy which influences the BACT selection process.

Step 1: Identify All Available Control Technologies

The RBLC does not individually identify BACT determinations for N_2O separate from CO_2e entries and there are no individual references for N_2O emissions from natural gas simple cycle large combustion turbines greater than 25 MW (process type 15.110) in the last 10 years. However, similar to other GHGs, good combustion practices have been identified as a control strategy for N_2O.

[11] Honegger, U., Kansas State University, *Gas Turbine Combustion Modeling for a Parametric Emissions Monitoring System*, 2007.
[12] American Petroleum Institute, *Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Gas Industry*, February 2004.

In addition to good combustion practices, N_2O catalysts are a potential control option, as these have been used in nitric/adipic acid plant applications to minimize N_2O emissions.[13] Through this technology, tail gas from the nitric acid production process is routed to a reactor vessel with a N_2O catalyst followed by ammonia injection and a NO_X catalyst.

The following control strategies are evaluated:

1. N_2O Catalysts
2. Efficient Turbine Operation and Good Combustion, Operating, and Maintenance Practices (GCDP).

Step 2: Eliminate Technically Infeasible Options

N_2O catalyst providers do not offer products to control N_2O emissions from gas-fired combustion turbines due to the very low N_2O concentrations present in turbine exhaust streams (approximately 5 ppm).[14] In comparison, the application of a catalyst in the nitric acid industry sector has been effective due to the high (1,000-2,000 ppm) N_2O concentration in the tail gas from nitric acid production.

With N_2O catalysts eliminated, GCDP is the only available control option or reducing N_2O emissions from the combustion turbines.

Step 3: Rank the Remaining Control Technologies

Since GCDP is evaluated in the remaining steps of the BACT analysis, no ranking of control options is required.

Step 4: Evaluate Most Effective Controls

GCDP is the most effective control for N_2O emissions.

Step 5: Select BACT

Efficient turbine design and good combustion, operating, and maintenance practices are the selected control options for minimizing N_2O emissions from the combustion turbines.

4.2 Black-Start Generators (BSGs)

Unlike other combustion equipment (e.g., CTs and boilers), new diesel engines are required to be certified in compliance with EPA's NSPS requirements, including emission limits, upon purchase. Different types of engines have different emission requirements based on the type of engine being purchased (emergency engine, emergency fire pump engine, or non-emergency engine). Depending on the type of engine and the applicable NSPS emission limits, engine manufacturers may need to employ add-on control technologies to comply with such limits.

[13] *N_2O Emissions from Adipic Acid and Nitric Acid Production*, written by Heike Mainhardt (ICF Incorporated) and reviewed by Dina Kruger (U.S. EPA).
[14] *Emissions of Nitrous Oxide from Combustion Sources*, in Progress and Energy and Combustion Science 18(6): pages 529-552, December 1992.

As discussed in Section 3.3.2 (Regulatory Analysis) and Section 3.4 (NESHAP), black-start (emergency) diesel generator engines are subject to federal NSPS and NESHAPS standards: Part 60 Subpart IIII and Part 63 Subpart ZZZZ. These standards are applicable to stationary compression ignition internal combustion engines. They establish emissions standards that must be met by the manufacturer and owner/operator regarding NO_X, CO, PM, hydrocarbon (VOC) emissions and fuel sulfur content. The proposed black-start (emergency) diesel generator engines will meet these standards which, for these size engines, are equivalent to US EPA Tier 2 standards stipulated in Appendix I of Part 1039.

The following sections contain details on the "top down" BACT review, as well as the control technology and emission limits for proposed BACT for NO_X, PM, and GHG emissions from the two black-start (emergency) diesel generators.

4.2.1 BSG NO_X BACT

Step 1: Identify All Available Control Technologies

A search of the RBLC indicates that BACT for emergency diesel engines and generators for NOx is good combustion practices and limited use along with compliance with the NSPS and MACT standards. Refer to Appendix C, Table C-4 for black start engines found in the RBLC search of large diesel internal combustion engines (> 500 HP). For engines operated more frequently than only for emergencies, selective catalytic reduction (SCR) can be used for NOx control. A generator equipped with selective catalytic reduction along with compliance demonstrated with vendor emission certification and adherence to vendor-specified maintenance recommendations was identified as LAER for the Cricket Valley Energy Center (RBLC ID NY-0103) black start generator using ultra-low sulfur diesel.

The following control strategies are evaluated:

1. Good combustion practices and limited use along with compliance with the applicable NSPS and NESHAP;
2. Selective catalytic reduction.

Step 2: Eliminate Technically Infeasible Options

Good combustion practices, limited use, and compliance with NSPS and MACT is feasible and is the proposed level of control.

While SCR is possible to add to an emergency engine, SCR would not be very effective on an emergency engine because it takes time for the NO_X controls to be operational. Since emergency engines typically only operate periodically for 30 minutes to an hour for readiness and maintenance testing, SCR would only be marginally effective. Similarly, when operated to support a black start of the turbine generators, the engine would only operate approximately 30 minutes. Because of its limited effectiveness on such units, SCR is not typically provided on emergency engines. Additionally, SCR is not very cost effective because of the units limited use as discussed in Step 4 of this analysis. Nevertheless, SCR would be feasible to install on this engine.

Step 3: Rank the Remaining Control Technologies

The technically feasible options are SCR and good combustion practices and limited use along with compliance with the NSPS and MACT standards. Table 4-6 ranks these technologies by effectiveness.

Table 4-6. Ranked Options for Black Start Generator NOx

Rank	Control Option
1	SCR
2	Good combustion practices and limited use along with compliance with the NSPS and MACT standards

Step 4: Evaluate Most Effective Controls

Because of the limited use of the black start generator (no more than 100 hours per year), SCR would not be reasonably cost effective. SCR's lack of cost-effectiveness is illustrated in EPA's March 5, 2010, report entitled "Alternative Control Techniques Document: Stationary Diesel Engines". In that analysis, EPA estimated SCR controls on a Tier 2 engine rated above 750 hp would be $9,833 per ton in 2004 dollars, assuming 1,000 hours of operation.[15] Adjusting that cost to 2024 dollars using the CEPCI index and modifying it for a maximum of no more than 100 hours per year of operation, this SCR cost would exceed $100,000 per ton.[16]

Considering the very limited use of this engine and the estimated cost of add-on controls (including the use of NSPS certified non-emergency engines), we are eliminating the use of SCR as BACT for these engines as not cost effective.

Step 5: Select BACT

TVA proposes that BACT for these black start emergency engines is good combustion practices; compliance with NSPS Subpart IIII, NESHAPS Subpart ZZZZ; and limited use for NO_X emissions.

4.2.2 BSG PM BACT

Step 1: Identify All Available Control Technologies

A search of the RBLC indicates that BACT for emergency diesel engines and generators for particulate emissions is good combustion practices, ULSD, and limited use along with compliance with the NSPS and MACT standards. Refer to Appendix C, Table C-4 for black start engines found in the RBLC search of large diesel internal combustion engines (> 500 HP). For PM, PM_{10}, and $PM_{2.5}$ emissions, a diesel particulate filter/trap could be added.

The following control strategies are evaluated:

[15] See EPA's Alternative Control Techniques Document: Stationary Diesel Engines, Table 5-2, March 5, 2010.
[16] CEPCI index for 2004 is 444.2, for 2024 (Mar. Prelim.) is 800.7. Accordingly, $9,833 per ton in 2004 is equivalent to $17,700 per ton in 2024. That cost/ton is escalated approximately an order of magnitude to well over $100,000/ton for a turbine operation of only 100 hrs per year compared to the 1000 hrs per year basis EPA used in their document.

1. Good combustion practices, ULSD, and limited use along with compliance with the applicable NSPS and NESHAP;
2. Diesel particulate filter/trap.

Step 2: Eliminate Technically Infeasible Options

All of the control technologies identified are assumed to be technically feasible.

Step 3: Rank the Remaining Control Technologies

The only technically feasible options are diesel particulate filter and good combustion practices and limited use along with compliance with the NSPS and MACT standards. Table 4-7 ranks these technologies by effectiveness.

Table 4-7. Ranked Options for Black Start Generator PM

Rank	Control Option
1	Diesel particulate filter
2	Good combustion practices, ULSD, and limited use along with compliance with the NSPS and MACT standards

Step 4: Evaluate Most Effective Controls

Due to economic impacts, TVA has eliminated add-on controls, such as diesel particulate filter, for the black start engine. As with NO_X above, EPA has previously estimated that the cost effectiveness of adding PM controls to stationary diesel engines in a report entitled "Alternative Control Techniques Document: Stationary Diesel Engines," dated March 5, 2010. In this analysis, EPA estimated that the cost of adding PM controls to a Tier 2 engine rated above 750 hp, would be $99,724 per ton (2008 dollars), assuming 1,000 hours of operation.[17] This is an excess cost without even adjusting to current dollars or accounting for the lower hours of operation of the proposed black start engine.

Considering the very limited use of this engine and the estimated cost of add-on controls (including the use of NSPS certified non-emergency engines), we are eliminating the use of diesel particulate filter/trap as BACT for these engines as not cost effective.

Step 5: Select BACT

TVA proposes that BACT for these emergency engines is good combustion practices; ULSD, compliance with NSPS Subpart IIII, NESHAPS Subpart ZZZZ; and their limited use for particulate emissions.

4.2.3 BSG GHG BACT

Step 1: Identify All Available Control Technologies

[17] See EPA's Alternative Control Techniques Document: Stationary Diesel Engines, Table 5-3, March 5, 2010.

A search of the RBLC indicates that BACT for emergency diesel engines and generators for GHGs is good combustion practices and limited use. Refer to Appendix C, Table C-4 for black start engines found in the RBLC search of large diesel internal combustion engines (> 500 HP). The use of further add-on controls would not be justified given the infrequent use of this equipment. No other GHG controls have any practical applicability to such a service.

The following control strategies are evaluated: Good combustion practices and limited use.

Step 2: Eliminate Technically Infeasible Options

Good combustion practices and limited use is the only technically feasible option.

Step 3: Rank the Remaining Control Technologies

Since good combustion practices and limited use are evaluated in the remaining steps of the BACT analysis, no ranking of control options is required.

Step 4: Evaluate Most Effective Controls

Good combustion practices and limited use is the most effective control for GHGs and is feasible.

Step 5: Select BACT

TVA proposes that BACT for these emergency engines is good combustion practices and limited use for GHG emissions.

5.0 AIR QUALITY DISPERSION MODELING ANALYSIS

5.1 Description of Analysis

To satisfy PSD requirements for assessment of Class II and Class I area impacts in attainment or unclassifiable areas, an air quality analysis was performed to demonstrate that the proposed emissions will not cause or contribute to a violation of any applicable National Ambient Air Quality Standards (NAAQS) or PSD increments (EPA, 1990). The modeling analysis specifically focused on the following pollutants that exceed the SER: NO_X, O_3 (due to NO_X), PM_{10}, and $PM_{2.5}$ (primary and secondary). The applicable pollutants that were modeled or quantitatively assessed are presented in Table 5-1.

In March 2024, the EPA finalized revisions to the primary annual $PM_{2.5}$ standard by lowering the level from 12.0 µg/m^3 to 9.0 µg/m^3. Upon the effective published date (May 6, 2024) of the revised primary annual $PM_{2.5}$ NAAQS, a PSD demonstration must include the revised primary annual $PM_{2.5}$ NAAQS. Therefore, TVA evaluated the annual $PM_{2.5}$ results against the revised NAAQS.

Additionally, in light of the NAAQS revision, the EPA provided a supplemental guidance to the SILs for O_3 and $PM_{2.5}$ on April 30, 2024 (EPA, 2024a). The guidance retains the current O_3 SIL and 24-hour $PM_{2.5}$ SILs for Class II and Class I areas, it provides revised annual $PM_{2.5}$ SILs for Class I and Class II areas (Table 5-1). Therefore, TVA applied the new SILs to the annual $PM_{2.5}$ modeling analyses.

Table 5-1. List of Criteria Pollutants Evaluated [1]

Pollutant	Averaging Period	PSD SIL		NAAQS		PSD Increment	
		Class II (µg/m^3)	Class I (µg/m^3)	Primary (µg/m^3)	Secondary (µg/m^3)	Class II (µg/m^3)	Class I (µg/m^3)
NO_2	1-hour	7.5 [1]	--	188 [3]	--	--	--
	Annual	1 [1]	0.1	100	100	25	2.5
O_3	8-hour	1.0 ppb	--	70 ppb [4]	70 ppb [4]	--	--
PM_{10}	24-hour	5	0.3	150 [5]	150 [5]	30	8
	Annual	1	0.2	--	--	17	4
$PM_{2.5}$	24-hour	1.2 [6]/ 1.2 [7]	1.2 [6]/ 0.27 [7]	35 [8]	35 [8]	9	2
	Annual	0.13 [6]/ 0.13 [7]	0.13 [6] / 0.03 [7]	9 [9]	15 [9]	4	1

Notes:
1. NAAQS are found in 40 CFR Part 50. The 1-hr NO_2 Class II Significant Impact Level (SIL) is an interim SIL found in EPA's *Guidance Concerning the Implementation of the 1-hour NO_2 NAAQS for the PSD Program* (EPA, 2010); it is not a formally established SIL. The Class II SIL for NO_2 (annual) is found in 40 CFR 51.165(b)(2). SILs for O_3 and $PM_{2.5}$ are based on the April 17, 2018 EPA memo, *Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program* (EPA, 2018). PSD increments are found in 40 CFR Part 51.166.
2. Not to be exceeded more than once per year.
3. 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years.
4. Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years.
5. Not to be exceeded more than once per year on average over 3 years.

6. The Class I and Class II SIL for the NAAQS.
7. SIL for the PSD increment.
8. 98th percentile, averaged over 3 years.
9. Annual mean, averaged over 3 years.

Maximum modeled concentrations were compared to the Class II significant impact levels (SILs) for each pollutant and averaging time to determine if a cumulative impact analysis was necessary. For pollutants with short-term averaging periods, the highest-first-high modeled concentration was compared to the corresponding SIL. If maximum predicted impacts from the modeling analysis exceeded the SILs, a full (cumulative) impact modeling analysis was performed for that pollutant and averaging time.

To evaluate impacts of precursor emissions on secondary pollutants, a Modeled Emission Rates for Precursors (MERPs) assessment of secondary $PM_{2.5}$ and ozone (O_3) impacts was performed (Section 5.3). The assessment estimated secondary $PM_{2.5}$ impacts from NO_X and SO_2 precursor emissions; and O_3 impacts from emissions of NO_X and VOC (EPA, 2022).

A separate analysis was also performed to assess potential impacts to nearby Class I areas. Modeled AERMOD impacts at receptors located 50 km from ACT were compared to the applicable Class I SILs for the PSD increments (Section 5.5).

All Class II and Class I modeling methods and assumptions – such as model selection and options, source parameters, and meteorological data – were presented in the ACT modeling protocol for review by the Shelby County Health Department (SCHD) in August 2024 (provided electronically). The following subsections present the modeling results.

5.2 Class II Modeling: Single-Source Impact Analysis

The following sections summarize the methodology used to evaluate the facility's air quality impacts in Class II areas. The dispersion modeling described was performed in accordance with the EPA "Guideline on Air Quality Models" (GAQM, contained in 40 CFR Part 51, Appendix W) (EPA, 2024b), the New Source Review (NSR) Workshop Manual (EPA, 1990), all applicable EPA clarification memorandums and guidance documents, and direction and regulatory guidance provided by SCHD. The modeling analysis focused on demonstrating that the ambient impact of proposed emissions from the ACT project will be in compliance with all applicable NAAQS and PSD Class II increments.

5.2.1 Dispersion Model

On November 9, 2005, the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) was promulgated as the EPA's preferred near-field dispersion modeling for a wide range of regulatory applications in all types of terrain based on extensive developmental and performance evaluation. On November 20, 2024, the EPA Administrator signed a final rule that revised the Guideline on Air Quality Models (Appendix W to 40 CFR Part 51), which included enhancements to the formulation and application of the agency's AERMOD dispersion model, updates to the recommendations for the development of appropriate background concentration for cumulative impact analyses, and various typographical updates to the existing regulation. The rule was published in the Federal Register on November 29, 2024.

To coincide with the revised Appendix W, the EPA also provided an updated AERMOD modeling system on November 20, 2024, including new versions of AERMOD, AERMET, and AERMAP along with an updated version of AERSURFACE (v24142). For the ACT PSD Class II modeling analysis, the most current versions of the AERMOD system that were issued during preparation of the ACT modeling protocol and this PSD permit application were used to assess impacts from NO_X, CO, PM_{10}, and $PM_{2.5}$ (primary):

- AERMOD, v23132 (EPA, 2023c);
- AERMET, v23132 (EPA, 2023b);
- AERMAP, v18081 (EPA, 2018b);
- AERMINUTE, v15272 (EPA, 2015);
- BPIPPRM, v04274 (EPA, 2004);
- AERSURFACE, v20060 (EPA, 2020).

Additional regulatory default options used in the AERMOD modeling system included the following:

- Appropriate treatment of calms and use of missing meteorological data routines;
- Inclusion of actual receptor elevations;
- Incorporation of complex / intermediate terrain algorithms;
- Calculations of stack-tip downwash;
- Calculation of direction-specific building downwash;
- Use of the NO_2 Tier 2 Ambient Ratio Method (ARM2);
- Use of the ADJ_U* option to adjust surface friction velocity during stable, low wind speed conditions.

The BREEZE AERMOD modeling software developed by Trinity Consultants (https://www.breeze-software.com/software/aermod) was used to run the AERMOD v23132 executable and associated preprocessors after approval from SCHD.

5.2.2 Meteorology

Site specific meteorological data were not available for the ACT site, so 2018-2022 surface data collected by the National Weather Service (NWS) at the Memphis International Airport (MEM) were used. Twice-daily soundings for the same time period from the NWS North Little Rock, AR (LZK), station were used for the upper air data.

The LZK meteorological data included 1-minute ASOS wind data from the National Climatic Data Center (NCDC) processed with AERMINUTE to generate hourly averaged wind speed and wind direction to supplement the standard hourly NWS observations. A minimum wind speed threshold value of 0.5 m/s and the ADJ_U* option were both set in AERMET.

According to Appendix W, Section 8.4.2(b), the surface characteristics input to AERMET should be representative of the land cover in the vicinity of the meteorological data, i.e., the location of the meteorological tower for measured data (EPA, 2024b). Therefore, the surface characteristics based on a one-kilometer radius centered on the NWS MEM site were used.

Additional details of the meteorological analyses performed are described in the Class II modeling protocol which is provided in Appendix D. The AERMET files, AERMOD-ready surface and profile files from AERMET, and AERSURFACE input and output files are also included electronically.

5.2.3 Receptors

For comparison to the Class II SILs, the modeling analysis used a nested Cartesian grid centered on the ACT site that extended out to 10 km in each direction. Boundary receptors were also placed along the perimeter of the fenced and other security barriers[18] of the ACT property and spaced 50 meters apart (Figure 5-1). These boundary receptors corresponded to a permanent fence surrounding the property (TVA, 2024). Additional boundary receptors were also placed along the perimeter of the fenced ACC property directly south of ACT and spaced 50 m apart.

The nested receptor grids surrounded the facility site with the exception of those falling inside the fenced boundary area, which were removed. Because concentration gradients are most pronounced near a source, the receptor spacing varied with distance from the site with those nearest the site more closely spaced than those further away. The center of each grid was defined by the ACT53 stack location.

The receptor spacing used for comparison to the Class II SILs is outlined in Table 5-2. For comparison to the SILs, receptors were spaced 100-m apart on a Cartesian grid extending out to a distance sufficient to resolve the maximum concentrations, but at least extending outward to 5 km in all directions. Additional, less refined receptor grids extended from the finest grid out to 10 km in each direction. If the maximum concentration fell outside of the finest grid, an additional 100-m spaced receptor grid was added to ensure that the highest concentration was captured.

Table 5-2. Receptor Grid Size and Spacing

Receptor Spacing (m)	Grid Size (km)	Grid Origin (km south and west of site)
100	10 x 10	0-5
250	16 × 16	5-8
500	20 × 20	8-10

Elevations for all receptors were extracted from U.S. Geological Survey (USGS) National Elevation Dataset (NED) files using the AERMAP terrain processor of the AERMOD modeling system. All AERMAP input and output files are electronically.

5.2.4 Building Downwash

Actual stack heights were used in the modeling analysis. The AERMOD model has the Plume Rise Modeling Enhancements (PRIME) incorporated in the regulatory version through the Building Profile Input Program, PRIME version (BPIPPRM) v04274 (Earth Tech, Inc., 1997).

[18] Both physical and other security barriers (signage, security patrol) will surround the TVA ACT property boundary to preclude public access.

The direction-specific building downwash dimensions were determined by all buildings and structures within the stack influence area. The stack influence area was defined by a circular area with a radius of five (5) times the lesser of the 'building height' or 'building projected width' from the stack out to 800 meters from the stack. The downwash effects were incorporated into the AERMOD modeling.

Results from BPIPPRM showed that the SCR structures were the main components influencing downwash for the aeroderivative units; the Power Distribution Center was the main component influencing the BSGs. The overall downwash summary table is provided in Table 5-3. The BPIPPRM input tables are included in Appendix E, and the BPIPPRM modeling files are provided electronically.

Table 5-3. Building Downwash Results [1]

Stack	Actual Stack Height (m)	GEP Stack Height (m)	GEP Building Height (m)	GEP Projected Building Width (m)	GEP Eqn. Height (m)
ACT50	21.9	65.0	9.10	9.11	22.8
ACT51	21.9	65.0	9.10	9.70	22.8
ACT52	21.9	65.0	9.10	9.75	22.8
ACT53	21.9	65.0	9.10	9.72	22.8
ACT54	21.9	65.0	9.10	9.73	22.8
ACT55	21.9	65.0	9.10	9.73	22.8
ACT56	3.05	65.0	6.70	17.2	16.8
ACT57	3.05	65.0	6.70	16.2	16.8

Note:
1. BPIPPRM inputs, output, and summary are provided in Appendix E.

5.2.5 ACT Sources and Emissions

Modeling was performed for the six (6) CT units (ACT50-55), and the two BSGs (ACT56-57). Source locations, base elevations, and fixed stack parameters are provided in Table 5-4.

Table 5-4. CT and GH Stack Parameters [1]

Unit	UTM Zone 15, NAD83 [2]		Base Elev. (m)	Stack Height (m)	Stack Inside Diam. (m)
	Easting (m)	Northing (m)			
ACT50	760227.95	3884780.33	72.5	21.9	2.74
ACT51	760258.38	3884778.28	72.5	21.9	2.74
ACT52	760288.80	3884776.24	72.5	21.9	2.74
ACT53	760319.23	3884774.20	72.5	21.9	2.74
ACT54	760349.65	3884772.16	72.5	21.9	2.74
ACT55	760380.07	3884770.12	72.5	21.9	2.74
ACT56	760342.82	3884803.85	72.5	3.05	0.24
ACT57	760346.84	3884803.57	72.5	3.05	0.24

Notes:

1. Stack locations and elevations provided in Appendix E.
2. Stack parameters provided in Appendix F.

Modeling scenarios were developed for both short-term and annual averaging periods (see Tables 5-5 and 5-6). The modeling analysis for each ambient-air standard utilized inputs that represented the most conservative, or a "worst-case", operating scenario and included startup and shutdown parameters. AERSCREEN was used for the "short-term" air quality standards (i.e., standards of ≤ 24 hours) to determine the conditions worst-case concentrations occur because CT performance varies with ambient temperature and generation load. The AERSCREEN results indicated that the "worst-case" emissions scenario occurred at 95°F and 50% load. The AERSCREEN emissions are provided in Appendix F. The AERSCREEN model input and output files are provided electronically.

Although AERSCREEN includes conversion factors to estimate "worst-case" annual concentrations from resulting one-hour "worst-case" concentrations, AERSCREEN's unsophisticated nature does not capture the inherent characteristics of the screened source: ambient conditions affect emissions and power output from CT units more than from external combustion systems (EPA, 2000). "The operation at high excess air levels and at high pressures increases the influence of inlet humidity, temperature, and pressure. Variations of emissions of 30 percent or greater have been exhibited with changes in ambient humidity and temperature" (EPA, 2000). Extrapolating CT performance achieved at a relatively low ambient temperature for an entire year of operations is not appropriate. A review of recent annual temperature data obtained from nearby meteorological towers indicates an average annual temperature range of 61.1°F to 63.4°F. Consequently, annual air quality standards will be modeled using manufacturer-provided CT performance at 59°F and full load conditions along with startup and shutdown parameters.

The black-start generators are for emergency resiliency and are to be utilized for ancillary power (e.g., energizing the switchyard) only during black start events (i.e., recovery from power transmission-network shutdowns). When one (or more) of the LM2500 units completes startup, the black-start generators will cease operating. The generators will be load tested once every three years and will only run periodically over the course of the year for maintenance and readiness testing. EPA's guidance on intermittent source operation (EPA, 2011) exempts the black start generators from 1-hour NO_2 modeling. However, maintenance and readiness testing were included for modeling other applicable standards.

The emissions for each pollutant and averaging period are presented in Tables 5-5 through 5-7. Details of the operating scenarios are detailed in the emissions spreadsheet provided electronically.

Table 5-5. 1-Hour Model Inputs for NO_x (as NO_2) [1,2,3]

Unit / Stack ID	Stack-Exit Parameters		NO_X (g/s)
	Velocity (m/s)	Temp. (K)	
ACT50-55	27.2	766	4.58E-01

Notes:
1. Emission inputs are provided in Appendix F.
2. AERMOD modeling files labeled with "t1" correspond to Table 1 cited in Note 1.

3. Stack heights and stack diameters are provided in Table 5-4.

Table 5-6. 24-Hour Model Inputs for PM_{10}, $PM_{2.5}$ [1,2,3]

Unit / Stack ID	Stack-Exit Parameters		PM_{10} (g/s)	$PM_{2.5}$ (g/s)
	Velocity (m/s)	Temp. (K)		
ACT50-55	20.0	729	2.48E-01	2.48E-01
ACT56-57	133	722	1.05E-03	1.05E-03

Notes:
1. Emission inputs are in Appendix F.
2. AERMOD modeling files labeled with "t2" correspond to Table 2 cited in Note 1.
3. Stack heights and stack diameters are provided in Table 5-4.

Table 5-7. Annual Model Inputs for PM_{10}, $PM_{2.5}$, NO_X (as NO_2) [1,2,3]

Unit / Stack ID	Stack-Exit Parameters		NO_X (g/s)	PM_{10} (g/s)	$PM_{2.5}$ (g/s)
	Velocity (m/s)	Temp. (K)			
ACT50-55	32.1	731	2.14E-01	1.62E-01	1.62E-01
ACT56-57	133	722	7.58E-03	4.99E-04	4.99E-04

Notes:
1. Emission inputs are in Appendix F.
2. AERMOD modeling files labeled with "t3" correspond to Table 3 cited in Note 1.
3. Stack heights and stack diameters are provided in Table 5-4.

5.2.6 Single-Source Impact Modeling Results

For the Class II single-source modeling analysis, the maximum modeled concentrations were compared to the PSD Class II SIL for each pollutant and averaging time. The modeled impacts for each pollutant are summarized in Table 5-8.

Table 5-8. AERMOD Results – Estimated Maximum Impacts to the PSD Class II SILs [1]

Pollutant	Avg. Period	Receptor			Max Conc ($\mu g/m^3$)	PSD Class II SIL ($\mu g/m^3$)
		East (m)	North (m)	Elev. (m)		
NO_2	1-hour [2,3]	760819.20	3884674.20	72.19	4.09	7.5
	Annual [4]	760419.20	3884874.20	89.25	0.10	1
PM_{10}	24-hour	760019.20	3885674.20	63.09	1.12	5
	Annual [4]	760419.20	3885074.20	69.41	0.041	1
$PM_{2.5}$ (primary)	24-hour [5,6]	760119.20	3885274.20	56.50	0.77	1.2
	Annual [5]	760419.20	3885074.20	69.41	0.038	0.13

Notes:
1. Based on 2019-2023 meteorology using MEM surface, LZK upper air, and MEM surface characteristics. Concentrations rounded to two significant figures.
2. Maximum 1-hour NO_2 reported is the highest daily maximum averaged over 5 years.
3. The regulatory default Tier 2 option (ARM2) was applied (EPA, 2024b).
4. Maximum annual NO_2, PM_{10} are the highest from the 5 years.
5. Maximum 24-hour, annual primary $PM_{2.5}$ are the highest averaged over 5 years.

6. AERMOD results reflect primary $PM_{2.5}$ concentrations. Secondary impacts are addressed in Section 5.3.

The modeling results showed that concentrations of 1-hour annual NO_2; 24-hour, annual PM_{10}, and 24-hour, annual primary $PM_{2.5}$ were below the PSD Class II SILs. While modeled primary $PM_{2.5}$ concentrations were below the Class II SILs, secondary $PM_{2.5}$ concentrations were also considered in order to compare total $PM_{2.5}$ impacts to the SILs. A MERPs (Modeled Emission Rates for Precursors) assessment of secondary $PM_{2.5}$ impacts and O_3 impacts was also completed and discussed in Section 5.3. The input and output files for all AERMOD model runs are provided electronically.

5.3 Assessment of Secondary Pollutant Impacts

In April 2018, the EPA released guidance recommending SILs for O_3 and $PM_{2.5}$ (EPA, 2018a). Although this guidance was not a final agency action and did not create any binding requirements on permitting authorities, permit applicants, or the public, the recommended SILs could be used to demonstrate that a proposed source does not cause or contribute to a violation of the NAAQS or PSD increments. The recommended Class II SILs for O_3 and $PM_{2.5}$ will be used to assess potential impacts from ACT.

In July 2022, the EPA provided draft guidance on how to implement the modeling requirements to show PSD compliance for O_3 and $PM_{2.5}$ (EPA, 2020b). To make the required NAAQS or PSD increment compliance demonstration, proposed sources should provide a full accounting of the combined impacts of each allowable precursor (and direct component of $PM_{2.5}$) emissions on ambient concentrations of the relevant O_3 or $PM_{2.5}$ NAAQS if any precursor(s) (or the direct component of $PM_{2.5}$) would be emitted in a significant amount. In other words, for O_3, if either NOx or VOC precursor emissions would be emitted in a significant amount (i.e., above their SER), then both precursors should be included in the assessment of O_3 impacts. For $PM_{2.5}$, if a source would emit a significant amount of one or more of NOx, SO_2, or direct $PM_{2.5}$ emissions, then the source should include NOx and SO_2 precursor as well as direct $PM_{2.5}$ emissions in the assessment of $PM_{2.5}$ impacts. As mentioned in Section 5.2, primary impacts of $PM_{2.5}$ were determined with the AERMOD modeling system.

To estimate O_3 and total $PM_{2.5}$ impacts, the EPA released final guidance on the use of MERPs as a Tier I demonstration tool (EPA, 2019b). The tool relates single source impacts on secondary pollutants (O_3 and secondary $PM_{2.5}$) with an air quality threshold to determine if such an impact causes or contributes to a violation of the appropriate NAAQS and PSD Increments (EPA, 2019b). MERPs reflect levels of increased precursor emissions that are not expected to cause a significant contribution to O_3 and $PM_{2.5}$. In practice, MERPs are intended to be used with SILs as analytical tools for PSD air quality analyses.

In November 2019, TDEC published guidance on the use of EPA's MERPs in TN that identified four hypothetical sites to represent sources in TN: Shelby County, TN, Giles County, TN, Barren County, KY and Ashe County, NC (TDEC, 2019). The lowest, most conservative MERPs at these locations are the default MERPs that can be used without the need for further justification (Table 5-9). TVA used the default MERPs to estimate secondary O_3 and daily $PM_{2.5}$ impacts in accordance with PSD (EPA, 2019).

Table 5-9. Default MERPs (tons/year) for Tennessee PSD Applications [1]

Precursor	8-hr O_3 MERP	Daily $PM_{2.5}$ MERP
NO_x	156	3,717
SO_2	-	716
VOC	1,542	-

Notes:
1. TDEC, 2019.

For annual $PM_{2.5}$, the TDEC default MERPs have not yet incorporated the recently revised annual $PM_{2.5}$ SILs at the time of this application. Therefore, representative hypothetical MERPs sites for the precursors were chosen following the EPA MERPs and SILs guidance documents (EPA, 2019; EPA, 2024a). The MERPs selection was based on the lowest, most conservative values in the Ohio Valley climate zone (Step 1 of the Tier 1 Demonstration [EPA, 2019]). Using the EPA View Qlik interface tool (https://www.epa.gov/scram/merps-view-qlik) to extract the latest MERPs information for the selected climate zone, the most conservative MERPs values are from the Porter, Indiana (IN), and Giles, TN, modeled locations (Table 5-10).

Table 5-10. Most Conservative Annual $PM_{2.5}$ MERPs for the Ohio Valley Climate Zone [1,2]

Location	Prec.	Emis.	Stack (m)	Class II MERP	Class II MERP HMC [3]	Class I MERP NAAQS	Class I MERP Increment	Class I MERP HMC
Giles, TN	NOx	1000	10	4,956	0.0262	119,935	27,677	0.00108
Porter, IN	SO_2	1000	10	2,014	0.0646	68,127	15,722	0.00191

Notes:
1. EPA, 2019.
2. https://www.epa.gov/scram/merps-view-qlik.
3. HMC = highest modeled concentration.

5.3.1 O_3 Assessment

O_3 impacts for the SILs analysis were calculated as the sum of the ratio of precursor emissions to the MERPs following TDEC guidance as outlined in Equation 5.1 (TDEC, 2019). If the sum of the ratios is less than 1, then O_3 impacts are below the O_3 SIL and no cumulative analysis is necessary.

$$\left[\left(\frac{NO_x\ EM_S}{NO_x MERP}\right) + \left(\frac{VOC\ EM_S}{VOC\ MERP}\right)\right] < 1 \qquad [5.1]$$

Where:
- NO_X EM_S: Project source NO_X emission increase (tons/yr);
- NO_X MERP: NO_X MERP for selected hypothetical source;
- VOC EM_S: Project source VOC emission increase (tons/yr);
- VOC MERP: VOC MERP for selected hypothetical source.

The O_3 inputs to Equation 5.1 are provided in Table 5-11, and the resulting impacts are calculated in Equation 5.2.

Table 5-11. O_3 Inputs for the Class II SIL Analysis [1]

O_3 Impacts	8-hr Average
O_3 Class II SIL (µg/m^3) [2]	1.0
NO_X EM_S (tons/yr) [3]	47
NO_X MERP [4]	156
VOC EM_S (tons/yr) [3]	11
VOC MERP [4]	1,542

Notes:
1. EPA, 2019a.
2. The Class II SIL for the NAAQS.
3. Emission inputs are in Appendix F.
4. TDEC default values.

Combined impacts for 8-hr O_3 for the SIL in Class II areas:

$$\left[\left(\frac{47}{156}\right)+\left(\frac{11}{1542}\right)\right]=0.31<1 \quad [5.2]$$

Because impacts were less than one (1), emissions from ACT will not cause or contribute to a violation of the O_3 NAAQS.

5.3.2 $PM_{2.5}$ Assessment

Combined primary and secondary impacts of $PM_{2.5}$ for the 24-hour and annual SILs analyses were assessed using the highest modeled primary $PM_{2.5}$ concentration (HMC), the applicable Class II SILs, precursor emissions, and the representative MERPs. The TN MERPs equation was used for determining daily $PM_{2.5}$ (Equation 5.3) (TDEC, 2019). The EPA MERPs equation was used for determining annual $PM_{2.5}$ (Equation 5.4) as TDEC had not revised their equation to incorporate the revised SILs at the time of this application (EPA, 2019; EPA, 2024a). If the combined impacts are less than the guidance-established thresholds, the $PM_{2.5}$ SILs will not be exceeded, and no additional analyses will be necessary.

24-hour $PM_{2.5}$ (TDEC Equation):

$$\left[\left(\frac{PM_{2.5}\ HMC}{PM_{2.5}\ SIL}\right)+\left(\frac{NO_x\ EM_S}{NO_x MERP}\right)+\left(\frac{SO_2 EM_S}{SO_2\ MERP}\right)\right]<1 \quad [5.3]$$

Where:
- $PM_{2.5}$ HMC: Highest modeled primary $PM_{2.5}$ concentration from project;
- $PM_{2.5}$ SIL: Significant impact level for $PM_{2.5}$ (1.2 µg/m^3 for 24-hr);
- NO_X EM_S: Project source NO_X emission increase (tons/yr);
- NO_X MERP: NO_X MERP for selected hypothetical source;
- SO_2 EM_S: Project source SO_2 emission increase (tons/yr);
- SO_2 MERP: SO_2 MERP for selected hypothetical source.

Annual $PM_{2.5}$ (EPA Equation):

$$\left[\frac{PM_{2.5}\ HMC}{PM_{2.5}\ SIL}\times 100\right]+\left[\left(\frac{NO_X\ EM_S}{NO_X MERP}+\frac{SO_2\ EM_S}{SO_2\ MERP}\right)\times 100\right]<100\% \quad [5.4]$$

Where:

- $PM_{2.5}$ HMC: Highest modeled primary $PM_{2.5}$ concentration from project;
- $PM_{2.5}$ SIL: Significant impact level for $PM_{2.5}$ (0.13 µg/m^3 for annual);
- NO_X EM_S: Project source NO_X emission increase (tons/yr);
- NO_X MERP: NO_X MERP for selected hypothetical source;
- SO_2 EM_S: Project source SO_2 emission increase (tons/yr);
- SO_2 MERP: SO_2 MERP for selected hypothetical source.

The 24-hour and annual $PM_{2.5}$ inputs to Equations 5.3-5.4 are provided in Table 5-12, and the resulting impacts are calculated in Equation 5.5 and Equation 5.6 respectively.

Table 5-12. Secondary $PM_{2.5}$ Inputs for the Class II SIL Analysis [1]

Secondary $PM_{2.5}$ Impacts	24-hr Average	Annual Average
$PM_{2.5}$ HMC (µg/m^3) [2]	0.77298	0.03823
$PM_{2.5}$ Class II SIL (µg/m^3) [3]	1.2	0.13
NO_X EM_S (tons/yr) [4]	47	47
NO_X MERP	3,717	4,956
NOx HMC MERP [5]	n/a	0.0262
NOx MERP EMs (tons/yr) [5]	n/a	1000
SO_2 EM_S (tons/yr) [4]	2	2
SO_2 MERP	716	2,014
SO_2 HMC MERP [5]	n/a	0.0646
SO_2 MERP EMs (tons/yr) [5]	n/a	1000

Notes:

1. Modeled primary $PM_{2.5}$ concentrations taken from:
   a. ACT_6Aeros_2BSGs_t2gas_pm25_max24hr_memlzk2019-23_10km.ami.
   b. ACT_6Aeros_2BSGs_t3gas_pm25_annavg_memlzk2019-23_10km.ami.
2. The AERMOD modeled concentrations have not been rounded.
3. The Class II SILs for the NAAQS and PSD Increments.
4. Emission inputs are in Appendix F.
5. The HMC MERP values are the highest modeled concentrations from the selected MERPs (MERPs View Qlik | US EPA). The MERP EMs values are the emissions that correlate to the MERPs HMCs. The 24-hour HMC and EMs MERP values are not used in the TDEC equations.

Combined impacts for 24-hour $PM_{2.5}$ for the SIL in Class II areas:

$$\left[\left(\frac{0.77298}{1.2}\right)+\left(\frac{47}{3717}\right)+\left(\frac{2}{716}\right)\right]=0.66<1 \quad [5.5]$$

Combined impacts for annual $PM_{2.5}$ for the SIL in Class II areas:

$$\left[\frac{0.03823}{0.13}\times 100\right]+\left[\left(\frac{47}{4956}+\frac{2}{2014}\right)\times 100\right]=30.5<100\% \quad [5.6]$$

Both 24-hour and annual $PM_{2.5}$ impacts are less than the thresholds, which indicate that $PM_{2.5}$ impacts are below the Class II SILs for the NAAQS and PSD increments. Therefore, emissions from ACT will not cause or contribute to a violation of the $PM_{2.5}$ NAAQS and the $PM_{2.5}$ Increments in Class II areas.

The total (primary + secondary) 24-hour and annual $PM_{2.5}$ concentrations for the SIL in Class II areas are calculated in Equations 5.7-5.10 (EPA, 2019a).

24-hour $PM_{2.5}$ (TDEC Equation):

$$[PM_{2.5}\ HMC] + \left[\left(\frac{NO_x\ EM_S}{NO_x MERP} + \frac{SO_2 EM_S}{SO_2 MERP}\right) \times PM_{2.5}\ SIL\right] = \text{Total } PM_{2.5}\ (\mu g/m^3) \quad [5.7]$$

$$[0.77298] + \left[\left(\frac{47}{3717} + \frac{2}{716}\right) \times 1.2\right] = 0.79\ \mu g/m^3 \quad [5.8]$$

Annual $PM_{2.5}$ (EPA Equation):

$$[PM_{2.5}\ HMC] + \left[\left(NO_x\ EM_S \times \frac{NO_x\ HMC_{MERP}}{NO_x\ EM_{MERP}}\right) + \left(SO_2\ EM_S \times \frac{SO_2\ HMC_{MERP}}{SO_2\ EM_{MERP}}\right)\right] = \text{Total } PM_{2.5}\ (\mu g/m^3) \quad [5.9]$$

$$[0.03823] + \left[\left(47 \times \frac{0.0262}{1000}\right) + \left(2 \times \frac{0.0646}{1000}\right)\right] = 0.040\ \mu g/m^3 \quad [5.10]$$

5.4 Class I Modeling Analysis

There are two key components of a Class I analysis: a Class I PSD increment analysis, and an Air Quality Related Value (AQRV) analysis. The Class I increment analysis compares the projected impacts from the source under review to the Class I EPA SILs for the NAAQS and PSD increments (EPA, 2018a). The AQRV analysis evaluates regional haze as well as sulfur and nitrogen deposition at all nearby Class I areas. There are two Class I areas within 300 km of ACT: the Mingo Wildlife Refuge (Mingo) located 208 km away, and the Sipsey Wilderness Area (Sipsey) located 254 km away.

AERMOD modeling was performed to assess potential impacts on the Class I increments. A 360-degree receptor ring was placed at 50 km from ACT. If the concentrations at these receptors fell below the Class I SILs, the concentrations at the Class I areas would likewise be below the SILs. The results of the AERMOD Class I analysis are shown in Table 5-13.

Table 5-13. Modeling Results at 50 km - Comparison with PSD Class I SILs [1,2]

Pollutant	Avg. Period	Receptor East (m)	Receptor North (m)	Receptor Elev. (m)	Max Conc. ($\mu g/m^3$)	PSD Class I SIL ($\mu g/m^3$)
NO_2	Annual	759446.6	3934766.60	69.43	0.0033	0.1
PM_{10}	24-hour	794419.1	3848206.50	104.40	0.064	0.3
	Annual	762064.2	3934743.70	69.75	0.0027	0.2
$PM_{2.5}$	24-hour	758574.3	3934743.70	69.03	0.044	1.2 [3] / 0.27 [4]
	Annual	775770.1	3932327.00	71.44	0.0024	0.13 [3] / 0.03 [4]

Notes:

1. Based on 2019-2023 MEM surface, TUP upper air, and MEM surface characteristics.
2. Concentrations have been rounded to two significant figures.
3. $PM_{2.5}$ Class I SIL for the NAAQS.
4. $PM_{2.5}$ Class I SIL for the PSD increment.

The results of the AERMOD modeling showed that annual NO_2, 24-hour and annual $PM_{10,}$ and 24-hour and annual primary $PM_{2.5}$ concentrations were below the applicable PSD Class I SILs at the 50 km receptor ring. For assessing total $PM_{2.5}$ impacts, the sum of direct project-related $PM_{2.5}$ impacts (from AERMOD at 50km) and secondary $PM_{2.5}$ impacts (from project-related SO_2 and NOx emissions) will be used for comparison to the Class I $PM_{2.5}$ SILs using the appropriate MERPs (Table 5-14) and MERPs equations (Equations 5.10-11) (TDEC, 2019; EPA, 2019). If the combined impacts are less than the thresholds, the $PM_{2.5}$ SILs will not be exceeded, and no additional analyses will be necessary.

Table 5-14. Most Conservative Annual $PM_{2.5}$ MERPs for the Ohio Valley Climate Zone [1,2]

Location	Metric	Precursor	Emissions	Stack	NAAQS MERP	PSD INC. MERP	Highest Modeled Conc. (HMC)
Giles, TN	Annual $PM_{2.5}$	NOx	1000	10	119,935	27,677	0.00108
Porter, IN	Annual $PM_{2.5}$	SO_2	1000	10	68,127	15,722	0.00191

Notes:
1. EPA, 2019.
2. https://www.epa.gov/scram/merps-view-qlik.

24-hour $PM_{2.5}$ (TDEC Equation):

$$\left[\left(\frac{PM_{2.5}\ HMC}{PM_{2.5}\ SIL}\right)+\left(\frac{NO_x\ EM_S}{NO_xMERP}\right)+\left(\frac{SO_2EM_S}{SO_2\ MERP}\right)\right]<1 \qquad [5.10]$$

Where:
- $PM_{2.5}$ HMC: Highest modeled primary $PM_{2.5}$ concentration from project;
- $PM_{2.5}$ SIL: Significant impact level for $PM_{2.5}$ (1.2 [NAAQS] / 0.27 [Inc.] µg/m^3 for 24-hr);
- NO_X EM_S: Project source NOx emission rate (tons/yr);
- NO_X MERP: NO_X MERP for selected hypothetical source.
- SO_2 EM_S: Project source SO_2 emission rate (tons/yr);
- SO_2 MERP: SO_2 MERP for selected hypothetical source.

Annual $PM_{2.5}$ (EPA Equation):

$$\left[\frac{PM_{2.5}\ HMC}{PM_{2.5}\ SIL}\times 100\right]+\left[\left(\frac{NO_x\ EM_S}{NO_xMERP}+\frac{SO_2\ EM_S}{SO_2\ MERP}\right)\times 100\right]<100\% \qquad [5.11]$$

Where:
- $PM_{2.5}$ HMC: Highest modeled primary $PM_{2.5}$ concentration from project;
- $PM_{2.5}$ SIL: Significant impact level for $PM_{2.5}$ (0.13 µg/m^3 for annual);
- NO_X EM_S: Project source NO_X emission increase (tons/yr);
- NO_X MERP: NO_X MERP for selected hypothetical source;
- SO_2 EM_S: Project source SO_2 emission increase (tons/yr);

- SO_2 MERP: SO_2 MERP for selected hypothetical source.

The 24-hour and annual $PM_{2.5}$ inputs to Equations 5.10-11 are provided in Table 5-15. For 24-hour $PM_{2.5}$, the percent impacts to the SIL and the total concentrations are provided in Equations 5.12-5.15. For annual $PM_{2.5}$, the percent impacts to the SILs and the total concentrations are provided in Equations 5.16-5.19. All impacts are less than the thresholds, which indicate that $PM_{2.5}$ impacts at 50-km from the source are below the SILs for the PSD Increments in Class I areas.

Table 5-15. Secondary $PM_{2.5}$ Inputs for the Class I SIL Analysis [1]

Secondary $PM_{2.5}$ Impacts	24-hr Average	Annual Average
$PM_{2.5}$ HMC ($\mu g/m^3$)[2]	0.04395	0.00241
$PM_{2.5}$ Class I SIL ($\mu g/m^3$)	1.2 [3] / 0.27 [4]	0.13 [3] / 0.03 [4]
NO_X EM_S (tons/yr) [5]	47	47
NO_X MERP [6]	3,717	119,935
NOx HMC MERP [7]	n/a	0.00108
NO_X MERP EMs (tons/yr) [7]	n/a	1000
SO_2 EM_S (tons/yr) [5]	2	2
SO_2 MERP [6]	716	68,127
SO_2 HMC MERP [7]	n/a	0.00191
SO_2 MERP EMs (tons/yr) [7]	n/a	1000

Notes:
1. Modeled primary $PM_{2.5}$ concentrations taken from:
   a. ACT_6Aeros_2BSGs_t2gas_pm25_max24hr_memlzk2019-23_50kmRing.ami
   b. ACT_6Aeros_2BSGs_t3gas_pm25_annavg_memlzk2019-23_50kmRing.ami
2. The AERMOD modeled concentrations have not been rounded.
3. Class I SILs for the NAAQS.
4. Class I SILs for the PSD Increments.
5. Emissions (tons/yr) provided in Appendix F.
6. The 24-hour values are the TDEC default MERPs and are conservatively applied to the Class I analysis. The annual values are based on the EPA Class I MERPs assessed at 200km from ACT as the nearest Class I area, Mingo, is 208 km away.
7. The 24-hour HMC MERP and MERP EMs values are not used in the TDEC equations.

The following set of equations show total 24-hour $PM_{2.5}$ impacts to the Class I SILs for the NAAQS and PSD increments.

24-hour $PM_{2.5}$ (TDEC Equation):

- Total (primary + secondary) 24-hour $PM_{2.5}$ Class I impacts, represented as percent of SIL for the NAAQS:

$$\left[\left(\frac{0.04395}{1.2}\right) + \left(\frac{47}{3717}\right) + \left(\frac{2}{716}\right)\right] = 0.052 < 1 \qquad [5.12]$$

- Total (primary + secondary) 24-hour $PM_{2.5}$ Class I concentrations in comparison with the Class I SIL for the NAAQS:

$$[0.04395] + \left[\left(\frac{47}{3717} + \frac{2}{716}\right) \times 1.2\right] = 0.063\ \mu g/m^3 \quad [5.13]$$

- Total (primary + secondary) 24-hour $PM_{2.5}$ Class I impacts, represented as percent of SIL for the PSD Increment:

$$\left[\left(\frac{0.04395}{0.27}\right) + \left(\frac{47}{3717}\right) + \left(\frac{2}{716}\right)\right] = 0.18 < 1 \quad [5.14]$$

- Total (primary + secondary) 24-hour $PM_{2.5}$ Class I concentrations in comparison with the Class I SIL for the PSD Increment:

$$[0.04395] + \left[\left(\frac{47}{3717} + \frac{2}{716}\right) \times 0.27\right] = 0.048\ \mu g/m^3 \quad [5.15]$$

The following set of equations show total annual $PM_{2.5}$ impacts to the Class I SILs for the NAAQS and Increments.

Annual $PM_{2.5}$ (EPA Equation):

- Total (primary + secondary) annual $PM_{2.5}$ Class I impacts, represented as percent of SIL for the NAAQS:

$$\left[\frac{0.00239}{0.13} \times 100\right] + \left[\left(\frac{47}{119{,}935} + \frac{2}{68{,}127}\right) \times 100\right] = 1.9 < 100\% \quad [5.16]$$

- Total (primary + secondary) annual $PM_{2.5}$ Class I concentrations, in comparison with the Class I SIL for the NAAQS:

$$[0.00239] + \left[\left(47 \times \frac{0.00108}{1000}\right) + \left(2 \times \frac{0.00191}{1000}\right)\right] = 0.0024\ \mu g/m^3 \quad [5.17]$$

- Total (primary + secondary) annual $PM_{2.5}$ Class I impacts, represented as percent of SIL for the PSD increment:

$$\left[\frac{0.00239}{0.03} \times 100\right] + \left[\left(\frac{47}{119{,}935} + \frac{2}{68{,}127}\right) \times 100\right] = 8.2 < 100\% \quad [5.18]$$

- Total (primary + secondary) annual $PM_{2.5}$ Class I concentrations, in comparison with the Class I SIL for the PSD increment:

$$[0.00239] + \left[\left(47 \times \frac{0.00108}{1000}\right) + \left(2 \times \frac{0.00191}{1000}\right)\right] = 0.0024\ \mu g/m^3 \quad [5.19]$$

The input and output files for all AERMOD model runs are provided electronically.

For the AQRV analysis, the screening calculations provided in the modeling protocol were preliminary and have since been revised (TVA, 2024). The initial screening criteria have been

recalculated for Sipsey using the ACT plant total emission estimates (Table 5-16). The results of the analysis showed a Q/D ratio less than 10, indicating that there would be no adverse impact on AQRVs. Therefore, no AQRV analysis was performed.

Table 5-16. Class I Initial Screening Criteria

Emissions (tons/year)	Class I Areas within 300 km	
	Mingo	Sipsey
SO_2	5.6	5.6
NO_X	90	90
PM_{10}	90	90
H_2SO_4	0	0
Total Emissions	185.6	185.6
Distance (km)	208	254
Q/D	**0.89**	**0.73**

Notes:
1. Distance was calculated from ACT site center to the nearest boundary of each Class I Area.

Figure 5-1. Allen Plant Boundaries Used in Class II Modeling



6.0 ADDITIONAL IMPACT ANALYSIS

The PSD regulations require an additional impacts analysis for each pollutant emitted by a source, including the analysis of the effects of emissions on local soils and vegetation. The depth of the analysis performed generally depends on existing air quality, the quantity of air emissions, and the sensitivity of local soils and vegetation.

6.1 Growth Analysis

Air quality impacts projected for the area as a result of general commercial, residential, industrial, and other growth associated with the project are expected to be insignificant. Due to the nature of the project, TVA anticipates negligible emissions growth in the local area. Any resulting emissions growth on the part of TVA electricity customers due to competitive electrical rates would be spread across the entire TVA service region and is expected to have insignificant air quality impacts.

6.2 Soils And Vegetation Analysis

The ACT site is situated in a mainly rural area, with a few industrial facilities located both north and south of the site. Much of the area consists of prime farmland and wetlands with some mixed forest. Soils around the site range from poorly to excessively drained loamy alluvium soils and sand to filled land, levees and borrow pits, and fine and sandy loams.

State-of-the-art construction equipment and emission controls will be used to keep potential air pollutant impacts less than ambient air quality standards, which are protective of secondary effects on soils and vegetation. Furthermore, modeled NO_X, PM_{10} and primary $PM_{2.5}$ are below the SILs. Additionally, the secondary $PM_{2.5}$ assessment indicates that impacts are below the SILs and the calculated cumulative O_3 impacts are less than the O_3 SIL. Therefore, no adverse impacts are expected to occur to sensitive vegetation, crops, or soil systems as a result of the actions proposed in this project.

The criteria for evaluating impacts on soils and vegetation is taken from the EPA's, "A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals" (EPA, 1980). Table 6-1 lists the EPA suggested criteria for the modeled pollutants from the project and the predicted project impacts. These criteria are established for sensitive vegetation and crops exposed to the effects of the gaseous pollutants through direct exposure. Adverse impacts on soil systems result more readily from the secondary effects of the pollutants' impacts on the stability of the soil system. These impacts could include increased soil temperature and moisture stress and/or increased runoff and erosion resulting from damage to vegetative cover.

The Table 6-1 criteria have been applied to the project to evaluate impacts on both soils and vegetation. The results indicate concentrations from the project at ACT will be far below the suggested EPA screening levels for harmful impacts to vegetation even after background concentrations are included. Additionally, modeled 1-hour and annual NO_2 concentrations are below the SILs, which are defined concentrations of criteria pollutants in the ambient air that are considered inconsequential in comparison to the National Ambient Air Quality Standards (NAAQS). The NAAQS are designed to protect the public health and the environment including

damage to croplands and vegetation. Therefore, no adverse impacts are expected to occur to sensitive vegetation, crops, or soil systems as a result of the actions proposed in this project.

Table 6-1. ACT Pollutant Impacts on Natural Vegetation and Crops

Pollutant	Avg. Time	EPA Minimum Impact Level for Effects on Sensitive Plants[1] (µg/m^3)	Maximum Impact of ACT (µg/m^3)	Background Concentrations (µg/m^3) [2]	ACT + Background Concentration (µg/m^3)
NO_2	4-hour / 8-hour	3,760	4.091[3]	70 [4]	74.1
	1-year	94	0.3045	11.8 [4]	12.1

Notes:

1. Values for sensitive vegetation from EPA Table 3.1 (EPA, 1980).
2. Background NO_2 concentrations are taken from the Crittenden County monitor (AIRS ID 05-035-0005) located in Marion, AR.
3. Modeled highest-first-high (H1H) concentrations are provided. Max 1-hour (H1H) NO_2 concentration was used to conservatively represent 4-hour and 8-hour average impact.
4. The max 1-hour concentration (2021-2023) from the background monitor was used to conservatively represent 4-hour and 8-hour NO_2. The max annual average (2021-2023) was used to represent the 1-year NO_2 averaging time.

6.3 Plume Blight Analysis

To assess near-field visual impacts from ACT at sensitive areas, the methodology and assumptions outlined in the FLAG report and the EPA's Workbook for Plume Visual Screening and Analysis were reviewed (NPS, 2010; EPA, 1992). As per EPA's guidance, the nearest sensitive areas within 20 km of ACT were evaluated for VISCREEN modeling. The sensitive areas included regional and international airports, and State and National Parks (Table 6-2).

Table 6-2. Class II Sensitive Areas Within 20 km of ACT

Class II Sensitive Area	Distance from ACT (km)
T.O. Fuller State Park	1.9
Isle-a-Port Airport (AP)	2.8
West Memphis Municipal AP	9.5
Memphis Intl. AP	14.3
General Dewitt Spain AP	15.1
Old Forest State Natural Area	16.1

A visible plume analysis was conducted with the most current version of USEPA's screening model VISCREEN to determine if project emissions cause visibility impairment. The analysis was conducted in accordance with USEPA's *Workbook for Plume Visual Impacts Screening and Analysis (Revised)* (USEPA, 1992). The VISCREEN model was applied to estimate two visual impact parameters, plume perceptibility (ΔE) and plume contrast (Cp). Screening-level guidance indicates that values above 2.0 for ΔE and +/- 0.05 for Cp are considered perceptible.

The VISCREEN model Workbook offers two levels of analysis, Level-1 and Level-2 screening. A Level-2 analysis is used to analyze the visibility analysis as this allows refinement of meteorological conditions and site-specific conditions. The Level-2 analysis was conducted with five years (2019-2023) of surface observations and stability classes from the MEM NWS site.

Inputs to VISCREEN should include emissions of particulates, NO_X, primary NO_2, soot, and primary sulfate (SO_4); distance to observer in the Class II area, distance to the nearest and farthest points in the Class II area, background visual range, wind speed, stability index, and background O_3. Only emissions of particulates and NO_X were included in the visibility analysis and the primary NO_2, soot and primary sulfate were modeled as zero as per VISCREEN guidance.

If the sites are in the same general direction and are in the same line of sight from the site, then the site(s) closest to ACT is used in the screening analysis. Three (3) sites were selected to perform the screening modeling and are listed in Table 6-3. The 22.5-degree (°) wind direction sectors that would transport emissions from the ACT toward the T.O. Fuller State Park, Isle-a-Port Airport (AP), and West Memphis Municipal AP Class II areas were chosen for the analysis. The Level-2 parameters (worst-case stability class and wind speed) were identified, and a Level-2 analysis was performed with these parameters using background O_3 to determine visual impacts.

Table 6-3. VISCREEN Level 2 Input Data

Class II area	22.5 deg Wind Sector	Closest Distance to the Source (km)	Farthest distance from the source (km)	Level 2 Worst Case Stability Class	Level 2 Worst Case Wind Speed (m/s)
T.O. Fuller State Park	104.49-126.97	1.93	3.93	D	4.0
Isle-a-port Airport (AP)	37.03-59.53	2.84	4.31	D	3.0
West Memphis Municipal AP	293.54-316.04	9.54	12.21	D	4.0

Based on this information, and the five years of meteorological data, a table of joint frequency of occurrence of wind speed, wind direction, and stability class was developed as outlined in the Workbook (USEPA, 1992). The dispersion conditions, defined by wind speed and stability class, were ranked by evaluating the product of σy, σz, and u, where σy and σz are the Pasquill-Gifford horizontal and vertical diffusion coefficients for the given stability class and downwind distance and u is the wind speed. The dispersion conditions were then ranked in ascending order according to the value of σyσzu, as shown for Isle-a-Port in Table 6-4.

Table 6-4 Dispersion Condition Frequency Analysis (Isle-a-Port)

Dispersion Condition		Disp. Coeff. x Wind Speed ($\sigma_x\sigma_y u$)	Transport time (hrs)	Frequency by Time of Day (%)				Cumulative frequency by Time of the Day (%)			
Stab. Class	Wind speed m/s			0-6	6-12	12-18	18-24	0-6	6-12	12-18	18-24
F	1	2290	2	0.082	0.018	0	0.064	0.082	0.018	0	0.064
F	2	4581	1	0.712	0.064	0.009	0.511	0.794	0.082	0.009	0.575
E	1	5379	2	0	0	0	0.009	0.794	0.082	0.009	0.584
F	3	6871	0	0.064	0.018	0	0.046	0.858	0.1	0.009	0.63
E	2	10758	1	0.037	0.009	0.009	0	0.894	0.11	0.018	0.63
D	1	11046	2	0	0.009	0	0	0.894	0.119	0.018	0.63
E	3	16138	0	1.762	0.173	0.1	1.323	2.656	0.292	0.119	1.953
E	4	21517	0	1.634	0.237	0.283	1.981	4.29	0.529	0.402	3.934
D	2	22092	1	0.009	0.027	0.027	0	4.299	0.557	0.429	3.934
E	5	26896	0	1.26	0.237	0.164	1.187	5.559	0.794	0.593	5.12
D	**3**	33138	0	0	0.365	0.155	0	5.559	**1.159**	0.748	5.12
D	4	44184	0	0	0.776	0.548	0.064	5.559	1.935	1.296	5.184
D	5	55230	0	0	1.351	0.958	0.055	5.559	3.286	2.254	5.239
D	6	66276	0	0	0.785	0.812	0.027	5.559	4.071	3.067	5.267
D	7	77321	0	0	0.374	0.374	0	5.559	4.445	3.441	5.267
D	8	88367	0	0	0.146	0.137	0	5.559	4.591	3.578	5.267

According to Level 2 analysis, the worst-case daylight (6 AM – 6 PM) dispersion conditions with a cumulative frequency of one (1) percent are D stability, 4.0 meters per second (m/s) for T.O. Fuller State Park and west Memphis Municipal AP; D stability, 3.0 meters per second (m/s) for Isle-a-Port AP. The VISCREEN results are summarized in Table 6-5 using ACT project emissions. The results are below the significance criteria. Therefore, the plume is expected to be imperceptible against background sky. The VISCREEN meteorological data, inputs, and results are provided electronically.

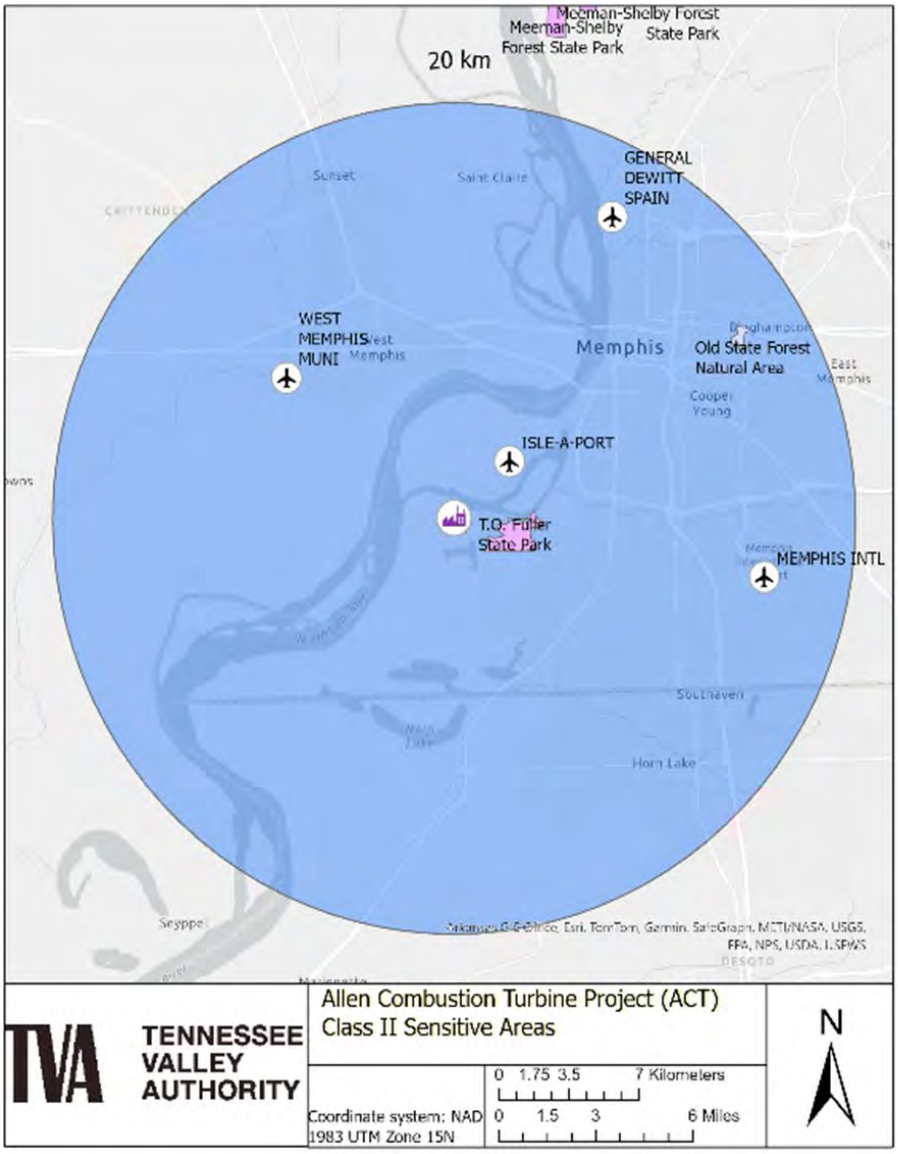
Table 6-5. Comparison to EPA Criteria for Visibility – VISCREEN Level 2 Model results

Class II area (Distance in Km)	VISCREEN worst case stability Class (Wind Speed)	Plume Perceptibility (Delta E)			Plume Contrast (Cp)		
		VISCREEN1		Criteria	VISCREEN1		Criteria
		Theta 10	Theta 140		Theta 10	Theta 140	
T.O. Fuller State Park	D (4), 3.0 m/s	0.511	0.159	2.0	0.005	-0.003	0.06
Isle-a-Port AP	D (3), 3.0 m/s	0.373	0.121	2.0	0.003	-0.002	0.07
West Memphis Municipal AP	D (4), 3.0 m/s	0.068	0.019	2.0	0.001	-0.0001	0.07

Notes:

1. VISCREEN results are provided for the two VISCREEN default worst-case theta angles. The two theta angles represent the sun being in front of the observer (theta = 10 degrees) or behind the observer (theta = 140 degrees).
2. A negative Cp means the plume has a darker contrast than the background sky.

Figure 6-1. Sensitive Areas for Near-Field Visibility Assessment



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APPENDIX A: SCHD PERMIT TO CONSTRUCT FORMS

SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
INDEX OF AIR POLLUTION PERMIT APPLICATION FORMS

1. ADMINISTRATION	
This application contains the following forms:	APC Form V.1, Facility Identification
	APC Form V.2, Operations and Flow Diagrams

2. EMISSIONS SOURCE DESCRIPTION		TOTAL NUMBER OF THIS FORM
This application contains the following forms (one form for each incinerator, printing operation, fuel burning installation, etc.):	APC Form V.3, Stack Identification	2
	APC Form V.4, Fuel Burning Non-Process Equipment	
	APC Form V.5, Stationary Gas Turbines or Internal Combustion Engines	2
	APC Form V.6, Storage Tanks	
	APC Form V.7, Incinerators	
	APC Form V.8, Printing Operations	
	APC Form V.9, Painting and Coating Operations	
	APC Form V.10, Miscellaneous Processes	
	APC Form V.33, Stage I and Stage II Vapor Recovery Equipment	
	APC Form V.34, Open Burning	
	APC Form V.36, R.I.C.E. Emergency Generator	

3. AIR POLLUTION CONTROL SYSTEM		TOTAL NUMBER OF THIS FORM
This application contains the following forms (one form for each control system in use at the facility):	APC Form V.11, Control Equipment - Miscellaneous	1
	APC Form V.12, Condensers	
	APC Form V.13, Adsorbers	
	APC Form V.14, Catalytic or Thermal Oxidation Equipment	1
	APC Form V.15, Cyclones/Settling Chambers	
	APC Form V.16, Electrostatic Precipitators	
	APC Form V.17, Wet Collection Systems	
	APC Form V.18, Baghouse/Fabric Filters	

MAJOR SOURCE OPERATING PERMIT APPLICATION
INDEX OF AIR POLLUTION PERMIT APPLICATION FORMS

4. COMPLIANCE DEMONSTRATION		TOTAL NUMBER OF THIS FORM
This application contains the following forms (one form for each incinerator, printing operation, fuel burning installation, etc.):	APC Form V.19, Compliance Certification - Monitoring and Reporting - Description of Methods for Determining Compliance	2
	APC Form V.20, Continuous Emissions Monitoring	1
	APC Form V.21, Portable Monitors	
	APC Form V.22, Control System Parameters or Operating Parameters of a Process	
	APC Form V.23, Monitoring Maintenance Procedures	
	APC Form V.24, Stack Testing	1
	APC Form V.25, Fuel Sampling and Analysis	
	APC Form V.26, Record Keeping	2
	APC Form V.27, Other Methods	2
	APC Form V.28, Emissions from Process Emissions Sources / Fuel Burning Installations / Incinerators	2
	APC Form V.29, Emissions Summary for the Facility or for the Source Contained in This Application	1
	APC Form V.30, Current Emissions Requirements and Status	2
	APC Form V.31, Compliance Plan and Compliance Certification	1
	APC Form V.32, Air Monitoring Network	

5. STATEMENT OF COMPLETENESS AND CERTIFICATION OF COMPLIANCE

I have reviewed this application in its entirety and to the best of my knowledge, and based on information and belief formed after reasonable inquiry, the statements and information contained in this application are true, accurate, and complete.

I have provided all the information that is necessary for compliance purposes and this application consists of 33 pages and they are numbered from page A-1 to A-33.

The status of this facility's compliance with all applicable air pollution control requirements, including the enhanced monitoring and compliance certification requirements of the Federal Clean Air Act, is reported in this application along with the methods to be used for compliance demonstration.

Name and Title of Responsible Official	Telephone Number with Area Code
Michael S. Cashon, Plant Manager of Allen CC Site	901 - 623 - 2070

Signature of Responsible Official	Date of Application
	12 /10 /2024

(FOR DEFINITION OF RESPONSIBLE OFFICIAL, SEE INSTRUCTIONS FOR APC FORM V.1)

CN-1007 RDA 1298

SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
FACILITY IDENTIFICATION

1. FACILITY NAME AND OWNER'S NAME IF DIFFERENT FROM THE FACILITY NAME:
Tennessee Valley Authority - Allen Combustion Turbine Plant

FOR APC USE ONLY

APC COMPANY NO.

MAILING ADDRESS (ST/RD/P.O. BOX):
2480 Hemington Avenue

LOG/PERMIT NO.

CITY, STATE, ZIP CODE:
Memphis, TN 38109

2. FACILITY LOCATION (ST/RD/HWY):
2480 Hemington Avenue

COUNTY NAME:
Shelby

CITY OR DISTANCE TO NEAREST TOWN, ZIP CODE:
Memphis, TN 38109

TELEPHONE NUMBER WITH AREA CODE:
901-623-2070

3. FACILITY'S PRIMARY ACTIVITY AND THE FACILITY SIX DIGIT NORTH AMERICAN INDUSTRIAL CLASSIFICATION SYSTEM (NAICS) CODE(S):
Fossil Fuel Electric Power Generation, 221112

4. CONTACT PERSON'S NAME FOR THIS PERMIT: Parker Maners
TITLE: Environmental Scientist
TELEPHONE NUMBER WITH AREA CODE: 573-724-2507

5. IF FACILITY IS LOCATED IN AN AREA DESIGNATED AS "NONATTAINMENT" OR "ADDITIONAL CONTROL", INDICATE THE POLLUTANT(S) FOR THE DESIGNATION.
Not Applicable

6. LIST ALL VALID AIR POLLUTION PERMITS ISSUED TO THE SOURCES CONTAINED IN THIS APPLICATION [IDENTIFY ALL PERMITS WITH MOST RECENT PERMIT NUMBERS AND EMISSION SOURCE REFERENCE NUMBERS LISTED ON THE PERMIT(S)].

Permit No. 01280-01 TV; for Allen Combined Cycle Plant

7. PERMIT REQUESTED FOR:

INITIAL APPLICATION TO OPERATE: _____
RELOCATION TO OPERATE: _____
MODIFICATION: _____
PERMIT RENEWAL TO OPERATE: _____
REVISION (ADMINISTRATIVE AMENDMENTS): _____
CONSTRUCTION PERMIT: X .

8. OWNER'S REGISTERED AGENT'S NAME & ADDRESS FOR SERVICE OF PROCESS
Allen A. Clare, Senior Vice President, Power Operations LP
2K-C, 1101 Market Street, Chattanooga, TN 37402-2801

TELEPHONE NUMBER WITH AREA CODE
910-214-9414

9. IS THIS FACILITY SUBJECT TO THE PROVISIONS GOVERNING PREVENTION OF ACCIDENTAL RELEASES OF HAZARDOUS AIR CONTAMINANTS CONTAINED IN CHAPTER 1200-3-32 OF THE TENNESSEE AIR POLLUTION CONTROL REGULATIONS?

_____ YES X NO

IF THE ANSWER IS YES, ARE YOU IN COMPLIANCE WITH THE PROVISIONS OF CHAPTER 1200-3-32 OF THE TENNESSEE AIR POLLUTION CONTROL REGULATIONS?

_____ YES _____ NO

10. PAGE NUMBER: REVISION NUMBER: DATE OF REVISION:

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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
OPERATIONS AND FLOW DIAGRAMS

1. PLEASE LIST, IDENTIFY AND DESCRIBE BRIEFLY PROCESS EMISSION SOURCES, FUEL BURNING INSTALLATIONS, AND INCINERATORS T HAT ARE CONTAINED IN THIS APPLICATION. PLEASE ATTACH A FLOW DIAGRAM FOR THIS APPLICATION.

List of Significant Emission Units

Emission Unit	Name	Description
50 - 55	CT 1 through 6	33.8 MW Natural Gas-Fired LM2500
56 - 57	BSG 1 and 2	2,200 hp Black-Start Diesel Emergency Generators

The 6 identical natural gas-fired aeroderivative CT units (General Electric Model LM2500) have gross electrical generating capacities of 33.8 MW each (at 59 F). Each LM2500 (EU 50 through 55) is equipped with dry low emissions (DLE) combustors, and the exhaust-path has an oxidation catalyst for CO/VOC emissions control and a SCR reactor for NOx emissions control.

Emergency Engines: Two 2,200 hp black-start ULSD-fired emergency generators (EU 56 and 57) are used to energize the switchyard (in < 30 minutes) during an unlikely transmission-system emergency.

2. LIST ALL INSIGNIFICANT ACTIVITIES WHICH ARE EXEMPTED BECAUSE OF SIZE OR PRODUCTION RATE AND CITE THE APPLICABLE REGULATIONS.

N/A

3. ARE THERE ANY STORAGE PILES?

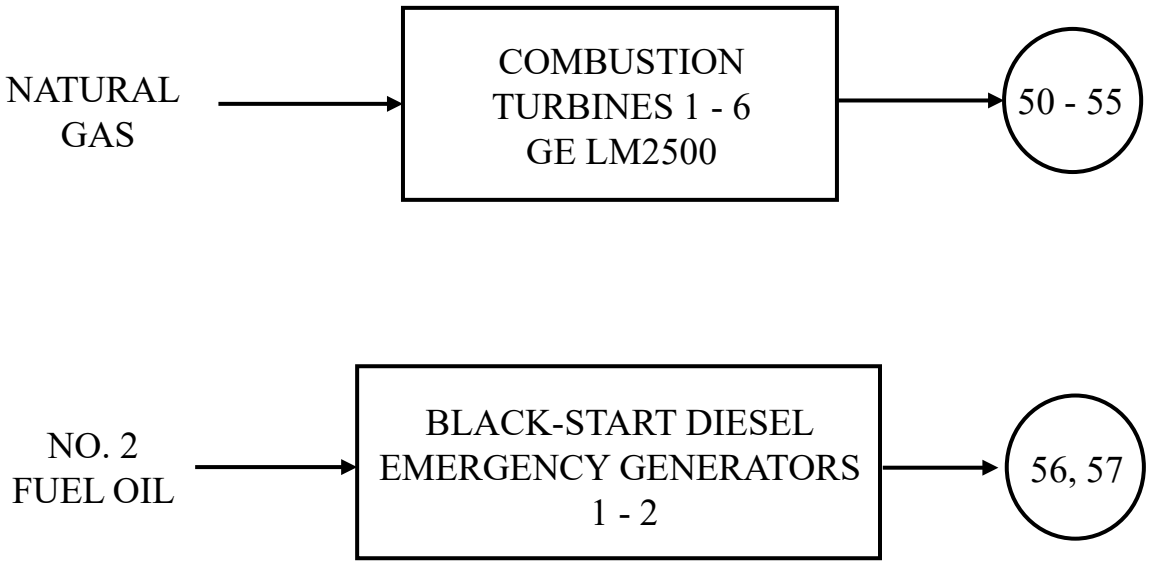
YES _____ NO X

4. LIST THE STATES THAT ARE WITHIN 50 MILES OF YOUR FACILITY

Arkansas and Mississippi

5. PAGE NUMBER: REVISION NUMBER: DATE OF REVISION

FIGURE A-1



TENNESSEE VALLEY AUTHORITY – ALLEN COMBUSTION TURBINE PLANT PLANT FLOW DIAGRAM AND EMISSION POINT LOCATIONS	LEGEND: ◯ INDICATES AN EMISSION POINT

SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
EMISSION SUMMARY FOR THE FACILITY OR FOR THE SOURCES CONTAINED IN THIS APPLICATION

1. FACILITY NAME:
Tennessee Valley Authority - Allen Combustion Turbine Plant

2. COMPLETE THE FOLLOWING EMISSIONS SUMMARY FOR REGULATED AIR POLLUTANTS AT THIS FACILITY OR FOR THE SOURCES CONTAINED IN THIS APPLICATION.

AIR POLLUTANT	SUMMARY OF MAXIMUM ALLOWABLE EMISSIONS		SUMMARY OF ACTUAL EMISSIONS	
	TONS PER YEAR	RESERVED FOR AGENCY USE (POUNDS PER HOUR-ITEM 4, APC V.28)	TONS PER YEAR	RESERVED FOR AGENCY USE (POUNDS PER HOUR-ITEM 4, APC V.28)
PARTICULATES (TSP)	24.5		N/A	
SULFUR DIOXIDE	2.12		N/A	
VOLATILE ORGANIC COMPOUNDS	11.2		N/A	
CARBON MONOXIDE	55.8		N/A	
LEAD	1.38E-03		N/A	
NITROGEN OXIDES	46.8		N/A	
TOTAL REDUCED SULFUR	N/A		N/A	
MERCURY	4.59E-06		N/A	
ASBESTOS	N/A		N/A	
BERYLLIUM	3.45E-05		N/A	
VINYL CHLORIDES	N/A		N/A	
FLUORIDES	N/A		N/A	
GASEOUS FLUORIDES	N/A		N/A	
Total PM 2.5	33.9		N/A	
Sulfuric Acid Mist	2.22E-02		N/A	
Carbon Dioxide Equivalent	401,755		N/A	

CONTINUED

3. COMPLETE THE FOLLOWING EMISSIONS SUMMARY FOR REGULATED AIR POLLUTANTS THAT ARE HAZARDOUS AIR POLLUTANT (S) AT THIS FACILITY OR FOR THE SOURCES CONTAINED IN THIS APPLICATION.

AIR POLLUTANT & CAS	SUMMARY OF MAXIMUM ALLOWABLE EMISSIONS		SUMMARY OF ACTUAL EMISSIONS	
	TONS PER YEAR	RESERVED FOR AGENCY USE (POUNDS PER HOUR-ITEM 5, APC V.28)	TONS PER YEAR	RESERVED FOR AGENCY USE (POUNDS PER HOUR-ITEM 5, APC V.28)
Formaldehyde	7.49E-01		N/A	
Total HAPs	1.83		N/A	

4. PAGE NUMBER: REVISION NUMBER: DATE OF REVISION:

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Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
COMPLIANCE PLAN AND COMPLIANCE CERTIFICATION

1. FACILITY NAME:

Tennessee Valley Authority - Allen Combustion Turbine Plant

2. LIST ALL THE PROCESS EMISSION SOURCE(S) OR FUEL BURNING INSTALLATION (S) OR INCINERATOR (S) THAT ARE PART OF THIS APPLICATION.

See list provided in APC V.2

3. INDICATE THAT SOURCE (S) WHICH ARE CONTAINED IN THIS APPLICATION ARE PRESENTLY IN COMPLIANCE WITH ALL APPLICABLE REQUIREMENTS, BY CHECKING THE FOLLOWING:

X A. ATTACHED IS A STATEMENT OF IDENTIFICATION OF THE SOURCE (S) CURRENTLY IN COMPLIANCE. WE WILL CONTINUE TO OPERATE AND MAINTAIN THE SOURCE (S) TO ASSURE COMPLIANCE WITH ALL THE APPLICABLE REQUIREMENTS FOR THE DURATION OF THE PERMIT.

X B. APC V 30 FORM (S) INCLUDES NEW REQUIREMENTS THAT APPLY OR WILL APPLY TO THE SOURCE (S) DURING THE TERM OF THE PERMIT. WE WILL MEET SUCH REQUIREMENTS ON A TIMELY BASIS.:

4. INDICATE THAT THERE ARE SOURCE (S) THAT ARE CONTAINED IN THIS APPLICATION WHICH ARE NOT PRESENTLY IN FULL COMPLIANCE, BY CHECKING BOTH OF THE FOLLOWING:

N/A A. ATTACHED IS A STATEMENT OF IDENTIFICATION OF THE SOURCE (S) NOT IN COMPLIANCE, NON - COMPLYING REQUIREMENT (S), BRIEF DESCRIPTION OF THE PROBLEM, AND THE PROPOSED SOLUTION.

N/A B. WE WILL ACHIEVE COMPLIANCE ACCORDING TO THE FOLLOWING SCHEDULE:

ACTION	DEADLINE

PROGRESS REPORTS WILL BE SUBMITTED:

START DATE: _____ AND EVERY 180 DAYS THEREAFTER UNTIL COMPLIANCE IS ACHIEVED.

5. STATE THE COMPLIANCE STATUS WITH ANY APPLICABLE ENHANCED MONITORING AND COMPLIANCE CERTIFICATION REQUIREMENTS THAT HAVE BEEN PROMULGATED UNDER SECTION 114(a)(3) OF THE CLEAN AIR ACT AS OF THE DATE OF SUBMITTAL OF THIS APC FORM V.31.

No requirements have been promulgated by EPA as of this date.

6. PAGE NUMBER: REVISION NUMBER: DATE OF REVISION:

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COMPLIANCE CERTIFICATION FOR APC V.31 PART 3A
ALLEN COMBUSTION TURBINE PLANT

Based on information and belief formed after reasonable inquiry, the following is true, accurate, and complete. Significant emission units, as listed in Item 1 of APC V.2, are certified to currently be in compliance with applicable requirements. As required by Chapter 1200-3-9-.04(5)(c)3 of the Rules of the Division of Air Pollution Control (adopted by reference in the CMAPCC Section 16-77), the insignificant emission units that are subsets of the fuel burning sources and the process emission sources are also certified to currently be in compliance with applicable requirements. TVA will operate and maintain the above sources to continue to comply with applicable requirements for the duration of the permit.

SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
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MAJOR SOURCE OPERATING PERMIT APPLICATION
STATIONARY GAS TURBINE OR INTERNAL COMBUSTION ENGINE

1. FACILITY NAME:

Tennessee Valley Authority - Allen Combustion Turbine Plant

2. LIST ALL GAS TURBINES AND INTERNAL COMBUSTION ENGINES AT THIS FACILITY ON A SEPARATE SHEET, AND PLEASE COMPLETE AN APC V.5 FORM FOR EACH PIECE OF EQUIPMENT.

All gas turbines and internal combustion engines are listed in APC V.2

3. MANUFACTURER AND MODEL NUMBER:	4. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION(S):
General Electric (GE) LM2500	50, 51, 52, 53, 54, 55 (6 identical units, info below on a per unit basis)

5. EQUIPMENT DESCRIPTION:

The 6 identical natural gas-fired aeroderivative CT units (GE Model LM2500) have gross electrical generating capacities of 33.8 MW each at 59 F. Each CT is equipped with dry low emissions (DLE) combustors, and the exhaust-path has an oxidation catalyst for CO/VOC emissions control and a SCR reactor for NOx emissions control.

6. DATE OF INSTALLATION OR LAST MODIFICATION OF EQUIPMENT:

2025 - 2026

7. RATED HEAT INPUT CAPACITY (IN MILLION BTU/HOUR) AND HORSE POWER:	8. IF EQUIPMENT IS GAS TURBINE, LIST TYPE.
325 MMBtu/hr	X SIMPLE CYCLE
STATE WHICH HEATING VALUE WAS UTILIZED:	_____ REGENERATIVE CYCLE
X HIGHER HEATING VALUE	_____ COMBINED CYCLE
_____ LOWER HEATING VALUE	

9. FUELS:	PRIMARY FUEL	BACKUP FUEL #1	BACKUP FUEL #2	BACKUP FUEL #3
FUEL NAME	Natural Gas			
ACTUAL YEARLY CONSUMPTION	1,111,814,000 scf			

10. (FOR NSPS TURBINES ONLY) MANUFACTURER'S RATED HEAT RATE AT MANUFACTURER'S RATED PEAK LOAD (KILOJOULES PER WATT HOUR), OR ACTUAL MEASURED HEAT RATE BASED ON LOWER HEATING VALUE OF FUEL AS MEASURED AT ACTUAL PEAK LOAD FOR THE UNIT:

9.1 kJ/W-hr at 59 F, based on LHV

11. LOCATION OF THIS FUEL BURNING INSTALLATION:

see next page

LATITUDE (DECIMAL DEGREES): _____ LONGITUDE (DECIMAL DEGREES): _____

12. NORMAL OPERATING SCHEDULE:

24 HRS/DAY 7 DAYS/WK 365 DAYS/YR

13. PAGE NUMBER: REVISION NUMBER: DATE OF REVISION:

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Location of CT 1 through CT 6 for GE LM2500

	Latitude	Longitude
CT 1	35.072242	-90.146132
CT 2	35.072216	-90.145799
CT 3	35.07219	-90.145466
CT 4	35.072164	-90.145134
CT 5	35.072138	-90.144801
CT 6	35.072111	-90.144469

SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
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MEMPHIS, TN 38134
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FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
STACK IDENTIFICATION

1. FACILITY NAME: Tennessee Valley Authority - Allen Combustion Turbine Plant		FOR APC USE ONLY	APC COMPANY NO.
2. STACK ID (OR FLOW DIAGRAM POINT IDENTIFICATION): 50, 51, 52, 53, 54, 55 (6 identical units)			LOG/PERMIT NO.
3. EMISSION SOURCE (IDENTIFY): Combustion Turbines 1 through 6; GE LM2500			
4. STACK HEIGHT ABOVE GRADE IN FEET: 72			
5. VELOCITY (DATA AT EXIT CONDITIONS): 105 (ACTUAL FEET PER SECOND)	6. INSIDE DIMENSIONS AT OUTLET IN FEET: 9		
7. EXHAUST FLOW RATE AT EXIT CONDITIONS (ACFM): 402,518	8. FLOW RATE AT STANDARD CONDITIONS (DSCFM): 148,251		
9. EXHAUST TEMPERATURE: 850 DEGREES FAHRENHEIT (°F)	10. MOISTURE CONTENT (DATA AT EXIT CONDITIONS): 7.87 PERCENT 29 GRAINS PER DRY STANDARD CUBIC FOOT (gr/dscf)		
11. EXHAUST TEMPERATURE THAT IS EQUALED OR EXCEEDED DURING NINETY (90) PERCENT OR MORE OF THE OPERATING TIME (FOR STACKS SUBJECT TO DIFFUSION EQUATION ONLY): N/A (°F)			
12. IF THIS STACK IS EQUIPPED WITH CONTINUOUS POLLUTANT MONITORING EQUIPMENT REQUIRED FOR COMPLIANCE, WHAT POLLUTANT(S) DOES THIS EQUIPMENT MONITOR (e.g., OPACITY, SO_2, NO_X, etc.)? NOx			
COMPLETE THE APPROPRIATE APC FORM(S) V.4, V.5, V.7, V.8, V.9, OR V.10 FOR EACH SOURCE EXHAUSTING THROUGH THIS STACK.			
13. DO YOU HAVE A BYPASS STACK? _____ YES __X__ NO IF YES, DESCRIBE THE CONDITIONS WHICH REQUIRE ITS USE & COMPLETE APC FORM V.3 FOR THE BYPASS STACK. PLEASE IDENTIFY THE STACK NUMBER(S) OR FLOW DIAGRAM POINT NUMBER(S) EXHAUSTING THROUGH THIS BYPASS STACK.			
14. PAGE NUMBER:	REVISION NUMBER:	DATE OF REVISION	

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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
CONTROL EQUIPMENT - MISCELLANEOUS

1. FACILITY NAME:	2. EMISSION SOURCE (IDENTIFY):
Tennessee Valley Authority - Allen Combustion Turbine Plant	Combustion Turbines 1 through 6; GE LM2500

3. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S): 50, 51, 52, 53, 54, 55 (6 identical units)

4. DESCRIBE THE DEVICE IN USE. LIST THE KEY OPERATING PARAMETERS OF THIS DEVICE AND THEIR NORMAL OPERATING RANGE (e.g., PRESSURE DROP, GAS FLOW RATE, TEMPERATURE):

A Selective Catalytic Reduction (SCR) reactor resides in each CT unit's exhaust path to reduce Nitrogen Oxides (NOx).

Expected operating parameters:

1. Maximum Flue Gas Mass Rate through SCR: 800,000 lb/hr
2. Minimum Continuous Operating Temperature with Ammonia Injection: 810 F
3. Pressure Drop: < 1.8 inches water column (gauge)
4. Maximum Ammonia Slip: 5 parts per million by volume (ppmv)

5. MANUFACTURER AND MODEL NUMBER (IF AVAILABLE): To Be Determined (TBD)

6. YEAR OF INSTALLATION: 2025-2026

7. LIST OF POLLUTANT (S) TO BE CONTROLLED BY THIS EQUIPMENT AND THE EXPECTED CONTROL EFFICIENCY FOR EACH POLLUTANT.

POLLUTANT	EFFICIENCY (%)	SOURCE OF DATA
Nitrogen Oxides (NOx)	90 %	Vendor (Excludes periods of startup, shutdown, malfunction)

8. DISCUSS HOW COLLECTED MATERIAL IS HANDLED FOR REUSE OR DISPOSAL.

SCR reaction products are molecular nitrogen (N2) and water. Ammonia (NH3) slip escaping the SCR reactor is neutralized by acidic components of the flue gas to form ammonium salts.

9. IF THIS CONTROL EQUIPMENT IS IN SERIES WITH SOME OTHER CONTROL EQUIPMENT, STATE AND SPECIFY THE OVERALL EFFICIENCY.

N/A

10. PAGE NUMBER: REVISION NUMBER: DATE OF REVISION:

SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
CONTROL EQUIPMENT - CATALYTIC OR THERMAL OXIDATION

1. FACILITY NAME:	2. EMISSION SOURCE (IDENTIFY):
Tennessee Valley Authority - Allen Combustion Turbine Plant	Combustion Turbines 1 through 6; GE LM2500

3. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
50, 51, 52, 53, 54, 55 (6 identical units)

4. DESCRIBE THE OXIDATION SYSTEM IN USE. LIST THE KEY OPERATING PARAMETERS OF THIS DEVICE AND THEIR NORMAL OPERATING RANGE.

A catalytic oxidation unit (or catox) resides in each CT unit's exhaust path to reduce carbon monoxide (CO) and volatile organic compounds (VOC).

Expected operating parameters:
1. Maximum Flue Gas Mass Rate through Catalytic Oxidizer: 800,000 lb/hr
2. Maximum Continuous Operating Temperature: 850 F
3. Maximum Intermittent Operating Temperature: TBD

5. MANUFACTURER AND MODEL NUMBER (IF AVAILABLE):	6. YEAR OF INSTALLATION	7. TYPE (check one):
TBD	2025-2026	CATALYTIC OXIDIZER X THERMAL OXIDIZER

8. LIST OF POLLUTANT (S) TO BE CONTROLLED AND THE EXPECTED CONTROL EFFICIENCY FOR EACH POLLUTANT.

POLLUTANT	EFFICIENCY (%)	SOURCE OF DATA
Carbon Monoxide (CO)	> 80	Vendor (Excludes periods of startup, shutdown, malfunction)
Volatile Organic Compounds (VOC)	30	Vendor (Excludes periods of startup, shutdown, malfunction)

9. IF APPLICABLE, DISCUSS HOW SPENT CATALYST IS HANDLED FOR REUSE OR DISPOSAL.

Spent catalyst is recycled for precious metal value.

10. EQUIPMENT SPECIFICATIONS:

CATALYTIC OXIDATION		THERMAL OXIDATION	
10A. MINIMUM OPERATING TEMPERATURE (°F):	300 F	10B. MINIMUM OPERATING TEMPERATURE (°F):	N/A
11A. TYPE OF FUEL USED:	N/A	11B. TYPE OF FUEL USED:	N/A
12. TYPE OF CATALYST USED AND VOLUME OF CATALYST USED (FT^3):	Stainless-Steel Substrate: Aluminum Oxide, Platinum; TBD cu ft		
13A. MAXIMUM FUEL USE:	N/A	13B. MAXIMUM FUEL USE:	N/A
14A. RESIDENCE TIME (SEC):	N/A	14B. RESIDENCE TIME (SEC):	N/A

15. IF THIS CONTROL EQUIPMENT IS IN SERIES WITH SOME OTHER CONTROL EQUIPMENT, STATE AND SPECIFY THE OVERALL EFFICIENCY.

None

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SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
EMISSIONS FROM PROCESS EMISSION SOURCE / FUEL BURNING INSTALLATION / INCINERATOR

1. FACILITY NAME:	2. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
TVA - Allen Combustion Turbine Plant	50, 51, 52, 53, 54, 55 (6 identical units)

3. PROCESS EMISSION SOURCE / FUEL BURNING INSTALLATION / INCINERATOR (IDENTIFY):
Combustion Turbines 1 through 6; GE LM2500

4. COMPLETE THE FOLLOWING EMISSIONS SUMMARY FOR REGULATED AIR POLLUTANTS. FUGITIVE EMISSIONS SHALL BE INCLUDED. ATTACH CALCULATIONS AND EMISSION FACTOR REFERENCES.

AIR POLLUTANT	MAXIMUM ALLOWABLE EMISSIONS		ACTUAL EMISSIONS	
	TONS PER YEAR	RESERVED FOR AGENCYUSE (POUNDS PER HOUR-ITEM 7, APC V.30)	TONS PER YEAR	RESERVED FOR AGENCY USE (POUNDS PER HOUR-ITEM 8, APC V.30)
PARTICULATES (TSP)	24.4		N/A	
(FUGITIVE EMISSIONS)				
SULFUR DIOXIDE	2.12		N/A	
(FUGITIVE EMISSIONS)				
VOLATILE ORGANIC COMPOUNDS	11.1		N/A	
(FUGITIVE EMISSIONS)				
CARBON MONOXIDE	54.6		N/A	
(FUGITIVE EMISSIONS)				
LEAD	1.36E-03		N/A	
(FUGITIVE EMISSIONS)				
NITROGEN OXIDES	44.6		N/A	
(FUGITIVE EMISSIONS)				
TOTAL REDUCED SULFUR	N/A		N/A	
(FUGITIVE EMISSIONS)				
MERCURY	2.72E-06		N/A	
(FUGITIVE EMISSIONS)				

CONTINUED

Note: Emissions are total for CT-1 through CT-6 and include startup and shutdown emissions.

AIR POLLUTANT	MAXIMUM ALLOWABLE EMISSIONS		ACTUAL EMISSIONS	
	TONS PER YEAR	RESERVED FOR AGENCY USE (POUNDS PER HOUR-ITEM 7, APC V.30)	TONS PER YEAR	RESERVED FOR AGENCY USE (POUNDS PER HOUR-ITEM 8, APC V.30)
ASBESTOS	N/A		N/A	
(FUGITIVE EMISSIONS)				
BERYLLIUM	3.40E-05		N/A	
(FUGITIVE EMISSIONS)				
VINYL CHLORIDE	N/A		N/A	
(FUGITIVE EMISSIONS)				
FLUORIDES	N/A		N/A	
(FUGITIVE EMISSIONS)				
GASEOUS FLUORIDES	N/A		N/A	
(FUGITIVE EMISSIONS)				
Total PM 2.5	33.8		N/A	
Sulfuric Acid Mist	2.20E-02		N/A	
Carbon Dioxide Equivalent	401,500		N/A	

5. COMPLETE THE FOLLOWING EMISSIONS SUMMARY FOR REGULATED AIR POLLUTANTS THAT ARE HAZARDOUS AIR POLLUTANT(S). FUGITIVE EMISSIONS SHALL BE INCLUDED. ATTACH CALCULATIONS AND EMISSION FACTOR REFERENCES.

AIR POLLUTANT & CAS #	MAXIMUM ALLOWABLE EMISSIONS		ACTUAL EMISSIONS	
	TONS PER YEAR	RESERVED FOR AGENCY USE (POUNDS PER HOUR-ITEM 7, APC V.30)	TONS PER YEAR	RESERVED FOR AGENCY USE (POUNDS PER HOUR-ITEM 8, APC V.30)
Formaldehyde	7.48E-01		N/A	
Total HAPs	1.83		N/A	

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Note: Emissions are total for CT-1 through CT-6 and include startup and shutdown emissions.

SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
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MAJOR SOURCE OPERATING PERMIT APPLICATION
CURRENT EMISSIONS REQUIREMENTS AND STATUS

GENERAL IDENTIFICATION AND DESCRIPTION	
1. Facility name: Tennessee Valley Authority – Allen Combustion Turbine Plant	2. Emission source number: 50, 51, 52, 53, 54, 55 (6 identical units)
3. Describe the process emission source / fuel burning installation / incinerator. Combustion Turbines 1 through 6; GE LM2500	

EMISSIONS AND REQUIREMENTS					
4. Identify if only a part of the source is subject to this requirement	5. Pollutant	6. Applicable requirement (s): air pollution control regulations, 40 CFR, permit restrictions, air quality based standards	7. Limitation	8. Maximum actual emissions	9. Compliance status (In/Out)
	Filterable PM	TAPCR 1200-3-06-.02(2); 40 CFR 51.110(a)	0.100 lbs./MMBtu		IN
	Opacity	TAPCR 1200-3-5-.01(1); 40 CFR 51.110(a)	20% (6-min. avg.) – except allowed exceedances		IN
	Opacity	TAPCR 1200-3-5-.02(1); 40 CFR 51.211: Exceptions - Maintain logs containing specified information and provide copy upon request	Startup, shutdown, and malfunction		IN
	Sulfur Dioxide (SO_2)	40 CFR § 60.4330(a)(2); 40 CFR 51.110(a)	0.060 lbs. SO_2/MMBtu		IN
	Nitrogen Oxides (NO_X)	TAPCR 1200-3-16-.01(3); 40 CFR 60.4320(a); 40 CFR 51.110(a): CT ≥75% Load on Natural Gas	25 ppm @ 15% O_2		IN
	NO_X	40 CFR Part 75.10(a)(2); TAPCR 1200-03-10-.02; 1200-03-09-.03: Install, certify, operate, and maintain in accordance with all requirements a NO_X CEMS with automated DAHS			IN
	SO_2 and NO_X	TAPCR 1200-03-09-.03(8); 40 CFR § 52.2240 and § 52.2241; 40 CFR 97 Subparts AAAAA, CCCCC, and EEEEE: Cross-State Air Pollution Rule (CASPR)			IN

(CONTINUED ON NEXT PAGE)

(CONTINUED FROM PRIOR PAGE)

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:	2. Emission source number:
Tennessee Valley Authority – Allen Combustion Turbine Plant	50, 51, 52, 53, 54, 55 (6 identical units)

3. Describe the process emission source / fuel burning installation / incinerator.
Combustion Turbines 1 through 6; GE LM2500

EMISSIONS AND REQUIREMENTS

4. Identify if only a part of the source is subject to this requirement	5. Pollutant	6. Applicable requirement (s): air pollution control regulations, 40 CFR, permit restrictions, air quality based standards	7. Limitation	8. Maximum actual emissions	9. Compliance status (In/Out)
(CONTINUED FROM PREVIOUS PAGE)					
	SO_2 and NO_X	40 CFR Part 72, 73, 75, 76, 77, 78: Acid Rain Program; Requirements Regulations; Allowance System, Custom Fuel Monitoring Schedule			IN
	Carbon Dioxide (CO_2)	TAPCR 1200-3-16-.01(3); 40 CFR § 60.5520(a); 40 CFR 51.110(a)	120 lbs./10^6 Btu		IN
	CO_2	TAPCR 1200-3-30-.01(6)(b)1; 40 CFR 75.10(a)(3)(ii): Determine CO_2 emissions based on measured carbon content of the fuel and the procedures in 40 CFR Part 75 App. G			IN
	NO_X, flow, and diluent gas monitor	TAPCR 1200-3-30-.01(6)(b)1; 40 CFR 75 App. A: Certification Procedures and Specification and Testing Procedures			IN
	All Regulated Pollutants	TAPCR 1200-3-16-.01; 40 CFR 60, Subpart A: General Provisions			IN
	All Regulated Pollutants	TAPCR 1200-3-20-.02; 40 CFR 51.211: Reasonable Measures Required - All reasonable precautions to minimize emissions during malfunctions, startups, and shutdowns.			IN
	All Regulated Pollutants	TAPCR 1200-3-20-.03; 40 CFR 51.211: Notice Required When Malfunction Occurs - Malfunction of equipment resulting in excess emissions for more than 24 hours must be reported within 24 hours.			IN

(CONTINUED ON NEXT PAGE)

(CONTINUED FROM PRIOR PAGE)

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:	2. Emission source number:
Tennessee Valley Authority – Allen Combustion Turbine Plant	50, 51, 52, 53, 54, 55 (6 identical units)

3. Describe the process emission source / fuel burning installation / incinerator.
Combustion Turbines 1 through 6; GE LM2500

EMISSIONS AND REQUIREMENTS

4. Identify if only a part of the source is subject to this requirement	5. Pollutant	6. Applicable requirement (s): air pollution control regulations, 40 CFR, permit restrictions, air quality based standards	7. Limitation	8. Maximum actual emissions	9. Compliance status (In/Out)
(CONTINUED FROM PREVIOUS PAGE)					
	All Regulated Pollutants	TAPCR 1200-3-10-.04: Sampling, Recording, and Reporting Required for Major Stationary Sources - Technical Secretary may require periodic or enhanced monitoring, recording, and reporting that he deems necessary for the verification of a source's compliance			IN
	All Regulated Pollutants	TAPCR 1200-3-9-.02(11)(e)7(iii); 40 CFR 70.6(g)(3): Emergency Provisions - Requires the maintenance of operating logs containing specified information, prompt submittal of information to the Technical Secretary, and taking all reasonable steps to minimize emissions in order for an emergency to be used as an affirmative defense to an enforcement action.	Take all reasonable steps to minimize levels of emissions that exceed an emission standard or other permit requirements		IN
	All Regulated Pollutants	TAPCR 1200-3-9-.02(11)(e)1(iii); 40 CFR 70.6(a)(3) : Monitoring and related recordkeeping and reporting requirements - Specifies requirements for monitoring and related recordkeeping and reporting and the maintenance of records of all required monitoring data and support information for a period of at least 5 years.			IN
10. Other applicable requirements (new requirements that apply to this source during term of this permit)					

11. Page number:	Revision number:	Date of revision:

SHELBY COUNTY HEALTH DEPARTMENT
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COMPLIANCE CERTIFICATION - MONITORING AND REPORTING
DESCRIPTION OF METHODS USED FOR DETERMINING COMPLIANCE

ALL SOURCES THAT ARE SUBJECT TO 1200-3-9-.02(11) OF TENNESSEE AIR POLLUTION CONTROL REGULATIONS ARE REQUIRED TO CERTIFY COMPLIANCE WITH ALL APPLICABLE REQUIREMENTS BY INCLUDING A STATEMENT WITHIN THE PERMIT APPLICATION OF THE METHODS USED FOR DETERMINING COMPLIANCE. THIS STATEMENT MUST INCLUDE A DESCRIPTION OF THE MONITORING, RECORDKEEPING, AND REPORTING REQUIREMENTS AND TEST METHODS. IN ADDITION, THE APPLICATION MUST INCLUDE A SCHEDULE FOR COMPLIANCE CERTIFICATION SUBMITTALS DURING THE PERMIT TERM. THESE SUBMITTALS MUST BE NO LESS FREQUENT THAN ANNUALLY AND MAY NEED TO BE MORE FREQUENT IF SPECIFIED BY THE UNDERLYING APPLICABLE REQUIREMENT OR THE TECHNICAL SECRETARY.

1. FACILITY NAME: Tennessee Valley Authority - Allen Combustion Turbine Plant

2. PROCESS EMISSION SOURCE, FUEL BURNING INSTALLATION, OR INCINERATOR (IDENTIFY):
Combustion Turbines 1 through 6; GE LM2500

3. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
50, 51, 52, 53, 54, 55 (6 identical units)

4. THIS SOURCE AS DESCRIBED UNDER ITEM #2 OF THIS APPLICATION WILL USE THE FOLLOWING METHOD(S) FOR DETERMINING COMPLIANCE WITH APPLICABLE REQUIREMENTS (AND SPECIAL OPERATING CONDITIONS FROM AN EXISTING PERMIT). CHECK ALL THAT APPLY AND ATTACH THE APPROPRIATE FORM(S).

X CONTINUOUS EMISSIONS MONITORING (CEM) - APC FORM V.20
POLLUTANT(S): NOx

_____ EMISSION MONITORING USING PORTABLE MONITORS - APC FORM V.21
POLLUTANT(S):

_____ MONITORING CONTROL SYSTEM PARAMETERS OR OPERATING PARAMETERS OF A PROCESS - APC FORM V.22
POLLUTANT(S):

_____ MONITORING MAINTENANCE PROCEDURES - APC FORM V.23
POLLUTANT(S):

X STACK TESTING - APC FORM V.24
POLLUTANT(S): PM/PM10/PM2.5

_____ FUEL SAMPLING & ANALYSIS (FSA) - APC FORM V.25
POLLUTANT(S):

X RECORDKEEPING - APC FORM V.26
POLLUTANT(S): CO2

X OTHER (PLEASE DESCRIBE) - APC FORM V.27
POLLUTANT(S): PM/PM10/PM2.5, Opacity, CO, VOC, and SO2

5. COMPLIANCE CERTIFICATION REPORTS WILL BE SUBMITTED TO THE DIVISION ACCORDING TO THE FOLLOWING SCHEDULE.

START DATE: Within 60 days after June 30 and December 31 of each year

AND EVERY N/A DAYS THEREAFTER.

6. COMPLIANCE MONITORING REPORTS WILL BE SUBMITTED TO THE DIVISION ACCORDING TO THE FOLLOWING SCHEDULE:

START DATE: Within 60 days after June 30 and December 31 of each year

AND EVERY N/A DAYS THEREAFTER.

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SHELBY COUNTY HEALTH DEPARTMENT
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MAJOR SOURCE OPERATING PERMIT APPLICATION
COMPLIANCE DEMONSTRATION BY CONTINUOUS EMISSIONS MONITORING

1. FACILITY NAME: Tennessee Valley Authority - Allen Combustion Turbine Plant

2. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S): 50, 51, 52, 53, 54, 55 (6 identical units)

3. PROCESS EMISSION SOURCE OR FUEL BURNING INSTALLATION OR INCINERATOR: Combustion Turbines 1 through 6; GE LM2500

4. DESCRIPTION OF EQUIPMENT MONITORING POLLUTANT:

POLLUTANT BEING MONITORED: NOx

4A. NAME OF MANUFACTURER: TBD

4B. MODEL NUMBER: TBD

4C. INSTALLATION YEAR: 2025 - 2026

4D. TYPE: _____IN SITU __X__EXTRACTIVE _____DILUTION _____OTHER (SPECIFY): _____

4E. DESCRIBE HOW THE MONITOR WORKS:

5. DESCRIPTION OF EQUIPMENT MONITORING DILUENT:

DILUENT BEING MONITORED: Oxygen (O2)

5A. NAME OF MANUFACTURER: TBD

5B. MODEL NUMBER: TBD

5C. INSTALLATION YEAR:

5D. TYPE: _____IN SITU __X__EXTRACTIVE _____O_2 _____CO_2 _____OTHER (SPECIFY):_____

5E. DESCRIBE HOW THE MONITOR WORKS:

6. DESCRIPTION OF EQUIPMENT MONITORING FLOW: N/A

AMOUNT OF FLOW (DSCFM): _____

6A. NAME OF MANUFACTURER:

6B. MODEL NUMBER:

6C. INSTALLATION YEAR:

6D. TYPE: _____ DIFFERENTIAL PRESSURE _____ THERMAL _____OTHER (SPECIFY): _____

7. OPACITY (OR USE OF VISIBLE EMISSION EVALUATIONS IN LIEU OF OPACITY MONITORING):

7A. INDICATE WHICH IS USED. N/A

_____ MONITOR _____ VISIBLE EMISSION EVALUATIONS*

*FOR "VISIBLE EMISSION EVALUATIONS" CHOICE, PROCEDURES WILL BE SPECIFIED AS A CONDITION IN THE SOURCE'S OPERATING PERMIT.

7B. OPACITY MONITOR (STATE THE NAME OF MANUFACTURER, MODEL NUMBER, AND YEAR OF INSTALLATION):

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Monitor Description for V.20

The continuous emission monitoring system (CEMS) automatically and continuously monitor concentrations of nitrogen oxides (NO_X) using a NO_X/oxygen (O_2) monitor. Additionally, sulfur dioxide (SO_2) and carbon dioxide (CO_2) emissions are monitored in accordance with Appendices D and G of 40 CFR Part 75, respectively.

The CEMS sampling probes are installed according to 40 CFR Part 75, Appendix A, Section 1. Separate orifice-plate fuel flowmeters are used to measure the amount of pipeline natural gas (PNG) combusted per CT unit. For pollutant concentration, the sample probe is installed at a location that is representative of the total emissions from each CT unit. The CEMS measures an extracted sample which uses O_2 as the diluent. Zero and span checks and Relative Accuracy Test Audits (RATAs) are performed on the CEMS in accordance with EPA regulations.

Collected data are controlled by a data acquisition and handling system (DAHS). The DAHS software generates reports, calibrates the analyzers, performs EPA specific algorithms, sorts data on a hard disk drive, and provides operator interface. The DAHS polls the system to generate one-minute, 15-minute, and one-hour averages. The measurements are transmitted to the DAHS via a communication link. Four valid 15-minute averages must be available to calculate a one-hour average except during periods when calibration, quality assurance, or maintenance are being performed. During these periods, a valid one-hour average shall consist of at least two valid 15-minute averages.

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MAJOR SOURCE OPERATING PERMIT APPLICATION
COMPLIANCE DEMONSTRATION BY STACK TESTING

THE PERFORMANCE OF AN APPROPRIATE EPA STACK TEST METHOD FOR DEMONSTRATING COMPLIANCE WITH AN EMISSION LIMITATION HAS ALWAYS BEEN ACCEPTABLE. EPA TEST METHODS CONTAIN QUALITY ASSURANCE PROCEDURES THAT SHALL BE STRICTLY ADHERED TO BY THE SOURCE.

1. FACILITY NAME:

Tennessee Valley Authority - Allen Combustion Turbine Plant

2. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):

50, 51, 52, 53, 54, 55 (6 identical units)

3. EMISSION SOURCE (IDENTIFY):

Combustion Turbines 1 through 6; GE LM2500

4. POLLUTANT(S) BEING MONITORED:

PM/PM10/PM2.5

5. TEST METHOD:

Initial particulate performance testing shall utilize EPA Method 5 and Method 202.

6. COMPLIANCE DEMONSTRATION FREQUENCY (SPECIFY THE FREQUENCY WITH WHICH COMPLIANCE WILL BE DEMONSTRATED):

Initial compliance demonstration via stack testing; subsequent compliance ensured via measures presented in APC V.27.

7. PAGE NUMBER: REVISION NUMBER: DATE OF REVISION:

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MAJOR SOURCE OPERATING PERMIT APPLICATION
COMPLIANCE DEMONSTRATION BY RECORDKEEPING

RECORDKEEPING SHALL BE ACCEPTABLE AS A COMPLIANCE DEMONSTRATION METHOD PROVIDED THAT A CORRELATION BETWEEN THE PARAMETER VALUE RECORDED AND THE APPLICABLE REQUIREMENT IS ESTABLISHED

1. FACILITY NAME:	2. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
Tennessee Valley Authority - Allen Combustion Turbine Plant	50, 51, 52, 53, 54, 55 (6 identical units)

3. EMISSION SOURCE (IDENTIFY):

Combustion Turbines 1 through 6; GE LM2500

4. POLLUTANT(S) OR PARAMETER BEING MONITORED:

GHG, measured and reported as CO2

5. MATERIAL OR PARAMETER BEING MONITORED AND RECORDED:

Gross Generation (megawatt-hours [MWh]) Output

6. METHOD OF MONITORING AND RECORDING:

A monthly log of the electric generation output (MWh) at each generator's terminals will be compiled via a 12-month rolling total for each unit. The log will be maintained at the source location and kept available for inspection by the Technical Secretary or his representative.

7. COMPLIANCE DEMONSTRATION FREQUENCY (SPECIFY THE FREQUENCY WITH WHICH COMPLIANCE WILL BE DEMONSTRATED):

Compliance with the "per CT unit" generation restriction, which assures compliance with the 120 lbs. CO2/MMBtu limit and will be submitted as part of the annual compliance report.

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MAJOR SOURCE OPERATING PERMIT APPLICATION
COMPLIANCE DEMONSTRATION BY OTHER METHOD(S)

1. FACILITY NAME:	2. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
Tennessee Valley Authority - Allen Combustion Turbine Plant	50, 51, 52, 53, 54, 55 (6 identical units)

3. EMISSION SOURCE (IDENTIFY):

Combustion Turbines 1 through 6; GE LM2500

4. POLLUTANT(S) OR PARAMETER BEING MONITORED:

Particulate Matter, Opacity, Carbon Monoxide, Volatile Organic Compounds, Sulfur Dioxide

5. DESCRIPTION OF THE METHOD OF MONITORING:

The CT units only combust natural gas. Compliance with the opacity standard will be demonstrated utilizing the opacity matrix dated June 18, 1996 (amended September 12, 2005). Due to the inherent properties of natural gas, no other compliance demonstration is necessary for the PM and opacity standards. Natural gas inherently complies with any SO2 limits due to its relatively low-to-no sulfur content. Good combustion practices and state-of-the-art combustion systems are used to ensure CO and VOC emission standards are maintained.

6. COMPLIANCE DEMONSTRATION FREQUENCY (SPECIFY THE FREQUENCY WITH WHICH COMPLIANCE WILL BE DEMONSTRATED):

N/A

7. PAGE NUMBER:	REVISION NUMBER:	DATE OF REVISION:

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MAJOR SOURCE OPERATING PERMIT APPLICATION
STATIONARY GAS TURBINE OR INTERNAL COMBUSTION ENGINE

1. FACILITY NAME:

Tennessee Valley Authority - Allen Combustion Turbine Plant

2. LIST ALL GAS TURBINES AND INTERNAL COMBUSTION ENGINES AT THIS FACILITY ON A SEPARATE SHEET, AND PLEASE COMPLETE AN APC V.5 FORM FOR EACH PIECE OF EQUIPMENT.

All gas turbines and internal combustion engines are listed in APC V.2

3. MANUFACTURER AND MODEL NUMBER:	4. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION(S):
Cummins Inc. QSK50-G4 NR2	56, 57 (2 identical units, info below on a per unit basis)

5. EQUIPMENT DESCRIPTION:

Two identical black-start diesel emergency generators (BSG-1 and BSG-2) are used to energize the switchyard during an unlikely transmission-system emergency. The black-start generator's operational duration to address such emergencies is expected to not exceed 30 minutes. Each generator is expected to be operated once per week for maintenance/readiness testing and will meet 40 CFR 1039, Appendix 1, Tier 2 standards for > 750 hp engines.

6. DATE OF INSTALLATION OR LAST MODIFICATION OF EQUIPMENT:

2025 - 2026

7. RATED HEAT INPUT CAPACITY (IN MILLION BTU/HOUR) AND HORSE POWER:	8. IF EQUIPMENT IS GAS TURBINE, LIST TYPE.
15.54 MMBtu/hr; 2,220 hp	_____ SIMPLE CYCLE
STATE WHICH HEATING VALUE WAS UTILIZED:	_____ REGENERATIVE CYCLE
X HIGHER HEATING VALUE	_____ COMBINED CYCLE
_____ LOWER HEATING VALUE	

9. FUELS:	PRIMARY FUEL	BACKUP FUEL #1	BACKUP FUEL #2	BACKUP FUEL #3
FUEL NAME	No. 2 fuel oil			
ACTUAL YEARLY CONSUMPTION	11,100 gal			

10. (FOR NSPS TURBINES ONLY) MANUFACTURER'S RATED HEAT RATE AT MANUFACTURER'S RATED PEAK LOAD (KILOJOULES PER WATT HOUR), OR ACTUAL MEASURED HEAT RATE BASED ON LOWER HEATING VALUE OF FUEL AS MEASURED AT ACTUAL PEAK LOAD FOR THE UNIT:

11. LOCATION OF THIS FUEL BURNING INSTALLATION:

LATITUDE (DECIMAL DEGREES): 35.072425 LONGITUDE (DECIMAL DEGREES): -90.144866 BSG-1
35.072421 -90.144822 BSG-2

12. NORMAL OPERATING SCHEDULE: No normal operating schedule, maximum operations of 100 hours per year.

_____ HRS/DAY _____ DAYS/WK _____ DAYS/YR

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SHELBY COUNTY HEALTH DEPARTMENT
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MAJOR SOURCE OPERATING PERMIT APPLICATION
STACK IDENTIFICATION

1. FACILITY NAME: Tennessee Valley Authority - Allen Combustion Turbine Plant		FOR APC USE ONLY	APC COMPANY NO.
2. STACK ID (OR FLOW DIAGRAM POINT IDENTIFICATION): 56, 57 (2 identical units)			LOG/PERMIT NO.
3. EMISSION SOURCE (IDENTIFY): Black-Start Diesel Emergency Generators 1 and 2			
4. STACK HEIGHT ABOVE GRADE IN FEET: 10			
5. VELOCITY (DATA AT EXIT CONDITIONS): 437 (ACTUAL FEET PER SECOND)	6. INSIDE DIMENSIONS AT OUTLET IN FEET: 0.8		
7. EXHAUST FLOW RATE AT EXIT CONDITIONS (ACFM): 13,180	8. FLOW RATE AT STANDARD CONDITIONS (DSCFM): 4,770		
9. EXHAUST TEMPERATURE: 840 DEGREES FAHRENHEIT (°F)	10. MOISTURE CONTENT (DATA AT EXIT CONDITIONS): 10.9 PERCENT 39 GRAINS PER DRY STANDARD CUBIC FOOT (gr/dscf)		
11. EXHAUST TEMPERATURE THAT IS EQUALED OR EXCEEDED DURING NINETY (90) PERCENT OR MORE OF THE OPERATING TIME (FOR STACKS SUBJECT TO DIFFUSION EQUATION ONLY): N/A (°F)			
12. IF THIS STACK IS EQUIPPED WITH CONTINUOUS POLLUTANT MONITORING EQUIPMENT REQUIRED FOR COMPLIANCE, WHAT POLLUTANT(S) DOES THIS EQUIPMENT MONITOR (e.g., OPACITY, SO_2, NO_X, etc.)? N/A			
COMPLETE THE APPROPRIATE APC FORM(S) V.4, V.5, V.7, V.8, V.9, OR V.10 FOR EACH SOURCE EXHAUSTING THROUGH THIS STACK.			
13. DO YOU HAVE A BYPASS STACK? _____ YES __X__ NO IF YES, DESCRIBE THE CONDITIONS WHICH REQUIRE ITS USE & COMPLETE APC FORM V.3 FOR THE BYPASS STACK. PLEASE IDENTIFY THE STACK NUMBER(S) OR FLOW DIAGRAM POINT NUMBER(S) EXHAUSTING THROUGH THIS BYPASS STACK.			
14. PAGE NUMBER:	REVISION NUMBER:	DATE OF REVISION	

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MAJOR SOURCE OPERATING PERMIT APPLICATION
EMISSIONS FROM PROCESS EMISSION SOURCE / FUEL BURNING INSTALLATION / INCINERATOR

1. FACILITY NAME:	2. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
Tennessee Valley Authority - Allen Combustion Turbine Plant	56, 57 (2 identical units)

3. PROCESS EMISSION SOURCE / FUEL BURNING INSTALLATION / INCINERATOR (IDENTIFY):

Black Start Diesel Emergency Generators 1 and 2

4. COMPLETE THE FOLLOWING EMISSIONS SUMMARY FOR REGULATED AIR POLLUTANTS. FUGITIVE EMISSIONS SHALL BE INCLUDED. ATTACH CALCULATIONS AND EMISSION FACTOR REFERENCES.

AIR POLLUTANT	MAXIMUM ALLOWABLE EMISSIONS		ACTUAL EMISSIONS	
	TONS PER YEAR	RESERVED FOR AGENCYUSE (POUNDS PER HOUR-ITEM 7, APC V.30)	TONS PER YEAR	RESERVED FOR AGENCY USE (POUNDS PER HOUR-ITEM 8, APC V.30)
PARTICULATES (TSP)	7.30E-02		N/A	
(FUGITIVE EMISSIONS)				
SULFUR DIOXIDE	2.23E-03		N/A	
(FUGITIVE EMISSIONS)				
VOLATILE ORGANIC COMPOUNDS	1.17E-01		N/A	
(FUGITIVE EMISSIONS)				
CARBON MONOXIDE	1.28		N/A	
(FUGITIVE EMISSIONS)				
LEAD	2.18E-05		N/A	
(FUGITIVE EMISSIONS)				
NITROGEN OXIDES	2.22		N/A	
(FUGITIVE EMISSIONS)				
TOTAL REDUCED SULFUR	N/A		N/A	
(FUGITIVE EMISSIONS)				
MERCURY	1.86E-06		N/A	
(FUGITIVE EMISSIONS)				

CONTINUED

Note: Emissions are total for both BSG-1 and BSG-2.

AIR POLLUTANT	MAXIMUM ALLOWABLE EMISSIONS		ACTUAL EMISSIONS	
	TONS PER YEAR	RESERVED FOR AGENCY USE (POUNDS PER HOUR-ITEM 7, APC V.30)	TONS PER YEAR	RESERVED FOR AGENCY USE (POUNDS PER HOUR-ITEM 8, APC V.30)
ASBESTOS	N/A		N/A	
(FUGITIVE EMISSIONS)				
BERYLLIUM	4.82E-07		N/A	
(FUGITIVE EMISSIONS)				
VINYL CHLORIDE	N/A		N/A	
(FUGITIVE EMISSIONS)				
FLUORIDES	N/A		N/A	
(FUGITIVE EMISSIONS)				
GASEOUS FLUORIDES	N/A		N/A	
(FUGITIVE EMISSIONS)				
Total PM 2.5	1.46E-01		N/A	
Sulfuric Acid Mist	1.80E-04		N/A	
Carbon Dioxide Equivalent	254		N/A	

5. COMPLETE THE FOLLOWING EMISSIONS SUMMARY FOR REGULATED AIR POLLUTANTS THAT ARE HAZARDOUS AIR POLLUTANT(S). FUGITIVE EMISSIONS SHALL BE INCLUDED. ATTACH CALCULATIONS AND EMISSION FACTOR REFERENCES.

AIR POLLUTANT & CAS #	MAXIMUM ALLOWABLE EMISSIONS		ACTUAL EMISSIONS	
	TONS PER YEAR	RESERVED FOR AGENCY USE (POUNDS PER HOUR-ITEM 7, APC V.30)	TONS PER YEAR	RESERVED FOR AGENCY USE (POUNDS PER HOUR-ITEM 8, APC V.30)
Formaldehyde	1.23E-04		N/A	
Total HAPs	3.20E-03		N/A	

6. PAGE NUMBER: REVISION NUMBER: DATE OF REVISION

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Note: Emissions are total for BSG-1 and BSG-2.

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MAJOR SOURCE OPERATING PERMIT APPLICATION
CURRENT EMISSIONS REQUIREMENTS AND STATUS

GENERAL IDENTIFICATION AND DESCRIPTION

1. Facility name:	2. Emission source number
Tennessee Valley Authority – Allen Combustion Turbine Plant	56, 57 (2 identical units)

3. Describe the process emission source / fuel burning installation / incinerator.
Black-Start Diesel Emergency Generators 1 and 2

EMISSIONS AND REQUIREMENTS

4. Identify if only a part of the source is subject to this requirement	5. Pollutant	6. Applicable requirement(s): Air Pollution Control Regulations, 40 CFR, permit restrictions, air quality based standards	7. Limitation	8. Maximum actual emissions	9. Compliance status (In/Out)
	Sulfur Dioxide	40 CFR 60.4207(b): Fuel Sulfur Limit	Only No. 2 fuel oil with a sulfur content not to exceed 0.0015 %S (15 ppm) shall be used as fuel.		IN
	Nitrogen Oxides, Hydrocarbons, Carbon Monoxide, Particulates	40 CFR Part 1039, Appendix I, Tier 2, Emission Standards for > 750 hp Engines	NOx + NMHC < 4.8 grams/hp-hr CO < 2.6 grams/hp-hr PM < 0.15 grams/hp-hr Install non-resettable hour meter prior to startup.		IN
	All Regulated Pollutants	40 CFR Part 60.4211: Annual Operating Hours	No time limit for emergency situations. 100 hr/yr for maintenance and readiness testing. 50 hr/yr for non-emergency situations.		IN
	Opacity	TAPCR 1200-3-5-.02(1); 40 CFR 51.110(a): Opacity Standard	20 % opacity (6 minute average), except allowed exclusions.		IN
	Opacity	TAPCR 1200-3-5-.02(1); 40 CFR 51.211: Exception - Due allowance for emissions in excess of the opacity limit during startup, shutdown, and malfunction.	Take reasonable precaution to minimize emissions		IN

10. Other applicable requirements (new requirements that apply to this source during the term of this permit)

11. Page number: Revision number: Date of revision:

SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

COMPLIANCE CERTIFICATION - MONITORING AND REPORTING
DESCRIPTION OF METHODS USED FOR DETERMINING COMPLIANCE

ALL SOURCES THAT ARE SUBJECT TO 1200-3-9-.02(11) OF TENNESSEE AIR POLLUTION CONTROL REGULATIONS ARE REQUIRED TO CERTIFY COMPLIANCE WITH ALL APPLICABLE REQUIREMENTS BY INCLUDING A STATEMENT WITHIN THE PERMIT APPLICATION OF THE METHODS USED FOR DETERMINING COMPLIANCE. THIS STATEMENT MUST INCLUDE A DESCRIPTION OF THE MONITORING, RECORDKEEPING, AND REPORTING REQUIREMENTS AND TEST METHODS. IN ADDITION, THE APPLICATION MUST INCLUDE A SCHEDULE FOR COMPLIANCE CERTIFICATION SUBMITTALS DURING THE PERMIT TERM. THESE SUBMITTALS MUST BE NO LESS FREQUENT THAN ANNUALLY AND MAY NEED TO BE MORE FREQUENT IF SPECIFIED BY THE UNDERLYING APPLICABLE REQUIREMENT OR THE TECHNICAL SECRETARY.

1. FACILITY NAME: Tennessee Valley Authority - Allen Combustion Turbine Plant

2. PROCESS EMISSION SOURCE, FUEL BURNING INSTALLATION, OR INCINERATOR (IDENTIFY):
Black-Start Diesel Emergency Generators 1 and 2

3. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
56, 57 (2 identical units)

4. THIS SOURCE AS DESCRIBED UNDER ITEM #2 OF THIS APPLICATION WILL USE THE FOLLOWING METHOD(S) FOR DETERMINING COMPLIANCE WITH APPLICABLE REQUIREMENTS (AND SPECIAL OPERATING CONDITIONS FROM AN EXISTING PERMIT). CHECK ALL THAT APPLY AND ATTACH THE APPROPRIATE FORM(S).

_____ CONTINUOUS EMISSIONS MONITORING (CEM) - APC FORM V.20
POLLUTANT(S):

_____ EMISSION MONITORING USING PORTABLE MONITORS - APC FORM V.21
POLLUTANT(S):

_____ MONITORING CONTROL SYSTEM PARAMETERS OR OPERATING PARAMETERS OF A PROCESS - APC FORM V.22
POLLUTANT(S):

_____ MONITORING MAINTENANCE PROCEDURES - APC FORM V.23
POLLUTANT(S):

_____ STACK TESTING - APC FORM V.24
POLLUTANT(S):

_____ FUEL SAMPLING & ANALYSIS (FSA) - APC FORM V.25
POLLUTANT(S):

X RECORDKEEPING - APC FORM V.26
POLLUTANT(S): PM, SO2, NOx, CO, and VOC

X OTHER (PLEASE DESCRIBE) - APC FORM V.27
POLLUTANT(S): Opacity

5. COMPLIANCE CERTIFICATION REPORTS WILL BE SUBMITTED TO THE DIVISION ACCORDING TO THE FOLLOWING SCHEDULE.

START DATE: Within 60 days after June 30 and December 31 of each year

AND EVERY N/A DAYS THEREAFTER.

6. COMPLIANCE MONITORING REPORTS WILL BE SUBMITTED TO THE DIVISION ACCORDING TO THE FOLLOWING SCHEDULE:

START DATE: Within 60 days after June 30 and December 31 of each year

AND EVERY N/A DAYS THEREAFTER.

7. PAGE NUMBER: REVISION NUMBER: DATE OF REVISION:

CN-1007 RDA 1298

SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
COMPLIANCE DEMONSTRATION BY RECORDKEEPING

RECORDKEEPING SHALL BE ACCEPTABLE AS A COMPLIANCE DEMONSTRATION METHOD PROVIDED THAT A CORRELATION BETWEEN THE PARAMETER VALUE RECORDED AND THE APPLICABLE REQUIREMENT IS ESTABLISHED

1. FACILITY NAME:	2. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
Tennessee Valley Authority - Allen Combustion Turbine Plant	56, 57 (2 identical units)

3. EMISSION SOURCE (IDENTIFY):

Black-Start Diesel Emergency Generators 1 and 2

4. POLLUTANT(S) OR PARAMETER BEING MONITORED:

PM, SO2, NOx, CO, VOC

5. MATERIAL OR PARAMETER BEING MONITORED AND RECORDED:

Operating Hours

6. METHOD OF MONITORING AND RECORDING:

A monthly record of operating hours, via a non-resettable hour meter, will be kept for a period of five (5) years from the time of making of such records. This record shall contain identification of any hours of operation under emergency conditions and any operation as followed:

a. Maintenance checks.
b. Readiness testing.
c. Other non-emergency situations of up to 50 hours per year.

7. COMPLIANCE DEMONSTRATION FREQUENCY (SPECIFY THE FREQUENCY WITH WHICH COMPLIANCE WILL BE DEMONSTRATED):

Diesel engine hours will be maintained monthly and will reside onsite.
Records will be available for inspection by the Technical Manager or his representative.

8. PAGE NUMBER:	REVISION NUMBER:	DATE OF REVISION

CN-1007 RDA 1298

SHELBY COUNTY HEALTH DEPARTMENT
POLLUTION CONTROL SECTION
1826 SYCAMORE VIEW ROAD
MEMPHIS, TN 38134
Telephone: (901) 222-9599
FAX: (901) 222-9550

MAJOR SOURCE OPERATING PERMIT APPLICATION
COMPLIANCE DEMONSTRATION BY OTHER METHOD(S)

1. FACILITY NAME:	2. STACK ID OR FLOW DIAGRAM POINT IDENTIFICATION (S):
Tennessee Valley Authority - Allen Combustion Turbine Plant	56, 57 (2 identical units)

3. EMISSION SOURCE (IDENTIFY):

Black-Start Diesel Emergency Generators 1 and 2

4. POLLUTANT(S) OR PARAMETER BEING MONITORED:

Opacity

5. DESCRIPTION OF THE METHOD OF MONITORING:

Only ultra-low sulfur distillate oil will be combusted. Due to the inherent properties of this fuel, no other compliance demonstration is necessary for the particulate matter standards and opacity standards.

6. COMPLIANCE DEMONSTRATION FREQUENCY (SPECIFY THE FREQUENCY WITH WHICH COMPLIANCE WILL BE DEMONSTRATED):

N/A

7. PAGE NUMBER:	REVISION NUMBER:	DATE OF REVISION:

APPENDIX B: SAMPLE CALCULATIONS

Appendix B
Sample Emission Calculations

Emission estimates are based on equipment heat input and an emission factor. A pollutant's specific emission factor is established on manufacturer/vendor/industry data, an engineering approximation obtained from similar equipment, current air-permit limits, or EPA's Compilation of Air Pollutant Emission Factors (AP-42, Volume I, 5th Edition).

The calculation methodologies described are implemented in Microsoft Excel for Microsoft 365. Because Excel can carry more significant digits than the significant digits provided in this section, minor discrepancies in emission estimates may result. The purpose of this section is to explain the methods used and not be a source from which results provided in other sections/files associated with this application can be scrutinized.

1. Combustion Turbines – GE LM2500 Aeroderivative Units

CT performance varies with ambient temperature. For the annual emission calculations presented, CT heat input at 59°F is utilized, which is representative of average annual ambient temperatures. For maximum hourly emission calculations, the CT heat input at 0°F is used.

Table B-1. Full Load Heat Inputs versus Ambient Temperature

Ambient Temp. (°F)	Heat Input, MMBtu [HHV]/CT-hr
0	356
59	325

1.1. Criteria-Pollutant and Non-Hazardous Air Pollutants

1.1.1. Routine Ops: Filterable and Condensable Particulate Matter Emissions

The Total $PM_{2.5}$ (where *Total* = *Filterable* + *Condensable*) emission factor is from the manufacturer provided maximum (3.4 lbs./CT-hour) and maximum heat input at 0ºF (356×10^6 Btu/CT-hour). Total $PM_{2.5}$ emission factor is determined as followed:

$$EF^{LM2500}_{TotalPM_{2.5}} = \frac{3.4\ lb\ TotalPM_{2.5}/_{CT-hour}}{356\times10^6 Btu/_{CT-hour}} = \frac{9.54\times10^{-3}\ lb\ TotalPM_{2.5}}{10^6\ Btu} \quad [1]$$

The average-hourly Total $PM_{2.5}$ emissions are calculated from the equation 1 emission factor and the hourly heat input at 59ºF (325×10^6 Btu/CT-hour) as followed:

$$E^{LM2500}_{TotalPM_{2.5}} = \frac{9.54\times10^{-3}\ lb\ TotalPM_{2.5}}{10^6\ Btu} \times \frac{325\times10^6\ Btu}{CT-hour} = \frac{3.1\ lb\ TotalPM_{2.5}}{CT-hour} \quad [2]$$

Manufacturer data indicates that condensable PM is 25% of Total PM. Filterable $PM_{2.5}$ is calculated as follows:

$$E_{FPM_{2.5}}^{LM2500} = \frac{3.1\ lb\ TotalPM_{2.5}}{CT-hour} \times \left(1 - \frac{25}{100}\right) \frac{lb\ FPM_{2.5}}{lb\ TotalPM_{2.5}} = \frac{2.3\ lb\ FPM_{2.5}}{CT-hour} \quad [3]$$

1.1.2. Routine Ops: Sulfur Dioxide and Sulfuric Acid Mist Emissions

The SO_2 emission factor (0.0006 lbs./10^6 Btu) is the 40 CFR Part 75, Appendix D, default emission rate for firing pipeline natural gas. Average-hourly emissions are calculated as followed:

$$E_{SO_2}^{LM2500} = \frac{0.0006\ lb\ SO_2}{10^6\ Btu} \times \frac{325{\times}10^6\ Btu}{CT-hour} = \frac{0.195\ lb\ SO_2}{CT-hour} \quad [4]$$

Maximum-hourly SO_2 emissions are calculated in a similar fashion using the hourly heat input at 0ºF.

The Sulfuric acid emission factor is derived from the SO_2 emission factor. Total SO_X, as SO_2, is from emission factor (0.0006 lbs./10^6 Btu). Some SO_2 is converted to sulfur trioxide (SO_3) by further sulfur oxidation: five (5) percent from combustion, 2.5 percent from the SCR catalyst, eight (8) percent from the CO Catalyst. TVA conservatively assumes SO_3 is equivalent to sulfuric acid mist (H_2SO_4). Accounting for the H_2SO_4-to-SO_2 molecular weight ratio, the average-hourly SO_3 (as H_2SO_4) emission factor is calculated as followed:

$$EF_{H_SSO_4}^{LM2500} = \frac{0.0006\ lb\ SO_2}{10^6\ Btu} \times \left(1 - \left(1 - \frac{5}{100}\right) \times \left(1 - \frac{2.5}{100}\right) \times \left(1 - \frac{8}{100}\right)\right) \times \frac{98.1\ lb\ H_2SO_4}{64.1\ lb\ SO_2} \quad [5]$$

$$EF_{H_SSO_4}^{LM2500} \cong \frac{1.36 \times 10^{-4}\ lb\ H_2SO_4}{10^6\ Btu}$$

During SCR ammonia injection, the ammonia slip will react with sulfuric acid. The equation 5 emission factor, hourly heat input at 59ºF (325×10^6 Btu/CT-hour), and the engineering approximation for SCR ammonia injection operating factor (100%) are used to calculate sulfuric acid emission estimates as follows:

$$E_{H_2SO_4}^{LM2500} = \frac{1.36{\times}10^{-4}\ lb\ H_2SO_4}{10^6\ Btu} \times \frac{325{\times}10^6\ Btu}{CT-hour} \times \left(1 - \frac{100}{100}\right) = \frac{0\ lb\ H_2SO_4}{CT-hour} \quad [6]$$

Maximum-hourly H_2SO_4 emissions are calculated in a similar fashion using the hourly heat input at 0°F.

1.1.3. Routine Ops: Nitrogen Oxides Emissions

The performance guarantee for NO_X, as NO_2, is 2.5 parts per million by volume, dry basis (ppmvd) at 15 percent oxygen (O_2) concentration for natural gas firing. This concentration is converted to an emissions rate using the molar volume of gas at standard conditions (385.3 std. ft^3 per lbmole at 68°F and 1 atmosphere [atm]) the EPA Method 19 F-factor for natural gas (8710 dscf/MMBtu), the molecular weight of NO_2 (46.01 lb/lbmole) and the hourly CT heat input. Average hourly NOx emissions are calculated as followed:

$$\frac{2.5\ ft^3\ NO_2}{10^6\ ft^3 FG} \times \frac{1\ lbmol\ NO_2}{385.3\ ft^3 NO_2} \times \frac{46.01\ lb\ NO_2}{1\ lbmol\ NO_2} \times \left(\frac{20.9}{20.9-15}\right) \times \frac{8710\ dscf}{10^6 Btu} \times \frac{325\ {\times}10^6\ Btu}{CT-hour} = \frac{3.0\ lb\ NO_2}{CT-hr} \quad [7]$$

1.1.4. Routine Ops: Carbon Monoxide Emissions

CO performance guarantees are provided as 5.0 ppmvd at 15% O_2 for natural gas firing. Calculation of CO emissions follow the same methodology discussed for NO_X.

1.1.5. Routine Ops: Volatile Organic Compounds Emissions

VOC performance guarantees are provided as 2.5 ppmvd at 15% O_2 for natural gas firing. Calculation of VOC emissions follow the same methodology discussed for NO_X.

1.1.6. Routine Ops: Greenhouse Gases Emissions

Emission factors for Greenhouse Gases (GHG) are provided in 40 CFR Part 60, Subpart TTTTa, and 40 CFR Part 98. Each GHG emission factor is weighted by a Global Warming Potential (GWP) to determine a (total GHG) carbon dioxide equivalent (CO_2e) emission factor.

Table B-2. GHG Emission Factors (lb/10^6 Btu)

	CO_2	CH4	N_2O
Pipeline Natural Gas	120.0	2.2E-03	2.2E-04

Table B-3. GWP for Combustion-Source GHG Pollutants (100-Year Horizon)

	CO_2	CH4	N_2O
GWP	1	28	265

$$EF_{CO_2e} = \frac{120.0\ lb\ CO_2}{10^6\ Btu} \times 1 + \frac{2.2\times10^{-3}\ lb\ CH_4}{10^6\ Btu} \times 28 + \frac{2.2\times10^{-4}\ lb\ N_2O}{10^6\ Btu} \times 268 = \frac{120.1\ lb\ CO_2e}{10^6\ Btu} \quad [8]$$

The average-hourly CO_2e emissions are as followed:

$$E_{CO_2e}^{LM2500} = \frac{120.1\ lb\ CO_2e}{10^6\ Btu} \times \frac{325\times10^6\ Btu}{CT-hour} = \frac{39{,}071\ lb\ CO_2e}{CT-hour} \quad [9]$$

1.1.7. Startup and Shutdown Emissions

Startup and shutdown emissions are derived from manufacturer-provided, proprietary performance data. Nominal startup and shutdown durations used[19] can vary:

- A startup event is approximated to last 30 minutes per CT unit.
- A shutdown event is approximated to last nine minutes per CT unit.

Table B-4 provides startup/shutdown (SU/SD) emissions.

[19] The startup and shutdown durations are not proposed limits and are only used to demonstrate compliance.

Table B-4. SU/SD Emissions (lb/CT-hour)

Event	$TPM_{10/2.5}$	FPM	CPM	SO_2	NO_X	CO	VOC	H_2SO_4
Startup	5.4	2.7	2.7	0.20	23	18	0.80	0.036
Shutdown	4.0	2.0	2.0	0.67	21	60	2.7	0.021

1.2. Hazardous Air Pollutants

1.2.1. Trace Elements

EPRI's Emission Factors Handbook: Guidelines for Estimating Trace Substance Emissions from Fossil Fuel Steam Electric Plants (EPRI Report No. 1005402, April 2002) is the source for most of the trace element emission factors. However, this source lists trace-element HAP emission factors for uncontrolled boilers burning natural gas. While EPRI cautioned that these HAP emission factors are not appropriate for gas turbines, the trace-element HAP emission factors should be reasonably applicable because trace element emissions are directly related to the fuel composition whether burned in a boiler or a turbine.

No natural gas-fired emission factor for antimony (Sb) was listed in the EPRI data. An antimony emission factor for natural gas firing in a rotary kiln incinerator simulator (EPA-600/R-97-115, October 1997) is used.

Emission factors used to estimate natural gas-fired trace-element HAP emissions are listed in Table B-5. Other than mercury (Hg) and selenium (Se), trace-element HAP constituents are considered to be emitted predominately as particulate matter (PM). Mercury and selenium are considered to be emitted predominately in the gaseous phase.

The average-hourly lead (Pb) emissions are as followed:

$$E_{Pb}^{LM2500} = \frac{4.0\times10^{-7}\ lb\ Pb}{10^{6}\ Btu} \times \frac{325\times10^{6}\ Btu}{CT-hour} = \frac{1.3\times10^{-4}\ lb\ Pb}{CT-hour} \quad [10]$$

The remaining average hourly HAP emissions are calculated using the same methodology. Maximum-hourly HAP emissions are calculated in a similar fashion using the hourly heat input at 0ºF.

Table B-5. CT Natural Gas Trace-Element HAP Emission Factors

Pollutant		CAS	Emission Factor
Name	(Symbol)	Number	lb/10^6 Btu
Antimony	Sb	7440-36-0	1.80E-07
Arsenic	As	7440-38-2	2.30E-07
Beryllium	Be	7440-41-7	1.00E-08
Cadmium	Cd	7440-43-9	4.00E-08
Chromium	Cr	7440-47-3	1.10E-06
Cobalt	Co	7440-48-4	8.00E-08

Pollutant		CAS	Emission Factor
Name	(Symbol)	Number	lb/10^6 Btu
Lead	Pb	7439-92-1	4.00E-07
Manganese	Mn	7439-96-5	4.00E-07
Mercury	Hg	7439-97-6	8.00E-10
Nickel	Ni	7440-02-0	2.40E-06
Selenium	Se	7782-49-2	2.00E-08

1.2.2. Organic HAP

TVA estimated CT organic-HAP emissions using most of the emission factors listed in AP-42, Sec. 3.1. Organic HAP Emission factors are listed in Table B-6.

Table B-6. CT Natural Gas Organic HAP Emission Factors

Pollutant	CAS Number	Emission Factor
	Number	(lb/10^6 Btu)
1,3-Butadiene	106-99-0	4.3E-07
Acetaldehyde	75-07-0	4.0E-05
Acrolein	107-02-8	6.4E-06
Benzene	71-43-2	1.2E-05
Ethylbenzene	100-41-4	3.2E-05
Formaldehyde	50-00-0	2.2E-04
Naphthalene	91-20-3	1.3E-06
Propylene Oxide	75-56-9	2.9E-05
Toluene	108-88-3	1.3E-04
Xylenes	1330-20-7	6.4E-05
Polycyclic Organic Matter (POM)	-	2.47E-06

For formaldehyde (CH_2O), TVA derived emissions from the 40 CFR Part 63, Subpart YYYY, natural-gas standard: 91 parts per billion by volume, dry basis (ppbvd) at 15% O_2.

$$\frac{91\ ft^3\ CH_2O}{10^9\ ft^3\ FG} \times \frac{1\ lbmol\ CH_2O}{385.3\ ft^3 CH_2O} \times \frac{30.03\ lb\ CH_2O}{1\ lbmol\ CH_2O} \times \frac{8{,}710\ dscf\ FG}{10\text{^}6\ Btu} \times \left(\frac{20.9}{20.9-15}\right) \cong \frac{2.2\times10^{-4}\ lb\ CH_2O}{10\text{^}6\ Btu} \quad [11]$$

Average-hourly organic-HAP emissions are calculated via following methodology:

$$E_{CH_2O}^{LM2500} = \frac{2.2\times10^{-4}\ lb}{10^6\ Btu} \times \frac{325\times10^6\ Btu}{hour} = \frac{7.15\times10^{-2}\ lb\ CH_2O}{hour} \quad [12]$$

1.3. Annual Emission Estimates

The basis for annual emission estimates is CT full load performance at 59°F, which is deemed most representative of site annual-average temperature, and a generation limit stipulated by 40

CFR Part 60, Subpart TTTTa, which establishes standards for the control of GHG emissions from CT electrical generating units (EGUs) constructed after May 23, 2023.

Each CT unit has a generation restriction determined from the following:

- The EGU's Subpart TTTTa-defined design efficiency[20].
- The EGU's Subpart TTTTa-defined base load rating[21].
- The applicable annual capacity factor in Table 1 of Subpart TTTTa.

The LM2500 has a (higher heating value [HHV]) heat rate of 9,621 Btu per kilowatt-hour (kWh) at ISO conditions (59°F, 60% relative humidity, and 14.7 psia). A theoretically perfect heat-to-power system is 3,413 Btu/kWh; therefore, the Subpart TTTTa base load rating design efficiency is as followed:

$$3{,}413\,\frac{Btu}{kWh} \div 9{,}621\,\frac{Btu\ (HHV)}{kWh} = 0.35 \quad [13]$$

Potential electric output (PEO) – defined in §60.5580a – is the base load rating design efficiency at the maximum electric production rate multiplied by the base load rating (expressed in MMBtu/hour) of the electric generating unit, multiplied by 10^6 Btu/MMBtu, divided by 3,413 Btu/kWh, divided by 1,000 kWh/MWh, and multiplied by 8,760 hours/year.

The ISO base load heat-input rating is 328 MMBtu (HHV)/CT-hr. The PEO is calculated as followed:

$$0.35 \times \frac{328\ MMBtu}{CT{-}hour} \times \frac{10^6\ Btu}{MMBtu} \div \left(\frac{3{,}413\ Btu}{kWh} \times \frac{1{,}000\ kWh}{MWh}\right) \times \frac{8{,}760\ hours}{year} = 294{,}778\ \frac{MWh\ (PEO)}{CT{-}year} \quad [14]$$

Generation for each LM2500, which can achieve the "Intermediate load combustion turbine" GHG standard, is restricted to an annual capacity factor of 40%, which is determined by a 12-operating-month and 3-year rolling average.

$$294{,}778\ \frac{MWh\ (PEO)}{CT{-}year} \times \frac{40}{100} = 118{,}000\ \frac{MWh\ (Gross)}{CT{-}year} \quad [15]$$

Annual emission estimates, which are tabulated and presented in the narrative, are calculated utilizing startup/shutdown operations and routine/steady-state operations at 59°F. Startup/shutdown annual hours are approximated as followed:

- A startup is predicted to last 30 minutes (0.5 hours) via GE data;
- A shutdown is predicted to last 9 minutes (0.15 hours) via GE data;
- The predicted number of annual startups with subsequent shutdowns is 350.

[20] Defined in § 60.5580a, *design efficiency* "means the rated overall net efficiency (e.g., electric plus useful thermal output) on a higher heating value basis at the base load rating, at ISO conditions, and at the maximum useful thermal output […]."

[21] Defined in § 60.5580a, *base load rating* "means the maximum amount of heat input (fuel) that an EGU [Electric Generating Unit] can combust on a steady state basis, as determined by the physical design and characteristics of the EGU at ISO conditions."

$$(0.5 + 0.15)\ \frac{hours}{event} \times 350\ \frac{events}{CT-yr} = 228\ \frac{hours}{CT-yr} \quad [16]$$

Using the LM2500 unit's non-ISO gross power output at 59°F, the annual hours each CT can operate, including routine operations and startup/shutdown events, is determined from the generation limit (see equation 15).

$$118{,}000\ \frac{MWh}{CT-year} \div 33.844\frac{MW}{CT} = 3{,}487\frac{hours}{CT-year} \quad [17]$$

Annual hours of routine/steady-state operation, per CT is the difference between equation 17 and equation 16, as followed:

$$(3{,}487 - 228)\frac{hours}{CT-year} = 3{,}259\frac{hours}{CT-year} \quad [18]$$

These hours are estimates and only used for annual emission calculations. They are not meant to represent limits on operation.

Annual emissions are calculated from the annual-average (59°F) hourly emissions, annual routine operating hours, and contributions from startup and shutdown events. For criteria and non-HAP emissions, annual emissions utilize a four-step calculation method. $TPM_{10/2.5}$ (as TPM) annual emissions for one LM2500 unit are calculated as followed:

- Startup: $\frac{5.4\ lb\ TPM}{CT-hr} \times \frac{0.5\ hr}{SU} \times \frac{350\ SU}{year} = \frac{945\ lb\ TPM}{CT-year}$ [19a]
- Routine Ops: $\frac{3.1\ lb\ TPM}{CT-hour} \times \frac{3{,}259\ hr}{year} = \frac{10{,}110\ lb\ TPM}{CT-year}$ [19b]
- Shutdown: $\frac{4.0\ lb\ TPM}{CT-SD} \times \frac{0.15\ hr}{SD} \times \frac{350\ SD}{year} = \frac{210\ lb\ TPM}{CT-year}$ [19c]
- Total: $\left(\frac{945\ lb\ TPM}{CT-year} + \frac{10{,}110\ lb\ TPM}{CT-year} + \frac{210\ lb\ TPM}{CT-year}\right) \times \frac{1\ ton\ TPM}{2000\ lb\ TPM} = \frac{5.63\ tons\ TPM}{CT-year}$ [19d]

For HAP emissions, only one calculation step is needed. The total annual hours calculated in equation 17 are utilized because startup/shutdown characteristics associated with HAP emissions are not documented by the manufacturer, EPA, or other known sources. A sample calculation for formaldehyde annual emissions associated with one LM2500 unit is as followed:

$$\frac{7.15\times10^{-2}\ lb\ CH_2O}{CT-hour} \times \frac{3{,}487\ hours}{CT-year} \times \frac{1\ ton}{2000\ lb} = \frac{0.125\ tons\ CH_2O}{CT-year} \quad [20]$$

2. Black Start Generators

ACT will have two (2) diesel engine black start generators (BSG). The input parameters used to calculate emissions estimates are provided in the following table.

Table B-7. Diesel-Fired BSG Inputs

Parameter	Value	Units
Number of Engines	2	Engines
Annual Operation	100	Hr/engine-yr
Rated Horsepower	2,220	Bhp/eng
Fuel Consumption	111	Gal/eng-hr
Fuel Heat Content	140,000	Btu/gal
No. 2 Fuel Oil Density	7.05	lb/gal
No. 2 Fuel Oil Sulfur Content	0.0015	Weight %
Fuel-Sulfur Oxidation [1]	5.0	%

Notes:
1. Estimated portion of fuel-sulfur that is oxidized to SO_3/H_2SO_4.

2.1. Criteria-Pollutant and Non-Hazardous Air Pollutants

Criteria-pollutant and non-HAP emission factors are presented in the following Table B-8.

Table B-8. BSG Criteria-Pollutant and non-HAP Emission Factors

FPM [1]	CPM	SO_2 [3]	NO_X [1,2]	CO [1]	VOC [1,2]	CO_2e [4]
(lb/MMBtu)						
0.0470	0.0470	0.00143	1.43	0.822	0.0752	163.6
(g/kW-hr)						
0.20	--	--	6.08	3.50	0.32	--

Notes:
1. 40 CFR Part 1039, App. I (Tier 2) standard for a >560 kW engine, Conversion from "g/kW-hr" to "g/hp-hr" based on 0.7457 "kW-hr/hp-hr" from EPA AP-42, Vol. 1, 5th Edition, Appendix A, 9/85 (reformatted 1/95). "NOx + NMHC" is listed as 6.4 g/kW-hr.
2. "CARB Emission Factors for CI Diesel Engines - Percent HC in Relation to NMHC+NO_X," June 28, 2004: "When the [NMHC] and [NO_X] emission factor is combined, assume a breakdown of 5% and 95%, respectively."
3. SO_2 emission estimates are based on mass-balance calculation for conversion of fuel sulfur to SO_2 or SO_3/H_2SO_4.
4. US EPA, Code of Federal Regulations, Title 40, Part 98, Subpart A, Table A-1, as revised 4-25-24 (89 FR 31802), and Subpart C, Tables C-1 & C-2, as amended 11-29-13 (78 FR 71904).

FPM, NO_X, CO, and VOC emission factors are standards for a >560 kW (Tier 2) engine. SO_2 emission estimates are based on mass-balance calculation for conversion of fuel sulfur to SO_2. The greenhouse gas (CO_2e) emission factor is obtained from 40 CFR Part 98.

Maximum hourly FPM emissions are as followed:

$$EF_{FPM}^{BSG} = \frac{2{,}220\ bhp}{eng} \times \frac{0.20\ g}{kW-hr} \times \frac{0.7457\ kW-hr}{hp-hr} \times \frac{1\ lb}{453.593\ g} \times \frac{eng-hr}{111\ gal} \times \frac{gal}{140{,}000\ Btu} \times \frac{10^6\ Btu}{MMBtu} \quad [21]$$

$$EF_{FPM}^{BSG} = \frac{4.70\times10^{-2}\ lb\ FPM}{MMBtu}$$

$$E_{FPM}^{BSG} = \frac{4.70\times10^{-2}\ lb\ FPM}{MMBtu} \times \frac{MMBtu}{10^{6}\ Btu} \times \frac{140{,}000\ Btu}{gal} \times \frac{111\ gal}{eng-hr} = \frac{0.73\ lb\ FPM}{eng-hour} \quad [22]$$

The same calculation methodology is applied to calculate NO_X, CO, VOC, and CO_2e hourly emissions.

The SO_2 emission factor is based on mass-balance for conversion of fuel sulfur (S) to SO_2 minus the amount of fuel-S converted to SO_3/H_2SO_4 (estimated to be five (5) percent). For SO_2, the heat-input based emission factor is calculated:

$$EF_{SO_2}^{BSG} = \frac{0.0015\ lb\ S}{100\ lb\ ULSD} \times \frac{7.05\ lb}{gal} \times \frac{gal}{140{,}000\ Btu} \times \left(1 - \frac{5}{100}\right) \times \frac{64\ MW\ SO_2}{32\ MW\ S} \times \frac{10^{6}\ Btu}{MMBtu} = \frac{1.43\times10^{-3}\ lb\ SO_2}{MMBtu} \quad [23]$$

Hourly emissions for SO_2 are as followed:

$$E_{SO_2}^{BSG} = \frac{1.43\times10^{-3}\ lb\ SO_2}{MMBtu} \times \frac{MMBtu}{10^{6}\ Btu} \times \frac{140{,}000\ Btu}{gal} \times \frac{111\ gal}{eng-hr} = \frac{0.022\ lb\ SO_2}{eng-hour} \quad [24]$$

Sulfuric acid emissions are derived a similar way calculated as followed:

$$EF_{H_2SO_4}^{BSG} = \frac{0.0015\ lb\ S}{100\ lb\ ULSD} \times \frac{7.05\ lb}{gal} \times \frac{gal}{140{,}000\ Btu} \times \left(\frac{5}{100}\right) \times \frac{98\ MW\ H_2SO_4}{32\ MW\ S} \times \frac{10^{6}\ Btu}{MMBtu} = \frac{1.16\times10^{-4}\ lb\ H_2SO_4}{MMBtu} \quad [25]$$

$$E_{H_2SO_4}^{BSG} = \frac{1.16\times10^{-4}\ lb\ H_2SO_4}{mmBtu} \times \frac{mmBtu}{1{,}000{,}000\ Btu} \times \frac{140{,}000\ Btu}{gal} \times \frac{111\ gal}{eng-hr} = \frac{1.80E-03\ lb\ H_2SO_4}{FP-hour} \quad [26]$$

2.2. Hazardous Air Pollutants

Organic HAP emission factors are from EPA AP-42, Vol. 1, 5th Ed., Chapter 3.4 - Large Stationary Diesel and All Stationary Dual-fuel Engines - Supplement B, 10/96. Metal HAP emission factors are from emission factors are from EPA AP-42, Vol. I, 5th Ed., Section 3.1 - Stationary Gas Turbines - Supplement F, 4/00. Two exceptions are hydrochloric acid (HCl) and manganese (Mn) emission factors which are derived from TVA Combustion-Turbine (CT) Fuel-Oil Specifications (#2 Distillate) Revision 5.0, dated January 17, 2001.

The organic HAPs listed in AP-42 are extensive and only the total organic HAP, obtained from summing all the organic HAPs together, is provided in the following table.

Table B-9. BSG HAP Emission Factors

Pollutant		Emission Factors
Name	(Symbol)	(lb/MMBtu)
Arsenic	As	1.10×10^{-5}
Beryllium	Be	3.10×10^{-7}
Cadmium	Cd	4.80×10^{-6}
Hydrochloric Acid	HCl	3.11×10^{-4}
Chromium	Cr	1.10×10^{-5}

Pollutant		Emission Factors
Name	(Symbol)	(lb/MMBtu)
Lead	Pb	1.40×10^{-5}
Manganese	Mn	1.01×10^{-4}
Mercury	Hg	1.20×10^{-6}
Nickel	Ni	4.60×10^{-6}
Selenium	Se	2.50×10^{-5}
Total Organic HAP		1.57×10^{-3}

The hourly HCl emissions for the black start generators are calculated as followed:

$$EF_{HCl}^{BSG} = \frac{6\ lb\ Cl}{10^6\ lb\ ULSD} \times \frac{7.05\ lb}{gal} \times \frac{gallon}{140{,}000\ Btu} \times \frac{36\ MW\ HCl}{35\ MW\ Cl} = \frac{3.1\times10^{-4}\ lb\ HCl}{10^6\ Btu} \quad [27]$$

$$E_{HCl}^{BSG} = \frac{3.1x10^{-4} lb\ HCl}{10^6\ Btu} \times \frac{140{,}000\ Btu}{gal} \times \frac{111\ gal}{eng-hr} = \frac{4.8\times10^{-3}\ lb\ HCl}{Eng-hr} \quad [28]$$

The same methodology is utilized to calculate the Mn emissions with a concentration of two (2) ppm (by weight).

2.3. Annual Emission Estimates

Annual black start generator emissions are calculated from the hourly emissions and 100 annual operating hours per EPA guidance for emergency engines. Operational hours are assumed and only used for emission estimations. They are not meant to represent limits on emergency operation. A sample calculation for FPM annual emissions is as followed:

$$\frac{0.73\ lb\ FPM}{eng-hour} \times \frac{100\ eng-hour}{eng-year} \times \frac{1\ ton\ FPM}{2000\ lb\ FPM} = \frac{0.0365\ tons\ FPM}{eng-year} \quad [29]$$

APPENDIX C: EPA RACT/BACT/LAER CLEARINGHOUSE RESULTS

Appendix C
RACT/BACT/LAER

Table C-1. RBLC Search Results for Large Gas-Fired Simple Cycle Turbines >25 MW – NOx

RBLC ID	Permit & Date	Corporate/ Company & Facility Name	Description	Emission Limit	Pollution Prevention	RACT/BACT /LAER
TX-0975	173582, PSDTX1626, GHGPSDTX233 06/13/2024	Freestone Peakers Plant	Simple Cycle Gas Turbines	9.00 ppvd 15% O_2	Dry low-NOx burners (DLNB) and good combustion practices.	BACT
PA-0340	38-05019 01/13/2024	Helix Ironwood LLC	Turbines	4.5000 ppmv	SCR	RACT
LA-0324	PSD-LA-841 03/28/2023	Commonwealth LNG, LLC	Refrigeration Turbines and Generator Turbines (EQT0001 - EQT0006 and EQT0013 - EQT0015) each rated at 575 MMBtu/hr	2.5 ppmvd @ 15% O_2	Good combustion practices and use clean fuel. Dry low-NOx and selective catalytic reduction.	BACT
MI-0454	74-18D 12/20/2022	LBWL-Erickson Station	667 MMBTU/H natural gas-fired simple cycle CTG	25.00 ppm 4-hr rolling Avg except <75% peak load	DLNB and good combustion practices.	BACT
TX-0878	158420, PSDTX1572, GHGPSDTX198 09/15/2022	Port Arthur LNG, LLC	Simple Cycle Electrical Generation Gas Turbines	5.00 ppm	SCR	BACT
TN-0187	979348 08/31/2022	Tennessee Valley Authority - J	Ten Simple Cycle NG Turbines	5.00 ppmvd @ 15% O_2	dry low-NOx burners selective catalytic reduction	BACT
AK-0088	AQ1539CPT01 07/07/2022 (As of Jan 2024, not constructed)	Alaska Gas Line Development Corporation Liquefaction Plant	Six Simple Cycle Gas-Fired Turbines each rated at 1,113 MMBtu/hr EUs 1 - 6 are simple cycle gas turbines used for gas compression at LNG facility (Allowed 40 hours per year per turbine of operation without SCR and OxCat.)	2.00 ppmV@15% O_2 3 hours	SCR, DLN combustors, and good combustion practices	BACT
TX-0933	164137 PSDTX1594 GHGPSDTX207 11/17/2021	Nacero Penwell Facility	Turbine	9.00 ppmvd 15% O_2	Low NOx Burners And SCR	BACT

RBLC ID	Permit & Date	Corporate/ Company & Facility Name	Description	Emission Limit	Pollution Prevention	RACT/BACT /LAER
TX-0908	N284, PSDTX1090M1, GHGPSDTX199 08/27/2021	El Paso Electric Company Newman Power Station	Simple Cycle Turbine	2.50 ppmvd	Dry Low NOx Burners and SCR	BACT
AL-0329	701-0010 09/21/2021	TVA Colbert Combustion Turbine P:lant	Three 229 MW Simple Cycle Combustion Turbines	9.00 ppmvd 3 hr avg 15% O_2	--	BACT
AK-0086	AQ0083CPT07 03/26/2021	Agrium U.S. Inc. Kenai Nitrogen Operations	Five (5) Natural Gas-Fired Combustion Turbines	5.00 PPMV At 15% O_2 3-hr avg	Selective Catalytic Reduction and SoLoNOx Technology on Turbines	BACT
MI-0447	74-18A 01/07/2021	Lansing Board of Water and Light LBWL-Erickson Station	EUCTGSC1-natural gas fired simple cycle CTG	25.00 ppm	DLNB and good combustion practices.	BACT
LA-0383	PSD-LA-838 09/03/2020	Lake Charles Lng Export Termin	Turbines (EQT0020 - EQT0031)	3.10 PPMVD @15 O_2	LNB + SCR	BACT
TX-0900	110423, PSDTX1366M1 GHGPSD49M1 08/17/2020	Ector County Energy Center	Simple Cycle Turbines	9.00 PPMVD 3% O_2 3 hr Avg 15.00 PPMVD Peak 3% O_2 1 hr Avg	Equipped with dry-low NOx burners with best management practices and good combustion practices. Minimize the duration of startup and shutdown events to less than 60 minutes per event. Limit MSS by 140 lb/hr maximum allowable emission rate for each turbine.	BACT
AK-0085		Gas Treatment Plant	Six (6) Simple Cycle Gas-Turbines (Power Generation)	15.00 ppmv 2 15% O_2 3-hr avg	DLN combustors and Good Combustion Practices	BACT
LA-0257	PSD-LA-703(M3) 12/06/2011	Sabine Pass LNG, LP & Liquefaction, LL	Simple Cycle Generation Turbines (2) GE LM2500+G4	25.0 ppmv at O_2	Water injection	BACT

RBLC ID	Permit & Date	Corporate/ Company & Facility Name	Description	Emission Limit	Pollution Prevention	RACT/BACT /LAER
TX-0678	104840 N170 PSDTX1302 07/16/2014 CN601720345 RN106481500	Freeport LNG Development LP Pretreatment Facility	Natural gas-fired combustion simple cycle turbine (GE 7EA) (87.00 MW) The turbine is fueled by what is technically natural gas but contains enough nitrogen to affect the Wobbe Index of the turbine fuel gas compared to typical pipeline gas.	2.00 ppmvd 15% O_2 3 hr rolling average	Selective Catalytic Reduction	BACT in database/LAER in application
	SJVUAPCD 2001	High Sierra Limited-- Oilfield	General Electric LM2500 gas turbine (222 MMBtu/hr) with heat recovery steam generator producing 25 MW	4.5 ppm	General Electric LM2500 gas turbine (222 MMBtu/hr) with heat recovery steam generator producing 25 MW	
TX-0672	9/12/2014	CORPUS CHRISTI LIQUEFACTION LLC CORPUS CHRISTI LIQUEFACTION PLANT GREGORY, TX	3 liquefied natural gas trains consisting of a total of (6) GE LM2500+ DLE turbines that drive the ethylene section compressors with waste heat recovery for amine solution regeneration.	20 PPMVD/25 PPMVD @15% O2, 4 HOUR ROLLING AVERAGE	dry low emission combustors	BACT

Table C-2. RBLC Search Results for Large Gas-Fired Simple Cycle Turbines >25 MW – PM/PM_{10}/$PM_{2.5}$

RBLC ID	Corporate/ Company & Facility Name	Source Description	Permit & Date	PM/PM_{10}/$PM_{2.5}$ Permit Limit	Pollution Prevention Method	RACT/ BACT/ LAER
TX-0975	Freestone Peakers Plant	Two F-class GE 7FA.05 natural gas-fired simple cycle gas turbines with an average heat input of 2,257 MMBtu/hr and output of 221 MW each	173582, PSDTX1626, GHGPSDTX233 06/13/2024 RN111788618	--	Good combustion practices.	BACT

RBLC ID	Corporate/ Company & Facility Name	Source Description	Permit & Date	PM/PM_{10}/$PM_{2.5}$ Permit Limit	Pollution Prevention Method	RACT/ BACT/ LAER
LA-0324	Commonwealth LNG Facility	Refrigeration Turbines and Generator Turbines (EQT0001 - EQT0006 and EQT0013 - EQT0015)	PSD-LA-841 03/28/2023	0.0183 LB PM_{10}/$PM_{2.5}$ per MMBTU	Good combustion practices.	BACT
MI-0454	LBWL-Erickson Station	667 MMBTU/H natural gas-fired simple cycle CTG	74-18D 12/20/2022	4.5 LB PM_{10}/$PM_{2.5}$ per hr	Pipeline quality natural gas, inlet air conditioning and good combustion practices.	BACT
TN-0187	TVA – Johnsonville Combustion Turbine Plant	Ten Simple Cycle NG GE LM6000 Turbines equipped with SCR and oxidation catalyst	979348 08/31/2022	3.65 lb TPM/hr	Good combustion design and operating practices and the use of low sulfur fuel.	BACT
AK-0088	Alaska Gas Line Development Corporation Liquefaction Plant	Six Simple Cycle Gas-Fired Turbines each rated at 1,113 MMBtu/hr. EUs 1 - 6 are simple cycle gas turbines used for gas compression at LNG facility	AQ1539CPT01 07/07/2022	0.0070 LB PM/PM_{10}/$PM_{2.5}$ per MMBTU	Good combustion practices and burning clean fuels (natural gas)	BACT
TX-0933	Nacero Penwell Facility	Simple Cycle NG Turbine GE LM2500+G4	164137 PSDTX1594 GHGPSDTX207 11/17/2021 RN111194916	0.0075 LB PM/PM_{10}/$PM_{2.5}$ per MMBTU	good combustion practices and the use of gaseous fuel	BACT
AL-0329	TVA Colbert Combustion Turbine Plant	Three 229 MW Simple Cycle Combustion Turbines	701-0010 09/21/2021	0.0080 LB PM_{10}/$PM_{2.5}$ per MMBTU 3-hr avg. 18.00 PM_{10}/$PM_{2.5}$ lb per hr 3-hr avg	--	BACT
LA-0383	Lake Charles Lng Export Termin	Turbines (EQT0020 - EQT0031)	PSD-LA-838 09/03/2020	--	Good combustion practices and clean natural gas	BACT
AK-0085	Alaska Gasline Development Corporation Gas Treatment Plant	Six Simple Cycle Gas-Turbines (Power Generation) EUs 25 -30 each provide 44 MW of power generation for the facility	AQ1524CPT01 08/13/2020	0.0070 LB PM/PM_{10}/$PM_{2.5}$ per MMBTU 3-hr avg	Good combustion practices and clean burning fuel (NG)	BACT
TX-0851	Rio Grande LNG LLC Rio Bravo Pipeline Facility	Twelve GE Frame 7EA simple cycle combustion turbines to serve as drivers for refrigeration and compression at the site.	140792, PSDTX1498, GHGPSDTX158 12/17/2018	7.0 LB PM_{10}/$PM_{2.5}$ per hr	Good combustion practices and use of pipeline quality natural gas.	BACT

RBLC ID	Corporate/ Company & Facility Name	Source Description	Permit & Date	PM/PM_{10}/$PM_{2.5}$ Permit Limit	Pollution Prevention Method	RACT/ BACT/ LAER
LA-0331	Venture Global Calcasieu Pass, LLC	Simple Cycle Combustion Turbines (SCCT1 to SCCT3), 927 MMBtu/hr	PDS-LA-805 09/21/2018	8.0 LB PM_{10}/$PM_{2.5}$ per hr 3-hr avg	Exclusive Combustion of Fuel Gas and Good Combustion Practices, Including Proper Burner Design..	BACT
LA-0349	Driftwood LNG Facility	Compressor Turbines (20)	PSD-LA-824 07/10/2018	0.0066 LB PM_{10}/$PM_{2.5}$ per MMBTU	Good Combustion Practices and Use of low sulfur facility fuel gas	BACT
LA-0327	Washington Parish Energy Center One, LLC	Simple-Cycle Combustion Turbine 1 (Startup/Shutdown/ Maintenance/Tuning/Runback) [EQT0019]	PSD-LA-829 05/23/2018	6.3 LB PM_{10}/$PM_{2.5}$ per hr Hourly Maximum	Good combustion practices and the use of low sulfur fuels (pipeline quality natural gas).	BACT
		CTG02 NO - Simple-Cycle Combustion Turbine 2 (Normal Operations) [EQT0018]		6.3 LB PM_{10}/$PM_{2.5}$ per hr Hourly Maximum		BACT
		CTG01 NO - Simple-Cycle Combustion Turbine 1 (Normal Operations) [EQT0017]		6.3 LB PM_{10}/$PM_{2.5}$ per hr Hourly Maximum		BACT
		CTG02 SUSD - Simple-Cycle Combustion Turbine 2 (Startup/Shutdown/ Maintenance/Tuning/Runback) [EQT0020]		6.3 LB PM_{10}/$PM_{2.5}$ per hr Hourly Maximum		BACT
WV-0028	Pleasants Energy LLC Waverly Power Plant	GE 7FA.004 Turbine	R14-0034A 03/13/2018	15.09 lb $PM_{2.5}$/hr 41.65 tons $PM_{2.5}$/yr	Inlet air filtration.	BACT
TX-0833	Southern Power Jackson County Generators	Combustion Turbines MSS	PSDTX1422 01/26/2018	0.01 tons PM/PM_{10}/$PM_{2.5}$ per yr	Minimizing duration of startup/shutdown, using good air pollution control practices and safe operating practices.	BACT
TX-0826	Golden Spread Electric Cooperative, Inc. Mustang Station	Simple Cycle Turbine	72579, PSDTX1080M1, GHGPSDTX13 08/16/2017	27.00 tons PM_{10}/$PM_{2.5}$ per yr	Pipeline quality natural gas and good combustion practices	BACT

RBLC ID	Corporate/ Company & Facility Name	Source Description	Permit & Date	$PM/PM_{10}/PM_{2.5}$ Permit Limit	Pollution Prevention Method	RACT/ BACT/ LAER
TX-0819	Southwestern Public Service Company Gaines County Power Plant	Four Siemens SGT6-5000F5 natural gas fired combustion turbines	135322, PSDTX1470, AND GHGPSDT 04/28/2017	8.50 tons $PM/PM_{10}/PM_{2.5}$ per yr	Pipeline quality natural gas; limited hours; good combustion practices.	BACT
IN-0261	Duke Energy Indiana, LLC Vermillion Generating Station	Simple Cycle, Natural Gas Fired Combustion Turbines	165-36956-00022 02/28/2017	5.0 lb $PM/PM_{10}/PM_{2.5}$ per hr each turbine 0.50 ton $PM/PM_{10}/PM_{2.5}$ per 12-consecutive months Only two turbines will operate during low load operation..	Good combustion practices	BACT
LA-0316	Cameron LNG LLC	Gas turbines (9 units)	PSD-LA-766(M3) 02/17/2017	0.0076 lb $PM_{10}/PM_{2.5}$ per MMBtu	Good combustion practices and fueled by natural gas	BACT
TX-0816	Corpus Christi Liquefaction Stage III, LLC	Refrigeration compressor turbines. Two liquefied natural gas trains consisting of a total of (12) GE LM2500+ DLE turbines drive the propane, ethylene, and methane section compressors.	139479, PSDTX1496, GHGPSDTX157 02/14/2017	0.75 lb $PM_{2.5}$/hr	--	BACT
WV-0026	Pleasants Energy, LLC Waverly Facility	Two GE Model 7FA Turbines	R14-0034 01/23/2017	15.00 lb $PM_{2.5}$/hr Natural Gas (All PM assumed to be $PM_{2.5}$ or less.)	Inlet Air Filtration, Use of Natural Gas, Ultra-Low Sulfur Diesel	BACT
IN-0264	AES Ohio Generation, LLC Montpelier Generating Station	Pratt & Twin-Pac Simple Cycle Natural Gas-Fired Turbines with No. 2 Diesel Oil Backup Fuel	179-37209-00026 01/06/2017	0.0066 lb $PM_{10}/PM_{2.5}$ per MMBtu 3-hr avg for natural gas	Use Natural gas as primary fuel; good combustion practices	BACT
VA-0326	Doswell Limited Partnership Doswell Energy Center	Two (2) GE 7FA simple cycle combustion turbines.	51018 10/04/2016	10.00 lb Filterable PM (FPM)/hr 12.5 ton FPM/12 Mo Rolling Total 12.00 lb Filterable PM_{10}/total $PM_{2.5}$ per hr	Good combustion, operation and maintenance practices and use of pipeline quality natural gas.	BACT

RBLC ID	Corporate/ Company & Facility Name	Source Description	Permit & Date	PM/PM_{10}/$PM_{2.5}$ Permit Limit	Pollution Prevention Method	RACT/ BACT/ LAER
IL-0121	Invenergy Nelson Expansion LLC	Two GE 7FA simple cycle combustion turbines used for peaking purposes and fired primarily on natural gas with ULSD as a secondary fuel.	15060042 09/27/2016	0.0038 lb FPM/MMBtu 3-hr avg 0.0050 TPM_{10}/$TPM_{2.5}$ per MMBtu 3-hr avg	Turbine-generator design and proper operation.	BACT
NY-0106	Greenidge Generation LLC	Turbine - natural gas	8-5736-00004/00017 09/07/2016	0.0020 lb FPM/MMBtu per 1 hr 0.00825 lb FPM_{10}/$FPM_{2.5}$ per 1-hr	Baghouse with leak detection system.	BACT
TX-0794	Brazos Electric Cooperative Hill County Generating Facility	Simple cycle turbine (GE 7FA.03, GE 7FA.04, GE 7FA.05, or Siemens SGT6-5000)	130051,PSDTX1450, GHGPSDTX131 04/07/2016	14.00 lb TPM_{10}/$TPM_{2.5}$ per hr	Premixing of fuel and air enhances combustion efficiency and minimizes emissions.	BACT
TX-0788	Apex Texas Power LLC Neches Station	4 Simple cycle CTGs, 2,500 hr/yr operational limitation. Facility will consist of either 232 MW (Siemens) or 220 MW (GE)	122401, PSDTX1428, GHGPSDTX111 03/24/2016	13.40 lb TPM_{10}/$TPM_{2.5}$ per hr	Good combustion practices, low sulfur fuel	BACT
LA-0307	Magnolia Lng, LLC	Gas Turbines (8 units)	PSD-LA-792 03/21/2016	--	Good combustion practices and fueled by natural gas	BACT
TX-0778	Navasota South Peakers Operating Company II, LLC Union Valley Energy Center	Three General Electric 7FA.04 (~183 MW each for a total of 550 MW), operating as peaking units in simple cycle mode.	GHGPSDTX117 12/16/2015	1,461 lb/MW-hr Each turbine will be limited to 2,500 hours of operation per year.	--	BACT
LA-307	Magnolia LNG Facility	Gas Turbines (8 units)	PSD-LA-792 03/21/2016	--	Good combustion practices and fueled by natural gas	BACT
TX-0777	Navasota South Peakers Operating Company, LLC Union Valley Energy Center	Three General Electric 7FA.04 (~183 MW each for a total of 550 MW), operating as peaking units in simple cycle mode.	120973 AND PSDTX1420 12/09/2015	8.6 lb TPM_{10}/$TPM_{2.5}$ per hr Each turbine will be limited to 2,500 hours of operation per year.	Pipeline quality natural gas, good combustion practices	BACT

RBLC ID	Corporate/ Company & Facility Name	Source Description	Permit & Date	PM/PM_{10}/$PM_{2.5}$ Permit Limit	Pollution Prevention Method	RACT/ BACT/ LAER
TX-0769	Navasota North Country Peakers Operating Company I Van Alstyne Energy Center	Three General Electric 7FA.04 (~183 MW each for a total of 550 MW), operating as peaking units in simple cycle mode.	121051 AND PSDTX1418 10/27/2015	8.6 lb $TPM_{10}/TPM_{2.5}$ per hr Each turbine will be limited to 2,500 hours of operation per year.	Pipeline Quality Natural Gas	BACT
TX-0764	Nacogdoches Power Electric Generating Plant	One Siemens F5 simple cycle combustion turbine generator.	77679, PSDTX1061M1 & O-3455 10/14/2015	12.09 $TPM_{10}/TPM_{2.5}$ per hour 12.94 tpy $TPM_{10}/TPM_{2.5}$	Pipeline quality natural gas; limited hours; good combustion practices.	BACT
TX-0768	Shawnee Energy Center	Siemens Model SGT6-5000 F5ee – 230 MW or Second turbine option: General Electric Model 7FA.05TP – 227 MW	PSDTX1442, 125963 10/09/2015	84.10 $TPM_{10}/TPM_{2.5}$ per hour 152.96 tpy $TPM_{10}/TPM_{2.5}$	Pipeline quality natural gas; limited hours; good combustion practices.	BACT
FL-0355	Florida Power & Light Fort Myers Plant	Two GE 7F.05 turbines, approximately 200 MW each. Natural-gas is primary fuel.	0710002-022-AC 09/10/2015	2.00 GR S/100 SCF Gas $TPM/TPM_{10}/TPM_{2.5}$	Use of clean fuels, and annual VE test	BACT
FL-0354	Florida Power & Light Lauderdale Plant	Five simple cycle GE 7F.05 turbines. (10% VE limit with annual VE test is a proxy for PM.)	0110037-013-AC 08/25/2015	2.00 GR S/100 SCF Gas $TPM/TPM_{10}/TPM_{2.5}$ 0.0015%S In Fuel Oil Max of 3,390 hours per year per turbine.	Clean fuel prevents PM formation	BACT
TX-0733	Golden Spread Electric Cooperative, Inc. Antelope Elk Energy Center	Three additional GE 7F 5-Series Combustion Turbine Generators	109148, PSDTX1358M1 05/12/2015	Operation of each turbine is limited to 4,572 hours per year.	Pipeline quality natural gas; limited hours; good combustion practices.	BACT
TX-0694	Indeck Wharton Energy Center	The CTGs will either be the General Electric 7FA (~214 MW each) or the Siemens SGT6-5000F (~227 MW each), operating as peaking units in simple cycle mode	111724 PSDTX1374 02/02/2015	--	natural gas fuel	BACT
TX-0688	NRG Texas Power SR Bertron Electric Generation Station	Simple cycle natural gas turbines	102731, PSDTX1294 12/19/2014	--	Good Combustion Practices, natural gas	BACT

RBLC ID	Corporate/ Company & Facility Name	Source Description	Permit & Date	PM/PM_{10}/$PM_{2.5}$ Permit Limit	Pollution Prevention Method	RACT/ BACT/ LAER
TX-0696	Tenaska Roan's Prairie Partners, LLC; Roan's Prairie Generating Station	Two simple cycle turbines. The three possible CT models are: (1) General Electric 7FA.04; (2) General Electric 7FA.05; or (3) Siemens SGT6- 5000F. will operate 2,920 hours per year at full load for each CT	114698 PSDTX1378 09/22/2014	--	Natural gas fuel	BACT
TX-0672	Corpus Christi Liquefaction Plant	There are three LNG trains with a total of (12) GE LM2500+ DLE turbines that drive the propane and methane refrigeration compressors.	PSDTX1306 105710 09/12/2014	0.72 lb PM/PM_{10}/$PM_{2.5}$ per hour (1-hr)	Natural gas is the fuel	BACT
TX-0695	Invenergy Thermal Development LLC Ector County Energy Center	Two Simple Cycle Combustion Turbines, GE 7FA.03.	110423 PSDTX1366 08/01/2014	--	Natural gas fuel	BACT
MD-0043	Constellation Power Source Generation, Ince. Perryman Generating Station	Two 60-Megawatt Pratt & Whitney Gas Turbine Generator Package	PSC CASE NO. 9136 07/01/2014	0.0033 lb FPM/MMBtu 0.0070 lb TPM_{10}/$TPM_{2.5}$ per MMBtu, except SU/SD 300.8 lb TPM_{10}/$TPM_{2.5}$ per SU 5.6 lb TPM_{10}/$TPM_{2.5}$ per SD	Exclusive use of Facility process fuel gas or pipeline quality natural gas and good combustion practices	BACT
CO-0075	Black Hills Electric Generation, LLC Pueblo Airport Generating Station	One (1) General Electric, simple cycle, gas turbine electric generator, Unit 6 (CT08), model: LM6000, SN: N/A, rated at 375 MMBtu per hour. EPA Home	13PB2245 05/30/2014	4.8 lb PM_{10}/$PM_{2.5}$/hr (3-hr avg)	Firing of pipeline quality natural gas as defined in 40 CFR Part 72. Specifically, the owner or the operator shall demonstrate that the natural gas burned has total sulfur content less than 0.5 grains/100 SCF.	BACT

RBLC ID	Corporate/ Company & Facility Name	Source Description	Permit & Date	PM/PM_{10}/$PM_{2.5}$ Permit Limit	Pollution Prevention Method	RACT/ BACT/ LAER
TX-0691	NRG Texas Power LLC PH Robinson Electric Generating Station	Six simple cycle GE electric frame 7E turbines that have an ISO rating of 65 MW and a nominal maximum generating capacity of 80 MW.	108182 PSDTX1346 05/20/2014	--	Natural gas fuel	BACT
FL-0346	Florida Power & Light Lauderdale Plant	Five 200-MW combustion turbines Throughput could vary slightly (+/- 120 MMBtu/hr) depending on final selection of turbine model and firing of natural gas or oil. Primary fuel is expected to be gas.	0110037-011-AC 04/22/2014	--	Good combustion practice and low-sulfur fuel (The fuel specifications of 2.0 grains/100 standard cubic feet of natural gas and 0.0015% sulfur in the ULSD fuel together with a 10% opacity limits for visible emissions (VE) are proposed as BACT.)	BACT
TX-0686	Golden Spread Electric, Inc. Antelope Elk Energy Center	Simple Cycle Natural Gas Combustion Turbine-Generator(CTG) rated at 202.00 MW	109148, PSDTX1358 04/22/2014	--	Pipeline quality natural gas; limited hours; Good combustion practices	BACT
TX-0693	Golden Spread Electric, Inc. Antelope Elk Energy Center	GE 7FA 5-Series gas turbine in a simple cycle application, with a maximum electric output of 202 megawatts (MW) and a maximum design capacity of 1,941 million British thermal units per hour (MMBtu/hr). The turbine will operate a maximum of 4,572 hours per year.	109148 PSDTX1358 04/22/2014	--	Natural gas fuel	BACT
OR-0050	Troutdale Energy Center LLC	GE LMS-100 combustion turbines, simple cycle with water injection	26-0235 03/05/2014	9.1 lb PM_{10}/hr (6-hr average on NG)	Utilize only natural gas or ULSD fuel; Limit the time in startup or shutdown.	BACT

Table C-3. RBLC Search Results for Large Natural Gas-Fired Simple Cycle Turbines >25 MW - GHG (CO_2e)

RBLC ID	Corporate/ Company & Facility Name	Source Description	Permit & Date	GHG Permit Limit	Pollution Prevention Method	RACT/ BACT/ LAER
TX-0975	Freestone Peakers Plant	Two F-class GE 7FA.05 natural gas-fired simple cycle gas turbines with an average heat input of 2,257 MMBtu/hr and output of 221 MW each	173582, PSDTX1626, GHGPSDTX233 06/13/2024 RN111788618	800 lb/MWH Base Load 1,170 lb/MWh Int Load 160 lb/MMBtu Low Load which meets 40 CFR 60 Subpart TTTTa	Good combustion practices. Total gross thermal efficiency proposed for both CTs is 1,418 lb CO_2/MWh.	BACT
MI-0454	LBWL-Erickson Station	667 MMBTU/H natural gas-fired simple cycle CTG	74-18D 12/20/2022	318,404 tons/12-month rolling period	Low carbon fuel (pipeline quality natural gas), good combustion practices, and energy efficiency measures.	BACT
TN-0187	TVA – Johnsonville Combustion Turbine Plant	Ten Simple Cycle NG GE LM6000 Turbines equipped with SCR and oxidation catalyst	979348 08/31/2022	120 lb/MMBtu	Efficient turbine operation and good combustion practices	BACT
AK-0088	Alaska Gas Line Development Corporation Liquefaction Plant	Six Simple Cycle Gas-Fired Turbines each rated at 1,113 MMBtu/hr. EUs 1 - 6 are simple cycle gas turbines used for gas compression at LNG facility	AQ1539CPT01 07/07/2022	117.1 lb/MMBtu (Allowed 40 hr/yr per turbine of operation without SCR and OxCat.)	Good combustion practices and burning clean fuels (natural gas)	BACT
TX-0933	Nacero Penwell Facility	Simple Cycle NG Turbine GE LM2500+G4	164137 PSDTX1594 GHGPSDTX207 11/17/2021 RN111194916	--	good combustion practices and the use of gaseous fuel	BACT
LA-0383	Lake Charles Lng Export Termin	Turbines (EQT0020 - EQT0031)	PSD-LA-838 09/03/2020	--	Low carbon fuels Energy efficient designs and operation	BACT
TX-0900	Ector County Energy Center	Simple Cycle Turbines	110423, PSDTX1366M1 GHGPSD49M1 08/17/2020	1,514 lb/MWHR	Best management practices and good combustion practices, clean fuel	BACT
AK-0085	Alaska Gasline Development Corporation Gas Treatment Plant	Six Simple Cycle Gas-Turbines (Power Generation) EUs 25 -30 each provide 44 MW of power generation for the facility	AQ1524CPT01 08/13/2020	117 lb/MMBtu 3-hr average	Good combustion practices and clean burning fuel (NG)	BACT

RBLC ID	Corporate/ Company & Facility Name	Source Description	Permit & Date	GHG Permit Limit	Pollution Prevention Method	RACT/ BACT/ LAER
TX-0851	Rio Grande LNG LLC Rio Bravo Pipeline Facility	Twelve GE Frame 7EA simple cycle combustion turbines to serve as drivers for refrigeration and compression at the site.	140792, PSDTX1498, GHGPSDTX158 12/17/2018	--	Good combustion practices and use of pipeline quality natural gas.	BACT
LA-0331	Venture Global Calcasieu Pass, LLC	Simple Cycle Combustion Turbines (SCCT1 to SCCT3), 927 MMBtu/hr	PDS-LA-805 09/21/2018	1,426,146 T/YR	Exclusively combust low carbon fuel gas, good combustion practices, good operation and maintenance practices, and insulation.	BACT
		Aeroderivative Simple Cycle Combustion Turbine		134,907 T/YR	Combust low carbon fuel gas, good combustion practices, good operation and maintenance practices and insulation.	BACT
LA-0327	Washington Parish Energy Center One, LLC	Simple-Cycle Combustion Turbine 1 (Startup/Shutdown/ Maintenance/Tuning/Runback) [EQT0019]	PSD-LA-829 05/23/2018	Limited to 600 hr/yr 120 lb/MMBtu 50 KG/GJ Annual Avg	Facility-wide energy efficiency measures , such as improved combustion measures, and use of pipeline quality natural gas.	BACT
		CTG02 NO - Simple-Cycle Combustion Turbine 2 (Normal Operations) [EQT0018]		Normal operations based on 7,000 hr/yr 50 KG/GJ Annual Avg 120 lb/MMBtu		BACT
		CTG01 NO - Simple-Cycle Combustion Turbine 1 (Normal Operations) [EQT0017]		Normal operations based on 7,000 hr/yr 50 KG/GJ Annual Avg 120 lb/MMBtu		BACT
		CTG02 SUSD - Simple-Cycle Combustion Turbine 2 (Startup/Shutdown/ Maintenance/Tuning/Runback) [EQT0020]		Limited to 600 hr/yr 120 lb/MMBtu 50 KG/GJ Annual Avg		BACT

RBLC ID	Corporate/ Company & Facility Name	Source Description	Permit & Date	GHG Permit Limit	Pollution Prevention Method	RACT/ BACT/ LAER
WV-0028	Pleasants Energy LLC Waverly Power Plant	GE 7FA.004 Turbine	R14-0034A 03/13/2018	1,300 lb/MW-hr 12 month rolling average (gas)	Use of natural gas & use of GE 7FA.004	BACT
TX-0826	Golden Spread Electric Cooperative, Inc. Mustang Station	Simple Cycle Turbine	72579, PSDTX1080M1, GHGPSDTX13 08/16/2017	120 lb/MMBtu	Pipeline quality natural gas and good combustion practices	BACT
TX-0824	Jackson County Generating Facility	Four Siemens F5 model (~230 megawatts (MW) each for a total of 920 MW), operating as peaking units in simple cycle mode.	GHGPSDTX118 06/30/2017	1,316 lb/MW-hr Each turbine will be limited to 2,500 hours of operation per year.	Energy efficiency designs, practices, and procedures, CT inlet air cooling, periodic CT burner maintenance and tuning, reduction in heat loss, i.e., insulation of the CT, instrumentation and controls	BACT
TX-0819	Southwestern Public Service Company Gaines County Power Plant	Four Siemens SGT6-5000F5 natural gas fired combustion turbines	135322, PSDTX1470, AND GHGPSDT 04/28/2017	1,300 lb/MW-hr	Pipeline quality natural gas; limited hours; good combustion practices.	BACT
LA-0316	Cameron LNG LLC	Gas turbines (9 units)	PSD-LA-766(M3) 02/17/2017	--	Good combustion practices and fueled by natural gas; Use high thermal efficiency turbines.	BACT
TX-0816	Corpus Christi Liquefaction Stage III, LLC	Refrigeration compressor turbines. Two liquefied natural gas trains consisting of a total of (12) GE LM2500+ DLE turbines drive the propane, ethylene, and methane section compressors.	139479, PSDTX1496, GHGPSDTX157 02/14/2017	1,793,574 tons/year	--	BACT
VA-0326	Doswell Limited Partnership Doswell Energy Center	Two (2) GE 7FA simple cycle combustion turbines.	51018 10/04/2016	--	Good combustion, maintenance and use of active combustion dynamic monitoring systems.	BACT
IL-0121	Invenergy Nelson Expansion LLC	Two GE 7FA simple cycle combustion turbines used for peaking purposes and fired primarily on natural gas with ULSD as a secondary fuel.	15060042 09/27/2016	1,367 lb CO_2e/MW-hr	Turbine-generator design and proper operation.	BACT

RBLC ID	Corporate/ Company & Facility Name	Source Description	Permit & Date	GHG Permit Limit	Pollution Prevention Method	RACT/ BACT/ LAER
NY-0106	Greenidge Generation LLC	Turbine - natural gas	8-5736-00004/00017 09/07/2016	130.1700 LB CO_2/MMBTU 1 H	--	BACT
TX-0794	Brazos Electric Cooperative Hill County Generating Facility	Simple cycle turbine (GE 7FA.03, GE 7FA.04, GE 7FA.05, or Siemens SGT6-5000)	130051,PSDTX1450, GHGPSDTX131 04/07/2016	1,434 lb CO_2e/MW-hr	--	BACT
TX-0788	Apex Texas Power LLC Neches Station	4 Simple cycle CTGs, 2,500 hr/yr operational limitation. Facility will consist of either 232 MW (Siemens) or 220 MW (GE)	122401, PSDTX1428, GHGPSDTX111 03/24/2016	1,341 lb CO_2e/MW-hr	Good combustion practices	BACT
LA-0307	Magnolia Lng, LLC	Gas Turbines (8 units)	PSD-LA-792 03/21/2016	--	Good combustion/operating/ maintenance practices and fueled by natural gas; use intake air chiller.	BACT
TX-0778	Navasota South Peakers Operating Company II, LLC Union Valley Energy Center	Three General Electric 7FA.04 (~183 MW each for a total of 550 MW), operating as peaking units in simple cycle mode.	GHGPSDTX117 12/16/2015	1,461 lb/MW-hr Each turbine will be limited to 2,500 hours of operation per year.	--	BACT
TX-0775	Navasota South Peakers Operating Company II, LLC Clear Springs Energy Center	Three General Electric 7FA.04 (~183 MW each for a total of 550 MW), operating as peaking units in simple cycle mode.	GHGPSDTX120, 120849, AND PSDTX 11/13/2015	1,461 lb/MW-hr Each turbine will be limited to 2,500 hours of operation per year.	Low carbon fuel, good combustion, efficient combined cycle design	BACT
TX-0771	Shawnees Energy Center, LLC	Simple cycle Siemens Model SGT6-5000 F5ee – 230 MW or Second turbine option: General Electric Model 7FA.05TP – 227 MW	GHGPSDTX126, PSDTX1442, 125963 11/10/2015	1,398 lb/MW-hr	--	BACT

RBLC ID	Corporate/ Company & Facility Name	Source Description	Permit & Date	GHG Permit Limit	Pollution Prevention Method	RACT/ BACT/ LAER
FL-0355	Florida Power & Light Fort Myers Plant	Two GE 7F.05 turbines, approximately 200 MW each. Natural-gas is primary fuel.	0710002-022-AC 09/10/2015	1,374 lb CO_2e/MWH for NG 1,874 lb CO_2e/MWH for ULSD Permitted 3390 hr/yr of operation, of which no more than 500 hr may be on fuel oil.	Use of low-emitting fuel and efficient turbine.	BACT
TX-0735	Golden Spread Electric Cooperative, Inc. Antelope Elk Energy Center	Three additional GE 7F 5-Series Combustion Turbine Generators	GHGPSDTX41M1 05/20/2015	1,304 lb CO_2/MWHR	Energy efficiency, good design & combustion practices.	BACT
TX-0679	Corpus Christi Liquefaction Plant	There are three LNG trains with a total of (12) GE LM2500+ DLE turbines that drive the propane and methane refrigeration compressors. There are three LNG trains. In total there are (6) GE LM2500+ DLE turbines driving the compressors in the ethylene refrigeration sections.	GHGPSDTX123 02/27/2015	146,754 tpy rolling 12-month basis	Install efficient turbines, follow the turbine manufacturer's emission-related written instructions for maintenance activities including prescribed maintenance intervals to assure good combustion and efficient operation. Compressors shall be inspected and maintained according to a written maintenance plan to maintain efficiency.	BACT
TX-0753	Guadalupe Generating Station	Natural gas-fired simple cycle combustion turbine generators (CTG) will be General Electric 7FA.05 (GE 7FA.05), each with a maximum base-load electric power output of 227 megawatts (MW, nominal). Combined gross heat rate limit of 10,279,456 MMBtu/yr.	PSD-TX-1310-GHG 12/02/2014	1,293 lb CO_2/MWhr 12-month rolling average 20.8 tons CO_2/hr 12-month rolling average basis	--	BACT

RBLC ID	Corporate/ Company & Facility Name	Source Description	Permit & Date	GHG Permit Limit	Pollution Prevention Method	RACT/ BACT/ LAER
TX-0758	Invenergy Thermal Development LLC Ector County Energy Center	Simple Cycle Combustion Turbine, GE 7FA.03.	GHGPSDTX1366 08/01/2014	1,393 lb CO_2/MWhr 239,649 tpy CO_2e 12-month rolling total	--	BACT
MD-0043	Constellation Power Source Generation, Ince. Perryman Generating Station	Two 60-Megawatt Pratt & Whitney Gas Turbine Generator Package	PSC CASE NO. 9136 07/01/2014	1,395 lb CO_2e/MWH 12-month rolling, excluding SU/SD	Use of natural gas, energy efficiency design, use of inlet fogging/wet compression, insulation blankets to reduce heat loss, and fuel gas preheating.	BACT
CO-0075	Black Hills Electric Generation, LLC Pueblo Airport Generating Station	One (1) General Electric, simple cycle, gas turbine electric generator, Unit 6 (CT08), model: LM6000, SN: N/A, rated at 375 MMBtu per hour. EPA Home	13PB2245 05/30/2014	1,600 lb/MWH 193,555 tons per year rolling 365-day avg	Good Combustion Control	BACT
TX-0757	Indeck Wharton Energy Center	Three simple cycle combustion turbine generators (CTGs) will be either GE 7FA.05 or Siemens SGT6-5000F(5). The GE 7FA.05 has a base-load electric power output of approximately 213 megawatts (MW, net nominal), and the Siemens SGT6-5000F(5) has a base-load electric power output of approximately 225 MW (net nominal).	PSD-TX-1374-GHG 05/12/2014	1,337 lb CO_2/MWHR 2,500 hours of operation, plus 300 startup and shutdown events on a 12-month rolling basis	Use of modern natural gas-fired, thermally efficient simple cycle combustion turbines combined with evaporative cooling and good combustion and maintenance practices to maintain optimum efficiency.	BACT
OR-0050	Troutdale Energy Center LLC	GE LMS-100 combustion turbines, simple cycle with water injection	26-0235 03/05/2014	1,707 lb of CO_2/Gross MWH 365-Day Rolling Average	Thermal efficiency and clean fuels.	BACT
LA-0257	Sabine Pass LNG, LP & Sabine Pass Liquefaction, LL	Two GE LM2500+G4 simple cycle generation turbines. Eight (8) GE LM2500+G4 combined cycle refrigeration compressor turbines Six-teen (16) GE LM2500+G4 Simple Cycle Refrigeration Compressor Turbines	PSD-LA-703(M3) 12/06/2011	4,872,107 tons/yr Facility-wide	Good combustion/operating practices and fueled by natural gas - use GE LM2500+G4 turbines.	BACT

Table C-4. RBLC Search Results for Large Diesel Black Start Internal Combustion Engines >500 HP - CO_2e, NOx, PM

RBLC ID	Corporate/ Company & Facility Name	Source Description	Permit & Date	Pollutant	Emission Limit	Pollution Prevention Method	RACT / BACT / LAER
AK-0085	Alaska Gasline Development Corporation Gas Treatment Plant	One (1) Black Start Diesel Generator 4,060 hp Tier 4 Engine (EU39)	AQ1524CPT01 08/13/2020	CO_2e	163.6 lb/MMBtu	Good combustion practices and limit operation to 500 hr/yr.	BACT
				NOx	3.3 g/Hp-hr 3-hr average	Good combustion practices, ULSD, and limit operation to 500 hours per year.	
				PM (TPM)	0.045 g/hp-hr		
				PM_{10}			
				$PM_{2.5}$			
AK-0084	Donlin Gold LLC	Two (2) 600 kWe black start diesel generators and four (4) 1,500 kWe emergency diesel generators.	AQ0934CPT01 06/30/2017	CO_2e	2,781 tpy	Clean Fuel and Good Combustion Practices	BACT
				NOx	8.0 g/kW-hr 30hr average for NOx and VOC		
				PM (TPM)	0.25 g/kW-hr 3-hr average		
				PM_{10}			
				$PM_{2.5}$			
NY-0103	Cricket Valley Energy Center LLC	Black start generator using ultra-low sulfur diesel	3-1326-00275/00009 02/03/2016	NOx	2.11 g/BHP-h	Generator equipped with selective catalytic reduction. Compliance demonstrated with vendor emission certification and adherence to vendor-specified maintenance recommendations.	LAER
				Filterable PM	0.15 g/BHP-h	Compliance demonstrated with vendor emission certification and adherence to vendor-specified maintenance recommendations.	BACT

Table C-5. Cost Effectiveness Calculation for Proposed Simple Cycle Turbines

Cost Input		Basis: One 2000 MMBtu/hr Combined Cycle Turbine [1]		Proposed LM2500: One 325MMBtu/hr Simple Cycle Turbine	
		Value	Notes	Value	Notes
A	Baseload Rating(MMBtu/hr)	2000	(1)	325	@59F
B	Power Output (MW) (w/o 11% CCS Derate)	313.5	=C/(1-0.11)	33.8	@59F
C	Net Power Output (MW) (w/ CCS)	279	(1)	30.1	=B*(1-0.11)
D	Factor: Capital Costs for Carbon Capture ($/KW)	1440	(1)	N/A	(6)
E	Factor: Fixed Annual Costs for Capture ($/MWhr)	5.0	(1)	N/A	(6)
F	Factor: Variable Cost ($/MWh)	2.3	(1)	2.3	(1)
G	Assumed Capacity Factor (%)	50%	--	40%	Permit max.
H	Design Capture Rate (tonne/h)	97	(1)	15.8	(7)
I	Design Capture rate (ton/h)	106.9	(2)	17.4	(2)
J	Capital Recovery Factor (7% Interest, 30-yr life)	0.0806	(3)	0.0806	(3)
K	Design Exhaust gas to CCS (KDSCF/hr at 15% O_2)	46,086	(7)	26,211	(8)
L	**Capital Costs for Carbon Capture ($)**	**$401,760,000**	=C*D*1000	**$286,364,700**	(9)
M	Capture Capital Cost Annualized	$32,376,400	=J*L	$23,077,100	=J*L
N	Capture Fixed Annual Costs	$13,730,600	=B*E*8760	$9,786,800	(9)
O	Capture Variable Annual Costs	$3,158,000	=B*F*G*8760	$410,540	(9)
P	Transportation, Storage, & Monitoring Costs	$5,159,500	(4)	$670,700	(4)
Q	**Total Annual Costs ($)**	**$54,424,500**	=M+N+O+P	**$33,945,140**	=M+N+O+P
R	CO_2 Capture at assumed capacity factor (tons/yr)	468,196	=G*I*8760	60,865	=G*I*8760
S	**$/Ton for CCS**	**$116.20**	=Q/R	**$557.70**	=Q/R
T	Possible Tax Credit ($/ton 30 years)	-$40.80	(5)	Tax credit not included, see (11)	
U	$/Ton for CCS after Tax Credit	$75.40	=S-T & (10)		

Notes:

(1). Data and cost factors for a 2,000 MMBtu/hr combined cycle turbine from Figure 7, "Cost of CCS for New Combustion Turbine", in the US EPA Technical Support Document (TSD) supporting NSPS TTTTa rulemaking entitled "Greenhouse Gas Mitigation Measures, Carbon Capture and Storage for Combustion Turbines, Technical Support Document", EPA Docket ID No. EPA-HQ-OAR-2023-0072, May 23, 2023.

(2). Units conversion: 1 tonne = 1.102 tons.

(3). Capital Recovery Factor (CRF) = $[i \times (1+i)^n] \div [(i+1)^n - 1]$ where *i* is the interest rate and *n* is the equipment life years.

(4). Transport, Storage (Sequestration) and monitoring costs estimated as $10/Tonne (or $11.02/ton) via Footnote to Figure 7 of the EPA TSD referenced in (1).

(5). Inflation Reduction Tax credit for CCS is $85/tonne for 12 years which annualized over 30 years is $45/tonne or $40.83/ton captured [see Figure 8 Footnote of the EPA TSD referenced in (1)].

(6). Capture capital cost factor and fixed annual cost factor are not needed for smaller turbines – those costs are calculated on rows labeled L and N based on cost for larger unit times ratio of size difference raised to six-tenths power [six-tenths factor, see (9)].

(7). Combined cycle turbine design exhaust flow (to CCS) is calculated from MMBtu/hr × F-factor (dscf/MMBtu). Natural gas F-Factor is 8710 dscf/MMBtu at 0% O_2 or 30,854 dscf/MMBtu at 15% O_2.

(8). Simple cycle turbine exhaust flow (to CCS) is calculated based on MMBtu/hr and above referenced F-Factor (dscf/MMBtu). However, that figure is multiplied by 3.5 to account for the additional of at least 2.5 scf of ambient tempering air permit scf of hot turbine exhaust to provide needed cooling the exhaust going into the carbon capture absorbers.

(9). The capital and fixed annual costs of the LM2500 turbine CCS is estimated using the six-tenths factor method based on the ratio of the exhaust flow rate (gas volumes treated). Example: LM2500 CCS capital cost = cost of larger CCS × (LM2500 scf ÷ larger unit scf)$^{0.6}$. Variable annual costs are assumed to be directly proportional to amount of CO_2 captured.

(10). Although the above cost factors and parameters are from the EPA TSD referenced in (1), the calculated cost effectiveness of $75.4/ton for a 2,000 MMBtu/hr turbine, with 30-year amortization (and taking CCS tax credit) is slightly lower than the $81/ton cost effectiveness shown in Figure 8 of that document. The reason for the slight difference (-7%) in values is unknown but is directionally conservative and may related to different assumptions regarding actual capture efficiency versus "design capture efficiency."

(11). CCS tax credits discussed in (5) are provided for the 2000 MMBtu/hr case for comparison. However, CCS tax credits are not included in the BACT cost-effectiveness calculations for the proposed LM2500. TVA is a tax-exempt organization and is not eligible to claim tax credit. Furthermore, via EPA's Draft New Source Review Workshop Manual, at B.11 (Oct. 1990), "It is also recommended that income tax considerations be excluded from cost analysis. The simplifies the analysis. Income taxes generally represent transfer payments for one segment of society to another and as such are not properly part of economic costs."

APPENDIX D: ACT MODELING PROTOCOL

ALLEN COMBUSTION TURBINE PROJECT (ACT)

MODELING PROTOCOL
PREVENTION OF SIGNIFICANT DETERIORATION (PSD) PERMIT APPLICATION
Response to Comments - 2

SHELBY COUNTY, TENNESSEE
August 2024

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Appendix A. Wind Roses for Meteorological Sites Considered 38

1.0 INTRODUCTION AND BACKGROUND

This document presents the proposed dispersion modeling methodology that will be performed associated with a PSD permit application for the Tennessee Valley Authority (TVA) Allen Plant (Permit No. 01280-01 TV), which includes a combined cycle facility (ACC) and a simple cycle facility (ACT). Modeling methods and assumptions, including model selection and options, source parameters, and meteorological data to be used, are presented in this document for review by the Shelby County Health Department (SCHD).

2.0 PROJECT DESCRIPTION AND REGULATORY ANALYSIS

ACT is currently permitted to operate 16 dual-fuel GE 5N simple-cycle combustion turbines (CTs) and four GE 7B simple-cycle CTs along with ancillary equipment. TVA has demolished the 16 pre-NSPS, low efficiency GE 5N CT units, which were constructed circa 1971-72, and proposes to replace them with six (6) state-of-the-art, natural gas-fired GE LM2500 simple-cycle CT units (ACT 50-55). Each GE LM2500 unit will satisfy the requirements of 40 CFR 60, Subpart TTTTa, "intermediate load" CT: 1,170 lbs. CO_2/MWh and ≤40% annual capacity factor. The six GE LM2500 units will provide approximately 200 Megawatts (MW) of replacement generation, which will be used to address non-base load (i.e., peak load) electrical demands and to address highly unlikely transmission-system emergencies (i.e., black start). To support black-start operations, two ultra-low sulfur diesel (ULSD) 2,200 horsepower black-start generators, rated at 1,500 kW_e each, will be installed to manage ancillary, transient house loads (e.g., energizing the switchyard). The proposed project is a major modification under City of Memphis Code Section 16-77 and the Federal PSD regulations (40 CFR § 52.21). A site locality map (Figure 1) and a topographic map (Figure 2) provide details of the location and property boundaries.

ACT is located near Memphis in Shelby County, Tennessee (TN). Shelby County currently meets the National Ambient Air Quality Standards (NAAQS) and is designated as unclassifiable/ attainment for all criteria pollutants. Although Shelby County continues to be designated as attainment for ozone (O_3), the 2022-2023 8-hr design value is violating the 2015 O_3 NAAQS.

3.0 PROJECT EMISSIONS

Preliminary emission estimates for the proposed project are provided in Table 1. Emission estimates are based on manufacturer/vendor/industry data, an engineering approximation obtained from similar equipment, or EPA's Compilation of Air Pollutant Emission Factors (AP-42, Volume I, 5th Edition). All 40 CFR § 52.21 pollutants that exceed their respective significant emission rate (SER) will be subject to PSD review. Emission estimates utilized are provided electronically.

Table 1. Preliminary Annual Emission Estimates (tons)[1,2]

Pollutant	Emissions	SER
Carbon Monoxide (CO)	56	100
Nitrogen Oxides (NO_X)	47	40
Sulfur Dioxide (SO_2)	2	40
Particulate Matter (TSP/PM)	25	25
Total PM ≤ 10 microns [3]	34	15
Total PM ≤ 2.5 microns [3]	34	10
Volatile Organic Compounds (VOC)	11	40
Lead (Pb)	<0.01	0.6
Sulfuric Acid Mist (H_2SO_4)	<0.05	7
Carbon Dioxide (CO_2) Equivalent	401,800	75,000

Notes:
1. Based on six LM2500 units operating 3,260 hours per CT-year with 350 startups/shutdown events per CT-year and two black-start generators operating 100 hours/unit-year.
2. "ACT LM2500 240605_SCHD.xlsx", "air" worksheet (provided electronically).
3. Includes filterable and condensable PM.

Best Available Control Technology (BACT) will be applied to particulates and greenhouse gases (CO_2/CO_2e), and the Lowest Achievable Emission Rate (LAER) will be adopted for NO_X. Both analyses will be provided in the PSD application and cover all combustion sources; however, an abbreviated LAER analysis regarding the GE LM2500 units is provided as follows.

A review of EPA's RACT/BACT/LAER Clearinghouse provides the following NO_X LAER adopted by other aeroderivative simple-cycle CT units:

Table 2. RBLC Natural Gas-Fired Aeroderivative Simple-Cycle NO_X LAER

Facility	Year	Model	Size	Controls	LAER
Bayonne Energy Center, NJ	2016	Rolls Royce Trent WLE 60	64 MW to 66 MW	Wet Injection, SCR	2.5 ppmvd at 15% O_2
Perryman Gen. Station, MD	2014	Rolls Royce Trent WLE 60		Wet Injection, SCR	2.5 ppmvd at 15% O_2

LAER is achieved via combustion-zone NO_X mitigation and post-combustion Selective Catalytic Reduction (SCR). The identified Rolls Royce aeroderivatives utilize wet injection to suppress NO_X formation during combustion by reducing peak temperatures in the flame zone. Similarly, peak flame-zone temperatures are reduced in the proposed GE LM2500 via dry combustion controls: advanced low-NO_X emission combustors, which enhance air-fuel mixing. An SCR system, also used by the Rolls Royce aeroderivatives, will reside in each GE LM2500 exhaust path. By installing similar technology that other sources have used to achieve LAER, TVA adopts 2.5 ppmvd NO_X at 15% O_2 during steady-state operations.

4.0 MODELING APPROACH

The specific modeling approach that will be used to evaluate the project's short-range (less than 50 kilometers from plant) air quality impacts in Class II areas as well as long range, regional impacts (50 to 300 kilometers from plant) to Class I area visibility, soils, and vegetation is detailed in the following sections.

The dispersion modeling analysis will be performed in accordance with the United States Environmental Protection Agency (EPA) "Guideline on Air Quality Models" (GAQM, contained in 40 CFR Part 51, Appendix W (EPA, 2017), New Source Review Workshop Manual (EPA, 1990), all applicable EPA clarification memorandums and guidance documents, and direct regulatory guidance provided by SCHD.

4.1 Source Analysis

Modeling analysis for each ambient-air standard will utilize inputs that represent the most conservative, or a "worst-case", operating scenario. AERSCREEN was used for the "short-term" air quality standards (i.e., standards of ≤24 hours) to determine the load and ambient temperature conditions when worst-case concentrations occur because CT performance varies with generation load and temperature. The model estimates "worst-case" one-hour concentrations for a single source. Preliminary AERSCREEN results indicate the "worst-case" concentrations for natural-gas firing occur at 50% load and 95°F. The input and output files for all AERSCREEN runs are provided electronically. The modeling analysis inputs will include the "worst-case" operating scenario along with startup and shutdown parameters.

Although AERSCREEN does include conversion factors to estimate "worst-case" annual concentrations from resulting one-hour "worst-case" concentrations, AERSCREEN's unsophisticated nature does not capture the inherent characteristics of the screened source: ambient conditions affect emissions and power output from CT units more than from external combustion systems (EPA, 2000). "The operation at high excess air levels and at high pressures increases the influence of inlet humidity, temperature, and pressure. Variations of emissions of 30 percent or greater have been exhibited with changes in ambient humidity and temperature" (EPA, 2000). Extrapolating CT performance at 0°F or 95°F over an entire year is inappropriate. A review of recent annual temperature data obtained from nearby meteorological towers (see "ACT_surface_met_comparison.xlsx") indicates an average annual temperature range of 61.1°F to 63.4°F. Consequently, annual air quality standards will be modeled using manufacturer-provided CT performance at 59°F and full load conditions along with startup and shutdown parameters.

The black-start generators are for emergency resiliency and are to be utilized for ancillary power (e.g., energizing the switchyard) only during black start events (i.e., recovery from power transmission-network shutdowns). When one (or more) of the LM2500 units completes startup, the black-start generators will cease operating. The generators will be load tested once every three years and will only run periodically over the course of the year for maintenance and readiness testing. EPA's guidance on intermittent source operation (EPA, 2011) exempts the black-start generators from 1-hour NO_2 modeling. However, maintenance and readiness testing will be included for modeling other applicable standards.

Source locations, base elevations, and fixed stack parameters are provided in Table 3. A general arrangement showing the proposed sources and ancillary equipment is presented in Figure 3 and

provided electronically. Preliminary stack parameters and emissions associated with each air quality standard are also provided electronically.

Table 3. GE LM2500 and Black-Start Generators Stack Parameters[1]

Proposed Unit	UTM Zone 15, NAD83		Base Elevation (m)	Stack Height (m)	Stack Inside Diameter (m)
	Easting (m)	Northing (m)			
ACT50	760227.95	3884780.33	72.5	21.9	2.74
ACT51	760258.38	3884778.28	72.5	21.9	2.74
ACT52	760288.80	3884776.24	72.5	21.9	2.74
ACT53	760319.23	3884774.20	72.5	21.9	2.74
ACT54	760349.65	3884772.16	72.5	21.9	2.74
ACT55	760380.07	3884770.12	72.5	21.9	2.74
ACT56[2]	760342.82	3884803.85	72.5	TBD	TBD
ACT57[2]	760346.84	3884803.57	72.5	TBD	TBD

Notes:
1. "Allencoordinates_05-13-24_final.xlsx" worksheet (provided electronically).
2. Black-start generator stack parameters will be finalized prior to modeling. "TBD" denotes "to be determined."

4.2 Class II Modeling Analysis

To satisfy PSD requirements for Class II area impacts in attainment or unclassifiable areas, a refined air quality analysis will be performed to demonstrate that the proposed emissions will not cause or contribute to ambient concentrations that exceed any applicable NAAQS or PSD increment (EPA, 1990). The modeling analysis will specifically focus on the following pollutants that exceed the SER: NO_X, PM_{10}, $PM_{2.5}$ (primary and secondary), and O_3.

Maximum modeled concentrations will be compared to the PSD Class II Significant Impact Level (SIL) for each pollutant and averaging time (Table 4) to determine if a cumulative impact analysis is necessary. For pollutants with short-term averaging periods, the highest-first-high (H-1-H) modeled concentration will be compared to the corresponding SIL. If the maximum predicted impacts from the modeling analysis are equal to or exceed the SILs, a full impact modeling analysis will be performed for that pollutant and averaging time.

In March 2024, the EPA finalized revisions to the primary annual $PM_{2.5}$ standard by lowering the level from 12.0 µg/m^3 to 9.0 µg/m^3. Upon the effective published date (May 6, 2024) of the revised primary annual $PM_{2.5}$ NAAQS, a PSD demonstration must include the revised primary annual $PM_{2.5}$ NAAQS. Therefore, TVA will demonstrate through modeling analyses that the proposed ACT project will not cause or contribute to a violation of the revised annual $PM_{2.5}$ NAAQS.

Additionally, the EPA provided a supplemental guidance to the SILs for O_3 and $PM_{2.5}$ on April 30, 2024 (EPA, 2024). The guidance retained the current O_3 SIL and 24-hour $PM_{2.5}$ SILs for Class II and Class I areas, and it lowered the annual $PM_{2.5}$ SILs for Class I and Class II areas (Table 4). TVA will apply the new SILs to the annual $PM_{2.5}$ modeling analyses.

Table 4. List of Criteria Pollutants to be Evaluated [1]

Pollutant	Avg. Period	PSD SILs		NAAQS		PSD Increments	
		Class II (µg/m³)	Class I (µg/m³)	Primary(µg/m³)	Secondary (µg/m³)	Class II (µg/m³)	Class I (µg/m³)
NO_2	1-hour	7.5	--	188 [2]	--	--	--
	Annual	1	0.1	100	100	25	2.5
PM_{10}	24-hour	5	0.3	150 [3]	150 [3]	30	8
	Annual	1	0.2	--	--	17	4
$PM_{2.5}$	24-hour	1.2 [4] / 1.2 [5]	1.2 [4] / 0.27 [5]	35 [6]	35 [6]	9	2
	Annual	0.13 [4] / 0.13 [5]	0.13 [4] / 0.03 [5]	9 [7]	15 [7]	4	1
O_3	8-hour	1.0 ppb	--	70 ppb [8]	70 ppb [8]	--	--

Notes:

1. NAAQS are found in 40 CFR Part 50. The 1-hr NO_2 Class II SIL is an interim SIL found in EPA's *Guidance Concerning the Implementation of the 1-hour NO_2 NAAQS for the PSD Program* (EPA, 2010); it is not a formally established SIL. The Class II SIL for NO_2 (annual) is found in 40 CFR 51.165(b)(2). SILs for O_3 and $PM_{2.5}$ are based on the April 17, 2018, EPA memo, *Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program*. PSD increments are found in 40 CFR Part 51.166.
2. 98th percentile of hourly daily maximum concentrations, averaged over three years.
3. Not to be exceeded more than once per year on average over three years.
4. The Class I and Class II SIL for the NAAQS. Annual SILs revised April 30, 2024.
5. The Class II SIL for the PSD increment. Annual SILs revised April 30, 2024.
6. 98th percentile, averaged over three years.
7. Annual mean, averaged over three years.
8. Annual fourth-highest daily maximum 8-hour concentration, averaged over three years.

4.2.1 Modeling System

On November 9, 2005, the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) was promulgated as the EPA's preferred near-field dispersion modeling for a wide range of regulatory applications in all types of terrain based on extensive developmental and performance evaluation. On December 20, 2016, the EPA Administrator signed a final rule that revised the Guideline on Air Quality Models, which included enhancements to the formulation and application of the agency's AERMOD dispersion model. The final rule was published in the Federal Register on January 17, 2017.

On October 12, 2023, the EPA Administrator signed a proposed rule that would revise Appendix W to include enhancements to the formulation and application of the EPA's near-field dispersion modeling system, AERMOD; updates to the recommendations for the development of appropriate background concentration for cumulative impact analyses; and various typographical updates to the existing regulation. Until the next revision of Appendix W is published, the 2017 version will be referenced in this document.

For the PSD Class II modeling analysis, the most current versions of the AERMOD system will be used to assess impacts from NO_X, PM_{10}, and $PM_{2.5}$ (primary):

- AERMOD, v23132 (EPA, 2023c);
- AERMET, v23132 (EPA, 2023b);

- AERMAP, v18081 (EPA, 2018b);
- AERMINUTE, v15272 (EPA, 2015);
- BPIPPRM, v04274 (EPA, 2004);
- AERSURFACE, v20060 (EPA, 2020a).

There are two input data processors that are regulatory components of the AERMOD modeling system: AERMET, a meteorological data preprocessor that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts; and AERMAP, a terrain data preprocessor that incorporates complex terrain using USGS digital elevation data. Other components of the system include: AERMINUTE, a meteorological processor that uses 1-minute ASOS wind data to generate hourly average winds for input to AERMET; BPIPPRIM, a multi-building dimensions program incorporating the GEP technical procedures for PRIME applications; and AERSURFACE, a surface characteristics preprocessor used to estimate key surface parameters for input into AERMET.

Additional regulatory default options used in the AERMOD modeling system will include the following:

- Appropriate treatment of calms and use of missing meteorological data routines;
- Inclusion of actual receptor elevations;
- Incorporation of complex/intermediate terrain algorithms;
- Calculations of stack tip downwash;
- Calculation of direction-specific building downwash;
- Use of the NO_2 Tier 2 Ambient Ratio Method (ARM2);
- Use of the ADJ_U* option to adjust surface friction velocity during stable, low wind speed conditions.

The BREEZE AERMOD modeling software developed by Trinity Consultants (https://www.breeze-software.com/software/aermod) will be used to run the AERMOD executable and associated preprocessors, with approval from SCHD. The modeling files will be provided in BREEZE AERMOD format.

4.2.2 Urban/Rural Determination

The “urban” or “rural” determination of a source is important in determining the boundary layer characteristics that affect AERMOD’s prediction of downwind concentrations (EPA, 2017; EPA, 2023a). A land use determination is required to determine the urban/rural characterization of a modeling study area and the proper dispersion coefficients to use in AERMOD (EPA, 2017). The EPA guidance recommends the use of the Auer land use scheme within three (3) kilometers of a source to classify the predominant dispersion regime (EPA, 2017). If the percentage of land use types that are characteristic of heavy industrial, light-moderate industrial, commercial, or compact residential use account for 50 percent or more within the three kilometers, the modeling area is classified as urban, and the urban dispersion options in AERMOD should be used. Otherwise, the area is classified and modeled as rural.

The Auer method was used to determine the land use status of the area around ACT. A three-kilometer radius was centered on the site, and the source for the land cover was the 2019 National Land Cover Database (NLCD), with a data cell size (raster) of 30 meters by 30 meters. The NLCD 2019 land cover categories for medium and high intensity development and barren land areas were found to be suitable surrogates for the Auer “urban” classifications in the radius around ACT.

The results of the Auer land use analysis for the study area are presented in Figure 4 and Table 5. The analysis indicates that the ACT study area is approximately 86% rural and 14% urban. Therefore, the rural option will be used in AERMOD.

Table 5. Auer Land Use Percentages by Category: ACT Study Area

Auer Analysis -NCLD 2019				Allen Site - 3km ring		
NLCD Code	**NLCD 2019 Descriptions**	**Auer Code**	**Auer Class**	**Area (Sq. Meters)**	**Percentage**	**Totals**
23	Developed, Medium Intensity	R2/R3	urban	1680344.375	5.948819352	13.71%
24	Developed, High Intensity	I1/I2/C1		2191909.75	7.759882636	
31	Barren Land	NA	rural	302983.4375	1.07263354	86.29%
11	Open Water	A5		5068904	17.94512759	
21	Developed, Open Space	A1/R4		731835.375	2.590871553	
22	Developed, Low Intensity	R1		865795.375	3.3.065121863	
41	Deciduous forest	A4		652718	2.3107772	
42	Evergreen forest	A4		N/A	N/A	
43	Mixed Forest	A4		1575154.25	5.576421252	
52	Shrub/Scrub	A4		111483.515625	0.394678201	
71	Herbaceous	A3		275112.5625	0.973964004	
81	Hay/Pasture	A3		158234.671875	0.560188431	
82	Cultivated Crops	A2		7719334.5	27.3282829	
90	Woody Wetlands	A4		6326689.5	22.39798787	
95	Emergent Herbaceous Wetlands	A3		586187.5625	2.075243603	
Grand Totals:				**28,262,891.91**	**100%**	**100%**

4.2.3 Downwash

The AERMOD model has the Plume Rise Modeling Enhancements (PRIME) incorporated in the regulatory version through the Building Profile Input Program, PRIME version (BPIPPRM) v04274 (Earth Tech, Inc., 1997). BPIPPRIM is designed to incorporate the downwash concepts and procedures expressed in the GEP Technical Support document (Auer, 1978) and the Building

Downwash Guidance document (EPA, 1985), while incorporating the PRIME enhancements to improve prediction of ambient impacts in building cavities and wake regions.

Actual stack heights at ACT will be used for the modeling analysis. In addition, the potential for building downwash effects will be accounted for in the modeling, with building parameters calculated using the EPA's Building Profile Input Program for PRIME, BPIPPRM, v04274 (EPA, 2004).

The direction-specific building downwash dimensions will be determined by all buildings and structures within the stack influence area. The stack influence area is defined by a circular area with a radius of five (5) times the lesser of the 'building height' or 'building projected width' from the stack out to no more than 800 meters from the stack.

According to the GEP technical support document, a structure is considered nearby if it is within 5L of the emissions source, where L is the lesser dimension (height or projected width) of the nearby structure (EPA, 1985). Figure 5 shows the scaled nearby structures within the ACT boundary, including the following:

- Combustion turbine structures;
- General buildings;
- Storage tanks.

The BPIPPRM input stack and building parameters are provided electronically.

4.2.4 Receptor Network

The air dispersion modeling for the proposed site will be performed using nested Cartesian grids. Boundary receptors will also be placed along the perimeter of the fenced and restricted areas of the ACT property and spaced 50 meters (m) apart. These boundary receptors will correspond to a permanent fence surrounding the property. Additional boundary receptors will also be placed along the perimeter of the fenced ACC property directly south of ACT and spaced 50 m apart (Figure 6).

The nested receptor grids will surround the plant site except for those falling inside the fenced boundary area, which will be removed. Because concentration gradients are most pronounced near a source, the receptor spacing will vary with distance from the site, with those nearest the site more closely spaced than those further away. The origin of each grid will be the ACT53 stack center coordinates.

For comparison to the SILs, receptors will be spaced 100-m apart on a Cartesian grid extending out to a distance sufficient to resolve the maximum concentrations, but at least extending outward to 5 km in all directions. Additionally, less refined receptor grids will extend from the finest grid out to 10 km in each direction. The nested receptor grid sizes and spacing are shown in Table 6 and Figure 7. If the maximum concentration falls outside of the finest grid, an additional 100-m spaced receptor grid will be added to ensure that the highest concentration is captured.

Table 6. Receptor Grid Size and Spacing

Receptor Spacing (m)	Grid Size (km)	Distance from Origin (km)
100	10 x 10	0-5
250	16 x 16	5-8
500	20 × 20	8-10

If the SIL is exceeded for any pollutant, additional modeling will be performed to determine the size of the significant impact area (SIA) (see Section 4.3). If the furthest receptor with a concentration greater than the SIL occurs within the coarse receptor grid, a two-by-two-kilometer refined grid will be placed around the area of concern with a grid spacing of 100 m to ensure the proper determination of the SIA.

For any pollutants exceeding the Class II SIL, a polar grid of nested receptors out to the SIA will be used to conduct the cumulative modeling for demonstrating compliance with the applicable NAAQS and PSD Increments. If the maximum concentration falls outside of the fine receptor grid, an additional 100-m spaced receptor grid will be used to ensure that the maximum is captured. If an air quality standard is exceeded, the MAXDCONT option in AERMOD will be used to determine if the proposed project is significant (above the corresponding SIL) at the receptors exceeding the standard.

Elevations for all receptors will be extracted from U.S. Geological Survey (USGS) National Elevation Dataset (NED) files using the AERMAP terrain processor of the AERMOD modeling system.

4.2.5 Meteorology

Given that site-specific meteorological data is not available for the ACT site, surface data collected by a representative meteorological site will be used.

According to Appendix W, the selection of meteorological data to be used in the modeling analysis should be based on spatial and climatological (temporal) representativeness (EPA, 2017). The representativeness of the data is based on the following:

1. The proximity of the meteorological monitoring site to the area under consideration;
2. The complexity of terrain;
3. The exposure of the meteorological site; and
4. The period during which data are collected.

Site-specific meteorological data or data from National Weather Service (NWS) stations, universities, Federal Aviation Administration (FAA) stations, military stations, and others should be used if possible (EPA, 2017). The determination of representativeness of site-specific data for AERMOD applications cannot be based solely on proximity (EPA, 2018a). According to Appendix W, the implementation of NWS Automated Surface Observing Stations (ASOS) in the early 1990's should not preclude the use of NWS ASOS data if such a station is determined to be representative of the modeled area (EPA, 2017).

Given that site-specific meteorological data is not available for the ACT site, surface data collected by a representative meteorological site will be used. Surface meteorological sites located within

100 km of the ACT site with available comprehensive meteorological data during the 2019-2023 period were evaluated (Table 7 and Figure 7).

Table 7. Nearest Surface Meteorological Stations from ACT

Met. Station ID	WBAN ID	Site Description	Station Type [1,2,3]	Base Elevation (m)	Distance from ACT (km)	Recoverability 2019-23
AWM	53959	WEST MEMPHIS MUNICIPAL	ASOS	63.7	9.97	92.19%
MEM	13893	MEMPHIS	ASOS	76.8	14.57	99.18%
OLV	13815	OLIVE BRANCH	AWOS	124.1	34.40	91.65%
NQA	93839	MILLINGTON REGIONAL	AWOS III	102.4	41.26	88.75%
UTA	23903	TUNICA MUNICIPAL	AWOS	57.0	47.53	59.92%
CKM	00314	CLARKSDALE COUNTY	AWOS	51.6	92.71	69.41%
JBR	03953	JONESBORO MUNICIPAL	AWOS	79.9	96.04	89.78%
HKA	53869	BLYTHEVILLE MUNICIPAL	ASOS	77.5	100.17	95.06%

Notes:

1. AWOS: Automated Weather Observing System.
2. An AWOS III measures and reports all the parameters of AWOS system plus visibility (AWOS II), precipitation accumulation (rain gauge), and cloud height. An AWOS III can have optional sensors such as precipitation type/intensity (present weather, P) and/or thunderstorm/lightning (T).
3. ASOS: Automated Surface Observing System with one-minute data available.

NWS AWOS sites often suffer from low data recoverability and data quality compared to ASOS sites. They also often report a larger percentage of calm winds than ASOS data as their minimum wind speed thresholds, which are defined by the METAR coding software, are higher than the ASOS thresholds. Therefore, all sites were further analyzed for data completeness with AERMET using the latest available 5-year data set for each site. Based on the results, the three sites with the greatest recoverability (AWM, MEM, HKA) were analyzed further to determine recoverability by quarter over the 5-year period (2019-23). MEM showed greater than 90% recoverability for every quarter of each year. AWM showed less than 90% for one quarter and just above 90% for at least two more quarters during the 5-year period. HKA also showed less than 90% recoverability for one quarter and had several quarters below 95%.

Regulatory application of AERMOD necessitates careful consideration of the meteorological data for input to AERMET. Data representativeness, in the case of AERMOD, means utilizing data of an appropriate type for constructing realistic boundary layer profiles (EPA, 2017). Calculations of the boundary layer parameters are dependent on the surface characteristics in the vicinity of the modeled facility. The surface characteristics are quantified by the assignment of three variables: surface albedo, Bowen ratio, and surface roughness length. Therefore, the remaining meteorological sites' surface characteristics (surface albedo, Bowen ratio, and surface roughness length) were compared with ACT. The USEPA tool, AERSURFACE (Version 20060), was used to determine surface characteristics using land cover data from the U.S. Geological Survey (USGS) National Land Cover Data (NLCD) 2016 archives and look-up tables of surface characteristics that vary by land cover type and season (EPA, 2020). The surface variables were set to vary by season using 12 sectors. For the AERSURFACE analysis, the mean of the surface characteristics generated for average moisture conditions at each of the nearby meteorological stations were compared to ACT (Table 8). The results of the AERSURFACE analysis showed that the AWM, MEM and HKA sites all had surface characteristics comparable to ACT.

Table 8. Surface Characteristics at ACT and Nearby Meteorological Stations

Meteorological Station ID	Mean Albedo	Mean Bowen Ratio	Mean Surface Roughness
ACT	0.153	0.358	0.021
AWM	0.168	0.528	0.057
MEM	0.165	0.862	0.032
HKA	0.175	0.565	0.023

The remaining meteorological sites were also evaluated with a land cover analysis, a terrain analysis, a climate analysis, and a wind-rose analysis. For the land cover analysis, a one-kilometer (1-km) radius was centered on each meteorological tower location, and the land use was categorized based on the 2019 NLCD (EPA, 2017). Impervious and canopy differences among the sites were also examined. The results showed that the MEM site had similar spatial distribution of land use, impervious coverage, and canopy coverage to ACT.

A terrain analysis of the proposed meteorological sites revealed that HKA, AWM, and ACT are physiographically located in the Mississippi Alluvial Plain. The MEM site is physiographically located in the East Gulf Coastal Plain. All sites are in a humid temperate subtropical eco-region. However, ACT, AWM and HKA are all located specifically in the Lower Mississippi Riverine Forest Providence, while MEM is in the southeastern Mixed Forest Providence. The Mississippi Alluvial Plain has generally extremely flat surface topography; deep alluvial soils, poor drainage, wetland areas; widely scattered bottomland and hardwood forests, and large productive farms. The elevation generally ranges from 100 to 300 feet above sea level. The East Gulf Coastal Plain includes a variety of landscapes. It is flat and relatively featureless in some areas, but elsewhere consists of rounded and eroded hills, topographic features known as cuestas and flatwoods, the floodplains of the Alabama, Tombigbee and Black Warrior Rivers. Elevations range from sea level to 300 feet.

National Elevation Data (NED) imagery showed that the AWM, MEM, and ACT sites have similar base elevations, but the MEM site has elevated terrain surrounding it to the north, east, and south directions. The HKA site is situated further away at higher base elevation, and with more complex terrain surrounding it. A climatological analysis showed all sites having similar climate normals of temperature, precipitation, and winds, but a wind rose analyses during the 5-year modeling period (2018-2022) showed that the AWM site had predominately southerly flow, with some strong southwesterly flow as well. The MEM and HKA sites have predominately southwesterly flows. Based on the terrain profile and land cover distribution, wind flow patterns around the ACT site are most likely to be southerly.

From the results of all analyses, the MEM NWS site was chosen to best represent the land use, terrain and exposure of the ACT site. According to Appendix W, Section 8.4.2(b), the surface characteristics input to AERMET should be representative of the land cover in the vicinity of the meteorological data, i.e., the location of the meteorological tower for measured data (EPA, 2017). Therefore, surface characteristics representative of the MEM NWS site will be used in AERMET. The land cover, terrain, climate, and wind rose analyses are all provided electronically. The wind roses for the main sites evaluated are also provided in Appendix A.

Characterization of surface moisture conditions for the NWS MEM site for each year of meteorology is presented in Table 9. The surface moisture conditions were determined by comparing precipitation for the period of data to be processed to the 30-year climatological record,

selecting “wet” conditions if precipitation is in the upper 30th percentile, “dry” conditions if precipitation is in the lower 30th percentile, and “average” conditions if precipitation is in the middle 40th percentile (EPA, 2013a).

Table 9. Average Yearly Surface Moisture Conditions for MEM[1,2]

Year	MEM	
	Annual Precipitation [1]	Surface Moisture Classification
2019	73.14	WET
2020	58.85	AVG
2021	51.80	AVG
2022	51.96	AVG
2023	51.96	AVG

Notes:

1. The 2019-2023 annual precipitation amounts for MEM were taken from the NOAA National Centers for Environmental Information, climatological data online search, MEM international airport. Source: https://www.ncdc.noaa.gov/cdo-web/search.
2. The 30-year climate normal (1991-2020) precipitation was taken from the NOAA National Centers for Environmental Information, Climate at a Glance: County Time Series, for Crittenden County, AR. Source: https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/county/time-series. The 30th and 70th percentiles were calculated in Microsoft Excel using the percentile function.

The MEM meteorological data will include 1-minute ASOS wind data from the National Climatic Data Center (NCDC) processed with AERMINUTE (Version 15272) to generate hourly averaged wind speed and wind direction to supplement the standard hourly NWS observations. The MEM NWS site is an Ice-Free Wind (IFW) station with a commission date of October 6, 2008, indicating that it used sonic anemometers during the 2019-2023 modeling period. Because the starting wind speed threshold for sonic anemometers is effectively zero, 1-minute ASOS wind speeds less than two knots are valid for IFW sites and are included in the hourly-averaged winds (EPA, 2015). AERMINUTE will flag the 2019-2023 winds as non-calm.

The minimum wind speed threshold for site-specific data is 0.5 m/s (EPA, 2000). In the March 08, 2013, EPA ASOS guidance memorandum, the agency states that it is reasonable and appropriate to apply the same minimum threshold to the hourly-averaged wind speeds provided by AERMINUTE to avoid imposing a more stringent requirement on data derived from 1-minute ASOS data (EPA, 2013). Therefore, the 0.5 m/s threshold value, which is based on the upper bound of the recommended starting speed for anemometers as listed in Section 5.2, Table 5-2 of the EPA meteorological monitoring guidance document (EPA, 2000), will be set in AERMET Stage 3.

According to Appendix W, the EPA has integrated the ADJ_U* option into AERMET as a regulatory option to address issues with model over-prediction of ambient concentrations from some sources associated with under-prediction of the surface friction velocity (u*) during light wind, stable conditions (EPA, 2017). The ADJ_U* option is specifically recommended for sources using standard NWS airport meteorological data, site-specific meteorological data without turbulence parameters, or prognostic meteorological inputs derived from prognostic meteorological models. The ADJ_U* option will be used in AERMET Stage 3.

For upper air data, the closest upper air station is located at the NWS in North Little Rock, AR (Figure 8). Twice daily soundings from the NWS KLZK for the 2019-2023 period will be used in AERMET.

4.2.6 Assessment of O_3 and Total $PM_{2.5}$

In April 2018, the EPA released guidance recommending SILs for O_3 and $PM_{2.5}$ (EPA, 2018a). Although this guidance was not a final agency action and did not create any binding requirements on permitting authorities, permit applicants, or the public, the recommended SILs could be used to demonstrate that a proposed source does not cause or contribute to a violation of the NAAQS or PSD increments. On April 30, 2024, the EPA provided supplemental guidance to the SILs for O_3 and $PM_{2.5}$, which retained the SILs for O_3 and 24-hour $PM_{2.5}$ and recommended new, lower SILs for annual $PM_{2.5}$ (EPA, 2024). TVA will use the latest recommended Class II SILs for O_3 and $PM_{2.5}$ to assess potential secondary pollutant impacts from ACT.

In July 2022, the EPA provided final guidance on how to implement the modeling requirements to show PSD compliance for O_3 and $PM_{2.5}$ (EPA, 2022). To make the required NAAQS or PSD increment compliance demonstration, proposed sources should provide a full accounting of the combined impacts of each allowable precursor (and direct component of $PM_{2.5}$) emissions on ambient concentrations of the relevant O_3 or $PM_{2.5}$ NAAQS if any precursor(s) (or the direct component of $PM_{2.5}$) would be emitted in a significant amount. In other words, for O_3, if either NOx or VOC precursor emissions would be emitted in a significant amount (i.e., above their SER), then both precursors should be included in the assessment of O_3 impacts. For $PM_{2.5}$, if a source would emit a significant amount of one or more of NOx, SO_2, or direct $PM_{2.5}$ emissions, then the source should include NOx and SO_2 precursor as well as direct $PM_{2.5}$ emissions in the assessment of $PM_{2.5}$ impacts. As mentioned in Section 3.2.1, primary impacts of $PM_{2.5}$ will be estimated with the AERMOD modeling system.

To estimate O_3 and total (primary + secondary [from precursors]) $PM_{2.5}$ impacts, the EPA released final guidance on the use of MERPs (Modeled Emission Rates for Precursors) as a Tier I demonstration tool (EPA, 2019). The tool relates single source impacts on secondary pollutants (O_3 and secondary $PM_{2.5}$) with an air quality threshold to determine if such an impact causes or contributes to a violation of the appropriate NAAQS and PSD Increments (EPA, 2019). MERPs reflect levels of increased precursor emissions that are not expected to cause a significant contribution to O_3 and $PM_{2.5}$. In practice, MERPs are intended to be used with SILs as analytical tools for PSD air quality analyses.

In November 2019, TDEC published guidance on the use of EPA's MERPs in TN that identified four hypothetical sites to represent sources in TN: Shelby County, TN, Giles County, TN, Barren County, KY and Ashe County, NC (TDEC, 2019). The lowest, most conservative MERPs at these locations are the default MERPs that can be used without the need for further justification (Table 10). TVA will use the default MERPs to estimate secondary O_3 and daily $PM_{2.5}$ impacts in accordance with PSD (EPA, 2019).

Table 10. Default MERPs (tons/year) for Tennessee PSD Applications [1]

Precursor	8-hr O_3	Daily $PM_{2.5}$
NO_x	156	3,717
SO_2	-	716
VOC	1,542	-

Notes:
1. TDEC, 2019.

For annual $PM_{2.5}$, the TDEC default MERPs have not yet incorporated the recently revised annual $PM_{2.5}$ SILs at the time of this protocol submission. Therefore, representative hypothetical MERPs sites for the precursors will be chosen following the EPA MERPs and SILs guidance documents (EPA, 2019; EPA, 2024). The MERPs selection will initially be based on the lowest, most conservative values in the Ohio Valley climate zone (Step 1 of the Tier 1 Demonstration [EPA, 2019]). Using the EPA View Qlik interface tool (https://www.epa.gov/scram/merps-view-qlik) to extract the latest MERPs information for the selected climate zone, the most conservative MERPs values are from the Porter, Indiana (IN), and Giles, TN, modeled locations (Table 11).

Table 11. Most Conservative Annual $PM_{2.5}$ MERPs for the Ohio Valley Climate Zone [1,2,3]

Location	Metric	Precursor	Emissions	Stack	MERP
Giles, TN	Annual $PM_{2.5}$	NOx	1000	10	4,956
Porter, IN	Annual $PM_{2.5}$	SO_2	1000	10	2,014

Notes:
1. EPA, 2019.
2. https://www.epa.gov/scram/merps-view-qlik
3. Calculations in "ACT_OhioValleyMERPS_selection.xlsx" (provided electronically).

If the secondary concentrations exceed their corresponding SILs using the most conservative TDEC and EPA MERPs, then the MERPs selection will continue with the multi-step process as outlined in the MERPs guidance (EPA, 2019). The Step 2 evaluation will select the lowest MERP from nearby sources with similar stack height; the Step 3 evaluation will select the most representative nearby source with a similar emissions and stack height with justification (TDEC, 2019; EPA, 2019).

4.2.6.1 Ozone (O_3) Assessment

O_3 impacts for the SILs analysis will be calculated as the sum of the ratio of precursor emissions to the MERPs following TDEC guidance as outlined in Equation 3.1 (TDEC, 2019). If the sum of the ratios is less than 1, then O_3 impacts are below the O_3 SIL and no cumulative analysis is necessary.

$$\left[\left(\frac{NO_x\ EM_S}{NO_x MERP}\right)+\left(\frac{VOC\ EM_S}{VOC\ MERP}\right)\right] < 1 \qquad [3.1]$$

Where:
- NO_X EM_S: Project source NO_X emission increase (tons/yr);
- NO_X MERP: NO_X MERP for selected hypothetical source;
- VOC EM_S: Project source VOC emission increase (tons/yr);

- VOC MERP: VOC MERP for selected hypothetical source.

If O_3 impacts are greater than one (1), a cumulative O_3 impact analysis will be performed following TDEC guidance (TDEC, 2019). Ambient O_3 monitors in the vicinity of ACT were reviewed to determine the most appropriate for representing background O_3 concentrations. There are several ambient O_3 monitors that meet data completeness requirements and have representative measurement scales in the vicinity of ACT (Table 12). The Shelby Farms NCore site was selected as the most representative background site due to its proximity, identical county emissions, and large enough measurement scale to represent air quality in the vicinity of ACT (Figure 9). The three-year average (2021-2023) of the fourth-highest 8-hour O_3 concentration will be used for the design value.

Table 12. Select Ambient O_3 Monitors within 250 km of ACT [1,2,3]

Site ID	Location	Distance (km)	Measure. Scale (km)	County NO_x emissions (tons/year)	County VOC emissions (tons/year)	2021-2023 Design Value (ppb)[4]
05-035-0005	Crittenden Co. (Marion, AR)	14.5	4km-50km	2,655	11,429	72
47-157-0021	Frayser Blvd (Memphis, TN)	19.8	500m-4km	14,743	37,438	68
47-157-0075	Shelby Farms Ncore Site (Memphis, TN)	28.3	4km-50km	14,743	37,438	72
28-033-0002	E South Street (Hernando, MS)	31.4	4km-50km	3,406	16,241	70
47-157-1004	Mudville Rd (Millington, TN)	44.2	4km-50km	14,743	37,438	67
28-161-9991	Yalobusha (MS)	122.9	50km-100km	657	15,368	60
28-081-0005	Tupelo Airport (MS)	154.9	4km-50km	2,399	13,943	63
28-011-0002	Highway 8 West (Cleveland, MS)	156.4	4km-50km	1,659	14,882	65
05-119-1002	Remount Rd Little-Rock (Pulaski, AR)	195.3	4km-50km	8,059	28,601	66
05-119-0007	Pike Ave Little-Rock (Pulaski, AR)	198.6	500m-4km	8,059	28,601	63

Notes:
1. Monitor data from EPA Air Quality System (AQS): https://www.epa.gov/outdoor-air-quality-data. Note: Air quality data in the table may not reflect final values; once modeling commences, TVA will verify with SCHD the correct design values to use.
2. EPA's National Emission Inventory (NEI), 2020.
3. Calculations taken from "ACT Monitor Selection_2021-2023AQ.xlsx" (provided electronically).
4. 4th-highest maximum 8-hour value.

If a cumulative O_3 analysis is needed, the 3-year monitoring design value will be added to the product of the O_3 SIL with the ratio of the proposed emission increases of each precursor to its representative MERP as shown in Equation 3.2 (TDEC, 2019).

$$O_3DV + \left[\left(\frac{NO_x\ EM_S}{NO_x MERP} + \frac{VOC\ EM_S}{VOC\ MERP}\right) \times O_3\ SIL\right] \leq NAAQS_{O3} \qquad [3.2]$$

Where:

- O_3 DV: Background monitoring O_3 design value;
- NO_X EM_S: Project source NO_X emission rate (tons/yr);
- NO_X MERP: NO_X MERP for selected hypothetical source;
- VOC EM_S: Project source VOC emission rate (tons/yr);
- VOC MERP: VOC MERP for selected hypothetical source;
- O_3 SIL: Significant impact level for O_3 (1.0 ppb).

If the calculated cumulative O_3 impacts do not exceed the NAAQS, precursor emissions from ACT will not cause or contribute to a violation of the O_3 NAAQS.

4.2.6.2 Secondary $PM_{2.5}$ Assessment

Combined primary and secondary impacts of $PM_{2.5}$ for the 24-hour and annual SILs analyses will be assessed using the highest modeled primary $PM_{2.5}$ concentration (HMC), the applicable Class II SILs, precursor emissions, and the representative MERPs. Because the TN MERPs equations for annual $PM_{2.5}$ have not incorporated the revised SILs at the time of this protocol submission, the EPA MERPs equations will be used for estimating secondary annual $PM_{2.5}$[1]. Equation 3.3 presents the TDEC equation for assessing 24-hour $PM_{2.5}$ (TDEC, 2019); Equation 3.4 presents the EPA equation for assessing annual $PM_{2.5}$ (EPA, 2019; EPA, 2024). If the combined impacts are less than the guidance-established thresholds, the $PM_{2.5}$ SILs will not be exceeded, and no additional analyses will be necessary.

24-hour $PM_{2.5}$ (TDEC Equation):

$$\left[\left(\frac{PM_{2.5}\ HMC}{PM_{2.5}\ SIL}\right)+\left(\frac{NO_X\ EM_S}{NO_X MERP}\right)+\left(\frac{SO_2 EM_S}{SO_2\ MERP}\right)\right]<1 \qquad [3.3]$$

Where:

- $PM_{2.5}$ HMC: Highest modeled primary $PM_{2.5}$ concentration from project;
- $PM_{2.5}$ SIL: Significant impact level for $PM_{2.5}$ (1.2 µg/m^3 for 24-hr);
- NO_X EM_S: Project source NO_X emission increase (tons/yr);
- NO_X MERP: NO_X MERP for selected hypothetical source;
- SO_2 EM_S: Project source SO_2 emission increase (tons/yr);
- SO_2 MERP: SO_2 MERP for selected hypothetical source.

Annual $PM_{2.5}$ (EPA Equation):

$$\left[\frac{PM_{2.5}\ HMC}{PM_{2.5}\ SIL}\times 100\right]+\left[\left(\frac{NO_X\ EM_S}{NO_X MERP}+\frac{SO_2\ EM_S}{SO_2\ MERP}\right)\times 100\right]<100\% \qquad [3.4]$$

Where:

- $PM_{2.5}$ HMC: Highest modeled primary $PM_{2.5}$ concentration from project;
- $PM_{2.5}$ SIL: Significant impact level for $PM_{2.5}$ (0.13 µg/m^3 for annual);
- NO_X EM_S: Project source NO_X emission increase (tons/yr);
- NO_X MERP: NO_X MERP for selected hypothetical source;
- SO_2 EM_S: Project source SO_2 emission increase (tons/yr);
- SO_2 MERP: SO_2 MERP for selected hypothetical source.

[1] SCHD, TDEC, and EPA Region 4 comments on ACT Modeling Protocol June 2024 submission (provided electronically).

If $PM_{2.5}$ impacts are greater than the thresholds, a cumulative $PM_{2.5}$ impact analysis will be performed. Ambient $PM_{2.5}$ monitors in the vicinity of ACT were reviewed to determine the most representative for background $PM_{2.5}$ concentrations (Figure 9). There are several ambient $PM_{2.5}$ monitors that meet data completeness requirements and have representative measurement scales within the immediate vicinity of ACT (Table 13). Unfortunately, the Shelby Farms NCore site could not be used because the monitor failed to capture 75% of all PM data during the 3rd quarter of 2023 (see SCHD comments provided electronically). Therefore, the Hernando monitor was selected as the most representative background site due to its proximity, measurement scale, and advanced PM measurement system. (It uses a T640x monitor that is also used at Shelby Farms.) The three-year average (2021-2023) of the 98th percentile 24-hour and annual mean $PM_{2.5}$ concentrations will be used for the design values.

Table 13. Select Ambient $PM_{2.5}$ Monitors within 250 km of ACT [1,2,3]

Site ID	POC [4]	Site Name	Dist. (km)	Measure. Scale (km)	County $PM_{2.5}$ Emissions (tons/year)	2021-2023 24-hr $PM_{2.5}$ ($\mu g/m^3$) [5]	2021-2023 Annual $PM_{2.5}$ ($\mu g/m^3$) [6]
47-157-0024	1	Alabama Avenue (Memphis, TN)	12.9	500m-4km	3,672	19	8.9
47-157-0024	2	Alabama Avenue (Memphis, TN)	12.9	500m-4km	3,672	19	8.9
05-035-0005	1	Crittenden County (Marion, AR)	14.6	500m-4km	1,229	18	8.2
47-157-0100	1	Near Road Site (Memphis, TN)	27.0	4km-50km	3,672	19	8.4
47-157-0075	2	Shelby Farms NCore (Memphis, TN)	28.3	4km-50km	3,672	18	8.0 [7]
28-033-0002	3	Hernando (Desoto, MS)	31.4	4km-50km	2,204	22	8.7 [8]
47-045-0004	3	Greenway Street (Dyersburg, TN)	128.8	500m-4km	549	20	7.7
47-113-0010	3	Demonbreun Dr. (Jackson, TN)	139.7	500m-4km	1,059	19	8.1
05-001-0011	1	Hwy 63 (Stuttgart, AR)	143.4	500m-4km	1,780	19	8.0
28-011-0002	3	Bolivar (Cleveland, MS)	156.4	4km-50km	1,368	22	8.9
05-119-0007	1	Pike - North Little Rock (Pulaski, AR)	198.6	500m-4km	4,565	22	9.4
05-119-0007	2	Pike - North Little Rock (Pulaski, AR)	198.6	500m-4km	4,565	25	9.9
47-099-0002	3	Loretto, (Lawrenceburg, TN)	244.0	50km-100km	775	17	6.8

Notes:

1. Monitor data from EPA Air Quality System (AQS): https://www.epa.gov/outdoor-air-quality-data. Note: Air quality data in the table may not reflect final values; once modeling commences, TVA will verify with SCHD the correct design values to use.
2. County emissions determined from EPA's National Emission Inventory, 2020.
3. Calculations taken from "ACT_Monitor Selection_2021-2013AQ.xlsx" (provided electronically).
4. Parameter Occurrence Code.
5. 98th percentile 24-hour value.
6. Annual mean value.
7. In 3rd quarter of 2023, the Shelby Farms T640x monitor failed to capture 75% of all PM data including $PM_{2.5}$ and PM_{10}.

8. Monitoring value provided by MDEQ (correspondence with MDEQ provided electronically).

For the NAAQS analysis, the monitoring design value will be added to the project's highest modeled $PM_{2.5}$ impacts from the cumulative analyses and to representative MERP ratios. The TDEC equation for the comparison to the NAAQS is presented in Equation 3.5. This equation will be applied to estimate the 24-hour $PM_{2.5}$ impacts at each receptor. The EPA equation for comparison to the NAAQS is presented in Equation 3.6. This equation will be applied to estimate the annual $PM_{2.5}$ impacts at each receptor (EPA, 2022).

24-hour $PM_{2.5}$ (TDEC Equation):

$$PM_{2.5}\ HMC + PM_{2.5}\ DV + \left[\left(\frac{NO_X\ EM_S}{NO_X MERP} + \frac{SO_2\ EM_S}{SO_2 MERP}\right) \times PM_{2.5}\ SIL\right] < NAAQS_{PM2.5} \quad [3.5]$$

Where:

- $PM_{2.5}$ HMC: Highest cumulative modeled primary $PM_{2.5}$ concentration from project;
- $PM_{2.5}$ DV: Background monitoring $PM_{2.5}$ design value;
- NO_X EM_S: Project source NOx emission increase (tons/yr);
- NO_X MERP: Modeled emission rate from hypothetical MERP source;
- SO_2 EM_S: Project source SO_2 emission increase (tons/yr);
- SO_2 MERP: SO_2 MERP for selected hypothetical source;
- $PM_{2.5}$ SIL: Significant impact level for $PM_{2.5}$ (1.2 µg/m^3 for 24-hr).

Annual $PM_{2.5}$ (EPA Equation):

$$PM_{2.5}\ HMC + PM_{2.5}DV + \left[\left(NO_X\ EM_S \times \frac{NO_X\ HMC_{MERP}}{NO_X\ EM_{MERP}}\right) + \left(SO_2\ EM_S \times \frac{SO_2\ HMC_{MERP}}{SO_2\ EM_{MERP}}\right)\right] \leq NAAQS_{PM2.5} \quad [3.6]$$

Where:

- $PM_{2.5}$ HMC: Highest cumulative modeled primary $PM_{2.5}$ concentration from project;
- $PM_{2.5}$ DV: Background monitoring $PM_{2.5}$ design value;
- NO_X EM_S: Project source NOx emission rate (tons/yr);
- NO_X HMC_{MERP}: Modeled NOx air quality impact from hypothetical MERP source;
- NO_X EM_{MERP}: Modeled NOx emission rate from hypothetical MERP source;
- SO_2 EM_S: Project source SO_2 emission rate (tons/yr);
- SO_2 HMC_{MERP}: Modeled SO_2 air quality impact from hypothetical MERP source;
- SO_2 EM_{MERP}: Modeled SO_2 emission rate from hypothetical MERP source.

For the PSD increment consumption analysis, the direct and the secondary component of $PM_{2.5}$ increment consumption from the proposed project as well as direct $PM_{2.5}$ emissions and precursor emissions from any nearby $PM_{2.5}$ increment sources will be included. No background monitoring values will be applied (see Equations 3.7-3.8). Section V.3.2 of the 2022 EPA O_3 and $PM_{2.5}$ guidance specifically addresses the key components that will be included in the cumulative $PM_{2.5}$ increment analysis, if necessary (EPA, 2022):

1. Direct and precursor allowable emissions from the proposed new or modifying source (TVA ACT);
2. Direct and precursor actual emissions changes that have occurred at existing sources (including the existing plant) since the minor source baseline date for the proposed source's baseline area;
3. Direct and precursor actual emissions from any major stationary source on which construction commenced after October 20, 2010 (major source baseline date for $PM_{2.5}$);

4. Direct and precursor allowable emissions of permitted sources that are not yet fully operative, if applicable.

24-hour $PM_{2.5}$ (TDEC Equation):

$$PM_{2.5}\ HMC + \left[\left(\frac{NO_x\ EM_S}{NO_x MERP} + \frac{SO_2 EM_S}{SO_2\ MERP}\right) \times PM_{2.5}\ SIL\right] \leq PSD\ Inc_{PM2.5} \quad [3.7]$$

Annual $PM_{2.5}$ (EPA Equation):

$$PM_{2.5}\ HMC + \left[\left(NO_x\ EM_S \times \frac{NO_x\ HMC_{MERP}}{NO_x\ EM_{MERP}}\right) + \left(SO_2\ EM_S \times \frac{SO_2\ HMC_{MERP}}{SO_2\ EM_{MERP}}\right)\right] \leq PSD\ Inc_{PM2.5} \quad [3.8]$$

If the cumulative total 24-hour and annual $PM_{2.5}$ impacts do not exceed the corresponding NAAQS or the PSD Increments, emissions from ACT will not cause or contribute to a violation of the $PM_{2.5}$ standards.

4.3 Class II Cumulative Impact Analysis

If the refined modeling analyses show that maximum predicted impacts for a pollutant exceed a SIL at any receptor, a cumulative modeling analysis will be performed for that pollutant and averaging period (EPA, 2017). Both a NAAQS analysis and a PSD Class II increment consumption analysis (when applicable) will be performed for each pollutant exceeding the SIL.

The SIA will be determined for each pollutant and averaging time subject to the full impact analysis in accordance with Chapter C of the EPA New Source Review Workshop Manual (EPA, 1990). The SIA is defined as a circular geographical region with the radius extending from the proposed plant to the furthest point of significant impact or a radius of 50 kilometers, whichever is less.

The cumulative impact analysis will involve modeling the proposed ACT total emissions, any ACT and ACC existing sources, along with emissions from other nearby sources. Representative ambient monitored background concentrations will also be included in order to estimate the cumulative impact levels for comparison to the NAAQS.

If a violation of any NAAQS or increment is predicted at one or more receptors in the impact area, TVA will determine whether the net emissions increase from the proposed source will result in a significant ambient impact at the point (receptor) of each predicted violation and at the time the violation is predicted to occur. If the proposed project impact is not significant at any violating receptor at the time of the predicted violation, it will not be considered to cause or contribute to the violation (EPA, 1990). In the specific case of $PM_{2.5}$, the Tier I MERPs assessment will be used to calculate ACT's secondary $PM_{2.5}$ concentrations, which will then be added to the modeled primary component at each impacted receptor to determine if ACT is significant at any violating receptor. This approach is considered a conservative estimate of combined impacts since peak impacts associated with a source's direct $PM_{2.5}$ and precursor emissions are not likely well-correlated in time or space (EPA, 2022).

4.3.1 Nearby Sources

A comprehensive emissions inventory of all nearby point sources will be requested from SCHD. If the SIA extends into the neighboring states of Mississippi and Arkansas, nearby sources will also be requested from the Mississippi (MS) Department of Environmental Quality (MDEQ) and

the Arkansas (AR) Department of Environmental Quality (ADEQ). This inventory will be used to determine which nearby sources will be included in the cumulative impact modeling. All nearby sources of the pollutant within the SIA will be included in the modeling regardless of the level of emissions. For nearby sources up to 50 km outside the SIA, a Q/D (emission rate/distance) screening assessment will be used to determine the additional sources to be modeled. Application of the Q/D assessment involves determining the total annual emission rate (Q) of all sources at a nearby plant and dividing its distance (D) from ACT. If the ratio is greater than or equal to 20, the nearby source should be included. Clusters of sources will also be evaluated for inclusion in the modeling if they have a combined Q/D greater than or equal to 20. Sources with a Q/D less than 20 and sources beyond 50 km will be indirectly accounted for in the background monitored concentration. No building downwash will be performed for these sources.

The existing ACT and ACC sources will be included in any necessary cumulative analysis. TVA will work with SCHD to formulate the appropriate emissions profile.

If a PSD increment consumption analysis is required, TVA will request from SCHD all increment-affecting sources. For any sources that extend into MS and/or AR, they will be requested by MDEC and /or ADEQ, respectively, and they will be modeled along with ACT for the specific pollutant and averaging time. The construction date of the nearby sources that met the criteria for inclusion in the NAAQS analysis will be reviewed, and all sources which were constructed after the major source baseline date will be included in the PSD increment consumption analysis.

4.3.2 Background Air Quality

Ambient monitored background concentrations are included in a cumulative impact analysis to capture the impact of natural sources, mobiles sources, other unidentifiable sources in the vicinity of ACT, as well as more distant sources not included in the modeling. However, background concentrations should not include the ambient impacts of the project source under consideration. Air quality monitoring data should be of sufficient completeness and follow appropriate data validation procedures (EPA, 2017).

The background O_3 and $PM_{2.5}$ monitors have already been determined and are discussed in Section 4.2.6. Nearby NO_2 and PM_{10} monitors were also assessed as project emissions are estimated to be above their respective SERs.

4.3.2.1 NO_2 Monitor Selection

NO_2 monitors in the vicinity of ACT were assessed to determine the most representative monitor for background concentrations if a NO_2 cumulative analysis is required. There are three (3) monitors within 250 km that meet the data completeness requirements for the most recent years of data (Table 14 and Figure 9). The Crittenden County monitor in Marion, AR, and Near Road monitor in Memphis, TN, are both very close to the ACT site Due to its proximity to the proposed site and large measurement scale, the Crittenden County monitor will be used to represent background NO_2 concentrations in the vicinity of ACT.

The NO_2 background concentrations used in the modeling will be based on the last three years (2021-2023) of available monitoring data. For 1-hr NO_2, the average of the 98th percentile 1-hour NO_2 concentration will be used (EPA, 2011). For annual NO_2, the annual mean concentration will be used.

Table 14. Select NO_2 Monitors within 250 km of ACT [1,2,3]

Site ID	Site Name	Dist. (km)	Measure. Scale (km)	County NO_2 Emissions (tons/year)	2021-2023 1-hr NO_2 ($\mu g/m^3$) [4]	2021-2023 Annual NO_2 ($\mu g/m^3$) [5]
05-035-0005	Crittenden Co., Marion, AR	14.6	4km-50km	2,655	70	11.8
47-157-0100	Near Road Site, Memphis, TN	26.9	4km-50km	14,743	69	16.7
05-119-0007	North Little Rock, AR	198.6	500m-4km	8,059	57	10.9

Notes:

1. Monitor data from EPA Air Quality System (AQS): https://www.epa.gov/outdoor-air-quality-data. Note: Air quality data in the table may not reflect final values; once modeling commences, TVA will verify with SCHD the correct design values to use.
2. County emissions determined from EPA's National Emission Inventory, 2020.
3. Calculations taken from "ACT_Monitor Selection_2021-2023AQ.xlsx" (provided electronically).
4. 98th percentile 1-hour value.
5. Annual mean value.

4.3.2.2 PM_{10} Monitor Selection

Nearby PM_{10} monitors were assessed to determine the most representative monitor for background concentrations if a cumulative analysis is required. There are very few monitors within 250 km that meet the data completeness requirements for the most recent years of data (Table 15). In 3rd quarter 2023, the Shelby Farms NCore monitor failed to capture 75% of all PM data including $PM_{2.5}$ and PM_{10}. Therefore, the Alabama Avenue monitor was selected as it is the closest to ACT, shares the same county emissions, and meets the data completeness requirements to represent air quality in the vicinity of ACT.

The PM_{10} background concentrations used in the modeling will be based on the last three years (2021-2023) of available monitoring data at the monitor. For 24-hour PM_{10}, the highest second-high average concentrations will be used.

Table 15. Select PM_{10} Monitors within 250 km of ACT [1,2,3]

Site Name	Site ID	POC	Dist. (km)	Measure. Scale (km)	County PM_{10} Emissions (tons/year)	2021-2023 24-hour PM_{10} ($\mu g/m^3$)
416 Alabama Avenue, Memphis, TN	47-157-0024	2	12.9	100m-500m	9,907	74
Shelby Farms Ncore Site, Memphis, TN	47-157-0075	3	28.3	4km-50km	9,907	64[4]

Notes:

1. Monitor data from EPA Air Quality System (AQS): https://www.epa.gov/outdoor-air-quality-data. Air quality data in the table may not reflect final values; once modeling commences, TVA will verify with SCHD the correct design values to use.
2. County emissions determined from EPA's National Emission Inventory, 2020.
3. Calculations taken from "ACT_Monitor Selection_2021-2023AQ.xlsx" (provided electronically)

4. In 3rd quarter of 2023, the Shelby Farms T640x monitor failed to capture 75% of all PM data including $PM_{2.5}$ and PM_{10}.

4.4 Class I Area Impact Analysis

4.4.1 Class I SIL Modeling

The PSD program provides extra protection for pristine areas of the United States, such as national parks, forests, and wildlife refuges. These areas (Class I areas) have lower ambient air quality thresholds with respect to significance levels and allowable increments.

Additional AERMOD modeling will be performed to assess potential impacts on the Class I SILs for the NAAQS and PSD increments. Since AERMOD is EPA's preferred model for assessing impacts at distances up to 50 km, and the nearest Class I area is located over 200 km away, a 360-degree receptor ring will be placed at 50 km from ACT. If the concentrations at these receptors fall below the Class I SILs, the concentrations at the Class I areas would likewise be below the SILs.

For assessing total $PM_{2.5}$ impacts, the sum of direct project-related $PM_{2.5}$ impacts (from AERMOD at 50km) and secondary $PM_{2.5}$ impacts (from project-related SO_2 and NOx emissions) will be used for comparison to the Class I $PM_{2.5}$ SILs (Equations 3.9-3.10).

24-hour $PM_{2.5}$ (TDEC Equation):

$$[PM_{2.5}\ HMC] + \left[\left(\frac{NO_X\ EM_S}{NO_X MERP} + \frac{SO_2 EM_S}{SO_2 MERP}\right) \times PM_{2.5}\ SIL\right] = \text{Total } PM_{2.5}\ (\mu g/m^3) \qquad [3.9]$$

Where:

- $PM_{2.5}$ HMC: Highest modeled primary $PM_{2.5}$ concentration from project;
- $PM_{2.5}$ SIL: Significant impact level for $PM_{2.5}$ (1.2 [NAAQS] / 0.27 [Inc.] µg/m^3 for 24-hr);
- NO_X EM_S: Project source NOx emission rate (tons/yr);
- NO_X MERP: NO_X MERP for selected hypothetical source.
- SO_2 EM_S: Project source SO_2 emission rate (tons/yr);
- SO_2 MERP: SO_2 MERP for selected hypothetical source.

Annual $PM_{2.5}$ (EPA Equation):

$$[PM_{2.5}\ HMC] + \left[\left(NO_X\ EM_S \times \frac{NO_X\ HMC_{MERP}}{NO_X\ EM_{MERP}}\right) + \left(SO_2\ EM_S \times \frac{SO_2\ HMC_{MERP}}{SO_2\ EM_{MERP}}\right)\right] = \text{Total } PM_{2.5}\ (\mu g/m^3) \qquad [3.10]$$

Where:

- $PM_{2.5}$ HMC: Highest cumulative modeled primary $PM_{2.5}$ concentration from project;
- $PM_{2.5}$ DV: Background monitoring $PM_{2.5}$ design value;
- NO_X EM_S: Project source NOx emission rate (tons/yr);
- NO_X HMC_{MERP}: Modeled NOx air quality impact from hypothetical MERP source;
- NO_X EM_{MERP}: Modeled NOx emission rate from hypothetical MERP source;
- SO_2 EM_S: Project source SO_2 emission rate (tons/yr);
- SO_2 HMC_{MERP}: Modeled SO_2 air quality impact from hypothetical MERP source;
- SO_2 EM_{MERP}: Modeled SO_2 emission rate from hypothetical MERP source.

4.4.2 Class I AQRV Impact Analysis

Under the Clean Air Act, Federal Land Managers (FLMs) have the responsibility to protect Air Quality Related Values (AQRVs) in Class I areas and to consider whether a proposed major emitting facility will have an adverse impact on these values. Class I AQRVs include visibility impairment, ozone effects on vegetation, and effects of pollutant deposition on soils and surface waters. All PSD projects for facilities that propose to locate within 300 kilometers of a Class I area must determine whether emissions will cause an "adverse impact" on the Class I area, including AQRVs and visibility (EPA, 1990; FLAG, 2010).

There are two Class I areas within 300 km of ACT: the Mingo Wildlife Refuge (Mingo) located 208 km away, and the Sipsey Wilderness Area (Sipsey) located 254 km away (Figure 10).

The FLMs have developed an Initial Screening Criteria, Q/D, to determine if sources greater than 50 kilometers from a Class I area need to perform any further Class I AQRV impact analyses. The Q/D criteria is calculated by summing the annual SO2, NOX, PM10, and H2SO4 emissions (in tons per year, based on 24-hour maximum allowable emissions and adjusted to reflect 8,760 operating hours per year) and dividing by the distance (in km) to the nearest Class I area. If the Q/D value is less than or equal to 10, the source is considered to have no adverse impact on AQRVs in the Class I area and no further AQRV analysis is required.

Initial screening criteria were calculated for the Class I areas using the ACT plant total emission estimates (Table 16) based on natural gas firing. The results of the analysis showed Q/D ratios less than 10 for both Class I areas indicating that no adverse impacts on AQRVs are expected.

Table 16. Class I Initial Screening Criteria

Emissions (tons/year)	Class I Areas within 300 km	
	Mingo	Sipsey
SO_2	6.0	6.0
NO_X	281	281
PM_{10}	102	102
H_2SO_4	0.0	0.0
Total Emissions	389	389
Distance (km)	208	254
Q/D	**1.87**	**1.53**

Notes:
1. Distance was calculated from ACT site center to the nearest boundary of each Class I Area.

4.5 Additional Impact Analysis

The PSD regulations require an additional impacts analysis for each pollutant emitted by a source, including the analysis of the effects of emissions on soils, vegetation and visibility caused by any increase in emissions from the source and from associated growth. The depth of the analysis performed generally depends on existing air quality, the quantity of air emissions, and the sensitivity of local soils and vegetation. The additional analysis will follow EPA's guidance provided in the New Source Review Workshop Manual (EPA, 1990).

The proposed project may generate a few new jobs at ACT; however, this project is not expected to result in any commercial, residential, or industrial growth in the area. No significant air quality degradation due to associated growth will be expected. Construction activities will also be planned so that no adverse air quality or visibility impacts occur.

The potential for soil and vegetation impacts from increased emissions from ACT will be evaluated on recreationally and commercially valuable vegetation located in the area. The criteria for evaluating impacts on soils and vegetation will be taken from the EPA's, "A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals" (EPA, 1980). Estimated ambient impacts from ACT will be compared to minimum impact levels for effects on sensitive vegetation as suggested by the EPA. These screening values represent the minimum concentrations at which adverse growth effects or tissue injury in exposed vegetation are reported. Likewise, the potential for soil impacts will also be assessed. State-of-the-art construction equipment and emission controls will be used to keep potential air pollutant impacts less than ambient air quality standards, which are protective of secondary effects on soils and vegetation. Therefore, no adverse impacts to soils or vegetation within in the site vicinity are anticipated.

To assess near-field visual impacts from ACT at Class II sensitive areas, the methodology and assumptions outlined in the FLAG report and the EPA's Workbook for Plume Visual Screening and Analysis will be reviewed (FLAG, 2010; EPA, 1992). As directed by SCHD, the nearest sensitive areas within 20 km of ACT will be evaluated for VISCREEN modeling. The sensitive areas will include regional and international airports as well as state and national parks (Figure 11 and Table 17).

Table 17. Class II Sensitive Areas Within 20 km of ACT

Class II Sensitive Area	Distance from ACT (km)
T.O. Fuller State Park	1.9
Isle-a-port Airport (AP)	2.8
West Memphis Municipal AP	9.5
Memphis Intl. AP	14.3
General Dewitt Spain AP	15.1
Old Forest State Natural Area	16.1

5.0 MODELING RESULTS AND DOCUMENTATION

A summary of modeling results will be presented to SCHD in support of the proposed ACT project. Summary tables of estimated ambient impacts will be included in the PSD permit application. The modeling application will be provided both in hard copy and electronically. All model input and output files (model control files, meteorology, emissions, and receptor files) will also be provided.

6.0 REFERENCES

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Figure 1. Site Locality Map

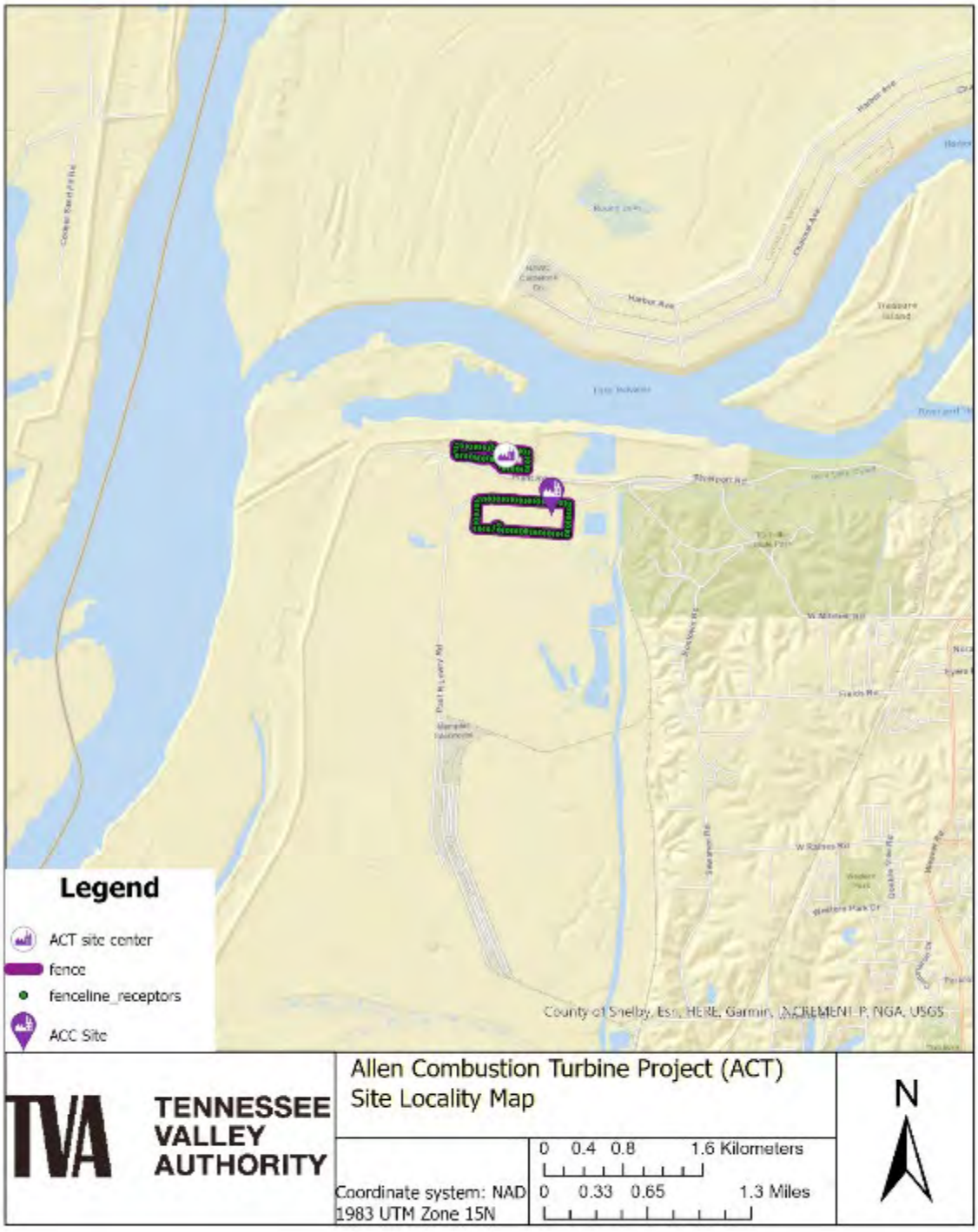


Figure 2. Topographical Map



Figure 3. ACT General Arrangement

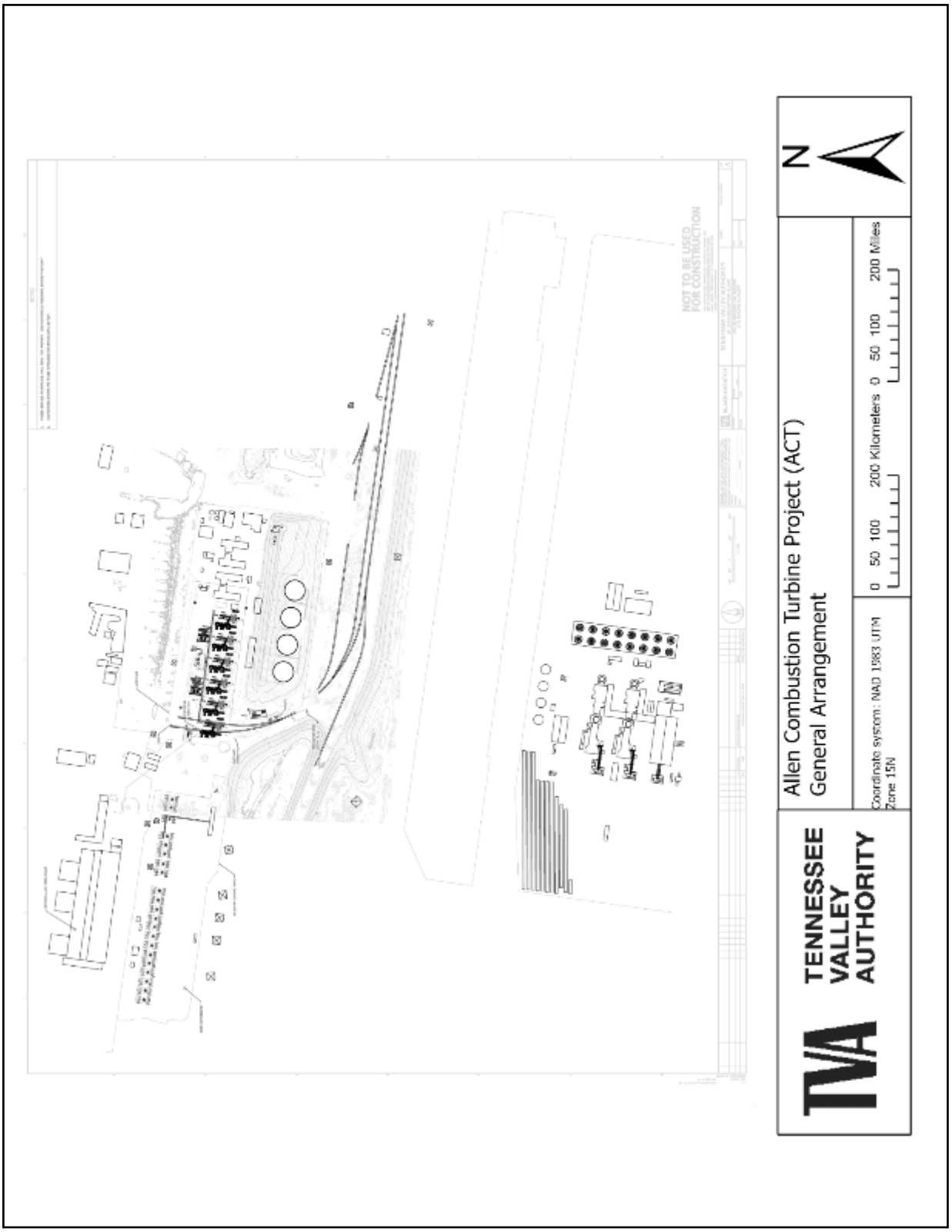


Figure 4. Auer Land Use Analysis - ACT Study Area

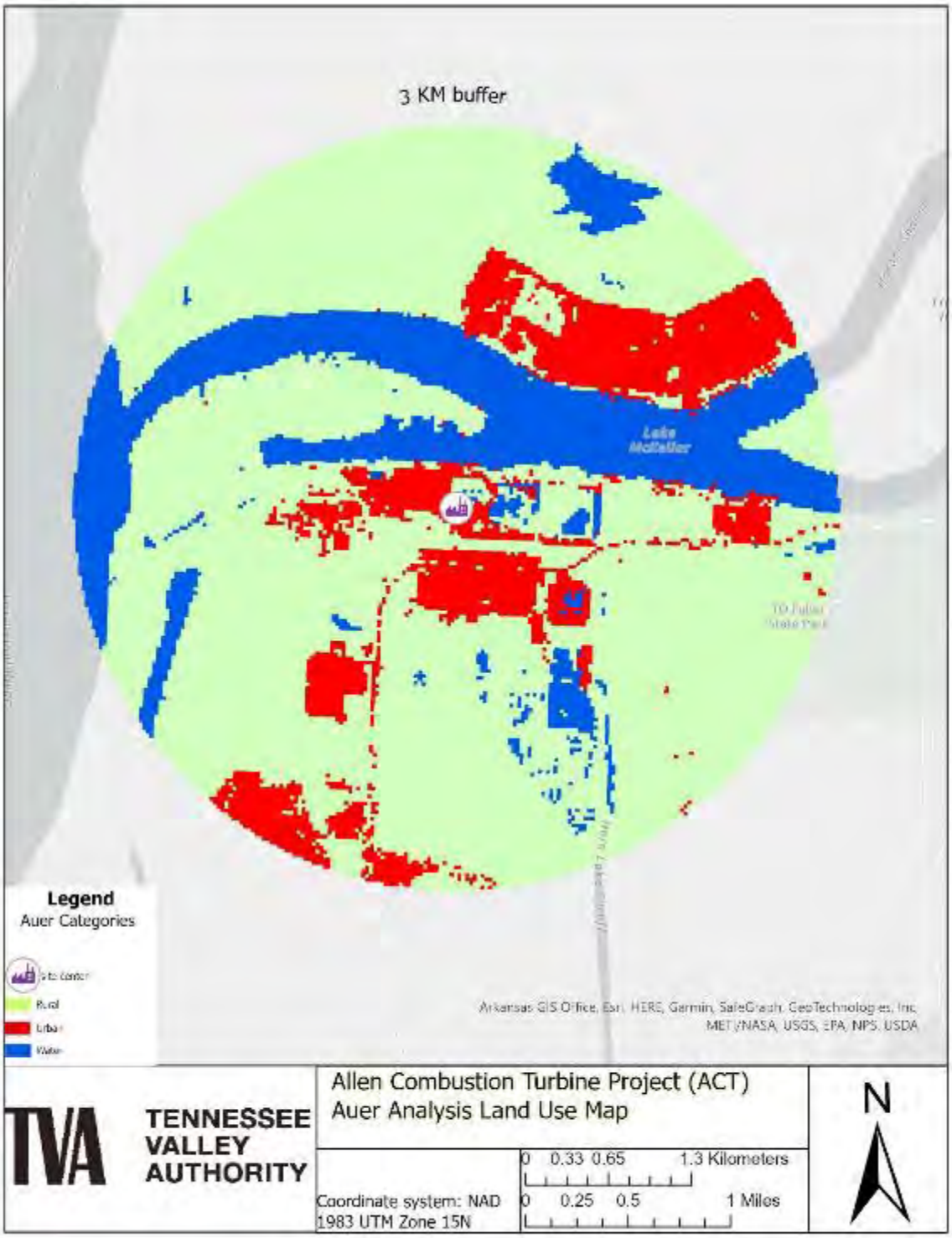


Figure 5. Building Locations for Stack Downwash Analysis

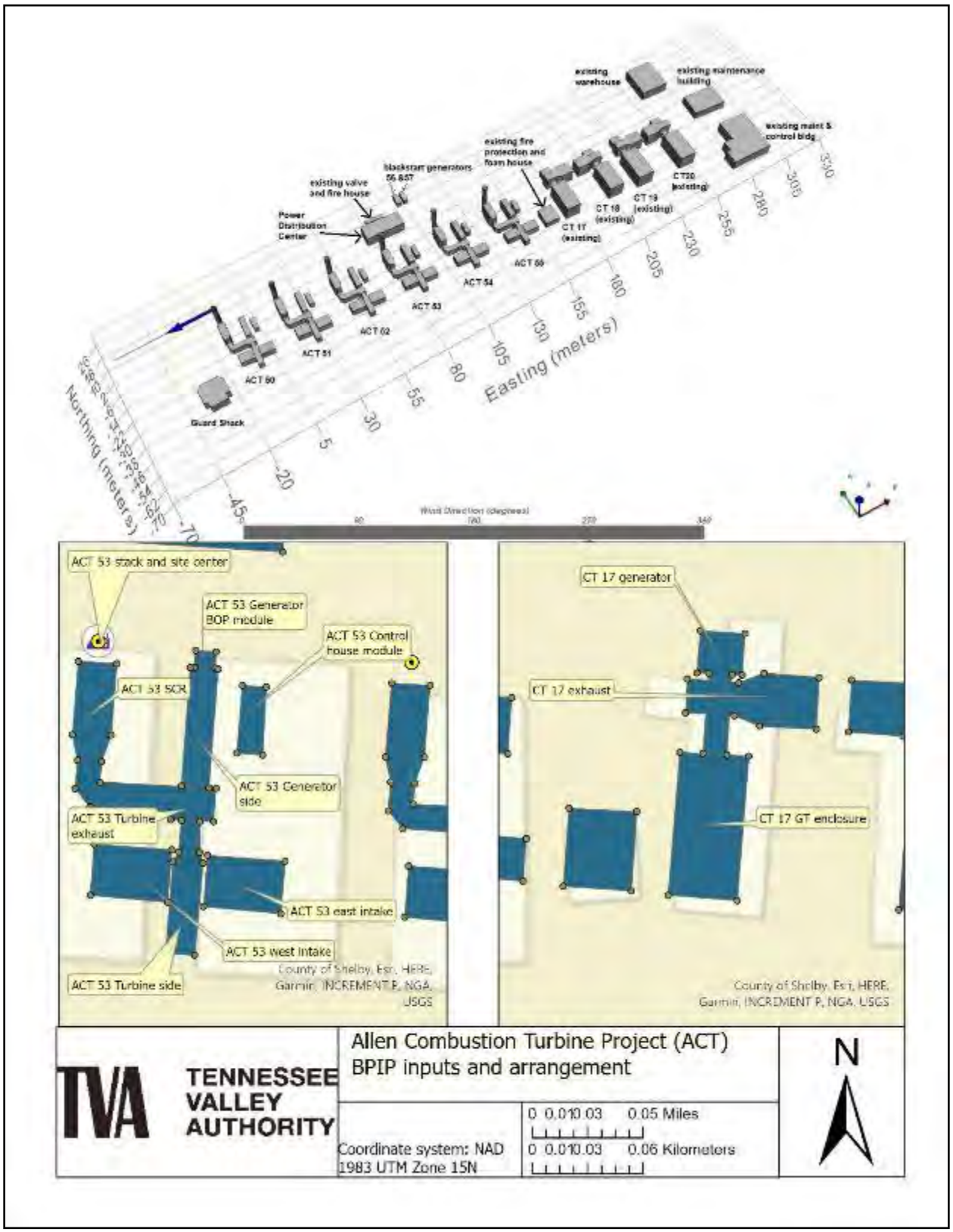


Figure 6. ACT Fence Line Receptors



Figure 7. ACT Receptor Elevation Plot for Class II SIL Modeling

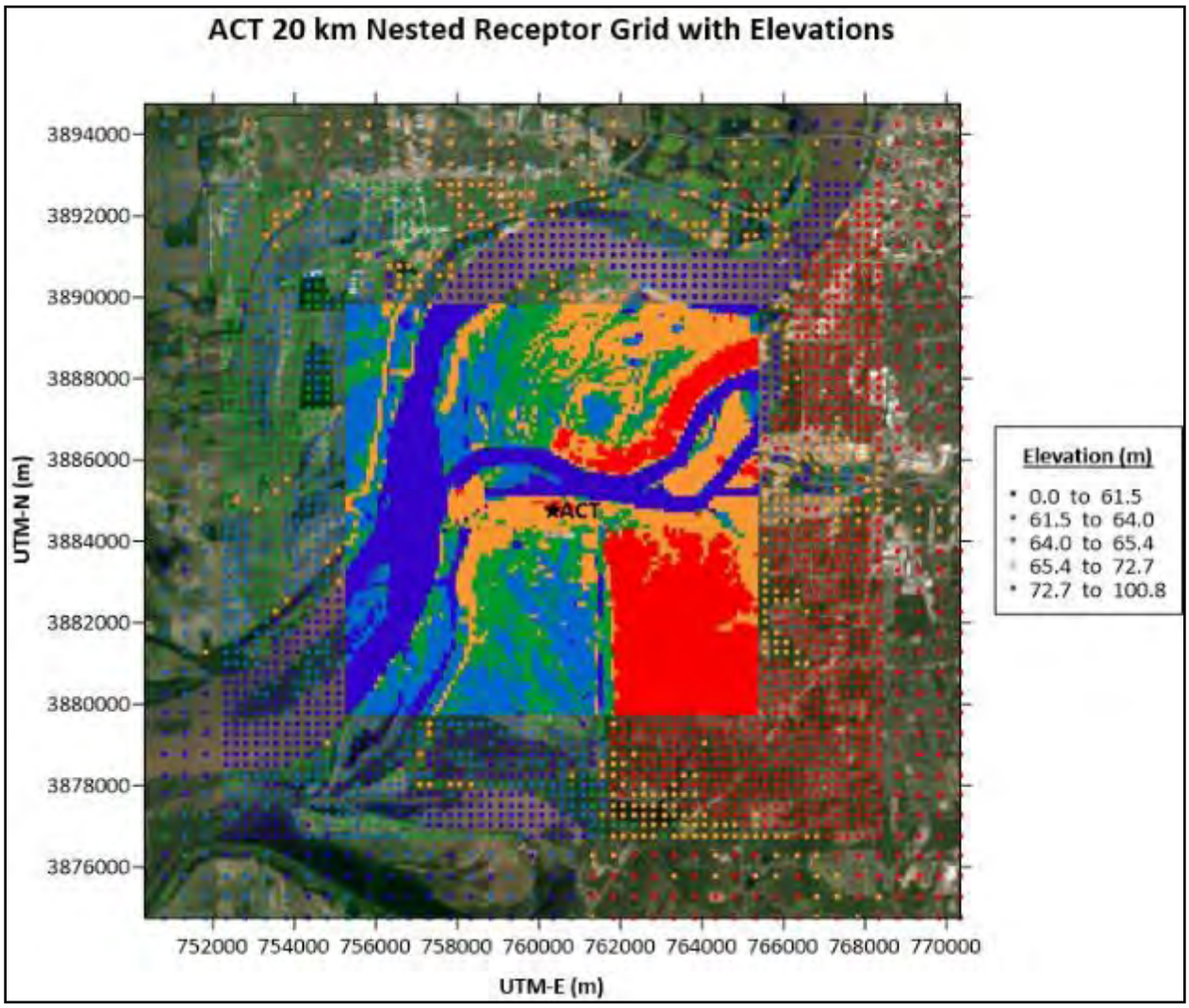


Figure 8. Map of the Nearby Surface and Upper Air Meteorological Stations

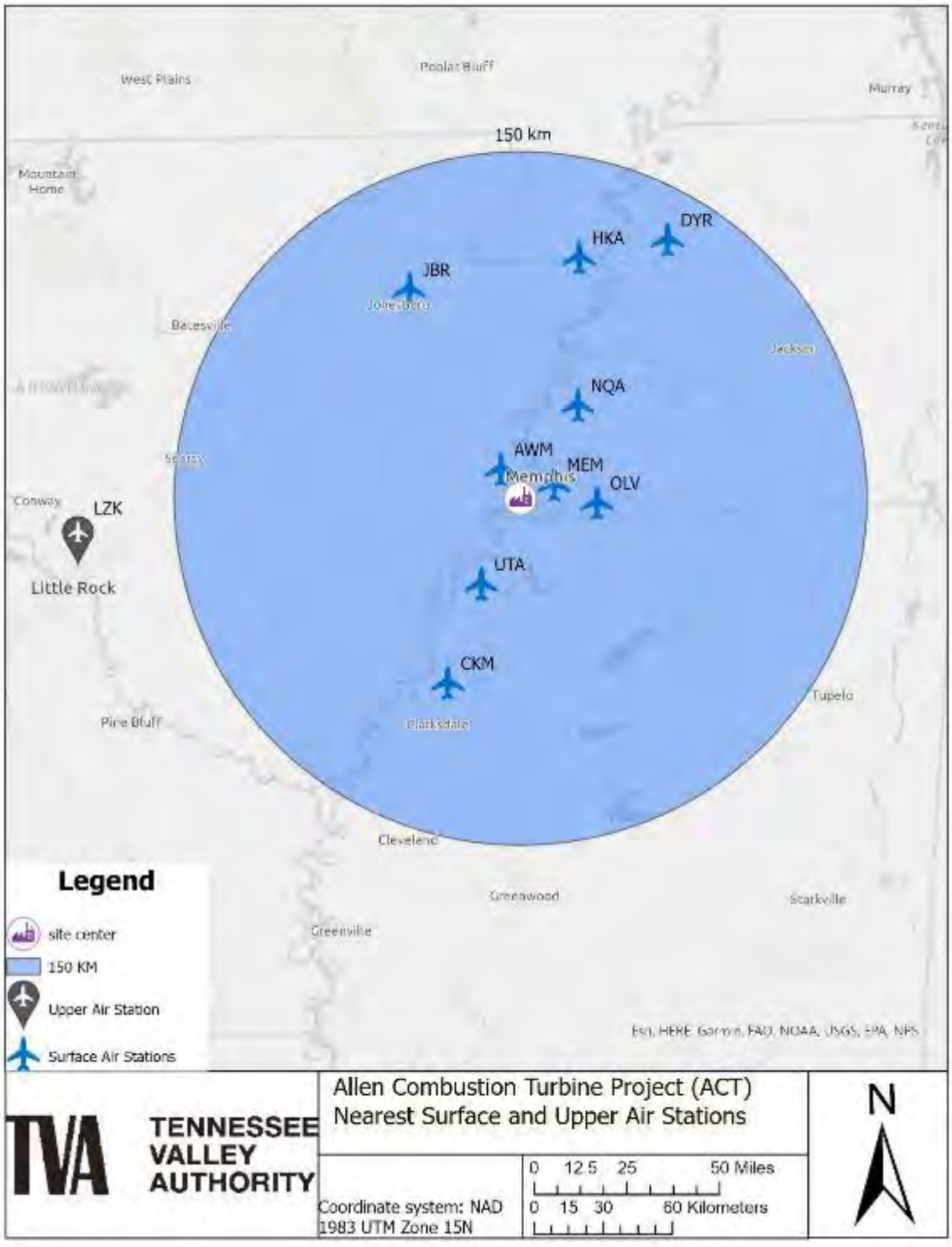


Figure 9. Ambient O_3, $PM_{2.5}$, NO_2, and PM_{10} Monitors Near ACT

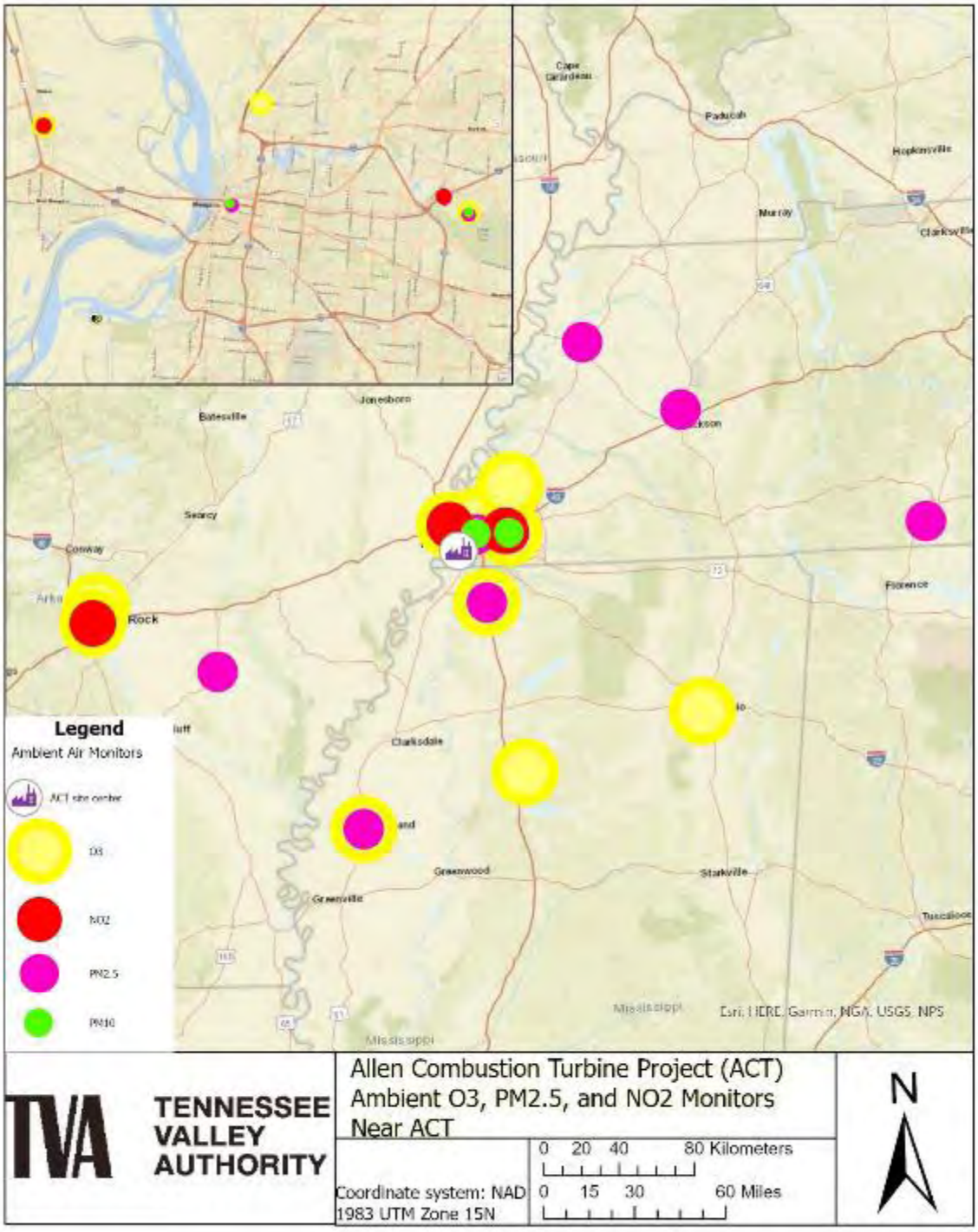


Figure 10. Class I Areas Within 300 km of ACT

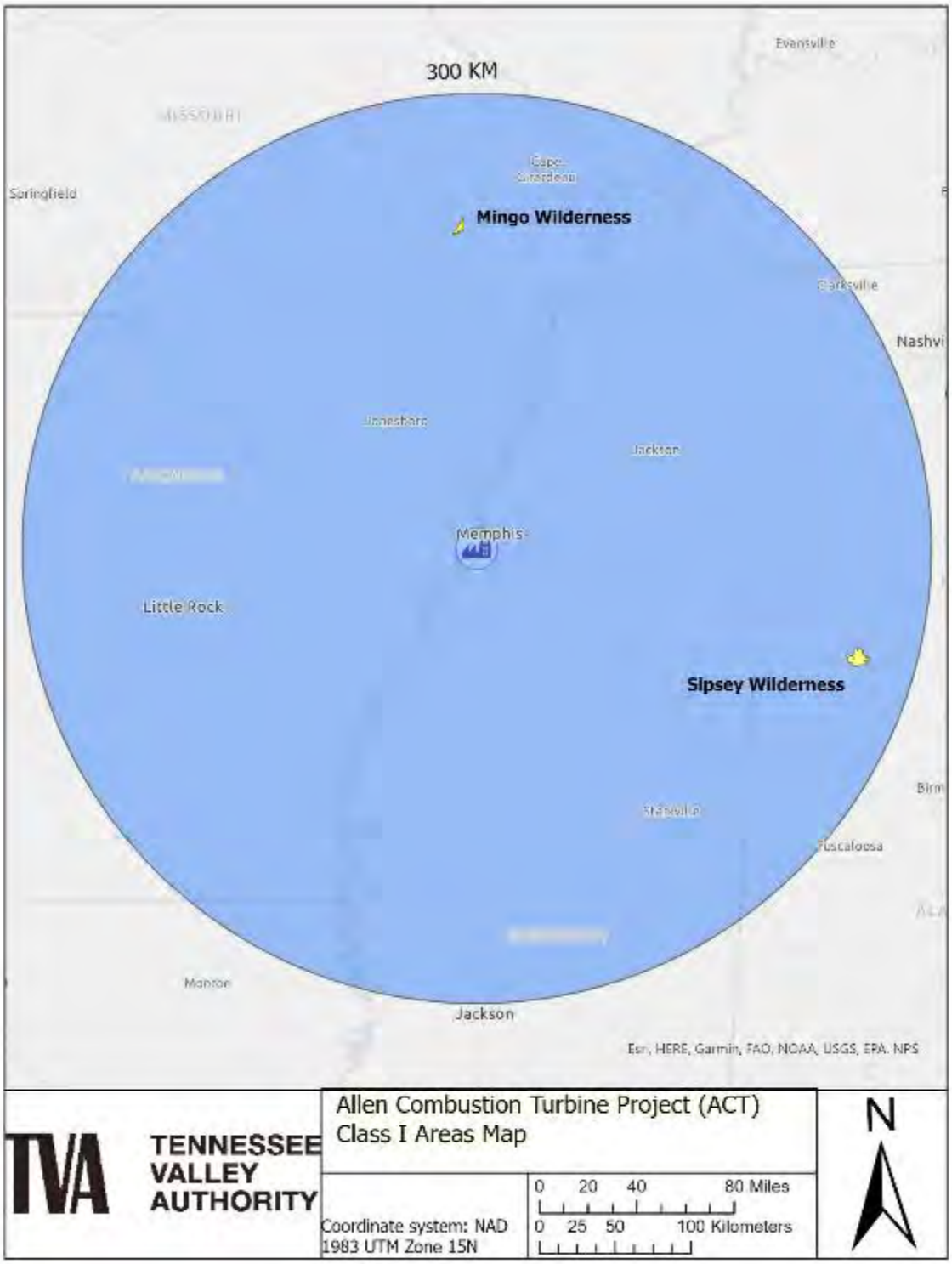
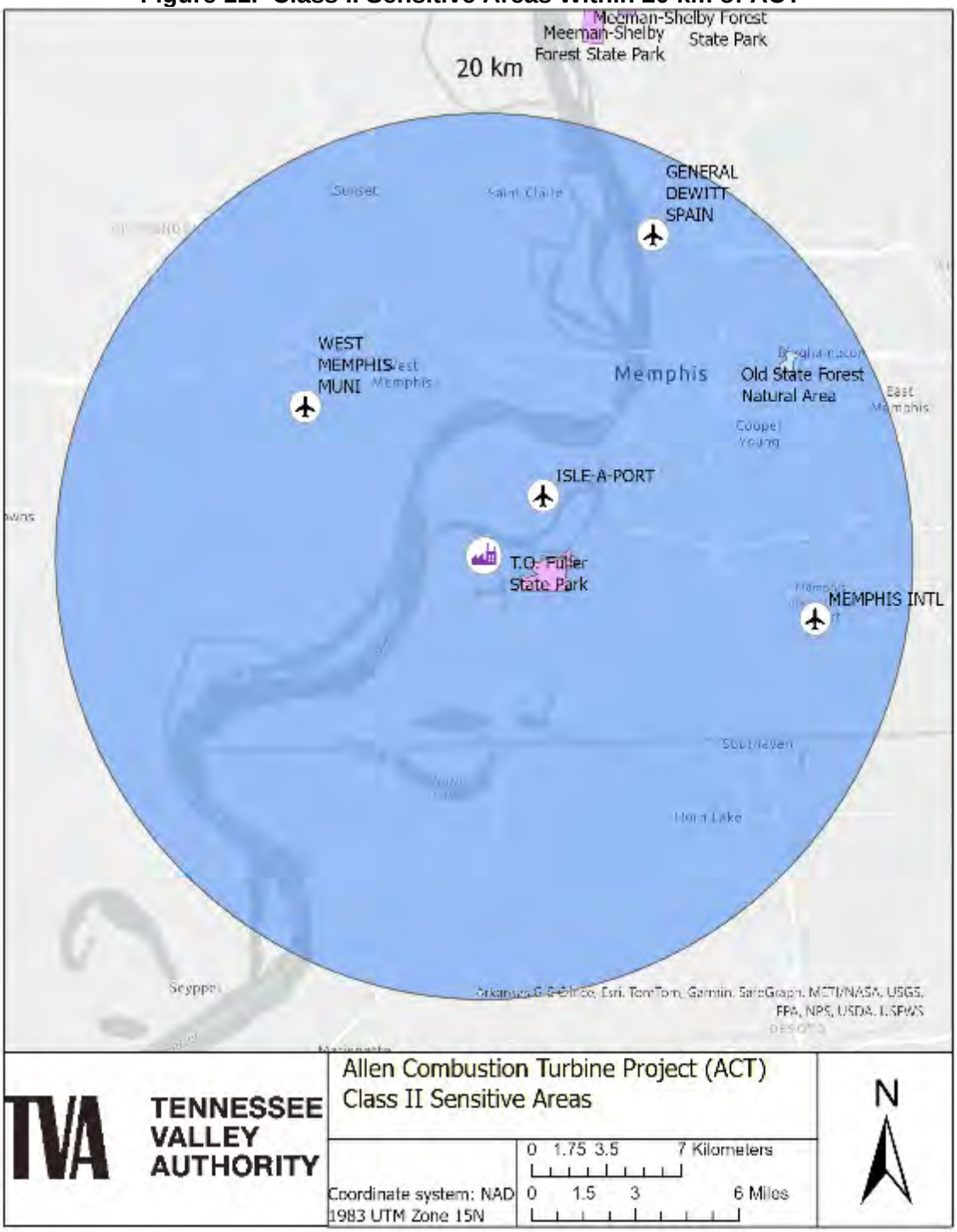
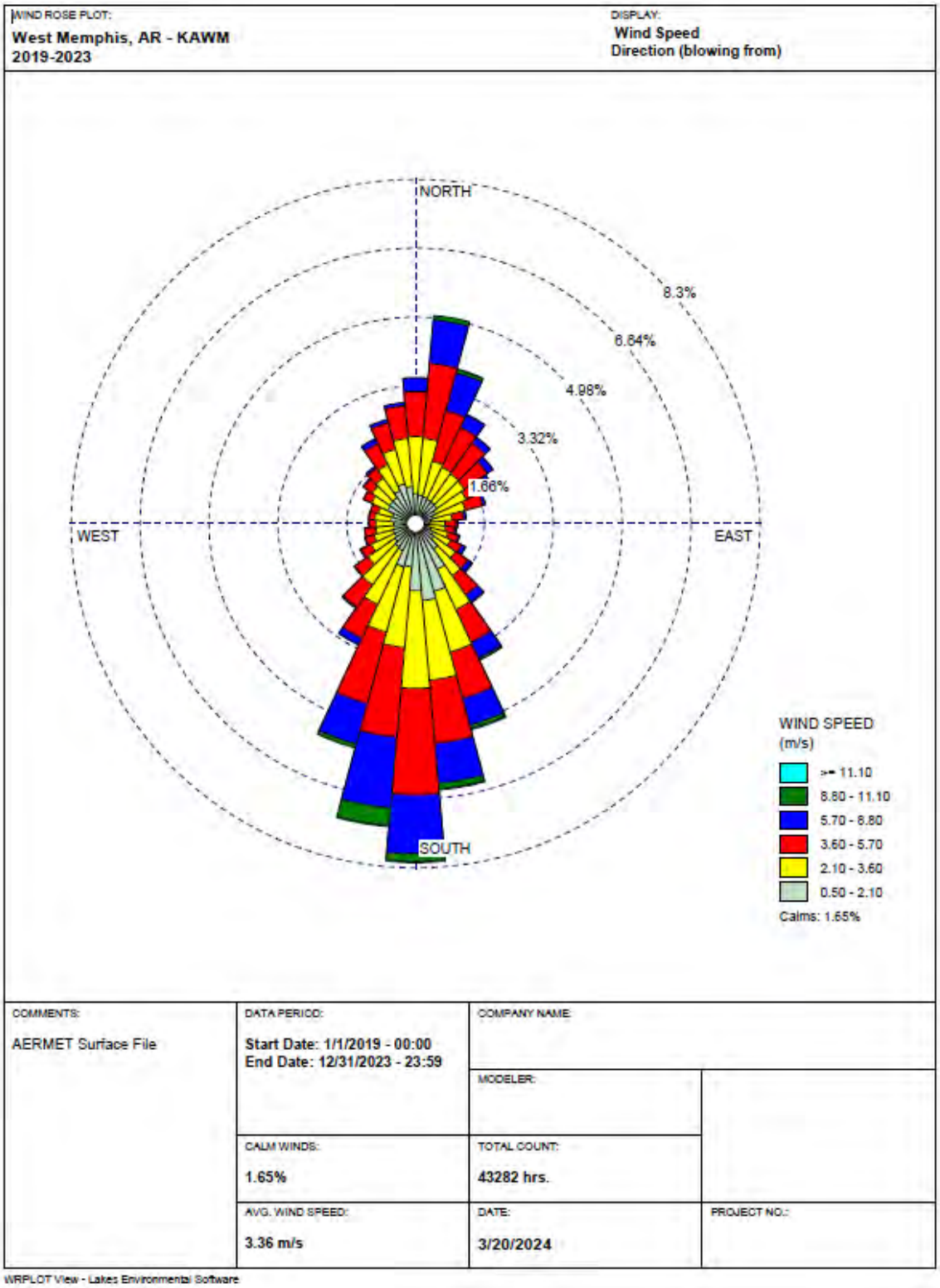


Figure 11. Class II Sensitive Areas Within 20 km of ACT

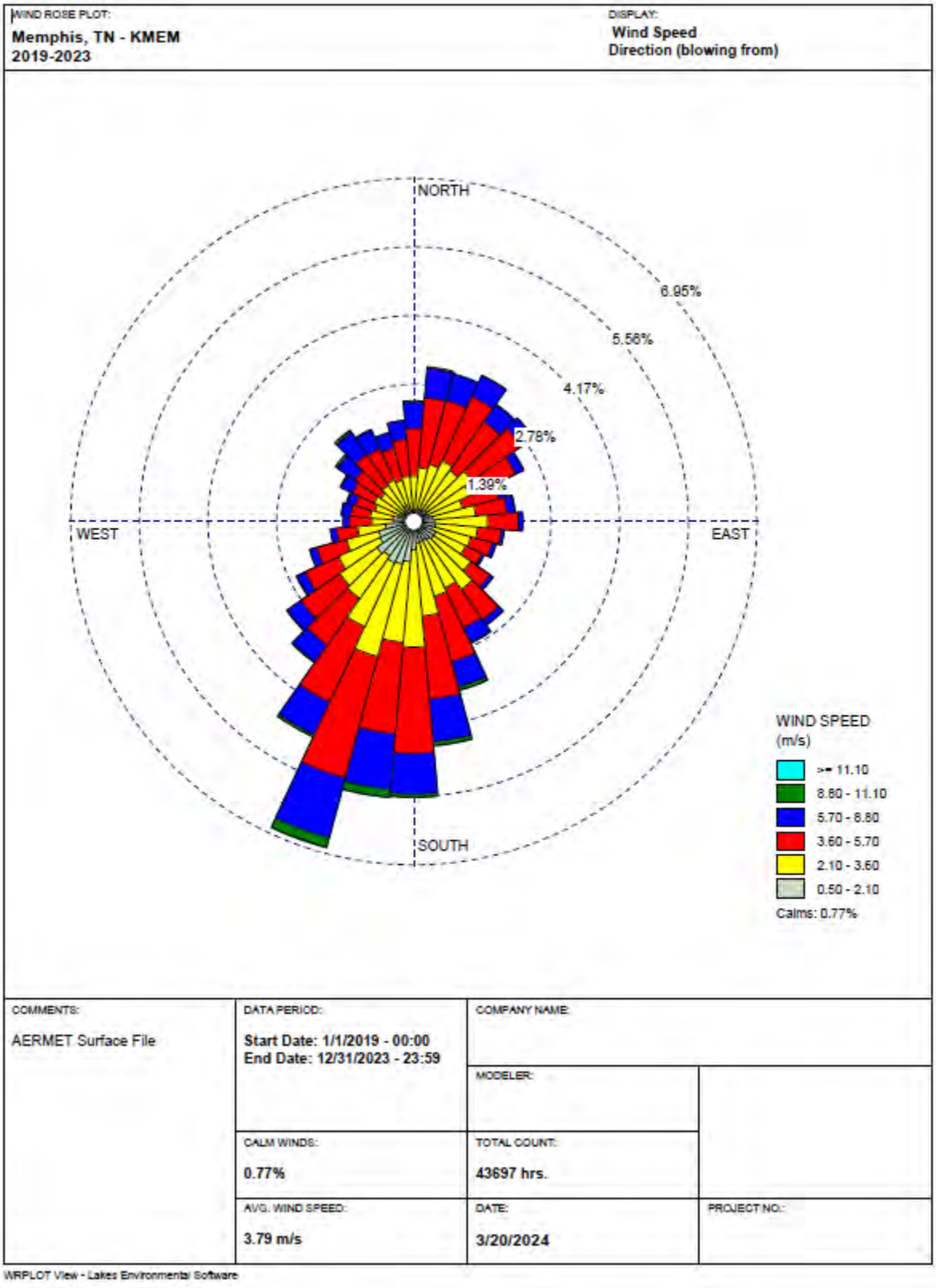


Appendix A. Wind Roses for Meteorological Sites Considered

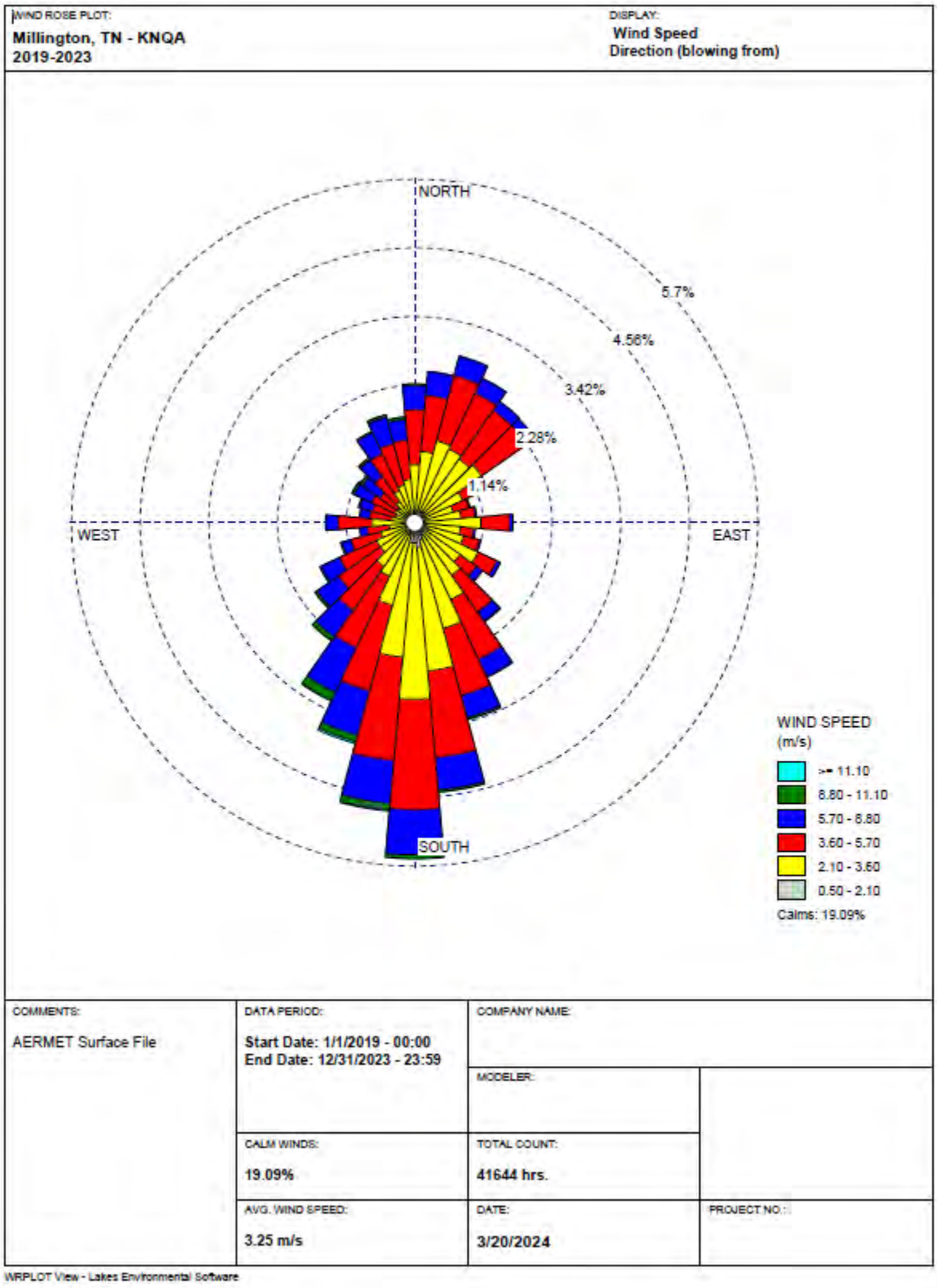
West Memphis AP (AWM)



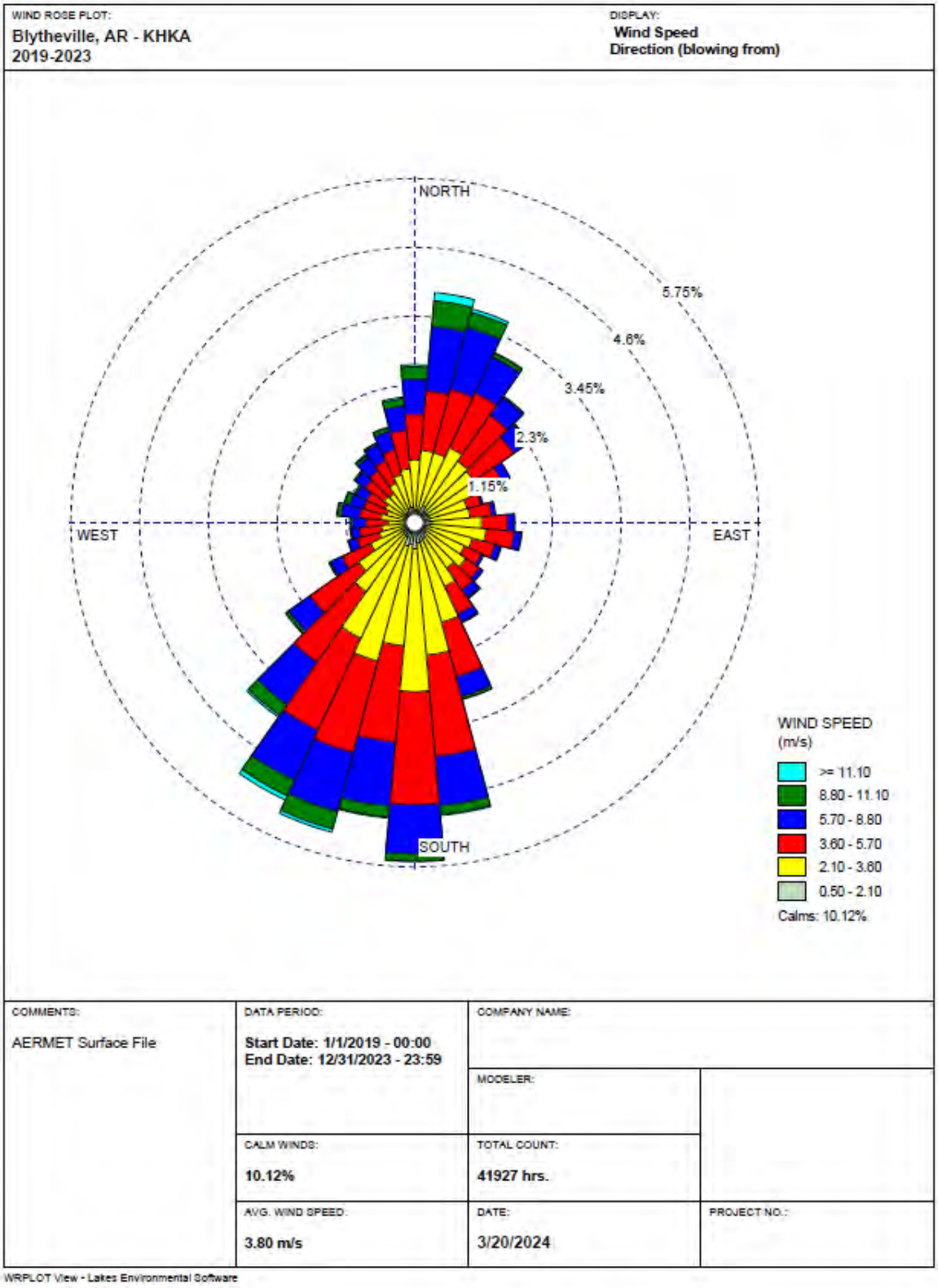
Memphis AP (MEM)



Millington Regional AP (NQA)



Blytheville Municipal AP (HKA)



From:	Khokhar, Wasim
To:	Walker, Eric
Cc:	Myers-Cook, Toree R.; Myers, Tyson B; Fortunato, Gregg; Landry, Mark; Li, Jianing; Goldstein, Michael
Subject:	FW: EPA Region 4 Comments on the TVA Allen Combustion Turbine Project PSD Modeling Protocol: June 2024
Date:	Thursday, July 25, 2024 1:23:21 PM
Attachments:	image001.png

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

Good afternoon, Eric,

I hope you are doing well. I am forwarding the clarification email (below) from the EPA R4 regarding the protocol. All stakeholders have provided input, and we are ready to move forward. Please take a moment to review the email and ensure that all necessary details are clear. Feel free to reach out if you have any questions or need further clarification.

Regards,

Wasim Khokhar
Technical Manager – Air Pollution Control
Shelby County Health Department
1826 Sycamore View Road
Memphis, TN 38134
Office: (901) 222-9587
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Facebook: www.facebook.com/ShelbyTNHealth
Instagram: www.instagram.com/ShelbyTNHealth

Public Health
Prevent. Promote. Protect.
Shelby County Health Department

From: Howard, Chris <Howard.Chris@epa.gov>
Sent: Thursday, July 25, 2024 12:50 PM
To: Khokhar, Wasim <Wasim.Khokhar@shelbycountytn.gov>
Subject: RE: EPA Region 4 Comments on the TVA Allen Combustion Turbine Project PSD Modeling Protocol: June 2024

[This EMAIL was not sent from a Shelby County Government email address. Please use caution.]

Wasim,

Below, highlighted in yellow, I have provided feedback on each of the modeling issues. In general, each representative background monitor should be chosen following the guidance in Section 8.3.3 of 40 CFR part 51 Appendix W – The Guideline on Air Quality Models. For ozone and PM2.5 background monitors, Section IV.2 of the 2022 EPA Guidance for Ozone and Fine Particle Matter Permit Modeling should be followed. Also, justification for the background monitors chosen be provided in both the modeling protocol and the final application modeling report. EPA Region 4 does recommend including the information regarding the data incompleteness for the Shelby farms PM data in 2023 in both the protocol and the final modeling report for the PSD application.

We hope you find our feedback to be helpful and don't hesitate to let me know if you have any follow-up questions. We are also willing to review any revisions to the modeling protocol.

-Chris

Christopher M. Howard
Regional Meteorologist
US EPA Region 4 - Atlanta
404/562-9036
Howard.chris@epa.gov

From: Khokhar, Wasim <Wasim.Khokhar@shelbycountytn.gov>
Sent: Wednesday, July 24, 2024 1:29 PM
To: Howard, Chris <Howard.Chris@epa.gov>
Subject: RE: EPA Region 4 Comments on the TVA Allen Combustion Turbine Project PSD Modeling Protocol: June 2024

> **Caution:** This email originated from outside EPA, please exercise additional caution when deciding whether to open attachments or click on provided links.

Thank you very much for your response, especially during your time off. I look forward to your input tomorrow.

Wasim

From: Howard, Chris <Howard.Chris@epa.gov>
Sent: Wednesday, July 24, 2024 11:20 AM
To: Khokhar, Wasim <Wasim.Khokhar@shelbycountytn.gov>
Subject: RE: EPA Region 4 Comments on the TVA Allen Combustion Turbine Project PSD Modeling Protocol: June 2024

[This EMAIL was not sent from a Shelby County Government email address. Please use caution.]

Wasim,

Just wanted to let you know that I received your voice mail. I am not working this afternoon, but I plan to review this information in the morning, and I should be able let you know something some time tomorrow.

-Chris

Christopher M. Howard
Regional Meteorologist
US EPA Region 4 - Atlanta
404/562-9036
Howard.chris@epa.gov

From: Khokhar, Wasim <Wasim.Khokhar@shelbycountytn.gov>
Sent: Tuesday, July 23, 2024 1:38 PM
To: Howard, Chris <Howard.Chris@epa.gov>
Subject: RE: EPA Region 4 Comments on the TVA Allen Combustion Turbine Project PSD Modeling Protocol: June 2024

> **Caution:** This email originated from outside EPA, please exercise additional caution when deciding whether to open attachments or click on provided links.

Hi Chris,

I hope you are doing well. I am just circling back to your comments. We had discussions internally and with Haidar Alrawi at TDEC. We want to guide TVA, and here is our interpretation and understanding. Could you please review and let me know if we are on the right path and would that be okay:

"Below are my thoughts and Haidar Al-Rawi's (TDEC) thoughts to Chris Howard's response comments to the TVA PSD Modeling Protocol.

Comment 1 (Section 4.1 – Screening Analysis):

As the black start generators will be intermittent and likely seasonal, I believe they want a brief justification of the exclusion with a summary of when the generators will be started (both seasonally and situationally) as well as a short yet concise explanation of the process. This justification should be part of the PSD modeling protocol.

EPA Region 4 Feedback – In addition, we recommend that the justification for the exclusion of the black start generators from the modeling also include a discussion of all the permit conditions and emissions estimates for the generators. For example, Table 1 indicates that the black start

generators will operate 100 hours per year. Will this be a permit condition? We also recommend that the justification include information on the frequency of testing of the generators, the typical hours per year of testing and whether testing occurs on a routine or nonroutine basis.

Comment 2 (Section 4.2.6):

I believe that the EPA saw a discrepancy between the data in Table 4 (showing PM 2.5 Class I and Class II PSD SILs as 0.13 µg/m³) and Table 10 showing the default MERPs in tons per year. If I am correct, they calculated the default MERPs for TN PSD calculations from Table 10 and it was determined that it was based on the previous NAAQS and SIL of 0.2 µg/m³ instead of 0.13 µg/m³. I believe that they want it to be calculated with 0.13 µg/m³. This calculation and/or data may have occurred prior to the NAAQS changes at the end of April. I would suggest following the formula provided by Chris Howard.

Haidar responded with this answer:

"1. Assessment of Ozone and total PM2.5 (section 4.2.6)
The EPA Clarification guidance (4/30/2024) deals only with the revised annual PM2.5 SIL (from 0.20 to 0.13 ug/m3) and neither the 24-hour PM2.5 nor the ozone SIL. So, for this PM2.5 annual averaging period as long as you are using the highest value from a selected representative hypothetical source and not the default MERPS values (Table 10) for the precursor emissions of SO2 and NOx, then you should be OK. Basically, EPA is saying that you cannot use a MERPs value from a selected default values as such values have the old SIL (0.20 ug/m3) accounted for in their impact assessment. So, the recommended EPA MERPS equation for the hypothetical source is to be used and as you recommended."

No additional feedback needed.

Comment 4-Going out of order, because comments 3 and 5 and very similar, so will answer them together (4.2.6.1 Ozone (O3) Assessment):

Although self-explanatory, I'm wondering if EPA R4 wants it to be documented in the PSD protocol that they will be contacted if estimated ozone impacts from the project are near or greater than 1 ppb.

EPA Region 4 Feedback – No, it is not necessary for this to be documented in the protocol.

Comments 3 (Section 4.2.6-) and 5 (4.3.2)

EPA Region 4 wants individual background monitors for each pollutant. As average concentrations from two monitors are not used in Region 4, I believe that it would be in the best interest of time to use single monitors for each pollutant. See Haidar comment below:

1. "Background Monitoring Data for PM2.5 and Ozone (section 4.3.2)
   EPA will not approve on taking the average DV values from these monitors. We recommend

taking the highest DV from the selected monitors as a worst-case assessment. Another approach is for TVA-Allen to selects one representative monitor and provides justifications for their selection over the other monitoring sites. It seems like the Shelby Farms monitoring site can be selected for PM10, PM2.5 and ozone. The monitoring data capture/recoverability factor of at least 90% of the reported hourly met data on an annual basis is recommended."

My recommendations for background monitors are:

Done. Ozone: Either Marion, AR or Shelby Farms. Both show 8-hr Ozone DV of 72 ppb. By comparing to the highest monitors, it shows a conservative, transparent approach.

EPA Region 4 Feedback – EPA Region 4 agrees with either your approach or Haidar's approach outlined above. As stated above, justification for the background monitor selected should be provided in the modeling protocol and the final permit application modeling report.

Done. PM 2.5, PM10-In Q3 2023, the Shelby Farms T640x monitor failed to capture 75% of all PM data including PM2.5 and PM10. I suggest using Hernando, MS over Marion, AR for PM2.5, as Hernando uses a T640 versus a TEOM at Marion. For PM10, the only other alternative in the Memphis metropolitan area is a TEOM at the Alabama Ave. site.

EPA Region 4 Feedback -EPA Region 4 agrees with either your approach or Haidar's approach outlined above. We note that the December 2023 version of the modeling protocol recommended the use of the Shelby Farms PM2.5 data.

N/A as SO2 is below the SER. SO2-Shelby Farms

EPA Region 4 Feedback – EPA Region 4 agrees.

Done. NOx-I recommend using the Marion, AR monitor as the 2023 NO2 design value is 38 ppb versus the Shelby Farms design value of 26 ppb. Both design values are well below the NAAQS.

EPA Region 4 Feedback – EPA Region 4 agrees.

N/A as CO is below SER. CO-Both the Macon Cove/Near Rd and Shelby Farms/NCORE monitors are well below the NAAQs with concentrations very close to one another. Either monitor would suffice, but Macon Cove/Near Rd is slightly higher in 2nd-highest concentrations (in comparison to both the 1-hr and 8-hr NAAQS)."

EPA Region 4 Feedback – EPA Region 4 agrees.

Let me know.

Regards,
Wasim Khokhar
Technical Manager – Air Pollution Control
Shelby County Health Department
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Instagram: www.instagram.com/ShelbyTNHealth



From: Howard, Chris <Howard.Chris@epa.gov>
Sent: Monday, June 24, 2024 9:47 AM
To: Khokhar, Wasim <Wasim.Khokhar@shelbycountytn.gov>; Goldstein, Michael <Michael.Goldstein@shelbycountytn.gov>; Fortunato, Gregg <Gregg.Fortunato@shelbycountytn.gov>; Landry, Mark <Mark.Landry@shelbycountytn.gov>
Cc: Ferrando, Emily (she/her/hers) <Ferrando.Emily@epa.gov>; Michelle Oakes <Michelle.Oakes@tn.gov>; Lusky, Katy <Lusky.Kathleen@epa.gov>; Shepherd, Lorinda (she/her/hers) <Shepherd.Lorinda@epa.gov>; Haidar Alrawi <Haidar.Alrawi@tn.gov>; Gillam, Rick <Gillam.Rick@epa.gov>
Subject: EPA Region 4 Comments on the TVA Allen Combustion Turbine Project PSD Modeling Protocol: June 2024

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Wasim,

It was good speaking with you on the telephone this past Friday, June 21. I hope you had a great weekend! Thank you for giving us the opportunity to provide input on the PSD air quality modeling protocol for the TVA Allen Combustion Turbine project. Our comments regarding the modeling protocol are provided below. We discussed most of these comments during our Friday call, however, more details are provided below.

Section 4.1 – Screening Analysis

- **Comment #1** - This section provides justification for the exclusion of the black start generators from the modeling due to the intermittent nature of expected operation of the units. We recommend that this justification also include a discussion of the permit conditions for the black start generators.

Section 4.2.6 - Assessment of O_3 and Total $PM_{2.5}$

- **Comment #2** - Table 10 of this section of the modeling protocol identifies the default ton per year MERPs that will be used to assess ozone and secondary $PM_{2.5}$ impacts. EPA's recent memo "**Clarification on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program**", dated April 30, 2024, states the following regarding MERPs values that are presented in the form of an emission rate:

  "*Any MERP values presented as an emission rate published in the MERPs Guidance or through online tools should no longer be used for PSD permitting applications since the form of these values explicitly included a significant impact level that is no longer appropriate*."

  Since the SO_2 and NO_x MERPs values listed in Table 10 for annual $PM_{2.5}$ are presented in the form of an emission rate and were based on the previously recommended SIL (.20 µg/m^3), these MERPs values should not be used to compute secondary annual $PM_{2.5}$ impacts as shown in Equation 3.3 of the modeling protocol. Instead, secondary $PM_{2.5}$ impacts may be computed using the following equation:

  Project Air Quality Impact (Secondary $PM_{2.5}$) = Project emission rate × {Modeled air quality impact from hypothetical source ÷ Modeled emission rate from hypothetical source}

  Where:

  Project emission rate = Project precursor-specific emission rate (tpy)

  Modeled air quality impact from hypothetical source = secondary $PM_{2.5}$ impact (µg/m^3) resulting from the modeled precursor emission rate for the hypothetical source

  Modeled emission rate from hypothetical source = Precursor emission rate modeled for the hypothetical source (tpy)

  Based on Table 5 of TDEC's 2019 MERPs Guidance, the worst case MERP for NO_x for annual $PM_{2.5}$ was based on a hypothetical source modeled with an emission rate of 1,000 tpy with an annual secondary $PM_{2.5}$ impact of 0.026229 µg/m^3. Likewise, based on Table 6 of TDEC's 2019 MERPs Guidance, the worst case MERP for SO_2 for annual $PM_{2.5}$ was based on a hypothetical source modeled with an emission rate of 1,000 tpy with an annual secondary $PM_{2.5}$ impact of 0.034382 µg/m^3.

- **Comment #3** – Section 4.2.6 of the modeling protocol proposes to use the average concentrations from three or more monitors to represent background concentrations for $PM_{2.5}$ and ozone. We are not aware of such an approach being used in PSD modeling within EPA Region 4. Therefore, we recommend that a single monitor be chosen to represent background

concentrations based on the guidance in Section 8.3 of 40 CFR part 51 Appendix W – The Guideline on Air Quality Models and Section IV.2 of the 2022 EPA Guidance for Ozone and Fine Particle Matter Permit Modeling.

As we discussed in our conference call on Friday, June 21, if TVA wishes to pursue the proposed approach, we recommend that the modeling protocol be revised to include additional justification for the approach as well as details regarding how the average background concentrations using multiple monitors would be computed. Based on the additional information provided it will likely be necessary for EPA Region 4 to consult with the EPA Office and Air Quality Planning and Standards (OAQPS) regarding the proposed approach.

4.2.6.1 Ozone (O_3) Assessment

- **Comment #4** - If estimated ozone impacts from the project are near or greater than 1 ppb, please contact EPA Region 4 for additional consultation.

Section 4.3.2 – Background Air Quality

- **Comment #5** - This section proposes to use the average concentrations from two monitors to represent background concentrations for NO_2. We are not aware of such an approach being used in PSD modeling within EPA Region 4. Therefore, we recommend that a single monitor be chosen to represent background concentrations based on the guidance in Section 8.3 of 40 CFR part 51 Appendix W – The Guideline on Air Quality Models and the March 2011, EPA memo "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 NAAQS".

  If TVA wishes to pursue the proposed approach, we recommend that the modeling protocol be revised to include additional justification for the approach as well as details regarding how the average background concentrations using multiple monitors would be computed. Based on the additional information provided it will likely be necessary for EPA Region 4 to consult with OAQPS regarding the proposed approach.

Don't hesitate to let me know if you have any questions regarding these comments.

-Chris

Christopher M. Howard
Regional Meteorologist
US EPA Region 4 - Atlanta
404/562-9036
Howard.chris@epa.gov

From: Khokhar, Wasim <Wasim.Khokhar@shelbycountytn.gov>
Sent: Wednesday, June 12, 2024 3:18 PM
To: Howard, Chris <Howard.Chris@epa.gov>; Haidar Alrawi <Haidar.Alrawi@tn.gov>; Goldstein,

Michael <Michael.Goldstein@shelbycountytn.gov>; Fortunato, Gregg <Gregg.Fortunato@shelbycountytn.gov>; Landry, Mark <Mark.Landry@shelbycountytn.gov>; ghazal.majidi-weese@usda.gov; Allen, Tim <tim_allen@fws.gov>; Ming, Jaron E <jaron_ming@fws.gov>; Gillam, Rick <Gillam.Rick@epa.gov>; King, Kirsten L <kirsten_king@nps.gov>; 'Jim_Renfro@nps.gov' <Jim_Renfro@nps.gov>
Cc: Ferrando, Emily (she/her/hers) <Ferrando.Emily@epa.gov>; Michelle Oakes <Michelle.Oakes@tn.gov>
Subject: TVA Allen Combustion Turbine Project PSD Modeling Protocol: June 2024

> **Caution:** This email originated from outside EPA, please exercise additional caution when deciding whether to open attachments or click on provided links.

Good Afternoon,

Please find attached a revised modeling protocol for the proposed TVA Allen Combustion Turbine Project in Memphis, Tennessee. The project description is below, and more details are in the attached PDF file. Feel free to let me know if you have any questions.

Regards,
Wasim Khokhar
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From: Myers-Cook, Toree R. <tmcook@tva.gov>
Sent: Wednesday, June 12, 2024 1:43 PM
To: Khokhar, Wasim <Wasim.Khokhar@shelbycountytn.gov>
Cc: Walker, Eric <elwalker@tva.gov>; Myers, Tyson B <tbmyers@tva.gov>

Subject: TVA Allen Combustion Turbine Project PSD Modeling Protocol: June 2024

[This EMAIL was not sent from a Shelby County Government email address. Please use caution.]

Wasim,

Attached is the TVA Allen Combustion Turbine Project PSD modeling protocol for your review. This protocol reflects TVA's proposal to replace the 16 pre-NSPS, low efficiency GE 5N CT units with six (6) state-of-the-art, natural gas-fired GE LM2500 simple-cycle CT units. The six GE LM2500 units will provide approximately 200 Megawatts (MW) of replacement generation to address non-base load (i.e., peak load) electrical demands and highly unlikely transmission-system emergencies (i.e., black start). The modeling protocol presents the proposed emissions and modeling methodology to satisfy NSR PSD requirements for obtaining a permit to construct.

An electronic version of the modeling protocol and its referenced attachments have been uploaded to Microsoft Teams. A hard copy of the modeling protocol and an optical disk with the attachments have also been sent.

Please feel free to contact us if you have any questions or need additional information.

Thanks,
Toree

Toree R. Myers-Cook
Sr. Specialist, Air Programs Support
Air Permits, Compliance, and Monitoring

TVA logo

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APPENDIX E: BPIPPRM INPUTS

Appendix E
BPIPPRM Inputs

Table E-1. ACT Site Center

OBJECTID	Name	UTM_E_X_15	UTM_N_Y_15
1	site center ACT53	760319.23	3884774.20

Table E-2. Emission Source Information

OBJECTID	Name of Part	UTM_E_X_15	UTM_N_Y_15	Height (m)	Elev (m)
1	ACT 50 stack center	760227.95	3884780.33	21.9	72.5
2	ACT 51 stack center	760258.38	3884778.28	21.9	72.5
3	ACT 52 stack center	760288.80	3884776.24	21.9	72.5
4	ACT 53 stack center	760319.23	3884774.20	21.9	72.5
5	ACT 54 stack center	760349.65	3884772.16	21.9	72.5
6	ACT 55 stack center	760380.07	3884770.12	21.9	72.5
14	Blackstart gen 56 stack	760342.82	3884803.85	3.05	72.5
15	Blackstart gen 57 stack	760346.84	3884803.57	3.05	72.5

Table E-3. ACT CT Structures and Building Dimensions

Object ID	Part	UTM_E_X	UTM_N_Y	height_m	elev_m
1	ACT 50 generator BOP module	760239.40	3884779.53	3.66	72.5
2	ACT 50 generator BOP module	760239.34	3884777.94	3.66	72.5
3	ACT 50 generator BOP module	760237.32	3884778.03	3.66	72.5
4	ACT 50 generator BOP module	760237.43	3884779.64	3.66	72.5
6	ACT 50 generator side	760239.61	3884777.84	6.71	72.5
7	ACT 50 generator side	760238.71	3884766.33	6.71	72.5
8	ACT 50 generator side	760236.02	3884766.50	6.71	72.5
9	ACT 50 generator side	760236.90	3884777.96	6.71	72.5
11	ACT 50 Control house module	760244.21	3884776.18	3.81	72.5
12	ACT 50 Control house module	760243.79	3884769.56	3.81	72.5
13	ACT 50 Control house module	760241.35	3884769.74	3.81	72.5
14	ACT 50 Control house module	760241.74	3884776.33	3.81	72.5
16	ACT 50 Turbine exhaust	760239.39	3884766.29	3.96	72.5
17	ACT 50 Turbine exhaust	760239.16	3884763.06	3.96	72.5
18	ACT 50 Turbine exhaust	760237.88	3884763.12	3.96	72.5
19	ACT 50 Turbine exhaust	760236.08	3884763.20	3.96	72.5
20	ACT 50 Turbine exhaust	760234.98	3884763.25	3.96	72.5
21	ACT 50 Turbine exhaust	760235.04	3884763.94	3.96	72.5
22	ACT 50 Turbine exhaust	760227.13	3884764.49	3.96	72.5
23	ACT 50 Turbine exhaust	760225.71	3884766.23	3.96	72.5

Object ID	Part	UTM_E_X	UTM_N_Y	height_m	elev_m
24	ACT 50 Turbine exhaust	760225.94	3884769.03	3.96	72.5
25	ACT 50 Turbine exhaust	760228.30	3884768.88	3.96	72.5
26	ACT 50 Turbine exhaust	760228.15	3884766.87	3.96	72.5
28	ACT 50 Turbine side	760238.17	3884759.07	3.96	72.5
29	ACT 50 Turbine side	760237.30	3884750.11	3.96	72.5
30	ACT 50 Turbine side	760234.46	3884750.35	3.96	72.5
31	ACT 50 Turbine side	760234.86	3884754.94	3.96	72.5
32	ACT 50 Turbine side	760235.21	3884759.20	3.96	72.5
33	ACT 50 Turbine side	760235.78	3884760.16	3.96	72.5
34	ACT 50 Turbine side	760236.08	3884763.20	3.96	72.5
35	ACT 50 Turbine side	760237.88	3884763.12	3.96	72.5
36	ACT 50 Turbine side	760237.84	3884760.08	3.96	72.5
38	ACT 50 SCR	760229.22	3884771.44	9.14	72.5
39	ACT 50 SCR	760228.30	3884768.88	9.14	72.5
40	ACT 50 SCR	760225.94	3884769.03	9.14	72.5
41	ACT 50 SCR	760225.45	3884771.47	9.14	72.5
42	ACT 50 SCR	760226.03	3884778.60	9.14	72.5
43	ACT 50 SCR	760229.77	3884778.37	9.14	72.5
45	ACT 51 generator BOP module	760269.88	3884776.93	3.66	72.5
46	ACT 51 generator BOP module	760269.82	3884775.34	3.66	72.5
47	ACT 51 generator BOP module	760267.80	3884775.43	3.66	72.5
48	ACT 51 generator BOP module	760267.91	3884777.05	3.66	72.5
50	ACT 51 generator side	760270.09	3884775.25	6.71	72.5
51	ACT 51 generator side	760269.19	3884763.74	6.71	72.5
52	ACT 51 generator side	760266.50	3884763.91	6.71	72.5
53	ACT 51 generator side	760267.38	3884775.37	6.71	72.5
55	ACT 51 Control house module	760274.57	3884773.87	3.81	72.5
56	ACT 51 Control house module	760274.16	3884767.19	3.81	72.5
57	ACT 51 Control house module	760271.70	3884767.38	3.81	72.5
58	ACT 51 Control house module	760272.07	3884773.99	3.81	72.5
60	ACT 51 Turbine exhaust	760269.87	3884763.69	3.96	72.5
61	ACT 51 Turbine exhaust	760269.64	3884760.46	3.96	72.5
62	ACT 51 Turbine exhaust	760265.46	3884760.65	3.96	72.5
63	ACT 51 Turbine exhaust	760265.52	3884761.34	3.96	72.5
64	ACT 51 Turbine exhaust	760257.61	3884761.90	3.96	72.5
65	ACT 51 Turbine exhaust	760256.19	3884763.64	3.96	72.5
66	ACT 51 Turbine exhaust	760256.42	3884766.43	3.96	72.5
67	ACT 51 Turbine exhaust	760258.78	3884766.28	3.96	72.5
68	ACT 51 Turbine exhaust	760258.63	3884764.28	3.96	72.5
70	ACT 51 SCR	760259.70	3884768.84	9.14	72.5

Object ID	Part	UTM_E_X	UTM_N_Y	height_m	elev_m
71	ACT 51 SCR	760258.78	3884766.28	9.14	72.5
72	ACT 51 SCR	760256.42	3884766.43	9.14	72.5
73	ACT 51 SCR	760255.93	3884768.88	9.14	72.5
74	ACT 51 SCR	760256.51	3884776.01	9.14	72.5
75	ACT 51 SCR	760260.25	3884775.78	9.14	72.5
77	ACT 52 generator BOP module	760300.27	3884775.33	3.66	72.5
78	ACT 52 generator BOP module	760300.20	3884773.74	3.66	72.5
79	ACT 52 generator BOP module	760298.19	3884773.83	3.66	72.5
80	ACT 52 generator BOP module	760298.29	3884775.44	3.66	72.5
82	ACT 52 generator side	760300.47	3884773.64	6.71	72.5
83	ACT 52 generator side	760299.58	3884762.14	6.71	72.5
84	ACT 52 generator side	760296.88	3884762.30	6.71	72.5
85	ACT 52 generator side	760297.77	3884773.77	6.71	72.5
87	ACT 52 Control house module	760305.30	3884771.85	3.81	72.5
88	ACT 52 Control house module	760304.88	3884765.25	3.81	72.5
89	ACT 52 Control house module	760302.37	3884765.43	3.81	72.5
90	ACT 52 Control house module	760302.80	3884772.00	3.81	72.5
92	ACT 52 Turbine exhaust	760300.25	3884762.09	3.96	72.5
93	ACT 52 Turbine exhaust	760300.03	3884758.86	3.96	72.5
94	ACT 52 Turbine exhaust	760295.85	3884759.05	3.96	72.5
95	ACT 52 Turbine exhaust	760295.91	3884759.74	3.96	72.5
96	ACT 52 Turbine exhaust	760287.99	3884760.29	3.96	72.5
97	ACT 52 Turbine exhaust	760286.58	3884762.03	3.96	72.5
98	ACT 52 Turbine exhaust	760286.80	3884764.83	3.96	72.5
99	ACT 52 Turbine exhaust	760289.16	3884764.68	3.96	72.5
100	ACT 52 Turbine exhaust	760289.01	3884762.67	3.96	72.5
102	ACT 52 SCR	760290.09	3884767.24	9.14	72.5
103	ACT 52 SCR	760289.16	3884764.68	9.14	72.5
104	ACT 52 SCR	760286.80	3884764.83	9.14	72.5
105	ACT 52 SCR	760286.32	3884767.27	9.14	72.5
106	ACT 52 SCR	760286.90	3884774.41	9.14	72.5
107	ACT 52 SCR	760290.63	3884774.18	9.14	72.5
109	ACT 53 generator BOP module	760330.66	3884773.20	3.66	72.5
110	ACT 53 generator BOP module	760330.60	3884771.62	3.66	72.5
111	ACT 53 generator BOP module	760328.58	3884771.70	3.66	72.5
112	ACT 53 generator BOP module	760328.68	3884773.32	3.66	72.5
114	ACT 53 generator side	760330.86	3884771.52	6.71	72.5
115	ACT 53 generator side	760329.97	3884760.01	6.71	72.5
116	ACT 53 generator side	760327.27	3884760.18	6.71	72.5
117	ACT 53 generator side	760328.16	3884771.64	6.71	72.5

Object ID	Part	UTM_E_X	UTM_N_Y	height_m	elev_m
119	ACT 53 Control house module	760335.55	3884769.78	3.81	72.5
120	ACT 53 Control house module	760335.17	3884763.18	3.81	72.5
121	ACT 53 Control house module	760332.69	3884763.35	3.81	72.5
122	ACT 53 Control house module	760333.20	3884769.92	3.81	72.5
124	ACT 53 Turbine exhaust	760330.65	3884759.96	3.96	72.5
125	ACT 53 Turbine exhaust	760330.42	3884756.73	3.96	72.5
126	ACT 53 Turbine exhaust	760326.24	3884756.92	3.96	72.5
127	ACT 53 Turbine exhaust	760326.30	3884757.61	3.96	72.5
128	ACT 53 Turbine exhaust	760318.38	3884758.17	3.96	72.5
129	ACT 53 Turbine exhaust	760316.97	3884759.91	3.96	72.5
130	ACT 53 Turbine exhaust	760317.19	3884762.70	3.96	72.5
131	ACT 53 Turbine exhaust	760319.55	3884762.55	3.96	72.5
132	ACT 53 Turbine exhaust	760319.40	3884760.55	3.96	72.5
134	ACT 53 SCR	760320.48	3884765.11	9.14	72.5
135	ACT 53 SCR	760319.55	3884762.55	9.14	72.5
136	ACT 53 SCR	760317.19	3884762.70	9.14	72.5
137	ACT 53 SCR	760316.71	3884765.15	9.14	72.5
138	ACT 53 SCR	760317.29	3884772.28	9.14	72.5
139	ACT 53 SCR	760321.02	3884772.05	9.14	72.5
141	ACT 54 generator BOP module	760361.06	3884771.08	3.66	72.5
142	ACT 54 generator BOP module	760361.00	3884769.49	3.66	72.5
143	ACT 54 generator BOP module	760358.98	3884769.58	3.66	72.5
144	ACT 54 generator BOP module	760359.09	3884771.20	3.66	72.5
146	ACT 54 generator side	760361.27	3884769.40	6.71	72.5
147	ACT 54 generator side	760360.37	3884757.89	6.71	72.5
148	ACT 54 generator side	760357.68	3884758.06	6.71	72.5
149	ACT 54 generator side	760358.56	3884769.52	6.71	72.5
151	ACT 54 Control house module	760366.03	3884767.56	3.81	72.5
152	ACT 54 Control house module	760365.49	3884761.05	3.81	72.5
153	ACT 54 Control house module	760363.01	3884761.20	3.81	72.5
154	ACT 54 Control house module	760363.68	3884767.71	3.81	72.5
156	ACT 54 Turbine exhaust	760361.05	3884757.84	3.96	72.5
157	ACT 54 Turbine exhaust	760360.82	3884754.61	3.96	72.5
158	ACT 54 Turbine exhaust	760356.64	3884754.80	3.96	72.5
159	ACT 54 Turbine exhaust	760356.70	3884755.49	3.96	72.5
160	ACT 54 Turbine exhaust	760348.79	3884756.05	3.96	72.5
161	ACT 54 Turbine exhaust	760347.37	3884757.79	3.96	72.5
162	ACT 54 Turbine exhaust	760347.60	3884760.58	3.96	72.5
163	ACT 54 Turbine exhaust	760349.96	3884760.43	3.96	72.5
164	ACT 54 Turbine exhaust	760349.81	3884758.43	3.96	72.5

Object ID	Part	UTM_E_X	UTM_N_Y	height_m	elev_m
166	ACT 54 SCR	760350.88	3884762.99	9.14	72.5
167	ACT 54 SCR	760349.96	3884760.43	9.14	72.5
168	ACT 54 SCR	760347.60	3884760.58	9.14	72.5
169	ACT 54 SCR	760347.11	3884763.03	9.14	72.5
170	ACT 54 SCR	760347.69	3884770.16	9.14	72.5
171	ACT 54 SCR	760351.43	3884769.93	9.14	72.5
173	ACT 55 generator BOP module	760391.34	3884768.81	3.66	72.5
174	ACT 55 generator BOP module	760391.28	3884767.22	3.66	72.5
175	ACT 55 generator BOP module	760389.26	3884767.31	3.66	72.5
176	ACT 55 generator BOP module	760389.37	3884768.92	3.66	72.5
178	ACT 55 generator side	760391.55	3884767.12	6.71	72.5
179	ACT 55 generator side	760390.66	3884755.61	6.71	72.5
180	ACT 55 generator side	760387.96	3884755.78	6.71	72.5
181	ACT 55 generator side	760388.84	3884767.24	6.71	72.5
183	ACT 55 Control house module	760396.49	3884765.61	3.81	72.5
184	ACT 55 Control house module	760396.02	3884758.92	3.81	72.5
185	ACT 55 Control house module	760393.45	3884759.04	3.81	72.5
186	ACT 55 Control house module	760394.14	3884765.75	3.81	72.5
188	ACT 55 Turbine exhaust	760391.33	3884755.57	3.96	72.5
189	ACT 55 Turbine exhaust	760391.10	3884752.34	3.96	72.5
190	ACT 55 Turbine exhaust	760386.93	3884752.53	3.96	72.5
191	ACT 55 Turbine exhaust	760386.99	3884753.22	3.96	72.5
192	ACT 55 Turbine exhaust	760379.07	3884753.77	3.96	72.5
193	ACT 55 Turbine exhaust	760377.65	3884755.51	3.96	72.5
194	ACT 55 Turbine exhaust	760377.88	3884758.31	3.96	72.5
195	ACT 55 Turbine exhaust	760380.24	3884758.16	3.96	72.5
196	ACT 55 Turbine exhaust	760380.09	3884756.15	3.96	72.5
198	ACT 55 SCR	760381.17	3884760.72	9.14	72.5
199	ACT 55 SCR	760380.24	3884758.16	9.14	72.5
200	ACT 55 SCR	760377.88	3884758.31	9.14	72.5
201	ACT 55 SCR	760377.39	3884760.75	9.14	72.5
202	ACT 55 SCR	760377.97	3884767.89	9.14	72.5
203	ACT 55 SCR	760381.71	3884767.66	9.14	72.5
205	CT 17 GT enclosure	760424.80	3884758.62	9.14	72.5
206	CT 17 GT enclosure	760423.44	3884741.42	9.14	72.5
207	CT 17 GT enclosure	760415.18	3884742.06	9.14	72.5
208	CT 17 GT enclosure	760416.57	3884759.08	9.14	72.5
210	CT 17 generator	760424.33	3884773.22	4.26	72.5
211	CT 17 generator	760424.02	3884768.29	4.26	72.5
212	CT 17 generator	760422.79	3884768.34	4.26	72.5

Object ID	Part	UTM_E_X	UTM_N_Y	height_m	elev_m
213	CT 17 generator	760422.18	3884758.77	4.26	72.5
214	CT 17 generator	760419.33	3884758.93	4.26	72.5
215	CT 17 generator	760420.01	3884768.50	4.26	72.5
216	CT 17 generator	760418.61	3884768.56	4.26	72.5
217	CT 17 generator	760419.02	3884773.58	4.26	72.5
219	CT 17 exhaust	760426.63	3884768.52	8.00	72.5
220	CT 17 exhaust	760433.23	3884768.00	8.00	72.5
221	CT 17 exhaust	760432.85	3884761.84	8.00	72.5
222	CT 17 exhaust	760426.11	3884762.19	8.00	72.5
223	CT 17 exhaust	760423.09	3884763.46	8.00	72.5
224	CT 17 exhaust	760417.24	3884763.82	8.00	72.5
225	CT 17 exhaust	760417.48	3884767.83	8.00	72.5
226	CT 17 exhaust	760423.59	3884767.39	8.00	72.5
228	ACT 51 Turbine side	760268.90	3884756.44	3.96	72.5
229	ACT 51 Turbine side	760268.09	3884747.50	3.96	72.5
230	ACT 51 Turbine side	760265.25	3884747.72	3.96	72.5
231	ACT 51 Turbine side	760265.98	3884756.56	3.96	72.5
232	ACT 51 Turbine side	760266.53	3884757.53	3.96	72.5
233	ACT 51 Turbine side	760266.79	3884760.55	3.96	72.5
234	ACT 51 Turbine side	760268.59	3884760.47	3.96	72.5
235	ACT 51 Turbine side	760268.57	3884757.45	3.96	72.5
237	ACT 52 Turbine side	760299.22	3884754.83	3.96	72.5
238	ACT 52 Turbine side	760298.41	3884745.89	3.96	72.5
239	ACT 52 Turbine side	760295.57	3884746.11	3.96	72.5
240	ACT 52 Turbine side	760296.30	3884754.95	3.96	72.5
241	ACT 52 Turbine side	760296.85	3884755.91	3.96	72.5
242	ACT 52 Turbine side	760297.11	3884758.94	3.96	72.5
243	ACT 52 Turbine side	760298.91	3884758.86	3.96	72.5
244	ACT 52 Turbine side	760298.89	3884755.84	3.96	72.5
246	ACT 53 Turbine side	760329.40	3884752.71	3.96	72.5
247	ACT 53 Turbine side	760328.59	3884743.77	3.96	72.5
248	ACT 53 Turbine side	760325.75	3884743.99	3.96	72.5
249	ACT 53 Turbine side	760326.48	3884752.83	3.96	72.5
250	ACT 53 Turbine side	760327.03	3884753.80	3.96	72.5
251	ACT 53 Turbine side	760327.29	3884756.82	3.96	72.5
252	ACT 53 Turbine side	760329.09	3884756.74	3.96	72.5
253	ACT 53 Turbine side	760329.06	3884753.72	3.96	72.5
255	ACT 54 Turbine side	760360.01	3884750.56	3.96	72.5
256	ACT 54 Turbine side	760359.21	3884741.62	3.96	72.5
257	ACT 54 Turbine side	760356.37	3884741.84	3.96	72.5

Object ID	Part	UTM_E_X	UTM_N_Y	height_m	elev_m
258	ACT 54 Turbine side	760357.09	3884750.68	3.96	72.5
259	ACT 54 Turbine side	760357.65	3884751.64	3.96	72.5
260	ACT 54 Turbine side	760357.91	3884754.67	3.96	72.5
261	ACT 54 Turbine side	760359.70	3884754.59	3.96	72.5
262	ACT 54 Turbine side	760359.68	3884751.57	3.96	72.5
264	ACT 55 Turbine side	760390.23	3884748.32	3.96	72.5
265	ACT 55 Turbine side	760389.42	3884739.38	3.96	72.5
266	ACT 55 Turbine side	760386.58	3884739.60	3.96	72.5
267	ACT 55 Turbine side	760387.31	3884748.44	3.96	72.5
268	ACT 55 Turbine side	760387.86	3884749.40	3.96	72.5
269	ACT 55 Turbine side	760388.13	3884752.43	3.96	72.5
270	ACT 55 Turbine side	760389.92	3884752.35	3.96	72.5
271	ACT 55 Turbine side	760389.90	3884749.33	3.96	72.5
273	CT 18 GT enclosure	760452.40	3884756.87	9.14	72.5
274	CT 18 GT enclosure	760451.21	3884739.83	9.14	72.5
275	CT 18 GT enclosure	760442.72	3884740.33	9.14	72.5
276	CT 18 GT enclosure	760444.10	3884757.27	9.14	72.5
278	CT 19 GT enclosure	760471.04	3884756.00	9.14	72.5
279	CT 19 GT enclosure	760469.88	3884737.34	9.14	72.5
280	CT 19 GT enclosure	760460.53	3884738.06	9.14	72.5
281	CT 19 GT enclosure	760462.03	3884756.43	9.14	72.5
283	CT 20 GT enclosure	760498.48	3884753.84	9.14	72.5
284	CT 20 GT enclosure	760497.33	3884735.17	9.14	72.5
285	CT 20 GT enclosure	760487.97	3884735.90	9.14	72.5
286	CT 20 GT enclosure	760489.47	3884754.27	9.14	72.5
288	Power Distribution Center	760337.63	3884791.34	6.70	72.5
289	Power Distribution Center	760337.13	3884782.87	6.70	72.5
290	Power Distribution Center	760315.20	3884784.26	6.70	72.5
291	Power Distribution Center	760316.00	3884792.54	6.70	72.5
293	existing valve and fire house	760330.62	3884797.03	2.43	72.5
294	existing valve and fire house	760330.45	3884794.86	2.43	72.5
295	existing valve and fire house	760320.57	3884795.55	2.43	72.5
296	existing valve and fire house	760320.75	3884797.73	2.43	72.5
298	existing fire protection foam house	760411.44	3884752.01	3.96	72.5
299	existing fire protection foam house	760410.78	3884742.56	3.96	72.5
300	existing fire protection foam house	760402.65	3884743.12	3.96	72.5
301	existing fire protection foam house	760403.36	3884752.40	3.96	72.5
303	Blackstart generator 56	760343.44	3884797.51	3.00	72.5
304	Blackstart generator 56	760341.14	3884797.67	3.00	72.5
305	Blackstart generator 56	760341.59	3884803.85	3.00	72.5

Object ID	Part	UTM_E_X	UTM_N_Y	height_m	elev_m
306	Blackstart generator 56	760344.02	3884803.72	3.00	72.5
308	Blackstart generator 57	760347.50	3884797.28	3.00	72.5
309	Blackstart generator 57	760345.06	3884797.40	3.00	72.5
310	Blackstart generator 57	760345.63	3884803.61	3.00	72.5
311	Blackstart generator 57	760347.93	3884803.46	3.00	72.5
313	existing warehouse	760517.40	3884803.89	6.10	72.5
314	existing warehouse	760516.34	3884785.28	6.10	72.5
315	existing warehouse	760500.59	3884786.33	6.10	72.5
316	existing warehouse	760501.96	3884804.63	6.10	72.5
318	existing maint bldg	760538.06	3884770.19	4.87	72.5
319	existing maint bldg	760536.90	3884757.08	4.87	72.5
320	existing maint bldg	760517.76	3884759.09	4.87	72.5
321	existing maint bldg	760519.24	3884772.20	4.87	72.5
323	existing maint & control bldg	760539.79	3884743.89	6.40	72.5
324	existing maint & control bldg	760537.78	3884718.09	6.40	72.5
325	existing maint & control bldg	760513.67	3884719.36	6.40	72.5
326	existing maint & control bldg	760513.99	3884727.40	6.40	72.5
327	existing maint & control bldg	760516.78	3884727.30	6.40	72.5
328	existing maint & control bldg	760517.12	3884733.37	6.40	72.5
329	existing maint & control bldg	760522.71	3884732.98	6.40	72.5
330	existing maint & control bldg	760523.61	3884745.16	6.40	72.5
332	gaurd shack	760216.33	3884752.89	5.79	72.5
333	gaurd shack	760216.26	3884744.36	5.79	72.5
334	gaurd shack	760214.23	3884744.43	5.79	72.5
335	gaurd shack	760214.03	3884741.39	5.79	72.5
336	gaurd shack	760204.62	3884741.39	5.79	72.5
337	gaurd shack	760204.64	3884744.51	5.79	72.5
338	gaurd shack	760202.65	3884744.65	5.79	72.5
339	gaurd shack	760202.66	3884753.16	5.79	72.5
340	gaurd shack	760204.69	3884753.16	5.79	72.5
341	gaurd shack	760204.82	3884755.06	5.79	72.5
342	gaurd shack	760214.30	3884754.79	5.79	72.5
343	gaurd shack	760214.23	3884753.03	5.79	72.5
345	CT 19 generator	760470.15	3884770.41	4.26	72.5
346	CT 19 generator	760469.83	3884765.48	4.26	72.5
347	CT 19 generator	760468.60	3884765.54	4.26	72.5
348	CT 19 generator	760467.99	3884755.96	4.26	72.5
349	CT 19 generator	760465.14	3884756.12	4.26	72.5
350	CT 19 generator	760465.83	3884765.69	4.26	72.5
351	CT 19 generator	760464.42	3884765.75	4.26	72.5

Object ID	Part	UTM_E_X	UTM_N_Y	height_m	elev_m
352	CT 19 generator	760464.83	3884770.77	4.26	72.5
354	CT 19 exhaust	760472.42	3884765.65	8.00	72.5
355	CT 19 exhaust	760479.02	3884765.13	8.00	72.5
356	CT 19 exhaust	760478.64	3884758.96	8.00	72.5
357	CT 19 exhaust	760471.90	3884759.31	8.00	72.5
358	CT 19 exhaust	760468.88	3884760.58	8.00	72.5
359	CT 19 exhaust	760463.03	3884760.94	8.00	72.5
360	CT 19 exhaust	760463.27	3884764.95	8.00	72.5
361	CT 19 exhaust	760469.38	3884764.51	8.00	72.5
363	CT 18 exhaust	760452.68	3884765.70	8.00	72.5
364	CT 18 exhaust	760452.45	3884761.68	8.00	72.5
365	CT 18 exhaust	760446.34	3884762.13	8.00	72.5
366	CT 18 exhaust	760443.30	3884760.99	8.00	72.5
367	CT 18 exhaust	760436.70	3884761.51	8.00	72.5
368	CT 18 exhaust	760437.08	3884767.68	8.00	72.5
369	CT 18 exhaust	760443.82	3884767.32	8.00	72.5
370	CT 18 exhaust	760446.84	3884766.06	8.00	72.5
372	CT 18 generator	760451.90	3884771.32	4.26	72.5
373	CT 18 generator	760451.58	3884766.39	4.26	72.5
374	CT 18 generator	760450.35	3884766.45	4.26	72.5
375	CT 18 generator	760449.74	3884756.87	4.26	72.5
376	CT 18 generator	760446.89	3884757.03	4.26	72.5
377	CT 18 generator	760447.58	3884766.60	4.26	72.5
378	CT 18 generator	760446.17	3884766.66	4.26	72.5
379	CT 18 generator	760446.58	3884771.68	4.26	72.5
381	CT 20 exhaust	760498.40	3884762.92	8.00	72.5
382	CT 20 exhaust	760498.17	3884758.91	8.00	72.5
383	CT 20 exhaust	760492.06	3884759.36	8.00	72.5
384	CT 20 exhaust	760489.01	3884758.22	8.00	72.5
385	CT 20 exhaust	760482.42	3884758.74	8.00	72.5
386	CT 20 exhaust	760482.80	3884764.90	8.00	72.5
387	CT 20 exhaust	760489.54	3884764.55	8.00	72.5
388	CT 20 exhaust	760492.56	3884763.29	8.00	72.5
390	CT 20 generator	760497.61	3884768.55	4.26	72.5
391	CT 20 generator	760497.30	3884763.62	4.26	72.5
392	CT 20 generator	760496.07	3884763.68	4.26	72.5
393	CT 20 generator	760495.46	3884754.10	4.26	72.5
394	CT 20 generator	760492.61	3884754.26	4.26	72.5
395	CT 20 generator	760493.29	3884763.83	4.26	72.5
396	CT 20 generator	760491.89	3884763.89	4.26	72.5

Object ID	Part	UTM_E_X	UTM_N_Y	height_m	elev_m
397	CT 20 generator	760492.30	3884768.91	4.26	72.5
399	ACT 50 west intake	760235.28	3884760.03	4.26	72.5
400	ACT 50 west intake	760234.86	3884754.94	4.26	72.5
401	ACT 50 west intake	760227.37	3884755.63	4.26	72.5
402	ACT 50 west intake	760227.74	3884760.59	4.26	72.5
404	ACT 51 west intake	760265.96	3884757.94	4.26	72.5
405	ACT 51 west intake	760265.54	3884752.85	4.26	72.5
406	ACT 51 west intake	760258.04	3884753.54	4.26	72.5
407	ACT 51 west intake	760258.42	3884758.50	4.26	72.5
409	ACT 51 east intake	760276.87	3884756.93	4.26	72.5
410	ACT 51 east intake	760276.44	3884751.84	4.26	72.5
411	ACT 51 east intake	760268.95	3884752.53	4.26	72.5
412	ACT 51 east intake	760269.32	3884757.49	4.26	72.5
414	ACT 52 west intake	760296.20	3884756.06	4.26	72.5
415	ACT 52 west intake	760295.78	3884750.97	4.26	72.5
416	ACT 52 west intake	760288.28	3884751.66	4.26	72.5
417	ACT 52 west intake	760288.66	3884756.62	4.26	72.5
419	ACT 54 west intake	760356.90	3884751.87	4.26	72.5
420	ACT 54 west intake	760356.47	3884746.78	4.26	72.5
421	ACT 54 west intake	760348.98	3884747.46	4.26	72.5
422	ACT 54 west intake	760349.35	3884752.43	4.26	72.5
424	ACT 53 west intake	760326.37	3884754.00	4.26	72.5
425	ACT 53 west intake	760325.95	3884748.90	4.26	72.5
426	ACT 53 west intake	760318.45	3884749.59	4.26	72.5
427	ACT 53 west intake	760318.83	3884754.56	4.26	72.5
429	ACT 53 east intake	760337.37	3884752.90	4.26	72.5
430	ACT 53 east intake	760336.95	3884747.81	4.26	72.5
431	ACT 53 east intake	760329.45	3884748.50	4.26	72.5
432	ACT 53 east intake	760329.83	3884753.46	4.26	72.5
434	ACT 55 east intake	760398.24	3884748.81	4.26	72.5
435	ACT 55 east intake	760397.81	3884743.72	4.26	72.5
436	ACT 55 east intake	760390.32	3884744.40	4.26	72.5
437	ACT 55 east intake	760390.69	3884749.37	4.26	72.5
439	ACT 55 west intake	760387.25	3884749.64	4.26	72.5
440	ACT 55 west intake	760386.83	3884744.55	4.26	72.5
441	ACT 55 west intake	760379.33	3884745.24	4.26	72.5
442	ACT 55 west intake	760379.71	3884750.20	4.26	72.5
444	ACT 54 east intake	760367.80	3884750.85	4.26	72.5
445	ACT 54 east intake	760367.38	3884745.76	4.26	72.5
446	ACT 54 east intake	760359.89	3884746.45	4.26	72.5

Object ID	Part	UTM_E_X	UTM_N_Y	height_m	elev_m
447	ACT 54 east intake	760360.26	3884751.41	4.26	72.5
449	ACT 52 east intake	760307.10	3884755.14	4.26	72.5
450	ACT 52 east intake	760306.68	3884750.04	4.26	72.5
451	ACT 52 east intake	760299.19	3884750.73	4.26	72.5
452	ACT 52 east intake	760299.56	3884755.70	4.26	72.5
454	ACT 50 east intake	760245.90	3884759.04	4.26	72.5
455	ACT 50 east intake	760245.47	3884753.95	4.26	72.5
456	ACT 50 east intake	760237.98	3884754.64	4.26	72.5
457	ACT 50 east intake	760238.35	3884759.60	4.26	72.5

Table E-4. Tank Information

OBJECTID	Name of Part	UTM_E_X_15	UTM_N_Y_15	height_M	Elev (m)	radius_m
7	Tank 1	760320.68	3884672.85	12.20	72.5	14.35
8	Tank 2	760359.23	3884670.17	12.20	72.5	14.35
9	Tank 3	760397.43	3884667.60	12.20	72.5	14.35
10	Tank 4	760435.71	3884665.31	12.20	72.5	14.35
11	existing demin water tank 1	760529.21	3884781.84	15.84	72.5	2.5
12	existing demin water tank 2	760537.11	3884781.01	15.84	72.5	2.5
13	existing demin water tank 3	760537.11	3884788.88	15.84	72.5	3

Table E-5. Fence Line Coordinates

Northern Fence			Southern Fence		
OBJECTID	UTM_E_X	UTM_N_Y	OBJECTID	UTM_E_X	UTM_N_Y
1	760245.50	3884709.14	42	760585.68	3883999.54
2	760264.84	3884692.59	43	760630.58	3883996.54
3	760276.23	3884657.53	44	760675.48	3883993.53
4	760312.58	3884641.38	45	760720.38	3883990.53
5	760357.52	3884639.01	46	760765.27	3883987.52
6	760402.46	3884636.64	47	760810.17	3883984.52
7	760447.40	3884634.26	48	760855.07	3883981.52
8	760492.33	3884631.89	49	760899.97	3883978.51
9	760537.27	3884629.52	50	760944.87	3883975.51
10	760543.89	3884670.28	51	760948.22	3884019.96
11	760546.84	3884715.19	52	760951.16	3884064.86
12	760544.75	3884758.37	53	760954.11	3884109.77
13	760547.72	3884803.27	54	760957.05	3884154.67
14	760508.34	3884810.63	55	760960.00	3884199.57
15	760463.43	3884813.53	56	760962.95	3884244.48
16	760418.52	3884816.42	57	760961.06	3884285.15
17	760373.62	3884819.32	58	760916.16	3884288.18

Northern Fence			Southern Fence		
OBJECTID	UTM_E_X	UTM_N_Y	OBJECTID	UTM_E_X	UTM_N_Y
18	760328.71	3884822.21	59	760871.26	3884291.21
19	760283.80	3884825.11	60	760826.37	3884294.25
20	760238.89	3884827.82	61	760781.47	3884297.28
21	760197.32	3884839.85	62	760736.57	3884300.31
22	760175.55	3884862.52	63	760691.67	3884303.35
23	760144.01	3884845.81	64	760646.78	3884306.38
24	760099.14	3884849.22	65	760601.88	3884309.41
25	760054.27	3884852.64	66	760556.98	3884312.44
26	760009.40	3884856.05	67	760512.08	3884315.48
27	759964.53	3884859.46	68	760467.18	3884318.51
28	759919.66	3884862.87	69	760422.29	3884321.54
29	759874.79	3884866.28	70	760377.39	3884324.57
30	759829.92	3884869.70	71	760332.49	3884327.61
31	759821.10	3884842.09	72	760287.59	3884330.64
32	759819.19	3884799.70	73	760242.70	3884333.67
33	759839.59	3884769.01	74	760197.80	3884336.70
34	759884.50	3884766.22	75	760153.02	3884334.77
35	759929.41	3884763.44	76	760108.33	3884329.51
36	759974.33	3884760.66	77	760063.64	3884324.26
37	760018.82	3884756.76	78	760036.46	3884302.36
38	760059.35	3884742.40	79	760033.45	3884257.46
39	760104.26	3884739.55	80	760030.45	3884212.56
40	760149.02	3884741.67	81	760027.44	3884167.66
41	760191.62	3884735.00	82	760024.44	3884122.76
			83	760021.43	3884077.86
			84	760022.53	3884036.56
			85	760067.45	3884033.76
			86	760112.36	3884030.95
			87	760157.27	3884028.15
			88	760202.18	3884025.35
			89	760220.50	3884052.89
			90	760255.13	3884060.85
			91	760258.39	3884021.11
			92	760303.29	3884018.16
			93	760348.19	3884015.21
			94	760393.10	3884012.25
			95	760438.00	3884009.30
			96	760482.90	3884006.35
			97	760527.80	3884003.40

APPENDIX F: EMISSION CALCULATIONS

LM2500 AERSCREEN Inputs

AERSCREEN Inputs																				
Load		%	100	75	60	50	100	75	60	50	100	100	75	60	50	100	100	75	60	50
Ambient Temperature		deg. F	0	0	0	0	25	25	25	25	59	59	59	59	59	95	95	95	95	95
Evap. Cooler Status		On/Off	Off	Off	Off	Off	Off	Off	Off	Off	On	Off	Off	Off	Off	On	Off	Off	Off	Off
Stack Diameter		meters	2.74	2.74	2.74	2.74	2.74	2.74	2.74	2.74	2.74	2.74	2.74	2.74	2.74	2.74	2.74	2.74	2.74	2.74
Stack Height		meters	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9
Stack Temperature		K	728	728	728	728	728	728	728	728	728	728	728	728	728	728	728	728	728	728
Stack Flow		m^3/s	209	175	162	146	202	175	159	143	190	186	163	141	132	174	166	147	129	116
Stack Velocity		m/s	35.3	29.7	27.4	24.7	34.1	29.6	26.9	24.2	32.1	31.5	27.6	23.9	22.4	29.4	28.1	24.8	21.7	19.7
TPM10/2.5		g/s	0.42	0.40	0.40	0.40	0.42	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
NOX as NO2		g/s	0.42	0.35	0.30	0.26	0.40	0.33	0.28	0.25	0.38	0.37	0.29	0.26	0.23	0.34	0.33	0.26	0.24	0.21
CO		g/s	0.50	0.44	0.39	0.35	0.52	0.43	0.38	0.35	0.49	0.49	0.40	0.38	0.34	0.47	0.45	0.38	0.35	0.33
AERSCREEN Max 1-hr Conc.			2.675	3.182	3.542	4.008	2.779	3.196	3.625	4.101	2.925	2.969	3.509	4.158	4.465	3.225	3.419	3.989	4.621	5.469
	1	g/s																		
Scaled Results																				
TPM10/TPM2.5		µg/m^3	1.11E+00	1.28E+00	1.43E+00	1.62E+00	1.16E+00	1.29E+00	1.46E+00	1.65E+00	1.18E+00	1.20E+00	1.41E+00	1.68E+00	1.80E+00	1.30E+00	1.38E+00	1.61E+00	1.86E+00	2.21E+00
NOX as NO2		µg/m^3	1.11E+00	1.12E+00	1.07E+00	1.06E+00	1.12E+00	1.05E+00	1.00E+00	1.03E+00	1.11E+00	1.08E+00	1.02E+00	1.10E+00	1.01E+00	1.10E+00	1.12E+00	1.06E+00	1.11E+00	1.17E+00
CO		µg/m^3	1.35E+00	1.40E+00	1.38E+00	1.41E+00	1.44E+00	1.37E+00	1.37E+00	1.45E+00	1.44E+00	1.46E+00	1.41E+00	1.57E+00	1.52E+00	1.50E+00	1.55E+00	1.51E+00	1.63E+00	1.79E+00

ALLEN AERODERIVATIVE PROJECT
Potential to Emit (tons/year)

APC&M Air Programs Support
21-Nov-24

Table 1. General Operations

Number of Units: 6 2

Parameter	Note	LM2500 Units Baseload	Startup/SD	SC Total	% SU/SD	Black Start Gen.	Project Total	Pollutant	Project Totals	NSR SER tons/yr	>SER?
Natural Gas Annual Operating Hours	per Unit	3,259									
Startup/Shutdowns	per Unit		350								
No. 2 Fuel Oil Annual Operating Hours	per Unit					100					
Startup/Shutdowns	per Unit										
Miscellaneous Annual Operating Hours per Unit	per Unit										

Table 2. Criteria / Non-HAP Pollutants

Pollutant	(Abbrev.)	Note	6 LM2500 Units Baseload	Startup/SD	Total	% SU/SD	2 Black Start Gen.	Project Total	Pollutant	Project Totals	NSR SER tons/yr	>SER?
Filterable Particulate Matter	FPM		2.27E+01	1.73E+00	2.44E+01	7.1	7.30E-02	2.45E+01	FPM	24.5	25	No
FPM < 10-micrometer aero. dia.	FPM10		2.27E+01	1.73E+00	2.44E+01	7.1	7.30E-02	2.45E+01	TPM10	34	15	Yes
FPM < 2.5-micrometer aero. dia.	FPM2.5		2.27E+01	1.73E+00	2.44E+01	7.1	7.30E-02	2.45E+01	TPM2.5	34	10	Yes
Condensable Particulate Matter	CPM		7.63E+00	1.73E+00	9.36E+00	18	7.30E-02	9.44E+00				
Sulfur Dioxide	SO2		1.91E+00	2.10E-01	2.12E+00	9.9	2.23E-03	2.12E+00	SO2	2	40	No
Nitrogen Oxides	NOX		2.93E+01	1.53E+01	4.46E+01	34	2.22E+00	4.68E+01	NOX	47	40	Yes
Carbon Monoxide	CO		3.57E+01	1.89E+01	5.46E+01	35	1.28E+00	5.58E+01	CO	56	100	No
Volatile Organic Compounds	VOC		1.02E+01	8.40E-01	1.11E+01	7.6	1.17E-01	1.12E+01	VOC	11	40	No
Sulfuric Acid	H2SO4		0.00E+00	2.20E-02	2.20E-02	100	1.80E-04	2.22E-02	H2SO4	0.02	7	No
Carbon Dioxide	CO2		381,619	19,480	401,099	4.9	253	401,352	CO2	401,352		
Methane	CH4		7.01E+00	3.58E-01	7.37E+00	4.9	1.03E-02	7.38E+00	CH4			
Nitrous Oxide	N2O		7.01E-01	3.58E-02	7.37E-01	4.9	2.06E-03	7.39E-01	N2O			
CO2 equivalent (GHGs)	CO2e		382,001	19,499	401,500	4.9	254	401,755	CO2e	401,755	75,000	Yes

Table 3. Trace-Element Pollutants

Pollutant	(Symbol)	Note	6 LM2500 Units Baseload	Startup/SD	Total	% SU/SD	2 Black Start Gen.	Project Total	Pollutant	Project Totals	NSR SER tons/yr	>SER?
Antimony	Sb	HAP	6.12E-04		6.12E-04			6.12E-04				
Arsenic	As	HAP	7.82E-04		7.82E-04		1.7094E-05	8.00E-04				
Beryllium	Be	HAP	3.40E-05		3.40E-05		4.8174E-07	3.45E-05				
Cadmium	Cd	HAP	1.36E-04		1.36E-04		7.4592E-06	1.44E-04				
Hydrogen Chloride	HCl	HAP	0.00E+00		0.00E+00		0.00048288	4.83E-04				
Chromium	Cr	HAP	3.74E-03		3.74E-03		1.7094E-05	3.76E-03				
Cobalt	Co	HAP	2.72E-04		2.72E-04			2.72E-04				
Hydrogen Fluoride	HF	HAP							HF		3	No
Lead	Pb	HAP	1.36E-03		1.36E-03		2.1756E-05	1.38E-03	Pb	1.38E-03	0.60	No
Manganese	Mn	HAP	1.36E-03		1.36E-03		0.00015651	1.52E-03				
Mercury	Hg	HAP	2.72E-06		2.72E-06		1.8648E-06	4.59E-06				
Nickel	Ni	HAP	8.17E-03		8.17E-03		7.1484E-06	8.17E-03				
Selenium	Se	HAP	6.80E-05		6.80E-05		0.00003885	1.07E-04				

Note:
HAP This abbreviation denotes "Hazardous Air Pollutant."

Table 4. Organic HAP

Pollutant	(CASRN)	Note	6 LM2500 Units Baseload	Startup/SD	Total	% SU/SD	2 Black Start Gen.	Project Total
1,3-Butadiene	106-99-0	HAP	1.46E-03		1.46E-03			1.46E-03
2-Methylnaphthalene	91-57-6	POM	5.51E-04		5.51E-04			5.51E-04
Acenaphthene	83-32-9	POM					7.27E-06	7.27E-06
Acenaphthylene	208-96-8	POM					1.43E-05	1.43E-05
Acetaldehyde	75-07-0	HAP	1.36E-01		1.36E-01		3.92E-05	1.36E-01
Acrolein	107-02-8	HAP	2.18E-02		2.18E-02		1.22E-05	2.18E-02
Anthracene	120-12-7	POM					1.91E-06	1.91E-06
Benzene	71-43-2	HAP	4.08E-02		4.08E-02		1.21E-03	4.20E-02
Benzo(a)anthracene	56-55-3	PAC					9.67E-07	9.67E-07
Benzo(a)pyrene	50-32-8	PAC					3.99E-07	3.99E-07
Benzo(b)fluoranthene	205-99-2	PAC					1.72E-06	1.72E-06
Benzo(g,h,i)perylene	191-24-2	POM					8.64E-07	8.64E-07
Benzo(k)fluoranthene	207-08-9	PAC					3.39E-07	3.39E-07
Chrysene	218-01-9	PAC					2.38E-06	2.38E-06
Dibenzo(a,h)anthracene	53-70-3	PAC					5.38E-07	5.38E-07
Ethylbenzene	100-41-4	HAP	1.09E-01		1.09E-01			1.09E-01
Fluoranthene	206-44-0	PAC					6.26E-06	6.26E-06
Fluorene	86-73-7	POM					1.99E-05	1.99E-05
Fluorene	86-73-7	POM					1.99E-05	1.99E-05
Formaldehyde	50-00-0	HAP	7.48E-01		7.48E-01		1.23E-04	7.49E-01
Indeno(1,2,3-c,d)pyrene	193-39-5	PAC					6.43E-07	6.43E-07
Naphthalene	91-20-3	HAP	4.42E-03		4.42E-03		2.02E-04	4.62E-03
Phenanthrene	85-01-8	POM	3.78E-04		3.78E-04		6.34E-05	4.41E-04
Propylene Oxide	75-56-9	HAP	9.87E-02		9.87E-02			9.87E-02
Pyrene	129-00-0	POM					5.77E-06	5.77E-06
Toluene	108-88-3	HAP	4.42E-01		4.42E-01		4.37E-04	4.43E-01
Xylenes	1330-20-7	HAP	2.18E-01		2.18E-01		3.00E-04	2.18E-01
Polycyclic Aromatic Compounds	PAC	POM					1.33E-05	1.33E-05
Polycyclic Aromatic Hydrocarbons	PAH	POM	7.48E-03		7.48E-03			7.48E-03
Polycyclic Organic Matter	POM	HAP	8.41E-03		8.41E-03		1.27E-04	8.54E-03
Organic HAP Total	--		1.83E+00		1.83E+00		2.45E-03	1.83E+00
Total HAP	--		1.83E+00		1.83E+00		3.20E-03	1.83E+00

Notes:
HAP This abbreviation denotes "Hazardous Air Pollutant."
PAC This abbreviation denotes "Polycyclic Aromatic Compounds" (PAC). Although the PAC group is not identified as a Clean Air Act Section 112(b) HAP, it is reportable for Emergency Planning and Community Right-to-Know Act (EPCRA) Section 313 (i.e., Toxic Release Inventory [TRI]).
POM This abbreviation denotes "Polycyclic Organic Matter" (POM), which is broad class of organic compounds that includes Polycyclic Aromatic Hydrocarbons (PAH) and Polycyclic Aromatic

ALLEN AERODERIVATIVE PROJECT: GE LM2500

APC&M APS - Date: 21-Nov-24

Table 1. Natural Gas-Fired Inputs

Parameter		Value	Units	Comment	Note
Number of Units:		6		each with 9.0 ft stk ID and 72 ft stack height	A
Annual Operation:		3,259	hr/CT-yr	Routine annual hrs sans 228 CT-hours for startups/shutdwns	1
Maximum Heat Input at 0 deg F:		356	*10^6 Btu/hr	per CT; M. 19 F-Factor: 8,710 dscf/10^6 Btu at 68 F, 1 atm, & 0% O2	
Annual-Avg. Heat Input at 59 deg F:		325	*10^6 Btu/hr	per CT; M. 19 F-Factor: 8,710 dscf/10^6 Btu at 68 F, 1 atm, & 0% O2	
Heat Content:		1,020	Btu/scf	scf = standard ft^3; nominal, higher heating value (HHV) heat content	2
Fuel Sulfur Content:		2,000	gr/10^6 scf	gr = grains; equivalent to 6.32E-04 % S (0.04524 lb/ft^3 at 60 deg F)	2
Total PM2.5:	TPM2.5	9.54E-03	lb/10^6 Btu	Manufacturer data: 3.4 lb/hr; est. to be < given mass rate - GE	3
Condensable PM:	CPM	2.40E-03	lb/10^6 Btu	Manufacturer data: 25 % of total PM is condensable.	4
Sulfur Dioxide:	SO2	6.00E-04	lb/10^6 Btu	AP-42 states 100% fuel S conversion: 0.94 * %S (lb/10^6 Btu)	5
Nitrogen Oxides:	NOX	2.5	ppmvd	Eng. approx.; conc. in ppm vol. dry-basis (ppmvd) at 15 % O2	3
Carbon Monoxide:	CO	5.0	ppmvd	Engineering approx.; conc. in ppm vol. dry-basis at 15 % O2	3
Volatile Organic Cmpnds:	VOC	2.5	ppmvd	Engineering approx.; conc. in ppm vol. dry-basis at 15 % O2	3
SCR w/ Ammonia Injection Op. Factor:		100	%	Eng. approx.; percentage of annual hrs that NH3 is injected into the SCR unit	
Fuel-Sulfur Oxidation:		5.0	%	Estimated portion of fuel-sulfur that is oxidized to SO3 / H2SO4	6
CO Catalyst Sulfur Oxidation:		8.0	%	Est. [JCC] portion of SO2 that is oxidized to SO3 / H2SO4 via catalytic bed	
SCR Catalyst Sulfur Oxidation:		2.5	%	Est. [JCC] portion of SO2 that is oxidized to SO3 / H2SO4 via catalytic bed	

Table 1 Notes:

A [Reserved]

1 Equivalent annual hours via the generation restriction determined by 40 CFR Part 60, Subpart TTTTa, potential electric output (PEO) at base load HHV ISO rating times 40%, which is the upper bound of the intermediate load CT category: 118,000 MWh/CT-year.

2 EPA AP-42, Vol. I, 5th Edition, Section 3.1 - Stationary Gas Turbines - Supplement F, 4/00

3 [Reserved]

4 [Reserved]

5 AP-42 conversion factor assumes all fuel sulfur is converted to SO2. Emission factor used is the 40 CFR Part 75 App. D, 2.3.1.1.1 default SO2 emission rate for firing pipeline natural gas, which will be subsumed into the operating permit. Part 75 emssn rate approximates to 2,000 gr/10^6 scf at 60 deg F.

6 J.P. Lobene [GE] 3-2-01 email to S.C. Strunk

Table 2. Annual Fuel Burned (per CT)

Fuel	Units	ACT21	ACT22	ACT23	ACT24	ACT25	ACT26
Natrl Gas	10^3 scf/yr	1,039,268	1,039,268	1,039,268	1,039,268	1,039,268	1,039,268
Natrl Gas	10^6 Btu/yr	1,060,053	1,060,053	1,060,053	1,060,053	1,060,053	1,060,053

Table 3. Criteria/Non-HAP Pollutant Average-Annual Emissions at 59 deg F and Max Short-Term Emissions at 0 deg F

Pollutant	(Abbrev.)	Note	Emssn Fctr, lb/10^6 Btu Natrl Gas	--	Max Hrly lb/CT-hr	Avg. Hourly, lb/CT-hr Natrl Gas	--	Avg. Annual, tons/CT-yr Natrl Gas	--	Total tons/yr
Filterable Particulate Matter	FPM		7.14E-03	--	2.54E+00	2.32E+00	--	3.78E+00	--	2.27E+01
FPM < 10-micrometer aero. dia.	FPM10		7.14E-03	--	2.54E+00	2.32E+00	--	3.78E+00	--	2.27E+01
FPM < 2.5-micrometer aero. dia.	FPM2.5		7.14E-03	--	2.54E+00	2.32E+00	--	3.78E+00	--	2.27E+01
Condensable Particulate Matter	CPM		2.40E-03	--	8.56E-01	7.81E-01	--	1.27E+00	--	7.63E+00
Sulfur Dioxide	SO2		6.00E-04	--	2.14E-01	1.95E-01	--	3.18E-01	--	1.91E+00
Nitrogen Oxides	NOX	1	9.21E-03	--	3.28E+00	3.00E+00	--	4.88E+00	--	2.93E+01
Carbon Monoxide	CO	1	1.12E-02	--	3.65E+00	3.65E+00	--	5.94E+00	--	3.57E+01
Volatile Organic Compounds	VOC	1	3.21E-03	--	3.28E+00	1.04E+00	--	1.70E+00	--	1.02E+01
Sulfuric Acid (SO3/H2SO4) as H2SO4	H2SO4	2	1.36E-04	--	4.84E-02	0.00E+00	--	0.00E+00	--	0.00E+00
Carbon Dioxide	CO2	4	120.0	--	42,778	39,031	--	63,603	--	381,619
Methane	CH4	5	2.20E-03	--	7.86E-01	7.17E-01	--	1.17E+00	--	7.01E+00
Nitrous Oxide	N2O	5	2.20E-04	--	7.86E-02	7.17E-02	--	1.17E-01	--	7.01E-01
Grnhouse Gas (GHG) as CO2 equiv.	CO2e		120.1	--	42,821	39,070	--	63,667	--	382,001

Notes:

1 Assumed ideal gas - conversion from concentration value utilizing a molar volume of 385.3 ft^3/lbmole at 68 deg F and 1 atmosphere (atm).

2 H2SO4 is not estimated for operations ≥MECL because emissions are directly related to SCR-ammonia not being injected.

4 40 CFR 60 Subpart TTTTa, Table 1, limits natural gas-fired operations to 120 lb CO2 per 10^6 Btu.

5 US EPA, Code of Federal Regulations, Title 40, Part 98, Subpart A, Table A-1 and Subpart C, Tables C-1 & C-2.

Table 4. Trace Elements Average-Annual Emissions at 59 deg F and Max Short-Term Emissions at 0 deg F

Pollutant	(Symbol)	Note	Emssn Fctr, lb/10^12 Btu Natrl Gas [1]	--	Max Hrly lb/CT-hr	Avg. Hourly, lb/CT-hr Natrl Gas	--	Avg. Annual, tons/CT-yr Natrl Gas	--	Total tons/yr
Antimony	Sb	HAP	1.80E-07	--	6.42E-05	5.85E-05	--	1.02E-04	--	6.12E-04
Arsenic	As	HAP	2.30E-07	--	8.20E-05	7.48E-05	--	1.30E-04	--	7.82E-04
Barium	Ba	3	4.00E-06	--	1.43E-03	1.30E-03	--	2.27E-03	--	1.36E-02
Beryllium	Be	HAP	1.00E-08	--	3.56E-06	3.25E-06	--	5.67E-06	--	3.40E-05
Cadmium	Cd	HAP	4.00E-08	--	1.43E-05	1.30E-05	--	2.27E-05	--	1.36E-04
Chlorine as HCl	HCl	HAP		--			--		--	0.00E+00
Chromium	Cr	HAP	1.10E-06	--	3.92E-04	3.58E-04	--	6.24E-04	--	3.74E-03
Cobalt	Co	HAP	8.00E-08	--	2.85E-05	2.60E-05	--	4.54E-05	--	2.72E-04
Copper	Cu	3	7.00E-07	--	2.50E-04	2.28E-04	--	3.97E-04	--	2.38E-03
Lead	Pb	HAP	4.00E-07	--	1.43E-04	1.30E-04	--	2.27E-04	--	1.36E-03
Manganese	Mn	HAP	4.00E-07	--	1.43E-04	1.30E-04	--	2.27E-04	--	1.36E-03
Mercury	Hg	HAP	8.00E-10	--	2.85E-07	2.60E-07	--	4.54E-07	--	2.72E-06
Nickel	Ni	HAP	2.40E-06	--	8.56E-04	7.81E-04	--	1.36E-03	--	8.17E-03
Selenium	Se	HAP	2.00E-08	--	7.13E-06	6.51E-06	--	1.13E-05	--	6.80E-05
Vanadium	V	4	1.80E-06	--	6.42E-04	5.85E-04	--	1.02E-03	--	6.12E-03
Zinc	Zn	5	2.84E-05	--	1.01E-02	9.25E-03	--	1.61E-02	--	9.67E-02

Notes:

1 Unless noted, emission factors are from Emission Factors Handbook [EFH] - Guidelines for Estimating Trace Substance Emissions from Fossil Fuel Steam Electric Plants, Electric Power Research Institute (EPRI), Report No. EPRI TR-105611, 11-95, Table 4-1 (Uncontrolled Gas-Fired Boiler Emission Factors)[*] [*]While EPRI cautioned against using the data in Table 4-1 for gas-fired turbines, TVA believes that the trace-element emission factors should be reasonably applicable to CT units. Fuel composition determines trace-element emissions (mass-per-unit-energy basis) whether burned in a boiler or a CT unit.

2 [Reserved]

3 Natrl Gas: US EPA, Air Emissions from Scrap Tire Combustion, EPA-600/R-97-115, October 1997 (natrl gas-fired rotary-kiln incinerator simulator emssn data)

4 [Reserved]

5 Natrl Gas: Emission Factors Handbook [EFH] Addendum, EPRI, 9-98, Table 4-1. Table 3-1 in April 2002 EFH Revision is the current version of this table.

6 [Reserved]

7 [Reserved]

8 Natrl Gas: Emission Factors Handbook [EFH] Addendum 2, EPRI, 2-01, Table 4-1. Table 3-1 in April 2002 EFH Revision is the current version of this table.

9 Natrl Gas: EPA AP-42, Vol. I, 5th Ed., Section 1.4 - Natural Gas Combustion - Supplement D, 7/98

HAP This abbreviation denotes "Hazardous Air Pollutant."

Table 5. Organic HAP Average-Annual Emissions at 59 deg F and and Max Short-Term Emissions at 0 deg F

Pollutant	(CASRN)	Note	Emssn Fctr, lb/10^6 Btu Natrl Gas [1]	--	Max Hourly, lb/CT-hr	Avg. Hourly, lb/CT-hr Natrl Gas	--	Avg. Annual, tons/CT-yr Natrl Gas	--	Total tons/yr
1,3-Butadiene	106-99-0	HAP	4.30E-07	--	1.53E-04	1.40E-04	--	2.44E-04	--	1.46E-03
2-Methylnaphthalene	91-57-6	2, POM	1.62E-07	--	5.78E-05	5.27E-05	--	9.19E-05	--	5.51E-04
Acetaldehyde	75-07-0	HAP	4.00E-05	--	1.43E-02	1.30E-02	--	2.27E-02	--	1.36E-01
Acrolein	107-02-8	HAP	6.40E-06	--	2.28E-03	2.08E-03	--	3.63E-03	--	2.18E-02
Benzene	71-43-2	HAP	1.20E-05	--	4.28E-03	3.90E-03	--	6.80E-03	--	4.08E-02
Ethylbenzene	100-41-4	HAP	3.20E-05	--	1.14E-02	1.04E-02	--	1.81E-02	--	1.09E-01
Formaldehyde	50-00-0	3, HAP	2.20E-04	--	7.84E-02	7.16E-02	--	1.25E-01	--	7.48E-01
Naphthalene	91-20-3	HAP	1.30E-06	--	4.63E-04	4.23E-04	--	7.37E-04	--	4.42E-03
Phenanthrene	85-01-8	2, POM	1.11E-07	--	3.96E-05	3.61E-05	--	6.29E-05	--	3.78E-04
Propylene Oxide	75-56-9	HAP	2.90E-05	--	1.03E-02	9.43E-03	--	1.64E-02	--	9.87E-02
Toluene	108-88-3	HAP	1.30E-04	--	4.63E-02	4.23E-02	--	7.37E-02	--	4.42E-01
Xylenes	1330-20-7	HAP	6.40E-05	--	2.28E-02	2.08E-02	--	3.63E-02	--	2.18E-01
Polycyclic Aromatic Hydrocarbons	PAH	POM	2.20E-06	--	7.84E-04	7.16E-04	--	1.25E-03	--	7.48E-03
Polycyclic Organic Matter	POM	HAP	2.47E-06	--	8.82E-04	8.04E-04	--	1.40E-03	--	8.41E-03
Organic HAP Total	--		5.38E-04	--	1.92E-01	1.75E-01	--	3.05E-01	--	1.83E+00
Total HAP	--		5.38E-04	--	1.92E-01	1.75E-01	--	3.05E-01	--	1.83E+00

Notes:

1 EPA AP-42, Vol. I, 5th Edition, Section 3.1 - Stationary Gas Turbines - Supplement F, 4/00

2 Gas-Fired Boiler and Turbine Air Toxics Summary Report, EPRI, Report No. EPRI TR-105646, Table S-2, 10-96

3 Table 1 to Subpart YYYY of Part 63 CH2O limit: 91 ppbvd at 15 % O2, which equates to 2.20E-04 lb/10^6 Btu

HAP This abbreviation denotes "Hazardous Air Pollutant."

POM This abbreviation denotes "Polycyclic Organic Matter" (POM), which is broad class of organic compounds that includes PAH and PAC. The POM group is defined as a HAP.

ssd

ALLEN AERODERIVATIVE PROJECT: GE LM2500 STARTUP & SHUTDOWN

APC&M APS - Date: 21-Nov-24

Table 1. Nominal Number of Startup and Shutdowns per CT-Year

Event Type	(Abbrev.)	Downtime Hours	No. Units	LM2500 Natrl Gas	--	Total
Starts	S	--	6	350		350
Shutdown	SD	--	6	350		350

Table A. Natural Gas Inputs at 59 deg F

Parameter		E-Factor	Units	Comment
Sufuric Acid:	H2SO4	1.36E-04	lb/10^6 Btu	SO3/H2SO4 est. based on mass-balance conversn of SO2 to SO3/H2SO4
Carbon Dioxide		120.0	lb/10^6 Btu	40 CFR 60 Subpart TTTTa
Methane		2.20E-03	lb/10^6 Btu	US EPA, 40 CFR Part 98, Subpart A, Table A-1, and Subpart C, Tables C-1 & C-2
Nitrous Oxide		2.20E-04	lb/10^6 Btu	US EPA, 40 CFR Part 98, Subpart A, Table A-1, and Subpart C, Tables C-1 & C-2
Grnhouse Gas (GHG) as CO2 equiv.		120.1	lb/10^6 Btu	US EPA, 40 CFR Part 98, Subpart A, Table A-1, and Subpart C, Tables C-1 & C-2

Table 2. Natural Gas Startup with Subsequent Shutdown

Item	No. of Units	Duration hour	Avg. Exh. Temp, deg F	Avg. Flow acfm	Simple Cycle Natural-Gas Startup and Subsequent Shutdown, lb/CT-hr NOX	CO	VOC	SO2	H2SO4	FPM	FPM2.5	CPM	CO2	CH4	N2O	CO2e
Startup	6	5.00E-01	987	387,759	2.30E+01	1.80E+01	8.00E-01	2.00E-01	3.56E-02	2.70E+00	2.70E+00	2.70E+00	31,440	5.78E-01	5.78E-02	31,471
Shutdown	6	1.50E-01	850	402,518	2.07E+01	6.00E+01	2.67E+00	6.67E-01	2.14E-02	2.00E+00	2.00E+00	2.00E+00	18,880	3.47E-01	3.47E-02	18,899
Simple Cycle Startup and Shutdown, tons/CT-yr:					2.56E+00	3.15E+00	1.40E-01	3.50E-02	3.67E-03	2.89E-01	2.89E-01	2.89E-01	3,247	5.96E-02	5.96E-03	3,250
Simple Cycle Startup and Shutdown, tons/yr:					1.53E+01	1.89E+01	8.40E-01	2.10E-01	2.20E-02	1.73E+00	1.73E+00	1.73E+00	19,480	3.58E-01	3.58E-02	19,499

ALLEN AERODERVIATIVE PROJECT: ULSD BLACK START GENERATOR

APC&M APS - Date: 21-Nov-24

Table 1. Diesel Engine Inputs

Parameter		Value	Units	Comment						Note
Number of Engines:		2		each with	0.8	ft stk ID and	10	ft stack height		1
Annual Operation, per BSG:		100	hr/yr	stk temp.:	840	F; stk flow:	13,180	acf/min and 437 ft/s		1,2
Rated Horsepower:		2,220	bhp/eng	SI equiv. = 1,655 kW/eng		Heat input equivalent is		15.5	*10^6 Btu/hr.	3
Fuel Consumption:		111	gal/eng-hr	Approx. fuel consumption per engine based on				7,000	Btu/hp-hr	4
Fuel Heat Content		140,000	Btu/gal	Nominal distillate-oil heat content (HHV)						5
No. 2 Fuel Oil Density:		7.05	lb/gal	Nominal distillate-oil density						6
No. 2 Fuel Oil Sulfur Content:		0.0015	weight %	Ultra-low-sulfur distillate oil						
Filterable Particulate Matter:	FPM	0.20	g/kW-hr	40 CFR 1039, App. I (Tier 2) standard for a >560 kW engine						
Nitrogen Oxides:	NOX	6.08	g/kW-hr	NOX+NMHC	6.4	g/kW-hr; 40 CFR 1039, App. I (Tier 2) >560 kW eng.				7
Carbon Monoxide:	CO	3.50	g/kW-hr	40 CFR 1039, App. I (Tier 2) standard for a >560 kW engine						
Volatile Organic Compounds:	VOC	0.32	g/kW-hr	40 CFR 1039, App. I (Tier 2) standard for a >560 kW engine						7
Fuel-Sulfur Oxidation:		5.0	%	Engine-outlet fuel-S conversion to SO3/H2SO4 (by analogy with CT units)						

Notes:

1 The black-start generators provide instantaneous power to a variety of equipment required for a LM2500 start and power to the switchyard. Although actual black starts are highly unlikely, annual hours provided here are from 40 CFR 63, Subpart ZZZZ. Stack dimensions are estimated based on the schematics in "Proposed DSDG scope and tech spec.pdf."

2 Stack temp. and flow derived from "QSK50-G4 Emissions Data Sheet.pdf"

3 QSK50-G4 Engine data.pdf

4 EPA AP-42, Vol. 1, 5th Ed., Chapter 3.4 - Large Stationary Diesel and All Stationary Dual-fuel Engines - Supplement B, 10/96

5 EPA AP-42, Vol. I, 5th Edition, Section 1.3 - Fuel Oil Combustion - Supplement E, 9/99 (corrected 5/10)

6 EPA AP-42, Vol. 1, 5th Edition, Appendix A, 9/85 (reformatted 1/95)

7 "CARB Emission Factors for CI Diesel Engines - Percent HC in Relation to NMHC+NOX," June 28, 2004: "When the [NMHC] and [NOX] emission factor is combined, assume a breakdown of 5% and 95%, respectively."

Table 2. Annual Diesel Burned

Units	BSG1	BSG2
gal/yr	11,100	11,100
10^6 Btu/yr	1,554	1,554

Table 3. Criteria / Non-HAP Pollutant Emission Estimates

Pollutant		Note	Emission Factor, g/hp-hr [1]	Emission Factor, lb/10^6 Btu	Hourly, lb/eng-hr	Annual, tons/yr
Filterable Particulate Matter	FPM		0.15	4.70E-02	7.30E-01	7.30E-02
FPM < 10-micrometer aero. dia.	FPM10			4.70E-02	7.30E-01	7.30E-02
FPM < 2.5-micrometer aero. dia.	FPM2.5			4.70E-02	7.30E-01	7.30E-02
Condensable Particulate Matter	CPM			4.70E-02	7.30E-01	7.30E-02
Sulfur Dioxide	SO2	2		1.43E-03	2.23E-02	2.23E-03
Nitrogen Oxides	NOX		4.53	1.43E+00	2.22E+01	2.22E+00
Carbon Monoxide	CO		2.61	8.22E-01	1.28E+01	1.28E+00
Volatile Organic Compounds	VOC		0.24	7.52E-02	1.17E+00	1.17E-01
Sulfuric Acid (SO3/H2SO4) as H2SO4	H2SO4	2		1.16E-04	1.80E-03	1.80E-04
Carbon Dioxide	CO2	3		163.1	2,534	253
Methane	CH4	3		6.61E-03	1.03E-01	1.03E-02
Nitrous Oxide	N2O	3		1.32E-03	2.06E-02	2.06E-03
Greenhouse Gas (GHG) as CO2 equiv.	CO2e			163.6	2,542	254

Notes:

1 Conversion from "g/kW-hr" to "g/hp-hr" based on 0.7457 "kW-hr/hp-hr" from EPA AP-42, Vol. 1, 5th Edition, Appendix A, 9/85 (reformatted 1/95)

2 SO2 and SO3/H2SO4 emission estimates are based on mass-balance calculation for conversion of fuel sulfur to SO2 or SO3/H2SO4.

3 US EPA, Code of Federal Regulations, Title 40, Part 98, Subpart A, Table A-1 and Subpart C, Tables C-1 & C-2, as amended 11-29-13 (78 FR 71904)

Table 4. Trace Elements Emission Estimates

Pollutant	(Symbol)	Note	Emission Factor, [1] lb/10^3 gal	Emission Factor, [1] lb/10^6 Btu	Hourly, lb/eng-hr	Annual, tons/yr
Arsenic	As	HAP		1.10E-05	1.71E-04	1.71E-05
Beryllium	Be	HAP		3.10E-07	4.82E-06	4.82E-07
Cadmium	Cd	HAP		4.80E-06	7.46E-05	7.46E-06
Chlorine as Hydrogen Chloride	HCl	2,HAP		3.11E-04	4.83E-03	4.83E-04
Chromium	Cr	HAP		1.10E-05	1.71E-04	1.71E-05
Lead	Pb	HAP		1.40E-05	2.18E-04	2.18E-05
Manganese	Mn	2,HAP		1.01E-04	1.57E-03	1.57E-04
Mercury	Hg	HAP		1.20E-06	1.86E-05	1.86E-06
Nickel	Ni	HAP		4.60E-06	7.15E-05	7.15E-06
Selenium	Se	HAP		2.50E-05	3.89E-04	3.89E-05

Notes:

1 Unless noted, emission factors are from EPA AP-42, Vol. I, 5th Ed., Section 3.1 - Stationary Gas Turbines - Supplement F, 4/00

2 HCl and Mn emission factors are derived from TVA Combustion-Turbine (CT) Fuel-Oil Specifications (#2 Distillate) Rev. 5.0, 17-Jan-2001
Chloride: 6 parts per million by weight (ppmw) Manganese: 2 ppmw

3 Trace Element Emission Factors from Distillate Oil Combustion, Paul Chu, EPRI, 5-13-99 (Source: PISCES database 4-6-99)

HAP This abbreviation denotes "Hazardous Air Pollutant."

ALLEN AERODERVIATIVE PROJECT: ULSD BLACK START GENERATOR

APC&M APS - Date: 21-Nov-24

Table 1. Diesel Engine Inputs

Parameter		Value	Units	Comment						Note
Number of Engines:		2		each with	0.8	ft stk ID and	10	ft stack height		1
Annual Operation, per BSG:		100	hr/yr	stk temp.:	840	F; stk flow:	13,180	acf/min and 437 ft/s		1,2
Rated Horsepower:		2,220	bhp/eng	SI equiv. = 1,655 kW/eng		Heat input equivalent is		15.5	*10^6 Btu/hr.	3
Fuel Consumption:		111	gal/eng-hr	Approx. fuel consumption per engine based on				7,000	Btu/hp-hr	4
Fuel Heat Content		140,000	Btu/gal	Nominal distillate-oil heat content (HHV)						5
No. 2 Fuel Oil Density:		7.05	lb/gal	Nominal distillate-oil density						6
No. 2 Fuel Oil Sulfur Content:		0.0015	weight %	Ultra-low-sulfur distillate oil						
Filterable Particulate Matter:	FPM	0.20	g/kW-hr	40 CFR 1039, App. I (Tier 2) standard for a >560 kW engine						
Nitrogen Oxides:	NOX	6.08	g/kW-hr	NOX+NMHC	6.4	g/kW-hr; 40 CFR 1039, App. I (Tier 2) >560 kW eng.				7
Carbon Monoxide:	CO	3.50	g/kW-hr	40 CFR 1039, App. I (Tier 2) standard for a >560 kW engine						
Volatile Organic Compounds:	VOC	0.32	g/kW-hr	40 CFR 1039, App. I (Tier 2) standard for a >560 kW engine						7
Fuel-Sulfur Oxidation:		5.0	%	Engine-outlet fuel-S conversion to SO3/H2SO4 (by analogy with CT units)						

Notes:

1 The black-start generators provide instantaneous power to a variety of equipment required for a LM2500 start and power to the switchyard. Although actual black starts are highly unlikely, annual hours provided here are from 40 CFR 63, Subpart ZZZZ. Stack dimensions are estimated based on the schematics in "Proposed DSDG scope and tech spec.pdf."

2 Stack temp. and flow derived from "QSK50-G4 Emissions Data Sheet.pdf"

3 QSK50-G4 Engine data.pdf

4 EPA AP-42, Vol. 1, 5th Ed., Chapter 3.4 - Large Stationary Diesel and All Stationary Dual-fuel Engines - Supplement B, 10/96

5 EPA AP-42, Vol. I, 5th Edition, Section 1.3 - Fuel Oil Combustion - Supplement E, 9/99 (corrected 5/10)

6 EPA AP-42, Vol. 1, 5th Edition, Appendix A, 9/85 (reformatted 1/95)

7 "CARB Emission Factors for CI Diesel Engines - Percent HC in Relation to NMHC+NOX," June 28, 2004: "When the [NMHC] and [NOX] emission factor is combined, assume a breakdown of 5% and 95%, respectively."

Table 5. Organic HAP Emission Estimates

Pollutant	(CASRN)	Note	Emission Factor, [1] lb/10^3 gal	lb/10^6 Btu	Hourly, lb/eng-hr	Annual, tons/yr
Acenaphthene	83-32-9	POM		4.68E-06	7.27E-05	7.27E-06
Acenaphthylene	208-96-8	POM		9.23E-06	1.43E-04	1.43E-05
Acetaldehyde	75-07-0	HAP		2.52E-05	3.92E-04	3.92E-05
Acrolein	107-02-8	HAP		7.88E-06	1.22E-04	1.22E-05
Anthracene	120-12-7	POM		1.23E-06	1.91E-05	1.91E-06
Benzene	71-43-2	HAP		7.76E-04	1.21E-02	1.21E-03
Benzo(a)anthracene	56-55-3	PAC		6.22E-07	9.67E-06	9.67E-07
Benzo(a)pyrene	50-32-8	PAC		2.57E-07	3.99E-06	3.99E-07
Benzo(b)fluoranthene	205-99-2	PAC		1.11E-06	1.72E-05	1.72E-06
Benzo(g,h,i)perylene	191-24-2	POM		5.56E-07	8.64E-06	8.64E-07
Benzo(k)fluoranthene	207-08-9	PAC		2.18E-07	3.39E-06	3.39E-07
Chrysene	218-01-9	PAC		1.53E-06	2.38E-05	2.38E-06
Dibenzo(a,h)anthracene	53-70-3	PAC		3.46E-07	5.38E-06	5.38E-07
Fluoranthene	206-44-0	PAC		4.03E-06	6.26E-05	6.26E-06
Fluorene	86-73-7	POM		1.28E-05	1.99E-04	1.99E-05
Formaldehyde	50-00-0	HAP		7.89E-05	1.23E-03	1.23E-04
Indeno(1,2,3-c,d)pyrene	193-39-5	PAC		4.14E-07	6.43E-06	6.43E-07
Naphthalene	91-20-3	HAP		1.30E-04	2.02E-03	2.02E-04
Phenanthrene	85-01-8	POM		4.08E-05	6.34E-04	6.34E-05
Pyrene	129-00-0	POM		3.71E-06	5.77E-05	5.77E-06
Toluene	108-88-3	HAP		2.81E-04	4.37E-03	4.37E-04
Xylenes	1330-20-7	HAP		1.93E-04	3.00E-03	3.00E-04
Polycyclic Aromatic Compounds	PAC			8.53E-06	1.33E-04	1.33E-05
Polycyclic Organic Matter	POM	HAP		8.15E-05	1.27E-03	1.27E-04
Organic HAP Total	--			1.57E-03	2.45E-02	2.45E-03
Total HAP	--			2.06E-03	3.20E-02	3.20E-03

Notes:

1 EPA AP-42, Vol. 1, 5th Ed., Chapter 3.4 - Large Stationary Diesel and All Stationary Dual-fuel Engines - Supplement B, 10/96

HAP This abbreviation denotes "Hazardous Air Pollutant."

PAC This abbreviation denotes "Polycyclic Aromatic Compounds". This group does not have an associated CASRN.

POM This abbreviation denotes "Polycyclic Organic Matter" (POM), which is broad class of organic compounds that includes PAH and PAC. The POM group is defined as a HAP.

ALLEN AERODERIVATIVE PROJECT: DISPERSION MODEL INPUTS

APC&M APS - Date: 21-Nov-24

Combustion turbine performance (i.e., heat input, generation, etc.) varies with ambient temperature. Consequently, AERSCREEN was utilized to determine the "worst case" modeling inputs. Results for each applicable pollutant is as followed:

	Max	Units	Scenario	Load	Ambient
TPM10/2.5	2.2	µg/m^3	Evap. Off	50%	95 F
NOX	1.2	µg/m^3	Evap. Off	50%	95 F

Table A. LM2500 Operational Inputs — Stack: 9 feet ID and 72 feet high

Ambient Temp., deg. F	Heat Input, 10^6 Btu[HHV]/CT-hr Natrl Gas	Natural Gas-Fired Stack Parameters: F-Factor dscf/10^6 Btu	Stk Temp, deg F	Stk O2, %	Stk H2O, %	Stk Flow, acfm	--	--	--	--	--
59	325	8,710	850			402,518	--	--	--	--	--
95 [50%]	197	8,710	850			246,329	--	--	--	--	--

Scenario	Annual Op Hours	SCR+NH3 Op Fctr, %	--	--	--	FPM10/2.5 lb/10^6 Btu	CPM lb/10^6 Btu	SO2 lb/10^6 Btu	NOX ppmvd 15	CO ppmvd 15	VOC ppmvd 15	H2SO4 lb/10^6 Btu
Natrl Gas	3,259	100	--	--	--	7.14E-03	2.40E-03	6.00E-04	2.5	5.0	2.5	1.36E-04

Table A-2. LM2500 Full Load (Evaporative Cooling On) Operations at 59 deg F Ambient [English Units]

Scenario	--	--	Stk Temp, deg F	Stk Flow, acfm	Stk Vel., ft/s	Full Load Op. w/ Evap. Cooling at 59 deg F, lb/CT-hr: TPM10	TPM2.5	SO2	NOX	CO	VOC	H2SO4
	--	--										
Natrl Gas	--	--	850	402,518	105	3.10E+00	3.10E+00	1.95E-01	3.00E+00	3.65E+00	1.04E+00	0.00E+00

Table A-3. LM2500 50% Load (Evaporative Cooling Off) Operations at 95 deg F Ambient [English Units]

Scenario	--	--	Stk Temp, deg F	Stk Flow, acfm	Stk Vel., ft/s	50% Load Op. w/o Evap. Cooling at 95 deg F, lb/CT-hr: TPM10	TPM2.5	SO2	NOX	CO	VOC	H2SO4
	--	--										
Natrl Gas	--	--	850	246,329	65	1.88E+00	1.88E+00	1.18E-01	1.81E+00		6.32E-01	0.00E+00

Table B-1. Natural Gas Startup and Shutdown Operations - Stack Parameters and Emission Estimates [English Units]

Event Type	Annual Events	Duration, Hours	Stk Temp, deg F	Stk Flow, acfm	Stk Vel., ft/s	Startup/Shutdown Operations, lb/CT-hr: TPM10	TPM2.5	SO2	NOX	CO	VOC	H2SO4
Startup	350	0.50	987	387,759	102	5.40E+00	5.40E+00	2.00E-01	2.30E+01	1.80E+01	8.00E-01	3.56E-02
Shutdown	350	0.15	850	402,518	105	4.00E+00	4.00E+00	6.67E-01	2.07E+01	6.00E+01	2.67E+00	2.14E-02

Tbl B-1 [1]: Each unit's expected startup events will last 175.0 hours/CT-year; expected shutdown events will last 52.5 hours/CT-year. The given number of starts/shutdowns per year is equivalent to 1 starts/shutdowns per day. For any given day (i.e., 24-hour period) of a year, the probability of a startup (coupled with a subsequent shutdown) occuring is 100 %; therefore, in one 24 hour period TVA assumes (at least) 1 startup. The standards less than 24-hour calculate the chances a startup/shutdown may occur.

Table C-1. Natural Gas Max **1-Hour Average** Stack Parameters and Emission Rates [English Units]

Scenario	--	Averaging Period, hrs	Stk Temp, deg F	Stk Flow, acfm	Stk Vel., ft/s	Startup + 50% Load Op. w/o Evap. Cooling at 95 deg F + Shutdown, lb/CT-hr: TPM10	TPM2.5	SO2	NOX [1]	CO	VOC	H2SO4
	--											
Startup	--	0.50	987	387,759	102				9.58E-01			
50% Load	--	0.35	850	246,329	65				1.81E+00			
Shutdown	--	0.15	850	402,518	105				8.61E-01			
Avg. Rate	--	1	919	340,472	89				3.63E+00			

Tbl C-1 [1]: Modeling one (or more) startup and/or shutdown every hour of the day is excessive because these events are transient and intermittent. Here, startup/shutdown emission rates consider the likelihood that one startup/shutdown event would occur in a given 1-hour interval of a 24 hour period. The chance for a startup/shutdown event in any 1-hour interval is 1/24* 100% = 4.2%; consequently, startup/shutdown rates are adjusted accordingly to determine representative emissions [*]. Additionally, the 1-hour emission rate associated with the "Avg. Rate" row is a sum and not a weighted average; using the weighted average would result in an 1-hour emission rate less than what occurs at full load.

[*] Because the pollutant standard is being evaluated, a representative emission rate of the pollutant needs to be determined. Worst-case is assured via assuming continuous operations and calculating a weighted-average for stack temperature and stack-tip velocity, which are two modeled paramaters inherent to the operating unit.

Table E-1. Natural Gas Max **24-Hour Average** Stack Parameters and Emission Rates [English Units]

Unit/Stack ID	--	Averaging Period, hrs	Stk Temp, deg F	Stk Flow, acfm	Stk Vel., ft/s	Startup + 50% Load Op. w/o Evap. Cooling at 95 deg F + Shutdown, lb/CT-hr: TPM10	TPM2.5	SO2	NOX	CO	VOC	H2SO4
	--											
Startup	--	0.50	987	387,759	102	5.40E+00	5.40E+00	2.00E-01	2.30E+01		8.00E-01	3.56E-02
50% Load	--	23.4	850	246,329	65	1.88E+00	1.88E+00	1.18E-01	1.81E+00		6.32E-01	0.00E+00
Shutdown	--	0.15	850	402,518	105	4.00E+00	4.00E+00	6.67E-01	2.07E+01		2.67E+00	2.14E-02
Avg. Rate	--	24	853	250,251	66	1.96E+00	1.96E+00	1.23E-01	2.37E+00		6.49E-01	8.75E-04

ALLEN AERODERIVATIVE PROJECT: DISPERSION MODEL INPUTS

APC&M APS - Date: 21-Nov-24

Table F-1. Natural Gas **Annual Average** Stack Parameters and Emission Rates [English Units]

Scenario	--	Averaging	Stk Temp,	Stk Flow,	Stk Vel.,	Startup + Full Load w/ Evap. Cooling at 59 F + Shutdown, lb/CT-hr						
	--	Period, hrs	deg F	acfm	ft/s	TPM10	TPM2.5	SO2	NOX	CO	VOC	H2SO4
Avg. Rate	--	8760	857	401,777	105	1.29E+00	1.29E+00		1.70E+00			

Tbl F-1 [1]: Stack-exit parameters are based on predicted annual CT-operating hours; whereas, emission rates based on total annual hours (i.e., 8760 hours per year). Because an annual concentration must be determined from modeling, emission rates must be averaged out for the entire year, which would account for periods of no CT operations. Stack-exit parameters are not averaged over the entire year because they are inherent to and only applicable when the CT operates

Table G. Ancillary Equipment Stack Parameters and Emission Estimates [English Units]

Unit/Stack	Stk Dia.	Stk Height	Stk Temp,	Stk Flow,	Stk Vel.,	Maximum Capacity Emissions, lb/unit-hr						
ID	feet	feet	deg F	acfm	ft/s	TPM10	TPM2.5	SO2	NOX	CO	VOC	H2SO4
BSG [1]	0.80	10	840	13,180	437	1.46E+00	1.46E+00	2.23E-02	2.22E+01	1.28E+01	1.17E+00	1.80E-03

Tbl G [1]: Although BSG operations during emergency use is unlikely to occur and/or only occur when other SIA TVA/non-TVA sources are not operating, Region 4 recommends (and SCHD concurs) via a 8-21-24 email from W. Khokhar (modeling protocol "Final Feedback") that maintenance and readiness testing (MRT) be included in modeling applicable air quality standards other than 1-hour NO2 and 1-hour SO2 (both 1-hour standards' guidance exempts intermittent sources).

Because the pollutant standard being evaluated is of a longer duration than an actual MRT event, a representative emission rate of the pollutant needs to be determined. Stack-exit parameters are not averaged over the entire standard because they are inherent to and only applicable when the BSGs operate.

Each BSG is allowed to run for MRT 100 hours/year via 40 CFR § 63.6640(f), which serves as basis for the following calculations.

Table Ga. Max 24-Hour Average Stack Parameters and Emission Rates [English Units]

Unit/Stack	--	Averaging	Stk Temp,	Stk Flow,	Stk Vel.,	BSG 24-Hour Max Capacity Emissions, lb/unit-hr [1a]						
ID	--	Period, hrs	deg F	acfm	ft/s	TPM10	TPM2.5	SO2	NOX	CO	VOC	H2SO4
BSG 1/2	--	24	840	13,180	437	8.33E-03	8.33E-03					

Tbl Ga [1a]: Modeling any one MRT event is difficult because these events are transient and random. TVA expects each MRT event to only last 0.5 hours because operational needs during a black start will only last long enough until one (or more) LM2500 is at full load (about 5-10 minutes). Therefore, modeling a half-hour (30-minute) MRT event is accurate-to-conservatively high.

TVA tests emergency equipment only during normal daytime work hours. The opportunity for testing is half of the 24-hours available making any MRT event less likely to occur. The emission rate is adjusted to reflect the lower chance that testing will occur for a given 24-hour period.

Table Gb. Annual Average Stack Parameters and Emission Rates [English Units]

Unit/Stack	--	Averaging	Stk Temp,	Stk Flow,	Stk Vel.,	BSG Annual Average Max Capacity Emission, lb/unit-hr [1b]						
ID	--	Period, hrs	deg F	acfm	ft/s	TPM10	TPM2.5	SO2	NOX	CO	VOC	H2SO4
BSG 1/2	--	8760	840	13,180	437	3.96E-03	3.96E-03		6.01E-02			

Tbl Gb [1b]: TVA tests emergency equipment only during normal daytime work hours: 2,080 hours/year. An annual, representative emission rate includes the chance that an MRT event may occur.

Table 1-Gas. 1-Hour Average Stack Parameters and Emission Rates [Metric Units]

Unit/Stack	Stk Dia.	Stk Height	Stk Temp,	Stk Flow,	Stk Vel.,	Startup + 50% Load Op. w/o Evap. Cooling at 95 deg F + Shutdown, g/CT-s						
ID	meters	meters	K	m^3/s	m/s	TPM10	TPM2.5	SO2	NOX	CO	VOC	H2SO4
ACT50/55	2.74	21.9	766	161	27.2				4.58E-01			

Table 2-Gas. 24-Hour Average Stack Parameters and Emission Rates [Metric Units]

Unit/Stack	Stk Dia.	Stk Height	Stk Temp,	Stk Flow,	Stk Vel.,	Startup + 50% Load Op. w/o Evap. Cooling at 95 deg F + Shutdown & BSG Engines, g/unit-s						
ID	meters	meters	K	m^3/s	m/s	PM10	PM2.5	SO2	NOX	CO	VOC	H2SO4
ACT50/55	2.74	21.9	729	118	20.0	2.48E-01	2.48E-01					
ACT56/57	0.24	3.05	722	6.22	133	1.05E-03	1.05E-03					

Table 3-Gas. Annual Average Stack Parameters and Emission Rates [Metric Units]

Unit/Stack	Stk Dia.	Stk Height	Stk Temp,	Stk Flow,	Stk Vel.,	Startup + Full Load w/ Evap. Cooling at 59 F + Shutdown & BSG Engines, g/unit-s						
ID	meters	meters	K	m^3/s	m/s	PM10	PM2.5	SO2	NOX	CO	VOC	H2SO4
ACT50/55	2.74	21.9	731	190	32.1	1.62E-01	1.62E-01		2.14E-01			
ACT56/57	0.24	3.05	722	6.22	133	4.99E-04	4.99E-04		7.58E-03			

Table VISCREEN

Unit/Stack	--	--	--	--	--	Startup + 50% Ld w/o Evap. Cooling at 95 deg F + Shutdown & Ancillary Equip., g/s						
ID	--	--	--	--	--	SO2	SO4	NOX	SOA	PMF	PMC	--
ACT Aeros	--	--	--	--	--			1.83E+00		1.49E+00		

CALCULATION CONSTANTS

Table 1. Molecular Weights [1]

	Formula	MW
Ammonia	NH3	17.0304
Ammonium Sulfate	(NH4)2SO4	132.1382
Argon	Ar	39.948
Butane	C4H10	58.1236
Carbon Dioxide	CO2	44.00995
Carbon Monoxide	CO	28.01055
Chloride	Cl	35.453
Ethane	C2H6	30.0697
Fluoride	F	18.9984
Formaldehyde	CH2O	30.02635
Hexane	C6H14	86.1775
Hydrogen Chloride	HCl	36.4609
Hydrogen Fluoride	HF	20.0063
Hydrogen Sulfide	H2S	34.0798
Mercury	Hg	200.59
Methane	CH4	16.04275
Natural Gas [2]	--	17.1676532
Nitrogen	N2	28.0134
Nitrogen Monoxide	NO	30.0061
Nitrogen Oxides (as NO2)	NOX	46.0055
Oxygen	O2	31.9988
Pentane	C5H12	72.15055
Propane	C3H8	44.09665
Selenium	Se	78.96
Sulfur	S	32.064
Sulfur Dioxide	SO2	64.0628
Sulfur Trioxide	SO3	80.0622
Sulfuric Acid	H2SO4	98.0774
Water	H2O	18.0152

Note:

1 Chemical Engineers' Handbook, 5th Edition, R.H. Perry & C.H. Chilton, Editors, 1973

2 Gas-fired performance specifications/guarantees are based on the following TVA-provided natural gas analysis:

Consituent		MW	%, vol.	Fuel, mol	O2, mol	H2O, mol	CO2, mol
Methane	CH4	16.04275	94.71	1	2	2	1
Ethane	C2H6	30.0697	2.62	2	7	6	4
Propane	C3H8	44.09665	0.52	1	5	4	3
Butane	C4H10	58.1236	0.22	2	13	10	8
Pentane	C5H12	72.15055	0.08	1	8	6	5
Hexane+	C6H14	86.1775	0.085	2	19	14	12
Nitrogen	N2	28.0134	0.495				
Carbon Dioxide	CO2	44.00995	1.27				

AP-42 natural gas constants are at 60 deg F, which equates to 0.04524 lb/scf.

Table 2. Default Greenhouse-Gas (GHG) Emission Factors (lbs/10^6 Btu) [1]

Fuel	CO2	CH4	N2O	CO2e
Pipeline Natural Gas	117.0	2.20E-03	2.20E-04	117.1
Distillate Oil (No. 2)	163.1	6.61E-03	1.32E-03	163.6

Note:

1 US EPA, Code of Federal Regulations, Title 40, Part 98, Subpart C, Tables C-1 & C-2, as amended 11-29-13 (78 FR 71904)

Table 3. Global Warming Potentials (GWP) for Combustion-Source Greenhouse-Gas (GHG) Pollutants (100-Year Time Horizon) [1]

	CO2	CH4	N2O
Global Warming Potntl	1	28	265

Note:

1 US EPA, Code of Federal Regulations, Title 40, Part 98, Subpart A, Table A-1, as revised 4-25-2024 (89 FR 31802)

Table 4. Molar Volume and F-Factors

Gas Constant:	0.7302	ft^3-atm/(lbmol-deg R)	
Standard Temp:	68	degF	40 CFR 60 Appendix, Method 19, Table 19-2, Footnote
Standard Press:	1	atm	40 CFR 60 Appendix, Method 19, Table 19-2, Footnote
Molar Volume:	385.3	ft^3/lbmole	
F Factor - Nat Gas:	8,710	dscf/10^6 Btu	40 CFR 60 Appendix, Method 19, Table 19-2
F Factor - Oil:	9,190	dscf/10^6 Btu	40 CFR 60 Appendix, Method 19, Table 19-2
Perfect Heat Rate:	3,413	Btu/kWh	40 CFR 60 Subpart TTTT, Eq. 3, and "Potential electric output" definition

Attachment 11

ORAL ARGUMENT NOT YET SCHEDULED

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 18-1167

SIERRA CLUB,

Petitioner,

v.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, and ANDREW WHEELER, ADMINISTRATOR,

Respondents.

ON PETITION FOR REVIEW OF ACTION BY THE
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

FINAL BRIEF OF RESPONDENTS

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Dated: June 11, 2019

STATEMENT OF ISSUES

1. Whether the Court has jurisdiction to review a guidance statement concerning permitting that is not the final step in an Agency rule-making process, but rather provides recommendations to permitting authorities of legal and technical analysis rather than binding determinations, and thus leaves ultimate decision-making on each permit application to the exercise of those permitting authorities' discretion in a manner reviewable elsewhere?

2. If the Court has jurisdiction, whether the Act is ambiguous regarding the degree of air quality impact from a proposed source that will "cause, or contribute to" a violation, and whether EPA has reasonably interpreted that statutory phrase in light of the text, purposes and structure of the Act?

3. If the Court has jurisdiction, whether the significant impact levels recommended by the Guidance are a reasonable exercise of EPA's statutory authority to specify air quality models and the conditions under which they may be used by a permit applicant to "demonstrate" that its proposed construction will not "cause, or contribute to" a violation?

STATEMENT OF THE CASE

I. STATUTORY BACKGROUND

Congress enacted the Clean Air Act, 42 U.S.C. §§ 7401-7671q, in 1970 "to respond[] to the growing perception of air pollution as a serious national problem,"

technical expertise." *City of Waukesha v. EPA*, 320 F.3d 228, 247 (D.C. Cir. 2003) (internal quotation marks omitted). "Such deference is especially appropriate in [the Court's] review of EPA's administration of the complicated provisions of the Clean Air Act." *Catawba*, 571 F.3d at 41 (citation omitted).

In reviewing EPA's interpretation of the Act, the Court must inquire whether Congress "has directly spoken to the precise question at issue" and, if so, must give effect to Congress' "unambiguously expressed intent." *Chevron, U.S.A., Inc. v. NRDC*, 467 U.S. 837, 842-43 (1984). If the statute is "silent or ambiguous with respect to the specific issue," the Court considers "whether the agency's answer is based on a permissible construction," *id.* at 843, and "may not substitute its own construction . . . for [EPA's] reasonable interpretation." *Id.* at 844.

SUMMARY OF ARGUMENT

The Guidance is not a final agency action subject to this Court's review, as it does not establish any new binding legal norm. SILs have been used for decades, consistent with EPA regulations, in making the air quality demonstration that is required of a permit applicant. The Guidance does not alter how SILs have historically been used in that context. Rather, it identifies new SIL values for $PM_{2.5}$ and ozone based on an improved statistical and analytic approach and recommends that permit applicants and permitting authorities apply those values in making the required demonstration.

Additionally, the Guidance is supported by a more robust legal justification of how the use of SILs comports with applicable statutory provisions and case law. The Guidance only makes *recommendations* and supplies a supporting rationale that states and EPA field offices may elect to use in their permitting decisions. The Guidance is *not* binding in any particular permit application review, has no legal effect, and does not substitute for or reduce the discretion that individual permitting authorities have in reviewing each permit application and in making permitting decisions subject to review. The decision each permitting authority makes must stand or fall on the record developed in that permitting proceeding and based on the justification that the permitting authority provides. The Guidance does not purport to and in fact does not, merely by its issuance, "authorize" any particular decision by a permitting authority. As such, the Guidance is not a reviewable final action, and the issues Petitioner seeks to raise will not be ripe unless and until they arise in the context of a specific permitting decision. *See infra* Arguments I, II.

On the merits (Argument III), EPA's interpretation of the "cause, and contribute to" language in 42 U.S.C.§ 7475(a)(3) is consistent with the Court's case law finding that the term "contribute" does not have a plain and obvious meaning and is ambiguous in the context of air pollutant emissions. EPA reasonably interprets the language to allow permitting authorities to conclude that

modeled air quality impacts below the recommended SILs, based on consideration of the facts in each permitting action and the statistical analysis developed by EPA, do not cause or contribute to a violation in the modeled area. EPA thoroughly explained the statistical methodology underlying the recommended SIL values. Petitioner fails to overcome the extreme deference owed to EPA regarding the development of that methodology.

ARGUMENT

I. THE GUIDANCE IS NOT FINAL AGENCY ACTION.

The Clean Air Act's judicial review provision states, in pertinent part, that "nationally applicable regulations promulgated, or [any other] final action taken, by the Administrator under this chapter" is subject to review. 42 U.S.C. § 7607(b)(1). EPA did not "promulgate" the Guidance as a "regulation[]", but rather wrote informal Guidance consistent with its stated aim of giving non-binding recommendations.[11] Thus, the Guidance is reviewable only if it is "other . . . *final* action." *Id.* § 7607(b)(1) (emphasis added); *see Portland Cement Ass'n v. EPA*, 665 F.3d 177, 193 (D.C. Cir. 2011). This finality inquiry is governed by the familiar two-part test in *Bennett v. Spear*, 520 U.S. 154 (1997). Under *Bennett*, to be final, an action "must be one by which rights or obligations have been

[11] Petitioner has not mounted any procedural challenge to the Guidance.

determined, or from which legal consequences will flow," and "must mark the consummation of the agency's decisionmaking process . . . it must not be of a merely tentative or interlocutory nature." *Id.* at 177-78 (internal quotations and citations omitted). The Guidance meets neither criterion.

A. The Guidance Does Not Have Binding Legal Consequences or Conclusively Determine Rights or Obligations.

When deciding whether guidance statements "determine rights or obligations," this Court has considered factors including: (1) "most important[ly,] . . . the actual legal effect (or lack thereof) of the agency action in question on regulated entities"; (2) "the agency's characterization of the guidance"; and (3) "whether the agency has applied the guidance as if it were binding on regulated parties." *National Mining Ass'n v. McCarthy*, 758 F.3d 243, 253 (D.C. Cir. 2014). Here, all of these factors weigh against finality.

1. The Guidance has no legal effect on regulated entities.

As to the Guidance's "actual legal effect . . . on regulated entities": it has none. The Guidance contains recommended SIL values that "permit applicants and permitting authorities may elect to use," and supporting legal and technical analyses that "permitting authorities may choose to adopt [as well as the Guidance itself]" in supporting the use of the SILs in particular [] permitting actions. Guidance at 1 (JA0002). In advance of a planned future EPA SILs rulemaking,

decisions on whether to allow the use of SILs in permitting actions are made under existing statutory and regulatory Prevention of Significant Deterioration permitting requirements by individual permitting authorities. They "retain discretion whether to apply SILs as a general matter, or in particular permitting actions." *Id.* at 10 (JA0011). EPA explicitly stated in the Guidance that "[s]ince this guidance is neither a final determination nor a binding regulation, permitting authorities retain the discretion not to use the SILs as described here, either in specific cases or programmatically." *Id.* at 19 (JA0020). Permitting authorities also may develop and justify the use of different SIL values than those the Guidance recommends, supported by a record showing that "the value represents a level below which a proposed source does not cause or contribute to a violation of the NAAQS or [] increment." *Id.* at 19-20 (JA0020-0021).

Contrary to Petitioner's claims, *e.g.*, Pet. Br. at 13, the Guidance does not in any legal or regulatory sense "authorize" a determination that any specific proposed source will not cause or contribute to a violation. Legal requirements in the Clean Air Act and EPA's regulations for the issuance of permits, including the "demonstration" requirement of 42 U.S.C. § 7475(a)(3), remain wholly unchanged by the Guidance. And, apart from its general complaints about "authorization," Petitioner does not show that the Guidance is written or has been applied in a binding manner.

providing non-binding guidance so that we may gain valuable experience and information as permitting authorities use their discretion to apply and justify the application of the SILs values identified below on a case-by-case basis . . . ." *Id.* Second, "EPA will use this experience and information to assess, refine and, as appropriate, codify SIL values and specific applications of those values in a future, potentially binding rulemaking." *Id.*; *see also* RIN 2060-AR28 (JA0874) (EPA's Fall 2018 regulatory agenda, noting that "[b]ased on the information gathered from the implementation of [the Guidance] by the permitting authorities, EPA will complete a rulemaking action, as appropriate").

EPA indicated that it will consider whether the case-by-case permitting experience "has confirmed that the recommended SIL values are suitable in all circumstances to show that an increase in air quality concentration below the value does not cause or contribute to a violation." Guidance at 3 (JA0004). However, pending that, EPA's Guidance cannot, by itself, be the basis for a permit decision. EPA emphasized permitting authorities' discretion "to develop alternative SIL values," including SILs based on different confidence intervals or taking into account regional or local factors. *Id.* Thus, the content of a future proposed rulemaking for ozone and $PM_{2.5}$ SILs, let alone a final regulation, is undetermined. *See SEC v. Chenery*, 332 U.S. at 202 ("Not every principle essential to the

challenge the state's issuance of a PSD permit); 77 Fed. Reg. 65,305, 65,306 (Oct. 26, 2012) (EPA "interpret[s] the [Act] to require an opportunity for judicial review of a decision to grant or deny a [Prevention of Significant Deterioration] permit, whether issued by EPA or by a State under a SIP-approved or delegated [] program" (citing 61 Fed. Reg. 1880, 1882–83 (Jan. 24, 1996)). A state permitting agency's decision to use the SILs recommended in the Guidance would likewise be reviewable by a state court.

III. THE GUIDANCE REASONABLY INTERPRETS 42 U.S.C. § 7475(a)(3).

The Act provides that a permit applicant must "demonstrate[] that emissions from construction or operation of the applicant's proposed facility will not cause, or contribute to" a violation of the NAAQS or an increment. 42 U.S.C. § 7475(a)(3). This Court has held that the term "contribute" is ambiguous, leaving EPA and permitting authorities discretion to determine what air quality impact "causes, or contributes." Petitioner's plain meaning argument is contrary to the statutory text and well established case law.

A. The Act Is Ambiguous Regarding The Degree of Air Quality Impact That "Causes, or Contributes to" a Violation and Leaves EPA and Permitting Authorities Discretion in Making That Judgment.

As discussed above, the Act states that the owner or operator of a proposed source must "demonstrate[] that emissions from construction or operation of such

"significant impact" to identify a degree of change in air quality that is distinguishable from the inherent variability in pollutant concentrations and can thus represent an impact that causes or contributes to a violation of air quality standards.

In short, Petitioner identifies no sound basis to depart from *Catawba County* and *EDF* and conclude that Congress has unambiguously commanded Petitioner's reading of "contribute." Accordingly, if the Court reaches the merits, it should find that the statutory text is ambiguous and subject to reasonable interpretation.

B. EPA's Non-binding Interpretation of Section 7475(a)(3) to Apply to Meaningful Impacts on Air Quality is Reasonable.

In the absence of specific language in section 7475(a)(3) regarding the degree of contribution that is required, EPA or another permitting authority has discretion to exercise its expertise. They can apply their judgment to determine the degree of impact that "contributes" to a violation of the NAAQS or increment based on the particular context in which that term is used. Memorandum at 4-5 (JA0025-0026). For purposes of the Guidance, EPA determined that the $PM_{2.5}$ and ozone SILs may be used as acceptable quantitative criteria to identify the degree of impact on air quality that is a "significant" or "meaningful" "impact"—i.e., "more than 'inconsequential' or 'negligible'—and thus amounts to a "contribution" for

impact from the proposed source may be considered not meaningful. Therefore, the approach EPA describes in its Guidance is consistent with this Court's observation in *Sierra Club*, 705 F.3d at 465, that it would be unlawful to "rely[] on permitting authorities to address violations [by revising their plans], rather than to prevent violations by requiring demonstration that a proposed source or modification will not cause a violation."

2. The Guidance does not "exempt" sources or "authorize violations."

Petitioners' remaining criticisms of EPA's legal interpretation are also misplaced. Nowhere does the Guidance purport to "authorize 'permitting authorities to automatically exempt sources with projected impacts below the SILs" from the demonstration requirement. Pet. Br. at 29, *quoting Sierra Club*, 705 F.3d at 465. On the contrary, EPA said directly that "SILs do not function to exempt a source from making the demonstration required by section 165(a)(3)" but rather "provide a streamlined means of making the air quality impact demonstration" required by this provision. Memorandum at 13 (JA0034); see also Guidance at 5 (JA0006). EPA also made clear that the Guidance, unlike the 2010 rule, does not rely on any theory of inherent agency authority to exempt *de minimis* circumstances from regulation. *See* Memorandum at 12-14 (JA0033-0035). Rather, as shown above, the Guidance expresses the interpretive view that "the

Attachment 12

ORAL ARGUMENT SCHEDULED FOR SEPTEMBER 24, 2012

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 10-1413

SIERRA CLUB,

Petitioner,

v.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, and
LISA PEREZ JACKSON, ADMINISTRATOR,

Respondents.

ON PETITION FOR REVIEW OF FINAL ACTIONS BY THE
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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Dated: June 26, 2012

Nevertheless, EPA expects permitting agencies to be cautious about using SILs where a number of *de minimis* impacts could collectively create air quality problems. *See* RTC at 62 (JA00194) ("In short, it is not our intent that the SILs be used as a means of allowing known adverse air quality situations to be ignored just because they are small."). If, for example, the cumulative effect of a number of *de minimis* impacts in an area can be shown to cause air quality problems that are not being addressed simply because no source's impact is "significant" then the permitting authority must address the air quality problems, either by using lower *de minimis* levels, or by temporarily ceasing to use the *de minimis* concept altogether where it is known to allow the adverse conditions to worsen without remedy, or by taking some other step to address the problems. *Id.*

2. $PM_{2.5}$ Significant Monitoring Concentrations

The Rule also added a significant monitoring concentration ("SMC") for $PM_{2.5}$ to the long-standing monitoring exemption provision (promulgated in the 1980 PSD regulations at 45 Fed. Reg. at 52,710 (JA0009)). *See* 75 Fed. Reg. at 64,866-67 (JA0070-0071) (40 C.F.R. § 51.166(i)(5)(i)(c); § 52.21(i)(5)(i)(c)). EPA proposed and evaluated three options for determining an appropriate SMC that would identify the degree of ambient impact on $PM_{2.5}$ concentration that is truly *de minimis*. 72 Fed. Reg. at 54,141-42 (JA0052-0053). Ultimately, EPA selected the option that is based on the lowest detectable concentration, adjusted by

228, 247 (D.C. Cir. 2003) (internal quotation marks omitted). "Such deference is especially appropriate in [the court's] review of EPA's administration of the complicated provisions of the Clean Air Act." *Catawba*, 571 F.3d at 41 (citation omitted).

When reviewing EPA's statutory interpretation, the Court first inquires whether Congress "has directly spoken to the precise question at issue," in which case the Court "must give effect to the unambiguously expressed intent of Congress." *Chevron, U.S.A., Inc. v. NRDC*, 467 U.S. 837, 842-43 (1984). If the statute is "silent or ambiguous with respect to the specific issue," the Court moves to *Chevron's* second step and must defer to the agency's interpretation so long as it is "based on a permissible construction of the statute." *Id*.

Under *Chevron* step two, considerable deference must be accorded to the interpretation of the agency assigned to administer that statute. In applying that deference, the agency's interpretation must be upheld "if it is a reasonable interpretation of the statute – not necessarily the only possible interpretation, nor even the interpretation deemed *most* reasonable by the courts." *Entergy Corp. v. Riverkeeper, Inc*., 556 U.S. 208, 218 (2009) (emphasis in original). Moreover, heightened deference is to be given to an agency's interpretation of a statute that is complex and within the agency's expertise. *United States v. Mead*, 533 U.S. 218, 227-31 (2001). The CAA is precisely this type of statute. *NRDC v. EPA*, 571 F.3d

1245, 1251 (D.C. Cir. 2009). *See also Am. Electric Power Co. v. Connecticut*, 131 S. Ct. 2527, 2533 n.2 (2011) (describing the "complicated issues related to carbon-dioxide emissions and climate change").

Finally, to the extent that EPA's longstanding interpretation reflected in its PSD regulations authorizing the use of *de minimis* screening levels does not foreclose Petitioners' arguments under 42 U.S.C. § 7607(b), *see infra* argument III.A, EPA's interpretation must at the very least be accorded substantial deference. *Envtl. Def. v. Duke Energy Corp.,* 549 U.S. 561, 575 (2007); *Alaska Dep't of Envtl. Conservation v. EPA*, 540 U.S. 461, 487 (2004) ("We 'normally accord particular deference to an agency interpretation of longstanding' duration.") (citations omitted).

In reviewing EPA's use of its *de minimis* authority recognized in *Alabama Power Co. v. EPA*, 636 F.2d 323, 360-61 (D.C. Cir. 1979), the Court should apply the same deference that is accorded the agency's "reasonable interpretation of an ambiguous statute." *Envtl. Def. Fund, Inc. ("EDF") v. EPA*, 82 F.3d 451, 467 (D.C. Cir. 1996), *amended by,* 92 F.3d 1209 (D.C. Cir. 1996) (citing *Chevron,* 467 U.S. at 843; *Ohio v. EPA*, 997 F.2d 1520, 1535 (D.C. Cir. 1993)); *see also Ober v. Whitman*, 243 F.3d 1190, 1195 (9th Cir. 2001) ("EPA, in discharging its duty to enforce the Act, is permitted under *Chevron* to exempt *de minimis* sources of PM-10 from pollution controls.").

Section 165(a)(3) provides that "[n]o major emitting facility . . . may be constructed in any area to which [the PSD program] applies unless" . . . the facility "*demonstrates*" that its emissions "will not *cause, or contribute to*, air pollution in excess of any (A) [increment] for any pollutant . . . [or] (B) national ambient air quality standard for any pollutant." 42 U.S.C. § 7475(a)(3) (emphasis added). While it is clear that such a demonstration must be made to obtain a PSD permit, the statute does not define the phrase "cause, or contribute to," or specify how a facility is to "demonstrate" that it does not cause or contribute to a violation of the NAAQS or increments. Therefore, the statute is ambiguous with respect to the precise questions at issue here, and EPA's permissible interpretation of these terms must be upheld. *Chevron,* 467 U.S. at 843.

As this Court recently observed, dictionary definitions of "contribute" vary as to whether the word implicitly includes a level of significance or is defined without reference to any threshold level of significance. *Catawba*, 571 F.3d at 38-39 (discussing meaning of "contribute" in 42 U.S.C. § 7407(d), and concluding that the provision "is ambiguous as to how EPA should measure contribution and what degree of contribution is sufficient"). In that case, petitioners had argued that EPA was *required* to interpret the word "contribute" in section 107(d) of the CAA to incorporate a significance threshold. *Id.* The *Catawba* court concluded that the fact that the term "contribute" may or may not connote a significance threshold

specifically cautioned against the use of SILs in circumstances where the ambient air quality in an area is close to the NAAQS or close to consuming the increment. *See* 75 Fed. Reg. at 64,894 (JA0098) ("[W]e have historically cautioned states that the use of a SIL may not be appropriate when a substantial portion of any NAAQS or increment is known to be consumed."). Similarly, EPA stated that SILs *should not* be used where a number of *de minimis* impacts could collectively cause a violation. *See* RTC at 62 (JA00194) ("If, for example, the cumulative effect of a number of *de minimis* impacts in an area can be shown to cause air quality problems that are not being addressed simply because no source's impact is "significant" then the permitting authority must address the air quality problems, whether by using lower *de minimis* levels or temporarily cease using the *de minimis* concept altogether where it is known to allow the adverse conditions to worsen without remedy, or taking some other step to address the problems.").

In short, EPA did not and does not intend for SILs "to be used as a means for allowing known adverse air quality situations to be ignored just because they are small." RTC at 62 (JA00194). Thus, in the preamble to the final Rule, EPA stated: "[N]otwithstanding the existence of a SIL, permitting authorities should determine when it may be appropriate to conclude that even a *de minimis* impact will 'cause or contribute' to an air quality problem and to seek remedial action from the proposed new source or modification." 75 Fed. Reg. at 64,892 (JA0096).

fact, there is "virtually a presumption in its favor." *Public Citizen v. Young*, 831 F.2d 1108, 1113 (D.C. Cir. 1987).

As applied here, EPA is using SILs to identify a level of impact on ambient air quality that EPA regards as truly *de minimis*, in that requiring more detailed air quality analysis would have virtually no benefit. A source that demonstrates its impact does not exceed a SIL is not required to conduct more extensive air quality analysis or modeling to demonstrate that those emissions "will not cause, or contribute to" a violation of the NAAQS or increment. 42 U.S.C. § 7475(a)(3). Because in such circumstances the source's impacts alone are *de miminis*, i.e., insignificant, a cumulative impact analysis and modeling by that source would yield information of trivial value. It thus makes little economic or environmental sense to require that work to be done.

As discussed more fully below, EPA's interpretation of section 165(a)(3) to allow sources with *de minimis* impacts to demonstrate compliance with NAAQs and increments without a comprehensive cumulative impact analysis is firmly grounded in EPA's *de minimis* authority under *Alabama Power* and reflects a permissible construction of the statute under *Chevron*. Petitioner's arguments against EPA's use of its *de minimis* authority should be rejected. The statute is not so rigid as to foreclose EPA's use of SILs as a means for making the demonstration required by section 165(a)(3) of compliance with the NAAQS and increments.

competing interests. EPA's use of SILs as a means of demonstrating compliance with NAAQS and increments is one reasonable approach to balancing these competing purposes of the statute.

B. EPA's Interpretation of Section 165(a)(3) to Allow the Use of SILs to Demonstrate Compliance with NAAQS and Increments Furthers the Legislative Design.

Because SILs are a means of demonstrating compliance with the NAAQS and increments, they also implement the legislative design. Petitioner's argument that SILs thwart the legislative design is based on their assumption that SILs waive the requirement in section 165(a)(3) that permit applicants "demonstrate" that they will not "cause, or contribute to" a violation of the NAAQS and or the increments. Pet. Br. 29. As discussed in argument I.B., *supra*, EPA agrees with Petitioner that SILs should not be used to justify permitting a source without a cumulative analysis in circumstances where there is information to suggest that use of the SIL in this manner would lead to a violation of the NAAQS or increment. Because EPA recognizes that the regulatory language it adopted in 40 C.F.R. §§ 51.166(k)(2) and 52.21(k)(2) does not provide permitting authorities discretion not to apply SILs for the particular purpose covered by these provisions, EPA agrees that §§ 51.166(k)(2) and 52.21(k)(2) should be vacated and remanded. With appropriate safeguards addressing circumstances when SILs should not be used, however, SILs remain a reasonable mechanism to meet section 165(a)(3)'s

Attachment 13

September 27, 2024

Subject:	**Compliance Test Report, Eight Turbines, Ref. Nos. TG-01 – TG-08**
Facility Name:	**Vantage Data Centers VA2, LLC**
Facility Location:	**22318 Glenn Drive, Sterling, Virginia 20167**
Permit No.:	**74242**
Montrose Document No.:	**SE012AS-042083-RT-2905**

Enclosed please find the compliance test report for the above-referenced facility and sources. The report documents the results of the testing performed by Montrose Air Quality Services, LLC (Montrose) at Vantage Data Centers VA2, LLC on September 19- 20 and 22-23, 2024.

The following distribution was provided for this project.

Name	Company / Agency	No. of copies	Electronic Copy
Marshall Montet	Distributed Power Solutions, LLC 11513 W County Rd 122 Odessa, TX 79765	NA	Emailed PDF, 09/27/2024
Andrew Ratliff			

*****COPIES HAVE NOT BEEN SENT TO ANY REGULATORY AGENCIES*****

Please do not hesitate to contact our office at 540-265-1987 if you have any questions.

Sincerely,

David Vecellio
Reporting QC Manager
Montrose Air Quality Services, LLC

Source Test Report for 2024 Compliance Testing
Eight Turbines (Ref. Nos. TG-01 – TG-08)
Distributed Power Solutions, LLC
Vantage Data Centers VA2, LLC
Sterling, Virginia

Prepared For:

Distributed Power Solutions, LLC
11513 W County Rd 122
Odessa, TX 79765

Prepared By:

Montrose Air Quality Services, LLC
5075 Hollins Road
Roanoke, Virginia 24019

For Submission To:

Virginia Department of Environmental Quality
Northern Regional Office
13901 Crown Court
Woodbridge, Virginia 22193

Document Number: SE012AS-042083-RT-2905
Test Date: September 19- 20 and 22-23, 2024
Submittal Date: September 27, 2024

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TO ASTM D7036 ONLY
CERT #3925.01

Review and Certification

All work, calculations, and other activities and tasks performed and presented in this document were carried out by me or under my direction and supervision. I hereby certify that, to the best of my knowledge, Montrose operated in conformance with the requirements of the Montrose Quality Management System and ASTM D7036-04 during this test project.

Signature:	Gerren Meahl	**Date:**	09 / 27 / 2024
Name:	Gerren Meahl	**Title:**	Field Project Manager

I have reviewed, technically and editorially, details, calculations, results, conclusions, and other appropriate written materials contained herein. I hereby certify that, to the best of my knowledge, the presented material is authentic, accurate, and conforms to the requirements of the Montrose Quality Management System and ASTM D7036-04.

Signature:	David Vecellio	**Date:**	09 / 27 / 2024
Name:	David Vecellio	**Title:**	Reporting QC Manager

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1.0 Introduction

1.1 Summary of Test Program

Distributed Power Solutions, LLC (DPS) contracted Montrose Air Quality Services, LLC (Montrose) to perform an air emission test program at the Vantage Data Centers VA2, LLC (Vantage) facility located in Sterling, Virginia. The tests were conducted to determine compliance of eight turbines with the source testing limitations of the Virginia Department of Environmental Quality (DEQ) Stationary Source Permit to Construct and Operate for Registration No. 74242. Eight of the identical simple cycle combustion natural gas-fired turbines, Permit Ref. Nos. TG-01 through TG-08, were tested. The testing was required by Permit Conditions 26, 27, 28, and 29.

The specific objectives were to:

- Comply with Permit Condition 28 by measuring NO_x, CO, and VOC Uncontrolled emissions at the exhaust stack of two of the eight turbines, TG-01 through TG-08, supporting VA2
- Comply with Permit Conditions 28 and 29 by measuring NO_x, CO, VOC, and visible (opacity) Controlled emissions at the exhaust stack of two of the eight turbines, TG-01 through TG-08, supporting VA2
- Comply with Permit Condition 26 by measuring NO_x emissions at the exhaust stack of the eight turbines, TG-01 through TG-08, supporting VA2
- Comply with Permit Condition 27 by measuring the SO_2 content of the natural gas fuel used for firing each of the eight turbines, TG-01 through TG-08, supporting VA2
- Conduct the test program with a focus on safety

Montrose performed the tests to measure the emission parameters listed in Table 1-1.

Table 1-1
Summary of Test Program

Test Date	Unit ID / Source Name	Activity / Parameters	Test Methods	No. of Runs	Duration (Minutes)
September 19-20, 2024	Each of turbines TG-03 and TG-04 exhaust stacks	Velocity/Volumetric Flow Rate	EPA 1 & 2	3/Controlled and 3/Uncontrolled Test Conditions	As long as needed to complete during each pollutant run
		O_2, CO_2	EPA 3A		60[1]
		Moisture	EPA 4		
		NO_x	EPA 7E		
		CO	EPA 10		
		VOC, as THC	EPA 25A		
		Opacity	EPA 9	3/Controlled	
September 22-23, 2024	Each of turbines TG-01, TG-02, , TG-05, , TG-06, TG-07, and TG-08 exhaust stacks	O_2	EPA 3A	3	30
		NO_x	EPA 7E		
September 19-20 and 22-23, 2024	Representative fuel combusted in turbines TG-01 – TG-08	SO_2	ASTM 6228-10	1 grab sample at beginning and 1 at end of each test day	Duration is time it takes to fill a sample tank
September 19-20 and 22-23, 2024	--	Post-test meter calibration check	EPA ALT-009	--	--
September 26, 2024	--	Post-test thermocouple calibration check	EPA 2/4	--	--

[1] All of the runs on TG-3 and TG-4 were 60 minutes except for the TG-4 Uncontrolled Run 2 moisture run, which was 30 minutes.

To simplify this report, a list of Units and Abbreviations is included in Appendix D.1. Throughout this report, chemical nomenclature, acronyms, and reporting units are not defined. Please refer to the list for specific details.

This report presents the test results and supporting data, descriptions of the testing procedures, descriptions of the facility and sampling locations, and a summary of the quality assurance procedures used by Montrose. The average emission test results are summarized and compared to their respective permit limits in Tables 1-2 through 1-5. Detailed results for individual test runs can be found in Section 4.0. All supporting data can be found in the appendices.

The testing was conducted by the Montrose personnel listed in Table 1-6. The tests were conducted according to the test plan (protocol) dated September 11, 2024 that was submitted to and approved by the DEQ's Northern Regional Office (DEQ-NRO).

Table 1-2
Summary of Average Compliance Results – TG-03

September 19, 2024

Parameter / Units	Average Results	Emission Limits	Compliant (Y / N)
Nitrogen Oxides (NO_x)			
ppmvd (Uncontrolled)	4.84	--	--
lb/hr (Uncontrolled)	3.66	6.32	Y
ppmvd(Controlled)	1.33	--	--
ppm @ 15% O_2 (Controlled)	2	2	Y
lb/hr (Controlled)	0.98	1.41	Y
Carbon Monoxide (CO)			
ppmvd(Uncontrolled)	< 0.64	--	--
lb/hr (Uncontrolled)	< 0.29	6.42	Y
ppmvd(Controlled)	< 0.36	--	--
lb/hr (Controlled)	< 0.16	1.07	Y
Total Non-Methane / Non-Ethane Hydrocarbons, as Propane (VOC)			
ppmvd (Uncontrolled)	0.50	--	--
lb/hr (Uncontrolled)	0.36	1.22	Y
ppmvd(Controlled)	0.48	--	--
lb/hr (Controlled)	0.34	0.61[(2)]	Y
Visible Emissions (Opacity)			
% (Controlled)	0	5[(1)]	Y

(<) One or more run results averaged less than the detection limit (2% of span), where the detection limit was used for the result of the run.

[(1)] Except during one 6-minute period in any one hour in which visible emissions shall not exceed 10% opacity

[(2)] If actual VOC emissions are < 0.49 lb/hr, then Controlled emissions limit is 0.61 lb/hr. If actual emissions are < 0.98 lb/hr, then the Controlled emissions limit is 1.25 x actual hourly emissions.

Table 1-3
Summary of Average Compliance Results – TG-04

September 20, 2024

Parameter / Units	Average Results	Emission Limits	Compliant (Y / N)
Nitrogen Oxides (NO_x)			
ppmvd (Uncontrolled)	3.97	--	--
lb/hr (Uncontrolled)	3.44	6.32	Y
ppmvd(Controlled)	0.72	--	--
ppm @ 15% O_2 (Controlled)	1	2	Y
lb/hr (Controlled)	0.62	1.41	Y
Carbon Monoxide (CO)			
ppmvd(Uncontrolled)	1.35	--	--
lb/hr (Uncontrolled)	0.71	6.42	Y
ppmvd(Controlled)	0.75	--	--
lb/hr (Controlled)	0.39	1.07	Y
Total Non-Methane / Non-Ethane Hydrocarbons, as Propane (VOC)			
ppmvd (Uncontrolled)	0.43	--	--
lb/hr (Uncontrolled)	0.36	1.22	Y
ppmvd(Controlled)	0.47	--	--
lb/hr (Controlled)	0.39	0.61[(2)]	Y
Visible Emissions (Opacity)			
% (Controlled)	0	5[(1)]	Y

[(1)] Except during one 6-minute period in any one hour in which visible emissions shall not exceed 10% opacity
[(2)] If actual VOC emissions are < 0.49 lb/hr, then Controlled emissions limit is 0.61 lb/hr. If actual emissions are < 0.98 lb/hr, then the Controlled emissions limit is 1.25 x actual hourly emissions.

Table 1-4
Summary of Average Compliance Results – TG-01 - TG-02 and TG-05 - TG-08

September 22-23, 2024

Parameter/Units	Average Results	Emission Limits	Compliant (Y/N)
TG-01			
Nitrogen Oxides (NO_x)			
ppmvd	0.810	--	--
ppm @ 15% O_2	1	2	Y
TG-02			
Nitrogen Oxides (NO_x)			
ppmvd	0.964	--	--
ppmvd @ 15% O_2	1	2	Y
TG-05			
Nitrogen Oxides (NO_x)			
ppmvd	0.808	--	--
ppmvd @ 15% O_2	1	2	Y
TG-06			
Nitrogen Oxides (NO_x)			
ppmvd	0.851	--	--
ppmvd @ 15% O_2	1	2	Y
TG-07			
Nitrogen Oxides (NO_x)			
ppmvd	0.831	--	--
ppmvd @ 15% O_2	1	2	Y
TG-08			
Nitrogen Oxides (NO_x)			
ppmvd	0.786	--	--
ppmvd @ 15% O_2	1	2	Y

Table 1-5
Summary of Average SO_2 Compliance Results – TG-01 - TG-08

September 19-20 and 22-23, 2024

Parameter/Units	Average Results	Emission Limits	Compliant (Y/N)
Sulfur Dioxide (SO_2)			
lb SO_2/MMBtu	8.95E-06	0.060	Y

1.2 Key Personnel

A list of project participants is included below:

Facility Information

Source Location:	Distributed Power Solutions, LLC (DPS) Vantage Data Centers VA2, LLC (Vantage) 22318 Glenn Drive Sterling, Virginia 20167	
Project Contact:	Marshall Montet	Andrew Ratliff
Role:	Test Program Coordinator	Plant Operations Manager (VA2)
Company:	DPS	DPS
Telephone:	337-465-0526	432-208-5988
Email:	marshall.montet@dpsenergy.com	andrew.ratliff@dpsenergy.com

Agency Information

Regulatory Agency:	Virginia Department of Environmental Quality (DEQ) Northern Regional Office (NRO)	
Agency Contact:	R. David Hartshorn	David Perry
Title:	Air Compliance Manager	Air Compliance Inspector
Telephone:	571-408-1778	703-583-3800
Email:	r.david.hartshorn@deq.virginia.gov	david.perry@deq.virginia.gov

Testing Company Information

Testing Firm:	Montrose Air Quality Services, LLC	
Contact:	Gerren Meahl	David Vecellio
Title:	Field Project Manager	Reporting QC Manager
Telephone:	352-870-3848	540-265-1987 x 11203
Email:	gemeahl@montrose-env.com	dvecellio@montrose-env.com

Test personnel and observers are summarized in Table 1-6.

Table 1-6
Test Personnel and Observers

Name	Affiliation	Role / Responsibility
Gerren Meahl	Montrose	Project Manager/Field Team Leader/Qualified Individual (QI)/Trailer operator/Sample recovery
Tyler Conway	Montrose	Field Technician/Sample train operator
Miranda Howell	Montrose	Field Technician/Sample train operator/Visible Emission Evaluator
Christopher Grafe	Montrose	Field Technician/Sample train operator/Visible Emission Evaluator
David Vecellio	Montrose	Calculations and report preparation
Anthony Ratliff	DPS	Client Liaison/Test Coordinator
David Perry	DEQ-NRO	Observer

2.0 Plant and Sampling Location Descriptions

2.1 Process Description, Operation, and Control Equipment

Testing of eight identical simple cycle combustion natural gas-fired turbines at the Vantage facility was required for this test program. Each turbine was a Solar SMT-130, rated at 16.5 MWe (161 MMBtu/hr). Emission controls included SoLoNO$_x$ burners and closed loop SCR within the multi-pollutant catalyst bed.

Turbine exhaust gas mixed with ambient tempering air is treated with an ammonia solution when the turbines are operating at or above 50% load and the multi-pollutant catalyst bed inlet temperature of 450 °F is achieved, except for periods of start-up, shutdown, or malfunction. In the event that the average catalyst inlet temperature measurement exceeds 875 °F, ammonia solution injection is discontinued and any operations above that level are considered a malfunction.

2.2 Flue Gas Sampling Location

Information regarding the sampling location is presented in Table 2-1.

Table 2-1
Sampling Location

Sampling Location	Stack Inside Diameter (in.)	Distance from Nearest Disturbance		Number of Traverse Points
		Downstream EPA "B" (in./dia.)	Upstream EPA "A" (in./dia.)	
Identical Exhaust Stacks for Turbines TG-01 through TG-08	108	355/3.3	54/0.5	Flow: 16 (4/port) Gaseous: 1 after 12-pt. stratification test

The sample location was verified in the field to conform to EPA Method 1. Acceptable cyclonic flow conditions were confirmed prior to testing using EPA Method 1, Section 11.4. See Appendix A.1 for more information.

2.3 Operating Conditions and Process Data

Emission tests were performed while the source/unit and air pollution control devices were operating at the conditions required by the permit. To comply with Permit Conditions 28 and 29, two of the eight units were tested when operating at ≥ 90% of their rated capacity. To comply with Permit Condition 26, all eight of the units were tested at any load condition within ± 25% of 100% of peak load or, alternatively, the highest achievable load point, if ≥ 75% of peak load can't be achieved in practice.

Plant personnel were responsible for establishing the test conditions and collecting all applicable unit-operating data. The process data that was provided is presented in Appendix B. Data collected includes the following parameters:

- Turbine load, MWe
- Sulfur content of the natural gas, lb SO_2/MMBtu heat input
- NEMS NO_x concentration after the SCR multi-pollutant catalyst
- SCR multi-pollutant catalyst bed inlet temperature, °F
- Urea solution injection rate, L/min

3.0 Sampling and Analytical Procedures

3.1 Test Methods

The test methods for this test program have been presented in Table 1-1. Additional information regarding specific applications or modifications to standard procedures is presented below.

3.1.1 EPA Method 1, Sample and Velocity Traverses for Stationary Sources

EPA Method 1 is used to assure that representative samples or measurements of volumetric flow rate are obtained by dividing the cross-section of the stack or duct into equal areas, and then locating a traverse point within each of the equal areas. Acceptable sample locations must be located at least two stack or duct equivalent diameters downstream from a flow disturbance and one-half equivalent diameter upstream from a flow disturbance.

The sample port and traverse point locations are detailed in Appendix A.

3.1.2 EPA Method 2, Determination of Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)

EPA Method 2 is used to measure the gas velocity using an S-type pitot tube connected to a pressure measurement device, and to measure the gas temperature using a calibrated thermocouple connected to a thermocouple indicator. Typically, Type S (Stausscheibe) pitot tubes conforming to the geometric specifications in the test method are used, along with an inclined manometer. The measurements are made at traverse points specified by EPA Method 1. The molecular weight of the gas stream is determined from independent measurements of O_2, CO_2, and moisture. The stack gas volumetric flow rate is calculated using the measured average velocity head, the area of the duct at the measurement plane, the measured average temperature, the measured duct static pressure, the molecular weight of the gas stream, and the measured moisture.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - S-type pitot tube coefficient is 0.84

The typical sampling system is detailed in Figure 3-1 in conjunction with the EPA Method 4 sampling train.

3.1.3 EPA Method 4, Determination of Moisture Content in Stack Gas

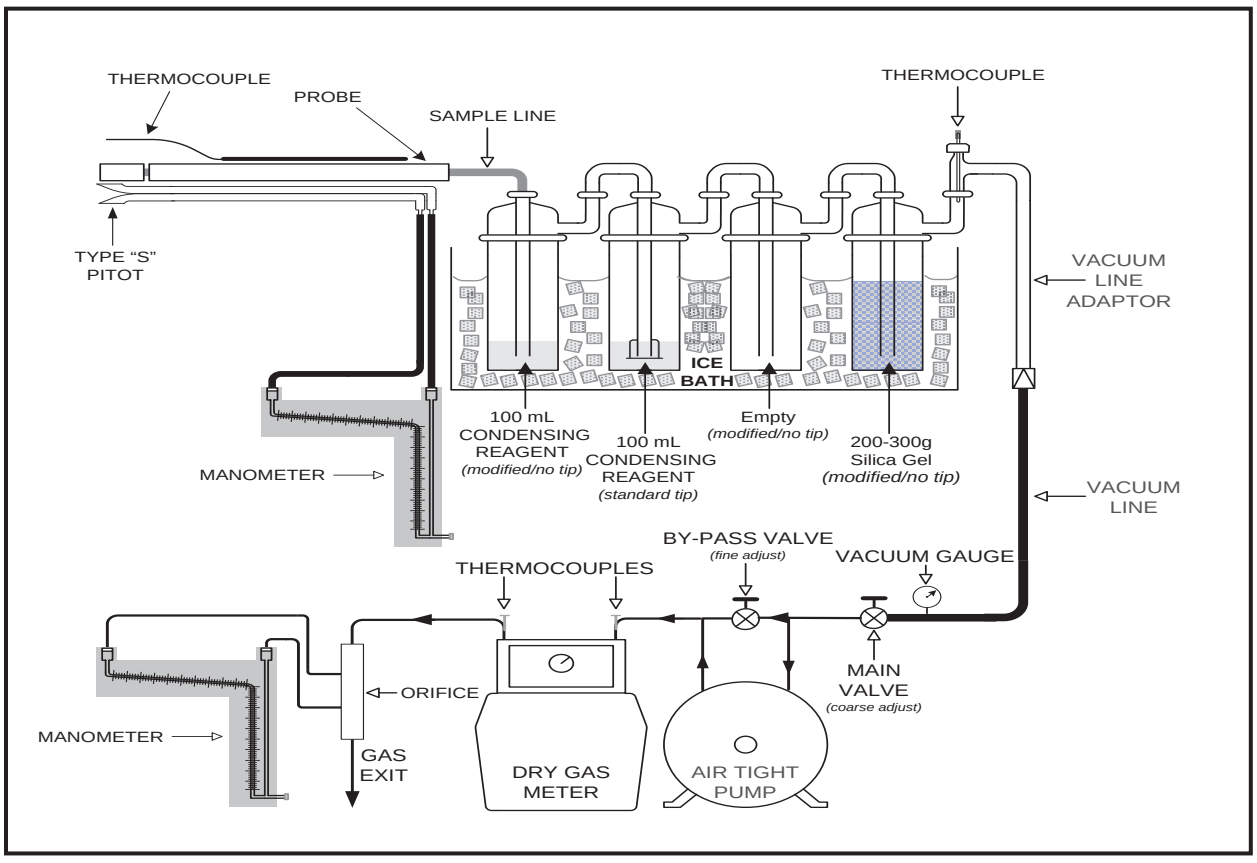
EPA Method 4 is a manual, non-isokinetic method used to measure the moisture content of gas streams. Gas is sampled at a constant sampling rate through a probe and impinger train. Moisture is removed using a series of pre-weighed impingers containing methodology-specific liquids and silica gel immersed in an ice water bath. The impingers are weighed after each run to determine the percent moisture.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - The reference method is used to measure moisture
  - Glass wool is used as a filter
- Target and/or Minimum Required Sample Duration: 60 minutes
- Target and/or Minimum Required Sample Volume: 21 scf

The typical sampling system is detailed in Figure 3-1 in conjunction with the EPA Method 2 sampling train.

Figure 3-1
EPA Method 4 Detached with Pitots Sampling Train



3.1.4 EPA Methods 3A, 7E, and 10, Determination of Oxygen, Carbon Dioxide, Nitrogen Oxides, and Carbon Monoxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)

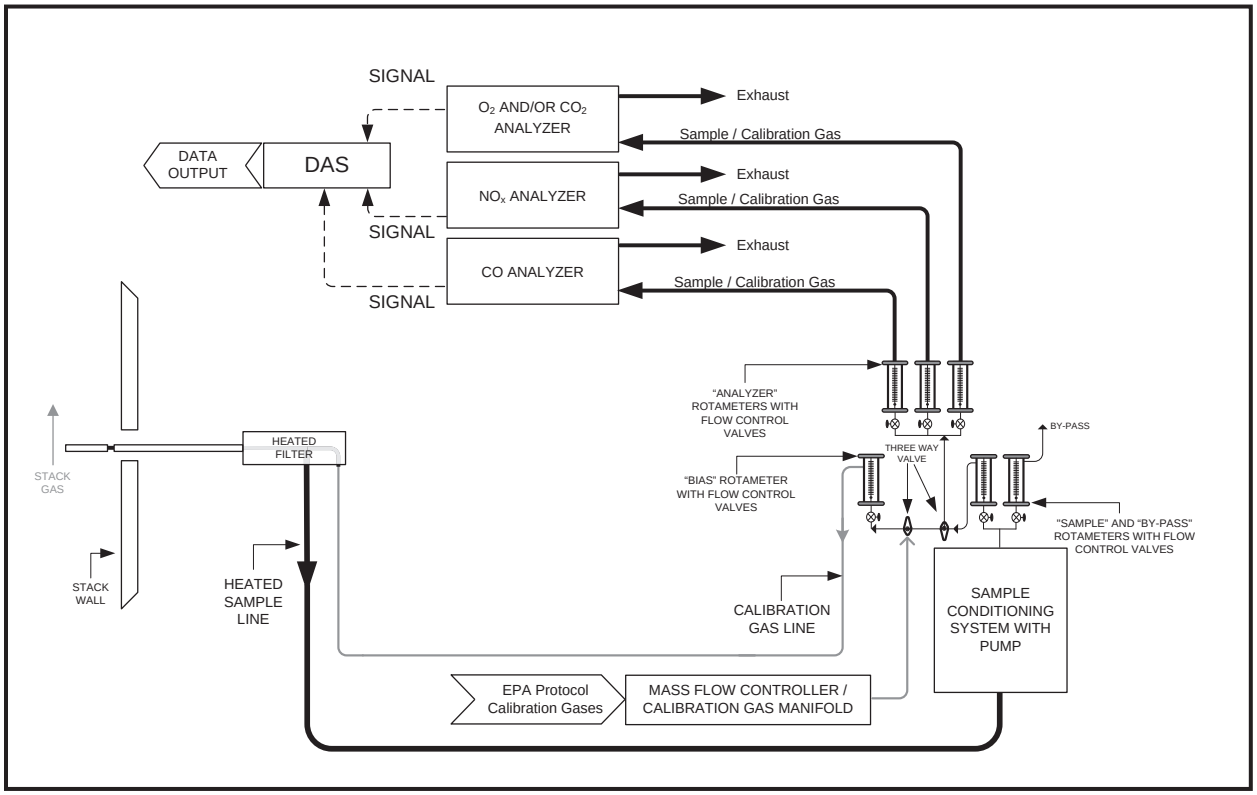
Concentrations of O_2, CO_2, NO_X, and CO are measured simultaneously using EPA Methods 3A, 7E, and 10, which are instrumental test methods. Conditioned gas is sent to a series of analyzers to measure the gaseous emission concentrations. The performance requirements of the method must be met to validate the data.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - A dry extractive sampling system is used to report emissions on a dry basis
  - A paramagnetic analyzer is used to measure O_2
  - A nondispersive infrared analyzer is used to measure CO_2
  - A chemiluminescent analyzer is used to measure NO_x
  - A gas filter correlation nondispersive infrared analyzer is used to measure CO
  - The alternative NOx converter efficiency test described in EPA Method 7E Section 16.2 is used (bag procedure)
  - Calibration span values are 22.56% O2, 22.24% CO2,11.89 ppmvd NO_x, and 14.00 ppmvd CO
- Target and/or Minimum Required Sample Duration: 60 minutes
- Target Analytes: O_2, CO_2, NO_X, and CO

The typical sampling system is detailed in Figure 3-2.

Figure 3-2
US EPA Method 3A, 7E, And 10 Sampling Train



3.1.5 EPA Method 25A, Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer

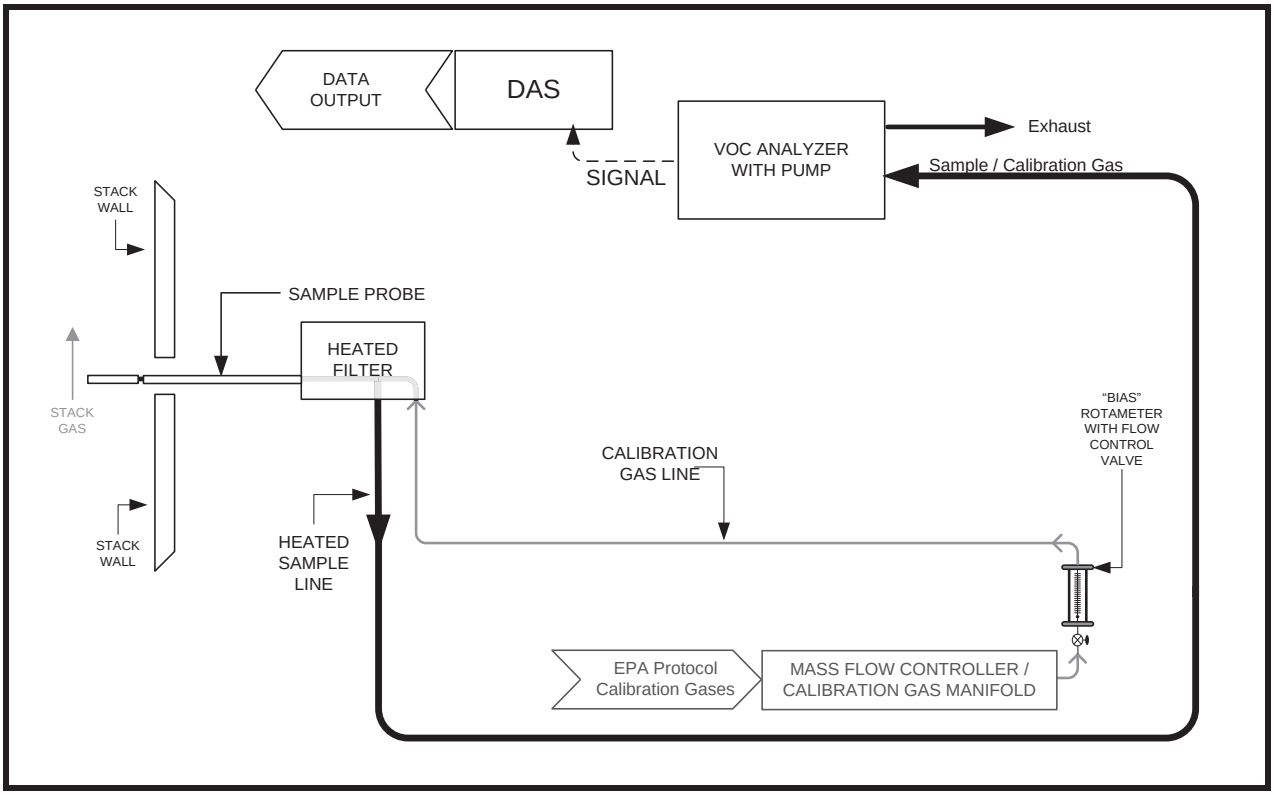
EPA Method 25A is an instrumental test method used for the determination of total gaseous organic concentration of vapors in stack gas. A gas sample is extracted from the source through a heated sample line and glass fiber filter to an FIA. Results are reported as THC as volume concentration equivalents of the calibration gas, typically propane, or as carbon equivalents.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - Results are reported in terms of propane
  - Span values for THC are 10 and 16 ppmvw
- Target Analytes: THC
- Target and/or Minimum Required Sample Duration: 60 minutes

The typical sampling system is detailed in Figure 3-3.

Figure 3-3
EPA Method 25A Sampling Train



3.1.6 EPA Method 9, Visual Determination of the Opacity of Emissions

EPA Method 9 is used to observe the visual opacity of emissions (opacity). The observer stands at a distance sufficient to provide a clear view of the emissions with the sun oriented in the 140° sector to their back. The line of vision is perpendicular to the plume direction and does not include more than one plume diameter. Observations are recorded at 15-second intervals and are made to the nearest 5% opacity. The qualified observer is certified according to the requirements of EPA Method 9, section 3.1.

3.1.7 EPA Method 205, Verification of Gas Dilutions Systems for Field Instrument Calibrations

EPA Method 205 is used to accurately dilute high-level EPA Protocol 1 calibration gases to intermediate levels for use when calibrating instrumental analyzers. A calibrated gas dilution system is used for these dilutions. The gas dilution system is recalibrated once per calendar year using NIST-traceable primary flow standards with an uncertainty ≤ 0.25 percent. A field evaluation is also performed to verify the dilution ratios for each project.

To perform the field evaluation, two diluted standards are prepared using the high-level supply gas. The diluted gas is alternately introduced in triplicate to a pre-calibrated

analyzer, the average instrument response is calculated, and the average predicted concentration is calculated using the dilution ratios. No single injection should differ by more than ± 2% from the average instrument response for that dilution. For each level of dilution, the difference between the average concentration output recorded by the analyzer and the predicted concentration is calculated. The average concentration output from the analyzer should be within ± 2% of the predicted value.

Next, a mid-level supply gas is injected three different times directly into the analyzer while bypassing the dilution system. The average analyzer output is calculated. The difference between the certified concentration of the mid-level supply gas and the average instrument response should be within ± 2%. If the gas dilution system meets the criteria listed above, it may be used throughout the field test.

3.1.8 EPA Alternative Method ALT-009, Alternative Method 5 Post-Test Calibration

EPA Approved Alternative Method 009 (ALT-009) is used as an alternative to a two-point post-test meter box calibration. This procedure uses a calculation to check the meter box calibration factor rather than requiring a physical post-test meter box calibration using a standard dry gas meter. The average calculated meter box percent (%) error must result in a percent error within ±5% of Y. If not, a full calibration is performed, and the results are presented using the Y factor that yields the highest emissions.

3.2 Process Test Methods

The test plan did not require that process samples be collected during this test program; therefore, no process sample data are presented in this test report.

4.0 Test Discussion and Results

4.1 Field Test Deviations and Exceptions

Except as noted below, no field deviations or exceptions from the test plan or test methods occurred during this test program. Please note the following:

- Per on-site guidance provided by the DEQ, visible emissions testing was conducted only during the Controlled test conditions on TG-3 and TG-4 because the original intent of the test program was to test the Uncontrolled and Controlled conditions simultaneously before and after the SCR, and the exhaust stack after the SCR is the only location for evaluating the visible emissions.
- The TG-4 Uncontrolled Run 2 moisture run ended after 30 minutes due to electrical power issues with the sampling equipment; however, the minimum required sample volume was obtained for the run and the leak checks were valid, indicating the run data were valid.
- EPA Method 205 was utilized to accommodate the need to ensure the CO span would be sufficiently greater than actual concentrations. The EPA Method 10 allowances for calibration error, system bias, and calibration drift were met.

4.2 Presentation of Results

The average results are compared to the permit limits in Tables 1-2 through 1-5. The results of individual compliance test runs performed are presented in Tables 4-1 through 4-11. Emissions are reported in units consistent with those in the applicable regulations or requirements. Additional information is included in the appendices as presented in the Table of Contents.

Table 4-1
NO_x, CO, and VOC Uncontrolled Emissions Results -
TG-03 Exhaust Stack

Parameter/Units	Run 1	Run 2	Run 3	Average
Date	9/19/2024	9/19/2024	9/19/2024	--
Time	1020-1120	1153-1253	1320-1420	--
Process Data				
turbine load, % of rated capacity	93.15	94.52	95.57	94.42
turbine load, MWe	15.37	15.60	15.77	15.58
avg. catalyst bed inlet temperature, °F	800	800	800	800
NEMS NO_x conc., ppm @ 15% O_2	5.35	5.20	5.11	5.22
Sampling & Flue Gas Parameters				
sample duration, minutes	60	60	60	--
O_2, % volume dry	16.44	16.42	16.46	16.44
CO_2, % volume dry	2.60	2.59	2.57	2.59
flue gas temperature, °F	765	770	775	770
moisture content, % volume	5.55	6.84	6.64	6.35
volumetric flow rate, dscfm	105,355	106,752	104,866	105,658
Nitrogen Oxides (NO_x as NO_2)				
ppmvd	5.00	4.83	4.68	4.84
lb/hr	3.78	3.69	3.52	3.66
Carbon Monoxide (CO)				
ppmvd	1.12	0.52	< 0.28	< 0.64
lb/hr	0.52	0.24	< 0.13	< 0.29
Volatile Organic Compounds (VOC)				
ppmvw	0.47	0.43	0.49	0.47
ppmvd	0.50	0.46	0.53	0.50
lb/hr	0.36	0.34	0.38	0.36

(<) One or more run results averaged less than the detection limit (2% of span), where the detection limit was used for the result of the run.

Table 4-2
NO_x, CO, VOC, and Visible Controlled Emissions Results - TG-03 Exhaust Stack

Parameter/Units	Run 1	Run 2	Run 3	Average
Date	9/19/2024	9/19/2024	9/19/2024	--
Time	1500-1600	1626-1726	1748-1848	--
Process Data				
turbine load, % of rated capacity	94.64	92.63	92.53	93.27
turbine load, MWe	15.62	15.28	15.27	15.39
avg. catalyst bed inlet temperature, °F	801	800	800	800
NEMS NO_x conc., ppm @ 15% O_2	1.40	1.49	1.16	1.35
urea solution injection rate, L/min	2.360	2.082	2.184	2.209
Sampling & Flue Gas Parameters				
sample duration, minutes	60	60	60	--
O_2, % volume dry	16.44	16.53	16.48	16.48
CO_2, % volume dry	2.53	2.55	2.56	2.55
flue gas temperature, °F	773	776	778	776
moisture content, % volume	5.79	6.08	7.13	6.33
volumetric flow rate, dscfm	105,015	100,037	101,727	102,260
Nitrogen Oxides (NO_x as NO_2)				
ppmvd	1.41	1.40	1.18	1.33
ppm @ 15% O_2	1.87	1.90	1.57	1.78
lb/hr	1.06	1.01	0.86	0.98
Carbon Monoxide (CO)				
ppmvd	0.52	< 0.28	< 0.28	< 0.36
lb/hr	0.24	< 0.12	< 0.12	< 0.16
Volatile Organic Compounds (VOC)				
ppmvw	0.50	0.44	0.42	0.45
ppmvd	0.53	0.47	0.46	0.48
lb/hr	0.38	0.32	0.32	0.34
Visible Emissions (VEs)				
% opacity, max. individual reading	0	0	0	0
% opacity, max. 6-minute average	0	0	0	0

(<) One or more run results averaged less than the detection limit (2% of span), where the detection limit was used for the result of the run.

Table 4-3
NO_x, CO, and VOC Uncontrolled Emissions Results -
TG-04 Exhaust Stack

Parameter/Units	Run 1	Run 2	Run 3	Average
Date	9/20/2024	9/20/2024	9/20/2024	--
Time	0952-1052	1115-1215	1232-1332	--
Process Data				
turbine load, % of rated capacity	94.15	93.83	94.01	93.99
turbine load, MWe	15.53	15.48	15.51	15.51
avg. catalyst bed inlet temperature, °F	800	800	800	800
NEMS NO_x conc., ppm @ 15% O_2	4.68	4.55	4.45	4.56
Sampling & Flue Gas Parameters				
sample duration, minutes	60	60	60	--
O_2, % volume dry	16.36	16.49	16.45	16.43
CO_2, % volume dry	2.66	2.56	2.56	2.59
flue gas temperature, °F	783	776	775	778
moisture content, % volume	7.77	8.14	9.42	8.44
volumetric flow rate, dscfm	119,455	122,595	120,191	120,747
Nitrogen Oxides (NO_x as NO_2)				
ppmvd	4.14	3.87	3.90	3.97
lb/hr	3.54	3.40	3.36	3.44
Carbon Monoxide (CO)				
ppmvd	2.02	0.57	1.45	1.35
lb/hr	1.05	0.31	0.76	0.71
Volatile Organic Compounds (VOC)				
ppmvw	0.27	0.48	0.43	0.39
ppmvd	0.29	0.52	0.48	0.43
lb/hr	0.24	0.44	0.39	0.36

Table 4-4
NO_x, CO, VOC, and Visible Controlled Emissions Results - TG-04 Exhaust Stack

Parameter/Units	Run 1	Run 2	Run 3	Average
Date	9/20/2024	9/20/2024	9/20/2024	--
Time	1356-1456	1522-1622	1645-1745	--
Process Data				
turbine load, % of rated capacity	94.15	93.92	94.56	94.21
turbine load, MWe	15.53	15.50	15.60	15.54
avg. catalyst bed inlet temperature, °F	800	800	800	800
NEMS NO_x conc., ppm @ 15% O_2	0.80	0.84	1.09	0.91
urea solution injection rate, L/min	2.640	1.934	1.442	2.005
Sampling & Flue Gas Parameters				
sample duration, minutes	60	60	60	--
O_2, % volume dry	16.49	16.51	16.55	16.52
CO_2, % volume dry	2.57	2.58	2.60	2.58
flue gas temperature, °F	775	776	782	777
moisture content, % volume	8.19	7.59	8.40	8.06
volumetric flow rate, dscfm	121,312	120,042	118,560	119,971
Nitrogen Oxides (NO_x as NO_2)				
ppmvd	0.59	0.71	0.86	0.72
ppm @ 15% O_2	0.80	0.96	1.16	0.97
lb/hr	0.52	0.61	0.73	0.62
Carbon Monoxide (CO)				
ppmvd	0.70	0.93	0.61	0.75
lb/hr	0.37	0.48	0.32	0.39
Volatile Organic Compounds (VOC)				
ppmvw	0.49	0.41	0.39	0.43
ppmvd	0.53	0.45	0.43	0.47
lb/hr	0.44	0.37	0.35	0.39
Visible Emissions (VEs)				
% opacity, max. individual reading	0	0	0	0
% opacity, max. 6-minute average	0	0	0	0

Table 4-5
NO_x Emissions Results -
TG-01 Exhaust Stack

Parameter/Units	Run 1	Run 2	Run 3	Average
Date	9/22/2024	9/22/2024	9/22/2024	--
Time	0815-0845	0900-0930	0948-1018	--
Process Data				
turbine load, % of rated capacity	79.22	79.32	79.51	79.35
turbine load, MWe	13.07	13.09	13.12	13.09
avg. catalyst bed inlet temperature, °F	800	800	800	800
NEMS NO_x conc., ppm @ 15% O_2	0.70	0.93	1.13	0.92
urea solution injection rate, L/min	1.759	1.329	1.221	1.436
Sampling & Flue Gas Parameters				
sample duration, minutes	30	30	30	--
O_2, % volume dry	16.46	16.48	16.49	16.48
Nitrogen Oxides (NO_x as NO_2)				
ppmvd	0.559	0.858	1.015	0.810
ppm @ 15% O_2	0.74	1.14	1.36	1.08

Table 4-6
NO_x Emissions Results -
TG-02 Exhaust Stack

Parameter/Units	Run 1	Run 2	Run 3	Average
Date	9/22/2024	9/22/2024	9/22/2024	--
Time	1140-1210	1225-1255	1315-1345	--
Process Data				
turbine load, % of rated capacity	79.79	80.38	81.28	80.48
turbine load, MWe	13.16	13.26	13.41	13.28
avg. catalyst bed inlet temperature, °F	801	800	800	800
NEMS NO_x conc., ppm @ 15% O_2	1.27	1.33	1.17	1.26
urea solution injection rate, L/min	1.754	1.801	1.843	1.799
Sampling & Flue Gas Parameters				
sample duration, minutes	30	30	30	--
O_2, % volume dry	16.41	16.36	16.41	16.39
Nitrogen Oxides (NO_x as NO_2)				
ppmvd	1.118	0.835	0.940	0.964
ppm @ 15% O_2	1.47	1.09	1.24	1.26

Table 4-7
NO_x Emissions Results -
TG-05 Exhaust Stack

Parameter/Units	Run 1	Run 2	Run 3	Average
Date	9/22/2024	9/22/2024	9/22/2024	--
Time	1445-1515	1530-1600	1615-1645	--
Process Data				
turbine load, % of rated capacity	78.01	77.63	77.41	77.68
turbine load, MWe	12.87	12.81	12.77	12.82
avg. catalyst bed inlet temperature, °F	800	800	800	800
NEMS NO_x conc., ppm @ 15% O_2	0.80	1.13	1.17	1.03
urea solution injection rate, L/min	0.959	0.725	0.679	0.788
Sampling & Flue Gas Parameters				
sample duration, minutes	30	30	30	--
O_2, % volume dry	16.48	16.49	16.48	16.49
Nitrogen Oxides (NO_x as NO_2)				
ppmvd	0.599	0.835	0.991	0.808
ppm @ 15% O_2	0.80	1.12	1.32	1.08

Table 4-8
NO_x Emissions Results -
TG-06 Exhaust Stack

Parameter/Units	Run 1	Run 2	Run 3	Average
Date	9/23/2024	9/23/2024	9/23/2024	--
Time	0808-0838	0900-0930	0955-1025	--
Process Data				
turbine load, % of rated capacity	76.40	76.90	77.19	76.83
turbine load, MWe	12.61	12.69	12.74	12.68
avg. catalyst bed inlet temperature, °F	800	800	800	800
NEMS NO_x conc., ppm @ 15% O_2	0.70	0.93	0.60	0.74
urea solution injection rate, L/min	1.338	0.903	1.399	1.214
Sampling & Flue Gas Parameters				
sample duration, minutes	30	30	30	--
O_2, % volume dry	16.55	16.53	16.51	16.53
Nitrogen Oxides (NO_x as NO_2)				
ppmvd	0.627	0.820	1.106	0.851
ppm @ 15% O_2	0.85	1.11	1.49	1.15

Table 4-9
NO_x Emissions Results -
TG-07 Exhaust Stack

Parameter/Units	Run 1	Run 2	Run 3	Average
Date	9/23/2024	9/23/2024	9/23/2024	--
Time	1100-1130	1145-1215	1232-1302	--
Process Data				
turbine load, % of rated capacity	76.46	76.79	76.89	76.71
turbine load, MWe	12.62	12.67	12.69	12.66
avg. catalyst bed inlet temperature, °F	800	800	800	800
NEMS NO_x conc., ppm @ 15% O_2	0.90	0.90	0.97	0.92
urea solution injection rate, L/min	1.292	1.283	1.292	1.289
Sampling & Flue Gas Parameters				
sample duration, minutes	30	30	30	--
O_2, % volume dry	16.36	16.48	16.49	16.44
Nitrogen Oxides (NO_x as NO_2)				
ppmvd	0.815	0.840	0.840	0.831
ppm @ 15% O_2	1.06	1.12	1.12	1.10

Table 4-10
NO_x Emissions Results -
TG-08 Exhaust Stack

Parameter/Units	Run 1	Run 2	Run 3	Average
Date	9/23/2024	9/23/2024	9/23/2024	--
Time	1355-1425	1447-1517	1540-1610	--
Process Data				
turbine load, % of rated capacity	76.91	76.71	77.03	76.88
turbine load, MWe	12.69	12.66	12.71	12.69
avg. catalyst bed inlet temperature, °F	800	800	800	800
NEMS NO_x conc., ppm @ 15% O_2	0.83	0.76	0.90	0.83
urea solution injection rate, L/min	1.164	1.179	0.987	1.110
Sampling & Flue Gas Parameters				
sample duration, minutes	30	30	30	--
O_2, % volume dry	16.53	16.49	16.53	16.52
Nitrogen Oxides (NO_x as NO_2)				
ppmvd	0.897	0.632	0.830	0.786
ppm @ 15% O_2	1.21	0.85	1.12	1.06

Table 4-11
SO_2 Emissions Results -
Natural Gas Fuel Analyses for TG-01 - TG-08

Parameter/Units	1	2	3	4	Average
Date	9/19/2024		9/20/2024		--
Time	10:00	20:30	9:20	18:00	--
Sulfur Dioxide (SO_2)					
Sulfur content, gr/scf	3.38E-05	1.18E-05	6.03E-05	1.18E-05	--
Sulfur content, gr/100 scf	3.38E-03	1.18E-03	6.03E-03	1.18E-03	--
Heating Value, Btu/scf	1,023.73	1,042.82	1,012.56	1,017.64	--
lb SO2/MMBtu	9.43E-06	3.24E-06	1.70E-05	3.32E-06	--
Parameter/Units	**5**	**6**	**7**	**8**	--
Date	9/22/2024		9/23/2024		--
Time	7:00	17:00	7:00	17:00	--
Sulfur Dioxide (SO_2)					
Sulfur content, gr/scf	1.18E-05	9.07E-05	1.18E-05	2.30E-05	3.19E-05
Sulfur content, gr/100 scf	1.18E-03	9.07E-03	1.18E-03	2.30E-03	3.19E-03
Heating Value, Btu/scf	1,017.64	1,014.14	1,015.95	1,026.88	1,021.42
lb SO2/MMBtu	3.32E-06	2.55E-05	3.33E-06	6.41E-06	8.95E-06

5.0 Internal QA/QC Activities

5.1 QA/QC Audits

The meter box and sampling train used during sampling performed within the requirements of their respective methods. All post-test leak checks, minimum metered volumes, and minimum sample durations met the applicable QA/QC criteria, except where noted in Section 5.2.

EPA Method 3A, 7E, and 10 calibration audits were all within the measurement system performance specifications for the calibration drift checks, system calibration bias checks, and calibration error checks.

EPA Method 25A FIA calibration audits were within the measurement system performance specifications for the calibration drift checks and calibration error checks.

The NO_2 to NO converter efficiency check of the analyzer was conducted per the procedures in EPA Method 7E, Section 16.2.2. The conversion efficiency met the criteria.

EPA Method 9 was performed by a certified Visible Emissions Evaluator. For quality assurance, the observer obtained a view of the emissions with the best available contrasting background and with the sun oriented in the 140° sector to their back. Readings were taken every 15 seconds and made to the nearest 5% opacity.

The EPA Method 205 calibration audit and dilution level was within the measurement system performance specifications for the average instrument response and predicted value.

5.2 QA/QC Discussion

All QA/QC criteria were met during this test program.

5.3 Quality Statement

Montrose is qualified to conduct this test program and has established a quality management system that led to accreditation with ASTM Standard D7036-04 (Standard Practice for Competence of Air Emission Testing Bodies). Montrose participates in annual functional assessments for conformance with D7036-04 which are conducted by the American Association for Laboratory Accreditation (A2LA). All testing performed by Montrose is supervised on site by at least one Qualified Individual (QI) as defined in D7036-04 Section 8.3.2. Data quality objectives for estimating measurement uncertainty within the documented limits in the test methods are met by using approved test protocols for each project as defined in D7036-04 Sections 7.2.1 and 12.10. Additional quality assurance information is included in the report appendices. The content of this report is modeled after the EPA Emission Measurement Center Guideline Document (GD-043).

Attachment 14

Volatile Organic Compound, Sulfur Dioxide, and Formaldehyde Emission Estimates

Leslie Witherspoon

PURPOSE

This Product Information Letter (PIL) summarizes emission factors commonly utilized to estimate emissions of volatile organic compounds (VOC), sulfur dioxide (SO_2), and formaldehyde from gas turbines.

Volatile Organic Compounds

Many permitting agencies require gas turbine users to include emissions of VOC, a subpart of the unburned hydrocarbon (UHC) emissions, during the air permitting process. Volatile organic compounds, non-methane hydrocarbons (NMHC), and reactive organic gases (ROG) are different ways of referring to the non-methane (and non-ethane) portion of an "unburned hydrocarbon" emission estimate.

For natural gas fuel, Solar's customers often use 10-20% of the UHC emission rate to conservatively estimate VOC emissions. Solar can offer a 5 ppm VOC warranty level upon request. For liquid fuel, it is appropriate to estimate that 100% of the UHC estimate is VOC. The emissions estimates are assumed valid for natural gas at ambient temperatures >-4°F (-20C) from 50-100% load (80-100% load for the Saturn® 20 and >-20°F (-29C) and 40-100% for the Titan™ 250) and for liquid fuel from 65-100% load (80-100% for the Saturn 20 and Centaur® 40).

Environmental Protection Agency (EPA's) AP-42[1] document and WebFIRE[2] database also contain VOC emission estimates for gas turbines. These sources are not commonly used by Solar's customers.

Sulfur Dioxide

Sulfur dioxide emissions are produced by conversion of any sulfur in the fuel to SO_2. Solar customers usually either use a mass balance calculation or reference AP-42 to estimate SO_2 emissions. Because Solar does not control the amount of sulfur in the fuel, no SO_2 emissions warranty is available.

The mass balance method assumes that any sulfur in the fuel converts to SO_2. For reference, the typical mass balance equation is shown below.

$$\frac{\text{lb SO2}}{\text{hr}} = \left(\frac{\text{wt\% Sulfur}}{100}\right)\left(\frac{\text{lb fuel}}{\text{Btu}}\right)\left(\frac{10^6\ \text{Btu}}{\text{MMBtu}}\right)\left(\frac{\text{MMBtu fuel}}{\text{hr}}\right)\left(\frac{\text{MW SO2}}{\text{MW Sulfur}}\right)$$

Variables: wt% of sulfur in fuel
Btu/lb fuel (LHV)
MMBtu/hr fuel flow (LHV)

As an alternative to the mass balance calculation, EPA's AP-42 document can be used. AP-42 (Table 3.1-2a, April 2000) suggests emission factors of 0.94S lb/MMBtu (HHV) (where S=Sulfur % in fuel) or 0.0034 lb/MMBtu (HHV) for gas fuel and 1.01S lb/MMBtu (HHV) (where S=Sulfur% in fuel) or 0.33 lb/MMBtu (HHV) for liquid fuel.

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[1]AP-42 is an EPA document containing a compilation of air pollutant emission factors by source category.
[2] WebFIRE is an EPA electronic based repository and retrieval tool for emission factors.

Formaldehyde

For gas turbines, formaldehyde emissions are a result of incomplete combustion and are unstable in the exhaust stream. In this section, regulatory background, recommended emission factors, and testing considerations are discussed.

Regulatory Background and Emissions Factors – U.S. and EU

In 2004 the U.S. EPA published a Maximum Achievable Control Technology (MACT) standard (40 CFR 63 Subpart YYYY) for natural gas fired combustion turbines with a formaldehyde limit of 91 ppb (15% O2). The standard was stayed a few months later for the natural gas subcategories essentially rendering the regulation "on hold". The stay was lifted on March 9, 2022. After ~18 years of not having to comply with the MACT standard, natural gas fired combustion turbines located **at major sources of hazardous air pollutants** need to comply with the standard. The initial compliance date is September 4, 2022. With the lifting of the stay, four of the eight subcategories outlined in the Subpart YYYY must comply with the MACT standard. They are:

- stationary lean premix combustion turbines when firing gas and when firing oil at sites where all turbines fire oil no more than an aggregate total of 1,000 hours annually
- stationary lean premix combustion turbines when firing oil at sites where all turbines fire oil more than an aggregate total of 1,000 hours annually
- stationary diffusion flame combustion turbines when firing gas and when firing oil at sites where all turbines fire oil no more than an aggregate total of 1,000 hours annually
- stationary diffusion flame combustion turbines when firing oil at sites where all turbines fire oil more than an aggregate total of 1,000 hours annually

For U.S. customers with a combustion turbine that must comply with Subpart YYYY, an emission factor of 91 ppb @ 15% O2 (~0.00021 lb/MMBtu HHV) is recommended.

The formaldehyde emissions estimate of 91 ppb @15%O2 (~0.00021 lb/MMbtu HHV) can be used for all new, current production, SoLoNOx models and ratings when firing pipeline quality natural gas or ultra-low sulfur (ULSD) diesel fuel. The emissions estimate is valid for natural gas from 50-100% load (40-100% load for Titan 250) or for liquid fuel from 65-100% load (80-100% load for the Centaur 40) and at ambient temperatures >-4°F (-20C) [> -20 °F (-29C) for Titan 250].

Alternative emission factors for combustion turbines **not** affected by Subpart YYYY (or non-U.S. based combustion turbines) are from U.S. EPA's AP-42 document and are 0.00071 lb/MMBtu (HHV) for natural gas and 0.00028 lb/MMBtu (HHV) for distillate oil[3]. Note that both of the aforementioned formaldehyde emission factors are higher than the MACT standard. Since ~2003 many gas turbine users have used the emission factors found in an EPA memo Revised HAP Emission Factors for Stationary Combustion Turbines[4] for estimating hazardous air pollutant emissions. The memo presents hazardous air pollutant emission factor data in several categories. While the memo presents several formaldehyde emissions factors, the most common formaldehyde emission factor used to estimate emissions from gas turbines from this document is 0.00288 lb/MMBtu HHV (Table 16). Note that this emission factor is an order of magnitude higher than the MACT standard.

In the EU, Germany has established a formaldehyde limit of 5 mg/Nm3 for combustion turbines (13.BImSchV Section 33). This limit applies for operation at 70-100% load and it is anticipated that something similar will be adopted in other EU member states. The 5 mg/Nm3 limit is equivalent to ~0.0038 kg/GJ or ~3.7 ppm.

Formaldehyde Emissions Testing Considerations

Actual emissions of formaldehyde from Solar's gas turbines, in the SoLoNOx operating range, are predicted to be less than 91 ppb @15%O2. However, **the 91 ppb level can only be verified if the proper testing equipment is utilized.** To properly measure formaldehyde emissions, Fourier Transform Infrared (FTIR) instrumentation with limits of detection well below the standard must be utilized. Most "traditional" FTIR systems have formaldehyde

[3] AP-42, Table 3.1-3 for Natural Gas and Table 3.1-4 for Distillate Oil, 4/00.
[4] Revised HAP Emission Factors for Stationary Combustion Turbines, OAR-2002-0060, IV-B-09,8/22/03.

limits of detection in the 120-150 ppb range and are not suitable to measure formaldehyde from combustion turbines.

Solar recommends the MKS Multi Gas 2030 FTIR with StarBoost™ System, the Spectrum WaveRunIR-EXT or an equivalent system with similar path lengths and detection levels.

EPA Method 320 (or equivalent method for non-U.S. testing) should be used to measure formaldehyde. Testing should include three – 120-minute test runs. To ensure accurate formaldehyde measurements, the testing company, in addition to following the requirements of Method 320 (or equivalent method), should take necessary steps to optimize signal-to-noise, verify the FTIR is fully temperature stabilized and purged, ensure the FTIR signal is optimized before testing by maximizing alignment and cleanliness of optics, minimize sampling line bias by using clean sample lines at 250°F to prevent off-gassing and minimize contamination with other compounds, verify absence of sampling system bias via system zero measurements, measure a source specific moisture spectrum while at the test site using a water/N2 delivery systems at +/-10% of turbine moisture content, and use the source specific water spectrum as an interferent in the analysis.

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Attachment 15

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Formaldehyde and VOC Emissions from a General Electric LM6000 Combustion Turbine with SCR and CO Catalysts

1013170

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Formaldehyde and VOC Emissions from a General Electric LM6000 Combustion Turbine with SCR and CO Catalysts

1013170

Technical Update, February 2006

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PRODUCT DESCRIPTION

This report summarizes measurements to characterize trace organic emissions from New York Power Authority's Harlem River Unit 1 - a simple-cycle, natural gas-fired General Electric (GE) LM6000 combustion turbine, and employing selective catalytic reduction (SCR) and carbon monoxide (CO) catalyst.

Results & Findings

Formaldehyde emissions were higher during the low load and winter tests. Formaldehyde emission concentrations during the winter averaged 46 $\mu g/m^3$ (37 ppb) at high load and 151 $\mu g/m^3$ (121 ppb) at low load. The summer test showed lower formaldehyde emissions compared to the winter tests and also showed a similar pattern of higher formaldehyde emissions at low load. Warm weather formaldehyde concentration averaged 7.9 $\mu g/m^3$ (6.3 ppb) at high load and 41 $\mu g/m^3$ (33 ppb) at low load. Carbon monoxide was also elevated during the low load testing, indicating that incomplete combustion may have been a factor in formaldehyde emissions at low load.

Most volatile organic compounds (VOCs) were below or marginally above the detection limits. The one exception was benzene, which was detected at significant concentrations during both the winter and summer tests. Decreasing levels of benzene emissions were detected. For example, the benzene emission concentrations over the four high load winter tests started at 155 $\mu g/m^3$ (48 ppb) during the first test, decreased each subsequent run, and measured 9.8 $\mu g/m^3$ (3 ppb) during the fourth test – all of which occurred in less than three hours. During the low load winter tests conducted on the following day, benzene was either below detection limit or detected just above the detection limit, with the highest benzene concentration being 0.8 $\mu g/m^3$ (0.3 ppb). There were no obvious measures of either sampling or laboratory contamination, as the trip and field blanks were benzene-free. Lastly, the results were not indicative of gasoline contamination where toluene and xylenes would have also been detected at similar levels.

Challenges & Objectives

The objectives of this study are:

- Characterize aldehyde and VOC emissions from "utility-size" state-of-the-art combustion turbines.
- Evaluate the impact of seasonal effects (ambient temperature) and operating load.

The most significant challenges are the complexity of the trace organic measurements at low ppb levels.

Applications, Values & Use

The results would assist in permitting new combustion turbines, as well as to support reporting estimated emissions for Toxics Release Inventory (TRI).

EPRI Perspective

These results summarize formaldehyde and VOC emission measurements from a simple cycle combustion turbine operating at several operating loads and during summer and winter conditions. The formaldehyde results indicated higher emission concentrations during lower load operation as well as winter operating conditions. The VOCs were generally not detected, with the exception of benzene. Decreasing levels of benzene emissions were detected, and it is unclear whether the measurements are representative of real operating conditions, a sampling/analytical issue, and/or outside contamination. Previous EPRI measurements at a Siemens-Westinghouse 501F gas-fired combustion turbine with SCR and CO catalysts indicated similar results for formaldehyde, but generally not detected values for the VOCs, although benzene was detected during start-up (EPRI 1005408).

Additional trace organic measurements are planned to characterize other combustion turbine designs.

Approach

Measurements were conducted in the winter as well as the summer to evaluate the impact of ambient temperature. Measurements were conducted at full load, as well as a reduced load in order to evaluate the impact of operating load. Investigators measured formaldehyde using EPA SW-846 Method 0011 and 8315a. The VOCs were measured using the volatile organic sampling train (VOST) in accordance with EPA SW-846 Method 0300. Flue gas measurements were conducted at only the stack.

Keywords

Air toxics, formaldehyde, combustion turbines

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1.0 INTRODUCTION

TRC Environmental Corporation (TRC) was retained by the Electric Power Research Institute (EPRI) to perform a volatile organic compound (VOC) air emission measurement project on a simple cycle gas turbine generator firing natural gas. The emissions test was conducted on a General Electric LM6000 combustion turbine generator (CTG) operated by the New York Power Authority (NYPA) at the Harlem River site in The Bronx. The LM6000 turbine has a nominal capacity of 48 megawatts and a heat input of approximately 400 MMBtu/hr at 59 degrees F. The project included testing at maximum and partial turbine loads and was repeated during winter and summer weather. Both winter and summer weather emission tests were conducted according to the following test matrix.

Parameter	Sampling Method	Analytical Method	Test Duration (minutes)	Number of Tests at Each Operating Load
Aldehydes and Ketones	SW-846 0011	SW-846 8315a	64	3
VOC (non-water soluable compounds)	SW-846 0030	SW-846 8260	40	4

Target compounds included aldehydes and ketones measured according to EPA SW-846 Method 0011 and 8315a. Samples are collected in dinitrophenylhydrazine (DNPH) solution, which forms a derivative with aldehydes and ketones. The DNPH is extracted in methylene chloride, and the extract is analyzed by high pressure liquid chromatography (HPLC) for multiple compounds.

Target compounds also included non-water soluble volatile organic compounds (VOC) measured according to EPA SW-846 Method 0030 and 8260. The Method 0030 samples are collected on sorbent tubes (Tenax® and charcoal), which are thermally desorbed and analyzed by gas chromatography/mass spectrometry (GC/MS) according to Method 8260. The target compound list included 70 compounds.

The tests were conducted on the stack of the Harlem River Plant Unit 1. Cold weather testing was conducted on December 14-15, 2004 and warm weather testing was conducted on July

13-14, 2005. The GE LM6000 turbine generators are used by NYPA for peak demand power generation and during the winter the generators are typically fired in the late afternoon. The winter tests were conducted between 3:20 and 8:00 PM with ambient temperature in the range of 20 to 25° F. During the summer the generators are typically fired in the early afternoon and the July tests were conducted between noon and 5:00 pm with the ambient temperature in the range of 73 to 81° F.

Sampling was conducted by TRC staff including Jim Canora, Kirk Laakso and Robert Mennillo. Method 0011 laboratory analyses were conducted by Enthalpy Analytical in Raleigh, NC, and Method 0030 VOC analyses were conducted by Air Toxics, Inc in Folsom, CA. Michael Stockstad of NYPA coordinated testing with the plant operation.

The test results are presented and discussed in Section 2 of this report followed by a brief discussion of the process in Section 3. Section 4 presents a description of sampling and analytical methods and Section 5 presents a discussion of measurement quality assurance. Copies of sampling data, sampling calibration forms, process data, and analytical data summaries are included in the appendices.

2.0 SUMMARY AND DISCUSSION OF RESULTS

Test results are summarized in Tables 2-1 and 2-2 for the winter and summer tests. Only 5 compounds (formaldehyde, acetaldehyde, acetone, benzene and toluene) were detected in at least two samples and these compounds are the only compounds included in Tables 2-1 and 2-1. Detection limits for other target compounds are presented in Appendices A – D. In summary, the test program showed increased formaldehyde emissions at low load and at cold weather operations.

Emissions are presented in micrograms per standard cubic meter ($\mu g/m^3$), parts per billion volume (ppbv) and pounds per million Btu (lb/MMBtu). The lb/MMBtu emissions were calculated using the natural gas dry fuel factor (F_d= 8,710 dscf/MMBtu) provided in EPA Method 19. Winter high load tests were conducted on December 14, 2004 with an average power output of 47.95 megawatts and winter low load tests were conducted on the following day with an average power output of 36.88 megawatts. Summer high load tests were conducted on July 13, 2005 with an average power output of 47.76 megawatts and summer low load tests were conducted on the following day with an average power output of 38.02 megawatts.

2.1 Aldehyde and Ketone Emissions – SW-846 Method 0011

Tests showed that formaldehyde emissions were higher during low load and winter weather. Formaldehyde emission concentration during the winter averaged 46.4 $\mu g/m^3$ at high load and 151 $\mu g/m^3$ at low load; concentration was approximately 3 times higher during low load. The summer test showed lower formaldehyde emissions compared to the winter tests and also showed a similar pattern of higher formaldehyde emissions at low load. Warm weather formaldehyde concentration averaged 7.9 $\mu g/m^3$ at high load and 40.7 $\mu g/m^3$ at low load. Carbon monoxide concentration, measured by the plant CEMS, was also elevated during the low load testing, indicating that incomplete combustion may have been a factor in formaldehyde emissions at low load.

2.2 VOC Emissions – SW-846 Method 0030

The cold weather test results showed that most target compounds were below, or marginally above, the detection limits. The one exception was benzene, which was detected at significant concentrations during the high load winter tests. Benzene emission concentrations rapidly decreased over the four high load winter tests, starting at 155 $\mu g/m^3$ during the first test and decreasing to 9.75

$\mu g/m^3$ during the fourth test. During the low load winter tests conducted on the following day, benzene was either below detection limit or marginally detectable; the highest benzene concentration during the low load winter test was 0.84 $\mu g/m^3$. There was no indication of sampling or laboratory contamination, as trip and field blanks were benzene free and the results were not indicative of gasoline contamination where toluene and xylenes would have also been detected at similar levels.

The warm weather test results also showed that most target compounds were below, or marginally above, the detection limits. However, benzene was again detected in decreasing concentrations similar to the cold weather high load test; the warm weather high load benzene emissions decreased from 60.0 to 6.0 $\mu g/m^3$ and the low load decreased from 65.6 to 1.2. As with the winter tests there was no evidence of sampling or laboratory contamination and no indication of gasoline contamination.

Possible explanations for the benzene emissions include benzene in the compressor condensate entering the turbine exhaust through the catalyst inlet dilution air fans. The condensate consists of an oil/water mixture and analyses of the condensate shows significant benzene concentration. The condensate is stored in tanks located near the dilution air fan intake and there is the potential for tank vapors to be injected into the turbine exhaust prior to the catalyst. Benzene emissions as a function of test time to turbine start up were also investigated and the data showed no correlation. Cold weather testing was initiated within 1 hour of a cold turbine start up on both test days and the first day showed high benzene emissions and the second day showed low benzene emissions. Warm weather testing was initiated within 1 hour of start up on the low load day and 6 hours after start up on the high load day, and benzene emissions were similar on both days.

In summary, decreasing levels of benzene emissions were detected and the data indicates the emissions were a transient condition. A possible source of the benzene is the dilution air fans and benzene vapors from condensate storage tanks. There was no correlation with the benzene emissions and the time between testing and turbine start up. There was no evidence of sampling and analytical benzene contamination; however, there is the possibility of an unusual sampling train contamination that only occurred when the sampling system was exposed to high temperature stack gas.

TABLE 2-1
SIMPLE CYCLE GAS TURBINE
COLD WEATHER VOC EMISSIONS TEST SUMMARY

NYPA - HARLEM RIVER UNIT 1

Date	December 14, 2004						December 15, 2005				
Load	High Load (48.0 MW)						Low Load (36.9 MW)				
Test No.	1	2	3	4	Average		1	2	3	4	Average
CEMS Data											
CO (ppm @ 15% O_2)	1.1	1.1	1.1		1.1		2.5	1.9	1.9		2.1
NH_3 (ppm @ 15% O_2)	7.2	7.2	7.4		7.3		7.2	7.0	6.6		6.9
NOx (ppm @ 15% O_2)	2.3	2.3	2.4		2.3		2.2	2.0	2.2		2.1
O_2 (%)	15.1	15.1	15.2		15.1		16.0	15.9	16.0		16.0
Emission Conc (ug/dscm)											
formaldehyde	59.0	49.2	31.0		46.4		165	141	146		151
acetaldehyde	15.3	9.4	10.2		11.6		9.2	28.1	9.4		15.6
acetone	ND	ND	ND		ND		84.2	10.9	69.2		54.8
benzene	155	69.5	18.4	9.8	63.3		0.6	0.84	ND	ND	<0.6
toluene	6.04	2.52	ND	ND	<2.4		ND	ND	ND	ND	ND
Emission Conc (ppbv)											
formaldehyde	47.3	39.4	24.9		37.2		132	113	117		121
acetaldehyde	8.4	5.1	5.6		6.3		5.0	15.3	5.1		8.5
acetone	ND	ND	ND		ND		34.9	4.5	28.7		22.7
benzene	47.8	21.4	5.7	3.0	19.5		0.2	0.3	ND	ND	<0.2
toluene	1.6	0.7	ND	ND	0.6		ND	ND	ND	ND	ND
Emission Rate (lb/mmBtu)											
formaldehyde	1.2E-04	9.6E-05	6.2E-05		9.1E-05		3.8E-04	3.2E-04	3.4E-04		3.5E-04
acetaldehyde	3.0E-05	1.8E-05	2.0E-05		2.3E-05		2.1E-05	6.4E-05	2.2E-05		3.6E-05
acetone	ND	ND	ND		ND		2.0E-04	2.5E-05	1.6E-04		1.3E-04
benzene	3.8E-04	1.7E-04	4.4E-05	2.4E-05	1.5E-04		1.5E-06	2.0E-06	ND	ND	<1.4E-06
toluene	1.5E-05	6.1E-06	ND	ND	<5.7E-06		ND	ND	ND	ND	ND

ND = non-detected
ug/dscm = micrograms per dry standard cubic meter at 68 ^{o}F and 29.92 in Hg
< = detection limit based on averages of detected quantities and detection limits

TABLE 2-2
SIMPLE CYCLE GAS TURBINE
WARM WEATHER VOC EMISSIONS TEST SUMMARY

NYPA - HARLEM RIVER UNIT 1

Date	July 13, 2005						July 14, 2005				
Load	High Load (47.8 MW)						Low Load (38.0 MW)				
Test No.	1	2	3	4	Average		1	2	3	4	Average
CEMS Data											
CO (ppm @ 15% O_2)	1.2	1.2	1.2		1.2		3.6	3.6	3.6		3.6
NH_3 (ppm @ 15% O_2)	3.2	3.3	2.9		3.1		1.3	1.1	1.1		1.2
NOx (ppm @ 15% O_2)	1.9	1.8	1.9		1.9		1.9	1.9	1.9		1.9
O_2 (%)	15.0	15.0	15.0		15.0		15.7	15.7	15.6		15.7
Emission Conc (ug/dscm)											
formaldehyde	12.8	5	5.9		7.9		37.4	41.8	43		40.7
acetaldehyde	ND	ND	ND		ND		ND	ND	ND		ND
acetone	9.5	6.8	18.5		11.6		14.2	4.8	23.6		14.2
benzene	60.0	23.5	11.1	6.0	25.1		65.6	13.8	1.7	1.2	20.6
toluene	1.6	0.9	ND	ND	<0.9		2.1	1.1	ND	ND	<1.0
Emission Conc (ppbv)											
formaldehyde	10.3	4.0	4.7		6.3		30	34	34		33
acetaldehyde	ND	ND	ND		ND		ND	ND	ND		ND
acetone	3.9	2.8	7.7		4.8		5.9	2.0	9.8		5.9
benzene	18.5	7.2	3.4		7.7		20.2	4.3	ND		6.4
toluene	0.4	0.2	ND		0.2		ND	ND	ND		ND
Emission Rate (lb/mmBtu)											
formaldehyde	2.5E-05	9.9E-06	1.2E-05		1.6E-05		8.3E-05	9.5E-05	1.0E-04		9.3E-05
acetaldehyde	ND	ND	ND		ND		ND	ND	ND		ND
acetone	1.9E-05	1.3E-05	3.5E-05		2.3E-05		3.2E-05	1.1E-05	5.5E-05		3.2E-05
benzene	1.2E-04	4.6E-05	2.7E-05	1.1E-05	5.2E-05		1.6E-04	3.3E-05	4.2E-06	3.0E-06	5.0E-05
toluene	3.2E-06	1.8E-06	ND	ND	<1.8E-06		5.0E-06	2.6E-06	ND	ND	<2.5E-06

ND = non-detected
ug/dscm = micrograms per dry standard cubic meter at 68 °F and 29.92 in Hg
< = detection limit based on averages of detected quantities and detection limits

3.0 PROCESS INFORMATION

3.1 Process Description

New York Power Authority (NYPA) operates ten identical LM-6000 gas turbines, which fire only natural gas. The turbines are located at six separate sites. There are a total of four sites that operate dual units and two sites that operate a single unit. The dual unit sites are Harlem River, Hell Gate, Gowanus and Vernon Blvd. and the single units are Kent and Pouch Terminal. The net capacity for all units is 47 MW. The dual units are restricted to 79.9 MW combined output.

Each gas turbine operates as a simple cycle unit, employing a spray inter-cooling system to optimize power output. Each plant is equipped with Selective Catalytic Reduction (SCR) units for control of oxides of nitrogen and catalytic oxidation units (CO catalyst) for the control of carbon monoxide attached to each combustion turbine. Dilution air fans are used to inject ambient air prior to the catalyst bed to control gas temperature at the catalyst.

3.2 Process Monitoring

The gas turbine stacks are equipped with dedicated continuous emission monitoring systems (CEMS). The CEMS are dry extractive design, and measure stack concentrations of NOx, CO, O_2, and NH_3 on a dry basis. Power output, gas flow rate, and other process operating parameters are also monitored and recorded. Process data and emissions data recorded during the emissions test are included in Appendices E and F.

4.0 SAMPLING AND ANALYTICAL METHODS

Sampling was conducted from four ports in the 150-inch diameter stack. The ports were located 50 feet (4 diameters) downstream of the breeching entrance and greater than 25 feet (2 diameters) upstream of the stack exit. The stack schematic and sampling point locations are presented in Figure 4-1.

4.1 Volatile Organic Compounds

The concentrations of volatile organic compounds were determined using the volatile organic sampling train (VOST) in accordance with EPA SW-846 Method 0030. Four samples were collected during each operating load for a total of 8 samples. One field blank and one trip blank were also collected. Sampling duration was 40 minutes per test.

4.1.1 Sample Collection

A 20-liter (nominal) sample of exhaust gas was collected at a flow rate of approximately 0.5 liter per minute (lpm). A schematic of the sampling train is shown in Figure 4-2. The sampling train includes a heated (250° F ± 25° F) glass-lined probe followed by a glass 3-way valve, and a condenser chilled to 20 °C. A Tenax® cartridge follows the first condenser which is followed by a second condenser and a second sorbent cartridge containing a 3:1 mix of Tenax® and activated charcoal.

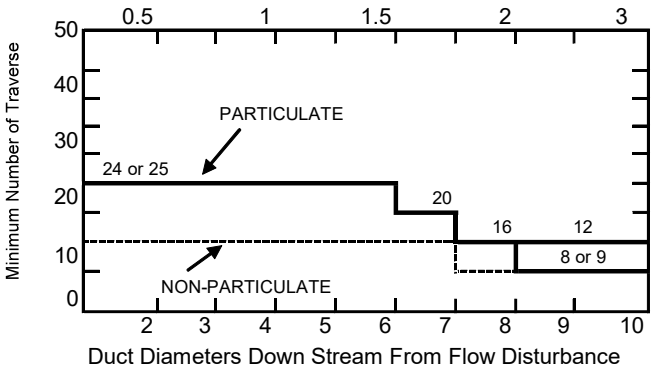
Each pair of sorbent cartridges (Tenax® and Tenax®/charcoal) were desorbed and analyzed together. The field blank and trip blank cartridge pairs were also desorbed and analyzed togather. There was approximately 2 milliliters of condensate from each set of four samples and the condensates were collected in a 40 milliliter vials which were filled to “zero headspace” with purified water. The two condensate samples were analyzed with a purge and trap concentrator for the Method 8260 compounds and no compounds were detected.

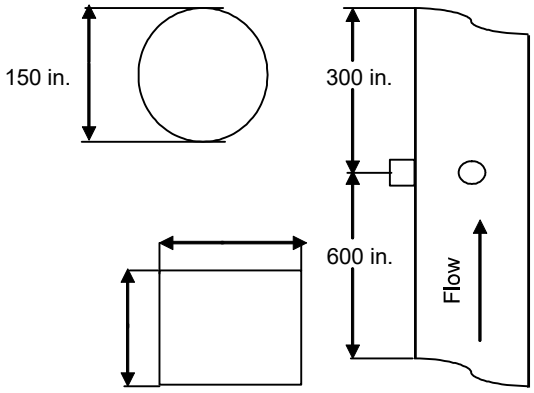
Figure 4-1

TRC Environmental Corporation
EPA Method 1 Data Sheet

Firm	NYPA Harlem River	Total Traverse Points Required	16
Location	Unit 1 Stack	Number of Ports	2
Diameters Upstream	2.0	Points Per Port	8
Diameters Downstream	4.0	Traverse (Horizontal or Vertical)	Horizontal
Nipple Size (in.)	6		

Minimum Number of Traverse Points For Particulate and Non-Particulate Traverses



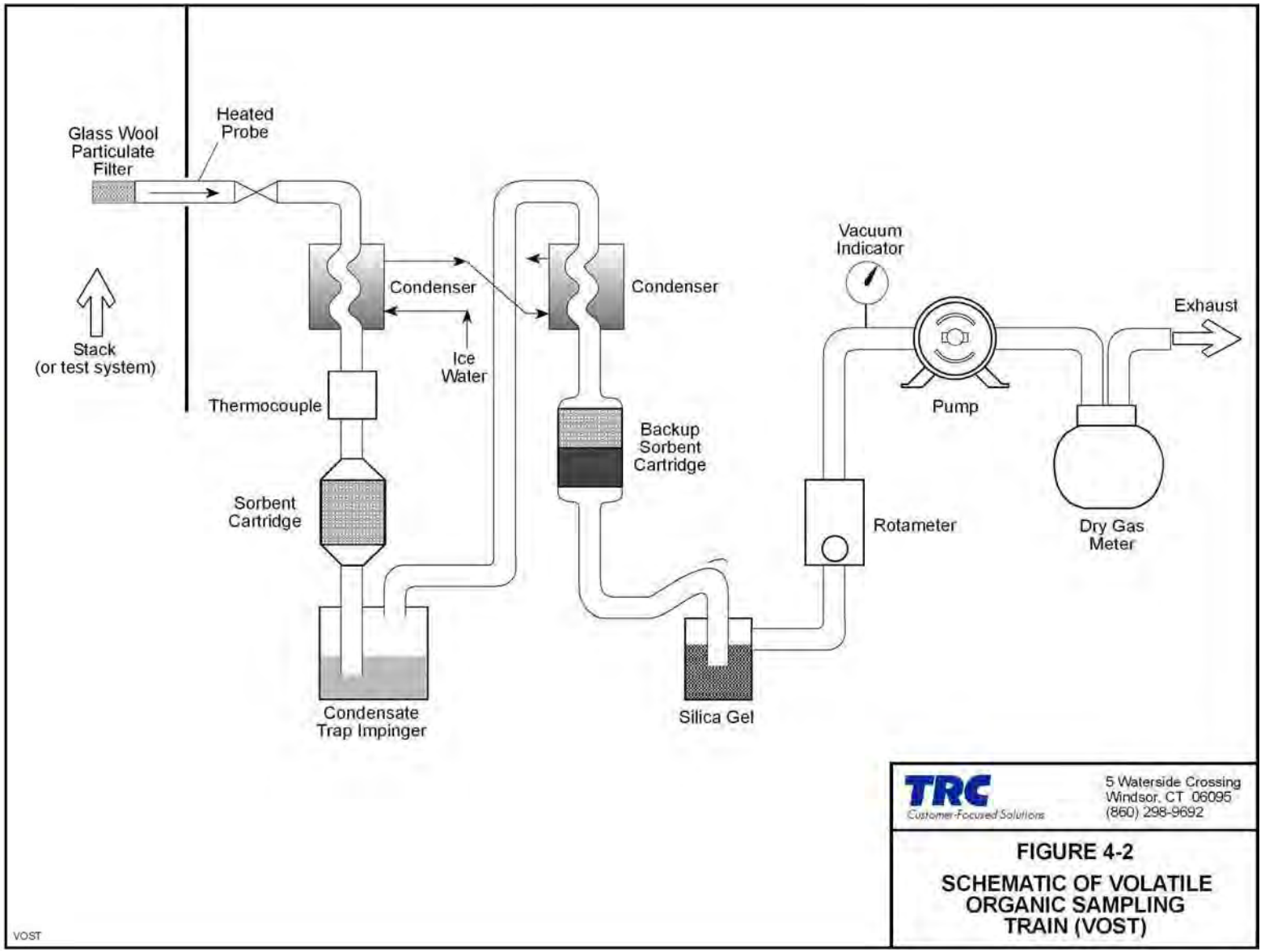


Cross-Sectional Layout For Rectangular Stacks Total	
Total Traverse Points	Matrix
9	3x3
12	4x3
16	4x4
20	5x4
25	5x5

Point Number On a Diameter	(Percent of Stack Diameter from Inside Wall to Traverse Point) (No. of Traverse Points on a Dia.) 4	6	8	10	12
1	6.7	4.4	3.2	2.6	2.1
2	25.0	14.6	10.5	8.2	6.7
3	75.0	29.6	19.4	14.6	11.8
4	93.3	70.4	32.3	22.6	17.7
5	c	85.4	67.7	34.2	25.0
6		95.6	80.6	65.8	35.6
7			89.5	77.4	64.4
8			96.8	85.4	75.0
9				91.8	82.3
10				97.4	88.2
11					93.3
12					97.9

Traverse Point Location

Point Number	Distance From Wall	Nipple Size	Total Distance
1	4.8	6.0	10.8
2	15.8	6.0	21.8
3	29.1	6.0	35.1
4	48.5	6.0	54.5
5	101.6	6.0	107.6
6	120.9	6.0	126.9
7	134.3	6.0	140.3
8	145.2	6.0	151.2
9			
10			
11			
12			



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FIGURE 4-2

SCHEMATIC OF VOLATILE ORGANIC SAMPLING TRAIN (VOST)

4.1.2 Sample Recovery

At the completion of each test run, the sample cartridges were sealed with Swagelok fittings and stored on ice until shipment for analysis. Test data was recorded on appropriate field data sheets.

4.1.3 Sample Analysis

Sample analysis was performed by Air Toxics, Inc according to Methods 0030 and 8260. The contents of the paired sorbent cartridges were spiked with an internal standard and thermally desorbed for 11 minutes at 180° C with organic-free nitrogen gas, bubbled through 5 ml of organic-free water, and trapped on an analytical absorbent trap. After the 11-minute desorption, the analytical absorbent trap was rapidly heated to 180° C with the carrier gas flow reversed so that the effluent flow from the analytical trap was directed into the GC/MS. The volatile compounds were separated by temperature-programmed gas chromatography and detected by low-resolution mass spectrometry. The concentrations of volatile compounds were based on calibration runs performed with standards containing the target compounds.

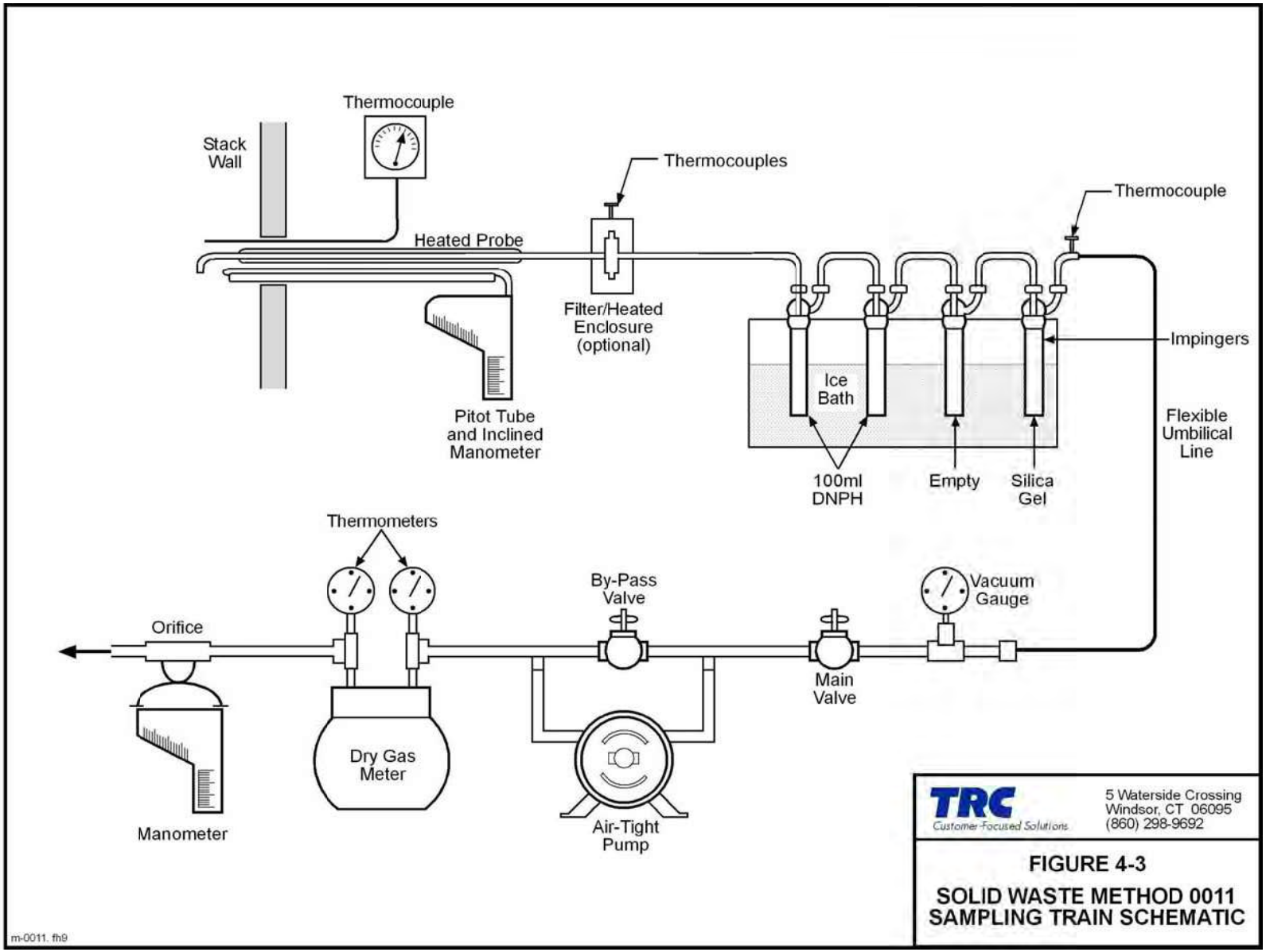
One additional compound was added to the target compound list for this project; this was 1,4-dioxane. The additional compound was quantified as a tentatively identified compound (TIC) using an internal standard calibration and recovery factor.

4.2 Aldehydes and Ketones – SW-846 Method 0011

Emissions measurements for formaldehyde, acetaldehyde, acetone, acrolein, and 16 additional compounds were conducted in accordance with EPA SW-846 Method 0011 and 8315a.

4.2.1 Sample Collection

The sampling train, as shown in Figure 4-3, consisted of a glass nozzle, heated glass-lined probe, four full-size impingers, a vacuum pump, dry gas meter, and calibrated orifice. The first and second impingers were each charged with 100 ml of DNPH solution. The third impinger was empty and the fourth impinger contained 200g of indicating silica gel to capture any remaining moisture. Prior to sampling, the entire impinger train was weighed to the nearest 0.5 gram. A programmable


Thermocouple
Stack Wall
Thermocouples
Thermocouple
Heated Probe
Filter/Heated Enclosure (optional)
Impingers
Ice Bath
Pitot Tube and Inclined Manometer
Flexible Umbilical Line
100ml DNPH
Empty
Silica Gel
Thermometers
By-Pass Valve
Vacuum Gauge
Orifice
Main Valve
Dry Gas Meter
Air-Tight Pump
Manometer
TRC
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(860) 298-9692
FIGURE 4-3
SOLID WASTE METHOD 0011
SAMPLING TRAIN SCHEMATIC
m-0011. fh9

calculator was used to quickly determine the orifice pressure drop required for the measured pitot velocity pressure and stack temperature in order to maintain isokinetic sampling conditions. Sampling flow was adjusted by means of the bypass valve.

4.2.2 Sample Recovery

At the completion of each test the impinger train was weighed to the nearest gram to determine moisture gain. The following sample fractions were collected:

Container No. 1: The nozzle and probe were brushed and rinsed in triplicate with methylene chloride and HPLC water. The rinses were deposited into a glass sample container. The jar was marked, labeled, and sealed with a Teflon-lined lid.

Container No. 2: The contents of the first three impingers were deposited into a 500 ml glass sample jar. The impingers were rinsed in triplicate with methylene chloride and HPLC grade water and the washes deposited into the same jar. The jar was marked, labeled, and sealed with a Teflon-lined lid.

4.2.3 Sample Analysis

The collected liquid samples were submitted for formaldehyde analysis by HPLC according to SW-846 Method 0011.

5.0 QUALITY ASSURANCE

The Project Manager was responsible for developing data of the highest quality. The following discussions present the standard TRC QC procedures for source test emissions. These discussions are organized into sampling, analytical, and reporting procedures.

5.1 Sample Collection

The TRC quality assurance (QA) program for source testing is designed to ensure that emission measurement work is performed by qualified people using proper equipment and following written procedures in order to provide accurate, defensible data. The program is based upon the EPA *Quality Assurance Handbook for Air Pollution Measurement Systems*, Volume III (EPA-600/4-77-0276).

Sampling and measurement equipment, including continuous analyzers, recorders, pitot tubes, dry meters, orifice meters, thermocouples, probes, nozzles, and any other pertinent apparatus, are uniquely identified, undergo preventive maintenance, and are calibrated before and after each field effort, following written procedures and acceptance criteria. Most calibrations are performed with standards traceable to the National Institute for Science and Technology (NIST). These standards include wet test meters, standard pitot tubes, and NIST Standard Reference Materials. Records of all calibration data are maintained in TRC files.

During field tests, sampling performance and progress were continually evaluated, and deviations from sampling method criteria were reported to the Field Team Leader who then determined the validity of the test run. All field data were recorded on prepared data sheets. Field Team Leaders maintained a written log describing the events of each day. Field samples, including field blanks, were transported from the field in shockproof, secure containers. Sample integrity was controlled through the use of prepared data sheets, positive sample identification, and chain-of-custody forms.

5.2 Sample Analysis

In the TRC and subcontract laboratories, all QC samples including field blank samples, reagent and filter blanks, and any audit samples were analyzed with the actual test samples. Each laboratory maintains a continuous QC program to monitor instrument response and analyst proficiency and to ensure the precision and accuracy of all analytical results. These programs have been developed in consultation with EPA, NIOSH, and various state departments of health.

Each subcontract laboratory has its own standard internal QA program and was directed by the Project Leaders to conduct additional project specific QC procedures. The laboratory conducted the specified laboratory QC procedures in addition to their internal procedures.

The following quality control procedures were used during this program:

Field Blanks - For each set of samples taken, a field blank was also collected. Field blanks were collected and analyzed for both VOST and Method 0011 samples. The analysis showed that the VOST field blank was clean demonstrating that field procedures were conducted properly. The Method 0011 field blanks contained small amounts of acetone and cyclohexanone and the results were used to blank correct samples. During the warm weather test the Method 0011 blank contained low levels of formaldehyde and the sample results were also blank corrected.

Method Blanks - To ensure that no contamination occurs during the laboratory work-up, the laboratories processed a method blank with all analytical runs. These blanks indicated no contamination from analytical procedures.

Spiked Samples - All VOST cartridges were spiked with known quantities of target compound isotopes prior to sampling to determine the percent recovery and to indicate the overall accuracy. VOST cartridge pairs were spiked with three surrogate isotopes prior to analysis to determine the percent recovery and recoveries were within method specifications. A Method 0011 field spike was also conducted and the formaldehyde recovery was within method specification.

5.3 Reporting

All calculations were performed using an Excel spreadsheet developed by TRC. The final results were checked by a senior-level project scientist.

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Attachment 16

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[EPA–HQ–OAR–2024–0419; FRL–11542–02–OAR]

RIN 2060–AW21

New Source Performance Standards Review for Stationary Combustion Turbines and Stationary Gas Turbines

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: The U.S. Environmental Protection Agency (EPA, or Agency) is finalizing amendments to the new source performance standards (NSPS) for stationary combustion turbines and stationary gas turbines pursuant to a review required by the Clean Air Act (CAA). As a result of this review, the EPA is establishing subcategories for new, modified, or reconstructed stationary combustion turbines based on size, rates of utilization, design efficiency, and fuel type. The EPA determined that combustion controls are the best system of emission reduction (BSER) for nitrogen oxide (NO_X) emissions for most new, modified, or reconstructed stationary combustion turbines. For one subcategory, the BSER for NO_X is combustion controls with the addition of selective catalytic reduction (SCR). The EPA further determined that the BSER for sulfur dioxide (SO_2) emissions has not changed since the last NSPS review. Based on these determinations, the Agency is promulgating standards of performance in a new subpart of the Code of Federal Regulations (CFR). The Agency is also adding a subcategory for stationary combustion turbines that are used in temporary applications, exempting certain sources from title V requirements, and finalizing other provisions. The EPA is finalizing amendments to existing regulations to address or clarify specific technical and editorial issues.

DATES: This final rule is effective on January 15, 2026. The incorporation by reference of certain publications listed in the rule is approved by the Director of the Federal Register as of January 15, 2026. The incorporation by reference of certain other material listed in the rule was approved by the Director of the Federal Register as of July 8, 2004, and July 6, 2006.

ADDRESSES: The EPA has established a docket for this action under Docket ID No. EPA–HQ–OAR–2024–0419. All documents in the docket are listed on the *https://www.regulations.gov* website. Although listed, some information is not publicly available, *e.g.,* Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the internet and will be publicly available only as portable document format (PDF) versions that can only be accessed on the EPA computers in the docket office reading room. Certain databases and physical items cannot be downloaded from the docket but may be requested by contacting the docket office at (202) 566–1744. The docket office has up to 10 business days to respond to these requests. Except for such material, all documents are available electronically in *Regulations.gov* or on the EPA computers in the docket office reading room at the EPA Docket Center, WJC West Building, Room Number 3334, 1301 Constitution Ave. NW, Washington, DC. The Public Reading Room hours of operation are 8:30 a.m. to 4:30 p.m. Eastern Standard Time (EST), Monday through Friday. The telephone number for the Public Reading Room is (202) 566–1744, and the telephone number for the EPA Docket Center is (202) 566–1742.

FOR FURTHER INFORMATION CONTACT: For information about this final rule, contact John Ashley, Industrial Processing and Power Division (D243–02), Office of Clean Air Programs, U.S. Environmental Protection Agency, 109 T.W. Alexander Drive, P.O. Box 12055, RTP, North Carolina 27711; telephone number: (919) 541–1458; and email address: *ashley.john@epa.gov.*

SUPPLEMENTARY INFORMATION:

Preamble acronyms and abbreviations. Throughout this document the use of ''we,'' ''us,'' or ''our'' is intended to refer to the EPA. We use multiple acronyms and terms in this preamble. While this list may not be exhaustive, to ease the reading of this preamble and for reference purposes, the EPA defines the following terms and acronyms here:

ANSI American National Standards Institute
ASME American Society of Mechanical Engineers
ASTM American Society for Testing and Materials
BPT benefit-per-ton
BSER best system of emission reduction
Btu British thermal unit
CAA Clean Air Act
CAMPD Clean Air Markets Program Data
CBI Confidential Business Information
CDX Central Data Exchange
CEDRI Compliance and Emissions Data Reporting Interface
CEMS continuous emissions monitoring system
CFR Code of Federal Regulations
CHP combined heat and power
CMS continuous monitoring system
CO carbon monoxide
CO_2 carbon dioxide
DLE dry low-emission
DLN dry low-NO_X
EIA Economic Impact Analysis
EPA Environmental Protection Agency
ERT Electronic Reporting Tool
FR Federal Register
GE General Electric
GHG greenhouse gas
GJ gigajoule(s)
gr grains
HAP hazardous air pollutant
HHV higher heating value
HRSG heat recovery steam generator
ICR information collection request
ISA Integrated Science Assessment
kW kilowatt
LAER lowest achievable emission rate
LCOE levelized cost of electricity
lb/MWh pounds per megawatt-hour
lb/MMBtu pounds per million British thermal units
MJ megajoules
MMBtu/h million British thermal units per hour
MW megawatt
MWh megawatt-hour
NAICS North American Industry Classification System
NEI National Emissions Inventory
NESHAP national emission standards for hazardous air pollutants
NETL National Energy Technology Laboratory
ng/J nanograms per joule
NO_X nitrogen oxide
NSPS new source performance standards
NSR New Source Review
NSSN National Standards System Network
NTTAA National Technology Transfer and Advancement Act
O_2 oxygen gas
O&M operating and maintenance
OEM original equipment manufacturers
OMB Office of Management and Budget
PDF portable document format
PM particulate matter
$PM_{2.5}$ particulate matter (diameter less than or equal to 2.5 micrometers)
ppm parts per million
ppmv parts per million by volume
ppmvd parts per million by volume dry
ppmw parts per million by weight
PRA Paperwork Reduction Act
PSD Prevention of Significant Deterioration
RATA relative accuracy test audit
RFA Regulatory Flexibility Act
RICE reciprocating internal combustion engines
scf standard cubic feet
scm standard cubic meter
SCR selective catalytic reduction
SO_2 sulfur dioxide
SSM startup, shutdown, and malfunction
ULSD ultra-low-sulfur diesel
UMRA Unfunded Mandates Reform Act
U.S.C. United States Code
VCS voluntary consensus standard

VOC volatile organic compound(s)

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I. General Information

A. Does this action apply to me?

The source category that is the subject of this final action is composed of stationary combustion turbines and stationary gas turbines regulated under CAA section 111. Based on the number of sources of stationary combustion turbines listed in the 2020 National Emissions Inventory (NEI), most, but not all, are accounted for by the following 2022 North American Industry Classification System (NAICS) codes. These include 2111 (Oil and Gas Extraction), 2211 (Electric Power Generation, Transmission, and Distribution), 2212 (Natural Gas Distribution), 3251 (Basic Chemical Manufacturing), 4862 (Pipeline Transportation of Natural Gas), and 518210 (Data Processing, Hosting, and Related Services). The NAICS codes serve as a guide for readers outlining the types of entities that this final action is likely to affect.

The NSPS codified in 40 CFR part 60, subpart KKKKa, are directly applicable to affected facilities that began construction, modification, or reconstruction after December 13, 2024. Federal, State, local, and Tribal government entities that own and/or operate stationary combustion turbines subject to 40 CFR part 60, subpart KKKKa, are affected by these amendments and standards. If you have any questions regarding the applicability of this action to a particular entity, you should carefully examine the applicability criteria found in 40 CFR part 60, subparts GG, KKKK, and KKKKa, and consult the person listed in the **FOR FURTHER INFORMATION CONTACT** section of this preamble, your State air pollution control agency with delegated authority for NSPS, or your EPA Regional Office.

B. Where can I get a copy of this document and other related information?

In addition to being available in the docket, an electronic copy of this final action is available on the internet at *https://www.epa.gov/stationary-sources-air-pollution/stationary-gas-and-combustion-turbines-new-source-performance.* Following publication in the **Federal Register**, the EPA will post the **Federal Register** version of the final rule and key technical documents at this same website.

C. Judicial Review and Administrative Review

Under CAA section 307(b)(1), judicial review of this final action is available only by filing a petition for review in the United States Court of Appeals for the District of Columbia Circuit by March 16, 2026. Under CAA section 307(b)(2), the requirements established by this final rule may not be challenged separately in any civil or criminal proceedings brought by the EPA to enforce the requirements.

CAA section 307(d)(7)(B) further provides that ''[o]nly an objection to a rule or procedure which was raised with reasonable specificity during the period for public comment (including any public hearing) may be raised during judicial review.'' This section also provides a mechanism for the EPA to convene a proceeding for reconsideration ''[i]f the person raising an objection can demonstrate to the EPA that it was impracticable to raise such objection within [the period for public comment] or if the grounds for such objection arose after the period for public comment, (but within the time specified for judicial review) and if such objection is of central relevance to the outcome of the rule.'' Any person seeking to make such a demonstration to us should submit a Petition for Reconsideration to the Office of the Administrator, U.S. Environmental Protection Agency, Room 3000, WJC South Building, 1200 Pennsylvania Ave. NW, Washington, DC 20460, with a copy to both the person(s) listed in the preceding **FOR FURTHER INFORMATION CONTACT** section, and the Associate General Counsel for the Air and Radiation Law Office, Office of General Counsel (Mail Code 2344A), U.S. Environmental Protection Agency, 1200 Pennsylvania Ave. NW, Washington, DC 20460.

II. Background

A. What is the statutory authority for this final action?

The EPA's authority for this final rule is CAA section 111, which governs the establishment of standards of performance for stationary sources. CAA section 111(b)(1)(A) requires the EPA Administrator to promulgate a list of categories of stationary sources that the Administrator, ''in his judgment,'' finds ''causes, or contributes significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare.'' The EPA has the authority under this section to define the scope of the source categories; to determine, consistent with the statutory requirements, the pollutants for which standards should be developed; and to distinguish among classes, types, and sizes within categories in establishing

the standards.[1] Once the EPA lists a source category that contributes significantly to dangerous air pollution, the EPA must, under CAA section 111(b)(1)(B), establish ''standards of performance'' for ''new sources'' in the source category. These standards are referred to as new source performance standards, or NSPS. The NSPS are national requirements that apply directly to the sources subject to them.

Under CAA section 111(a)(1), a ''standard of performance'' is defined as ''a standard for emissions of air pollutants'' that is determined in a specified manner. When the EPA establishes or revises a performance standard, CAA section 111(a)(1) provides that such standard must ''reflect[ ] the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated.'' Thus, the term ''standard of performance'' as used in CAA section 111 makes clear that the EPA must determine both the ''best system of emission reduction . . . adequately demonstrated'' (BSER) for emissions of the relevant air pollutants by regulated sources in the source category and the ''degree of emission limitation achievable through the application of the [BSER].'' [2] As explained further below, to determine the BSER, the EPA first identifies the ''system[s] of emission reduction'' that are ''adequately demonstrated,'' and then determines the ''best'' of those adequately demonstrated systems, ''taking into account'' factors including ''cost,'' ''nonair quality health and environmental impact,'' and ''energy requirements.'' The EPA then derives from that system an ''achievable'' ''degree of emission limitation.'' The EPA must then, under CAA section 111(b)(1)(B), promulgate ''standard[s] for emissions''—the NSPS—that reflect that level of stringency. The EPA may determine that different sets of sources have different characteristics relevant for determining the BSER for emissions of the relevant air pollutants and may subcategorize sources accordingly.[3] CAA section 111(b)(5) generally precludes the EPA from prescribing a particular technological system that must be used to comply with a standard of performance. Rather, sources can select any measure or combination of measures that will achieve the standard.

Pursuant to the definition of new source in CAA section 111(a)(2), standards of performance apply to facilities that begin construction, modification, or reconstruction after the date of publication of the proposed standards in the **Federal Register**. Under CAA section 111(a)(4), ''modification'' means any physical change in, or change in the method of operation of, a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of any air pollutant not previously emitted. Changes to an existing facility that do not result in an increase in emissions are not considered modifications. Under the provisions in 40 CFR 60.15, reconstruction means the replacement of components of an existing facility such that: (1) the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable entirely new facility; and (2) it is technologically and economically feasible to meet the applicable standards. Pursuant to CAA section 111(b)(1)(B), the standards of performance or revisions thereof shall become effective upon promulgation.

1. Key Elements of Determining a Standard of Performance

Congress first defined the term ''standard of performance'' when enacting CAA section 111 in the 1970 Clean Air Act, amended the definition in the Clean Air Act Amendments (CAAA) of 1977, and then amended the definition again in the 1990 CAAA to largely restore the definition as it read in the 1970 CAA. The D.C. Circuit has reviewed CAA section 111 rulemakings on numerous occasions since 1973 and has developed a body of caselaw that interprets the term.[4]

The basis for standards of performance is the ''degree of emission limitation'' that is ''achievable'' by sources in the source category by application of the ''best system of emission reduction'' that the EPA determines is ''adequately demonstrated'' (BSER). As explained further below in this section, the D.C. Circuit has explained that systems are not ''adequately demonstrated'' if they are ''purely theoretical or experimental.'' [5] The D.C. Circuit has stated that in determining the ''best'' adequately demonstrated system for the pollutants at issue, the EPA must also take into account ''the amount of air pollution'' reduced.[6] The D.C. Circuit has also stated that the EPA may weigh the various factors identified in the statute and caselaw to determine the ''best'' system and has emphasized that the EPA has significant discretion in weighing the factors.[7]

After determining the BSER, the EPA sets an achievable emission limit based on application of the BSER.[8] For a CAA section 111(b) rule, the EPA determines the standard of performance that reflects the achievable emission limit. For a CAA section 111(d) rule, the States have the obligation of establishing standards of performance for the affected sources that reflect the degree of emission limitation that the EPA has determined and provided to States as part of an emission guideline. In applying these standards to existing sources, States are permitted to take a source's remaining useful life and other factors into account.

In identifying ''system[s] of emission reduction, the EPA has historically followed a ''technology-based approach'' that focuses on ''measures that improve the pollution performance of individual sources,'' such as ''add-on controls.'' [9] The EPA departed from its historical approach in a significant way in the 2015 Clean Power Plan (CPP) [10] by setting a BSER in which the ''system'' of emissions reduction involved shifting electricity generation from one type of fuel to another. In *West Virginia* v. *EPA,* the Supreme Court applied the major questions doctrine to hold that the term ''system'' did not provide the requisite clear authorization to support the CPP's BSER, which the Court described as ''carbon emissions

[1] 42 U.S.C. 7411(b)(2) provides the EPA the authority to establish subcategories.

[2] *West Virginia* v. *EPA,* 597 U.S. 697, 709 (2022).

[3] 42 U.S.C. 7411(b)(2).

[4] *Portland Cement Ass'n* v. *Ruckelshaus,* 486 F.2d 375 (D.C. Cir. 1973); *Essex Chemical Corp.* v. *Ruckelshaus,* 486 F.2d 427 (D.C. Cir. 1973); *Sierra Club* v. *Costle,* 657 F.2d 298 (D.C. Cir. 1981); *Lignite Energy Council* v. *EPA,* 198 F.3d 930 (D.C. Cir. 1999); *Portland Cement Ass'n* v. *EPA,* 665 F.3d 177 (D.C. Cir. 2011); *American Lung Ass'n* v. *EPA,* 985 F.3d 914 (D.C. Cir. 2021), *rev'd in part, West Virginia* v. *EPA,* 597 U.S. 697 (2022). *See also Delaware* v. *EPA,* 785 F.3d 1 (D.C. Cir. 2015).

[5] *Essex Chem. Corp.* v. *Ruckelshaus,* 486 F.2d 427, 433–34 (D.C. Cir. 1973).

[6] *See Sierra Club* v. *Costle,* 657 F.2d 298, 326 (D.C. Cir. 1981). The D.C. Circuit has stated that EPA must also take into account ''technological innovation.'' *See id.* at 347.

[7] *See Lignite Energy Council,* 198 F.3d at 933 (''Because section 111 does not set forth the weight that should be assigned to each of these factors, we have granted the agency a great degree of discretion in balancing them.'').

[8] See, *e.g.,* Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air pollutants Reviews (77 FR 49494; August 16, 2012) (describing the three-step analysis in setting a standard of performance).

[9] *See West Virginia* v. *EPA,* 597 U.S. at 727 (internal quotations removed).

[10] 80 FR 64662 (Oct. 23, 2015).

caps based on a generation shifting approach'' [11] that capped ''emissions at a level that will force a nationwide transition away from the use of coal to generate electricity[.]'' [12] The Court explained that the EPA's BSER ''forc[es] a shift throughout the power grid from one type of energy source to another,'' which constituted '' 'unprecedented power over American industry' '' and was different in kind from the type of ''system'' of emissions reduction envisioned by CAA section 111(d).[13]

To qualify for selection as the BSER, the system of emission reduction must be ''adequately demonstrated'' as ''the Administrator determines.'' The plain text of CAA section 111(a)(1), and in particular the terms ''adequately'' and ''the Administrator determines,'' confer discretion to the EPA in identifying the appropriate system, including making scientific and technological determinations and considering a broad range of policy considerations.[14] However, the terms ''adequately'' and ''demonstrated,'' as well as applicable caselaw, make clear that the EPA may not determine that a ''purely theoretical or experimental'' system is ''adequately demonstrated.'' [15]

In addition, CAA section 111(a)(1) requires the EPA to account for ''the cost of achieving [the emission] reduction'' in determining the adequately demonstrated BSER. Although the CAA does not describe how the EPA is to account for costs to affected sources, the D.C. Circuit has formulated the cost standard in various ways, including stating that the EPA may not adopt a standard the cost of which would be ''excessive'' or ''unreasonable.'' [16] The EPA has considerable discretion in considering cost under section 111(a), both in determining the appropriate level of costs and in balancing costs with other BSER factors.[17] The D.C. Circuit has repeatedly upheld the EPA's consideration of cost in reviewing standards of performance.[18]

The Agency does not apply a brightline test in determining what level of cost is reasonable. In evaluating whether the cost reasonableness of a particular system of emission reduction, the EPA considers various costs associated with the particular air pollution control measure or a level of control, including capital costs and operating costs, and the emission reductions that the control measure or particular level of control can achieve. The Agency considers these costs in the context of the industry's overall capital expenditures and revenues. The Agency also considers cost effectiveness analysis as a useful metric, and a means of evaluating whether a given control achieves emission reduction at a reasonable cost. A cost effectiveness analysis allows comparisons of relative costs and outcomes (effects) of two or more options. In general, cost effectiveness is a measure of the outcomes produced by resources spent. In the context of air pollution control options, cost effectiveness typically refers to the annualized cost of implementing an air pollution control option divided by the amount of pollutant reductions realized annually. Notably, a cost effectiveness analysis is not intended to constitute or approximate a benefit-cost analysis in which benefits are compared to costs but rather is intended to provide a metric to compare the relative cost of different air pollution control options. The EPA typically has considered cost effectiveness along with various associated cost metrics, such as capital costs and operating costs, total costs, costs as a percentage of capital for a new facility, and the cost per unit of production. In many contexts, the cost per unit of production may be passed on to consumers, including ratepayers in the utility context and consumers of end products in other contexts.

Under CAA section 111(a)(1), the EPA is required to take into account ''any nonair quality health and environmental impact and energy requirements'' in determining the BSER. Nonair quality health and environmental impacts may include the impacts of the disposal of byproducts of the air pollution controls, or requirements of the air pollution control equipment for water.[19] Energy requirements may include the impact, if any, of the air pollution controls on the source's own energy needs.[20] In addition, based on the D.C. Circuit's interpretations of CAA section 111, energy requirements may also include the impact, if any, of the air pollution controls on the energy supply for a particular area or nationwide.[21] In addition, the EPA has considered under this statutory factor whether possible controls would create risks to the reliability of the electricity system.

After the EPA evaluates the statutory factors with respect to adequately demonstrated control technologies, the EPA compares the various systems of emission reductions and determines which system is ''best,'' and therefore represents the BSER. The D.C. Circuit has also held that the term ''best'' authorizes the EPA to consider factors in addition to the ones enumerated in CAA section 111(a)(1) that further the purpose of the statute. In particular, consistent with the plain language and the purpose of CAA section 111(a)(1), which requires the EPA to determine the ''best system of *emission reduction*'' (emphasis added), the EPA must consider the quantity of emissions at issue.[22] In determining which adequately demonstrated system of emission reduction is the ''best,'' the EPA has broad discretion. In *Sierra Club* v. *Costle,* 657 F.2d 298 (D.C. Cir. 1981), the court explained that ''section 111(a) explicitly instructs the EPA to balance multiple concerns when promulgating a NSPS'' [23] and emphasized that ''[t]he text gives the EPA broad discretion to weigh different factors in setting the standard,'' including the amount of emission reductions, the cost of the controls, and the non-air quality environmental impacts and energy requirements.[24]

The EPA then establishes a standard of performance that reflects the degree of emission limitation achievable through the implementation of the BSER. A standard of performance is

[11] *West Virginia* v. *EPA,* 597 U.S. at 732.

[12] *Id.* at 734.

[13] *Id.* at 728 (citation omitted).

[14] *Nat'l Asphalt Pavement Ass'n* v. *Train,* 539 F.2d 775, 786 (D.C. Cir. 1976); *Essex Chem. Corp.* v. *Ruckelshaus,* 486 F.2d 427, 434 (D.C. Cir. 1973).

[15] *Essex Chem. Corp.,* 486 F.2d at 433–34; *see Portland Cement Assn.* v. *Ruckelshaus,* 486 F.2d 375, 391–92 (D.C. Cir. 1973) (EPA may not base an ''adequately demonstrated'' determination on a '' 'crystal ball' inquiry'') (citation omitted).

[16] *Sierra Club* v. *Costle,* 657 F.2d 298, 343 (D.C. Cir. 1981). *See* 79 FR 1430, 1464 (January 8, 2014); *Lignite Energy Council,* 198 F.3d at 933 (costs may not be ''exorbitant''); *Portland Cement Ass'n* v. *EPA,* 513 F.2d 506, 508 (D.C. Cir. 1975) (costs may not be ''greater than the industry could bear and survive'').

[17] *Sierra Club* v. *Costle,* 657 F.2d 298, 343 (D.C. Cir. 1981).

[18] *See Essex Chemical Corp.* v. *Ruckelshaus,* 486 F.2d 427, 440 (D.C. Cir. 1973); *Portland Cement Ass'n* v. *Ruckelshaus,* 486 F.2d 375, 387–88 (D.C. Cir. 1973); *Sierra Club* v. *Costle,* 657 F.2d 298, 313 (D.C. Cir. 1981).

[19] *Portland Cement Ass'n* v. *Ruckelshaus,* 465 F.2d 375, 387–88 (D.C. Cir. 1973), *cert. denied,* 417 U.S. 921 (1974).

[20] For details on the modeled energy requirements associated with CCS, please see section 6.4 of the RIA for this rule.

[21] *See Sierra Club* v. *Costle,* 657 F.2d at 327–28 (quoting 44 FR 33583–84; June 11, 1979); 79 FR 1430, 1465 (January 8, 2014) (citing *Sierra Club* v. *Costle,* 657 F.2d at 351).

[22] *Sierra Club* v. *Costle,* 657 F.2d 298, 326 (D.C. Cir. 1981). The D.C. Circuit has also held that Congress intended for CAA section 111 to create incentives for new technology and therefore that the EPA is required to consider technological innovation as one of the factors in determining the ''best system of emission reduction.'' *See id.* at 346–47.

[23] *Sierra Club* v. *Costle,* 657 F.2d at 319; *see also AEP* v. *Connecticut,* 564 U.S. 410, 427 (2011).

[24] *Sierra Club* v. *Costle,* 657 F.2d at 321; *see also New York* v. *Reilly,* 969 F.2d at 1150.

''achievable'' if a technology can reasonably be projected to be available to an individual source at the time it is constructed so as to allow it to meet the standard.[25] For purposes of evaluating the source category and determining BSER, the EPA can determine whether subcategorization is appropriate based on classes, types, and sizes of sources, and may identify a different BSER and establish different performance standards for each subcategory. The result of the analysis and BSER determination leads to standards of performance that apply to facilities that begin construction, reconstruction, or modification after the date of publication of the proposed standards in the **Federal Register**. Because the NSPS reflect the BSER under conditions of proper operation and maintenance, in doing its review, the EPA also evaluates and determines the proper testing, monitoring, recordkeeping and reporting requirements needed to ensure compliance with the emission standards.

B. How does the EPA perform the NSPS review?

CAA section 111(b)(1)(B) requires the EPA to, ''at least every 8 years, review and, if appropriate, revise'' the standards of performance applicable to new, modified, or reconstructed sources. However, the Administrator need not review any such standard if the ''Administrator determines that such review is not appropriate in light of readily available information on the efficacy'' of the standard. If the EPA revises the standards of performance, they must reflect the degree of emission limitation achievable through the application of the BSER, which is selected from among adequately demonstrated technologies after consideration of the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements.[26] When conducting a review of an existing performance standard, the EPA may, as appropriate and consistent with the statutory requirements, add emission limits for pollutants or emission sources not currently regulated for that source category.

In reviewing an NSPS for a source category to determine whether it is ''appropriate'' to revise the standards of performance, the EPA evaluates the statutory factors, which may include consideration of the following information:[27]

- Expected growth for the source category, including how many new facilities, modifications, or reconstructions may trigger NSPS in the future.
- Pollution control measures, including advances in control technologies, process operations, design or efficiency improvements, or other systems of emission reduction, that the Administrator determines have been ''adequately demonstrated'' in the regulated industry.
- Available information from the implementation and enforcement of current requirements indicating that emission limitations and percent reductions beyond those required by the current standards are achieved in practice.
- Costs (including capital and annual costs) associated with implementation of the available pollution control measures.
- The amount of emission reductions achievable through application of such pollution control measures.
- Any non-air quality health and environmental impact and energy requirements associated with those control measures.

C. What is the source category regulated in this final action?

The EPA first promulgated NSPS for stationary gas turbines on September 10, 1979.[28] These standards of performance are codified in 40 CFR part 60, subpart GG, and are applicable to sources that commenced construction, modification, or reconstruction after October 3, 1977. The standards of performance in subpart GG regulate emissions of NO_X and SO_2 from all new, modified, or reconstructed simple and regenerative cycle gas turbines and the gas turbine portion of a combined cycle steam/electric generating system. The EPA last reviewed and revised the NO_X and SO_2 standards of performance on July 6, 2006, and promulgated 40 CFR part 60, subpart KKKK, which is applicable to stationary combustion turbines that commenced construction, modification, or reconstruction after February 18, 2005.[29] In subpart KKKK, the definition of the source was expanded to include all equipment, including but not limited to the combustion turbine; the fuel, air, lubrication, and exhaust gas systems; the control systems (except emission control equipment); the heat recovery system (including heat recovery steam generators (HRSG) and duct burners); and any ancillary components and sub-components comprising any simple cycle, regenerative/recuperative cycle, and combined cycle stationary combustion turbine, and any combined heat and power (CHP) stationary combustion turbine-based system.

The stationary combustion turbine source category consists of combustion turbines with design base load ratings (*i.e.,* maximum heat input at ISO conditions) equal to or greater than 10.7 gigajoules per hour (GJ/h) (10 million British thermal units per hour (MMBtu/h))[30] based on the higher heating value (HHV) of the fuel and applies to combustion turbines and their associated HRSG and duct burners, as described above. The source is ''stationary'' because the combustion turbine is not self-propelled or intended to be propelled while performing its function. Combustion turbines may, however, be mounted on a vehicle (or trailer) for portability and still be considered stationary. As discussed in section IV.B.2.e of this preamble, the EPA is amending the applicability of subparts KKKK and KKKKa to provide that combustion turbines that are subject to applicable CAA title II standards are not subject to the NSPS. To the EPA's knowledge, no such stationary combustion turbines are currently being used in temporary applications.

The NO_X standards in subparts GG and KKKK are generally based on the application of combustion controls (as the BSER) and allow the turbine owner or operator the choice of meeting a concentration-based emission standard or an output-based emission standard. The concentration-based emission limits are in units of parts per million by volume dry (ppmvd) at 15 percent oxygen gas (O_2).[31] The output-based emission limits are in units of mass per unit of useful recovered energy, nanograms per joule (ng/J) or pounds per megawatt-hour (lb/MWh). Each NO_X limit in subparts GG and KKKK is based on the application of combustion controls as the BSER, but individual standards may differ for individual

[25] *Sierra Club* v. *Costle,* 657 F.2d at 364, n.276.

[26] *See* 42 U.S.C. 7411(a)(1).

[27] *See generally* 42 U.S.C. 7411; 76 FR 65653, 65658 (Oct. 24, 2011).

[28] *See* 44 FR 52792 (Sept. 10, 1979).

[29] *See* 71 FR 38482 (July 6, 2006).

[30] The base load rating is based on the heat input to the combustion turbine engine. Any additional heat input from duct burners used with HRSG units or fuel preheaters is not included in the heat input value used to determine the applicability of this subpart to a given stationary combustion turbine. However, this subpart does apply to emissions from any HRSG and duct burners that are associated with a combustion turbine subject to this subpart.

[31] Throughout this document, all references to parts per million (ppm) NO_X are intended to be interpreted as ppmvd at 15 percent O_2, unless otherwise noted.

subcategories of combustion turbines based on the following factors: the fuel input rating at base load, the fuel used, the application, the load, and the location of the turbine.[32] The fuel input rating of the turbine does not include any supplemental fuel input to the heat recovery system and refers to the rating of the combustion turbine itself.

The standards of performance for SO_2 emissions in subparts GG and KKKK reflect the BSER of using low-sulfur fuels for all new, modified, or reconstructed combustion turbines, regardless of class, size, or type. The input-based SO_2 standard applies to the sulfur content of the fuel combusted in the turbine. The NSPS also includes an optional output-based standard that limits the discharge of excess SO_2 into the atmosphere as a fraction of the gross energy output of the combustion turbine.[33]

Combustion turbines are a large and diverse source category. Thousands of stationary combustion turbines are operating across numerous industrial sectors. For instance, in the utility sector alone, there are approximately 3,400 existing stationary combustion turbines.[34] Generally, existing combustion turbine sources are subject to either subpart KKKK or subpart GG.

The EPA last revised the NSPS for stationary combustion turbines in 2006, when it promulgated subpart KKKK. In 2022, certain parties filed a complaint in Federal district court pursuant to CAA section 304 alleging that the EPA had failed to fulfill a nondiscretionary duty under CAA section 111(b)(1)(B) to review and, if appropriate, revise this NSPS within 8 years of the 2006 revision. The EPA resolved this litigation through entering a consent decree establishing judicially enforceable deadlines for the EPA to propose and finalize this NSPS review.[35] The EPA is discharging its obligations under the consent decree in this final rule.

The EPA proposed the current review of the stationary combustion turbines NSPS on December 13, 2024. We received 167 unique comments from private citizens, environmental and public health advocacy groups, community organizations, Tribes, and States. The EPA also received unique comments from numerous industrial sectors, including electric utilities, public power cooperatives, original equipment manufacturers (OEMs), trade groups and associations, and certain sectors of the oil and gas industry. In addition, thousands of similar comments were submitted by individuals as part of mass mailer campaigns. A summary of significant comments we timely received regarding the 2024 Proposed Rule and our responses are provided in this preamble. A summary of all other public comments on the proposal and the EPA's responses to those comments is available in the *Summary of Public Comments and Responses: Review of New Source Performance Standards for Stationary Combustion Turbines and Stationary Gas Turbines,* Docket ID No. EPA–HQ–OAR–2024–0419. In this action, the EPA is finalizing decisions and revisions pursuant to its CAA section 111(b)(1)(B) review of the NSPS for stationary combustion turbines and stationary gas turbines that reflect our consideration of all the comments received.

D. The Role of the NSPS

The role of NSPS in relation to other requirements of the Act is to establish a minimum Federal baseline for pollution control performance that all new, modified, or reconstructed facilities within a specific source category must meet. While independently established by the EPA and based strictly on the statutory criteria, in practice, NSPS often act as a starting point for permitting requirements, such as emission limits and standards that may be established through other programs *(e.g.,* the New Source Review (NSR) permitting program or State and local requirements). NSPS are directly enforceable against sources.[36] However, effective implementation is often achieved through collaboration with State and local authorities, who may have delegated authority to implement NSPS and who are typically responsible for incorporating NSPS requirements into operating permits.

Permitting decisions may result in more stringent emissions standards for individual sources than the NSPS based on different legal requirements and case-by-case assessments of the appropriate requirements for individual facilities considering source-specific information, such as the local air quality conditions.[37] For example, a permitting authority evaluating permit requirements for a new combustion turbine in an area that has been designated as non-attainment for ozone under the National Ambient Air Quality Standards (NAAQS) program must set a standard based on the ''lowest achievable emissions rate'' (LAER) (and also must offset new emissions with reductions from other sources).[38] Under a LAER analysis, a NO_X emissions standard lower than what is required in this final rule may be appropriate (*e.g.,* an emissions standard of less than 5 ppm NO_X based on the application of SCR). That decision does not necessarily mean the same level of emissions performance must be required for all combustion turbines in the country through the NSPS. The reverse is also true—it is not necessarily appropriate to use the emission standards in an NSPS as the sole justification for not requiring additional emissions reduction measures under facility-specific permitting authorities.

III. What changes did we propose for the stationary combustion turbines and stationary gas turbines NSPS?

On December 13, 2024, the EPA proposed the current review of, and several revisions to, the stationary combustion turbines and stationary gas turbines NSPS. In that action, we proposed to establish size-based subcategories for new, modified, or reconstructed stationary combustion turbines in 40 CFR part 60, subpart KKKKa that also recognized distinctions between those sources that operate at varying loads or capacity factors, those firing natural gas or non-natural gas fuels, and those that operate in unique locations. Capacity factor or ''utilization'' level or rate is a ratio that measures how often a stationary combustion turbine is operating at its maximum rated heat input. The ratio is based on heat input, or *actual* heat input, compared to the base load rating, or *potential* maximum heat input, under specified conditions.

The EPA proposed post-combustion SCR in addition to combustion controls to be the BSER for limiting NO_X emissions from certain combustion turbines in the small, medium, and large size-based subcategories. The EPA proposed SCR to be adequately demonstrated and generally cost-effective for combustion turbines in this

[32] Throughout this document, all uses of the term ''turbine'' refer to a ''combustion turbine'' as defined in subparts KKKK and KKKKa.

[33] See the 2024 Proposed Rule (89 FR 101310; Dec. 13, 2024) for further discussion of the specific subcategories in previous NSPS and the applicable limits for NO_X and SO_2 emissions in those rules.

[34] *See* the U.S. Environmental Protection Agency's (EPA) National Electric Energy Data System database. NEEDS rev 06–06–2024. Accessed at *https://www.epa.gov/power-sector-modeling/national-electric-energy-data-system-needs.*

[35] *See* Consent Decree, *Environmental Defense Fund et al.* v. *EPA,* No. 3:22–cv–07731–WHO (N.D. Cal. July 27, 2023).

[36] *See* 42 U.S.C. 7411(e).

[37] Experience with emissions control technologies gained through permitting for specific projects can often help inform the EPA when conducting its periodic reviews of the NSPS.

[38] 42 U.S.C. 7503.

source category when those turbines are operated at higher utilization rates. The EPA also proposed that a BSER that includes SCR satisfies the other statutory criteria under CAA section 111(a)(1). We sought comment on these proposed determinations, including on the issues set forth below.

However, the EPA recognized that as the size of a combustion turbine diminishes and/or as the level of operation (*i.e.,* utilization on an annual basis) of a combustion turbine diminishes or becomes more variable, the incremental cost-effectiveness on a per-ton basis and efficacy of SCR technology also diminishes. Thus, at smaller sizes and at lower rates of utilization, we proposed to establish standards of performance based on a BSER of combustion controls without SCR. Specifically, for small combustion turbines (*i.e.,* at proposal, those that have a base load heat input rating less than or equal to 250 MMBtu/h) that operate at an annual capacity factor less than or equal to 40 percent (*i.e.,* at proposal, ''low'' and ''intermediate'' utilization combustion turbines), we proposed that the use of combustion controls alone remains the BSER. For medium combustion turbines (*i.e.,* at proposal, those that have a base load heat input rating greater than 250 MMBtu/h and less than or equal to 850 MMBtu/h) that operate at capacity factors less than or equal to 20 percent (*i.e.,* low-utilization combustion turbines), we proposed that combustion controls alone remain the BSER. Likewise, for large combustion turbines (*i.e.,* those that have a base load heat input rating greater than 850 MMBtu/h) that operate at capacity factors less than or equal to 20 percent (*i.e.,* low-utilization combustion turbines), we proposed that combustion controls alone remain the BSER.

Based on the application of these NO_X control technologies, the EPA proposed to lower the NO_X standards of performance for most of the stationary combustion turbines in this source category relative to subpart KKKK. In addition, the EPA proposed to maintain the current standards for SO_2 emissions after finding that the use of low-sulfur fuels remains the BSER.

The Agency also proposed amendments or requested comment to address several technical and editorial issues that had arisen under the existing regulations in subparts GG and KKKK, which also could be relevant to the new subpart KKKKa. These included, among other things, whether to revise the definition of ''reconstruction'' for this source category; how to address unique challenges faced by newer higher efficiency combustion turbines in meeting the current subpart KKKK standard of performance of 15 ppm NO_X for large turbines; whether to include alternative, optional mass-based NO_X standards of performance; whether to adjust the current approach to the part-load NO_X standards; whether to provide a process for site-specific NO_X standards of performance when burning byproduct fuels; how to address co-firing of non-natural gas fuels, including hydrogen; whether and how to handle certain kinds of emergency operations; whether to include an exemption from title V permitting for non-major sources under CAA section 502(a); whether to address other criteria air pollutants; and whether to create a subcategory or exemption for combustion turbines used in temporary applications, such as for less than 1 year, similar to current NSPS and national emission standards for hazardous air pollutants (NESHAP) provisions for internal combustion engines and industrial boilers.[39]

IV. What actions are we finalizing and what is our rationale for such decisions?

The EPA is finalizing revisions to the NSPS for stationary combustion turbines and stationary gas turbines pursuant to its CAA section 111(b)(1)(B) review. The EPA is promulgating the NSPS revisions in a new subpart, 40 CFR part 60, subpart KKKKa. The revised NSPS subpart is applicable to affected sources constructed, modified, or reconstructed after December 13, 2024. A complete list of the final subcategories and associated emissions standards being finalized in this action is provided in Table 1 in section IV.B.5 of this preamble.

After considering comments critical of the proposed size-based subcategory threshold between small and medium combustion turbines, the EPA has decided to retain in subpart KKKKa the general size-based subcategories from subpart KKKK. This includes subcategories for new, modified, or reconstructed stationary combustion turbines with base load ratings greater than 850 MMBtu/h of heat input (*i.e.,* large), base load ratings greater than 50 MMBtu/h and less than or equal to 850 MMBtu/h of heat input (*i.e.,* medium), and base load ratings less than or equal to 50 MMBtu/h of heat input (*i.e.,* small). In addition, certain subcategories of new stationary combustion turbines in subpart KKKKa reflect the correlation between the level of utilization of a combustion turbine and the cost effectiveness of available control technologies in limiting NO_X emissions. This correlation was discussed in the proposed rule and generated significant input in public comments.[40] The final rule therefore subcategorizes large and medium combustion turbines according to how they are operated—either at high rates of utilization or low rates of utilization. A new large or medium combustion turbine with a 12-calendar-month capacity factor greater than 45 percent is subcategorized as a high-utilization source. A new large or medium combustion turbine with a 12-calendar-month capacity factor less than or equal to 45 percent is subcategorized as a low-utilization source. Small combustion turbines are not being further subcategorized based on utilization.

In addition, taking into consideration public comments in response to the EPA's discussion in the proposal of the unique challenges faced by new large higher efficiency combustion turbines, we are finalizing two subcategories for large low-utilization turbines based on the design efficiency of the turbine, which accounts for different levels of emissions performance that can be achieved by combustion controls alone (*i.e.,* without SCR).[41] Specifically, for new large turbines with low rates of utilization (*i.e.,* a 12-calendar-month capacity factor less than or equal to 45 percent) and design efficiencies greater than or equal to 38 percent on a HHV basis, the EPA is finalizing a determination that the BSER is the use of combustion controls alone.[42] For new large turbines with low rates of utilization (*i.e.,* a 12-calendar-month capacity factor less than or equal to 45 percent) and design efficiencies less than 38 percent, the EPA is finalizing a

[39] See the proposed rule preamble for additional discussion about these and other proposals and requests for comment (89 FR 101306; Dec. 13, 2024). See section IV of this preamble for discussion of the proposals being finalized in subpart KKKKa and section VI of this preamble for discussion of the proposals not being finalized in this action.

[40] The proposal differentiated the cost effectiveness of combustion controls and SCR for combustion turbines operating at low, intermediate, and base load levels. *See* 89 FR 101315.

[41] Efficiency for purposes of subcategorization in 40 CFR part 60, subpart KKKKa refers to the design efficiency of a specific class or type of stationary combustion turbine according to manufacturer specifications. Turbine manufacturers list this value as a percentage based on the HHV of the individual turbine design.

[42] The 38 percent HHV design efficiency is equal to 42 percent on a lower heating value (LHV) basis. In relation to the design efficiency rating of a combustion turbine, ratings based on the HHV will appear lower, as the calculation includes a portion of heat that may not be recoverable in many applications. Efficiency ratings based on the LHV will appear higher because they exclude the energy lost with the water vapor in the exhaust.

determination that the BSER is the use of combustion controls with NO_X emissions rate guarantees based on the use of technologies such as lean premix combustion and dry low-NO_X (DLN) or ultra DLN burners.[43]

The EPA is finalizing a determination that the BSER is the use of various types of combustion controls (*i.e.,* without SCR) for all but one subcategory of new, modified, or reconstructed stationary combustion turbines. For that one subcategory—new large turbines with high rates of utilization (*i.e.,* 12-calendar-month capacity factors greater than 45 percent)—the BSER is combustion controls with SCR.

The standards of performance for each subcategory of stationary combustion turbine in subpart KKKKa reflect the degree of emission limitation achievable based upon application of the BSER. For new large high-utilization turbines firing natural gas with a BSER of combustion controls with SCR, the NO_X standard is 5 ppm. For new large natural gas-fired turbines with low rates of utilization, the NO_X standard is 25 ppm for higher efficiency classes of turbines and 9 ppm for lower efficiency classes.

For new medium high-utilization combustion turbines firing natural gas, the NO_X standard is 15 ppm based on the performance of dry combustion controls. For new medium low-utilization turbines firing natural gas, the NO_X standard is 25 ppm based on the performance of water- or steam-injection combustion controls. The high/low utilization threshold—greater than or less than or equal to a 45 percent capacity factor—is the same for new medium combustion turbines as for new large combustion turbines. And for all new small combustion turbines firing natural gas, the NO_X standard is 25 ppm based on combustion controls regardless of the level of utilization.[44]

This action maintains subcategories for modified and reconstructed stationary combustion turbines that are generally consistent with the subcategories in subpart KKKK. As discussed in section IV.B.6, these subcategories are based on a BSER of combustion controls with associated NO_X standards of performance. As discussed in section VI.A of this preamble, the EPA is not finalizing the proposed, category-specific definition of ''reconstruction'' for combustion turbines.

Some of the other final determinations reflected in subpart KKKKa include: the creation of a new subcategory for stationary temporary combustion turbines; lowering the threshold that defines part-load operations to any hour when the heat input of the combustion turbine is less than or equal to 70 percent of the base load rating; allowing owners or operators to petition the Administrator for a site-specific NO_X standard when burning byproduct fuels; a provision that operation during a ''system emergency'' (Energy Emergency Alert levels 1, 2, or 3) is not included in calculating a turbine's 12-calendar-month utilization; an exemption from title V permitting for combustion turbines that are not major sources or located at major sources under CAA section 502(a); and retention of the SO_2 standards from subpart KKKK for all new, modified, or reconstructed stationary combustion turbines.[45] [46]

The EPA is finalizing corresponding amendments in subparts GG and KKKK with respect to several of these ancillary issues, which will be applicable to combustion turbines subject to those subparts as of the effective date of this final rule. Specifically:

- In subpart GG, the EPA is finalizing that turbines subject to subparts Da, KKKK, or KKKKa are not subject to subpart GG.
- In subpart KKKK, the EPA is finalizing a clarification that only the heat input to the combustion turbine engine is used for applicability purposes and that combustion turbines regulated under subpart KKKK are exempt from subparts KKKKa and GG. The EPA is also finalizing that emergency, military, and firefighting combustion turbines are exempt from the NO_X emission standards in subpart KKKK. Additionally, the EPA is finalizing flexibilities regarding when performance tests must be conducted after long periods of non-operation and that owners or operators can use fuel records to comply with their SO_2 standard. The EPA is finalizing a low-Btu alternative to the SO_2 standard in subpart KKKK, as well as a concentration-based alternate SO_2 standard. Finally, the EPA is finalizing the requirement for approval from the delegated authority for certain monitoring and compliance tasks that are already covered under 40 CFR part 75 and specifications about including duct burners in performance tests.
- In both subparts GG and KKKK, the EPA is finalizing that as an alternative to being subject to either of those subparts, owners or operators of combustion turbines that otherwise meet those subparts' applicability criteria may petition the Administrator to become subject to subpart KKKKa instead. The EPA is also finalizing in both subparts GG and KKKK that turbines subject to subparts J or Ja are not subject to the respective SO_2 standard in subparts GG or KKKK and that NO_X continuous emissions monitoring systems (CEMS) installed and certified according to 40 CFR part 75 can be used to monitor NO_X emissions, where approved. The EPA is finalizing standard electronic reporting requirements for turbines subject to subparts GG or KKKK and that an additional test method (EPA Method 320) can be used to determine NO_X and diluent concentration in subparts GG and KKKK.

It is the EPA's understanding and intention that none of these changes alter the stringency or increase any regulatory burdens with respect to the existing combustion turbines subject to subparts GG and KKKK, and nothing in this final rule is intended to have retroactive effect (that is, to govern any conduct or activities occurring prior to the effective date of this final rule).

This action finalizes standards of performance in subpart KKKKa that apply at all times, including during periods of startup, shutdown, and malfunction (SSM), and other changes such as electronic reporting that also apply to previous NSPS subparts GG and KKKK. These topics are discussed below in sections IV.F–H.

A. Applicability

The source category that is the subject of this final action is composed of new, modified, or reconstructed stationary combustion turbines with a base load rating of greater than 10 MMBtu/h of heat input.[47] The standards of

[43] Dry combustion controls that include the use of lean premix, DLN, ultra DLN, and other technologies are often referred to as ''advanced'' combustion controls by turbine manufacturers and the regulated community. These technologies are generally more effective at NO_X control than other dry combustion controls but are not available for all types, sizes, and applications of new, modified, or reconstructed stationary combustion turbines. The EPA uses the same terminology in this preamble to make the same distinction.

[44] *See* Table 1 of this preamble for a complete listing of subcategories and associated NO_X emissions standards.

[45] Energy Emergency Alert levels 1, 2, and 3 are defined by the North American Electric Reliability Corporation (NERC) Reliability Standard EOP–011–2, or its successor, or equivalent.

[46] *See* section IV.B.7.d of this preamble for discussion of site-specific NO_X standards for stationary combustion turbines in subpart KKKKa. *See* sections IV.B.3–4 for discussion of the BSER for the different subcategories of stationary combustion turbines. *See* section IV.B.5 for discussion of the associated NO_X standards based on the application of the BSER.

[47] The base load rating is the maximum heat input of the combustion turbine engine at ISO conditions. The EPA uses the HHV when specifying heat input ratings.

performance, codified in 40 CFR part 60, subpart KKKKa, are directly applicable to affected sources that began construction, modification, or reconstruction after December 13, 2024—the date of publication of the proposed standards in the **Federal Register**. The final amendments to subparts GG and KKKK are directly applicable to the affected facilities already subject to those subparts. Stationary combustion turbines subject to the standards in subpart KKKKa are not subject to the requirements of subparts GG or KKKK. The HRSG and duct burners subject to the standards in subpart KKKKa are exempt from the requirements of 40 CFR part 60, subpart Da (the Utility Boiler NSPS) as well as subparts Db and Dc (the Industrial/Commercial/Institutional Boiler NSPS), continuing the approach previously established in subpart KKKK.

Subpart KKKKa maintains certain exemptions from NO_X emissions standards promulgated previously in subparts GG and KKKK. In 1977, in subpart GG, the EPA determined that it was appropriate to exempt emergency combustion turbines from the NO_X limits. These included emergency-standby combustion turbines, military combustion turbines, and firefighting combustion turbines. Subpart KKKK further defined emergency combustion turbines as units that operate in emergency situations, such as turbines that supply electric power when the local utility service is interrupted. Additional exemptions being maintained from subpart KKKK include: (1) stationary combustion turbine test cells/stands, (2) integrated gasification combined cycle (IGCC) combustion turbine facilities covered by subpart Da of 40 CFR part 60 (the Utility Boiler NSPS), and (3) stationary combustion turbines that, as determined by the Administrator or delegated authority, are used exclusively for the research and development of control techniques and/or efficiency improvements relevant to stationary combustion turbine emissions.

In general, and as discussed in the following sections, the EPA is finalizing minor changes in wording and writing style to add clarity to the applicability language in subparts GG and KKKK and to track with language being finalized in subpart KKKKa. The Agency does not intend for these editorial revisions to applicability and/or updates to the test methods to substantively change any of the technical requirements of existing subparts GG and KKKK.

1. Exemptions for Combustion Turbines Subject to More Stringent Standards

The EPA is finalizing as proposed provisions to make clear that stationary combustion turbines at petroleum refineries subject to 40 CFR part 60, subparts J or Ja are not subject to the SO_2 performance standards in subparts GG, KKKK, or KKKKa. The SO_2 standards in subparts J and Ja are more stringent than the SO_2 limits in subparts GG, KKKK, or KKKKa. This clarification simplifies compliance for owners or operators of petroleum refineries without an increase in pollutant emissions by minimizing overlap of competing NSPS for different source categories. The EPA received supportive and no adverse comments on the subpart J and Ja related amendments. The EPA is unaware of additional source categories or facilities with stationary combustion turbines that are subject to more stringent NSPS that should not be subject to the SO_2 and/or NO_X performance standards in subparts GG, KKKK, or KKKKa. Further, no commenters identified any such categories or facilities.

2. Petition To Comply With 40 CFR Part 60, Subpart KKKKa

The EPA is finalizing as proposed a provision that will allow owners or operators of stationary combustion turbines currently covered by subparts GG or KKKK, and any associated steam generating unit subject to an NSPS, to petition the Administrator to comply with subpart KKKKa in lieu of complying with subparts GG, KKKK, and any associated steam generating unit NSPS. Since the applicability of subpart KKKKa encompasses any associated heat recovery equipment, owners or operators can have the flexibility to comply with one NSPS instead of multiple NSPS. The Administrator will only grant the petition if it is determined that compliance with subpart KKKKa would be equivalent to, or more stringent than, compliance with subparts GG, KKKK, or any associated steam generating unit NSPS.

Also, if any solid fuel as defined in subpart KKKKa is burned in the HRSG, the HRSG is covered by the applicable steam generating unit NSPS and not subpart KKKKa. The intent of the solid fuel exclusion in subpart KKKKa is that it is only applicable to new turbines burning liquid and gaseous fuels. The exclusion prevents a large solid fuel-fired boiler from using the exhaust from a combustion turbine engine to avoid the requirements of the applicable steam generating unit NSPS.

B. NO_X Emissions Standards

1. Overview

This section discusses the EPA's final BSER determinations for NO_X emissions for each of the subcategories of new, modified, or reconstructed stationary combustion turbines and the associated standards of performance. The EPA explains in section IV.B.2 of this preamble the subcategory approach it is adopting in subpart KKKKa. Sections IV.B.3 and IV.B.4 of this preamble present the EPA's BSER analysis of the NO_X control technologies the EPA evaluated as part of this review of the NSPS, which include dry combustion controls, wet combustion controls (*e.g.,* water or steam injection), and post-combustion SCR. Dry combustion controls include ''advanced'' systems that incorporate lean premix with dry low-NO_X (DLN) or ultra DLN burners to reduce the flame temperature and further limit NO_X formation. In section IV.B.5 of this preamble, the EPA sets out the final NO_X performance standards, based on the application of a particular BSER for each subcategory of stationary combustion turbine.

In determining the subcategories, BSER, and NO_X standards in this action, the EPA considered multiple characteristics of combustion turbines within the source category. These included whether the size of a new, modified, or reconstructed stationary combustion turbine is small, medium, or large; whether the affected source is of a type that typically operates at high or low annual capacity factors (*i.e.,* utilization); whether certain affected sources are higher or lower efficiency designs; whether the affected source operates at full load or part load; and whether the affected source burns natural gas, non-natural gas (such as gaseous hydrogen or liquid distillate), or a combination of fuels.

In section IV.B.6 of this preamble, the EPA explains the final BSER determinations and NO_X emission standards for modified and reconstructed sources. The EPA is finalizing NO_X emission standards for modified and reconstructed stationary combustion turbines that are different than those for new sources and reflect the EPA's determination that combustion controls without SCR are the BSER for these sources. This approach reflects comments that explained that many existing turbines undergoing modification or reconstruction face unique, site-specific challenges to retrofitting SCR, which can dramatically increase costs.

Furthermore, in sections IV.B.2.d and IV.B.7.b of this preamble, the EPA

discusses the NO_X control technologies that the EPA has determined to be the BSER for each of the non-natural gas subcategories and also explains its approach to characterizing new, modified, or reconstructed stationary combustion turbines that elect to co-fire with hydrogen as either natural gas-fired or non-natural gas-fired. Specifically, combustion turbines that elect to co-fire with natural gas blended with hydrogen are subject to the same BSER and NO_X performance standards as those applicable to either natural gas-fired or non-natural gas-fired combustion turbines, depending on the size- and utilization-based subcategory. Section IV.B.2.e of this preamble includes discussion of the new subcategory for stationary combustion turbines used in temporary applications.

2. Subcategorization

This section describes the subcategorization approach being finalized in subpart KKKKa. The discussion that follows begins with a summary of the subcategories in the proposed rule and concludes with a discussion of the final subcategory determinations and the Agency's rationale in support of those decisions. As noted in the proposal, the EPA bases subcategories on the characteristics of combustion turbines that are relevant to the reasonableness of potential BSER controls (*i.e.,* characteristics that make potential controls reasonable or unreasonable in accordance with one or more of the BSER factors in CAA section 111(a)(1)). Therefore, the availability and performance of NO_X controls for different designs, sizes, *etc.,* of stationary combustion turbines have informed the Agency's subcategorization decisions.

To this end, this section discusses the characteristics of various combustion turbines—such as their size, utilization level, and efficiency—and why these characteristics are appropriate bases for subcategorization of sources, as well as how they impact the determinations of the BSER and associated NO_X standards of performance.[48] Summaries of significant comments received during the public comment period and the EPA's responses to those comments are included in the appropriate sections below. The EPA's further response to comments on the proposal, including any comments not discussed in this preamble, can be found in the EPA's response to comments document in the docket for this rule.[49] [50]

a. Subcategorization Based on Size

At proposal, the EPA continued the approach from subpart KKKK of determining subcategories based on combustion turbine size, as reflected by the base load rated heat input of an individual combustion turbine.[51] As discussed in the proposal, the size of a combustion turbine is related to its intended application, whether industrial or utility, and the combination of those factors influences the availability and performance of NO_X combustion controls, making it a relevant consideration for subcategorization and subsequent BSER determinations.[52] The EPA proposed to maintain some of the size cutoffs for defining subcategories from subpart KKKK and proposed to revise others.

The proposed subcategory of large combustion turbines included new, modified, or reconstructed sources with base load ratings greater than 850 MMBtu/h of heat input. This subcategory of large turbines maintained the size-based threshold from subpart KKKK. However, the proposed size-based thresholds for medium and small combustion turbines were revised relative to subpart KKKK. The EPA proposed that the size-based subcategory for medium combustion turbines included new, modified, or reconstructed sources with base load ratings greater than 250 MMBtu/h of heat input and less than or equal to 850 MMBtu/h. The EPA proposed that the size-based subcategory for small combustion turbines included new, modified, or reconstructed sources with base load ratings less than or equal to 250 MMBtu/h of heat input. In addition, for the subcategories of medium and small combustion turbines, the EPA proposed to include both new and reconstructed units in the same size subcategory; and the EPA proposed to determine the same BSER and NO_X emission standards for both new and reconstructed units. This was also in contrast to subcategorizations in subpart KKKK.

In particular, the proposed subcategorization approach for small stationary combustion turbines represented a significant shift from that in subpart KKKK. The EPA proposed that a separate subcategory of combustion turbines smaller than 50 MMBtu/h of heat input is not necessary because multiple turbine manufacturers have developed dry combustion controls capable of limiting NO_X emissions to the same rates as those achieved by larger combustion turbines (*e.g.,* those up to 250 MMBtu/h of heat input) for both electrical and mechanical drive applications. This same rationale also led the EPA to propose that separate subcategories for new small combustion turbines, based on whether they serve electrical or mechanical drive applications, are no longer necessary.

The EPA received significant comments on the size-based subcategorization approach for large, medium, and small stationary combustion turbines.

Many commenters opposed the proposed elimination of the 50 MMBtu/h threshold that distinguishes between the small and medium size subcategories of combustion turbines in the previous NSPS (subpart KKKK). Specifically, the commenters stated that the elimination of the subcategory for very small combustion turbines impacted the EPA's proposed determination of the BSER and associated standards of performance, which they argued were not appropriate for the smallest turbines, *i.e.,* those less than 50 MMBtu/h of heat input. Separately, commenters asserted that the proposed 250 MMBtu/h size threshold did not meaningfully correspond with the emissions performance or other characteristics of models of combustion turbines currently on the market. For example, commenters from the natural gas pipeline industry indicated that they use industrial turbines in sizes of up to 320 MMBtu/h at compressor stations and advocated that the small size subcategory should be increased to that, while the BSER of combustion controls from subpart KKKK should be maintained. There was consistent agreement among these commenters that the subcategory of small combustion turbines with base load ratings less than or equal to 50 MMBtu/h of heat input should be maintained in subpart KKKKa. One commenter indicated that turbines with base load ratings less than 20 MMBtu/h should have their own subcategory.

The EPA agrees with the commenters that it is appropriate to maintain a subcategory for new combustion turbines with base load ratings less than or equal to 50 MMBtu/h of heat input.

[48] *See* Table 1 in section IV.B.5 of this preamble.

[49] EPA–HQ–OAR–2024–0419. *Summary of Public Comments and Responses: Review of New Source Performance Standards for Stationary Combustion Turbines and Stationary Gas Turbines.*

[50] *See* sections IV.B.3–7 of this preamble and Table 1 in section IV.B.5 of this preamble for information about the final BSER determinations and NO_X standards of performance for all new, modified, or reconstructed stationary combustion turbines in subpart KKKKa.

[51] The base load rating only includes the heat input to the combustion turbine engine and does not include the rated input from associated duct burners.

[52] *See* 89 FR 101317 (Dec. 13, 2024).

As described in sections IV.B.3–5 of this preamble, the Agency has further examined the available controls for the source category and their reasonableness based on the varying characteristics of different types of combustion turbines. At proposal, the EPA believed that 250 MMBtu/h represented an inflection point above which SCR would be cost-reasonable at intermediate and high levels of utilization (and therefore the BSER) and below which SCR would not be cost-reasonable (and combustion controls would comprise the BSER) except for high-utilization turbines. However, based on updated information, the Agency is not determining that SCR is the BSER for any units smaller than 850 MMBtu/h. There is therefore no reason to define the boundary between small and medium combustion turbines at 250 MMBtu/h.[53]

Moreover, the EPA's review also indicates that the available combustion controls for turbines with base load ratings less than or equal to 50 MMBtu/h of heat input are more limited and can achieve different emission reductions relative to combustion turbines with base load ratings greater than 50 MMBtu/h of heat input.[54] For example, the manufacturer guaranteed NO_X emission rates for these small combustion turbines is generally 25 ppm based on the use of dry combustion controls. However, as the size of the combustion turbine increases above 50 MMBtu/h, manufacturers have developed more effective dry combustion controls with manufacturer guaranteed NO_X emissions rates decreasing to 15 ppm. This includes many models of industrial and frame type combustion turbines larger than 50 MMBtu/h and smaller than 250 MMBtu/h that would have fallen into the proposed small turbine subcategory. These differences between combustion turbines smaller or larger than 50 MMBtu/h and the availability and performance of the different combustion controls each sized group can employ leads the Agency to conclude that subpart KKKK's size-based cutoff of 50 MMBtu/h between small and medium combustion turbines remains the appropriate threshold for differentiating between small- and medium-sized combustion turbines in subpart KKKKa.

The EPA disagrees with commenters that a subcategory for new combustion turbines with base load ratings less than or equal to 20 MMBtu/h of heat input is appropriate, as there are no significant differences in the performance of new combustion controls for turbines less than or equal to 20 MMBtu/h and combustion turbines greater than 20 MMBtu/h and less than or equal to 50 MMBtu/h.[55] However, combustion controls that achieve emission rates of 25 ppm or lower for small combustion turbines are not available for certain existing small combustion turbines that modify or reconstruct, and SCR is not cost reasonable. Therefore, the EPA agrees that a subcategory for combustion turbines with base load ratings less than or equal to 20 MMBtu/h of heat input—with higher NO_X standards based on application of different BSER—is appropriate for modified and reconstructed combustion turbines only.

The EPA is finalizing, as proposed, that subpart KKKKa will not include additional subcategories for new, modified, or reconstructed small combustion turbines to distinguish between those that are electrical drive versus those that are mechanical drive. While the EPA did receive comments requesting that it maintain the distinction between electrical and mechanical drive turbines as in subpart KKKK, the Agency does not believe it is necessary given that the final rule does not treat new and reconstructed combustion turbines the same way, and existing electrical or mechanical drive turbines that modify or reconstruct can meet the final NO_X standards of performance for small modified or reconstructed units in subpart KKKKa using combustion controls.[56]

In subpart KKKKa, after completion of the technology review and consideration of comments provided by stakeholders, the EPA is finalizing the same size-based subcategory approach as the previous combustion turbine criteria pollutant NSPS (subpart KKKK). The final subcategories in subpart KKKKa include combustion turbines with base load ratings greater than 850 MMBtu/h of heat input (*i.e.,* large), those with base load ratings greater than 50 MMBtu/h and less than or equal to 850 MMBtu/h of heat input (*i.e.,* medium), and those with base load ratings less than or equal to 50 MMBtu/h of heat input (*i.e.,* small). Like subpart KKKK, these subcategories are based on the base load rating of the turbine engine and do not include any supplemental fuel input to the heat recovery system.

b. Subcategorization Based on Utilization

In the proposed rule, in addition to subcategorizing combustion turbines according to size, the EPA proposed to subcategorize stationary combustion turbines further depending on 12-calendar-month capacity factors (*i.e.,* utilization). Although the EPA had not previously subcategorized on this basis in subparts GG or KKKK, it has differentiated between combustion turbines on the basis of utilization in other contexts since 2015.[57] Subcategorizing on this basis is appropriate for combustion turbines in the utility sector because a source's pattern of operation (*e.g.,* how often it is in operation over different time frames) generally tracks with how turbines are configured (*e.g.,* as simple cycle versus combined cycle, *etc.*). Patterns of utilization and configuration in turn impact the feasibility, emission reductions that would be achieved by, and cost-reasonableness of different types of NO_X emissions controls. For example, in the utility sector, project developers do not typically construct combined cycle combustion turbine systems to serve peak demand where they would be expected to start and stop often. Similarly, project developers in the utility sector do not typically construct and install simple cycle combustion turbines to operate at higher capacity factors to provide base load power. Combustion turbines used in the utility sector typically fall into both the medium and large subcategories. Similar patterns exist for combustion turbines used in the commercial, institutional, and industrial power generating sectors, which are typically turbines in the small and medium subcategories. In the non-utility sector, project developers typically construct CHP turbines for high-utilization applications and simple cycle turbines for low-utilization applications, such as providing backup power. Thus, turbine utilization is a useful proxy for certain characteristics of turbines—classes, types, sizes, and modes of operation—that are relevant for the systems of emission reduction that the EPA may

[53] The EPA noted in the proposal that ''if the EPA were to determine that SCR was not an appropriate BSER for all small stationary combustion turbines, then it may be appropriate to adjust the size-based thresholds such that turbines of greater than 50, 100, or 150 MMBtu/h of heat input should be treated as 'medium' turbines.'' 89 FR 101318.

[54] *See* the discussion of the determination of the BSER and NO_X standards for new small combustion turbines in section IV.B.5.c of this preamble.

[55] *See* the manufacturer specification sheet in the rulemaking docket for additional information about available models of stationary combustion turbines.

[56] *See* section IV.B.6 of this preamble for discussion of the subcategory for small modified and reconstructed combustion turbines.

[57] *See, e.g., Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units* (88 FR 33318; Oct. 23, 2015).

evaluate to be the BSER and therefore for the resulting standards of performance.

While it is generally the case that utilization tracks turbine size and mode of operation (*e.g.,* simple versus combined cycle), there are exceptions. Industrial mechanical drive applications (*i.e.,* not electric generating) primarily use turbines from the small and medium subcategories but have different utilization characteristics. These turbines tend to operate at more variable loads as compared to combustion turbines used to generate electricity. Their frequent operation may result in their subcategorization as high-utilization facilities, but they are primarily in simple cycle configurations because heat recovery is generally not a technically or economically viable option. However, the amount of utilization and the mode of operation remain relevant for the systems of emission reduction that the EPA may evaluate to be the BSER and therefore for the resulting standards of performance.

The EPA proposed that combustion turbines with 12-calendar-month capacity factors greater than 40 percent would be subcategorized as high capacity factor (*i.e.,* base load or high-utilization) units, those with capacity factors greater than 20 percent and less than or equal to 40 percent were proposed to be subcategorized as intermediate capacity factor/utilization units, and those with capacity factors less than or equal to 20 percent were proposed to be subcategorized as low capacity factor/utilization units. The proposed capacity factor/utilization thresholds were chosen to reflect what, at proposal, were believed to be reasonable cut points above and below which different NO_X controls would be cost-effective based on sources' operational characteristics. The proposed thresholds were also designed to align with thresholds in the 2024 NSPS for greenhouse gas (GHG) emissions from new combustion turbines.[58]

The EPA received significant comments on the subcategorization of stationary combustion turbines according to capacity factor (*i.e.,* utilization). Several commenters recommended that the upper capacity factor threshold for defining small low-utilization combustion turbines be increased to at least 25 percent or as high as 40 percent in subpart KKKKa to not restrict the operation of simple cycle peaking units that will have to support higher demand variability in the future due to increased deployment of intermittent generation. According to the commenters, a lower capacity factor threshold coupled with an emission limit based on SCR would exacerbate the risk and complexity of operating combustion turbines essential for grid firming generation and reliability during extreme weather events and seasonal demands, and constraining these assets could lead to capacity shortfalls that increase the potential of higher-emitting generation being called upon. Another commenter stated that the EPA should set the capacity factor-based subcategories in subpart KKKKa to better reflect the changing operational characteristics for certain combustion turbines used in simple cycle mode and the typical capacity factors of combined cycle units. Specifically, the commenter stated that an annual capacity factor of 60 percent is a more appropriate demarcation between simple cycle and combined cycle turbines. The commenter expects that some frame type simple cycle turbines will be required to operate at capacity factors of more than 40 percent in the future as demand for power climbs, largely due to the boom in artificial intelligence and the associated data centers. In addition, the commenter stated that a threshold of 60 percent would help differentiate between units that operate in simple cycle mode and those that operate in combined cycle mode.

Based on the EPA's updated analysis of the cost and feasibility of available controls for combustion turbines, the Agency is determining in this final rule that SCR does not qualify as the BSER for any subcategory of stationary combustion turbines with 12-calendar-month capacity factors less than or equal to 45 percent.[59] Therefore, the proposed ''intermediate load'' subcategory that would have covered combustion turbines operating at annual capacity factors greater than 20 percent and less than or equal to 40 percent is no longer necessary. Moreover, the EPA has not found differences in the reasonableness of combustion controls based on a combustion turbine's utilization that would make distinguishing between ''low'' and ''intermediate'' load turbines appropriate. Therefore, the proposed low-utilization threshold referenced by the commenter is not included in final subpart KKKKa.

After deciding that three utilization-based subcategories are unnecessary and shifting to just two in this final rule (''high utilization'' and ''low utilization''), the EPA further considered the cutoff between these two subcategories. To determine an appropriate capacity factor that generally reflects the differences between turbines that operate in simple cycle mode and those that operate in combined cycle mode, the EPA evaluated the 12-calendar-month capacity factors of simple cycle turbines in the electric utility power sector that have commenced operation since January 1, 2020. To account for variability, the EPA calculated the 99 percent confidence maximum capacity factor for each combustion turbine. The 99 percent confidence maximum 12-calendar-month capacity factor for recently constructed simple cycle turbines was 43 percent. To account for potential future uncertainty, the EPA is finalizing a 12-calendar-month utilization rate threshold of 45 percent to delineate between low- and high-utilization turbines.[60] [61]

In this final rule, the EPA is subcategorizing large and medium combustion turbines as high- or low-utilization units depending on 12-calendar-month capacity factors (*i.e.,* utilization rates). The high-utilization subcategories include large and medium turbines utilized at 12-calendar-month capacity factors greater than 45 percent. The low-utilization subcategories include large and medium combustion turbines utilized at 12-calendar-month capacity factors less than or equal to 45 percent. Large and medium combustion turbines that exceed the 12-calendar-month capacity factor threshold of 45 percent will be subject to the high-utilization NO_X standards, and owners or operators of such facilities must achieve the applicable NO_X standard, presumably through the operation of additional emission control technology relative to that required for low-utilization combustion turbines. The EPA is not subcategorizing small combustion turbines by utilization and the same BSER and emissions standard is applicable to all new small combustion turbines regardless of the utilization level because utilization level is not determinative of the

[58] *See* 89 FR 39798, 39913 (May 9, 2024). The EPA proposed to repeal the 2024 NSPS for GHG emissions for new combustion turbines, as well as for other new and existing fossil fuel-fired power plants, on June 17, 2025. 90 FR 25752.

[59] *See* sections IV.B.3 and IV.B.5 of this preamble.

[60] While the fleetwide average capacity factor of both medium and large simple cycle turbines is increasing, the average and maximum capacity factors of both medium and large simple cycle turbines that have recently commenced operation has remained relatively constant.

[61] *See* section IV.B.2.g of this preamble for discussion of the EPA's decision not to establish subcategories based on whether a combustion turbine operates in a simple cycle or combined cycle configuration.

reasonableness of NO_X controls for these units.

Even combustion turbines that operate at consistent utilization levels for the life of the facility, the 12-calendar-month utilization rates vary over the life of the turbine. To estimate the variability in 12-calendar-month utilization rates, the EPA reviewed the maximum 12-calendar-month capacity factors and the average capacity factors of combined cycle and simple cycle turbines in the power sector that have commenced operation since 2020. The median percentage that the maximum capacity factor is greater than the average capacity factor is 11 percent for combined cycle turbines and 15 percent for simple cycle turbines. Assuming this is the only factor impacting the relationship between the maximum and average capacity factor, the maximum 12-calendar-month capacity factors of combined cycle and simple cycle turbines with average capacity factors of 40 percent is 44 and 46 percent, respectively. Therefore, the EPA used a 45 percent applicability threshold as representative of combustion turbines with an average capacity factor of 40 percent. The 40 percent value was used when evaluating cost and other BSER factors for control technologies for combustion turbines in the high-utilization subcategories. The EPA acknowledges that this approach is conservative. Once that investment is made, the control technology would likely be used for the life of the facility even if the combustion turbine were to be subcategorized as low utilization in the future. For example, in the utility sector, the average 30-year capacity factor of combined cycle and simple cycle combustion turbines is 51 percent and 9 percent, respectively. Combined cycle turbines initially operate on average at a capacity factor of 66 percent, and by year 30, the capacity factor drops to 37 percent.[62] Simple cycle combustion turbines initially operate at a capacity factor of 13 percent and drop to 5 percent by year 30. For combined cycle and simple cycle turbines, the maximum capacity factor is 28 percent higher and 49 percent higher than the 30-year lifetime average capacity factor, respectively. In conclusion, the EPA determined it is appropriate to use a 40 percent utilization rate when evaluating the BSER factors, but this translates for implementation purposes into a utilization subcategory threshold of 45 percent based on the 12-calendar-month capacity factor to accommodate for the variability of a combustion turbine that operates at a consistent utilization over the life of the unit.

c. Subcategorization Based on Efficiency

The Agency noted in the proposed rule that ''[t]he EPA's review of combustion turbine emissions data and applied control technologies . . . demonstrates a correlation between the efficiency of new turbine designs and NO_X emissions using combustion controls.'' [63] We went on to state that turbine manufacturers have endeavored to increase the efficiency of new turbine designs, but that there is a tradeoff between efficiency and NO_X emissions such that some models of large higher efficiency turbines cannot meet a 15 ppm NO_X standard.[64] We discussed and requested comment on the relationship between turbine efficiency and the effectiveness of combustion controls in our analysis of combustion controls for large combustion turbines.[65] Based on comments received in response to its requests, the EPA is determining that it is appropriate to further subcategorize large low-utilization combustion turbines in subpart KKKKa based on the manufacturer's design efficiency rating.

When subpart KKKK was finalized in 2006, the largest available aeroderivative combustion turbine had a base load rating of less than 850 MMBtu/h of heat input, and less efficient frame units greater than 850 MMBtu were available with manufacturer guaranteed NO_X emission rates of 15 ppm or less. Thus, the subcategories in subpart KKKK were designed to reflect the distinctions between the sizes and feasibility of different types of combustion controls between more efficient turbines that were less than 850 MMBtu/h and less efficient turbines that were greater than 850 MMBtu/h.

Since subpart KKKK was finalized, incremental advances have been made to the design of the aeroderivative turbine that had been used to define the 850 MMBtu/h threshold, and the base load rating of that specific turbine model is now approximately 1,000 MMBtu/h.[66] Further, new frame type turbines have become available that have higher efficiencies. The most common way to increase the efficiency of a combustion turbine is to increase the firing temperature. However, an increase in firing temperature also results in increased formation of thermal NO_X. Several frame turbines have become commercially available since 2013 that have design efficiencies of at least 38 percent on a HHV basis [67] and guaranteed NO_X emission rates of 25 ppm. In essence, the state of the source category has evolved since 2006 so that there are now more types of large combustion turbines available, and those combustion turbines have a broader range of efficiencies, which affects NO_X formation and the emission reductions that can be achieved using combustion controls. Given the subsequent development of the industry and the EPA's further understanding of how large, higher efficiency turbines are operated today (*i.e.,* of the intersection between size, utilization, and efficiency), for the purposes of subpart KKKKa, the Agency is determining it is appropriate to subcategorize large, low-utilization combustion turbines depending on whether their design efficiency is less than 38 percent or greater than or equal to 38 percent.[68]

Several commenters requested that the EPA consider subcategorizing large combustion turbines further to reflect the performance of available combustion controls in relation to the utilization and design efficiencies of certain classes or types of available combustion turbines. Other commenters stated that the EPA should revise the size-based subcategories in subpart KKKKa to capture and accommodate variations within certain classes of combustion turbines that could bear significantly on the cost of NO_X controls. Specifically, commenters suggested that the EPA should create additional subcategories for large combustion turbines to distinguish between classes of turbines with distinct NO_X profiles and for which SCR has materially different marginal costs and benefits. The commenters asserted that doing so would account for variation in the BSER, NO_X reductions, and cost effectiveness for three classes of large

[62] At year 24, combined cycle turbines would become low-utilization turbines and the NSPS BSER would no longer be based on the use of SCR. The EPA costing analysis assumes the high-utilization BSER (*i.e.,* SCR) continues to operate the entire 30-year period. Assuming the SCR ceases operation in year 24 would decrease the cost effectiveness of SCR.

[63] 89 FR at 101325.

[64] *Id.*

[65] *See, e.g., id.* at 101333 (solicitation for comment on whether combustion controls are being developed for large, high-efficiency turbines currently guaranteed at 25 ppm that would reduce the NO_X emission rate).

[66] The larger version became available in 2013. See the Excel file docket item titled *combustion turbine manufacturer specifications proposal docket number EPA–HQ–OAR–2024–0419–0020 attachment 3.*

[67] This value is equal to a design efficiency rating of 42 percent on a lower heating value (LHV) basis.

[68] This characteristic was not analyzed or understood to be relevant at the time the BSER analysis was conducted for subpart KKKK.

frame turbines used in the power industry. Specifically, the commenters suggested the following:

- Simple cycle frame turbines (90 to 150 MW) with a NO_X performance standard of 5 ppm reflecting advanced DLN combustion controls as BSER for intermediate and base load. The performance standard should be 15 ppm based on DLN for the low-utilization subcategory.
- Simple cycle frame turbines (200 to 320 MW) with a performance standard of 9 ppm reflecting advanced DLN combustion controls as BSER for intermediate and base load. The performance standard should be 15 ppm based on DLN for the low-utilization subcategory.
- Simple cycle frame turbines (greater than 320 MW) with a performance standard of 25 ppm reflecting DLN combustion controls as BSER for all load subcategories. There is no advanced DLN technology for these very large turbines.
- All units in combined cycle mode (*i.e.,* base load) with a performance standard based on SCR as BSER.

The EPA agrees with the commenters that since subpart KKKK was finalized in 2006, new higher efficiency classes of frame type combustion turbines have become commercially available, and the sizes of these large turbines range from approximately 290 MW to 450 MW. There are also two aeroderivative turbine designs that are large higher efficiency units with NO_X emission rates of 25 ppm.[69] As pointed out by the commenters, these classes of combustion turbines are generally larger than earlier generation designs and these frame type turbines are differentiated from earlier models by their higher firing temperatures that result in higher NO_X emissions.[70]

As discussed above, the EPA is determining that it is appropriate to further subcategorize large, low-utilization combustion turbines according to efficiency. The new subcategorization approach for these turbines reflects the distinctions between large, higher efficiency turbines and large, lower efficiency turbines when those turbines are operating at low levels of utilization. This distinction is not relevant when these turbines are operating at high utilization because, regardless of the efficiency of the turbine, combustion controls with the addition of SCR is reasonable for large turbines operating at high utilization.[71] However, at low utilization, there is a clear distinction between the technical feasibility of achieving different emission rates using combustion controls based on the efficiency of the turbine. Efficiency is thus an appropriate basis for subcategorization for large combustion turbines operating at low utilization.

Further subcategorization according to design efficiency is only reasonable for combustion turbines in the large subcategory. For instance, the EPA is not aware of any commercially available models of new medium combustion turbines with design efficiencies greater than 38 percent on a HHV basis. For the subcategory of new small combustion turbines, the most efficient model of which we are aware achieves an efficiency of 35 percent on a HHV basis. Regardless of the design efficiencies of new small and medium combustion turbines, we did not identify a distinct correlation between efficiency and the manufacturer guaranteed NO_X emission rates. On the other hand, for combustion turbines in the large subcategory, we identified a clear correlation between design efficiency and manufacturer guaranteed NO_X emissions.

For subpart KKKKa, the EPA determines this additional subcategorization is appropriate because it reflects, in part, improvements in the design efficiency of stationary combustion turbines. These developments in the current combustion turbine marketplace—as evidenced by a review of manufacturer specification data and as stated in public comments—continued to evolve since the promulgation of subpart KKKK in 2006. Additionally, distinguishing between combustion turbines in subpart KKKKa based on utilization has the effect of elucidating distinctions in the reasonableness of controls when turbines are operating at low versus high utilization; these distinctions were not evident based on the subcategorization approach in subpart KKKK. As discussed in section IV.B.5 of this preamble, this results in a higher NO_X emissions standard for the class of large low-utilization higher efficiency combustion turbines relative to subpart KKKK. It also results in a lower NO_X emissions standard for the class of large low-utilization lower efficiency combustion turbines than was determined for other classes of large turbines in subpart KKKK.

The EPA notes that subcategorizing large low-utilization combustion turbines by design efficiency can impact the availability of large turbines for use as high-utilization units. For example, combined cycle facilities can be built in stages—initially the simple cycle portion is installed and the HRSG and steam turbine are installed later. This occurs when developers elect to go ahead and install the simple cycle portion to meet current low-utilization loads, and as demand increases over time, they add the steam portion of the combined cycle facility to meet high-utilization loads. Under this planned staging of construction and generation, the combustion turbine could operate as a simple cycle unit for years. For other installations, the simple cycle portion of the combined cycle facility is completed prior to the remainder of the combined cycle facility due to unforeseen events, such as delays in the availability of materials necessary to complete the steam portion of the facility or delays in the availability of a second (or third) combustion turbine engine for a combined cycle facility with multiple turbines serving a single steam turbine. The ability to begin operating the simple cycle portion of the facility prior to the completion of the combined cycle project could have significant financial benefit to the developer and provide additional resources to assist in grid stability. And because the SCR for combined cycle turbines is included in the HRSG, the simple cycle turbine would be operating without SCR in both scenarios.

Without a subcategory for large low-utilization combustion turbines based on efficiency, developers would not be able to use models with efficiencies of 38 percent or greater as simple cycle turbines—even on a short-term basis. The lack of a subcategory would provide a perverse regulatory incentive to install lower efficiency combustion turbines so that they could be operated on a short-term basis in simple cycle mode. This would result in higher overall emissions because when the HRSG becomes operational, the resulting lower efficiency combined cycle facility with a lower efficiency turbine engine would have higher emissions compared to these higher efficiency turbine engines that result in a more efficient and lower emitting combined cycle facility.

d. Subcategorization of Non-Natural Gas-Fired Combustion Turbines

Consistent with subpart KKKK, the EPA proposed that when a combustion turbine fires a fuel that is more than 50 percent non-natural gas (*e.g.,* either a gaseous fuel, such as hydrogen, or a liquid fuel, such as oil) while under full load for a portion of an hour of operation, then that combustion turbine

[69] Variations of the General Electric (GE) LMS100.

[70] Examples include GE's 7HA series (7HA.01, 7HA.02, and 7HA.03), Siemens' 9000HL, and Mitsubishi's M501J series that includes the M501JAC.

[71] *See* section IV.B.3 of this preamble.

is subject to the appropriate non-natural gas NO_X emission standard—based on the application of the BSER—for that entire hour of full-load operation. However, we also solicited comment on eliminating the 50 percent requirement so that the non-natural gas emissions standard would apply when any amount of non-natural gas fuel is burned in the combustion turbine engine at full load. In general, we proposed that the BSER for most sources firing non-natural gas fuels is the use of wet combustion controls (*i.e.,* water or steam injection) and/or diffusion flame combustion. (Diffusion flame combustion is where fuel and air are injected at the combustor and are mixed only by diffusion prior to ignition. Generally, it is not considered a type of combustion control technology per se because the EPA is not aware of diffusion flame combustors broadly available that are able to achieve significant NO_X reduction in combustion turbines, though for some subcategories the EPA identifies this technology as the BSER in the absence of any other method of control.) Accordingly, we proposed NO_X standards for non-natural gas-fired sources in subpart KKKKa based on the application of the BSER for each size-based subcategory.

Several commenters opposed the EPA's proposal to define sources in subpart KKKKa as non-natural gas-fired when more than 50 percent of the heat input is from a non-natural gas fuel at full load. For example, according to one commenter, widespread industry practice when switching from natural gas to oil is to reduce load and switch from lean premix/DLN combustion controls (for natural gas) to diffusion flame (for oil). This can lead to a short-term spike in emissions, which, according to the commenter, necessitates a higher, less stringent NO_X limit. Should such a spike in NO_X emissions occur when less than 50 percent of the fuel being combusted is fuel oil, the source would be subject to the (lower, more stringent) NO_X standard for natural gas.[72] Commenters further explained that given the effect on emissions of switching fuels, it could be difficult for a source to meet a lower NO_X standard for natural gas combustion when a non-natural gas fuel is being combusted, including when the non-natural gas fuel represents less than 50 percent of the total heat input during the hour. The commenters asserted that a more reasonable approach would be to apply the highest applicable NO_X emissions standard for *any* hour when *any* amount of non-natural gas fuel is combusted—as in the Industrial Boiler NESHAP—and pointed out the EPA's acknowledgement in the proposal that eliminating the 50 percent threshold ''could provide a more accurate representation of the performance of applicable control technologies.'' [73] [74]

Other commenters stated the EPA's concern that eliminating the 50 percent requirement would incentivize operators to burn a small amount of non-natural gas fuel to be subject to a higher NO_X emissions limit is unfounded. Specifically, the commenters asserted that reducing load makes fuel switching impractical by causing generation to be less efficient, meaning there is little to no incentive for an operator to conduct a fuel switch to take advantage of a less stringent standard.

Further, several commenters responded to a solicitation for comment in the proposal regarding whether multiple fuels could be combusted simultaneously in a combustion turbine engine and whether it is necessary to temporarily cease operation or reduce load to switch from natural gas to distillate oil. According to commenters, the design and operation of combustion systems do not allow for multiple fuels to be combusted simultaneously in turbines operating under full load—except for specific designs of dual-fuel combustion turbines used in certain industrial processes. The commenters explained that for combustion turbines not designed to operate in dual-fuel mode, different gaseous fuel streams can be premixed and fired (*e.g.,* natural gas and refinery fuel gas or natural gas and hydrogen). A combustion turbine operator cannot simply switch between liquid and gaseous fuels while operating at full load if the turbine is not designed for dual-fuel operation. In general, most combustion turbines are not dual-fuel designs and either start on gas or oil and continue to operate on the same fuel as the unit loads, or, to improve reliability in cold weather, units will start on gas and transition to oil at or before the full speed no load (FSNL) operating condition. In all cases, turbines with dry or wet combustion controls never operate at full load while simultaneously firing both natural gas and fuel oil. The combustion characteristics of the higher hydrocarbon, distillate oil differ from the combustion characteristics of natural gas. These fuels are incompatible with systems that were engineered for methane gas, most notably regarding poor flashback margin, which can result in significant damage to premixed, dry combustion controls.

In subpart KKKKa, the EPA is maintaining the provision from subpart KKKK that non-natural gas hours are defined as any hour when more than 50 percent non-natural gas fuels are fired in the combustion turbine at full load (*i.e.,* when the heat input is greater than 70 percent of the base load rating). In these situations, the non-natural gas NO_X standard applies for the entire reporting hour—even if non-natural gas fuel was fired for only a portion of the hour.[75] Specifically, if the total heat input is greater than 50 percent from non-natural gas fuels (*e.g.,* distillate oil, hydrogen, and fuels other than natural gas), the combustion turbine is subject to the applicable NO_X standard in the non-natural gas-fired subcategory and that NO_X standard must be met for the entire hour. This is consistent with the approach for subcategorizing hours based on load. For example, if the turbine is operated at part load (*i.e.,* 75 percent and 70 percent of the base load rating in subparts KKKK and KKKKa, respectively) at any point during the hour, the part-load standard is applicable for the entire hour even if the average load exceeds the full load threshold. While the EPA appreciates commenters' explanation that fuel switching to obtain more lenient emissions standards is unlikely to occur because it is not economical, the 50 percent non-natural gas threshold has proven workable in subpart KKKK and retaining this threshold in subpart KKKKa avoids any regulatory incentive to unnecessarily combust small amounts of non-natural gas fuels. Similarly, if multiple fuels are burned during an hour of operation and the total heat input is less than or equal to 50 percent non-natural gas (and more than 50 percent natural gas), then the turbine is subject to a NO_X limit that is prorated based on the heat input of the fuels during the hour. For example, if a turbine burns 75 percent by heat input natural gas and 25 percent non-natural gas, the applicable hourly NO_X standard is 0.75 times the applicable natural gas standard, plus 0.25 times the applicable non-natural gas standard.[76]

[72] See Table 1 in section IV.B.5 of this preamble for the NO_X standards for subcategories of natural gas-fired stationary combustion turbines.

[73] *See* 40 CFR part 63, subpart DDDDD.

[74] *See* 89 FR 101318 (Dec. 13, 2024).

[75] For example, an affected facility could burn 51 percent non-natural gas fuel for 1 minute of an hour and 100 percent natural gas for the remaining 59 minutes. In this extreme situation, the entire hour would be considered a non-natural gas-fired hour.

[76] This example assumes the natural gas and non-natural gas fuels are using different fuel nozzles. If the fuels are mixed prior to combustion, the natural gas/non-natural gas determination is based on the

It is important to make clear that the NO_X standards for natural gas and non-natural gas hours apply *only* when combustion turbines are operating at *full load.* As explained by commenters, most combustion turbines decrease load during fuel switching, and regardless of the heat input from a particular fuel being fired for a portion of an operating hour, those turbines would be subject to the part-load NO_X standards, which are higher than the individual natural gas- and non-natural gas-fired NO_X standards. See section IV.B.2.f of this preamble for an explanation of subcategorization for turbines operating at part load.

In subpart KKKKa, the EPA is also finalizing as proposed, with one exception, that the NO_X standards of performance are based on the type of fuel being burned in the combustion turbine engine alone. Fuel choice impacts combustion turbine engine NO_X emissions to a greater degree than it impacts such emissions from a duct burner. Therefore, the EPA concludes that this approach provides a more accurate representation of the performance of applicable control technologies. The natural gas standard applies at those times when the fuel input to the combustion turbine engine meets the definition of natural gas, regardless of the fuel, if any, that is burned in the duct burners. The one exception is for byproduct fuels. For turbines burning byproduct fuels, the applicable emissions standard is based on the total heat input to the turbine, including and fuel burned in the duct burners. See section IV.B.7.d of this preamble for further discussion of turbines burning byproduct fuels.

e. Subcategory for Temporary Combustion Turbines

At proposal, the EPA requested comment on creating either a subcategory or an exemption for stationary combustion turbines used in temporary applications. Many commenters generally supported some form of streamlined compliance for temporary applications. Some commenters raised concerns that a full exemption could have unintended consequences. After considering these comments, the Agency is finalizing a new subcategory in subpart KKKKa for small and medium stationary combustion turbines (*i.e.,* up to 850 MMBtu/h in size) used in temporary applications. This subcategory reflects a BSER determination of combustion controls with an associated standard of 25 ppm NO_X when combusting natural gas and 74 ppm NO_X when burning non-natural gas fuels, along with a streamlined approach to compliance that primarily relies on maintaining documentation of manufacturer certification. Such turbines may be used in a single location for up to 24 months. The EPA is also amending subpart KKKK to include an optional subcategory for stationary temporary combustion turbines with the same BSER, NO_X standards, and recordkeeping and reporting requirements as for the subcategory of stationary temporary combustion turbines in subpart KKKKa.[77]

As discussed in the proposal, a streamlined approach to NSPS compliance for temporary combustion turbine applications would bring this NSPS into alignment with similar approaches that are available in the boilers NSPS and in the reciprocating internal combustion engines (RICE) NSPS. The EPA has historically considered portable boilers and RICE used for limited periods of time to be temporary equipment not subject to regulation under their respective NSPS or NESHAP subparts.[78] The Agency observed at proposal that the absence of any such provisions in the combustion turbines NSPS is anomalous insofar as combustion turbines tend to have lower air pollutant emissions than are emitted by an equivalent level of power generation from RICE. Further, in the proposal, the EPA noted that the permitting, testing, and monitoring requirements typically applicable for a combustion turbine subject to an NSPS may not be appropriate or suitable for combustion turbines needed quickly and only for limited periods of time. Temporary combustion turbines are generally operated in short-term situations but can also provide power during extended emergency or emergency-like situations (*e.g.,* a natural disaster damages the electric grid) while the primary generating equipment is not available, while transmission and/or generation capacity is being repaired and/or upgraded, or for some other unforeseen event.[79] Since permitting itself could take longer than the need for temporary generation, the Agency solicited comment on whether an applicability exemption or subcategorization would be appropriate for temporary combustion turbines under subparts GG, KKKK, and KKKKa.

The EPA also requested comment at proposal on whether the BSER for temporary combustion turbines is the use of combustion control technology consistent with the otherwise applicable subcategory—25 ppm NO_X for units with base load ratings of 850 MMBtu/h or less and 15 ppm NO_X for larger units. Relatedly, we solicited comment on the appropriate testing and recordkeeping criteria for such regulatory provisions.

Multiple commenters supported the idea of a subcategory or exemption. Comments, particularly from industry stakeholders, supported a BSER of combustion controls and indicated that turbines used in temporary applications are generally capable of meeting a NO_X standard of 25 ppm using combustion controls. The same commenters also generally opposed requiring SCR for temporary turbines, the complexity of which would tend to defeat the purpose of being able to bring in such turbines quickly for immediate and short-term power supply. The EPA agrees that combustion controls are the BSER for temporary turbines, and the Agency applies the BSER analysis set forth in section IV.B.3 of this preamble explaining why SCR is not the BSER for small and medium turbines.

The Agency is limiting the scope of the temporary combustion turbines subcategory so that large combustion turbines (*i.e.,* those with a base load rated heat input greater than 850 MMBtu/h) cannot qualify for treatment as temporary combustion turbines. In general, large combustion turbines are not used in temporary applications—these turbines tend to be frame type units that are more challenging to transport and operate without more extensive onsite preparation.

The EPA finds 25 ppm to be the appropriate standard of performance for NO_X emissions from temporary combustion turbines. (The EPA is not establishing a separate SO_2 standard of performance for this subcategory—in other words, the otherwise applicable SO_2 standard will apply).) Most trailer-mounted turbines, which would likely be intended to remain in the same location for less than 2 years and so can be considered representative of typical temporary turbines, have standard

fuel mixture. If the mixture meets the definition of natural gas, the natural gas standard is applicable. And if the mixture does not meet the definition of natural gas, the non-natural gas standard is applicable.

[77] The emission standards for temporary turbines are consistent with the standards in subpart KKKK.

[78] *See, e.g.,* 40 CFR 60.4200(a), 60.4230(a), 60.40b(m), and 60.40c(i). (We note that at proposal we inadvertently cited similar but separate provisions of the RICE NSPS related to ''replacement'' engines. *Cf.* 40 CFR 60.4200(e), 60.4230(f).)

[79] Note that a separate exemption is available for ''emergency turbines'' in subpart KKKK, which is also being included in subpart KKKKa. *See* 40 CFR 60.4310(a); *id.* 60.4420 (definition of ''emergency combustion turbine''). However, this provision may not be clearly applicable in all circumstances in which temporary turbines are needed.

emission guarantees of 25 ppm NO_X. There are some trailer-mounted turbines with lower standard emission guarantees, but these are less efficient designs with lower rated outputs. For example, an emissions standard of 15 ppm NO_X would limit the availability of temporary turbines to those less efficient models with lower rated outputs—significantly increasing costs for the regulated community and resulting in increased fuel use. Combustion systems capable of achieving 15 ppm NO_X are generally more complex and physically larger than comparable combustion systems capable of achieving 25 ppm NO_X. For example, more complex combustion control systems generally have more fuel nozzles and burners, premix larger amounts of air with the fuel, and have more sophisticated control systems. This increases the physical size and cost of a combustion turbine for a given rated output. Furthermore, aeroderivative turbines are generally physically smaller than frame units for the same rated output. Most aeroderivative turbines have guaranteed emission rates of 25 ppm NO_X. The ability to transport a temporary turbine is a critical feature and an emissions standard of less than 25 ppm NO_X would increase the physical size per rated output of combustion turbines that could meet that emissions standard and undermine the purpose of the subcategory. In addition, as discussed in section IV.B.4 of this preamble, combustion controls capable of achieving 25 ppm NO_X qualify as the BSER for small combustion turbines and low-utilization medium turbines—both of which are potential temporary turbines. While some medium temporary turbines may operate at high utilization levels for limited periods of time, there will be periods when the turbine will be in storage, being transported to a new location, or otherwise not operating. On balance, the EPA anticipates that medium temporary turbines will have utilization levels of less than 45 percent. Therefore, we conclude that combustion controls capable of achieving 25 ppm NO_X are the BSER for the temporary turbines subcategory.

Commenters recommended increasing the allowable period of operation at a single location to 18 months or 2 years to account for situations where temporary power is needed for longer than the 12-month period mentioned in the proposal. The Agency agrees with commenters that a 12-calendar-month period may not be sufficient for all situations. In addition, a 24-month period is consistent with a longstanding policy within the Prevention of Significant Deterioration (PSD) permitting program, which recognizes that emissions occurring for no longer than that period of time may be considered temporary and therefore excluded from modeling analysis.[80] We note that 24 months is the total residence time permitted from when a temporary turbine commences operation. The final temporary turbine subcategory is for turbines used at a single location for up to 24 months.

Some commenters also stated that the subcategory should be available to combustion turbines used in temporary applications regardless of whether they meet criteria for portability. To simplify compliance and avoid potentially complicated regulatory determinations, the EPA is not requiring temporary combustion turbines to be portable in nature or meet indicia of portability to qualify for this subcategory.[81] Commenters noted there may be applications where a temporary combustion turbine can be transported to a location and installed onsite for a time-limited purpose, but may not meet a definition of ''portable'' such as that included, for example, in the definition of ''temporary boilers.'' [82] Given other criteria the EPA is finalizing that limit the scope of a new subcategory for temporary combustion turbines, we agree a requirement to be portable serves little benefit and is not needed.[83]

Monitoring, recordkeeping, and reporting requirements are substantially reduced for the subcategory of temporary turbines. In the final rule, the EPA is requiring only that the owner or operator of a turbine falling within the temporary turbines subcategory maintain documentation onsite that each temporary turbine has been certified by its manufacturer to meet a NO_X emissions rate of 25 ppm, and that each turbine has been performance tested at least once in the prior 5 years (for turbines older than 5 years, after the initial sale by the manufacturer). Annual performance testing is not required for turbines in the temporary subcategory. We anticipate that a test every 5 years will be sufficient to ensure that temporary turbines are properly maintained so as to continue to meet the 25-ppm limit.

Consistent with the proposal, the EPA finds that several conditions on the use or replacement of temporary turbines are necessary to ensure the subcategory does not inadvertently create a means of avoiding requirements that apply under the NSPS for turbines used in non-temporary capacities. Under the final rule, should a temporary combustion turbine remain in place for longer than 24 months, then it would not be considered temporary for any period of its operation, and any failure of the owner or operator to comply with the otherwise applicable requirements of the relevant NSPS, even in the initial 24 months of operation, would be an enforceable violation of the Act. In addition, the final rule does not allow the replacement of a temporary combustion turbine with another temporary combustion turbine to maintain temporary status beyond the 24-month period. However, as an anticipated normal function for these types of turbines, temporary turbines may be used to replace or substitute the generation provided by non-temporary turbines (or other types of generators) when those units are taken offline (*e.g.,* for maintenance work). In addition, the relocation of a temporary stationary combustion turbine within a facility does not restart the 24-calendar month residence time.

The EPA is not finalizing a complete exemption from the NSPS for temporary combustion turbines. In response to the alternative exemption approach on which the Agency sought comment, multiple commenters supported an exemption approach like the NSPS for RICE. However, for RICE, the exemption from the NSPS for equipment operating in a single location of up to 12 months works in conjunction with regulations promulgated under title II of the Act to bring these RICE within the definition of ''nonroad engines'' as set forth at 40 CFR 1068.30. Such units are then subject to regulations that the EPA has promulgated for nonroad engines pursuant to title II of the Act.[84]

Under both the statute and EPA regulations, combustion turbines in general are considered a kind of internal combustion engine that therefore could in theory be regulated as nonroad engines.[85] Historically, however, the EPA has not regulated combustion turbines, even those that may be portable, as nonroad engines, but rather

[80] *See* 43 FR 26380, 26394 (June 19, 1978).

[81] Note that combustion turbines that are mounted on a vehicle for portability continue to be subject to the NSPS, as they have been under subparts GG and KKKK. *See, e.g.,* 40 CFR 60.4420 (definition of ''stationary combustion turbine'').

[82] *See* 40 CFR 60.41b.

[83] Note that, as a separate matter, to be considered a ''nonroad engine'' for purposes of mobile source regulation under Title II, a unit must, among other things, meet the criteria in the definition at 40 CFR 1068.30, paragraph 1, such as being ''portable or transportable.''

[84] *See* 42 U.S.C. 7547; *see also, e.g.,* 40 CFR 60, subparts III and JJJ; 40 CFR part 1039.

[85] *See* 42 U.S.C. 7550(1) and 7602(z).

as stationary sources.[86] The current definition of ''nonroad engine'' at 40 CFR 1068.30 excludes engines that are subject to an NSPS. All combustion turbines meeting the applicability criteria of the NSPS for combustion turbines are subject to those NSPS standards (including portable turbines) and thus have been excluded from the definition of nonroad engines. An exemption from the NSPS for qualifying stationary temporary applications would potentially bring portable combustion turbines within the definition of nonroad engine at 40 CFR 1068.30. However, the kinds of turbines that are used in stationary temporary applications are not currently subject to any title II regulations or standards. Finalizing an exemption for temporary or portable combustion turbines without ensuring a workable framework for compliance under title II could leave these engines subject to no emission standards at all.

Nonetheless, the Agency recognizes the significant interest several stakeholders have expressed in treating combustion turbines used in stationary temporary applications as nonroad engines subject to regulation under title II. There could be benefits in the form of reduced permitting burden and further streamlined compliance obligations for the purchasers and users of such turbines. At the same time, manufacturers of combustion turbines that are treated as nonroad engines would be subject to compliance obligations under title II, including, for example, obtaining certificates of conformity. Such turbines would be treated as other nonroad engines under title II and permitting requirements would not apply to emissions from the engine because such turbines would no longer be considered a part of the stationary source. Commenters on this rule identified concerns with the air quality effects if many temporary combustion turbines were brought together and operated in a single location and suggested imposing operating or total-emissions constraints and air quality considerations to prevent these consequences.[87]

The EPA believes these matters deserve further investigation before rulemaking action is taken to consider regulating portable combustion turbines used in temporary applications under title II rather than under the NSPS. The EPA is not promulgating any such regulations under title II in this action. In this final rule, the EPA is including a conditional exclusion in subpart KKKKa that will exclude combustion turbines from the definition of ''stationary combustion turbine,'' if the turbine meets the definition of ''nonroad engine'' under title II of the Act and applicable regulations, and is certified to meet emission standards promulgated pursuant to title II of the Act, along with all related requirements. This provision will become operative if the EPA in the future adopts nonroad emission standards and certification requirements for portable combustion turbines.

Even in the absence of a complete exemption from the NSPS, the EPA believes creating the subcategory for temporary combustion turbines in this action can facilitate actions that reduce the permitting burden faced both by sources and permitting authorities. Note that the EPA is separately exercising authority granted to it under CAA section 502(a) to exempt from title V permitting any combustion turbines that are not major sources.[88] The EPA expects that the application of combustion turbines at sites with a potential to emit below the title V permitting major source threshold (as referenced in the last sentence of CAA section 502(a)) would also emit below major NSR emissions thresholds and thus only be subject to minor NSR program requirements. CAA section 110(a)(2)(C) requires States to develop a program to regulate the construction and modification of any stationary source, including minor NSR requirements as necessary, to assure that NAAQS are achieved. Minor NSR requirements are required to be approved into a State Implementation Plan (SIP), Tribal Implementation Plan (TIP), or Federal Implementation Plans (FIP) and are often mechanisms to assist in achieving and maintaining the NAAQS.[89] The CAA and the EPA's regulations are less prescriptive regarding the minor NSR program requirements. Therefore, reviewing authorities generally have significant flexibility in designing their minor NSR programs, including any air permitting programs for minor sources. Minor NSR permits are almost exclusively issued by State, local, and other authorized reviewing authorities, although the EPA issues minor NSR permits for most areas of Indian country where Tribes have not developed TIPs or requested delegation to administer minor NSR air permitting programs for their jurisdictions. With the creation of the temporary combustion turbines subcategory in this action, the EPA believes authorized reviewing authorities may find it efficient to pursue further streamlining of minor-source permitting for such sources, including developing a general permit for such sources, or issuing a permit by rule for these sources.

Even where temporary combustion turbines comprise or are part of a major source for purposes of NSR permitting, the temporary turbines subcategory will assist States in identifying emissions from such sources that may be excluded from parts of the permit review because they are temporary. Under the EPA's PSD regulations, temporary emissions can be excluded from the analysis of whether the emissions increases that would result from construction or modification of a major stationary source cause or contribute to a violation of air quality standards.[90] As discussed above, the 24-month period we are finalizing for this subcategory accords with the duration the EPA has used for decades to classify temporary emissions in the PSD program. Sources with characteristics that place them within this subcategory will have a straightforward means of showing that emissions from these sources are temporary to apply this PSD exemption for temporary emissions in the review of a PSD permit application.

Further, the standards of performance in this final rule are legally and practically enforceable and thus can serve to inform calculations of the potential to emit of these sources for purposes of determining whether they are major sources for NSR applicability purposes. Sources may, of course, also voluntarily accept, in an enforceable permit condition, more stringent emissions limits, or limit their operating time, to reduce their potential to emit so as to become synthetic-minor sources for NSR applicability purposes.

f. Subcategory for Combustion Turbines Operating at Part Loads, Located North of the Arctic Circle, or Operating at Ambient Temperatures of Less Than 0 °F

When the EPA promulgated subpart GG (the original stationary gas turbine criteria pollutant NSPS) in 1979, the NO_X standards and compliance requirements were based on performance testing. Based on subsequent rulemakings, owners or

[86] *See* 42 U.S.C. 7411(a)(3). *See* 40 CFR 60.331(a); 40 CFR 60.4420 (definition of ''stationary combustion turbine'').

[87] The EPA notes that under the subcategory approach to temporary stationary combustion turbines, which was are finalizing in subpart KKKKa, permitting authorities may take these kinds of considerations into account in determining appropriate emissions limitations or other requirements.

[88] *See* section IV.E.5 of this preamble for further discussion.

[89] *See* 42 U.S.C. 7410(a)(2)(C).

[90] *See* 40 CFR 51.166(i)(3); 40 CFR 52.21(i)(3).

operators of a gas turbine subject to subpart GG with a NO_X CEMS began determining excess emissions on a 4-hour rolling average basis. The EPA found that a 4-hour basis is the approximate time required to conduct a performance test using the performance test methods specified in subpart GG. This 4-hour rolling average became the default for determining the emission rates of gas turbines, and, in 2006, the EPA retained it in the subsequent review of the stationary combustion turbine criteria pollutant NSPS.

When the EPA proposed subpart KKKK in 2005, the NO_X performance emissions data were based on stack performance tests, which are representative of emission rates at high hourly loads, rather than CEMS data. The final NO_X standards for high hourly loads were consistent with the performance test data and manufacturer guarantees. To avoid confusion with the annual ''utilization'' levels discussed elsewhere in this document, we will refer to high hourly loads as ''full loads,'' in contrast with ''part loads''; utilization levels on an annual basis are referred to as ''low-utilization'' and ''high-utilization.'' Manufacturer guarantees are only applicable during specific conditions, which include the load of the combustion turbine (*i.e.,* when the load meets certain specifications) and the ambient temperature (*i.e.,* generally above 0 °F). When combustion turbines are operated at part loads and/or at low ambient temperatures, low-NO_X combustion controls—the identified BSER in subpart KKKK—were not as effective at reducing NO_X from a technical standpoint.[91] At part-load operation and low ambient temperatures, it is more challenging to maintain stable combustion using DLN and adjustments to the combustion system are required—resulting in higher NO_X emission rates. Therefore, in subpart KKKK, the Agency identified diffusion flame combustion as the BSER for hours of part-load operation or low ambient temperatures.[92]

In subpart KKKK, a part-load hour is defined as any hour when the heat input rate is less than 75 percent of the base load rating of the combustion turbine. If the heat input rate drops below 75 percent at any point during the hour, the entire hour is considered a part-load hour, and the part-load standard is applicable during that hour. Determination of the 4-hour emissions standard is calculated by averaging the four previous hourly emission standards. Under this approach, the ''full load'' standard (*i.e.,* the standard of performance that has been established for the relevant subcategory as discussed elsewhere in this notice) would not be applicable until a minimum of 6 continuous operating hours. The initial and final hours would be startup and shutdown, respectively, and the part-load standard is applicable during those hours. If the combustion turbines were operating at full load during the middle 4 hours, the full load standard would be applicable to that 4-hour average. The emission standards for the remaining hours would be a blended standard that is between the part-load and full load standards. This approach was viewed as appropriate to account for the different applicable BSERs. Subpart KKKK also includes a 30-operating-day rolling average standard that is applicable to combustion turbines with a HRSG. The 30-operating-day rolling average was included in subpart KKKK because the HRSG was part of the affected facility, and a longer averaging period is necessary to account for variability when complying with the alternate output-based emissions standard.

The EPA is finalizing the same short-term 4-hour standard for part load in subpart KKKKa along with the blended standard approach. Specifically, the applicable emissions standard is based on the heat input weighted average of the four applicable hourly emissions standards. However, as discussed at proposal, the EPA is finalizing two changes to the part-load subcategory. First, the CEMS data analyzed by the EPA indicates that emissions tend to slowly increase at lower loads, but, in general, combustion turbines can maintain compliance with the emissions standards at hourly loads of 70 percent and greater, not just at loads of 75 percent and greater, as reflected in subpart KKKK.[93] Therefore, the EPA determines in subpart KKKKa that this subcategory applies for any hour when the heat input is less than or equal to 70 percent of the base load rating. The EPA notes that lowering the part-load threshold brings more operating periods under the otherwise-applicable standards of performance.

Second, the EPA is finalizing a different size threshold for subcategorizing the part-load emission standards. Subpart KKKK subcategorizes the part-load emissions standard based on the rated output of the turbine (*i.e.,* combustion turbines with outputs greater than 30 MW have a more stringent part-load standard than smaller combustion turbines). For subpart KKKKa, the EPA proposed to subcategorize the part-load standard based on the heat input rating (*i.e.,* turbines with base load heat input ratings greater 250 MMBtu/h would have a more stringent standard (96 ppm NO_X) than smaller combustion turbines at part load (150 ppm NO_X)).

In this action, since the final size-based subcategorization approach no longer includes the proposed 250 MMBtu/h of heat input size threshold for combustion turbines operating at full load, and because the proposal did not otherwise identify a basis for amending the part-load size threshold, the EPA is retaining in subpart KKKKa a size threshold that is comparable to the 30 MW output threshold in subpart KKKK. However, instead of using an output metric, subpart KKKKa sets a threshold to distinguish the two size-based, part-load subcategories at less than, or equal to or greater than, 300 MMBtu/h of heat input. All new combustion turbines with base load ratings of greater than 300 MMBtu/h have design rated outputs of greater than 30 MW, and all new combustion turbines with base load ratings of less than 300 MMBtu/h have design rated outputs of less than 30 MW. This maintains consistency with the use of a heat-input metric for other size-based subcategories in the NSPS.

In the proposed rule for subpart KKKKa, the EPA solicited comment with respect to a concern that the standards for the part-load subcategory are significantly less stringent than the otherwise applicable standards of performance and could create a perverse incentive to operate at part loads. The Agency also solicited comment on possible solutions. Commenters largely disagreed that the part-load standards substantially eroded the stringency of the NSPS or created a perverse incentive for sources to operate at lower hourly

[91] The ambient temperature of combustion turbines located north of the Arctic Circle would often be below 0 °F, and these units are included in the low ambient temperature subcategory regardless of the actual ambient temperature. As we found with subpart KKKK, the costs of requiring combustion controls that would rarely be used are not reasonable.

[92] Combustion turbines have multiple modes of operation that are applicable at different operating loads and when the combustion turbine is changing loads. The modes are specific to each combustion turbine model. The identified BSER of diffusion flame combustion also includes periods of operation that use less effective DLN compared to operation at full loads.

[93] To maintain flame stability during part-load operation, dry combustion controls must increase the relative amount of the fuel going to the diffusion flame portion of combustion system. This inherently results in an increase in the NO_X emissions rate. Similarly, to maintain stable operation during part-load operation, the relative amount of water injected for wet combustion controls must be reduced.

loads to obtain the higher emissions standards. One commenter submitted graphical data illustrating that it typically will not be economically advantageous to operate at part-load for extended periods of time, and other commenters that own or operate combustion turbines stated that extended part-load operations are not consistent with their practices.

After considering these comments, the EPA agrees that further changes from subpart KKKK's approach to part-load operations are not needed in subpart KKKKa. The EPA finds the commenters' explanations credible that the part-load subcategory does not unduly weaken the NSPS. Nonetheless, as the EPA discussed in the proposal, we believe the use of an optional, alternative approach to compliance using mass-based limits could be an effective way to simplify compliance for some combustion turbines while also ensuring overall good emissions performance consistent with the revised standards of performance in subpart KKKKa.[94]

Additionally, in subpart KKKKa, the EPA is maintaining as proposed the same ambient temperature subcategorization and BSER as in subpart KKKK. If at any point during an operating hour the ambient temperature is below 0 °F, or if the combustion turbine is located north of the Arctic Circle, the BSER is the use of diffusion flame combustion with the corresponding part-load standard.

Dry combustion controls are less effective at reducing NO_X emissions at part-load operations and low ambient temperatures. In addition, SCR is only effective at reducing NO_X under certain temperatures at part loads and is not as effective at reducing NO_X as at design conditions. The only technology the EPA has identified for all part-load operations and/or low ambient temperatures is the use of diffusion flame combustion. Therefore, in subpart KKKKa, the EPA determines that diffusion flame combustion is the BSER for these conditions as proposed.[95]

g. Subcategorization Based on Other Factors

In response to the proposed rule, several commenters recommended that subpart KKKKa subcategorize stationary combustion turbines based on whether they operate as simple or combined cycle units and/or whether they are aeroderivative or frame type units. These commenters recommended that the EPA re-evaluate its BSER determinations to better address the physical and operational differences between simple and combined cycle turbine configurations because of the technical and economic effects these differences have on controlling emissions. Specifically, the commenters cited the higher exhaust temperatures of simple cycle frame turbines and noted the challenges this would create for operating SCR. One commenter noted that due to the different capabilities of the equipment, the base load subcategory should be split so that simple cycle and combined cycle units are not in the same group.

While the EPA appreciates the differences between these types of units and discusses such differences as appropriate throughout this preamble, it is not subcategorizing based on simple versus combined cycle or aeroderivative versus frame type combustion turbines in subpart KKKKa. For aeroderivative and frame type combustion turbines, separate subcategories might not be technically viable. For example, aeroderivative turbines share components and are adapted from aircraft jet engines, and while they tend to be lighter and have higher pressure ratios and efficiencies than similar-sized frame units, there is overlap and no clear distinction between the technologies. In addition, and critically, there are no inherent differences in the performance of combustion controls or SCR between aeroderivative and frame type combustion turbines.[96]

Further, the EPA believes it is more appropriate to address the differences between combustion turbines operating in simple cycle and combined cycle configurations through subcategorizing by utilization.[97] While there are clearly differences between simple and combined cycle configurations, those differences are not necessarily determinative of the reasonableness of different types of NO_X controls because they are superseded by another basis or bases for subcategorization. That is, there are other characteristics of turbines that, when accounted for under the EPA's subcategorization approach in this final rule, obviate the need to subcategorize by simple cycle versus combined cycle configuration because such differences are already effectively accounted for by the utilization subcategories.

In the utility sector, simple cycle turbines tend to operate at much lower capacity factors (*e.g.,* the average lifetime capacity factor is 9 percent) than combined cycle turbines (*e.g.,* the average lifetime capacity factor is 51 percent). However, there is some overlap in capacity factors. For example, in 2024, 3 percent of simple cycle turbines operated at capacity factors greater than 30 percent, and 19 percent of combined cycle turbines operated at capacity factors less than 30 percent. As discussed in section IV.B.2.b of this preamble, the capacity factor or utilization level impacts the cost effectiveness of NO_X controls. This is the case regardless of whether a turbine is in a simple cycle versus a combined cycle configuration. After accounting for utilization (in addition to the other types of subcategorizations the EPA is providing in this final rule), there is no further basis for differentiating between simple and combined cycle turbines from the perspective of selecting the BSER and standards for NO_X. Furthermore, establishing separate subcategories could create a regulatory incentive to install simple cycle turbines instead of combined cycle turbines—although the same controls are reasonable for both, and simple cycle turbines emit more NO_X per unit of useful energy output. To avoid this perverse environmental outcome, the EPA is establishing standards of performance that are achievable by both simple and combined cycle combustion turbines under the subcategories in this final rule. In addition, to establish separate subcategories for simple and combined cycle turbines, the Agency would have to determine how to subcategorize CHP facilities that operate with and without an associated steam turbine, turbines using steam injection, and recuperated turbines. While these turbines recover energy from the turbine exhaust, that energy is not necessarily used to generate electricity with a steam turbine, so these would not be considered a combined cycle since they are not using two separate thermodynamic cycles. However, since these types of combustion turbines are recovering thermal energy and the exhaust gas temperatures are lower, the costs of SCR are lower compared to simple cycle turbines. The EPA notes that new CHP facilities often replace existing boilers (or boilers that would have been built if CHP were not installed) and offer significant environmental benefit compared to generating the electricity and thermal

[94] *See* section IV.E.4 of this preamble for discussion of the optional, alternative mass-based NO_X standards.

[95] A BSER of diffusion flame combustion includes DLN that is less effective at reducing NO_X than DLN under design conditions.

[96] *See* the manufacturer specification sheet in the rulemaking docket for additional information about available models of stationary combustion turbines.

[97] *See* discussion in section IV.B.2.b of this preamble.

energy separately. Increasing the costs of new small, medium or low-utilization CHP to the point that sources are disincentivized from using CHP could have the perverse environmental outcome of increasing overall emissions. The Agency has considered these broader impacts in determining not to subcategorize between simple and combined cycle turbines.

3. Evaluation of SCR Under BSER Factors

In the proposal of subpart KKKKa in December 2024, the EPA proposed to find SCR justified under the BSER factors for combustion turbines of all sizes, albeit not below a 40 percent capacity factor for turbines equal to or smaller than a base load rating of 250 MMBtu/h of heat input, and not below a 20 percent capacity factor for turbines larger than that size.[98] Since the proposal, the EPA has undertaken a review of the BSER criteria in relation to SCR considering the extensive technical comments submitted. The EPA's closer evaluation of cost information concerning SCR as well as information concerning the difficulty of application of SCR for certain subcategories, and other downsides of SCR in terms of its emissions and energy impacts have led the EPA to conclude that SCR is not justified under the BSER factors for all but new large high-utilization combustion turbines.

The EPA is determining for subpart KKKKa that SCR is part of the BSER for new large high-utilization stationary combustion turbines (*i.e.,* that are utilized at 12-calendar-month capacity factors greater than 45 percent). For these types of combustion turbines, SCR has been nearly universally adopted in recent years, and the EPA has determined it is cost-effective, achieving substantial reductions in NO_X emissions at costs that are comparable to those that the EPA has found reasonable in other rules over the past several decades. The EPA received no significant, adverse comments asserting that SCR is not appropriately part of the BSER for this subcategory of new combustion turbines.

A review of recent rules and determinations, multiple relevant cost metrics, and the adoption of SCR technology across certain types and sizes of power sector stationary combustion turbines in recent years, all support our determination that this technology is cost-reasonable for the subcategory of large high-utilization turbines, to which we apply it as BSER in subpart KKKKa.

However, for all other combustion turbine subcategories, the EPA is determining that SCR is not part of the BSER under present circumstances. For these other subcategories, SCR is not cost reasonable in relation to the amount of NO_X emission reductions that can be achieved, presents implementation and operational challenges, has high energy impacts, and has other non-air quality and environmental impacts that are not justified in relation to the relatively small reduction in NO_X emissions beyond the standards that can be achieved with combustion controls.

The SCR process is based on the chemical reduction of NO_X via a reducing agent (reagent) and a solid catalyst. To remove NO_X, the reagent, commonly ammonia (NH_3, anhydrous and aqueous) or urea-derived ammonia, is injected into the post-combustion flue gas of the combustion turbine. The reagent reacts selectively with the flue gas NO_X within a specific temperature range and in the presence of the catalyst and oxygen to reduce the NO_X into molecular nitrogen (N_2) and water vapor (H_2O). SCR employs a ceramic honeycomb or metal-based surface with activated catalytic sites to increase the rate of the reduction reaction. Over time, however, the catalyst activity decreases, requiring replacement, washing/cleaning, rejuvenation, or regeneration to extend the life of the catalyst. Catalyst designs and formulations are generally proprietary. The primary components of the SCR include the ammonia storage and delivery system, ammonia injection grid, and the catalyst reactor. The technology can be applied as a standalone NO_X control or combined with other technologies, including wet and dry combustion controls.

The EPA's proposed BSER of combustion controls with the addition of post-combustion SCR for most new and reconstructed combustion turbines generated a significant adverse response from the regulated community and certain States during the public comment period. Other commenters supported broad application of SCR as the BSER.

Many commenters stated that the proposed BSER is problematic and impractical because it would require SCR on industrial combustion turbines as well as those that operate at variable loads. According to the commenters, this would introduce significant operating complexity, increase annual operating costs, and result in unreasonable costs and operating burden for these installations. Instead, these commenters argued that the need for SCR should be determined on a site-specific basis as part of NSR air permitting.

Additionally, commenters stated that SCR systems on simple cycle turbines are complicated, expensive, and pose design challenges when compared to combined cycle operations. For example:

- SCR systems require specific temperature ranges to operate effectively, typically between 315 °C and 400 °C (600 °F and 750 °F). For simple cycle turbines with higher exhaust temperatures, additional cooling air may be needed to cool the exhaust flow and avoid damage to the SCR catalyst structure and operation. The costs associated with installation, operation, and maintenance of such cooling air systems were not adequately addressed by the EPA in the proposal.
- The installation of SCR systems requires sufficient space for the catalyst and ammonia injection systems. Therefore, it can be infeasible to install SCR on an existing installation that is modifying or reconstructing; the cost of SCR on a simple cycle frame turbine can be 30 percent to 50 percent of the cost of the turbine alone while doubling the space requirements.
- SCR is difficult even for combined cycle units in the case of existing turbines going through modifications or reconstructions. An existing turbine may have been installed without SCR in mind, so replacement of the HRSG could be required for a combined cycle unit, which is more expensive (estimated at $50 million) than the SCR system itself (estimated at $14 million).
- SCR systems are generally more effective in steady-state operations. Combustion turbines that frequently start and stop or operate under variable loads could face challenges in optimizing SCR performance.
- Implementing and operating an SCR system involves not only engineering, design, and installation costs but also additional maintenance and operational costs, including the handling and storage of ammonia or urea, catalyst replacement, and monitoring. For this reason, SCR is not viable for remote sites that have no full-time operator (*e.g.,* unattended compressor stations).
- The EPA developed the proposed limits based on utility data, not data adequately characterizing industrial installations. The EPA should revise its cost analysis, which will demonstrate the requirement to achieve emissions rates associated with SCR is inappropriate for non-utility units.

Due in part to these concerns, several commenters stated that the EPA underestimated the cost for SCR relative

[98] *See* 89 FR 101322–23.

to recent cost estimates received from manufacturers and technology providers and submitted information to that effect. Furthermore, the commenters contended that considering more accurate cost estimates, SCR costs would not be ''relatively low,'' as the EPA stated at proposal, and the technology would not be the BSER for medium and small combustion turbines, including industrial turbines, low-utilization turbines, and existing sources that modify or reconstruct.

These commenters stated that the EPA should re-analyze its proposed BSER determination based on the design and operational differences among different types of combustion turbines. In addition, commenters provided several cost estimates that result in the incremental cost effectiveness of installing SCR at values generally greater than $20,000/ton NO_X abated to achieve the proposed NO_X emissions limits, which exceed the levels that the EPA has historically considered to be cost effective.

Taking into consideration the SCR cost information submitted by commenters, the EPA has updated the BSER cost analysis from proposal. This cost analysis supports a conclusion that the BSER for most subcategories of new, modified, or reconstructed combustion turbines subject to subpart KKKKa is the use of combustion controls alone (*i.e.,* without SCR). The updated cost analysis nonetheless also supports our conclusion that SCR is the BSER for large high-utilization turbines—turbines with base load ratings greater than 850 MMBtu/h of heat input that are utilized at capacity factors greater than 45 percent on a 12-calendar-month basis. The new combustion turbines subject to a standard of performance based on the BSER of combustion controls with SCR have, over the past 5 years, almost exclusively used combined cycle technology and have operated as base load units (*i.e.,* at high utilization rates). This means that the technical issues associated with SCR raised by commenters are not a factor for new large high-utilization sources in this subcategory.

a. Adequately Demonstrated

SCR is a mature and well-understood post-combustion add-on NO_X control that has been installed on combustion turbines (both simple and combined cycle), utility boilers, industrial boilers, process heaters, and reciprocating internal combustion engines. Many natural gas-fired combustion turbines in the power sector currently utilize SCR. While costs and operational challenges can vary quite dramatically among different types of combustion turbines in ways that are relevant to other BSER factors (as discussed in the sections that follow), the EPA is not aware that SCR is completely unavailable to any type of natural gas-fired combustion turbine. Therefore, in general the EPA considers SCR to be a technically feasible and available technology for control of NO_X emissions from natural gas-fired stationary combustion turbines. In that sense, SCR can be considered to be ''adequately demonstrated''; however, after considering all of the BSER factors as described in the sections that follow, the EPA finds that SCR in a number of combustion turbine applications is not the BSER for most subcategories of combustion turbines.

For non-natural gas-fired combustion turbines, commenters noted that SCR has not been demonstrated on liquid fuel-fired turbines (including distillate and biofuels) operating at high-utilization rates and that biofuels can poison SCR catalysts. The EPA does not have long-term performance information for various types of non-natural gas-fired combustion turbines and due to potential complications, such as catalyst deactivation due to impurities in the fuel, the EPA is not determining that SCR is technically feasible for all non-natural gas-fired turbines.

b. Extent of Reductions in NO_X Emissions

The percent reduction in NO_X emissions from SCR depends on the level of control achieved through combustion controls. For a combustion turbine using standard combustion controls (*i.e.,* a guaranteed full load emissions rate of 25 p.m. NO_X) reductions can approach 90 percent. The percent reduction across SCR is lower if the combustion turbine is equipped with advanced combustion controls. In conjunction with dry combustion controls on natural gas-fired combustion turbines, SCR has been demonstrated to reduce long-term NO_X emission rates to approximately 3 ppm for multiple types of turbines.[99]

c. Costs

In response to significant adverse comments concerning the EPA's proposed cost analysis for SCR, the EPA has revised its cost analysis. The full, final cost analysis is available in the *SCR Costing* technical support document available in the docket for this action.[100] This section summarizes key findings from this updated analysis.

In 2006, when subpart KKKK was promulgated, SCR was evaluated as a potential BSER and was determined to not meet the statutory criteria. The estimated cost of achieving incremental NO_X reductions with the use of SCR was $9,000/ton (adjusted to 2024$) compared to the lean premix and DLN systems that were available at that time. The EPA determined that these costs were not reasonable in promulgating subpart KKKK.

SCR is widely adopted as a NO_X emissions control strategy for certain stationary combustion turbines, particularly for large turbines in the utility sector. However, during the technology review for this action, the EPA found that information contained in the records of permitting actions requiring SCR on combustion turbines is not consistent or well-developed for purposes of informing a detailed cost analysis for an NSPS. Generally, if a source was required (or chose voluntarily) to install SCR and went forward with a new combustion turbine project or installation, the cost of SCR presumably did not undermine the economic viability of that project. Nonetheless, just because individual projects have been economically viable with SCR installation does not necessarily mean SCR installation on all combustion turbines is cost-justified on a national basis, nor does it necessarily reflect the best or most cost-effective means of achieving overall reductions in NO_X emissions. These considerations will be discussed further in sections IV.B.3.c.ii and iii below.

Before proceeding with our evaluation of SCR under the BSER factors, the Agency first notes that standalone SCR (*i.e.,* without combustion controls) is not the BSER. The EPA estimates that SCR without combustion controls would be able to reduce NO_X emissions by 90 percent and achieve emission rates like turbines with 25 ppm and 15 ppm NO_X guarantees based on combustion controls alone. The exact achievable level would depend on the uncontrolled NO_X emissions rate of the relevant turbine. The estimated cost effectiveness of SCR without combustion controls is approximately $5,000/ton for low-utilization large turbines and $2,000/ton for high-utilization large turbines. However, the combustion controls analyzed in this technology review can achieve the same level of emissions reduction at significantly lower cost. As discussed in greater detail in section IV.B.4.c of this

[99] *See* section IV.B.5.a.i of this preamble for discussion of the determination of the NO_X standards of performance for the subcategory of combustion turbines subject to a BSER that includes SCR in subpart KKKKa.

[100] *See* Docket ID No. EPA–HQ–OAR–2024–0419.

preamble, combustion control costs are approximately $2,000/ton for low-utilization large turbines and $100/ton for high-utilization large turbines, without any of the secondary environmental and energy impacts associated with SCR.[101] Therefore, SCR alone is not the BSER for any subcategory. The remainder of this section considers whether SCR should be a part of the BSER, as a technology applied in addition to combustion controls.

For this final rule, as in the proposal, the EPA estimated the capital and operating costs of SCR primarily using information from the U.S. Department of Energy's (DOE) National Energy Technology Laboratory (NETL) flexible generation report.[102] The NETL report includes detailed costing information on aeroderivative simple cycle turbines using hot SCR and frame combined cycle turbines using conventional SCR. For information not available in the NETL report, the EPA used information from its cost control manual and applied Agency engineering judgment.[103] One commenter provided detailed comments on the SCR costing analysis that the EPA incorporated, as appropriate, into the cost estimations. Other commenters provided cost comparisons that suggest the costs of SCR for simple cycle turbines have been underestimated.[104]

The EPA determines for purposes of subpart KKKKa that the costs of SCR are reasonable on a nationwide basis for new large high-utilization stationary combustion turbines (*i.e.,* with base load ratings greater than 850 MMBtu/h of heat input and utilized at 12-calendar-month capacity factors greater than 45 percent) and therefore that SCR is part of the BSER for this subcategory. However, for new large low-utilization stationary combustion turbines (*i.e.,* utilized at 12-calendar-month capacity factors less than or equal to 45 percent), and for all medium and small combustion turbines, the EPA determines that the costs of SCR are not reasonable and therefore that SCR is not part of the BSER for these subcategories, particularly in light of the other factors discussed in the following sections.

i. Large High-Utilization Combustion Turbines

Based on information reported to EPA's Clean Air Markets Program Data (CAMPD), most new construction of large high-utilization combustion turbines is projected to be combined cycle facilities. As described in section IV.B.5 of this preamble, the maximum 12-calendar-month capacity factor of recently constructed large simple cycle turbines is less than 45 percent. Large turbines are almost exclusively used to generate electrical power, and at high levels of utilization, the levelized cost of electricity (LCOE) of combined cycle turbines is approximately the same as or lower than the LCOE for simple cycle turbines. Therefore, the EPA's primary costing analysis for large high-utilization turbines is based only on the impacts and costs of using SCR on combined cycle turbines. The costs for large high capacity factor simple cycle turbines are provided for completeness, and while these costs are higher than for combined cycle turbines, simple cycle turbines are generally not expected to operate at the high utilization levels that would trigger the SCR-based BSER subcategory.

There are several indicators that broadly support the cost-reasonableness of SCR as part of the BSER for new large combined cycle turbines that plan to operate at high rates of utilization. The cost of SCR as a percentage of the capital costs associated with constructing a new combined cycle turbine is estimated to be approximately 1 percent. The estimation of spent capital cost for SCR is approximately $3 million to $7 million (2024$) depending on the size of the combined cycle turbine. The capital costs of SCR on a capacity basis range from $10 per kilowatt (kW) to $20/kW, depending on the size of the combined cycle turbine. These costs translate into a relatively low cost per unit of energy output, and their effects on prices or costs to the consumer are relatively small and manageable. Total SCR cost (annualized capital costs, fixed costs, and operating costs) per unit of production (*i.e.,* electricity generation) is approximately $0.66/MWh, which represents a 2 percent increase in the LCOE for a new 370 MW combined cycle combustion turbine operating at a 12-calendar-month capacity factor of 51 percent for 30 years. This effect on the cost of electricity generation compares favorably with cost analyses that have been conducted in the past.[105]

Turning to the $/ton cost-effectiveness metric: In the final cost analysis for this rule, the EPA finds that the cost effectiveness on a $/ton of NO_X controlled basis varies significantly based on the percent reduction and the size of the combined cycle turbine. SCR costs decrease with economies of scale and there is no single $/ton figure that can be used to broadly represent SCR costs.

For combined cycle turbines with combustion controls guaranteed at 25 ppm NO_X, the incremental costs to reduce NO_X concentrations to 3 ppm range from $3,200/ton to $4,600/ton.[106] For combined cycle turbines with combustion controls guaranteed at 15 ppm NO_X, the incremental costs to reduce NO_X concentrations to 3 ppm range from $4,400/ton to $6,800/ton.[107] For combined cycle turbines with combustion controls guaranteed at 9 ppm NO_X, the incremental costs to reduce NO_X concentrations to 3 ppm range from $7,300/ton to $12,000/ton.[108] For combined cycle turbines with combustion controls guaranteed at 5 ppm NO_X, the incremental costs to reduce the NO_X concentration to 3 ppm range from $13,000/ton to $22,000/ton.[109]

SCR costs decrease with economies of scale, and the low end of each range is more representative of the typical size of new combined cycle turbines. The EPA has concluded that the costs of SCR for large high-utilization turbines with combustion controls and guaranteed NO_X emission rates of 9 ppm or greater are reasonable. Therefore, for these types of turbines, the EPA finds SCR to be cost-effective. While the Agency finds the incremental costs of SCR from

[101] See section IV.B.3.d of this preamble.

[102] Oakes, M.; Konrade, J.; Bleckinger, M.; Turner, M.; Hughes, S.; Hoffman, H.; Shultz, T.; and Lewis, E. (May 5, 2023). *Cost and Performance Baseline for Fossil Energy Plants, Volume 5: Natural Gas Electricity Generating Units for Flexible Operation.* U.S. Department of Energy (DOE). Office of Scientific and Technical Information (OSTI). Available at *https://www.osti.gov/biblio/1973266.*

[103] *EPA Air Pollution Control Manual, Chapter 2 Selective Catalytic Reduction.* June 2019. Available at *https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution.*

[104] For detailed information on the costing analysis, see the *SCR Costing* technical support document included in the docket for this action.

[105] *See, e.g.,* 80 FR 64510, 64565, tbl. 9 (Oct. 23, 2015). While this comparison is useful to illustrate in a relative sense this cost metric as used in prior EPA analyses, reference to this prior rulemaking notice should not be understood as endorsing any legal of factual determinations made at that time.

[106] The EPA reviewed the previous 5 years of emissions data to determine long-term emission rates of turbines. A long-term emissions rate of 3 ppm NO_X was used for a turbine complying with a short-term emissions rate of 5 ppm NO_X. The long-term emissions rate of a turbine with a 25 ppm NO_X guarantee is 20 ppm NO_X. Using a long-term emissions rate of 2 ppm or 4 ppm as representative for a combustion turbine with SCR would not change the BSER determinations.

[107] The long-term emissions rate of a turbine with a 15 ppm NO_X guarantee is 14 ppm NO_X.

[108] The long-term emissions rate of a turbine with a 9 ppm NO_X guarantee is 7 ppm NO_X. The SCR costs are estimated by assuming the SCR uses two catalyst layers instead of three.

[109] The EPA assumed the long-term emissions rate of a turbine with a 5 ppm NO_X guarantee is 5 ppm NO_X. The SCR costs are estimated by assuming the SCR uses two catalyst layers instead of three.

a 5-ppm baseline would not be considered cost-effective, the large high-utilization turbines for which the EPA is including SCR in the BSER do not achieve an emissions rate this low with combustion controls alone. (Further, as discussed in more detail below, the EPA is setting the standard of performance associated with SCR at 5 ppm, meaning that to the extent large, high-utilization combustion turbines are, or come to be, capable of achieving 5 ppm with combustion controls alone, SCR would not need to be installed to meet the emissions standard.)

The costs of SCR for new large high-utilization combustion turbines on a per-ton of NO_X abated basis (*i.e.,* $/ton) compare favorably with prior EPA rulemakings that regulate NO_X emissions. Although determinations concerning cost reasonableness in one statutory or programmatic context may not necessarily translate to another, these regulatory precedents offer points of comparison with respect to the same pollutant that can be informative in evaluating the most cost-effective opportunities for abatement of a common pollutant across multiple program arenas and therefore are relevant to the BSER analysis. That is particularly true when the relevant statutory provisions involve cost considerations similar to CAA section 111(a)(1).

In prior NSPS and CAA rules, the EPA generally found incremental costs in the range of $7,400/ton of NO_X abated to be cost effective (escalated to 2024$).[110] The EPA has also recognized that an SCR with incremental costs of approximately $12,000/ton of NO_X abated may be justifiably rejected as not cost-reasonable (escalated to 2024$).[111]

In the proposed rule, the EPA cited the *Federal Implementation Plan Addressing Regional Ozone Transport for the 2015 Ozone National Ambient Air Quality Standard* rulemaking (commonly known as the Good Neighbor Plan), as a comparison point. In that rule, the EPA estimated SCR costs for retrofit applications of $14,000/ton of NO_X abated (escalated to 2024$) as the appropriate representative cost threshold for defining ''significant contribution'' under CAA section 110(a)(2)(D)(i)(I).[112] However, upon further review and taking into account comments with respect to this particular rule comparison, the EPA no longer believes the Good Neighbor Plan is an appropriate comparator. First, we did not grapple at proposal with the Supreme Court's decision to stay enforcement of the Good Neighbor Plan as likely arbitrary and capricious.[113] Although the Court addressed the Agency's failure to consider a different aspect of the problem, its opinion raised significant doubts about the adequacy of the EPA's analysis and engagement with comments received. Because the Good Neighbor Plan was never implemented and its assumptions about cost reasonableness were not tested in the real world, we do not believe the cost analysis in that rule is entitled to significant weight as a regulatory precedent. Second, the cost analysis in the Good Neighbor Plan assessed retrofit costs for coal units for the purpose of promoting attainment of the NAAQS and therefore does not directly translate to the situation here. As noted elsewhere in this preamble, more stringent standards may be appropriate under the specific set of facts presented in an individual permitting context than would be appropriate for a NSPS. Similarly, more stringent standards, and greater associated costs, may be appropriate when necessary to meet statutory requirements for nonattainment areas. Finally, the EPA is in the process of reconsidering the Good Neighbor Plan, and as such, no longer believes this cost-per-ton figure should serve as an appropriate comparison point. Although that process is not yet complete, its initiation reflects the Agency's significant concerns with the analysis and justifications underlying the Good Neighbor Plan.

Turning to simple cycle turbines: The costs of SCR for simple cycle combustion turbines are higher, especially for frame type turbines. SCR catalysts require specific operating temperatures to control NO_X effectively, and the exhaust temperatures of simple cycle turbines are generally too high to be used directly in the SCR. The exhaust gases need to be cooled, generally through injecting tempering air to cool the exhaust to avoid damaging the SCR catalyst. Frame turbines require higher amounts of air tempering than aeroderivative turbines because the exhaust temperature of the most efficient frame-type combustion turbine is approximately 200°C higher than the most efficient aeroderivative combustion turbines. For utility units at high utilization rates, it is generally more cost effective to cool the exhaust prior to the SCR using the HRSG instead of tempering air. Since a HRSG does not increase the volume of exhaust gas entering the SCR, the SCR can be smaller and less costly, and the recovered thermal energy can be used to generate additional useful output. The EPA notes that there are technologies other than air tempering and a traditional HRSG that can be used to cool the exhaust gas prior to the SCR reactor. For example, a new combined cycle turbine could be designed with a relatively simple, lower cost HRSG and the recovered thermal energy (*i.e.,* steam) could be used in a relatively simple, lower cost steam turbine or injected into the combustion turbine itself (*i.e.,* a steam injection combustion turbine). These technologies have efficiencies and costs that range between more standard simple and combined cycle turbine configurations.

To estimate the costs of SCR on large simple cycle turbines, the EPA scaled costs based on the NETL 50 MW simple cycle turbine using dry combustion controls. These costs incorporate tempering air and are more representative of the SCR costs for large simple cycle turbines than the 100 MW simple cycle model plant the EPA used at proposal. The 100 MW aeroderivative model plant is a simple cycle turbine that uses compressor intercooling and wet combustion controls—both of which lower the exhaust temperature and reduce the need for tempering air. In response to specific concerns raised by commenters, the EPA incorporated several of the suggested adjustments to the SCR costing equations.[114] However, for simple cycle turbines, even with these adjustments the EPA's estimated costs are significantly less than the example costs provided by other commenters. Because the EPA finds commenters' information credible and representative, this suggests that actual costs could be as high as twice the EPA's derived costs. Consequently, the EPA's cost analysis for simple cycle turbines likely represents best-case scenario costs.

The cost of SCR as a percentage of the capital costs associated with constructing a new simple cycle turbine is estimated to be approximately 5 percent. The estimation of spent capital cost of the SCR reactor is approximately $8 million to $18 million (2024$), depending on the size of the turbine.

[110] *See, e.g.,* 71 FR 9866, 9870 (Feb. 27, 2006) (finding an incremental cost for SCR on boilers of approximately $5,000/ton to be reasonable).

[111] *See, e.g.,* 77 FR 20894, 20929 (Apr. 6, 2012) (approving State determination rejecting SCR where incremental cost was estimated at $8,845).

[112] *See* 88 FR 36654 and 36746 (June 5, 2023).

[113] *Ohio* v. *EPA,* 603 U.S. 279, 292–94 (2024).

[114] The EPA continues to primarily use SCR costs derived from the NETL Flexible Generation Report. Differences in the final rule include using SCR fixed costs dervied from the EPA's pollution Control Manual, accounting for capacity payments, using the base cost of the combustion turbine without SCR when determining the value of the lost electric sales, and using the six-tenths rule when estimating the capital costs of SCR for different combustion turbine sizes.

The capital costs on a capacity basis range from $45/kW to $80/kW, depending on the size of the simple cycle turbine. These costs translate into a higher cost per unit of energy output, and in terms of their likely effect on prices or costs to the consumer, are higher than for combined cycle turbines. Total costs (annualized capital costs, fixed costs, and operating costs) in terms of cost per unit of production (in terms of electricity generation) translate to $2/MWh, a 4 percent increase in the LCOE for a 240 MW simple cycle combustion turbine operating at a 12-calendar-month capacity factor of 51 percent for 30 years.

For a simple cycle turbine with combustion controls guaranteed at 25 ppm NO_X, the incremental costs to reduce the NO_X concentration to 3 ppm range from $6,800/ton to $10,000/ton. For a simple cycle turbine with combustion controls guaranteed at 15 ppm NO_X, the incremental costs to reduce the NO_X concentration to 3 ppm range from $10,000/ton to $16,000/ton. For a simple cycle turbine with combustion controls guaranteed at 9 ppm NO_X, the incremental costs to reduce the NO_X concentration to 3 ppm range from $17,000/ton to $28,000/ton. And for simple cycle turbines with combustion controls guaranteed at 5 ppm NO_X, the incremental costs to reduce the NO_X concentration to 3 ppm NO_X range from $33,000/ton to $54,000/ton. While these estimates generally exceed what has historically been considered cost-reasonable for NO_X emissions reductions, the EPA does not anticipate simple cycle turbines will generally fall into the large high-utilization subcategory because they will not be utilized at or above the 45 percent capacity factor on a 12-calendar-month basis. At high levels of utilization, the fuel savings of combined cycle turbine outweigh the increase in capital costs and the large high-utilization subcategory is almost exclusively combined cycle and combined heat and power turbines. Therefore, these costs do not change the EPA's determination that the costs of SCR are reasonable for large high utilization combustion turbines.

ii. Large Low-Utilization Combustion Turbines

The EPA concludes that SCR is not cost-reasonable for all other subcategories of new stationary combustion turbines, including large combustion turbines that are designed and operated as low-utilization units.

Most large low-utilization combustion turbines operate as simple cycle turbines in the utility sector. Historical data indicates that simple cycle turbines in the utility sector typically have utilization rates of less than 20 percent, considerably lower than the 45 percent utilization level that defines the high-utilization subcategory. The long-term, fleetwide average utilization for large simple cycle turbines is approximately 9 percent. While some combined cycle turbines may also occasionally operate below a 45 percent utilization level on a 12-month basis, this is more unusual. Therefore, the EPA uses the costs of SCR for simple cycle turbines rather than combined cycle turbines when evaluating low-utilization turbines.

While some indicators could support the cost-reasonableness of SCR as a part of the BSER for large simple cycle turbines operated at low rates of utilization, others do not. In particular, the EPA finds that the incremental $/ton cost ranges for NO_X abatement are substantially higher than the EPA has found reasonable in prior rules (see section IV.B.3.c.ii). Therefore, the EPA is determining in subpart KKKKa that the costs of SCR are not reasonable for new large low-utilization combustion turbines.

The EPA estimates using its SCR cost model that the capital cost of SCR as a percentage of the capital costs associated with constructing new simple cycle turbines is estimated to be approximately 3 to 4 percent. The estimation of spent capital cost is approximately $5 million to $17 million (2024$) depending on the size of the simple cycle turbine. The capital cost on a capacity basis ranges from $40/kW to $80/kW depending on the size of the simple cycle turbine. These costs translate into significantly higher costs per unit of energy output relative to large high-utilization turbines. Total costs (annualized capital costs, fixed costs, and operating costs) in terms of costs per unit of production (in terms of electricity generation) for a simple cycle turbine operated at a 9 percent capacity factor for 30 years translate to $8/MWh to $14/MWh, a 5 to 8 percent increase in the LCOE, depending on the size of the turbine. However, several industry commenters asserted that estimated SCR costs for large simple cycle turbines are far higher than the estimates derived from the EPA's primary data sources. As discussed in the *SCR Costing* technical support document included in the docket, as a reasonable bounding assumption we assume the capital costs that could be experienced by some firms may be up to three times higher than the estimates derived from our primary data sources. Increasing the EPA estimated capital costs by a factor of three results in an increase in the costs of electricity generation for a typical simple cycle turbine that is higher than prior EPA rules. Nonetheless, the EPA notes that at the upper end of the utilization threshold, the increase in the cost of electricity from simple cycle turbines would still be comparable with previous EPA rules.

In contrast, the costs on a per-ton basis, even using the EPA-derived costs, do not compare favorably with prior EPA rulemakings regulating NO_X emissions. The cost effectiveness of the $/ton of NO_X controlled vary significantly based on the utilization of the simple cycle turbine, the percent reduction, and the size of the simple cycle turbine. Nonetheless, the historical, long-term capacity factor of 9 percent, along with a relatively conservative 25 ppm manufacturer guaranteed emissions rate, is a reasonably accurate representative example. For simple cycle turbines with combustion controls guaranteed at 25 ppm NO_X operating at a 30-year capacity factor of 9 percent, the incremental costs to reduce the NO_X concentration to 3 ppm range from $27,000/ton to $46,000/ton. The $/ton costs would be even higher for turbines with lower guaranteed NO_X emission rates (such as 15 or 9 ppm).[115] The EPA has determined these costs to be not reasonable.

Even assuming a simple cycle turbine is operated at an average capacity factor of 40 percent for 30 years (the upper end of the subcategory threshold), the EPA has determined the costs are not reasonable. For simple cycle turbines with combustion controls guaranteed at 25 ppm NO_X, the incremental costs to reduce the NO_X concentration to 3 ppm range from $8,000/ton to $12,000/ton. While these costs are closer to the range of costs the EPA has considered reasonable in previous rulemakings, commenters with experience in this area provided information indicating a range of capital costs that may be considerably higher than used in our primary cost analysis. As described earlier in this section, to incorporate this information, we use a three-fold increase in capital cost as a bounding assumption, and we applied adjustments to the cost model to reflect these additional inputs to illustrate the increase in cost that may be associated with SCR installation on at least some large simple cycle turbines. This results in an incremental cost effectiveness of $15,000/ton to $25,000/ton. Again, costs on a $/ton basis would be even higher for turbines with lower guaranteed NO_X emission

[115] *See SCR Costing* technical support document in the docket.

rates based on combustion controls. Therefore, the Agency determines that the costs of SCR are not reasonable for large low-utilization turbines in subpart KKKKa.

iii. Medium and Small Turbines

Unlike the large combustion turbine subcategory, which is dominated by utility units, the medium and small size subcategories include a significant number of combustion turbines used in the industrial and institutional sectors.

The medium low-utilization subcategory is primarily comprised of utility sector simple cycle turbines. Due to economies of scale, the relative costs of SCR are higher for medium simple cycle turbines than for large simple cycle turbines. The incremental control costs of SCR on medium combustion turbines with a guaranteed NO_X emissions rate of 25 ppm range from $32,000/ton to $150,000/ton depending on the turbine size. This corresponds to a 5 to 18 percent increase in the cost of electricity and the $/MWh costs range from $10/MWh to $47/MWh. Even assuming a new medium simple cycle combustion turbine operates near the 45 percent utilization threshold, the incremental control costs range from $9,000/ton to $37,000/ton NO_X abated. The Agency has determined the costs of SCR are not reasonable for any new, modified, or reconstructed medium low-utilization combustion turbines.

The medium high-utilization subcategory is primarily comprised of industrial simple cycle combustion turbines that serve mechanical drive applications, and about one-third of the units operate in either industrial CHP or utility sector combined cycle applications. Consistent with the proposed rule, the EPA used a 30-year capacity factor of 60 percent when estimating the incremental impacts of SCR for CHP and mechanical drive applications. Mechanical drive applications are projected to comprise most of the new medium high-utilization turbines. For medium mechanical drive applications using a turbine with a 25 ppm NO_X guarantee, the incremental control costs range from $10,000/ton to $25,000/ton NO_X abated depending on the size of the turbine. These costs are higher than the Agency considers reasonable. (See prior rule examples in section IV.B.3.c.i.) The control costs would be even higher on a per-ton basis for combustion turbines using combustion controls with lower NO_X guarantees. In addition, turbines with mechanical drive applications tend to be at the smaller end of the medium size subcategory—resulting in even higher control costs (on a $/ton basis) for such units. Finally, commenters provided cost information that suggest the EPA's estimated SCR costs may be unreasonably low for simple cycle turbines.[116] Therefore, SCR does not qualify as the BSER for new, modified, or reconstructed medium mechanical applications.

For medium CHP and combined cycle turbine applications using a turbine with a 25 ppm NO_X guarantee, the NO_X control costs for SCR range from $5,000/ton to $15,000/ton depending on the size of the turbine and the application. For medium CHP and combined cycle turbine applications using a turbine with a 15 ppm NO_X guarantee, the control costs for SCR range from $7,000/ton to $23,000/ton depending on the size of the turbine and the application. The average base load rating of medium institutional and industrial CHP combustion turbines is 220 MMBtu/h, and the corresponding cost of control is $10,000/ton NO_X abated. SCR would not be cost reasonable for medium-sized CHP applications using a turbine with an emissions guarantee less than or equal to 15 ppm NO_X.

The average base load rating of medium combined cycle combustion turbines is 740 MMBtu/h, and the corresponding cost of control is $7,000/ton NO_X abated for facilities using a turbine with a guaranteed NO_X emissions rate of 15 ppm. The cost of control for medium combined cycle applications using a turbine with a guaranteed NO_X emissions rate of 9 ppm using combustion controls is $13,000/ton.

Reviewing the cost-estimate ranges for all the types of turbines included in the medium subcategory, we observe that certain cost-per-ton figures at the lower end of the range fall within or approach a level that may be considered reasonable. However, the Agency has determined that it is not appropriate to subcategorize by turbine type (*i.e.,* simple cycle vs. combined cycle or aeroderivative vs. frame type) as discussed earlier in section IV.B.2.g of this preamble. As discussed further in section IV.B.3.d below, issues with SCR on small and medium turbines addressed under other BSER factors, including operational and maintenance challenges, ammonia slip, and energy requirements, tip the scale against SCR as the BSER for any new, modified, or reconstructed medium turbine regardless of size or level of utilization within that subcategory.

Small combustion turbines are used primarily in the industrial and institutional sectors. For small combustion turbines, the incremental costs of SCR for a 50 MMBtu/h combined cycle turbine with NO_X combustion control guarantees of 25 ppm is $13,000/ton NO_X abated. The Agency has determined that this cost is not reasonable. Since SCR costs on a $/ton basis will be even higher for small low-utilization combustion turbines and for small combustion turbines with lower guaranteed NO_X emission rates based on the use of combustion controls, the EPA has determined that the costs of SCR are not reasonable for all new, modified, or reconstructed small combustion turbines regardless of the level of utilization.

iv. Response to Comments Regarding SCR Costs

With respect to the ''cost of emissions reduction'' BSER factor, one commenter opposed the cost analysis presented at proposal as over-reliant on the incremental $/ton metric in evaluating SCR as the BSER. The commenter contended that judicial precedents as well as longstanding EPA practice take a more flexible view of the role of cost, that the cost can be assessed for BSER as a whole rather than by the incremental costs of individual components, and that under CAA section 111, costs simply need not be excessive, *i.e.,* so great that they would drive the industry to ruin.

As an initial matter, the EPA agrees that the Agency has traditionally looked at several metrics to evaluate cost as part of the BSER analysis, and that the statute affords the Agency discretion in how this factor can be considered under CAA section 111(a)(1).[117] In this rulemaking, as the analysis above sets forth, the Agency evaluated costs using those same metrics that have been used in prior NSPS rulemakings, including total cost, cost as a percentage of capital cost, incremental cost-per-ton of pollutant reduced, and cost per unit of production (in this case, electricity production or LCOE). Overall, our cost analysis shows that while some of these cost metrics suggested at proposal that SCR may be cost-reasonable for more subcategories of combustion turbines than the large high-utilization subcategory, the incremental cost-per-ton in many of these circumstances far exceed what the Agency has found to be cost-effective in prior CAA rulemakings. That is particularly true considering the additional information submitted by commenters experienced in the procurement of SCR technologies showing that the EPA underestimated the actual costs of procurement,

[116] *See SCR Costing* technical support document.

[117] *See Lignite Energy Council,* 198 F.3d at 933.

installation, and operation at proposal, which the Agency has since incorporated into its analysis through adjustments to the cost model. In addition, for reasons further explained in the following section, other BSER factors weigh against identifying SCR as the BSER, including that SCR involves ammonia slip, which can lead to the formation of criteria pollutants.

With respect to the claim that the EPA is giving undue weight to the incremental cost effectiveness of SCR and is using more rigid cost tests than supported by relevant case law, the EPA disagrees. Use of that metric here, including the incorporation of emissions reductions achieved through technologies used to comply with existing subpart KKKK as a baseline, is consistent with many prior NSPS rulemakings and applicable case law confirming the EPA's broad discretion in analyzing costs under CAA section 111(a)(1).[118] Particularly in the NSPS technology review context, considering incremental costs and emissions reductions of a relevant emissions technology is necessarily part of the ''review'' required by CAA section 111(b)(1)(B). The EPA has given weight to incremental cost-effectiveness (on a $/ton basis) in evaluating different technologies within BSER analysis in many rules while, as here, also considering several other cost metrics.

The EPA has historically used incremental costing as part of NSPS technology reviews as a way of evaluating whether the marginal cost of an adequately demonstrated additional emissions control supports selecting that control as the BSER. For example, when the EPA first determined SCR to be the BSER for coal-fired utility boilers, we used the existing NSPS standards, which were based on combustion control technologies, as the baseline when determining whether the incremental costs of SCR were reasonable and whether the technology qualified as the BSER.[119] That cost analysis was upheld by the D.C. Circuit in *Lignite*.[120] In addition, when the EPA later reviewed the NSPS for coal-fired electric generating units, the Agency evaluated the incremental impacts of additional NO_X reductions from the SCR when determining the amended emissions standard and did not include the reductions from the use of combustion controls when determining the cost effectiveness of the amended emissions standard.[121] Furthermore, when promulgating subpart KKKK, the EPA did not use the original NSPS subpart GG as the baseline, because the NO_X performance standards in subpart GG were primarily based on diffusion flame combustion, and the EPA recognized that combustion controls would meet BSER factors. Thus, the Agency first evaluated the level of combustion control that could be achieved and then determined if the incremental impacts of SCR were reasonable.[122] The EPA has also considered incremental costs in any number of other NSPS rulemakings in addition to these.[123] The EPA disagrees with commenter's assertion that considering the incremental costs of a technology from a baseline of either an existing standard or a less costly emissions control technology is inconsistent with longstanding practice or case law.

Further, cost-effectiveness figures evaluated across other CAA rules and programs provide a meaningful comparison to assist in determining what level of cost has generally been considered cost-effective for reducing emissions of a given pollutant. Here, for the subcategories of combustion turbines for which the EPA finds SCR is not cost-reasonable, the incremental $/ton values are well in excess of incremental cost values that have been deemed cost-effective in the past (see examples cited in section IV.B.3.c.i.).

For this category of sources, and in the context of conducting an NSPS review where the previous BSER was combustion controls, the EPA finds it particularly important to focus on the incremental $/ton of SCR rather than looking only at the total cost-effectiveness of an ''SCR with combustion control'' BSER as a whole. The SCR in this case is an additional control, to be combined with controls that are already widely used to comply with the current NSPS (and, indeed, largely built directly into most turbine models by the manufacturer). Failing to present or consider the incremental cost of SCR to the use of combustion controls alone would effectively mask the true driver of a large portion of the cost of a revised BSER that includes SCR.

In the case of combustion turbines, dry combustion controls are an inherent part of the affected facility and cannot be easily removed or modified and the end user has limited ability to change the way the combustion controls are operated. For turbines with wet combustion controls, if the water injection is turned off, thermal NO_X would increase, but the increased combustion flame temperature and exhaust gas temperature potentially will result in damage to turbine components.

For this source category, it is generally the case that combustion turbine manufacturers have integrated combustion control technologies into the design of the turbine itself for decades, and turbines are sold with manufacturer guarantees of a specific level of NO_X performance already built into the machine. Given that these controls are essentially priced into the retail cost of the turbine itself, it is difficult to generate reliable cost estimates for many types of combustion control technologies in isolation. Substantial improvements in NO_X performance are readily achieved through combustion control technologies integrated into the turbine at the time of manufacture, and the cost of these controls is reflected in the price of purchase of the unit itself.

In contrast, SCR is an add-on technology that typically must be purchased separately and installed on-site, often through dedicated vendors and sub-contracts. The SCR is essentially an additional facility that must be constructed separately with its own footprint. As a practical matter, the costs associated with SCR are borne separately and are clearly additional to the costs of combustion controls. Further, combustion controls are now capable of achieving relatively low NO_X emissions rates that approach what can be achieved with SCR. It makes sense to consider the incremental cost-effectiveness of a technology when that technology comes at substantially increased capital costs and operating and maintenance (O&M) costs over the life of its operation and, compared with a baseline level of emissions performance that is reflective of current or revised BSER determinations for combustion controls, only achieves modestly improved emissions performance compared to a far less costly technology.

The commenter also argues that SCR costs must be reasonable because many combustion turbines in recent years

[118] See Section II.A.1 of this preamble for further discussion of the case law under CAA section 111.

[119] *See* 62 FR 36948, 36955, 36958 (July 9, 1997).

[120] *See* 198 F.3d 930, 933.

[121] *See* 71 FR 9870 (Feb. 27, 2006).

[122] *See* Memorandum, NO_X Control Technology Cost Per Ton for Stationary Combustion Turbines 7–8 (December 21, 2004), available at docket ID EPA–HQ–OAR–2004–0490–0114; Memorandum, Response to Public Comments on Proposed Standards of Performance for Stationary Combustion Turbines 53, available at docket ID EPA–HQ–OAR–0490–0322.

[123] *See, e.g.,* 89 FR 16820, 16864 (Mar. 8, 2024); 87 FR 35608, 35627 (June 10, 2022); 80 FR 64510, 64559 (Oct. 23, 2015); and 77 FR 56422, 56443 (Sept. 12, 2012). Citations to these examples are not intended to imply endorsement of the rules themselves, only that the Agency has had a consistent practice of looking at incremental costs in NSPS rulemakings.

have been required to install or have voluntarily installed SCR, citing to a variety of permitting decisions. The EPA agrees that SCR is generally an adequately demonstrated technology for combustion turbines. However, this commenter's argument collapses the statutory requirement that the Administrator find that a potential control technology is ''adequately demonstrated'' with the factors the Administrator must consider, including the cost of emissions reduction, when selecting the BSER. Many of the permitting decisions cited by the commenter lack meaningful or probative cost analysis with respect to SCR and focus instead on whether SCR is capable of being installed on the particular source at issue. In addition, many of the commenter's examples are for large high-utilization combined cycle turbines for which the EPA agrees that SCR is cost reasonable. However, the Agency disagrees that SCR is cost-reasonable for all subcategories on a nationwide basis, such that it must be included as part of the BSER for all combustion turbines. Whether SCR is cost-reasonable for smaller or lower utilization combustion turbines in particular permitting contexts is a determination that should continue to be made on a case-by-case basis by local and State permitting authorities, taking into consideration an array of localized factors, including air quality planning and NAAQS attainment status.[124]

d. Non-Air Quality Health and Environmental Impacts and Energy Requirements

Post-combustion SCR has several drawbacks compared to combustion controls technologies. SCR operation has associated ammonia emissions, a criteria pollutant precursor, reduces the output of the combustion turbine, and requires energy to operate. That auxiliary load energy is typically drawn from the combustion turbine itself, reducing the efficiency of its overall power generation and resulting in proportionally increased emissions of other air pollutants that result from combustion turbine operation.[125]

Post-combustion SCR uses ammonia as a reagent, and some ammonia is emitted either by passing through the catalyst bed without reacting with NO_X (unreacted ammonia) or by passing around the catalyst bed through leaks in the seals. Both types of excess ammonia emissions are referred to as ''ammonia slip.'' Ammonia is a precursor to the formation of fine particulate matter (*i.e.,* $PM_{2.5}$). Ammonia slip typically increases as the catalyst beds age and is often limited to 10 ppm or less in operating permits. Ammonia catalysts, consisting of an additional catalyst bed after the SCR catalyst, reacts with the ammonia that passes through and around the catalyst to reduce overall ammonia slip. In the NETL model plants used in the EPA's analysis of SCR, no additional ammonia catalyst was included, and ammonia emissions were limited to 10 ppm at the end of the catalyst's service life. For estimating secondary impacts, the EPA assumed average ammonia emissions of 3.5 ppm. Assuming the ammonia slip is 3.5 ppm regardless of the NO_X emissions rate prior to the SCR, the amount of ammonia emitted per ton of NO_X controlled increases with combustion controls that achieve lower NO_X emission rates prior to the SCR. For example, assuming the NO_X emissions rate is decreased from the manufacturer guaranteed rate of 15 ppm to 3 ppm with the addition of SCR, the EPA estimates that for each ton of NO_X controlled, 0.12 tons of ammonia will be emitted from SCR controls. For combustion turbines with guaranteed NO_X emission rates of 9 ppm and 5 ppm, the EPA estimates the relative ammonia emissions increase to 0.33 tons and 0.65 tons of ammonia per ton of NO_X controlled, respectively.[126] According to information submitted by commenters, ammonia slip increases as the percentage of NO_X reduced by SCR increases above 80 percent. For example, the ammonia slip at 85 percent reduction is nearly double the ammonia slip at 80 percent reduction. And at 94 percent reduction, the ammonia slip is 10 times as high relative to 80 percent reduction.

Several commenters supportive of SCR technology called on the EPA to establish standards of performance for ammonia slip and took the view that this would be sufficient to mitigate this downside of SCR technology. First, as these and other comments acknowledged, ammonia slip is typically addressed through identifying facility-specific practices and conditions in the permitting process, and the EPA continues to view permitting as the appropriate mechanism for addressing this concern. Second, a standard of performance would still not eliminate ammonia emissions from SCR operation. Our analysis assumes ammonia emissions of 3.5 ppm, while these commenters called for setting an emissions limit of 2 ppm. Other commenters, however, stated that permitted ammonia emissions rates are often in the range of 7 to 10 ppm. In short, ammonia emissions of some level are a downside of SCR that at present cannot be entirely avoided, regardless of whether a limit is set, and it is reasonable to assume that such a hypothetical limit would be at or near the rate already assumed in our analysis.

The use of SCR also reduces the efficiency of a combustion turbine through the auxiliary/parasitic load requirements to run the SCR and the backpressure created from the catalyst bed. This not only reduces the net energy output of combustion turbines but also translates into increases in other types of emissions to the extent the turbine must run longer to produce the same amount of energy to meet energy requirements.[127]

In general, the EPA does not believe that these effects, on their own, exclude SCR from being part of the BSER. However, these impacts are sufficiently adverse that, in the case of minimal incremental NO_X reductions from SCR as compared with combustion controls alone, they support a conclusion that SCR is not part of the BSER. Thus, the non-air quality health and environmental impacts and energy requirements of SCR support the conclusion that SCR does not qualify as the BSER for turbines with combustion controls capable of achieving 5 ppm NO_X. For combined cycle turbines using less effective combustion controls, the non-air quality and environmental impacts do not necessarily eliminate SCR as the BSER, and these effects do not change our determination that SCR is part of the BSER for large high-utilization combustion turbines. With respect to the low-utilization and small and medium combustion turbines for which the EPA identifies a range of cost-

[124] The EPA further notes that the analysis required in promulgating or reviewing an NSPS is materially different than the analysis required for permitting. For example, CAA section 111(b)(2) authorizes the Agency to distinguish only among classes, types, and sizes of new sources, whereas permitting decisions focus on particular sources in a facility-specific way. 42 U.S.C. 7411(b)(2).

[125] Note that in this section we evaluate a range of environmental impacts associated with SCRs. To the extent these impacts are not explicitly covered under the ''nonair quality health and environmental impact'' factor, they are nonetheless statutorily relevant in identifying the ''best'' system of emissions reduction. *See* section II.A.1 of this preamble.

[126] Ammonia has a lower molecular weight (17) than NO_2 (46). Thus, although more molecules of ammonia are being emitted in the example of a combustion turbine with a guaranteed NO_X emissions rate of 5 ppm, the mass of NO_X is greater.

[127] Among the pollutants that would potentially increase in association with this increase in operation is formaldehyde, a hazardous air pollutant regulated for combustion turbines at major sources under CAA section 112. *See generally* 40 CFR part 63, subpart YYYY.

effectiveness values for SCR, the lower ends of which may be considered reasonable at least under some scenarios, the EPA finds these downsides to SCR are sufficient to tip the scale away from including SCR in the BSER.

Some commenters asserted that SCR, when used in combination with combustion controls, is clearly the BSER even if it has downsides under some BSER factors. These commenters asserted that statutory language and case law requires the EPA to prioritize and maximize emissions reductions.

The EPA agrees with the commenter that adequately demonstrated technologies that achieve the greatest amount of emissions reduction need to be carefully considered under all the BSER factors. However, the statutory language does not bear out the commenters' claim that the EPA must always mandate the most emissions reductions possible through our BSER determinations, heedless of the other statutory factors Congress directed the Agency to consider in CAA section 111(a)(1). In general, the courts have recognized that the EPA has considerable discretion in weighing those factors,[128] and a general policy of selecting the technology with the greatest emissions reductions irrespective of the ''cost of achieving such reduction,'' ''nonair quality health and environmental impact[s],'' and ''energy requirements'' would be inconsistent with the statute.[129]

Here, the analyses above supply important and persuasive information that SCR is not the BSER for many types of combustion turbine applications for cost and other reasons. If the Agency were to follow the approach suggested by some commenters and include a stringent standard of performance across the board for combustion turbines that could only be met with SCR, it could discourage the development of other control technologies that do not suffer from similar drawbacks and would likely increase emissions of other pollutants.[130] For example, a BSER that includes SCR could substantially reduce the incentive to improve combustion control design and performance. Once SCR is installed on a unit, the type of combustion control used matters less. Taking ammonia costs as an example, while less ammonia is required and those costs are reduced with improved combustion controls in combination with SCR, the savings are small relative to the overall annual costs of SCR. All else being equal, the annual SCR costs for a 50 MW simple cycle turbine with a 15 ppm NO_X guarantee is 0.9 percent lower than for a turbine with a 25 ppm NO_X guarantee (an annual savings of $6,000).[131] Similarly, the annual costs of a turbine with a 9 ppm NO_X guarantee are 0.7 percent ($5,000) lower than a comparable turbine with a 15 ppm NO_X guarantee. These incremental reductions in SCR costs are relatively low and not likely to offer a competitive advantage for an end user purchasing a turbine with combustion controls with lower guaranteed NO_X emission rates. The economic incentive for manufacturers to invest in improved combustion controls is to gain a competitive advantage by developing turbines that do not require SCR, at least in certain situations. If a BSER determination is made that effectively mandates SCR for all new combustion turbines, regardless of the level of emissions reduction achieved with combustion controls, there would be little incentive for manufacturers to invest in improved combustion controls. This could lead to increased costs for users of energy, increased fuel use (from the efficiency loss associated with SCR), and increased ammonia emissions.

Other commenters stated in response to the proposed rule that the EPA should exclude SCR as a component of the BSER for large combustion turbines utilized at lower capacity factors because the proposed SCR costs, as well as the proposed 3 ppm NO_X standards for large simple cycle turbines that result from including SCR in the BSER, are arbitrary and unreasonable. Instead, according to the commenters, the BSER for these large turbines should be advanced DLN or DLN combustion controls with associated NO_X emission limits, as appropriate. The commenters argued that the proposed determination of the BSER did not consider the full costs of adding SCR to larger simple cycle turbines (*i.e.,* those greater than 850 MMBtu/h). Specifically, the hot exhaust gases require cooling prior to the SCR, resulting in an approximate doubling of capital costs. Such costs would cause an entire class of larger frame-type turbines to be eliminated from consideration for use due to cost. According to two commenters, large turbines have guaranteed NO_X emission rates ranging from 5 ppm to 25 ppm by utilizing only combustion controls. The commenters added that the exclusion of SCR as the BSER for these turbines would support the creation of additional subcategories for combustion turbines with base load rated heat inputs greater than 850 MMBtu/h.

Based on a review of comments, the EPA is not including in subpart KKKKa the proposed subcategory for all sizes of new and reconstructed combustion turbines that would operate at intermediate loads (*i.e.,* at 12-calendar-month capacity factors greater than 20 percent and less than or equal to 40 percent). The EPA is also determining in subpart KKKKa that SCR does not qualify as the BSER for large low-utilization combustion turbines (*i.e.,* with 12-calendar-month utilization levels less than or equal to 45 percent). Instead, the EPA is determining that the BSER is the use of combustion controls for all sizes of new low-utilization combustion turbines. These changes address commenters' concerns about being required to install SCR for simple cycle turbines, which, as discussed in section IV.B.2, have not historically operated at high utilization levels. For large high-utilization combustion turbines, including simple cycle turbines, the BSER includes the use of SCR as proposed, for the reasons discussed above.

4. Evaluation of Combustion Controls Under BSER Factors

Since proposal, the EPA has undertaken a careful review of the BSER criteria in relation to combustion controls and has considered the extensive technical comments submitted. This includes information about the availability and performance of wet combustion controls (*i.e.,* steam or water injection), dry combustion controls, and the performance of advanced combustion controls for certain types and classes of available stationary combustion turbines. Advanced combustion controls generally refer to dry combustion controls that have been tuned, upgraded, or modified to improve the combustion process in such a manner as to limit the formation of thermal NO_X. These include technologies such as lean premixed combustion, DLN and ultra DLN burners, staged combustion, and flue gas recirculation, which generally

[128] *See, e.g., Sierra Club* v. *Costle,* 657 F.2d 298, 346–47 (D.C. Cir. 1981).

[129] 42 U.S.C. 7411(a)(1).

[130] *See id.* (''We have no reason to believe Congress meant to foreclose in section 111(a) any consideration by EPA of the stimulation of technologies that promise significant cost, energy, nonair health and environmental benefits. . . . [W]hen balancing the enumerated factors to determine the basic standard it is appropriate to consider which level of required control will encourage or preclude development of a technology that promises significant advantages with respect to those concerns.'').

[131] These costs are derived using the EPA's cost model as proposed and without adjusting based on the information provided by commenters intended to demonstrate that the EPA's estimated capital costs of SCR for simple cycle turbine are low. Using higher capital costs would reduce the percent reduction in savings from improved combustion controls.

result in lower NO_X emission rates than non-advanced combustion controls.[132]

The basis of dry combustion control or DLN combustion control is to premix the fuel and air and supply the combustion zone with a homogenous, lean mixture of fuel and air. Lean premix means the air-to-fuel ratio contains a low quantity of fuel, and the DLN combustors in the turbine are designed to sustain ignition of this lean premix air/fuel mixture at a lower peak flame temperature, thereby limiting the formation of thermal NO_X. Lean combustion may be combined with staged combustion to achieve additional NO_X reductions. Staged combustion is designed to reduce the residence time of the combustion air in the presence of the flame at peak temperature. The longer the residence time, the greater the potential for thermal NO_X formation. When increasing the air/fuel ratio, excess air is added to the mixture, which both leans the combustion air by adding more air to the air/fuel ratio and decreases the residence time at peak flame temperatures.

Wet combustion controls involve the injection of water (or steam) into the flame area of the combustion reaction to reduce the peak flame temperature in the combustion zone and limit thermal NO_X formation.[133] Wet control systems are designed to a specific water-to-fuel ratio that has a direct impact on the controlled NO_X emission rate and is generally controlled by the combustion turbine inlet temperature and ambient temperature. Water injection also increases the mass flow rate and the power output, but the energy required to vaporize the water can reduce overall efficiency.

Steam injection is like water injection, except that steam is injected into the compressor and/or through the fuel nozzles directly into the combustion chamber instead of water. Steam injection reduces NO_X emissions and has the advantage of improved efficiency and larger increases in the output of the combustion turbine. When compared to standard simple cycle turbines, combustion turbines using steam injection are more efficient but more complex with higher capital costs. Conversely, compared to standard combined cycle combustion turbines, the combustion turbines using steam injection are simpler and have shorter construction times and lower capital costs but also lower efficiencies.[134] Combustion turbines using steam injection can start quickly, have good part-load performance, and can respond to rapid changes in demand. Since the exhaust gas is cooled, it reduces or eliminates the need for air tempering prior to any associated SCR and thereby lowers the costs of SCR.

The EPA is determining that combustion controls continue to be either the BSER or part of the BSER for all subcategories of new, modified, or reconstructed stationary combustion turbines in subpart KKKKa. This is the result of a revised BSER analysis since proposal that supports the conclusion that combustion controls alone, without the addition of SCR, are the BSER for all but one subcategory of new stationary combustion turbines and for all modified or reconstructed turbines.

The different types of dry combustion controls have been standard equipment on stationary combustion turbines for decades and have been shown to be cost-effective while achieving substantial reductions in NO_X. Furthermore, the technology has continued to improve, as demonstrated by the lower guaranteed NO_X emission rates of advanced combustion controls for certain sizes, classes, and types of new turbines compared to the performance of combustion controls that were available when subpart KKKK was promulgated in 2006. For certain classes of turbines, advanced combustion controls with DLN or ultra DLN have demonstrated the ability to achieve NO_X emission rates comparable to the NO_X emission rates achieved by combustion turbines that operate with SCR but at lower cost and without the drawbacks of SCR discussed elsewhere in this preamble.

Wet combustion controls (including steam-injection), by contrast, are also a mature combustion control technology but generally there have not been significant improvements in emissions performance with these technologies over time. Wet combustion controls remain the appropriate control type for non-gaseous fuels. However, in general, for natural gas-fired combustion turbines, the EPA bases its BSER determinations and emissions standards on dry combustion controls. Nonetheless, this preamble also discusses circumstances in which wet controls may be able to meet the selected emissions standards for certain subcategories firing natural gas.

Based on the EPA's revised analysis, the BSER for most subcategories of new, modified, and reconstructed combustion turbines subject to subpart KKKKa is the use of wet, dry, or advanced dry combustion controls alone (*i.e.,* without SCR).

a. Adequately Demonstrated

Combustion controls were determined to be the BSER in subpart KKKK and continue to be widely used as NO_X emission controls on new stationary combustion turbines.[135] In that sense, combustion controls can be considered to be ''adequately demonstrated''; however, after considering all of the BSER factors as described in the sections that follow, the EPA finds that different types of combustion controls have varying degrees of feasibility and emissions performance in relation to specific combustion turbine applications. Thus, in generally finding that combustion controls are an ''adequately demonstrated'' technology for the source category, the EPA does not mean to imply that the most stringent combustion control technologies necessarily qualify as the BSER for all subcategories of combustion turbines. The various combustion control technologies and our evaluation of them under the BSER factors are further discussed in this and the sections that follow.

Combustion control systems were commercially introduced more than 30 years ago and consist of operational or design modifications that govern combustion conditions to reduce NO_X formation. The control technology is widely available from major manufacturers of natural gas-fired aeroderivative and frame type stationary combustion turbines and is a mature technology that has been demonstrated in various end-use applications.[136] In

[132] Unless otherwise indicated, ''combustion controls'' is used in this preamble as an umbrella term to refer to both combustion controls and advanced combustion controls. Advanced combustion controls have guaranteed emission rates of less than 25 ppm NO_X.

[133] In general, the addition of water or steam will not increase emissions of carbon monoxide (CO) or unburned hydrocarbons. However, at higher injection rates, emissions of CO and unburned hydrocarbons can increase.

[134] Bahrami, S., et al (2015), *Performance Comparison between Steam Injected Gas Turbine and Combined Cycle during Frequency Drops.* Energies 2015, Volume 8. Accessed at *https://doi.org/10.3390/en8087582;* Mitsubishi Power, *Smart-AHAT (Advanced Humid Air Turbine.* Accessed at *https://power.mhi.com/products/gasturbines/technology/smart-ahat.*)

[135] *See* 71 FR 38482 (July 6, 2006).

[136] Combustion turbine manufacturers publish information about their products, including the different combustion controls for each model of combustion turbine commercially available. This includes combustion turbine size, rated output, emission controls, and guaranteed NO_X emission rates. This information is also summarized in the combustion turbine specification sheet included in the docket for this rulemaking (Docket ID: EPA–HQ–OAR–2024–0419); *See also* Siemens gas turbines at *https://www.siemens-energy.com/global/en/home/products-services/product-offerings/gas-turbines.html;* GE/Vernova gas turbines at *https://www.gevernova.com/gas-power/products/gas-turbines;* Mitsubishi Power gas turbines at *https://*

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subpart KKKKa, the EPA maintains that combustion controls are, as a general matter, adequately demonstrated for new, modified, or reconstructed natural gas-fired turbines of all sizes. However, the availability of dry combustion controls that can achieve a particular guaranteed NO_X emission rate (*e.g.,* 25 ppm, 15 ppm, 9 ppm, and 5 ppm) varies between the subcategories and applications. The availability of more advanced combustion controls that can achieve NO_X emission rates less than 25 ppm tends to correlate with turbine size. For example, according to turbine manufacturer specifications and information in *Gas Turbine World,* most models of combustion turbines with guaranteed NO_X emission rates of 9 ppm would fall within the large turbine subcategory, whereas the availability of 9 ppm NO_X turbines is generally more limited in the medium and small subcategories. Similarly, as discussed in section IV.B.2.c of this preamble, dry combustion controls can achieve differing NO_X emission rates depending in part on the efficiency of the turbine model to which they are applied. Thus, the EPA is determining that combustion controls with different guaranteed NO_X emission rates are adequately demonstrated for different subcategories of combustion turbines, based primarily on the current state of development of those controls as evidenced by availability of turbines of different sizes and efficiencies that meet certain guaranteed NO_X emission rates.

Specifically, for the subcategory of large low-utilization combustion turbines, the EPA finds that advanced combustion controls that have guaranteed NO_X emission rates of 9 ppm are adequately demonstrated for less efficient turbine designs. For large low-utilization combustion turbines with higher efficiencies, advanced combustion control technologies are not as effective, *i.e.,* cannot achieve the same emission rates due to the higher combustion temperatures necessary for increased efficiency. Therefore, based on the capabilities of controls available for such turbines, the EPA finds that advanced combustion controls with guaranteed NO_X emission rates lower than 25 ppm are not adequately demonstrated for these higher efficiency turbine models, whereas dry combustion controls with guaranteed rates of 25 ppm *are* adequately demonstrated for this subcategory of large low-utilization combustion turbines.

The subcategories of medium combustion turbines include many models of combustion turbines designed to be operated at higher levels of utilization. For these applications and turbines sizes, dry combustion controls have manufacturer guaranteed NO_X emission rates of 15 ppm, and the EPA is determining that such controls are adequately demonstrated for medium high-utilization combustion turbines. For many models of medium combustion turbines designed to be operated at lower levels of utilization, both wet and dry combustion controls achieve the same manufacturer guaranteed emission rate of 25 ppm NO_X. Wet combustion controls have particular benefits for medium turbines operating at approximately 20 percent annual utilization or less, while at utilizations of 20 to 40 percent, dry combustion controls are more cost effective. However, as stated above, both wet and dry combustion controls achieve the same NO_X emission rate for combustion turbines in the medium low-utilization subcategory and both are adequately demonstrated.

While some small combustion turbines can be equipped with advanced combustion controls with guaranteed NO_X emission rates of less than 25 ppm, such controls are not widely available across the entire subcategory. Therefore, the EPA has determined that such advanced combustion controls have not been adequately demonstrated for the small combustion turbine subcategory. Based on information from turbine manufacturers and commenters, the EPA determines combustion controls, both wet and dry, with guaranteed NO_X emission rates of 25 ppm are adequately demonstrated for all small combustion turbines.

For new turbines that burn non-natural gas fuels (*e.g.,* distillate oil), the EPA maintains that wet combustion controls only are adequately demonstrated for control of NO_X emissions. *I.e.,* dry combustion controls are not adequately demonstrated for such turbines because, as discussed in sections IV.B.2.d and IV.7.a of this preamble, dry combustion controls have limited applicability to limit NO_X emissions when liquid fuels are fired. Wet combustion controls (*e.g.,* water or steam injection) are a mature combustion control technology that has been used since the 1970s to control NO_X emissions from combustion turbines. As discussed above, the EPA also maintains that wet combustion controls are available for certain natural gas-fired combustion turbines as an alternative to dry combustion controls. The emission standards for small and medium turbines in subpart KKKK could be achieved using either wet or dry combustion controls. However, wet combustion controls were not part of the BSER for large natural gas-fired combustion turbines in subpart KKKK because the technology had not demonstrated the ability to achieve NO_X emissions rates of less than 25 ppm.[137]

b. Extent of Reductions in NO_X Emissions

Combustion turbines without NO_X controls use combustors that are diffusion controlled where fuel and air are injected separately. The resultant diffusion flame combustion can lead to the creation of hot spots that produce high levels of thermal NO_X—as high as 200 ppm. Combustion controls are widely available for new combustion turbines and provide substantial reductions in NO_X emissions relative to combustion turbines without combustion controls.

The level of NO_X reduction that can be achieved with dry combustion controls depends on the combustion systems that have been developed for the specific turbine product line. Development of dry combustion systems is a research intensive and expensive undertaking that is specific to each turbine product line (*i.e.,* combustors developed for a specific turbine model cannot be used on a different turbine model). While almost all combustion systems developed by manufacturers and third parties can achieve 25 ppm NO_X when burning natural gas, some combustion systems with more advanced technologies can achieve 15 ppm, 9 ppm, or 5 ppm NO_X. The feasibility of lower NO_X emissions is additionally impacted by the characteristics of the turbine. For example, compact turbines that can start and stop quickly (typical of aeroderivative turbines) and turbines with high firing temperatures (typical of higher efficiency turbines) have emission guarantees of 25 ppm NO_X. And turbines that are physically larger on a per MW of output basis, and turbines with lower firing temperatures, frequently have available combustion systems with emission guarantees of 15 ppm NO_X or less. The operating parameters that influence guaranteed NO_X emission rates include turbine load, fuel, and ambient conditions, which are like the parameters used to determine the applicable hourly emissions standards in this final rule, meaning that the EPA's BSER determinations and standards reflect the

power.mhi.com/products/gasturbines; and Solar Turbines at *https://www.solarturbines.com/en_US/products.html.*

[137] The emissions standard in subpart KKKK for large natural gas-fired turbines is 15 ppm NO_X.

real-world conditions in which turbines will be operating. Based on emissions information reported to CAMPD, these guaranteed emission rates are being achieved in practice. For all these reasons, the EPA has determined that it is appropriate to use manufacturer guarantees for the purposes of assessing the extent of NO_X emission reductions for the BSER analysis, as well as for establishing emission standards in subpart KKKKa.

Wet control systems are simpler to implement and have demonstrated the ability to limit NO_X emissions to as low as 25 ppm for stationary combustion turbines firing natural gas and between 42 ppm and 74 ppm for sources firing non-natural gas fuels. The EPA is not aware of any advances in combustion controls for non-natural gas-fired fuels relative to the analysis it conducted for subpart KKKK in 2006.

c. Costs

The EPA initially assessed costs relative to a starting point of a combustion turbine with a base load rating of less than 850 MMBtu/h of heat input using combustion controls with a NO_X emissions rate guarantee of 25 ppm, and a guarantee of 15 ppm NO_X for a turbine with a base load rating greater than 850 MMBtu/h of heat input. These are appropriate initial baselines because, absent the revisions to the NSPS being finalized in this action, they are the standards to which natural gas-fired combustion turbines are subject under subpart KKKK. Thus, in this rulemaking, the EPA is assessing incremental costs associated with revising the existing NO_X standards.

Importantly, the EPA believes that the costs of combustion controls are reasonable for the source category because turbine manufacturers are currently making, and end users (including in the utility, industrial, and institutional sectors) are currently purchasing and operating, combustion turbines with guaranteed NO_X emission rates of 25 ppm, 15 ppm, and 9 ppm.[138] In general, due to more complex combustion systems (*e.g.,* additional fuel nozzles and burners, premixing larger amounts of air with the fuel, and more sophisticated control systems) and/or maintenance requirements, costs increase as the guaranteed NO_X emissions rate of a combustion turbine decreases. Moreover, assessing the incremental costs of combustion controls is different from assessing the costs of other, add-on pollution controls because combustion controls are integrated into the up-front design and manufacture of combustion turbines. It can therefore be difficult to disentangle the costs of the controls from the costs of the turbines themselves. The EPA has endeavored to do so, but this cost analysis of combustion controls relies more heavily on the overall availability and costs of different sizes, classes, *etc.,* of turbines and their associated controls, as well as the current use of specific types of turbines in specific applications, as indicators of cost reasonableness than might be appropriate in other contexts.

As stated above, the fact that turbines with combustion controls guaranteeing NO_X emission rates ranging from 9 ppm to 25 ppm are being purchased and used today is an indicator that the incremental capital and operating costs of combustion controls (including advanced combustion controls) relative to diffusion flame turbines are reasonable.[139] However, the characteristics of how a turbine is operated can impact the cost effectiveness of combustion controls. For example, if a unit is operating less it will emit less NO_X, while the capital cost of the combustion controls remains relatively unaffected. As a result, all else being held equal, the cost per ton of NO_X reduced increases as utilization decreases. Therefore, while the capital costs of combustion controls are generally reasonable for the source category, for certain subcategories of combustion turbines, the cost *effectiveness* of certain combustion controls to meet particular guaranteed NO_X emission rates may not be.

In the 2024 proposed rule, the Agency solicited comment on detailed capital and O&M cost information and other impacts for combustion turbines with NO_X guarantees of 15 ppm, 9 ppm and 5 ppm relative to the costs of comparable combustion turbines with 25 ppm NO_X guarantees. The EPA stated in the proposal that to the extent the Agency received information that the costs of more advanced combustion controls are reasonable, NO_X emission standards consistent with these guaranteed levels could be finalized.[140] In response, commenters did not provide significant additional information on the incremental cost impacts of combustion controls with different guaranteed NO_X emission rates (*i.e.,* on the differences in costs between 25 ppm, 15 ppm, 9 ppm, and 5 ppm combustion systems, respectively); however, they did provide information on the cost of combustion controls capable of achieving 25 ppm NO_X emissions relative to diffusion flame combustion. According to commenters' information, adding dry combustion controls increased the capital costs relative to a comparable combustion turbine using diffusion flame combustion but the efficiency and operating costs for turbines were unaffected by controlling emissions to 25 ppm NO_X.[141] In contrast, the EPA's estimates of incremental emissions reductions from combustion systems capable of achieving 15 ppm and 9 ppm NO_X relative to a 25 ppm NO_X combustion system include capital costs as well as efficiency and operating costs of controls. This indicates that the EPA's estimated impacts of the incremental costs and efficiency impacts of improvements in combustion controls may be conservatively high.

In evaluating the costs and cost reasonableness of different types of combustion controls, the EPA considered the applications for which turbines in different subcategories are designed and the corresponding ways in which they are operated. Small- and medium-sized turbines that operate at low levels of utilization include, but are not limited to, peaking turbines, which are often simple cycle turbines used to provide power during peak summer demand when ambient temperatures are high. They also include turbines that are not, strictly speaking, peaking turbines but that operate 40 percent of the time or less on an annual basis. For both types of turbines (*i.e.,* peaking turbines and other low-utilization turbines), wet and dry combustion controls that achieve a NO_X emission rate of 25 ppm are adequately demonstrated. Thus, for the purposes of these revisions to subpart KKKKa, the EPA estimated the costs of wet combustion controls at 25 ppm NO_X compared to dry combustion controls at 25 ppm NO_X. Although wet combustion controls are sometimes less effective at reducing emissions than dry combustion controls, the use of wet combustion controls increases the design output of simple cycle turbines and can reduce capacity and efficiency losses because of high ambient

[138] *See* the inventory in the docket of turbines that have recently commenced operation in the U.S.

[139] As discussed in section IV.B.4.a of this preamble, while combustion controls are broadly available for and used in the source category, advanced combustion controls are currently less available for smaller turbine sizes and are not available for large, high-efficiency turbines. As a corollary to their lack of general availability for such turbines, advanced combustion controls would also de facto not be cost reasonable for small and large, high-efficiency turbines.

[140] *See* 89 FR at 101328, 101331, 101333 (requesting information on, among other things, the capital and O&M costs of combustion controls to meet varying emission rates for small, medium, and large combustion turbines).

[141] *See* the Electric Power Research Institute (EPRI) supporting materials.

temperatures relative to the use of dry combustion controls. Wet combustion controls also have lower capital costs than dry combustion controls. However, wet combustion controls require highly purified water and reduce the turbine efficiency, which contributes to higher operating costs relative to the sue of dry combustion controls. Based on information provided by commenters, at a NO_X emissions standard of 25 ppm, the use of wet combustion controls results in lower overall costs than the use of dry combustion controls, but only up to a utilization rate of approximately 20 percent, which is consistent with a turbine that is operated in peaking applications.[142] The costs of dry combustion controls at these relatively low rates of utilization would be higher.[143] For annual utilization rates above 20 percent, dry combustion controls are generally more cost reasonable than wet combustion controls. Given that the low-utilization subcategory for medium combustion turbines encompasses both of these applications—peaking turbines at the lowest end of the utilization spectrum and turbines that operate more frequently but still below 40 percent annual utilization—and that both wet and dry combustion controls for turbines with these characteristics achieve 25 ppm NO_X, the EPA is determining that the costs of combustion controls that can meet this emission rate, whether wet or dry, are reasonable.

Notwithstanding the preceding analysis of and conclusions about the costs of wet and dry combustion controls that achieve 25 ppm NO_X for certain small and medium turbines, the EPA also evaluated the costs of advanced combustion controls for all sizes of combustion turbines (*i.e.,* including small and medium turbines). For medium and small turbines with combustion systems with emission guarantees of less than 25 ppm NO_X, most are 15 ppm NO_X turbines with the availability of 9 ppm NO_X turbines being more limited. Since combustion turbines with 9 ppm NO_X are not widely available within the medium and small turbines subcategories, the EPA is not considering combustion controls with 9 ppm NO_X guarantees as a potential BSER for these subcategories.

To estimate the costs of advanced dry combustion controls capable of achieving 15 ppm NO_X, relative to a turbine with a combustion system capable of achieving 25 ppm NO_X, the EPA used three costing models.[144] The first reduced the efficiency of the combustion turbine and the corresponding output by 2 percent while leaving everything else constant. The second approach is based on available information for an aeroderivative turbine with multiple combustion system options and reduced the heat rate, output, and variable costs of the lower NO_X turbine. The third assumed an increase in capital costs of the turbine with lower NO_X emission rates but similar performance.[145]

For medium low-utilization turbines operating at a capacity factor of 9 percent, the cost effectiveness of advanced combustion controls with 15 ppm NO_X guarantees ranges from $22,000/ton to $46,000/ton NO_X abated.[146] The EPA does not consider these costs reasonable and therefore, based on both the preceding analysis of wet and dry combustion controls that achieve 25 ppm NO_X for medium low-utilization turbines and the high cost-per-ton figures here, the Agency is determining that the use of combustion controls capable of achieving 15 ppm NO_X does not qualify as the BSER for medium low-utilization turbines. Due to economies of scale, the incremental control costs would be even higher for small turbines relative to those for medium turbines. Therefore, the Agency also does not consider the use of combustion controls capable of achieving 15 ppm NO_X as the BSER for small low-utilization turbines.[147] However, at a utilization level of 40 percent, the cost effectiveness of combustion controls for medium turbines is $8,000/ton to $10,000/ton NO_X abated. Considering that this is likely an overestimate and that there are limited, if any, secondary environmental impacts, the EPA considers these costs reasonable, and the use of combustion controls with guaranteed emission rates of 15 ppm NO_X could qualify as the BSER for medium high-utilization turbines. The incremental control costs of more advanced combustion controls for small turbines are higher than for medium turbines and, although the costs may appear reasonable before considering cost adjustments as discussed in section IV.B.4.a of this preamble, the EPA has determined that small turbines with 15 ppm NO_X guarantees are not available across the entire subcategory and therefore do not qualify as the BSER.

As explained in sections IV.B.3 and IV.B.5 of this preamble, the EPA is determining that the BSER for large high-utilization turbines of any efficiency is combustion controls with SCR. Further, as discussed in section IV.B.4.a of this preamble, advanced combustion controls are not adequately demonstrated for large, higher efficiency combustion turbines operating at lower levels of utilization. Therefore, the EPA's cost analysis of advanced combustion controls for large turbines focuses on low-utilization, lower efficiency combustion turbines.

For large low-utilization, lower efficiency combustion turbines, the EPA considered advanced combustion controls that can achieve NO_X emission rates of 9 ppm. At a capacity factor of 9 percent, the cost effectiveness of combustion controls for large turbines with 9 ppm NO_X guarantees ranges from $15,000/ton to $33,000/ton NO_X abated relative to a baseline of 15 ppm NO_X. The Agency reviewed the design information in *Gas Turbine World* to assess the impacts on turbine performance of advanced combustion controls to achieve NO_X guarantees of 9 ppm versus 15 ppm. This assessment revealed that, when accounting for size (which the Agency did not do at proposal), there was no significant difference in performance between

[142] This does not account for potential financial benefits of certain wet combustion controls (*e.g.,* inlet fogging and wet compression used in combination with direct injection of water into the combustor or steam injection) reducing the efficiency and output losses that result from high ambient temperatures. However, given that the cutoff for the low utilization subcategory is 40 percent and that, below this threshold, both dry and wet combustion controls are reasonable under various circumstances and regardless can achieve the same NO_X emission rate, we did not find it necessary to further account for these potential benefits.

[143] *See* the Electric Power Research Institute (EPRI) supporting materials.

[144] *See* the NO_X control technology technical support document included in the docket for this rulemaking.

[145] The costs of advanced DLN may be approximately $24/kW (2024$). *See Control Technologies Review for Gas Turbines in Simple, Combined Cycle and Cogeneration Systems,* Eastern Research Group, Inc., September 1, 2014. The third costing model may be more relevant to frame type turbine because the size of the combustor is less of an issue relative to aeroderivative turbines. Other sources report the costs of advanced DLN as approximately $2.6/kW. *See Cost Analysis of NO_X Control Alternatives for Stationary Gas Turbines.* Onsite Sycom Energy Corporation. November 5, 1999.

[146] For the medium low-utilization subcategory, most affected facilities will use simple cycle turbines. The EPA has already determined that wet combustion controls have not been demonstrated to be able to achieve 15 ppm NO_X and these costs are shown for completeness. Even if the costs were reasonable the Agency would not necessarily determine the dry combustion controls with emission guarantees of 15 ppm NO_X is the BSER for the low-utilization medium turbine subcategory or the small turbine subcategory.

[147] Even if the incremental control costs of more advanced combustion controls for small turbines were reasonable, as discussed in section IV.B.4.a, the EPA has determined that small turbines with 15 ppm NO_X guarantees are not available across the entire subcategory and therefore would not qualify as the BSER.

turbines with 15 ppm and 9 ppm NO_X guarantees (at proposal, the EPA estimated a 2 percent increase in heat rate). In addition, within the large low-utilization, lower efficiency combustion turbine subcategory (large low-utilization turbines with design efficiencies of less than 38 percent), most new turbines have emission guarantees of 9 ppm NO_X or less. Due to the similar design performance characteristics of large turbines with 15 ppm and 9 ppm NO_X emission guarantees, and that most of the large lower efficiency combustion turbines available have NO_X emission guarantees of 9 ppm, for the purposes of this analysis, the Agency is assuming that the costs and performance of large lower efficiency turbines are similar regardless of whether the NO_X emissions guarantee is 15 ppm or 9 ppm. Therefore, the incremental costs of amending the NO_X emissions standard for large low-utilization, lower efficiency combustion turbines from 15 ppm to 9 ppm is minimal. Furthermore, relative to a baseline of 25 ppm NO_X, the cost effectiveness ranges from $8,000/ton to $17,000/ton. The EPA has determined that the cost effectiveness values are likely on the low end of this range, $8,000/ton. The EPA considers these costs reasonable. Therefore, it is not appropriate to amend the standard to 25 ppm NO_X. Moreover, the EPA estimates that the incremental costs of a BSER based on the use of advanced combustion controls guaranteed at 9 ppm NO_X relative to advanced combustion controls guaranteed to achieve 15 ppm NO_X likely does not represent a significant cost and could qualify as the BSER, at least for the large low-utilization turbine subcategory.[148]

d. Non-Air Quality Health and Environmental Impacts and Energy Requirements[149]

Due to the potential efficiency loss of a combustion turbine with NO_X guarantees of 15 ppm and 9 ppm relative to a combustion turbine with NO_X guarantees of 25 ppm, for each ton of NO_X reduced, additional emissions may be generated. This reduction in efficiency is in the combustion turbine engine and at least a portion of the lost turbine engine efficiency can be partially recovered in the HRSG of combined cycle and CHP facilities. If emission rates of other pollutants are unchanged by the low-NO_X combustor, the loss of efficiency would mean that emissions of other criteria and hazardous air pollutants (HAP) would increase by a maximum of approximately 2 percent. However, as noted previously, the efficiency differences between large turbines with 15 ppm NO_X and 9 ppm NO_X guarantees is negligible and actual reductions in efficiency may be less.

In general, the EPA finds that the non-air quality health and environmental impacts and energy requirements of both dry and wet combustion controls are acceptable, whether in conjunction with controls capable of meeting 25 ppm, 15 ppm, 9 ppm, or 5 ppm NO_X emission standards when firing natural gas.

5. Revised NSPS for Stationary Combustion Turbines

The following sections describe the EPA's determinations of the BSER and the degree of NO_X emission limitation achievable through application of the BSER for each subcategory of stationary combustion turbine in subpart KKKKa. These determinations are based on the results of a technology review of demonstrated NO_X emission controls, including information received during the public comment period. The following sections describe each of the combustion turbine subcategories, each BSER technology determination, and the associated NO_X standards of performance in subpart KKKKa.

The control technologies the EPA evaluated for each size-based subcategory, whether the combustion turbine is utilized at a high or low rate on a 12-calendar-month basis, whether the combustion turbine is more or less efficient, whether the combustion turbine burns natural gas or non-natural gas fuels, or whether the combustion turbine is operated at full or part loads on an hourly basis, include dry combustion controls (*i.e.,* lean premix/DLN), wet combustion controls (*i.e.,* water or steam injection) (together, ''combustion controls''), and post-combustion SCR.[150]

The EPA used three primary sources of information for determining appropriate emission standards—combustion turbine manufacturer guaranteed NO_X emission rates, information provided in public comments, and hourly emissions database information reported to the EPA and available from CAMPD. The EPA considered, but did not use, permitted emission rates (*i.e.,* emission rates included in permits to construct or operate) because the numeric standards differ in terms of the averaging period used for compliance purposes and the operating conditions under which the standards are applicable. Similarly, the EPA did not base the NO_X emission standards on stack performance test information because these emission rates are representative of what can be achieved under the conditions of a performance test and do not necessarily represent what is achievable under other operating conditions. Therefore, the EPA determines that manufacturer guarantees represent appropriate NO_X emission standards for determination of the BSER based on the use combustion controls. The EPA also determines that the analysis of hourly emissions data allows the Agency to evaluate the appropriate numeric NO_X standards associated with a BSER based on the use of post-combustion SCR in combination with combustion controls while also identifying under what conditions the emission standards are applicable.

TABLE 1—SUBPART KKKKa NO_X EMISSION STANDARDS

Combustion turbine type	Combustion turbine base load rated heat input (HHV)	NO_X emission standard
New, firing natural gas with utilization rate >45 percent	>850 MMBtu/h	5 ppm at 15 percent O_2 or 0.018 lb/MMBtu.

[148] The capital costs may be approximately the same for turbines with NO_X emission guarantees of 15 ppm or 9 ppm. The operation and maintenance costs are higher due to more rigorous maintenance requirements. *Cost Analysis of NO_X Control Alternative for Stationary Gas Turbines,* ONSITE SYCOM Energy Corporation, November 5, 1999.

[149] To the extent any impacts are not explicitly covered under the ''nonair quality health and environmental impact'' factor, they are nonetheless statutorily relevant in identifying the ''best'' system of emissions reduction. *See* Section II.A.1 of this preamble.

[150] *See* section IV.B.2 of this preamble for additional discussion of the EPA's approach to subcategorization. *See* sections IV.B.3–4 for discussion of the EPA's application of the BSER criteria for these general control technology types, including further consideration of costs, emission reductions, and non-air quality health and environmental impacts and energy requirements, as applies to combustion turbines in the large, medium, and small subcategories. For additional discussion of the EPA's review of these control technologies, *see* the proposal, 89 FR 101323, and the technical support documents included in the docket for this rulemaking.

TABLE 1—SUBPART KKKKa NO_X EMISSION STANDARDS—Continued

Combustion turbine type	Combustion turbine base load rated heat input (HHV)	NO_X emission standard
New, firing natural gas with utilization rate ≤45 percent and with design efficiency ≥38 percent.	>850 MMBtu/h	25 ppm at 15 percent O_2 or 0.092 lb/MMBtu.
New, firing natural gas with utilization rate ≤45 percent and with design efficiency <38 percent.	>850 MMBtu/h	9 ppm at 15 percent O_2 or 0.035 lb/MMBtu.
New, modified, or reconstructed, firing non-natural gas	>850 MMBtu/h	42 ppm at 15 percent O_2 or 0.16 lb/MMBtu.
Modified or reconstructed, firing natural gas, at all utilization rates with design efficiency ≥38 percent.	>850 MMBtu/h	25 ppm at 15 percent O_2 or 0.092 lb/MMBtu.
Modified or reconstructed, firing natural gas, at all utilization rates with design efficiency <38 percent.	>850 MMBtu/h	15 ppm at 15 percent O_2 or 0.055 lb/MMBtu.
New, firing natural gas at utilization rates >45 percent	>50 MMBtu/h and ≤850 MMBtu/h.	15 ppm at 15 percent O_2 or 0.055 lb/MMBtu.
New, firing natural gas at utilization rates ≤45 percent	>50 MMBtu/h and ≤850 MMBtu/h.	25 ppm at 15 percent O_2 or 0.092 lb/MMBtu.
Modified or reconstructed, firing natural gas	>20 MMBtu/h and ≤850 MMBtu/h.	42 ppm at 15 percent O_2 or 0.15 lb/MMBtu.
New, firing non-natural gas	>50 MMBtu/h and ≤850 MMBtu/h.	74 ppm at 15 percent O_2 or 0.29 lb/MMBtu.
Modified or reconstructed, firing non-natural gas	>20 MMBtu/h and ≤850 MMBtu/h.	96 ppm at 15 percent O_2 or 0.37 lb/MMBtu.
New, firing natural gas	≤50 MMBtu/h	25 ppm at 15 percent O_2 or 0.092 lb/MMBtu.
New, firing non-natural gas	≤50 MMBtu/h	96 ppm at 15 percent O_2 or 0.37 lb/MMBtu.
Modified or reconstructed, all fuels	≤20 MMBtu/h	150 ppm at 15 percent O_2 or 0.55 lb/MMBtu.
New, firing natural gas, either offshore turbines, turbines bypassing the heat recovery unit, and/or temporary turbines.	>50 MMBtu/h	25 ppm at 15 percent O_2 or 0.092 lb/MMBtu.
Located north of the Arctic Circle (latitude 66.5 degrees north), operating at ambient temperatures less than 0 °F (−18 °C), modified or reconstructed offshore turbines, operated during periods of turbine tuning, byproduct-fired turbines, and/or operating at less than 70 percent of the base load rating.	≤300 MMBtu/h	150 ppm at 15 percent O_2 or 0.55 lb/MMBtu.
Located north of the Arctic Circle (latitude 66.5 degrees north), operating at ambient temperatures less than 0 °F (−18 °C), modified or reconstructed offshore turbines, operated during periods of turbine tuning, byproduct-fired turbines and/or operating at less than 70 percent of the base load rating.	>300 MMBtu/h	96 ppm at 15 percent O_2 or 0.35 lb/MMBtu.
Heat recovery units operating independent of the combustion turbine	All sizes	54 ppm at 15 percent O_2 or 0.20 lb/MMBtu.

a. Large Combustion Turbines

As noted previously, the EPA is finalizing a size-based subcategory for stationary combustion turbines with base load ratings greater than 850 MMBtu/h of heat input (*i.e.,* large turbines).[151] The subcategory is divided further based on whether the annual utilization of the combustion turbine is greater than or less than or equal to a 12-calendar-month capacity factor of 45 percent. The large low-utilization combustion turbine subcategory includes separate subcategories based on whether the design efficiency of the turbine engine is 38 percent or greater based on the HHV of the fuel.

These emission standards for large combustion turbines only apply to new natural gas-fired sources operating at full load. In subpart KKKKa, the EPA establishes separate subcategories, BSER, and NO_X standards for turbines operating at part load, turbines burning non-natural as fuels, and modified and reconstructed combustion turbines.

i. Large High-Utilization Combustion Turbines

This section describes the emissions standards in subpart KKKKa, based on the identified BSER, for the subcategory of new large stationary combustion turbines operated at high rates of utilization. The EPA is finalizing, largely as proposed, a determination that the use of combustion controls in combination with SCR is the BSER for large high-utilization combustion turbines operating at full load. The EPA proposed a NO_X emission standard of 3 ppm for large natural gas-fired combustion turbines utilized at intermediate and high capacity factors and 5 ppm for the same combustion turbines when firing non-natural gas fuels. In the proposed rule, the EPA solicited comment on a range of 2 ppm to 5 ppm NO_X when firing natural gas in recognition of the potential for some variation in SCR performance among different units and operating conditions.[152]

In response to the proposed rule, several commenters stated that the proposed emissions standard for large, high-utilization turbines firing natural gas of 3 ppm NO_X is too stringent and not consistently achievable. Commenters provided descriptions and examples of how the effectiveness of SCR can be impacted by many factors, such as load changes and ambient conditions. For example, during variable load operation, the absolute mass of NO_X entering the SCR system, the temperature of the combustion turbine exhaust, and exhaust flow characteristics change. Furthermore,

[151] Subcategories are based on the base load rating of the turbine engine and do not include any supplemental fuel input to the heat recovery system.

[152] See sections IV.7.a and IV.7.c for the final BSER determinations and NO_X standards of performance for the subcategories of combustion turbines firing non-natural gas fuels and turbines operating at part load.

SCR performance is impacted by catalyst temperature and flow characteristics, and the ammonia injection rate must be adjusted to maintain the exhaust NO_X emissions concentration. Too much ammonia injection can result in excess ammonia emissions (*i.e.,* ammonia slip) and too little can result in higher NO_X emissions. In addition, commenters stated that it can be challenging to adjust ammonia injection rates during rapid load changes to maintain NO_X emissions rates while at the same time minimizing ammonia slip, particularly for combustion turbines not selling electricity to the electric grid. Other commenters stated that emission standards of combustion turbines required to meet LAER should not be used to support the cost effectiveness of SCR as a control technology. Other commenters supported an emissions standard consistent with the lowest emitting turbines—2 ppm NO_X.

In consideration of these comments, to determine the appropriate NO_X standard of performance for large high-utilization combustion turbines firing natural gas, the EPA also reviewed additional NO_X emissions data reported to CAMPD. Specifically, the EPA reviewed the NO_X emission rates of 91 combined cycle and CHP turbines at 46 separate stationary sources, and the NO_X emissions rates of 143 simple cycle turbines at 43 separate stationary sources. The demonstrated natural gas-fired high-load emissions rates of the 26 recent large combined cycle and CHP turbines with SCR range from 1.5 ppm NO_X to 8.4 ppm NO_X with a median reported value of 2.7 ppm NO_X.[153] Two facilities had demonstrated emission rates greater than 5 ppm NO_X. One of the facilities is the first installation of a highly efficient combined cycle turbine that recently became commercially available.[154] While this turbine has a relatively high NO_X emissions rate, the Agency anticipates that the manufacturer and owners or operators of future installations will learn from the performance of this initial installation. The other facility had higher emissions during the initial 6 months of operation and has demonstrated an emissions rate below 5 ppm NO_X after this initial period. All other turbines have demonstrated that an emissions standard of 5 ppm NO_X is achievable for combined cycle turbines. There are three turbines with emission rates between 4.3 ppm and 4.8 ppm NO_X. These are all high-efficiency turbines equipped with combustion controls capable of achieving 25 ppm NO_X in combination with SCR. While not the only combined cycle facilities using these higher efficiency models, they account for the variability in performance at different locations. A more stringent standard could restrict the use of these highly efficient turbines and result in greater overall fuel use and the environmental impacts associated with increased fuel use.

While the EPA's SCR costing analysis primarily focused on large high-utilization combined cycle turbines, the EPA also evaluated the performance of large low-utilization simple cycle turbines with SCR to determine the achievability of the NSPS for these units in case owners or operators of new simple cycle combustion turbines choose to operate as high-utilization sources, assuming installation of SCR. The achievable NO_X emissions rate of the four recent large simple cycle turbines with SCR ranges from 2.2 ppm to 30 ppm NO_X with a median reported value of 11 ppm NO_X. Like the combined cycle turbine mentioned above, the highest emitting simple cycle turbine is the first installation of a higher efficiency model that recently became commercially available. While this turbine has a relatively high NO_X emissions rate, the Agency anticipates that the manufacturer and owners or operators of future installations will learn from the performance of this initial installation. The NO_X emissions standards for the remaining three turbines range from 2.2 ppm to 7.3 ppm NO_X. There is one other highly efficient large simple cycle turbine with SCR that has been installed. This facility uses a different turbine model that began operation in 2019 and has been able to achieve an emission rate of 9 ppm NO_X. While none of the large higher efficiency simple cycle turbines have demonstrated that 5 ppm NO_X is consistently achievable, the Agency does not project any large simple cycle turbine operating as high-utilization turbines. However, the mass-based standard allows large higher efficiency simple turbines with SCR to operate in excess of a 12-calendar-month utilization rate of 45 percent while maintaining compliance with the NSPS.

Due to the limited number of large simple cycle turbines with SCR, the EPA also reviewed the performance of recent medium low-utilization simple cycle turbines with SCR. The NO_X emissions rate of the 62 recent medium simple cycle turbines with SCR ranges from 2 ppm to 26 ppm NO_X with a median reported value of 6.8 ppm NO_X. While only 37 percent of recent medium simple cycle turbines have maintained an emissions rate of 5 ppm NO_X or less, the Agency finds that 5 ppm is an appropriate emissions standard for high-utilization large simple cycle turbines. Turbines operating at higher utilizations would have steadier loads and the operator would be able to optimize the SCR for greater emission reduction.

Considering these factors, the EPA is finalizing a NO_X standard of performance of 5 ppm for large high-utilization turbines firing natural gas based on the application of a BSER of combustion controls in combination with SCR. Available data indicate that SCR installed on new large stationary combustion turbines, when operated in conjunction with combustion controls, is generally capable of achieving a NO_X emissions rate of 5 ppm when combustion turbines are operating at high rates of utilization and firing natural gas. Therefore, for this subcategory of stationary combustion turbines for which the EPA determines SCR is a component of the BSER and which are firing natural gas, the EPA determines that the emissions standard is 5 ppm. For new large combustion turbines operating at high rates of utilization and firing non-natural gas fuels, the EPA determines the NO_X standard to be 42 ppm based on the application of a BSER of wet combustion controls with the addition of post-combustion SCR.

While some combustion turbine facilities have generally been capable of reaching an emissions rate of 3 ppm or less, the 5-ppm emissions standard in this case will allow sources to use higher efficiency classes of turbines in combined cycle configurations, to use combustion controls without SCR, and to minimize ammonia emissions.

The EPA finds some commenters' call for a 2 ppm NO_X emissions standard to be unrealistically stringent. Only two-thirds of recent (*i.e.,* since 2020 large, combined cycle turbines and no simple cycle facility evaluated by the EPA have been able to achieve an emissions rate of 2 ppm NO_X. As a practical matter, it would prohibit the use of high-utilization simple cycle turbines with SCR, and to maintain any compliance

[153] The EPA determined the achievable emissions rate for each turbine by calculating the 99.9 percentile of the 4-hour rolling averages using full load hours when only natural gas was the reported fuel. Combustion turbines with reported achievable emission rates that are 10 percent or higher than the applicable standard under subpart KKKK were excluded from the calculations when reporting the demonstrated emission rates for combustion turbines.

[154] The EPA only evaluated the reported data 6 months after initial operation to account for the initial shake down period. The EPA is also excluding the initial 6 months of operation for combustion turbines where it appears the SCR might not have been consistently operated.

margin, would at a minimum restrict developers of new combined cycle turbines to use turbine designs with the lowest emitting combustion controls in combination with SCR and high ammonia injection rates. This would result in increased costs, fuel use, and ammonia emissions. Thus, while the EPA acknowledges that some combustion turbine facilities have generally been capable of reaching an emissions rate of 2 or 3 ppm using SCR, the Agency believes it is important that all of the combustion turbines in the subcategory for which SCR is the BSER are capable of achieving the emissions standard, taking into account natural variability and temporary fluctuations in emissions performance, as well as cost, fuel, and emissions downsides associated with a more stringent emissions standard.

Finally, as the EPA noted at proposal, an emissions standard of 5 ppm can also potentially be met by certain classes of stationary combustion turbines solely with the use of advanced combustion controls rather than SCR. Given that SCR has some additional cost, pollutant, and energy impacts associated with it, there is benefit to a standard that at least some sources may be capable of meeting without installing SCR, and which will help incentivize the further development and deployment of increasingly advanced combustion controls. Thus, the NO_X standard for large high-utilization turbines is set at an emissions rate that also recognizes the environmental benefit of continued development of combustion controls, which, if capable of achieving the same or similar emissions performance, have substantial advantages over SCR.

ii. Large Low-Utilization Combustion Turbines

For large combustion turbines utilized at low capacity factors, the EPA proposed that the BSER is the use of dry combustion controls when firing natural gas and wet combustion controls when firing non-natural gas fuels. The EPA proposed on that basis to maintain the same NO_X emission standards as in subpart KKKK for large combustion turbines utilized at low capacity factors—15 ppm for natural gas-fired turbines and 42 ppm for non-natural gas-fired turbines.

(A.) Higher Efficiency Combustion Turbines

This section describes the emissions standards the EPA is finalizing in subpart KKKKa, based on the identified BSER, for the subcategory of new large stationary combustion turbines operated at low rates of utilization and with higher efficiencies. Specifically, this subcategory includes combustion turbines with a base load rating greater than 850 MMBtu/h of heat input, a 12-calendar-month capacity factor less than or equal to 45 percent, and a design efficiency greater than or equal to 38 percent based on the HHV of the fuel.

Commenters noted that large turbines with simple cycle design efficiencies of 38 percent or greater all have guaranteed NO_X emission rates of 25 ppm and have become commercially available since subpart KKKK was finalized. Based on the BSER analysis in section IV.B.3 of this preamble, the EPA determines that SCR does not qualify as the BSER for these turbines. The only commercially available combustion controls are guaranteed at 25 ppm NO_X. Therefore, for this subcategory of stationary combustion turbines for which the EPA determines combustion controls to be the BSER and which are firing natural gas, the EPA determines that the NO_X standard of performance is 25 ppm. Likewise, for this subcategory, the EPA determines that the NO_X emissions standard is 42 ppm when firing non-natural gas fuels (based on the use of wet combustion controls) and 96 ppm when operating at less than 70 percent of the base load rating (based on the use of diffusion flame combustion). The EPA is not aware of any advances in wet combustion controls that would reduce NO_X emissions lower than the emission standards in subpart KKKK when large combustion turbines are using non-natural gas fuels.

(B.) Lower Efficiency Combustion Turbines

This section describes the emissions standards for new large stationary combustion turbines operated at low rates of utilization and with lower efficiencies. Specifically, this subcategory includes combustion turbines with a base load rated heat input greater than 850 MMBtu/h, a 12-calendar-month capacity factor less than or equal to 45 percent, and a design efficiency less than 38 percent based on the HHV of the fuel.

For this subcategory, the EPA determines that SCR does not meet the BSER criteria and that the BSER is the use of advanced dry combustion controls when firing natural gas, the use of wet combustion controls when firing non-natural gas fuels, and the use of diffusion flame combustion when operating at less than 70 percent of the base load rating (*i.e.,* when operating at part load).

The BSER for large, low-utilization, lower efficiency combustion turbines burning natural gas is the use of advanced combustion controls. The EPA reviewed the standard NO_X guaranteed emission rates of 13 commercially available large combustion turbines with design efficiencies less than 38 percent. Five of the turbines have standard guarantees of 9 ppm NO_X. Four of the turbines have standard guarantees of 15 ppm NO_X, and four of the turbines have standard guarantees of 25 ppm NO_X.

Of the four turbines with 15 ppm NO_X standard guarantees, two have available upgrade packages that reduce the guaranteed emissions rate to 9 ppm NO_X or less. In addition, the manufacturer of one of the other turbines has developed a newer design that is similar in size, more efficient, and available with combustion controls guaranteed at 9 ppm NO_X. The remaining 15-ppm turbine is on the lower end of the large turbine subcategory (905 MMBtu/h and 88 MW) and the manufacturer offers a similar size, but less efficient, frame type turbine with emission guarantees of 9 ppm NO_X or less. The same manufacturer also offers similar sized aeroderivative turbines with significantly higher efficiencies that would be classified as a medium turbine (660 MMBtu/h and 71 MW) that can meet the low-utilization medium turbine emissions standard without SCR. As noted previously, large low-utilization turbines are primarily used in the utility sector and the fuel flexibility and other characteristics of frame type turbines are not as critical. Therefore, the EPA finds that many turbine models with emission guarantees of 9 ppm NO_X exist that can meet the needs for all owners or operators. As such, the EPA finds that 9 ppm is the appropriate standard of performance for new large low-utilization lower efficiency combustion turbines firing natural gas.

Even for large, lower efficiency turbine models not manufactured to meet a 9-ppm emissions standard, the EPA generally anticipates that these models will continue to be sold and operated at little incremental cost under this rule, because this is already occurring in the commercial marketplace. Three of the four large, lower efficiency turbine models with 25 ppm NO_X guarantees were available when subpart KKKK was finalized and have been subject to an emissions standard of 15 ppm NO_X since 2006. The remaining large turbine with a 25 ppm NO_X guarantee became commercially available in 2013 but is primarily intended for combined cycle

applications.[155] In any case, under subpart KKKK, these turbine models have continued to be marketed and typically install and operate SCR to meet the subpart KKKK 15 ppm standard. The EPA anticipates that updating the emissions standard for turbines in this subcategory from an emissions rate of 15 ppm to 9 ppm will not induce a change in how these turbine models are currently brought to market or used. In other words, even if their manufacturers, owners, or operators elect not to upgrade the combustion control performance to achieve a 9-ppm rate, they will still be able to meet the new standard using SCR, as is already occurring in the baseline under subpart KKKK. In the case of continued use of SCR for these turbine models, the EPA calculates a slight increase in incremental costs associated with going from a 15 ppm NO_X emissions standard to a 9 ppm NO_X emissions standard. Specifically, the Agency estimates that the incremental costs to achieve the standard in KKKKa for these turbines using SCR is from the use of additional ammonia for a cost effectiveness of $1,000/ton. These costs are reasonable.

To confirm that a 9 ppm NO_X standard is appropriate, the EPA also reviewed the turbine models of the 20 large simple cycle turbines that have commenced operation in the utility sector since 2020. Four of these units use SCR and the other 16 units do not. The 16 turbines without SCR are models that have emission guarantees of 9 ppm NO_X and the reported emission rates support that the combustors are achieving 9 ppm NO_X. As discussed previously, these data support finding that the BSER need not include SCR. Therefore, lowering the emissions standard from 15 ppm to 9 ppm for large low-utilization, lower efficiency turbines would not represent significant costs to the regulated community.

For this subcategory, the EPA determines that the NO_X emissions standard is 42 ppm when firing non-natural gas fuels and 96 ppm when operating at less than 70 percent of the base load rating.

b. Medium Combustion Turbines

The EPA is finalizing a size-based subcategory for stationary combustion turbines with base load ratings greater than 50 MMBtu/h and less than or equal to 850 MMBtu/h of heat input (*i.e.,* medium). As discussed in section IV.B.2.b of this preamble, the subcategory is divided further based on whether the annual utilization of the combustion turbine is greater than or less than or equal to a 12-calendar-month capacity factor of 45 percent.

i. Medium High-Utilization Combustion Turbines

The EPA proposed the use of combustion controls with SCR as the BSER for medium intermediate- and high-utilization combustion turbines operating at full load and a NO_X emissions standard of 3 ppm when firing natural gas and 9 ppm when firing non-natural gas. The EPA proposed the use of diffusion flame combustion as the BSER when operating at part load with a NO_X emissions standard of 96 ppm or 150 ppm (depending on the base load rating of the individual turbine). For this subcategory, as described in section IV.B.3, the EPA has determined that SCR does not meet the BSER criteria for new medium high-utilization combustion turbines (*i.e.,* those with 12-calendar-month capacity factors greater than 45 percent). In subpart KKKKa, the BSER for medium high-utilization combustion turbines is the use of advanced dry combustion controls when firing natural gas, wet combustion controls when firing non-natural gas fuels, and diffusion flame combustion when operating at part load (*i.e.,* less than 70 percent of the base load rating).

In response to the proposed rule, several commenters stated that the proposed 3 ppm NO_X limit for medium-sized units operating at 20 percent to 40 percent capacity factors are not achievable without SCR. The commenters added that based on guarantees from manufacturers, the EPA should increase the proposed NO_X limit from 3 ppm to 9 ppm for medium-sized units operating at capacity factors of less than 40 percent based on the use of dry combustion controls. Furthermore, a review of EPRI research found that most dry combustion control NO_X guarantees ranged from 9 ppm to 25 ppm. The commenters stated that the EPA's data showed that not all dry combustion controls can achieve 15 ppm NO_X for medium-sized turbines. The commenters stated that the most efficient combustion turbines operate at higher temperatures, which results in higher NO_X emissions.

The EPA agrees with the commenters that manufacturer NO_X emission rate performance guarantees for medium natural gas-fired stationary combustion turbines using dry combustion controls range from 9 ppm to 25 ppm. While a few natural gas-fired high-efficiency aeroderivative combustion turbines have available combustor upgrades that have NO_X emission rate performance guarantees of 15 ppm, most have standard NO_X emission rate performance guarantees of 25 ppm. However, most natural gas-fired frame units using dry combustion controls have available guaranteed NO_X emissions rates of 15 ppm or lower; of these, half have standard emission guarantees of 15 ppm NO_X or less and only four frame units do not have available combustor options with guarantees of less than 25 ppm NO_X. The manufacturer of these four turbines offers models with similar outputs, often with higher efficiencies, that have guaranteed emission rates of 15 ppm NO_X or less available. The fact that frame units with dry combustion controls are more common than aeroderivative or turbines using wet controls at high utilization rates supports a standard for medium high-utilization turbines of 15 ppm NO_X. The EPA considered, but rejected, the use of combustion controls with guaranteed emission rates of 9 ppm NO_X as the BSER. Many of the most efficient medium turbines are aeroderivative turbines and only a select few have available emission guarantees of less than 25 ppm NO_X. Maintaining a high-utilization emissions standard of 15 ppm NO_X provides a strong incentive for manufacturers to invest in technology development and commercialize combustors with 15 ppm NO_X emission guarantees. In addition, while 13 turbines offer available combustor upgrades with NO_X emission guarantees of 9 ppm, only two models have standard guarantees of 9 ppm NO_X. An emissions standard more stringent than 15 ppm would likely require the use of SCR for many applications, and the Agency has determined that SCR does not meet the BSER criteria for medium turbines.

With the adjustments in subcategories described in section IV.B.2, and the associated BSER analysis for combustion controls in section IV.B.4, the EPA is finalizing a NO_X emissions standard of 15 ppm for this subcategory when firing natural gas. The NO_X emission standards are 74 ppm when combusting non-natural gas fuels and 96 ppm or 150 ppm (depending on the base load rating) when operating at part load. These NO_X standards are based on the application of dry and/or wet combustion controls at full load and diffusion flame combustion at part load.

ii. Medium Low-Utilization Combustion Turbines

The medium low-utilization turbine subcategory is primarily composed of

[155] The same manufacturer offers a slightly smaller turbine (260 MW compared to 310 MW) that was commercially available when subpart KKKK was finalized. The smaller turbine has the same simple cycle efficiency and has a guaranteed NO_X emissions rate of 9 ppm.

utility sector simple cycle turbines, the majority of which are aeroderivative designs equipped with SCR. However, as described in section IV.B.3 of this preamble, the EPA has determined that SCR does not meet the BSER criteria for any medium combustion turbines. The EPA proposed a NO_X emissions standard of 25 ppm for medium low-utilization combustion turbines (*i.e.,* those with 12-calendar-month capacity factors less than or equal to 45 percent) firing natural gas, 74 ppm NO_X when firing non-natural gas, and 96 ppm or 150 ppm (depending on the base load rating) when operating at part load (*i.e.,* at less than 70 percent of the base load rating).

Regarding emission standards associated with combustion controls, some commenters supported the proposed emission standards, stating that most aeroderivative combustion turbines and combustion turbines using wet combustion controls have emission guarantees of 25 ppm NO_X.

The EPA agrees with commenters and is finalizing a BSER of combustion controls for this subcategory. The reported emissions rates of these turbines indicate that they are using combustion turbines and controls with emission guarantees of 25 ppm NO_X or less. The medium low-utilization turbines without SCR appear to be using units with NO_X emission guarantees of 25 ppm NO_X. An emissions standard of 25 ppm NO_X is consistent with the guaranteed emissions rate of most aeroderivative turbines that have characteristics that make them valuable for low-utilization applications—they can start quickly without increasing maintenance requirements and they have relatively high efficiency. Although the EPA's BSER determination is based on its conclusion that dry combustion controls are reasonable for the subcategory, in certain applications or circumstances (notably for the lowest utilization peaking turbines), wet combustion controls that can achieve the same emission rate (25 ppm NO_X) potentially have comparative advantages in terms of cost. This overlap corroborates the reasonableness of a final emission standard of 25 ppm NO_X, which can be achieved using either wet or dry combustion controls. Therefore, the Agency is finalizing the emissions standard as proposed.

The emission standards for new medium stationary combustion turbines operating at low rates of utilization (*i.e.,* at 12-calendar-month capacity factors less than or equal to 45 percent) is 25 ppm. For low-utilization medium turbines firing non-natural gas fuels, the NO_X standard in subpart KKKKa is 74 ppm.

c. Small Combustion Turbines

The EPA is finalizing a size-based subcategory for stationary combustion turbines with base load ratings less than or equal to 50 MMBtu/h of heat input (*i.e.,* small). The final BSER for all turbines in this subcategory is combustion controls.

The EPA proposed NO_X emission standards of 3 ppm for small natural gas-fired combustion turbines that operate at high utilization rates and 9 ppm for the same combustion turbines when firing non-natural gas fuels. The EPA proposed NO_X emission standards for small combustion turbines utilized at intermediate and low utilization rates of 25 ppm for natural gas-fired turbines, 74 ppm for non-natural gas-fired turbines, and 150 ppm for turbine operating at part loads.

With respect to emission standards associated with combustion controls, some commenters supported maintaining the subpart KKKK emission standard for small turbines—42 ppm NO_X for electric generating and 100 ppm NO_X for mechanical drive applications. Other commenters stated that space constraints do not allow the same combustor design considerations as for larger turbines and that small turbines cannot achieve less than 25 ppm NO_X.

As discussed in section IV.B.3 of this preamble, the EPA has determined that SCR does not meet the BSER criteria for small combustion turbines at any utilization level. The Agency therefore has determined that combustion controls remain the BSER for the subcategory. The EPA agrees with commenters that combustion controls are more limited for small turbines than medium and large turbines. To determine the appropriate emissions standard the EPA reviewed information on manufacturer NO_X emission guarantees. One small turbine has a NO_X emissions rate guarantee of 5 ppm and a high design efficiency. However, this is a higher-cost recuperated turbine model that is only capable of burning natural gas (*i.e.,* not dual-fuel capable). The fuel limitation does not cover the source category as a whole and the EPA has determined the performance of this single turbine should not be used when establishing the NO_X emissions standard for this subcategory. Most of the remaining turbines have emission guarantees of 25 ppm NO_X. The EPA considered, but rejected, an emissions standard of 15 ppm NO_X. Turbines with 15 ppm NO_X guarantees are only available in the 2 MW size category and this would require the use of SCR on the 1.5 MW and 3.5 MW turbines in the source category. As many of these turbines are used in industrial mechanical applications, it is necessary to match the load to the output of the turbine. Restricting the availability of turbines would result in turbines running at part load, which would result in inefficient operation and higher NO_X emission rates or the use of higher-emitting reciprocating engines. Therefore, the EPA has determined that the BSER for small natural gas-fired turbines is dry combustion controls that can meet a NO_X emission rate of 25 ppm, and the emissions standard for these turbines is 25 ppm. The EPA notes that this emissions standard is also achievable using wet combustion controls.

The EPA is not aware of any improvements in the performance of wet combustion controls or improvements in the part-load performance for these combustion turbines. Therefore, the EPA is maintaining the same standards as in subpart KKKK—96 ppm when firing non-natural gas fuels and 150 ppm when operating at part load (*i.e.,* at less than 70 percent of the base load rating).

6. Revised NSPS for Modified and Reconstructed Stationary Combustion Turbines

This section describes the BSER and emission standards for modified and reconstructed stationary combustion turbines subject to subpart KKKKa. The EPA proposed to include reconstructed stationary combustion turbines in the same size-based subcategories as new stationary combustion turbines. The EPA believed at proposal that reconstructed turbines could likely incorporate the same technologies to reduce NO_X as part of the reconstruction process at little or no additional cost compared to a greenfield facility. Therefore, the EPA proposed BSERs and NO_X standards of performance for large, medium, and small reconstructed combustion turbines were identical to those proposed for new combustion turbines for each size-based subcategory. Identical rationale applied to modified large combustion turbines, which we proposed to subcategorize with the same BSER and NO_X standards of performance as new and reconstructed large turbines.

For modified medium and small combustion turbines, the EPA proposed that the BSER is the use of combustion controls and that SCR did not qualify as part of the BSER for these sources due to potentially high retrofit costs, regardless of level of utilization. Based

on the BSER of combustion controls, the EPA proposed NO_X standards of performance for all modified medium and small combustion turbines of 25 ppm when firing natural gas and 74 ppm when firing non-natural gas fuels.

Several commenters criticized the EPA's proposal to subcategorize modified and reconstructed turbines with BSER and NO_X emission standards identical to new turbines, including the proposed BSER determinations with respect to SCR. These commenters stated that subpart KKKKa should group reconstructed units with modified turbines because the same retrofit technology limitations and cost factors apply. Another commenter, however, asserted that it is more difficult and expensive to retrofit an existing unit to meet more stringent standards. For example, some owners or operators might have to pay millions of dollars to replace and redesign the HRSG to retrofit the unit with SCR in addition to the millions of dollars spent in SCR capital costs. Reconstruction costs are also higher because of factors such as downtime, demolition, space constraints, and replacement of equipment. The commenter stated that the EPA did not adequately support grouping reconstructed and new combustion turbines together and that the proposed NSPS should have included a more thorough analysis before applying SCR as part of the BSER for reconstructed turbines.

The EPA agrees with commenters' assertions that the costs of retrofitting combustion turbines with SCR is significantly higher than for new turbines. Consequently, the EPA is determining that SCR does not qualify as the BSER for reconstructed or modified large high-utilization combustion turbines and is finalizing separate BSER and standards for such turbines. In subpart KKKK, the standards for modified and reconstructed combustion turbines are generally higher for a given subcategory than for newly constructed turbines because combustion controls can be more challenging to apply to modified and reconstructed combustion turbines compared to newly constructed combustion turbines. The different NO_X standards for modified and reconstructed combustion turbines with the same BSER as new combustion turbines are necessary because lean premix/DLN technology is specific to each combustion turbine model (*i.e.,* a combustor designed for a particular turbine model cannot simply be installed on a different turbine model).

In subpart KKKKa, the EPA is determining that the use of combustion controls alone (without SCR) is the BSER for modified and reconstructed combustion turbines of all sizes. For modified and reconstructed stationary combustion turbines with base load ratings less than or equal to 20 MMBtu/h of heat input (*i.e.,* small), the EPA is not aware of technology developments and therefore the numerical NO_X standard for all small modified and reconstructed turbines in subpart KKKKa is the same as the NO_X standard in subpart KKKK. All small modified and reconstructed stationary combustion turbines are subject to a NO_X emissions standard of 150 ppm whether they burn natural gas or non-natural gas fuels. The EPA has determined that modified and reconstructed combustion turbines with base load ratings between 20 MMBtu/h and 850 MMBtu/h can achieve the same emissions rates as larger turbines and these turbines are subcategorized as medium turbines. The EPA is not aware of technological developments for modified or reconstructed medium combustion turbines and is therefore maintaining the emission standards in subpart KKKK—42 ppm NO_X for modified and reconstructed medium natural gas-fired combustion turbines and 96 ppm NO_X for modified and reconstructed medium non-natural gas-fired combustion turbines. Modified and reconstructed combustion turbines cannot achieve the same emissions rates as new combustion turbines because manufacturers have not developed combustor upgrade packages for all combustion turbines and even for specific models with combustor upgrade packages there might physical space constraints making the combustor upgrade impractical. Similarly, for modified and reconstructed large lower efficiency and non-natural gas-fired turbines the EPA is finalizing emissions standards consistent with subpart KKKK—15 ppm NO_X for large lower efficiency natural gas-fired combustion turbines and 42 ppm NO_X for large non-natural gas-fired combustion turbines. For modified and reconstructed large natural gas-fired higher efficiency combustion turbines the EPA is finalizing an emissions standard consistent with that for newly constructed combustion turbines—25 ppm NO_X. For modified and reconstructed large high utilization turbines that EPA has determined that even if the practical limitations can be overcome the cost of retrofitting SCR is not reasonable.

7. Revised NSPS for Other Subcategories of Stationary Combustion Turbines

a. Non-Natural Gas Emissions Standard

The EPA is not aware of any advances in NO_X combustion controls for non-natural gas-fired fuels relative to the analysis it conducted for subpart KKKK in 2006. Dry combustion controls have limited applicability to liquid fuels because the technology typically functions by premixing gaseous fuels and air into a homogenous mixture prior to combustion, which is not possible with liquid fuels. Advancements in wet combustion controls are limited by the amount of water that can be injected before the flame is prematurely quenched, resulting in increased CO and unburned hydrocarbon emissions. Contrary to dry combustion controls, this limitation of wet combustion controls does not prevent the technology from effectively reducing NO_X emissions during the combustion of liquid fuels. Wet combustion controls just do not reduce NO_X emissions as effectively as dry combustion controls when gaseous fuels are burned. Therefore, in subpart KKKKa, the EPA maintains that wet combustion controls (*i.e.,* water or steam injection) are the BSER for new, modified, or reconstructed stationary combustion turbines that burn non-natural gas fuels.

In subpart KKKKa, based on application of the BSER of wet combustion controls, the EPA maintains the NO_X emissions standards for each subcategory of new, modified, or reconstructed combustion turbines firing non-natural gas.[156] Specifically, for large turbines, the EPA maintains a NO_X standard of 42 ppm for all new, modified, or reconstructed turbines firing non-natural gas fuels. For medium combustion turbines, the EPA maintains NO_X standards of 74 ppm NO_X for new turbines and 96 ppm for modified and reconstructed combustion turbines when firing non-natural gas fuels. For small combustion turbines, the EPA maintains a NO_X standard of 96 ppm for new turbines and 150 ppm NO_X for modified and reconstructed turbines.

b. Combustion Turbines Firing Hydrogen

The EPA proposed that combustion turbines that burn less than or equal to 30 percent (by volume) hydrogen (blended with natural gas) should be subcategorized as natural gas-fired combustion turbines and subject to the same BSER and NO_X standards of performance as other new, modified, or reconstructed natural gas-fired

[156] *See* table 1 in section IV.B.5 of this preamble.

combustion turbines.[157] For combustion turbines that burn greater than 30 percent (by volume) hydrogen (blended with natural gas), the EPA proposed to subcategorize these sources as non-natural gas-fired combustion turbines and the applicable NO_X limit was proposed to be the same as the standard for non-natural gas-fired combustion turbines, again, depending on the particular size-based subcategory listed in table 1 of this preamble.

The proposal also included a solicitation for comment on the proposed 30 percent (by volume) hydrogen threshold and its appropriateness for determining whether an affected source should be subject to the NO_X standard for natural gas or non-natural gas fuels. We also sought comment on the costs associated with co-firing high percentages (by volume) of hydrogen, including information about hydrogen-ready turbine designs, components, upgrades, and retrofits. The EPA also requested data from co-firing demonstrations, especially NO_X emissions data associated with the performance of various combustion controls with and without SCR.

In response to the proposed rule, commenters asserted that the importance of establishing NO_X standards of performance for combustion turbines co-firing hydrogen in subpart KKKKa considering the characteristics of hydrogen gas and the potential for increased formation of thermal NO_X from its combustion. Some commenters stressed the need for further research because the efficacy of hydrogen co-firing, including critical issues of fuel costs and availability, is not yet fully established. Other commenters stated that while some demonstrations of co-firing hydrogen with natural gas have been conducted, and the results have been promising regarding NO_X emissions, there is insufficient industry experience and data at this time to support the EPA's proposal that turbines co-firing up to 30 percent hydrogen (by volume) can consistently meet the natural gas NO_X standard for each size-based subcategory. Several of the commenters who stated that it is premature to establish NO_X standards of performance for hydrogen co-firing commensurate with the NO_X standards for natural gas-fired combustion turbines also stated that the EPA should subcategorize hydrogen co-firing like the approach for non-natural gas fuels with a separate BSER and NO_X standards.

In accordance with the limited data received in response to the proposal, the EPA agrees that the NO_X emissions rate of combustion turbines co-firing hydrogen includes uncertainty and remains in the early stages of research and development. The EPA also recognizes the concerns of several commenters that the co-firing of hydrogen gas does increase the temperature of combustion, and a higher firing temperature leads to the formation of thermal NO_X. However, until more data is available about the performance of different sizes and designs of combustion turbines co-firing various percentages of hydrogen (by volume), and the performance of different combustion controls under those conditions, at this time the Agency is not able to establish hydrogen-specific NO_X standards of performance in subpart KKKKa as proposed.

Even though subpart KKKKa does not establish NO_X standards for hydrogen co-firing that are determined according to a specific percentage of hydrogen (by volume) blended with natural gas, in this final action, the subcategories of fuel-based NO_X standards in subpart KKKKa would apply to all new, modified, and reconstructed combustion turbines that elect to co-fire hydrogen. It is the EPA's understanding that hydrogen is generally mixed with natural gas prior to entering the combustor, and once the heating value or the methane concentration of the fuel blend no longer meets the definition of natural gas in 40 CFR 60.4420a, the fuel would be considered a non-natural gas fuel and subject to the non-natural gas NO_X standards for those operating hours.

In terms of percentages of hydrogen (by volume), this means that when a combustion turbine co-fires up to approximately 25 percent hydrogen (by volume), the blended fuel meets the definition of natural gas and would be subject to the size-based subcategory NO_X standard for a turbine firing natural gas. If the blended fuel is greater than approximately 25 percent (by volume) hydrogen, the fuel no longer meets the definition of natural gas and the size-based subcategory NO_X standards for non-natural gas fuels apply.

The EPA acknowledges that there is not much practical difference between establishing a subcategory and NO_X standard based on a co-firing limit of 30 percent (by volume) hydrogen and the approximate 25 percent threshold that results from the application of the definition of natural gas in subpart KKKKa. But based on limited data, we are not able to support a determination that more stringent NO_X standards for hydrogen co-firing are applicable at this time.

Again, based on limited data, the EPA expects that the performance of combustion controls without SCR will be effective at limiting the formation of thermal NO_X in accordance with the NO_X standards for natural gas and non-natural gas fuels when co-firing with hydrogen. The EPA notes that if the hydrogen and natural gas are fed into the combustor with separate burners, the applicable NO_X standard would be calculated differently. If the energy content is greater than 50 percent of the heat input, the non-natural gas standard would be applicable. At lower mixing levels, the applicable hourly NO_X standard would be prorated based on the relative heat input of the hydrogen and natural gas.[158]

See the 2024 Proposed Rule preamble (89 FR 101338; December 13, 2024) for additional information about hydrogen co-firing in stationary combustion turbines, including sections III.B.14.a through III.B.14.d for discussions of the characteristics of hydrogen gas that impact NO_X emissions, hydrogen and combustion controls, hydrogen and SCR, and future combustion turbine capabilities.

c. Part-Load NO_X Standards

As discussed previously in section IV.B.2.g of this preamble, existing subpart KKKK subcategorizes stationary combustion turbines operating at part load (*i.e.,* less than 75 percent of the base load rating) and combustion turbines operating at low ambient temperatures.[159] The hourly NO_X emissions standard is less stringent during any hour when either of these conditions is met regardless of the type of fuel being burned. Subpart KKKK also has different hourly NO_X emissions standards depending on if the output of the combustion turbine is less than or equal to 30 MW (150 ppm NO_X) or greater than 30 MW (96 ppm NO_X) during part-load operation or when operating at low ambient temperatures. As described in section IV.B.2.g of this preamble, in subpart KKKKa, the EPA is changing this size threshold for this subcategory such that the 150 ppm NO_X

[157] *See* table 1 in section IV.B.5 for a list of the size-based subcategories in subpart KKKKa and *see* 40 CFR 60.4420a for the definition of natural gas.

[158] Instructions for calculating NO_X emissions on a lb/MMBtu basis, based upon the ratio of natural gas to hydrogen (by percent volume) in the fuel blend, is included in the memorandum *Fuel-Based F-Factors for Firing of Hydrogen and Hydrogen Blends in Combustion Turbines* located in the docket for this rulemaking (*See* Docket ID No. EPA–HQ–OAR–2024–0419).

[159] While the EPA refers to this as the part-load standard, it includes an independent temperature component as well.

emissions standard would be applicable to combustion turbines with base load ratings less than or equal to 300 MMBtu/h of heat input and the 96 ppm NO_X emissions standard would be applicable to combustion turbines with base load ratings greater than 300 MMBtu/h. In subpart KKKKa, the EPA maintains that the BSER for turbines operating at part load or at low ambient temperatures is diffusion flame combustion for all fuel types. Thus, the EPA also maintains, based on the application of diffusion flame combustion, that the part-load and low ambient temperature NO_X emission standards are 150 ppm for turbines with base load ratings of less than or equal to 300 MMBtu/h of heat input and 96 ppm for combustion turbines with base load ratings greater than 300 MMBtu/h. In addition, the proposed part-load standard includes all periods of part-load operation, including startup and shutdown. However, in contrast to the part-load standards in subpart KKKK, in subpart KKKKa, the EPA lowers the part-load threshold from less than 75 percent load to less than 70 percent of the combustion turbine's base load rating.[160]

The part-load emissions standards effectively accommodate periods of startup and shutdown for this source category. The determination to maintain the BSER and NO_X emission standards in subpart KKKKa for combustion turbines operating at part load or low ambient temperatures is based on a review of reported maximum emissions rate data for recently constructed combustion turbines. The data includes all periods of operation, including periods of startup and shutdown. For combustion turbines with base load ratings of greater than 300 MMBtu/h and that recently commenced operation, 80 percent of simple cycle turbines and 98 percent of combined cycle turbines reported a maximum NO_X emissions rate of less than 96 ppm. Based on this information, in subpart KKKKa, the EPA maintains that a part-load standard of 96 ppm, which includes periods of startup and shutdown, is appropriate for combustion turbines with base load ratings of greater than 300 MMBtu/h of heat input. The EPA does not have CEMS data for combustion turbines with base load ratings of less than 250 MMBtu/h of heat input and maintains the existing part-load standard in subpart KKKKa of 150 ppm NO_X.

Since startups and shutdowns are part of the regular operating practices of stationary combustion turbines, subpart KKKKa includes a part-load NO_X emissions standard that applies during periods of startup and shutdown. Since periods of startup and shutdown are by definition periods of part load, and since the ''part-load standard'' is based on the emissions rate achieved by a diffusion flame combustor instead of the combustion controls and/or SCR otherwise identified as the BSER, the Agency concludes that this standard is appropriate to accommodate periods of startup and shutdown. Through analysis of CEMS data, the EPA determines that, given the part-load limits, including periods of startup and shutdown would not result in non-compliance with the NSPS. This also ensures this rule complies with the statutory requirement that NSPS standards of performance apply on a continuous basis.[161] The EPA analyzed NO_X CEMS data from existing multiple combustion turbines and the theoretical compliance rate with a 4-hour rolling average, including all periods of operation, was demonstrated to be achievable.[162]

d. Site-Specific NO_X Standard

The EPA is finalizing as proposed a provision allowing for a site-specific NO_X standard for an owner or operator of a stationary combustion turbine that burns byproduct fuels. The owner or operator would be required to petition the Administrator for a site-specific standard, and, if appropriate, the Agency would conduct a notice and comment rulemaking to establish a site-specific standard. The Agency considers it appropriate to promulgate this provision because subpart KKKKa covers the HRSG that was previously covered by subpart Db when the site-specific NO_X standard was adopted for industrial boilers. The Agency also solicited comment on and is finalizing amending subpart KKKK to provide a provision allowing for a site-specific NO_X standard for an owner or operator of an existing stationary combustion turbine that burns byproduct fuels.

Several commenters supported finalizing a provision allowing for a site-specific NO_X standard for combustion turbines burning byproduct fuels. Several commenters explained that there are environmental benefits to combusting byproduct fuels (*a.k.a.,* associated gas or opportunity fuels) in a turbine and that a case-by-case or site-specific NO_X standard would encourage their use as an alternative to flaring, diesel gensets, or spark ignition gas engines, especially for byproduct fuels recovered from oil and gas drilling operations. However, one commenter noted that associated gas is not the same as ''pipeline quality'' natural gas and typically contains higher amounts of heavy alkanes and diluents such as carbon dioxide. According to the commenter, these substances create changes in fuel composition and increase the variability of emissions that, in turn, increase the operational variability of these types of combustion turbines. Another commenter supported amending subpart KKKK with the same rule language to maintain consistency with subpart KKKKa and added that this provision should be expanded so that facilities can request a site-specific standard for other reasons, such as using turbine exhaust to provide direct heat to a process.

Another commenter stated that the EPA's proposal to allow for a site-specific NO_X standard for turbines using byproduct fuels is too broad or loosely defined. The commenter expressed concern that facilities could blend small amounts of waste gases with regular fuels to claim byproduct status while allowing for higher NO_X emissions than otherwise allowed under the NSPS. To address these concerns, the commenter suggested that the final NSPS narrow the definition of ''byproduct fuels'' to prevent misuse, require periodic emissions testing to ensure compliance, set a minimum NO_X reduction requirement as it relates to site-specific facilities using byproduct fuels, and limit the scope of this exemption so only unavoidable cases qualify.

For byproduct fuels not meeting the combustion characteristics of natural gas, DLN combustion systems have limited technical availability. In addition, byproduct fuels can contain high amounts of fuel-bound nitrogen. Since fuel-bound nitrogen forms NO_X by a reaction of nitrogen bound in the fuel with oxygen in the combustion air directly (*i.e.,* is not thermally dependent), water injection also has limited technical availability to reduce fuel-bound NO_X. Subpart GG includes a provision for increasing the applicable NO_X emission standards by up to 50 ppm based on the amount of fuel-bound nitrogen.[163] The EPA considered

[160] *See* section IV.B.2.g of this preamble for additional discussion of this reduction in the part-load threshold.

[161] *See* 42 U.S.C. 7411(a)(1), 7602(k), 7602(*l*).

[162] When determining the applicable standard for the hour in conducting this analysis, the EPA assumed the combustion turbine was operated at the hourly average capacity factor for the entire 60-minute period. However, under the rule, the part-load standard is applicable to the entire hour if the combustion turbine operates at part-load at *any point* during the hour. Note that for this analysis, hours with less than 60 minutes of operation were assigned the part-load standard regardless of the reported hourly average capacity factor.

[163] *See* 40 CFR 60.332(a)(4).

including a similar provision in subparts KKKK and KKKKa. With this provision, a turbine using water injection to reduce thermal NO_X and burning byproduct fuels with high fuel-bound nitrogen must comply with a standard between 92 ppm NO_X and 146 ppm NO_X. These emission standards are similar to the part-load standards in subparts KKKK and KKKKa, which are based on the use of diffusion flame combustion while burning fuels with low fuel-bound nitrogen. Further, for locations where byproduct fuels are available, high-purity water required for wet combustion controls is not necessarily available. In these situations, if the fuel-bound nitrogen is low, the expected emission rates would be similar to the part-load standards in subpart KKKKa. The EPA is finalizing a BSER of diffusion flame combustion for byproduct fuel-fired combustion turbines with low fuel-bound nitrogen, and diffusion flame combustion with wet combustion controls for byproduct fuel-fired combustion turbines with high fuel-bound nitrogen. Therefore, the Agency is determining in subpart KKKKa that it is appropriate to apply the same NO_X standard developed for the part-load subcategory to facilities burning byproduct fuels.[164] This NO_X standard recognizes the environmental benefit of reduced flaring or direct venting to the atmosphere. To address concerns about misuse of the provision, the emissions standard would be determined using the weighed emissions standard approach similar to turbines that are co-firing natural gas and non-natural gas fuels. Turbines that are only co-firing a small portion of byproduct fuel with natural gas would be subject to an emissions standard that is close to that of natural gas.

The EPA appreciates commenters' concern regarding breadth but ultimately disagrees that the provision, as proposed, was unnecessarily broad. If the NSPS is overly restrictive in the use of byproduct fuels in a combustion turbine, then those byproduct fuels would be flared or vented directly to the atmosphere. While the Agency expects that the byproduct NO_X standard in subpart KKKKa will allow most types of byproducts fuels to be combusted in turbines some may still exceed the standard (*e.g.,* byproduct fuel with high fuel bound nitrogen content without available water for wet combustion controls). Therefore, to not limit the use of byproduct fuels the EPA is including the provision to allow owners or operators to petition for a site-specific standard.

e. Subcategory for HRSG Units Operating Independent of the Combustion Turbine

The affected facility under subpart KKKK (and the proposed affected facility under subpart KKKKa) includes the HRSG of CHP and combined cycle facilities. Although not common practice, it is possible that the HRSG could operate and generate useful thermal output while the combustion turbine itself is not operating. In subpart KKKK, the EPA subcategorized this type of operation and based the NO_X emissions standard on the use of combustion controls for a steam generating unit under one of the steam generating unit NSPS. The EPA proposed the same BSER and emissions standard in subpart KKKKa and received no comments. In subpart KKKKa, the EPA maintains the same approach and subcategorizes operation of the HRSG independent of the combustion turbine engine with the same emissions standard as in subpart KKKK.

8. Additional Amendments to the NO_X Standards

a. Form of the Standard

The form of the concentration-based NO_X standards of performance in subpart KKKK is based on ppm corrected to 15 percent O_2 and the form of alternate output-based NO_X standards is determined on a pounds per megawatt hour-gross (lb/MWh-gross) basis. Manufacturer guarantees are often reported and operating permits are often issued in ppm (corrected to an O_2 or CO_2 basis). Aligning the form of the NSPS with common practice simplifies the understanding of the emission standards and reduces the burden to the regulated community. While not the primary form of the standard, the alternate output-based form of lb/MWh-gross in subpart KKKK recognizes the environmental benefit of highly efficient generation.

In subpart KKKKa, the EPA is continuing the approach of expressing the primary form of the standard on an input basis. The EPA is including input-based NO_X standards on both a ppm basis and in the form of pounds per million British thermal units (lb/MMBtu). The EPA is also finalizing optional, alternate output-based standards in both a gross- and net-output form.

There are advantages to allowing the input-based standard to be expressed on either a ppm or lb/MMBtu basis. As described in section IV.B.7.b of this preamble, co-firing hydrogen can increase the NO_X emissions rate on a ppm basis when corrected to 15 percent O_2 while absolute NO_X emissions may not significantly change. Since actual emissions to the atmosphere are the true measure of environmental impacts, the NO_X emission standards in the form of lb/MMBtu are a superior measure of environmental performance when comparing emissions from different fuel types. However, throughout this document, the EPA refers to NO_X emission rates using ppm for ease of comparison with performance guarantees and permitted emission rates. The standards in subpart KKKKa include both a ppm and equivalent lb/MMBtu for a natural gas-fired combustion turbine or a distillate oil-fired combustion turbine for the natural gas- and non-natural gas-fired NO_X emission standards, respectively.

The EPA also proposed optional, alternate output-based NO_X standards that owners or operators could elect to comply with instead of the input-based standards. Commenters opposed the output-based standards as proposed because, in their view, the values would allow greater NO_X emissions than the input-based standards. The Agency disagrees that the output-based standards are less environmentally protective and is including them in subpart KKKKa. For the large high-utilization and large low-utilization subcategories, the EPA evaluated operating data and amended the efficiency value used to calculate the output-based standard. Based on available data and likely operating parameters, the EPA believes the optional output-based standards are likely to be most relevant to large high-utilization combustion turbines. The other output-based standards currently in subpart KKKK are largely maintained.

Subpart KKKK uses an assumed efficiency of 23 percent, 27 percent, and 44 percent to convert from the input to equivalent output-based standards for small, medium, and large turbines, respectively.[165] The lower efficiencies were intended to be representative of the performance of simple cycle turbines while the higher efficiency is representative of the performance of combined cycle turbines. For purposes of subpart KKKKa, the EPA reviewed the 30-operating-day efficiencies of combined cycle turbines, including all periods of operation (*i.e.,* including part-load and non-natural gas-fired hours) that have recently commenced operation. The achievable 30-operating-

[164] *See* section IV.B.7.c of this preamble for discussion of the part-load NO_X standards in subpart KKKKa.)

[165] *See* 71 FR 38489.

day gross efficiencies vary from 37 to 59 percent with an average of 50 percent. The EPA also reviewed the 30-operating-day emission rates of combined cycle turbines that recently commenced operation. The demonstrated achievable emission rates vary from 0.030 lb NO_X/MWh-gross to 0.10 lb NO_X/MWh-gross. The upper range includes turbines that have maintained 4-hour full load emission rates of less than 5 ppm NO_X. Based on this review, for the large high-utilization combustion turbine subcategory, the EPA has determined it is appropriate to increase the efficiency used to convert the input-based standard to an equivalent output-based standard to 50 percent, and therefore the optional output-based standard is 0.12 lb NO_X/MWh-gross during all periods of operation.[166] (Note that part-load subcategorization is not available for combustion turbines opting to comply with the output-based standards. Among other things, the much longer 30-day averaging time makes the part-load standard less necessary.)

For the large low-utilization subcategories, the EPA uses a 38 percent efficiency to determine the optional output-based standards for the high-efficiency subcategory. The BSER analysis for this subcategory is based on the use of simple cycle turbine technology and 38 percent is the subcategorization criteria. For the low-efficiency subcategory, the average lower efficiency simple cycle turbines that recently commenced operation is 30 percent. The EPA used this value to determine the optional output-based standards for the subcategory.

As noted above, for subcategories where the input-based standard was not changed the EPA is finalizing the same optional output-based standards currently in subpart KKKK.

The EPA determines in subpart KKKKa that owners/operators can elect to comply the alternate output-based standards in either the form of gross- or net-output. Net output is the combination of the gross electrical (or mechanical) output of the combustion turbine engine and any output generated by the HRSG minus the parasitic power requirements. A parasitic load for a stationary combustion turbine represents any of the auxiliary loads or devices powered by electricity, steam, hot water, or directly by the gross output of the stationary combustion turbine that does not contribute to electrical, mechanical, or thermal output. One reason for including alternate net-output based standards is that while combustion turbine engines that require high fuel gas feed pressures typically have higher gross efficiencies, they also often require fuel compressors that have potentially larger parasitic loads than combustion turbine engines that require lower fuel gas pressures. Gross output from electrical utility units is reported to CAPD and the EPA can evaluate gross output-based emission rates directly.[167] For units calculating net-output, as an alternative to continuously monitoring parasitic loads, the EPA determines in subpart KKKKa that estimating parasitic loads is adequate and would minimize compliance costs. A calibration would be required to determine the parasitic loads at four load points: less than 25 percent load; 25 to 50 percent load; 50 to 75 percent load; and greater than 75 percent load. Once the parasitic load curve is determined, the appropriate amount would be subtracted from the gross output to determine the net output.

b. Recognizing the Benefit of Avoided Line Losses for CHP Facilities

In subpart KKKKa, the EPA recognizes the environmental benefit of generating electricity on-site by CHP facilities, which avoids line losses associated with the transmission and distribution of electricity over long distances. Actual line losses vary from location to location, but to recognize the benefit of avoided transmission and distribution losses of electricity, subpart KKKKa includes a benefit of 5 percent when determining the electric output for CHP facilities. This benefit applies only to CHP facilities where at least 20 percent of the annual output is useful thermal output. This restriction is intended to prevent CHP facilities that provide a trivial amount of thermal energy from qualifying for the 5 percent transmission and distribution benefit.

C. SO_2 Emissions Standards

For new, modified, or reconstructed stationary combustion turbines, the BSER for limiting emissions of SO_2 has been demonstrated to be the firing of low-sulfur fuels. Since the promulgation of the original NSPS in 1979 (subpart GG), the sulfur content of natural gas has continued to decline, and the increased stringency of this best system was reflected in an updated BSER analysis for combustion turbines when the EPA promulgated subpart KKKK in 2006, which lowered the SO_2 standards for this source category.

In conducting our review of the SO_2 standards for purposes of new subpart KKKKa, we continue to find, as proposed, that natural gas continues to be the primary fuel fired in most stationary combustion turbines, and the sulfur content of delivered natural gas in the U.S. is limited to 20 grains or less total sulfur per 100 standard cubic feet (gr/100 scf).[168] Distillate fuel oil (*i.e.,* diesel fuel) is a secondary or backup fuel for most combustion turbines, and due to EPA regulations dating back to 1993, its sulfur content must be limited by fuel producers. The sulfur content of distillate fuel oil in continental areas must not contain more than 500 parts per million by weight (ppmw) sulfur. This is considered low-sulfur diesel and is widely available as a fuel for stationary combustion turbines. However, in noncontinental areas, the availability of this low-sulfur fuel is uncertain, and fuel oil can contain as much as 4,000 ppmw sulfur. These sulfur contents are approximately equivalent to 0.05 percent by weight sulfur in continental areas and 0.4 percent by weight in noncontinental areas.

In subpart KKKKa, we are retaining the existing standards of performance from subpart KKKK. In the proposed rule, the EPA explained how the regulation and production of low-sulfur fuels has changed since the promulgation of subpart KKKK in 2006. This includes the availability in continental areas of ''pipeline'' quality natural gas with a sulfur content often less than 20 gr/100 scf. For example, depending on the U.S. region, the sulfur content of pipeline natural gas can be as low as 0.5 gr/100 scf. And for combustion turbines that potentially fire liquefied natural gas (LNG), the fuel is typically sulfur-free other than the sulfur added as an odorant for safety. Regarding diesel fuel, the sulfur content has also been reduced over time, generally in reaction to the promulgation of increasingly stringent diesel production standards for on-road and nonroad vehicles, locomotives, and certain types of marine vessels.[169] Today, ultra-low sulfur diesel (ULSD) that is limited to 15 ppmw is produced and available to combustion turbine facilities in continental areas. Therefore, in the proposal, we acknowledged that pipeline natural gas and ultra-low sulfur diesel (ULSD) are available fuels that can be fired in stationary combustion turbines in continental areas and solicited comment on the extent of the

[166] The output-based emissions standard is scaled by a factor of 1.4 for non-natural gas fuels.

[167] Net output is not reported to CAMPD.

[168] *See generally* 40 CFR part 72; *see also* 58 FR 3650 (Jan. 11, 1993).

[169] *See* 69 FR 38958 (June 29, 2004).

current use of ULSD at affected facilities, including information on the availability of ULSD in both continental and noncontinental areas.

Commenters stated that natural gas remains the primary fuel fired in most stationary combustion turbines, and the burning of distillate fuel oil is a secondary or backup/emergency fuel in many cases. However, reliable access to ULSD in certain areas remains questionable, as does documented information about its consistent use in non-utility sectors that operate stationary combustion turbines. Therefore, for purposes of subpart KKKKa, the EPA does not have sufficient information to support a determination that lower sulfur fuels than those we identified in 2006 are the BSER or to amend the associated SO_2 standards relative to subpart KKKK. The EPA notes that owners or operations of stationary combustion turbines typically use natural gas and fuel oil as delivered without additional processing. Technically there are limited viable options for end users to remove additional sulfur, and even if the technology was viable, the costs would be high. Moreover, while most of the pipeline and liquified natural gas available in the continental U.S. may contain less than 20 gr/scf sulfur, demonstrations of compliance with the SO_2 standard in the NSPS may be based on the use of tariff sheets. Setting an SO_2 standard that cannot use tariff sheets for the initial and ongoing compliance determinations would require site-specific performance testing. These tests could be costly when proper sampling is accounted for, with limited to no environmental benefit, given the already-very-low amount of sulfur in the typical fuel supply. Therefore, to align the SO_2 standards with the lower sulfur content of natural gas and ULSD in continental areas, the allowable sulfur content in tariff sheets would also need to be updated, or an exemption would need to be established for owners or operators of combustion turbines burning pipeline quality natural gas or LNG. Such impacts and alternatives would need to be considered when weighing the potential cost of compliance against potential environmental benefits. Based on this review, the EPA maintains that, as in subpart KKKK, limiting burning to low-sulfur fuels continues to be the BSER for SO_2 emissions from new, modified, or reconstructed stationary combustion turbines, regardless of the rated heat input, size, or utilization of the turbine. Accordingly, the application of this BSER is reflected in the SO_2 standards in subpart KKKKa, which are identical to those promulgated in subpart KKKK and are the same for all turbines.

Specifically, an affected source may not cause to be discharged into the atmosphere from a new, modified, or reconstructed stationary combustion turbine any gases that contain SO_2 in excess of 110 ng/J (0.90 lb/MWh) gross energy output or 26 ng SO_2/J (0.060 lb SO_2/MMBtu) heat input. The EPA continues to recognize that low-sulfur fuels may be less available on islands and other offshore areas. For turbines located in noncontinental areas (including offshore turbines), an affected source may not cause to be discharged into the atmosphere any gases that contain SO_2 in excess of 780 ng/J (6.2 lb/MWh) gross energy output or 180 ng SO_2/J (0.42 lb SO_2/MMBtu) heat input.

The EPA expects no additional SO_2 emissions reductions based on the standards in subpart KKKKa. Although the EPA anticipates that the demand for electric output from stationary combustion turbines in the power and industrial sectors will increase during the next 8 years, the Agency does not expect significant increases in SO_2 emissions from the sector prior to the next CAA-required review of the NSPS. The EPA also does not expect any adverse energy impacts from the SO_2 standards in subpart KKKKa. All affected sources can comply with the rule without any additional controls, and the BSER and standards have not changed from subpart KKKK in 2006.

In terms of compliance with subpart KKKKa, the use of low-sulfur fuels may be demonstrated by using the fuel quality characteristics in a current, valid purchase contract, tariff sheet, or transportation contract, or through representative fuel sampling data that show that the potential sulfur emissions of the fuel do not exceed the standard. This is consistent with the monitoring and reporting requirements in subpart KKKK.

D. Consideration of Other Criteria Pollutants

In the proposal, the EPA discussed whether there was any need to establish standards of performance for criteria pollutants beyond NO_X and SO_2, including for CO and particulate matter (PM). Although such consideration of additional criteria pollutants is not required by CAA section 111(b)(1)(B) as part of the review of existing standards of performance for particular air pollutants, the EPA has authority to regulate additional air pollutants when doing so is consistent with CAA section 111. As in the proposed rule, the EPA does not believe that standards of performance for CO or PM are necessary for this source category at this time but will continue to consider these topics.

1. Carbon Monoxide

Carbon monoxide is a product of incomplete combustion when there is insufficient residence time at high temperature, or incomplete mixing to complete the final step in fuel carbon oxidation. Turbine manufacturers have significantly reduced CO emissions from combustion turbines by developing lean premix technology, which is incorporated into most current turbine designs. Lean premix combustion not only produces lower NO_X than diffusion flame technology but also lowers CO and volatile organic compounds (VOC). In the 2005 NSPS proposal, the EPA determined that ''with the advancement of turbine technology and more complete combustion through increased efficiencies, and the prevalence of lean premix combustion technology in new turbines, it is not necessary to further reduce CO in the proposed rule,'' and the EPA retained its view that no CO emission limitation need be developed for the combustion turbine NSPS.[170]

2. Particulate Matter

Particulate matter (PM) emissions from combustion turbines result primarily from carryover of noncombustible trace constituents in the fuel. Particulate matter emissions are negligible with natural gas firing due to the low sulfur content of natural gas. Emissions of PM are only marginally significant with distillate oil firing because of the low ash content and are expected to decline further as the sulfur content of distillate oil decreases due to other regulatory requirements as discussed previously. As such, the EPA retains its view that no PM emission limitation need be developed for the combustion turbine NSPS.

E. Additional Amendments

1. Clarification of Fuel Analysis Requirements for Determination of SO_2 Compliance

The EPA is adding rule language in subpart KKKKa to clarify the intent of the rule in that if a source elects to perform fuel sampling to demonstrate compliance with the SO_2 standard, the initial test must be conducted using a method that measures multiple sulfur compounds (*e.g.,* hydrogen sulfide, dimethyl sulfide, carbonyl sulfide, and thiol compounds). Alternate test procedures can be used only if the

[170] 70 FR 8314, 8320–21 (Feb. 18, 2005).

measured sulfur content is less than half of the applicable standard. In addition, subpart KKKKa allows fuel blending to achieve the applicable SO_2 standard. Under the rule language, an owner or operator of an affected facility may burn higher sulfur fuels if the average fuel fired meets the applicable SO_2 standard at all times. Finally, the primary method of controlling emissions is through selecting fuels containing low amounts of sulfur or through fuel pretreatment operations that can operate at all times, including periods of startup and shutdown as discussed below in section IV.F.

2. Expanding the Application of Low-Btu Gases

For stationary combustion turbines combusting 50 percent or more biogas (based on total heat input) per calendar month, subpart KKKK established a maximum allowable SO_2 emissions standard of 65 ng SO_2/J (0.15 lb SO_2/MMBtu) heat input. This standard was set to avoid discouraging the development of energy recovery projects that burn landfill gases to generate electricity in stationary combustion turbines.[171] Stationary combustion turbine technologies using other low-Btu gases are also commercially available. These technologies can burn low-Btu content gases recovered from other activities, such as steelmaking (*e.g.,* blast furnace gas and coke oven gas) and coal bed methane. Like biogas, substantial environmental benefits can be achieved by using these low-Btu gases to fuel combustion turbines instead of flaring or direct venting to the atmosphere. Therefore, in subparts KKKK and KKKKa, the EPA is amending and expanding the application of the existing 65 ng SO_2/J (0.15 lb SO_2/MMBtu) heat input emissions standard to include stationary combustion turbines combusting 50 percent or more (on a heat input basis) any gaseous fuels that have heating values less than 26 megajoules per standard cubic meter (MJ/scm) (700 Btu/scf) per calendar month.

To account for the environmental benefit of productive use and simplify compliance for low-Btu gases, the Agency considers it appropriate to base the SO_2 standard on a fuel concentration basis as an alternative to a lb/MMBtu basis. The original proposed subpart KKKK standard for SO_2 was based on the sulfur content in distillate oil and included a standard of 0.05 percent sulfur by weight (500 ppmw).[172] In general, emission standards are applied to a gaseous mixture by volume (parts per million by volume (ppmv)), not by weight (ppmw). Basing the standard on a volume basis would simplify compliance and minimalize burden to the regulated community. Therefore, the EPA includes in subparts KKKK and KKKKa a fuel specification standard of 650 mg sulfur/scm (or 28 gr sulfur/100 scf) for low-Btu gases. This is approximately equivalent to a standard of 500 ppmv sulfur and is in the units directly reported by most test methods.

3. Amendments To Simplify NSPS

This rulemaking includes some additional amendments for subparts KKKK and KKKKa that are intended to simplify the regulatory burden.

a. Compliance Demonstration Exemption for Units Out of Operation

The EPA includes in subpart KKKKa, and is amending in subpart KKKK, that units that have been out of operation for 60 days or longer at the time of a required performance test are not required to conduct the performance test until 45 days after the facility is brought back into operation, or until after 10 operating days, whichever is longer. The EPA concludes that it is not appropriate to require an affected facility that is not currently in operation to start up for the sole purpose of conducting a performance test to demonstrate compliance with the NSPS.

Similarly, owners or operators of a combustion turbine that has operated 50 hours or less since the previous performance test was required to be conducted can request an extension of the otherwise required performance test from the appropriate EPA Regional Office until the turbine has operated more than 50 hours. This provision is specific to a particular fuel, and an owner or operator permitted to burn a backup fuel, but that rarely does so, can request an extension on testing on that particular fuel until it has been burned for more than 50 hours.

b. Authorization of a Single Emissions Test

For both subparts KKKKa and KKKK, we are finalizing the availability of a streamlined emissions test procedure for groups of no more than five similar stationary combustion turbines at a single source under common ownership. Such units (or ''affected facilities'') may not be equipped with SCR and use dry combustion control equipment. Specifically, for any given calendar year, the Administrator or delegated authority may authorize a single emissions test as adequate demonstration for up to five units of the same combustion turbine model and using the same dry combustion control technology, so long as: (1) the most recent performance test for each affected facility shows that performance of each affected facility is 75 percent or less of the applicable emissions standard; (2) the manufacturer's recommended maintenance procedures for each turbine and its control device are followed; and (3) each affected facility conducts a performance test for each pollutant for which it is subject to a standard at least once every 5 years.

DLN combustion results in relatively stable emission rates. Furthermore, the DLN combustor is a fundamental part of a combustion turbine, and if similar maintenance procedures are followed, the Agency concludes that emission rates will likely be comparable between combustion turbines of the same make and model. Therefore, the additional compliance costs associated with testing each affected facility (*i.e.,* each individual combustion turbine) are not needed to ensure emissions standards are being met, under the conditions specified.

c. Verification of Proper Operation of Emission Controls

Turbine engine performance can deteriorate with operation and age. Operational parameters need to be verified periodically to ensure proper operation of emission controls. Therefore, the EPA is finalizing a requirement in subpart KKKKa that facilities using the water- or steam-to-fuel ratio as a demonstration of continuous compliance with the NO_X emissions standard to verify the appropriate ratio or parameters at a minimum of once every 60 months. The Agency concludes this would not add significant burden since most affected facilities are already required to conduct performance testing at least every 5 years through title V requirements or other State permitting requirements.

d. Compliance for Multiple Turbine Engines With a Single HRSG

The previous NSPS (subpart KKKK) does not state how multiple combustion turbine engines that are exhausted through a single HRSG would demonstrate compliance with the NO_X standards. Therefore, the EPA includes procedures in subpart KKKKa for demonstrating compliance when multiple combustion turbine engines are exhausted through a single HRSG and when steam from multiple combustion turbine HRSGs is used in a single steam turbine. Subpart KKKK is being amended to include the same procedures.

[171] *See* 74 FR 11858 (Mar. 20, 2009).

[172] *See* 70 FR at 8319–20.

Furthermore, subpart KKKK requires approval from the permitting authority for any use of the 40 CFR part 75 NO_X monitoring provisions in lieu of the specified 40 CFR part 60 procedures, but the Agency's review concludes that approval is an unnecessary burden for facilities using combustion controls only. Therefore, the EPA includes in subpart KKKKa and is amending subpart KKKK to allow sources using only combustion controls to use the NO_X monitoring in 40 CFR part 75 to demonstrate continuous compliance without requiring prior approval. However, if the source is using post-combustion control technology (*i.e.,* SCR) to comply with the requirements of the NSPS, then approval from the delegated authority is required prior to using the 40 CFR part 75 CEMS procedures instead of the 40 CFR part 60 procedures.

e. System Emergency

The EPA determines it is appropriate to add a provision to subpart KKKKa clarifying the calculation of utilization levels when turbines are operated for ''system emergencies.'' Operation during system emergencies would not be included when determining the utilization-based subcategorization. In addition, for owners or operators that elect to comply with the mass-based standards, emissions during system emergencies would not be included when determining 12-calendar-month emissions.[173] The Agency concludes that this subcategorization approach is necessary to provide flexibility, maintain system reliability, and minimize overall costs to the sector.[174] The EPA defines system emergency in subpart KKKKa to mean periods when the Reliability Coordinator has declared an Energy Emergency Alert levels 1, 2, or 3 which should follow NERC Reliability Standard EOP–011–2 or its successor, or equivalent.[175] This provision ensures that stationary combustion turbines intended for less frequent operation are available for grid reliability purposes during grid emergencies without being subject to an emission standard that the unit might not be able to meet without an investment in additional controls.

These provisions in subpart KKKKa are like those included in other EPA rulemakings that affect facilities in the power sector, such as in *Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units* in 2015, and in the Carbon Pollution Standards promulgated in May 2024.[176]

f. Exemptions Included From Subpart GG

The EPA included exemptions for combustion turbines used in certain military applications and firefighting applications from the standards of performance for stationary gas turbines in 40 CFR part 60, subpart GG.[177] The EPA is finalizing including these exemptions from subpart GG in subparts KKKK and KKKKa. The exemptions include military combustion turbines for use in other than a garrison facility, military combustion turbines installed for use as military training facilities, and firefighting combustion turbines. These combustion turbines only operate during critical situations.

4. Alternative Mass-Based NO_X Standards

The EPA solicited comment on and is finalizing short-term and long-term mass-based NO_X standards in subpart KKKKa as an optional alternative to the input- and output-based NO_X standards for stationary combustion turbines. Owners or operators can choose to comply with both a short-term, 4-operating-hour rolling mass-based NO_X standard and a long-term, 12-calendar-month rolling mass-based NO_X standard. The optional, alternative mass-based NO_X standards are designed to provide regulatory flexibility and potentially reduce compliance burden.

The implementation of mass-based NO_X standards is more straightforward than for the input- and output-based standards because there is no consideration of separate standards for full- and part-load hours. Mass-based standards are a better indicator of environmental impact because, in subpart KKKKa, mass-based standards are based on total NO_X emitted by the turbine. In addition, mass-based standards recognize the environmental benefit of efficient generation and provide a regulatory incentive for owners or operators of new combustion turbines to purchase the most efficient turbine designs.

The short-term, 4-operating-hour rolling mass-based standard is 0.83 lb NO_X/MW-rated output and the long-term, 12-calendar-month rolling mass-based standard is 0.48 tons NO_X/MW-rated output when combusting natural gas. As noted in the proposed rule, the 4-operating-hour rolling mass-based NO_X standard is calculated based on the short-term NO_X emissions from large low-utilization combustion turbines with a BSER of combustion controls; the 12-calendar-month rolling mass-based NO_X standard is calculated based on the long-term NO_X emissions from large high-utilization combustion turbines with a BSER of combustion controls with SCR.[178]

For owners or operators that elect to comply with the NSPS according to the 4-operating-hour and 12-calendar-month rolling mass-based NO_X standards, the individual combustion turbine is not subject to the input-based NO_X emission standards in table 1 of subpart KKKKa or subcategorization according to its 12-calendar-month capacity factor.[179] Instead, the combustion turbine is subject to the same 4-operating-hour rolling mass-based NO_X emissions standard regardless of the actual utilization in addition to the 12-calender-month rolling mass-based NO_X standard. The EPA discussed in the proposed rule that an optional, alternative short-term rolling mass-based NO_X emission standard functions as an alternative to the 4-operating-hour input-based low-utilization NO_X standard. The 4-operating-hour rolling mass-based NO_X emission standard ensures the use of combustion controls at all times. Likewise, the 12-calendar-month rolling mass-based NO_X emission standard functions as an alternative to the 4-operating-hour input-based high-utilization NO_X standard. The 12-calendar-month rolling mass-based NO_X standard ensures that high-utilization combustion turbines achieve greater NO_X reductions with advanced

[173] *See* discussion of the optional, alternative mass-based NO_X emission standards in section IV.E.4 of this preamble. During system emergencies the owner/operator of a combustion turbine complying with the mass-based standard still would be subject to a 4-hour emissions standard of 0.83 lb NO_X/MW-rated output or the current hourly emissions rate necessary to comply with the 12-calendar month emissions standard of 0.48 tons NO_X/MW-rated output, whichever is more stringent. For example, if a combustion turbine operated for 4,000 hours prior to the system emergency the 4-hour emissions standard during the system emergency would be 0.24 lb NO_X/MW-rated output.

[174] *See* 80 FR 64612 (Oct. 23, 2015) and 89 FR 39914–15 (May 9, 2024).

[175] The EPA determines it necessary to add ''or equivalent'' for areas not covered by NERC Reliability Standard EOP–011–2, for example Puerto Rico. The definition therefore differs slightly from the definition that had been promulgated in subpart TTTTa.

[176] *See* 40 CFR 60.5580 and 60.5580a. *See also* 40 CFR part 60, subparts TTTT and TTTTa.

[177] *See* 40 CFR 60.332(g).

[178] The short- and long-term mass-mased NO_X standards are most relevant to combustion turbines where the low-utilization and high-utilization input-based (or output-based) emission standards vary significantly.

[179] The optional output-based NO_X standards would also not be applicable.

combustion controls or combustion controls with SCR.

Some commenters disagreed with the optional, alternative mass-based NO_X standards being the primary NO_X standards in subpart KKKKa. The commenters stated that such mass-based standards could restrict the use of high-utilization, simple cycle combustion turbines as well as the operation of combustion turbines at part load. While the EPA agrees that a mass-based NO_X standard is not appropriate as the primary NO_X standard for this source category, it increases regulatory flexibility and could reduce regulatory compliance burden for certain owners or operators of combustion turbines. For example, some permits for combustion turbines include annual mass limitations and EGUs in the utility sector are often subject to emissions trading programs. Optional, alternative mass-based NO_X standards can reduce compliance burden for owners or operators of these turbines. Therefore, alternative, mass-based NO_X standards are included as a compliance option in subpart KKKKa.

In establishing appropriate mass-based NO_X standards, the Agency considered the hourly standards that would otherwise be applicable. In subpart KKKKa, owners or operators of all new natural gas-fired combustion turbines operating at full load that comply with the input-based NO_X standard are subject to a 4-operating-hour standard of no more than 25 ppm (0.092 lb NO_X/MMBtu).[180] The maximum hourly mass-based emissions of NO_X can be determined according to this input-based NO_X emissions standard and the design efficiency of the turbine. Further, the maximum mass-based NO_X emissions rate can be normalized based on the design rated output of the turbine.[181] Similar to input-based standards, while the absolute allowable NO_X emissions are determined according to the size of the turbine, the emissions standard is not. Based on reported design efficiencies and NO_X emission rate guarantees, the EPA determined the design mass-based NO_X emission rates of available new simple cycle turbines. The maximum hourly design mass-based NO_X emissions rate of a large turbine meeting the full load, input-based emissions standard is 0.83 lb NO_X/MW-rated output.[182] Therefore, in subpart KKKKa, the EPA is finalizing a 4-operating-hour emissions standard of 0.83 lb NO_X/MW-rated output when firing natural gas. For example, a turbine with a 100 MW rated output at design conditions could comply with the 4-operating-hour standard if the cumulative emissions are maintained at or below 332 lb NO_X (83 lb NO_X/h over a 4-hour period). Similarly, the 4-operating-hour mass-based emissions standard for a turbine with a 200 MW rated design output is 664 lb NO_X. The corresponding emissions standard for non-natural gas fuels is 1.5 lb NO_X/MW-rated output.[183] The objective of the 4-operating-hour standard is to establish an emissions standard based on the use of the BSER for low-utilization turbines (*i.e.,* combustion controls) and a more stringent standard cannot be established without restricting the use of a turbine model beyond what was determined as the BSER for low-utilization turbines.

As the Agency has noted, a challenge of establishing standards of performance for combustion turbines is that emission rates increase at lower loads. In the NSPS, the EPA addresses this issue for input-based NO_X standards by subcategorizing turbine operating hours as either full-load or part-load hours. A lower numeric NO_X standard (*e.g.,* 25 ppm) applies during operation at full load and a higher numeric NO_X standard (*e.g.,* 96 ppm) is applicable during hours of operation at part load. The relationship between the emissions and load is complex and the Agency must balance the stringency of the full-load emissions standard and the full-load threshold and the part-load standard.[184] Since the same 4-operating-hour mass-based NO_X standard applies during all periods of operation (*i.e.,* hours are not subcategorized as full- or part-load) and the relative stringency of the input-based and mass-based standards varies with the load of the turbine. At the base load rating of the turbine, the mass-based standard and the input-based standard (*i.e.,* 25 ppm NO_X) are essentially equivalent. When the turbine is operating above the base load rating (*e.g.,* during periods of operation at cold ambient conditions), the mass-based standard is more stringent, and compliance requires a lower input-based emissions rate. Consequently, turbines that are not able to reduce emissions below 25 ppm NO_X might not be able to operate above the base load rating of the turbine. When the turbine is operated between 70 and 100 percent of the base load rating (*e.g.,* at full load but below the base load rating) the input-based standard is theoretically more stringent. However, combustion control guarantees extend to 70 percent of the base load rating or lower and owners or operators are not able to adjust the operation of DLN systems, and, in practice, compliance with the mass-based standard would not result in an increase in NO_X emissions during operation between 70 and 100 percent of the base load rating.

During part-load operation, the BSER is diffusion flame combustion for both high- and low-utilization turbines. At 70 percent of the base load rating (the part-load threshold), the input-based emission standard is 3.8 times higher than the full-load input-based emissions standard, and the allowable mass-based emissions are 2.7 times higher than the allowable mass-based NO_X emissions for a natural gas-fired turbine operating at full load.[185] This is difficult to avoid using the input-based NO_X standard since the part-load standard includes all periods of operation at part load, including periods of startup and shutdown, and an achievable emissions standard has to account for all periods of operation when the NO_X standard is applicable. While the part-load emission

[180] Large high-utilization combustion turbines are subject to an emissions standard of 25 ppm NO_X when the HRSG is bypassed regardless of the efficiency of the turbine engine.

[181] The hourly design mass-based NO_X emissions standard is calculated by multiplying the input-based emissions rate (lb NO_X/MMBtu) by the base load rating of the turbine (MMBtu/h). The product is the design output of the turbine in lb NO_X/h. The design output can be normalized to the rated output of the turbine by dividing the design output (lb NO_X/h) by the rated output of the turbine (MW). This produces units of lb NO_X/MW*h, but the hour in the denominator is eliminated when the value is multiplied by an hour. This results in a mass-based emissions standard of lb NO_X/MW-design rated output. Numerically this value is the same as the value of the design output-based emissions rate, which is calculated by multiplying the input-based emissions rate (lb NO_X/MMBtu) by 3.412 MMBtu/MWh and diving the product by the efficiency (in HHV) of the turbine.

[182] For large low-utilization combustion turbines, the mass-based NO_X emissions standard depends on the efficiency of the turbine. The maximum hourly design emissions rate varies between 0.31 and 0.37 lb NO_X/MW-rated output for large lower efficiency turbines with 9 ppm NO_X guarantees to 0.79 and 0.83 lb NO_X/MW-capacity for large higher efficiency turbines with 25 ppm NO_X guarantees. While combined cycle turbines would use combustion controls with SCR to comply with the high-utilization standard, hours when the HRSG is bypassed would be subcategorized. The input-based emissions standard for these hours is 25 ppm NO_X without any efficiency requirement of the turbine engine itself. The design emissions rate for these turbines could be as high as 1.0 including only the output from the turbine engine. When the output of the steam turbine is included, the maximum design emissions rate is 0.68 lb NO_X/MW-rated output.

[183] The non-natural gas standard was calculated using an input-based emissions rate of 42 ppm NO_X (0.16 lb NO_X/MMBtu) and an efficiency of 30.5 percent. This represents the emissions rate that is achievable for all large simple cycle turbines in compliance with the input = based non-natural gas standard.

[184] *See* 89 FR 101320 (Dec. 13, 2024).

[185] The comparisons are done assuming a full load standard of 25 ppm NO_X and a part-load standard of 25 ppm NO_X. The part load input-based emissions standard is 19 times higher than the 5 ppm NO_X standard.

standards are significantly higher than the full-load emission standards, the absolute hourly emissions do not vary as much between part-load and full-load hours.[186] Since the mass-based standards are not subcategorized for part-load operation they are more environmentally protective when turbines are operating between approximately 25 and 70 percent of the base load rating. For example, the input-based part-load NO_X emissions standard for large turbines is 96 ppm. For a 100 MW simple cycle turbine, the allowable hourly emission rates when complying with the input-based, part-load NO_X emissions standard are 220 lb/h and 80 lb/h at 70 percent and 25 percent of the base load rating, respectively. The mass-based NO_X emissions standard is 83 lb/h regardless of the load of the turbine. At these loads, demonstrating compliance with the mass-based standard requires operating at an input-based NO_X emissions rate that is lower than the NSPS input-based NO_X emissions standard. Turbines rarely operate at less than 25 percent of the base load rating, and most part-load emissions occur between 25 and 70 percent of the base load rating. Therefore, the optional, alternative mass-based NO_X standard offers superior environmental protection compared to the input-based standards by recognizing the environmental benefit of reducing emissions below what is required by the input-based NO_X emissions standard. Mass-based standards also eliminate any potential regulatory incentive to switch to part-load operation so that the higher part-load, input-based NO_X standard is applicable during that hour.

The 12-calendar-month mass-based standard functions as an alternative to the 4-operating-hour input-based high-utilization standard and ensures that high-utilization turbines achieve greater reductions in NO_X based on a BSER of combustion controls with SCR. In subpart KKKKa, new high-utilization natural gas-fired turbines operating at full load and complying with the input-based NO_X emissions standard are subject to a 4-operating-hour emissions standard of 5 ppm. Like the 4-operating-hour standard, the maximum 12-calendar-month mass-based NO_X emissions of a turbine can be determined based on the input-based emissions standard and the design efficiency of the turbine. Based on reported design efficiencies and using an input-based NO_X emissions rate of 5 ppm, the EPA determined the average 12-calendar-month design mass-based NO_X emission rates of new large combined cycle turbines to be 0.52 ton NO_X/MW-rated output and range from 0.48 to 0.60 ton NO_X/MW-rated output. At a constant, input-based emissions rate, the potential annual NO_X emissions (when corrected to the design rated output) is strictly a function of the design efficiency—more efficient turbines have lower design mass-based emission rates. The EPA considered, but rejected, using these values to set the 12-calendar-month mass-based NO_X emissions standard. A 4-operating-hour average accounts for short-term spikes in emissions, and on a 12-calendar-month basis, the EPA projects that high-utilization turbines will emit at a rate of 4 ppm NO_X. The EPA, therefore, used 4 ppm NO_X when determining the 12-calendar-month mass-based NO_X emissions standard. Based on design efficiencies, the average maximum 12-calendar-month mass-based emissions rate of large, combined cycle turbines is 0.42 ton NO_X/MW-rated output and range from 0.38 to 0.48 ton NO_X/MW-rated output. Therefore, the 12-calendar-month mass-based NO_X standard is 0.48 tons NO_X/MW-rated output. A turbine with a 400 MW rated output at design conditions could comply with the 12-calendar-month standard if the cumulative NO_X emissions are maintained at or below 192 tons over each rolling 12-calendar-month period. Setting a lower standard would restrict turbine models beyond what was determined to be the BSER (*i.e.,* combustion controls with SCR) for high-utilization turbines.[187] The corresponding mass-based NO_X standard for non-natural gas-fired turbines is 0.81 tons NO_X/MW-rated output.[188]

Like the 4-operating-hour mass-based standard, the 12-calendar-month mass-based NO_X standard is not subcategorized by full- and part-load hours. While the 12-calendar-month mass-based standard provides short-term flexibilities relative to the input-based standards for high-utilization turbines operating at full loads (*e.g.,* an owner or operator of a large high-utilization turbine operating at full load would not be in violation of the mass-based NO_X emissions standard in the NSPS if a single 4-operating-hour period at full load exceeds 5 ppm NO_X), it is more environmentally protective over a 12-calendar-month period. Under the input-based standards, the average allowable NO_X emissions rate of a large high-utilization turbine where 95 percent of the heat input is during full-load hours and 5 percent during part-load hours is 9.6 ppm NO_X. This is 2.4 times higher than the emissions rate used to derive the 12-calendar-month mass-based emissions rate. Even at a 12-calendar-month capacity factor of 50 percent, the allowable mass-based NO_X emissions of a turbine complying with the input-based standards are higher than the allowable mass-based NO_X emissions of the same turbine operating at a 12-calendar-month capacity factor of 100 percent and complying with the mass-based standards. For example, the allowable annual emissions of a 400 MW combined cycle turbine operating at a 12-calendar-month capacity factor of 50 percent and complying with the input-based standards is 228 tons NO_X. The same combined cycle turbine operating at a 100 percent capacity factor over a 12-calendar-month period complying with the mass-based emission standards would be limited to 192 tons of NO_X.

The benefits of mass-based NO_X standards include recognizing the environmental benefit of efficiency—more efficient combustion turbines achieving the same input-based emissions rate (*e.g.,* lb NO_X/MMBtu) would be able to operate at higher capacity factors while still maintaining emissions below the annual standard. This approach also incentivizes reduced emissions during all periods of operation, including during startup and shutdown. It ensures that part-load operation is either kept to a minimum or emissions are lower than required by the NSPS so that both the 4-operating-hour and 12-calendar-month absolute mass-based NO_X limits are fulfilled. The mass-based standards eliminate regulatory incentive to switch to part-load operation so that the higher part-load NO_X standard is applicable during an operating hour. The mass-based standards also complement each other. As finalized, the 4-operating-hour mass-based NO_X emissions standard is more stringent at 12-calendar-month

[186] Even though the concentration of NO_X emissions is higher at part loads (which increases the mass emissions rate) the lower amount of fuel being combusted reduces the mass emissions rate.

[187] The most efficient combined cycle design could emit at an emission rate of 5 ppm NO_X and still comply with the 12-calendar month emissions standard. To operate at a 100 percent capacity factor, owners or operators of simple cycle turbines would have to reduce the NO_X emissions rate to between 2.6 ppm to 3.4 ppm depending on the efficiency of the turbine.

[188] While the EPA has determined that SCR is not the BSER for non-natural gas-fired turbines, natural gas-fired combined cycle turbines can fire distillate for short periods of time as a backup fuel. The EPA used a factor of 1.7 to determine the 12-calendar-month non-natural gas-fired mass-based standard. The 12-calendar-month standard is determined based on the relative heat inputs of natural gas and non-natural gas fuels during the 12-calendar-month period.

utilization rates of 13 percent and less. At higher utilization rates, the 12-calendar-month mass-based NO_X emissions standard is more stringent. For example, the potential 12-calendar-month NO_X emissions of a 100 MW simple cycle turbine operating at a 9 percent capacity factor complying with the 4-operating-hour mass-based emissions standard is approximately 33 tons NO_X. The corresponding 12-calendar-month mass-based NO_X emissions standard is less stringent (48 tons NO_X). At a 20 percent utilization rate, the potential 12-calendar-month NO_X emissions based on compliance with the 4-operating-hour mass-based emissions standard is 73 tons NO_X. The corresponding 12-calendar-month mass-based emissions standard is more stringent (48 tons NO_X). Further, to maintain compliance with the 12-calendar-month mass-based emissions standard, the turbine would have to emit at an input-based emissions rate of 16 ppm NO_X. To the extent this approach results in lower overall emissions while also avoiding the need to use SCR control technology, it provides an incentive for manufacturers to continue to improve combustion controls and to expand the operating conditions over which the combustion controls can operate.

Additional benefits include lowering compliance costs and providing flexibility to the regulated community—like conditions often included in operating permits. In addition, a 12-calendar-month mass-based NO_X emissions standard recognizes the complex relationship between the choice of combustion controls (and the impact of those controls on other pollutants), the anticipated operation of the combustion turbine, and the use of SCR. The flexibility would allow the owner or operator of the combustion turbine to work with the permitting authority to determine the appropriate emissions reduction strategy for each specific project.

5. Exemption of Non-Major Sources From Title V Permitting

The EPA has decided to exempt certain lower-emitting stationary combustion turbines subject to subparts GG, KKKK, or subpart KKKKa from title V permitting requirements. CAA section 502(a) authorizes the Administrator to exempt certain sources subject to CAA section 111 (NSPS) standards from the requirements of title V if the Administrator finds that compliance with such requirements is ''impracticable, infeasible, or unnecessarily burdensome'' on such sources.[189] However, any exemption from title V permitting under this provision cannot extend to any sources that are ''major sources'' as that term is defined at CAA section 501(2).[190]

The EPA has previously established permitting exemptions under this provision for several NSPS, particularly in circumstances where the affected facilities are numerous and relatively low-emitting, the burdens and process of obtaining permits would be substantial for permitting authorities and the sources (such as numerous small businesses, farms, or residences), and where compliance with applicable standards can be assured through the manufacture or design of the equipment or facility in question.[191]

At proposal, the EPA explained that it had not determined that title V permitting is ''impracticable, infeasible, or unnecessarily burdensome'' for sources subject to subparts GG, KKKK, or KKKKa. However, the EPA discussed the statutory factors and requested comment as to whether there are circumstances in which the burdens and costs of going through title V permitting for combustion turbines would not be justified in light of the purposes of title V. The EPA specifically requested comment on whether there are appropriate size, emissions, or other characteristics that could be appropriately used to define sources that may warrant exemption under CAA section 502(a), and what specific features of these sources would justify such an exemption in light of the statutory criteria.

The EPA previously proposed a title V exemption for combustion turbines in a reconsideration proceeding concerning subparts GG and KKKK.[192] In conjunction with that proposal, the EPA prepared a memorandum in 2012 describing the proposed section 502(a) exemption from title V permitting requirements for non-major stationary combustion turbines subject to subparts GG or KKKK under the relevant statutory factors. The Agency cited to this document in the proposal in seeking comment.[193]

After considering comments, the EPA is finalizing a title V exemption for non-major combustion turbines that fall into the small and medium subcategories and the large low-utilization subcategory under subpart KKKKa and for all non-major combustion turbines under subparts GG and KKKK. For combustion turbines in these subcategories and/or under these subparts, the EPA finds that compliance with title V permitting is unnecessarily burdensome, as discussed in the 2012 Memorandum.

The EPA has developed a four-factor balancing test in determining under CAA section 502(a) whether compliance with title V is ''unnecessarily burdensome.'' These four factors are: (1) whether Title V permitting would result in significant improvements in compliance with emission standards; (2) whether Title V permitting would impose significant burdens on the area source category; (3) whether the costs are justified, taking into account potential gains; and (4) whether there are existing enforcement programs in place sufficient to ensure compliance.[194] The EPA has historically also considered whether such an exemption would adversely affect public health, welfare, or the environment.[195] In exercising the discretion conferred by statute, the Administrator considers the factors in combination, and not every factor must point in the same direction to support an exemption.

As explained in the 2012 Memorandum, the EPA has considered and balanced these factors and finds that they support granting the title V exemption for the identified non-major combustion turbines. Please refer to that memorandum for a full explanation of our reasoning.

We note that in adopting the analysis set forth in the 2012 Memorandum included in the docket as the primary rationale for this exemption, we have specifically considered whether any information or analysis in that document is out of date. The circumstances described there remain applicable. The 2012 Memorandum noted that as many as 1 in 10 new

[189] 42 U.S.C. 7661a(a).

[190] *Id.; see also id.* 7661(2).

[191] *See, e.g.,* 40 CFR 60.4200(c) (''If you are an owner or operator of an area source subject to this subpart, you are exempt from the obligation to obtain a permit under 40 CFR part 70 or 40 CFR part 71, provided you are not required to obtain a permit under 40 CFR 70.3(a) or 40 CFR 71.3(a) for a reason other than your status as an area source under this subpart.'') and 40 CFR 70.3(b)(4)(i) (''The following source categories are exempted from the obligation to obtain a part 70 permit: All sources and source categories that would be required to obtain a permit solely because they are subject to part 60, subpart AAA—Standards of Performance for New Residential Wood Heaters.'').

[192] *See* 77 FR 52554, 52557–58 (Aug. 29, 2012).

[193] *See* 89 FR 101347; U.S. EPA, *Exemption of non-major source subject to new source performance standards for stationary gas combustion turbines under 40 CFR subpart KKKK from Title V permitting requirements* (June 2012) (EPA–HQ–OAR–2004–0490–0331) (hereinafter ''2012 Memorandum''), available in the docket.

[194] 70 FR 75320, 75323 (Dec. 19, 2005); *see U.S. Sugar Corp.* v. *EPA,* 830 F.3d 579, 647 (D.C. Cir. 2016).

[195] *See, e.g.,* 70 FR 75323.

combustion turbines may be owned by small entities, and in the EIA for this action, we identify that a comparable percentage of new affected units may be owned by small entities. *See* EIA section 5.2.2.

The EPA is not extending the title V exemption to large high-utilization combustion turbines under subpart KKKKa. We note that for the small, medium, and low-utilization subcategories, and for turbines subject to subparts GG or KKKK, combustion controls are the BSER, and these controls typically are integrated into the unit itself and come with manufacturer guarantees of NO_X performance that are generally sufficient to comply with the relevant standards. Similarly, the vast majority of combustion turbines comply with the applicable SO_2 standards through firing low-sulfur fuels and do not need to install or operate add-on control technologies. In contrast, turbines in the large high-utilization subcategory are subject to a NO_X standard that is premised on a BSER that includes SCR, which is an add-on control technology. Effective emissions control with SCR depends on continuing operational and maintenance practices, and a title V operating permit is typically appropriate to establish facility-specific conditions to ensure those practices are in place. Further, in most cases, large high-utilization turbines have sufficiently high potential to emit that they are often either individually large enough to constitute a major source, at a facility that is a major source, and/or are affected sources under acrid rain rules.[196] Because the EPA cannot extend title V permitting exemptions to major sources, there is therefore little practical effect in including such turbines within the scope of the exemption.

Many commenters generally supported finalizing a title V exemption. One commenter opposed any title V exemption for any sources on grounds that title V permitting is an important mechanism for transparency and accountability. The commenter stated that permitting authorities have strengthened permit conditions to ensure adequate monitoring and other compliance assurance requirements through the public participation process required by title V.

While the EPA recognizes the value of title V permitting, the Act clearly contemplates that title V permitting may be impracticable, infeasible, or unnecessarily burdensome in the case of smaller, lower-emitting units that are not located at major sources or constitute major sources in their own right. The commenter did not supply any information to counter with specificity the findings set forth in the 2012 Memorandum cited at proposal. The 2012 Memorandum explained, for example, that the monitoring and recordkeeping requirements of subpart KKKK (which generally are being carried over into subpart KKKKa) are sufficient to demonstrate compliance. The commenter did not offer any information that that conclusion is flawed, and the Agency continues to find that the monitoring and recordkeeping requirements in subparts KKKK and KKKKa are sufficient to demonstrate compliance.

We note that States remain free to subject all stationary combustion turbines to their operating permits programs if they so choose. Further, new source review (NSR) construction permitting generally applies and is not included in the title V exemption being finalized in this action. NSR permitting processes afford public participation. Thus, the EPA is finalizing a title V exemption for small and medium combustion turbines and large low-utilization turbines that are subject KKKKa and all turbines subject to GG and KKKK unless the units are co-located at a major source or major sources themselves.

F. NSPS Subpart KKKKa Without Startup, Shutdown, Malfunction Exemptions

Consistent with *Sierra Club* v. *EPA,* 551 F.3d 1019 (D.C. Cir. 2008), the EPA has established standards in this rule that apply at all times. We are finalizing in subpart KKKKa a provision at 40 CFR 60.4320a(d) that overrides 40 CFR 60.8(c). In finalizing the standards in this rule, the EPA has considered startup and shutdown periods. These periods are accounted for through the adjusted emissions standards that apply during part-load operation and potentially when firing non-natural gas fuels. This approach continues the approach applied in subpart KKKK, which has, to the EPA's knowledge, worked well and has not created compliance challenges. The EPA received several adverse comments against the inclusion of 40 CFR 60.4320a(d) in subpart KKKKa, and we have responded to these comments in the response to comments document in the docket.

Periods of startup, normal operations, and shutdown are all predictable and routine aspects of a source's operations. Malfunctions, in contrast, are neither predictable nor routine. Instead, they are, by definition, sudden, infrequent, and not reasonably preventable failures of emissions control, process, or monitoring equipment.[197] The EPA interprets CAA section 111 as not requiring emissions that occur during periods of malfunction to be factored into development of CAA section 111 standards. Nothing in CAA section 111 or in case law requires that the EPA consider malfunctions when determining what standards of performance reflect the degree of emission limitation achievable through ''the application of the best system of emission reduction'' that the EPA determines is adequately demonstrated. While the EPA accounts for variability in setting emissions standards, nothing in CAA section 111 requires the Agency to consider malfunctions as part of that analysis. The EPA is not required to treat a malfunction in the same manner as the type of variation in performance that occurs during routine operations of a source. A malfunction is a failure of the source to perform in a ''normal or usual manner'' and no statutory language compels the EPA to consider such events in setting CAA section 111 standards of performance. The EPA's approach to malfunctions in the analogous circumstances (setting ''achievable'' standards under CAA section 112) has been upheld as reasonable by the D.C. Circuit in *U.S. Sugar Corp.* v. *EPA,* 830 F.3d 579, 606–610 (2016).

G. Testing and Monitoring Requirements

1. Averaging Period

The NO_X emission standards in existing subpart KKKK are based on a 4-hour rolling average for simple cycle turbines and a 30-operating-day average for combustion turbines with a HRSG (*e.g.,* combined cycle and CHP combustion turbines). The EPA solicited comment on finalizing a 4-hour average for all turbines, finalizing a daily standard, or finalizing a 30-operating-day standard. Some commenters supported a 4-hour standard for all turbines while others supported maintaining the 30-operating-day standard for combined cycle turbines, stating that it is necessary to address variability, periods of startup, and when the SCR has not reached the design temperature.

[196] A 200 MW combined cycle facility complying with the standards in this final rule would have an annual potential emissions rate of approximately 100 tons of NO_X. Affected sources under acid rain rules are required to obtain title V permits regardless of their potential emissions. *See* 42 U.S.C. 7651g.

[197] *See* 40 CFR 60.2.

For subpart KKKKa, the EPA analyzed hourly emissions data using 4-hour full-load rolling averages for both simple and combined cycle turbines. Since the analysis was done using reported 4-hour averages, the Agency disagrees with commenters that a longer averaging period is necessary to account for variability and periods of startup. As discussed in section IV.B.8.b above, periods of startup and shutdown would be considered part-load hours (if the turbine operates at less than 70 percent of the base load rating at any point during an hour, the entire hour is considered a part-load hour). The emissions standard for part-load hour is based on the use of diffusion flame combustion and not the use of combustion controls or combustion controls in combination with SCR. Further, when exhaust gases are bypassing the HRSG (*e.g.,* as may occur during startup, shutdown, or when the turbine is intentionally operated in simple cycle mode) those hours are subcategorized with an emissions standard of 25 ppm NO_X. The higher hourly emission standards would be blended with any full-load hours in the same 4-operating-hour period to determine a blended average for that 4-operating-hour period. The data analysis demonstrates that the emission standards in this final rule are achievable on a 4-operating-hour basis. Therefore, the EPA is finalizing in subpart KKKKa that the emission standards for all combustion turbines complying with the input-based standard (ppm or lb NO_X/MMBtu) would be determined on a 4-hour rolling average.

Subpart KKKK currently includes alternate output-based standards that owners or operators can elect to comply with instead of the input-based standard. The EPA proposed output-based standards, on both a gross- and net-output basis, as an alternative to the heat input-based standards. Owners or operators electing to use the output-based standards would demonstrate compliance on a 30-operating-day average. The longer averaging period is appropriate because both the NO_X emissions rate on a lb NO_X/MMBtu basis and the efficiency of the combustion turbine can vary—increasing the overall variability. See section IV.B.8.a for further discussion of this topic.

2. Demonstrating Compliance With NO_X Emissions Standards Using CEMS

All affected sources must conduct an initial performance test pursuant to 40 CFR 60.8 (and as further specified in subparts KKKK and KKKKa). Thereafter, varying monitoring and performance test methods apply depending on the type of emissions control used.

For combustion turbines using SCR or other post-combustion controls, subpart KKKKa requires that continuous compliance with the applicable NO_X standard must be demonstrated with a NO_X CEMS. Among other things, those NO_X measurements must be used to determine and report excess emissions of NO_X as well as monitor availability. In addition, if a stationary combustion turbine is equipped with a NO_X CEMS, those measurements must be used to determine excess emissions. Owners or operators of combustion turbines not using post-combustion controls may elect to install a NO_X CEMS as an alternative to the otherwise required monitoring methods.

For combustion turbines that do not use post-combustion controls and that do not have installed CEMS, subpart KKKKa provides two NO_X monitoring approaches to demonstrate compliance depending on the nature of the combustion controls used, as described in sections IV.G.3 and IV.G.4.

3. Demonstrating Compliance With NO_X eMissions Standards Without Using CEMS for Water or Steam Injection Combustion Controls

Owners or operators of affected sources that (1) use water or steam injection but not post-combustion controls and (2) elect not to use a NO_X CEMS, must continuously monitor the water- or steam-to-fuel ratio of the affected source to demonstrate compliance. This requires the installation and operation of a continuous monitoring system (CMS) that monitors and records both the fuel consumption and the ratio of water- or steam-to-fuel being fired in the turbine. Owners or operators of affected combustion turbines using combustion controls that elect not to use a NO_X CEMS must conduct performance testing at a minimum of once every 12 months, except as otherwise specified in 40 CFR 60.4331a(c)(2), 40 CFR 60.4333a(b)(2), and 40 CFR 60.4333a(b)(5)(v).

4. Demonstrating Compliance With NO_X Emissions Standards Without Using CEMS for Non-Water or Non-Steam Injection Combustion Controls

Owners or operators of affected sources that (1) do not use water or steam injection or post-combustion controls and (2) elect not to use a NO_X CEMS, must then (a) conduct performance tests according to 40 CFR 60.4400a, (b) monitor the NO_X emissions rate using the Appendix E or low mass emissions methodology of 40 CFR part 75, or (c) install, calibrate, maintain, and operate an operating parameter CMS according to 40 CFR 60.4340a(b)(1)–(4).

H. Electronic Reporting

To increase the ease and efficiency of data submittal and data accessibility, the EPA is finalizing, as proposed, a requirement that owners or operators of stationary combustion turbine facilities subject to existing NSPS subparts GG and KKKK and subpart KKKKa submit electronic copies of initial and periodic performance test reports (including relative accuracy test audits (RATAs)), and compliance reports through the EPA's Central Data Exchange (CDX) using the Compliance and Emissions Data Reporting Interface (CEDRI). A description of the electronic data submission process is provided in the memorandum, *Electronic Reporting Requirements for New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP) Rules,* available in the docket for this action. The final rule requires that performance test results be submitted in the format generated through the use of the EPA's Electronic Reporting Tool (ERT) or an electronic file consistent with the xml schema on the ERT website.[198] Similarly, performance evaluation results of CEMS that include a RATA must be submitted in the format generated through the use of the ERT or an electronic file consistent with the xml schema on the ERT website. Alternatively, electronic files consistent with the xml schema on the ERT website accompanied by all the information required by 40 CFR 60.8(f)(2) in PDF may be submitted.[199]

Specifically, the final requires that (1) for NSPS subpart GG, the reports specified in 40 CFR 60.334(k), (2) for NSPS subpart KKKK, the reports specified in 40 CFR 60.4375, and (3) for NSPS subpart KKKKa, the reports specified in 40 CFR 60.4375a, owners or operators use the appropriate spreadsheet template to submit information to CEDRI.[200] The final version of the template[s] for these

[198] *https://www.epa.gov/electronic-reporting-air-emissions/electronic-reporting-tool-ert.*

[199] A PDF of the full stack test report (*i.e.,* performance test report and/or RATA) may optionally be submitted as an attachment to the ERT package test data but is not required.

[200] 40 CFR 60.334(k), 60.4375, and 60.4375a also now include updated language reflecting the EPA's current report submittal procedures regarding CDX, CEDRI, ERT, and CBI.

reports will be located on the CEDRI website.[201]

Furthermore, the EPA is finalizing in subparts GG, KKKK, and KKKKa, as proposed, provisions that allow owners or operators the ability to seek extensions for submitting electronic reports for circumstances beyond the control of the facility, *i.e.,* for a possible outage in CDX or CEDRI or for a *force majeure* event, in the time just prior to a report's due date, as well as the process to assert such a claim.

I. Other Final Amendments

The EPA requested comment on whether it is appropriate in subpart KKKKa to divide the thermal output from district energy systems by a factor (*i.e.,* 0.95 or 0.90) that would account for the net efficiency benefits of district energy systems. The Agency received no comments on the solicitation and is finalizing a factor of 0.95, which is the same as the electric transmission and distribution factor.

J. Effective Date and Compliance Dates

Pursuant to CAA section 111(b)(1)(B), the effective date of the final rule requirements in subparts KKKKa, KKKK, and GG will be the promulgation date. Affected sources that commence construction, reconstruction, or modification after December 13, 2024, must comply with all requirements of subpart KKKKa no later than the effective date of the final rule or upon startup, whichever is later.

K. Severability

This final action contains several discrete components, which the EPA views as severable as a practical matter—*i.e.,* they are functionally independent and operate in practice independently of the other components. These discrete components are generally delineated by the section headings within section IV of this document. In general, each of the final BSER determinations and associated emissions standards for each subcategory function independently of the others, as do any differences in the rule associated with modified or reconstructed units. In addition, the several other provisions of subpart KKKKa included in this final rule (and any associated changes to subparts GG and KKKK) generally function independently of one another.

V. Summary of Cost, Environmental, and Economic Impacts

A. What are the air quality impacts?

During the period 2025–2032, the EPA estimates that approximately 44 new stationary combustion turbines per year will be installed in the U.S. and would be affected by this rule. The EPA estimates that 26 of these combustion turbines will be in the electric utility power sector. For affected combustion turbines in the electric utility power sector, the BSER in subpart KKKKa is generally consistent with the control technologies in the baseline. That is, based on data reported to the EPA, the Agency anticipates that new combined cycle facilities (including combined cycle CHP facilities) would already have plans to use controls or otherwise achieve emissions rates equivalent to the emissions standards finalized in this NSPS, though in some cases new combined cycle turbines may have to upgrade and/or operate the controls more intensively than existing counterparts to meet the NSPS requirements in subpart KKKKa. The EPA estimates that most new simple cycle combustion turbines generating electricity would be in the low-utilization subcategory and have combustion controls consistent with the standards and would not be impacted by this action. The EIA for this final rule includes additional details of EPA's methodology for estimating cost, environmental, and other economic impacts, as well as a discussion of the limitations and uncertainties.

Based on information collected as part of a separate combustion turbine NESHAP rulemaking, the EPA projects that each year approximately 10 new, modified, or reconstructed direct mechanical drive combustion turbines (*e.g.,* compressors) will be subject to the NO_X standards in subpart KKKKa. However, none of these units are expected to incur increased costs because of this rule.

Table 2 below presents the projected change in NO_X emissions under the final rule from 2025 to 2032. NO_X emissions are a precursor to ozone and fine particulate matter.

TABLE 2—NET NO_X EMISSION CHANGES IN FIRST 8 YEARS AFTER THE RULE IS FINAL

[tons]

Year	Net annual NO_X emission changes relative to baseline (tons)
2025	0 to 0
2026	0 to 0
2027	41 to 88
2028	−26 to 68
2029	−94 to 47
2030	−161 to 27
2031	−229 to 5
2032	−296 to −15

The range in the projected emissions changes in Table 2 is due to the uncertainty in the number of higher efficiency turbines that will be constructed in the future. See section V.C of this preamble for further discussion on this topic. We also note that there are no expected SO_2 reductions because of the rule. All estimates and assumptions of emissions reductions have been documented in the rulemaking docket.

B. What are the secondary impacts?

The requirements in subpart KKKKa are not anticipated to result in significant energy impacts. The only energy requirement is a potential small increase in fuel consumption, resulting from operating the NO_X control equipment and back pressure caused by an add-on emission control device, such as an SCR. However, many entities will be able to comply with the final rule

[201] *https://www.epa.gov/electronic-reporting-air-emissions/cedri.*

without the use of add-on control devices. Because the cost of the identified BSER control technologies is a relatively small percentage of the total costs associated with building and operating combustion turbines in the various subcategories for which those technologies are BSER, the EPA does not anticipate significant secondary effects in terms of switching to other methods of electricity generation or mechanical output.

While no new installations of SCR beyond the baseline are anticipated to be required by this rule, some large high-utilization combustion turbines may need to run their SCR more to comply with the NO_X emission limit. The slightly increased application of SCR for large high-utilization combustion turbines is estimated to modestly increase emissions of ammonia (NH_3). Therefore, subpart KKKKa is estimated to increase NH_3 emissions by 1 ton in 2027; 12 tons in 2028; 22 tons in 2029; 33 tons in 2030; 44 tons in 2031; and 54 tons in 2032. It should be noted that these are likely overestimates, because we assumed SCR installation as a proxy for combustion controls for industrial sources in this analysis, given the lack of data on combustion control costs. Compliance in many cases will likely be achieved through combustion controls, which would lead to reduced ammonia emissions compared to these estimates. The EPA notes that emissions may also increase generally to the extent that emissions control strategies used make a turbine less efficient and therefore result in additional utilization.

C. What are the cost impacts?

To comply with the requirements of this final rule, some new units will incur capital costs associated with installation of controls or upgrades to planned controls, while some units that modify or reconstruct are expected to incur some increased operating costs of their controls to meet the rule requirements. These capital costs and increased operating costs were estimated based on model plants from the DOE NETL flexible generation report.[202] For the analysis period 2025–2032, the total estimated capital cost is $13.7 million (2024$), and the operation and maintenance costs are $9.5 million (2024$). Combined, this represents a present value in 2024 of $19.4 million (2024$) and an equivalent annualized value of $2.77 million (2024$) at a 3 percent discount rate, and a present value of $15.5 million (2024$) and an equivalent annualized value of $2.59 million (2024$) at a 7 percent discount rate.

There is also a deregulatory aspect of this rule. New natural gas-fired combustion turbines in the large, low-utilization subcategory that are higher efficiency (*i.e.,* with a base load rated heat input greater than 850 MMBtu/h, utilized at a 12-calendar-month capacity factor less than or equal to 45 percent, and with a design efficiency greater than or equal to 38 percent on a HHV basis) are subject to a less stringent NO_X emission limit than they otherwise would have been subject to under the previous NSPS. When subpart KKKK was promulgated in 2006, these classes of large, higher efficiency turbines did not exist. They are a newer technology that is now commercially available, and subpart KKKKa is recognizing this fact along with the environmental and economic benefits of operating higher efficiency designs at lower levels of utilization.

To account for the rule accommodating these higher efficiency turbines, we conduct an additional analysis where we compare the construction and operations of these higher efficiency turbines under the final rule to a baseline where lower efficiency turbines compliant with the 2006 NO_X standards are constructed instead. How many new turbines will take advantage of this subcategory in the future is uncertain, so we assume two to four single turbines are constructed for each 5-year period beginning in 2027. Specifically, EPA has identified 28 frame-type combustion turbines that have commenced operation in the previous 5 years. One of these turbines was a large high-efficiency combustion turbine with SCR controls. An additional six large turbines completed during this period have comparable or higher utilization rates. The EPA presumes that a subset of these turbines would have considered the new large higher efficiency subcategory had it been available. Therefore, the EPA identified two to four turbines per 5-year period as a likely range for the rate of new turbines availing themselves of this higher efficiency subcategory. Although we assume that the higher efficiency turbines have more expensive capital costs, the fuel savings lead to overall cost savings for the turbine operators. The present value in 2024 of the combined capital cost and fuel savings for these turbines under the deregulatory provision is projected to be $53.2 million to $106.2 million (2024$) with an equivalent annualized value of $7.58 million to $15.2 million (2024$) at a 3 percent discount rate, and a present value of $21.5 million to $43.0 million (2024$) with an equivalent annualized value of $3.60 million to $7.19 million (2024$) at a 7 percent discount rate, where the range reflects the assumption of two to four higher efficiency turbines constructed during the analysis period.

The present value in 2024 of the net regulatory cost savings is projected to be $33.8 million to $87.0 million (2024$) with an equivalent annualized value of $4.81 million to $12.4 million (2024$) at a 3 percent discount rate, and a present value of $5.98 million to $27.5 million (2024$) with an equivalent annualized value of $1.01 million to $4.60 million (2024$) at a 7 percent discount rate, where the range again reflects uncertainty about the number of higher efficiency turbines that will be constructed during the analysis period.

D. What are the economic impacts?

Economic impact analyses focus on changes in market prices and output levels. If changes in market prices and output levels in the primary markets are significant enough, impacts on other markets may also be examined. Both the magnitude of costs needed to comply with a rule and the distribution of these costs among affected facilities can have a role in determining how the market will change in response to a rule.

This final rule generally requires new, modified, or reconstructed stationary combustion turbines to meet more stringent emission standards for the release of NO_X into the environment than required under subparts GG or KKKK. While the units impacted by these requirements are generally expected to construct using emissions control devices that would already be compliant with the revised NSPS, some units may incur some increased costs to meet the rule requirements. These changes may result in higher costs of production for affected producers and impact broader markets these entities serve. As shown in section 2.5 of the EIA, the types of turbines affected by this rulemaking are primarily used in the power sector and in the oil and natural gas transmission sector but are located in smaller numbers in many economic sectors.

However, because the increased costs discussed in the previous section are small in comparison to the sales of the average owner of a combustion turbine, the costs of this rule are not expected to result in a significant market impact, regardless of whether they are passed on

[202] Oakes, M.; Konrade, J.; Bleckinger, M.; Turner, M.; Hughes, S.; Hoffman, H.; Shultz, T.; and Lewis, E. (May 5, 2023). *Cost and Performance Baseline for Fossil Energy Plants, Volume 5: Natural Gas Electricity Generating Units for Flexible Operation.* U.S. Department of Energy (DOE). Office of Scientific and Technical Information (OSTI). Available at *https://www.osti.gov/biblio/1973266.*

through market relationships or absorbed by the firms. For more information on these impacts, please refer to the economic impact analysis in the rulemaking docket.

E. What are the benefits?

Combustion turbines are a source of NO_X and SO_2 emissions. The health effects of exposure to these pollutants are briefly discussed in this section. The revised NSPS is expected to result in reductions of NO_X emissions from new, modified, or reconstructed units.

The EPA is obligated to present the Agency's best scientific understanding when developing policies and regulations and to ensure the public is not misled regarding the level of scientific understanding. Historically, however, the EPA's analytical practices often provided the public with a false sense of precision and more confidence regarding the monetized impacts of fine particulate matter ($PM_{2.5}$) and ozone than the underlying science could fully support, especially as overall emissions have significantly decreased, and impacts have become more uncertain. The EPA has seen the uncertainties expand even further with the use of benefit-per-ton (BPT) monetized values. Although intended as a screening tool when full-form photochemical modeling was not feasible, the BPT approach reduces complex spatial and atmospheric relationships into an average value per ton, which magnifies uncertainty in the resulting monetized estimates. Examples of uncertainties include but are not limited to: epidemiological uncertainty (*e.g.,* concentration-response functions, mortality valuation); economic factors (*e.g.,* discount rates, income growth); and methodological assumptions (*e.g.,* health thresholds, linear relationships, spatial relationships).

However, the EPA historically provided point estimates instead of just ranges or only quantifying emissions, which leads the public to believe the Agency has a better understanding of the monetized impacts of exposure to $PM_{2.5}$ and ozone than in reality. Therefore, to rectify this error, the EPA is no longer monetizing benefits from $PM_{2.5}$ and ozone but will continue to quantify the emissions until the Agency is confident enough in the modeling to properly monetize those impacts.

Historically, the EPA estimated the monetized benefits of avoided $PM_{2.5}$- and ozone-related impacts, which accounted for most, if not all, of the monetized benefits of many air regulations—even when the regulation was not regulating $PM_{2.5}$ or ozone—within Regulatory Impact Analyses (RIAs).[203] Throughout these analyses, the EPA acknowledged significant uncertainties related to monetized $PM_{2.5}$ and ozone impacts. The EPA has and is considering various techniques for characterizing the uncertainty in such estimates, such as estimating the fraction of avoided health effects occurring at various concentration ranges, sensitivity analyses, and alternate concentration-response assumptions. Because of the significant impacts of environmental regulations on the U.S. economy, it is essential that the Agency have confidence in the estimated benefits of an action prior to utilizing these estimates in a regulatory context.

In particular, the EPA is interested in evaluating the validity of estimating the benefits of air quality improvements relative to the National Ambient Air Quality Standards (NAAQS) for $PM_{2.5}$ and ozone. These standards, which have been set at a level which the Administrator judges to be requisite to protect public health or welfare with an adequate margin of safety, are widely understood to represent the divide between clean air and air with an unacceptable level of pollution.

The limitations of the BPT approach are even more pronounced due to the compounding effects of emissions reductions typically occurring across many geographic areas simultaneously, with varying proximity to population centers; differing atmospheric transformation pathways for nitrous oxides (NO_X), Volatile Organic Compounds (VOCs), and secondary $PM_{2.5}$; and region-specific photochemical and meteorological conditions. Using a national BPT estimate implicitly assumes uniform marginal health benefits for each ton of reduced emissions, an assumption not supported given heterogeneity in exposure patterns and atmospheric chemistry. As more areas achieve or maintain attainment with the NAAQS, the uncertainties associated with low-concentration health effects grow, and marginal benefits become more difficult to characterize with precision.

Therefore, it may be appropriate for the EPA to separate exposures and impacts above the level of the standard from those occurring at lower ambient concentrations. The EPA will investigate this prior to estimating these impacts in a regulatory analysis even for informational purposes. The EPA will seek peer review for new methods developed from this work consistent with the OMB's Peer Review Guidance.[204]

1. Benefits of NO_X Reductions

Nitrogen dioxide (NO_2) is the criteria pollutant that is central to the formation of nitrogen oxides (NO_X), and NO_X emissions are a precursor to ozone and fine particulate matter.[205]

Based on many recent studies discussed in the ozone Integrated Science Assessment (ISA),[206] the EPA has identified several key health effects that may be associated with exposure to elevated levels of ozone. Exposures to high ambient ozone concentrations have been linked to increased hospital admissions and emergency room visits for respiratory problems. Repeated exposure to ozone may increase susceptibility to respiratory infection and lung inflammation and can aggravate preexisting respiratory disease, such as asthma. Prolonged exposures can lead to inflammation of the lung, impairment of lung defense mechanisms, and irreversible changes in lung structure, which could in turn lead to premature aging of the lungs and/or chronic respiratory illnesses such as emphysema, chronic bronchitis, and asthma.

Children typically have the highest ozone exposures since they are active outside during the summer when ozone levels are the highest. Further, children are more at risk than adults from the effects of ozone exposure because their respiratory systems are still developing. Adults who are outdoors and moderately active during the summer months, such as construction workers and other outdoor workers, also are among those with the highest exposures. These individuals, as well as people with respiratory illnesses such as asthma, especially children with asthma, experience reduced lung function and increased respiratory symptoms, such as chest pain and cough, when exposed to relatively low ozone levels during periods of moderate exertion.

NO_X emissions can react with ammonia, VOCs, and other compounds

[203] See OMB's 2017 Report to Congress on Benefits and Costs of Federal Regulations and Agency Compliance with the Unfunded Mandates Reform Act for fuller discussion on uncertainties at *https://trumpwhitehouse.archives.gov/wp-content/uploads/2019/12/2019-CATS-5885-REV_DOC-2017Cost_BenefitReport11_18_2019.docx.pdf.*

[204] OMB Memorandum M–05–03, Memorandum for the Heads of Executive Departments and Agencies: Issuance of OMB's ''Final Information Quality Bulletin for Peer Review'' (2005), available at *https://www.federalregister.gov/documents/2005/01/14/05-769/final-information-quality-bulletin-for-peer-review.*

[205] Additional information is available in the ISA at *https://www.epa.gov/isa/integrated-science-assessment-isa-oxides-nitrogen-health*-criteria.

[206] *See* Ozone ISA at *https://assessments.epa.gov/isa/document/&deid=348522.*

to form $PM_{2.5}$.[207] Studies have linked $PM_{2.5}$ (alone or in combination with other air pollutants) with a series of negative health effects. Short-term exposure to $PM_{2.5}$ has been associated with premature mortality, increased hospital admissions, bronchitis, asthma attacks, and other cardiovascular outcomes. Long-term exposure to $PM_{2.5}$ has been associated with premature death, particularly in people with chronic heart or lung disease. Children, the elderly, and people with cardiopulmonary disease, such as asthma, are most at risk from these health effects.

Reducing the emissions of NO_X from stationary combustion turbines can help to improve some of the effects mentioned above, either those directly related to NO_X emissions, or the effects of ozone and $PM_{2.5}$ resulting from the combination of NO_X with other pollutants.

2. Benefits of SO_2 Reductions

High concentrations of SO_2 can cause inflammation and irritation of the respiratory system, especially during physical activity.[208] Exposure to very high levels of SO_2 can lead to burning of the nose and throat, breathing difficulties, severe airway obstruction, and can be life threatening. Long-term exposure to persistent levels of SO_2 can lead to changes in lung function.

Sensitive populations include asthmatics, individuals with bronchitis or emphysema, children, and the elderly. PM can also be formed from SO_2 emissions. Secondary PM is formed in the ambient air through a number of physical and chemical processes that transform gases, such as SO_2, into particles. Overall, emissions of SO_2 can lead to some of the effects discussed in this section—either those directly related to SO_2 emissions, or the effects of PM resulting from the combination of SO_2 with other pollutants. Maintaining the standards of performance for emissions of SO_2 from all stationary combustion turbines will continue to protect human health and the environment from the adverse effects mentioned above.

3. Disbenefits From Increased Emissions of NH_3 and NO_X

Ammonia is a precursor to $PM_{2.5}$ formation and an increase in NH_3 formation may lead to an increase in $PM_{2.5}$. An increase in $PM_{2.5}$ is associated with significant mortality and morbidity health outcomes such as premature mortality, stroke, lung cancer, metabolic and reproductive effects, among others.

There are also potential NO_X disbenefits associated with the use of higher efficiency combustion turbines. As previously noted, new natural gas-fired combustion turbines in the large, low-utilization subcategory that are higher efficiency (*i.e.,* with a base load rated heat input greater than 850 MMBtu/h, operating at a 12-calendar-month capacity factor less than or equal to 45 percent, and with a design efficiency greater than or equal to 38 percent) are subject to a less stringent NO_X emission limit than otherwise applicable under the previous NSPS (subpart KKKK). These higher NO_X emissions create disbenefits relative to the baseline with lower efficiency turbines.

VI. What actions are we not finalizing and what is our rationale for such decisions?

The EPA is not finalizing certain proposed revisions to the NSPS for stationary combustion turbines and stationary gas turbines pursuant to CAA section 111(b)(1)(B) review.

A. Clarification to the Definition of Stationary Combustion Turbine

To clarify the applicability of the definition of a stationary combustion turbine when determining whether an existing combined cycle or CHP facility should be considered ''new'' or ''reconstructed,'' the EPA proposed to amend the rule language in subpart KKKKa. In subpart KKKK, the definition of the affected source includes the HRSG and associated duct burners at combined cycle and CHP facilities.[209] The amended language was intended to clarify that the test for determining if an existing facility is a new source would be based on whether only the combustion turbine portion of the affected combined cycle/CHP facility (*i.e.,* HRSG, etc.) was entirely replaced. The reconstruction applicability determination was proposed to be based on whether the fixed capital costs of the replacement of components of the combustion turbine portion (*i.e.,* the air compressor, combustor, and turbine sections) exceeded 50 percent of the fixed capital costs of installing *only* a comparable new combustion turbine portion of the affected facility. The EPA proposed that it was appropriate for owners or operators of combined cycle and CHP facilities that entirely replace or undertake major capital investments in the combustion turbine portion of the facility to invest in emissions control equipment as well.

This specific portion of the 2024 Proposed Rule raised numerous questions and concerns in public comments and opposition to amending the definition of the source as proposed in subpart KKKKa was consistent across all sectors. Therefore, in this final action, the EPA is not finalizing any proposed revisions to the definition of stationary combustion turbines that would impact a reconstruction analysis to determine whether an existing combined cycle or CHP combustion turbine should be subject to the requirements for new sources under subpart KKKKa.

See the EPA's response to comments document in the docket for this rule for complete summaries of comments regarding this specific proposal and the EPA's responses.

B. Definition of Noncontinental Area

The EPA's review of low-sulfur fuels for this NSPS indicates that since subpart KKKK was promulgated, the availability of low-sulfur diesel has increased in States and territories previously defined as noncontinental areas for purposes of compliance with the SO_2 emission standards in subpart KKKK. As a result, in subpart KKKKa, the EPA proposed to remove Hawaii, the Commonwealth of Puerto Rico, and the U.S. Virgin Islands from the definition of noncontinental area. This proposed change would require new, modified, or reconstructed stationary combustion turbines in Hawaii, Puerto Rico, and the Virgin Islands to demonstrate compliance with the lower SO_2 standards in subpart KKKKa for affected sources in continental areas. The continental standards are based on fuel oil with sulfur content limited to approximately 0.05 percent sulfur by weight (500 ppmw).

Based on available information, the EPA also proposed to maintain in subpart KKKKa that Guam, American Samoa, the Northern Mariana Islands, and offshore platforms be included in the definition of noncontinental area and those locations would continue to be allowed to meet the existing standards for higher sulfur fuels. This is due to the fact these locations continue to have limited access to the same low-sulfur fuels as facilities in continental areas.

In response to the proposal, several commenters, including commenters from the State of Hawaii, opposed the removal of Hawaii, the Commonwealth of Puerto Rico, and the U.S. Virgin Islands from the definition of

[207] $PM_{2.5}$ health effects are discussed in detail in the ISA at *https://www.epa.gov/isa/integrated-science-assessment-isa-particulate-matter.*

[208] Health effects are discussed in detail in the ISA available at *https://www.epa.gov/isa/integrated-science-assessment-isa-sulfur-oxides-health-criteria.*

[209] *See* 71 FR 38483; July 6, 2006.

noncontinental area. Specifically, commenters stated that the proposal would disproportionately affect island utilities that must rely on liquid fuels and that lack the compliance options of utilities located in continental areas. The commenters also highlighted some of the regulatory precedents that exist in rules previously promulgated in the power sector in which the EPA has acknowledged the need to set more relaxed standards in Hawaii and other remote islands. The commenters also stated that an additional supporting factor for the non-continental exemption is the attainment status of Hawaii for all regulated pollutants. Another commenter stated that before proposing to determine that these locations have the same access to low-sulfur fuels as continental areas, the EPA should provide additional information to support the proposed new SO_2 standards for affected sources located in Hawaii, Puerto Rico, and the Virgin Islands (*i.e.,* cost effectiveness analysis). Should additional EPA analyses support the proposed new SO_2 standards, the EPA should include a delayed compliance date (*i.e.,* 5 years) for affected sources to use their remaining higher sulfur fuel oil supplies and to allow fuel oil suppliers time to develop reliable long-term supplies of low sulfur fuel oil to those areas.

This specific proposal raised numerous questions and concerns in public comments and opposition to amending the definition of the noncontinental areas as proposed in subpart KKKKa was consistent from affected stakeholders. Therefore, in this action, the EPA is not finalizing the proposed revisions to the definition of noncontinental area for new sources under subpart KKKKa.

C. Affected Facility

The EPA requested comment on treating multiple combustion turbine engines connected to a single generator, separate combustion turbines engines using a single HRSG, and separate combustion turbine engines with separate HRSG that use a single steam turbine or otherwise combine the useful thermal output as single affected facilities. The Agency is not finalizing any changes that would treat multiple turbines as a single affected facility.

VII. Statutory and Executive Order Reviews

Additional information about these statutes and Executive Orders can be found at *https://www.epa.gov/laws-regulations/laws-and-executive-orders.*

A. Executive Order 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review

This action is a significant regulatory action that was submitted to the Office of Management and Budget (OMB) for review. Any changes made in response to OMB recommendations have been documented in the docket. An economic impact analysis (EIA) was prepared for this action and is available in the docket.

The EIA estimates the costs from 2025–2032 associated with the application of the BSER to stationary combustion turbines with a heat input at peak load equal to or greater than 10.7 GJ/h (10 MMBtu/h), based on the HHV of the fuel, that commence construction, modification, or reconstruction after the date of publication of the 2024 Proposed Rule in the **Federal Register**. These costs are relative to the baseline of the existing NSPS (subpart KKKK). Table 3 below provides a summary of the estimated costs associated with the application of the BSER to these new, modified, or reconstructed stationary combustion turbines and stationary gas turbines.

TABLE 3—ESTIMATED MONETIZED COSTS OF COMBUSTION TURBINES NSPS

[Millions, 2024$]

		3% Discount rate		7% Discount rate	
		PV	EAV	PV	EAV
Impacts associated with subcategories with increased stringency.	Costs	$19.4	$2.77	$15.5	$2.59.
Impacts associated with subcategories with decreased stringency.	Avoided Costs	$53.2 to $106	$7.58 to $15.2	$21.5 to $43.0	$3.60 to $7.19.
Net Costs		−$87.0 to −$33.8	−$12.4 to −$4.81	−$27.5 to −$5.98	−$4.60 to −$1.01.

Notes: Values rounded to three significant figures. The range reflect the assumption of two to four higher efficiency turbines constructed during the analysis period.

The net benefits associated with the regulated pollutants are the net cost savings of this final action presented above in Table 3. Potential non-quantified impacts are expected from changes in NO_X emissions. The EIA presents a discussion of the projected costs and benefits of this action, as well as a discussion of uncertainty and additional impacts that the EPA could not quantify or monetize.

B. Executive Order 14192: Unleashing Prosperity Through Deregulation

This action is considered an Executive Order 14192 deregulatory action. Details on the estimated cost savings of this final rule can be found in EPA's analysis of the potential costs and benefits associated with this action.

C. Paperwork Reduction Act (PRA)

The information collection activities in this rule have been submitted for approval to OMB under the PRA. The Information Collection Request (ICR) document that the EPA prepared has been assigned EPA ICR number 7810.01. You can find a copy of the ICR in the docket for this rule, and it is briefly summarized here. The information collection requirements are not enforceable until OMB approves them. As noted in section IV.H, the template for the semiannual report for these subparts will be on the CEDRI website.[210]

[210] *See https://www.epa.gov/electronic-reporting-air-emissions/cedri.*

The EPA is finalizing amendments to the NSPS for stationary combustion turbines and stationary gas turbines to establish size-based subcategories for new, modified, or reconstructed stationary combustion turbines, update NO_X standards of performance for certain stationary combustion turbines and address specific technical and editorial issues to clarify the existing regulations. The EPA is also finalizing amendments to add electronic reporting requirements for submittal of certain reports and performance test results.

This information will be collected to assure compliance with 40 CFR part 60, existing subparts GG, KKKK, and new subpart KKKKa. The total estimated burden and cost for reporting and recordkeeping due to these amendments

are presented here and are not intended to be cumulative estimates that include the burden associated with the requirements of the existing 40 CFR part 60, subparts GG and KKKK, and new 40 CFR part 60, subpart KKKKa. The ICR reflects both the total burden for subject units to comply with GG, KKKK, and KKKKa and the incremental burden associated with the requirements of these final amendments.

- *Respondents/affected entities:* Owners or operators of new, modified, or reconstructed stationary combustion turbines.
- *Respondent's obligation to respond:* Mandatory.
- *Estimated number of respondents:* 5.
- *Frequency of response:* Semi-annual.
- *Total estimated burden:* 310 hours per year. Burden is defined at 5 CFR 1320.3(b).
- *Total estimated cost:* $36,000 per year, includes $0 annualized capital or operation & maintenance costs.

An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for the EPA's regulations in 40 CFR are listed in 40 CFR part 9. When OMB approves this ICR, the Agency will announce that approval in the **Federal Register** and publish a technical amendment to 40 CFR part 9 to display the OMB control number for the approved information collection activities contained in this final rule.

D. Regulatory Flexibility Act (RFA)

I certify that this action will not have a significant economic impact on a substantial number of small entities under the RFA. In making this determination, the EPA concludes that the impact of concern for this rule is any significant adverse economic impact on small entities and that the Agency is certifying that this rule will not have a significant economic impact on a substantial number of small entities because the rule relieves regulatory burden. The small entities subject to the requirements of this action include small businesses and small governmental entities. The rule relieves regulatory burden by modifying several provisions that could impact small entities. Amendments to simplify the NSPS are discussed in section IV.E.3 of this preamble, and other flexibilities in this final rule, including an exemption from title V permitting for certain non-major combustion turbines, are also discussed in section IV.E. While not quantified, these amendments are expected to result in cost savings for affected entities. In addition, section V.C of this preamble discusses cost savings associated with the less stringent NO_X emission limit for certain large, higher efficiency turbines. Because this is a relatively new technology, the EPA is unable to estimate the number of small entities that will experience regulatory relief under this provision. For this reason, the EIA only considers potential costs as a conservative approach. For all small entities projected to experience economic impact, those impacts are estimated to be less than one percent of revenues.

E. Unfunded Mandates Reform Act (UMRA)

This action does not contain an unfunded mandate of $100 million (adjusted annually for inflation) or more (in 1995 dollars) as described in UMRA, 2 U.S.C. 1531–1538, and does not significantly or uniquely affect small governments. The costs involved in this action are estimated not to exceed $187 million in 2024$ ($100 million in 1995$ adjusted for inflation using the GDP implicit price deflator) or more in any one year.

F. Executive Order 13132: Federalism

This action does not have federalism implications. It will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

G. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

This action does not have Tribal implications as specified in Executive Order 13175. The EPA is not aware of any stationary combustion turbine owned or operated by Indian Tribal governments. However, if there are any, it will neither impose direct compliance costs on federally recognized Tribal governments nor preempt Tribal law. Thus, Executive Order 13175 does not apply to this final rule.

Consistent with the EPA Policy on Consultation and Coordination with Indian Tribes, the EPA offered government-to-government consultation with Tribes in April 2024. The offer of direct consultation was declined.

H. Executive Order 13045: Protection of Children From Environmental Health Risks and Safety Risks

Executive Order 13045 directs Federal agencies to include an evaluation of the health and safety effects of the planned regulation on children in Federal health and safety standards and explain why the regulation is preferable to potentially effective and reasonably feasible alternatives. This action is not subject to Executive Order 13045 because it is not a significant regulatory action under section 3(f)(1) of Executive Order 12866.

However, the EPA's *Policy on Children's Health* applies to this action. This action is consistent with the EPA's *Policy on Children's Health* because the new technology-based standards provide a maximum level of emission control that is implementable for all stationary combustion turbines. As described in the proposal, the EPA also considered more stringent NO_X standards for most subcategories of new, modified, or reconstructed units based on an expanded application post-combustion control technology, but determined that this technology (specifically, SCR) is not the BSER other than for new large high-utilization combustion turbines.

I. Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use

This action is not a ''significant energy action'' because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. This action includes defining and setting emission limits for affected new, modified, and reconstructed sources; applicability-related and definitional changes; changes to the startup, shutdown, and malfunction (SSM) provisions; and the testing, monitoring, recordkeeping, and reporting requirements. This does not impact energy supply, distribution, or use and the EPA does not expect a significant change in retail electricity prices or availability on average across the contiguous U.S. for natural gas-fired generation, or significant impacts on utility power sector delivered natural gas prices.

J. National Technology Transfer and Advancement Act (NTTAA) and 1 CFR Part 51

This action involves technical standards. As discussed in the proposal preamble,[211] the EPA conducted searches for the Review of New Source Performance Standards for Stationary Combustion Turbines through the Enhanced National Standards Systems Network (NSSN) Database managed by the American National Standards

[211] 89 FR 101306 (Dec. 13, 2024).

Institute (ANSI). Searches were conducted for EPA Methods 1, 2, 3A, 6, 6C, 7E, 8, 19, and 20 of 40 CFR part 60, appendix A. No applicable voluntary consensus standards (VCS) were identified for EPA Methods 1, 2, 3A, 6, 6C, 7E, 8, 19, and 20. All potential standards were reviewed to determine the practicality of the VCS for this rulemaking. One VCS was identified as an acceptable alternative to EPA test methods for the purpose of this final rule: [212]

- American Society for Testing and Materials (ASTM) D6348–12 (R2020), ''Determination of Gaseous Compounds by Extractive Direct Interface Fourier Transform (FTIR) Spectroscopy,'' is an acceptable alternative to EPA Method 320, with the conditions discussed below.

When using ASTM D6348–12 (R2020), the following conditions must be met:

(1) The test plan preparation and implementation in the Annexes to ASTM D 6348–12 (R2020), Sections A1 through A8 are mandatory; and

(2) In ASTM D6348–12 (R2020) Annex A5 (Analyte Spiking Technique), the percent (%) R must be determined for each target analyte (Equation A5.5). For the test data to be acceptable for a compound, %R must be 70% ≥ R ≤ 130%. If the %R value does not meet this criterion for a target compound, the test data is not acceptable for that compound and the test must be repeated for that analyte (*i.e.,* the sampling and/or analytical procedure should be adjusted before a retest). The %R value for each compound must be reported in the test report, and all field measurements must be corrected with the calculated %R value for that compound by using the following equation:

Reported Results = ((Measured Concentration in Stack))/(%R) × 100

The search identified 13 VCS that were potentially applicable for this final rule in lieu of EPA reference methods. However, these have been determined to not be practical due to lack of equivalency, documentation, validation of data, and other important technical and policy considerations. Additional information for the VCS search and determinations can be found in the memorandum titled, *Voluntary Consensus Standard Search Results for New Source Performance Standards Review for Stationary Combustion Turbines and Stationary Gas Turbines (40 CFR part 60, subpart KKKKa).*

In addition, final rule updates to 40 CFR 60.17 (incorporations by reference) are to include additional test methods identified in subpart KKKKa. The Agency does not intend for these editorial revisions to substantively change any of the technical requirements of existing subparts GG and KKKK. These test methods are: ASTM D129–00; ASTM D240–19; ASTM D396–98; ASTM D975–08a; ASTM D1072–90 (Reapproved 1999); ASTM D1266–98 (Reapproved 2003); ASTM D1552–03; ASTM D1826–94 (Reapproved 2003); ASTM D2622–05; ASTM D3246–05; ASTM D3588–98 (Reapproved 2003); ASTM D3699–08; ASTM D4057–95 (Reapproved 2000); ASTM D4084–05; ASTM D4177–95 (Reapproved 2000); ASTM D4294–03; ASTM D4468–85 (Reapproved 2000); ASTM D4809–18; ASTM D4810–88 (Reapproved 1999); ASTM D4891–89 (Reapproved 2006); ASTM D5287–97 (Reapproved 2002); ASTM D5453–05; ASTM D5504–20; ASTM D5623–24; ASTM D6228–98 (Reapproved 2003); ASTM D6348–12 (Reapproved 2020); ASTM D6522–20; ASTM D6667–04; ASTM D6751–11b; ASTM D7039–24; ASTM D7467–10; GPA 2140–17; GPA 2166–17; GPA 2172–09; GPA 2174–14; and GPA 2377–86.

The EPA is also finalizing the option for facilities to use 40 CFR part 63, Appendix A, EPA Method 320 for NO_X testing of sources subject to either subparts GG, KKKK, or KKKKa.[213] This will also provide testing flexibility and increase efficiency for test firms concurrently performing formaldehyde testing on KKKK and KKKKa sources subject to the stationary combustion turbine NESHAP requirements under 40 CFR part 63, subpart YYYY. Similarly, the EPA allows the option to use ASTM Method D6348–12 (2020) as an equivalent FTIR alternative to Method 320 provided the conditions specified above are met.

In accordance with the requirements of 1 CFR part 51, the EPA is incorporating the following four voluntary consensus standards by reference in the final rule.

- ASTM D5504–20, Standard Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Chemiluminescence, covers the determination of sulfur-containing compounds in high methane content gaseous fuels such as natural gas. It can be used to determine the sulfur content of gaseous fuels in the rule.
- ASTM D5623–24, Standard Test Method for Sulfur Compounds in Light Petroleum Liquids by Gas Chromatography and Sulfur Selective Detection, covers the determination of volatile sulfur-containing compounds in light petroleum liquids. It can be used to determine the sulfur content of liquid fuels in the rule.
- ASTM D6348–12, Determination of Gaseous Compounds by Extractive Direct Interface Fourier Transform (FTIR) Spectroscopy. It can be used as an equivalent FTIR alternative to Method 320 provided the conditions specified above are met.
- ASTM D7039–24, Standard Test Method of Sulfur in Gasoline, Diesel Fuel, Jet Fuel, Kerosine, Biodiesel, Biodiesel Blends, and Gasoline-Ethanol Blends by Monochromatic Wavelengths Dispersive X-ray Fluorescence Spectrometry, covers the determination of total sulfur by monochromatic wavelength-dispersive X-ray fluorescence spectrometry in various fuels. It can be used to determine the sulfur content of liquid fuels in the rule.

The EPA determined that the ASTM standards are reasonably available because they are available for purchase or access from the following addresses: ASTM International, 100 Barr Harbor Drive, Post Office Box C700, West Conshohocken, PA 19428–2959, +1.610.832.9500, *www.astm.org.*

K. Congressional Review Act (CRA)

This action is subject to the Congressional Review Act (CRA), and the EPA will submit a rule report to each House of the Congress and to the Comptroller General of the United States. This action is not a ''major rule'' as defined by 5 U.S.C. 804(2).

List of Subjects in 40 CFR Part 60

Environmental protection, Administrative practice and procedures, Air pollution control, Incorporation by reference, Reporting and recordkeeping requirements.

Lee Zeldin,

Administrator.

For the reasons set forth in the preamble, the Environmental Protection Agency amends part 60 of title 40, chapter I, of the Code of Federal Regulations as follows:

[212] ANSI/ASME PTC 19.10–1981 Part 10 (2010) has been removed as a VCS alternative due to withdrawn or outdated testing methodologies.

[213] EPA Method 320 can also be used to determine moisture (H_2O) content, when necessary. However, EPA Method 320 cannot be used to determine the O_2 content of the flue gas stream. The oxygen content must be determined via a method prescribed by the NSPS, which in turn is used to correct the NO_X ppm concentration to 15 percent O_2, where applicable.

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

■ 1. The authority citation for part 60 continues to read as follows:

Authority: 42 U.S.C. 7401 *et seq.*

Subpart A—General Provisions

■ 2. Amend § 60.17 by revising paragraphs (h) and (m)(1) through (4) and (6) to read as follows:

§ 60.17 Incorporations by reference.

* * * * *

(h) ASTM International, 100 Barr Harbor Drive, P.O. Box CB700, West Conshohocken, Pennsylvania 19428–2959; phone: (800) 262–1373; website: *www.astm.org.*

(1) ASTM A99–76, Standard Specification for Ferromanganese; IBR approved for § 60.261.

(2) ASTM A99–82 (Reapproved 1987), Standard Specification for Ferromanganese; IBR approved for § 60.261.

(3) ASTM A100–69, Standard Specification for Ferrosilicon; IBR approved for § 60.261.

(4) ASTM A100–74, Standard Specification for Ferrosilicon; IBR approved for § 60.261.

(5) ASTM A100–93, Standard Specification for Ferrosilicon; IBR approved for § 60.261.

(6) ASTM A101–73, Standard Specification for Ferrochromium; IBR approved for § 60.261.

(7) ASTM A101–93, Standard Specification for Ferrochromium; IBR approved for § 60.261.

(8) ASTM A482–76, Standard Specification for Ferrochromesilicon; IBR approved for § 60.261.

(9) ASTM A482–93, Standard Specification for Ferrochromesilicon; IBR approved for § 60.261.

(10) ASTM A483–64, Standard Specification for Silicomanganese; IBR approved for § 60.261.

(11) ASTM A483–74 (Reapproved 1988), Standard Specification for Silicomanganese; IBR approved for § 60.261.

(12) ASTM A495–76, Standard Specification for Calcium-Silicon and Calcium Manganese-Silicon; IBR approved for § 60.261.

(13) ASTM A495–94, Standard Specification for Calcium-Silicon and Calcium Manganese-Silicon; IBR approved for § 60.261.

(14) ASTM D86–78, Distillation of Petroleum Products; IBR approved for §§ 60.562–2(d); 60.593(d); 60.593a(d); 60.633(h).

(15) ASTM D86–82, Distillation of Petroleum Products; IBR approved for §§ 60.562–2(d); 60.593(d); 60.593a(d); 60.633(h).

(16) ASTM D86–90, Distillation of Petroleum Products; IBR approved for §§ 60.562–2(d); 60.593(d); 60.593a(d); 60.633(h).

(17) ASTM D86–93, Distillation of Petroleum Products; IBR approved for § 60.593a(d).

(18) ASTM D86–95, Distillation of Petroleum Products; IBR approved for §§ 60.562–2(d); 60.593(d); 60.593a(d); 60.633(h).

(19) ASTM D86–96, Distillation of Petroleum Products, approved April 10, 1996; IBR approved for §§ 60.562–2(d); 60.593(d); 60.593a(d); 60.633(h); 60.5401(f); 60.5401a(f); 60.5402b(d); 60.5402c(d).

(20) ASTM D129–64, Standard Test Method for Sulfur in Petroleum Products (General Bomb Method); IBR approved for § 60.106(j) and appendix A–7 to part 60: Method 19, Section 12.5.2.2.3.

(21) ASTM D129–78, Standard Test Method for Sulfur in Petroleum Products (General Bomb Method); IBR approved for § 60.106(j) and appendix A–7 to part 60: Method 19, Section 12.5.2.2.3.

(22) ASTM D129–95, Standard Test Method for Sulfur in Petroleum Products (General Bomb Method); IBR approved for § 60.106(j) and appendix A–7 to part 60: Method 19, Section 12.5.2.2.3.

(23) ASTM D129–00, Standard Test Method for Sulfur in Petroleum Products (General Bomb Method); IBR approved for § 60.335(b).

(24) ASTM D129–00 (Reapproved 2005), Standard Test Method for Sulfur in Petroleum Products (General Bomb Method); IBR Approved for §§ 60.4360a(c) and 60.4415(a).

(25) ASTM D240–76, Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter; IBR approved for §§ 60.46(c); 60.296(b); and appendix A–7 to part 60: Method 19, Section 12.5.2.2.3.

(26) ASTM D240–92, Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter; IBR approved for §§ 60.46(c); 60.296(b); and appendix A–7: Method 19, Section 12.5.2.2.3.

(27) ASTM D240–02 (Reapproved 2007), Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter, approved May 1, 2007; IBR approved for § 60.107a(d).

(28) ASTM D240–19, Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter, approved November 1, 2019; IBR approved for §§ 60.485b(g) and 60.4360a(c).

(29) ASTM D270–65, Standard Method of Sampling Petroleum and Petroleum Products; IBR approved for appendix A–7 to part 60: Method 19, Section 12.5.2.2.1.

(30) ASTM D270–75, Standard Method of Sampling Petroleum and Petroleum Products; IBR approved for appendix A–7 to part 60: Method 19, Section 12.5.2.2.1.

(31) ASTM D323–82, Test Method for Vapor Pressure of Petroleum Products (Reid Method); IBR approved for §§ 60.111(l); 60.111a(g); 60.111b; 60.116b(f).

(32) ASTM D323–94, Test Method for Vapor Pressure of Petroleum Products (Reid Method); IBR approved for §§ 60.111(l); 60.111a(g); 60.111b; 60.116b(f).

(33) ASTM D388–77, Standard Specification for Classification of Coals by Rank; IBR approved for §§ 60.41; 60.45(f); 60.41Da; 60.41b; 60.41c; 60.251.

(34) ASTM D388–90, Standard Specification for Classification of Coals by Rank; IBR approved for §§ 60.41; 60.45(f); 60.41Da; 60.41b; 60.41c; 60.251.

(35) ASTM D388–91, Standard Specification for Classification of Coals by Rank; IBR approved for §§ 60.41; 60.45(f); 60.41Da; 60.41b; 60.41c; 60.251.

(36) ASTM D388–95, Standard Specification for Classification of Coals by Rank; IBR approved for §§ 60.41; 60.45(f); 60.41Da; 60.41b; 60.41c; 60.251.

(37) ASTM D388–98a, Standard Specification for Classification of Coals by Rank; IBR approved for §§ 60.41; 60.45(f); 60.41Da; 60.41b; 60.41c; 60.251.

(38) ASTM D388–99 (Reapproved 2004)$^{\varepsilon 1}$(ASTM D388–99R04), Standard Classification of Coals by Rank, approved June 1, 2004; IBR approved for §§ 60.41; 60.45(f); 60.41Da; 60.41b; 60.41c; 60.251; 60.5580; 60.5580a.

(39) ASTM D396–78, Standard Specification for Fuel Oils; IBR approved for §§ 60.41b; 60.41c; 60.111(b); 60.111a(b).

(40) ASTM D396–89, Standard Specification for Fuel Oils; IBR approved for §§ 60.41b; 60.41c; 60.111(b); 60.111a(b).

(41) ASTM D396–90, Standard Specification for Fuel Oils; IBR approved for §§ 60.41b; 60.41c; 60.111(b); 60.111a(b).

(42) ASTM D396–92, Standard Specification for Fuel Oils; IBR approved for §§ 60.41b; 60.41c; 60.111(b); 60.111a(b).

(43) ASTM D396–98, Standard Specification for Fuel Oils, approved April 10, 1998; IBR approved for §§ 60.41b; 60.41c; 60.111(b); 60.111a(b); 60.4420a; 60.5580; 60.5580a.

(44) ASTM D975–78, Standard Specification for Diesel Fuel Oils; IBR approved for §§ 60.111(b) and 60.111a(b).

(45) ASTM D975–96, Standard Specification for Diesel Fuel Oils; IBR approved for §§ 60.111(b) and 60.111a(b).

(46) ASTM D975–98a, Standard Specification for Diesel Fuel Oils; IBR approved for §§ 60.111(b) and 60.111a(b).

(47) ASTM D975–08a, Standard Specification for Diesel Fuel Oils, approved October 1, 2008; IBR approved for §§ 60.41b; 60.41c; 60.4420a; 60.5580; 60.5580a.

(48) ASTM D1072–80, Standard Test Method for Total Sulfur in Fuel Gases; IBR approved for § 60.335(b).

(49) ASTM D1072–90 (Reapproved 1994), Standard Test Method for Total Sulfur in Fuel Gases; IBR approved for § 60.335(b).

(50) ASTM D1072–90 (Reapproved 1999), Standard Test Method for Total Sulfur in Fuel Gases; IBR approved for §§ 60.4360a(c) and 60.4415(a).

(51) ASTM D1137–53, Standard Method for Analysis of Natural Gases and Related Types of Gaseous Mixtures by the Mass Spectrometer; IBR approved for § 60.45(f).

(52) ASTM D1137–75, Standard Method for Analysis of Natural Gases and Related Types of Gaseous Mixtures by the Mass Spectrometer; IBR approved for § 60.45(f).

(53) ASTM D1193–77, Standard Specification for Reagent Water; IBR approved for appendix A–3 to part 60: Method 5, Section 7.1.3; Method 5E, Section 7.2.1; Method 5F, Section 7.2.1; appendix A–4 to part 60: Method 6, Section 7.1.1; Method 7, Section 7.1.1; Method 7C, Section 7.1.1; Method 7D, Section 7.1.1; Method 10A, Section 7.1.1; appendix A–5 to part 60: Method 11, Section 7.1.3; Method 12, Section 7.1.3; Method 13A, Section 7.1.2; appendix A–8 to part 60: Method 26, Section 7.1.2; Method 26A, Section 7.1.2; Method 29, Section 7.2.2.

(54) ASTM D1193–91, Standard Specification for Reagent Water; IBR approved for appendix A–3 to part 60: Method 5, Section 7.1.3; Method 5E, Section 7.2.1; Method 5F, Section 7.2.1; appendix A–4 to part 60: Method 6, Section 7.1.1; Method 7, Section 7.1.1; Method 7C, Section 7.1.1; Method 7D, Section 7.1.1; Method 10A, Section 7.1.1; appendix A–5 to part 60: Method 11, Section 7.1.3; Method 12, Section 7.1.3; Method 13A, Section 7.1.2; appendix A–8 to part 60: Method 26, Section 7.1.2; Method 26A, Section 7.1.2; Method 29, Section 7.2.2.

(55) ASTM D1266–87, Standard Test Method for Sulfur in Petroleum Products (Lamp Method); IBR approved for § 60.106(j).

(56) ASTM D1266–91, Standard Test Method for Sulfur in Petroleum Products (Lamp Method); IBR approved for § 60.106(j).

(57) ASTM D1266–98, Standard Test Method for Sulfur in Petroleum Products (Lamp Method); IBR approved for §§ 60.106(j) and 60.335(b).

(58) ASTM D1266–98 (Reapproved 2003)$^{\varepsilon,1}$ Standard Test Method for Sulfur in Petroleum Products (Lamp Method); IBR approved for §§ 60.4360a(c) and 60.4415(a).

(59) ASTM D1475–60 (Reapproved 1980), Standard Test Method for Density of Paint, Varnish Lacquer, and Related Products; IBR approved for § 60.435(d), appendix A–7 to part 60: Method 24, Sections 6.1 and 11.3.3; Method 24A, Sections 6.5,7.1, 11.2, 11.3, and 16.0.

(60) ASTM D1475–90, Standard Test Method for Density of Paint, Varnish Lacquer, and Related Products; IBR approved for § 60.435(d); appendix A–7 to part 60: Method 24, Sections 6.1 and 11.3.3; Method 24A, Sections 6.5, 7.1, 11.2, 11.3, and 16.0.

(61) ASTM D1475–13, Standard Test Method for Density of Liquid Coatings, Inks, and Related Products, approved November 1, 2013; IBR approved for § 60.393a(f).

(62) ASTM D1552–83, Standard Test Method for Sulfur in Petroleum Products (High-Temperature Method); IBR approved for § 60.106(j) and appendix A–7 to part 60: Method 19, Section 12.5.2.2.3.

(63) ASTM D1552–95, Standard Test Method for Sulfur in Petroleum Products (High-Temperature Method); IBR approved for § 60.106(j) and appendix A–7 to part 60: Method 19, Section 12.5.2.2.3.

(64) ASTM D1552–01, Standard Test Method for Sulfur in Petroleum Products (High-Temperature Method; IBR approved for § 60.335(b).

(65) ASTM D1552–03, Standard Test Method for Sulfur in Petroleum Products (High-Temperature Method); IBR approved for §§ 60.4360a(c) and 60.4415(a).

(66) ASTM D1826–77, Standard Test Method for Calorific Value of Gases in Natural Gas Range by Continuous Recording Calorimeter; IBR approved for §§ 60.45(f); 60.46(c); 60.296(b); appendix A–7 to part 60: Method 19, Section 12.3.2.4.

(67) ASTM D1826–94, Standard Test Method for Calorific Value of Gases in Natural Gas Range by Continuous Recording Calorimeter; IBR approved for §§ 60.45(f); 60.46(c); 60.296(b); appendix A–7 to part 60: Method 19, Section 12.3.2.4.

(68) ASTM D1826–94 (Reapproved 2003), Standard Test Method for Calorific (Heating) Value of Gases in Natural Gas Range by Continuous Recording Calorimeter, approved May 10, 2003; IBR approved for §§ 60.107a(d) and 60.4360a(c).

(69) ASTM D1835–87, Standard Specification for Liquefied Petroleum (LP) Gases; IBR approved for §§ 60.41b; 60.41c.

(70) ASTM D1835–91, Standard Specification for Liquefied Petroleum (LP) Gases; IBR approved for §§ 60.41Da; 60.41b; 60.41c.

(71) ASTM D1835–97, Standard Specification for Liquefied Petroleum (LP) Gases; IBR approved for §§ 60.41Da; 60.41b; 60.41c.

(72) ASTM D1835–03a, Standard Specification for Liquefied Petroleum (LP) Gases; IBR approved for §§ 60.41Da; 60.41b; 60.41c; 60.4420a.

(73) ASTM D1945–64, Standard Method for Analysis of Natural Gas by Gas Chromatography; IBR approved for § 60.45(f).

(74) ASTM D1945–76, Standard Method for Analysis of Natural Gas by Gas Chromatography; IBR approved for § 60.45(f).

(75) ASTM D1945–91, Standard Method for Analysis of Natural Gas by Gas Chromatography; IBR approved for § 60.45(f).

(76) ASTM D1945–96, Standard Method for Analysis of Natural Gas by Gas Chromatography; IBR approved for § 60.45(f).

(77) ASTM D1945–03 (Reapproved 2010), Standard Method for Analysis of Natural Gas by Gas Chromatography, approved January 1, 2010; IBR approved for §§ 60.107a(d); 60.5413(d); 60.5413a(d); 60.5413b(d); 60.5413c(d).

(78) ASTM D1945–14 (Reapproved 2019), Standard Test Method for Analysis of Natural Gas by Gas Chromatography, approved December 1, 2019; IBR approved for § 60.485b(g).

(79) ASTM D1946–77, Standard Method for Analysis of Reformed Gas by Gas Chromatography; IBR approved for §§ 60.18(f); 60.45(f); 60.564(f); 60.614(e); 60.664(e); 60.704(d).

(80) ASTM D1946–90 (Reapproved 1994), Standard Method for Analysis of Reformed Gas by Gas Chromatography; IBR approved for §§ 60.18(f); 60.45(f); 60.564(f); 60.614(e); 60.664(e); 60.704(d).

(81) ASTM D1946–90 (Reapproved 2006), Standard Method for Analysis of Reformed Gas by Gas Chromatography, approved June 1, 2006; IBR approved for § 60.107a(d).

(82) ASTM D2013–72, Standard Method of Preparing Coal Samples for Analysis; IBR approved for appendix A–7 to part 60: Method 19, Section 12.5.2.1.3.

(83) ASTM D2013–86, Standard Method of Preparing Coal Samples for Analysis; IBR approved for appendix A–7 to part 60: Method 19, Section 12.5.2.1.3.

(84) ASTM D2015–77 (Reapproved 1978), Standard Test Method for Gross Calorific Value of Solid Fuel by the Adiabatic Bomb Calorimeter; IBR approved for §§ 60.45(f); 60.46(c); and appendix A–7 to part 60: Method 19, Section 12.5.2.1.3.

(85) ASTM D2015–96, Standard Test Method for Gross Calorific Value of Solid Fuel by the Adiabatic Bomb Calorimeter; IBR approved for §§ 60.45(f); 60.46(c); and appendix A–7 to part 60: Method 19, Section 12.5.2.1.3.

(86) ASTM D2016–74, Standard Test Methods for Moisture Content of Wood; IBR approved for appendix A–8 to part 60: Method 28, Section 16.1.1.

(87) ASTM D2016–83, Standard Test Methods for Moisture Content of Wood; IBR approved for appendix A–8 to part 60: Method 28, Section 16.1.1.

(88) ASTM D2234–76, Standard Methods for Collection of a Gross Sample of Coal; IBR approved for appendix A–7 to part 60: Method 19, Section 12.5.2.1.1.

(89) ASTM D2234–96, Standard Methods for Collection of a Gross Sample of Coal; IBR approved for appendix A–7 to part 60: Method 19, Section 12.5.2.1.1.

(90) ASTM D2234–97a, Standard Methods for Collection of a Gross Sample of Coal; IBR approved for appendix A–7 to part 60: Method 19, Section 12.5.2.1.1.

(91) ASTM D2234–98, Standard Methods for Collection of a Gross Sample of Coal; IBR approved for appendix A–7 to part 60: Method 19, Section 12.5.2.1.1.

(92) ASTM D2369–81, Standard Test Method for Volatile Content of Coatings; IBR approved for appendix A–7 to part 60: Method 24, Section 6.2.

(93) ASTM D2369–87, Standard Test Method for Volatile Content of Coatings; IBR approved for appendix A–7 to part 60: Method 24, Section 6.2.

(94) ASTM D2369–90, Standard Test Method for Volatile Content of Coatings; IBR approved for appendix A–7 to part 60: Method 24, Section 6.2.

(95) ASTM D2369–92, Standard Test Method for Volatile Content of Coatings; IBR approved for appendix A–7 to part 60: Method 24, Section 6.2.

(96) ASTM D2369–93, Standard Test Method for Volatile Content of Coatings; IBR approved for appendix A–7 to part 60: Method 24, Section 6.2.

(97) ASTM D2369–95, Standard Test Method for Volatile Content of Coatings; IBR approved for appendix A–7 to part 60: Method 24, Section 6.2.

(98) ASTM D2369–10 (Reapproved 2015)e1, Standard Test Method for Volatile Content of Coatings, approved June 1, 2015; IBR approved for appendix A–7 to part 60: Method 24, Section 6.2.

(99) ASTM D2369–20, Standard Test Method for Volatile Content of Coatings, approved June 1, 2020; IBR approved for §§ 60.393a(f); 60.723(b); 60.724(a); 60.725(b); 60.723a(b); 60.724a(a); 60.725a(b).

(100) ASTM D2382–76, Heat of Combustion of Hydrocarbon Fuels by Bomb Calorimeter (High-Precision Method); IBR approved for §§ 60.18(f); 60.485(g); 60.485a(g); 60.564(f); 60.664(e); 60.704(d).

(101) ASTM D2382–88, Heat of Combustion of Hydrocarbon Fuels by Bomb Calorimeter (High-Precision Method); IBR approved for §§ 60.18(f); 60.485(g); 60.485a(g); 60.564(f); 60.704(d).

(102) ASTM D2504–67, Noncondensable Gases in C3 and Lighter Hydrocarbon Products by Gas Chromatography; IBR approved for §§ 60.485(g) and 60.485a(g).

(103) ASTM D2504–77, Noncondensable Gases in C3 and Lighter Hydrocarbon Products by Gas Chromatography; IBR approved for §§ 60.485(g) and 60.485a(g).

(104) ASTM D2504–88 (Reapproved 1993), Noncondensable Gases in C3 and Lighter Hydrocarbon Products by Gas Chromatography; IBR approved for §§ 60.485(g) and 60.485a(g).

(105) ASTM D2584–68 (Reapproved 1985), Standard Test Method for Ignition Loss of Cured Reinforced Resins; IBR approved for § 60.685(c).

(106) ASTM D2584–94, Standard Test Method for Ignition Loss of Cured Reinforced Resins; IBR approved for § 60.685(c).

(107) ASTM D2597–94 (Reapproved 1999), Standard Test Method for Analysis of Demethanized Hydrocarbon Liquid Mixtures Containing Nitrogen and Carbon Dioxide by Gas Chromatography; IBR approved for § 60.335(b).

(108) ASTM D2622–87, Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-Ray Fluorescence Spectrometry; IBR approved for § 60.106(j).

(109) ASTM D2622–94, Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-Ray Fluorescence Spectrometry; IBR approved for § 60.106(j).

(110) ASTM D2622–98, Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-Ray Fluorescence Spectrometry; IBR approved for §§ 60.106(j) and 60.335(b).

(111) ASTM D2622–05, Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-Ray Fluorescence Spectrometry; IBR approved for §§ 60.4360a(c) and 60.4415(a).

(112) ASTM D2697–22, Standard Test Method for Volume Nonvolatile Matter in Clear or Pigmented Coatings, approved July 1, 2022; IBR approved for §§ 60.393a(g); 60.723(b); 60.724(a); 60.725(b); 60.723a(b); 60.724a(a); 60.725a(b).

(113) ASTM D2879–83, Test Method for Vapor Pressure-Temperature Relationship and Initial Decomposition Temperature of Liquids by Isoteniscope, approved 1983; IBR approved for §§ 60.111b; 60.116b(e) and (f); 60.485(e); 60.485a(e); 60.5403b(d); 60.5406c(d).

(114) ASTM D2879–96, Test Method for Vapor Pressure-Temperature Relationship and Initial Decomposition Temperature of Liquids by Isoteniscope, approved 1996; IBR approved for §§ 60.111b; 60.116b(e) and (f); 60.485(e); 60.485a(e); 60.5403b(d); 60.5406c(d).

(115) ASTM D2879–97, Test Method for Vapor Pressure-Temperature Relationship and Initial Decomposition Temperature of Liquids by Isoteniscope, approved 1997; IBR approved for §§ 60.111b; 60.116b(e) and (f); 60.485(e); 60.485a(e); 60.5403b(d); 60.5406c(d).

(116) ASTM D2879–23, Standard Test Method for Vapor Pressure-Temperature Relationship and Initial Decomposition Temperature of Liquids by Isoteniscope, approved December 1, 2019; IBR approved for § 60.485b(e).

(117) ASTM D2880–78, Standard Specification for Gas Turbine Fuel Oils; IBR approved for §§ 60.111(b) and 60.111a(b).

(118) ASTM D2880–96, Standard Specification for Gas Turbine Fuel Oils; IBR Approved for §§ 60.111(b) and 60.111a(b).

(119) ASTM D2908–74, Standard Practice for Measuring Volatile Organic Matter in Water by Aqueous-Injection Gas Chromatography; IBR approved for § 60.564(j).

(120) ASTM D2908–91, Standard Practice for Measuring Volatile Organic Matter in Water by Aqueous-Injection

Gas Chromatography; IBR approved for § 60.564(j).

(121) ASTM D2986–71, Standard Method for Evaluation of Air, Assay Media by the Monodisperse DOP (Dioctyl Phthalate) Smoke Test; IBR approved for appendix A–3 to part 60: Method 5, Section 7.1.1; appendix A–5 to part 60: Method 12, Section 7.1.1; and Method 13A, Section 7.1.1.2.

(122) ASTM D2986–78, Standard Method for Evaluation of Air, Assay Media by the Monodisperse DOP (Dioctyl Phthalate) Smoke Test; IBR approved for appendix A–3 to part 60: Method 5, Section 7.1.1; appendix A–5 to part 60: Method 12, Section 7.1.1; and Method 13A, Section 7.1.1.2.

(123) ASTM D2986–95a, Standard Method for Evaluation of Air, Assay Media by the Monodisperse DOP (Dioctyl Phthalate) Smoke Test; IBR approved for appendix A–3 to part 60: Method 5, Section 7.1.1; appendix A–5 to part 60: Method 12, Section 7.1.1; and Method 13A, Section 7.1.1.2.

(124) ASTM D3173–73, Standard Test Method for Moisture in the Analysis Sample of Coal and Coke; IBR approved for appendix A–7 to part 60: Method 19, Section 12.5.2.1.3.

(125) ASTM D3173–87, Standard Test Method for Moisture in the Analysis Sample of Coal and Coke; IBR approved for appendix A–7 to part 60: Method 19, Section 12.5.2.1.3.

(126) ASTM D3176–74, Standard Method for Ultimate Analysis of Coal and Coke; IBR approved for § 60.45(f) and appendix A–7 to part 60: Method 19, Section 12.3.2.3.

(127) ASTM D3176–89, Standard Method for Ultimate Analysis of Coal and Coke; IBR approved for § 60.45(f) and appendix A–7 to part 60: Method 19, Section 12.3.2.3.

(128) ASTM D3177–75, Standard Test Method for Total Sulfur in the Analysis Sample of Coal and Coke; IBR approved for appendix A–7 to part 60: Method 19, Section 12.5.2.1.3.

(129) ASTM D3177–89, Standard Test Method for Total Sulfur in the Analysis Sample of Coal and Coke; IBR approved for appendix A–7 to part 60: Method 19, Section 12.5.2.1.3.

(130) ASTM D3178–73 (Reapproved 1979), Standard Test Methods for Carbon and Hydrogen in the Analysis Sample of Coal and Coke; IBR approved for § 60.45(f).

(131) ASTM D3178–89, Standard Test Methods for Carbon and Hydrogen in the Analysis Sample of Coal and Coke; IBR approved for § 60.45(f).

(132) ASTM D3246–81, Standard Test Method for Sulfur in Petroleum Gas by Oxidative Microcoulometry; IBR approved for § 60.335(b).

(133) ASTM D3246–92, Standard Test Method for Sulfur in Petroleum Gas by Oxidative Microcoulometry; IBR approved for § 60.335(b).

(134) ASTM D3246–96, Standard Test Method for Sulfur in Petroleum Gas by Oxidative Microcoulometry; IBR approved for § 60.335(b).

(135) ASTM D3246–05, Standard Test Method for Sulfur in Petroleum Gas by Oxidative Microcoulometry; IBR approved for §§ 60.4360a(c) and 60.4415(a).

(136) ASTM D3270–73T, Standard Test Methods for Analysis for Fluoride Content of the Atmosphere and Plant Tissues (Semiautomated Method); IBR approved for appendix A–5 to part 60: Method 13A, Section 16.1.

(137) ASTM D3270–80, Standard Test Methods for Analysis for Fluoride Content of the Atmosphere and Plant Tissues (Semiautomated Method); IBR approved for appendix A–5 to part 60: Method 13A, Section 16.1.

(138) ASTM D3270–91, Standard Test Methods for Analysis for Fluoride Content of the Atmosphere and Plant Tissues (Semiautomated Method); IBR approved for appendix A–5 to part 60: Method 13A, Section 16.1.

(139) ASTM D3270–95, Standard Test Methods for Analysis for Fluoride Content of the Atmosphere and Plant Tissues (Semiautomated Method); IBR approved for appendix A–5 to part 60: Method 13A, Section 16.1.

(140) ASTM D3286–85, Standard Test Method for Gross Calorific Value of Coal and Coke by the Isoperibol Bomb Calorimeter; IBR approved for appendix A–7 to part 60: Method 19, Section 12.5.2.1.3.

(141) ASTM D3286–96, Standard Test Method for Gross Calorific Value of Coal and Coke by the Isoperibol Bomb Calorimeter; IBR approved for appendix A–7 to part 60: Method 19, Section 12.5.2.1.3.

(142) ASTM D3370–76, Standard Practices for Sampling Water; IBR approved for § 60.564(j).

(143) ASTM D3370–95a, Standard Practices for Sampling Water; IBR approved for § 60.564(j).

(144) ASTM D3588–98 (Reapproved 2003), Standard Practice for Calculating Heat Value, Compressibility Factor, and Relative Density of Gaseous Fuels, approved May 10, 2003; IBR approved for §§ 60.107a(d); 60.4360a(c); 60.5413(d); 60.5413a(d); 60.5413b(d); 60.5413c(d).

(145) ASTM D3699–08, Standard Specification for Kerosine, including Appendix X1, approved September 1, 2008; IBR approved for §§ 60.41b; 60.41c; 60.4420a; 60.5580; 60.5580a.

(146) ASTM D3792–79, Standard Test Method for Water Content of Water-Reducible Paints by Direct Injection into a Gas Chromatograph; IBR approved for appendix A–7 to part 60: Method 24, Section 6.3.

(147) ASTM D3792–91, Standard Test Method for Water Content of Water-Reducible Paints by Direct Injection into a Gas Chromatograph; IBR approved for appendix A–7 to part 60: Method 24, Section 6.3.

(148) ASTM D4017–81, Standard Test Method for Water in Paints and Paint Materials by the Karl Fischer Titration Method; IBR approved for appendix A–7 to part 60: Method 24, Section 6.4.

(149) ASTM D4017–90, Standard Test Method for Water in Paints and Paint Materials by the Karl Fischer Titration Method; IBR approved for appendix A–7 to part 60: Method 24, Section 6.4.

(150) ASTM D4017–96a, Standard Test Method for Water in Paints and Paint Materials by the Karl Fischer Titration Method; IBR approved for appendix A–7 to part 60: Method 24, Section 6.4.

(151) ASTM D4057–81, Standard Practice for Manual Sampling of Petroleum and Petroleum Products; IBR approved for appendix A–7 to part 60: Method 19, Section 12.5.2.2.3.

(152) ASTM D4057–95, Standard Practice for Manual Sampling of Petroleum and Petroleum Products; IBR approved for appendix A–7 to part 60: Method 19, Section 12.5.2.2.3.

(153) ASTM D4057–95 (Reapproved 2000), Standard Practice for Manual Sampling of Petroleum and Petroleum Products; IBR approved for §§ 60.4360a(b) and 60.4415(a).

(154) ASTM D4084–82, Standard Test Method for Analysis of Hydrogen Sulfide in Gaseous Fuels (Lead Acetate Reaction Rate Method); IBR approved for § 60.334(h).

(155) ASTM D4084–94, Standard Test Method for Analysis of Hydrogen Sulfide in Gaseous Fuels (Lead Acetate Reaction Rate Method); IBR approved for § 60.334(h).

(156) ASTM D4084–05, Standard Test Method for Analysis of Hydrogen Sulfide in Gaseous Fuels (Lead Acetate Reaction Rate Method); IBR approved for §§ 60.4360; 60.4360a(c); 60.4415(a).

(157) ASTM D4177–95, Standard Practice for Automatic Sampling of Petroleum and Petroleum Products; IBR approved for appendix A–7 to part 60: Method 19, Section 12.5.2.2.1.

(158) ASTM D4177–95 (Reapproved 2000), Standard Practice for Automatic Sampling of Petroleum and Petroleum Products; IBR approved for §§ 60.4360a(b) and 60.4415(a).

(159) ASTM D4239–85, Standard Test Methods for Sulfur in the Analysis Sample of Coal and Coke Using High Temperature Tube Furnace Combustion Methods; IBR approved for appendix A–7 to part 60: Method 19, Section 12.5.2.1.3.

(160) ASTM D4239–94, Standard Test Methods for Sulfur in the Analysis Sample of Coal and Coke Using High Temperature Tube Furnace Combustion Methods; IBR approved for appendix A–7 to part 60: Method 19, Section 12.5.2.1.3.

(161) ASTM D4239–97, Standard Test Methods for Sulfur in the Analysis Sample of Coal and Coke Using High Temperature Tube Furnace Combustion Methods; IBR approved for appendix A–7 to part 60: Method 19, Section 12.5.2.1.3.

(162) ASTM D4294–02, Standard Test Method for Sulfur in Petroleum and Petroleum Products by Energy-Dispersive X-Ray Fluorescence Spectrometry; IBR approved for § 60.335(b).

(163) ASTM D4294–03, Standard Test Method for Sulfur in Petroleum and Petroleum Products by Energy-Dispersive X-Ray Fluorescence Spectrometry; IBR approved for §§ 60.4360a(c) and 60.4415(a).

(164) ASTM D4442–84, Standard Test Methods for Direct Moisture Content Measurement in Wood and Wood-base Materials; IBR approved for appendix A–8 to part 60: Method 28, Section 16.1.1.

(165) ASTM D4442–92, Standard Test Methods for Direct Moisture Content Measurement in Wood and Wood-base Materials; IBR approved for appendix A–8 to part 60: Method 28, Section 16.1.1.

(166) ASTM D4444–92, Standard Test Methods for Use and Calibration of Hand-Held Moisture Meters; IBR approved for appendix A–8 to part 60: Method 28, Section 16.1.1.

(167) ASTM D4457–85 (Reapproved 1991), Test Method for Determination of Dichloromethane and 1,1,1-Trichloroethane in Paints and Coatings by Direct Injection into a Gas Chromatograph; IBR approved for appendix A–7 to part 60: Method 24, Section 6.5.

(168) ASTM D4468–85 (Reapproved 2000), Standard Test Method for Total Sulfur in Gaseous Fuels by Hydrogenolysis and Rateometric Colorimetry; IBR approved for §§ 60.335(b); 60.4360a(c); 60.4415(a).

(169) ASTM D4468–85 (Reapproved 2006), Standard Test Method for Total Sulfur in Gaseous Fuels by Hydrogenolysis and Rateometric Colorimetry, approved June 1, 2006; IBR approved for § 60.107a(e).

(170) ASTM D4629–02, Standard Test Method for Trace Nitrogen in Liquid Petroleum Hydrocarbons by Syringe/Inlet Oxidative Combustion and Chemiluminescence Detection; IBR approved for §§ 60.49b(e) and 60.335(b).

(171) ASTM D4809–95, Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter (Precision Method); IBR approved for §§ 60.18(f); 60.485(g); 60.485a(g); 60.564(f); 60.704(d).

(172) ASTM D4809–06, Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter (Precision Method), approved December 1, 2006; IBR approved for § 60.107a(d).

(173) ASTM D4809–18, Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter (Precision Method), approved July 1, 2018; IBR approved for §§ 60.485b(g) and 60.4360a(c).

(174) ASTM D4810–88 (Reapproved 1999), Standard Test Method for Hydrogen Sulfide in Natural Gas Using Length of Stain Detector Tubes; IBR approved for §§ 60.4360; 60.4360a(c); 60.4415(a).

(175) ASTM D4840–99(2018)e1, Standard Guide for Sample Chain-of-Custody Procedures, approved August 2018; IBR approved for Appendix A–7: Method 23, Section 8.2.12.

(176) ASTM D4891–89 (Reapproved 2006), Standard Test Method for Heating Value of Gases in Natural Gas Range by Stoichiometric Combustion, approved June 1, 2006; IBR approved for §§ 60.107a(d); 60.4360a(c); 60.5413(d); 60.5413a(d); 60.5413b(d); 60.5413c(d).

(177) ASTM D5066–91 (Reapproved 2017), Standard Test Method for Determination of the Transfer Efficiency Under Production Conditions for Spray Application of Automotive Paints—Weight Basis, approved June 1, 2017; IBR approved for § 60.393a(h).

(178) ASTM D5087–02 (Reapproved 2021), Standard Test Method for Determining Amount of Volatile Organic Compound (VOC) Released from Solventborne Automotive Coatings and Available for Removal in a VOC Control Device (Abatement), approved February 1, 2021; IBR approved for § 60.397a(e) and appendix A to subpart MMa.

(179) ASTM D5287–97 (Reapproved 2002), Standard Practice for Automatic Sampling of Gaseous Fuels; IBR approved for §§ 60.4360a(b) and 60.4415(a).

(180) ASTM D5403–93, Standard Test Methods for Volatile Content of Radiation Curable Materials; IBR approved for appendix A–7 to part 60: Method 24, Section 6.6.

(181) ASTM D5453–00, Standard Test Method for Determination of Total Sulfur in Light Hydrocarbons, Motor Fuels and Oils by Ultraviolet Fluorescence; IBR approved for § 60.335(b).

(182) ASTM D5453–05, Standard Test Method for Determination of Total Sulfur in Light Hydrocarbons, Motor Fuels and Oils by Ultraviolet Fluorescence; IBR approved for §§ 60.4360a(c) and 60.4415(a).

(183) ASTM D5504–01, Standard Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Chemiluminescence; IBR approved for §§ 60.334(h) and 60.4360.

(184) ASTM D5504–08, Standard Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Chemiluminescence, approved June 15, 2008; IBR approved for § 60.107a(e).

(185) ASTM D5504–20, Standard Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Chemiluminescence, approved November 1, 2020; IBR approved for § 60.4360a(c).

(186) ASTM D5623–19, Standard Test Method for Sulfur Compounds in Light Petroleum Liquids by Gas Chromatography and Sulfur Selective Detection, approved July 1, 2019; IBR approved for § 60.4415(a).

(187) ASTM D5623–24, Standard Test Method for Sulfur Compounds in Light Petroleum Liquids by Gas Chromatography and Sulfur Selective Detection, approved March 1, 2024; IBR approved for § 60.4360a(c).

(188) ASTM D5762–02, Standard Test Method for Nitrogen in Petroleum and Petroleum Products by Boat-Inlet Chemiluminescence; IBR approved for § 60.335(b).

(189) ASTM D5865–98, Standard Test Method for Gross Calorific Value of Coal and Coke; IBR approved for §§ 60.45(f); 60.46(c); and appendix A–7 to part 60: Method 19, Section 12.5.2.1.3.

(190) ASTM D5865–10, Standard Test Method for Gross Calorific Value of Coal and Coke, approved January 1, 2010; IBR approved for §§ 60.45(f); 60.46(c); and appendix A–7 to part 60: Method 19, section 12.5.2.1.3.

(191) ASTM D5965–02 (Reapproved 2013), Standard Test Methods for Specific Gravity of Coating Powders, approved June 1, 2013; IBR approved for § 60.393a(f).

(192) ASTM D6093–97 (Reapproved 2016), Standard Test Method for Percent Volume Nonvolatile Matter in Clear or

Pigmented Coatings Using a Helium Gas Pycnometer, approved December 1, 2016; IBR approved for §§ 60.393a(g); 60.723(b); 60.724(a); 60.725(b); 60.723a(b); 60.724a(a); 60.725a(b).

(193) ASTM D6216–20, Standard Practice for Opacity Monitor Manufacturers to Certify Conformance with Design and Performance Specifications, approved September 1, 2020; IBR approved for appendix B to part 60.

(194) ASTM D6228–98, Standard Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Flame Photometric Detection; IBR approved for § 60.334(h).

(195) ASTM D6228–98 (Reapproved 2003), Standard Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Flame Photometric Detection; IBR approved for §§ 60.4360; 60.4360a(c); 60.4415(a).

(196) ASTM D6266–00a (Reapproved 2017), Standard Test Method for Determining the Amount of Volatile Organic Compound (VOC) Released from Waterborne Automotive Coatings and Available for Removal in a VOC Control Device (Abatement), approved July 1, 2017; IBR approved for § 60.397a(e).

(197) ASTM D6348–03, Standard Test Method for Determination of Gaseous Compounds by Extractive Direct Interface Fourier Transform Infrared (FTIR) Spectroscopy, approved October 1, 2003; IBR approved for § 60.73a(b); table 7 to subpart IIII; table 2 to subpart JJJJ; § 60.4245(d).

(198) ASTM D6348–12e1, Standard Test Method for Determination of Gaseous Compounds by Extractive Direct Interface Fourier Transform Infrared (FTIR) Spectroscopy, approved February 1, 2012; IBR approved for § 60.5413c(b).

(199) ASTM D6348–12 (Reapproved 2020), Standard Test Method for Determination of Gaseous Compounds by Extractive Direct Interface Fourier Transform Infrared (FTIR) Spectroscopy, approved December 1, 2020; IBR approved for §§ 60.4400(a) and 60.4400a(b).

(200) ASTM D6366–99, Standard Test Method for Total Trace Nitrogen and Its Derivatives in Liquid Aromatic Hydrocarbons by Oxidative Combustion and Electrochemical Detection; IBR approved for § 60.335(b).

(201) ASTM D6377–20, Standard Test Method for Determination of Vapor Pressure of Crude Oil: $VPCR_X$ (Expansion Method), approved June 1, 2020; IBR approved for § 60.113c(d).

(202) ASTM D6378–22, Standard Test Method for Determination of Vapor Pressure (VPX) of Petroleum Products, Hydrocarbons, and Hydrocarbon-Oxygenate Mixtures (Triple Expansion Method), approved July 1, 2022; IBR approved for § 60.113c(d).

(203) ASTM D6420–99 (Reapproved 2004), Standard Test Method for Determination of Gaseous Organic Compounds by Direct Interface Gas Chromatography-Mass Spectrometry, approved October 1, 2004; IBR approved for § 60.107a(d).

(204) ASTM D6420–18, Standard Test Method for Determination of Gaseous Organic Compounds by Direct Interface Gas Chromatography-Mass Spectrometry, approved November 1, 2018; IBR approved for §§ 60.485(g); 60.485a(g); 60.485b(g); 60.611a; 60.614(b) and (e); 60.614a(b) and (e), 60.664(b) and (e); 60.664a(b) and (f); 60.700(c); 60.704(b) (d), and (h); 60.705(l); 60.704a(b) and (f).

(205) ASTM D6522–00, Standard Test Method for Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Concentrations in Emissions from Natural Gas-Fired Reciprocating Engines, Combustion Turbines, Boilers, and Process Heaters Using Portable Analyzers; IBR approved for §§ 60.335(a) and (b).

(206) ASTM D6522–00 (Reapproved 2005), Standard Test Method for Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Concentrations in Emissions from Natural Gas-Fired Reciprocating Engines, Combustion Turbines, Boilers, and Process Heaters Using Portable Analyzers, approved October 1, 2005; IBR approved for table 2 to subpart JJJJ, §§ 60.5413(b); 60.5413a(b).

(207) ASTM D6522–11 Standard Test Method for Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Concentrations in Emissions from Natural Gas-Fired Reciprocating Engines, Combustion Turbines, Boilers, and Process Heaters Using Portable Analyzers, approved December 1, 2011; IBR approved for §§ 60.37f(a) and 60.766(a).

(208) ASTM D6522–20, Standard Test Method for Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Concentrations in Emissions from Natural Gas-Fired Reciprocating Engines, Combustion Turbines, Boilers, and Process Heaters Using Portable Analyzers, approved June 1, 2020; IBR approved for §§ 60.4400(a); 60.4400a(b); 60.5413b(b); 60.5413c(b).

(209) ASTM D6667–01, Standard Test Method for Determination of Total Volatile Sulfur in Gaseous Hydrocarbons and Liquefied Petroleum Gases by Ultraviolet Fluorescence; IBR approved for § 60.335(b).

(210) ASTM D6667–04, Standard Test Method for Determination of Total Volatile Sulfur in Gaseous Hydrocarbons and Liquefied Petroleum Gases by Ultraviolet Fluorescence; IBR approved for §§ 60.4360a(c) and 60.4415(a).

(211) ASTM D6751–11b, Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels, including Appendices X1 through X3, approved July 15, 2011; IBR approved for §§ 60.41b; 60.41c; 60.4420a; 60.5580; 60.5580a.

(212) ASTM D6784–02, Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury in Flue Gas Generated from Coal-Fired Stationary Sources (Ontario Hydro Method); IBR approved for § 60.56c(b).

(213) ASTM D6784–02 (Reapproved 2008), Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury in Flue Gas Generated from Coal-Fired Stationary Sources (Ontario Hydro Method), approved April 1, 2008; IBR approved for § 60.56c(b).

(214) ASTM D6784–16, Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury in Flue Gas Generated from Coal-Fired Stationary Sources (Ontario Hydro Method), approved March 1, 2016; IBR approved for appendix B to part 60.

(215) ASTM D6911–15 Standard Guide for Packaging and Shipping Environmental Samples for Laboratory Analysis, approved January 15, 2015; IBR approved for Appendix A–7: Method 23, Section 8.2.11; Appendix A–8: Method 30B, Section 8.3.3.8.

(216) ASTM D7039–15a, Standard Test Method for Sulfur in Gasoline, Diesel Fuel, Jet Fuel, Kerosine, Biodiesel, Biodiesel Blends, and Gasoline-Ethanol Blends by Monochromatic Wavelength Dispersive X-ray Fluorescence Spectrometry, approved July 1, 2015; IBR approved for § 60.4415(a).

(217) ASTM D7039–24, Standard Test Method for Sulfur in Gasoline, Diesel Fuel, Jet Fuel, Kerosine, Biodiesel, Biodiesel Blends, and Gasoline-Ethanol Blends by Monochromatic Wavelength Dispersive X-ray Fluorescence Spectrometry, approved December 1, 2024; IBR approved for § 60.4360a(c).

(218) ASTM D7467–10, Standard Specification for Diesel Fuel Oil, Biodiesel Blend (B6 to B20), including Appendices X1 through X3, approved August 1, 2010; IBR approved for §§ 60.41b; 60.41c; 60.4420a; 60.5580; 60.5580a.

(219) ASTM D7520–16, Standard Test Method for Determining the Opacity of a Plume in the Outdoor Ambient Atmosphere, approved April 1, 2016; IBR approved for §§ 60.123(c); 60.123a(c); 60.271(k); 60.272(a) and (b); 60.273(c) and (d); 60.274(i); 60.275(e); 60.276(c); 60.271a; 60.272a(a) and (b); 60.273a(c) and (d); 60.274a(h); 60.275a(e); 60.276a(f); 60.271b; 60.272b(a) and (b); 60.273b(c) and (d); 60.274b(h); 60.275b(e); 60.276b(f); 60.374a(d); 60.2972(a); tables 1, 1a, and 1b to subpart EEEE; § 60.3067(a); tables 2 and 2a to subpart FFFF.

(220) ASTM E168–67, General Techniques of Infrared Quantitative Analysis; IBR approved for §§ 60.485a(d); 60.593(b); 60.593a(b); 60.632(f).

(221) ASTM E168–77, General Techniques of Infrared Quantitative Analysis; IBR approved for §§ 60.485a(d); 60.593(b); 60.593a(b); 60.632(f).

(222) ASTM E168–92, General Techniques of Infrared Quantitative Analysis; IBR approved for §§ 60.485a(d); 60.593(b); 60.593a(b); 60.632(f); 60.5400; 60.5400a(f).

(223) ASTM E168–16 (Reapproved 2023), Standard Practices for General Techniques of Infrared Quantitative Analysis, approved January 1, 2023; IBR approved for §§ 60.485b(d); 60.5400b(a); 60.5400c(a); 60.5401c(a).

(224) ASTM E169–63, General Techniques of Ultraviolet Quantitative Analysis; IBR approved for §§ 60.485a(d); 60.593(b); 60.593a(b); 60.632(f).

(225) ASTM E169–77, General Techniques of Ultraviolet Quantitative Analysis; IBR approved for §§ 60.485a(d); 60.593(b); 60.593a(b); 60.632(f).

(226) ASTM E169–93, General Techniques of Ultraviolet Quantitative Analysis, approved May 15, 1993; IBR approved for §§ 60.485a(d); 60.593(b); 60.593a(b); 60.632(f); 60.5400(f); 60.5400a(f).

(227) ASTM E169–16 (Reapproved 2022), Standard Practices for General Techniques of Ultraviolet-Visible Quantitative Analysis, approved November 1, 2022; IBR approved for § 60.485b(d), 60.5400b(a); 60.5401b(a); 60.5400c(a); 60.5401c(a).

(228) ASTM E260–73, General Gas Chromatography Procedures; IBR approved for §§ 60.485a(d); 60.593(b); 60.593a(b); 60.632(f).

(229) ASTM E260–91, General Gas Chromatography Procedures; IBR approved for §§ 60.485a(d); 60.593(b); 60.593a(b); 60.632(f).

(230) ASTM E260–96, General Gas Chromatography Procedures, approved April 10, 1996; IBR approved for §§ 60.485a(d); 60.593(b); 60.593a(b); 60.632(f); 60.5400(f); 60.5400a(f); 60.5406(b); 60.5406a(b)(3); 60.5400b(a)(2); 60.5401b(a)(2); 60.5406b(b)(3); 60.5400c(a); 60.5401c(a).

(231) ASTM E260–96 (Reapproved 2019), Standard Practice for Packed Column Gas Chromatography, approved September 1, 2019; IBR approved for § 60.485b(d).

(232) ASTM E617–13, Standard Specification for Laboratory Weights and Precision Mass Standards, approved May 1, 2013; IBR approved for appendix A–3: Methods 4, 5, 5H, 5I, and appendix A–8: Method 29.

(233) ASTM E871–82 (Reapproved 2013), Standard Test Method for Moisture Analysis of Particulate Wood Fuels, approved August 15, 2013; IBR approved for appendix A–8: Method 28R.

(234) ASTM E1584–11, Standard Test Method for Assay of Nitric Acid, approved August 1, 2011; IBR approved for § 60.73a(c).

(235) ASTM E2515–11, Standard Test Method for Determination of Particulate Matter Emissions Collected by a Dilution Tunnel, approved November 1, 2011; IBR approved for §§ 60.534(c) and (d); 60.5476(f).

(236) ASTM E2618–13 Standard Test Method for Measurement of Particulate Matter Emissions and Heating Efficiency of Outdoor Solid Fuel-Fired Hydronic Heating Appliances, approved September 1, 2013; IBR approved for § 60.5476(g).

(237) ASTM E2779–10, Standard Test Method for Determining Particulate Matter Emissions from Pellet Heaters, approved October 1, 2010; IBR approved for § 60.534(a) and (f).

(238) ASTM E2780–10, Standard Test Method for Determining Particulate Matter Emissions from Wood Heaters, approved October 1, 2010; IBR approved for appendix A: Method 28R.

(239) ASTM UOP539–97, Refinery Gas Analysis by Gas Chromatography, (Copyright 1997); IBR approved for § 60.107a(d).

* * * * *

(m) * * *

(1) GPA Midstream Standard 2140–17 (GPA 2140–17), Liquified Petroleum Gas Specifications and Test Methods (Revised 2017); IBR approved for §§ 60.4360a(c) and 60.4415(a).

(2) GPA Midstream Standard 2166–17 (GPA 2166–17), Obtaining Natural Gas Samples for Analysis by Gas Chromatography, (Reaffirmed 2017); IBR approved for §§ 60.4360a(b) and 60.4415(a).

(3) GPA Standard 2172–09 (GPA 2172–09), Calculation of Gross Heating Value, Relative Density, Compressibility and Theoretical Hydrocarbon Liquid Content for Natural Gas Mixtures for Custody Transfer (2009); IBR approved for §§ 60.107a(d) and 60.4360a(c).

(4) GPA Standard 2174–14 (GPA 2174–14), Obtaining Liquid Hydrocarbon Samples for Analysis by Gas Chromatography, (Revised 2014); IBR approved for §§ 60.4360a(b) and 60.4415(a).

* * * * *

(6) GPA Standard 2377–86 (GPA 2377–84), Test for Hydrogen Sulfide and Carbon Dioxide in Natural Gas Using Length of Stain Tubes, 1986 Revision; IBR approved for §§ 60.105(b); 60.107a(b); 60.334(h); 60.4360; 60.4360a(c); and 60.4415(a).

* * * * *

Subpart GG—Standards of Performance for Stationary Gas Turbines

■ 3. Amend § 60.330 by revising paragraph (a) and adding paragraphs (c) through (e) to read as follows:

§ 60.330 Applicability and designation of affected facility.

(a) Except as provided for in paragraphs (c) through (e) of this section, the provisions of this subpart are applicable to the following affected facilities: All stationary gas turbines with a heat input at peak load equal to or greater than 10.7 gigajoules (10 million Btu) per hour, based on the lower heating value of the fuel fired.

* * * * *

(c) As an alternative to being subject to this subpart, the owner or operator of a stationary combustion turbine meeting the applicability of this subpart may petition the Administrator (in writing) to become subject to the requirements for modified units in subpart KKKKa of this part. If the Administrator grants the petition, the affected facility is no longer subject to this subpart and is subject to (unless the unit is modified or reconstructed in the future) the requirements for modified units in subpart KKKKa of this part. The Administrator can only grant the petition if it is determined that compliance with subpart KKKKa of this part would be equivalent to, or more stringent than, compliance with this subpart.

(d) Stationary gas turbines subject to subpart Da, KKKK, or KKKKa of this part are not subject to this subpart.

(e) A combustion turbine that is subject to this subpart and is not a ''major source'' or located at a ''major source'' (as that term is defined at 42

U.S.C. 7661 (2)) is exempt from the requirements of 42 U.S.C. 7661a(a).

■ 4. Amend § 60.331 by:
■ a. Revising paragraphs (a) and (g);
■ b. Removing and reserving paragraphs (m) and (n); and
■ c. Revising paragraphs (p) and (u).

The revisions read as follows:

§ 60.331 Definitions.

* * * * *

(a) *Stationary gas turbine* means any simple cycle gas turbine, regenerative cycle gas turbine, or any gas turbine portion of a combined cycle steam/electric generating system that is not self-propelled. It may, however, be mounted on a vehicle for portability. Portable combustion turbines are excluded from the definition of ''stationary combustion turbine,'' and not regulated under this part, if the turbine meets the definition of ''nonroad engine'' under title II of the Clean Air Act and applicable regulations and is certified to meet emission standards promulgated pursuant to title II of the Clean Air Act, along with all related requirements.

* * * * *

(g) *ISO standard day conditions* means 288 degrees Kelvin (15 °C, 59 °F), 60 percent relative humidity, and 101.3 kilopascals (14.69 psi, 1 atm) pressure.

* * * * *

(p) *Gas turbine model* means a group of gas turbines having the same nominal air flow, combustor inlet pressure, combustor inlet temperature, firing temperature, turbine inlet temperature, and turbine inlet pressure.

* * * * *

(u) *Natural gas* means a fluid mixture of hydrocarbons (*e.g.,* methane, ethane, or propane) that maintains a gaseous state at standard atmospheric temperature and pressure under ordinary conditions. Natural gas contains 20.0 grains or less of total sulfur per 100 standard cubic feet. Equivalents of this in other units are as follows: 0.068 weight percent total sulfur, 680 parts per million by weight (ppmw) total sulfur, and 338 parts per million by volume (ppmv) at 15.5 degrees Celsius total sulfur. Additionally, natural gas must be composed of at least 70 percent methane by volume and have a gross calorific value between 950 and 1100 British thermal units (Btu) per standard cubic foot. Unless refined to meet the definition of natural gas in this paragraph (u), natural gas does not include the following gaseous fuels: landfill gas, digester gas, refinery gas, sour gas, blast furnace gas, coal-derived gas, producer gas, coke oven gas, or any gaseous fuel produced in a process which might result in highly variable sulfur content or heating value.

* * * * *

■ 5. Amend § 60.332 by revising paragraphs (f) through (h) to read as follows:

§ 60.332 Standard for nitrogen oxides.

* * * * *

(f) Stationary gas turbines using water or steam injection for control of NO_X emissions are exempt from paragraph (a) of this section when ice fog is deemed a traffic hazard by the owner or operator of the gas turbine.

(g) Emergency gas turbines, military gas turbines for use in other than a garrison facility, military gas turbines installed for use as military training facilities, and firefighting gas turbines are exempt from paragraph (a) of this section.

(h) Stationary gas turbines engaged by manufacturers in research and development of equipment for both gas turbine emission control techniques and gas turbine efficiency improvements are exempt from paragraph (a) of this section on a case-by-case basis as determined by the Administrator.

* * * * *

■ 6. Amend § 60.333 by revising the introductory text and paragraph (a) and adding paragraph (c) to read as follows:

§ 60.333 Standard for sulfur dioxide.

Except as provided in paragraph (c) of this section, on and after the date on which the performance test required to be conducted by § 60.8 is completed, every owner or operator subject to the provisions of this subpart shall comply with one or the other of the following conditions in paragraphs (a) and (b) of this section:

(a) No owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere from any stationary gas turbine any gases which contain sulfur dioxide in excess of 0.015 percent by volume at 15 percent oxygen and on a dry basis; or

* * * * *

(c) Stationary gas turbines subject to either subpart J or Ja of this part are not subject to the SO_2 standards in this subpart.

■ 7. Amend § 60.334 by revising paragraphs (b)(3)(iii), (h)(1), and (j)(3) and adding paragraph (k) to read as follows:

§ 60.334 Monitoring of operations.

* * * * *

(b) * * *

(3) * * *

(iii) If the owner or operator has installed a NO_X CEMS to meet the requirements of part 75 of this chapter, and is continuing to meet the ongoing requirements of part 75, the CEMS may be used to meet the requirements of this section, except that the missing data substitution methodology provided for at subpart D of part 75, is not required for purposes of identifying excess emissions. Instead, periods of missing CEMS data are to be reported as monitor downtime in the excess emissions and monitoring performance report required in § 60.7(c). For affected units that are also regulated under part 75, the NO_X emission rate may be monitored using a NO_X diluent CEMS that is installed and certified in accordance with appendix A to part 75 and the QA program in appendix E to part 75, or the low mass emissions methodology in § 75.19 of this chapter.

* * * * *

(h) * * *

(1) Shall monitor the total sulfur content of the fuel being fired in the turbine, except as provided in paragraph (h)(3) of this section. The sulfur content of the fuel must be determined using total sulfur methods described in § 60.335(b)(10). Alternatively, if the total sulfur content of the gaseous fuel during the most recent performance test was less than 0.4 weight percent (4,000 ppmw), ASTM D4084–82, D4084–94, D5504–01, D6228–98, or Gas Processors Association Standard 2377–86 (all of which are incorporated by reference, see § 60.17), which measure the major sulfur compounds may be used; and

* * * * *

(j) * * *

(3) *Ice fog.* Each period during which an exemption provided in § 60.332(f) is in effect shall be reported in writing to the Administrator in the semiannual report described in paragraph (k)(3) of this section. For each period, the ambient conditions existing during the period, the date and time the air pollution control system was deactivated, and the date and time the air pollution control system was reactivated shall be reported.

* * * * *

(k) The reporting requirements for this subpart shall be as follows:

(1) *Reporting frequency.* All reports required under § 60.7(c) must be electronically submitted via the Compliance and Emissions Data Reporting Interface (CEDRI) by the 30th day following the end of each 6-month period.

(2) *Electronic reporting.* Beginning on March 16, 2026, within 60 days after the date of completing each performance test or CEMS performance evaluation that includes a RATA, you must submit

the results following the procedures specified in paragraph (k)(4) of this section. You must submit the report in a file format generated using the EPA's Electronic Reporting Tool (ERT). Alternatively, you may submit an electronic file consistent with the extensible markup language (XML) schema listed on the EPA's ERT website (*https://www.epa.gov/electronic-reporting-air-emissions/electronic-reporting-tool-ert*) accompanied by the other information required by § 60.8(f)(2) in PDF format.

(3) *General reporting requirements.* You must submit to the Administrator semiannual reports of the following recorded information. Beginning on January 15, 2027, or once the report template for this subpart has been available on the CEDRI website (*https://www.epa.gov/electronic-reporting-air-emissions/cedri*) for one year, whichever date is later, submit all subsequent reports using the appropriate electronic report template on the CEDRI website for this subpart and following the procedure specified in paragraph (k)(4) of this section. The date report templates become available will be listed on the CEDRI website. Unless the Administrator or delegated State agency or other authority has approved a different schedule for submission of reports, the report must be submitted by the deadline specified in this subpart, regardless of the method in which the report is submitted.

(4) *CEDRI and CBI.* If you are required to submit notifications or reports following the procedure specified in this paragraph (k)(4), you must submit notifications or reports to the EPA via CEDRI, which can be accessed through the EPA's Central Data Exchange (CDX) (*https://cdx.epa.gov/*). The EPA will make all the information submitted through CEDRI available to the public without further notice to you. Do not use CEDRI to submit information you claim as CBI. Although we do not expect persons to assert a claim of CBI, if you wish to assert a CBI claim for some of the information in the report or notification, you must submit a complete file in the format specified in this subpart, including information claimed to be CBI, to the EPA following the procedures in paragraphs (k)(4)(i) and (ii) of this section. Clearly mark the part or all of the information that you claim to be CBI. Information not marked as CBI may be authorized for public release without prior notice. Information marked as CBI will not be disclosed except in accordance with procedures set forth in 40 CFR part 2. All CBI claims must be asserted at the time of submission. Anything submitted using CEDRI cannot later be claimed CBI. Furthermore, under CAA section 114(c), emissions data is not entitled to confidential treatment, and the EPA is required to make emissions data available to the public. Thus, emissions data will not be protected as CBI and will be made publicly available. You must submit the same file submitted to the CBI office with the CBI omitted to the EPA via the EPA's CDX as described earlier in this paragraph (k)(4).

(i) The preferred method to receive CBI is for it to be transmitted electronically using email attachments, File Transfer Protocol, or other online file sharing services. Electronic submissions must be transmitted directly to the OAQPS CBI Office at the email address *oaqps_cbi@epa.gov,* and as described above, should include clear CBI markings. ERT files should be flagged to the attention of the Group Leader, Measurement Policy Group; all other files should be flagged to the attention of the Stationary Combustion Turbine Sector Lead. If assistance is needed with submitting large electronic files that exceed the file size limit for email attachments, and if you do not have your own file sharing service, please email *oaqps_cbi@epa.gov* to request a file transfer link.

(ii) If you cannot transmit the file electronically, you may send CBI information through the postal service to the following address: U.S. EPA, Attn: OAQPS Document Control Office, Mail Drop: C404–02, 109 T.W. Alexander Drive, P.O. Box 12055, RTP, NC 27711. In addition to the OAQPS Document Control Officer, ERT files should also be sent to the attention of the Group Leader, Measurement Policy Group, and all other files should also be sent to the attention of the Stationary Combustion Turbine Sector Lead. The mailed CBI material should be double wrapped and clearly marked. Any CBI markings should not show through the outer envelope.

(5) *System outage.* If you are required to electronically submit a report through CEDRI in the EPA's CDX, you may assert a claim of EPA system outage for failure to timely comply with that reporting requirement. To assert a claim of EPA system outage, you must meet the requirements outlined in paragraphs (k)(5)(i) through (vii) of this section.

(i) You must have been or will be precluded from accessing CEDRI and submitting a required report within the time prescribed due to an outage of either the EPA's CEDRI or CDX systems.

(ii) The outage must have occurred within the period of time beginning 5 business days prior to the date that the submission is due.

(iii) The outage may be planned or unplanned.

(iv) You must submit notification to the Administrator in writing as soon as possible following the date you first knew, or through due diligence should have known, that the event may cause or has caused a delay in reporting.

(v) You must provide to the Administrator a written description identifying:

(A) The date(s) and time(s) when CDX or CEDRI was accessed and the system was unavailable;

(B) A rationale for attributing the delay in reporting beyond the regulatory deadline to EPA system outage;

(C) A description of measures taken or to be taken to minimize the delay in reporting; and

(D) The date by which you propose to report, or if you have already met the reporting requirement at the time of notification, the date you reported.

(vi) The decision to accept the claim of EPA system outage and allow an extension to the reporting deadline is solely within the discretion of the Administrator.

(vii) In any circumstance, the report must be submitted electronically as soon as possible after the outage is resolved.

(6) *Force majeure.* If you are required to electronically submit a report through CEDRI in the EPA's CDX, you may assert a claim of *force majeure* for failure to timely comply with that reporting requirement. To assert a claim of *force majeure,* you must meet the requirements outlined in paragraphs (k)(6)(i) through (v) of this section.

(i) You may submit a claim if a *force majeure* event is about to occur, occurs, or has occurred or there are lingering effects from such an event within the period of time beginning five business days prior to the date the submission is due. For the purposes of this section, a *force majeure* event is defined as an event that will be or has been caused by circumstances beyond the control of the affected facility, its contractors, or any entity controlled by the affected facility that prevents you from complying with the requirement to submit a report electronically within the time period prescribed. Examples of such events are acts of nature (*e.g.,* hurricanes, earthquakes, or floods), acts of war or terrorism, or equipment failure or safety hazard beyond the control of the affected facility (*e.g.,* large scale power outage).

(ii) You must submit notification to the Administrator in writing as soon as possible following the date you first knew, or through due diligence should

have known, that the event may cause or has caused a delay in reporting.

(iii) You must provide to the Administrator:

(A) A written description of the *force majeure* event;

(B) A rationale for attributing the delay in reporting beyond the regulatory deadline to the *force majeure* event;

(C) A description of measures taken or to be taken to minimize the delay in reporting; and

(D) The date by which you propose to report, or if you have already met the reporting requirement at the time of notification, the date you reported.

(iv) The decision to accept the claim of *force majeure* and allow an extension to the reporting deadline is solely within the discretion of the Administrator.

(v) In any circumstance, the reporting must occur as soon as possible after the *force majeure* event occurs.

(7) *Record availability.* Any records required to be maintained by this subpart that are submitted electronically via the EPA's CEDRI may be maintained in electronic format. This ability to maintain electronic copies does not affect the requirement for facilities to make records, data, and reports available upon request to a delegated air agency or the EPA as part of an on-site compliance evaluation.

■ 8. Amend § 60.335 by revising paragraphs (a)(3), (a)(5)(ii)(A) and (B), (b)(2), (b)(7)(i), (b)(9)(ii), and (b)(10)(ii) to read as follows:

§ 60.335 Test methods and procedures.

(a) * * *

(3) To determine NO_X and diluent concentration:

(i) Either EPA Method 7E in appendix A–4 to this part or EPA Method 320 in appendix A to part 63 of this chapter; and

(ii) Either EPA Method 3 or 3A in appendix A to this part.

* * * * *

(5) * * *

(ii) * * *

(A) If each of the individual traverse point NO_X concentrations, normalized to 15 percent O_2, is within ±10 percent of the mean normalized concentration for all traverse points, then you may use 3 points (located either 16.7, 50.0, and 83.3 percent of the way across the stack or duct, or, for circular stacks or ducts greater than 2.4 meters (7.8 feet) in diameter, at 0.4, 1.2, and 2.0 meters from the wall). The 3 points shall be located along the measurement line that exhibited the highest average normalized NO_X concentration during the stratification test; or

(B) If each of the individual traverse point NO_X concentrations, normalized to 15 percent O_2, is within ±5 percent of the mean normalized concentration for all traverse points, then you may sample at a single point, located at least 1 meter from the stack wall or at the stack centroid.

* * * * *

(b) * * *

(2) The 3-run performance test required by § 60.8 must be performed within ±5 percent at 30, 50, 75, and 90-to-100 percent of peak load or at four evenly-spaced load points in the normal operating range of the gas turbine, including the minimum point in the operating range and 90-to-100 percent of peak load, or at the highest achievable load point if 90-to-100 percent of peak load cannot be physically achieved in practice. If the turbine combusts both oil and gas as primary or backup fuels, separate performance testing is required for each fuel. Notwithstanding these requirements, performance testing is not required for any emergency fuel (as defined in § 60.331).

* * * * *

(7) * * *

(i) Perform a minimum of 9 reference method runs, with a minimum time per run of 21 minutes, at a single load level, between 90 and 100 percent of peak (or the highest physically achievable) load while the source is combusting the fuel that is a normal primary fuel for that source.

* * * * *

(9) * * *

(ii) For gaseous fuels, shall use analytical methods and procedures that are accurate within ±5 percent of the instrument range and are approved by the Administrator.

(10) * * *

(ii) For gaseous fuels, ASTM D1072–80, D1072–90 (Reapproved 1994); D3246–81, D3246–92, D3246–96; D4468–85 (Reapproved 2000); or D6667–01 (all of which are incorporated by reference, see § 60.17). The applicable ranges of some ASTM methods mentioned above are not adequate to measure the levels of sulfur in some fuel gases. Dilution of samples before analysis (with verification of the dilution ratio) may be used, subject to the prior approval of the Administrator.

* * * * *

Subpart KKKK—Standards of Performance for Stationary Combustion Turbines

■ 9. Revise § 60.4305 to read as follows:

§ 60.4305 Does this subpart apply to my stationary combustion turbine?

(a) If you are the owner or operator of a stationary combustion turbine with a heat input at peak load equal to or greater than 10.7 gigajoules (10 MMBtu) per hour, based on the higher heating value of the fuel, which commenced construction, modification, or reconstruction after February 18, 2005, your turbine is subject to this subpart. Only heat input to the combustion turbine engine should be included when determining whether or not this subpart is applicable to your combustion turbine. Any additional heat input to associated heat recovery steam generators (HRSG) or duct burners should not be included when determining your peak heat input. However, this subpart does apply to emissions from any associated HRSG and duct burners.

(b) Stationary combustion turbines regulated under this subpart are not subject to subpart GG of this part. Heat recovery steam generators and duct burners regulated under this subpart are not subject to subparts Da, Db, and Dc of this part.

(c) Stationary combustion turbines subject to subpart KKKKa of this part are not subject to this subpart.

(d) As an alternative to being subject to this subpart, the owner or operator of an affected stationary combustion turbine meeting the applicability of this subpart may petition the Administrator (in writing) to become subject to the requirements for modified units in subpart KKKKa of this part. If the Administrator grants the petition, the affected facility is no longer subject to this subpart and is subject to (unless the unit is modified or reconstructed in the future) the requirements for modified units under subpart KKKKa of this part. The Administrator can only grant the petition if it is determined that compliance with subpart KKKKa of this part would be equivalent to, or more stringent than, compliance with this subpart.

(e) Stationary gas turbines subject to title II of the Clean Air Act are not subject to this subpart.

■ 10. Amend § 60.4310 by adding paragraphs (e) and (f) to read as follows:

§ 60.4310 What types of operations are exempt from these standards of performance?

* * * * *

(e) Military combustion turbines for use in other than a garrison facility and military combustion turbines installed for use as military training facilities are exempt from the NO_X standards in this subpart.

(f) A combustion turbine that is subject to this subpart and is not a ''major source'' or located at a ''major source'' (as that term is defined at 42 U.S.C. 7661 (2)) is exempt from the requirements of 42 U.S.C. 7661a(a).

■ 11. Amend § 60.4320 by revising paragraph (a) and adding paragraph (c) to read as follows:

§ 60.4320 What emission limits must I meet for nitrogen oxides (NO_X)?

(a) Except as provided for in paragraph (c) of this section, you must meet the emission limits for NO_X specified in table 1 to this subpart.

* * * * *

(c) A stationary combustion turbine that combusts byproduct fuels for which a facility-specific NO_X emission standard has been established by the Administrator or delegated authority according to the requirements of paragraphs (c)(1) and (2) of this section is exempt from the emission limits specified in table 1 to this subpart.

(1) You may request a facility-specific NO_X emission standard by submitting a written request to the Administrator or delegated authority explaining why your affected facility, when combusting the byproduct fuel, is unable to comply with the applicable NO_X emission standard determined using table 1 to this subpart.

(2) If the Administrator or delegated authority approves the request, a facility-specific NO_X emissions standard will be established in a manner that the Administrator or delegated authority determines to be consistent with minimizing NO_X emissions.

■ 12. Revise § 60.4325 to read as follows:

§ 60.4325 What emission limits must I meet for NO_X if my turbine burns both natural gas and distillate oil (or some other combination of fuels)?

You must meet the emission limits specified in table 1 to this subpart. If your turbine operates below 75 percent of the peak load at any point during an operating hour, the part load standard is applicable during the entire operating hour. For non-part load operating hours, if your heat input is greater than or equal to 50 percent fuels other than natural gas at any point during an operating hour, you must meet the corresponding limit for fuels other than natural gas for that operating hour. For non-part load operating hours when your total heat input is greater than 50 percent natural gas for the entire operating hour while combusting some portion of non-natural gas fuels, you must meet the corresponding emissions standard as determined by prorating the applicable NO_X standards, based on the applicable size category in table 1 to this subpart, by the heat input from each fuel type.

■ 13. Amend § 60.4330 by revising the section heading and paragraph (a)(3) and adding paragraph (c) to read as follows:

§ 60.4330 What emission limits must I meet for sulfur dioxide (SO_2)?

(a) * * *

(3) For each stationary combustion turbine burning 50 percent or more biogas and/or low-Btu gas on a calendar month basis, as determined based on total heat input, you must not cause to be discharged into the atmosphere from the affected source any gases that contain SO_2 in excess of:

(i) 650 milligrams of sulfur per standard cubic meter (mg/scm) (28 grains (gr) of sulfur per 100 standard cubic feet (scf)); or

(ii) 65 ng SO_2/J (0.15 lb SO_2/MMBtu) heat input.

* * * * *

(c) A stationary combustion turbine subject to either subpart J or Ja of this part is not subject to the SO_2 performance standards in this subpart.

■ 14. Add § 60.4331 to read as follows:

§ 60.4331 What are the requirements for operating a stationary temporary combustion turbine?

(a) Notwithstanding any other provision of this subpart, you may operate a small- or medium-size stationary combustion turbine (*i.e.,* combustion turbine with a base load rating less than or equal to 850 MMBtu/h) at a single location for up to 24 consecutive months, so long as you comply with all of the requirements in paragraphs (b) through (e) of this section.

(b) You must meet the NO_X emissions standard for stationary temporary combustion turbines in table 1 to this subpart and the applicable SO_2 emissions standard in § 60.4330.

(c) Unless you elect to demonstrate compliance through the otherwise-applicable monitoring, recordkeeping, and reporting requirements of this subpart, compliance with the NO_X emissions standard must be demonstrated through maintaining the documentation in paragraphs (c)(1) and (2) of this section on-site:

(1) Each stationary temporary combustion turbine has a manufacturer's emissions guarantee at or below the full load NO_X emissions standard in table 1 to this subpart; and

(2) Each such turbine has been performance tested at least once in the prior 5 years as meeting the NO_X emissions standard in table 1 to this subpart.

(d) Unless you elect to demonstrate compliance through the otherwise-applicable monitoring, recordkeeping, and reporting requirements of this subpart, compliance with the SO_2 emissions standard must be demonstrated through complying with the provisions in § 60.4365.

(e) The conditions in paragraphs (e)(1) through (3) of this section apply in determining whether your stationary combustion turbine qualifies as a stationary temporary combustion turbine.

(1) The turbine may only be located at the same stationary source (or group of stationary sources located within a contiguous area and under common control) for a total period of 24 consecutive months. This is the total period of residence time allowed after the turbine commences operation at the location, regardless of whether the turbine is in operation for the entire 24-consecutive-month period.

(2) Any temporary combustion turbine that replaces a temporary combustion turbine at a stationary source and performs the same or similar function will be included in calculating the consecutive time period.

(3) The relocation of a stationary temporary combustion turbine within a single stationary source (or a group of stationary sources located within a contiguous area and under common control) while performing the same or similar function (*i.e.,* serving the same electric, mechanical, or thermal load) does not restart the 24-calendar-month residence time period.

■ 15. Amend § 60.4333 by revising paragraph (b) to read as follows:

§ 60.4333 What are my general requirements for complying with this subpart?

* * * * *

(b) For multiple combustion turbines and with a common heat recovery unit, heat recovery units utilizing a common steam header, or using a common stack, the owner or operator shall either:

(1) Determine compliance with the applicable NO_X emissions limits by measuring the emissions combined with the emissions from the other unit(s) utilizing the common heat recovery unit. The applicable emissions standard for the affected facility is equal to the prorated (by heat input) emissions standards of each of the individual combustion turbine engines that are exhausted through the single heat recovery steam generating unit;

(2) For combustion turbines complying with an output-based standard, develop, demonstrate, and provide information satisfactory to the Administrator on methods for apportioning the combined gross energy output from the heat recovery unit for each of the affected combustion turbines. The Administrator may approve such demonstrated substitute methods for apportioning the combined gross energy output measured at the steam turbine whenever the demonstration ensures accurate estimation of emissions related under this part; or

(3) Monitor each combustion turbine separately by measuring the NO_X emissions prior to mixing in the common stack.

■ 16. Amend § 60.4335 by adding paragraph (b)(5) to read as follows:

§ 60.4335 How do I demonstrate compliance for NO_X if I use water or steam injection?

* * * * *

(b) * * *

(5) For affected units that are also regulated under part 75 of this chapter, the NO_X emission rate may be monitored using a NO_X diluent CEMS that is installed and certified in accordance with appendix A to part 75 and the QA program in appendix E to part 75, or the low mass emissions methodology in § 75.19 of this chapter.

■ 17. Amend § 60.4340 by revising paragraphs (a) and (b)(2)(iv) to read as follows:

§ 60.4340 How do I demonstrate continuous compliance for NO_X if I do not use water or steam injection?

(a) Except as provided for in paragraphs (a)(1) through (4) of this section, if you are not using water or steam injection to control NO_X emissions, you must perform annual performance tests (no more than 14 calendar months following the previous performance test) in accordance with § 60.4400 to demonstrate continuous compliance.

(1) If the NO_X emission result from the performance test is less than or equal to 75 percent of the NO_X emission limit for the turbine, you may reduce the frequency of subsequent performance tests to once every 2 years (no more than 26 calendar months following the previous performance test). If the results of any subsequent performance test exceed 75 percent of the NO_X emission limit for the turbine, you must resume annual performance tests.

(2) An affected facility that has not operated for the 60 calendar days prior to the due date of a performance test is not required to perform the subsequent performance test until 45 calendar days after the next operating day. The Administrator or delegated authority must be notified of recommencement of operation consistent with § 60.4375(d).

(3) If you own or operate an affected facility that has operated 168 operating hours or less in total or with a particular fuel since the date the previous performance test was required to be conducted, you may request an extension from the otherwise required performance test until after the affected facility has operated more than 168 operating hours in total or with a particular fuel since the date of the previous performance test was required to be conducted. A request for an extension under this paragraph (a)(3) must be addressed to the relevant air division or office director of the appropriate Regional Office of the U.S. EPA as identified in § 60.4(a) for his or her approval at least 30 calendar days prior to the date on which the performance test is required to be conducted. If an extension is approved, a performance test must be conducted within 45 calendar days after the day the facility reaches 168 hours of operation since the date the previous performance test was required to be conducted. When the facility has operated more than 168 operating hours since the date the previous performance test was required to be conducted, the Administrator or delegated authority must be notified consistent with § 60.4375(d).

(4) For a facility at which a group consisting of no more than five similar stationary combustion turbines (*i.e.,* same manufacturer and model number) is operated, you may request the use of a custom testing schedule by submitting a written request to the Administrator or delegated authority. The minimum requirements of the custom schedule include the conditions specified in paragraphs (a)(4)(i) through (v) of this section.

(i) Emissions from the most recent performance test for each individual affected facility are 75 percent or less of the applicable standard;

(ii) Each stationary combustion turbine uses the same emissions control technology;

(iii) Each stationary combustion turbine is operated in a similar manner;

(iv) Each stationary combustion turbine and its emissions control equipment are maintained according to the manufacturer's recommended maintenance procedures; and

(v) A performance test is conducted on each facility at least once every 5 calendar years.

(b) * * *

(2) * * *

(iv) For affected units that are also regulated under part 75 of this chapter, you can monitor the NO_X emission rate using the methodology in appendix E to part 75, or the low mass emissions methodology in § 75.19 of this chapter, the requirements of this paragraph (b) may be met by performing the parametric monitoring described in section 2.3 of appendix E to part 75 or in § 75.19(c)(1)(iv)(H).

■ 18. Amend § 60.4345 by revising paragraphs (a), (c), and (e) to read as follows:

§ 60.4345 What are the requirements for the continuous emission monitoring system equipment, if I choose to use this option?

* * * * *

(a) Each NO_X diluent CEMS must be installed and certified according to Performance Specification 2 (PS 2) in appendix B to this part, except the 7-day calibration drift is based on unit operating days, not calendar days. Procedure 1 in appendix F to this part is not required. Alternatively, a NO_X diluent CEMS that is installed and certified according to appendix A to part 75 of this chapter is acceptable for use under this subpart. The relative accuracy test audit (RATA) of the CEMS shall be performed on a lb/MMBtu basis.

* * * * *

(c) Each fuel flowmeter shall be installed, calibrated, maintained, and operated according to the manufacturer's instructions. Alternatively, fuel flowmeters that meet the installation, certification, and quality assurance requirements of appendix D to part 75 of this chapter are acceptable for use under this subpart.

* * * * *

(e) The owner or operator shall develop and keep on-site a quality assurance (QA) plan for all of the continuous monitoring equipment described in paragraphs (a), (c), and (d) of this section. For the CEMS and fuel flow meters, the owner or operator may satisfy the requirements of this paragraph (e) by implementing the QA program and plan described in section 1 of appendix B to part 75 of this chapter.

■ 19. Amend § 60.4350 by:

■ a. Removing and reserving paragraph (c); and

■ b. Revising paragraphs (d) and (f)(1).

The revisions read as follows:

§ 60.4350 How do I use data from the continuous emission monitoring equipment to identify excess emissions?

* * * * *

(d) If you have installed and certified a NO_x diluent CEMS to meet the requirements of part 75 of this chapter, only quality assured data from the CEMS shall be used to identify excess emissions under this subpart. Periods where the missing data substitution procedures in subpart D of part 75 are applied are to be reported as monitor downtime in the excess emissions and monitoring performance report required under § 60.7(c).

* * * * *

(f) * * *

(1) For simple-cycle operation:

Equation 1 to Paragraph (f)(1)

$$E = \frac{(NO_X)_h \times (HI)_h}{P} \quad (Eq. 1)$$

Where:

E = hourly NO_X emission rate, in lb/MWh;

$(NO_X)h$ = hourly NO_X emission rate, in lb/MMBtu;

(HI)h = hourly heat input rate to the unit, in MMBtu/h, measured using the fuel flowmeter(s), *e.g.,* calculated using Equation D–15a in appendix D to part 75 of this chapter; and

P = gross energy output of the combustion turbine in MW. For an hour in which there is zero electrical load, you may calculate the pollutant emission rate using a default electrical load value equivalent to 5 percent of the maximum sustainable electrical load of the turbine.

* * * * *

■ 20. Amend § 60.4355 by revising paragraph (b) to read as follows:

§ 60.4355 How do I establish and document a proper parameter monitoring plan?

* * * * *

(b) For affected units that are also subject to part 75 of this chapter, you may meet the requirements of this paragraph (b) by developing and keeping on-site (or at a central location for unmanned facilities) a QA plan, as described in § 75.19(e)(5) of this chapter or in section 2.3 of appendix E to part 75 and section 1.3.6 of appendix B to part 75.

■ 21. Revise § 60.4360 to read as follows:

§ 60.4360 How do I determine the total sulfur content of the turbine's combustion fuel?

You must monitor the total sulfur content of the fuel being fired in the turbine, except as provided in § 60.4365. The sulfur content of the fuel must be determined using total sulfur methods described in § 60.4415. Alternatively, if the total sulfur content of the gaseous fuel during the most recent performance test was less than half the applicable limit, ASTM D4084–05, D4810–88 (Reapproved 1999), D5504–01, or D6228–98 (Reapproved 2003), or Gas Processors Association Standard 2377–86 (all of which are incorporated by reference, see § 60.17), which measure the major sulfur compounds, may be used.

■ 22. Amend § 60.4375 by revising paragraph (b) and adding paragraphs (c) through (j) to read as follows:

§ 60.4375 What reports must I submit?

* * * * *

(b) The notification requirements of § 60.8 apply to the initial and subsequent performance tests.

(c) An owner or operator of an affected facility complying with § 60.4340(a)(2) must notify the Administrator or delegated authority within 15 calendar days after the facility recommences operation.

(d) An owner or operator of an affected facility complying with § 60.4340(a)(3) must notify the Administrator or delegated authority within 15 calendar days after the facility has operated more than 168 operating hours since the date the previous performance test was required to be conducted.

(e) Beginning on [March 16, 2026, within 60 days after the date of completing each performance test or continuous emissions monitoring systems (CEMS) performance evaluation that includes a RATA, you must submit the results following the procedures specified in paragraph (g) of this section. You must submit the report in a file format generated using the EPA's Electronic Reporting Tool (ERT). Alternatively, you may submit an electronic file consistent with the extensible markup language (XML) schema listed on the EPA's ERT website (*https://www.epa.gov/electronic-reporting-air-emissions/electronic-reporting-tool-ert*) accompanied by the other information required by § 60.8(f)(2) in PDF format.

(f) You must submit to the Administrator semiannual reports of the following recorded information. Beginning on January 15, 2027, or once the report template for this subpart has been available on the Compliance and Emissions Data Reporting Interface (CEDRI) website (*https://www.epa.gov/electronic-reporting-air-emissions/cedri*) for one year, whichever date is later, submit all subsequent reports using the appropriate electronic report template on the CEDRI website for this subpart and following the procedure specified in paragraph (g) of this section. The date report templates become available will be listed on the CEDRI website. Unless the Administrator or delegated State agency or other authority has approved a different schedule for submission of reports, the report must be submitted by the deadline specified in this subpart, regardless of the method in which the report is submitted.

(g) If you are required to submit notifications or reports following the procedure specified in this paragraph (g), you must submit notifications or reports to the EPA via CEDRI, which can be accessed through the EPA's Central Data Exchange (CDX) (*https://cdx.epa.gov/*). The EPA will make all the information submitted through CEDRI available to the public without further notice to you. Do not use CEDRI to submit information you claim as CBI. Although we do not expect persons to assert a claim of CBI, if you wish to assert a CBI claim for some of the information in the report or notification, you must submit a complete file in the format specified in this subpart, including information claimed to be CBI, to the EPA following the procedures in paragraphs (g)(1) and (2) of this section. Clearly mark the part or all of the information that you claim to be CBI. Information not marked as CBI may be authorized for public release without prior notice. Information marked as CBI will not be disclosed except in accordance with procedures set forth in 40 CFR part 2. All CBI claims must be asserted at the time of submission. Anything submitted using CEDRI cannot later be claimed CBI. Furthermore, under CAA section 114(c), emissions data is not entitled to confidential treatment, and the EPA is required to make emissions data available to the public. Thus, emissions data will not be protected as CBI and will be made publicly available. You must submit the same file submitted to the CBI office with the CBI omitted to the EPA via the EPA's CDX as described earlier in this paragraph (g).

(1) The preferred method to receive CBI is for it to be transmitted electronically using email attachments, File Transfer Protocol, or other online file sharing services. Electronic submissions must be transmitted directly to the OAQPS CBI Office at the email address *oaqps_cbi@epa.gov,* and as described above, should include clear CBI markings. ERT files should be flagged to the attention of the Group Leader, Measurement Policy Group; all other files should be flagged to the attention of the Stationary Combustion Turbine Sector Lead. If assistance is needed with submitting large electronic

files that exceed the file size limit for email attachments, and if you do not have your own file sharing service, please email *oaqps_cbi@epa.gov* to request a file transfer link.

(2) If you cannot transmit the file electronically, you may send CBI information through the postal service to the following address: U.S. EPA, Attn: OAQPS Document Control Office, Mail Drop: C404–02, 109 T.W. Alexander Drive, P.O. Box 12055, RTP, NC 27711. In addition to the OAQPS Document Control Officer, ERT files should also be sent to the attention of the Group Leader, Measurement Policy Group, and all other files should also be sent to the attention of the Stationary Combustion Turbine Sector Lead. The mailed CBI material should be double wrapped and clearly marked. Any CBI markings should not show through the outer envelope.

(h) If you are required to electronically submit a report through CEDRI in EPA's CDX, you may assert a claim of EPA system outage for failure to timely comply with that reporting requirement. To assert a claim of EPA system outage, you must meet the requirements outlined in paragraphs (h)(1) through (7) of this section.

(1) You must have been or will be precluded from accessing CEDRI and submitting a required report within the time prescribed due to an outage of either the EPA's CEDRI or CDX systems.

(2) The outage must have occurred within the period of time beginning 5 business days prior to the date that the submission is due.

(3) The outage may be planned or unplanned.

(4) You must submit notification to the Administrator in writing as soon as possible following the date you first knew, or through due diligence should have known, that the event may cause or has caused a delay in reporting.

(5) You must provide to the Administrator a written description identifying:

(i) The date(s) and time(s) when CDX or CEDRI was accessed and the system was unavailable;

(ii) A rationale for attributing the delay in reporting beyond the regulatory deadline to EPA system outage;

(iii) A description of measures taken or to be taken to minimize the delay in reporting; and

(iv) The date by which you propose to report, or if you have already met the reporting requirement at the time of the notification, the date you reported.

(6) The decision to accept the claim of EPA system outage and allow an extension to the reporting deadline is solely within the discretion of the Administrator.

(7) In any circumstance, the report must be submitted electronically as soon as possible after the outage is resolved.

(i) If you are required to electronically submit a report through CEDRI in the EPA's CDX, you may assert a claim of *force majeure* for failure to timely comply with that reporting requirement. To assert a claim of *force majeure,* you must meet the requirements outlined in paragraphs (i)(1) through (5) of this section.

(1) You may submit a claim if a *force majeure* event is about to occur, occurs, or has occurred or there are lingering effects from such an event within the period of time beginning five business days prior to the date the submission is due. For the purposes of this section, a *force majeure* event is defined as an event that will be or has been caused by circumstances beyond the control of the affected facility, its contractors, or any entity controlled by the affected facility that prevents you from complying with the requirement to submit a report electronically within the time period prescribed. Examples of such events are acts of nature (*e.g.,* hurricanes, earthquakes, or floods), acts of war or terrorism, or equipment failure or safety hazard beyond the control of the affected facility (*e.g.,* large-scale power outage).

(2) You must submit notification to the Administrator in writing as soon as possible following the date you first knew, or through due diligence should have known, that the event may cause or has caused a delay in reporting.

(3) You must provide to the Administrator:

(i) A written description of the *force majeure* event;

(ii) A rationale for attributing the delay in reporting beyond the regulatory deadline to the *force majeure* event;

(iii) A description of measures taken or to be taken to minimize the delay in reporting; and

(iv) The date by which you propose to report, or if you have already met the reporting requirement at the time of the notification, the date you reported.

(4) The decision to accept the claim of *force majeure* and allow an extension to the reporting deadline is solely within the discretion of the Administrator.

(5) In any circumstance, the reporting must occur as soon as possible after *the force majeure* event occurs.

(j) Any records required to be maintained by this subpart that are submitted electronically via the EPA's CEDRI may be maintained in electronic format. This ability to maintain electronic copies does not affect the requirement for facilities to make records, data, and reports available upon request to a delegated air agency or the EPA as part of an on-site compliance evaluation.

■ 23. Amend § 60.4380 by revising paragraph (b)(3) to read as follows:

§ 60.4380 How are excess emissions and monitor downtime defined for NO_X?

* * * * *

(b) * * *

(3) For averaging periods during which multiple emissions standards apply, the applicable standard for the averaging period is the heat input weighted average of the applicable standards during each hour. For hours with multiple emission standards, the applicable limit for that hour is determined based on the condition that corresponded to the highest emissions standard.

* * * * *

■ 24. Revise § 60.4395 to read as follows:

§ 60.4395 What must I submit my reports?

All reports required under § 60.7(c) must be electronically submitted via CEDRI by the 30th day following the end of each 6-month period.

■ 25. Amend § 60.4400 by revising paragraphs (a)(1)(i) and (ii) and (b)(2) to read as follows:

§ 60.4400 How do I conduct the initial and subsequent performance tests, regarding NO_X?

(a) * * *

(1) * * *

(i) Measure the NO_X concentration (in parts per million (ppm)), using EPA Method 7E in appendix A–4 to this part, EPA Method 20 in appendix A–7 to this part, EPA Method 320 in appendix A of part 63 of this chapter, or ASTM D6348–12 (Reapproved 2020) (incorporated by reference, see § 60.17). For units complying with the output-based standard, concurrently measure the stack gas flow rate, using EPA Methods 1 and 2 in appendix A to this part, and measure and record the electrical and thermal output from the unit. Then, use the following equation to calculate the NO_X emission rate:

Equation 1 to Paragraph (a)(1)(i)

$$E = \frac{1.194 \times 10^{-7} \times (NO_X)_c \times Q_{std}}{P} (Eq. 1)$$

Where:

E = NO_X emission rate, in lb/MWh;

1.194×10^{-7} = conversion constant, in lb/dscf-ppm;

$(NO_X)_c$ = average NO_X concentration for the run, in ppm;

Q_{std} = stack gas volumetric flow rate, in dscf/hr; and

P = gross electrical and mechanical energy output of the combustion turbine, in MW (for simple cycle operation), for combined cycle operation, the sum of all electrical and mechanical output from the combustion and steam turbines, or, for combined heat and power operation, the sum of all electrical and mechanical output from the combustion and steam turbines plus all useful recovered thermal output not used for additional electric or mechanical generation, in MW, calculated according to § 60.4350(f)(2); or

(ii) Measure the NO_X and diluent gas concentrations, using either EPA Methods 7E and 3A or EPA Method 20 in appendix A to this part. In addition, when only natural gas is being combusted, ASTM D6522–20 (incorporated by reference, see § 60.17) can be used instead of EPA Method 3A in appendix A–2 to this part or EPA Method 20 in appendix A–7 to this part to determine the oxygen content in the exhaust gas. Concurrently measure the heat input to the unit, using a fuel flowmeter (or flowmeters), and measure the electrical and thermal output of the unit. Use EPA Method 19 in appendix A to this part to calculate the NO_X emission rate in lb/MMBtu. Then, use equations 1 and, if necessary, 2 and 3 in § 60.4350(f) to calculate the NO_X emission rate in lb/MWh.

* * * * *

(b) * * *

(2) For a combined cycle and CHP turbine systems with supplemental heat (duct burner), you must measure the total NO_X emissions after the duct burner rather than directly after the turbine. The duct burner must be in operation within 25 percent of 100 percent of the peak load rating of the duct burners or the highest achievable load if at least 75 percent of the peak load of the duct burners cannot be achieved during the performance test.

* * * * *

■ 26. Amend § 60.4405 by revising paragraph (a) to read as follows:

§ 60.4405 How do I perform the initial performance test if I have chosen to install a NO_X-diluent CEMS?

* * * * *

(a) Perform a minimum of nine RATA reference method runs, with a minimum time per run of 21 minutes, at a single load level, within plus or minus 25 percent of 100 percent of peak load, while the source is combusting the fuel that is a normal primary fuel for that source. The ambient temperature must be greater than 0 °F during the RATA runs.

* * * * *

■ 27. Amend § 60.4415 by revising paragraphs (a) introductory text and (a)(2) through (4) to read as follows:

§ 60.4415 How do I conduct the initial and subsequent performance tests for sulfur?

(a) You must conduct an initial performance test, as required in § 60.8. An owner or operator of an affected facility complying with the fuel-based standard may use fuel records (such as a current, valid purchase contract, tariff sheet, transportation contract, or results of a fuel analysis) to satisfy the requirements of § 60.8. Subsequent SO_2 performance tests shall be conducted on an annual basis (no more than 14 calendar months following the previous performance test). There are four methodologies that you may use to conduct the performance tests.

* * * * *

(2) Periodically determine the sulfur content of the fuel combusted in the turbine, a representative fuel sample may be collected either by an automatic sampling system or manually. For automatic sampling, follow ASTM D5287–97 (Reapproved 2002) (incorporated by reference, see § 60.17) for gaseous fuels or ASTM D4177–95 (Reapproved 2000) (incorporated by reference, see § 60.17) for liquid fuels. For manual sampling of gaseous fuels, follow API Manual of Petroleum Measurement Standards, Chapter 14, Section 1; GPA 2166–17; or ISO 10715:1997(E) (all incorporated by reference, see § 60.17). For manual sampling of liquid fuels, follow GPA 2174–14 or the procedures for manual pipeline sampling in section 14 of ASTM D4057–95 (Reapproved 2000) (both incorporated by reference, see § 60.17). The fuel analyses of this section may be performed either by you, a service contractor retained by you, the fuel vendor, or any other qualified agency. Analyze the samples for the total sulfur content of the fuel using:

(i) For liquid fuels, ASTM D129–00 (Reapproved 2005), or alternatively D1266–98 (Reapproved 2003), D1552–03, D2622–05, D4294–03, D5453–05, D5623–19, or D7039–15a (all incorporated by reference, see § 60.17); or

(ii) For gaseous fuels, ASTM D1072–90 (Reapproved 1999), or alternatively D3246–05, D4084–05, D4468–85 (Reapproved 2000), D4810–88 (Reapproved 1999), D6228–98 (Reapproved 2003), D6667–04, or GPA 2140–17, 2261–19, or 2377–86 (all incorporated by reference, see § 60.17).

(3) Measure the SO_2 concentration (in parts per million (ppm)), using EPA Method 6, 6C, 8, or 20 in appendix A to this part. For units complying with the output-based standard, concurrently measure the stack gas flow rate, using EPA Methods 1 and 2 in appendix A to this part, and measure and record the electrical and thermal output from the unit. Then use the following equation to calculate the SO_2 emission rate:

Equation 1 to Paragraph (a)(3)

$$E = \frac{1.664 \times 10^{-7} \times (SO_2)_c \times Q_{std}}{P} (Eq. 1)$$

Where:

E = SO_2 emission rate, in lb/MWh;

1.664×10^{-7} = conversion constant, in lb/dscf-ppm;

$(SO_2)_c$ = average SO_2 concentration for the run, in ppm;

Q_{std} = stack gas volumetric flow rate, in dscf/hr; and

P = gross electrical and mechanical energy output of the combustion turbine, in MW (for simple-cycle operation), for combined-cycle operation, the sum of all electrical and mechanical output from the combustion and steam turbines, or, for combined heat and power operation, the sum of all electrical and mechanical output from the combustion and steam turbines plus all useful recovered thermal output not used for additional electric or mechanical generation, in

MW, calculated according to § 60.4350(f)(2); or

(4) Measure the SO_2 and diluent gas concentrations, using either EPA Method 6, 6C, or 8 and 3A, or 20 in appendix A to this part. Concurrently measure the heat input to the unit, using a fuel flowmeter (or flowmeters), and measure the electrical and thermal output of the unit. Use EPA Method 19 in appendix A to this part to calculate the SO_2 emission rate in lb/MMBtu. Then, use equations 1 and, if necessary, 2 and 3 in § 60.4350(f) to calculate the SO_2 emission rate in lb/MWh.

* * * * *

■ 28. Amend § 60.4420 by:
■ a. Adding the definition of *Byproduct* in alphabetical order;
■ b. Revising the definitions of *Duct burner* and *Emergency combustion turbine;*
■ c. Adding the definitions of *Firefighting turbine, Garrison facility,* and *Low-Btu gas* in alphabetical order;
■ d. Revising the definitions of *Natural gas* and *Noncontinental area;*
■ e. Adding the definition of *Offshore turbine* in alphabetical order;
■ f. Revising the definition of *Stationary combustion turbine;* and
■ g. Adding the definition of *Temporary combustion turbine* in alphabetical order.

The additions and revisions read as follows:

§ 60.4420 What definitions apply to this subpart?

* * * * *

Byproduct means any liquid or gaseous substance produced at chemical manufacturing plants, petroleum refineries, pulp and paper mills, or other industrial facilities (except natural gas and fuel oil).

* * * * *

Duct burner means a device that combusts fuel and that is placed in the exhaust duct from another source, such as a stationary combustion turbine, internal combustion engine, kiln, etc., to allow the firing of additional fuel to heat the exhaust gases.

* * * * *

Emergency combustion turbine means any stationary combustion turbine which operates in an emergency situation. Examples include stationary combustion turbines used to produce power for critical networks or equipment, including power supplied to portions of a facility, when electric power from the local utility is interrupted, or stationary combustion turbines used to pump water in the case of fire (*e.g.,* firefighting turbine) or flood, etc. Emergency combustion turbines may be operated for the purpose of maintenance checks and readiness testing, provided that the tests are recommended by Federal, State, or local government, agencies, or departments, voluntary consensus standards, the manufacturer, the vendor, the regional transmission organization or equivalent balancing authority and transmission operator, or the insurance company associated with the combustion turbine. Required testing of such units should be minimized, but there is no time limit on the use of emergency combustion turbines. Emergency combustion turbines do not include combustion turbines used as peaking units at electric utilities or stationary combustion turbines at industrial facilities that typically operate at low capacity factors.

* * * * *

Firefighting turbine means any stationary combustion turbine that is used solely to pump water for extinguishing fires.

Garrison facility means any permanent military installation.

* * * * *

Low-Btu gas means any gaseous fuels that have heating values less than 26 megajoules per standard cubic meter (MJ/scm) (700 Btu/scf).

Natural gas means a fluid mixture of hydrocarbons (*e.g.,* methane, ethane, or propane) that maintains a gaseous state at standard atmospheric temperature and pressure under ordinary conditions. Additionally, natural gas must be composed of at least 70 percent methane by volume and have a gross calorific value between 950 and 1,100 British thermal units (Btu) per standard cubic foot. Unless refined to meet this definition of natural gas, natural gas does not include the following gaseous fuels: landfill gas, digester gas, refinery gas, sour gas, blast furnace gas, coal-derived gas, producer gas, coke oven gas, or any gaseous fuel produced in a process which might result in highly variable sulfur content or heating value.

Noncontinental area means the State of Hawaii, the Virgin Islands, Guam, American Samoa, the Commonwealth of Puerto Rico, the Northern Mariana Islands, or offshore turbines.

Offshore turbine means a stationary combustion turbine located on a platform or facility in an ocean, territorial sea, the outer continental shelf, or the Great Lakes of North America and stationary combustion turbines located in a coastal management zone and elevated on a platform.

* * * * *

Stationary combustion turbine means all equipment, including but not limited to the turbine, the fuel, air, lubrication and exhaust gas systems, control systems (except emissions control equipment), heat recovery system, and any ancillary components and sub-components comprising any simple cycle stationary combustion turbine, any regenerative/recuperative cycle stationary combustion turbine, any combined cycle combustion turbine, and any combined heat and power combustion turbine based system. Stationary means that the combustion turbine is not self-propelled or intended to be propelled while performing its function. It may, however, be mounted on a vehicle for portability. Portable combustion turbines are excluded from the definition of ''stationary combustion turbine,'' and not regulated under this part, if the turbine meets the definition of ''nonroad engine'' under title II of the Clean Air Act and applicable regulations and is certified to meet emission standards promulgated pursuant to title II of the Clean Air Act, along with all related requirements.

Temporary combustion turbine means a combustion turbine that is intended to and remains at a single stationary source (or group of stationary sources located within a contiguous area and under common control) for 24 consecutive months or less.

* * * * *

■ 29. Revise table 1 to subpart KKKK to read as follows:

TABLE 1 TO SUBPART KKKK OF PART 60—NITROGEN OXIDE EMISSION LIMITS FOR NEW STATIONARY COMBUSTION TURBINES

Combustion turbine type	Combustion turbine heat input at peak load (HHV)	NO_X emission standard
New turbine firing natural gas, electric generating	≤50 MMBtu/h	42 ppm at 15 percent O_2 or 290 ng/J of useful output (2.3 lb/MWh).

TABLE 1 TO SUBPART KKKK OF PART 60—NITROGEN OXIDE EMISSION LIMITS FOR NEW STATIONARY COMBUSTION TURBINES—Continued

Combustion turbine type	Combustion turbine heat input at peak load (HHV)	NO_X emission standard
New turbine firing natural gas, mechanical drive	≤50 MMBtu/h	100 ppm at 15 percent O_2 or 690 ng/J of useful output (5.5 lb/MWh).
New turbine firing natural gas	>50 MMBtu/h and ≤850 MMBtu/h	25 ppm at 15 percent O_2 or 150 ng/J of useful output (1.2 lb/MWh).
New, modified, or reconstructed turbine firing natural gas	>850 MMBtu/h	15 ppm at 15 percent O_2 or 54 ng/J of useful output (0.43 lb/MWh)
New turbine firing fuels other than natural gas, electric generating	≤50 MMBtu/h	96 ppm at 15 percent O_2 or 700 ng/J of useful output (5.5 lb/MWh).
New turbine firing fuels other than natural gas, mechanical drive	≤50 MMBtu/h	150 ppm at 15 percent O_2 or 1,100 ng/J of useful output (8.7 lb/MWh).
New turbine firing fuels other than natural gas	>50 MMBtu/h and ≤850 MMBtu/h	74 ppm at 15 percent O_2 or 460 ng/J of useful output (3.6 lb/MWh).
New, modified, or reconstructed turbine firing fuels other than natural gas.	>850 MMBtu/h	42 ppm at 15 percent O_2 or 160 ng/J of useful output (1.3 lb/MWh).
Modified or reconstructed turbine	≤50 MMBtu/h	150 ppm at 15 percent O_2 or 1,100 ng/J of useful output (8.7 lb/MWh).
Modified or reconstructed turbine firing natural gas	>50 MMBtu/h and ≤850 MMBtu/h	42 ppm at 15 percent O_2 or 250 ng/J of useful output (2.0 lb/MWh).
Modified or reconstructed turbine firing fuels other than natural gas	>50 MMBtu/h and ≤850 MMBtu/h	96 ppm at 15 percent O_2 or 590 ng/J of useful output (4.7 lb/MWh).
Turbines located north of the Arctic Circle (latitude 66.5 degrees north), turbines operating at less than 75 percent of peak load, modified and reconstructed offshore turbines, and turbine operating at temperatures less than 0 °F.	≤300 MMBtu/h or ≤30 MW output	150 ppm at 15 percent O_2 or 1,100 ng/J of useful output (8.7 lb/MWh).
Turbines located north of the Arctic Circle (latitude 66.5 degrees north), turbines operating at less than 75 percent of peak load, modified and reconstructed offshore turbines, and turbine operating at temperatures less than 0 °F.	>300 MMBtu/h and >30 MW output	96 ppm at 15 percent O_2 or 590 ng/J of useful output (4.7 lb/MWh).
Heat recovery units operating independent of the combustion turbine.	All sizes	54 ppm at 15 percent O_2 or 110 ng/J of useful output (0.86 lb/MWh).
Combustion turbines bypassing the heat recovery unit	>50 MMBtu/h	25 ppm at 15 percent O_2 or 150 ng/J of useful output (1.2 lb/MWh).

■ 30. Add subpart KKKKa to read as follows:

Subpart KKKKa—Standards of Performance for Stationary Combustion Turbines

Sec.

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Introduction

§ 60.4300a What is the purpose of this subpart?

This subpart establishes emission standards and compliance schedules for the control of emissions from stationary combustion turbines that commenced

construction, modification, or reconstruction after December 13, 2024.

Applicability

§ 60.4305a Does this subpart apply to my stationary combustion turbine?

(a) Except as provided for in § 60.4310a, you are subject to this subpart if you own or operate a stationary combustion turbine that commenced construction, modification, or reconstruction after December 13, 2024, and that has a base load rating equal to or greater than 10.7 gigajoules per hour (GJ/h) (10 million British thermal units per hour (MMBtu/h)). Any additional heat input from duct burners used with heat recovery steam generating (HRSG) units or fuel preheaters is not included in the heat input value used to determine the applicability of this subpart to a given stationary combustion turbine. However, this subpart does apply to emissions from any associated HRSG and duct burner(s) that are associated with a combustion turbine subject to this subpart.

(b) A stationary combustion turbine subject to this subpart is not subject to subpart GG or KKKK of this part.

(c) Duct burners are not subject to subpart D, Da, Db, or Dc of this part (as applicable) if the duct burner is used with a HRSG unit that is part of a combustion turbine that is subject to this subpart.

(d) If you own or operate a stationary combustion turbine (including a combined cycle combustion turbine or a CHP combustion turbine) that commenced construction, modification, or reconstruction on or before December 13, 2024, you may submit a written petition to the Administrator requesting that the stationary combustion turbine comply with the applicable requirements for modified units under this subpart as an alternative to complying with subpart GG or KKKK of this part, and with subparts D, Da, Db, and Dc of this part, as applicable. If the Administrator or delegated authority approves the petitioner's request, the affected facility must comply with the requirements for modified units under this subpart unless the stationary combustion turbine is reconstructed or replaced with a new facility in the future.

(e) If you own or operate a combined cycle combustion turbine or combined heat and power combustion turbine, and changes are made after December 13, 2024, to allow the existing combustion turbine to also operate in simple cycle mode and those changes are determined a modification for NSPS purposes, this subpart shall apply to the combustion turbine only as it operates in simple cycle mode, and not to its existing configuration in combined cycle mode.

§ 60.4310a What stationary combustion turbines are not subject to this subpart?

(a) An integrated gasification combined cycle electric utility steam generating unit subject to subpart Da of this part is not subject to this subpart.

(b) A stationary combustion turbine used in a combustion turbine test cell/stand, as defined in § 60.4420a, is not subject to this subpart.

(c) If any solid fuel is combusted in the HRSG, the HRSG is not subject to this subpart.

(d) Stationary gas turbines subject to title II of the Clean Air Act are not subject to this subpart.

Emission Standards

§ 60.4315a What pollutants are regulated by this subpart?

The pollutants regulated by this subpart are nitrogen oxide (NO_X) and sulfur dioxide (SO_2).

§ 60.4320a What NO_X emissions standard must I meet?

(a) Except as provided for in paragraph (c) of this section, for each stationary combustion turbine you must not discharge into the atmosphere from the affected facility any gases that contain an amount of NO_X that exceeds the applicable emissions standard and be in accordance with the requirements specified in paragraph (b) of this section. If you choose to use NO_X CEMS, input-based emission rates and standards are determined on a 4-operating-hour rolling basis and output-based emission rates and standards are determined on a 30-operating-day rolling basis. Mass-based emission rates are determined on both a 4-operating-hour and 12-calendar-month rolling basis.

(b) For the purpose of determining compliance with the applicable emissions standard, you must also meet the requirements specified in paragraphs (b)(1) through (4) of this section, as applicable to your affected facility.

(1) The NO_X emission standard that is applicable to your affected facility shall be determined on an operating-hour basis, unless you elect to use the alternative provided for in paragraph (b)(2) of this section. Determining the hourly NO_X emission standards for your affected facility requires recording hourly data and maintaining records according to the requirements in § 60.4390a. For hours with multiple emission standards, the applicable standard for that hour is determined based on the condition, excluding periods of monitor downtime, that corresponds to the highest emissions standard. For example, if your affected facility operates at 70 percent or less of its base load rating for any portion of the hour, the emission limit(s) in table 1 to this subpart for combustion turbines operating at 70 percent or less of base load rating shall apply for that hour.

(2) As an alternative to the requirements specified in paragraph (b)(1) of this section, you may elect to use the lowest NO_X emission standard that is applicable to your affected facility, as determined using table 1 to this subpart, for the entire required compliance period.

(3) During each operating hour when only natural gas is combusted, you must meet the NO_X emission standard as determined by the applicable size category in table 1 or 2 to this subpart, as applicable, which corresponds to a stationary combustion turbine firing natural gas for that operating hour. During each operating hour when the heat input (based on the HHV of the fuels) of the combustion turbine engine is less than 50 percent natural gas (*i.e.,* 50 percent or greater non-natural gas), as defined in § 60.4420a, at any point during an operating hour, you must meet the NO_X emission standard as determined by the applicable size category in table 1 or 2 to this subpart, as applicable, which corresponds to a stationary combustion turbine firing fuels other than natural gas for that operating hour. During each operating hour when the heat input to the combustion turbine engine is greater than 50 percent natural gas, as defined in § 60.4420a, during an entire operating hour while combusting some portion of non-natural gas fuels, you must meet the NO_X emission standard as determined by prorating the applicable NO_X standards, based on the applicable size category in table 1 or 2 to this subpart, as applicable, by the heat input from each fuel type.

(4) If you have two or more combustion turbine engines share a common stack, are connected to a single electric generator, or share a steam turbine, except as provided for in paragraph (b)(4)(i) of this section, you must monitor the hourly NO_X emissions at the common stack in lieu of monitoring each combustion turbine separately. If you choose to comply with the output-based emissions standard, the hourly gross or net energy output (electric, thermal, or mechanical, as applicable) must be the sum of the hourly loads for the individual affected combustion turbines, and you must

express the operating time as ''stack operating hours'' (as defined in 40 CFR 72.2). If you attain compliance with the most stringent applicable emission standard in table 1 or 2 to this subpart, as applicable, at the common stack, each affected combustion turbine sharing the stack is in compliance.

(i) As an alternative to the requirements in this paragraph (b)(4), you may either:

(A) Monitor each combustion turbine separately by measuring the NO_X emissions prior to mixing in the common stack; or

(B) Apportion the NO_X emissions based on the unit's heat input contribution to the total heat input associated with the common stack and the appropriate F-factors. If you chose to comply with the output-based standard, output from a common steam turbine shall be apportioned based on the heat input to each combustion turbine. You may also elect to develop, demonstrate, and provide information satisfactory to the Administrator on alternate methods to apportion the NO_X emissions. The Administrator may approve such alternate methods for apportioning the NO_X emissions whenever the demonstration ensures accurate estimation of emissions regulated under this part.

(ii) [Reserved]

(c) Stationary combustion turbines that meet at least one of the specifications described in paragraphs (c)(1) through (4) of this section are exempt from the applicable NO_X emission standard in paragraphs (a) and (b) of this section.

(1) An emergency combustion turbine, as defined in § 60.4420a;

(2) A stationary combustion turbine that, as determined by the Administrator or delegated authority, is used for the research and development of control techniques and/or efficiency improvements relevant to stationary combustion turbine emissions; or

(3) A stationary combustion turbine that combusts byproduct fuels for which a facility-specific NO_X emissions standard has been established by the Administrator or delegated authority according to the requirements of paragraphs (c)(3)(i) and (ii) of this section is exempt from the emission limits specified in tables 1 and 2 to this subpart.

(i) You may request a facility-specific NO_X emission standard by submitting a written request to the Administrator or delegated authority explaining why your affected facility, when combusting the byproduct fuel, is unable to comply with the applicable NO_X emission standard determined using table 1 or 2 to this subpart.

(ii) If the Administrator or delegated authority approves the request, a facility-specific NO_X emissions standard will be established in a manner that the Administrator or delegated authority determines to be consistent with minimizing NO_X emissions.

(4) Military combustion turbines for use in other than a garrison facility and military combustion turbines installed for use as military training facilities.

(d) You must meet the applicable NO_X emissions standard to your affected facility during all times that the affected facility is operating (including periods of startup, shutdown, and malfunction).

§ 60.4325a What emission limit must I meet for NO_X if my turbine burns both natural gas and distillate oil (or some other combination of fuels)?

You must meet the emission limits specified in table 1 or 2 to this subpart. If your turbine operates below 70 percent of the base load rating at any point during an operating hour, the part load standard is applicable during the entire operating hour. For non-part load operating hours, if your stationary combustion turbine's heat input is greater than or equal to 50 percent fuels other than natural gas at any point during an operating hour, your combustion turbine must meet the corresponding limit for non-natural gas. For non-part load operating hours when your total heat input is greater than 50 percent natural gas while combusting some portion of non-natural gas fuels, you must meet the corresponding emissions standard as determined by prorating the applicable NO_X standards, based on the applicable size category in table 1 or 2 to this subpart, as applicable, by the heat input from each fuel type.

§ 60.4330a What SO_2 emissions standard must I meet?

(a) Except as provided for in paragraphs (b) through (e) of this section, for each new, modified, or reconstructed stationary combustion turbine you must not cause to be discharged from the affected facility and into the atmosphere any gases that contain an amount of SO_2 exceeding either:

(1) 110 nanograms per Joule (ng/J) (0.90 pounds per megawatt-hour (lb/MWh)) gross energy output; or

(2) 26 ng SO_2/J (0.060 lb SO_2/MMBtu) heat input.

(b) For each new, modified, or reconstructed stationary combustion turbine combusting 50 percent or more low-Btu gas per calendar month based on total heat input (using the HHV of the fuel), you must not cause to be discharged from the affected facility and into the atmosphere any gases that contain an amount of SO_2 exceeding either:

(1) 650 milligrams of sulfur per standard cubic meter (mg/scm) (28 grains (gr) of sulfur per 100 standard cubic feet (scf)); or

(2) 65 ng SO_2/J (0.15 lb SO_2/MMBtu) heat input.

(c) For each new, modified, or reconstructed stationary combustion turbine located in a noncontinental area, you must not cause to be discharged from the affected facility and into the atmosphere any gases that contain an amount of SO_2 exceeding either:

(1) 780 ng/J (6.2 lb/MWh) gross energy output; or

(2) 180 ng SO_2/J (0.42 lb SO_2/MMBtu) heat input.

(d) For each new, modified, or reconstructed stationary combustion turbine for which the Administrator determines that the affected facility does not have access to natural gas and that the removal of sulfur compounds from the fuel would cause more environmental harm than benefit, you must not cause to be discharged from the affected facility and into the atmosphere any gases that contain an amount of SO_2 exceeding either:

(1) 780 ng/J (6.2 lb/MWh) gross energy output; or

(2) 180 ng SO_2/J (0.42 lb SO_2/MMBtu) heat input.

(e) A stationary combustion turbine subject to either subpart J or Ja of this part is not subject to the SO_2 performance standards in this subpart.

§ 60.4331a What are the requirements for operating a stationary temporary combustion turbine?

(a) Notwithstanding any other provision of this subpart, you may operate a small- or medium-size stationary combustion turbine (*i.e.,* a combustion turbine with a base load rating less than or equal to 850 MMBtu/h) at a single location for up to 24 consecutive months, so long as you comply with all of the requirements in paragraphs (b) through (e) of this section.

(b) You must meet the NO_X emissions standard for stationary temporary combustion turbines in table 1 to this subpart and the applicable SO_2 emissions standard in § 60.4330a.

(c) Unless you elect to demonstrate compliance through the otherwise-applicable monitoring, recordkeeping, and reporting requirements of this subpart, compliance with the NO_X emissions standard must be

demonstrated through maintaining the documentation in paragraphs (c)(1) and (2) of this section on-site:

(1) Each stationary temporary combustion turbine in use at the location has a manufacturer's emissions guarantee at or below the full load NO_X emissions standard in table 1 to this subpart; and

(2) Each such turbine has been performance tested at least once in the prior 5 years as meeting the NO_X emissions standard in table 1 to this subpart.

(d) Unless you elect to demonstrate compliance through the otherwise-applicable monitoring, recordkeeping, and reporting requirements of this subpart, compliance with the SO_2 emissions standard must be demonstrated through complying with the provisions in § 60.4372a.

(e) The conditions in paragraphs (e)(1) through (3) of this section apply in determining whether your stationary combustion turbine qualifies as a stationary temporary combustion turbine.

(1) The turbine may only be located at the same stationary source (or group of stationary sources located within a contiguous area and under common control) for a total period of 24 consecutive months. This is the total period of residence time allowed after the turbine commences operation at the location, regardless of whether the turbine is in operation for the entire 24 consecutive month period.

(2) Any temporary combustion turbine that replaces a temporary combustion turbine at a location and performs the same or similar function will be included in calculating the consecutive time period.

(3) The relocation of a stationary temporary combustion turbine within a single stationary source (or group of stationary sources located within a contiguous area and under common control) while performing the same or similar function (*i.e.,* serving the same electric, mechanical, or thermal load) does not restart the 24-calendar month residence time period.

General Compliance Requirements

§ 60.4333a What are my general requirements for complying with this subpart?

(a) You must operate and maintain your stationary combustion turbine, air pollution control equipment, and monitoring equipment in a manner consistent with good air pollution control practices for minimizing emissions at all times, including during startup, shutdown, and malfunction.

(b) If you own or operate a stationary combustion turbine subject to a NO_X emissions standard in § 60.4320a, you must conduct an initial performance test according to § 60.8 using the applicable methods in § 60.4400a or § 60.4405a. Thereafter, unless you perform continuous monitoring consistent with § 60.4335a, § 60.4340a, or § 60.4345a, you must conduct subsequent performance tests according to the applicable requirements in paragraphs (b)(1) through (6) of this section.

(1) Except as provided for in paragraphs (b)(2) through (5) of this section, you must conduct subsequent performance tests within 12 calendar months of the date that the previous performance test was conducted.

(2) If the NO_X emission result from the most recent performance test is less than or equal to 75 percent of the NO_X emissions standard for the stationary combustion turbine, you may reduce the frequency of subsequent performance tests to 26 calendar months following the date the previous performance test was conducted. If the results of any subsequent performance test exceed 75 percent of the NO_X emissions standard for the stationary combustion turbine, you must resume 14-calendar-month performance testing.

(3) An affected facility that has not operated for the 60 calendar days prior to the due date of a performance test is not required to perform the subsequent performance test until 45 calendar days or 10 operating days, whichever is longer, after the next operating day. The Administrator or delegated authority must be notified of recommencement of operation consistent with § 60.4375a(d).

(4) If you own or operate an affected facility that has operated 168 operating hours or less, either in total or using a particular fuel, since the date on which the previous performance test was conducted, you may request that the otherwise required performance test be postponed until the affected facility has operated more than 168 operating hours, either in total or using a particular fuel, since the date on which the previous performance test was conducted. A request for an extension under this paragraph (b)(4) must be addressed to the relevant air division or office director of the appropriate Regional Office of the U.S. EPA as identified in § 60.4(a) for his or her approval at least 30 calendar days prior to the date on which the performance test is required to be conducted. If a postponement is approved, a performance test must be conducted within 45 calendar days after the day that the facility reaches 168 hours of operation since the date on which the previous performance test was conducted. When the facility has operated more than 168 operating hours since the date on which the previous performance test was conducted, the Administrator or delegated authority must be notified consistent with § 60.4375a(e).

(5) For a facility at which a group consisting of no more than five similar stationary combustion turbines (*i.e.,* same manufacturer and model number) is operated, you may request the use of a custom testing schedule by submitting a written request to the Administrator or delegated authority. The minimum requirements of the custom schedule include the conditions specified in paragraphs (b)(5)(i) through (v) of this section.

(i) Emissions from the most recent performance test for each individual affected facility are 75 percent or less of the applicable standard;

(ii) Each stationary combustion turbine uses the same emissions control technology;

(iii) Each stationary combustion turbine is operated in a similar manner;

(iv) Each stationary combustion turbine and its emissions control equipment are maintained according to the manufacturer's recommended maintenance procedures; and

(v) A performance test is conducted on each affected facility at least once every 5 calendar years.

(6) A stationary combustion turbine subject to a NO_X emissions standard in § 60.4320a that exchanges the combustion turbine engine for an overhauled combustion turbine engine as part of an exchange program, must conduct an initial performance test according to § 60.8 using the applicable methods in § 60.4400a or § 60.4405a. (as applicable).

(c) Except as provided for in paragraph (c)(1) or (2) of this section, for each stationary combustion turbine subject to a NO_X emissions standard in § 60.4320a, you must demonstrate continuous compliance using a continuous emissions monitoring system (CEMS) for measuring NO_X emissions according to the provisions in § 60.4345a. If your stationary combustion turbine is equipped with a NO_X CEMS, those measurements must be used to determine excess emissions.

(1) If your stationary combustion turbine uses water or steam injection but not post-combustion controls to meet the applicable NO_X emissions standard in § 60.4320a, you may elect to demonstrate continuous compliance using the pounds per million British thermal units (lb/MMBtu) or parts per million (ppm) input-based standard

according to the provisions in § 60.4335a.

(2) If your stationary combustion turbine does not use water injection, steam injection, or post-combustion controls to meet the applicable NO_X emissions standard in § 60.4320a, you may elect to demonstrate continuous compliance with an input-based standard according to the provisions in § 60.4340a.

(d) An owner or operator of a stationary combustion turbine subject to an SO_2 emissions standard in § 60.4330a must demonstrate compliance using one of the methods specified in paragraphs (d)(1) through (4) of this section.

(1) Conduct an initial performance test according to § 60.8 and use the applicable methods in § 60.4415a. Thereafter, you must conduct subsequent performance tests within 12 calendar months following the date the previous performance test was conducted. An affected facility that has not operated for the 60 calendar days prior to the due date of a performance test is not required to perform the subsequent performance test until 45 calendar days after the next operating day;

(2) Conduct an initial performance test according to § 60.8 and use the applicable methods in § 60.4415a. Thereafter, conduct subsequent fuel sulfur analyses using the applicable methods specified in § 60.4360a and at the frequency specified in § 60.4370a;

(3) Conduct an initial performance test according to § 60.8 and use the applicable methods in § 60.4415a. Thereafter, maintain records (such as a current, valid purchase contract, tariff sheet, or transportation contract) documenting that total sulfur content for the initial and subsequent fuel combusted in your stationary combustion turbine at all times does not exceed applicable conditions specified in § 60.4370a; or

(4) Conduct an initial performance test according to § 60.8 using the applicable methods in § 60.4415a. Thereafter, continue to monitor SO_2 emissions using a CEMS according to the requirements specified in § 60.4374a.

(e) If you elect to comply with an input-based standard (lb/MMBtu or ppm) and your affected facility includes use of one or more heat recovery steam generating units, then you must determine compliance with the applicable NO_X and SO_2 emission standards according to the procedures specified in paragraph (e)(1) or (2) of this section as applicable to the heat recovery steam generating unit configuration used for your affected facility.

(1) For a configuration where a single combustion turbine engine is exhausted through the heat recovery steam generating unit, you must measure both the emissions at the exhaust stack for the heat recovery steam generating unit and the fuel flow to the combustion turbine engine and any associated duct burners.

(2) For a configuration where two or more combustion turbine engines are exhausted through a single heat recovery steam generating unit, you must measure both the total emissions at the exhaust stack for the heat recovery steam generating unit and the total fuel flow to each combustion turbine engine and any associated duct burners. The applicable emissions standard for the affected facility is equal to the prorated (by heat input) emissions standards of each of the individual combustion turbine engines that are exhausted through the single heat recovery steam generating unit.

(f) If you elect to comply with an output-based standard (lb/MWh) and your affected facility includes use of one or more heat recovery steam generating units, then you must determine compliance with the applicable NO_X and SO_2 emission standards according to the procedures in paragraph (f)(1), (2), or (3) of this section as applicable to the heat recovery steam generating unit configuration used for your affected facility.

(1) For a configuration where a single combustion turbine engine is exhausted through the heat recovery steam generating unit, you must measure both the emissions at the exhaust stack for the heat recovery steam generating unit and the total electrical, mechanical energy, and useful thermal output of the stationary combustion turbine (as applicable).

(2) For a configuration where two or more combustion turbine engines are exhausted through a single heat recovery steam generating unit, you must measure both the total emissions at the exhaust stack for the heat recovery steam generating unit, and the total electrical, mechanical energy, and useful thermal output of the heat recovery steam generating unit and each combustion turbine engine (as applicable). The applicable emissions standard for the affected facility is equal to the most stringent emissions standard for any individual combustion turbine engines.

(3) For a configuration where your combustion turbine engines are exhausted through two or more heat recovery steam generating units which serve a common steam turbine or steam header, you must measure both the emissions at the exhaust stack for each heat recovery steam generating unit and the total electrical or mechanical energy output of each combustion turbine engine (as applicable). To determine the net or gross energy output of the steam produced by the heat recovery steam generating unit, you must develop a custom method and provide information, satisfactory to the Administrator or delegated authority, apportioning the net or gross energy output of the steam produced by the heat recovery steam generating units to each of the affected stationary combustion turbines.

(g) If you elect to comply with the mass-based standard, you must demonstrate continuous compliance using either a CEMS for measuring NO_X emissions according to the provisions in § 60.4345a or using the methodology in appendix E to part 75 of this chapter.

Monitoring

§ 60.4335a How do I demonstrate compliance with my NO_X emissions standard without using a NO_X CEMS if I use water or steam injection?

If you qualify and elect to demonstrate continuous compliance according to the provisions of § 60.4333a(c)(1), you must install, calibrate, maintain, and operate a continuous monitoring system to monitor and record the fuel consumption and the water or steam to fuel ratio fired in the combustion turbine engine consistent with the requirements in § 60.4342a. Water or steam only needs to be injected when a fuel is being combusted that requires water or steam injection for compliance with the applicable NO_X emissions standard.

§ 60.4340a How do I demonstrate compliance with my NO_X emissions standard without using a NO_X CEMS if I do not use water or steam injection?

(a) If you qualify and elect to demonstrate continuous compliance according to the provisions of § 60.4333a(c)(2), you must demonstrate compliance with the NO_X emissions standard using one of the methods specified in paragraphs (a)(1) through (3) of this section.

(1) Conduct performance tests according to requirements in § 60.4400a;

(2) Monitor the NO_X emissions rate using the methodology in appendix E to part 75 of this chapter, or the low mass emissions methodology in § 75.19 of this chapter; or

(3) Install, calibrate, maintain, and operate an operating parameter

continuous monitoring system according to the requirements specified in paragraph (b) of this section and consistent with the requirements specified in § 60.4342a.

(b) If you opt to demonstrate compliance according to the procedures described in paragraph (a)(3) of this section, continuous operating parameter monitoring must be performed using the methods specified in paragraphs (b)(1) through (4) of this section as applicable to the stationary combustion turbine.

(1) Selection of the operating parameters used to comply with this paragraph (b) must be identified in the performance test report. The selection of operating parameters is subject to the review and approval of the Administrator or delegated authority.

(2) For a lean premix stationary combustion turbine, you must continuously monitor the appropriate parameters to determine whether the unit is operating in low-NO_X mode during periods when low-NO_X operation is required to comply with the applicable emission NO_X standard.

(3) For a stationary combustion turbine other than a lean premix stationary combustion turbine, you must define parameters indicative of the unit's NO_X formation characteristics and monitor these parameters continuously.

(4) You must perform the parametric monitoring described in section 2.3 in appendix E to part 75 of this chapter or in § 75.19(c)(1)(iv)(H) of this chapter.

§ 60.4342a How do I monitor NO_X control operating parameters?

(a) If you monitor steam or water to fuel ratio according to § 60.4335a or other parameters according to § 60.4340a, the applicable parameters must be continuously monitored and recorded during the performance test, to establish acceptable values and ranges. You may supplement the performance test data with engineering analyses, design specifications, manufacturer's recommendations, and other relevant information to define the acceptable parametric ranges more precisely. You must develop and keep on-site a parameter monitoring plan which explains the procedures used to document proper operation of the NO_X emission controls. The plan must include the information specified in paragraphs (a)(1) through (6) of this section:

(1) Identification of the parameters to be monitored and show there is a significant relationship to emissions and proper operation of the NO_X emission controls;

(2) Selected parameter ranges (or designated conditions) indicative of proper operation of the stationary combustion turbine NO_X emission controls, or describe the process by which such range (or designated condition) will be established;

(3) Explanation of the process you will use to make certain that you obtain data that are representative of the emissions or parameters being monitored (such as detector location, installation specification if applicable);

(4) Description of quality assurance and control practices used to ensure the continuing validity of the data;

(5) Description of the frequency of monitoring and the data collection procedures which you will use (*e.g.,* you are using a computerized data acquisition over a number of discrete data points with the average (or maximum value) being used for purposes of determining whether an exceedance has occurred); and

(6) Justification for the proposed elements of the monitoring. If a proposed performance specification differs from manufacturer recommendation, you must explain the reasons for the differences. You must submit the data supporting the justification, but you may refer to generally available sources of information used to support the justification. You may rely on engineering assessments and other data, provided you demonstrate factors which assure compliance or explain why performance testing is unnecessary to establish indicator ranges.

(b) The water or steam to fuel ratio and parameter continuous monitoring system ranges must be confirmed or reestablished at least once every 60 calendar months following the previous calibration and each time the combustion turbine engine is replaced with an overhauled turbine engine as part of an exchange program. An affected facility that has not operated for 60 calendar days prior to the due date of a recalibration or has had the combustion turbine replaced with an overhauled turbine engine as part of an exchange program is not required to perform the subsequent recalibration until 45 calendar days after the next operating day.

§ 60.4345a How do I demonstrate compliance with my NO_X emissions standard using a NO_X CEMS?

(a) Each CEMS measuring NO_X emissions used to meet the requirements of this subpart, must meet the requirements in paragraphs (a)(1) through (6) of this section.

(1) You must install, certify, maintain, and operate a NO_X monitor to determine the hourly average NO_X emissions in the units of the standard with which you are complying.

(2) If you elect to comply with an input-based or mass-based emissions standard, you must install, calibrate, maintain, and operate either a fuel flow meter (or flow meters) or an O_2 or CO_2 CEMS and a stack flow monitor to continuously measure the heat input to the affected facility.

(3) If you elect to comply with an output-based emissions standard, you must also install, calibrate, maintain, and operate both a watt meter (or meters) to continuously measure the gross electrical output from the affected facility and either a fuel flow meter (or flow meters) or an O_2 or CO_2 CEMS and a stack flow monitor. If you have a CHP combustion turbine and elect to comply with an output-based emissions standard, you must also install, calibrate, maintain, and operate meters to continuously determine the total useful recovered thermal energy. For steam this includes flow rate, temperature, and pressure. If you have a direct mechanical drive application and elect to comply with the output-based emissions standard you must submit a plan to the Administrator or delegated authority for approval of how energy output will be determined.

(4) If you elect to comply with the part-load NO_X emissions standard, you must install, calibrate, maintain, and operate either a fuel flow meter (or flow meters) or an O_2 or CO_2 CEMS and a stack flow monitor to continuously measure the heat input to the affected facility.

(5) If you elect to comply with the temperature dependent NO_X emissions standard, you must install, calibrate, maintain, and operate a thermometer to continuously monitor the ambient temperature.

(6) If you combust natural gas with fuels other than natural gas and elect to comply with the fuels other than natural gas NO_X emissions standard, you must install, calibrate, maintain, and operate a device to continuously monitor when a fuel other than natural gas fuel is combusted in the combustion turbine engine.

(b) Each NO_X CEMS must be installed and certified according to Performance Specification 2 (PS 2) in appendix B to this part. The span value must be 125 percent of the highest applicable standard or highest anticipated hourly NO_X emissions rate. Alternatively, span values determined according to section 2.1.2 in appendix A to part 75 may be used. For stationary combustion turbines that do not use post-combustion technology to reduce emissions of NO_X to comply with the

requirements of this subpart, you may use NO_X and diluent CEMS that are installed and certified according to appendix A to part 75 in lieu of Procedure 1 in appendix F to this part and the requirements of § 60.13, except that the relative accuracy test audit (RATA) of the CEMS must be performed on a lb/MMBtu basis. For stationary combustion turbines that use post-combustion technology to reduce emissions of NO_X to comply with the requirements of this subpart, you may use NO_X and diluent CEMS that are installed and certified according to appendix A to part 75 in lieu of Procedure 1 in appendix F to this part and the requirements of § 60.13 with approval from the Administrator or delegated authority, except that the relative accuracy test audit (RATA) of the CEMS must be performed on a lb/MMBtu basis.

(c) During each full operating hour, both the NO_X monitor and the diluent monitor must complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each 15-minute quadrant of the hour. For partial operating hours, at least one data point must be obtained with each monitor for each quadrant of the hour in which the unit operates. For operating hours in which required quality assurance and maintenance activities are performed on the CEMS, a minimum of two data points (one in each of two quadrants) are required for each monitor.

(d) Each fuel flow meter must be installed, calibrated, maintained, and operated according to the manufacturer's instructions. Alternatively, fuel flow meters that meet the installation, certification, and quality assurance requirements in appendix D to part 75 of this chapter are acceptable for use under this subpart.

(e) Each watt meter, steam flow meter, and each pressure or temperature measurement device must be installed, calibrated, maintained, and operated according to manufacturer's instructions.

(f) You must develop, submit to the Administrator or delegated authority for approval, maintain, and adhere to an on-site quality assurance (QA) plan for all of the continuous monitoring equipment you use to comply with this subpart. At a minimum, such a QA plan must address the requirements of § 60.13(d), (e), and (h). For the CEMS and fuel flow meters, the owner or operator of a stationary combustion turbine that does not use post-combustion technology to reduce emissions of NO_X to comply with the requirements of this subpart may, with approval of the Administrator or delegated authority, satisfy the requirements of this paragraph (f) by implementing the QA program and plan described in section 1 in appendix B to part 75 of this chapter in lieu of the requirements in § 60.13(d)(1).

(g) At a minimum, non-out-of-control CEMS hourly averages shall be obtained for 90 percent of all operating hours on a 30-operating-day rolling average basis.

§ 60.4350a How do I use the NO_X CEMS data to determine excess emissions?

(a) If you demonstrate continuous compliance using a CEMS for measuring NO_X emissions, excess emissions are defined as the applicable compliance period for the stationary combustion turbine (either 4-operating-hours, 30-operating-days, or 12-calendar-month), during which the average NO_X emissions from your affected facility measured by the CEMS is greater than the applicable maximum allowable NO_X emissions standard specified in § 60.4320a as determined using the procedures specified in this section that apply to your stationary combustion turbine.

(b) The NO_X CEMS data for each operating hour as measured according to the requirements in § 60.4345a must be used to determine the hourly average NO_X emissions. The hourly average for a given operating hour is the average of all data points for the operating hour. However, for any periods during which the NO_X, diluent, flow, watt, steam pressure, or steam temperature monitors (as applicable) are out-of-control, the data points are not used in determining the hourly average NO_X emissions. All data points that are not collected during out-of-control periods must be used to determine the hourly average NO_X emissions.

(c) For each operating hour in which an hourly average is obtained, the data acquisition and handling system must calculate and record the hourly average NO_X emissions in units of lb/MMBtu or lbs, as applicable, using the appropriate equation from EPA Method 19 in appendix A–7 to this part. For any hour in which the hourly average O_2 concentration exceeds 19.0 percent O_2 (or the hourly average CO_2 concentration is less than 1.0 percent CO_2), a diluent cap value of 19.0 percent O_2 or 1.0 percent CO_2 (as applicable) may be used in the emission calculations.

(d) Data used to meet the requirements of this subpart shall not include substitute data values derived from the missing data procedures of part 75 of this chapter, nor shall the data be bias adjusted according to the procedures of part 75. For units complying with the 12-calendar-month mass-based standard, emissions for hours of missing data shall be estimated by using the average emissions rate of non-out-of-control hours within ±10 percent of the hour of missing data within the 12-calendar-month period. If non-out-of-control data is not available, the maximum hourly emissions rate during the 12-calendar-month period shall be used.

(e) All required fuel flow rate, steam flow rate, temperature, pressure, and megawatt data must be reduced to hourly averages. However, for any periods during which the flow, watt, steam pressure, or steam temperature monitors (as applicable) are out-of-control, the data points are not used in determining the appropriate hourly average value.

(f) Calculate the hourly average NO_X emissions rate, in units of the emissions standard under § 60.4320a, using lb/MMBtu or ppm for units complying with the input-based standard, using lbs for units complying with the mass-based standard, or lb/MWh or kg/MWh for units complying with the output-based standard:

(1) The gross or net energy output is calculated as the sum of the total electrical and mechanical energy generated by the combustion turbine engine; the additional electrical or mechanical energy (if any) generated by the steam turbine following the heat recovery steam generating unit; the total useful thermal energy output that is not used to generate additional electricity or mechanical output, expressed in equivalent MWh, minus the auxiliary load as calculated using equations 1 and 2 to this paragraph (f)(1):

Equation 1 to Paragraph (f)(1)

$$P = \frac{(Pe)_t}{T} + \frac{(Pe)_c}{T} - Pe_A + P_s + P_o \text{ (Eq. 1)}$$

Where:

P = Gross or net energy output of the stationary combustion turbine system in MWh;

$(Pe)_t$ = Electrical or mechanical energy output of the combustion turbine engine in MWh;

$(Pe)_c$ = Electrical or mechanical energy output (if any) of the steam turbine in MWh;

Pe_A = Electric energy used for any auxiliary loads in MWh (only applicable to owners/operators electing to demonstrate compliance on a net output basis);

P_s = Useful thermal energy of the steam, measured relative to ISO conditions, not used to generate additional electric or mechanical output, in MWh;

P_o = Other useful heat recovery, measured relative to ISO conditions, not used for steam generation or performance enhancement of the stationary combustion turbine; and

T = Electric Transmission and Distribution Factor. Equal to 0.95 for CHP combustion turbine where at least 20.0 percent of the total gross useful energy output consists of electric or direct mechanical output and 20.0 percent of the total gross useful energy output consists of useful thermal output on an annual basis. Equal to 1.0 for all other combustion turbines.

Equation 2 to Paragraph (f)(1)

$$P_s = \frac{Q_m \times H}{3.413 \times 10^6\ Btu/MWh} \quad \text{(Eq. 2)}$$

Where:

P_s = Useful thermal energy of the steam, measured relative to ISO conditions, not used to generate additional electric or mechanical output, in MWh;

Q_m = Measured steam flow in lb;

H = Enthalpy of the steam at measured temperature and pressure relative to ISO conditions, in Btu/lb; and

3.413×10^6 = Conversion factor from Btu to MWh.

(2) For mechanical drive applications complying with the output-based standard, use equation 3 to this paragraph (f)(2):

Equation 3 to Paragraph (f)(2)

$$E = \frac{(NO_x)_m}{BL \times AL} \quad \text{(Eq. 3)}$$

Where:

E = NO_X emissions rate in lb/MWh;

$(NO_X)_m$ = NO_X emissions rate in lb/h;

BL = Manufacturer's base load rating of turbine, in MW; and

AL = Actual load as a percentage of the base load rating.

(g) For each stationary combustion turbine demonstrating compliance on a heat input-based emissions standard, excess NO_X emissions are determined on a 4-operating-hour averaging period basis using the NO_X CEMS data and procedures specified in paragraphs (g)(1) and (2) of this section as applicable to the NO_X emissions standard in table 1 to this subpart.

(1) For each 4-operating-hour period, compute the 4-operating-hour rolling average NO_X emissions as the heat input weighted average of the hourly average of NO_X emissions for a given operating hour and the 3 operating hours preceding that operating hour using the applicable equation in paragraph (g)(2) of this section. Calculate a 4-operating-hour rolling average NO_X emissions rate for any 4-operating-hour period when you have valid CEMS data for at least 3 of those hours (*e.g.,* a valid 4-operating-hour rolling average NO_X emissions rate cannot be calculated if 1 or more continuous monitors was out-of-control for the entire hour for more than 1 hour during the 4-operating-hour period).

(2) If you elect to comply with the applicable heat input-based emissions rate standard, calculate both the 4-operating-hour rolling average NO_X emissions rate and the applicable 4-operating-hour rolling average NO_X emissions standard, calculated using hourly values in table 1 to this subpart, using equation 4 to this paragraph (g)(2).

Equation 4 to Paragraph (g)(2)

$$E = \frac{\sum_{i=1}^{4} (E_i \times Q_i)}{\sum_{i=1}^{4} Q_i} \quad \text{(Eq. 4)}$$

Where:

E = 4-operating-hour rolling average NO_X emissions (lb/MMBtu or ng/J);

E_i = Hourly average NO_X emissions rate or emissions standard for operating hour ''i'' (lb/MMBtu or ng/J); and

Q_i = Total heat input to stationary combustion turbine for operating hour ''i'' (MMBtu or J as appropriate).

(h)(1) For each combustion turbine demonstrating compliance on an output-based standard, you must determine excess emissions on a 30-operating-day rolling average basis. The measured emissions rate is the NO_X emissions measured by the CEMS for a given operating day and the 29 operating days preceding that day. Once each day, calculate a new 30-operating-day average measured emissions rate using all hourly average values based on non-out-of-control NO_X emission data for all operating hours during the previous 30-operating-day operating period. Report any 30-operating-day periods for which you have less than 90 percent data availability as monitor downtime. If you elect to comply with the applicable output-based emissions rate standard, calculate the measured emissions rate using equation 5 to this paragraph (h)(1) and calculate the applicable emissions standard using equation 6 to this paragraph (h)(1). If you elect to comply with the applicable output-based emissions rate standard and determine the heat input on an hourly basis, calculate the 30-operating-day rolling average NO_X emissions rate using equation 5, and determine the applicable 30-operating-day rolling average NO_X emissions standard, calculated using values in table 1 to this subpart, using equation 6. Hours are not subcategorized by load for the purposes of determining the applicable output-based standard. The emissions standard for all hours, regardless of load, is the otherwise applicable full load emissions standard.

Equation 5 to Paragraph (h)(1)

$$E = \frac{\sum_{i=1}^{n} (E_i \times Q_i)}{\sum_{i=1}^{n} P_i} \quad \text{(Eq. 5)}$$

Where:

E = 30-operating-day average NO_X measured emissions rate combustion turbines (lb/MWh or ng/J);

E_i = Hourly average NO_X emissions rate or emissions standard for non-out-of-control operating hour ''i'' (lb/MMBtu or ng/J);

Q_i = Total heat input to stationary combustion turbine for non-out-of-control operating hour ''i'' (MMBtu or J as appropriate);

P_i = Total gross or net energy output from stationary combustion turbine for non-out-of-control operating hour ''i'' (MWh or J); and

n = Total number of operating non-out-of-control hours in the 30-operating-day period.

Equation 6 to Paragraph (h)(1)

$$E = E_{NG} \times \frac{H_{NG}}{H_T} + E_{non-NG} \times \frac{H_{non-NG}}{H_T} \quad (Eq. 6)$$

E = 30-operating-day rolling NO_X emissions standard (lb/MWh or kg/MWh);
E_{NG} = 30-operating-day emissions standard for natural gas-fired combustion turbines (lb/MWh or kg/MWh);
E_{non-NG} = 30-operating-day emissions standard for non-natural gas-fired combustion turbines (lb/MWh or kg/MWh);
H_{NG} = Hours of operation combusting natural gas during the 30-operating-day period;
H_{non-NG} = Hours of operation combusting non-natural gas fuels during the 30-operating-day period; and
H_T = Total hours of operation during the 30-operating-day period.

(2) If you elect to comply with the applicable output-based emissions rate standard and elect to not determine the heat input on an hourly basis, the applicable 30-operating-day emissions rolling NO_X standard is the most stringent standard applicable to the combustion turbine. The 30-operating-day rolling NO_X emissions rate is determined as the sum of the hourly emissions divided by the sum of the gross or net output over the 30-operating-day period.

(i) For each combustion turbine demonstrating compliance on a mass-based standard, you must determine excess NO_X emissions on both a rolling 4-operating-hour and rolling 12-calendar-month basis using the NO_X CEMS data and procedures specified in paragraphs (i)(1) through (4) of this section as applicable to the NO_X emissions standard in table 2 to this subpart. In addition, during system emergencies each combustion turbine must determine excess NO_X emissions using the procedures specified in paragraph (i)(5) of this section.

(1) For each 4-operating-hour period, compute the 4-operating-hour rolling NO_X emissions as the sum of the hourly NO_X emissions for a given operating hour and the 3 operating hours preceding that operating hour. Calculate a 4-operating-hour NO_X emissions rate for any 4-operating-hour period when you have valid CEMS data for at least 3 of those hours (*e.g.,* a valid 4-operating-hour rolling NO_X emissions rate cannot be calculated if 1 or more continuous monitors was out-of-control for the entire hour for more than 1 hour during the 4-operating-hour period).

(2) Calculate the applicable 4-operating-hour rolling NO_X emissions standard, calculated using hourly values in table 2 to this subpart, using equation 7 to this paragraph (i)(2).

Equation 7 to Paragraph (i)(2)

$$E = \sum_{i=1}^{4} (E_i) \quad (Eq. 7)$$

Where:

E = 4-operating-hour rolling NO_X emissions (kg or lbs); and
E_i = Hourly NO_X emissions rate or emissions standard for operating hour ''i'' (kg or lbs).

(3) For each 12-calendar-month period, compute the 12-calendar-month rolling NO_X emissions as the sum of the hourly NO_X emissions for a given month and the 11 calendar months preceding the calendar month. Emissions during system emergencies are not included when calculating the 12-calendar-month emissions rate.

(4) Calculate the applicable 12-calendar-month rolling NO_X emissions standard, calculated using hourly values in table 2 to this subpart, using equation 8 to this paragraph (i)(4). Heat input during system emergencies is not included when calculating the 12-calendar-month emissions standard.

Equation 8 to Paragraph (i)(4)

$$E = E_{NG} \times \frac{H_{NG}}{H_T} + E_{Non-NG} \times \frac{H_{non-NG}}{H_T} \quad (Eq. 8)$$

Where:

E = 12-calendar-month rolling NO_X emissions (tonnes or tons);
E_{NG} = 12-calendar-month emissions standard for natural gas-fired combustion turbines (tonnes or tons);
E_{non-NG} = 12-calendar-month emissions standard for non-natural gas-fired combustion turbines (tonnes or tons);
H_{NG} = Hours of operation combusting natural gas during the 12-calendar-month period;
H_{non-NG} = Hours of operation combusting non-natural gas fuels during the 12-calendar-month period; and
H_T = Total hours of operation during the 12-calendar-month period.

(5) During system emergencies during which the owner or operator elects to not include emissions or heat input in the 12-calendar month calculations, the applicable average natural gas-fired emissions standard is 0.83 lb NO_X/MW-rated output (1.8 lb NO_X/MW-rated output when firing non-natural gas) or the current emissions rate necessary to comply with the 12-calendar month natural gas-fired emissions standard of 0.48 tons NO_X/MW-rated output (0.81 tons NO_X/MW-rated output when firing non-natural gas) whichever is more stringent. For example, if a combustion turbine operated for 4,000 hours during the current 12-calendar month period the applicable average natural gas-fired emissions standard during the system emergency would be 0.24 lb NO_X/MW-rated output and the applicable average non-natural gas-fired emissions standard during the system emergency would be 0.41 lb NO_X/MW-rated output.

§ 60.4360a How do I use fuel sulfur analysis to determine the total sulfur content of the fuel combusted in my stationary combustion turbine?

(a) If you elect to demonstrate compliance with a SO_2 emissions standard according to § 60.4333a(d)(2), the fuel analyses may be performed either by you, a service contractor retained by you, the fuel vendor, or any other qualified agency as determined by the Administrator or delegated authority using the sampling frequency specified in § 60.4370a.

(b) Representative fuel analysis samples may be collected either by an automatic sampling system or manually. For automatic sampling, follow ASTM D5287–97 (Reapproved 2002) (incorporated by reference, see § 60.17) for gaseous fuels or ASTM D4177–95 (Reapproved 2000) (incorporated by reference, see § 60.17) for liquid fuels. For reference purposes when manually collecting gaseous samples, see Gas Processors Association Standard 2166–17 (incorporated by reference, see § 60.17). For reference purposes when manually collecting liquid samples, see either Gas Processors Association Standard 2174–14 or the procedures for manual pipeline sampling in section 14 of ASTM D4057–95 (Reapproved 2000) (both of which are incorporated by reference, see § 60.17).

(c) Each collected fuel analysis sample must be analyzed for the total

sulfur content of the fuel and heating value using the methods specified in paragraph (c)(1) or (2) of this section, as applicable to the fuel type.

(1) For the sulfur content of liquid fuels, ASTM D129–00 (Reapproved 2005), or alternatively D1266–98 (Reapproved 2003), D1552–03, D2622–05, D4294–03, D5453–05, D5623–24, or D7039–24 (all of which are incorporated by reference, see § 60.17). For the heating value of liquid fuels, ASTM D240–19 or D4809–18 (both of which are incorporated by reference, see § 60.17); or

(2) For the sulfur content of gaseous fuels, ASTM D1072–90 (Reapproved 1999), or alternatively D3246–05, D4468–85 (Reapproved 2000), D6667–04, or D5504–20 (all of which are incorporated by reference, see § 60.17). If the total sulfur content of the gaseous fuel during the most recent compliance demonstration was less than half the applicable standard, ASTM D4084–05, D4810–88 (Reapproved 1999), D5504–20, or D6228–98 (Reapproved 2003), or Gas Processors Association Standard 2140–17 or 2377–86 (all of which are incorporated by reference, see § 60.17), which measure the major sulfur compounds, may be used. For the heating value of gaseous fuels, ASTM D1826–94 (Reapproved 2003), or alternatively D3588–98 (Reapproved 2003), D4891–89 (Reapproved 2006), or Gas Processors Association Standard 2172–09 (all of which are incorporated by reference, see § 60.17).

§ 60.4370a How frequently must I determine the fuel sulfur content?

(a) If you are complying with requirements in § 60.4360a, the total sulfur content of all fuels combusted in each stationary combustion turbine subject to an SO_2 emissions standard in § 60.4330a must be determined according to the schedule specified in paragraph (a)(1) or (2) of this section, as applicable to the fuel type, unless you determine a custom schedule for the stationary combustion turbine according to paragraph (b) of this section.

(1) Use one of the total sulfur sampling options and the associated sampling frequency described in sections 2.2.3, 2.2.4.1, 2.2.4.2, and 2.2.4.3 in appendix D to part 75 of this chapter (*i.e.,* flow proportional sampling, daily sampling, sampling from the unit's storage tank after each addition of fuel to the tank or sampling each delivery prior to combining it with liquid fuel already in the intended storage tank).

(2) If the fuel is supplied without intermediate bulk storage, the sulfur content value of the gaseous fuel must be determined and recorded once per operating day.

(b) As an alternative to the requirements of paragraph (a) of this section, you may implement custom schedules for determination of the total sulfur content of gaseous fuels, based on the design and operation of the affected facility and the characteristics of the fuel supply using the procedures provided in either paragraph (b)(1) or (2) of this section. Either you or the fuel vendor may perform the sampling. As an alternative to using one of these procedures, you may use a custom schedule that has been substantiated with data and approved by the Administrator or delegated authority as a change in monitoring prior to being used to comply with the applicable standard in § 60.4330a.

(1) You may determine and implement a custom sulfur sampling schedule for your stationary combustion turbine using the procedure specified in paragraphs (b)(1)(i) through (iv) of this section.

(i) Obtain daily total sulfur content measurements for 30 consecutive operating days, using the applicable methods specified in this subpart. Based on the results of the 30 daily samples, the required frequency for subsequent monitoring of the fuel's total sulfur content must be as specified in paragraph (b)(1)(ii), (iii), or (iv) of this section, as applicable.

(ii) If none of the 30 daily measurements of the fuel's total sulfur content exceeds half the applicable standard, subsequent sulfur content monitoring may be performed at 12-month intervals provided the fuel source or supplier does not change. If any of the samples taken at 12-month intervals has a total sulfur content greater than half but less than the applicable standard, follow the procedures in paragraph (b)(1)(iii) of this section. If any measurement exceeds the applicable standard, follow the procedures in paragraph (b)(1)(iv) of this section.

(iii) If at least one of the 30 daily measurements of the fuel's total sulfur content is greater than half but less than the applicable standard, but none exceeds the applicable standard, then:

(A) Collect and analyze a sample every 30 days for 3 months. If any sulfur content measurement exceeds the applicable standard, follow the procedures in paragraph (b)(1)(iv) of this section. Otherwise, follow the procedures in paragraph (b)(1)(iii)(B) of this section.

(B) Begin monitoring at 6-month intervals for 12 months. If any sulfur content measurement exceeds the applicable standard, follow the procedures in paragraph (b)(1)(iv) of this section. Otherwise, follow the procedures in paragraph (b)(1)(iii)(C) of this section.

(C) Begin monitoring at 12-month intervals. If any sulfur content measurement exceeds the applicable standard, follow the procedures in paragraph (b)(1)(iv) of this section. Otherwise, continue to monitor at this frequency.

(iv) If a sulfur content measurement exceeds the applicable standard, immediately begin daily monitoring according to paragraph (b)(1)(i) of this section. Daily monitoring must continue until 30 consecutive daily samples, each having a sulfur content no greater than the applicable standard, are obtained. At that point, the applicable procedures of paragraph (b)(1)(ii) or (iii) of this section must be followed.

(2) You may use the data collected from the 720-hour sulfur sampling demonstration described in section 2.3.6 in appendix D to part 75 of this chapter to determine and implement a sulfur sampling schedule for your stationary combustion turbine using the procedure specified in paragraphs (b)(2)(i) through (iii) of this section.

(i) If the maximum fuel sulfur content obtained from any of the 720 hourly samples does not exceed half the applicable standard, then the minimum required sampling frequency must be one sample at 12-month intervals.

(ii) If any sample result exceeds half the applicable standard, but none exceeds the applicable standard, follow the provisions of paragraph (b)(1)(iii) of this section.

(iii) If the sulfur content of any of the 720 hourly samples exceeds the applicable standard, follow the provisions of paragraph (b)(1)(iv) of this section.

§ 60.4372a How can I demonstrate compliance with my SO_2 emissions standard using records of the fuel sulfur content?

(a) If you elect to demonstrate compliance with a SO_2 emissions standard according to § 60.4333a(d)(3), you must maintain on-site records (such as a current, valid purchase contract, tariff sheet, or transportation contract) documenting that total sulfur content for the fuel combusted in your stationary combustion turbine at all times does not exceed the conditions specified in paragraph (b) through (e) of this section, as applicable to your stationary combustion turbine.

(b) If your stationary combustion turbine is subject to the SO_2 emissions standard in § 60.4330a(a), then the fuel

combusted must have a potential SO_2 emissions rate of 26 ng/J (0.060 lb/MMBtu) heat input or less.

(c) If your stationary combustion turbine is subject to the SO_2 emissions standard in § 60.4330a(b), then the total sulfur content of the gaseous fuel combusted must be 650 (mg/scm) (28 gr/100 scf).

(d) If your stationary combustion turbine is subject to the SO_2 emissions standard in § 60.4330a(c) or (d), the total sulfur content of the fuel combusted must be:

(1) For natural gas, 140 gr/100 scf or less.

(2) For fuel oil, 0.40 weight percent (4,000 ppmw) or less.

(3) For other fuels, potential SO_2 emissions of 180 ng/J (0.42 lb/MMBtu) heat input or less.

(e) Representative fuel sampling data following the procedures specified in section 2.3.1.4 or 2.3.2.4 in appendix D to part 75 of this chapter documenting that the fuel meets the part 75 requirements to be considered either pipeline natural gas or natural gas. Your stationary combustion turbine may not cause to be discharged into the atmosphere any gases that contain SO_2 in excess of:

(1) 110 ng SO_2/J (0.90 lb SO_2/MWh) gross energy output or 26 ng SO_2/J (0.060 lb SO_2/MMBtu) heat input; or

(2) 780 ng SO_2/J (6.2 lb SO_2/MWh) gross energy output or 180 ng SO_2/J (0.42 lb SO_2/MMBtu) heat input if your combustion turbine is in a noncontinental area.

§ 60.4374a How do I demonstrate compliance with my SO_2 emissions standard and determine excess emissions using a SO_2 CEMS?

(a) If you demonstrate continuous compliance using a CEMS for measuring SO_2 emissions, excess emissions are defined as the applicable averaging period, either 4-operating-hour or 30-operating-day, during which the average SO_2 emissions from your stationary combustion turbine measured by the CEMS exceeds the applicable SO_2 emissions standard specified in § 60.4330a as determined using the procedures specified in this section that apply to your stationary combustion turbine.

(b) You must install, calibrate, maintain, and operate a CEMS for measuring SO_2 concentrations and either O_2 or CO_2 concentrations at the outlet of your stationary combustion turbine, and record the output of the system.

(c) The 1-hour average SO_2 emissions rate measured by a CEMS must be expressed in ng/J or lb/MMBtu heat input and must be used to calculate the average emissions rate under § 60.4330a.

(d) You must use the procedures for installation, evaluation, and operation of the CEMS as specified in § 60.13 and paragraphs (d)(1) through (3) of this section.

(1) Each CEMS must be operated according to the applicable procedures under Performance Specifications 1, 2, and 3 in appendix B to this part;

(2) Quarterly accuracy determinations and daily calibration drift tests must be performed according to Procedure 1 in appendix F to this part; and

(3) The span value of the SO_2 CEMS at the outlet from the SO_2 control device (or outlet of the stationary combustion turbine if no SO_2 control device is used) must be 125 percent of either the highest applicable standard or highest potential SO_2 emissions rate of the fuel combusted. Alternatively, SO_2 span values determined according to section 2.1.1 in appendix A to part 75 of this chapter may be used.

(e) If you have installed and certified a SO_2 CEMS that meets the requirements of part 75 of this chapter, the Administrator or delegated authority can approve that only quality assured data from the CEMS must be used to identify excess emissions under this subpart. You must report periods where the missing data substitution procedures in subpart D of part 75 are applied as monitoring system downtime in the excess emissions and monitoring performance report required under § 60.7(c).

(f) All required fuel flow rate, steam flow rate, temperature, pressure, and megawatt data must be reduced to hourly averages.

(g) Calculate the hourly average SO_2 emissions rate, in units of the emissions standard under § 60.4330a, using lb/MMBtu for units complying with the input-based standard or using equation 1 to paragraph (g)(1) of this section for units complying with the output-based standard:

(1) For simple cycle operation:

Equation 1 to Paragraph (g)(1)

$$E = \frac{(SO_2)_h \times Q}{P} \quad \text{(Eq. 1)}$$

Where:

E = Hourly SO_2 emissions rate, in lb/MWh;

$(SO_2)_h$ = Average hourly SO_2 emissions rate, in lb/MMBtu;

Q = Hourly heat input rate to the stationary combustion turbine, in MMBtu, measured using the fuel flow meter(s), *e.g.,* calculated using Equation D–15a in appendix D to part 75 of this chapter, an O_2 or CO_2 CEMS and a stack flow monitor, or the methodologies in appendix F to part 75 of this chapter; and

P = Gross or net energy output of the stationary combustion turbine in MWh.

(2) The gross or net energy output is calculated as the sum of the total electrical and mechanical energy generated by the stationary combustion turbine; the additional electrical or mechanical energy (if any) generated by the steam turbine following the heat recovery steam generating unit; the total useful thermal energy output that is not used to generate additional electricity or mechanical output, expressed in equivalent MWh, minus the auxiliary load as calculated using equations 2 and 3 to this paragraph (g)(2); and any auxiliary load.

Equation 2 to Paragraph (g)(2)

$$P = \frac{(Pe)_t}{T} + \frac{(Pe)_c}{T} - Pe_A + P_s + P_o \quad \text{(Eq. 2)}$$

Where:

P = Gross energy output of the stationary combustion turbine system in MWh;

$(Pe)_t$ = Electrical or mechanical energy output of the stationary combustion turbine in MWh;

$(Pe)_c$ = Electrical or mechanical energy output (if any) of the steam turbine in MWh;

Pe_A = Electric energy used for any auxiliary loads in MWh;

P_s = Useful thermal energy of the steam, measured relative to ISO conditions, not used to generate additional electric or mechanical output, in MWh;

P_o = Other useful heat recovery, measured relative to ISO conditions, not used for steam generation or performance enhancement of the stationary combustion turbine; and

T = Electric Transmission and Distribution Factor. Equal to 0.95 for CHP combustion turbine where at least 20.0 percent of the total gross useful energy output consists of electric or direct mechanical output and 20.0 percent of the total gross useful energy output consists of useful thermal output on an annual basis. Equal to 1.0 for all other combustion turbines.

Equation 3 to Paragraph (g)(2)

$$P_s = \frac{Q_m \times H}{3.413 \times 10^6\ Btu/MWh} \quad \text{(Eq. 3)}$$

Where:

P_s = Useful thermal energy of the steam, measured relative to ISO conditions, not used to generate additional electric or mechanical output, in MWh;

Q_m = Measured steam flow rate in lb;

H = Enthalpy of the steam at measured temperature and pressure relative to ISO conditions, in Btu/lb; and

3.413×10^6 = Conversion factor from Btu to MWh.

(3) For mechanical drive applications complying with the output-based standard, use equation 4 to this paragraph (g)(3):

Equation 4 to Paragraph (g)(3)

$$E = \frac{(SO_2)_m}{BL \times AL} \quad \text{(Eq. 4)}$$

Where:

E = SO_2 emissions rate in lb/MWh;

$(SO_2)_m$ = SO_2 emissions rate in lb/h;

BL = Manufacturer's base load rating of turbine, in MW; and

AL = Actual load as a percentage of the base load rating.

(h) For each stationary combustion turbine demonstrating compliance on a heat input-based emissions standard, excess SO_2 emissions are determined on a 4-operating-hour averaging period basis using the SO_2 CEMS data and procedures specified in paragraphs (i)(1) and (2) of this section and as applicable to the SO_2 emission standard.

(1) For each 4-operating-hour period, compute the 4-operating-hour rolling average SO_2 emissions as the heat input weighted average of the hourly average of SO_2 emissions for a given operating hour and the 3 operating hours preceding that operating hour using the applicable equation in paragraph (i)(2) of this section. Calculate a 4-operating-hour rolling average SO_2 emissions rate for any 4-operating-hour period when you have valid CEMS data for at least 3 of those hours (*e.g.,* a valid 4-operating-hour rolling average SO_2 emissions rate cannot be calculated if 1 or more continuous monitors was out-of-control for the entire hour for more than 1 hour during the 4-operating-hour period).

(2) If you elect to comply with the applicable heat input-based emissions rate standard, calculate both the 4-operating-hour rolling average SO_2 emissions rate and the applicable 4-operating-hour rolling average SO_2 emission standard using equation 5 to this paragraph (h)(2).

Equation 5 to Paragraph (h)(2)

$$E = \frac{\sum_{i=1}^{4} (E_i \times Q_i)}{\sum_{i=1}^{4} Q_i} \quad \text{(Eq. 5)}$$

Where:

E = 4-operating-hour rolling average SO_2 emissions (lb/MMBtu or ng/J);

E_i = Hourly average SO_2 emissions rate or emissions standard for operating hour ''i'' (lb/MMBtu or ng/J); and

Q_i = Total heat input to stationary combustion turbine for operating hour ''i'' (MMBtu or J as appropriate).

(i) For each combustion turbine demonstrating compliance on an output-based standard, you must determine excess emissions on a 30-operating-day rolling average basis. The measured emissions rate is the SO_2 emissions measured by the CEMS for a given operating day and the 29 operating days preceding that day. Once each operating day, calculate a new 30-operating-day average measured emissions rate using all hourly average values based on non-out-of-control SO_2 emission data for all operating hours during the previous 30-operating-day operating period. Report any 30-operating-day periods for which you have less than 90 percent data availability as monitor downtime. Calculate both the 30-operating-day rolling average SO_2 emissions rate and the applicable 30-operating-day rolling average SO_2 emissions standard using equation 6 to this paragraph (i).

Equation 6 to Paragraph (i)

$$E = \frac{\sum_{i=1}^{n} (E_i \times Q_i)}{\sum_{i=1}^{n} P_i} \quad \text{(Eq. 6)}$$

Where:

E = 30-operating-day average SO_2 measured emissions rate (lb/MWh or ng/J);

E_i = Hourly average SO_2 measured emissions rate for non-out-of-control operating hour ''i'' (lb/MMBtu or ng/J);

Q_i = Total heat input to stationary combustion turbine for non-out-of-control operating hour ''i'' (MMBtu or J as appropriate);

P_i = Total gross energy output from stationary combustion turbine for non-out-of-control operating hour ''i'' (MWh or J); and

n = Total number of non-out-of-control operating hours in the 30-operating-day period.

(j) At a minimum, non-out-of-control CEMS hourly averages shall be obtained for 90 percent of all operating hours on a 30-operating-day rolling average basis.

Recordkeeping and Reporting

§ 60.4375a What reports must I submit?

(a) An owner or operator of a stationary combustion turbine that elects to continuously monitor parameters or emissions, or to periodically determine the fuel sulfur content under this subpart, must submit reports of excess emissions and monitor downtime, according to § 60.7(c). Excess emissions must be reported for all periods of unit operation, including startup, shutdown, and malfunction.

(b) The notification requirements of § 60.8 apply to the initial and subsequent performance tests.

(c) An owner or operator of an affected facility complying with § 60.4333a(b)(3) must notify the Administrator or delegated authority within 15 calendar days after the facility recommences operation.

(d) An owner or operator of an affected facility complying with § 60.4333a(b)(4) must notify the Administrator or delegated authority within 15 calendar days after the facility has operated more than 168 operating hours since the date the previous performance test was required to be conducted.

(e) Within 60 days after the date of completing each performance test or continuous emissions monitoring systems (CEMS) performance evaluation that includes a relative accuracy test audit (RATA), you must submit the results following the procedures specified in paragraph (g) of this section. You must submit the report in a file format generated using the EPA's Electronic Reporting Tool (ERT). Alternatively, you may submit an electronic file consistent with the extensible markup language (XML) schema listed on the EPA's ERT website (*https://www.epa.gov/electronic-reporting-air-emissions/electronic-reporting-tool-ert*) accompanied by the other information required by § 60.8(f)(2) in PDF format.

(f) You must submit to the Administrator semiannual reports of the following recorded information. Beginning on January 15, 2027, or once the report template for this subpart has

been available on the Compliance and Emissions Data Reporting Interface (CEDRI) website (*https://www.epa.gov/electronic-reporting-air-emissions/cedri*) for one year, whichever date is later, submit all subsequent reports using the appropriate electronic report template on the CEDRI website for this subpart and following the procedure specified in paragraph (g) of this section. The date report templates become available will be listed on the CEDRI website. Unless the Administrator or delegated State agency or other authority has approved a different schedule for submission of reports, the report must be submitted by the deadline specified in this subpart, regardless of the method in which the report is submitted.

(g) If you are required to submit notifications or reports following the procedure specified in this paragraph (g), you must submit notifications or reports to the EPA via the Compliance and Emissions Data Reporting Interface (CEDRI), which can be accessed through the EPA's Central Data Exchange (CDX) (*https://cdx.epa.gov/*). The EPA will make all the information submitted through CEDRI available to the public without further notice to you. Do not use CEDRI to submit information you claim as CBI. Although we do not expect persons to assert a claim of CBI, if you wish to assert a CBI claim for some of the information in the report or notification, you must submit a complete file in the format specified in this subpart, including information claimed to be CBI, to the EPA following the procedures in paragraphs (g)(1) and (2) of this section. Clearly mark the part or all of the information that you claim to be CBI. Information not marked as CBI may be authorized for public release without prior notice. Information marked as CBI will not be disclosed except in accordance with procedures set forth in 40 CFR part 2. All CBI claims must be asserted at the time of submission. Anything submitted using CEDRI cannot later be claimed CBI. Furthermore, under CAA section 114(c), emissions data is not entitled to confidential treatment, and the EPA is required to make emissions data available to the public. Thus, emissions data will not be protected as CBI and will be made publicly available. You must submit the same file submitted to the CBI office with the CBI omitted to the EPA via the EPA's CDX as described earlier in this paragraph (g).

(1) The preferred method to receive CBI is for it to be transmitted electronically using email attachments, File Transfer Protocol, or other online file sharing services. Electronic submissions must be transmitted directly to the OAQPS CBI Office at the email address *oaqps_cbi@epa.gov,* and as described above, should include clear CBI markings. ERT files should be flagged to the attention of the Group Leader, Measurement Policy Group; all other files should be flagged to the attention of the Stationary Combustion Turbine Sector Lead. If assistance is needed with submitting large electronic files that exceed the file size limit for email attachments, and if you do not have your own file sharing service, please email *oaqps_cbi@epa.gov* to request a file transfer link.

(2) If you cannot transmit the file electronically, you may send CBI information through the postal service to the following address: U.S. EPA, Attn: OAQPS Document Control Officer, Mail Drop: C404–02, 109 T.W. Alexander Drive, P.O. Box 12055, RTP, NC 27711. In addition to the OAQPS Document Control Officer, ERT files should also be sent to the attention of the Group Leader, Measurement Policy Group, and all other files should also be sent to the attention of the Stationary Combustion Turbine Sector Lead. The mailed CBI material should be double wrapped and clearly marked. Any CBI markings should not show through the outer envelope.

(h) If you are required to electronically submit a report through CEDRI in the EPA's CDX, you may assert a claim of EPA system outage for failure to timely comply with that reporting requirement. To assert a claim of EPA system outage, you must meet the requirements outlined in paragraphs (h)(1) through (7) of this section.

(1) You must have been or will be precluded from accessing CEDRI and submitting a required report within the time prescribed due to an outage of either the EPA's CEDRI or CDX systems.

(2) The outage must have occurred within the period of time beginning 5 business days prior to the date that the submission is due.

(3) The outage may be planned or unplanned.

(4) You must submit notification to the Administrator in writing as soon as possible following the date you first knew, or through due diligence should have known, that the event may cause or has caused a delay in reporting.

(5) You must provide to the Administrator a written description identifying:

(i) The date(s) and time(s) when CDX or CEDRI was accessed and the system was unavailable;

(ii) A rationale for attributing the delay in reporting beyond the regulatory deadline to EPA system outage;

(iii) A description of measures taken or to be taken to minimize the delay in reporting; and

(iv) The date by which you propose to report, or if you have already met the reporting requirement at the time of the notification, the date you reported.

(6) The decision to accept the claim of EPA system outage and allow an extension to the reporting deadline is solely within the discretion of the Administrator.

(7) In any circumstance, the report must be submitted electronically as soon as possible after the outage is resolved.

(i) If you are required to electronically submit a report through CEDRI in the EPA's CDX, you may assert a claim of *force majeure* for failure to timely comply with that reporting requirement. To assert a claim of *force majeure,* you must meet the requirements outlined in paragraphs (i)(1) through (5) of this section.

(1) You may submit a claim if a *force majeure* event is about to occur, occurs, or has occurred or there are lingering effects from such an event within the period of time beginning 5 business days prior to the date the submission is due. For the purposes of this section, a *force majeure* event is defined as an event that will be or has been caused by circumstances beyond the control of the affected facility, its contractors, or any entity controlled by the affected facility that prevents you from complying with the requirement to submit a report electronically within the time period prescribed. Examples of such events are acts of nature (*e.g.,* hurricanes, earthquakes, or floods), acts of war or terrorism, or equipment failure or safety hazard beyond the control of the affected facility (*e.g.,* large scale power outage).

(2) You must submit notification to the Administrator in writing as soon as possible following the date you first knew, or through due diligence should have known, that the event may cause or has caused a delay in reporting.

(3) You must provide to the Administrator:

(i) A written description of the *force majeure* event;

(ii) A rationale for attributing the delay in reporting beyond the regulatory deadline to the *force majeure* event;

(iii) A description of measures taken or to be taken to minimize the delay in reporting; and

(iv) The date by which you propose to report, or if you have already met the reporting requirement at the time of the notification, the date you reported.

(4) The decision to accept the claim of *force majeure* and allow an extension

to the reporting deadline is solely within the discretion of the Administrator.

(5) In any circumstance, the reporting must occur as soon as possible after the *force majeure* event occurs.

(j) Any records required to be maintained by this subpart that are submitted electronically via the EPA's CEDRI may be maintained in electronic format. This ability to maintain electronic copies does not affect the requirement for facilities to make records, data, and reports available upon request to a delegated air agency or the EPA as part of an on-site compliance evaluation.

§ 60.4380a How are NO_X excess emissions and monitor downtime reported?

(a) For a stationary combustion turbine that uses water or steam to fuel ratio monitoring and is subject to the reporting requirements under § 60.4375a(a), periods of excess emissions and monitor downtime must be reported as specified in paragraphs (a)(1) through (3) of this section.

(1) An excess emission that must be reported is any operating hour for which the 4-operating-hour rolling average steam or water to fuel ratio, as measured by the continuous monitoring system, is less than the acceptable steam or water to fuel ratio needed to demonstrate compliance with § 60.4320a, as established during the most recent performance test. Any operating hour during which no water or steam is injected into the turbine when the specific conditions require water or steam injection for NO_X control will also be considered an excess emission.

(2) A period of monitor downtime that must be reported is any operating hour in which water or steam is injected into the turbine, but the parametric data needed to determine the steam or water to fuel ratio are unavailable or out-of-control.

(3) Each report must include the average steam or water to fuel ratio, average fuel consumption, and the stationary combustion turbine load during each excess emission.

(b) For reports required under § 60.4375a(a), periods of excess emissions and monitor downtime for stationary combustion turbines using a CEMS, excess emissions are reported as specified in paragraphs (b)(1) and (2) of this section.

(1) An excess emission that must be reported is any unit operating period in which the 4-operating-hour average NO_X emissions rate, 30-operating-day rolling average NO_X emissions rate, 4-hour mass-based emissions rate, or the 12-calendar-month mass-based emissions rate exceeds the applicable emissions standard in § 60.4320a as determined in § 60.4350a.

(2) A period of monitor downtime that must be reported is any operating hour in which the data for any of the following parameters that you use to calculate the emission rate, as applicable, used to determine compliance, are either missing or out-of-control: NO_X concentration, CO_2 or O_2 concentration, stack flow rate, heat input rate, steam flow rate, steam temperature, steam pressure, or megawatts. You are only required to monitor parameters used for compliance purposes.

(c) For reports required under § 60.4375a(a), periods of excess emissions and monitor downtime for stationary combustion turbines using combustion parameters or parameters that document proper operation of the NO_X emission controls excess emissions and monitor downtime are reported as specified in paragraphs (c)(1) and (2) of this section.

(1) Excess emissions that must be reported are each 4-operating-hour rolling average in which any monitored parameter (as averaged over the 4-operating-hour period) does not achieve the target value or is outside the acceptable range defined in the parameter monitoring plan for the unit.

(2) Periods of monitor downtime that must be reported are each operating hour in which any of the required parametric data that are used to calculate the emission rate, as applicable, used to determine compliance, are either not recorded or are out-of-control.

§ 60.4385a How are SO_2 excess emissions and monitor downtime reported?

(a) If you choose the option to monitor the sulfur content of the fuel, excess emissions and monitor downtime are defined as follows:

(1) For samples obtained using daily sampling, flow proportional sampling, or sampling from the unit's storage tank, excess emissions occur each operating hour included in the period beginning on the date and hour of any sample for which the sulfur content of the fuel being fired in the stationary combustion turbine exceeds the applicable standard and ending on the date and hour that a subsequent sample is taken that demonstrates compliance with the sulfur standard.

(2) If the option to sample each delivery of fuel oil has been selected, you must immediately switch to one of the other oil sampling options (*i.e.,* daily sampling, flow proportional sampling, or sampling from the unit's storage tank) if the sulfur content of a delivery exceeds 0.05 weight percent, 0.15 weight percent, or 0.40 weight percent as applicable. You must continue to use one of the other sampling options until all of the oil from the delivery has been combusted, and you must evaluate excess emissions according to paragraph (a) of this section. When all of the fuel from the delivery has been combusted, you may resume using the as-delivered sampling option.

(3) A period of monitor downtime begins when a required sample is not taken by its due date. A period of monitor downtime also begins on the date and hour of a required sample, if invalid results are obtained. The period of monitor downtime ends on the date and hour of the next valid sample.

(b) If you choose the option to maintain records of the fuel sulfur content, excess emissions are defined as any period during which you combust a fuel that you do not have appropriate fuel records or that fuel contains sulfur greater than the applicable standard.

(c) For reports required under § 60.4375a(a), periods of excess emissions and monitor downtime for stationary combustion turbines using a CEMS, excess emissions are reported as specified in paragraphs (c)(1) and (2) of this section.

(1) An excess emission that must be reported is any unit operating period in which the 4-operating-hour or 30-operating-day rolling average SO_2 emissions rate exceeds the applicable emissions standard in § 60.4330a as determined in § 60.4374a.

(2) A period of monitor downtime that must be reported is any operating hour in which the data for any of the following parameters that you use to calculate the emission rate, as applicable, used to determine compliance, are either missing or out-of-control: SO_2 concentration, CO_2 or O_2 concentration, stack flow rate, heat input rate, steam flow rate, steam temperature, steam pressure, or megawatts. You are only required to monitor parameters used for compliance purposes.

§ 60.4390a What records must I maintain?

(a) You must maintain records of your information used to demonstrate compliance with this subpart as specified in § 60.7.

(b) An owner or operator of a stationary combustion turbine that uses the other fuels, part-load, or low temperature NO_X standards in the compliance demonstration must maintain concurrent records of the hourly heat input, percent load, ambient

temperature, and emissions data as applicable.

(c) An owner or operator of a stationary combustion turbine that uses the tuning NO_X standard in the compliance demonstration must identify the hours on which the maintenance was performed and a description of the maintenance.

(d) An owner or operator of a stationary combustion turbine that demonstrates compliance using the output-based standard must maintain concurrent records of the total gross or net energy output and emissions data.

(e) An owner or operator of a stationary combustion turbine that demonstrates compliance using the water or steam to fuel ratio or a parameter continuous monitoring system must maintain continuous records of the appropriate parameters.

(f) An owner or operator of a stationary combustion turbine complying with the fuel-based SO_2 standard must maintain records of the results of all fuel analyses or a current, valid purchase contract, tariff sheet, or transportation contract.

§ 60.4395a When must I submit my reports?

Consistent with § 60.7(c), all reports required under § 60.7(c) must be electronically submitted via CEDRI by the 30th day following the end of each 6-month period.

Performance Tests

§ 60.4400a How do I conduct performance tests to demonstrate compliance with my NO_X emissions standard if I do not have a NO_X CEMS?

(a) You must conduct the performance test according to the requirements in § 60.8 and paragraphs (b) through (d) of this section.

(b) You must use the methods in either paragraph (b)(1) or (2) of this section to measure the NO_X concentration for each test run.

(1) Measure the NO_X concentration using EPA Method 7E in appendix A–4 to this part, EPA Method 20 in appendix A–7 to this part, EPA Method 320 in appendix A to part 63 of this chapter, or ASTM D6348–12 (Reapproved 2020) (incorporated by reference, see § 60.17). For units complying with the output-based standard, concurrently measure the stack gas flow rate, using EPA Methods 1 and 2 in appendix A–1 to this part, and measure and record the electrical and thermal output from the unit. Then, use equation 1 to this paragraph (b)(1) to calculate the NO_X emissions rate:

Equation 1 to Paragraph (b)(1)

$$E = \frac{1.194\times10^{-7}\times(NO_x)_c\times Q_{std}}{P} \quad \text{(Eq. 1)}$$

Where:

E = NO_X emissions rate, in lb/MWh;

1.194×10^{-7} = Conversion constant, in lb/dscf-ppm;

$(NO_X)_c$ = Average NO_X concentration for the run, in ppm;

Q_{std} = Average stack gas volumetric flow rate, in dscf/h; and

P = Average gross or net electrical and mechanical energy output of the stationary combustion turbine, in MW (for simple cycle operation), for combined cycle operation, the sum of all electrical and mechanical output from the combustion and steam turbines, or, for CHP operation, the sum of all electrical and mechanical output from the combustion and steam turbines plus all useful recovered thermal output not used for additional electric or mechanical generation or to enhance the performance of the stationary combustion turbine, in MW, calculated according to § 60.4350a.

(2) Measure the NO_X and diluent gas concentrations using either EPA Method 7E in appendix A–4 to this part and EPA Method 3A in appendix A–2 to this part, or EPA Method 20 in appendix A–7 to this part. In addition, when only natural gas is being combusted ASTM D6522–20 (incorporated by reference, see § 60.17) can be used instead of EPA Method 3A in appendix A–2 to this part or EPA Method 20 in appendix A–7 to this part to determine the oxygen content in the exhaust gas. Concurrently measure the heat input to the unit, using a fuel flowmeter (or flowmeters), an O_2 or CO_2 CEMS along with a stack flow monitor, or the methodologies in appendix F to part 75 of this chapter, and for units complying with the output-based standard measure the electrical, mechanical, and thermal output of the unit. Use EPA Method 19 in appendix A–7 to this part to calculate the NO_X emissions rate in lb/MMBtu. Then, use equations 1 and, if necessary, 2 and 3 in § 60.4350a(f) to calculate the NO_X emissions rate in lb/MWh.

(c) You must use the methods in either paragraph (c)(1) or (2) of this section to select the sampling traverse points for NO_X and (if applicable) diluent gas.

(1) You must select the sampling traverse points for NO_X and (if applicable) diluent gas according to EPA Method 20 in appendix A–7 to this part or EPA Method 1 in appendix A–1 to this part (non-particulate procedures) and sampled for equal time intervals. The sampling must be performed with a traversing single-hole probe, or, if feasible, with a stationary multi-hole probe that samples each of the points sequentially. Alternatively, a multi-hole probe designed and documented to sample equal volumes from each hole may be used to sample simultaneously at the required points.

(2) As an alternative to paragraph (c)(1) of this section, you may select the sampling traverse points for NO_X and (if applicable) diluent gas according to requirements in paragraphs (c)(2)(i) and (ii) of this section.

(i) You perform a stratification test for NO_X and diluent pursuant to the procedures specified in section 6.5.6.1(a) through (e) in appendix A to part 75 of this chapter.

(ii) Once the stratification sampling is completed, you use the following alternative sample point selection criteria for the performance test specified in paragraphs (c)(2)(ii)(A) through (C) of this section.

(A) If each of the individual traverse point NO_X concentrations is within ±10 percent of the mean concentration for all traverse points, or the individual traverse point diluent concentrations differs by no more than ±0.5 percent CO_2 (or O_2) from the mean for all traverse points, then you may use three points (located either 16.7, 50.0 and 83.3 percent of the way across the stack or duct, or, for circular stacks or ducts greater than 2.4 meters (7.8 feet) in diameter, at 0.4, 1.2, and 2.0 meters from the wall). The three points must be located along the measurement line that exhibited the highest average NO_X concentration during the stratification test; or

(B) For a stationary combustion turbine subject to a NO_X emissions standard greater than 15 ppm at 15 percent O_2, you may sample at a single point, located at least 1 meter from the stack wall or at the stack centroid if each of the individual traverse point NO_X concentrations is within ±5 percent of the mean concentration for all

traverse points, or the individual traverse point diluent concentrations differs by no more than ±0.3 percent CO_2 (or O_2) from the mean for all traverse points; or

(C) For a stationary combustion turbine subject to a NO_X emissions standard less than or equal to 15 ppm at 15 percent O_2, you may sample at a single point, located at least 1 meter from the stack wall or at the stack centroid if each of the individual traverse point NO_X concentrations is within ±2.5 percent of the mean concentration for all traverse points, or the individual traverse point diluent concentrations differs by no more than ±0.15 percent CO_2 (or O_2) from the mean for all traverse points.

(d) The performance test must be done at any load condition within ±25 percent of 100 percent of the base load rating. You may perform testing at the highest achievable load point, if at least 75 percent of the base load rating cannot be achieved in practice. You must conduct three separate test runs for each performance test. The minimum time per run is 20 minutes.

(1) If the stationary combustion turbine combusts both natural gas and fuels other than natural gas as primary or backup fuels, separate performance testing is required for each fuel.

(2) For a combined cycle or CHP combustion turbine with supplemental heat (duct burner), you must measure the total NO_X emissions downstream of the duct burner. The duct burner must be in operation within ±25 percent of 100 percent of the base load rating of the duct burners or the highest achievable load if at least 75 percent of the base load rating of the duct burners cannot be achieved during the performance test.

(3) If water or steam injection is used to control NO_X with no additional post-combustion NO_X control and you choose to monitor the steam or water to fuel ratio in accordance with § 60.4335a, then that monitoring system must be operated concurrently with each EPA Method 20 in appendix A–7 to this part or EPA Method 7E in appendix A–4 to this part run and must be used to determine the fuel consumption and the steam or water to fuel ratio necessary to comply with the applicable § 60.4320a NO_X emissions standard.

(4) If you elect to install a CEMS, the performance evaluation of the CEMS may either be conducted separately or (as described in § 60.4405a) as part of the initial performance test of the affected unit.

(5) The ambient temperature must be greater than 0 °F during the performance test. The Administrator or delegated authority may approve performance testing below 0 °F if the timing of the required performance test and environmental conditions make it impractical to test at ambient conditions greater than 0 °F.

§ 60.4405a How do I conduct a performance test if I use a NO_X CEMS?

(a) If you use a CEMS the performance test must be performed according to the procedures specified in paragraph (b) of this section.

(b) The initial performance test must use the procedure specified in paragraphs (b)(1) through (4) of this section.

(1) Perform a minimum of nine RATA reference method runs, with a minimum time per run of 21 minutes, at a single load level, within ±25 percent of 100 percent of the base load rating while the source is combusting the fuel that is a normal primary fuel for that source. You may perform testing at the highest achievable load point, if at least 75 percent of the base load rating cannot be achieved in practice. The ambient temperature must be greater than 0 °F during the RATA runs. The Administrator or delegated authority may approve performance testing below 0 °F if the timing of the required performance test and environmental conditions make it impractical to test at ambient conditions greater than 0 °F.

(2) For each RATA run, concurrently measure the heat input to the unit using a fuel flow meter (or flow meters) or the methodologies in appendix F to part 75 of this chapter, and for units complying with the output-based standard, measure the electrical and thermal output from the unit.

(3) Use the test data both to demonstrate compliance with the applicable NO_X emissions standard under § 60.4320a and to provide the required reference method data for the RATA of the CEMS described under § 60.4342a.

(4) Compliance with the applicable emissions standard in § 60.4320a is achieved if the sum of the NO_X emissions divided by the heat input (or gross or net energy output) for all the RATA runs, expressed in units of lb/MMBtu, ppm, lb/MWh, or kgs, does not exceed the emissions standard.

§ 60.4415a How do I conduct performance tests to demonstrate compliance with my SO_2 emissions standard?

(a) If you are an owner or operator of an affected facility complying with the fuel-based standard must submit fuel records (such as a current, valid purchase contract, tariff sheet, transportation contract, or results of a fuel analysis) to satisfy the requirements of § 60.8.

(b) If you are an owner or operator of an affected facility complying with the SO_2 emissions standard must conduct the performance test by measuring the SO_2 emissions in the stationary combustion turbine exhaust gases using the methods in either paragraph (b)(1) or (2) of this section.

(1) Measure the SO_2 concentration using EPA Method 6, 6C, or 8 in appendix A–4 to this part or EPA Method 20 in appendix A–7 to this part. For units complying with the output-based standard, concurrently measure the stack gas flow rate, using EPA Methods 1 and 2 in appendix A–1 to this part, and measure and record the electrical and thermal output from the unit. Then use equation 1 to this paragraph (b)(1) to calculate the SO_2 emissions rate:

Equation 1 to Paragraph (b)(1)

$$E = \frac{1.664 \times 10^{-7} \times (SO_2)_c \times Q_{std}}{P} \quad \text{(Eq. 1)}$$

Where:

E = SO_2 emissions rate, in lb/MWh;

1.664×10^{-7} = Conversion constant, in lb/dscf-ppm;

$(SO_2)_c$ = Average SO_2 concentration for the run, in ppm;

Q_{std} = Average stack gas volumetric flow rate, in dscf/h; and

P = Average gross electrical and mechanical energy output of the stationary combustion turbine, in MW (for simple cycle operation), for combined cycle operation, the sum of all electrical and mechanical output from the combustion and steam turbines, or, for CHP operation, the sum of all electrical and mechanical output from the combustion and steam turbines plus all useful recovered thermal output not used for additional electric or mechanical generation or to enhance the performance of the stationary combustion turbine, in MW, calculated according to § 60.4350a(f)(2).

(2) Measure the SO_2 and diluent gas concentrations, using either EPA Method 6, 6C, or 8 in appendix A–4 to this part and EPA Method 3A in appendix A–2 to this part, or EPA Method 20 in appendix A–7 to this part. Concurrently measure the heat input to the unit, using a fuel flowmeter (or flowmeters), an O_2 or CO_2 CEMS along with a stack flow monitor, or the methodologies in appendix F to part 75 of this chapter, and for units complying with the output based standard measure the electrical and thermal output of the unit. Use EPA Method 19 in appendix A–7 to this part to calculate the SO_2 emissions rate in lb/MMBtu. Then, use equations 1 and, if necessary, 2, 3, and 4 in § 60.4374a to calculate the SO_2 emissions rate in lb/MWh.

Other Requirements and Information

§ 60.4416a What parts of the general provisions apply to my affected EGU?

(a) Notwithstanding any other provision of this chapter, certain parts of the general provisions in §§ 60.1 through 60.19, listed in table 2 to this subpart, do not apply to your affected combustion turbine.

(b) Small, medium, and low utilization large combustion turbines that are subject to this subpart and are not a ''major source'' or located at a ''major source'' (as that term is defined at 42 U.S.C. 7661(2)) are exempt from the requirements of 42 U.S.C. 7661a(a).

§ 60.4417a Who implements and enforces this subpart?

(a) This subpart can be implemented and enforced by the EPA, or a delegated authority such as your State, local, or Tribal agency. If the Administrator has delegated authority to your State, local, or Tribal agency, then that agency, (as well as the EPA) has the authority to implement and enforce this subpart. You should contact your EPA Regional Office to find out if this subpart is delegated to your State, local, or Tribal agency.

(b) In delegating implementation and enforcement authority of this subpart to a State, local, or Tribal agency, the Administrator retains the authorities listed in paragraphs (b)(1) through (6) of this section and does not transfer them to the State, local, or Tribal agency. In addition, the EPA retains oversight of this subpart and can take enforcement actions, as appropriate.

(1) Approval of alternatives to the emissions standards.

(2) Approval of major alternatives to test methods.

(3) Approval of major alternatives to monitoring.

(4) Approval of major alternatives to recordkeeping and reporting.

(5) Performance test and data reduction waivers under § 60.8(b).

(6) Approval of an alternative to any electronic reporting to the EPA required by this subpart.

§ 60.4420a What definitions apply to this subpart?

As used in this subpart, all terms not defined in this section will have the meaning given them in the Clean Air Act and in subpart A of this part.

Annual capacity factor means the ratio between the actual heat input to a stationary combustion turbine during a calendar year and the potential heat input to the stationary combustion turbine had it been operated for 8,760 hours during a calendar year at the base load rating. Heat input during a system emergency as defined in § 60.4420a is excluded when determining the annual capacity factor. Actual and potential heat input derived from non-combustion sources (*e.g.,* solar thermal) are not included when calculating the annual capacity factor.

Base load rating means 100 percent of the manufacturer's design heat input capacity of the combustion turbine engine at ISO conditions using the higher heating value of the fuel. The base load rating does not include any potential heat input to an HRSG.

Biogas means gas produced by the anaerobic digestion or fermentation of organic matter including manure, sewage sludge, municipal solid waste, biodegradable waste, or any other biodegradable feedstock, under anaerobic conditions. Biogas is comprised primarily of methane and CO_2.

Byproduct means any liquid or gaseous substance produced at chemical manufacturing plants, petroleum refineries, pulp and paper mills, or other industrial facilities (except natural gas and fuel oil).

Combined cycle combustion turbine means any stationary combustion turbine which recovers heat from the combustion turbine engine exhaust gases to generate steam that is used to create additional electric power output in a steam turbine.

Combined heat and power (CHP) combustion turbine means any stationary combustion turbine which recovers heat from the combustion turbine engine exhaust gases to heat water or another medium, generate steam for useful purposes other than exclusively for additional electric generation, or directly uses the heat in the exhaust gases for a useful purpose.

Combustion turbine engine means the air compressor, combustor, and turbine sections of a stationary combustion turbine.

Combustion turbine test cell/stand means any apparatus used for testing uninstalled stationary or uninstalled mobile (motive) combustion turbines.

Diffusion flame stationary combustion turbine means any stationary combustion turbine where fuel and air are injected at the combustor and are mixed only by diffusion prior to ignition.

Distillate oil means fuel oils that comply with the specifications for fuel oil numbers 1 or 2, as defined in ASTM D396–98 (incorporated by reference, see § 60.17), diesel fuel oil numbers 1 or 2, as defined in ASTM D975–08a (incorporated by reference, see § 60.17), kerosene, as defined in ASTM D3699–08 (incorporated by reference, see § 60.17), biodiesel as defined in ASTM D6751–11b (incorporated by reference, see § 60.17), or biodiesel blends as defined in ASTM D7467–10 (incorporated by reference, see § 60.17).

District energy system means a central plant producing hot water, steam, and/or chilled water, which then flows through a network of insulated pipes to provide hot water, space heating, and/or air conditioning for commercial, institutional, or residential buildings.

Dry standard cubic foot (dscf) means the quantity of gas, free of uncombined water, that would occupy a volume of 1 cubic foot at 293 Kelvin (20 °C, 68 °F) and 101.325 kPa (14.69 psi, 1 atm) of pressure.

Duct burner means a device that combusts fuel and that is placed in the exhaust duct from another source, such as a stationary combustion turbine, internal combustion engine, kiln, etc., to allow the firing of additional fuel to heat the exhaust gases.

Emergency combustion turbine means any stationary combustion turbine which operates in an emergency situation. Examples include stationary combustion turbines used to produce power for critical networks or equipment, including power supplied to portions of a facility, when electric power from the local utility is interrupted, or stationary combustion turbines used to pump water in the case of fire (*e.g.,* firefighting turbine) or flood, etc. Emergency combustion turbines may be operated for maintenance checks and readiness testing to retain their status as emergency combustion turbines, provided that the tests are recommended by Federal, State, or local government, agencies, or departments, voluntary consensus standards, the manufacturer, the vendor, the regional

transmission organization or equivalent balancing authority and transmission operator, or the insurance company associated with the combustion turbine. Required testing of such units should be minimized, but there is no time limit on the use of emergency combustion turbines. Emergency combustion turbines do not include combustion turbines used as peaking units at electric utilities or combustion turbines at industrial facilities that typically operate at low capacity factors.

Excess emissions means a specified averaging period over which either:

(1) The NO_X or SO_2 emissions rate are higher than the applicable emissions standard in § 60.4320a or § 60.4330a;

(2) The total sulfur content of the fuel being combusted in the affected facility or the SO_2 emissions exceeds the standard specified in § 60.4330a; or

(3) The recorded value of a particular monitored parameter, including the water or steam to fuel ratio, is outside the acceptable range specified in the parameter monitoring plan for the affected unit.

Federally enforceable means all limitations and conditions that are enforceable by the Administrator or delegated authority, including the requirements of this part and part 61 of this chapter, requirements within any applicable State Implementation Plan, and any permit requirements established under § 52.21 or §§ CFR 51.18 and 51.24 of this chapter.

Firefighting combustion turbine means any stationary combustion turbine that is used solely to pump water for extinguishing fires.

Fuel oil means a fluid mixture of hydrocarbons that maintains a liquid state at ISO conditions. Additionally, fuel oil must meet the definition of either distillate oil (as defined in this subpart) or liquefied petroleum (LP) gas as defined in ASTM D1835–03a (incorporated by reference, see § 60.17).

Garrison facility means any permanent military installation.

Gross energy output means:

(1) For simple cycle and combined cycle combustion turbines, the gross useful work performed is the gross electrical or direct mechanical output from both the combustion turbine engine and any associated steam turbine(s).

(2) For a CHP combustion turbine, the gross useful work performed is the gross electrical or direct mechanical output from both the combustion turbine engine and any associated steam turbine(s) plus any useful thermal output measured relative to ISO conditions that is not used to generate additional electrical or mechanical output or to enhance the performance of the unit (i.*e.,* steam delivered to an industrial process).

(3) For a CHP combustion turbine where at least 20.0 percent of the total gross useful energy output consists of useful thermal output on an annual basis, the gross useful work performed is the gross electrical or direct mechanical output from both the combustion turbine engine and any associated steam turbine(s) divided by 0.95 plus any useful thermal output measured relative to ISO conditions that is not used to generate additional electrical or mechanical output or to enhance the performance of the unit (*i.e.,* steam delivered to an industrial process).

(4) For a district energy CHP combustion turbine where at least 20.0 percent of the total gross useful energy output consists of useful thermal output on a 12-calendar-month basis, the gross useful work performed is the gross electrical or direct mechanical output from both the combustion turbine engine and any associated steam turbine(s) divided by 0.95 plus any useful thermal output measured relative to ISO conditions that is not used to generate additional electrical or mechanical output or to enhance the performance of the unit (*e.g.,* steam delivered to an industrial process) divided by 0.95.

Heat recovery steam generating unit (HRSG) means a unit where the hot exhaust gases from the combustion turbine engine are routed in order to extract heat from the gases and generate useful output. Heat recovery steam generating units can be used with or without duct burners. A heat recovery steam generating unit operating independent of the combustion turbine engine may operate burners using ambient air.

High-utilization source means a new medium or large stationary combustion turbine with a 12-calendar-month capacity factor greater than 45 percent.

Integrated gasification combined cycle electric utility steam generating unit (IGCC) means an electric utility steam generating unit that combusts solid-derived fuels in a combined cycle combustion turbine. No solid fuel is directly combusted in the unit during operation.

ISO conditions mean 288 Kelvin (15 °C, 59 °F), 60 percent relative humidity, and 101.325 kilopascals (14.69 psi, 1 atm) pressure.

Large combustion turbine means a stationary combustion turbine with a base load rating greater than 850 MMBtu/h of heat input.

Lean premix stationary combustion turbine means any stationary combustion turbine where the air and fuel are thoroughly mixed to form a lean mixture before delivery to the combustor. Mixing may occur before or in the combustion chamber. A lean premixed turbine may operate in diffusion flame mode during operating conditions such as startup and shutdown, extreme ambient temperature, or low or transient load.

Low-Btu gas means biogas or any gas with a heating value of less than 26 megajoules per standard cubic meter (MJ/scm) (700 Btu/scf).

Low-utilization source means a new medium or large stationary combustion turbine with a 12-calendar-month capacity factor less than or equal to 45 percent.

Medium combustion turbine means a stationary combustion turbine with a base load rating greater than 50 MMBtu/h and less than or equal to 850 MMBtu/h of heat input.

Natural gas means a fluid mixture of hydrocarbons, composed of at least 70 percent methane by volume, that has a gross calorific value between 35 and 41 MJ/scm (950 and 1,100 Btu/scf), and that maintains a gaseous state under ISO conditions. Unless processed to meet this definition of natural gas, natural gas does not include the following gaseous fuels: Landfill gas, digester gas, refinery gas, sour gas, blast furnace gas, coal-derived gas, producer gas, coke oven gas, or any gaseous fuel produced in a process which might result in highly variable CO_2 content or heating value.

Net-electric output means the amount of gross generation the generator(s) produces (including, but not limited to, output from steam turbine(s), combustion turbine(s), and gas expander(s)), as measured at the generator terminals, less the electricity used to operate the plant (*i.e.,* auxiliary loads); such uses include fuel handling equipment, pumps, fans, pollution control equipment, other electricity needs, and transformer losses as measured at the transmission side of the step up transformer (*e.g.,* the point of sale).

Net energy output means:

(1) The net electric or mechanical output from the affected facility plus 100 percent of the useful thermal output; or

(2) For CHP facilities, where at least 20.0 percent of the total gross or net energy output consists of useful thermal output on a 12-calendar-month rolling average basis, the net electric or mechanical output from the affected turbine divided by 0.95, plus 100 percent of the useful thermal output.

(3) For district energy CHP facilities, where at least 20.0 percent of the total gross or net energy output consists of useful thermal output on a 12-calendar-month rolling average basis, the net electric or mechanical output from the affected turbine divided by 0.95, plus 100 percent of the useful thermal output divided by 0.95.

Noncontinental area means the State of Hawaii, the Virgin Islands, Guam, American Samoa, the Commonwealth of Puerto Rico, the Northern Mariana Islands, or offshore turbines.

Offshore turbine means a stationary combustion turbine located on a platform or facility in an ocean, territorial sea, the outer continental shelf, or the Great Lakes of North America and stationary combustion turbines located in a coastal management zone and elevated on a platform.

Operating day means a 24-hour period between midnight and the following midnight during which any fuel is combusted at any time in the unit. It is not necessary for fuel to be combusted continuously for the entire 24-hour period.

Operating hour means a clock hour during which any fuel is combusted in the affected unit. If the unit combusts fuel for the entire clock hour, the operating hour is a full operating hour. If the unit combusts fuel for only part of the clock hour, the operating hour is a partial operating hour.

Out-of-control period means any period beginning with the hour corresponding to the completion of a daily calibration error, linearity check, or quality assurance audit that indicates that the instrument is not measuring and recording within the applicable performance specifications and ending with the hour corresponding to the completion of an additional calibration error, linearity check, or quality assurance audit following corrective action that demonstrates that the instrument is measuring and recording within the applicable performance specifications.

Simple cycle combustion turbine means any stationary combustion turbine which does not recover heat from the combustion turbine engine exhaust gases for purposes other than enhancing the performance of the stationary combustion turbine itself.

Small combustion turbine means a stationary combustion turbine with a base load rating less than or equal to 50 MMBtu/h of heat input.

Solid fuel means any fuel that has a definite shape and volume, has no tendency to flow or disperse under moderate stress, and is not liquid or gaseous at ISO conditions. This includes, but is not limited to, coal, biomass, and pulverized solid fuels.

Stationary combustion turbine means all equipment including, but not limited to, the combustion turbine engine, the fuel, air, lubrication and exhaust gas systems, control systems (except post combustion emissions control equipment), heat recovery system (including heat recovery steam generators and duct burners); steam turbine; fuel compressor and/or pump, any ancillary components and sub-components comprising any simple cycle stationary combustion turbine, any combined cycle combustion turbine, and any combined heat and power combustion turbine based system; plus any integrated equipment that provides electricity or useful thermal output to the combustion turbine engine (*e.g.,* onsite photovoltaics), heat recovery system, or auxiliary equipment. Stationary means that the combustion turbine is not self-propelled or intended to be propelled while performing its function. It may, however, be mounted on a vehicle for portability. Portable combustion turbines are excluded from the definition of ''stationary combustion turbine,'' and not regulated under this part, if the turbine meets the definition of ''nonroad engine'' under title II of the Clean Air Act and applicable regulations and is certified to meet emissions standards promulgated pursuant to title II of the Clean Air Act, along with all related requirements.

Standard cubic foot (scf) means the quantity of gas that would occupy a volume of 1 cubic foot at 293 Kelvin (20.0 °C, 68 °F) and 101.325 kPa (14.69 psi, 1 atm) of pressure.

Standard cubic meter (scm) means the quantity of gas that would occupy a volume of 1 cubic meter at 293 Kelvin (20.0 °C, 68 °F) and 101.325 kPa (14.69 psi, 1 atm) of pressure.

System emergency means periods when the Reliability Coordinator has declared an Energy Emergency Alert level 1, 2, or 3, which should follow NERC Reliability Standard EOP–011–2, its successor, or equivalent.

Temporary combustion turbine means a combustion turbine that is intended to and remains at a single stationary source (or group of stationary sources located within a contiguous area and under common control) for 24 consecutive months or less.

Turbine tuning means planned maintenance or parameter performance testing of a combustion turbine engine involving adjustment of the operating configuration to maintain proper combustion dynamics or testing machine operating performance. Turbine tuning is limited to 30 hours annually.

Useful thermal output means the thermal energy made available for use in any heating application (*e.g.,* steam delivered to an industrial process for a heating application, including thermal cooling applications) that is not used for electric generation or mechanical output at the affected facility to directly enhance the performance of the affected facility (*e.g.,* economizer output is not useful thermal output, but thermal energy used to reduce fuel moisture is considered useful thermal output) or to supply energy to a pollution control device at the affected facility (*e.g.,* steam provided to a carbon capture system would not be considered useful thermal output). Useful thermal output for affected facilities with no condensate return (or other thermal energy input to affected facilities) or where measuring the energy in the condensate (or other thermal energy input to the affected facilities) would not meaningfully impact the emission rate calculation is measured against the energy in the thermal output at SATP conditions (*e.g.* liquid water). Affected facilities with meaningful energy in the condensate return (or other thermal energy input to the affected facility) must measure the energy in the condensate and subtract that energy relative to SATP conditions from the measured thermal output.

Valid data means quality-assured data generated by continuous monitoring systems that are installed, operated, and maintained according to this part or part 75 of this chapter as applicable. For CEMS maintained according to part 75, the initial certification requirements in § 75.20 and appendix A to part 75 must be met before quality-assured data are reported under this subpart; for on-going quality assurance, the daily, quarterly, and semiannual/annual test requirements in sections 2.1, 2.2, and 2.3 of appendix B to part 75 must be met and the data validation criteria in sections 2.1.5, 2.2.3, and 2.3.2 of appendix B to part 75 must be met. For fuel flow meters maintained according to part 75, the initial certification requirements in section 2.1.5 of appendix D to part 75 must be met before quality-assured data are reported under this subpart (except for qualifying commercial billing meters under section 2.1.4.2 of appendix D to part 75), and for on-going quality assurance, the provisions in section 2.1.6 of appendix D to part 75 apply (except for qualifying commercial billing meters). Any out-of-control data is not considered valid data.

TABLE 1 TO SUBPART KKKKa OF PART 60—NITROGEN OXIDE EMISSION STANDARDS FOR STATIONARY COMBUSTION TURBINES

Combustion turbine type	Combustion turbine base load rated heat input (HHV)	Input-based NO_X emission standard [1]	Optional output-based NO_X standard [2]
New, firing natural gas with utilization rate >45 percent.	>850 MMBtu/h	5 ppm at 15 percent O_2 or 7.9 ng/J (0.018 lb/MMBtu).	0.054 kg/MWh-gross (0.12 lb/MWh-gross) 0.055 kg/MWh-net (0.12 lb/MWh-net).
New, firing natural gas with utilization rate ≤45 percent and with design efficiency ≥38 percent.	>850 MMBtu/h	25 ppm at 15 percent O_2 or 40 ng/J (0.092 lb/MMBtu).	0.38 kg/MWh-gross (0.83 lb/MWh-gross) 0.39 kg/MWh-net (0.85 lb/MWh-net).
New, firing natural gas with utilization rate ≤45 percent and with design efficiency <38 percent.	>850 MMBtu/h	9 ppm at 15 percent O_2 or 14 ng/J (0.033 lb/MMBtu).	0.17 kg/MWh-gross (0.37 lb/MWh-gross) 0.17 kg/MWh-net (0.38 lb/MWh-net).
New, modified, or reconstructed, firing non-natural gas.	>850 MMBtu/h	42 ppm at 15 percent O_2 or 70 ng/J (0.16 lb/MMBtu).	0.45 kg/MWh-gross (1.0 lb/MWh-gross) 0.46 kg/MWh-net (1.0 lb/MWh-net).
Modified or reconstructed, firing natural gas, at all utilization rates, with design efficiency ≥38 percent.	>850 MMBtu/h	25 ppm at 15 percent O_2 or 40 ng/J (0.092 lb/MMBtu).	0.38 kg/MWh-gross (0.83 lb/MWh-gross) 0.39 kg/MWh-net (0.85 lb/MWh-net).
Modified or reconstructed, firing natural gas, at all utilization rates, with design efficiency <38 percent.	>850 MMBtu/h	15 ppm at 15 percent O_2 or 24 ng/J (0.055 lb/MMBtu).	0.28 kg/MWh-gross (0.62 lb/MWh-gross) 0.29 kg/MWh-net (0.30 lb/MWh-net).
New, firing natural gas, at utilization rate >45 percent.	>50 MMBtu/h and ≤850 MMBtu/h.	15 ppm at 15 percent O_2 or 24 ng/J (0.055 lb/MMBtu).	0.20 kg/MWh-gross (0.43 lb/MWh-gross) 0.20 kg/MWh-net (0.44 lb/MWh-net).
New, firing natural gas, at utilization rate ≤45 percent.	>50 MMBtu/h and ≤850 MMBtu/h.	25 ppm at 15 percent O_2 or 40 ng/J (0.092 lb/MMBtu).	0.54 kg/MWh-gross (1.2 lb/MWh-gross) 0.56 kg/MWh-net (1.2 lb/MWh-net).
Modified or reconstructed, firing natural gas	>20 MMBtu/h and ≤850 MMBtu/h.	42 ppm at 15 percent O_2 or 67 ng/J (0.15 lb/MMBtu).	0.91 kg/MWh-gross (2.0 lb/MWh-gross) 0.92 kg/MWh-net (2.0 lb/MWh-net).
New, firing non-natural gas	>50 MMBtu/h and ≤850 MMBtu/h.	74 ppm at 15 percent O_2 or 120 ng/J (0.29 lb/MMBtu).	1.6 kg/MWh-gross (3.6 lb/MWh-gross) 1.6 kg/MWh-net (3.7 lb/MWh-net).
Modified or reconstructed, firing non-natural gas	>20 MMBtu/h and ≤850 MMBtu/h.	96 ppm at 15 percent O_2 or 160 ng/J (0.37 lb/MMBtu).	2.1 kg/MWh-gross (4.7 lb/MWh-gross) 2.2 kg/MWh-net (4.8 lb/MWh-net).
New, firing natural gas	≤50 MMBtu/h	25 ppm at 15 percent O_2 or 40 ng/J (0.092 lb/MMBtu).	0.64 kg/MWh-gross (1.4 lb/MWh-gross) 0.65 kg/MWh-net (1.4 lb/MWh-net).
New, firing non-natural gas	≤50 MMBtu/h	96 ppm at 15 percent O_2 or 160 ng/J (0.37 lb/MMBtu).	2.4 kg/MWh-gross (5.3 lb/MWh-gross) 2.5 kg/MWh-net (5.4 lb/MWh-net).
Modified or reconstructed, all fuels	≤20 MMBtu/h	150 ppm at 15 percent O_2 or 240 ng/J (0.55 lb/MMBtu).	3.9 kg/MWh-gross (8.7 lb/MWh-gross) 4.0 kg/MWh-net (8.9 lb/MWh-net).
New, firing natural gas, either offshore turbines, turbines bypassing the heat recovery unit, and/or temporary turbines.	>50 MMBtu/h	25 ppm at 15 percent O_2 or 40 ng/J (0.092 lb/MMBtu).	N/A.
Located north of the Arctic Circle (latitude 66.5 degrees north), operating at ambient temperatures less than 0° F (−18° C), modified or reconstructed offshore turbines, operated during periods of turbine tuning, byproduct-fired turbines, and/or operating at less than 70 percent of the base load rating.	≤300 MMBtu/h	150 ppm at 15 percent O_2 or 240 ng/J) 0.55 lb/MMBtu.	N/A.
Located north of the Arctic Circle (latitude 66.5 degrees north), operating at ambient temperatures less than 0° F (−18° C), modified or reconstructed offshore turbines, operated during periods of turbine tuning, byproduct-fired turbines, and/or operating at less than 70 percent of the base load rating.	>300 MMBtu/h	96 ppm at 15 percent O_2 or 150 ng/J (0.35 lb/MMBtu).	N/A.
Heat recovery units operating independent of the combustion turbine.	All sizes	54 ppm at 15 percent O_2 or 86 ng/J) 0.20 lb/MMBtu.	N/A.

[1] Input-based standards are determined on a 4-operating-hour rolling average basis.
[2] Output-based standards are determined on a 30-operating-day average basis.

TABLE 2 TO SUBPART KKKKa OF PART 60—ALTERNATIVE MASS-BASED NO_X EMISSION STANDARDS FOR STATIONARY COMBUSTION TURBINES

Combustion turbine type	4-Hour emissions rate (lb NO_X/MW-rated output)	12-Calendar-month emissions rate (ton NO_X/MW-rated output)
Natural Gas	0.38 kg NO_X/MW-rated output (0.83 lb NO_X/MW-rated output).	0.44 tonne NO_X/MW-rated output (0.48 ton NO_X/MW-rated output).
Non-Natural Gas	0.82 kg NO_X/MW-rated output (1.8 lb NO_X/MW-rated output).	0.74 tonne NO_X/MW-rated output (0.81 ton NO_X/MW-rated output).

TABLE 3 TO SUBPART KKKKa OF PART 60—APPLICABILITY OF SUBPART A OF THIS PART TO THIS SUBPART

General provisions citation	Subject of citation	Applies to subpart KKKKa	Explanation
§ 60.1	Applicability	Yes.	
§ 60.2	Definitions	Yes	Additional terms defined in § 60.4420a.
§ 60.3	Units and Abbreviations	Yes.	

TABLE 3 TO SUBPART KKKKa OF PART 60—APPLICABILITY OF SUBPART A OF THIS PART TO THIS SUBPART—Continued

General provisions citation	Subject of citation	Applies to subpart KKKKa	Explanation
§ 60.4	Address	Yes	Does not apply to information reported electronically through ECMPS. Duplicate submittals are not required.
§ 60.5	Determination of construction or modification.	Yes.	
§ 60.6	Review of plans	Yes.	
§ 60.7	Notification and Recordkeeping	Yes	Only the requirements to submit the notifications in § 60.7(a)(1) and (3) and to keep records of malfunctions in § 60.7(b), if applicable.
§ 60.8(a)	Performance tests	Yes.	
§ 60.8(b)	Performance test method alternatives	Yes	Administrator can approve alternate methods.
§ 60.8(c)	Conducting performance tests	No	Overridden by § 60.4320a(d).
§ 60.8(d)–(f)	Conducting performance tests	Yes.	
§ 60.9	Availability of Information	Yes.	
§ 60.10	State authority	Yes.	
§ 60.11	Compliance with standards and maintenance requirements.	No.	
§ 60.12	Circumvention	Yes.	
§ 60.13(a)–(h), (j)	Monitoring requirements	Yes.	
§ 60.13(i)	Monitoring requirements	Yes	Administrator can approve alternative monitoring procedures or requirements.
§ 60.14	Modification	Yes.	
§ 60.15	Reconstruction	Yes.	
§ 60.16	Priority list	No.	
§ 60.17	Incorporations by reference	Yes.	
§ 60.18	General control device requirements	Yes.	
§ 60.19	General notification and reporting requirements.	Yes	Does not apply to notifications under § 75.61 of this chapter or to information reported through ECMPS.

[FR Doc. 2026–00677 Filed 1–14–26; 8:45 am]

BILLING CODE 6560–50–P

APPENDIX B

Comments Received from NAACP

From:	Conner, Abre"
To:	Jeffrey Bland
Subject:	NAACP Comment on Draft Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC and xAI
Date:	Tuesday, February 17, 2026 5:03:24 PM
Attachments:	NAACP Comment on Draft Clean Air Act Prevention of Significant Deterioration Construction Permit Air Ref No 0680-00119.pdf

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Mr. Bland

Please find the NAACP's Center for Environmental and Climate Justice comments attached.

Sincerely

Abre' Conner

[naacp.org]

Abre' Conner, Esq.

Director, Center for Environmental and Climate Justice

Policy and Legislative Affairs

aconner@naacpnet.org
O: M:

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[twitter.com] [facebook.com] [youtube.com] [instagram.com]

NAACP

Empowerment Programs

Sent via Online Submission: By email at jbland@mdeq.ms.gov

February 17, 2026

Mr. Jeffrey Bland
Mississippi Department of Environmental Quality
P.O. Box 2261
Jackson, MS 39225

Re: NAACP Comment on Draft Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC and xAI

Dear Mr. Bland:

The NAACP Center for Environmental and Climate Justice submits this letter in strong opposition to the proposed construction permit for the MZX Tech LLC and xAI facility at 2875 Stanton Road in Southaven, Mississippi, and urges the Mississippi Department of Environmental Quality (MDEQ) Permit Board to deny the draft permit. The NAACP is the nation's oldest and largest civil rights organization and has long recognized environmental and climate justice as critical to the protection of civil rights. Through its national advocacy and its state and local branches, including those in Mississippi, the NAACP has worked to challenge the disproportionate siting of polluting facilities in Black communities and other overburdened areas, and to secure meaningful protections for clean air, clean water, and public health across the state and nationally. Despite these efforts, Mississippi's permitting decisions have too often imposed environmental burdens on its most vulnerable residents. Approval of this permit would further this pattern by prioritizing development over the health, safety, and civil rights of affected communities.

The draft permit would authorize MZX Tech, an affiliate of Elon Musk's xAI, to construct and operate 41 methane gas-fired turbines totaling approximately 1,200 megawatts of generating capacity to power the xAI "Colossus 2" artificial intelligence data center across the Tennessee border in the Whitehaven neighborhood of Memphis. Together, these turbines would be capable of generating enough electricity to power a mid-sized city. Yet the communities expected to absorb the air pollution generated by this facility are not the beneficiaries of the project. Instead, residents of Southaven and Memphis, who share a common air shed, would shoulder the environmental and public health burdens of a massive power plant, that utilizes public resources, designed to serve a private data center.

The harms associated with this project are foreseeable. In addition to the lived experiences of Memphis residents who organized and pushed back for over a year due to turbine operations, after getting a glimpse of the unpermitted yet already operating data center, DeSoto County residents have

raised similar concerns regarding air pollution. Operation of the turbines would result in increased emissions of nitrogen oxides, particulate matter, and other hazardous air pollutants known to exacerbate cardiovascular disease, asthma, and other respiratory conditions. These health impacts will disproportionately affect Black communities in DeSoto County and the greater Memphis area, where baseline health disparities already exist.[1] Despite these risks, the draft permit fails to provide complete and accurate information regarding the project site's operations and air emissions. This Board's obligation is to review a comprehensive take on xAI's operations, which seems to be lacking here. Indeed, the public hearing is supposed to be informed by that level of transparency to highlight their concerns further. Communities are entitled to full transparency concerning the nature and scope of this project. Without complete and accurate information, MDEQ cannot expect the public to meaningfully evaluate the risks, and the Permit Board cannot reasonably conclude that the project complies with applicable air quality standards.

Beyond the substantive air quality concerns, the permitting process itself reflects a concerning pattern of procedural disregard for affected communities. DeSoto County residents and communities who share the impacts of industrial pollution, like Memphis, have highlighted that these decisions cannot be made in a vacuum. They have articulated concrete concerns regarding cumulative air pollution, public health impacts, and regulatory transparency. Yet too often, decisions have proceeded without meaningful engagement or adequate responsiveness to those concerns. Moreover, many advocates in the region have asked for an extension to ensure the public could participate. The Board denied those requests, however, we are hopeful that the Board recognizes the balance on the side of protecting public health, which by virtue of reviewing construction and operation of air emissions, is within its mission for any next steps. A permitting process that does not fully account for community input or provide complete and accurate information undermines the participatory protections embedded in federal and state environmental law.

Where a state fails to meaningfully respect procedural safeguards, it creates conditions that allow developers to proceed with that same lack of regard for the procedural protections designed to safeguard public health and community participation. That concern is present here. The draft Permit fails to disclose that MZX Tech has *already* installed 27 so-called "temporary" turbines at the Site—without any permit and in disregard of federal requirements. EPA recently confirmed the long-standing requirement that "temporary" turbines require preconstruction permits under the federal Clean Air Act. The Clean Air Act was enacted to address the public health risks posed by industrialization, which, in the absence of regulation, significantly increased the public's exposure to harmful air pollutants.[2] Since its enactment, the Act has played a critical role in reducing air pollution and protecting public health, particularly in communities already burdened by high pollution levels, by imposing heightened requirements on areas designated as "nonattainment."[3] Many of the MZX Tech and xAI's turbines have

---

[1] Health Planning Council of Southwest Florida, *DeSoto County, FL Health Profile 2025* (2025), https://hpcswf.com/wp-content/uploads/2025/05/DeSoto-County-Health-Profile-2025.pdf; Shelby County Health Dept., *Shelby County Health Department E-Newsletter April 2024* (April 2024), https://www.shelbytnhealth.com/CivicSend/ViewMessage/message/227878.

[2] U.S. Env't Prot. Agency, *Evolution of the Clean Air Act*, https://www.epa.gov/clean-air-act-overview/evolution-clean-air-act

[3] *Id.*

been operating for months without authorization. Yet the draft Permit makes no attempt to account for the 27 unpermitted turbines, neither including them in the emissions estimates for the Site nor requiring the best available pollution control technology for them. The failure of the draft Permit to include at least 27 emissions units at the site renders it deficient and makes it impossible for the community to understand the full scale of the site's impact on air quality and public health.

Installing and operating simple cycle combustion turbines before receiving permit approval demonstrates a complete disregard for the procedural safeguards that are intended to govern projects of this scale. Preconstruction permitting under the Clean Air Act is a mandatory prerequisite designed to ensure that emissions are evaluated and controlled *before* they occur, not after communities are already exposed. Yet here, turbines were installed and reportedly operated in advance of any permit approval. In a letter to MZX Tech, MDEQ "implored" the company to install pollution controls because of air quality concerns in DeSoto County. This posture is deeply concerning. The agency charged with enforcing environmental standards appears to be urging voluntary compliance rather than exercising its full regulatory authority.

The present moment provides an opportunity for the Permit Board to restore integrity to the permitting process. The Board should exercise its authority to: (1) order MZX Tech and xAI to cease operating the 27 unpermitted turbines until it obtains a permit for them; (2) withdraw the current draft Permit; and (3) require that any revised permit application include *all* turbines at the project site before seeking public comment. Only then can the community meaningfully evaluate the full scope of the project, and the Board determine whether it complies with applicable air quality requirements.

The draft permit further fails because even for the 41 turbines the Permit proposes to authorize, the permit does not accurately characterize air pollution and require adequate protections. Among other things, the draft Permit downplays the ongoing violation of the minimum federal ozone standard in the Memphis metropolitan area, which includes DeSoto County, and fails to require strict pollution controls and offsets for MZX Tech and xAI's NOx pollution required by Mississippi law. The draft Permit also underestimates the amount of harmful particulate matter and formaldehyde emissions from the turbines. Formaldehyde exposure is associated with adverse reproductive and developmental outcomes and significant respiratory harms, including narrowing of the bronchi, fluid buildup in the lungs, and worsening of asthma.[4] Studies have also found that formaldehyde is a likely human carcinogen, with links to nasopharyngeal cancer, nasal sinus cancer, and myeloid leukemia.[5] The risk of formaldehyde exposure exists here, as it did in Memphis, and therefore warrants disclosure, particularly given the well-documented harms associated with exposure.

It is imperative that the Permit Board disapprove the Permit because both MDEQ and the community must understand the full impact of the MZX Tech and xAI site's operations on air quality and address that impact as required by the Clean Air Act and Mississippi law. The area immediately around the MZX Tech power plant includes several residential neighborhoods, including Colonial Hills

[4] Agency for Toxic Substances and Disease Registry (ATSDR), *Medical Management Guidelines for Formaldehyde*, CDC Toxic Substances Portal, at https://wwwn.cdc.gov/Tsp/MMG/MMGDetails.aspx?mmgid=216&toxid=39

[5] *Id.*; American Cancer Society, *Formaldehyde and Cancer Risk*, https://www.cancer.org/cancer/risk-prevention/chemicals/formaldehyde.html

and Horn Lake. The power plant is within half a mile from homes and just a mile from an elementary school. Children, whose lungs are still developing abdominal who breathe more air per pound of body weight, face heightened vulnerability to air pollution exposure. These communities have already been experiencing impacts of the 27 unpermitted turbines MZX Tech and xAI have installed at 2875 Stanton Road without a permit, including increased noise and air pollution.

But the air pollution from both the 27 unpermitted turbines and the proposed 41 turbines will extend far beyond the immediately adjacent neighborhoods. Southaven and Memphis share the air—and right now, that air is not meeting minimum federal smog standards. The greater Memphis-Clarksdale-Forrest City metro area, which includes Memphis and Southaven, also received an "F" for high ozone days for the most recent reporting period. Smog makes asthma and other respiratory illnesses worse. Pollutants like smog are especially dangerous for children, who are more likely to develop respiratory illnesses like asthma. Pregnant people and unborn children are also at risk from fossil fuel pollution.[6] According to the Asthma and Allergy Foundation, the Memphis Metro Area, including Memphis and Southaven, has among the highest rates in the U.S. of emergency room visits and deaths due to asthma.[7]

The 41-turbine MZX Tech and xAI power plant alone is estimated to cause millions of dollars of health damages each year nationally, with the greatest effects centered in Shelby and DeSoto counties.[8] The damages include, among other things, missed days of school and work due to respiratory illnesses. This estimate likely understates the near-term health damages, since it does not consider the 27 turbines already installed at the Site, nor does it reflect the cumulative health burden imposed on communities already overexposed to air pollution.

Mississippi has repeatedly failed to protect its residents from avoidable environmental harms. Time and again, permitting decisions have allowed pollution to be concentrated in marginalized communities with the greatest existing environmental and health burdens. Approval of this permit would constitute yet another avoidable failure. The Permit Board has both the authority and the responsibility to prevent this.

We reiterate that the Permit Board must disapprove the draft Permit and instruct MDEQ to:

- Order MZX Tech and xAI to cease operating the 27 unpermitted turbines until it obtains a permit for them;
- Withdraw the draft Permit; and
- Revise the draft Permit to include *all* of the turbines on the site before seeking public comment.

---

[6] EmPower Analytics Group LLC, Air Quality, Health, and Economic Impacts of the Proposed MZX Tech Facility (February 13, 2026), at https://southernenvironment.sharefile.com/share/getinfo/s30d29af5a81747dabe362251af5ec4f4.

[7] 2025 Asthma Capitals: The Most Challenging Places to Live with Asthma, Asthma and Allergy Found. of Am. (2025), AAFA 2025 Asthma Capitals Report September 2025 (ranked 3rd for emergency room visits; 5th for deaths).

[8] EmPower Analytics Group LLC, Air Quality, Health, and Economic Impacts of the Proposed MZX Tech Facility (February 13, 2026), at https://southernenvironment.sharefile.com/share/getinfo/s30d29af5a81747dabe362251af5ec4f4.

The NAACP has stood in solidarity with Memphis residents who raised serious concerns about the first xAI data center, and we do so again here. Consistent with our mission, the NAACP will continue to advocate for communities asked to bear disproportionate environmental burdens without corresponding protections, safeguards or benefits. For these reasons, we urge the MDEQ Permit Board to deny the draft permit.

Sincerely,

Abre' Conner

Abre' Conner, Esq.
Director, NAACP Center for Environmental and Climate Justice

From:	Conner, Abre"
To:	Jeffrey Bland
Cc:	gordyjack10@gmail.com; Robert James; Charles Taylor; Allytra Perryman
Subject:	Mississippi State Conference of the NAACP Comment on Draft Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC
Date:	Tuesday, February 17, 2026 4:47:50 PM
Attachments:	MS State Conference NAACP Comment on Draft Clean Air Act Prevention of Significant Deterioration Construction Permit Air Ref No 0680-00119.pdf

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Mr. Bland

Please see the attached comment on behalf of the MS State Conference of the NAACP.

[naacp.org]

Abre' Conner, Esq.

Director, Center for Environmental and Climate Justice

Policy and Legislative Affairs

aconner@naacpnet.org
O: M:

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NAACP

Empowerment Programs

Sent via Online Submission: By email at jbland@mdeq.ms.gov

February 17, 2026

Mr. Jeffrey Bland
Mississippi Department of Environmental Quality
P.O. Box 2261
Jackson, MS 39225

Re: Mississippi State Conference of the NAACP Comment on Draft Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC and xAI

Dear Mr. Bland:

On behalf of the Mississippi State Conference of the NAACP, we are writing to comment on the draft construction permit (the "Permit") for the MZX Tech LLC and xAI facility at 2875 Stanton Road in Southaven, MS (the "Site"). The draft Permit proposes MZX tech, an xAI affiliate, to construct and operate 41 methane gas-fired turbines generating 1,200 megawatts of power. This is enough power for a mid-sized city, but the MZX Tech power plant isn't providing electricity to the city, even though the plant is surrounded by several residential neighborhoods, homes, and an elementary school.

The Mississippi State Conference of the NAACP has a long history of fighting for environmental and climate justice issues that impact members across the state. From other power plants to water contamination and more, we recognize that the decisions made today will impact our residents for generations to come. We stood with residents in Memphis when they shared that xAI planned to continue to operate methane gas turbines in a predominantly Black community. We are clear in our conviction here as well. Allowing xAI to apply for a permit to construct and operate 41 methane gas turbines seems irresponsible, considering the health concerns in the area. The American Lung Association gave DeSoto County an F for Ozone. Adding to pollution with this knowledge surely is not in the interest of environmental and public health.

MZX Tech and xAI installed 27 turbines without a permit, disregarding federal requirements. The community has been experiencing many negative impacts including noise and air pollution as a result of these turbines. MZX claims these 27 turbines and impacts are temporary, but now are asking to permanently install and operate 41 gas turbines at the same site. The draft Permit does not mention the 27 unpermitted turbines, nor includes them in emission estimates. The failure of the draft Permit to include these 27 emissions units on the Site renders it deficient and makes it impossible for the community to understand the full scale of the Site's impact on air quality and public health.

The Permit Board must disapprove the draft Permit and instruct MDEQ to:

- Order MZX Tech and xAI to cease operating the 27 unpermitted turbines until it obtains a permit for them;
- Withdraw the draft Permit; and
- Revise the draft Permit to include *all* of the turbines on the site before seeking public comment.

Even with the draft Permit, MZX Tech and xAI fail to be transparent with the community. The draft Permit does not provide accurate information characterizing the air pollution caused by the 41 turbines, which would require sufficient safeguards. The draft Permit also dismisses the fact that there is an ongoing violation of the minimum federal ozone standard, it underestimates the amount of harmful particulate matter emissions from the turbine, and it underestimates toxic formaldehyde emissions limits. For all of these reasons, the draft Permit fails to meet applicable requirements, and the Permit Board must disapprove the Permit.

Beyond the substantive air quality concerns, the permitting process itself reflects a concerning pattern of procedural disregard for affected communities. DeSoto County residents and communities who share the impacts of industrial pollution, like Memphis, have highlighted that these decisions cannot be made in a vacuum. They have articulated concrete concerns regarding cumulative air pollution, public health impacts, and regulatory transparency. Yet too often, decisions have proceeded without meaningful engagement or adequate responsiveness to those concerns. Moreover, many advocates from our communities have asked for an extension to ensure the public could participate. The Board denied those requests; however, we remain firm that the public and our Mississippi community must be able to engage fully.

The Permit Board must also disapprove the Permit because both MDEQ and the community need to understand the full and true impact of the MZX Tech Site. This includes the impact the operations have on the air quality and making sure they meet regulatory requirements of the Clean Air Act and Mississippi law. The MZX Tech and xAI power plant is surrounded by several residential neighborhoods, including Colonial Hills and Horn Lake, and is just a mile from an elementary school. These communities have already been experiencing the impacts of the 27 unpermitted turbines MZX Tech and xAI have installed at 2875 Stanton Road without a permit, including increased noise and air pollution.

The air pollution from both the 27 unpermitted turbines and the proposed 41 turbines will reach beyond the immediately adjacent neighborhoods. Currently, the air shared by Southaven and Memphis is not meeting minimum federal smog standards. The greater Memphis-Clarksdale-Forrest City metro area, which includes Memphis and Southaven, received an "F" for high ozone days for the most recent reporting period.[1]

Smog makes asthma and other respiratory illnesses worse.[2] Pollutants like smog are especially dangerous for children, who are more likely to develop respiratory illnesses like asthma.[3] Pregnant women and unborn children are also at risk from fossil fuel pollution.[4] According to the Asthma and

Allergy Foundation, the Memphis Metro Area, including Memphis and Southaven, has among the highest rates in the U.S. of emergency room visits and deaths due to asthma.[5]

The 41-turbine MZX Tech and xAI power plant, not including the already present 27 turbines, is estimated to cause millions of dollars of health damage nationally each year. Shelby and DeSoto counties will be those who experience the greatest impact. Some of the damages include missed days of school and work due to respiratory illnesses.[6]

Mississippi has repeatedly failed to protect its residents from avoidable environmental harms. Time and again, permitting decisions have allowed pollution to be concentrated in marginalized communities with the greatest existing environmental and health burdens. Approval of this permit would constitute yet another avoidable failure. The Permit Board has both the authority and the responsibility to prevent this.

Our communities, already impacted by air pollution, will bear the health risks of MZX Tech's and xAI's massive power plant. Our communities deserve better. We deserve transparent and full information about the Site's operations and air emissions, which MDEQ is required to provide. Because the draft Permit fails to provide complete and accurate information, we demand that the Permit Board disapprove the Permit.

Sincerely,

Dr. Robert James
President
Mississippi State Conference NAACP

Gordon Jackson
Environmental and Climate Justice Chair
Mississippi State Conference NAACP

[1] Memphis-Clarksdale-Forrest City, TN-MS-AR, Am. Lung Ass'n (2025), Memphis-Clarksdale-Forrest City, TN-MS-AR | American Lung Association.

[2] Katherine Burgess, *SELC petitions EPA to say Memphis area in violation of ozone standards*, MLK50 Justice Through Journalism (June 6, 2025),

https://mlk50.com/2025/06/06/selc-petitions-epa-to-say-memphis-area-in-violation-of-ozone-standards/.

[3] EPA, Health Effects of Ozone Pollution (last visited February 7, 2026), Health Effects of Ozone Pollution | US EPA.

[4] Exposure to Air Pollution During Pregnancy Linked to Neurodevelopmental Issues | Columbia University Mailman School of Public Health; Ambient air pollution in critical windows of exposure and spontaneous miscarriage in a preconception cohort - ScienceDirect.

[5]2025 Asthma Capitals: The Most Challenging Places to Live with Asthma, Asthma and Allergy Found. of Am. (2025), AAFA 2025 Asthma Capitals Report September 2025 (ranked 3rd for emergency room visits; 5th for deaths).

[6] Air Quality, Health, and Economic Impacts of the Proposed MZX Tech Facility (February 13, 2026), https://southernenvironment.sharefile.com/share/getinfo/s30d29af5a81747dabe362251af5ec4f4.

From:	Conner, Abre"
To:	Jeffrey Bland
Cc:	rtiptonjr@gmail.com; gordyjack10@gmail.com
Subject:	DeSoto County Branch of the NAACP Comment on Draft Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC
Date:	Tuesday, February 17, 2026 4:42:31 PM
Attachments:	DeSoto County NAACP Comment on Draft Clean Air Act Prevention of Significant Deterioration Construction Permit Air Ref No 0680-00119.pdf

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Mr. Bland,

Please see written comment attached for the DeSoto County Branch of the NAACP.

[naacp.org]

Abre' Conner, Esq.

Director, Center for Environmental and Climate Justice

Policy and Legislative Affairs

aconner@naacpnet.org
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NAACP

Empowerment Programs

Sent via Online Submission: By email at jbland@mdeq.ms.gov

February 17, 2026

Mr. Jeffrey Bland
Mississippi Department of Environmental Quality
P.O. Box 2261
Jackson, MS 39225

Re: DeSoto County Branch of the NAACP Comment on Draft Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Dear Mr. Bland:

On behalf of the DeSoto County Branch of the NAACP, we are writing to comment on the draft construction permit (the "Permit") for the MZX Tech LLC and xAI facility at 2875 Stanton Road in Southaven, MS (the "Site"). The draft Permit proposes MZX tech, an xAI affiliate, to construct and operate 41 methane gas-fired turbines generating 1,200 megawatts of power. This is enough power for a mid-sized city, but the MZX Tech power plant isn't providing electricity to the city, even though the plant is surrounded by several residential neighborhoods, homes, and an elementary school.

The DeSoto County Branch of the NAACP has residents close to the data center. Indeed, even as Colossus I came under unpermitted operation, that decision impacted our community. MDEQ and this Board has an opportunity to fix this pattern. Our branch has a long history of fighting for civil rights and demanding justice for the residents across the County. This fight is no different. Dirty pollution from methane gas does not cease to exist just because it is coming from a data center. We must view this for what it is: a large polluting power plant that does not need to add more pollution in our communities.

MZX Tech and xAI installed 27 turbines without a permit, disregarding federal requirements. Our community has been experiencing many negative impacts including noise and air pollution as a result of these turbines. MZX claims these 27 turbines and impacts are temporary, but now are asking to permanently install and operate 41 gas turbines at the same site. The draft Permit does not mention the 27 unpermitted turbines, nor includes them in emission estimates. The failure of the draft Permit to include these 27 emissions units on the Site renders it deficient and makes it impossible for our community to truly grasp the full scale of the Site's impact on air quality and public health.

The Permit Board must disapprove the draft Permit and instruct MDEQ to:

- Order MZX Tech and xAI to cease operating the 27 unpermitted turbines until it obtains a permit for them;
- Withdraw the draft Permit; and
- Revise the draft Permit to include *all* of the turbines on the site before seeking public comment.

Even with the draft Permit, MZX Tech and xAI fail to be transparent. The draft Permit does not provide information accurately characterizing the air pollution caused by the 41 turbines, that would require sufficient safeguarding. The draft Permit also dismisses the fact that there is an ongoing violation of the minimum federal ozone standard, it underestimates the amount of harmful particulate matter emissions from the turbine, and underestimates toxic formaldehyde emissions limits. For all of these reasons, the draft Permit fails to meet applicable requirements and the Permit Board must disapprove the Permit.

Beyond the substantive air quality concerns, the permitting process itself reflects a concerning pattern of procedural disregard for affected communities. DeSoto County residents and communities who share the impacts of industrial pollution, like Memphis, have highlighted that these decisions cannot be made in a vacuum. They have articulated concrete concerns regarding cumulative air pollution, public health impacts, and regulatory transparency. Yet too often, decisions have proceeded without meaningful engagement or adequate responsiveness to those concerns. Moreover, many advocates from our communities have asked for an extension to ensure the public could participate. The Board denied those requests; however, we remain firm that the public and our Mississippi community must be able to engage fully.

The Permit Board must also disapprove the Permit because both MDEQ and the DeSoto community need to understand the full and true impact of the MZX Tech Site. This includes the impact the operations have on the air quality and making sure they meet regulatory requirements of the Clean Air Act and Mississippi law. The MZX Tech and xAI power plant is surrounded by several residential neighborhoods, including Colonial Hills and Horn Lake, and is just a mile from an elementary school. We have already been experiencing the impacts of the 27 unpermitted turbines MZX Tech and xAI have installed at 2875 Stanton Road without a permit, including increased noise and air pollution.

The air pollution from both the 27 unpermitted turbines and the proposed 41 turbines will reach beyond the immediately adjacent neighborhoods. Currently, the air shared by Southaven and Memphis is not meeting minimum federal smog standards. The greater Memphis-Clarksdale-Forrest City metro area, which includes Memphis and Southaven, received an "F" for high ozone days for the most recent reporting period.[1]

Smog makes asthma and other respiratory illnesses worse.[2] Pollutants like smog are especially dangerous for children, who are more likely to develop respiratory illnesses like asthma.[3] Pregnant women and unborn children are also at risk from fossil fuel pollution.[4] According to the Asthma and

Allergy Foundation, the Memphis Metro Area, including Memphis and Southaven, has among the highest rates in the U.S. of emergency room visits and deaths due to asthma.[5]

The 41-turbine MZX Tech and xAI power plant, not including the already present 27 turbines, is estimated to cause millions of dollars of health damages nationally each year. Shelby and DeSoto counties will be those who experience the greatest impact. Some of the damages include missed days of school and work due to respiratory illnesses.[6]

Mississippi has repeatedly failed to protect its residents from avoidable environmental harms. Time and again, permitting decisions have allowed pollution to be concentrated in marginalized communities with the greatest existing environmental and health burdens. Approval of this permit would constitute yet another avoidable failure. The Permit Board has both the authority and the responsibility to prevent this.

Our communities, already impacted by air pollution, will be bearing the health risks of MZX Tech's and xAI's massive power plant. We deserve better. We deserve transparent and full information about the Site's operations and air emissions which MDEQ is required to provide. Because the draft Permit fails to provide complete and accurate information, we demand that the Permit Board disapprove the Permit.

Sincerely,

Rev. Robert Tipton Jr.
DeSoto County Branch President
NAACP

[1] Memphis-Clarksdale-Forrest City, TN-MS-AR, Am. Lung Ass'n (2025), Memphis-Clarksdale-Forrest City, TN-MS-AR | American Lung Association.

[2] Katherine Burgess, *SELC petitions EPA to say Memphis area in violation of ozone standards*, MLK50 Justice Through Journalism (June 6, 2025), https://mlk50.com/2025/06/06/selc-petitions-epa-to-say-memphis-area-in-violation-of-ozone-standards/.

[3] EPA, Health Effects of Ozone Pollution (last visited February 7, 2026), Health Effects of Ozone Pollution | US EPA.

[4] Exposure to Air Pollution During Pregnancy Linked to Neurodevelopmental Issues | Columbia University Mailman School of Public Health; Ambient air pollution in critical windows of exposure and spontaneous miscarriage in a preconception cohort - ScienceDirect.

[5] 2025 Asthma Capitals: The Most Challenging Places to Live with Asthma, Asthma and Allergy Found. of Am. (2025), AAFA 2025 Asthma Capitals Report September 2025 (ranked 3rd for emergency room visits; 5th for deaths).

[6] Air Quality, Health, and Economic Impacts of the Proposed MZX Tech Facility (February 13, 2026), https://southernenvironment.sharefile.com/share/getinfo/s30d29af5a81747dabe362251af5ec4f4.

APPENDIX C

Comments Received from Various Individuals Expressing Concerns

Outlook

Fw: MDEQ Website Message - "Shut Down the Unpermitted xAI Power Plant in Southaven"

From Jeffrey Bland <JBland@mdeq.ms.gov>
Date Sat 1/17/2026 6:20 PM
To Jaricus Whitlock <jwhitlock@mdeq.ms.gov>

Jeffrey Bland, P.E.
Air 1 Branch Chief
Environmental Permits Division
Office of Pollution Control
Mississippi Dept of Environmental Quality
P.O. Box 2261
Jackson, MS 39225

Office: (601) 961-5112 Fax: (601) 961-5703

From: Sterling Whittemore <mdeqweb@mdeq.ms.gov>
Sent: Saturday, January 17, 2026 6:00 PM
To: Jeffrey Bland <JBland@mdeq.ms.gov>; MDEQ Web <mdeqweb@mdeq.ms.gov>
Subject: MDEQ Website Message - "Shut Down the Unpermitted xAI Power Plant in Southaven"

From: Sterling Whittemore <dswhittemore@duck.com>
Subject: Shut Down the Unpermitted xAI Power Plant in Southaven

Message Body:
It's bizarre that we have to re-hash the concerns on placing methane turbines, let alone 41 of them, near residents and how the health-ravaging outputs (e.g. oxides, particulate matter, volatile organic compounds) will affect not just the immediate area, but that of it's neighbors.

I live in Shelby County. Both DeSoto and Shelby Counties already hold failing grades for ozone pollution from the American Lung Association. Authorizing additional pollution, especially from unpermitted sources, is reckless and unacceptable.

By MDEQ documents, air modeling for the proposed full project projects 423 tons of nitrogen oxides (NO_x) per year, more than four times the federal Significant Emission Rate (SER) threshold under the Prevention of Significant Deterioration (PSD) program. Emissions of volatile organic compounds (VOCs), carbon monoxide (CO), sulfur dioxide (SO_2), and total particulate matter (PM_{10} and $PM_{2.5}$) also exceed their respective SER thresholds.

Remember those health-ravaging products yet? We're talking about asthma, stroke, heart attacks, cancer, and premature death, especially in children, older adults, and those with preexisting conditions. Even short-term spikes can trigger respiratory distress and emergency visits. $PM_{2.5}$ exposure has also been linked to increased aggression and violent behavior, particularly in youth, due to its impact on neurological and behavioral regulation. Several of these pollutants, especially $PM_{2.5}$, are also known to increase the risk of miscarriage, preterm birth, and low birth weight. Both Tennessee and Mississippi currently rank as two of the worst states in the nation for both maternal and infant mortality. Continuing operations here is a direct threat to public health.

The constituents of these counties and states have lost faith in you; for many, they don't expect you to do the right thing. It is incumbent on you to protect them and to reject MZX Tech LLC; it is incumbent on you to restore their faith.

--

This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Outlook

methane turbine permits for xai Southaven facility

From JOHN KEARNS <bigdumbell@gmail.com>
Date Tue 1/20/2026 11:04 AM
To Jaricus Whitlock <jwhitlock@mdeq.ms.gov>
Cc Tammy <imasissy70@aol.com>

This Message Is From an External Sender
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Mr. Whitlock , nice speaking with you. As we discussed on the phone I'm gravely concerned with the planned use of these methane gas turbines a quarter mile from my home in Southaven. obviously local politicians see the massive influx of capital and give little regard to the citizens that will have to breathe this. my wife and I are both oxygen patients. we have both noticed it being harder to breathe outside of late without knowing these machines are already in use . the news report this morning said they have asked for permits for over 40 of these . please don't let this happen ! The air quality is already poor. this will tank our homes property value . who wants to live next to a machine spewing carcinogens into the air ? i asked grok XAI what the environmental impact would be . The answer is long and not very encouraging but the following really jumped out at me.

" Nitrogen oxides (NOx): Major smog-forming pollutant. High levels contribute to ground-level ozone (smog), linked to respiratory issues like asthma exacerbations, upper respiratory diseases, shortness of breath, throat irritation, and increased hospital visits for lung/heart conditions. In the Memphis/Southaven region (already challenged by poor air quality, with "F" ratings for ozone in some reports), these turbines have been cited as potentially worsening smog by significant margins (e.g., estimates from similar Memphis operations suggested large NOx contributions, up to thousands of tons annually across sites)."

How can state and local government allow this atrocity to happen? Please deny this request for gas turbines .

thank you!

Outlook

FW: EPA Violation

From Rodney Cuevas <RCuevas@mdeq.ms.gov>
Date Tue 2/3/2026 12:36 PM
To Jaricus Whitlock <jwhitlock@mdeq.ms.gov>

Jaricus,

Just forwarding this comment/complaint for MZX I received this morning.

Thanks!

Rodney Cuevas, BCES
Meteorologist
Air Quality Management Branch Manager
Mississippi Department of Environmental Quality (MDEQ)
515 East Amite St.
Jackson, Mississippi 39201
☎ Office: 601-961-5566
☎ Mobile: 228-669-7888
RCuevas@mdeq.ms.gov

From: JH1Photo <jh1photo@gmail.com>
Date: Tuesday, February 3, 2026 at 12:09 PM
To: Gerster, Sarah <gerster.sarah@epa.gov>, Rodney Cuevas <RCuevas@mdeq.ms.gov>
Subject: EPA Violation

This Message Is From an External Sender
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Hello,

I am writing to formally report a potential violation of the Clean Air Act involving an unpermitted air emission source located in Southaven, Mississippi (Desoto County)

Facility: MZX Tech, LLC – xAI
Address is 2875 Stanton Rd S, Southaven, MS 38671

There are currently at least 18 turbines running at the location that run constantly. At least one runs 24 hours as I hear them from inside my house that is a half mile away.

They are using unit types SMT130 & TM 2500 (Gen 6, 7, & 8) with daily runtime from 2.6 to 24 hours.
Based on my understanding, this source appears to be operating without the required air permit, or outside the scope of any authorized permit.

I respectfully request that EPA Region 4 evaluate this matter and conduct an investigation or inspection as appropriate. Additionally, I request that a copy of the investigation or inspection report be provided to me upon completion, consistent with applicable public records and disclosure requirements.

Please let me know if further information is needed to support this complaint. I appreciate your attention to this matter and your efforts to protect public health and air quality.

Thanks,

Jason Haley

901-495-4602

Jeffrey Bland

From: Joshua Langston <mdeqweb@mdeq.ms.gov>
Sent: Wednesday, February 4, 2026 1:12 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "MZX is, actually, a Horn Lake problem."

From: Joshua Langston <langstoncampaign@gmail.com>
Subject: MZX is, actually, a Horn Lake problem.

Message Body:
Southaven Mayor Musslewhite has told commenters on his page, among other dismissals of citizen's concern, that the expansion of XAI in Southaven is not the concern of Horn Lake residents, and that Horn Lake citizens should not comment on things that don't concern them.

I am not just a citizen of Horn Lake; this past summer I was elected to be a representative for the people of Ward 1. Ward 1's border begins less than 3000 yards from the purposed site. My own house sits right at 3000 yards "as the crow flies" from the site. I wish to inform the mayor, and any others who may not wish to hear the fact; the expansion of xAI and the addition of these turbines are, in fact, a "Horn Lake problem".

Right now, Horn Lake residents are making and sharing videos of the noise pollution from the turbines currently running. They can be found on social media with simple searches. In my home, my son has experienced worsening asthma, a condition we've worked hard to control previously, over the last months have seemed to worsen exponentially. I've heard from constituents of worsening medical conditions.

This is just Ward 1. Ward 5, which houses the mayor, is the same distance, with rumblings of the same problems. We as a city are being affected daily, our citizens are being affected daily. And the promise of investment means little when that money will eventually have to be used to tend a harmed and sickened community.

Without even discussing the risk to our water supply, or the dangers of uncontrolled artificial intelligence guidelines, these turbines are problems now, the negative effects are being felt now, and allowing more to be built with the knowledge of the damage already occurring is not only negligent but, in opinion, should be considered criminal.

These turbines are a Horn Lake issue, they are a DeSoto county issue, because noise pollution, air pollution, and water pollution does not stop at a border or city limit.

Thank you.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Outlook

FW: EPA Violation

From Rodney Cuevas <RCuevas@mdeq.ms.gov>
Date Tue 2/10/2026 8:01 AM
To Jaricus Whitlock <jwhitlock@mdeq.ms.gov>

Hey Jaricus,

Just passing this along regarding MZX. Sara from EPA initially responded to Jason.

Thanks!

Rodney Cuevas, BCES
Meteorologist
Air Quality Management Branch Manager
Mississippi Department of Environmental Quality (MDEQ)
515 East Amite St.
Jackson, Mississippi 39201
☎ Office: 601-961-5566
☎ Mobile: 228-669-7888
RCuevas@mdeq.ms.gov

From: JH1Photo <jh1photo@gmail.com>
Date: Monday, February 9, 2026 at 11:19 PM
To: Gerster, Sarah <gerster.sarah@epa.gov>, Rodney Cuevas <RCuevas@mdeq.ms.gov>
Subject: Re: EPA Violation

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Anything going to be done or looked into?
They are buying up more land here, and construction is 24/7 like are already permitted to install 41 permanent turbines. Why are they so sure it'll be approved? Is the MDEQ public hearing on the 17th just a way to act like they care about public input, concerns and experience?
The turbines continue to run, and continue to be a source of noise and air pollution. Our code & law enforcement don't enforce anything with this site.

- Jason Haley
901-495-4602

On Tue, Feb 3, 2026 at 1:35 PM JH1Photo <jh1photo@gmail.com> wrote:

> Thanks, please keep me updated as this is all day everyday since August 2025.
>
> On Tue, Feb 3, 2026 at 12:33 PM Gerster, Sarah <gerster.sarah@epa.gov> wrote:
>
> > Hi Jason,
> >
> > Thanks for reaching out again. I re-engaged folks in hopes that we can get you an answer sooner rather than later. I know there's a process for responding to public inquiries, and suspect it's still being worked on. I'll let you know if I hear more.

Thanks again,

Sarah

From: JH1Photo <jh1photo@gmail.com>
Sent: Tuesday, February 3, 2026 1:10 PM
To: Gerster, Sarah <gerster.sarah@epa.gov>; RCuevas@mdeq.ms.gov
Subject: EPA Violation

Caution: This email originated from outside EPA, please exercise additional caution when deciding whether to open attachments or click on provided links.

Hello,

I am writing to formally report a potential violation of the Clean Air Act involving an unpermitted air emission source located in Southaven, Mississippi (Desoto County)

Facility: MZX Tech, LLC – xAI
Address is 2875 Stanton Rd S, Southaven, MS 38671

There are currently at least 18 turbines running at the location that run constantly. At least one runs 24 hours as I hear them from inside my house that is a half mile away.

They are using unit types SMT130 & TM 2500 (Gen 6, 7, & 8) with daily runtime from 2.6 to 24 hours.
Based on my understanding, this source appears to be operating without the required air permit, or outside the scope of any authorized permit.

I respectfully request that EPA Region 4 evaluate this matter and conduct an investigation or inspection as appropriate. Additionally, I request that a copy of the investigation or inspection report be provided to me upon completion, consistent with applicable public records and disclosure requirements.

Please let me know if further information is needed to support this complaint. I appreciate your attention to this matter and your efforts to protect public health and air quality.

Thanks,

Jason Haley

901-495-4602

Outlook

southaven XAI facility

From JOHN KEARNS <bigdumbell@gmail.com>
Date Sat 2/14/2026 1:11 PM
To Jaricus Whitlock <jwhitlock@mdeq.ms.gov>

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Mr. Whitlock , is this facility already using gas turbines ? I've noticed it being more difficult to breathe outside of late. hoping your agency doesn't sacrifice the people of our community for economic progress.

Outlook

Re: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

From Asheton England <dnana333@yahoo.com>
Date Tue 2/17/2026 11:34 PM
To Jaricus Whitlock <jwhitlock@mdeq.ms.gov>

1 attachment (83 KB)
England_Comments_For_Air_Ref_No_0680-00119.pdf;

This Message Is From an External Sender
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Hello,

My name is Asheton England. Please find attached a PDF of my comments for the Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC.

Thank you.

Re: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Dear Mr. Whitlock:

My name is Asheton England, and I am a resident of Olive Branch, MS. I was born in Memphis, TN in 1995 and have lived in Olive Branch since 2005. My grandparents have lived in Southaven, MS since before my birth. I have spent at least 26 years of my life growing, studying, and working in DeSoto County.

I strongly oppose the draft construction permit for MZX Tech to operate 41 permanent gas turbines at 2875 Stanton Road. Due to incomplete and inaccurate information provided by the permit, as well as the failure to address the existing 27 "temporary" turbines currently running at the site without a proper permit, **I demand that the MDEQ Permit Board disapprove the permit.**

The public cannot be assured that their collective safety is prioritized while the draft permit fails to wholly and transparently capture the health risks presented by MZX Tech's proposed operations. In fact, research suggests that the permit severely underestimates overall health and environmental impacts. Furthermore, the public cannot be assured that MZX Tech will be held accountable for causing significant, undue, preventable harm to the community when the company has already boldly defied federal law under the Clean Air Act. MZX Tech also continues to violate Mississippi law by failing to provide adequate safeguards for the company's current NOx pollution. MDEQ's mission statement avows the protection of the welfare of current and future Mississippians by conserving the environment and enforcing responsible regulation on economic development—it would be duplicitous of MDEQ to reward MZX Tech by approving the draft permit when MZX Tech is flagrantly defying federal and state law at the expense of Mississippi's people and ecosystems, the very behavior that MDEQ claims to oppose.

While I do not live within Southaven, just as the air we all share does not adhere to manmade lines on a map, my community extends beyond the borders of my city—my family, friends, neighbors, and coworkers are all directly impacted by MZX Tech's turbines. In addition, a recent study done by EmPower Analytics Group LLC found that the entirety of DeSoto County experiences increased fine particulate matter exposure due to the MZX facility, putting the health of all county residents at risk. This is not merely a Southaven issue.

Even if I lacked personal ties to Southaven, geographic proximity is not a requirement to care about the safety and well-being of my fellow humans. Every person has a right to clean air and water. It is unjust to allow corporate greed to supersede the health of our neighbors and the sanctity of our natural environment, particularly when the affected communities are overwhelmingly marginalized already. Allowing MZX Tech to proceed with the current draft permit would be gross negligence on behalf of the MDEQ board. **I implore you to disapprove the permit and require that MZX Tech immediately cease the operation of the 27**

“temporary” turbines. I also urge MDEQ to realize that no revised version of this project aligns with MDEQ’s goals of fostering a safe, healthy environment for all Mississippians to enjoy.

Outlook

Fw: letter to J. Bland

From Tony Cox <tcox@mdeq.ms.gov>
Date Tue 2/17/2026 4:36 PM
To Jaricus Whitlock <jwhitlock@mdeq.ms.gov>; Mike Freiman <mfreiman@mdeq.ms.gov>

1 attachment (5 MB)
Public Comment Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC .David.docx;

Jaricus and Mike, I'm forwarding an email I received from a friend sent to my personal email.

Tony Cox
Chief, Field Services Division
Office: 601.961.5612
Cellular: 601.540.7132
P.O. Box 2261
Jackson, MS 39225
tcox@mdeq.ms.gov

From: Tony Cox <tonycox94@gmail.com>
Sent: Tuesday, February 17, 2026 4:33:37 PM
To: Tony Cox <tcox@mdeq.ms.gov>
Subject: Fwd: letter to J. Bland

This Message Is From an External Sender
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---------- Forwarded message ---------
From: **David Wood** <dww0522@gmail.com>
Date: Tue, Feb 17, 2026, 4:30 PM
Subject: letter to J. Bland
To: khairy Abu-salah <k_abusalah2003@yahoo.com>, Tony Cox <tonycox94@gmail.com>

Dear Khairy and Tony,

Perhaps you may be interested to read a letter many of us wrote and signed onto regarding the additional turbines seeking permits from your department.

I've sent a copy of the letter to your director. Can you follow up?

Thanks in advance, David Wood (soccer ref extraordinaire)

David Wood
608 Mitchell Cove [google.com]
Brandon, MS 39047 [google.com]

Re: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Dear Mr. Bland:

As a Mississippian, I strongly oppose the draft construction Permit for MZX Tech's gas-fired power plant at 2875 Stanton Road. This Permit would allow xAI to build and run 41 permanent gas turbines, creating a large-scale industrial power plant in a residential area, directly impacting surrounding communities including Southaven, Horn Lake, and Memphis residents. We understand this all across Mississippi.

We understand that these communities are being asked to bear the health risks of MZX Tech's massive power plant. Across Mississippi we understand that if any of us are vulnerable to being left behind and unprotected from for-profit corporations by our government and MDEQ, then we *all* are vulnerable. Communities deserve—and MDEQ is required to provide—complete and accurate information about the Site's operations and air emissions. Because the draft Permit fails to provide complete and accurate information, **I demand that the MDEQ Permit Board disapprove the Permit**.

The draft Permit fails to disclose that MZX Tech has *already* installed 27 so-called "temporary" turbines at the Site without any Permit at all and in disregard of federal requirements. The EPA recently confirmed the long-standing requirement that "temporary" turbines need construction Permits under the federal Clean Air Act. Many of the MZX Tech turbines have been operating for six months with no Permit. Yet the draft Permit makes no attempt to account for the 27 unpermitted turbines, neither including them in the emissions estimates for the Site nor requiring the best available pollution technology for them. The failure of the draft Permit to include at least 27 emissions units on the Site renders it deficient and makes it impossible for the community to understand the full scale of the Site's impact on air quality and public health.

Internal correspondence from December 22 obtained by a public records request shows MDEQ staff were instructed to initiate the public comment period by January 15. The EPA submitted additional Permit comments on January 6, yet there does not appear to be any further public records available regarding those comments. If those final comments were incorporated into the Permit materials, documentation of that process should be available to the public. If not, the Permit was publicly noticed while key issues remained under review. Either way, the timeline suggests the process was shaped by internal deadlines rather than by transparency or completeness.

The draft Permit defines an "ambient air boundary" based on physical barriers around the current Site. However, according to DeSoto County land records, MZX Tech has purchased multiple additional parcels, including parcels adjacent to the Site, that are not effectively excluded from public access. Under EPA's regulatory definition, ambient air extends to areas where the public can access the outdoor air, and impacts in those areas must be included in air quality modeling. Because the Permit relies on a boundary that does not correspond to true ambient air, the emissions impacts to the surrounding community could be underestimated.

MDEQ must clarify the actual ambient air boundary, include all owned or controlled land in modeling, and reevaluate impacts accordingly.

The Permit Board must disapprove the draft Permit and instruct MDEQ to:

- Order MZX Tech to cease operating the 27 unpermitted turbines until it obtains a permit for them;
- Withdraw the draft Permit; and
- Revise the draft Permit before seeking public comment.

Even for the 41 turbines it proposes to authorize, the draft Permit fails to accurately characterize air pollution and require adequate protections. Among other things, the draft Permit downplays the ongoing violation of the minimum federal ozone standard in the Memphis metro area, which includes DeSoto County, and fails to require strict pollution controls and offsets for MZX Tech's NOx pollution required by Mississippi law. The draft Permit also underestimates the amount of harmful particulate matter and formaldehyde emissions from the turbines. For all of these reasons, the draft Permit fails to meet applicable requirements and **the Permit Board must disapprove the Permit**.

It is imperative that the Permit Board disapprove the Permit because both MDEQ and the community must understand the full impact of the MZX Tech Site operations on air quality and address that impact as required by the Clean Air Act and Mississippi law. The area immediately around the MZX Tech power plant includes several residential neighborhoods, including Colonial Hills, Kingston Estates, Rasco Farms, and others along the Southaven/Horn Lake border. The power plant is within half of a mile from homes and just a mile from an elementary school. These communities have already been experiencing impacts of the 27 unpermitted turbines MZX Tech has installed at 2875 Stanton Road without a Permit, including increased noise, light, and air pollution.

But the air pollution from both the 27 unpermitted turbines and the proposed 41 turbines will extend far beyond the immediately adjacent neighborhoods. Southaven and Memphis share the air—and that air is already not meeting minimum federal smog standards. The greater Memphis-Clarksdale-Forrest City metro area, which includes Memphis and Southaven, also received an "F" for high ozone days for the most recent reporting period.[1]

While DeSoto County is currently classified as an ozone attainment area, MDEQ's own monitoring data presented at the A&WMA Southern Section Conference shows that DeSoto's 2024 design value is **71 ppb**, exceeding the 70 ppb federal ozone standard. This means that DeSoto is functionally in violation, even if formal nonattainment designations have not yet been made. Under the Clean Air Act, MDEQ must not treat an area trending into violation as if it were safely in attainment — especially when Permitting major new NOx sources that will make the problem worse.

[1] Memphis-Clarksdale-Forrest City, TN-MS-AR, Am. Lung Ass'n (2025), Memphis-Clarksdale-Forrest City, TN-MS-AR | American Lung Association.

In addition to ozone exceedances, the data used in the Permit's air modeling is misleading about current air quality conditions. The background pollution data for PM2.5 came from the Shelby Farms monitor in Tennessee, even though the Hernando monitor in DeSoto County is closer to the Site and more representative of local conditions. Instead of using this more accurate local data, the PM2.5 data relied on a cleaner monitor across state lines, misleading the public about the real pollution burden already faced by DeSoto County residents. At the 2025 A&WMA Southern Section Conference, MDEQ noted that the Hernando monitor recorded a PM2.5 annual average of **9.1 µg/m³**, which is above the EPA's annual standard of 9.0. That number was only brought below the limit after 13 exceptional events were excluded from the data.

At the same conference, MDEQ specifically identified **Desoto County as an area where it is "evaluating additional measures towards achieving attainment"** in reference to ozone and that the Memphis Metropolitan Area is an "area of priority." That means MDEQ is aware Desoto County has not been meeting the federal air quality standards and has been actively looking for ways to bring pollution levels back down. If MDEQ truly believes that additional measures are needed to *reduce* pollution in Desoto County, then Permitting a major new source of PM2.5 and NOx is inconsistent with MDEQ's own statements and puts the surrounding communities at even greater risk.

Smog makes asthma and other respiratory illnesses worse.[2] Pollutants like smog are especially dangerous for children, who are more likely to develop respiratory illnesses like asthma.[3] Pregnant women and unborn children are also at risk from fossil fuel pollution.[4] According to the Asthma and Allergy Foundation, the Memphis Metro Area, including Memphis and Southaven, has among the highest rates in the U.S. of emergency room visits and deaths due to asthma.[5]

The 41-turbine MZX Tech power plant alone is estimated to cause millions of dollars of health damages each year nationally, with the greatest effects centered in Shelby and DeSoto counties. The damages include, among other things, missed days of school and work due to respiratory illnesses.[6] This estimate likely understates the near-term health damages, since it does not take into account the 27 turbines already installed at the Site.

Across Mississippi, we understand that if MDEQ does nothing to protect some residents from living in literal toxicity, then we cannot count on MDEQ to protect any of us. The Permit Board must disapprove this draft Permit and recognize that no revised version of this project can be reconciled with the region's legal, environmental, or public health obligations under the Clean

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[2] Katherine Burgess, *SELC petitions EPA to say Memphis area in violation of ozone standards*, MLK50 JUSTICE THROUGH JOURNALISM (June 6, 2025), https://mlk50.com/2025/06/06/selc-petitions-epa-to-say-memphis-area-in-violation-of-ozone-standards/.

[3] EPA, Health Effects of Ozone Pollution (last visited February 7, 2026), Health Effects of Ozone Pollution | US EPA.

[4] Exposure to Air Pollution During Pregnancy Linked to Neurodevelopmental Issues | Columbia University Mailman School of Public Health; Ambient air pollution in critical windows of exposure and spontaneous miscarriage in a preconception cohort - ScienceDirect.

[5] 2025 Asthma Capitals: The Most Challenging Places to Live with Asthma, Asthma and Allergy Found. of Am. (2025), AAFA 2025 Asthma Capitals Report September 2025 (ranked 3rd for emergency room visits; 5th for deaths).

[6] Report TK.

Air Act. MDEQ itself "implored" MZX Tech to install pollution controls because of air quality concerns in DeSoto County. Now I am imploring you:

Follow the law. Protect the people. Disapprove the Permit.

Sincerely,



David Wood

608 Mitchell Cove

Brandon, MS 39047

601-421-9584

Outlook

Say NO to MZX Tech Permits - Southaven, MS

From Moriah Loya <moriahloya@gmail.com>
Date Tue 2/17/2026 11:21 PM
To Jeffrey Bland <JBland@mdeq.ms.gov>; Jaricus Whitlock <jwhitlock@mdeq.ms.gov>

This Message Is From an External Sender
This message came from outside your organization.

Good evening,

Tonight, I attended the hearing for the MZX Tech permit to operate 41 natural gas turbines in Southaven, MS which is located 1 mile from my home.

I ask that you please DO NOT approve the permits to operate the turbines. Here are a few reasons why aside from what should already be a very compelling impact study that has already been shared.

1. MDEQ's mission statement promises to IMPROVE the environment, but approving this permit would do the opposite. There is no world in which introducing natural gas powered turbines to an environment improves it.
2. Particle pollution is a deadly and growing threat to public health in communities around the country. The more researchers learn about the health effects of particle pollution, the more dangerous it is recognized to be. Short-term spikes in particle pollution that last from a few hours to a few days can kill. Most premature deaths are from respiratory and cardiovascular causes. Spikes in particle pollution also have many other harmful effects, ranging from decreased lung function to heart attacks.
3. The current unlawfully running turbines are already causing harm to local citizens as was shared at the hearing. Approving them and more turbines up to the 41 turbines would only make matters worse.
4. Why would you reward a company with a permit after it's been operating unlawfully?
5. The leading causes of death in DeSoto county: heart disease, cancer, and respiratory disease, are all linked to poor air quality. Why allow the air quality to be made worse even by the smallest measure?
6. Westerly winds common in this area will sweep these gasses across numerous homes, schools, ball fields, parks, and hospitals where people live, play, and work.
7. I urge you to take into deep consideration the statements given by healthcare workers at this hearing. A number of adverse health impacts have been associated with exposure to both PM2.5 and PM10. For PM2.5, short-term exposures (up to 24-hours duration) have been associated with premature mortality, increased hospital admissions for heart or lung causes, acute and chronic bronchitis, asthma attacks, emergency room visits, respiratory symptoms, and restricted activity days. These adverse health effects have been reported primarily in infants, children, and older adults with preexisting heart or lung diseases. In addition, of all of the common air pollutants, PM2.5 is associated with the greatest proportion of adverse health effects related to air pollution, both in the United States and world-wide based on the World Health Organization's Global Burden of Disease Project [thelancet.com].
8. Short-term exposures to PM10 have been associated primarily with worsening of respiratory diseases, including asthma and chronic obstructive pulmonary disease (COPD), leading to hospitalization and emergency department visits.
9. Long-term (months to years) exposure to PM2.5 has been linked to premature death, particularly in people who have chronic heart or lung diseases, and reduced lung function growth in children. The effects of long-term exposure to PM10 are less clear, although several studies suggest a link between long-term PM10 exposure and respiratory mortality. The International Agency for Research on Cancer (IARC) published a review [monographs.iarc.fr] in 2015 that concluded that particulate matter in outdoor air pollution causes lung cancer.
10. Children and infants are particularly susceptible to harm from inhaling pollutants such as PM because they inhale more air per pound of body weight than adults - they breathe faster, spend more time outdoors and have smaller body sizes. In addition, children's immature immune systems may cause them to be more susceptible to PM than

healthy adults. Keep in mind this facility is next to homes, a park, ball fields, and places where people live, play, and work.

11. For us in DeSoto county and along the state line, we're not only subjected to the pollution from the data center in Southaven, but we are also suffering the pollution from the other xAI facility in nearby Box Town in Tennessee and down wind of the soon to be data center across the MS river in Arkansas (however I have read that THAT data center is using renewable clean energy to operate, unlike xAI.). So keep in mind that this particular community is not being solely impacted by the turbines that you are deliberating for, but other surrounding plants outside of MS. We are uniquely positioned in a tri-state area and subject to those states leadership and governance on these issues.

Thank you for holding space to hear our community. I am pleading that you not approve the permits.

Thank you for your time and consideration. We are depending on you.

Kind regards,

Moriah Loya

Jeffrey Bland

From: Victor H Wheatley <mdeqweb@mdeq.ms.gov>
Sent: Monday, February 16, 2026 8:52 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Public Hearing 02/17/2026 (xAI Turbines, Southaven, Mississippi)"

From: Victor H Wheatley <oshawiz@att.net>
Subject: Public Hearing 02/17/2026 (xAI Turbines, Southaven, Mississippi)

Message Body:
DATE: 02/16/2026

FROM: Victor H Wheatley (oshawiz@att.net)

TO: Mississippi Environmental Quality Permit Board: Jeffrey Bland (OPC-EPD-Air I Branch)

REFERENCE: Public Hearing 02/17/2026 (xAI Turbines, Southaven, Mississippi) Northwest Mississippi Community College's, Desoto County campus in Southaven, Mississippi

REQUEST FOR CORRECTIVE ACTION: Mississippi Department of Environmental Quality (MEDQ) to provide a proposed implementation strategy and schedule; whereas MDEQ seeks to review and amend the agency's air emission regulations – titled ""Regulations for the Prevention, Abatement, and Control of Air Contaminants" (Mississippi Administrative Code, Title 11, Part 2, Chapter 1) Amended May 24, 2018. The State of Mississippi being state plan compliant; whereas, to approve and adopt the Environmental Protection Agency (EPA) Final rule: 40 CFR Part 60 [EPA–HQ–OAR–2024–0419; FRL–11542–02– OAR] RIN 2060–AW21 New Source Performance Standards Review for Stationary Combustion Turbines and Stationary Gas Turbines (effective on January 15, 2026).

NORTH MISSISSIPPI DELTA CITIZEN'S RECOMMENATION: MDEQ Air Division as being responsible, accountable and transparent for ensuring that air quality protects the public health and welfare. Whereas MDEQ being charged with controlling, preventing, and abating air pollution to achieve compliance with air emission regulations pursuant to the Mississippi Air and Water Pollution Control Act, applicable regulations promulgated by the EPA Final rule: 40 CFR Part 60 [EPA–HQ–OAR–2024–0419; FRL–11542–02– OAR] RIN 2060–AW21 New Source Performance Standards Review for Stationary Combustion Turbines and Stationary Gas Turbines. Therewith in adding a subcategory for stationary combustion turbines that are used in temporary applications (data center infrastructure and operations), exempting certain sources from title V requirements, and finalizing other provisions as per the federal Clean Air Act.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Alex Ohta <alex.ohta@gmail.com>
Sent: Sunday, February 15, 2026 2:18 PM
To: Jeffrey Bland
Subject: MZX Tech (xAI) PSD Air Permit

This Message Is From an External Sender
This message came from outside your organization.

Alex Ohta
86 Crockett Loop E
Hernando, MS 38632

Feb 15th, 2026

Mississippi Department of Environmental Quality – Permit Board
P.O. Box 2261
Jackson, MS 39225

Re: Public Comment on the Draft PSD Air Permit for MZX Tech (xAI) – 41-turbine Power Plant at 2875 Stanton Road, Southaven, MS

Dear Members of the Permit Board,

I am writing to oppose the issuance of the draft permit that would allow MZX Tech LLC (an affiliate of xAI) to permanently install and operate 41 methane-gas-fired turbines at the site above. Below are the principal reasons why this permit should be denied, revised, or withdrawn entirely.

Existing Unpermitted Turbines Already Harm the Community
-27 turbines are currently operating without any permit or public review. Under Mississippi law it is unlawful to run air-polluting equipment without a permit.
-These unpermitted units have been running 16–24 hours per day since August 2025, producing measurable noise, light, and air pollution that residents have already reported.
-The EPA's January 9 2026 rule clarifies that even "temporary" combustion turbines are "stationary sources" and must be permitted. MZX Tech continues operation despite this rule taking effect on January 15 2026.

Demand: Immediate shutdown of the 27 unpermitted turbines until a proper permit covering all turbines is obtained.

The Draft Permit Omits Major Sources of Pollution
-The application only accounts for the 41 proposed permanent turbines and ignores the 27 existing turbines. This omission leads to a serious underestimate of total emissions and misleads the Board's health-risk assessment.
-Federal and state law require all equipment that contributes to air pollution to be reviewed together.

Demand: Revise the draft to include all 68 turbines (27 existing + 41 proposed) before any further public comment.

Air-Quality Impacts Are Severe and Undermined in the Draft

Concern – Why It Matters
-Nitrogen Oxides (NOx) → Ozone (smog): Ozone aggravates asthma, reduces lung function, and can trigger heart attacks. Children, outdoor workers, and pregnant women are especially vulnerable.
-Particulate Matter (PM2.5): Fine particles penetrate deep into the lungs and bloodstream, causing cardiovascular disease, premature death, and developmental harms.
-Formaldehyde & Other Hazardous Air Pollutants (HAPs): Formaldehyde is a known carcinogen and respiratory irritant.
-Existing Ozone Violations: The Hernando monitoring station already fails the federal ozone standard. Adding a large emitter will exacerbate an already unhealthy air-quality situation.
-Regional "F" Grades: Both DeSoto County (MS) and Shelby County (TN) received "F" grades for high-ozone days from the American Lung Association (2025). The Memphis-Clarksdale-Forrest City metro area also earned an "F."

Demand: The permit must impose strict NO_x and PM2.5 limits, require continuous emissions monitoring, and mandate effective controls (e.g., selective catalytic reduction, high-efficiency particulate filters). Without these, the draft fails to protect public health.

Public-Health and Economic Harm Will Escalate
-Health impacts translate into economic costs—missed school/work days, increased hospital visits, medication expenses, and long-term care. Studies estimate millions of dollars per year in health-related damages for facilities of this size.
-Vulnerable populations—pregnant women, infants, seniors, and people with pre-existing heart or lung conditions—already face elevated risks in Mississippi and Tennessee (high maternal-mortality and infant-mortality rates). Air-pollution exposure worsens these outcomes, including low birth weight and prenatal complications.

Demand: A comprehensive health-impact analysis must be performed, and any permit that does not demonstrate net-zero or net-positive health outcomes must be denied.

Noise Pollution Is Already Disruptive
-Residents report constant, loud turbine noise audible inside homes even with windows closed.
-The noise has degraded sleep quality, concentration, and mental well-being for families living within a half-mile of the site.

Demand: Any future operation must incorporate state-of-the-art silencing technology, full turbine housings, and a sound barrier that meets or exceeds industry standards before turbines may run.

Additional Environmental Concerns
-While the draft does not yet detail wildlife impacts, the proximity to parks, churches, and natural habitats suggests potential disturbance to local ecosystems. A full ecological assessment should be required before approval.

Summary of Demands

-Immediate cessation of the 27 unpermitted turbines.
-Withdrawal of the current draft permit.
-Revision of the permit to include all 68 turbines and to accurately quantify total emissions.
-Denial of the permit unless it meets stringent air-quality, noise, and health-protection standards.
-Implementation of robust emission controls, continuous monitoring, and verified noise-mitigation measures.
-Comprehensive health-impact and ecological studies prior to any future consideration.

I appreciate the Board's commitment to protecting the environment and public health. I trust that, after reviewing the facts above, you will act to safeguard the Southaven community and the broader Memphis-DeSoto region.

Respectfully,
Alex Ohta

Jeffrey Bland

From: Ann <mdeqweb@mdeq.ms.gov>
Sent: Monday, February 16, 2026 12:04 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "No more pollution"

From: Ann <anharriso@aol.com>
Subject: No more pollution

Message Body:
Considering the pollution that currently impact the citizens of Desoto county, adding more pollutants to the air would be a death sentence. We pay tax dollars and elect officials to look out in the best interests of citizens, not just corporations. It is your job to protect our health not negatively impact our health. Allowing turbines near residential communities should not and should never be an option. Do the right thing and decline Xai's permit to use turbines.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Ava Seyer <mdeqweb@mdeq.ms.gov>
Sent: Saturday, February 14, 2026 3:15 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC"

From: Ava Seyer <blackoppsgirl79@gmail.com>
Subject: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Message Body:
I strongly oppose the draft construction Permit for MZX Tech's gas-fired power plant at 2875 Stanton Road. This Permit would allow xAI to build and run 41 permanent gas turbines, creating a large-scale industrial power plant in a residential area, directly impacting surrounding communities including Southaven, Horn Lake, and Memphis residents.
These communities are being asked to bear the health risks of MZX Tech's massive power plant. Communities deserve—and MDEQ is required to provide—complete and accurate information about the Site's operations and air emissions. Because the draft Permit fails to provide complete and accurate information, I demand that the MDEQ Permit Board disapprove the Permit.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	Chloe
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "xAI turbines"
Date:	Tuesday, January 20, 2026 4:54:11 AM

From: Chloe <chloesmeadows@gmail.com>
Subject: xAI turbines

Message Body:
I find it concerning that the xAI turbines are located so close to residential areas. That puts vulnerable people (such as children & seniors) at risk, without their knowledge or consent. There is no way for this to be safe, the turbines must be relocated. And they need to be than 5 miles away. It is important to err on the side of caution when lives are at stake. Nobody should be put at extra risk of heart attacks, cancer, or sudden infant death.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Danielle Kirk <mdeqweb@mdeq.ms.gov>
Sent: Monday, February 16, 2026 9:43 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Protect The People"

From: Danielle Kirk <dfaithc5@gmail.com>
Subject: Protect The People

Message Body:
Dear Mr. Bland,

My name is Danielle Kirk and I have been a resident of Southaven for nearly my entire life, the Greenbrook neighborhood to be more specific. I'm writing because as a parent of two small boys I value the air quality in my community. My youngest son, born premature, is affected by the air quality at a more significant rate because of the fact that his lungs were underdeveloped. However I am not only concerned for my family, but for all families in Southaven and the surrounding communities.

After I graduated college I spent two years as a missionary in Honduras, which is known for its extremely poor air quality. When my husband and I decided to move back to the U.S. and chose to come home to Desoto County, I knew that the air I breathed would be significantly cleaner than what my body had gone through while living abroad. The reality of 41 permanent turbines being continuously run in our community means that this will no longer be true.

Raising my family in an environmentally safe space with clean air is important to my family. I strongly oppose the draft construction Permit for MZX Tech's gas-fired power plant at 2875 Stanton Road. I urge the board to disapprove this permit and protect our community. This matters not only for us now, but generations to come. Mississippians deserve better.

Thank you,

Danielle Kirk
February 16, 2026

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: David Jens Thomas Pedersen <mdeqweb@mdeq.ms.gov>
Sent: Monday, February 16, 2026 8:48 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Please Take Immediate Action To Halt xAI's Gas Turbines Unless And Until A No-Harm Finding Can Be Made"

From: David Jens Thomas Pedersen <djtpedersen@gmail.com>
Subject: Please Take Immediate Action To Halt xAI's Gas Turbines Unless And Until A No-Harm Finding Can Be Made

Message Body:
Dear Mr. Bland,

"Injustice anywhere is a threat to justice everywhere."

Those words, once uttered by Martin Luther King Junior, are why I write to you today despite not being a citizen of your state or country to respectfully ask that you not only refuse to grant any more air permits to xAI, but that your Department does everything in its power to shut the facility's gas turbines down unless and until the facility can prove based on sound scientific data that its emissions will not cause harm to anyone outside of the facility.

As a computer scientist, I recognize the value that information technology has created for society; indeed, without it, I would not be able to submit these comments to you today - not in this manner anyway. However, as is the case with so many things in life, we must also ensure that we have our priorities straight, and the top priority must be the health of our environment since nothing else matters if the environment is unable to support life.

Air pollution is particularly damaging to the environment and public health since it has no safe level other than zero (contrary to Congress' mentality regarding the Clean Air Act) and causes permanent multi-generational health damage that can affect every cell and organ in the body and cause, contribute to, and exacerbate every disease including premature death (of which there are between 95,000 and 200,000 in your nation every year). Because of this, it is a prime example of cumulative harm, which only adds to the urgency that xAI's emissions are halted as soon as possible. Additionally, there is no known technology that can clean up combustion emissions to the health-protective level of zero. Therefore, I am pleading with your agency to take immediate action to shut down xAI's turbines unless and until it can prove that the fenceline concentration of their emissions will be zero. There is simply nothing else that will suffice at this point.

Thank you for your time and understanding.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Jodi N Miller <mdeqweb@mdeq.ms.gov>
Sent: Saturday, February 14, 2026 5:44 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Unpermitted xAI natural gas turbines in Mississippi"

From: Jodi N Miller <jodithebold@gmail.com>
Subject: Unpermitted xAI natural gas turbines in Mississippi

Message Body:
Dear sir,

It is unthinkable that the powering of a chatbot, known as Grok, is the impetus behind incessant air pollution on the Mississippi/Tennessee border. The lives of so many people who can ill afford to move away from the area are being compromised to help the fortunes of the world's richest man, Elon Musk. Surely he can afford a different power source. Surely he could have afforded to ask first, and get proper (if slightly costly) permits. Instead, people who now have asthma will have to deal with it worsening because of the plumes of gas burn-off. People with heart conditions? Well, they will have issues with their hearts racing, their blood pressure going up. People with migraines? They will have more headache days. I know all this from working across from a refinery myself with those conditions. My blood pressure spiked to 180/120, and I had a heart attack at 48. And those who don't already have those conditions, like little kids, will be more likely to develop them. But hey!

The world's richest man must have sited his power plant for a really, really necessary - what's that? This is just AI for Twitter? And it's in the deep south of the United States because land is cheaper there? Oh. Yeah. I would say something about the world's richest man coming from apartheid South Africa, and making comments on twitter which agree with its most racist user base, but that would be undignified.

Instead, I would urge you to consider the health implications on the poorest and the most vulnerable populations from someone who has personally experienced just what can happen with natural gas exposure. I only had to deal with it 8 hours a day. Imagine living across from it.

Thank you.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: john Kearns <mdeqweb@mdeq.ms.gov>
Sent: Wednesday, January 21, 2026 6:51 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "proposed gas turbines at Southaven xai"

From: john Kearns <bigdumbell@gmail.com>
Subject: proposed gas turbines at Southaven xai

Message Body:
I live .4 miles from the new xai location. both myself and my wife are oxygen patients. we don't need the additional pollution in Southaven that will have ramifications for decades. if allowed this will shorten people's lives. like increase cancer rates, and tank our property value .why doesn't billionaire genius Elon devise an electrical generator that runs off solar, or wind? his own AI grok candidly admits the damage this will cause ..." Nitrogen oxides (NOx): Major smog-forming pollutant. High levels contribute to ground-level ozone (smog), linked to respiratory issues like asthma exacerbations, upper respiratory diseases, shortness of breath, throat irritation, and increased hospital visits for lung/heart conditions. In the Memphis/Southaven region (already challenged by poor air quality, with "F" ratings for ozone in some reports), these turbines have been cited as potentially worsening smog by significant margins (e.g., estimates from similar Memphis operations suggested large NOx contributions, up to thousands of tons annually across sites)."

please put a stop to this absolute nonsense.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: LaTausha Holden <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, January 20, 2026 3:07 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "No turbines pollution should exist in both the city 2 times over"

From: LaTausha Holden <taushawasha@gmail.com>
Subject: No turbines pollution should exist in both the city 2 times over

Message Body:
This is ridiculous, I'm very scared for our children the youth. First he takes over Memphis with pollution now he in DeSoto asking for 46 more turbines. They already lied about how many turbines they had in Memphis. Mississippi woll not be bought for money and accept this proper Ganda. I think all voices should stand up and speak. Why Mississippi? why not the desert? I work for blue origin and Jeff Bezos would never do this. Elon Musk is going to destroy the people health why he's on his island looking for distance. Please DON'T LET THIS HAPPEN!! Stand up for the youth, the community, our lives, our health. He has done to much already and the sad part is everyone knows it. People please stand up. If they think because he has a billion dollars he can do this to OUR county he has another thing coming. Musk go back to where you came from. We dont want/ or need your business here. Anybody from Memphis/Mississippi has a job there? He's not hiring, and he will destroy our city.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Mike <mjvan29@gmail.com>
Sent: Monday, February 16, 2026 9:17 PM
To: Jeffrey Bland
Subject: RE: Formal Public Comment on Air Permit 0680-00119 (MZX Tech LLC)

This Message Is From an External Sender
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Dear Mr. Bland,

My name is Michael Van and I am a resident of Walls, MS. I am submitting a comment on behalf of the draft construction permit for MZX Tech's gas-fired power plant at 2875 Stanton Road, which is located six miles from my home.

I strongly oppose the draft construction Permit for MZX Tech's gas-fired power plant at 2875 Stanton Road.

The proposed operation of methane-gas-fired turbines at the facility presents a documented threat to public health in a region already overburdened by poor air quality. According to a February 2026 study by EmPower Analytics Group, the nitrogen oxides (NOx) and fine particulate matter (PM2.5) emitted by these turbines are projected to cause between $30 million and $44 million in annual health-related damages, including increased rates of asthma, heart attacks, and premature death.

The turbines also represent a significant threat to species protected under the Endangered Species Act (ESA) and the Migratory Bird Treaty Act. The project is situated within the Mississippi Flyway, a critical corridor for the federally endangered Whooping Crane and the Northern Long-eared Bat. Under the ESA, 'harm' includes significant habitat degradation that impairs essential behaviors such as breeding and feeding. The projected NOx emissions and constant 24/7 industrial noise constitute such degradation; research from the Cornell Lab of Ornithology and PNAS confirms that NOx-driven ozone causes direct, irreversible respiratory damage to birds, while chronic noise acts as an 'acoustic blanket' that masks predator cues and disrupts reproductive success. Furthermore, the facility's high-intensity nighttime lighting causes phototaxis, disorienting night-migrating birds and leading to exhaustion or lethal collisions with industrial stacks. MDEQ must consult with the U.S. Fish and Wildlife Service to determine if the cumulative noise, light, and air pollution from these turbines constitutes an illegal 'taking' of protected species before any permits are finalized.

I request that MDEQ deny this permit until a comprehensive, independent Health and Environmental Impact Statement is conducted and the U.S. Fish and Wildlife Service is formally consulted regarding potential "takings" of endangered species.

Thank you,
Michael Van

From: Tamitha Dill
To: Jeffrey Bland
Subject: Public Comment: Air Ref. No. 0680-00119 for MZX Tech, LLC
Date: Tuesday, February 17, 2026 1:40:53 PM
Attachments: 1000032899.png

This Message Is From an External Sender
This message came from outside your organization.

Re: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Dear Mr. Bland:

As a Mississippian, I strongly oppose the draft construction Permit for MZX Tech's gas-fired power plant at 2875 Stanton Road. This Permit would allow xAI to build and run 41 permanent gas turbines, creating a large-scale industrial power plant in a residential area, directly impacting surrounding communities including Southaven, Horn Lake, and Memphis residents. We understand this all across Mississippi.
We understand that these communities are being asked to bear the health risks of MZX Tech's massive power plant. Across Mississippi we understand that if any of us are vulnerable to being left behind and unprotected from for-profit corporations by our government and MDEQ, then we all are vulnerable. Communities deserve—and MDEQ is required to provide—complete and accurate information about the Site's operations and air emissions. Because the draft Permit fails to provide complete and accurate information, I demand that the MDEQ Permit Board disapprove the Permit.

The draft Permit fails to disclose that MZX Tech has already installed 27 so-called "temporary" turbines at the Site without any Permit at all and in disregard of federal requirements. The EPA recently confirmed the long-standing requirement that "temporary" turbines need construction Permits under the federal Clean Air Act. Many of the MZX Tech turbines have been operating for six months with no Permit. Yet the draft Permit makes no attempt to account for the 27 unpermitted turbines, neither including them in the emissions estimates for the Site nor requiring the best available pollution technology for them. The failure of the draft Permit to include at least 27 emissions units on the Site renders it deficient and makes it impossible for the community to understand the full scale of the Site's impact on air quality and public health.

Internal correspondence from December 22 obtained by a public records request shows MDEQ staff were instructed to initiate the public comment period by January 15. The EPA submitted additional Permit comments on January 6, yet there does not appear to be any further public records available regarding those comments. If those final comments were incorporated into the Permit materials, documentation of that process should be available to the public. If not, the Permit was publicly noticed while key issues remained under review. Either way, the timeline suggests the process was shaped by internal deadlines rather than by transparency or completeness.

The draft Permit defines an "ambient air boundary" based on physical barriers around the current Site. However, according to DeSoto County land records, MZX Tech has purchased multiple additional parcels, including parcels adjacent to the Site, that are not effectively

excluded from public access. Under EPA's regulatory definition, ambient air extends to areas where the public can access the outdoor air, and impacts in those areas must be included in air quality modeling. Because the Permit relies on a boundary that does not correspond to true ambient air, the emissions impacts to the surrounding community could be underestimated. MDEQ must clarify the actual ambient air boundary, include all owned or controlled land in modeling, and reevaluate impacts accordingly.

The Permit Board must disapprove the draft Permit and instruct MDEQ to:
Order MZX Tech to cease operating the 27 unpermitted turbines until it obtains a permit for them;
Withdraw the draft Permit; and
Revise the draft Permit before seeking public comment.

Even for the 41 turbines it proposes to authorize, the draft Permit fails to accurately characterize air pollution and require adequate protections. Among other things, the draft Permit downplays the ongoing violation of the minimum federal ozone standard in the Memphis metro area, which includes DeSoto County, and fails to require strict pollution controls and offsets for MZX Tech's NOx pollution required by Mississippi law. The draft Permit also underestimates the amount of harmful particulate matter and formaldehyde emissions from the turbines. For all of these reasons, the draft Permit fails to meet applicable requirements and the Permit Board must disapprove the Permit.
It is imperative that the Permit Board disapprove the Permit because both MDEQ and the community must understand the full impact of the MZX Tech Site operations on air quality and address that impact as required by the Clean Air Act and Mississippi law. The area immediately around the MZX Tech power plant includes several residential neighborhoods, including Colonial Hills, Kingston Estates, Rasco Farms, and others along the Southaven/Horn Lake border. The power plant is within half of a mile from homes and just a mile from an elementary school. These communities have already been experiencing impacts of the 27 unpermitted turbines MZX Tech has installed at 2875 Stanton Road without a Permit, including increased noise, light, and air pollution.

But the air pollution from both the 27 unpermitted turbines and the proposed 41 turbines will extend far beyond the immediately adjacent neighborhoods. Southaven and Memphis share the air—and that air is already not meeting minimum federal smog standards. The greater Memphis-Clarksdale-Forrest City metro area, which includes Memphis and Southaven, also received an "F" for high ozone days for the most recent reporting period.

While DeSoto County is currently classified as an ozone attainment area, MDEQ's own monitoring data presented at the A&WMA Southern Section Conference shows that DeSoto's 2024 design value is 71 ppb, exceeding the 70 ppb federal ozone standard. This means that DeSoto is functionally in violation, even if formal nonattainment designations have not yet been made. Under the Clean Air Act, MDEQ must not treat an area trending into violation as if it were safely in attainment — especially when Permitting major new NOx sources that will make the problem worse.

In addition to ozone exceedances, the data used in the Permit's air modeling is misleading about current air quality conditions. The background pollution data for PM2.5 came from the Shelby Farms monitor in Tennessee, even though the Hernando monitor in DeSoto County is closer to the Site and more representative of local conditions. Instead of using this more

accurate local data, the PM2.5 data relied on a cleaner monitor across state lines, misleading the public about the real pollution burden already faced by DeSoto County residents.
At the 2025 A&WMA Southern Section Conference, MDEQ noted that the Hernando monitor recorded a PM2.5 annual average of 9.1 $\mu g/m^3$, which is above the EPA's annual standard of 9.0. That number was only brought below the limit after 13 exceptional events were excluded from the data.

At the same conference, MDEQ specifically identified Desoto County as an area where it is "evaluating additional measures towards achieving attainment" in reference to ozone and that the Memphis Metropolitan Area is an "area of priority." That means MDEQ is aware Desoto County has not been meeting the federal air quality standards and has been actively looking for ways to bring pollution levels back down. If MDEQ truly believes that additional measures are needed to reduce pollution in Desoto County, then Permitting a major new source of PM2.5 and NOx is inconsistent with MDEQ's own statements and puts the surrounding communities at even greater risk.

Smog makes asthma and other respiratory illnesses worse. Pollutants like smog are especially dangerous for children, who are more likely to develop respiratory illnesses like asthma. Pregnant women and unborn children are also at risk from fossil fuel pollution. According to the Asthma and Allergy Foundation, the Memphis Metro Area, including Memphis and Southaven, has among the highest rates in the U.S. of emergency room visits and deaths due to asthma.

The 41-turbine MZX Tech power plant alone is estimated to cause millions of dollars of health damages each year nationally, with the greatest effects centered in Shelby and DeSoto counties. The damages include, among other things, missed days of school and work due to respiratory illnesses. This estimate likely understates the near-term health damages, since it does not take into account the 27 turbines already installed at the Site.

Across Mississippi, we understand that if MDEQ does nothing to protect some residents from living in literal toxicity, then we cannot count on MDEQ to protect any of us. The Permit Board must disapprove this draft Permit and recognize that no revised version of this project can be reconciled with the region's legal, environmental, or public health obligations under the Clean Air Act. MDEQ itself "implored" MZX Tech to install pollution controls because of air quality concerns in DeSoto County. Now I am imploring you:
Follow the law. Protect the people. Disapprove the Permit.

Sincerely,

Ms. Tamitha Dill
5140 Sedgwick Drive
Jackson, MS 39211

[1] Memphis-Clarksdale-Forrest City, TN-MS-AR, Am. Lung Ass'n (2025), Memphis-Clarksdale-Forrest City, TN-MS-AR | American Lung Association.

[2] Katherine Burgess, *SELC petitions EPA to say Memphis area in violation of ozone standards*, MLK50 Justice Through Journalism (June 6, 2025), https://mlk50.com/2025/06/06/selc-petitions-epa-to-say-memphis-area-in-violation-of-ozone-standards/.

[3] EPA, Health Effects of Ozone Pollution (last visited February 7, 2026), Health Effects of Ozone Pollution | US EPA.

[4] Exposure to Air Pollution During Pregnancy Linked to Neurodevelopmental Issues | Columbia University Mailman School of Public Health; Ambient air pollution in critical windows of exposure and spontaneous miscarriage in a preconception cohort - ScienceDirect.

[5] 2025 Asthma Capitals: The Most Challenging Places to Live with Asthma, Asthma and Allergy Found. of Am. (2025), AAFA 2025 Asthma Capitals Report September 2025 (ranked 3rd for emergency room visits; 5th for deaths).

[6] Report TK.

Yahoo Mail: Search, Organize, Conquer [mail.onelink.me]

Jeffrey Bland

From: Neisha Black-Koczka <mdeqweb@mdeq.ms.gov>
Sent: Saturday, February 14, 2026 9:44 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Turbines in Southaven"

From: Neisha Black-Koczka <Nkoczka15@gmail.com>
Subject: Turbines in Southaven

Message Body:
I liveca5 4742 Derby Drive in Southaven. I can hear the turbines at my house. It is wrong to continue to let them develop this in our city. The amount of water is absolutely horrendous that is being used. The fact they are using the police officers to stant guard over the site is a waste of time. They should be patrolling our streets not standing guard 24/7. I am against this. It .akes me want to sell and move. Shame on the mayor!

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	Nikki Jones
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "AI turbine"
Date:	Thursday, February 12, 2026 9:22:29 AM

From: Nikki Jones <nikkijones109@gmail.com>
Subject: AI turbine

Message Body:
This needs to be denied. This Mississippi is already last in Heath, education and wealth so you all want us to be FURST in AI air pollution. Y'all do realize air move and the polluted air will not just stay in hinds county. So when it enters your neighborhood what will the solutions be. My mother has always told me ALL money is not GOOD money. And I have learned that to be true. Please do the right thing for ALL our children and the future not just YOUR wallets.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Osborne Seyer <mdeqweb@mdeq.ms.gov>
Sent: Saturday, February 14, 2026 3:17 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC"

From: Osborne Seyer <tammiseyer@yahoo.com>
Subject: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Message Body:
I strongly oppose the draft construction Permit for MZX Tech's gas-fired power plant at 2875 Stanton Road. This Permit would allow xAI to build and run 41 permanent gas turbines, creating a large-scale industrial power plant in a residential area, directly impacting surrounding communities including Southaven, Horn Lake, and Memphis residents.
These communities are being asked to bear the health risks of MZX Tech's massive power plant. Communities deserve—and MDEQ is required to provide—complete and accurate information about the Site's operations and air emissions. Because the draft Permit fails to provide complete and accurate information, I demand that the MDEQ Permit Board disapprove the Permit.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Pete <mdeqweb@mdeq.ms.gov>
Sent: Saturday, February 14, 2026 12:05 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Our kids deserve better!"

From: Pete <petesmith1177@yahoo.com>
Subject: Our kids deserve better!

Message Body:
Our children deserve to live in a SAFE environment. Exposing them to toxic air and noise quality on a 24 hour basis is not safe! MANY schools and homes are in direct vicinity of this area. I implore you to do better! This is going to set a precedent that we cannot afford to lose!

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Roque Matus <mdeqweb@mdeq.ms.gov>
Sent: Monday, February 16, 2026 11:57 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "URGENT: Formal Objection & Evidence of Active Federal Violations – MZX Tech LLC (xAI)"

From: Roque Matus <roquematus@hotmail.com>
Subject: URGENT: Formal Objection & Evidence of Active Federal Violations – MZX Tech LLC (xAI)

Message Body:
1. The "Software" Smoking Gun (Feb 15 Tweet) On February 15, 2026, Elon Musk announced that "Grok 4.20 is finally out next week." This timing is not coincidental. It follows reports that xAI has "finally" successfully synchronized its 27 unpermitted methane turbines to hit the gigawatt-scale power threshold required for this launch. It is technically impossible for xAI to serve a model of Grok 4.20's scale (with its rumored 2 million+ token context) using the limited grid capacity of 150 MW. This tweet is a de facto admission that the launch is being powered by illegal off-grid generation.

2. The "Physical" Smoking Gun (Feb 13 Thermal Footage) High-resolution thermal drone imagery released on Friday, February 13, 2026, by The Guardian and Floodlight News provides irrefutable evidence that xAI is actively burning gas in at least 15-18 of these unpermitted turbines. This imagery captures active heat plumes, proving these machines are being used for daily operations, not just emergency backup. This is a "smoking gun" of environmental lawbreaking occurring just 72 hours before this hearing.

3. Intentional Defiance of the Jan 15 EPA Ruling As of January 15, 2026, the EPA finalized Subpart KKKKa, explicitly revoking the "portable engine" loophole that xAI is currently exploiting. These turbines are legally classified as stationary sources requiring air permits. By continuing to operate them after this date, xAI is in active, documented defiance of federal Clean Air Act standards.

4. Brute-Force Engineering vs. Responsible Research Unlike industry leaders like Anthropic and Google (Gemini), who use advanced research to reduce energy consumption per query, xAI is "brute-forcing" its way into the AI race through raw hardware scale. This reliance on a 495 MW illegal power plant is a choice of "engineering over research," prioritizing speed over the respiratory health of the Southaven community and the 10 schools within a two-mile radius.
-Roque Mario Matus

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Ross <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 7:50 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "xAI Permit"

From: Ross <rosslgkelly@outlook.com>
Subject: xAI Permit

Message Body:
The facts clearly indicate:
1. that this business has been operating unpermitted methane gas turbines.
2. that these turbines emit pollutants that - over time - yield asthma, respiratory diseases, & heart problems for local residents.
3. that this business is investing $20 billion in this endeavor.

The magnitude of the investment is fruitless if it yields such negative health consequences for local residents.
————————————————————
Still, I ask:
1. How many local jobs will be created?
2. How much of this investment will be taxed and reinvested into the local community?
3. If there is taxation and reinvestment, how much of it will be used to offset the negative health consequences for residents?

I suspect that the answer to all three questions is “none.”
————————————————————
Finally, AI does not provide anything useful for human life. Instead, it encourages us to outsource things like reading comprehension, emotional regulation, & time management skills to machines. Further, some industry experts gloat that AI will bring an end to every white collar job. What will people do when they have no work, Sir? To put it simply, the juice ain’t worth the squeeze.
————————————————————
Mr. Bland, please deny the permit.
————————————————————
“For where your treasure is, there your heart will be also . . . You cannot serve God and money.” - Matthew 6:21 and 6:24

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From: sandra
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "xAI"
Date: Monday, February 9, 2026 5:55:20 PM

From: sandra <marymars@bellsouth.net>
Subject: xAI

Message Body:
Stop this madness!

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Tammi Seyer <mdeqweb@mdeq.ms.gov>
Sent: Saturday, February 14, 2026 2:57 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC"

From: Tammi Seyer <seyers@bellsouth.net>
Subject: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Message Body:
Dear Mr. Bland:
I STRONLY oppose the draft construction Permit for MZX Tech's gas-fired power plant at 2875 Stanton Road. This Permit would allow xAI to build and run 41 permanent gas turbines, creating a large-scale industrial power plant in a residential area, directly impacting surrounding communities including Southaven, Horn Lake, and Memphis residents.
These communities are being asked to bear the health risks of MZX Tech's massive power plant. Communities deserve—and MDEQ is required to provide—complete and accurate information about the Site's operations and air emissions. Because the draft Permit fails to provide complete and accurate information, I demand that the MDEQ Permit Board disapprove the Permit.

The draft Permit fails to disclose that MZX Tech has already installed 27 so-called "temporary" turbines at the Site without any Permit at all and in disregard of federal requirements. The EPA recently confirmed the long-standing requirement that "temporary" turbines need construction Permits under the federal Clean Air Act. Many of the MZX Tech turbines have been operating for six months with no Permit. Yet the draft Permit makes no attempt to account for the 27 unpermitted turbines, neither including them in the emissions estimates for the Site nor requiring the best available pollution technology for them. The failure of the draft Permit to include at least 27 emissions units on the Site renders it deficient and makes it impossible for the community to understand the full scale of the Site's impact on air quality and public health.

GIVE THIS UP. DO NOT APPROVE. PLEASE FOR THE SAKE OF THE NON-PRIVILEDGED HUMANS AT THE MERCY OF OLIGARCHS.
They'll come for you at some point so go ahead and stand up for JUSTICE NOW PLEASE. If you believe in God at all you will let your heart guide you and not your pocketbook.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Teresa Howard <mdeqweb@mdeq.ms.gov>
Sent: Wednesday, January 21, 2026 12:36 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "XAI/MacroHardrr/Colessus 2"

From: Teresa Howard <sgmtmh@aol.com>
Subject: XAI/MacroHardrr/Colessus 2

Message Body:
Sir, as a retired veteran I ask you not to allow 41 gas turbines to be added to this location. My house is .5 mile away in the Rasco Farms subdivision. My daughter who is also a veteran and her 8 year old son who is had Autism reside there. Most in the community of Rasco Farms subdivision are proud homeowners who have escaped hard lives in Memphis. I bought this house in 2018 and it literally backs up to Stateline road. We were already running air purifiers because of the games from the TVA. Please vote no to the 41 Gas Turbines that will further kill the residents with the air pollution and water pollution. Thank you.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From: AJ cho
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Do not approve xAI data center constructeion"
Date: Tuesday, February 10, 2026 11:28:31 PM

From: AJ cho <amenoartemis@gmail.com>
Subject: Do not approve xAI data center constructeion

Message Body:
I urge you to withdraw all permits for Elon Musk's xAI data centers anywhere in MIssissippi, especially since these data centers will likely be powered by planet-warming methane gas.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	Allison Stafford
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "Board meeting regarding xAI facility air permits"
Date:	Monday, February 9, 2026 5:04:36 PM

From: Allison Stafford <allison.stafford00@yahoo.com>
Subject: Board meeting regarding xAI facility air permits

Message Body:
Hi Jeffrey,
I am writing to express concern after reading about the upcoming board meeting to discuss permitting for the new xAI facility to be built in Southhaven. I believe that as a Mississippi resident, I have a degree of unspoken responsibility to speak out against this effort.
These large data centers coming into our state is not in the citizen's best interest. I know that is beyond your control, but I stress the point that if these centers are going to exist in our state they should be heavily regulated. Computing centers like these generate pollutants of air and water that will cause damage to the land and people. Since the placement of an xAI data center in Memphis, residents complain about the impacts this has had on their quality of life. They report health side effects, whirring noises, and concerns about pollution. These large companies that want to build these data centers are not "investing" in our state. They are exploiting our resources and taking advantage of cheap land prices at the detriment of local residents.
Thank you for your time,
Allison

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Alyssa Rainey <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 9:13 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Elon Musk Gas Turbines"

From: Alyssa Rainey <alyssarainey822@gmail.com>
Subject: Elon Musk Gas Turbines

Message Body:
These turbines are very disruptive in terms of pollution and noise. This needs to stop. No matter the possible technological advancements xAI can accomplish (which I honestly don't see its benefits) it is not worth the destruction. As a nearby resident, it hurts to see my surrounding area slowly selling away to this. Please rid of these turbines for the health of not only our planet, but also our people. Who knows what health problems will arise from this?

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	Calandra Davis
To:	Jeffrey Bland
Subject:	American Lung Association Public Comment
Date:	Tuesday, February 17, 2026 5:36:30 PM
Attachments:	image001.png MDEQ Public Comment 2.17_MZX Tech Permit.pdf

This Message Is From an External Sender
This message came from outside your organization.

Dear Mr. Bland,

The American Lung Association recommends that the Mississippi Department of Environmental Quality delay the approval of this permit request from MZX Tech, LLC as more information is needed on the climate and health impacts of this project. Please see the attached full comment.

Thank you,

Calandra Davis, MPS
Director | Advocacy | Mississippi
American Lung Association
O: 601-282-9571| C: 769-348-7464
Lung HelpLine: 1-800-LUNGUSA
Lung.org [lung.org] | calandra.davis@Lung.org
Pronouns: She/Her/Hers

American Lung Association | Celebrating 120 Years of Impact [lung.or]

American Lung Association

February 17, 2026

Mississippi Department of Environmental Quality
Office of Pollution Control, Environmental Permits Division
515 E Amite Street
Jackson, MS 39201

Re: MZX Tech, LLC Draft Prevention of Significant Deterioration (PSD) Permit: 0680-00119

The American Lung Association works to save lives by improving lung health and preventing lung health disease through education, advocacy, and research. For decades, the Lung Association has pushed for policies that clean up electricity generation. The American Lung Association views healthy air as a significant public health issue and advocates for investments in clean, non-combustion energy sources. **The American Lung Association requests that the Mississippi Department of Environmental Quality reject the expansion of methane gas turbines in Southaven, MS as requested by MZX Tech, LLC in draft Prevention of Significant Deterioration (PSD) permit 0680-00119. This project has a myriad of health and climate implications deserving of a more robust public input process.**

The Lung Association's "State of the Air" report shows that residents of Desoto County already face unhealthy levels of ozone ("smog") pollution, so it is critical that our decisionmakers are taking key actions to reduce emissions and improve air quality. Air pollution threatens lung health and can exacerbate respiratory and heart conditions.

Children, pregnant individuals and older adults face greater risks from pollution worsened by fossil fuel combustion, including methane gas. Air pollution, including ozone and particle pollution, can cause premature death and other serious health effects such as asthma attacks, heart attacks and strokes, preterm births and impaired cognitive functioning later in life. Particle pollution can also cause lung cancer. This air pollution is a threat to human health at every stage of life, increasing the risk of premature birth and low birth weight in babies, causing or worsening lung and heart disease and shortening lives.

Research has shown that people of color are more likely to be exposed to air pollution and more likely to suffer harm to their health from air pollution than white people. This is due to a long history of systemic issues that have caused economically disadvantaged communities where sources of pollution are located. People of color are also more likely than white people to be living with one or more chronic conditions that make them more susceptible to the health impacts of air pollution, including asthma and diabetes.

Fossil fuels are a root cause of our air pollution and climate burdens. Expanding methane-burning gas turbines into Southaven will further exacerbate Desoto County's air pollution burdens and perpetuate environmental injustice.

With over 4,000 data centers across the United States – and thousands more planned – energy demand is only growing. Major projects come with power needs that can exceed those of entire cities. It is critical that the power needs of data centers do not add to local pollution burdens and that they instead rely on new, non-combustion renewable energy resources for both baseline and backup power. Developing clean, renewable, non-combustion sources of electricity – like solar, wind, geothermal and tidal – is critical for lung health and must be part of this proposal. These zero-emission sources of power can dramatically reduce health harms and premature deaths, both in the immediate term and over the long-term due to climate change.

Data centers must be developed with sensitivity to regional air quality, local utility consumer costs and broader sustainability needs. Projects must be developed with full and fair opportunities for community members, health experts and air quality agencies to engage in permitting, siting and other decisions to ensure the cleanest technologies and community protections are in place. This proposal did not do so.

The American Lung Association recommends that the Mississippi Department of Environmental Quality delay the approval of this permit request from MZX Tech, LLC as more information is needed on the climate and health impacts of this project. The American Lung Association looks forward to continued collaboration to safeguard Mississippians' health and secure a climate-resilient future. We appreciate the opportunity to engage in this process and work towards clean air for all Mississippi residents.

Sincerely,



Calandra Davis
Director, Advocacy
American Lung Association, Mississippi

Jeffrey Bland

From: Andy Kirk <mikalkirk@gmail.com>
Sent: Monday, February 16, 2026 9:02 PM
To: Jeffrey Bland
Subject: Statement for MDEQ Public Forum on MXZ Turbine Permits Southaven MS
Attachments: Statement letter .pdf

This Message Is From an External Sender
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Mr. Bland,

I am a homeowner and resident of Southaven and am writing to add my opposition to xAi's application for permits to operate 41 methane turbines in our city. Please see the attached letter for my full comments to be included in the record at the meeting tomorrow night, 2/17/26.

Thank you,

--

Andy Kirk

Mr. Bland,

My name is Andy Kirk. I was born at Baptist Memorial Hospital Desoto in Southaven. I have been a home owner and resident of Southaven since 2021. My wife has been a resident of the Greenbrook neighborhood of Southaven for virtually her entire life. Together we are raising two boys here in Southaven; they are 4 years old and 20 months old. Last year I coached our oldest son's soccer team, and we had multiple practices at the Stateline Soccer complex just 2 miles away from the xAi site. Our youngest son was born several weeks early and spent the first week of his life in the NICU at Baptist Desoto because his lungs were underdeveloped. He is especially susceptible to asthma and other respiratory conditions.

It is on behalf of my children that I am writing this letter to demand in no uncertain terms the denial of application from xAi operating as MXZ to use 41 permanent methane burning turbines in order to power their supercomputers in our city. Desoto County is the only county in Mississippi with an F ozone grade. We have some of the worst air quality in the country, significantly shortening our life expectancy and increasing health conditions like cancer and heart disease. The last thing Desoto country needs is more air pollution.

The 41 turbines included in the application ignore and are in addition to the 27 unpermitted "temporary" turbines running currently. These have been in use without permits since August of 2025 in clear violation of both Mississippi state law which requires permits for any air-polluting equipment, as well as a recent ruling by the Federal Environmental Protection Agency which clarified that even "temporary" turbines must have permits to be operated. These turbines have been running for between 16-20 hours a day since they were installed without public notice or public input, and without any effective sound barriers to protect the public.

This has resulted in not only additional air pollution, but noise pollution as well. This pollution has already had adverse effects on the health and wellbeing of our neighbors living close by. None of these neighbors were made aware of the environmental harm methane turbines could cause, and to this point we are unaware of any environmental impact studies having been conducted before xAi exploited what they perceived to be a loophole.

In addition to the air and noise pollution, public records requests have revealed the most recent water usage bill for the MXZ site. For the days of 11/25 - 12/07/25, xAi consumed 7.7 million gallons of water. Our water is not an infinite resource, although it is infinitely valuable. There are still many unanswered questions around water usage, water disposal, possible recycling, many of these questions have not even been asked. It is deeply concerning that our most precious natural resource is being consumed in unimaginable amounts by a single entity.

It is important to note the ends to which our water, air, and health are being consumed. The defining feature of Grok among Ai agents is its ability to generate sexually explicit images. Reports are documenting that Grok generates significantly more by volume, and more violent sexual images of women and children than any other Ai agent are appalling. Mississippi claims to be a pro-life state. A state where families are encouraged and supported. Allowing the vast

amounts of natural resources to be consumed in order to generate such vile and sickening images is absolutely antithetical to those claims.

In closing I join many of my neighbors in demanding the following steps be taken:

- **Stop all operations** of the 27 unpermitted turbines immediately.
- **Withdraw the draft permit** and revise it to include all turbines on-site, not just the 41 proposed, *before* seeking public comment.
- **Deny the permit**
- **Revise any draft permit** to include all of the turbines onsite and fully account for all air and noise pollution sources *before* seeking public comment.

Thank you for your time and consideration.

Andy Kirk
February 17, 2026

From:	Angela Rudisill
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "xAI Turbines"
Date:	Monday, January 19, 2026 12:16:48 PM

From: Angela Rudisill <arudisill.indy@gmail.com>
Subject: xAI Turbines

Message Body:
I am concerned that the xAI turbines are operating so close to residential areas. Health impacts from PM2.5 and NOx emissions are most pronounced for children and older adults, particularly when exposure occurs close to residential neighborhoods. These turbines need to be further away from people's homes.

If you expand this site you will increase the danger to nearby residents including children. Children and seniors face increased health risks from air pollution when facilities are located near residential areas. There are neighborhoods less than a mile away from the xAI site. There are thousands of homes within 5 miles of this site. This site needs to be moved further away from existing residential areas. Expanding this site is going to increase the harm that's already being done without these people's consent.

The xAi turbines are already operating too close to thousands of homes. Children, elderly residents, and those living closest to the facility should be explicitly considered in this environmental review. These turbines are known by the EPA to release hazardous air particles such benzene, toluene, and formaldehyde. If you expand this site you increase the risk of these people getting cancer.

Proximity matters for air pollution exposure, and children and elderly residents that live within a few miles of these turbines face elevated respiratory and cardiovascular risk. Now you're going to add more turbines and increase that risk? You need to move these turbines away from families.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: angelo earl <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 12:23 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "AI"

From: angelo earl <darkstar5619@gmail.com>
Subject: AI

Message Body:
I want to also let the people Know the AI is Dangerous to minorities because AI gets its information from a source that contains lies history is full of lies and and the writers of history wrote lies because winners of wars can not be trusted we are in big trouble with AI along with the illegal operation of those gas turbines!

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Angie Davis <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 6:21 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "xAI turbine installation in southaven"

From: Angie Davis <anfauvelle@yahoo.com>
Subject: xAI turbine installation in southaven

Message Body:
I'm deeply concerned about the proposed 41 natural gas fueled turbines to go in behind Colonial Hills subdivision. There are already 27 turbines roaring all day despite federal law recently passed making them illegal. Desoto and Shelby county already have an F in air quality. The burning of enough natural gas to fuel another city won't help.
These turbines use cooling water pulled from our aquifer. Much of the water will evaporate concentrating impurities and salt and it wont return to the ground. I worry about the rapid removal of water causing unexpected shifts in soil layers leading to contaminants in our water. Will they be detected in time?
These same type of turbines used in Memphis showed an increase in pollution by University of Tennessee. Despite the clear indications that this air pollution causes problematic health conditions including breathing problems, cancer, and even low sperm count, no air monitoring has been released at the site in Desoto county.
And now, 41 more turbines are to go in?
We lack info on how much damage will be done to our environment but studies of similar plants all over the world assure us that there WILL be damage. My daughter lives less than a mile from this site. My grand-daughter plays in the park where the roar of the present turbines can be heard. This proposal could almost triple the level of damage currently being done without lawful permit and with clear indications of health effects.
The fossil fuels being burned in my daughter's backyard and in all the backyards in the mid south will hurt us. While progress is inevitable, this is progress without balance. This energy won't go to homes, restaurants, schools and someone's uncle's auto shop. It goes to AI. I don't remember the people in Southaven being asked if we want a power plant that alone can fuel all of Shelby county to be built near our schools and ball fields. I think, had we been asked, we would have said no. Please protect us. Deny the permit.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Aramis Jones <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 4:57 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Deny Xai Air Permit"

From: Aramis Jones <Aramis@younggiftedgreen.org>
Subject: Deny Xai Air Permit

Message Body:
Dear Mississippi Department of Environmental Quality:

My name is Aramis Jones and I am a public health advocate and resident of Memphis,Tennessee, a community less than 10 minutes away from Southaven, Mississippi.

I am writing as a deeply concerned citizen who cares about the current and future wellbeing of our interconnected communities. I am asking that you deny the proposed permit for the 41 xAI gas turbines, as the pollution will only exacerbate the environmental health issues that our communities face.

These turbines not only lead to and increase chronic conditions like asthma, heart conditions, potentially resulting in premature deaths but they are extremely costly to our health care system. According to an independent study, conducted by EmPower Analytics Group, the air from the proposed turbines at Xai Southaven facility causes an estimated $30-$44 million in annual health damages each year. Every person living in Southaven deserves the opportunity to thrive and the children of our community deserve a future where they can safely breathe and play. Don't deny our future generations the future they deserve.

If you believe the health and safety of our community should always be a priority, then make the right decision to deny xAI the air permit. The future wellbeing of our community is dependent upon the choices your department makes today.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Aramis Jones <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 4:27 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Deny Xai Gas Turbines in Southhaven"

From: Aramis Jones <Aramis@younggiftedgreen.org>
Subject: Deny Xai Gas Turbines in Southhaven

Message Body:
Dear Mississippi Department of Environmental Quality:

My name is Aramis Jones, and I am a public health advocate and resident of Memphis,Tennessee, a community less than 10 minutes away from Southaven, Mississippi.

I am writing as a deeply concerned citizen who cares about the current and future well-being of our interconnected communities. I am asking that you deny the proposed permit for the 41 xAI gas turbines, as the pollution will only exacerbate the environmental health issues that our communities face.

These turbines not only lead to and increase chronic conditions like asthma, heart conditions, potentially resulting in premature deaths but they are extremely costly to our health care system. According to an independent study, conducted by EmPower Analytics Group, the air from the proposed turbines at Xai Southaven facility causes an estimated $30-$44 million in annual health damages each year. Every person living in Southaven deserves the opportunity to thrive and the children of our community deserve a future where they can safely breathe, play, work, and live. Don't deny our future generations the future they deserve.

If you believe the health and safety of our community should always be a priority, then make the right decision to deny xAI the air permit. The future well-being of our community depends on the choices your department makes today.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	Asheton England
To:	Jeffrey Bland
Subject:	Re: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC
Date:	Tuesday, February 17, 2026 11:31:12 PM
Attachments:	England_Comments_For_Air_Ref_No_0680-00119.pdf

This Message Is From an External Sender
This message came from outside your organization.

Hello,

My name is Asheton England. Please find attached a PDF of my comments for the Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC.

Thank you.

Re: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Dear Mr. Bland:

My name is Asheton England, and I am a resident of Olive Branch, MS. I was born in Memphis, TN in 1995 and have lived in Olive Branch since 2005. My grandparents have lived in Southaven, MS since before my birth. I have spent at least 26 years of my life growing, studying, and working in DeSoto County.

I strongly oppose the draft construction permit for MZX Tech to operate 41 permanent gas turbines at 2875 Stanton Road. Due to incomplete and inaccurate information provided by the permit, as well as the failure to address the existing 27 "temporary" turbines currently running at the site without a proper permit, **I demand that the MDEQ Permit Board disapprove the permit.**

The public cannot be assured that their collective safety is prioritized while the draft permit fails to wholly and transparently capture the health risks presented by MZX Tech's proposed operations. In fact, research suggests that the permit severely underestimates overall health and environmental impacts. Furthermore, the public cannot be assured that MZX Tech will be held accountable for causing significant, undue, preventable harm to the community when the company has already boldly defied federal law under the Clean Air Act. MZX Tech also continues to violate Mississippi law by failing to provide adequate safeguards for the company's current NOx pollution. MDEQ's mission statement avows the protection of the welfare of current and future Mississippians by conserving the environment and enforcing responsible regulation on economic development—it would be duplicitous of MDEQ to reward MZX Tech by approving the draft permit when MZX Tech is flagrantly defying federal and state law at the expense of Mississippi's people and ecosystems, the very behavior that MDEQ claims to oppose.

While I do not live within Southaven, just as the air we all share does not adhere to manmade lines on a map, my community extends beyond the borders of my city—my family, friends, neighbors, and coworkers are all directly impacted by MZX Tech's turbines. In addition, a recent study done by EmPower Analytics Group LLC found that the entirety of DeSoto County experiences increased fine particulate matter exposure due to the MZX facility, putting the health of all county residents at risk. This is not merely a Southaven issue.

Even if I lacked personal ties to Southaven, geographic proximity is not a requirement to care about the safety and well-being of my fellow humans. Every person has a right to clean air and water. It is unjust to allow corporate greed to supersede the health of our neighbors and the sanctity of our natural environment, particularly when the affected communities are overwhelmingly marginalized already. Allowing MZX Tech to proceed with the current draft permit would be gross negligence on behalf of the MDEQ board. **I implore you to disapprove the permit and require that MZX Tech immediately cease the operation of the 27**

“temporary” turbines. I also urge MDEQ to realize that no revised version of this project aligns with MDEQ’s goals of fostering a safe, healthy environment for all Mississippians to enjoy.

Jeffrey Bland

From: Ashley Minton <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 10:52 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "MZX Turbine Permit"

From: Ashley Minton <ashley.thesmash@gmail.com>
Subject: MZX Turbine Permit

Message Body:
Good evening, My name is Ashley. I'm a nurse, and I know what happens when people are failed by those meant to protect them. And I'm here tonight as your neighbor.
I'm here for one clear purpose: to oppose both the continued operation of existing turbines at MZX and any approval of additional turbines. This facility is currently operating in direct violation of the Clean Air Act. Not as an opinion — as a legal fact. A company already breaking federal law should not be granted permission to expand that harm.
What My Work Has Taught Me
As a nurse, I don't read about the consequences of negligence in textbooks — I see them. I know what it looks like when a body bears the cost of someone else's shortcuts.
What is happening in this community is not acceptable. And expanding it would be wrong.
The Air Quality Crisis Already on Our Doorstep DeSoto County's air quality is already failing. MDEQ's own 2024 data shows we are exceeding federal standards for both ozone and fine particle pollution. The numbers don't lie — our air quality is already a concern.
Adding more turbines to a county already over the limit is not just reckless — it is simply wrong.
The Children Who Will Inherit This
The children in our schools did not choose to breathe this air. But they will spend the rest of their lives carrying the consequences. These turbines compound pollution that is already above safe levels — raising the risk of childhood asthma, stunted lung development, heart disease, and cancer.
Our children are being enrolled in a health experiment they never consented to. And the results won't show up for decades — long after this board meeting is forgotten.
The Community Bearing the Burden
Environmental injustice follows a pattern — and this community is living it. The pollution lands here. The health consequences land here. And our children are left to inherit a burden they did nothing to create.
The Water We Depend On
The current turbines already consume enormous amou

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Ashtyn Starkey <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 7:31 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "xAI"

From: Ashtyn Starkey <lanhamashtyn@gmail.com>
Subject: xAI

Message Body:
We do not want this plant in Southaven, MS or in Memphis, TN. These would affect all of us who live in the area negatively and we do not want or need it here.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Becky dewease <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 6:57 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Xai"

From: Becky dewease <dddewease@gmail.com>
Subject: Xai

Message Body:
No more permits!

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Betty Bynum <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 11:26 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Southaven"

From: Betty Bynum <mshomesforu@aol.com>
Subject: Southaven

Message Body:
No do not bring your plant to our neighborhood.
We have fought long and hard to keep our places clean and free from this type of pollution!
No no no no

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From: Bobby Crudup
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "WE DO NOT WANT A DATA CENTER"
Date: Tuesday, February 10, 2026 11:41:01 AM

From: Bobby Crudup <bcrudup@gmail.com>
Subject: WE DO NOT WANT A DATA CENTER

Message Body:
WE DO NOT WANT A DATA CENTER IN MISSISSIPPI. It is bad for the community and the environment.

Massive Energy Use

Data centers suck up huge amounts of electricity, often rivaling small cities

If the grid relies on fossil fuels, that means higher emissions

Can strain local power infrastructure and drive-up utility costs

Water Consumption

Many data centers use water for cooling

This can stress local water supplies, especially in hot or drought-prone areas

Environmental Impact

Carbon footprint can be significant

Backup diesel generators add air and noise pollution

Heat output can affect nearby environments

Low Job Creation

Once built, data centers don’t create many permanent jobs

Construction jobs are temporary; long-term staffing is minimal

Opportunity Cost

They take up large parcels of land that could be used for:

Housing

Retail

Manufacturing

Communities sometimes give tax breaks and don’t see much return

Security & Risk Concerns

Targets for cyberattacks or physical sabotage

Heavy security can make them feel secretive or unwelcoming to neighbors

Noise & Aesthetics

Constant hum from cooling systems and generators

Big, windowless buildings = not exactly community eye candy

Infrastructure Burden

Requires upgrades to:

Power grids

Roads

Fiber networks

Local governments often foot part of the bill

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Breanna moss <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 1:05 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "XAI"

From: Breanna moss <breannjmoss@gmail.com>
Subject: XAI

Message Body:
This will destroy our community. It will decrease resources for locals and decrease quality of life. Protect your citizens and do not allow our water to be impacted.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From: Brianna Livingston
To: Jeffrey Bland
Subject: MZX Tech xAI Air Permit Public Comment Letter 2/17/26
Date: Tuesday, February 17, 2026 5:45:01 PM
Attachments: MZX Data Center Letter.docx

This Message Is From an External Sender
This message came from outside your organization.

Good evening,

Attached is a copy of my MZX Data Center Letter. I also pasted it below just in case the file won't open.

Thank you.

Dear Members of the MDEQ Board/Mr. Bland,

My name is Brianna Livingston, I am a teacher in DeSoto County and grew up, here, in Southaven and I strongly oppose the construction permit for MZX Tech's gas-fired plant. I returned to Southaven after college because I loved my community and felt it was safe. However, with the threat of AI at our door, I fear our public leaders may be selling our health and well-being short in favor of corporate interest.

I live in the Colonial Hills Subdivision and just over a mile (1.07 miles) away from the MZX Power Plant on Stanton Road. I have lived in Colonial Hills for nineteen years. With the exception of the two years I spent in Oxford, Mississippi completing my bachelor's degree, it has always been home. Now I feel that home is unsafe as the MZX plant moved in and introduced twenty-seven already operating turbines with plans to increase that number to forty-one turbines.

A disservice was done to nearby communities including ten schools, three daycares, 27 churches, eleven parks, and countless residents when the plant was introduced without public comment knowing it was going to be so close to our community without thought or care as to how loud the turbines are to those nearby and the effects that would have on their work and daily life. Day and night the turbines can be heard, sometimes changing in frequency or occasionally startling neighbors into action on community pages. I have seen them impact my life in this way for a while now. The first time, it woke me up in the middle of the night, a loud boom could be heard and then the turbines sounded as if they were roaring. I went room-to-room trying to find the source only to discover the roaring noise was coming from outside when at last I checked there. For hours after, that roaring kept me up until I finally fell asleep from exhaustion. I wish I could say that was the only time that happened, but the noise has only grown more noticeable and unbearable as the weeks and months progressed.

In addition to the noise pollution, we have air pollution. Southaven is already so close to Memphis who ranks poorly in air quality, yet we're adding one more obstacle for residents. We hear local and state legislators touting economic benefits, while ignoring the consequences to their constituents' health. What will we be spending on increased health care costs when dealing with the fallout from MZX's turbines?

The MZX Power Plant poses a threat to public health in a place many of us call home. Today, we call on officials, to treat this like a home. If you live in a house impacted by mold, you wouldn't attempt to cover it up. You would identify the source, possibly complete a DIY testing kit for spores or hire a certified mold inspector, and have it removed. MDEQ officials have the opportunity to protect citizens today, by saying a mistake was made, further research on the effects these twenty-seven temporary and eventually forty-one permanent turbines are having on nearby communities.

Thank you for your time and consideration.

Sincerely,

Brianna Livingston

Jeffrey Bland

From: Bryson Cannady <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 7:55 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Elon's Plant Needs to Go!"

From: Bryson Cannady <brysoncannady@gmail.com>
Subject: Elon's Plant Needs to Go!

Message Body:
My whole family has had an increase in flare ups and break outs since the plant has illegally began its transmissions into our community. On top of that I'm a personal trainer, and my coworkers and I have experienced many, many respiratory infections and asthma flare ups since the end of last year. Please stand by the side of this community.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Calandra Davis <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 4:49 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "MZX Tech Permit Comment - American Lung Association Part 1"

From: Calandra Davis <calandra.davis@lung.org>
Subject: MZX Tech Permit Comment - American Lung Association Part 1

Message Body:
Re: MZX Tech, LLC Draft Prevention of Significant Deterioration (PSD) Permit: 0680-00119

The American Lung Association works to save lives by improving lung health and preventing lung health disease through education, advocacy, and research. For decades, the Lung Association has pushed for policies that clean up electricity generation. The American Lung Association views healthy air as a significant public health issue and advocates for investments in clean, non-combustion energy sources. The American Lung Association requests that the Mississippi Department of Environmental Quality reject the expansion of methane gas turbines in Southaven, MS as requested by MZX Tech, LLC in draft Prevention of Significant Deterioration (PSD) permit 0680-00119. This project has a myriad of health and climate implications deserving of a more robust public input process.

The Lung Association's "State of the Air" report shows that residents of Desoto County already face unhealthy levels of ozone ("smog") pollution, so it is critical that our decisionmakers are taking key actions to reduce emissions and improve air quality. Air pollution threatens lung health and can exacerbate respiratory and heart conditions.

Children, pregnant individuals and older adults face greater risks from pollution worsened by fossil fuel combustion, including methane gas. Air pollution, including ozone and particle pollution, can cause premature death and other serious health effects such as asthma attacks, heart attacks and strokes, preterm births and impaired cognitive functioning later in life. Particle pollution can also cause lung cancer. This air pollution is a threat to human health at every stage of life, increasing the risk of premature birth and low birth weight in babies, causing or worsening lung and heart disease and shortening lives.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: cmann mannagency.com <cmann@mannagency.com>
Sent: Tuesday, February 17, 2026 10:37 AM
To: Jeffrey Bland
Subject: Re: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC
Attachments: img-44829ef9-774b-4172-8f0a-0148d8fd8f7e; img-f5cf6b8f-6b25-472a-b007-e939c045b2dc; Public_Comment__Clean_Air_Act_Prevention_of_Significant_Deterioration_Construction_Permit__Air_Ref._No._0680-00119__for_MZX_Tech,_LLC.pdf

This Message Is From an External Sender
This message came from outside your organization.

Re: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Dear Mr. Bland:

As a Mississippian, I strongly oppose the draft construction Permit for MZX Tech's gas- fired power plant at 2875 Stanton Road. This Permit would allow xAI to build and run 41 permanent gas turbines, creating a large-scale industrial power plant in a residential area, directly impacting surrounding communities including Southaven, Horn Lake, and Memphis residents. We understand this all across Mississippi.

We understand that these communities are being asked to bear the health risks of MZX Tech's massive power plant. Across Mississippi we understand that if any of us are vulnerable to being left behind and unprotected from for-profit corporations by our government and MDEQ, then we *all* are vulnerable. Communities deserve—and MDEQ is required to provide—complete and accurate information about the Site's operations and air emissions. Because the draft Permit fails to provide complete and accurate information, **I demand that the MDEQ Permit Board disapprove the Permit**.

The draft Permit fails to disclose that MZX Tech has *already* installed 27 so-called "temporary" turbines at the Site without any Permit at all and in disregard of federal requirements. The EPA recently confirmed the long-standing requirement that "temporary" turbines need construction Permits under the federal Clean Air Act. Many of the MZX Tech turbines have been operating for six months with no Permit. Yet the draft Permit makes no attempt to account for the 27 unpermitted turbines, neither including them in the emissions estimates for the Site nor requiring the best available pollution technology for them. The failure of the draft Permit to include at least 27 emissions units on the Site renders it deficient and makes it impossible for the community to understand the full scale of the Site's impact on air quality and public health.

Internal correspondence from December 22 obtained by a public records request shows MDEQ staff were instructed to initiate the public comment period by January 15. The EPA submitted additional Permit comments on January 6, yet there does not appear to be any further public records available regarding those comments. If those final comments were incorporated into the Permit materials, documentation of that process should be available to the public. If not, the Permit was publicly noticed while key issues remained under review. Either way, the timeline suggests the process was shaped by internal deadlines rather than by transparency or completeness.

The draft Permit defines an "ambient air boundary" based on physical barriers around the current Site. However, according to DeSoto County land records, MZX Tech has purchased multiple additional parcels, including parcels adjacent to the Site, that are not effectively excluded from public access. Under EPA's regulatory definition, ambient air extends to areas where the public can access the outdoor air, and impacts in those areas must be included in air quality modeling. Because the Permit relies on a boundary that does not correspond to true ambient air, the emissions impacts to the surrounding community could be underestimated.

MDEQ must clarify the actual ambient air boundary, include all owned or controlled land in modeling, and reevaluate impacts accordingly.

The Permit Board must disapprove the draft Permit and instruct MDEQ to:

- Order MZX Tech to cease operating the 27 unpermitted turbines until it obtains a

permit for them;
- Withdraw the draft Permit; and
- Revise the draft Permit before seeking public comment.

Even for the 41 turbines it proposes to authorize, the draft Permit fails to accurately characterize air pollution and require adequate protections. Among other things, the draft Permit downplays the ongoing violation of the minimum federal ozone standard in the Memphis metro area, which includes DeSoto County, and fails to require strict pollution controls and offsets for MZX Tech's NOx pollution required by Mississippi law. The draft Permit also underestimates the amount of harmful particulate matter and formaldehyde emissions from the turbines. For all of these reasons, the draft Permit fails to meet applicable requirements and **the Permit Board must disapprove the Permit**.

It is imperative that the Permit Board disapprove the Permit because both MDEQ and the community must understand the full impact of the MZX Tech Site operations on air quality and address that impact as required by the Clean Air Act and Mississippi law. The area immediately around the MZX Tech power plant includes several residential neighborhoods, including Colonial Hills, Kingston Estates, Rasco Farms, and others along the Southaven/Horn Lake border. The power plant is within half of a mile from homes and just a mile from an elementary school. These communities have already been experiencing impacts of the 27 unpermitted turbines MZX Tech has installed at 2875 Stanton Road without a Permit, including increased noise, light, and air pollution.

But the air pollution from both the 27 unpermitted turbines and the proposed 41 turbines will extend far beyond the immediately adjacent neighborhoods. Southaven and Memphis share the air—and that air is already not meeting minimum federal smog standards. The greater Memphis-Clarksdale-Forrest City metro area, which includes Memphis and Southaven, also received an "F" for high ozone days for the most recent reporting period.[1]

While DeSoto County is currently classified as an ozone attainment area, MDEQ's own monitoring data presented at the A&WMA Southern Section Conference shows that DeSoto's 2024 design value is **71 ppb**, exceeding the 70 ppb federal ozone standard. This means that DeSoto is functionally in violation, even if formal nonattainment designations have not yet been made. Under the Clean Air Act, MDEQ must not treat an area trending into violation as if it were safely in attainment — especially when Permiting major new NOx sources that will make the problem worse.

In addition to ozone exceedances, the data used in the Permit's air modeling is misleading about current air quality conditions. The background pollution data for PM2.5 came from the Shelby Farms monitor in Tennessee, even though the Hernando monitor in DeSoto County is closer to the Site and more representative of local conditions. Instead of using this more accurate local data, the PM2.5 data relied on a cleaner monitor across state lines, misleading the public about the real pollution burden already faced by DeSoto County residents. At the 2025 A&WMA Southern Section Conference, MDEQ noted that the Hernando monitor recorded a PM2.5 annual average of **9.1 µg/m3**, which is above the EPA's annual standard of 9.0. That number was only brought below the limit after 13 exceptional events were excluded from the data.

At the same conference, MDEQ specifically identified **Desoto County as an area where it is "evaluating additional measures towards achieving attainment"** in reference to ozone and that the Memphis Metropolitan Area is an "area of priority." That means MDEQ is aware Desoto County has not been meeting the federal air quality standards and has been actively looking for ways to bring pollution levels back down. If MDEQ truly believes that additional measures are needed to *reduce* pollution in Desoto County, then Permitting a major new source of PM2.5 and NOx is inconsistent with MDEQ's own statements and puts the surrounding communities at even greater risk.

Smog makes asthma and other respiratory illnesses worse.[2] Pollutants like smog are especially dangerous for children, who are more likely to develop respiratory illnesses like asthma.[3] Pregnant women and unborn children are also at risk from fossil fuel pollution.[4] According to the Asthma and Allergy Foundation, the Memphis Metro Area, including Memphis and Southaven, has among the highest rates in the U.S. of emergency room visits and deaths due to asthma.[5]

The 41-turbine MZX Tech power plant alone is estimated to cause millions of dollars of health damages each year nationally, with the greatest effects centered in Shelby and DeSoto counties. The damages include, among other things, missed days of school and work due to respiratory illnesses.[6] This estimate likely understates the near-term health damages, since it does not take into account the 27 turbines already installed at the Site.

Across Mississippi, we understand that if MDEQ does nothing to protect some residents from living in literal toxicity, then we cannot count on MDEQ to protect any of us. The Permit Board must disapprove this draft Permit and recognize that no revised version of this project can be reconciled with the region's legal, environmental, or public health obligations under the Clean

Follow the law. Protect the people. Disapprove the Permit.

Carol Mann
316 Sonoma Cove Madison, MS 39110

1 Memphis-Clarksdale-Forrest City, TN-MS-AR, Am. Lung Ass'n (2025), Memphis-Clarksdale-Forrest City, TN-MS-AR | American Lung Association.

2 Katherine Burgess, *SELC petitions EPA to say Memphis area in violation of ozone standards*, MLK50 Justice Through Journalism (June 6, 2025), https://mlk50.com/2025/06/06/selc-petitions-epa-to-say-memphis-area-in-violation-of-ozone-standards/ [mlk50.com].

3 EPA, Health Effects of Ozone Pollution (last visited February 7, 2026), Health Effects of Ozone Pollution | US EPA.
4 Exposure to Air Pollution During Pregnancy Linked to Neurodevelopmental Issues | Columbia University Mailman School of Public Health;

Ambient air pollution in critical windows of exposure and spontaneous miscarriage in a preconception cohort - ScienceDirect.
52025 Asthma Capitals: The Most Challenging Places to Live with Asthma, Asthma and Allergy Found. of Am. (2025), AAFA 2025 Asthma

Capitals Report September 2025 (ranked 3rd for emergency room visits; 5th for deaths). 6 Report TK.

Jeffrey Bland

From: Carrie Glancy <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 11:54 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "MZX Technology Southaven, MS"

From: Carrie Glancy <carrie.moultrie1@gmail.com>
Subject: MZX Technology Southaven, MS

Message Body:
A message from my son:
Typed as it was written.

People of my community, my name is Fitz Glancy (8 years old) and I will say my family might be forced to move from my and my family's friends if you approve this permit. My mommy has trouble breathing and is on "oxogen". More air pollution is bad for her lungs and she won't be able to ride bikes with me, play with me, watch me play tennis at Snowden Grove, or even be outside with me. It causes bad air quality days. Those are scary for me and my mommy and everyone we love. I love and feel safe where we live ; please don't let that change. Thank you for listening. - Fitz Glancy Age 8

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From: Cedric Magee Sr
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "NO TO THE DATA CENTER"
Date: Monday, February 9, 2026 4:11:35 PM

From: Cedric Magee Sr <Mronesr1@yahoo.com>
Subject: NO TO THE DATA CENTER

Message Body:
A huge NO to the data center! It's already bad where it's operating now and will cause further destruction.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: CHANDRA S MCKINNEY <mdeqweb@mdeq.ms.gov>
Sent: Wednesday, January 21, 2026 7:00 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "xAI Turbine Permit Request"

From: CHANDRA S MCKINNEY <shurnice@gmail.com>
Subject: xAI Turbine Permit Request

Message Body:
Please reconsider the request to permit 41 turbines to be introduced to Desoto county. Its imperative that you and your team.consider the long term affect this will have on the environment. These.facilties will damage the natural acquifers as well as already questionable air quality.

Please put health before profit.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Cicely Sharp <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 4:50 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "xAi's Turbines in Southaven"

Categories: Red Category

From: Cicely Sharp <sharpcicely@gmail.com>
Subject: xAi's Turbines in Southaven

Message Body:
Under the Clean Air Act, states cannot adopt rules that are weaker than EPA standards. If federal law requires compliance with the Clean Air Act, the question before the state is what does it choose to do in service of its people. The state should want to be more accountable to its citizens because we are the ones who live with the consequences of these decisions. We breathe this air every day. Our children, elders, and neighbors do not experience pollution as a policy debate. It is experienced in asthma attacks, missed school days, emergency room visits, and long-term health risks. Any additional emissions matter, especially in communities already burdened by environmental impacts.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Cloteal Walton-Kelly <mdeqweb@mdeq.ms.gov>
Sent: Monday, February 16, 2026 12:43 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Gas turbines potentially coming to our area"

From: Cloteal Walton-Kelly <kellycloteal@yahoo.com>
Subject: Gas turbines potentially coming to our area

Message Body:
I definitely do not want the turbines in our community generating known pollutants. Why must they be placed in a residential area anyway?

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	Cody
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "Concerns over xAI"
Date:	Monday, January 19, 2026 6:06:55 AM

From: Cody <nerevarincarnateiii@gmail.com>
Subject: Concerns over xAI

Message Body:
Please reconsider supporting the building of this plant.

https://urldefense.com/v3/__https://www.epa.gov/stationary-sources-air-pollution/stationary-combustion-turbines-national-emission-standards__;!!G3AUQnCt!jubzTT32ve2xfDR-zqbdZJvnH3qigrfHe_X1LROVy2gcFKXEEyT3DoZLEMl6gU8rTNQgwulfkz_aSx4ZMOg5a1U$

We have identified stationary combustion turbines as major sources of hazardous air pollutants (HAP) emissions such as formaldehyde, toluene, benzene, and acetaldehyde.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From: Cynthia
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Data center power plants and pollution"
Date: Monday, January 19, 2026 7:41:50 AM

From: Cynthia <cyn_city@proton.mail>
Subject: Data center power plants and pollution

Message Body:
https://urldefense.com/v3/__https://www.epa.gov/stationary-sources-air-pollution/stationary-combustion-turbines-national-emission-standards__;!!G3AUQnCt!hlPy0oSALn3Mb9EoJgKpTY_-v21QVkmB8kwcYuOrrBWey8n4Hrwk9jGmt_QCtQscynLgpf0giDa3ySvVubX19JU$

We have identified stationary combustion turbines as major sources of hazardous air pollutants (HAP) emissions such as formaldehyde, toluene, benzene, and acetaldehyde.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Cypress M <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 12:54 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "X-AI PLANT IN MEMPHIS"

From: Cypress M <bqngwqter69@gmail.com>
Subject: X-AI PLANT IN MEMPHIS

Message Body:
I am disappointed with the actions of our mayor who is supposed to make choices that better the community. This plant is poisoning our air and my community while exploiting our resources without a care. I'm scared for the future with climate change and generative ai is only worsening it with the excessive use of water. I want to have a future and to reach my goals like the previous generations have; give me this chance and get rid of X-Ai.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: David Mason <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 1:02 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Opposing the xAI Power Plant"

From: David Mason <davidpattenmason@gmail.com>
Subject: Opposing the xAI Power Plant

Message Body:
xAI is a lying and polluting organization. Their product creates political propaganda and sexually explicit images of real people. xAI has been documented lying about their use of methane turbines. I am imploring you all to not allow xAI's behavior to continue. I do not know anyone living here who thinks that xAI is a valuable and trusted business partner or thinks it is worthwhile to pollute our air to train large language models and image generation models used for propaganda and sexual exploitation.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	David Wood
To:	Jeffrey Bland
Subject:	Deny permit to MZX
Date:	Tuesday, February 17, 2026 4:29:38 PM
Attachments:	Public Comment Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC .David.docx

This Message Is From an External Sender
This message came from outside your organization.

Dear Mr. Bland,

Please see the attachment below detailing (with footnotes) the reasons for which your agency must deny a permit to build more turbines in affected areas of Mississippi.

Thanks,
David Wood
608 Mitchell Cove
Brandon, MS
601-421-9585

Re: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Dear Mr. Bland:

As a Mississippian, I strongly oppose the draft construction Permit for MZX Tech's gas-fired power plant at 2875 Stanton Road. This Permit would allow xAI to build and run 41 permanent gas turbines, creating a large-scale industrial power plant in a residential area, directly impacting surrounding communities including Southaven, Horn Lake, and Memphis residents. We understand this all across Mississippi.

We understand that these communities are being asked to bear the health risks of MZX Tech's massive power plant. Across Mississippi we understand that if any of us are vulnerable to being left behind and unprotected from for-profit corporations by our government and MDEQ, then we *all* are vulnerable. Communities deserve—and MDEQ is required to provide—complete and accurate information about the Site's operations and air emissions. Because the draft Permit fails to provide complete and accurate information, **I demand that the MDEQ Permit Board disapprove the Permit**.

The draft Permit fails to disclose that MZX Tech has *already* installed 27 so-called "temporary" turbines at the Site without any Permit at all and in disregard of federal requirements. The EPA recently confirmed the long-standing requirement that "temporary" turbines need construction Permits under the federal Clean Air Act. Many of the MZX Tech turbines have been operating for six months with no Permit. Yet the draft Permit makes no attempt to account for the 27 unpermitted turbines, neither including them in the emissions estimates for the Site nor requiring the best available pollution technology for them. The failure of the draft Permit to include at least 27 emissions units on the Site renders it deficient and makes it impossible for the community to understand the full scale of the Site's impact on air quality and public health.

Internal correspondence from December 22 obtained by a public records request shows MDEQ staff were instructed to initiate the public comment period by January 15. The EPA submitted additional Permit comments on January 6, yet there does not appear to be any further public records available regarding those comments. If those final comments were incorporated into the Permit materials, documentation of that process should be available to the public. If not, the Permit was publicly noticed while key issues remained under review. Either way, the timeline suggests the process was shaped by internal deadlines rather than by transparency or completeness.

The draft Permit defines an "ambient air boundary" based on physical barriers around the current Site. However, according to DeSoto County land records, MZX Tech has purchased multiple additional parcels, including parcels adjacent to the Site, that are not effectively excluded from public access. Under EPA's regulatory definition, ambient air extends to areas where the public can access the outdoor air, and impacts in those areas must be included in air quality modeling. Because the Permit relies on a boundary that does not correspond to true ambient air, the emissions impacts to the surrounding community could be underestimated.

MDEQ must clarify the actual ambient air boundary, include all owned or controlled land in modeling, and reevaluate impacts accordingly.

The Permit Board must disapprove the draft Permit and instruct MDEQ to:

- Order MZX Tech to cease operating the 27 unpermitted turbines until it obtains a permit for them;
- Withdraw the draft Permit; and
- Revise the draft Permit before seeking public comment.

Even for the 41 turbines it proposes to authorize, the draft Permit fails to accurately characterize air pollution and require adequate protections. Among other things, the draft Permit downplays the ongoing violation of the minimum federal ozone standard in the Memphis metro area, which includes DeSoto County, and fails to require strict pollution controls and offsets for MZX Tech's NOx pollution required by Mississippi law. The draft Permit also underestimates the amount of harmful particulate matter and formaldehyde emissions from the turbines. For all of these reasons, the draft Permit fails to meet applicable requirements and **the Permit Board must disapprove the Permit**.

It is imperative that the Permit Board disapprove the Permit because both MDEQ and the community must understand the full impact of the MZX Tech Site operations on air quality and address that impact as required by the Clean Air Act and Mississippi law. The area immediately around the MZX Tech power plant includes several residential neighborhoods, including Colonial Hills, Kingston Estates, Rasco Farms, and others along the Southaven/Horn Lake border. The power plant is within half of a mile from homes and just a mile from an elementary school. These communities have already been experiencing impacts of the 27 unpermitted turbines MZX Tech has installed at 2875 Stanton Road without a Permit, including increased noise, light, and air pollution.

But the air pollution from both the 27 unpermitted turbines and the proposed 41 turbines will extend far beyond the immediately adjacent neighborhoods. Southaven and Memphis share the air—and that air is already not meeting minimum federal smog standards. The greater Memphis-Clarksdale-Forrest City metro area, which includes Memphis and Southaven, also received an "F" for high ozone days for the most recent reporting period.[1]

While DeSoto County is currently classified as an ozone attainment area, MDEQ's own monitoring data presented at the A&WMA Southern Section Conference shows that DeSoto's 2024 design value is **71 ppb**, exceeding the 70 ppb federal ozone standard. This means that DeSoto is functionally in violation, even if formal nonattainment designations have not yet been made. Under the Clean Air Act, MDEQ must not treat an area trending into violation as if it were safely in attainment — especially when Permitting major new NOx sources that will make the problem worse.

[1] Memphis-Clarksdale-Forrest City, TN-MS-AR, Am. Lung Ass'n (2025), Memphis-Clarksdale-Forrest City, TN-MS-AR | American Lung Association.

In addition to ozone exceedances, the data used in the Permit's air modeling is misleading about current air quality conditions. The background pollution data for PM2.5 came from the Shelby Farms monitor in Tennessee, even though the Hernando monitor in DeSoto County is closer to the Site and more representative of local conditions. Instead of using this more accurate local data, the PM2.5 data relied on a cleaner monitor across state lines, misleading the public about the real pollution burden already faced by DeSoto County residents. At the 2025 A&WMA Southern Section Conference, MDEQ noted that the Hernando monitor recorded a PM2.5 annual average of **9.1 µg/m³**, which is above the EPA's annual standard of 9.0. That number was only brought below the limit after 13 exceptional events were excluded from the data.

At the same conference, MDEQ specifically identified **Desoto County as an area where it is "evaluating additional measures towards achieving attainment"** in reference to ozone and that the Memphis Metropolitan Area is an "area of priority." That means MDEQ is aware Desoto County has not been meeting the federal air quality standards and has been actively looking for ways to bring pollution levels back down. If MDEQ truly believes that additional measures are needed to *reduce* pollution in Desoto County, then Permitting a major new source of PM2.5 and NOx is inconsistent with MDEQ's own statements and puts the surrounding communities at even greater risk.

Smog makes asthma and other respiratory illnesses worse.[2] Pollutants like smog are especially dangerous for children, who are more likely to develop respiratory illnesses like asthma.[3] Pregnant women and unborn children are also at risk from fossil fuel pollution.[4] According to the Asthma and Allergy Foundation, the Memphis Metro Area, including Memphis and Southaven, has among the highest rates in the U.S. of emergency room visits and deaths due to asthma.[5]

The 41-turbine MZX Tech power plant alone is estimated to cause millions of dollars of health damages each year nationally, with the greatest effects centered in Shelby and DeSoto counties. The damages include, among other things, missed days of school and work due to respiratory illnesses.[6] This estimate likely understates the near-term health damages, since it does not take into account the 27 turbines already installed at the Site.

Across Mississippi, we understand that if MDEQ does nothing to protect some residents from living in literal toxicity, then we cannot count on MDEQ to protect any of us. The Permit Board must disapprove this draft Permit and recognize that no revised version of this project can be reconciled with the region's legal, environmental, or public health obligations under the Clean

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[2] Katherine Burgess, *SELC petitions EPA to say Memphis area in violation of ozone standards*, MLK50 JUSTICE THROUGH JOURNALISM (June 6, 2025), https://mlk50.com/2025/06/06/selc-petitions-epa-to-say-memphis-area-in-violation-of-ozone-standards/.

[3] EPA, Health Effects of Ozone Pollution (last visited February 7, 2026), Health Effects of Ozone Pollution | US EPA.

[4] Exposure to Air Pollution During Pregnancy Linked to Neurodevelopmental Issues | Columbia University Mailman School of Public Health; Ambient air pollution in critical windows of exposure and spontaneous miscarriage in a preconception cohort - ScienceDirect.

[5] 2025 Asthma Capitals: The Most Challenging Places to Live with Asthma, Asthma and Allergy Found. of Am. (2025), AAFA 2025 Asthma Capitals Report September 2025 (ranked 3rd for emergency room visits; 5th for deaths).

[6] Report TK.

Air Act. MDEQ itself "implored" MZX Tech to install pollution controls because of air quality concerns in DeSoto County. Now I am imploring you:

Follow the law. Protect the people. Disapprove the Permit.

Sincerely,



David Wood

608 Mitchell Cove

Brandon, MS 39047

601-421-9584

From: Deloris McGee
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "xAI Data Center"
Date: Thursday, February 12, 2026 8:30:29 AM

From: Deloris McGee <deemgee09@gmail.com>
Subject: xAI Data Center

Message Body:
How can a company put sites without permits? Normally you cannot do a lot of things without a permit. Whoever allowed this should be fired. Because you are pushing something in a community that is a danger to everyone's health. It shows that the people in that community you think of as less than until it is time to collect money for taxes, water, gas and electricity. It must be a minority community. You are not going by the law. There should have been a hearing before this center was placed in the community. How much will their taxes or electricity go up once this center is placed in their community? Will the community have to fund this center? Will they see strange taxes on their water and electricity bills? You know the ones that businesses pass on to the consumers and they have no clue as to what it is. They just pay it.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Demetri R Carter <mdeqweb@mdeq.ms.gov>
Sent: Monday, February 16, 2026 5:44 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Xai"

From: Demetri R Carter <mrsmeme1343@aol.com>
Subject: Xai

Message Body:
The noise already is unbearable. Trying to sleep at night has caused me so much stress and anxiety. I moved here 21 years ago because of the safety. Now it's not going to be that way with gas being emitting that I won't be able to physically see. I bet there are no turbines anywhere near Elon Musk home. Nor does Mayor Musselwhite have any noise distractions. It's not fair that we pay taxes and not receive the peace that DeSoto county claims to provide us in the laws that are on the books. There's enough open land in Mississippi that this will not affect any people. Y'all have failed us for a dollar. We trusted and voted for you now you've let us down. God have mercy on your souls.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From: Dobos Merse
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "AI powerplants"
Date: Monday, January 19, 2026 9:39:32 AM

From: Dobos Merse <dobosmerse@gmail.com>
Subject: AI powerplants

Message Body:
AI powerplants are poisoning people. How dare you let this happen? Remove these powerplants immediately.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From: Dr. K. Owens-Pearson
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "XAi no more!!!!!"
Date: Tuesday, February 17, 2026 4:59:18 PM

From: Dr. K. Owens-Pearson <kimberlyowenspearson@gmail.com>
Subject: XAi no more!!!!!

Message Body:
We share the air! The air does not care…we all SUFFER from these methane gas turbines…there is no stopping point.

There are other alternatives than to poison our people and our communities…if you don't think so put it in YOUR NEIGHBORHOOD!!

STOP KILLING PEOPLE FOR COMPUTERS! STOP COSTING US MORE MONEY FOR ASTHMA MEDICATIONS, RESPIRATORY INFECTIONS, DOCTORS APPOINTMENTS, ELECTRIC BILLS, WATER BILLS… just STOP

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From: Dreux Delcuze
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "XAI Southaven Facility"
Date: Monday, January 19, 2026 8:50:02 AM

From: Dreux Delcuze <dreuxdelcuze@gmail.com>
Subject: XAI Southaven Facility

Message Body:
Im writing to express my strong opposition to the xAI datacenter in Southaven. It is evident and clear that this facility will do significant damage which we can not afford or accept to our state's wonderful natural beauty and to the health of our citizens. Southaven is a beautiful town that will be plagued and ruined by this.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From: E Winters
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Public Comment Southaven xAI"
Date: Tuesday, February 10, 2026 12:06:37 PM

From: E Winters <enwinters24@gmail.com>
Subject: Public Comment Southaven xAI

Message Body:
I'd like to begin with a short anecdote, but I will conclude with a concise list of the issues. My sister is a nurse in Memphis where she serves the community most affected by xAI plant. Her patients are already showing adverse health effects related to the plant- namely asthma, but she's concerned that worse conditions are coming. Do we need more sick people in our area who are already struggling with medical bills/insurance? Would you have them take on the medical bills alongside the known increase in utility bills?

The problems with the Southaven plant
• Noise: Months of relentless, high-pitched whining and roaring has disrupted daily life.
• Air Pollution: Turbines are pumping out massive amounts of hazardous air pollution. These pollutants are linked to long term health issues like asthma, heart attacks, stroke, and cancer.
• No Permits: Our state and local officials allowed the plant to begin operations before any air permit, public notice, environmental review, or public comments. xAl was granted a one year exemption from an air permit.
• Drinking Water Threat: The facility is tapping into the Memphis Aquifer, our region's main drinking water supply. Data centers use millions of gallons daily for cooling. Wastewater can contain toxic chemicals and "forever chemicals" (PFAS), and hot water dumped back into the environment puts local streams and wildlife at risk. There is NO graywater recycling plant for Southaven's xAl data center.
• Unfair Tax Breaks: xAl pays only about one-third of normal property taxes, and is exempt from state sales, income, and franchise taxes for at least 10 years, with the possibility of extension. Ordinary families and local small businesses pay full price.
• Residents Kept in the Dark: This project was started behind our backs, with zero community input. Local officials have repeatedly downplayed concerns, spun the facts, and misled residents about the true impacts and the deals made with xAI.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	Eli Shin-Pérez
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "Xai Powerplant Pollution"
Date:	Sunday, January 18, 2026 10:48:30 PM

From: Eli Shin-Pérez <eli.shin.perez@gmail.com>
Subject: Xai Powerplant Pollution

Message Body:
The Xai powerplant at 2875 Stanton Rd Southaven, MS has been running 18 unregulated generators since August 2025, and will soon be running 41 permanent turbines. These turbines create toxic pollution that is known to cause cancer, heart attacks, strokes and sudden infant death. This is of great concern because the Xai powerplant is surrounded by residential areas is Southaven, Horn Lake, and Whitehaven, and the toxic pollution generated by these turbines can affect folks within a proximity of 5 miles, which means that thousands of unsuspecting families are already at risk.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Elizabeth Alley <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 10:24 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "No More Permits for xAI"

From: Elizabeth Alley <alleyelizabethw@gmail.com>
Subject: No More Permits for xAI

Message Body:
xAI is already operating 27 illegal methane gas turbines, they should not given any permits; they should be investigated, fined, and shut down.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Elizabeth <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 6:09 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "xAI permits"

From: Elizabeth <libbyspence@gmail.com>
Subject: xAI permits

Message Body:
I would like to express my grave concern about xAI. Specifically, I am against granting xAI more permits to pollute our air and gush water out of our aquifer. The health and resource costs for our community are far too great.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Emma grace <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, January 20, 2026 2:21 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "XAI"

From: Emma grace <emmie356@yahoo.com>
Subject: XAI

Message Body:
Take it somewhere else. Get out of memphis ams misisppi area. If you don't think the neighboring communities won't protest or complain youre dead wrong. We dont want AI here its unnecessary polution, itd taking away jobs and as someone unemployed and as bad as memphis already is. Are you seriously trying to make memphis a nothing area? Stop the ai shit and move on somewhere else like Arizona or whatever. Theres too many people living here and its gonna cause horrible air qualilty

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Erica Ploucha <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 12:16 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "xAI and turbine permit"

From: Erica Ploucha <plouchaerica@gmail.com>
Subject: xAI and turbine permit

Message Body:
Mr. Bland,
Please deny xAI's turbine permit. The data centers pollute our air, waste our fresh water, and open the door to job loss. These facilities should be shut down.
Other communities directly impacted by data centers talk of the smell and health issues they develop from the pollutants the turbines emit. The centers require so much energy, they tax our grid, and need constant help from these turbines. There is very little drinkable fresh water on our planet and it's being wasted to cool these super computers. xAI is entirely unnecessary, unreliable technology. It's tech that doesn't create jobs or positively impact our economy. A ruined economy and a ruined environment is not the future I want to leave my children.
Sincerely,
Erica Ploucha

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From: Erin Orey
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Concerns about proposed data"
Date: Monday, February 9, 2026 6:06:39 PM

From: Erin Orey <ErinRShirley@gmail.com>
Subject: Concerns about proposed data

Message Body:
I'm sharing my concerns about the proposed xAI data center. The Colossus data centers in Memphis have triggered massive environmental, health, and regulatory concerns. The methane gas turbines emit nitrogen oxides and they also generate significant noise. These pollutants cause long term health issues such as asthma, cardiovascular diseases and cancer. They are violating the federal Clean Air Act. Additionally, data centers require enormous amounts of energy and water where residents are paying an increase in utility bills and not benefitting from the data centers. As a public health professional, it's extremely disappointing to see data centers causing massive harm to the health of communities that will last for generations and straining our natural resources. I urge MDEQ to deny permits for methane gas turbines, even if they are temporary.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Fallon Decker <mdeqweb@mdeq.ms.gov>
Sent: Monday, February 16, 2026 10:57 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Aix"

From: Fallon Decker <fallonmariedecker@yahoo.com>
Subject: Aix

Message Body:
Our lives are worth more than a billionaire’s profits!

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Felicia Miller <mdeqweb@mdeq.ms.gov>
Sent: Monday, February 16, 2026 9:39 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "XAI Permit in Southaven"

From: Felicia Miller <feliciaa1971@icloud.com>
Subject: XAI Permit in Southaven

Message Body:
I'm a relatively new homeowner in this area and have lived in my home for just over a year. I truly love my home and this community, which is why the possibility of XAI operating gas turbines so close by is very concerning and stressful for me.

I suffer from chronic asthma and already deal with breathing issues due to the unpredictable weather we experience. I'm deeply worried about the long-term impact these turbines could have on the air we breathe and our overall quality of life.

Our community, especially the families and children who live here, should not have to face those risks so close to our homes. I respectfully ask that you decline their permit.

Thanks

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Foster Ashton <mdeqweb@mdeq.ms.gov>
Sent: Monday, February 16, 2026 2:27 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "XAi southaven that is near me I live in rosco farms very close..."

From: Foster Ashton <ashtonpassages@gmail.com>
Subject: XAi southaven that is near me I live in rosco farms very close...

Message Body:
Dear Jeffrey
Please confirm who or whom made the first dicision in regards to the location of the XAi turbines, seem very close to my home and the few they run now are quite loud.

Will there be any discussion of XAi offering any type of relocation ie buy my or others home and relocate. If this is something u can't answer I understand.
Is the metering tomorrow canceled or rescedualded?
Any input on non temporary permits vs fed epa required permits would be appreciated. Many are concerned why the state permit laws contraduct the federal epa permit laws.
Thank you
Foster Ashton
Rosco Farms resident
Southaven Ms

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Fred Van Cleave <frederick.vancleave@gmail.com>
Sent: Monday, February 16, 2026 11:18 PM
To: Jeffrey Bland
Subject: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

This Message Is From an External Sender
This message came from outside your organization.

Dear Mr. Bland:

I live .9 miles away from the site and I strongly oppose the draft construction Permit for MZX Tech's gas-fired power plant at 2875 Stanton Road. This Permit would allow xAI to build and run 41 permanent gas turbines, creating a large-scale industrial power plant in a residential area, directly impacting surrounding communities including Southaven, Horn Lake, and Memphis residents.

These communities are being asked to bear the health risks of MZX Tech's massive power plant. Communities deserve—and MDEQ is required to provide—complete and accurate information about the Site's operations and air emissions. Because the draft Permit fails to provide complete and accurate information, **I demand that the MDEQ Permit Board disapprove the Permit**.

The draft Permit fails to disclose that MZX Tech has *already* installed 27 so-called "temporary" turbines at the Site without any Permit at all and in disregard of federal requirements. The EPA recently confirmed the long-standing requirement that "temporary" turbines need construction Permits under the federal Clean Air Act. Many of the MZX Tech turbines have been operating for six months with no Permit. Yet the draft Permit makes no attempt to account for the 27 unpermitted turbines, neither including them in the emissions estimates for the Site nor requiring the best available pollution technology for them. The failure of the draft Permit to include at least 27 emissions units on the Site renders it deficient and makes it impossible for the community to understand the full scale of the Site's impact on air quality and public health.

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It is imperative that the Permit Board disapprove the Permit because both MDEQ and the community must understand the full impact of the MZX Tech Site operations on air quality and address that impact as required by the Clean Air Act and Mississippi law. The area immediately around the MZX Tech power plant includes several residential neighborhoods, including Colonial Hills, Kingston Estates, Rasco Farms, and others along the Southaven/Horn Lake border. The power plant is within half of a mile from homes and just a mile from an elementary school. These communities have already been experiencing impacts of the 27 unpermitted turbines MZX Tech has installed at 2875 Stanton Road without a Permit, including increased noise, light, and air pollution.

But the air pollution from both the 27 unpermitted turbines and the proposed 41 turbines will extend far beyond the immediately adjacent neighborhoods. Southaven and Memphis share the air—and that air is already not meeting minimum federal smog standards. The greater Memphis-Clarksdale-Forrest City metro area, which includes Memphis and Southaven, also received an "F" for high ozone days for the most recent reporting period.

While DeSoto County is currently classified as an ozone attainment area, MDEQ's own monitoring data presented at the A&WMA Southern Section Conference shows that DeSoto's 2024 design value is **71 ppb**, exceeding the 70 ppb federal ozone standard. This means that DeSoto is functionally in violation, even if formal nonattainment designations have not yet been made. Under the Clean Air Act, MDEQ must not treat an area trending into violation as if it were safely in attainment — especially when Permitting major new NOx sources that will make the problem worse.

In addition to ozone exceedances, the data used in the Permit's air modeling is misleading about current air quality conditions. The background pollution data for PM2.5 came from the Shelby Farms monitor in Tennessee, even though the Hernando monitor in DeSoto County is closer to the Site and more representative of local conditions. Instead of using this more accurate local data, the PM2.5 data relied on a cleaner monitor across state lines, misleading the public about the real pollution burden already faced by DeSoto County residents.
At the 2025 A&WMA Southern Section Conference, MDEQ noted that the Hernando monitor recorded a PM2.5 annual average of **9.1 µg/m³**, which is above the EPA's annual standard of 9.0. That number was only brought below the limit after 13 exceptional events were excluded from the data.

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a major new source of PM2.5 and NOx is inconsistent with MDEQ's own statements and puts the surrounding communities at even greater risk.

Smog makes asthma and other respiratory illnesses worse. Pollutants like smog are especially dangerous for children, who are more likely to develop respiratory illnesses like asthma. Pregnant women and unborn children are also at risk from fossil fuel pollution. According to the Asthma and Allergy Foundation, the Memphis Metro Area, including Memphis and Southaven, has among the highest rates in the U.S. of emergency room visits and deaths due to asthma.

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The Permit Board must disapprove this draft Permit and recognize that no revised version of this project can be reconciled with the region's legal, environmental, or public health obligations under the Clean Air Act. MDEQ itself "implored" MZX Tech to install pollution controls because of air quality concerns in DeSoto County. Now I am imploring you:

Follow the law. Protect the people. Disapprove the Permit.

Sincerely,

Frederick T. Van Cleave

Jeffrey Bland

From: George A Brewer <mdeqweb@mdeq.ms.gov>
Sent: Monday, February 16, 2026 11:40 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "X AI turbine generator plant in Southaven MS"

From: George A Brewer <gabrewer8581@yahoo.com>
Subject: X AI turbine generator plant in Southaven MS

Message Body:
This should not be allowed at all ! They are at present operating or testing turbines on site Now ! There is a constant noise being emmitted from those turbines now ! I live 1/4 to 1/2 of a mile away and the noise is obstructive and persistent at that distance ! I could not imagine haveing 41 or even 20 of them operating at the same time ! It Will kill property values on Hundreds of homes in the heavily housed area ! Not just in Southaven but also homes in Horn Lake Ms just a quarter mile south ! There is an elementary school directly behind my house that Will be effected ! I have lived here for 38 years and it has been peaceful !

The citicens of Southaven and Desoto county will see almost zero benefit from this plant financially and extreme loss in property values ! The power generated from this plant will go immediately across the stateline into Memphis to power their AI servers and serve absolutely No benefit to the citizens of MS ! Memphis and TN will get the benefits and we will get the pollution and noise ! The gas line they are tapping into runs diagonally across the county and could be tapped anywhere along it's route ! I would suggest the delta area south of Walls MS would be a better site ! It is open agricultural delta with few houses or businesses nearby to disturb !

They obviously must have believed that the plant approval was a forgone conclusion because the have been constructing the plant for six or more months Before appling for a license ! Did they believe that MS zoning was much more lax and desperate for any kind of facility ? Do multi billion dollar corporations get priviliged treatment at our expense ? Memphis and TN gets the positives and we get all the negatives !

In closing I see the residents of Southaven and Desoto county of getting all the pollution from burnt gas and noise pollution from dozens of turbines but No benefits from this AI monstrosity ! It is absolutely wrong to destroy a relatively quite peaceful neighborhood !

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Gloria Jean Gallagher McGraw <mdeqweb@mdeq.ms.gov>
Sent: Saturday, February 14, 2026 7:44 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "No more turbines in Southaven."

From: Gloria Jean Gallagher McGraw <gloriajmcgraw@gmail.com>
Subject: No more turbines in Southaven.

Message Body:
No more turbines in Southaven.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Griffen <mdeqweb@mdeq.ms.gov>
Sent: Monday, February 16, 2026 10:09 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "XAi"

From: Griffen <griffenjod@gmail.com>
Subject: XAi

Message Body:
Please reject the XAi permit for the 41 turbines. Please don’t poison our community.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Haley Snyder <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 7:12 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "No turbines in Southaven"

From: Haley Snyder <haleybsnyder@yahoo.com>
Subject: No turbines in Southaven

Message Body:
I've lived in Southaven for most of my life. I went to Southaven schools K-12, and my three children attend DeSoto Central schools, and I volunteer as PTO president at DCPS. We do not want XAI in our city. We do not want the illegal turbines running, and we certainly do not want additional turbines. You cannot put a price on the air we breathe and our precious water, and yet our leaders are selling their souls to Elon Musk (well-known unethical billionaire) without the consent of the citizens. The noise pollution is unlivable for those who live near the facility, and it will only get worse. Say no to XAI and shut the turbines DOWN!

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Harley Thom <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 9:57 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "NO MORE AIR POLLUTION! NO TURBINES"

From: Harley Thom <thenakedchefsupreme@gmail.com>
Subject: NO MORE AIR POLLUTION! NO TURBINES

Message Body:
I am submitting my comment to agree with my community member. We do NOT want the turbines- the xAI machines and we don't want out water supply stolen. The tri-state area on MS, TN, and AR all share the same air. It is the duty of out elected officials to step in and step up to stop these action or at least actually TRY to minimize the damage that's clearly happening. We are ALL challenging the elected and the elites to think about something more than money and themselves. Please reconsider allowing these hurtful acts to take place

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	Herschell Pargo
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "Mississippi Environmental Quality"
Date:	Monday, February 9, 2026 5:17:24 PM

From: Herschell Pargo <pargoherschell@gmail.com>
Subject: Mississippi Environmental Quality

Message Body:
The decisions “you make today will be having an impact on the public health for many years to come, due to the long life span for data center projects,” s

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Hildi Hoopes <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 11:59 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "mzxtechpsd permit"

From: Hildi Hoopes <hildihoopes@gmail.com>
Subject: mzxtechpsd permit

Message Body:
Songbird reproductive stress. Urge disapproval of permit.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Holly McCammon <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 5:41 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Re: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC"

From: Holly McCammon <hollylynea19@gmail.com>
Subject: Re: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Message Body:
Dear Mr. Bland:
I strongly oppose the draft construction Permit for MZX Tech's gas-fired power plant at 2875 Stanton Road.
1) MZX Tech is violating the Clean Air act by operating turbines with no permit.

2) There are already up to 27 turbines illegally installed & operating on site, which are NOT mentioned at all in the permit.

3. An additional 41 permanent turbines would significantly increase air pollution levels here and impact our air quality.

Additionally, I'd like to note that I understand you have likely been flooded with tons of data, studies, and so much more but what we the people are asking is simply that our voices are considered. That the health risks are a matter of when, not if. Desoto county already has poor air quality as data can suggest. This is causing unnecessary noise to residents. Please, I do ask the Permit Board to disapprove this draft Permit and recognize that no revised version of this project can be reconciled with the region's legal, environmental, or public health obligations under the Clean Air Act. MDEQ itself "implored" MZX Tech to install pollution controls because of air quality concerns in DeSoto County.

Thank you,
Holly McCammon, LPN

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: izzy vernon <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 8:16 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "xAI Wind Turbine Comment"

From: izzy vernon <izzyvernon72@gmail.com>
Subject: xAI Wind Turbine Comment

Message Body:
I am in strong opposition to the xAI wind turbines being built. I am a resident who has asthma and the air quality will likely be negatively affected by this. xAI is a company who does not care about how they affect our relatively small community and they already have nearly 40 turbines already, they don't need these. Lastly, these turbines will end up lining the pockets of Elon Musk, a man mentioned in the Epstein Files who made multiple attempts to go to the island. We do not want this.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From: J M
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "xAI turbines"
Date: Tuesday, January 20, 2026 12:45:06 AM

From: J M <a@a.com>
Subject: xAI turbines

Message Body:
I am concerned that the xAI turbines are operating so close to residential areas. Health impacts from PM2.5 and NOx emissions are most pronounced for children and older adults, particularly when exposure occurs close to residential neighborhoods. These turbines need to be further way from people's homes. If you expand this site you will increase the danger to nearby residents including children.

Children and seniors face increased health risks from air pollution when facilities are located near residential areas. There are neighborhoods less than a mile away from the xAI site. There are thousands of homes within 5 miles of this site. This site needs to be moved further away from existing residential areas. Expanding this site is going to increase the harm that's already being done without these people's consent.

The xAi turbines are already operating too close to thousands of homes. Children, elderly residents, and those living closest to the facility should be explicitly considered in this environmental review. These turbines are known by the EPA to release hazardous air particles such benzene, toluene, and formaldehyde. If you expand this site you increase the risk of these people getting cancer.

Proximity matters for air pollution exposure, and children and elderly residents that live within a few miles of these turbines face elevated respiratory and cardiovascular risk. Now you're going to add more turbines and increase that risk? You need to move these turbines away from families.

Expanding these turbines near neighborhoods warrants careful review due to increased health risks for children and older adults living in close proximity. What studies were done to protect the health of nearby residents? These turbines have known health risks. Move these turbines away from peoples homes.

I am concerned that approving expansion without baseline air-quality data limits the ability to assess future environmental and health impacts.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: James Adams <mdeqweb@mdeq.ms.gov>
Sent: Monday, February 16, 2026 5:31 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Xai turbines"

From: James Adams <adamshog@comcast.net>
Subject: Xai turbines

Message Body:
The XAI turbines are way to close to colonial hills neighborhood. This is a very old neighborhood and has a lot of elderly people living here for over 50 years. Most already are using oxygen tanks to breathe for health issues. Some of us have hearing problems the noise 24/7 doesn't help. Please don't allow XAI ruin this neighborhood more than they already have.We have been here for over 50 years

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Jamiah Thomas <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 10:42 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Shut Down the Unpermitted xAI Power Plant in Southaven"

From: Jamiah Thomas <jamiahthomas248@gmail.com>
Subject: Shut Down the Unpermitted xAI Power Plant in Southaven

Message Body:
I am for innovation and advancements of Desoto County specifically Southaven! It does not mean that carelessness of quality testing and safety should be on the backburner simply to seize the moment! Our health matters! YOU, MEDQ are our last line of defense, I want you to think more about the depth of your decision ethically. Desoto County is already at an F rating for air, if you allow this permit you will make matters worse. I want you to take the direction towards ethics and not financial gain. Please consider your fellow Mississippians. Thank you.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	Jan Hillegas
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "Deny a permit to xAI !"
Date:	Monday, February 9, 2026 4:19:04 PM

From: Jan Hillegas <newmsian@hotmail.com>
Subject: Deny a permit to xAI !

Message Body:
xAI announced it has begun operating its second South Memphis data center and is once again operating unpermitted “temporary” methane gas turbines to power the facility. The company’s use of turbines without a permit is a clear violation of the federal Clean Air Act.

The data center, called Colossus 2, was built in the Whitehaven neighborhood of South Memphis and requires tremendous amounts of electricity. To meet those power needs, xAI installed methane gas turbines at a site roughly a mile away in Southaven, MS, without getting any permits first. The site is less than a mile from homes, churches, and an elementary school.

The turbines at the Mississippi site are similar to the ones used at xAI’s first data center in the Boxtown neighborhood of South Memphis. Methane gas turbines release smog-forming pollution and harmful chemicals like formaldehyde. The pollutants are tied to asthma, respiratory illnesses, heart problems, and even certain types of cancer.

I urge the Mississippi Department of Environmental Quality to reject the proposed permit to allow xAI to operate more than 40 permanent turbines in this community. The community is concerned about what a permit would mean for their futures if xAI continues operating without proper oversight.

The American Lung Association has given the Memphis area, including Southaven, MS, an “F” for smog pollution.

MDEQ must protect the residents of Mississippi and consider the continued harm to the residents in Memphis for their air quality.

At least, I urge MDEQ to choose not to move forward with a permit until more information is gathered from xAI and its actions to date and commitments for the future are carefully compared to best practices and the needs of our communities for clean air and water.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Jasmine Bernard <mdeqweb@mdeq.ms.gov>
Sent: Monday, February 16, 2026 5:14 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "No. 0680-00119: Deny the Permit"

From: Jasmine Bernard <jasminebernard1@gmail.com>
Subject: No. 0680-00119: Deny the Permit

Message Body:
I ask that you deny the air permit of xAI and protect the citizens of South Haven by not allowing the installation of the 41 turbines.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Jasmine Blue <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 10:34 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Please Stop XAI"

From: Jasmine Blue <jasminecblue20@gmail.com>
Subject: Please Stop XAI

Message Body:
XAI is polluting and hurting South Memphis. Please do right by the community and regulate and stop what's happening!

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: JH1 <jh1photo@gmail.com>
Sent: Monday, February 16, 2026 11:25 PM
To: Jeffrey Bland
Subject: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

This Message Is From an External Sender
This message came from outside your organization.

Mr. Bland,

I have lived in Southaven, MS for 20 years in the Colonial Hills subdivision. My house is only 1/2 mile (roughly 3,000 feet) from the xAI power plant on Stanton Rd. Starting in August 2025 the noise coming from the Stanton Rd site has had a negative impact on my life, and has disrupted my peace and quality of life. The noise is a combination of a high pitch noise and a low tone noise. The low tone noise is heard inside my home. This has caused a loss of sleep, headaches, and my ears ring while laying in bed on the nights the noise is very loud. There is no escape from the noise, and it's torture to be outside. I've had reports of people that live up to 3 miles away hearing the noise. Some enjoyed sitting outside on their front porch or back deck and no longer are able to do that. I started voicing my concerns and problems this was causing in September and was told "it'll be better next week" Yet it continues day and night. They have now added a sound wall, which made no difference in the noise levels. The fact that none of the noise mitigation was in place before allowing this project to start shows there is no concern for nearby residents. Only after months of questioning and speaking out about the noise was any attempt made to lower the noise levels. It is still an ongoing issue, and I feel this was an afterthought instead of the plan. I've asked many times for this project to be paused until the noise mitigation attempts were in place. There has been no pausing of the 24/7 turbine use or around the clock construction. To me it seems like they already expect that the 41 permanent turbines will be approved and that's why they continue

to build and buy more land in that area. No one is aware of their full intentions for expansion.

People own property and live on the same street as the xAI power plant. To think this was not going to be a problem shows a failure in the due diligence process and a lack of concern for people. The wooded area is going away, and replaced by a massive scale operation, not only do I always hear it, I can see it from my backyard. What once was the sounds of nature, is now the sounds of turbines. What they are planning for will not only cause the noise to never stop, but will also continue to add pollution to the air in an area that is already failing in air quality.

There has been no actual study on the air with these temporary turbines, and there is no plan to do so. The data provided by xAI consultants should not treated as facts without air monitoring in place. MDEQ should provide accurate information with air monitoring at the site. MZX Tech said that the noise would have no adverse effects, and that was clearly not the truth. So it's difficult to believe the air pollution will not have negative impacts as well.

The EPA recently ruled that these turbines would require a permit, closing the loophole used by MZX Tech to call these "mobile" by putting them on a trailer. However they are still operating without permit.

There was no community input or notice for this. Desoto County already has an air quality problem, and allowing them to run 41 turbines will add to it. This power plant is of no benefit to the people of Desoto County. It is only used to provide power across the state line into Memphis, TN for xAI's data center, and will also send power to the future data center in Southaven, MS on State Line rd. This is going to cause many health

problems for the residents of Desoto County and this permit should not be approved. The currently running 27 gas fired turbines should be halted until proper studies and all noise mitigation efforts are complete. People's health and peace should be put first. Hard working people that just want to enjoy their space and be proud of where they live. That should be what's most important.

So I oppose the permit to allow MZX to have 41 gas fired turbines at 2875 Stanton rd. I also oppose the current running turbines to continue operating.

Thanks,
Jason Haley

Jeffrey Bland

From: Jaysonne Montoya <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 5:16 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "MZX Tech (XAI)"

From: Jaysonne Montoya <jaguarjjm@proton.me>
Subject: MZX Tech (XAI)

Message Body:
Dear Mr. Bland:

I strongly oppose the draft construction permit for MZX Tech's gas-fired power plant at 2875 Stanton Road. This permit would allow xAI to build and run 41 permanent gas turbines, creating a large-scale industrial power plant in a residential area, directly impacting surrounding communities including Southaven, Horn Lake, and Memphis residents. 27 turbines are already in operation without permit.

These communities are being asked to bear the health risks of XAI's massive power plant. Communities deserve, and MDEQ is required to provide, complete and accurate information about the Site's operations and air emissions. Because the draft Permit fails to provide complete and accurate information, I demand that the MDEQ Permit Board reject the draft permit at this time and require MZX Tech to revise the draft permit with complete and accurate information before seeking public comment again.

Sincerely,
Jaysonne Montoya

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Jessica <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 10:47 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Concerned"

From: Jessica <jsscdouglas9@gmail.com>
Subject: Concerned

Message Body:
I am concerned for the communities who will be negatively impacted by the pollution this will cause. Please consider the people.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Jessica McMinn-Cotton <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 9:07 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Re: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC"

From: Jessica McMinn-Cotton <jmcminn13@gmail.com>
Subject: Re: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Message Body:
Dear Mr. Bland:
I strongly oppose the draft construction Permit for MZX Tech's gas-fired power plant at 2875 Stanton Road. This Permit would allow xAI to build and run 41 permanent gas turbines, creating a large-scale industrial power plant in a residential area, directly impacting surrounding communities including Southaven, Horn Lake, and Memphis residents.
These communities are being asked to bear the health risks of MZX Tech's massive power plant. Communities deserve—and MDEQ is required to provide—complete and accurate information about the Site's operations and air emissions. Because the draft Permit fails to provide complete and accurate information, I demand that the MDEQ Permit Board disapprove the Permit. MZX purposefully and willfully omitted information and therefore has shown a disregard for public transparency and community trust. That isn't who we need operating on such a massive scale in our backyard.

It isn't just the people I'm concerned about. I am a resident of Horn Lake and live on Rollin Oaks Drive, which is on the very edge of the city and within 3.5 miles of the site. One of the main reasons I picked the location of my home is the native wildlife in the area, which I fear will be impacted by both environmental and noise pollution. Also, my land is currently zoned as agricultural/residential. I have neighbors with chickens, horses, donkeys, emus, goats, etc. and I worry about the effects of this operation on them.

We should also think about protecting our freshwater aquifer. 98,000 gallons for one month of usage is mind blowing and concerning.

The bottom line for me is that the very people who would be the most at risk for ANY health or noise concerns had zero say in the deal for this facility being sold and the construction of the new equipment. I don't believe the perceived risks are worth the supposed jobs this will bring to the area.

Thank you for your time and consideration on this matter.

Sincerely,
Jessica McMinn-Cotton

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

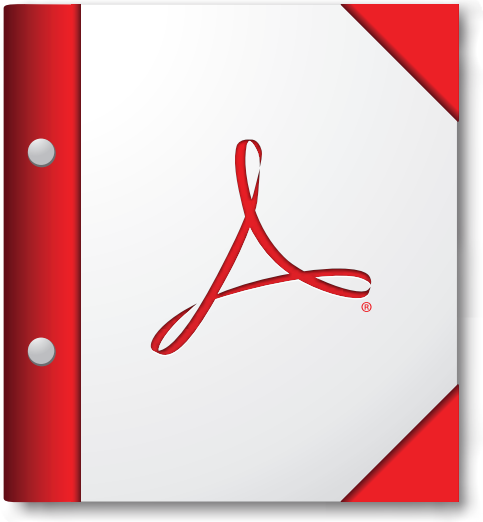
Jeffrey Bland

From: Jessica <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 10:47 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Concerned"

From: Jessica <jsscdouglas9@gmail.com>
Subject: Concerned

Message Body:
I am concerned for the communities who will be negatively impacted by the pollution this will cause. Please consider the people.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)



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Get Adobe Reader Now!

Jeffrey Bland

From: Jodie <mdeqweb@mdeq.ms.gov>
Sent: Saturday, February 14, 2026 8:32 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Turbines"

From: Jodie <jodiejennings@yahoo.com>
Subject: Turbines

Message Body:
Please do not allow more air turbines! I have an asthmatic child and can tell the difference on clean air and poor air quality days. Please do not give me another reason to move to somewhere safer for us.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	Jordan Seiler
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "xAI Facility Concerns, Southaven MS"
Date:	Monday, January 19, 2026 1:34:31 PM

From: Jordan Seiler <jjman291@gmail.com>
Subject: xAI Facility Concerns, Southaven MS

Message Body:
Mr. Bland,

I am writing you today out of concern for individuals and families living in proximity to the Southaven xAI facilities.

This facility currently operates and will operate even more equipment that has been proven to exhaust toxic airborne pollutants. Pollutants that will severely and negatively impact citizens who live in residential areas surrounding the facility.

I am calling for a full review of the health impacts that could be caused by airborne pollutants exhausted by the turbines in use at this facility. Pollutants that include NOx, Benzene, Formaldahyde and others.

This facility needs to be located further away from areas with such residential density. Thousands of homes, thousands of families, are within a 5-mile radius and at risk of having their health impacted or stolen from them by operation of this facility.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	Joshua Bernstein
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "Please deny the proposed permit to run 41 new turbines at xAI's facility in Southaven"
Date:	Tuesday, February 10, 2026 1:40:33 AM

From: Joshua Bernstein <joshuaandrewbernstein@gmail.com>
Subject: Please deny the proposed permit to run 41 new turbines at xAI's facility in Southaven

Message Body:
As a Mississippi resident and father of three young children, I strongly urge you to deny this permit. My only stake in this issue is the health and wellbeing of my family and neighbors.
I oppose this permit for three main reasons:
First, adding 41 turbines will significantly increase carbon emissions, contributing to climate-related health risks and deaths.
Second, the air pollution from these turbines poses serious health threats to Mississippians. Research links this type of pollution to asthma, dementia, Parkinson's disease, and other serious conditions.
Third, this facility will drive up residential energy costs at a time when Mississippi families are already struggling with high utility bills.
For these reasons, I ask you to reject this permit.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	Julia O"Neal
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "XAI in Southaven"
Date:	Monday, February 9, 2026 5:16:47 PM

From: Julia O'Neal <joneal4@gmail.com>
Subject: XAI in Southaven

Message Body:
MDEQ never saw a permit it didn't like, and the "economic benefits" have already been traded, so the fix is in. But this data center business has come to the attention of the people. It's bad news. We end up paying extra for electricity because they use so much. And they devastate the water table. Plus, they are loud. I am not for them.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	Juniper Devoy
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "xAI turbines"
Date:	Monday, January 19, 2026 8:32:13 PM

From: Juniper Devoy <djdevo604@gmail.com>
Subject: xAI turbines

Message Body:
The xAi turbines already operate too close to thousands of homes. These turbines are known by the EPA to release hazardous air particles such benzene, toluene, and formaldehyde. If this site is expanded, the risk of residents getting cancer increases drastically. Proximity matters for air pollution exposure, and children and elderly residents that live within a few miles of these turbines face elevated respiratory and cardiovascular risk. The addition of more turbine will only accelerate these effects. These turbines need to be moved away from residential areas, FAR away. Please do not let Southaven and its surrounding communities become another case study in government neglect and corporate greed.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Justin J. Pearson <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 5:30 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Deny the permit for MDQ"

From: Justin J. Pearson <justinjpearson1@gmail.com>
Subject: Deny the permit for MDQ

Message Body:
Please deny MZX's PSD permit application. This permit is erroneous and has many claims that egregiously fly in the face of the clean air act. The pollution from this facility will have horrible consequences on my constituents in Westwood and Whitehaven, particularly, but also on people across our states. Our communities are already in non-attainment as a relates to ozone level pollution, and this will exacerbate the problem. I joined in with the concerns of the southern environmental law center and Memphis community against pollution alongside other environmental justice, organizations like young, gifted and green and safe and sound coalition in each and everyone of their concerns.

Something that is most apparent to me is that this company has not provided you all adequate information to make the best possible decision for our community. We share the air. The consequences of 41 gas burning turbines is not only going to impact Mississippi, but it will cross state lines and impact people in Tennessee and also in Arkansas. This decision is extremely consequential for our present but also our future.

I would like to raise two particular concerns:

1. You all do not have adequate information to make the best possible decision.

This permit application has completely ignored the 27 gas turbines that are currently operating in South Haven today. By doing so, they are ignoring the impact that their pollution is having on this community today. Their permit does not speaking to this reality and thus you are not able to make an informed decision because of that the lack of true telling by this company. This should concern you as decision-makers. Your own regulations make clear that you cannot issue a permit unless the applicant has complied with all of the relevant applicable rules and regulations. MZX tech has failed to do so.

2. Research from Harvard-trained professors has shown us that the consequences of these polluters operating in our community could lead to death.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Kaden Boundy <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 7:23 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "xAI Gas Turbines"

From: Kaden Boundy <kadenboundy@icloud.com>
Subject: xAI Gas Turbines

Message Body:
As a resident of the Mid-South region, I am writing to express my strongest objection to granting xAI a permit to operate 41 permanent gas turbines, which would pump out 20 TONS of fine particle pollution, poisoning Southaven and the Mid-South.

https://urldefense.com/v3/__https://www.selc.org/press-release/new-study-finds-proposed-xai-gas-plant-could-worsen-regional-air-pollution-cause-millions-of-dollars-in-annual-health-damages/__;!!G3AUQnCt!lqwBD-O7evKYBIQJQLxtT5AFWoTBiyUp09r5k66qg5esSWJVhhFjFO9Bx8o9Tg1_Vym_OkCnHM0aRJqdlwdZqrw$

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Kaitlyn Dunn <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 10:30 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Protect the communities from xAI"

From: Kaitlyn Dunn <kai.mmsma@gmail.com>
Subject: Protect the communities from xAI

Message Body:
Protect the communities from xAI! It has already been proven to pollute the air and water, and is causing major health issues with local residents. They are disregarding regulations and operating at the expense of the local communities. This company is taking advantage of this city, it's residents, and it's water supply. The people of the community should be more important than profit. SHUT DOWN XAI!

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Karissa <livingisateamsport@gmail.com>
Sent: Tuesday, February 17, 2026 12:55 AM
To: Jeffrey Bland
Subject: Public Comment/ Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC
Attachments: Public Comment Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC .pdf

This Message Is From an External Sender
This message came from outside your organization.

Please see attachment for my comment regarding **"Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC".**

Thank you for your attention.

Karissa Bowley

Re: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Dear Mr. Bland:

As a Mississippian, I strongly oppose the draft construction Permit for MZX Tech's gas-fired power plant at 2875 Stanton Road. This Permit would allow xAI to build and run 41 permanent gas turbines, creating a large-scale industrial power plant in a residential area, directly impacting surrounding communities including Southaven, Horn Lake, and Memphis residents. We understand this all across Mississippi.

We understand that these communities are being asked to bear the health risks of MZX Tech's massive power plant. Across Mississippi we understand that if any of us are vulnerable to being left behind and unprotected from for-profit corporations by our government and MDEQ, then we *all* are vulnerable. Communities deserve—and MDEQ is required to provide—complete and accurate information about the Site's operations and air emissions. Because the draft Permit fails to provide complete and accurate information, **I demand that the MDEQ Permit Board disapprove the Permit**.

The draft Permit fails to disclose that MZX Tech has *already* installed 27 so-called "temporary" turbines at the Site without any Permit at all and in disregard of federal requirements. The EPA recently confirmed the long-standing requirement that "temporary" turbines need construction Permits under the federal Clean Air Act. Many of the MZX Tech turbines have been operating for six months with no Permit. Yet the draft Permit makes no attempt to account for the 27 unpermitted turbines, neither including them in the emissions estimates for the Site nor requiring the best available pollution technology for them. The failure of the draft Permit to include at least 27 emissions units on the Site renders it deficient and makes it impossible for the community to understand the full scale of the Site's impact on air quality and public health.

Internal correspondence from December 22 obtained by a public records request shows MDEQ staff were instructed to initiate the public comment period by January 15. The EPA submitted additional Permit comments on January 6, yet there does not appear to be any further public records available regarding those comments. If those final comments were incorporated into the Permit materials, documentation of that process should be available to the public. If not, the Permit was publicly noticed while key issues remained under review. Either way, the timeline suggests the process was shaped by internal deadlines rather than by transparency or completeness.

The draft Permit defines an "ambient air boundary" based on physical barriers around the current Site. However, according to DeSoto County land records, MZX Tech has purchased multiple additional parcels, including parcels adjacent to the Site, that are not effectively excluded from public access. Under EPA's regulatory definition, ambient air extends to areas where the public can access the outdoor air, and impacts in those areas must be included in air quality modeling. Because the Permit relies on a boundary that does not correspond to true ambient air, the emissions impacts to the surrounding community could be underestimated.

MDEQ must clarify the actual ambient air boundary, include all owned or controlled land in modeling, and reevaluate impacts accordingly.

The Permit Board must disapprove the draft Permit and instruct MDEQ to:

- Order MZX Tech to cease operating the 27 unpermitted turbines until it obtains a permit for them;
- Withdraw the draft Permit; and
- Revise the draft Permit before seeking public comment.

Even for the 41 turbines it proposes to authorize, the draft Permit fails to accurately characterize air pollution and require adequate protections. Among other things, the draft Permit downplays the ongoing violation of the minimum federal ozone standard in the Memphis metro area, which includes DeSoto County, and fails to require strict pollution controls and offsets for MZX Tech's NOx pollution required by Mississippi law. The draft Permit also underestimates the amount of harmful particulate matter and formaldehyde emissions from the turbines. For all of these reasons, the draft Permit fails to meet applicable requirements and **the Permit Board must disapprove the Permit**.

It is imperative that the Permit Board disapprove the Permit because both MDEQ and the community must understand the full impact of the MZX Tech Site operations on air quality and address that impact as required by the Clean Air Act and Mississippi law. The area immediately around the MZX Tech power plant includes several residential neighborhoods, including Colonial Hills, Kingston Estates, Rasco Farms, and others along the Southaven/Horn Lake border. The power plant is within half of a mile from homes and just a mile from an elementary school. These communities have already been experiencing impacts of the 27 unpermitted turbines MZX Tech has installed at 2875 Stanton Road without a Permit, including increased noise, light, and air pollution.

But the air pollution from both the 27 unpermitted turbines and the proposed 41 turbines will extend far beyond the immediately adjacent neighborhoods. Southaven and Memphis share the air—and that air is already not meeting minimum federal smog standards. The greater Memphis-Clarksdale-Forrest City metro area, which includes Memphis and Southaven, also received an "F" for high ozone days for the most recent reporting period.[1]

While DeSoto County is currently classified as an ozone attainment area, MDEQ's own monitoring data presented at the A&WMA Southern Section Conference shows that DeSoto's 2024 design value is **71 ppb**, exceeding the 70 ppb federal ozone standard. This means that DeSoto is functionally in violation, even if formal nonattainment designations have not yet been made. Under the Clean Air Act, MDEQ must not treat an area trending into violation as if it were safely in attainment — especially when Permitting major new NOx sources that will make the problem worse.

[1] Memphis-Clarksdale-Forrest City, TN-MS-AR, Am. Lung Ass'n (2025), Memphis-Clarksdale-Forrest City, TN-MS-AR | American Lung Association.

In addition to ozone exceedances, the data used in the Permit's air modeling is misleading about current air quality conditions. The background pollution data for PM2.5 came from the Shelby Farms monitor in Tennessee, even though the Hernando monitor in DeSoto County is closer to the Site and more representative of local conditions. Instead of using this more accurate local data, the PM2.5 data relied on a cleaner monitor across state lines, misleading the public about the real pollution burden already faced by DeSoto County residents.
At the 2025 A&WMA Southern Section Conference, MDEQ noted that the Hernando monitor recorded a PM2.5 annual average of **9.1 µg/m³**, which is above the EPA's annual standard of 9.0. That number was only brought below the limit after 13 exceptional events were excluded from the data.

At the same conference, MDEQ specifically identified **Desoto County as an area where it is "evaluating additional measures towards achieving attainment"** in reference to ozone and that the Memphis Metropolitan Area is an "area of priority." That means MDEQ is aware Desoto County has not been meeting the federal air quality standards and has been actively looking for ways to bring pollution levels back down. If MDEQ truly believes that additional measures are needed to *reduce* pollution in Desoto County, then Permitting a major new source of PM2.5 and NOx is inconsistent with MDEQ's own statements and puts the surrounding communities at even greater risk.

Smog makes asthma and other respiratory illnesses worse.[2] Pollutants like smog are especially dangerous for children, who are more likely to develop respiratory illnesses like asthma.[3] Pregnant women and unborn children are also at risk from fossil fuel pollution.[4] According to the Asthma and Allergy Foundation, the Memphis Metro Area, including Memphis and Southaven, has among the highest rates in the U.S. of emergency room visits and deaths due to asthma.[5]

The 41-turbine MZX Tech power plant alone is estimated to cause millions of dollars of health damages each year nationally, with the greatest effects centered in Shelby and DeSoto counties. The damages include, among other things, missed days of school and work due to respiratory illnesses.[6] This estimate likely understates the near-term health damages, since it does not take into account the 27 turbines already installed at the Site.

Across Mississippi, we understand that if MDEQ does nothing to protect some residents from living in literal toxicity, then we cannot count on MDEQ to protect any of us. The Permit Board must disapprove this draft Permit and recognize that no revised version of this project can be reconciled with the region's legal, environmental, or public health obligations under the Clean Air Act. MDEQ itself "implored" MZX Tech to install pollution controls because of air quality concerns in DeSoto County. Now I am imploring you:

---

[2] Katherine Burgess, *SELC petitions EPA to say Memphis area in violation of ozone standards*, MLK50 Justice Through Journalism (June 6, 2025), https://mlk50.com/2025/06/06/selc-petitions-epa-to-say-memphis-area-in-violation-of-ozone-standards/.

[3] EPA, Health Effects of Ozone Pollution (last visited February 7, 2026), Health Effects of Ozone Pollution | US EPA.

[4] Exposure to Air Pollution During Pregnancy Linked to Neurodevelopmental Issues | Columbia University Mailman School of Public Health; Ambient air pollution in critical windows of exposure and spontaneous miscarriage in a preconception cohort - ScienceDirect.

[5] 2025 Asthma Capitals: The Most Challenging Places to Live with Asthma, Asthma and Allergy Found. of Am. (2025), AAFA 2025 Asthma Capitals Report September 2025 (ranked 3rd for emergency room visits; 5th for deaths).

[6] Report TK.

<u>Follow the law. Protect the people. Disapprove the Permit.</u>

Sincerely,

Karissa Bowley, Mississippian

714 Eagle Ave.

Jackson, MS 39206

From: Katherine M Usky
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "xAI Combustion Turbines"
Date: Monday, January 19, 2026 11:59:18 PM

From: Katherine M Usky <katieusky@gmail.com>
Subject: xAI Combustion Turbines

Message Body:
Hi Mr. Bland,
I am concerned about the air pollution from the turbine generators at the xAI facility in Southhaven affecting the surrounding families and communities. There is a significant body of evidence showing the harmful effects on human health from the air pollution emitted. Please make sure there is sufficient review of the effects on the surrounding air and water, so that people are not harmed.

Sincerely,
Katherine Usky

https://urldefense.com/v3/__https://www.epa.gov/stationary-sources-air-pollution/stationary-combustion-turbines-national-emission-standards__;!!G3AUQnCt!hnzdzWBDgdzUM72iv5P-eQltrOXIDNMVfG8WM0YBsoVXSRIpY6jlCsVDbD5jHm7zrKBklB1q2ySbblJdXEq2S_Y$

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

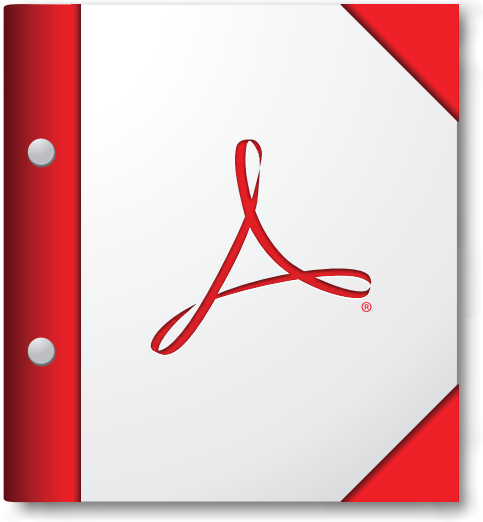
From:	Kathryn Knowlton
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "xAI in Southaven"
Date:	Monday, January 19, 2026 4:36:20 PM

From: Kathryn Knowlton <kathrynmary5@gmail.com>
Subject: xAI in Southaven

Message Body:
By allowing xAI to expand infrastructure in this community is unacceptable. Southaven and Southwest Memphis have long borne the brunt of environmental injustice, with elevated rates of cancer, asthma, and other chronic health conditions tied to pollution exposure.

Approving further expansion rather than investing in clean energy and public health is not just shortsighted, it is immoral. Communities like ours should not be treated as sacrifice zones for corporate gain. I urge decision-makers to oppose xAI turbines and instead prioritize the health, safety, and dignity of the people who live here.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)



For the best experience, open this PDF portfolio in Acrobat X or Adobe Reader X, or later.

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From:	Kimberlee K Laird
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "XAI Turbine Permitting Under the Clean Air Act"
Date:	Tuesday, February 10, 2026 8:04:37 AM

From: Kimberlee K Laird <laird.kk@gmail.com>
Subject: XAI Turbine Permitting Under the Clean Air Act

Message Body:
The EPA does not leave it up to states to decide whether to require permits for temporary turbines. State air agencies are not free to follow less stringent rules than EPA's, and MDEQ should comply with the Clean Air Act. MDEQ should exercise its oversight responsibility over these potentially environment damaging installations.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	LaTricea Adams
To:	Jeffrey Bland
Subject:	YGG Comment on Draft Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC
Date:	Tuesday, February 17, 2026 1:44:30 AM
Attachments:	YGG Comment on Draft Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC.pdf

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Good morning,

Find attached public comments regarding Draft [of] Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC.

Please confirm receipt.

Yours in Service,

LaTricea Adams, MAT, EdS (she/her/hers)
Founder CEO & President
Young, Gifted & Green
president@younggiftedgreen.org
Website: www.younggiftedgreen.org [younggiftedgreen.org]



*"Serving from the soul...**lead**ing with passion."*

Learn More About Young, Gifted & Green HERE [youtu.be]
Tune in to our Podcast The Green Agenda: Spotify [creators.spotify.com]| Apple Podcast [podcasts.apple.com]
Facebook [facebook.com] | Instagram [instagram.com] | Twitter [twitter.com] | YouTube [youtube.com] | LinkedIn [linkedin.com] | TikTok [tiktok.com] | Bluesky [bsky.app]

February 17, 2026

Mr. Jeffrey Bland
Mississippi Department of Environmental Quality
P.O. Box 2261
Jackson, MS 39225

Re: Comment on Draft Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Dear Mr. Bland:

Thank you for the opportunity to comment on the draft construction permit (the "Permit") for the MZX Tech LLC facility at 2875 Stanton Road in Southaven, MS (the "Site"). The draft Permit proposes to authorize MZX Tech, an affiliate of Elon Musk's xAI, to construct and ultimately operate 41 methane gas-fired turbines, totaling 1,200 megawatts, to power the xAI Colossus 2 artificial intelligence data center across the Tennessee border in the Whitehaven neighborhood of Memphis. These 41 turbines will form a power plant with the capacity to provide enough electricity to power a mid-sized city.

But what the draft Permit fails to disclose is that MZX Tech has already installed 27 so- called "temporary" turbines at the Site—without any permit at all and in disregard of federal requirements. EPA recently confirmed the long-standing requirement that "temporary" turbines need construction permits under the federal Clean Air Act. Many of the MZX Tech turbines have been operating for months with no permit. Yet the draft Permit makes no attempt to account for the 27 unpermitted turbines, neither including them in the emissions estimates for the Site nor requiring the best available pollution technology for them. The failure of the draft Permit to include at least 27 emissions units on the Site renders it deficient and makes it impossible for the community to understand the full scale of the Site's impact on air quality and public health.

The Permit Board must disapprove the draft Permit and instruct MDEQ to:
o Order MZX Tech to cease operating the 27 unpermitted turbines until it obtains a permit for them;
o Withdraw the draft Permit; and

o Revise the draft Permit to include all of the turbines on the site before seeking public comment.

Even for the 41 turbines it proposes to authorize, the draft Permit fails to accurately characterize air pollution and require adequate protections. Among other things, the draft Permit downplays the ongoing violation of the minimum federal ozone standard in the Memphis metro area, which includes DeSoto County, and fails to require strict pollution controls and offsets for MZX Tech's NOx pollution required by Mississippi law. The draft Permit also underestimates the amount of harmful particulate matter and formaldehyde emissions from the turbines. For all of these reasons, the draft Permit fails to meet applicable requirements and the **Permit Board must disapprove the Permit**.

It is imperative that the Permit Board disapprove the Permit because both MDEQ and the community must understand the full impact of the MZX Tech Site operations on air quality and address that impact as required by the Clean Air Act and Mississippi law. The area immediately around the MZX Tech power plant includes several residential neighborhoods, including Colonial Hills and Horn Lake. The power plant is within half of a mile from homes and just a mile from an elementary school. These communities have already been experiencing impacts of the 27 unpermitted turbines MZX Tech has installed at 2875 Stanton Road without a permit, including increased noise and air pollution.

But the air pollution from both the 27 unpermitted turbines and the proposed 41 turbines will extend far beyond the immediately adjacent neighborhoods. Southaven and Memphis share the air—and right now, that air is not meeting minimum federal smog standards. The greater Memphis-Clarksdale-Forrest City metro area, which includes Memphis and Southaven, also received an "F" for high ozone days for the most recent reporting period. 1

Smog makes asthma and other respiratory illnesses worse. 2 Pollutants like smog are especially dangerous for children, who are more likely to develop respiratory illnesses like asthma. 3 Pregnant women and unborn children are also at risk from fossil fuel pollution. 4 According to the Asthma and Allergy Foundation, the Memphis Metro Area, including Memphis and Southaven, has among the highest rates in the U.S. of emergency room visits and deaths due to asthma. 5

The 41-turbine MZX Tech power plant alone is estimated to cause millions of dollars of health damages each year nationally, with the greatest effects centered in Shelby and DeSoto counties. The damages include, among other things, missed days of school and work due to respiratory illnesses. 6 This estimate likely understates the near-term health damages, since it does not take into account the 27 turbines already installed at the Site.

Southaven and Memphis share the air, and these communities are being asked to bear the health risks of MZX Tech's massive power plant. Communities deserve—and MDEQ is required to provide—complete and accurate information about the Site's operations and air emissions. Because the draft Permit fails to provide complete and accurate information, **we demand that the Permit Board disapprove the Permit**.

---

1 Memphis-Clarksdale-Forrest City, TN-MS-AR, Am. Lung Ass'n (2025), Memphis-Clarksdale-Forrest City, TN-MS-AR | American Lung Association.
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4 Exposure to Air Pollution During Pregnancy Linked to Neurodevelopmental Issues | Columbia University Mailman School of Public Health; Ambient air pollution in critical windows of exposure and spontaneous miscarriage in a preconception cohort - ScienceDirect.
5 2025 Asthma Capitals: The Most Challenging Places to Live with Asthma, Asthma and Allergy Found. of Am. (2025), AAFA 2025 Asthma Capitals Report September 2025 (ranked 3 rd for emergency room visits; 5th for deaths).
6 Report TK.

Yours in Service,

LaTricea D. Adams, MAT, EdS
CEO & President
Young, Gifted & Green
president@younggiftedgreen.org

Jeffrey Bland

From: LaTricea Adams <president@younggiftedgreen.org>
Sent: Tuesday, February 17, 2026 1:41 AM
To: Jeffrey Bland
Subject: YGG Comment on Draft Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC
Attachments: YGG Comment on Draft Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC.pdf

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Please confirm receipt.

Yours in Service,

LaTricea Adams, MAT, EdS (she/her/hers)
Founder CEO & President
Young, Gifted & Green
president@younggiftedgreen.org
Website: www.younggiftedgreen.org [younggiftedgreen.org]



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Learn More About Young, Gifted & Green HERE [youtu.be]
Tune in to our Podcast The Green Agenda: Spotify [creators.spotify.com]| Apple Podcast [podcasts.apple.com]
Facebook [facebook.com] | Instagram [instagram.com] | Twitter [twitter.com] | YouTube [youtube.com] | LinkedIn [linkedin.com] | TikTok [tiktok.com] | Bluesky [bsky.app]

February 17, 2026

Mr. Jeffrey Bland
Mississippi Department of Environmental Quality
P.O. Box 2261
Jackson, MS 39225

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---

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6 Report TK.

Yours in Service,

LaTricea D. Adams, MAT, EdS
CEO & President
Young, Gifted & Green
president@younggiftedgreen.org

From: Laura Borst
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Please oppose data center"
Date: Monday, February 9, 2026 4:12:13 PM

From: Laura Borst <rebelljb@aol.com>
Subject: Please oppose data center

Message Body:
Please oppose the data center. This data center will use massive amounts of electricity. This will not only cause high grid demand which could lead to brownouts on hot days. Generating the massive amount of electricity through the gas turbine that is being proposed to power the data center would likely create massive amounts of pollution,which can cause and exacerbate illnesses.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Lauren Thomas <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 6:54 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Concerned resident of Southaven"

From: Lauren Thomas <L.B.Thomas@hotmail.com>
Subject: Concerned resident of Southaven

Message Body:
I am writing to oppose the issuance of the Prevention of Significant Deterioration Construction Permit for MZX Technology, LLC and its proposed use of 41 methane turbines in Southaven.

This level of industrial air emission activity does not belong in our community. The continuous turbine noise, increased air pollution, and excessive industrial lighting will continue to directly affect the daily lives, health, and well-being of the families who live nearby. Residents should not have to live with constant industrial noise, degraded air quality, and loss of the quiet environment that once defined our neighborhood.

The scale of this project also raises serious concerns about excessive water use from our aquifer, the loss of trees and natural buffers, and the impact on local wildlife and Horn Lake Creek. These natural resources are essential to the health and stability of our community and should be protected.

Southaven is a place where families live, children play, and people expect a safe, healthy environment. Introducing 41 methane turbines into this area permanently changes the character of our neighborhood and places unnecessary environmental and quality-of-life burdens on residents.

I respectfully ask the Mississippi Department of Environmental Quality and the Permit Board to stop this permit and protect the health, environment, and well-being of our community.

Thank you for your time and consideration.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	Louios Slade Jr
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "xAI facility in Southaven, MS"
Date:	Tuesday, January 20, 2026 12:21:29 PM

From: Louios Slade Jr <shagnslade@gmail.com>
Subject: xAI facility in Southaven, MS

Message Body:
I am writing in response to the Mississippi Department of Environmental Quality request for comments concerning the xAI facility in Southaven, MS. I have reviewed data submitted to this department as posted on the OPC Environmental Permits Division webpage. This data indicates significant increases in Nox, SO2 and PM emissions.

Based upon the document titled “Statement of Basis / Preliminary Determination)”, the facility would increase NOx by 423.39 tons per year, SO2 by 156.53 tons per year and Particulate Matter (PM) by 19 tones per year.

An additional 493 tons per year of Nox represents a significant localized or regional increase in air pollution, likely contributing to adverse health and environmental impacts.

An additional 156 tons per year of Sulfur Dioxide constitutes a measurable increase in air pollution that can negatively impact local air quality, human health, and ecosystems. This amount is significant enough to contribute to localized nonattainment of environmental standards.

An increase of 19 tons per year of Particulate Matter (PM) represents a significant addition to air pollution, capable of causing localized health crises, reducing air quality, and damaging ecosystems. PM, especially fine particles, can deeply penetrate the lungs and enter the bloodstream, resulting in increased respiratory and cardiovascular morbidity and mortality.

.”, I ask that you deny the permit requested. Should such permit be granted, I request that such grant be accompanied by stipulations that the permit be in effect only until such time as required to allow for design, permitting and construction of less harmful generation technologies, such as nuclear, wind, solar or combined cycle.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Lux Howe <mdeqweb@mdeq.ms.gov>
Sent: Monday, February 16, 2026 2:05 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Re: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC"

From: Lux Howe <lchowe@proton.me>
Subject: Re: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Message Body:
Dear Mr. Bland:
I strongly oppose the draft construction Permit for MZX Tech's gas-fired power plant at 2875 Stanton Road. This Permit would allow xAI to build and run 41 permanent gas turbines, creating a large-scale industrial power plant in a residential area, directly impacting surrounding communities including Southaven, Horn Lake, and Memphis residents.
The draft Permit fails to disclose that MZX Tech has already installed 27 so-called "temporary" turbines at the Site without any Permit at all and in disregard of federal requirements. The EPA recently confirmed the long-standing requirement that "temporary" turbines need construction Permits under the federal Clean Air Act. Many of the MZX Tech turbines have been operating for six months with no Permit. Yet the draft Permit makes no attempt to account for the 27 unpermitted turbines, neither including them in the emissions estimates for the Site nor requiring the best available pollution technology for them. The failure of the draft Permit to include at least 27 emissions units on the Site renders it deficient and makes it impossible for the community to understand the full scale of the Site's impact on air quality and public health.
DeSoto County is the only county in Mississippi with an "F" ozone grade. Shelby County is the only county in Tennessee with an "F" ozone grade. Placing at least 41 gas turbines right in the heart of Southaven in DeSoto County threatens to worsen ozone levels and particulate matter in the air, risking greater harm to public health.
The Permit Board must disapprove the draft Permit and instruct MDEQ to: Order MZX Tech to cease operating the 27 unpermitted turbines until it obtains a permit for them; Withdraw the draft Permit; and Revise the draft Permit before seeking public comment.
Sincerely,
Lux Howe

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Marilyn Swafford <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 5:31 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "xAI GAS TURBINES/SOUTHAVEN"

From: Marilyn Swafford <mswafford54@gmail.com>
Subject: xAI GAS TURBINES/SOUTHAVEN

Message Body:
I am reaching out to you to request that you not approve permitting xAI to install additional gas turbines at their facility in Southaven. I am a resident of Desoto County, and concerned about the air and noise pollution of the xAI facility. I already suffer with shortness of breath and allergies that affect my breathing. If these turbines are permitted to be placed, that is placing business interests above the health and well-being of Desoto County residents. Thank you for your consideration.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Marissa Thompson <mdeqweb@mdeq.ms.gov>
Sent: Saturday, February 14, 2026 5:11 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "permit to run 41 new turbines at xAI's facility in Southaven."

From: Marissa Thompson <marissat605@gmail.com>
Subject: permit to run 41 new turbines at xAI's facility in Southaven.

Message Body:
My family strongly opposes assigning a permit to xAI to permanently operate turbines in Southaven. We deserve to live in a community free of noise and pollution.
Moreover, Elon Musk has a track record of disturbing the quality of life of communities where his businesses operate.

For instance, his SpaceX development in Boca Chica, Texas, has fundamentally altered the area by restricting public access to beaches, creating environmental hazards, and pushing out longtime residents through, gentrification. The transformation of the area into "Starbase" has led to constant road closures,, noise complaints, and, ecological damage to surrounding, wildlife habitats.

In 2024, the Federal Aviation Administration and the Texas Commission on Environmental Quality have noted environmental concerns over SpaceX's proposal to increase the number of launches per year here.

Musk has shown that he has no regard for the environment or the people who live in it.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: martha crenshaw <marcicre12@icloud.com>
Sent: Tuesday, February 17, 2026 3:49 AM
To: Jeffrey Bland
Subject: Martha Ledesma, 20 years residente of colonial hills.

Good morning, I am sending this email hoping that the voice of the people will be heard. I ask you to please stop the "supercomputer" project being carried out in Southaven MS. The negative impact it will have on the environment and, consequently, on human health is disastrous. Please, we cannot allow this to continue, for ourselves and for our children. Together we can stop these projects that benefit and empower people who are not interested in the general well-being of the population. Thank you for your attention.
Sent from my iPhone

From:	Mary Pendergraph
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "Concerned about the air pollution these turbines will cause"
Date:	Tuesday, February 10, 2026 6:46:36 PM

From: Mary Pendergraph <marypendergraph88@gmail.com>
Subject: Concerned about the air pollution these turbines will cause

Message Body:
I live in the RASCO subdivision an I'm concerned about the air quality these turbines will cause us since this subdivision is less than a mile away. I came from Alabama an fell in love with this part of southaven. But since the turbines have been running I concerned about be out side for long periods of time. An the wildlife will no dought be effected i know this is progress for the future but please don't allow this to happen so close to our homes. An schools.thank you

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	Mary Schroth
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "permit hearing for xAI turbines in Southaven"
Date:	Friday, February 13, 2026 1:01:54 PM

From: Mary Schroth <accessearrings@yahoo.com>
Subject: permit hearing for xAI turbines in Southaven

Message Body:
I do not support the expansion of more turbines in Southaven to support xAI. These turbines contribute to noise pollution and especially compromised health for those living nearby. Please protect the people of this community. The financial gain is not worth the loss of lives that are irreplaceable. Please deny the requested permits for more turbines.

Thank you for your consideration.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Matthew Nelson <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 8:35 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Request to deny permit approval"

From: Matthew Nelson <jeffreybland@ffa.aleeas.com>
Subject: Request to deny permit approval

Message Body:
I am not against technology or progress. But I am against putting a large industrial power facility next to homes and families.

This project includes 41 gas turbines. That is not a small backup system. That is not a power plant. That is the equivalent of three coal power plants. These turbines will burn natural gas and release pollution into the air.

Gas turbines release nitrogen oxides, tiny particles, and other harmful gases. These pollutants are linked to asthma, heart problems, and other health issues. Children, elderly people, and anyone with breathing problems are most at risk.

Even if the company says the turbines meet legal limits, that does not mean they are safe. Legal limits are not the same as zero risk. When you add 41 turbines together, the pollution adds up.
This project will also use a lot of water for cooling. Our community depends on clean and reliable water. We should be careful before approving a project that could strain our water supply.
Noise is another concern. Gas turbines are very loud. The noise can run day and night. Low-frequency noise can travel far and go through walls. This can affect sleep, stress levels, and overall health.

Once this project is built, it is very hard to fix problems later. Promises made today will not be enforced years from now. Residents will be the ones who live with the consequences.

Our community deserves clean air, quiet neighborhoods, and safe water. We should not trade our health and quality of life for a project that creates very few local jobs.
Please protect residents and reject this project or move it far away from homes.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Mattie Burnett <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 2:31 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "XAI SOUTHAVEN MS"

From: Mattie Burnett <mattiewilliams87@gmail.com>
Subject: XAI SOUTHAVEN MS

Message Body:
This is deeply concerning and troubling that you all would let Musk come in and bring these turbines that are poisoning the community. When women in the area start having miscarriages and the babies start being born with 3 hands and 6 eyes will that get your attention. Desoto County is not hurting for money it's just pure greed at this point. A sad day in Desoto County.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Mattie Johnson <mdeqweb@mdeq.ms.gov>
Sent: Monday, February 16, 2026 7:47 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Health is more important than wealth of one man"

From: Mattie Johnson <mattjohn37@gmail.com>
Subject: Health is more important than wealth of one man

Message Body:
There are so many places Elon could have place that cancer machines outside of the city. Thousands of children and adults will develop long term illnesses from this. I want it closed and moved out side of the city of Memphis. We all agree that is need to be closed.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From: Maureen McGuire
To: Jeffrey Bland
Subject: DENY PERMIT TO MZX TECH
Date: Tuesday, February 17, 2026 2:54:28 PM

This Message Is From an External Sender
This message came from outside your organization.

Dear Mr. Bland:

As a Mississippian, I strongly oppose the draft construction Permit for MZX Tech's gas-fired power plant at 2875 Stanton Road. This Permit would allow xAI to build and run 41 permanent gas turbines, creating a large-scale industrial power plant in a residential area, directly impacting surrounding communities including Southaven, Horn Lake, and Memphis residents. We understand this all across Mississippi.

We understand that these communities are being asked to bear the health risks of MZX Tech's massive power plant. Across Mississippi we understand that if any of us are vulnerable to being left behind and unprotected from for-profit corporations by our government and MDEQ, then we *all* are vulnerable. Communities deserve—and MDEQ is required to provide—complete and accurate information about the Site's operations and air emissions. Because the draft Permit fails to provide complete and accurate information, **I demand that the MDEQ Permit Board disapprove the Permit**.

Sincerely,

Maureen McGuire
Jackson, Mississippi

From:	Max Baenen
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "Air quality"
Date:	Monday, January 19, 2026 7:19:18 AM

From: Max Baenen <maxbaenen@gmail.com>
Subject: Air quality

Message Body:
I have concerns about the air quality in Southaven with the new proposed changes to add turbines.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Mya Page <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 2:16 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Turbines at xAI / MXZ Tech Permiit Application"

From: Mya Page <myapage1@gmail.com>
Subject: Turbines at xAI / MXZ Tech Permiit Application

Message Body:
xAI's 41 permanent turbines in Southaven are expected to cause measurable harm to our communities. The health impact analysis done by Harvard-trained public health professionals at EmPower Analytics Group estimates 30 to 44 MILLION dollars per year in health damages from the increased PM2.5 (particle pollution) to our air.
This estimate includes premature deaths, hospital visits, and missed days of school & work due to health complications. That means WE will be the ones paying the price. The burden falls on us.
Breathing this level of particle pollution every year increases the risk of death per-person by roughly the same amount as the risk of being killed by an alcohol-impaired driver in a given year.
Most importantly, this analysis is likely an extremely CONSERVATIVE measure. It evaluates only long-term average PM2.5 exposure. It does not account for additional pollutants such as formaldehyde and nitrogen oxides, nor does it account for the 27 turbines that are ALREADY on site. I demand that the MDEQ Permit Board disapprove the Permit. There are children and people living in this city. We must use our discretion WISELY. Wisely DENY the permit. Why should the public pay the price just because the private has the money to make us pay.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Mickey <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 8:24 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "power for X AI"

From: Mickey <mickey1956@comcast.net>
Subject: power for X AI

Message Body:
Mini Nuclear power stations would be better. I wonder what their thoughts on that? Opposing progress is never going to work. Why not embrace the extra benefits like more tax base and jobs and local economy improvements.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Date: February 17th, 2026

From:
Money Powell III
490 N. Canton Club Cir
Jackson, MS. 39211
mp4video@yahoo.com

RE: Public Hearing / Permit Review — Turbine Expansion Project

To Whom It May Concern:

I respectfully submit this formal objection to the requested permit approval and expansion of large-scale turbine operations associated with this project.

My opposition is not rooted in resistance to innovation or economic development. Rather, it is based on the scale of industrial energy consumption being proposed, the environmental and infrastructure burden placed on local communities, the lack of demonstrated public benefit, and the need for strict adherence to environmental and regulatory standards.

Projects requiring substantial energy generation and industrial infrastructure have lasting consequences for surrounding communities. Residents are the ones who experience the effects of air emissions, noise, resource demand, land use change, and long-term environmental risk. These impacts should not be authorized without clear, transparent, and comprehensive evaluation.

Responsible permitting requires full compliance with environmental review standards. This includes cumulative impact assessment, emissions modeling, resource demand forecasting, long-term monitoring plans, and independent verification of mitigation measures. Where uncertainty exists regarding environmental or public health consequences, regulatory agencies have a duty to proceed cautiously.

Taxpayer fairness must also be considered. Public resources—including environmental capacity, infrastructure systems, and regulatory oversight—are shared assets supported by residents. Large-scale industrial operations relying on these resources must provide clear and measurable public benefit. Communities should not be expected to absorb environmental risk or infrastructure strain without meaningful local return.

Permitting decisions must be based on transparency, proper review, and demonstrated compliance. Approval of expansion without complete environmental analysis, clear mitigation strategies, and meaningful public engagement would undermine regulatory integrity and public trust.

As a resident, I am particularly concerned that communities are being asked to accept long-term impacts that were neither clearly communicated nor meaningfully consented to. People who live near these facilities will experience the consequences directly, and their interests must remain central to any decision of this magnitude.

Before any expansion is authorized, the public deserves clear answers to several fundamental questions:

- What direct, measurable benefits will local residents receive?
- How will environmental impacts be monitored and mitigated over the long term?
- What safeguards exist if resource demand exceeds projections?
- How does this project equitably balance private gain with public cost?

Until these questions are fully addressed with transparency and accountability, approval would be premature. For these reasons, I respectfully urge the reviewing authority to deny the requested permit expansion and prioritize community health, environmental stability, taxpayer equity, and responsible governance.

Sincerely,



Money Powell III

From: Moriah Loya
To: Jeffrey Bland; Jaricus Whitlock
Subject: Say NO to MZX Tech Permits - Southaven, MS
Date: Tuesday, February 17, 2026 11:21:11 PM

This Message Is From an External Sender
This message came from outside your organization.

Good evening,

Tonight, I attended the hearing for the MZX Tech permit to operate 41 natural gas turbines in Southaven, MS which is located 1 mile from my home.

I ask that you please DO NOT approve the permits to operate the turbines. Here are a few reasons why aside from what should already be a very compelling impact study that has already been shared.

1. MDEQ's mission statement promises to IMPROVE the environment, but approving this permit would do the opposite. There is no world in which introducing natural gas powered turbines to an environment improves it.
2. Particle pollution is a deadly and growing threat to public health in communities around the country. The more researchers learn about the health effects of particle pollution, the more dangerous it is recognized to be. Short-term spikes in particle pollution that last from a few hours to a few days can kill. Most premature deaths are from respiratory and cardiovascular causes. Spikes in particle pollution also have many other harmful effects, ranging from decreased lung function to heart attacks.
3. The current unlawfully running turbines are already causing harm to local citizens as was shared at the hearing. Approving them and more turbines up to the 41 turbines would only make matters worse.
4. Why would you reward a company with a permit after it's been operating unlawfully?
5. The leading causes of death in DeSoto county: heart disease, cancer, and respiratory disease, are all linked to poor air quality. Why allow the air quality to be made worse even by the smallest measure?
6. Westerly winds common in this area will sweep these gasses across numerous homes, schools, ball fields, parks, and hospitals where people live, play, and work.
7. I urge you to take into deep consideration the statements given by healthcare workers at this hearing. A number of adverse health impacts have been associated with exposure to both PM2.5 and PM10. For PM2.5, short-term exposures (up to 24-hours duration) have been associated with premature mortality, increased hospital admissions for heart or lung causes, acute and chronic bronchitis, asthma attacks, emergency room visits, respiratory symptoms, and restricted activity days. These adverse health effects have been reported primarily in infants, children, and older adults with preexisting heart or lung diseases. In addition, of all of the common air pollutants, PM2.5 is associated with the greatest proportion of adverse health effects related to air pollution, both in the United States and world-wide based on the World Health Organization's Global Burden of Disease Project [thelancet.com].
8. Short-term exposures to PM10 have been associated primarily with worsening of respiratory diseases, including asthma and chronic obstructive pulmonary disease

(COPD), leading to hospitalization and emergency department visits.

9. Long-term (months to years) exposure to PM2.5 has been linked to premature death, particularly in people who have chronic heart or lung diseases, and reduced lung function growth in children. The effects of long-term exposure to PM10 are less clear, although several studies suggest a link between long-term PM10 exposure and respiratory mortality. The International Agency for Research on Cancer (IARC) published a review [monographs.iarc.fr] in 2015 that concluded that particulate matter in outdoor air pollution causes lung cancer.
10. Children and infants are particularly susceptible to harm from inhaling pollutants such as PM because they inhale more air per pound of body weight than adults - they breathe faster, spend more time outdoors and have smaller body sizes. In addition, children's immature immune systems may cause them to be more susceptible to PM than healthy adults. Keep in mind this facility is next to homes, a park, ball fields, and places where people live, play, and work.
11. For us in DeSoto county and along the state line, we're not only subjected to the pollution from the data center in Southaven, but we are also suffering the pollution from the other xAI facility in nearby Box Town in Tennessee and down wind of the soon to be data center across the MS river in Arkansas (however I have read that THAT data center is using renewable clean energy to operate, unlike xAI.). So keep in mind that this particular community is not being solely impacted by the turbines that you are deliberating for, but other surrounding plants outside of MS. We are uniquely positioned in a tri-state area and subject to those states leadership and governance on these issues.

Thank you for holding space to hear our community. I am pleading that you not approve the permits.

Thank you for your time and consideration. We are depending on you.

Kind regards,

Moriah Loya

Jeffrey Bland

From: calvin shorter <caljoe16@gmail.com>
Sent: Monday, February 16, 2026 9:46 PM
To: Jeffrey Bland
Subject: XAI

This Message Is From an External Sender
This message came from outside your organization.

I am concerned about the impact on our air quality in this area. My husband and I purchased a home to spend our retirement here. The EPA has stated that these turbines will omitt toxins into the air by the tons. We are not against growth in the area, but there has to be a better solution.Also we are concerned about the water this plant will use trying to cool the Super Computer.

Thank you,

Mr.and Mrs. Calvin Shorter
6111 Liberty Estates Dr, Walls, MS 38680
901-628-4528

From:	Natalie Culbreath
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC"
Date:	Thursday, February 12, 2026 8:54:32 AM

From: Natalie Culbreath <nculbreath89@gmail.com>
Subject: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Message Body:
Dear Mr. Bland:
I strongly oppose the draft construction Permit for MZX Tech's gas-fired power plant at 2875 Stanton Road. This Permit would allow xAI to build and run 41 permanent gas turbines, creating a large-scale industrial power plant in a residential area, directly impacting surrounding communities including Southaven, Horn Lake, and Memphis residents. These communities are being asked to bear the health risks of MZX Tech's massive power plant. Communities deserve—and MDEQ is required to provide—complete and accurate information about the Site's operations and air emissions. Because the draft Permit fails to provide complete and accurate information, I demand that the MDEQ Permit Board disapprove the Permit.

My 3 children have to grow up here and breathe this air. Please follow the law and disapprove the Permit for the sake of our children.

Sincerely,
Natalie Culbreath

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Nathan Reed <mdeqweb@mdeq.ms.gov>
Sent: Sunday, February 15, 2026 8:43 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Southaven xAI"

From: Nathan Reed <rivolta83@hotmail.com>
Subject: Southaven xAI

Message Body:
My name is Nathan Reed. I am a lifelong resident of Southaven. I was born and raised around Stateline Road, and aside from the years I left to attend seminary—where I met my wife—I have always called this city home. We made a deliberate choice to come back. We chose to build our life here. For more than 17 years, my family has lived in the North Creek neighborhood, investing in this community because we believe in Southaven.

We have witnessed development before. Warehouses, distribution centers, commercial expansion—none of that is new. Growth, when managed responsibly, can be a sign of health. But what has occurred with xAI is categorically different. The scale, the speed, and the intensity of this expansion are unlike anything this area has absorbed before.

This was not thoughtful, phased development. It was an industrial surge imposed on a residential community.

The impact has been immediate and undeniable—relentless industrial noise, increased heavy traffic cutting through neighborhood arteries, and a noticeable degradation in air quality. I have never experienced chronic sinus issues in my life, yet now I deal with a persistent cough and prolonged irritation that coincides directly with this operation ramping up. When residents begin experiencing new health concerns alongside sudden industrial escalation, dismissal is not leadership—it is negligence.

This is not a theoretical policy debate. This is not partisan theater. This is happening in our front yards, in our children's bedrooms, and in the air we breathe. Families who have built their lives here for decades are being forced to absorb consequences they were never meaningfully consulted about.

Let me be clear: we are not anti-growth. We are not anti-business. We are anti-secrecy. We are anti-rubber-stamping. We are anti-sacrificing established neighborhoods for corporate acceleration without transparent safeguards.

We are demanding a full stop and full disclosure. Every plan. Every phase. Every enviro

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	Nicholas Hudson
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "Pollution from the xAI Power Plant."
Date:	Monday, January 19, 2026 3:48:48 PM

From: Nicholas Hudson <Nicholas.Adam.Hudson@gmail.com>
Subject: Pollution from the xAI Power Plant.

Message Body:
The xAI power plant at 2875 Stanton Rd Southaven, Mississippi is located less than five miles from residential neighborhoods. Natural gas turbines such as those used by the power plant are known by the EPA to release harmful air pollutants that disproportionately affect children and seniors. Thousands of homes are currently affected and any expansion of the site would only worsen the issue. The turbines need to be moved away from residential areas.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	Nikki Jones
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "AI turbine"
Date:	Thursday, February 12, 2026 9:22:29 AM

From: Nikki Jones <nikkijones109@gmail.com>
Subject: AI turbine

Message Body:
This needs to be denied. This Mississippi is already last in Heath, education and wealth so you all want us to be FURST in AI air pollution. Y'all do realize air move and the polluted air will not just stay in hinds county. So when it enters your neighborhood what will the solutions be. My mother has always told me ALL money is not GOOD money. And I have learned that to be true. Please do the right thing for ALL our children and the future not just YOUR wallets.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Noah Shelton <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 10:37 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "XAi"

From: Noah Shelton <noahshelton84@gmail.com>
Subject: XAi

Message Body:
WE DO NOT WANT XAI HERE POLLUTING, SICKENING, AND KILLING OUR ENVIRONMENT AND OUR PEOPLE!!!! XAI OUT NOW!!!

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Osaiyekemwen Okunbor <mdeqweb@mdeq.ms.gov>
Sent: Monday, February 16, 2026 8:22 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Elon Musk xAI pollution permit"

From: Osaiyekemwen Okunbor <jamoureve@gmail.com>
Subject: Elon Musk xAI pollution permit

Message Body:
Dear Mr. Bland,

Please do not give xAI the air pollution permit for the gas turbines. This is detrimental to the community and environment. It will destroy and ruin my community and the surrounding areas. Any amount of money is NOT worth it. The lives of people, my life, and the health of our environment cannot be bought, it is priceless.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: PATRICE FAUST <pfaust@bellsouth.net>
Sent: Tuesday, February 17, 2026 7:51 AM
To: Jeffrey Bland
Subject: No Turbines

This Message Is From an External Sender
This message came from outside your organization.

Dear Mr. Bland:

I strongly oppose the draft construction Permit for MZX Tech's gas-fired power plant at 2875 Stanton Road. This Permit would allow xAI to build and run 41permanent gas turbines, creating a large-scale industrial power plant in a residential area, directly impacting surrounding communities including Southaven, Horn Lake, and Memphis residents.

These communities are being asked to bear the health risks of MZX Tech's massive power plant. Communities deserve—and MDEQ is required to provide—complete and accurate information about the Site's operations and air emissions. Because the draft Permit fails to provide complete and accurate information, **I demand that the MDEQ Permit Board disapprove the Permit**.

The draft Permit fails to disclose that MZX Tech has *already* installed 27 so-called "temporary" turbines at the Site without any Permit at all and in disregard of federal requirements. The EPA recently confirmed the long-standing requirement that "temporary" turbines need construction Permits under the federal Clean Air Act. Many of the MZX Tech turbines have been operating for six months with no Permit. Yet the draft Permit makes no attempt to account for the 27 unpermitted turbines, neither including them in the emissions estimates for the Site nor requiring the best available pollution technology for them. The failure of the draft Permit to include at least 27 emissions units on the Site renders it deficient and makes it impossible for the community to understand the full scale of the Site's impact on air quality and public health.

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The Permit Board must disapprove the draft Permit and instruct MDEQ to:

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- Withdraw the draft Permit; and
- Revise the draft Permit before seeking public comment.

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It is imperative that the Permit Board disapprove the Permit because both MDEQ and the community must understand the full impact of the MZX Tech Site operations on air quality and address that impact as required by the Clean Air Act and Mississippi law. The area immediately around the MZX Tech power plant includes several residential neighborhoods, including Colonial Hills, Kingston Estates, Rasco Farms, and others along the Southaven/Horn Lake border. The power plant is within half of a mile from homes and just a mile from an elementary school. These communities have already been experiencing impacts of the 27 unpermitted turbines MZX Tech has installed at 2875 Stanton Road without a Permit, including increased noise, light, and air pollution.

But the air pollution from both the 27 unpermitted turbines and the proposed 41 turbines will extend far beyond the immediately adjacent neighborhoods. Southaven and Memphis share the air—and that air is already not meeting minimum federal smog standards. The greater Memphis-Clarksdale-Forrest City metro area, which includes Memphis and Southaven, also received an "F" for high ozone days for the most recent reporting period.[1] [docs.google.com]

While DeSoto County is currently classified as an ozone attainment area, MDEQ's own monitoring data presented at the A&WMA Southern Section Conference shows that DeSoto's 2024 design value is **71 ppb**, exceeding the 70 ppb federal ozone standard. This means that DeSoto is functionally in violation, even if formal nonattainment designations have not yet been made. Under the Clean Air Act, MDEQ must not treat an area trending into violation as if it were safely in attainment — especially when Permitting major new NOx sources that will make the problem worse.

In addition to ozone exceedances, the data used in the Permit's air modeling is misleading about current air quality conditions. The background pollution data for PM2.5 came from the Shelby Farms monitor in Tennessee, even though the Hernando monitor in DeSoto County is closer to the Site and more representative of local conditions. Instead of using this more accurate local data, the PM2.5 data relied on a cleaner monitor across state lines, misleading the public about the real pollution burden already faced by DeSoto County residents.

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Smog makes asthma and other respiratory illnesses worse.[2] [docs.google.com] Pollutants like smog are especially dangerous for children, who are more likely to develop respiratory illnesses like asthma.[3] [docs.google.com] Pregnant women and unborn children are also at risk from fossil fuel pollution.[4] [docs.google.com] According to the Asthma and Allergy Foundation, the Memphis Metro Area, including Memphis and Southaven, has among the highest rates in the U.S. of emergency room visits and deaths due to asthma.[5] [docs.google.com]

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likely understates the near-term health damages, since it does not take into account the 27 turbines already installed at the Site.

The Permit Board must disapprove this draft Permit and recognize that no revised version of this project can be reconciled with the region's legal, environmental, or public health obligations under the Clean Air Act. MDEQ itself "implored" MZX Tech to install pollution controls because of air quality concerns in DeSoto County. Now I am imploring you:

Follow the law. Protect the people. Disapprove the Permit.

Patrice Faust

From: Paul Rankin
To: Jeffrey Bland
Subject: MZX Tech Permit
Date: Tuesday, February 17, 2026 9:31:29 PM
Attachments: Public Comment to MDEQ.docx

This Message Is From an External Sender
This message came from outside your organization.

Please see attached.

Re: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

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Sincerely,

Paul M. Rankin II

753 Lenox Drive

Jackson, MS 39211

Jeffrey Bland

From: Peggy Neal <mdeqweb@mdeq.ms.gov>
Sent: Monday, February 16, 2026 10:39 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Gas Turbines in Southaven"

From: Peggy Neal <deanskunner7@gmail.com>
Subject: Gas Turbines in Southaven

Message Body:
It’s an absolute NO for me and my family. There are other states and areas that are not populated, build them there!

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Phil Garcia <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 9:40 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Noise pollution XAi"

From: Phil Garcia <rebnca@yahoo.com>
Subject: Noise pollution XAi

Message Body:
I lived under the Mphs airport flight paths in Greenbrier subdivision for many years. I now live in colonial hills 100 yards off hwy 51 n I can stand on my front porch at night or early morning. The turbine noise is very noticeable.

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R achel Villarreal

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387 Naples Rd

Jackson, MS 39206

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Sent: Tuesday, February 17, 2026 6:15 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Clean Air"

From: Ralph McKinney <mckinnr@gmail.com>
Subject: Clean Air

Message Body:
Be aware that XAI turbine runway is a silent killer and Health risk from combustion.

--
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While DeSoto County is currently classified as an ozone attainment area, MDEQ's own monitoring data presented at the A&WMA Southern Section Conference shows that DeSoto's 2024 design value is **71 ppb**, exceeding the 70 ppb federal ozone standard. This means that DeSoto is functionally in violation, even if formal nonattainment designations have not yet been made. Under the Clean Air Act, MDEQ must not treat an area trending into violation as if it were safely in attainment — especially when Permitting major new NOx sources that will make the problem worse.

[1] Memphis-Clarksdale-Forrest City, TN-MS-AR, Am. Lung Ass'n (2025), Memphis-Clarksdale-Forrest City, TN-MS-AR | American Lung Association.

In addition to ozone exceedances, the data used in the Permit's air modeling is misleading about current air quality conditions. The background pollution data for PM2.5 came from the Shelby Farms monitor in Tennessee, even though the Hernando monitor in DeSoto County is closer to the Site and more representative of local conditions. Instead of using this more accurate local data, the PM2.5 data relied on a cleaner monitor across state lines, misleading the public about the real pollution burden already faced by DeSoto County residents. At the 2025 A&WMA Southern Section Conference, MDEQ noted that the Hernando monitor recorded a PM2.5 annual average of **9.1 µg/m³**, which is above the EPA's annual standard of 9.0. That number was only brought below the limit after 13 exceptional events were excluded from the data.

At the same conference, MDEQ specifically identified **Desoto County as an area where it is "evaluating additional measures towards achieving attainment"** in reference to ozone and that the Memphis Metropolitan Area is an "area of priority." That means MDEQ is aware Desoto County has not been meeting the federal air quality standards and has been actively looking for ways to bring pollution levels back down. If MDEQ truly believes that additional measures are needed to *reduce* pollution in Desoto County, then Permitting a major new source of PM2.5 and NOx is inconsistent with MDEQ's own statements and puts the surrounding communities at even greater risk.

Smog makes asthma and other respiratory illnesses worse.[2] Pollutants like smog are especially dangerous for children, who are more likely to develop respiratory illnesses like asthma.[3] Pregnant women and unborn children are also at risk from fossil fuel pollution.[4] According to the Asthma and Allergy Foundation, the Memphis Metro Area, including Memphis and Southaven, has among the highest rates in the U.S. of emergency room visits and deaths due to asthma.[5]

The 41-turbine MZX Tech power plant alone is estimated to cause millions of dollars of health damages each year nationally, with the greatest effects centered in Shelby and DeSoto counties. The damages include, among other things, missed days of school and work due to respiratory illnesses.[6] This estimate likely understates the near-term health damages, since it does not take into account the 27 turbines already installed at the Site.

Across Mississippi, we understand that if MDEQ does nothing to protect some residents from living in literal toxicity, then we cannot count on MDEQ to protect any of us. The Permit Board must disapprove this draft Permit and recognize that no revised version of this project can be reconciled with the region's legal, environmental, or public health obligations under the Clean

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[2] Katherine Burgess, *SELC petitions EPA to say Memphis area in violation of ozone standards*, MLK50 JUSTICE THROUGH JOURNALISM (June 6, 2025), https://mlk50.com/2025/06/06/selc-petitions-epa-to-say-memphis-area-in-violation-of-ozone-standards/.

[3] EPA, Health Effects of Ozone Pollution (last visited February 7, 2026), Health Effects of Ozone Pollution | US EPA.

[4] Exposure to Air Pollution During Pregnancy Linked to Neurodevelopmental Issues | Columbia University Mailman School of Public Health; Ambient air pollution in critical windows of exposure and spontaneous miscarriage in a preconception cohort - ScienceDirect.

[5] 2025 Asthma Capitals: The Most Challenging Places to Live with Asthma, Asthma and Allergy Found. of Am. (2025), AAFA 2025 Asthma Capitals Report September 2025 (ranked 3rd for emergency room visits; 5th for deaths).

[6] Report TK.

Air Act. MDEQ itself "implored" MZX Tech to install pollution controls because of air quality concerns in DeSoto County. Now I am imploring you:

Follow the law. Protect the people. Disapprove the Permit.

Sincerely,



Ranjan Batra

1114 Lyncrest Avenue

Jackson, MS 39202

Jeffrey Bland

From: Rebecca Boyle <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 11:09 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "MDEQ - comment"

From: Rebecca Boyle <rboyle720@gmail.com>
Subject: MDEQ - comment

Message Body:
February 17, 2026 at 11:09PM

Jeffery Bland & the Mississippi Department of Environmental Quality (MDEQ) Permit Board:

I am Rebecca Boyle. I am a resident of Southaven, MS.

I'm aware there is a billionaire or two breathing down your neck, but progress should not come at the cost of the people of Southaven, MS. The laws surrounding the Clean Air Act are undoubtedly written in blood - there are reasons Mississippi has these laws in place.

Please, do not sacrifice the people of Southaven on the altar of greed in the name of progress.

We, the people of Southaven, are calling on you, MDEQ, to disapprove of the MZX Tech LLC (xAI's) permit to add an additional 41 "permanent" methane gas-fired turbines to the already operating 27 "temporary" methane gas-fired turbines that do not have a permit due to a loophole in the legal system that has since been been revised by the Environmental Protection Agency (EPA) on January 2025.

Please, halt all MZX Tech LLC (xAI's) "permanent" and "temporary" methane gas-fired turbines while the drafted permit is under review.

Thank you for your time.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Rebecca Boyle <mdeqweb@mdeq.ms.gov>
Sent: Sunday, February 15, 2026 4:28 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "The citizens of Southaven, MS are calling on you, you, Jeffery Bland & MDEQ Permit Board, to stop the Elon Musk's data centers and power plants from polluting Southaven, MS."

From: Rebecca Boyle <rboyle720@gmail.com>
Subject: The citizens of Southaven, MS are calling on you, you, Jeffery Bland & MDEQ Permit Board, to stop the Elon Musk's data centers and power plants from polluting Southaven, MS.

Message Body:
Jeffery Bland,

Elon Musk is seeking a permit to operate 41 permanent gas powered turbines - this does not include the 27 "temporary" gas powered turbines that have been operating without a permit since August 2025, in Southaven, MS

The EPA recently confirmed the long-standing requirement that "temporary" turbines need construction Permits under the federal Clean Air Act.

These gas turbines are polluting the air by creating smog.

Smog makes asthma and other respiratory illnesses worse. Pollutants like smog are especially dangerous for children, who are more likely to develop respiratory illnesses like asthma. Pregnant women and unborn children are also at risk from fossil fuel pollution.

According to the Asthma and Allergy Foundation, the Memphis Metro Area, including Memphis and Southaven, has among the highest rates in the U.S. of emergency room visits and deaths due to asthma.

The citizens of Southaven, MS are calling on you, you, Jeffery Bland & MDEQ Permit Board, to stop the Elon Musk's data centers and power plants from polluting Southaven, MS.

Sincerely,
Rebecca Boyle
rboyle720@gmail.com

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Rickie Hopkins <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 8:35 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "XaI"

From: Rickie Hopkins <rhopkins88@att.net>
Subject: XaI

Message Body:
What company's are going to supply the water and gas for this plant? How much of the cost is going to be passed on to the residents of Southaven and Desoto county? If the 41 gas turbines will generate enough power to power every home In Shelby County, as mentioned in the story, then they could do the same for us and cut our rates, especially for the residents living on SS. Have you ever lived within 20 miles of a chemical plant? There's not going to be a lot of difference in regards to the smell and health concerns. Whoever has come up with the idea of letting XaI come to Southaven did it for the monetary kickback.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Roque Matus <mdeqweb@mdeq.ms.gov>
Sent: Monday, February 16, 2026 11:40 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "MZX Technology LLC (xAI) Southaven Facility"

From: Roque Matus <roquematus101@gmail.com>
Subject: MZX Technology LLC (xAI) Southaven Facility

Message Body:
Dear Mr. Bland,

I am writing to formally object to the issuance of any Air Construction or Operating Permits for the xAI Colossus 2 facility at 2875 Stanton Road, Southaven. I demand an immediate Administrative Cease and Desist Order based on the following specific and logical findings:

1. The "Launch Intent" Smoking Gun On February 15, 2026, Elon Musk officially announced via X that "Grok 4.20 is finally out next week". This is clear evidence of the facility's motive for ongoing illegal operations. It is technically impossible for xAI to serve a model of Grok 4.20's scale (with its rumored 2 million+ token context window) without the 27 unpermitted methane gas turbines currently at the site, as the local grid connection is insufficient for such a massive "brute force" launch.

2. Thermal Evidence of Active Violations The most undeniable "smoking gun" is the thermal drone footage released on Friday, February 13, 2026, by The Guardian and Floodlight News. This high-resolution imagery proves that at least 15-18 of the 27 unpermitted turbines are in active use, directly contradicting claims of "temporary" or "emergency-only" operation. These machines are fueling the data center's current load in defiance of state and federal oversight.

3. Closed Federal Loophole As of January 15, 2026, the EPA's finalized NSPS Subpart KKKKa explicitly revoked the "portable engine" loophole. Large methane turbines are now classified as stationary sources requiring air permits even if used on a portable or temporary basis. xAI is currently operating what is functionally an illegal power plant producing 495 MW of electricity without any of the mandatory pollution controls.

4. Brute-Force Hardware vs. Efficient Research While industry leaders like Anthropic and Google (Gemini) prioritize architectural efficiency and research to reduce energy consumption (with Gemini 2.5 Pro requiring roughly 75x less energy per prompt than raw-scale competitors), xAI is attempting to dominate the AI ra

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From: Rowan Azooz
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "MZX Tech plant concerns"
Date: Monday, January 19, 2026 3:34:38 AM

From: Rowan Azooz <razoozen@gmail.com>
Subject: MZX Tech plant concerns

Message Body:
The MZX Tech plant at 2875 Stanton Rd Southaven, MS 38671 is running turbines and machines that are known to release emissions that can cause severe symptoms, including cancers, heart attacks, strokes and sudden infant death syndrome. Surrounding this plant, there are residential homes full of families who will suffer greatly due to the unregulation allowing this to happen. You need to step in and save your people!

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	Ruby Walker
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "xAI Turbines in Southaven"
Date:	Thursday, February 12, 2026 5:06:53 AM

From: Ruby Walker <rrowewalker@gmail.com>
Subject: xAI Turbines in Southaven

Message Body:
On behalf of my family and myself, I am speaking out AGAINST the permit for these air polluting turbines. We have enough pollution going on these days without Elon Musk bringing more with his stupid xAI turbines. He needs to take them and his stupid groot or grok or whatever that thing is called SOMEWHERE ELSE CAUSE WE DONT WANT IT HERE.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	Sabrina Hearst
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "xAI wind turbines near Southhaven"
Date:	Tuesday, February 10, 2026 9:23:31 AM

From: Sabrina Hearst <SabrinaHearst@earthlink.net>
Subject: xAI wind turbines near Southhaven

Message Body:
How as this ever approved?

We destroy one resource (actually more than one) for the scant possibility of maybe a hundred permanent jobs?
I am concerned about the known effects of massive data centers on the energy grid, water supply, and water quality for local residents, but also, in this case, how in the world did anyone think it's ok to install wind turbines along the Mississippi River flyway for birds?

Having grown up in central MS (Yazoo County), now as I approach my retirement years, I bought land in Yazoo and Holmes county specifically for the birds, and have been returning there for six weeks every March--May for the spring migration of birds. Additionally I've been looking at properties in Panola County for exactly the same purpose--to make it a site for people who want to visit Mississippi for the migration of birds.

What about all the land that is valuable for duck hunting? All the investments that come from in-state and out-of-state hunters?

What about sharing the planet with other species?

Here, we decide to approve machines that will destroy millions upon millions of bird lives--poof . . . it doesn't take much to see what this could do to permanently decimate the species that rely on the Mississippi flyway.

Please do NOT approve more wind turbines. Please consider all the large and permanent unintended consequences alongside any possible short-term and small consequences of the xAI center. WE are the stewards of this great planet with all its abundance; it's up to us to steward wisely.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From: Sam Boyd
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Ai air pollution"
Date: Tuesday, February 10, 2026 7:56:34 AM

From: Sam Boyd <symmeriashacol@yahoo.com>
Subject: Ai air pollution

Message Body:
The whole operation is inhumane.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Sara Jobe <sarajobe0926@gmail.com>
Sent: Tuesday, February 17, 2026 8:51 AM
To: Jeffrey Bland
Subject: Deny permit to MZX tech
Attachments: Public Comment Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC .docx

This Message Is From an External Sender
This message came from outside your organization.

-Sara Fields
Brandon, MS

Re: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Dear Mr. Bland:

As a Mississippian, I strongly oppose the draft construction Permit for MZX Tech's gas-fired power plant at 2875 Stanton Road. This Permit would allow xAI to build and run 41 permanent gas turbines, creating a large-scale industrial power plant in a residential area, directly impacting surrounding communities including Southaven, Horn Lake, and Memphis residents. We understand this all across Mississippi.

We understand that these communities are being asked to bear the health risks of MZX Tech's massive power plant. Across Mississippi we understand that if any of us are vulnerable to being left behind and unprotected from for-profit corporations by our government and MDEQ, then we *all* are vulnerable. Communities deserve—and MDEQ is required to provide—complete and accurate information about the Site's operations and air emissions. Because the draft Permit fails to provide complete and accurate information, **I demand that the MDEQ Permit Board disapprove the Permit**.

The draft Permit fails to disclose that MZX Tech has *already* installed 27 so-called "temporary" turbines at the Site without any Permit at all and in disregard of federal requirements. The EPA recently confirmed the long-standing requirement that "temporary" turbines need construction Permits under the federal Clean Air Act. Many of the MZX Tech turbines have been operating for six months with no Permit. Yet the draft Permit makes no attempt to account for the 27 unpermitted turbines, neither including them in the emissions estimates for the Site nor requiring the best available pollution technology for them. The failure of the draft Permit to include at least 27 emissions units on the Site renders it deficient and makes it impossible for the community to understand the full scale of the Site's impact on air quality and public health.

Internal correspondence from December 22 obtained by a public records request shows MDEQ staff were instructed to initiate the public comment period by January 15. The EPA submitted additional Permit comments on January 6, yet there does not appear to be any further public records available regarding those comments. If those final comments were incorporated into the Permit materials, documentation of that process should be available to the public. If not, the Permit was publicly noticed while key issues remained under review. Either way, the timeline suggests the process was shaped by internal deadlines rather than by transparency or completeness.

The draft Permit defines an "ambient air boundary" based on physical barriers around the current Site. However, according to DeSoto County land records, MZX Tech has purchased multiple additional parcels, including parcels adjacent to the Site, that are not effectively excluded from public access. Under EPA's regulatory definition, ambient air extends to areas where the public can access the outdoor air, and impacts in those areas must be included in air quality modeling. Because the Permit relies on a boundary that does not correspond to true ambient air, the emissions impacts to the surrounding community could be underestimated.

MDEQ must clarify the actual ambient air boundary, include all owned or controlled land in modeling, and reevaluate impacts accordingly.

The Permit Board must disapprove the draft Permit and instruct MDEQ to:

- Order MZX Tech to cease operating the 27 unpermitted turbines until it obtains a permit for them;
- Withdraw the draft Permit; and
- Revise the draft Permit before seeking public comment.

Even for the 41 turbines it proposes to authorize, the draft Permit fails to accurately characterize air pollution and require adequate protections. Among other things, the draft Permit downplays the ongoing violation of the minimum federal ozone standard in the Memphis metro area, which includes DeSoto County, and fails to require strict pollution controls and offsets for MZX Tech's NOx pollution required by Mississippi law. The draft Permit also underestimates the amount of harmful particulate matter and formaldehyde emissions from the turbines. For all of these reasons, the draft Permit fails to meet applicable requirements and **the Permit Board must disapprove the Permit**.

It is imperative that the Permit Board disapprove the Permit because both MDEQ and the community must understand the full impact of the MZX Tech Site operations on air quality and address that impact as required by the Clean Air Act and Mississippi law. The area immediately around the MZX Tech power plant includes several residential neighborhoods, including Colonial Hills, Kingston Estates, Rasco Farms, and others along the Southaven/Horn Lake border. The power plant is within half of a mile from homes and just a mile from an elementary school. These communities have already been experiencing impacts of the 27 unpermitted turbines MZX Tech has installed at 2875 Stanton Road without a Permit, including increased noise, light, and air pollution.

But the air pollution from both the 27 unpermitted turbines and the proposed 41 turbines will extend far beyond the immediately adjacent neighborhoods. Southaven and Memphis share the air—and that air is already not meeting minimum federal smog standards. The greater Memphis-Clarksdale-Forrest City metro area, which includes Memphis and Southaven, also received an "F" for high ozone days for the most recent reporting period.[1]

While DeSoto County is currently classified as an ozone attainment area, MDEQ's own monitoring data presented at the A&WMA Southern Section Conference shows that DeSoto's 2024 design value is **71 ppb**, exceeding the 70 ppb federal ozone standard. This means that DeSoto is functionally in violation, even if formal nonattainment designations have not yet been made. Under the Clean Air Act, MDEQ must not treat an area trending into violation as if it were safely in attainment — especially when Permitting major new NOx sources that will make the problem worse.

[1] Memphis-Clarksdale-Forrest City, TN-MS-AR, Am. Lung Ass'n (2025), Memphis-Clarksdale-Forrest City, TN-MS-AR | American Lung Association.

In addition to ozone exceedances, the data used in the Permit's air modeling is misleading about current air quality conditions. The background pollution data for PM2.5 came from the Shelby Farms monitor in Tennessee, even though the Hernando monitor in DeSoto County is closer to the Site and more representative of local conditions. Instead of using this more accurate local data, the PM2.5 data relied on a cleaner monitor across state lines, misleading the public about the real pollution burden already faced by DeSoto County residents. At the 2025 A&WMA Southern Section Conference, MDEQ noted that the Hernando monitor recorded a PM2.5 annual average of **9.1 µg/m³**, which is above the EPA's annual standard of 9.0. That number was only brought below the limit after 13 exceptional events were excluded from the data.

At the same conference, MDEQ specifically identified **Desoto County as an area where it is "evaluating additional measures towards achieving attainment"** in reference to ozone and that the Memphis Metropolitan Area is an "area of priority." That means MDEQ is aware Desoto County has not been meeting the federal air quality standards and has been actively looking for ways to bring pollution levels back down. If MDEQ truly believes that additional measures are needed to *reduce* pollution in Desoto County, then Permitting a major new source of PM2.5 and NOx is inconsistent with MDEQ's own statements and puts the surrounding communities at even greater risk.

Smog makes asthma and other respiratory illnesses worse.[2] Pollutants like smog are especially dangerous for children, who are more likely to develop respiratory illnesses like asthma.[3] Pregnant women and unborn children are also at risk from fossil fuel pollution.[4] According to the Asthma and Allergy Foundation, the Memphis Metro Area, including Memphis and Southaven, has among the highest rates in the U.S. of emergency room visits and deaths due to asthma.[5]

The 41-turbine MZX Tech power plant alone is estimated to cause millions of dollars of health damages each year nationally, with the greatest effects centered in Shelby and DeSoto counties. The damages include, among other things, missed days of school and work due to respiratory illnesses.[6] This estimate likely understates the near-term health damages, since it does not take into account the 27 turbines already installed at the Site.

Across Mississippi, we understand that if MDEQ does nothing to protect some residents from living in literal toxicity, then we cannot count on MDEQ to protect any of us. The Permit Board must disapprove this draft Permit and recognize that no revised version of this project can be reconciled with the region's legal, environmental, or public health obligations under the Clean

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[2] Katherine Burgess, *SELC petitions EPA to say Memphis area in violation of ozone standards*, MLK50 JUSTICE THROUGH JOURNALISM (June 6, 2025), https://mlk50.com/2025/06/06/selc-petitions-epa-to-say-memphis-area-in-violation-of-ozone-standards/.

[3] EPA, Health Effects of Ozone Pollution (last visited February 7, 2026), Health Effects of Ozone Pollution | US EPA.

[4] Exposure to Air Pollution During Pregnancy Linked to Neurodevelopmental Issues | Columbia University Mailman School of Public Health; Ambient air pollution in critical windows of exposure and spontaneous miscarriage in a preconception cohort - ScienceDirect.

[5] 2025 Asthma Capitals: The Most Challenging Places to Live with Asthma, Asthma and Allergy Found. of Am. (2025), AAFA 2025 Asthma Capitals Report September 2025 (ranked 3rd for emergency room visits; 5th for deaths).

[6] Report TK.

Air Act. MDEQ itself "implored" MZX Tech to install pollution controls because of air quality concerns in DeSoto County. Now I am imploring you:

Follow the law. Protect the people. Disapprove the Permit.

Sincerely,

[NAME]

[ADDRESS]

Jeffrey Bland

From: Sarah Houston <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 12:34 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Deny Air Permit for MZX / Southaven Power Plant"

From: Sarah Houston <sgwhouston@gmail.com>
Subject: Deny Air Permit for MZX / Southaven Power Plant

Message Body:
Thank you for having clear public engagement opportunities for the pending air permit Ref. No. 0680-00119. The massive expansion of gas turbines is a threat to our air quality and health. xAI and it's subsidiary companies have a huge power demand gap for their hyper scale data centers. This is a fact they have known since announcing at the Greater Memphis Chamber of Commerce luncheon in December 2024 their goal to build 1 million GPU worth of computing power. Water and power demand were never mentioned and requests for more information were ignored. For over a year, the company has been attempting to move at its own timeline, without coordination of local utilities and neighbors, pushing dozens of toxic, low efficiency gas turbines into backyards.

Fine particulate matter is not well measured or documented in the area, but the current health records can attest to unhealthy levels in our shared air. The addition of 41 permanent turbines at the Stanton Road Gas Plant are likely to result in premature deaths, increased hospital visits, and lost productivity. PPM is so impactful to the air we breath and approving this permit would be detrimental to so many lives -- including mine.

It is not MDEQ's job to support xAI & MZX aggressive data center timeline. It is your job to ensure the environmental conditions to do not impact people's health. Details in the permit and analysis from EmPower Analytics clearly state there will be negative effects to the air quality and my health. MDEQ and the Board must dismiss the unreasonable demands for expedited approval of this Permit.

Please deny this air permit. You must play a role in setting a precedent for sustainable economic development that does not threaten people's health or our shared air.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Savannah Posner <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 7:44 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "XAI"

From: Savannah Posner <posnersavannah@gmail.com>
Subject: XAI

Message Body:
Here's another thing that really bothers me about this situation. I happen to be a white lady, but the group of people these emissions have the strongest, deadliest, most crippling impact is on is a neighborhood with one of the highest rates of black people in the country. That was a long way to say, Musks group of goons feel confident they can get away with poisoning them/us because they don't believe we care about black people. They are betting that the Americans that can do something, believe black people don't matter. What disgusts me is that so far, they have been right. I urge you all to do better and hold this poor, victim of a billionaire to the same laws and regulations the rest of us have to follow.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Shakira Newsom <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 9:30 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Xai Development Concerns"

From: Shakira Newsom <shakiranewsom24@gmail.com>
Subject: Xai Development Concerns

Message Body:
Hello, I stay in the holmes-tulane neighborhood and I have seen the early development of the Xai building and I am not liking the commotion that it is causing. The large trucks are creating confusion and damaging our roads and I'm not too excited for the gas turbines to be operated. I've read that the gas turbines are running without an permit and that it can cause very bad air quality. There are already numerous plants over here that ruin our air quality and you all know that this will have a negative impact on our community. We deserve clean air and a safe neighborhood too.You all don't have to live here, we do.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Shannon Dixon <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 10:32 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "No permit for XAI"

From: Shannon Dixon <shannon@shannonmbdixon.com>
Subject: No permit for XAI

Message Body:
XAI has proven to be bad partners. They have operated illegal gas turbines and not lived up to promises made in Memphis (where are the jobs?). Don't get into bed with these untrustworthy folks.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From: sherwanda rochelle collins
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Stop the pollution"
Date: Monday, February 9, 2026 4:34:23 PM

From: sherwanda rochelle collins <collinsrosher1@gmail.com>
Subject: Stop the pollution

Message Body:
Not healthy not needed

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Stacey Abraham <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 4:38 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Public Comment – PSD Air Permit for MZX Tech (xAI) Facility, Southaven, MS"

From: Stacey Abraham <staceyabraham3@gmail.com>
Subject: Public Comment – PSD Air Permit for MZX Tech (xAI) Facility, Southaven, MS

Message Body:
Dear Members of the Mississippi Environmental Quality Permit Board,

My name is Stacey Abraham, LMSW, and I am a resident of Southaven, Mississippi. I live approximately 1.2 miles from the proposed MZX Tech (xAI) facility, measured in straight-line distance. I am submitting this written public comment regarding the Prevention of Significant Deterioration (PSD) air permit under consideration pursuant to the Clean Air Act PSD program (40 CFR §52.21).

My comments focus on environmental protection and public health, particularly for residents living in close proximity to the proposed facility.

Residents living closest to the site would experience a disproportionate and concentrated exposure burden, given proximity to emissions associated with large-scale power generation, including fine particulate matter (PM) and nitrogen oxides (NOx), which are known to adversely affect respiratory and cardiovascular health. As a licensed social worker, my professional ethics require attention to prevention of harm, protection of vulnerable populations, and cumulative environmental stressors, and I am concerned that nearby residents may be overburdened by sustained exposure over time.

If this permit is approved, I respectfully request that MDEQ require:

Enforceable and protective emission limits

Continuous and transparent air monitoring with public access to data

Clear corrective action protocols if emission limits are exceeded

Explicit consideration of cumulative impacts on residents living closest to the facility

Thank you for the opportunity to submit public comment and for your consideration.

Sincerely,
Stacey Abraham, LMSW
Southaven, Mississippi

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From: Stephanie Kunz
To: Jeffrey Bland
Subject: DENY A PERMIT to MZX TECH
Date: Tuesday, February 17, 2026 1:04:58 PM

This Message Is From an External Sender
This message came from outside your organization.

Re: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Dear Mr. Bland:

As a Mississippian, I strongly oppose the draft construction Permit for MZX Tech's gas-fired power plant at 2875 Stanton Road. This Permit would allow xAI to build and run 41 permanent gas turbines, creating a large-scale industrial power plant in a residential area, directly impacting surrounding communities including Southaven, Horn Lake, and Memphis residents. We understand this all across Mississippi.

We understand that these communities are being asked to bear the health risks of MZX Tech's massive power plant. Across Mississippi we understand that if any of us are vulnerable to being left behind and unprotected from for-profit corporations by our government and MDEQ, then we *all* are vulnerable. Communities deserve—and MDEQ is required to provide—complete and accurate information about the Site's operations and air emissions. Because the draft Permit fails to provide complete and accurate information, **I demand that the MDEQ Permit Board disapprove the Permit**.

The draft Permit fails to disclose that MZX Tech has *already* installed 27 so-called "temporary" turbines at the Site without any Permit at all and in disregard of federal requirements. The EPA recently confirmed the long-standing requirement that "temporary" turbines need construction Permits under the federal Clean Air Act. Many of the MZX Tech turbines have been operating for six months with no Permit. Yet the draft Permit makes no attempt to account for the 27 unpermitted turbines, neither including them in the emissions estimates for the Site nor requiring the best available pollution technology for them. The failure of the draft Permit to include at least 27 emissions units on the Site renders it deficient and makes it impossible for the community to understand the full scale of the Site's impact on air quality and public health.

Internal correspondence from December 22 obtained by a public records request shows MDEQ staff were instructed to initiate the public comment period by January 15. The EPA submitted additional Permit comments on January 6, yet there does not appear to be any further public records available regarding those comments. If those final comments were incorporated into the Permit materials, documentation of that process should be available to the public. If not, the Permit was publicly noticed while key issues remained under review. Either way, the timeline suggests the process was shaped by internal deadlines rather than by transparency or completeness.

The draft Permit defines an "ambient air boundary" based on physical barriers around the current Site. However, according to DeSoto County land records, MZX Tech has purchased multiple additional parcels, including parcels adjacent to the Site, that are not effectively excluded from public access. Under EPA's regulatory definition, ambient air extends to areas where the public can access the outdoor air, and impacts in those areas must be included in air quality modeling. Because the Permit relies on a boundary that does not correspond to true ambient air, the emissions impacts to the surrounding community could be underestimated. MDEQ must clarify the actual ambient air boundary, include all owned or controlled land in modeling, and reevaluate impacts accordingly.

The Permit Board must disapprove the draft Permit and instruct MDEQ to:

- Order MZX Tech to cease operating the 27 unpermitted turbines until it obtains a permit for them;
    - Withdraw the draft Permit; and
    - Revise the draft Permit before seeking public comment.

Even for the 41 turbines it proposes to authorize, the draft Permit fails to accurately characterize air pollution and require adequate protections. Among other things, the draft Permit downplays the ongoing violation of the minimum federal ozone standard in the Memphis metro area, which includes DeSoto County, and fails to require strict pollution controls and

offsets for MZX Tech's NOx pollution required by Mississippi law. The draft Permit also underestimates the amount of harmful particulate matter and formaldehyde emissions from the turbines. For all of these reasons, the draft Permit fails to meet applicable requirements and **the Permit Board must disapprove the Permit**.

It is imperative that the Permit Board disapprove the Permit because both MDEQ and the community must understand the full impact of the MZX Tech Site operations on air quality and address that impact as required by the Clean Air Act and Mississippi law. The area immediately around the MZX Tech power plant includes several residential neighborhoods, including Colonial Hills, Kingston Estates, Rasco Farms, and others along the Southaven/Horn Lake border. The power plant is within half of a mile from homes and just a mile from an elementary school. These communities have already been experiencing impacts of the 27 unpermitted turbines MZX Tech has installed at 2875 Stanton Road without a Permit, including increased noise, light, and air pollution.

But the air pollution from both the 27 unpermitted turbines and the proposed 41 turbines will extend far beyond the immediately adjacent neighborhoods. Southaven and Memphis share the air—and that air is already not meeting minimum federal smog standards. The greater Memphis-Clarksdale-Forrest City metro area, which includes Memphis and Southaven, also received an "F" for high ozone days for the most recent reporting period.

While DeSoto County is currently classified as an ozone attainment area, MDEQ's own monitoring data presented at the A&WMA Southern Section Conference shows that DeSoto's 2024 design value is **71 ppb**, exceeding the 70 ppb federal ozone standard. This means that DeSoto is functionally in violation, even if formal nonattainment designations have not yet been made. Under the Clean Air Act, MDEQ must not treat an area trending into violation as if it were safely in attainment — especially when Permitting major new NOx sources that will make the problem worse.

In addition to ozone exceedances, the data used in the Permit's air modeling is misleading about current air quality conditions. The background pollution data for PM2.5 came from the Shelby Farms monitor in Tennessee, even though the Hernando monitor in DeSoto County is closer to the Site and more representative of local conditions. Instead of using this more accurate local data, the PM2.5 data relied on a cleaner monitor across state lines, misleading the public about the real pollution burden already faced by DeSoto County residents.
At the 2025 A&WMA Southern Section Conference, MDEQ noted that the Hernando monitor recorded a PM2.5 annual average of **9.1 µg/m³**, which is above the EPA's annual standard of 9.0. That number was only brought below the limit after 13 exceptional events were excluded from the data.

At the same conference, MDEQ specifically identified **Desoto County as an area where it is "evaluating additional measures towards achieving attainment"** in reference to ozone and that the Memphis Metropolitan Area is an "area of priority." That means MDEQ is aware Desoto County has not been meeting the federal air quality standards and has been actively looking for ways to bring pollution levels back down. If MDEQ truly believes that additional measures are needed to *reduce* pollution in Desoto County, then Permitting a major new source of PM2.5 and NOx is inconsistent with MDEQ's own statements and puts the surrounding communities at even greater risk.

Smog makes asthma and other respiratory illnesses worse. Pollutants like smog are especially dangerous for children, who are more likely to develop respiratory illnesses like asthma. Pregnant women and unborn children are also at risk from fossil fuel pollution. According to the Asthma and Allergy Foundation, the Memphis Metro Area, including Memphis and Southaven, has among the highest rates in the U.S. of emergency room visits and deaths due to asthma.

The 41-turbine MZX Tech power plant alone is estimated to cause millions of dollars of health damages each year nationally, with the greatest effects centered in Shelby and DeSoto counties. The damages include, among other things, missed days of school and work due to respiratory illnesses. This estimate likely understates the near-term health damages, since it does not take into account the 27 turbines already installed at the Site.

Across Mississippi, we understand that if MDEQ does nothing to protect some residents from living in literal toxicity, then we cannot count on MDEQ to protect any of us. The Permit Board must disapprove this draft Permit and recognize that no revised version of this project can be reconciled with the region's legal, environmental, or public health obligations under the Clean Air Act. MDEQ itself "implored" MZX Tech to install pollution controls because of air quality concerns in DeSoto County. Now I am imploring you:

Follow the law. Protect the people. Disapprove the Permit.

Sincerely,

Stephanie Kunz

331 Indian Gate Cir

Ridgeland, MS 39157

Jeffrey Bland

From: Tammi Seyer <seyers@bellsouth.net>
Sent: Saturday, February 14, 2026 3:19 PM
To: Jeffrey Bland
Subject: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

This Message Is From an External Sender
This message came from outside your organization.

Dear Mr. Bland:

I strongly oppose the draft construction Permit for MZX Tech's gas-fired power plant at 2875 Stanton Road. This Permit would allow xAI to build and run 41 permanent gas turbines, creating a large-scale industrial power plant in a residential area, directly impacting surrounding communities including Southaven, Horn Lake, and Memphis residents.

These communities are being asked to bear the health risks of MZX Tech's massive power plant. Communities deserve—and MDEQ is required to provide—complete and accurate information about the Site's operations and air emissions. Because the draft Permit fails to provide complete and accurate information, I demand that the MDEQ Permit Board disapprove the Permit.

The draft Permit fails to disclose that MZX Tech has *already* installed 27 so-called "temporary" turbines at the Site without any Permit at all and in disregard of federal requirements. The EPA recently confirmed the long-standing requirement that "temporary" turbines need construction Permits under the federal Clean Air Act. Many of the MZX Tech turbines have been operating for six months with no Permit. Yet the draft Permit makes no attempt to account for the 27 unpermitted turbines, neither including them in the emissions estimates for the Site nor requiring the best available pollution technology for them. The failure of the draft Permit to include at least 27 emissions units on the Site renders it deficient and makes it impossible for the community to understand the full scale of the Site's impact on air quality and public health.

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The Permit Board must disapprove the draft Permit and instruct MDEQ to:

- Order MZX Tech to cease operating the 27 unpermitted turbines until it obtains a permit for them;
- Withdraw the draft Permit; and
- Revise the draft Permit before seeking public comment.

Even for the 41 turbines it proposes to authorize, the draft Permit fails to accurately characterize air pollution and require adequate protections. Among other things, the draft Permit downplays the ongoing violation of the minimum federal ozone standard in the Memphis metro area, which includes DeSoto County, and fails to require strict pollution controls and offsets for MZX Tech's NOx pollution required by Mississippi law. The draft Permit also underestimates the amount of harmful particulate matter and formaldehyde emissions from the turbines. For all of these reasons, the draft Permit fails to meet applicable requirements and the Permit Board must disapprove the Permit.

It is imperative that the Permit Board disapprove the Permit because both MDEQ and the community must understand the full impact of the MZX Tech Site operations on air quality and address that impact as required by the Clean Air Act and Mississippi law. The area immediately around the MZX Tech power plant includes several residential neighborhoods, including Colonial Hills, Kingston Estates, Rasco Farms, and others along the Southaven/Horn Lake border. The power plant is within half of a mile from homes and just a mile from an elementary school. These communities have already been experiencing impacts of the 27 unpermitted turbines MZX Tech has installed at 2875 Stanton Road without a Permit, including increased noise, light, and air pollution.

But the air pollution from both the 27 unpermitted turbines and the proposed 41 turbines will extend far beyond the immediately adjacent neighborhoods. Southaven and Memphis share the air—and that air is already not meeting minimum federal smog standards. The greater Memphis-Clarksdale-Forrest City metro area, which includes Memphis and Southaven, also received an "F" for high ozone days for the most recent reporting period.

While DeSoto County is currently classified as an ozone attainment area, MDEQ's own monitoring data presented at the A&WMA Southern Section Conference shows that DeSoto's 2024 design value is 71 ppb, exceeding the 70 ppb federal ozone standard. This means that DeSoto is functionally in violation, even if formal nonattainment designations have not yet been made. Under the Clean Air Act, MDEQ must not treat an area trending into violation as if it were safely in attainment — especially when Permitting major new NOx sources that will make the problem worse.

In addition to ozone exceedances, the data used in the Permit's air modeling is misleading about current air quality conditions. The background pollution data for PM2.5 came from the Shelby Farms monitor in Tennessee, even though the Hernando monitor in DeSoto County is closer to the Site and more representative of local conditions. Instead of using this more accurate local data, the PM2.5 data relied on a cleaner monitor across state lines, misleading the public about the real pollution burden already faced by DeSoto County residents.
At the 2025 A&WMA Southern Section Conference, MDEQ noted that the Hernando monitor recorded a PM2.5 annual average of 9.1 $\mu g/m^3$, which is above the EPA's annual standard of 9.0. That number was only brought below the limit after 13 exceptional events were excluded from the data.

At the same conference, MDEQ specifically identified Desoto County as an area where it is "evaluating additional measures towards achieving attainment" in reference to ozone and that the Memphis Metropolitan Area is an "area of priority." That means MDEQ is aware Desoto County has not been meeting the federal air quality standards and has been actively looking for ways to bring pollution levels back down. If MDEQ truly believes that additional measures are needed to *reduce* pollution in Desoto County, then Permitting a major new source of PM2.5 and NOx is inconsistent with MDEQ's own statements and puts the surrounding communities at even greater risk.

Smog makes asthma and other respiratory illnesses worse. Pollutants like smog are especially dangerous for children, who are more likely to develop respiratory illnesses like asthma. Pregnant women and unborn children are also at risk from fossil fuel pollution. According to the Asthma and Allergy Foundation, the Memphis Metro Area, including Memphis and Southaven, has among the highest rates in the U.S. of emergency room visits and deaths due to asthma.

The 41-turbine MZX Tech power plant alone is estimated to cause millions of dollars of health damages each year nationally, with the greatest effects centered in Shelby and DeSoto counties. The damages include, among other things, missed days of school and work due to respiratory illnesses. This estimate likely understates the near-term health damages, since it does not take into account the 27 turbines already installed at the Site.

The Permit Board must disapprove this draft Permit and recognize that no revised version of this project can be reconciled with the region's legal, environmental, or public health obligations under the Clean Air Act. MDEQ itself "implored" MZX Tech to install pollution controls because of air quality concerns in DeSoto County. Now I am imploring you:

Follow the law. Protect the people. Disapprove the Permit.

Thank you,

Tammi Seyer
901-831-5861

Jeffrey Bland

From: Tevin Williams <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 10:19 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Problem with breathing"

From: Tevin Williams <Tevinwilliams44@gmail.com>
Subject: Problem with breathing

Message Body:
I haven’t been having good night sleep every since Elon Musk business came to Southaven and my breathing getting worse from the air pollution coming from the his business I live a mile away from it in Southaven

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Valerie Samaniego <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 6:38 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC"

From: Valerie Samaniego <valeries5709@gmail.com>
Subject: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Message Body:
Dear Mr. Bland:

I strongly oppose the draft construction Permit for MZX Tech's gas-fired power plant at 2875 Stanton Road. This Permit would allow xAI to build and run 41 permanent gas turbines, creating a large-scale industrial power plant in a residential area, directly impacting surrounding communities including Southaven, Horn Lake, and Memphis residents.

The Permit Board must disapprove this draft Permit and recognize that no revised version of this project can be reconciled with the region's legal, environmental, or public health obligations under the Clean Air Act. MDEQ itself "implored" MZX Tech to install pollution controls because of air quality concerns in DeSoto County. Now I am imploring you:

Follow the law. Protect the people. Disapprove the Permit.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Valerie Samaniego <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 10:39 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC"

From: Valerie Samaniego <valeries5709@gmail.com>
Subject: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Message Body:
The environmental impact that this facility will have is too great a cost for the people, plants, and animals that call this place home to take. If approved the emissions from this facility will make the very air that we breathe posionus. The water that we drink to live will instead be siphoned to cool down those machines and rendered unusable after being pumped full of chemicals. The amount of energy it will take to run this facility will be the same as a whole city. The cost of living here will skyrocket. Ai should not take priority over the living people, plants, and animals that call this area home.
Follow the law. Protect the people. Disapprove the Permit.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Verónica Marquez <mdeqweb@mdeq.ms.gov>
Sent: Monday, February 16, 2026 9:07 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Reject to xAI's gas turbine proposal"

From: Verónica Marquez <marquezl9@aol.com>
Subject: Reject to xAI's gas turbine proposal

Message Body:
My name is Veronica Marquez, and I live in Southaven, Mississippi. I just read about this news: a permit has been requested to install gas turbines in the area, and I'm very worried about it. Unfortunately, it's always those of us who live in poor areas who bear the consequences. I'm concerned about the air quality, the pollution, and the plummeting value of our homes and all the consequences this project could bring to our neighborhood, I don't.'t know if writing this message will do any good, but I want to express my discontent. I hope this permit isn't granted.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Victor H Wheatley <mdeqweb@mdeq.ms.gov>
Sent: Monday, February 16, 2026 9:32 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Public Hearing 02/17/2026 MZX Tech, LLC (“MZX”), located at 2875 Stanton Road in Southaven, Mississippi,"

From: Victor H Wheatley <oshawiz@att.net>
Subject: Public Hearing 02/17/2026 MZX Tech, LLC (“MZX”), located at 2875 Stanton Road in Southaven, Mississippi,

Message Body:
DATE: 02/16/2026

FROM: Victor H Wheatley (oshawiz@att.net)

TO: Mississippi Environmental Quality Permit Board: Jeffrey Bland (OPC-EPD-Air I Branch)

REFERENCE: Public Hearing 02/17/2026 MZX Tech, LLC (“MZX”), located at 2875 Stanton Road; Southaven, Mississippi; Northwest Mississippi Community College’s, Desoto County campus in Southaven, Mississippi

REQUEST FOR CORRECTIVE ACTION: Mississippi Department of Environmental Quality (MEDQ) to provide a proposed implementation strategy and schedule; whereas MDEQ seeks to review and amend the agency’s air emission regulations – titled ““Regulations for the Prevention, Abatement, and Control of Air Contaminants” (Mississippi Administrative Code, Title 11, Part 2, Chapter 1) Amended May 24, 2018. The State of Mississippi being state plan compliant; whereas, to approve and adopt the Environmental Protection Agency (EPA) Final rule: 40 CFR Part 60 [EPA–HQ–OAR–2024–0419; FRL–11542–02– OAR] RIN 2060–AW21 New Source Performance Standards Review for Stationary Combustion Turbines and Stationary Gas Turbines (effective on January 15, 2026).

NORTH MISSISSIPPI DELTA CITIZEN’S RECOMMENATION: MDEQ Air Division as being responsible, accountable and transparent for ensuring that air quality protects the public health and welfare. Whereas MDEQ being charged with controlling, preventing, and abating air pollution to achieve compliance with air emission regulations pursuant to the Mississippi Air and Water Pollution Control Act, applicable regulations promulgated by the EPA Final rule: 40 CFR Part 60 [EPA–HQ–OAR–2024–0419; FRL–11542–02– OAR] RIN 2060–AW21 New Source Performance Standards Review for Stationary Combustion Turbines and Stationary Gas Turbines. Therewith in adding a subcategory for stationary combustion turbines that are used in temporary applications (data center infrastructure and operations), exempting certain sources from title V requirements, and finalizing other provisions as per the federal Clean Air Act.

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This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	Wallace West
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "xAi - Environmental health concerns"
Date:	Tuesday, January 20, 2026 5:01:48 AM

From: Wallace West <fakemailsorryman@gmail.com>
Subject: xAi - Environmental health concerns

Message Body:
Hello, I am someone from out of the state who is very much concerned on behalf of people living in the area around the xAi Power Plant located on 2875 Stanton Rd S, Southaven, MS 38671. The turbines, of which there are 18 and soon to be 41 at the plant, produce toxic pollution that can cause health issues for everyone living nearby, of which there are a concerning amount of people, as the plant is located too close to residential areas.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	Warren L Conway
To:	Jeffrey Bland; MDEQ Web
Subject:	MDEQ Website Message - "xAI Data Center Permit"
Date:	Monday, February 9, 2026 4:45:09 PM

From: Warren L Conway <warren@warrenconwaylaw.com>
Subject: xAI Data Center Permit

Message Body:
The American Lung Association has given the Memphis area—including both Memphis,Tenn. And Southaven, Miss., an “F” for smog pollution. There must be strong demands to MDEQ to protect the residents of Mississippi, and given the location, to consider the continued harm of the residents in Memphis for their air quality.

Gas turbines that are used to power an entire data center, like the xAI facility, require strong permits because strict safeguards are one of the tangible ways to see environmental justice in frontline communities. Without that information in the permit, companies can decide not to add the best safety technology on their site. They may also decide not to disclose certain information that would be required with a strong permit.

In order to adequately protect the Southaven community and the entire state of Mississippi as well as the surrounding states, strong permits with strong guidelines is a must. It is better to completely deny them a permit rather than to allow them to operate without any concerns for the people of these communities, including me.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Will Means <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 11:00 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "xAI turbines"

From: Will Means <willmeans@pm.me>
Subject: xAI turbines

Message Body:
I am writing to share my desire to reconsider the location of xAI natural gas turbines near residential areas. I understand they may bring big technological and economic boons to the area, but we should adopt this technology more wisely.

Our community is worried about the noise and air pollution these turbines would bring to our backyards. Please consider the quality of life in our residential zones by relocating these turbines to a less populated area or an appropriate industrial zone better suited for this infrastructure.

Will Means

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Wren Cates <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 6:58 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "XAI new turbines"

From: Wren Cates <wrencates@gmail.com>
Subject: XAI new turbines

Message Body:
The proposed new gas turbine for the xai plant with further pollute an area already facing severe health threats from bad air. The air near the AI plant smells like sewage. This proposal to further pollute the Area is unjust and harmful to the community

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Calandra Davis <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 4:52 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "MZX Tech Permit Comment - American Lung Association Pt. 2"

Categories: Red Category

From: Calandra Davis <calandra.davis@lung.org>
Subject: MZX Tech Permit Comment - American Lung Association Pt. 2

Message Body:
Research has shown that people of color are more likely to be exposed to air pollution and more likely to suffer harm to their health from air pollution than white people. This is due to a long history of systemic issues that have caused economically disadvantaged communities where sources of pollution are located. People of color are also more likely than white people to be living with one or more chronic conditions that make them more susceptible to the health impacts of air pollution, including asthma and diabetes.

Fossil fuels are a root cause of our air pollution and climate burdens. Expanding methane-burning gas turbines into Southaven will further exacerbate Desoto County's air pollution burdens and perpetuate environmental injustice.

With over 4,000 data centers across the United States – and thousands more planned – energy demand is only growing. Major projects come with power needs that can exceed those of entire cities. It is critical that the power needs of data centers do not add to local pollution burdens and that they instead rely on new, non-combustion renewable energy resources for both baseline and backup power. Developing clean, renewable, non-combustion sources of electricity – like solar, wind, geothermal and tidal – is critical for lung health and must be part of this proposal. These zero-emission sources of power can dramatically reduce health harms and premature deaths, both in the immediate term and over the long-term due to climate change.

Data centers must be developed with sensitivity to regional air quality, local utility consumer costs and broader sustainability needs. Projects must be developed with full and fair opportunities for community members, health experts and air quality agencies to engage in permitting, siting and other decisions to ensure the cleanest technologies and community protections are in place. This proposal did not do so.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Justin J. Pearson <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 5:38 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Please deny MZX PSD Permit"

From: Justin J. Pearson <justinjpearson1@gmail.com>
Subject: Please deny MZX PSD Permit

Message Body:
Please Deny MZX Tech's PSD permit.

2. Research from Harvard-trained professors has shown us that the consequences of these polluters operating in our community could lead to death. The increase in PM2.5 is being understated by the company but even so we have learned that there is likely an increase in death from 1.9-2.8 more people due to the increase in exposure of this plant's permit was approved. Please do not ignore that our counties of Shelby, DeSoto, and Crittenden are in nonattainment when it comes to ground level ozone pollution. This company exacerbates the problem without a single offset for the pollution they're creating.

3. Their lie or understatement about the levels of PM2.5 should slow down any approval due to how egregious the error in calculating the consequences. They claim their 41 turbines will only create 19.5 tons of PM2.5 pollution while creating 1.2 Gigagwatts of power. However, the TVA Southaven plant which creates 800 Megawatts of power creates 315 tons of PM2.5 which is dangerous to human health. They cannot explain this discrepancy and it shouldn't be on the public to find this out. They need to do revisions and follow proper guidelines and protocol. Please protect the health of my citizens and constituents.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Rebecca Boyle <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 11:11 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Please, halt all MZX Tech LLC (xAI's) "permanent" and "temporary" methane gas-fired turbines while the drafted permit is under review."

From: Rebecca Boyle <rboyle720@gmail.com>
Subject: Please, halt all MZX Tech LLC (xAI's) "permanent" and "temporary" methane gas-fired turbines while the drafted permit is under review.

Message Body:
February 17, 2026 at 11:11PM

Jeffery Bland & the Mississippi Department of Environmental Quality (MDEQ) Permit Board:

I am Rebecca Boyle. I am a resident of Southaven, MS.

We, the people of Southaven, are calling on you, MDEQ, to disapprove of the MZX Tech LLC (xAI's) permit to add an additional 41 "permanent" methane gas-fired turbines to the already operating 27 "temporary" methane gas-fired turbines that do not have a permit due to a loophole in the legal system that has since been been revised by the Environmental Protection Agency (EPA) on January 2025.

Please, halt all MZX Tech LLC (xAI's) "permanent" and "temporary" methane gas-fired turbines while the drafted permit is under review.

Thank you for your time.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Calandra Davis <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 4:53 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "MZX Tech Permit Comment - American Lung Association Pt. 3"

Categories: Red Category

From: Calandra Davis <calandra.davis@lung.org>
Subject: MZX Tech Permit Comment - American Lung Association Pt. 3

Message Body:
The American Lung Association recommends that the Mississippi Department of Environmental Quality delay the approval of this permit request from MZX Tech, LLC as more information is needed on the climate and health impacts of this project. The American Lung Association looks forward to continued collaboration to safeguard Mississippians' health and secure a climate-resilient future. We appreciate the opportunity to engage in this process and work towards clean air for all Mississippi residents.

Sincerely,

Calandra Davis
Director, Advocacy
American Lung Association, Mississippi

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Whitney Allegrezza <whitney.allegrezza@gmail.com>
Sent: Monday, February 16, 2026 11:08 PM
To: Jeffrey Bland
Subject: Re: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC
Attachments: Turbine-noise.MOV

This Message Is From an External Sender
This message came from outside your organization.

Dear Mr Bland,

I've lived in the Kingston Estates subdivision in Horn Lake for over 20 years. My house is 9/10 of a mile away from the MZX site. I previously enjoyed living in a quiet neighborhood, but over the last month the turbine noise has gotten so loud that I can hear it in my house over my television. I can hear it while I'm trying to sleep. It's a horrible jet engine noise along with incessant beeps that sound like a truck backing up all night. The noise stresses me out and makes my chest hurt. It makes it hard to sleep at night. During this time I've been experiencing heart palpitations and nosebleeds. My eyes burn. I run 5 times a week and now I'm noticing that when I run, the inside of my nose and throat hurts and my lungs feel strange. I guess I shouldn't exercise anymore because I'm inhaling a greater amount of pollution while doing so. This upsets me because even prison inmates get to work out.

These turbines are known to create hazardous air particles and emit cancerous substances such as benzene, toluene and formaldehyde. So, not only do they cause respiratory and cardiovascular problems, but they also cause cancer. Proximity to these pollutants is known to elevate risk. These turbines are too close to existing residential areas and children are known to be disproportionately affected by pollution. The Permit Board must disapprove the permit for 41 additional permanent turbines because a failure to do so would knowingly increase the danger to nearby residents, including children.

Effective January 15 2026, the EPA stated that temporary turbines must have permits. MS Code 49-17-29 also states that it is illegal to operate these turbines without a permit. Yet the turbines continue to run illegally. In accordance with state and federal law, these turbines should be shut down immediately.

Please protect our families. Shut down the turbines and disapprove the permit.

Sincerely,

Whitney Allegrezza

Attached, please find a video of the turbine noise and beeping at 9:13pm at night on February 7, 2026.

Jeffrey Bland

From: Ashley Lyons <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 4:32 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Almost 30 turbines with no permit? Not to mention they're ignoring the EPA? Please say no to giving them a permit until they can follow the rules!"

From: Ashley Lyons <ash.lyonsa@gmail.com>
Subject: Almost 30 turbines with no permit? Not to mention they're ignoring the EPA? Please say no to giving them a permit until they can follow the rules!

Message Body:
Mr. Bland (and to whom it may concern),

My name is Ashley, and I live in Mississippi. As a resident of Olive Branch that is not only 30 minutes away from the xAI facility, but who visits Southhaven often for errands and work, I would be very relieved and hopeful about the future of our lovely state if you would reject this permit. Even if a new, future permit is allowed after the below issues have been solved, there is a mounting pile of evidence that those running this xAI facility are ALREADY failing, flagrantly so, to respect the law or the protections for the environment they work within. Here are a few major points from articles that discuss current harmful practices (ongoing as of 4 days ago):

A Guardian article on this exact facility seems to imply that there are "loopholes" for producing pollution at a level that is not allowed, despite the EPA's clear guidelines against the pollution itself:
https://urldefense.com/v3/__https://www.theguardian.com/environment/2026/feb/13/elon-musk-xai-datacenters-air-pollution-mississippi__;!!G3AUQnCt!iS79eMIubk5s0P35kgBKDNkVBkWLgOKNgTnlF62ttfjWKFsD2vbduw7l2c3hZXkLWMKJd8BSjPMCpzyRyNsQpgw$

An article from today echoes the words of your colleague, Representative Pearson, who stated this permit will result not only in preventable deaths (can we really look even three families in the eye per year to explain this, when this facility was already breaking laws?) but also a great, multi-million dollar cost to the state of MS:
https://urldefense.com/v3/__https://wreg.com/news/local/xai-memphis/xais-data-center-accused-of-violating-clean-air-act/__;!!G3AUQnCt!iS79eMIubk5s0P35kgBKDNkVBkWLgOKNgTnlF62ttfjWKFsD2vbduw7l2c3hZXkLWMKJd8BSjPMCpzyR8DrktdM$

Multiple budding lawsuits, from the NAACP to the Southern Environmental Law Center, are also being brought to the attention of the public. Links not included to accommodate the word limit; my apologies.

With all of this in mind, from personal, professional, environmental, financial, and ethical standpoints, I do not believe this permit should be granted. Perhaps when xAI can follow the law, we could consider giving them another chance.

Thank you for your time and attention.

Best always,
Ashley Lyons

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Martha Kelly <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 5:49 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "xAI"

From: Martha Kelly <m1marthakelly@aol.com>
Subject: xAI

Message Body:
Please do not give xAI more permits to operate. They are depleting our pristine aquifer and poisoning our air. It's terrible business for our region -- using up our resources for almost no jobs.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Mary Hannah Alexander <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 10:34 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Do NOT Approve XAI's Colossus 2 in Southaven"

From: Mary Hannah Alexander <maryhannahmary1@gmail.com>
Subject: Do NOT Approve XAI's Colossus 2 in Southaven

Message Body:
MZX Tech is violating the Clean Air Act by operating turbines without a permit.

There are already up to 27 turbines installed and operating on site that are not mentioned in the permit application.

An additional 41 permanent turbines would significantly increase air pollution and negatively impact local air quality.

I demand that the Permit Board disapprove MZX Tech's permit.

This is NOT a good thing for our community. How dare our leaders jeopardize our health & futures? We already have F grade air quality. How on earth are our leaders not asking the serious questions required to consider bringing something like this to our neighborhoods?!

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Matthew Hamby <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 5:51 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "xAI Facility in Southaven MS"

From: Matthew Hamby <mhamby2347@gmail.com>
Subject: xAI Facility in Southaven MS

Message Body:
1. I am concerned that the xAI turbines are operating so close to residential areas. Health impacts from PM2.5 and NOx emissions are most pronounced for children and older adults, particularly when exposure occurs close to residential neighborhoods. These turbines need to be further way from people's homes. If you expand this site you will increase the danger to nearby residents including children.

2. Children and seniors face increased health risks from air pollution when facilities are located near residential areas. There are neighborhoods less than a mile away from the xAI site. There are thousands of homes within 5 miles of this site. This site needs to be moved further away from existing residential areas. Expanding this site is going to increase the harm that's already being done without these people's consent.

3. The xAi turbines are already operating too close to thousands of homes. Children, elderly residents, and those living closest to the facility should be explicitly considered in this environmental review. These turbines are known by the EPA to release hazardous air particles such benzene, toluene, and formaldehyde. If you expand this site you increase the risk of these people getting cancer.

4. Proximity matters for air pollution exposure, and children and elderly residents that live within a few miles of these turbines face elevated respiratory and cardiovascular risk. Now you're going to add more turbines and increase that risk? You need to move these turbines away from families.

5. Expanding these turbines near neighborhoods warrants careful review due to increased health risks for children and older adults living in close proximity. What studies were done to protect the health of nearby residents? These turbines have known health risks. Move these turbines away from peoples homes.

6. I am concerned that approving expansion without baseline air-quality data limits the ability to assess future environmental and health impacts.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Michelle Culbreath <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 9:16 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "MZX Tech (xAi) permit"

From: Michelle Culbreath <michbob2@sbcglobal.net>
Subject: MZX Tech (xAi) permit

Message Body:
February 17, 2026

Dear Jeffrey Bland and Members of the MDEQ Board,

I am writing to express my deep concerns regarding the proposed establishment of 41 methane gas turbines in my son, daughter-in-law and grandchildren's community of Southaven MS impacting the citizens of both Mississippi and Tennessee. This project raises significant health and environmental issues that cannot be overlooked and the potential for toxic pollutants emitted from these turbines poses a grave threat to the health of my family and the residents within its range, especially children. Pollutants such as nitrogen oxides, particulate matter, and volatile organic compounds will infiltrate their lungs and exacerbate respiratory illnesses, allergies, and other serious health conditions. The children including my grandchildren who are particularly susceptible, may face lifelong ailments, adversely affecting their quality of life and development.

Please take a moment to imagine a future where families live under a cloud of harmful emissions, where children cough and wheeze during play, where daily life is overshadowed by the fear of health complications. This is not a reality any of us should accept so I implore you to prioritize the well-being of this community over the allure of short-term economic gain.

I urge the board to reconsider this project, taking into account the long-term health implications for the residents and the importance of maintaining a safe and healthy environment for ALL the residents you serve rather than the corporations and billionaires. I am assuming that all of you who sit on this board are level headed, caring individuals and will do further testing to receive additional answers with which to make an intelligent decision. I love my family and am concerned for their quality of life or lack thereof. I believe they deserve your focused attention to this critical issue.

Thank you for hearing me out.

Sincerely,
Michelle Culbreath
108 Valarian Dr
Crossville TN 38558

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Oceana R. Gilliam <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 8:11 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "DENY XAI's PERMIT"

From: Oceana R. Gilliam <oceana.gilliam@gmail.com>
Subject: DENY XAI's PERMIT

Message Body:
We implore you to deny xAI's permit. The pollution from their turbines is not worth the injury and harm on communities it causes.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Tonya Bess-Force <mdeqweb@mdeq.ms.gov>
Sent: Thursday, February 12, 2026 2:27 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "AI turbines"

From: Tonya Bess-Force <tonyafloyd24@gmail.com>
Subject: AI turbines

Message Body:
No no no the ones they have already causes me health problems. I can't eat or sleep because of the constant vibration and noise. I use to be out going and done all sorts of stuff. I loved playing around with my family and friends but now I just stay tired and nauseous non stop. Enough is enough I want my life back. This has effected my whole family and im sick of it.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: daniel arata <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 8:52 AM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "we need it"

From: daniel arata <danielarata@att.net>
Subject: we need it

Message Body:
we need it build it will bring jobs there

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

Jeffrey Bland

From: Sydne Hopkins <mdeqweb@mdeq.ms.gov>
Sent: Tuesday, February 17, 2026 7:11 PM
To: Jeffrey Bland; MDEQ Web
Subject: MDEQ Website Message - "Do Not Permit Air Pollution - xAI"

From: Sydne Hopkins <sydnen2004@yahoo.com>
Subject: Do Not Permit Air Pollution - xAI

Message Body:
The action to permit 41 gas turbines to pollute out cities shows a genuine loss of respect for our fellow citizens and natural systems that SUFFER from this. xAI is a blight upon our community. Taking incentives in exchange for permitted pollution is dirtier than the pollution itself. Please show regard and dignity toward your community and do not let this permit become real. Thank you for your time.

--
This e-mail was sent from a contact form on MDEQ (https://mdeq.ms.gov)

From:	Jen Robbins
To:	Jeffrey Bland
Subject:	Re: Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC
Date:	Thursday, February 12, 2026 9:02:54 AM
Attachments:	Re Air Ref. No. 0680-00119 for MZX Tech LLC.pdf

This Message Is From an External Sender
This message came from outside your organization.

Dear Mr. Bland,

Please see my attached comment on the proposed action: Initial Issuance of a Prevention of Significant Deterioration Construction Permit, Air Ref. No. 0680-00119.

Respectfully,
Jennifer Robbins

Dear Mr. Bland:

I strongly oppose the draft construction Permit for MZX Tech's gas-fired power plant at 2875 Stanton Road. This Permit would allow xAI to build and run 41 permanent gas turbines, creating a large-scale industrial power plant in a residential area, directly impacting surrounding communities including Southaven, Horn Lake, and Memphis residents.

These communities are being asked to bear the health risks of MZX Tech's massive power plant. Communities deserve—and MDEQ is required to provide—complete and accurate information about the Site's operations and air emissions. Because the draft Permit fails to provide complete and accurate information, **I demand that the MDEQ Permit Board disapprove the Permit**.

The draft Permit fails to disclose that MZX Tech has *already* installed 27 so-called "temporary" turbines at the Site without any Permit at all and in disregard of federal requirements. The EPA recently confirmed the long-standing requirement that "temporary" turbines need construction Permits under the federal Clean Air Act. Many of the MZX Tech turbines have been operating for six months with no Permit. Yet the draft Permit makes no attempt to account for the 27 unpermitted turbines, neither including them in the emissions estimates for the Site nor requiring the best available pollution technology for them. The failure of the draft Permit to include at least 27 emissions units on the Site renders it deficient and makes it impossible for the community to understand the full scale of the Site's impact on air quality and public health.

Internal correspondence from December 22 obtained by a public records request shows MDEQ staff were instructed to initiate the public comment period by January 15. The EPA submitted additional Permit comments on January 6, yet there does not appear to be any further public records available regarding those comments. If those final comments were incorporated into the Permit materials, documentation of that process should be available to the public. If not, the Permit was publicly noticed while key issues remained under review. Either way, the timeline suggests the process was shaped by internal deadlines rather than by transparency or completeness.

The draft Permit defines an "ambient air boundary" based on physical barriers around the current Site. However, according to DeSoto County land records, MZX Tech has purchased multiple additional parcels, including parcels adjacent to the Site, that are not effectively excluded from public access. Under EPA's regulatory definition, ambient air extends to areas where the public can access the outdoor air, and impacts in those areas must be included in air quality modeling. Because the Permit relies on a boundary that does not correspond to true ambient air, the emissions impacts to the surrounding community could be underestimated. MDEQ must clarify the actual ambient air boundary, include all owned or controlled land in modeling, and reevaluate impacts accordingly.

The Permit Board must disapprove the draft Permit and instruct MDEQ to:

- Order MZX Tech to cease operating the 27 unpermitted turbines until it obtains a permit for them;

- Withdraw the draft Permit; and
- Revise the draft Permit before seeking public comment.

Even for the 41 turbines it proposes to authorize, the draft Permit fails to accurately characterize air pollution and require adequate protections. Among other things, the draft Permit downplays the ongoing violation of the minimum federal ozone standard in the Memphis metro area, which includes DeSoto County, and fails to require strict pollution controls and offsets for MZX Tech's NOx pollution required by Mississippi law. The draft Permit also underestimates the amount of harmful particulate matter and formaldehyde emissions from the turbines. For all of these reasons, the draft Permit fails to meet applicable requirements and **the Permit Board must disapprove the Permit**.

It is imperative that the Permit Board disapprove the Permit because both MDEQ and the community must understand the full impact of the MZX Tech Site operations on air quality and address that impact as required by the Clean Air Act and Mississippi law. The area immediately around the MZX Tech power plant includes several residential neighborhoods, including Colonial Hills, Kingston Estates, Rasco Farms, and others along the Southaven/Horn Lake border. The power plant is within half of a mile from homes and just a mile from an elementary school. These communities have already been experiencing impacts of the 27 unpermitted turbines MZX Tech has installed at 2875 Stanton Road without a Permit, including increased noise, light, and air pollution.

But the air pollution from both the 27 unpermitted turbines and the proposed 41 turbines will extend far beyond the immediately adjacent neighborhoods. Southaven and Memphis share the air—and that air is already not meeting minimum federal smog standards. The greater Memphis-Clarksdale-Forrest City metro area, which includes Memphis and Southaven, also received an "F" for high ozone days for the most recent reporting period.[i]

While DeSoto County is currently classified as an ozone attainment area, MDEQ's own monitoring data presented at the A&WMA Southern Section Conference shows that DeSoto's 2024 design value is **71 ppb**, exceeding the 70 ppb federal ozone standard. This means that DeSoto is functionally in violation, even if formal nonattainment designations have not yet been made. Under the Clean Air Act, MDEQ must not treat an area trending into violation as if it were safely in attainment — especially when Permitting major new NOx sources that will make the problem worse.

In addition to ozone exceedances, the data used in the Permit's air modeling is misleading about current air quality conditions. The background pollution data for PM2.5 came from the Shelby Farms monitor in Tennessee, even though the Hernando monitor in DeSoto County is closer to the Site and more representative of local conditions. Instead of using this more accurate local data, the PM2.5 data relied on a cleaner monitor across state lines, misleading the public about the real pollution burden already faced by DeSoto County residents. At the 2025 A&WMA Southern Section Conference, MDEQ noted that the Hernando monitor recorded a PM2.5 annual average of **9.1 µg/m³**, which is above the EPA's annual standard of 9.0. That number was only brought below the limit after 13 exceptional events were excluded from the data.

At the same conference, MDEQ specifically identified **Desoto County as an area where it is "evaluating additional measures towards achieving attainment"** in reference to ozone and that the Memphis Metropolitan Area is an "area of priority." That means MDEQ is aware Desoto County has not been meeting the federal air quality standards and has been actively looking for ways to bring pollution levels back down. If MDEQ truly believes that additional measures are needed to *reduce* pollution in Desoto County, then Permitting a major new source of PM2.5 and NOx is inconsistent with MDEQ's own statements and puts the surrounding communities at even greater risk.

Smog makes asthma and other respiratory illnesses worse.[ii] Pollutants like smog are especially dangerous for children, who are more likely to develop respiratory illnesses like asthma.[iii] Pregnant women and unborn children are also at risk from fossil fuel pollution.[iv] According to the Asthma and Allergy Foundation, the Memphis Metro Area, including Memphis and Southaven, has among the highest rates in the U.S. of emergency room visits and deaths due to asthma.[v]

The 41-turbine MZX Tech power plant alone is estimated to cause millions of dollars of health damages each year nationally, with the greatest effects centered in Shelby and DeSoto counties. The damages include, among other things, missed days of school and work due to respiratory illnesses.[vi] This estimate likely understates the near-term health damages, since it does not take into account the 27 turbines already installed at the Site.

The Permit Board must disapprove this draft Permit and recognize that no revised version of this project can be reconciled with the region's legal, environmental, or public health obligations under the Clean Air Act. MDEQ itself "implored" MZX Tech to install pollution controls because of air quality concerns in DeSoto County. Now I am imploring you:

Follow the law. Protect the people. Disapprove the Permit.

Sincerely,



Jennifer Robbins

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[i] Memphis-Clarksdale-Forrest City, TN-MS-AR, Am. Lung Ass'n (2025), Memphis-Clarksdale-Forrest City, TN-MS-AR | American Lung Association.

[ii] Katherine Burgess, *SELC petitions EPA to say Memphis area in violation of ozone standards*, MLK50 JUSTICE THROUGH JOURNALISM (June 6, 2025), https://mlk50.com/2025/06/06/selc-petitions-epa-to-say-memphis-area-in-violation-of-ozone-standards/.

[iii] EPA, Health Effects of Ozone Pollution (last visited February 7, 2026), Health Effects of Ozone Pollution | US EPA.

[iv] Exposure to Air Pollution During Pregnancy Linked to Neurodevelopmental Issues | Columbia University Mailman School of Public Health; Ambient air pollution in critical windows of exposure and spontaneous miscarriage in a preconception cohort - ScienceDirect.
[v] 2025 Asthma Capitals: The Most Challenging Places to Live with Asthma, Asthma and Allergy Found. of Am. (2025), AAFA 2025 Asthma Capitals Report September 2025 (ranked 3rd for emergency room visits; 5th for deaths).
[vi] Report TK.

APPENDIX D

Public Notice Documents and Associated Requests

Outlook

Draft Documents for Public Comment Period (MZX Tech, LLC)

From Jaricus Whitlock <jwhitlock@mdeq.ms.gov>
Date Fri 1/16/2026 6:04 PM
To Gotvald, Sunday <gotvald.sunday@epa.gov>; Lusky, Katy <lusky.kathleen@epa.gov>; Gillam, Rick <gillam.rick@epa.gov>
Cc Jeffrey Bland <JBland@mdeq.ms.gov>; Rodney Cuevas <RCuevas@mdeq.ms.gov>

3 attachments (3 MB)
Draft PSD Permit to Construct.pdf; Draft Preliminary Determination.pdf; MDEQ Notice of Public Hearing.pdf;

Good Evening!

It has come to my attention that MDEQ's "enReview" node still has Chris Howard as the primary EPA contact with respect to PSD modeling. Therefore, as we work to update that matter, attached please find for your review the "Notice of Public Hearing" and draft permit documents for the proposed PSD Permit to Construct Air Emissions Equipment requested by MZX Tech, LLC (Air Ref. No. 0680-00119). The public comment period for this proposed air permitting action will begin today (January 16, 2026) and end February 17, 2026.

In at the conclusion of the public comment period, a public hearing will be held at the M.R. Davis Public Library (8554 Northwest Drive; Southaven, MS 38671) from 6:00 - 8:30 PM. A decision regarding the proposed permitting action will be made after all public comments have been duly considered. If you have any questions or need any additional information, please feel free to contact me.

Best Regards,

Jaricus Whitlock, P.E.
Chief, Air Division
Office of Pollution Control
Mississippi Dept. of Environmental Quality
P.O. Box 2261
Jackson, MS 39225

Office: (601) 961-5303

Notice of Public Hearing
Mississippi Environmental Quality Permit Board
P. O. Box 2261 | Jackson, MS 39225
515 East Amite St. | Jackson, MS 39201
Telephone No. (601) 961-5171

Public Comment Period Start Date: January 16, 2026
Public Comment Period End Date: February 17, 2026
Date of Public Hearing: February 17, 2026

MDEQ Contact: Jeffrey Bland

MZX Tech, LLC ("MZX"), located at 2875 Stanton Road in Southaven, MS, has applied to the Mississippi Department of Environmental Quality (MDEQ) for the following permitting action: the issuance of an initial Prevention of Significant Deterioration (PSD) Construction Permit (Air Ref. No. 0680-00119). The applicant's operations fall within SIC Code 4911 (Electric Services). The permit board will hold a public hearing on this matter from 6:00 PM to 8:30 PM on February 17, 2026, at the M.R. Davis Public Library, 8554 Northwest Dr., Southaven, MS 38671. A Statement of Basis has been prepared that contains a discussion of the decision-making that went into the development of the permit and provides the permitting authority, the public, and other government bodies a record of the technical issues surrounding issuance of the permit.

MZX proposes to construct a greenfield, behind-the-meter electric power generation facility, which will be classified as a PSD major stationary source. The application for an initial PSD permit proposes the construction and operation of seventeen (17) Solar PGM-130 turbines (16.5 MW each), sixteen (16) Solar Titan 350 turbines (35 MW each), and eight (8) ProEnergy 6000PE turbines (50 MW each), resulting in a continuous generating capacity of approximately 1.2 GW. The Solar PGM-130 and Solar Titan 350 turbines will be equipped with Solar's Dry Low Emissions (DLE)/SoLoNO$_X$ control technology, followed by selective catalytic reduction (SCR) and oxidation catalysts. The ProEnergy 6000PE turbines will be equipped with SCR and oxidation catalysts. PLUM Pressure Reduction System (PRS) units, fueled by natural gas and containing two burners each rated at 5.0 MMBtu / hour (10 MMBtu / hour total per unit), will be used to ensure a steady and consistent natural gas supply to the combustion turbines. No black start engines or cooling towers are proposed for the facility.

The electric generation process has the maximum uncontrolled potential to emit volatile organic compounds, nitrigen oxides, and carbon monoxide greater than the PSD major source threshold of 250 tons per year. Therefore, this project is subject to the PSD regulations, including requirements regarding the best available control technology and air quality impacts.

The staff of the Permit Board have developed this draft permit based on information submitted to the Permit Board by the applicant, appropriate State and Federal agencies and other interested parties. The staff of the Permit Board is soliciting all relative information pertaining to the proposed activity (including public comment) to ensure that the final staff recommendation on the draft permit complies with all State and Federal regulations. Public review and comment on the draft permit and supporting documentation are an important element in the staff evaluation and resulting recommendation to the Permit Board. The draft permit conditions have been developed to ensure compliance with all State and Federal regulations but are subject to change based on information received as a result of public participation.

Persons wishing to comment upon or object to the proposed determination are invited to submit comments in writing to Jeffrey Bland at https://www.mdeq.ms.gov/Bland-Jeffrey/ or to the Permit Board address shown above no later than the end of February 17, 2026. All comments received by this date will be considered in the formulation of final determinations regarding the application. Any comments relative to zoning or economic and social impacts are within the jurisdiction of local zoning and planning authorities and should be addressed to them.

The Permit Board is created by Mississippi Law for the purpose of issuing or denying, under such conditions and limitations as it may prescribe, environmental protection permits to control or prevent the release of contaminants into the air and waters of the State. By law, the Board is composed of the Chief of the Bureau of Environmental Health within the State Department of Health; the Director of the Department of Wildlife, Fisheries, and Parks, the Director of the Office of Land and Water Resources within the Department of Environmental Quality, the Supervisor of the State Oil and Gas Board; the Director of the Department of Marine Resources; the Director of Geology within the Department of Environmental Quality; and the Commissioner of Agriculture and Commerce or their respective designees.

The purpose of the public hearing is to explain the proposed permitting action and to receive comments from the public regarding the action, particularly on the draft permit and the preliminary determination. Upon arrival at the public hearing, everyone will be asked to register and note if they expect to make a statement. Statements will be received in the order of registration (i.e., first to register will be the first to give public comment). However, everyone will be given an opportunity to comment, including those who indicated during registration that they did not expect to comment. Comments can be presented in writing if preferred. To help facilitate understanding between citizens and the Permit Board staff, the staff will attempt to answer questions at the hearing. However, such exchanges should be as brief as possible so that everyone who wants to speak has the opportunity as promptly as possible. Please know that seating in the library meeting room will be on a first come first serve basis. Standing room will only be available in accordance with the library's safety guidelines. With consideration to the operating hours of the library, the public hearing will end promptly at 8:30 PM.

All comments made during this public hearing will be transcribed and made part of the Permit Board file on this matter. Before making any decision, the Board will consider all issues and concerns raised regarding environmental protection. Any interested party aggrieved by the decision of the Permit Board may file a written request for a formal hearing after the formal evidentiary hearing the Permit Board will make its final decision on the matter. Any person aggrieved by that decision may appeal to the chancery court in the county of the proposed project.

Additional details about the application, including a copy of the draft permit, are available by writing or calling the Public Records Request Officer at the above Permit Board address and telephone number or by completing the form at the following website: https://www.mdeq.ms.gov/about-mdeq/public-records-request/public-records-request-form/. Additionally, a copy of the draft permit and statement of basis may be found on the MDEQ's website at: https://opc.deq.state.ms.us/publicnotice.aspx . Additional documents can be found on the Online Public Hearing link at https://opcgis.deq.state.ms.us/ensearchonline/public-hearings.aspx. This information is also available for review at the office of the MDEQ at the Permit Board address shown above during normal business hours. Please bring the foregoing to the attention of persons whom you know will be interested.

THE USE OF LIBRARY FACILITIES DOES NOT INDICATE ENDORSEMENT BY THE LIBRARY SYSTEM.

Outlook

Notice of MDEQ Public Hearing - MZX Tech, LLC

From Jaricus Whitlock <jwhitlock@mdeq.ms.gov>

Date Fri 1/16/2026 12:39 PM

Cc Jeffrey Bland <JBland@mdeq.ms.gov>; Taaka Scott-Bailey <tbailey@mdeq.ms.gov>

Bcc safeandsoundcoalition@gmail.com <safeandsoundcoalition@gmail.com>; Environmentalservices@desotocountyms.gov <Environmentalservices@desotocountyms.gov>; colson@desotocountyms.gov <colson@desotocountyms.gov>; dmusselwhite@southaven.org <dmusselwhite@southaven.org>; kfaulkner@southaven.org <kfaulkner@southaven.org>; gpayne@southaven.org <gpayne@southaven.org>; wjerome@southaven.org <wjerome@southaven.org>; jgallagher@southaven.org <jgallagher@southaven.org>; rflores@southaven.org <rflores@southaven.org>; jwheeler@southaven.org <jwheeler@southaven.org>; theresagillespieisomforsen25@gmail.com <theresagillespieisomforsen25@gmail.com>; a mullen <amullen@southaven.org>; cityclerk@southaven.org <cityclerk@southaven.org>; aford@southaven.org <aford@southaven.org>; ypriddy@firstregional.org <ypriddy@firstregional.org>; south@firstregional.org <south@firstregional.org>; Tommy Bledsoe <tbledsoe@hornlake.org>; Kelly Lee Smith <award4@hornlake.org>; LaShonda Johnson <award5@hornlake.org>; Charlotte Armstrong <award6@hornlake.org>

2 attachments (685 KB)

MDEQ Notice of Public Hearing (Short Form).pdf; MDEQ Notice of Public Hearing (Technical Document).pdf;

To Whom It May Concern,

Attached please find for your notification the public notice documents for the proposed Prevention of Significant Deterioration (PSD) Permit to Construct Air Emissions Equipment requested by MZX Tech, LLC. Additional information regarding this proposed air permitting action may be obtained from our office or at the following websites under "MZX Tech, LLC": https://opcgis.deq.state.ms.us/ensearchonline/epd-permits-at-public-notice.aspx and https://opcgis.deq.state.ms.us/ensearchonline/public-hearings.aspx

The public comment period for this proposed air permitting action will begin today (January 16, 2026) and end Tuesday, February 17, 2026. In addition, a public hearing will be held at M.R. Davis Public Library located at 8554 Northwest Drive; Southaven, MS 38671 from 6:00 - 8:30 PM (please see both attached documents for more information). **Please know that the use of the noted library services does not indicate endorsement by the library system.**

All interested parties are invited to submit comments in writing to the attention of Mr. Jeffrey Bland at https://www.mdeq.ms.gov/bland-jeffrey/ or by hand-mail to MDEQ; P.O. Box 2261; Jackson, MS 39225. All comments must be received electronically by 11:59 PM or postmarked no later than February 17, 2026.

Please feel free to distribute this e-mail and the provided information at your discretion.

Best Regards,

Jaricus Whitlock, P.E.
Chief, Air Division
Office of Pollution Control
Mississippi Dept. of Environmental Quality
P.O. Box 2261
Jackson, MS 39225

Office: (601) 961-5303

NOTICE OF PUBLIC HEARING

TUESDAY, FEBRUARY 17, 2026
6:00PM-8:30PM
M.R. DAVIS PUBLIC LIBRARY – 8554 NORTHWEST DRIVE
SOUTHAVEN, MS 38671

THIS HEARING IS OPEN TO THE PUBLIC

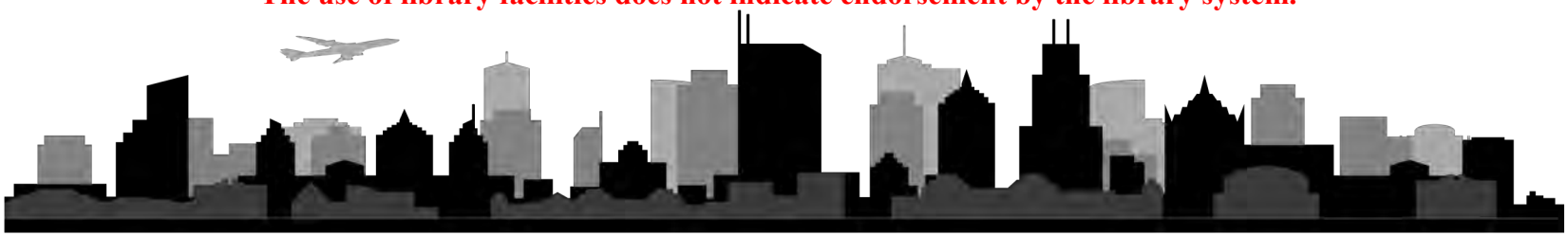
MZX Technology, LLC located at 2875 Stanton Rd, in Southaven, MS, has applied to the Mississippi Department of Environmental Quality (MDEQ) for the following permitting action:

- ***Initial Issuance of a Prevention of Significant Deterioration Construction Permit, Air Ref. No. 0680-00119.***

MDEQ is soliciting input on the above referenced permitting action on behalf of the MDEQ Permit Board. Persons wishing to comment on the proposed action are invited to submit comments in writing to Jeffrey Bland at https://www.mdeq.ms.gov/Bland-Jeffrey/ or by hand-mail to the address below. All comments must be received electronically by 11:59 p.m. or postmarked no later than February 17, 2026. Any questions regarding this permitting action may be directed to Jeffrey Bland at 601-961-5112.

Mississippi Environmental Quality Permit Board | P.O. Box 2261 | Jackson, MS 39225

The use of library facilities does not indicate endorsement by the library system.



Outlook

Notice of MDEQ Public Hearing - MZX Tech, LLC (Updated)

From Jaricus Whitlock <jwhitlock@mdeq.ms.gov>

Date Fri 1/16/2026 1:21 PM

Bcc safeandsoundcoalition@gmail.com <safeandsoundcoalition@gmail.com>; Environmentalservices@desotocountyms.gov <Environmentalservices@desotocountyms.gov>; colson@desotocountyms.gov <colson@desotocountyms.gov>; dmusselwhite@southaven.org <dmusselwhite@southaven.org>; kfaulkner@southaven.org <kfaulkner@southaven.org>; gpayne@southaven.org <gpayne@southaven.org>; wjerome@southaven.org <wjerome@southaven.org>; jgallagher@southaven.org <jgallagher@southaven.org>; rflores@southaven.org <rflores@southaven.org>; jwheeler@southaven.org <jwheeler@southaven.org>; theresagillespieisomforsen25@gmail.com <theresagillespieisomforsen25@gmail.com>; a mullen <amullen@southaven.org>; cityclerk@southaven.org <cityclerk@southaven.org>; aford@southaven.org <aford@southaven.org>; ypriddy@firstregional.org <ypriddy@firstregional.org>; south@firstregional.org <south@firstregional.org>; Tommy Bledsoe <tbledsoe@hornlake.org>; Kelly Lee Smith <award4@hornlake.org>; LaShonda Johnson <award5@hornlake.org>; Charlotte Armstrong <award6@hornlake.org>

2 attachments (685 KB)

MDEQ Notice of Public Hearing (Short Form).pdf; MDEQ Notice of Public Hearing (Technical Document).pdf;

To Whom It May Concern,

It has been brought to my attention that the original "MDEQ Notice of Public Hearing (Technical Document)" contained clerical errors.

Therefore, attached please find for your notification the corrected public notice documents for the proposed Prevention of Significant Deterioration (PSD) Permit to Construct Air Emissions Equipment requested by MZX Tech, LLC. Additional information regarding this proposed air permitting action may be obtained from our office or at the following websites under "MZX Tech, LLC": https://opcgis.deq.state.ms.us/ensearchonline/epd-permits-at-public-notice.aspx and https://opcgis.deq.state.ms.us/ensearchonline/public-hearings.aspx

The public comment period for this proposed air permitting action will begin today (January 16, 2026) and end Tuesday, February 17, 2026. In addition, a public hearing will be held at M.R. Davis Public Library located at 8554 Northwest Drive; Southaven, MS 38671 from 6:00 - 8:30 PM (please see both attached documents for more information). **Please know that the use of the noted library services does not indicate endorsement by the library system.**

All interested parties are invited to submit comments in writing to the attention of Mr. Jeffrey Bland at https://www.mdeq.ms.gov/bland-jeffrey/ or by hand-mail to MDEQ; P.O. Box 2261; Jackson, MS 39225. All comments must be received electronically by 11:59 PM or postmarked no later than February 17, 2026.

Please feel free to distribute this e-mail and the provided information at your discretion.

Best Regards,

Jaricus Whitlock, P.E.
Chief, Air Division
Office of Pollution Control
Mississippi Dept. of Environmental Quality
P.O. Box 2261
Jackson, MS 39225

Office: (601) 961-5303

Outlook

Request to Relocate Public Hearing to Larger Venue

From SafeAndSound Coalition <safeandsoundcoalition@gmail.com>
Date Tue 1/20/2026 1:15 AM
To Jaricus Whitlock <jwhitlock@mdeq.ms.gov>

This Message Is From an External Sender
This message came from outside your organization.

Dear Mr. Whitlock,

On behalf of Safe and Sound Coalition, we are requesting that the upcoming public hearing regarding the PSD permit for MZX Technology be relocated to a larger venue.

The current location of the Southaven Public Library is simply too small to accommodate the expected turnout. Given the facility's proximity to the Southaven, Horn Lake, and Memphis border, it has generated widespread concern throughout both DeSoto and Shelby Counties. We anticipate strong public attendance and are concerned that the limited room size may prevent full participation, particularly from residents living closest to the site, who deserve the opportunity to participate.

We are also concerned that individuals affiliated with the project may arrive early to fill the space, further limiting access for concerned community members. While this may seem speculative, we've seen similar outreach strategies used by xAI in Memphis, including direct mailers to residents and organized outreach to local churches and pastors. Given this precedence, we believe it's reasonable to anticipate similar tactics here.

In addition, an employee of Trinity Consultants reached out unprompted to one of our organizers through their personal Facebook account. While the message was friendly in tone, this kind of private outreach raises further concerns about behind-the-scenes coordination and attempts to shape public perception.

To ensure fairness, accessibility, and full public participation in the permitting process, we urge MDEQ to consider an alternative venue that is reasonably located and able to accommodate a larger audience. Possible alternatives may include the Southaven High School gym, The Arena at Southaven, or the Northwest Ranger Center. We recognize that logistics may be challenging. If MDEQ is open to moving the location, we're happy to assist with identifying or securing a suitable venue.

Thank you for your time and consideration. We appreciate MDEQ's efforts to provide opportunities for public input.

Sincerely,
Safe and Sound Coalition

Outlook

Notice of MDEQ Public Hearing - MZX Tech, LLC (Updated - New Venue)

From Jaricus Whitlock <jwhitlock@mdeq.ms.gov>

Date Thu 1/22/2026 12:12 PM

Cc Jeffrey Bland <JBland@mdeq.ms.gov>; Taaka Scott-Bailey <tbailey@mdeq.ms.gov>

Bcc safeandsoundcoalition@gmail.com <safeandsoundcoalition@gmail.com>; Environmentalservices@desotocountyms.gov <Environmentalservices@desotocountyms.gov>; colson@desotocountyms.gov <colson@desotocountyms.gov>; dmusselwhite@southaven.org <dmusselwhite@southaven.org>; kfaulkner@southaven.org <kfaulkner@southaven.org>; gpayne@southaven.org <gpayne@southaven.org>; wjerome@southaven.org <wjerome@southaven.org>; jgallagher@southaven.org <jgallagher@southaven.org>; rflores@southaven.org <rflores@southaven.org>; jwheeler@southaven.org <jwheeler@southaven.org>; theresagillespieisomforsen25@gmail.com <theresagillespieisomforsen25@gmail.com>; a mullen <amullen@southaven.org>; cityclerk@southaven.org <cityclerk@southaven.org>; aford@southaven.org <aford@southaven.org>; ypriddy@firstregional.org <ypriddy@firstregional.org>; south@firstregional.org <south@firstregional.org>; Tommy Bledsoe <tbledsoe@hornlake.org>; Kelly Lee Smith <award4@hornlake.org>; LaShonda Johnson <award5@hornlake.org>; Charlotte Armstrong <award6@hornlake.org>

2 attachments (297 KB)

Notice of Public Hearing (Short Form - Updated).pdf; Notice of Public Hearing (Technical Document-Updated).pdf;

To Whom It May Concern,

On January 20, 2026, MDEQ received a formal request to relocate the public hearing associated with the proposed air permitting action for MZX Tech, LLC to a venue that can accommodate a "larger audience" and ensure “full participation in the permitting process”. Upon review of this request and consideration of available alternative venues, MDEQ has decided to relocate the public hearing from the M.R. Davis Public Library to the Ranger Conference Center located in Southaven, MS. The address for the new location is as follows:

Ranger Conference Center (Northwest Mississippi Community College - Desoto Campus)
1210 Church Road West
Southaven, MS 38671

As a result of this decision, attached please find the updated "Notice of Public Hearing" documents that reflect this relocation. However, please recognize that this decision does not affect the originally announced date of the public hearing (February 16, 2026), the timeframe for the public hearing (6:00 - 8:30 PM), and the overall timeframe for the public comment period (January 16, 2026 - February 17, 2026).

All interested parties are still invited to submit comments in writing to the attention of Mr. Jeffrey Bland at https://www.mdeq.ms.gov/bland-jeffrey/ or by hand-mail to MDEQ; P.O. Box 2261; Jackson, MS 39225. All comments must be received electronically by 11:59 PM or postmarked no later than February 17, 2026. Additional information regarding this proposed air permitting action may be obtained from our office or at the following websites under "MZX Tech, LLC": https://opcgis.deq.state.ms.us/ensearchonline/epd-permits-at-public-notice.aspx and https://opcgis.deq.state.ms.us/ensearchonline/public-hearings.aspx

Please feel free to distribute this e-mail and the provided information at your discretion.

Best Regards,

Jaricus Whitlock, P.E.
Chief, Air Division
Office of Pollution Control
Mississippi Dept. of Environmental Quality
P.O. Box 2261
Jackson, MS 39225

Office: (601) 961-5303

From: Jaricus Whitlock <jwhitlock@mdeq.ms.gov>
Sent: Friday, January 16, 2026 12:39 PM
Cc: Jeffrey Bland <JBland@mdeq.ms.gov>; Taaka Scott-Bailey <tbailey@mdeq.ms.gov>
Subject: Notice of MDEQ Public Hearing - MZX Tech, LLC

To Whom It May Concern,

Attached please find for your notification the public notice documents for the proposed Prevention of Significant Deterioration (PSD) Permit to Construct Air Emissions Equipment requested by MZX Tech, LLC. Additional information regarding this proposed air permitting action may be obtained from our office or at the following websites under "MZX Tech, LLC":
https://opcgis.deq.state.ms.us/ensearchonline/epd-permits-at-public-notice.aspx and
https://opcgis.deq.state.ms.us/ensearchonline/public-hearings.aspx

The public comment period for this proposed air permitting action will begin today (January 16, 2026) and end Tuesday, February 17, 2026. In addition, a public hearing will be held at M.R. Davis Public Library located at 8554 Northwest Drive; Southaven, MS 38671 from 6:00 - 8:30 PM (please see both attached documents for more information). **Please know that the use of the noted library services does not indicate endorsement by the library system.**

All interested parties are invited to submit comments in writing to the attention of Mr. Jeffrey Bland at https://www.mdeq.ms.gov/bland-jeffrey/ or by hand-mail to MDEQ; P.O. Box 2261; Jackson, MS 39225. All comments must be received electronically by 11:59 PM or postmarked no later than February 17, 2026.

Please feel free to distribute this e-mail and the provided information at your discretion.

Best Regards,

Jaricus Whitlock, P.E.
Chief, Air Division
Office of Pollution Control
Mississippi Dept. of Environmental Quality
P.O. Box 2261
Jackson, MS 39225

Office: (601) 961-5303

UPDATED – January 22, 2026

Notice of Public Hearing
Mississippi Environmental Quality Permit Board
P. O. Box 2261 | Jackson, MS 39225
515 East Amite St. | Jackson, MS 39201
Telephone No. (601) 961-5171

Public Comment Period Start Date: January 16, 2026
Public Comment Period End Date: February 17, 2026
Date of Public Hearing: February 17, 2026

MDEQ Contact: Jeffrey Bland

MZX Tech, LLC ("MZX"), located at 2875 Stanton Road in Southaven, MS, has applied to the Mississippi Department of Environmental Quality (MDEQ) for the following permitting action: the issuance of an initial Prevention of Significant Deterioration (PSD) Construction Permit (Air Ref. No. 0680-00119). The applicant's operations fall within SIC Code 4911 (Electric Services). The permit board will hold a public hearing on this matter from 6:00 PM to 8:30 PM on February 17, 2026, at the Ranger Conference Center (Northwest Mississippi Community College – Desoto Campus) located at 1210 Church Road West; Southaven, MS 38671. A Preliminary Determination has been prepared that contains a discussion of the decision-making that went into the development of the permit and provides the permitting authority, the public, and other government bodies a record of the technical issues surrounding issuance of the permit.

MZX proposes to construct a greenfield, behind-the-meter electric power generation facility, which will be classified as a PSD major stationary source. The application for an initial PSD permit proposes the construction and operation of seventeen (17) Solar PGM-130 turbines (16.5 MW each), sixteen (16) Solar Titan 350 turbines (35 MW each), and eight (8) ProEnergy 6000PE turbines (50 MW each), resulting in a continuous generating capacity of approximately 1.2 GW. The Solar PGM-130 and Solar Titan 350 turbines will be equipped with Solar's Dry Low Emissions (DLE)/SoLoNO$_X$ control technology, followed by selective catalytic reduction (SCR) and oxidation catalysts. The ProEnergy 6000PE turbines will be equipped with SCR and oxidation catalysts. PLUM Pressure Reduction System (PRS) units, fueled by natural gas and containing two burners each rated at 5.0 MMBtu / hour (10 MMBtu / hour total per unit), will be used to ensure a steady and consistent natural gas supply to the combustion turbines. No black start engines or cooling towers are proposed for the facility.

The electric generation process has the maximum uncontrolled potential to emit volatile organic compounds, nitrigen oxides, and carbon monoxide greater than the PSD major source threshold of 250 tons per year. Therefore, this project is subject to the PSD regulations, including requirements regarding the best available control technology and air quality impacts.

The staff of the Permit Board have developed this draft permit based on information submitted to the Permit Board by the applicant, appropriate State and Federal agencies and other interested parties. The staff of the Permit Board is soliciting all relative information pertaining to the proposed activity (including public comment) to ensure that the final staff recommendation on the draft permit complies with all State and Federal regulations. Public review and comment on the draft permit and supporting documentation are an important element in the staff evaluation and resulting recommendation to the Permit Board. The draft permit conditions have been developed to ensure compliance with all State and Federal regulations but are subject to change based on information received as a result of public participation.

Persons wishing to comment upon or object to the proposed determination are invited to submit comments in writing to Jeffrey Bland at https://www.mdeq.ms.gov/Bland-Jeffrey/ or to the Permit Board address shown above no later than the end of February 17, 2026. All comments received by this date will be considered in the formulation of final determinations regarding the application. Any comments relative to zoning or economic and social impacts are within the jurisdiction of local zoning and planning authorities and should be addressed to them.

The Permit Board is created by Mississippi Law for the purpose of issuing or denying, under such conditions and limitations as it may prescribe, environmental protection permits to control or prevent the release of contaminants into the air and waters of the State. By law, the Board is composed of the Chief of the Bureau of Environmental Health within the State Department of Health; the Director of the Department of Wildlife, Fisheries, and Parks, the Director of the Office of Land and Water Resources within the Department of Environmental Quality, the

Supervisor of the State Oil and Gas Board; the Director of the Department of Marine Resources; the Director of Geology within the Department of Environmental Quality; and the Commissioner of Agriculture and Commerce or their respective designees.

The purpose of the public hearing is to explain the proposed permitting action and to receive comments from the public regarding the action, particularly on the draft permit and the preliminary determination. Upon arrival at the public hearing, everyone will be asked to register and note if they expect to make a statement. Statements will be received in the order of registration (i.e., first to register will be the first to give public comment). However, everyone will be given an opportunity to comment, including those who indicated during registration that they did not expect to comment. Comments can be presented in writing if preferred. To help facilitate understanding between citizens and the Permit Board staff, the staff will attempt to answer questions at the hearing. However, such exchanges should be as brief as possible so that everyone who wants to speak has the opportunity as promptly as possible. Please know that seating will be on a first-come, first-serve basis. Standing room will only be available in accordance with the safety guidelines outlined by Northwest Mississippi Community College – Desoto Campus.

All comments made during this public hearing will be transcribed and made part of the Permit Board file on this matter. Before making any decision, the Board will consider all issues and concerns raised regarding environmental protection. Any interested party aggrieved by the decision of the Permit Board may file a written request for a formal hearing after the formal evidentiary hearing the Permit Board will make its final decision on the matter. Any person aggrieved by that decision may appeal to the chancery court in the county of the proposed project.

Additional details about the application, including a copy of the draft permit, are available by writing or calling the Public Records Request Officer at the above Permit Board address and telephone number or by completing the form at the following website: https://www.mdeq.ms.gov/about-mdeq/public-records-request/public-records-request-form/. Additionally, a copy of the draft permit and statement of basis may be found on the MDEQ's website at: https://opc.deq.state.ms.us/publicnotice.aspx . Additional documents can be found on the Online Public Hearing link at https://opcgis.deq.state.ms.us/ensearchonline/public-hearings.aspx. This information is also available for review at the office of the MDEQ at the Permit Board address shown above during normal business hours. Please bring the foregoing to the attention of persons whom you know will be interested.

NOTICE OF PUBLIC HEARING

TUESDAY, FEBRUARY 17, 2026
6:00PM-8:30PM
RANGER CONFERENCE CENTER – 1210 CHURCH ROAD WEST
SOUTHAVEN, MS 38671

THIS HEARING IS OPEN TO THE PUBLIC

MZX Technology, LLC located at 2875 Stanton Rd, in Southaven, MS, has applied to the Mississippi Department of Environmental Quality (MDEQ) for the following permitting action:

- ***Initial Issuance of a Prevention of Significant Deterioration Construction Permit, Air Ref. No. 0680-00119.***

MDEQ is soliciting input on the above referenced permitting action on behalf of the MDEQ Permit Board. Persons wishing to comment on the proposed action are invited to submit comments in writing to Jeffrey Bland at https://www.mdeq.ms.gov/Bland-Jeffrey/ or by hand-mail to the address below. All comments must be received electronically by 11:59 p.m. or postmarked no later than February 17, 2026. Any questions regarding this permitting action may be directed to Jeffrey Bland at 601-961-5112.

Mississippi Environmental Quality Permit Board | P.O. Box 2261 | Jackson, MS 39225



Outlook

Notice of MDEQ Public Hearing - MZX Tech, LLC (Updated - New Venue) (CORRECTION)

From Jaricus Whitlock <jwhitlock@mdeq.ms.gov>
Date Fri 1/23/2026 5:22 PM
Cc Taaka Scott-Bailey <tbailey@mdeq.ms.gov>; Jeffrey Bland <JBland@mdeq.ms.gov>
Bcc safeandsoundcoalition@gmail.com <safeandsoundcoalition@gmail.com>; Environmentalservices@desotocountyms.gov <Environmentalservices@desotocountyms.gov>; colson@desotocountyms.gov <colson@desotocountyms.gov>; dmusselwhite@southaven.org <dmusselwhite@southaven.org>; kfaulkner@southaven.org <kfaulkner@southaven.org>; gpayne@southaven.org <gpayne@southaven.org>; wjerome@southaven.org <wjerome@southaven.org>; jgallagher@southaven.org <jgallagher@southaven.org>; rflores@southaven.org <rflores@southaven.org>; jwheeler@southaven.org <jwheeler@southaven.org>; theresagillespieisomforsen25@gmail.com <theresagillespieisomforsen25@gmail.com>; a mullen <amullen@southaven.org>; cityclerk@southaven.org <cityclerk@southaven.org>; aford@southaven.org <aford@southaven.org>; ypriddy@firstregional.org <ypriddy@firstregional.org>; south@firstregional.org <south@firstregional.org>; Tommy Bledsoe <tbledsoe@hornlake.org>; Kelly Lee Smith <award4@hornlake.org>; LaShonda Johnson <award5@hornlake.org>; Charlotte Armstrong <award6@hornlake.org>

2 attachments (297 KB)
Notice of Public Hearing (Short Form - Updated).pdf; Notice of Public Hearing (Technical Document-Updated).pdf;

Good Evening,

It has been brought to my attention the original announcement of a new venue for the public hearing erroneously referenced "February 16" as the date for said hearing. Therefore, the announcement below has been revised to correctly reference "February 17" as the date of the public hearing (highlighted in red).

I apologize for any confusion and/or inconvenience caused by this error. Please feel free to distribute this e-mail and the provided information at your discretion.

Best Regards,

Jaricus Whitlock, P.E.
Chief, Air Division
Office of Pollution Control
Mississippi Dept. of Environmental Quality
P.O. Box 2261
Jackson, MS 39225

Office: (601) 961-5303

From: Jaricus Whitlock <jwhitlock@mdeq.ms.gov>
Sent: Thursday, January 22, 2026 12:12 PM
Cc: Jeffrey Bland <JBland@mdeq.ms.gov>; Taaka Scott-Bailey <tbailey@mdeq.ms.gov>
Subject: Notice of MDEQ Public Hearing - MZX Tech, LLC (Updated - New Venue)

To Whom It May Concern,

On January 20, 2026, MDEQ received a formal request to relocate the public hearing associated with the proposed air permitting action for MZX Tech, LLC to a venue that can accommodate a "larger audience" and ensure “full participation in the permitting process”. Upon review of this request and consideration of available alternative venues, MDEQ has decided to relocate the public hearing from the M.R. Davis Public Library to the Ranger Conference Center located in Southaven, MS. The address for the new location is as follows:

Ranger Conference Center (Northwest Mississippi Community College - Desoto Campus)
1210 Church Road West
Southaven, MS 38671

As a result of this decision, attached please find the updated "Notice of Public Hearing" documents that reflect this relocation. However, please recognize that this decision does not affect the originally announced date of the public hearing (February 17, 2026), the timeframe for the public hearing (6:00 - 8:30 PM), and the overall timeframe for the public comment period (January 16, 2026 - February 17, 2026).

All interested parties are still invited to submit comments in writing to the attention of Mr. Jeffrey Bland at https://www.mdeq.ms.gov/bland-jeffrey/ or by hand-mail to MDEQ; P.O. Box 2261; Jackson, MS 39225. All comments must be received electronically by 11:59 PM or postmarked no later than February 17, 2026. Additional information regarding this proposed air permitting action may be obtained from our office or at the following websites under "MZX Tech, LLC": https://opcgis.deq.state.ms.us/ensearchonline/epd-permits-at-public-notice.aspx and https://opcgis.deq.state.ms.us/ensearchonline/public-hearings.aspx

Please feel free to distribute this e-mail and the provided information at your discretion.

Best Regards,

Jaricus Whitlock, P.E.
Chief, Air Division
Office of Pollution Control
Mississippi Dept. of Environmental Quality
P.O. Box 2261
Jackson, MS 39225

Office: (601) 961-5303

Outlook

Notice of MDEQ Public Hearing - MZX Tech, LLC (Updated - New Venue)

From publicnotice <publicnotice@mdeq.ms.gov>
Date Tue 1/27/2026 1:24 PM

1 attachment (99 KB)
Notice of Public Hearing (MZX Tech, LLC -updated).pdf;

To Whom It May Concern,

On January 20, 2026, MDEQ received a formal request to relocate the public hearing associated with the proposed air permitting action for MZX Tech, LLC to a venue that can accommodate a "larger audience" and ensure “full participation in the permitting process”. Upon review of this request and consideration of available alternative venues, MDEQ has decided to relocate the public hearing from the M.R. Davis Public Library to the Ranger Conference Center located in Southaven, MS. The address for the new location is as follows:

Ranger Conference Center (Northwest Mississippi Community College - Desoto Campus)
1210 Church Road West
Southaven, MS 38671

As a result of this decision, attached please find the updated "Notice of Public Hearing" that reflect this relocation. However, please recognize that this decision does not affect the originally announced date of the public hearing (February 17, 2026), the timeframe for the public hearing (6:00 - 8:30 PM), and the overall timeframe for the public comment period (January 16, 2026 - February 17, 2026).

All interested parties are still invited to submit comments in writing to the attention of Mr. Jeffrey Bland at https://www.mdeq.ms.gov/bland-jeffrey/ or by hand-mail to MDEQ; P.O. Box 2261; Jackson, MS 39225. All comments must be received electronically by 11:59 PM or postmarked no later than February 17, 2026. Additional information regarding this proposed air permitting action may be obtained from our office or at the following websites under "MZX Tech, LLC": https://opcgis.deq.state.ms.us/ensearchonline/epd-permits-at-public-notice.aspx and https://opcgis.deq.state.ms.us/ensearchonline/public-hearings.aspx

Please feel free to distribute this e-mail and the provided information at your discretion.

Best Regards,

Jaricus Whitlock, P.E.
Chief, Air Division
Office of Pollution Control
Mississippi Dept. of Environmental Quality
P.O. Box 2261
Jackson, MS 39225
Office: (601) 961-5303

From:	Amanda Garcia
To:	Jeffrey Bland
Cc:	Jaricus Whitlock; Patrick Anderson; paul klein; Keshaun Pearson; Conner, Abre"; SafeAndSound Coalition; LaTricea Adams
Subject:	Comment extension request re: MZX Tech LLC draft PSD permit (Air Ref. No. 0680-00119)
Date:	Monday, February 2, 2026 1:35:34 PM
Attachments:	2026-02-02 Extension Request re MZX Tech PSD Comments.pdf

This Message Is From an External Sender
This message came from outside your organization.

Dear Mr. Bland:

Please see the attached 30-day extension request for comments on the draft PSD permit for MZX Tech LLC (Air Ref. No. 0680-00119). This request is submitted by Climate Reality Project: Memphis and Mid-South Region Chapter, Memphis Community Against Pollution, National Association for the Advancement of Colored People (NAACP), Safe and Sound Coalition, Sierra Club Chickasaw Group, Southern Environmental Law Center, and Young, Gifted & Green.

Sincerely,
Amanda

Amanda Garcia (she/her/hers)
Senior Attorney
agarcia@selc.org

Southern Environmental Law Center
1033 Demonbreun Street, Suite 205
Nashville, TN 37203

Office (615) 921-9470

southernenvironment.org

SOUTHERN ENVIRONMENTAL LAW CENTER

1033 Demonbreun Street, Suite 205
Nashville, TN 37203

Telephone 615-921-9470
Facsimile 615-921-8011

February 2, 2026

Via Online Submission: https://www.mdeq.ms.gov/bland-jeffrey/ and by email at jbland@mdeq.ms.gov

Mr. Jeffrey Bland
Mississippi Department of Environmental Quality
P.O. Box 2261
Jackson, MS 39225

RE: Request for 30-day extension of time to comment on Draft Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Dear Mr. Bland:

Climate Reality Project: Memphis and Mid-South Region Chapter, Memphis Community Against Pollution, National Association for the Advancement of Colored People (NAACP), Safe and Sound Coalition, Sierra Club Chickasaw Group, Southern Environmental Law Center, and Young, Gifted & Green (collectively, Community Groups) respectfully request a 30-day extension of time, to March 19, 2026, to review and comment on the draft Prevention of Significant Deterioration (PSD) construction permit released for comment by the Mississippi Department of Environmental Quality (MDEQ) for the MZX Tech, LLC facility (Air Ref. No. 0680-00119). The draft permit and supporting documentation was released for public comment on January 16, 2026. A public hearing is scheduled for February 17, 2026, with the comment period set to close the same day. We respectfully request a 30-day extension of time to comment on the draft permit on the following basis:

MDEQ's regulations provide for a public comment period of "at least" 30 days. 11 Code Miss. R. Pt. 2, R. 5.7. A longer comment period is appropriate for the MZX Tech facility because of the unusual nature of the stationary source: an installation of at least 41 combustion turbines of varying makes and models. The draft permit and supporting documentation include hundreds of pages of technical analysis, including an air modeling report, agency comments, and MZX Tech's consultants' responses regarding that modeling. The air modeling analysis raises serious concerns about the air quality impact of the facility, particularly in light of the existing air quality problem in DeSoto County, MS and Shelby County, TN.[1] Thirty days is not a sufficient amount of time for Community Groups to obtain expert review of the analysis presented in the report.

[1] MDEQ acknowledges concern about DeSoto County air quality in a letter dated July 29, 2025, in which the agency "implores" MZX Tech to install pollution controls on unpermitted turbines.

Further, beginning on January 21, 2026, less than one week after the public comment period opened, Winter Storm Fern wreaked havoc on the communities affected by the MZX Tech, LLC facility. Road conditions became icy, causing schools to be closed for at least one week (Both De Soto County Schools and Memphis and Shelby County schools remain closed on Monday, February 2). Community members with children have been focused on keeping children safe and warm, not reviewing hundreds of pages of technical materials. Further, community members' travel has been impeded, preventing people from sharing information about the facility with neighbors in person and at community events. These poor travel conditions persist as of the date of this letter.

Finally, the permit hearing will provide an opportunity for community members to become informed about the facility and its potential air quality impacts. The notice indicates that "[t]he purpose of the public hearing is to explain the proposed permitting action. . ." and that "[t]o help facilitate understanding between citizens and the Permit Board staff, the staff will attempt to answer questions at the hearing."[2] Many directly-affected residents in Southaven and South Memphis will need additional time after attending the hearing to process what they have learned and provide comments about the air quality impacts of the facility.

For all of these reasons, Community Groups respectfully request a 30-day extension of time, to March 19, 2026, to review and comment on the draft PSD permit for the MZX Tech, LLC facility (Air Ref. No. 0680-00119).

Respectfully submitted,

Paul Klein,
Climate Reality Project: Memphis and Mid-South Region Chapter and Sierra Club Chickasaw Group

KeShaun Pearson
Memphis Community Against Pollution

Abre' Conner
NAACP

Shannon Samsa
Safe and Sound Coalition

LaTricea Adams
Young, Gifted & Green

/s/ Patrick J. Anderson
Patrick J. Anderson*
Senior Attorney
Southern Environmental Law Center
Ten 10th Street, NW, Suite 1050
Atlanta, Georgia 30309
404-521-9900
panderson@selc.org

/s/ Amanda Garcia
Amanda Garcia**
Senior Attorney
Southern Environmental Law Center
1033 Demonbreun Street, Suite 205
Nashville, Tennessee 37203
615-921-9470
agarcia@selc.org

[2] MDEQ, Notice of Public Hearing, MZX Tech LLC PSD Permit (January 16, 2026), *available at* https://opcgis.deq.state.ms.us/ensearchonline/publichearingdetails.aspx?id=107.

**Licensed in the State of Georgia*
*** Licensed in the State of Tennessee*

STATE OF MISSISSIPPI
TATE REEVES
GOVERNOR
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
CHRIS WELLS, EXECUTIVE DIRECTOR

February 4, 2026

Via email to:

Hon. Patrick J. Anderson
Senior Attorney
Southern Environmental Law Center
Ten 10th Street, NW, Suite 1050
Atlanta, GA 30309
panderson@selc.org

Hon. Amanda Garcia
Senior Attorney
Southern Environmental Law Center
1033 Demonbreun Street, Suite 205
Nashville, TN 37203
agarcia@selc.org

RE: Request for 30-day extension of time to comment on Draft Clean Air Act Prevention Of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Dear Mr. Anderson and Ms. Garcia:

Thank you for your letter dated February 2, 2026, regarding the Construction Permit referenced above. In your letter, you request that the Mississippi Department of Environmental Quality ("MDEQ") Permit Board extend the comment period for the above referenced Construction Permit by an additional 30 days.

MDEQ has considered your request. We continue to believe that the existing comment period is adequate and appropriate and are, therefore, denying the request for an extension.

Thank you for your interest in this matter.

Sincerely,

Chris Wells
Executive Director
Mississippi Department of Environmental Quality

Outlook

Request for Reconsideration of Public Comment Extension – MZX PSD Permit

From SafeAndSound Coalition <safeandsoundcoalition@gmail.com>
Date Fri 2/6/2026 2:12 AM
To Jaricus Whitlock <jwhitlock@mdeq.ms.gov>

This Message Is From an External Sender
This message came from outside your organization.

Dear Mr. Whitlock,

We are writing on behalf of Safe and Sound Coalition to respectfully but urgently request that MDEQ reconsider its denial of the extension request submitted by the Southern Environmental Law Center. While we are not attorneys or policy professionals, we represent the very people this process is meant to serve: the residents directly impacted by this facility, who deserve a fair and accessible opportunity to participate.

First, we want to sincerely thank MDEQ for relocating the public hearing to a larger venue. We recognize and appreciate that effort to accommodate public turnout.

Winter Storm Fern has created clear and ongoing barriers to public access. Beginning January 24, the storm brought widespread ice, power outages, and unsafe road conditions across Mississippi. Governor Reeves declared both a state of emergency and a federal disaster in response. While DeSoto County was not the hardest hit, it has still been significantly affected. All public libraries in the county have been closed since January 24 and remain closed as of this week. These libraries are the only reliable access point of internet, printing, and meeting space for many residents, especially those who are elderly, disabled, or low income.

Safe and Sound has also relied on the Southaven library as one of the only free and accessible places to organize. The storm has made it impossible to meet, print, distribute flyers, or conduct in-person outreach. Roads have remained dangerous for nearly two weeks, mail service has been delayed, and community events have been canceled. Families across the region have been focused on safety, heating, food access, and childcare. Reviewing hundreds of pages of complex permit language and drafting comments has not been feasible for most people during this period.

Second, this is the only public participation window residents have been given. This permit was issued without early outreach or community education. The public hearing is scheduled for the final day of the comment period, which means residents will have no opportunity to respond to what is said at the hearing or to any new information presented. Many still do not know this permit even exists. While we've tried our best to supplement with social media outreach, it cannot replace in-person engagement. The process has not been equitable or accessible.

Third, the timing of this permit raises serious regulatory questions. To our understanding, the EPA finalized a rule on January 15 clarifying that combustion turbines, even those labeled temporary, must undergo preconstruction permitting. MDEQ has acknowledged that this facility has been operating turbines since at least August. A public records email from MDEQ dated December 22 confirms that internal management directed the permit be noticed by January 15. Issuing a draft permit just after the new EPA rule went into effect gives the appearance of attempting to retroactively legitimize noncompliant activity rather than prevent it. This timeline raises concerns about whether the permit was strategically timed to avoid updated federal review requirements. At minimum, this shift in regulatory context demands further scrutiny and public input.

Fourth, there are unresolved concerns about the public record. A records request submitted in early January yielded documents only after a three-week delay, with the most recent dated January 7, nine days before the comment window opened. Internal correspondence from December 22 shows MDEQ staff were instructed to initiate the comment period by January 15. At the same time, EPA submitted detailed modeling feedback on December 23 and additional permit comments on January 6. If those final comments were incorporated into the permit materials, documentation of that process should be available to the public. If not, the permit was publicly noticed while key issues remained under review. Either way, the timeline suggests the process was shaped by internal deadlines rather than by transparency or completeness, and that reinforces the need for more time and public oversight.

This permit decision could affect our community's health and environment for decades. Rushing it through during a state-declared disaster with no time for post-hearing response does not meet the standard of public service or environmental stewardship that the public expects and deserves.

We respectfully request that MDEQ reconsider its decision and extend the comment period at least 14 days beyond the February 17 hearing. Even a partial extension would be a step toward restoring fairness to a process that has repeatedly failed our community.

We urge MDEQ to reconsider. The people of Southaven and surrounding communities deserve a real chance to be heard.
Sincerely,
Safe and Sound Coalition

Outlook

Re: Request for Reconsideration of Public Comment Extension – MZX PSD Permit

From Jaricus Whitlock <jwhitlock@mdeq.ms.gov>
Date Mon 2/16/2026 12:46 PM
To SafeAndSound Coalition <safeandsoundcoalition@gmail.com>
Cc Jeffrey Bland <JBland@mdeq.ms.gov>

Good Afternoon,

Upon review of the noted request by my agency's executive leadership, Executive Director Chris Wells has decided to not grant a reconsideration of his original denial for a 30-day extension of the public comment period. Therefore, in keeping with his decision conveyed in the February 4th letter to the Southern Environmental Law Center, the pubic comment period for the proposed PSD air permitting action requested by MZX Tech, LLC will end 12:00 AM on February 18.

Please feel free to submit comments via the portal referenced in the "Notice of Public Hearing" document or directly to me (especially if you wish to submit a comment with corresponding attachments).

Best Regards,

Jaricus Whitlock, P.E.
Chief, Air Division
Office of Pollution Control
Mississippi Dept. of Environmental Quality
P.O. Box 2261
Jackson, MS 39225

Office: (601) 961-5303

From: SafeAndSound Coalition <safeandsoundcoalition@gmail.com>
Sent: Monday, February 16, 2026 12:07 AM
To: Jaricus Whitlock <jwhitlock@mdeq.ms.gov>
Subject: Re: Request for Reconsideration of Public Comment Extension – MZX PSD Permit

This Message Is From an External Sender
This message came from outside your organization.

Hello,

We're writing to follow up regarding our February 6 request for reconsideration. With the public hearing approaching, we would appreciate an update on the status of that request so the community can plan accordingly.

Thank you,
Safe and Sound Coalition

On Mon, Feb 9, 2026 at 12:46 AM Jaricus Whitlock <jwhitlock@mdeq.ms.gov> wrote:

> Good Morning,
>
> Please know that your requested reconsideration was received on Friday (February 6) and has been forwarded to MDEQ's executive leadership - particularly Executive Director Wells - for evaluation.
>
> Best Regards,
>
> Jaricus Whitlock, P.E.
> Chief, Air Division

Office of Pollution Control
Mississippi Dept. of Environmental Quality
P.O. Box 2261
Jackson, MS 39225

Office: (601) 961-5303

From: SafeAndSound Coalition <safeandsoundcoalition@gmail.com>
Sent: Friday, February 6, 2026 2:12 AM
To: Jaricus Whitlock <jwhitlock@mdeq.ms.gov>
Subject: Request for Reconsideration of Public Comment Extension – MZX PSD Permit

Dear Mr. Whitlock,

We are writing on behalf of Safe and Sound Coalition to respectfully but urgently request that MDEQ reconsider its denial of the extension request submitted by the Southern Environmental Law Center. While we are not attorneys or policy professionals, we represent the very people this process is meant to serve: the residents directly impacted by this facility, who deserve a fair and accessible opportunity to participate.

First, we want to sincerely thank MDEQ for relocating the public hearing to a larger venue. We recognize and appreciate that effort to accommodate public turnout.

Winter Storm Fern has created clear and ongoing barriers to public access. Beginning January 24, the storm brought widespread ice, power outages, and unsafe road conditions across Mississippi. Governor Reeves declared both a state of emergency and a federal disaster in response. While DeSoto County was not the hardest hit, it has still been significantly affected. All public libraries in the county have been closed since January 24 and remain closed as of this week. These libraries are the only reliable access point of internet, printing, and meeting space for many residents, especially those who are elderly, disabled, or low income.

Safe and Sound has also relied on the Southaven library as one of the only free and accessible places to organize. The storm has made it impossible to meet, print, distribute flyers, or conduct in-person outreach. Roads have remained dangerous for nearly two weeks, mail service has been delayed, and community events have been canceled. Families across the region have been focused on safety, heating, food access, and childcare. Reviewing hundreds of pages of complex permit language and drafting comments has not been feasible for most people during this period.

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process should be available to the public. If not, the permit was publicly noticed while key issues remained under review. Either way, the timeline suggests the process was shaped by internal deadlines rather than by transparency or completeness, and that reinforces the need for more time and public oversight.

This permit decision could affect our community's health and environment for decades. Rushing it through during a state-declared disaster with no time for post-hearing response does not meet the standard of public service or environmental stewardship that the public expects and deserves.

We respectfully request that MDEQ reconsider its decision and extend the comment period at least 14 days beyond the February 17 hearing. Even a partial extension would be a step toward restoring fairness to a process that has repeatedly failed our community.

We urge MDEQ to reconsider. The people of Southaven and surrounding communities deserve a real chance to be heard.
Sincerely,
Safe and Sound Coalition

APPENDIX E

Certified Transcript of Public Hearing

MDEQ Public Hearing - MZX Tech, LLC

Transcript of Proceedings
February 17, 2026

All depositions & exhibits are available for downloading at
<www.brookscourtreporting.com>
Please call or e-mail depo@brookscourtreporting.com if you need a **Username** and **Password.**



Mississippi - Louisiana - Tennessee - New York
1-800-245-3376

MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY

MZX TECH, LLC PUBLIC HEARING

Taken at Ranger Conference Center
Northwest Mississippi Community College - DeSoto
1210 Church Road West, Southaven, Mississippi
on Tuesday, February 17, 2026
beginning at 6:05 p.m.

REPORTED BY:

CHRISTA SHERMAN, CCR #1964

APPEARANCES:

JARICUS WHITLOCK, P.E.
JEFFREY BLAND, P.E.
MS Department of Environmental Quality
P.O. Box 2261
Jackson, Mississippi 39225
jwhitlock@mdeq.ms.gov

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MR. WHITLOCK: If you'll please find a seat if you wish to be seated. Thank you so much.

We will now -- it's 6:05, we will now begin this public hearing. We want to say good evening, again, to everyone tonight, and thank you for being here tonight.

My name is Jaricus Whitlock. I am chief of the Air Division at the Mississippi Department of Environmental Quality, or MDEQ for short. This public hearing first regards the proposed issuance of an Air Prevention of Significant Deterioration Permit to Construct for the construction and operation of a behind-the-meter power generation facility to be called MZX Tech, LLC, and located at 2875 Stanton Road in Southaven, Mississippi.

This public hearing is the culmination of the public comment period associated with this proposed air permitting action, which began January 16, 2026, and will formally conclude tonight at 12:00 a.m.

Given the media interest this proposed air permitting action has garnered, I will share, at the onset of this hearing, that

anything conveyed during this overall proceeding is considered public record and may be recorded, quoted, and/or reported.

The purpose of the overall public comment period and this public hearing is to receive comments, concerns, and other information for consideration of the proposed draft Prevention of Significant Deterioration, or PSD for short, Permit to Construct Air Emissions Equipment requested by MZX Tech.

The public comment period and public hearing is a standard permitting process for such a project as this, and is an essential aspect of the subsequent review that will be conducted by MDEQ air permitting staff. As such, at the table with me tonight is Mr. Jeffrey Bland, Air Permitting Coordinator for MDEQ's Air Permitting Branch in the Air Division.

MDEQ developed the proposed draft PSD permit and supporting documentation based on a comprehensive review of all information submitted by the applicant for the proposed project. Moreover, the conditions of the

draft PSD permit were developed to ensure compliance with all applicable air regulations and standards promulgated by the State of Mississippi and the United States Environmental Protection Agency, or the EPA for short, but are subject to change based on information received during the public hearing and overall public comment period.

Please know that a final decision on this proposed air permitting action will be made by the Mississippi Environmental Quality Permit Board. The Permit Board is created by Mississippi law for the purpose of issuing, denying, or modifying -- under such conditions and limitations as it may prescribe -- environmental permits and coverages to control air and wastewater releases within the State of Mississippi.

The composition of the Permit Board is established by law and consists of the directors, or their assigned designees, from specific state agencies that have interest in environmental matters of the state. A complete listing of the specific agencies and their corresponding directors, or assigned

designees, can be found on MDEQ's website.

I will now provide a brief description of the proposed air permitting action under consideration.

On August 22, 2025, MDEQ received an application from MZX Tech, LLC, Air Reference Number 0680-00119, requesting a PSD Permit to Construct Air Emissions Equipment for the proposed construction of a behind-the-meter electric power generation facility. As a point of clarity, behind-the-meter means any power generated by the proposed facility will not be exported to the electrical grid.

The proposed project involves the installation and operation of 41 natural gas-fired, simple cycle, stationary combustion turbines and the supporting equipment, for a continuous power generating capacity of approximately 1.2 gigawatts. The overall power generation system is also to be designed with full redundancy through the on-site deployment of Tesla "Megapacks" for back-up power to ensure uninterrupted operations. Therefore, there will be no back-up diesel-fired or natural gas-fired

generator engines onsite.

With the projected operation of 41 stationary turbines, the overall project is subject to the PSD permitting program because the potential emission of several air pollutants exceeds the applicable thresholds established by this federal rule. As such, MZX Tech is considered a "PDS major source."

As a PSD major source, MZX Tech is required to complete a Best Available Control Technology analysis and an Ambient Air Quality analysis for each regulated air pollutant that exceeds the established PSD threshold. The specific pollutants that are subject to the referenced analyses are: Particulate matter less than 10 microns in diameter, or PM10, particulate matter less than 2.5 microns in diameter or PM2.5, nitrogen oxides, volatile organic compounds, sulfur dioxide, and carbon monoxide.

The Best Available Control Technology, or BACT for short, analysis is required to ensure that MZX Tech will incorporate the best practical air pollution control devices, techniques, and/or emission limitations to

minimize the emission of each applicable pollutant.

Upon completing this analysis and submitting it to MDEQ for review, MDEQ is proposing the following as BACT for each stationary combustion turbine: For PM10 and PM2.5, the application of "good combustion practices" and the sole usage of pipeline-grade natural gas; for nitrogen oxides, the usage of selective catalytic reduction control and a limitation on air emissions to no more than 2 parts per million; for carbon monoxide, the usage of oxidation catalyst control and a limitation on air emissions to no more than 4 parts per million; for sulfur dioxide, the sole usage of verified pipeline-grade natural gas; and for volatile organic compounds, the application of "good combustion practices" and a limitation on air emissions to no more 2.5 parts per million.

The Ambient Air Quality analysis is also required to demonstrate that the allowable emission increases from MZX Tech will not cause or contribute to air pollution that

ultimately violates either an EPA-established National Ambient Air Quality Standard or any applicable maximum allowable increase over the baseline concentration for the area. Such a complex demonstration, which accounts for existing air quality and historical meteorological conditions -- excuse me -- is accomplished through dispersion modeling. With consideration to "existing air quality," please note that at present the "existing" ambient air quality for DeSoto County, which is part of the Memphis metropolitan statistical area, is considered "in-attainment" with all national standards by EPA.

For this proposed project, the following pollutants were evaluated in the ambient air quality analysis: PM10, PM2.5, nitrogen dioxide, sulfur dioxide, and ground-level ozone, as volatile organic compounds and nitrogen oxides are precursors.

As MDEQ is conscious of the concerns regarding the contributions that emissions from MZX Tech will potentially have on existing air quality, this analysis was

thoroughly scrutinized by MDEQ air modeling staff. As such, the proposed facility's impacts from their modeled emissions and the estimates of precursor secondary formation were found to be compliant with the applicable National Ambient Air Quality Standards, PSD increments, and significant impact levels.

After a comprehensive review and consideration of the information presented in the application and the corresponding ambient air quality modeling, MDEQ has concluded that by adhering to the emission limitations, operational restrictions, and compliance assurance mechanisms incorporated into the draft PSD permit, the proposed facility can comply with all applicable Mississippi and Federal environmental laws, regulations, and air quality standards.

Now, before we begin the comment portion of the hearing, I want to share a few important guidelines to ensure we can hear from as many people as possible and maintain a respectful environment.

MDEQ is committed to providing a space

where all participants can express their views without disruption. Therefore, we ask that you refrain from booing, cheering, or interrupting a commenter during remarks. Also, applause, vocal reactions, or any other demonstrations, whether in support or in opposition of the proposed project, should be only made during the intermittent periods between commenters.

Each speaker is asked to convey their comments within a maximum time frame of three minutes. We implore you all to please adhere to this time limit as best you can so that everyone who wishes to speak has an opportunity to do so. A timer will be visible, and you will be notified when your time is nearing its end.

We appreciate your cooperation and your professionalism. Your respect for these guidelines helps ensure a fair, orderly, and productive public hearing for everyone.

We are now ready to receive your comments, but lastly, we wish to share a few instructions for all commenters.

Please come to one of the three podiums

that you see within the room before you present your comment. If you are physically impaired and cannot walk to the podium, please let us know and we will bring a microphone to your seat.

This public hearing is being transcribed by a court reporter so that the proceedings can be archived for the public record. In addition, we have a sign interpreter present for the hearing impaired. Therefore, we ask that you please speak clearly in the microphone so that your comments can be properly archived and interpreted. If you are presenting a pre-prepared comment, we ask that you please submit them upon completion of your presentation to ensure the transcript is accurate.

Before sharing your comment, please state your name. If you represent an organization, please share its name as well.

In lieu of presenting your comment at the podium, you may still submit written comments to enter into the public record. Located at both registration tables as you entered the conference center are comment

cards and pens. Upon completing your written comment, please submit it to MDEQ staff.

We will now call individuals to comment in the following order: First, those individuals that indicated "yes" on their registration cards with a desire to speak will go first; second, those individuals that indicated "maybe" on their registration card; and lastly, we will open up the floor to anyone else who wishes to comment and has not already done so already.

I will also -- and there's one other item that I might mention off the cuff, is that you please silence any cell phone, smart-watch, just so we can, I guess, clearly transcribe any comment made. That is the only thing that I had failed to mention beforehand. But other than that, we are ready to begin.

I also will apologize on the front end if I mispronounce anyone's name. So, I'm sorry in advance.

Mr. Gordon Jackson.

MR. JACKSON: Good afternoon. Or good evening, I think it's evening now. Members

of the board and executives of MDEQ, my name is Gordon Jackson. I am the state Environmental Climate Justice chair for the Mississippi State Conference NAACP. We're working closely with our DeSoto County branch.

I'm here to urge you to disapprove the draft of construction permit for the MZX, LLC, power plant in Southaven. This case is more than just about one facility, it's about whether Mississippi will continue a pattern of setting high -- citing high pollution projects in communities already burdened by poor air quality and health disparities, or whether you will choose a path that aligns with long-standing environmental laws, with environmental justice, and basic public health science.

The proposed 41 methane gas fired turbines, as well as the 27 already installed and operating without a permit, would have significant smog forming pollutants, particulate matter, and hazardous air pollutants, like formaldehyde, into a region that is already failing federal smog

standards.

Smog and other fine particles are not abstract words and phrases, but should be treated with a level of concern that environmental and public health officials should consider them, which are triggers for asthma attacks, hospital visits, heart problems, and missed days of school and work.

The Memphis metro area, including Southaven, already ranks among the highest in the nation for asthma related emergency room visits and deaths. To add a massive fossil fuel power plant into this context without a full, honest, cumulative impact analysis is irresponsible for the state environmental quality agency and government body to do.

We are asking to take a different course here. The permit board should disapprove this draft permit and direct MDEQ to require MZX Tech and xAI to stop operating the 27 unpermitted turbines until they are brought into full compliance, withdraw the current draft permit, conduct a comprehensive air quality and health impact analysis that includes all turbines and cumulative

pollution, and only then, with full transparent information, issue a permit proposal for meaningful public review.

And I'd like to add that last year at our national convention in Charlotte, we passed a resolution asking for such issues and asking for -- to be able to reach out and come and provide, or establish, community benefits agreements so that the -- so that the owners of the data center, along with the municipalities, are acting as responsible corporate citizens in the communities they -- that they exist.

Thank you very much.

MR. WHITLOCK: Kelly Jacobs. I'm sorry.

MS. JACOBS: Good evening, Mr. Bland, Mr. Whitlock, and everybody who came here tonight. Thank you for being here.

My name is Kelly Jacobs, my husband and I live in Hernando. I am here to ask you to not approve any permit for the new Southaven xAI power station operated by MZX technology.

History has proven that greedy businesses and politicians cannot be trusted to think about the safety of the public's

health versus their business plan to make as much money as possible. This is why, in 1970, Congress passed the Clean Air and the Clean Water Acts. These federal laws overrule state laws and prohibit the people of Mississippi from being used as polluted air and water pollution guinea pigs.

On a personal note, recently my husband's asthma and COPD-type symptoms and costs have significantly increased. Paul has never smoked anything, so please don't think he brought this on himself.

DeSoto County has an F rating for its air quality, the only county in our state with this flunking designation. And I worry that this newest polluter is why he continues to have trouble breathing, stumping his heart and lung doctors as to the problem, the cause.

Today you will hear facts. That this xAI company is operating without lawful permission. That no tests or measurements of the specific gray water pollution to cool computers and air pollution these turbines are making have been given -- specifically

measured in this Southaven neighborhood should appall you.

Would you want your children or your grandchildren living in this area? I listened to the mayor of Southaven at a city council meeting split hairs about how noisy this power plant can be, but he refused to discover that -- to discuss the health implications of his constituents who are now breathing the exhaust from these gas turbines that never turn off.

Even more turbines are being requested for a total of 41 air polluters that would run 24 hours a day, 7 days a week. The noise will also increase dramatically.

Please deny their operational permits. Federal laws protect our air and water, and without proof that this business' air and water pollution is harmless, you must err on the side of the people. You need to enforce the laws and the system that is set up to protect the public.

You are our only hope, Obi-Wan, of all enforcement of federal law that says we must keep our air and water clean because MZX

technology is violating the law by operating without required permits.

Without proof that their billion-dollar company cannot create power in a manner that is safe for Mississippi residents to drink and breathe, you must decline to issue a Prevention of Significant Deterioration construction permit.

Thank you.

MR. WHITLOCK: Hildi Hops.

MS. HOOPES: Hoopes.

MR. WHITLOCK: So sorry.

MS. HOOPES: Good evening. Thank you for the opportunity to speak today, an opportunity that was not extended to us prior to xAI setting up shop in our county. I'm not a professional speaker, so this won't be easy for me. Please, bear with me.

As a citizen of DeSoto County, a major concern that I have is for those who don't have a voice. As an animal lover, the studies provide -- providing (sic) adverse side effects on wildlife, as well as our precious cats and dogs, is nothing short of alarming. Once the birds stop singing and

our pets have suffered, it will be too late to press a restart button.

The bluebirds, something close to my heart, are a symbol of happiness, hope and love, and renewal, and are one of the many species negatively impacted. The bluebird populations were down 90 percent by the mid-twentieth century. Conservationists led the fight to protect our national treasure. We are now on the cusp of failing them all once, again.

Birds exposed to persistent noise of gas compressors show symptoms similar to humans who are suffering from PTSD. Studies show that chronic stress caused by air pollution, including skewed stress hormone levels due to the increased anxiety, distraction, and hypervigilance of birds.

Instead of corticosteroid levels being high, the opposite was found. Low corticosteroid can be a sign of intense stress, and that the body dials down the baseline as a means of self-protection. These are for those without a voice.

The studies showed that noise pollution

reduces animal's habitats and directly influences their fitness, and ultimately, their numbers. By doing so, making it more difficult for animals to survive. That's a pretty damning picture of what human-made noise can do to the natural population of animals.

A Penn State study shows that bluebirds and tree swallows nesting in noisy boxes spent less time incubating their eggs, laid fewer eggs, and produced less young than those in quiet boxes. This demonstrates that compressor noises cause behavioral changes and reducing reproductive success.

Unfortunately for our furry and feathered friends, generators, particularly those in industrial settings like data centers, also produce low-frequency noise that can be distressing to -- more so to animals than humans. Pets often perceive these noises as pressure or vibrations rather than just noise. Continuous exposure can lead to anxiety, agitation, and restlessness. Animals are unable to communicate, therefore suffering in silence.

We have a lot of trees and abundant wildlife throughout the beauty of DeSoto County. At the end of the day, this is where we all hang our hats. When xAI leaves, we will be dealing with the repercussions, not only for humans, but for animals as well.

Please, please say no the expansion of xAI and their continued pollution of humans and animals.

Thank you for your time.

MR. WHITLOCK: Mr. Robert Barnes. Mr. Robert Barnes?

Angie Davis.

MS. DAVIS: Hi, I'm Angie Davis. I'm new to this, never done anything like this before, but this is something close to my heart, and the things that I have found out have shocked me. And I really hope that you will, at least for now, disallow this -- the permit.

I've lived in Southaven since 1997. One of my daughters lives in Colonial Hills. She found out about the turbines, she went outside and she heard hums, so she got on Facebook, found that it was from these

turbines that had been placed in the fields behind her house.

And then I discovered, when I was walking her dog along the back of the neighborhood, and I heard a jet taking off. This didn't register for me because I live near Airways. I'm used to jets taking off.

The difference was this jet kept taking off. The noise was pretty loud. I saw on Facebook where somebody had gone out in their backyard. I think he's here, and -- okay.

And he -- it was this incredible, loud roar. I would be so sad, I thought at the time, to go out in my backyard and have to experience that.

I soon realized that noise was just the tip of the iceberg. I did some research. I'm not an expert, but the turbines in my daughter's backyard, where my granddaughter plays, are Titan 350 natural-gas burning turbines. They each produce 35 megawatts.

The new -- the now 27 turbines, I believe, now produce enough energy to run a city. I was shocked. And once the 41 turbines are put in, I think he said 1.2

gigawatts. So that's -- the Hoover Dam apparently produces 2 gigawatts.

So this is -- yeah. So but the Hoover dam is hydroelectric, and this is burning fossil fuels. So I think even third graders learned that fossil fuels produce pollutants. But, as you pointed out, there are safeguards in place.

What I'm worried about is, based on how these turbines appeared so quickly and without -- at least in Colonial Hills most people didn't know about it until they heard it. So that seemed kind of not good.

And then there's no air permit for the 27 turbines that are in there now, and they're burning fossil fuels and producing pollutants. But we don't know how many pollutants, what's in the air.

I have -- I did look at what -- the natural gas, when burned, produces the volatile organic compounds nitrogen oxide, carbon monoxide. These have been linked to low birth rates, stillbirth, low sperm count, cancer, as well as worsening the COPD and asthma that we're all familiar with already.

From -- you know, during the summer especially, the news guys will come on and say, if you have these health problems don't go outside.

So that's because of Memphis. Memphis is a city. We're a pretty good city right here, so we produce pollution. But now there's another city that apparently has been plopped down in the field between the soccer fields and Colonial Hills. And I can't help but worry about how much pollutants that's going to produce.

So I guess I'm asking you to make sure that we are safe, because from what's happening with the no air permit, with the sudden springing up without -- I guess they told us? That this huge plant, I just suspect that this is really being rushed.

And maybe our safety is not a really important part of this rush. And I want it to be, because my children live here, my grandchildren live here. They are having children, they're talking about having children, and I want those children to be safe. And I want our community to be safe.

And this doesn't seem like it would encourage safety.

So if you could just ensure our safety, ensure the procedures are actually followed, maybe, you know, put off this permit until the community has been educated, we know what's going on, and we know what's going to happen.

Thank you for your time.

MR. WHITLOCK: Mr. Joshua Langston.

MR. LANGSTON: Good evening. My name is Joshua Langston, I am the elected alderman for Ward 1 in Horn Lake, Mississippi.

According to the enviromental surveys, Ward 1 is in one the most dangerous fallout zones from the gas turbines of MZX Tech as they currently stand, and if more are added.

As an elected official charged with serving those I represent in my ward, I must raise the health and safety concerns of these turbines and the ones that would be added if this permit is approved.

While Horn Lake has not been advised or asked about the installation of these turbines, or the data center as a whole, we

would nonetheless suffer from the exposure of nitrogen oxides, formaldehyde, and particle matter these turbines promise. The pollutants are associated with increased risk of cardiovascular and respiratory illness, and as I see in my child over the last few months, an increase and worsening of asthma and asthma symptoms.

Videos from across the north end of my ward already show a continuous roar despite the promise of sound walls, and the assurance from local officials that, "It's not actually that loud."

Without taking into account the potential water use and pollution and the implication of recent controversy of artificial intelligence itself, these turbines are currently, right now, a health and safety threat. It's a threat against businesses to the east, residents to the west, communities to the south, cities to the north, and to all residents in between. This is not a city -- a single city issue and what businesses they allow, it is a health concern for all of North Mississippi, Southwest

Tennessee, and if allowed to continue, will be suffered for generations to come.

Gentlemen, you opened this by saying you were gathering information, I'm telling you you were given wrong information. This is a threat now. You cannot allow this permit to go through. Thank you.

(Indiscernible crosstalk.)

MR. WHITLOCK: Got to get this one first. I'm going to use the nickname Gray Fox? Could you pronounce your last name, sir?

MR. BACHELDER: My government name? Bachelder, it's two words my grandparents put together to make one -- when you want to buy land.

But I'm here to tell you, from our experience, that this is dangerous to everybody. Let me give you some words of wisdom from my family: Somewhere between the mountains and the mosquitoes, you will find man. We are just part of the creation. So price cash shall return to roots, a stone vested amount of return. We must base all of our decisions on how they will affect the

next seven generations.

I'm here to be not only a voice for our grandchildren's children, but all the rest of creation also. When the last tree has been cut, when that last fish has been caught, and the last drop of water has been poisoned, only then man will realize he can't eat money.

(Indiscernible) -- in Texas -- no matter what you do, he's going to violate that just like he did in Texas. So no elected officials should be allowed to sign an NDA.

Thank you very much.

MR. WHITLOCK: Mr. Andy Kirk.

MR. KIRK: Thank you, Mr. Bland, and your name?

MR. WHITLOCK: Jaricus Whitlock. You can say Jay. That's fine.

MR. KIRK: Okay. Thank you for taking time to come in here and holding this meeting for us. I appreciate that.

Mr. Bland, I wrote you an email previously, but I wanted to share this as well.

My name is Andy Kirk. I was born at

Baptist Memorial Hospital just down the road here in DeSoto County in Southaven in 1992. My wife has been a life-long resident of the Greenbrook neighborhood since 1996. So if she's watching this, don't get mad at me for just telling everybody your age.

Together we've been homeowners in Southaven Ward 3 since 2021, where we are raising our two sons. Their safety and well-being are that most important factors in any decision that we make, and today I want to introduce you to them.

We bought our first home in April of 2021 in Southaven. Our oldest son, John Mikal, who is now 4, who was born and brought home a month later. He currently loves trains, his bike, and our dog, Winnie. I coached his first ever soccer team last fall, and we practice multiple times at the Stateline Soccer Complex, just two miles away from the xAI site.

Our youngest son, Lewis, just turned 20 months old last week. He was born six weeks prematurely at Baptist DeSoto and spent the first week of his life in the NICU

because his lungs were underdeveloped. When we brought him home, we knew that his life was a precious gift, and that also that throughout his life he would be more susceptible to respiratory health issues, like asthma, RSV, and some others that are have already been talked about today.

Both of our boys love playing outside in our backyard, at Central Park, Snowden Grove Park. We visit our friends and family in Horn Lake. We go swimming at their grandparents' house. We love visiting the New Agricultural Education Center on Star Landing Road.

And while, you know, I'm sure most of everybody here, like me, spent the majority of their childhoods outside, I'm not sure that I ever imagined that that would be a concern that I would have for my children with spending too much time outside.

DeSoto County has some of the worst quality of air in the state of Mississippi. It is the worst quality of air in the State of Mississippi. Memphis has the worst quality of air in Tennessee. And lucky for

us, we are right up close to them. While there are many factors contributing to those facts, those facts are indisputable. And the last thing our city, our county, or our region needs is another contributor to more polluted air.

It is an indisputable fact that the 41 turbines applied for by MZX in addition to the 27 temporary turbines that are running without permits, and have been doing so since August of last year, have and will significantly contribute to more air pollution in our region.

On February 13th, EmPower Analytics Group just published the only environmental impact study to date on this proposed facility. MZX has been operating 27 turbines without permits since August, in violation of Mississippi State law requiring permits for all air polluting equipment; and in violation of the Environmental Protection Agency, which is just ruled recently that even temporary turbines need permits to operate.

In this study they found that the residents in DeSoto County will be exposed to

the highest increases in particulate matter, and that the cost we are going to have to pay for the increased pollution is anywhere from $30 million to $44 million per year in premature deaths, health care costs, missed work, and missed school days. Over 30 years, the study reports that the total cost to be between $588 and $862 billion to DeSoto County taxpayers.

This past week, the public records request revealed the most recent water usage bill for this facility. In just 12 days the facility consumed 7-7-million gallons of clean drinking water. If we extend that same 30 year period used to calculate the health cost, that would equal 7 trillion gallons of drinkable water used for this supercomputer.

The impacts to our environment, our health, and our community greatly outweigh any potential benefits for this project. I join my voice with many of my neighbors here, to ask that you deny this permit and have them revise it.

I appreciate your time.

MR. WHITLOCK: Mr. Robert James.

REV. JAMES: Good evening, (indiscernible) and community members. My name is Rev. Robert James. I serve as the president of the Mississippi State conference of the NAACP. Today I stand with our DeSoto branch members, the community of Southaven, and the residents of Memphis, urging you to disapprove the draft permit for the xAI center in Southaven.

Any form of pollution needs to be seriously reviewed, especially in communities already burdened by environmental hazards. This facility is not just a data center. It is a mass methane gas power plant. The proposal involves the operation of 41 gas turbines, enough to supply power to a midsize city.

Last year we went to Memphis and stood with our brothers and sisters when xAI disregarded the law and powered their first facility. As a result, our community are living near gas turbines that was installed and operated without the necessary pollution control. With this new permit, noise and air pollution would increase, intensify existing

health risks, and prolonging injustice for those who have opposed xAI for over a year.

To make matters worse, with or without your permit, they are already operating. That is unacceptable. This draft failed its fundamental duty of transparency. It does not include all the potential sources of pollution, making it impossible for the public to fully understand the scope of the environmental hazard and the health impact across the site. Why should MDEQ consider approving a permit when the application remains incomplete?

In any other situation, a permit of this size will have to return back to the drawing board. By ignoring the fact that the data center is already operating without a permit, the process undermines meaningful public participation. A permit that excludes pollution source is not a protected permit. It is a permission slip for further harm.

Moreover, the public has requested for more time to engage in this process. MDEQ has denied an extension for further community input. And if MDEQ moves forward with an

incomplete application and disregards the request of additional engagement, it is sending a troubled message to the public.

Southaven and the Memphis region are experiencing unhealthy air quality, pollution from turbines, worsening reparatory illness; especially in children, pregnant women, and elderly. Adding a large polluting power plant to these conditions is not only unwise, it's unjust.

As the state president, I can testify that Mississippi has a long and powerful history of making decisions, intensifying the environmental harms of black and low income communities, treating our neighbors as a sacrifice zone. The NAACP has fought this pattern from Jackson water prices to all the environmental justice struggles statewide. And we will continue to fight it here.

So to approve this permit under these circumstances would be a failure to Mississippians from further harm. We're calling on the permit board to exercise its full authority and responsibility. We urge you to order a cease in operation of the 27

unpermitted turbines until permanent permits are obtained. Withdraw current draft permits and require a revised permit that includes all turbines. Provide a honest accounting of emissions before ending public comment.

Our community deserves accurate information, enforceable protection, and a real voice in decisions that affect their lives. We're not opposed to economic development, far from it. We're opposed to development that treats our community as expendable, and our children's health as collateral damage. Mississippi can, and it must, do better.

So we urge you to disapprove this draft permit and stand for the public health, environment justice, and the civil rights of the people you serve.

Thank you for your time.

COURT REPORTER: Mr. Whitlock, will you remind them not to cover over people talking, or I won't be able to get it down?

MR. WHITLOCK: I will stress that you please, when anyone is speaking, please refrain from any additional noise, anything,

just so she can accurately get everything that's said on record.

I just ask -- it's okay after they've completed it, just while they're doing it. Okay. Thank you for that.

Also, please stress -- I want to stress that if at all possible, please adhere to the three-minute time limit. I know I can't force you to, but I know we've got a lot of people, and we are -- I need to be respectful of the facilities and their restrictions as well. So as best you can, 3 minutes.

Ms. Natalie Culbreath.

MS. CULBREATH: Hello, my name is Natalie Culbreath. I'm a resident of Southaven, a mom of three, and the vice president of DeSoto Central Primary School Parent Teacher Organization.

I am speaking on behalf of all the children of DeSoto County and the surrounding area to demand that the MDEQ permit board disapprove the permit allowing MZX Tech to operate. If the permit is approved, the MZX Tech facility would dramatically increase air, light, water, and noise pollution,

directly harming the health of our children.

MZX is already operating 27 turbines without a permit. This draft permit fails to account for all the sources of pollution and fails to protect air quality and public health. This permit underestimates health and economic harm. This permit fails to adequately address water concerns.

Ultimately, permitting this facility to operate will result in an unhealthy environment for the citizens of this area. For these reasons, I demand that the 27 unpermitted turbines be stopped immediately, and that MDEQ deny their permit.

It is my moral imperative as a mother to beg you to protect our children's air and water. It is your job, as the Department of Environmental Quality, to deny this permit.

Thank you for hearing our comments.

MR. WHITLOCK: Danielle Culbreath.

MISS CULBREATH: Hello, my name is Danielle Culbreath, and I'm a third grader at DeSoto Central Elementary.

I am against the permit for the MZX Tech facility because it's harmful to the

environment that I'm growing up in. Please protect the air and water that I will have to breathe and drink.

Thank you.

MR. WHITLOCK: Mr. Nathan Reed.

MR. REED: My name is Nathan Reed. I'm a lifelong resident of Southaven. I was born and raised on Stateline Road. And aside from the years I left to attend seminary, where I met my wife, I've always called the city home.

We made the choice to come back here. We chose to build our life here. More than 17 years my family has lived in North Creek neighborhood. It's on the west end.

We have witnessed development before: Warehouses, distribution centers, commercial expansions. None of this is new. Growth, when managed responsibly, can be healthy.

But what has occurred with xAI is categorically different. The scale, the speed, the intensity of this expansion are unlike anything this area has absorbed.

This was not thoughtful phase development, it was an industrial surge

imposed on the residents, on our residential community. The impact has been immediate and undeniable: Relentless industrial noise, increased heavy traffic coming through the arteries of our neighborhoods, the denigration of our air quality.

I have never experienced chronic sinus issues in my life, and yet now I deal with a persistent cough and a prolonged irritation that coincides directly with the operation of this ramping up. Where residents begin to experiencing new health concerns along sudden industrial escalations, dismissal is not leadership, it's negligence.

This is not a theoretical policy debate, this is not partisan theater, this is happening in front -- in our front yards, in our children's bedrooms, in our air we breathe. Families who have built their lives for decades have been forced to observe consequences they were never meaningfully consulted about.

Let me be clear, we are not anti-growth. We are not anti-business. We are anti-secrecy. We are anti-rubber stamping.

We are anti-sacrificing the established neighborhoods for corporate acceleration without transparent safeguards. Without transparency, it's exploitation. Growth without accountability is recklessness. Growth without community consent is political malpractice.

We are demanding a full stop, full disclosure, every plan, every phase, every environmental assessment -- every projected impact that the residents of the west end deserve -- clear data, emissions, infrastructure strain, long-term expansion and intention, and enforceable protections.

Because we deserve that. We live here. We've developed our lives here.

We are not asking for favors. We are not asserting -- we are asserting our rights as residents. Responsible development is the minimum standard, not a political talking point. And until transparency and accountability can be enforced and protections are in place, we will continue to demand it.

Thank you.

MR. WHITLOCK: Cas Kilroy.

MR. KILROY: Good evening, everyone. My name is Cas Kilroy. I live in Southaven, Mississippi.

I am here tonight to voice my opposition to the xAI development. Southaven is my hometown, and I don't want my family and I to have to breathe toxic air.

Opponents of this development have been accused by our mayor of having a political agenda. If someone wants to characterize it that way in order to diminish our concern, I cannot stop them. I can only say that my aim in being here tonight is to protect my right to clean air.

I do not accept the assurance of people with a vested financial interest in this project that it is safe. I'm not a scientist, but I know the system -- I know that systems change when you add to them. The pollution from these turbines is more than I want added.

Our environment is toxic enough. Our bodies do not need yet another stress on our health, and my well-being shouldn't suffer so

that some venture capitalists can make money as fast and as dirty as possible.

It is in your power to stop this here in DeSoto County. Thank you for your time.

MR. WHITLOCK: Okay. Jerry or Jimmy or Jeremy --

(Indiscernible crosstalk.)

MR. WHITLOCK: Suller, or --

MR. SALES: Good evening.

MR. BLAND: Okay. Say your name for the --

MR. SALES: Jerry Sales.

MR. WHITLOCK: I couldn't read it. I'm sorry.

MR. SALES: I've been a resident of Southaven for over 40 years, and I have been president of the homeowners association for 25 years.

MALE SPEAKER: Speak into the mic.

MR. SALES: So a couple of things. One is, one thing that's not been discussed here is it's not just the xAI plan for Southaven, you've got an xAI plant right across the street in Boxtown. They have the same issues that we're discussing here tonight.

Second, my statement in life is: Not all money is good money. And you've got to know how much money is coming into Southaven for having this xAI plant Southaven, okay.

There's big bucks here at the expense of the population, maybe. Maybe if we have less tax dollars -- maybe it's better to have more tax dollars and less pollution, potentially.

So where there's -- were there -- are studies performed and completed on water, air, and land pollution before allowing an xAI facility to be constructed in Southaven? Were there? Or was the income dollar figure so big it was decided to proceed without any research?

For five to ten years, DeSoto County cities complained about Memphis aquifer that provides the water used and consumed in DeSoto County as potentially being consumed and contaminated by the city of Memphis. What are we doing?

While the following is not an xAI story, the point is the potential cost of allowing a facility to operate without determining the potential effects to the public and natural

resources. Are we familiar with what is happening in south Memphis for the Sterilization Services of the Tennessee Plant, AKA SST?

This is the facility that used ethylene oxide, which is a poisonous gas that is used to sterilize approximately 50 percent of all medical and dental devices manufactured, which are implemented in humans -- it's not a problem with the implementation problem, it's the gas, the environment, the pollution -- some food products, cosmetics, and in industrial applications to manufacture plastics, detergents, and antifreeze.

What has happened within a 4 to 5-mile radius of the SST facility in Memphis? Many people in the area for several years were dying from cancer. Now there are lawsuits popping up for the families' losses as we speak today -- a lot.

The Clean Air Act lists EtO, which is ethylene oxide, as one of the 187 hazardous air pollutants commonly referred to as air toxins. I visited and toured an EtO facility in 1998 in New Jersey. The facility was not

in an immediate four to five area of residential or school properties. I was well aware of the effects of EtO, having spent my entire work career in a business that required EtO or irradiation for the safety of humans.

I questioned the location of the facility in New Jersey at the time with the employees there. The employees were aware of the potential impacts to humans and animals. Point here is, why would the city of Memphis allow an EtO facility in a populated area, in the city of Memphis?

While this facility is Southaven is not an EtO facility, the questions are: What might be the long-term effects of having this xAI facility near a residential community? Air, water, noise, land pollution potentially destroying the Memphis aquifer.

Where are we going to get our water from? That's drinking water. That's water we use to wash clothes in, to bathe in. Where will the residents obtain water?

Will it necessitate building several large water treatment plants? That's going

to cost a lot of money. We have fresh water here now, why are we wasting it?

That's all I have, thank you.

MR. WHITLOCK: LaTricea --

(Indiscernible crosstalk.)

MR. WHITLOCK: Before you start, ma'am, I'm sorry, is your last name Adams?

MS. ADAMS: Yes.

MR. WHITLOCK: Okay. Thank you, I'm sorry. Go ahead.

MS. ADAMS: Good evening, and thank you for the opportunity to speak. My name Is LaTricea Adams. I'm the founder, CEO, and president of Young Gifted & Green, and daughter of Willie Roy Adams, who was born in Senatobia, Mississippi, not too far from here.

He died prematurely at 65 years old, a week before Christmas in 2022. And my grandmother, his mother, died from lung cancer six months after. They both lived right across Stateline in Memphis, a place DeSoto County has in common, which is an F by the American Lung Association for air quality.

I am urging the Mississippi Department of Environmental Quality to disapprove the air permit for MZX Tech, LLC -- or xAI, Colossus 2, whatever moniker they have decided to use -- because approving it will be cruel acquiescence of the illegal polluting methane gas turbines that are currently running with no permit.

The Clean Air Act is not optional, but somehow xAI is still actively breaking the law. And to be clear, contrary to remarks respectfully made by MDEQ, federal law supercedes state statute.

In January 2026 the Environmental Protection Agency reaffirmed that methane gas turbines of this scale are required to obtain proper air permits before operating. That requirement exists to protect communities, not to slow down development, but to ensure it happens responsibly and legally.

Beyond legality, this is about public health. Increased emissions of nitrogen oxide and particulate matter are linked to higher rates of childhood asthma, more emergency room visits, and more missed days

of school.

As a former K-12 educator of 16 years, I can personally attest to the decline in academic achievement when children missed so many days from school because they are chronically ill from something that's completely preventable.

Research from our very own U.S. Environmental Protection Agency shows that air pollution exposure during pregnancy is associated with preterm birth and low birth weight, outcomes that could affect the child's health for a lifetime.

We should not accept preventable health risks in exchange for avoidable regulatory shortcuts. Mississippi can welcome innovation and economic growth without compromising the Clean Air Act or the health of our children.

The responsible course of action is clear. Require full compliance, protect public health, protect our children, and protect taxpayers.

Don't make the same illegal mistakes as the Shelby County Health Department, with a

director that was a coward and resigned. Uphold the law and the dignity of Mississippians and prioritize people over a South African ex-pat billionaire.

Thank you.

MR. WHITLOCK: Mr. Justin Pearson.

MR. J. PEARSON: Before my three minutes, could you tell me about the court reporter and how we get access to the comments that you made earlier?

MR. WHITLOCK: You mean a transcript?

MR. J. PEARSON: A transcript for today.

MR. BLAND: Once it's completed and certified, it will be available for just dissemination through our public records office. There is no, I guess, charge or nothing. There's no issue with that. We will easily provide it.

MR. J. PEARSON: Okay. So you'll email everybody who signed in today? Is that what -- I'm saying, what's the process for accessing it?

Because I heard your comments early on, and some of the things you were saying were a little bit concerning. But I wanted to make

sure we can get access to it. So I just wanted to know -- are you just going email it to us?

MR. WHITLOCK: We can -- I will coordinate with my community engagement director to see how we can best provide that to everyone. So, yeah. I'm going to say to be determined.

Again, a simple remedy for that is a public records request that can be just easily done by anyone, but --

(Indiscernible crosstalk.)

MR. J. PEARSON: -- information request if you have our information already? We signed in, and we filled out our emails.

Can you just email it to everybody? I just want to make sure we all get access to the transcript.

(Indiscernible crosstalk.)

MR. WHITLOCK: So, yes, anybody -- right now, anybody can just do a public records request, as far as just you have it readily available for anyone to receive. Submitting it through email might not work as far as just sending it everyone. But there is a

possibility as far as posting it on our website.

So that's why, I guess, I'm not just going to commit to just saying we can send it to everyone at this time.

MR. J. PEARSON: Okay. Well, I think if it's posted to your website, that would be fantastic. If you could send an email telling us that it's on the website or a link to it on the website I think that would be fantastic as well.

It's a public hearing, but I think accessibility to the information, and what you shared, particularly because this is a live stream, as I understand it right now. Is this being live streamed?

MR. WHITLOCK: Yes.

MR. J. PEARSON: Because of that, just to give everyone full access to that information. I think if you can let us know when that's posted to the website so that we can read those comments that you are were making at the very beginning in particular, that would be extremely helpful. And I appreciate you having --

(Indiscernible crosstalk.)

MR. J. PEARSON: Okay. Thank you. I'm Tennessee State Representative, Justin J. Pearson, representing District 86 in the Tennessee House of Representatives. It's my honor and privilege to represent communities all across Memphis, from South Memphis and Westwood and Boxtown, to Harbor Town, all the way up to the Millington area.

And I'm asking that MDEQ deny xAI, or its subsidiary, the permit that they are applying. And there are several reasons why.

But let's talk a little about our family history. My grand -- my pawpaw actually comes from Marks, Mississippi. We have a deep connection to this state and to the history of this place. And we are seventh generation Tennesseans on my mama's side.

And so the fact that this is happening is really connecting our ancestry and our history together. But that ancestry has taught us one thing in particular, that people in corporate positions of power will often exploit those who they think are the most vulnerable to try and gain more access

to resources, despite the implications on our children, on our grandchildren, and on people who are most vulnerable.

And what I want to say to everyone who is here is, one, thank you. And also take a minute to look around. The diversity of this room, the power that we are all bringing, no matter what our faith traditions, our political beliefs, and those things like that, to say that clean air is a human right, is powerful.

And our work is powerful. I was most disconcerted at the start of this because you were saying that you believe that xAI would actually be able to meet the requirements that are required by Tennessee law and the Clean Air Act. But in reviewing the letter from the Southern Poverty Law Center and our community groups, including Memphis Community Against Pollution, I'm sure you would see some things that they would not be able to do. In particular, as it relates to their PM2.5, particulate matter 2.5 exposure, they only articulated in their permit assessment that their 41 turbines wills emit only

19.5 tons of particular matter 2.5 while generating well over a gigawatt, 1.2 gigawatts, of power. This, as a rule, is simply not plausible.

The gas turbines at TVA's nearby Southaven plant, which is only 800 megawatts of power relative to xAI's MZX plan, emits 315 tons of particulate matter 2.5. And they're only 800 megawatts.

So how is it possible that a facility that is producing 1.2 gigawatts of power is going to produce only 19.5 tons of particular matter 2.5? They may have an extremely powerful AI technology, but they are aren't magicians. And it's the responsibility of you all to, not just take what they're saying for granted and at these values, but to do a little bit more research and work to determine whether or not what they are saying is actually plausible and possible.

Which is why the research, that I know has been made public by ACLC, by two Harvard epidemiologist researchers, is really important. The consequences of this pollution are going to be in Southaven and

the Horn Lake area, but it's also going to be in Westwood and Whitehaven, communities that I represent in Memphis. We share the air. And pollution doesn't care about the imaginary boundaries that have been written across our states. Which is why we have to have solidarity when we are standing up and when we're speaking up. But the responsibility that we have as elected officials, and the responsibility that you all have as government officials, is not to bend to the power of billionaires, but rather always do what is in the best interest of the people.

And I understand, we have a billionaire breathing down your neck, a weak governor who wants to just accept more tax money no matter who it comes from, and a mayor who is not responsible and being responsive to his citizens, that it feels like you have to answer to that pressure.

But you have a responsibility to care about the people and the consequences of this plan are real. And if you look at the research and the only environmental impact

study that's been done by two Harvard trained scientists, you will understand the ramifications of your decision are too significant to allow for this permit to happen.

I'll wrap up here. But the negative cost of $30 to $44 billion per year in premature deaths is -- per year is because of premature deaths, is because of lost productivity and hospitalization, totaling $588 to $862 billion dollars over the next 30 years.

But here's what's important about that research that we have been articulating and we will be continuing to share. That is the conservative estimate. That is using xAI's permit saying that there's actually 19.5 tons of particulate matter that's going to be released every year. In actuality, if we use the accurate number, which is what we expect it to be, which is closer to the TVA's number, which is over 300 tons of particulate matter 2.5, we can expect billions of dollars in damages and a significant increase, likely, in the amount of people who are going

to die because of the pollution of this permit -- because of the pollution from this company.

Those are the things that we're asking for you to take into consideration. That people matter way more than profits, and that no matter what these companies or these elected officials are asking you to do, your responsibility is to the health of our community. It's to the health of our children, our grandchildren, the generations that are to come.

And so the fact that you started off saying, "It looks like they're going to be able to do this," was wrong. Because they are not going to be able to protect the health of this community. There is no healthy amount of pollution. There is no healthy amount.

And y'all really need to interrogate this permit. You to put a pause, give more time for yourselves to study it, as well as give the community more time for input. And with that, I'll stop. Thank you.

MR. WHITLOCK: Dr. Kimberly

Owens-Pearson.

DR. OWENS-PEARSON: Hello, I am Dr. Kimberly Owens-Pearson. And that was my son.

And you can tell because, pretty much, I'm saying the same thing he says. I haven't read it, so I didn't copy. I'm just kidding.

But yes, I come before you today because this is a serious matter. We have fought, yelled, and screamed in Memphis about being sold out by our leadership. People who have positions have a responsibility to their taxpaying constituents, instead of selling out to corporate greed.

And those of you who have to decide, you have to have an ethical and moral compass as a human, that you take into consideration that little baby who spoke, the -- my son, who just got married. They're going to have kids. And now the impact of losing my mother-in-law, all of these cases of cancer.

So they want to go from 27 to 41 turbines. And everybody always emphasizes natural gas. Natural gas is methane gas. It's methane. Just look it up. It's

methane. Call it what it is. Stop saying "natural" like it's a good thing. It's not.

There are alternatives: Solar, wind, things of that sort. But everybody is trying to kill us. This air will not stop. It doesn't have any boundaries.

Harm against any person for profit is harmful to our society. This is a diverse problem. Age does not matter, ethnicity is a nonfactor, and the location has no bounds. Leadership -- leadership is putting profit over people because he's a billionaire. And like the other gentleman said, and I always say it, we can't eat money. We can't drink it.

During these times, healthcare is being lost, but there is an increase of health and respiratory illnesses. People can't even afford doctors. They're using emergency rooms as doctor visits.

I'm an educator. I have students who have personally come in and say, "Can I plug up my asthma machine and take my asthma medicine?"

At this time -- I see 12 seconds.

(Indiscernible.) Oh, it started over.
(Indiscernible.)
Okay. So at this time, I'm going to wrap it up. At this time, I just want you guys to think, to know that people matter. People matter. Children matter. Literally, you would allow them to build this by John P. Freeman, 500 acres, really? Like, you would -- in the community, like, you would allow this? You're allowing it in our community.
And people are here today -- and I'm so proud of y'all for showing up. I'm so proud of us because it's time. It's time for us to join together, speak together, fight together. Because it's about us. They don't care about us. We have to. We have to. And say no to this. You have the power. If you have the position, choose wisely.
MR. WHITLOCK: Charly Park.
MS. PARK: Hello, my name is Charly Park with the Safe and Sound Coalition.
As I sat down to write this statement, I knew how I wanted it to end. However, given the gravity of this situation, I believe that

the ending should come first. Shelby County made a grave error when they decided to overlook MZX's blatant disregard for the law and for public health. MDEQ has a chance here to make the right decision for DeSoto County.

I will start with the strawman argument raised, that since Southaven is situated under the Memphis International Airport flight path and adjacent to I-55, a little more pollution doesn't matter. Let me make this clear: We're not talking about a minor amount of extra pollution.

The proposed emissions for the xAI power plant are well above the PSD significant emissions rate. The CO2e, greenhouse gasses, colloquially, projected emissions in particular are especially worrisome. They are 8,548 percent of the emission rate it would take to trigger the PSD.

This is not an exaggeration or inflation of the data. This is a real number with real public health consequences.

While MEM and I-55 both contribute to the pollution and smog in Southaven, they

contribute net benefits to public infrastructure and transportation. MZX does not and cannot claim a net benefit to either of those categories. MZX does not contribute positively to our community. MZX simply has no business here.

I could talk to you all day about the emissions rates and the statistics on ecological damage and climate change, but I'm not going to do that. Instead, I want to call into question the trustworthiness of MZX to do what's best for our community in good faith.

MZX has already blatantly violated the EPA and the Clean Air Act. They have a long and sordid history of running their temporary turbines well before permissions were in place for them to do so. They did it in Memphis. And, as expected, they did it again in Southaven.

These decisions were not made publicly or with any input from the people who live here and breathe the air. Why should we trust MZX to follow the law set forth when they already believe themselves to be above

it?

Though they have been -- there's been excuses made that Southaven gave MZX permission to do as they see fit, state statute does not circumvent federal law. Our air, our water, and our environment were violated without our permission and in violation of the law set forth to protect such resources.

Southaven is already suffering from the burden of pollution from Memphis, of which xAI is already heavily contributing to. In fact, DeSoto County has received an F rating in air quality from the American Lung Association. The leadership in Southaven has publicly acknowledged this F rating, and in the same breath stated that it's due to Memphis pollution.

Let me once again restate that stacking pollutant on top of pollutant is not a solution to the crisis. According to the CDC, the major killers of North Mississippi are as follows: Heart disease, cancer, and lower respiratory disease, such as COPD and asthma. These health issues have been proven

to be made exponentially worse by the same pollutants that MZX is currently seeking permissions to produce in the area.

As someone who has worked in health care for years in North Mississippi, I'm gravely concerned for the patients who are at risk if this decision is made lightly. It's unfortunate that the leadership in our city has decided that our air quality and public health are up for sale, but I and the citizens behind me do not agree. I implore MDEQ to listen to us and to take our best interests at heart.

Our environment is another precious resource that threatens to become collateral damage of MZX's activities here in Southaven. Massive land clearing has already been conducted, leading to the mass exodus of wildlife from the area surrounding Colossus 2 and the accompanying power plant.

As I was speaking to someone who lives in Colonial Hills about the effects they had noticed, they said simply, "All of the birds are gone. They have all disappeared."

Clean drinking water and clean air are

imperative to society, and they are our most precious of resources. Allowing a company with a long track record of circumventing the law for their benefit would be a devastating decision for the people of Southaven and the surrounding areas of DeSoto and Shelby counties.

It was a mistake for Memphis, Tennessee to trust MZX to keep the best interests of their citizens in mind. We are standing on the precipice of the exact same decision here, and I'm really hoping that you make the right decision. I can only hope that you make the right decision.

MR. WHITLOCK: Shannon Samsa.

MS. SAMSA: Hi, my name is Shannon Samsa. I live in Southaven. I lived here my whole life. I currently live about two miles from the MZX Tech power plant site. I hold a master's degree in physician assistant studies, and I have completed graduate level public health coursework and thousands of hours of clinical training, and I'm about to begin my career as a medical provider here. I am speaking tonight as someone trained to

recognize preventable harm.

Even using MZX and MDEQ's own emission estimates, these 41 turbines are expected to cause measurable health harm. A Health Impact analysis conducted for SELC by public health experts, as a lot of us have discussed here tonight, estimates 30 to 44 million per year in health damages from increased air pollution, including premature deaths, hospital visits, and lost productivity from missed school and work.

The modeling also shows that the highest projected increases in fine particulate matter exposure in multiple areas of DeSoto and Shelby County, with annual increases meeting or exceeding 0.5 micrograms per cubic meter.

At a population level, that increase in exposure corresponds to an increase in per-person mortality risk comparable in scale to the average annual risk of death from alcohol impaired driving in the US. We would never sit in this room and knowingly advocate for increasing someone's risk of dying in a drunk driving crash, yet that is the scale of

the risk we are being asked to look away from here.

Most importantly, as has been mentioned by others as well, this analysis most likely underestimates the total impact. It only evaluates the long-term average PM2.5 exposure and does not include additional pollutants, like formaldehyde, nor does it account for the 27 turbines that are already on site. We don't have any studies for those 27 turbines already on site because there is no permit for them.

But I'm not here to talk about numbers or money. I'm here to talk about people. Because those numbers are not theoretical to me, they represent the people that I expect to care for. That is my community, and these will be my patients.

I have personally spoken with residents living near this facility who report relentless noise and vibration from the turbines. They describe headaches, migraines, vertigo, sleep disruption. And these are not imagined or hypothetical symptoms.

Chronic sleep disturbance alone is associated with hypertension, cardiovascular disease, and impaired cognitive function. Persistent stress activation affects the autonomic nervous system. That is just physiology.

If a patient with heart failure, emphysema, or asthma comes to me and asks whether the increased exposure from MZX Tech raises the risk of hospitalization or death, the honest answer is "yes." The epidemiology is clear, and the evidence is overwhelming.

Fine particulate pollution is linked to increased cardiovascular mortality, respiratory exacerbations, stroke, and premature death. This is recognized by major medical and public health bodies worldwide.

So what am I supposed to tell my patients? Am I supposed to tell an elderly patient with heart failure that the additional risk is an acceptable tradeoff? Am I supposed to tell a parent whose child attends Hope Sullivan Elementary School, one mile from the site, that increased asthma risk was simply unavoidable? Am I supposed

to tell my patients to move?

Approving this permit would be knowingly adding industrial emissions and sustained environmental stress into a residential community that already struggles with air quality. It means accepting preventable health burden as collateral damage. It means shifting the consequences onto patients and onto the clinicians who will be left managing the fallout.

In healthcare, we are guided by a very simple principle. It is, "First, do no harm."

You have the authority to prevent harm here. Disapprove this permit. Thank you.

MR. WHITLOCK: Krystal Polk.

DR. POLK: Good evening, my name is Dr. Krystal Polk, and I am 51 years old and a longtime resident of Southaven, Mississippi. In fact, I've been here since the age of 3.

I live and have a house on Stanton Road. My house is currently about 100 miles -- less than 100 yards from the data center. I'm impacted by noise pollution from this site.

The noise impact from the plant is a

constant sound that is generated constantly through the day and the night. The sound is a constant roar with periods of high screeching noises. These noises can be heard inside and outside the home. Even when away from the area, I experience a constant roar and ringing in my ears from being exposed to the noise.

According to the Journal of Research and Review, June 2020, who did a study on the impact of noise pollution on human health, the study revealed, and I quote, "Negative impacts of noise pollution on health are headaches, sleeplessness, psychological disorders, lack of concentration at work, and other health impacts such as hearing loss, ringing in the ears, and learning difficulties, strokes, hypertension, and reduced quality of life."

In addition to the noise, the quality of air near the data center is a violation of the Federal Clean Air Act, which guarantees that pollutants, such as sulfur dioxide and nitrous oxide, are regulated to prevent the exposure in the atmosphere.

Currently, the state of Mississippi, specifically DeSoto County, on our state report, as well as our neighboring cities in Shelby County, where their quality of air has received an F. Therefore, with the plants running gas turbines illegally without a permit, they're causing even more further harmful effects to our air quality. These emissions will only increase with the proposed 41 turbines.

I also have asthma and have noticed a significant change in my health, with more frequent visits to the doctor, as well as asthma and/or allergy flare ups. At one time I was able to stand outside, and even sit outside and enjoy a lovely evening. But the smells have now made it uncomfortable to do so without having some form of respiratory issues, such as coughing or shortness of breath.

According to the American Lung Association, those who are in danger of effects of air pollution are children, older adults, pregnant women, and people who live near sources of pollution. Since this data

center is already running and polluting the air illegally by violating the Federal Clean Air Act, the people in our communities and surrounding neighbors in their cities, as well as across state lines, are at greater possibility of experiencing short-term and long-term effects.

Dr. Steve Cole, who is a board-certified allergist and asthma doctor, who was just currently featured on the news, stated that people should stay away from pollutants because they are known triggers that can cause respiratory problems.

A most recent independent Environmental Health and Infrastructure Analysis on Air Quality with the health and economic impacts of the proposed MZX Tech facility showed that the results of emissions from these gas turbines could cost in the millions due to the effects that it would have resulting in infant mortality, premature deaths, acquired respiratory and cardiac disease, and exacerbation of current acute and chronic illnesses.

My last and final point is the effect

the pollution or emission from the turbines has on our wildlife. The area, which I have lived in my entire life, was heavily populated with wildlife. Their homes have been disturbed. And they are now making new homes in surrounding areas. With the air and noise pollution, their lives and home are affected, therefore affecting our ecosystem and the environment.

In closing, if they're not truthful concerning what they're currently doing, by violating the federal law of the Clean Air Act by running 27 unpermitted gas turbines, then there is a pattern, and that is a -- that is -- if they're given approval, that they will not be truthful and abide with the regulations in the future. By approving this permit you are sacrificing people, children, even yourselves with the short-term and long-term air pollution effects. This not only affects the people here, now, in this room, but it will affect your grandchildren, your parents, and generations to come.

I'm asking that you take this into consideration and that you deny this permit.

And all due respect, MDEQ, if you do not do your job and deny this permit, then I am afraid that your next job may be a participant for one of these studies that I have mentioned. Please deny this permit.

MR. WHITLOCK: Stacey Abraham.

MS. ABRAHAM: Good evening. My name is Stacey Abraham and I am a resident of Southaven, Mississippi. Both of my children graduated from DeSoto Central. That was very touching to see (indiscernible) the primary school.

I live approximately 1.2 miles from the proposed facility, measured in straight line distance. I am submitting public comment regarding the PSD air permit, with a focus on environmental protection and public health, particularly for residents who live in close proximity to this site.

While air quality impacts may affect Southaven broadly, those of us living closest to the proposed facility would experience a disproportionate and concentrated exposure burden. Proximity significantly increases risk related to emissions associated with

large scale power generation, including fine particulate matter, nitrogen oxides, and other pollutants known to affect respiratory and cardiovascular health.

As a licensed social worker, my professional ethics require attention to prevention of harm, protection of vulnerable populations, and the cumulative effects of environmental stressors. From that perspective, I am concerned that residents living within close range, especially children -- and as mentioned before an elementary school within 1 mile -- older adults, and individuals with asthma or other chronic conditions may be over burdened by sustained exposure time.

I'm also concerned about continuous operations and backup generation, particularly during periods of poor air dispersion. When pollutants can concentrate locally rather than dissipate for residents living nearby, these are not hypothetical impacts, but ongoing environmental conditions tied directly to our health and our quality of life.

If this permit is approved, I urge you, MDEQ, to require enforceable emission limits, continuous transparent air monitoring accessible to the public, clear corrective action protocols if limits are exceeded, explicit consideration of cumulative impacts on residents closest to the facility.

I respectfully ask the permit board to weigh whether the health burden placed on nearby residents is reasonable or excessive given proximity and exposure risk.

Thank you for the opportunity to provide comment and for your consideration of the residents most directly affected by this decision.

MR. WHITLOCK: Marquita Bradshaw.

MS. BRADSHAW: Hello, my name is Marquita Bradshaw, and I will try my best to squeeze in 30 years of lived experience and research and training into three minutes.

My people lived in Memphis and here. And even before the boundaries of Mississippi and Tennessee, the lineage of my people were here before the United States of America. So I speak on the authority of the ancestors,

and today I came to speak for the Memphis branch of the NAACP about health affects.

But before we go into that, everybody take a deep breath. Now in that deep breath, what parts of your body does that oxygen and that pollution go to? Just like there's no boundaries when it comes to air, when it comes to bad air quality, it affects every major system of the body.

And I'm trying to get through this without getting upset, because I've had so many people suffer with high morbidity and mortality rates of environmental induced diseases.

We talk about sensitive populations. Who are the sensitive populations?

Well, anyone can experience symptoms. And individuals at risk include children; teenagers; adults over 65; people with pre-existing heart or lung diseases, asthma, COPD; and individuals who work or exercise outdoors.

Does that sound like you? Raise your hand.

(Audience response.)

MS. BRADSHAW: So understanding the immediate, acute effects of air pollution, and the chronic long-term effects of air pollution, is what this board needs to weight. There is a certain thing as permissible legal pollution that's set by the World Health Organization and the Environmental Protection Agency. But that doesn't mean that there's a safe threshold for anybody.

And so when you have a company that continues to operate outside of the legal, permissible bounds, there's no way we can trust them. And I want you to understand that, yes, these -- there are some short-term symptoms like eye, nose, throat irritation; headaches; dizziness; fatigue; (indiscernible) breathing difficulties; wheezing; and chest pain, especially in the sensitive groups, but also exposure to pollutants from the methane gas turbines can cause inflammation, DNA damage, and hormone disruption.

And when you look at cognitive health, there are definitely no acceptable or

risk-free levels, as numerous studies show adverse health effects on the brain at concentrations even below the threshold.

And as someone who has had a family member commit suicide, suicide rates increase in bad air quality. We talked about cognitive health. Of course, we know it's going to affect respiratory health, and even at the lowest particulate matter that's on this -- this right here permit, this is the reason why it need to be denied. It caused people, not only sickness, but death eventually.

And just the risk to reproductive health, not only in women. As someone who has had menstrual cycles last 65 days, bad air quality can cause it.

So I want you to look around and understand that this is happening to the women, the children, the fathers, the uncles, the aunts, and all the members of your family. We cannot be silent. And we have to deny this permit just because of human health.

There's no amount of tax dollars that's

worth people being sick and dying. And I want to say a whole lot more, but because we have so many elected politicians that don't listen when we talk about the health effects, but they are really concerned about they sperm count. I want to go on public record to say that this decreased sperm count, the particulate matters that are in this permit.

And so people who are struggling to have children, this is not the precedent or the future that we want, right now or the future. We deserve clean air. And it's all of our land. It's all of our air. And we can do something about this permit today, and not continue the practice of what Shelby County did, and deny this permit.

MR. WHITLOCK: Taylor Logsdon. Could you say your name?

MS. LOGSDON: Logsdon.

MR. WHITLOCK: Logsdon. Okay. Thank you.

MS. LOGSDON: Okay. My name is Taylor Logsdon, and I'm with Safe and Sound Coalition, but I'm coming to you guys as a mother today.

I would like to point out a few things that I'm worried about when it comes to MZX Tech, LLC's power plant that's only 1771 feet from my house.

Me and my husband purchased our home in November of 2015, and we have lived there for over ten years. In that ten years we have welcomed three children and had many memories in our yard, and have learned to love Southaven.

But since August, we are slowly falling out of love with where we have decided to grow our family. Some of our concerns are the pollutants that are and will be emitting -- emitted from MZX Tech power plant, and the noises that are coming from it.

I have done plenty of research on this project -- project since I found out in late August. I have submitted a public records request from you guys to do my own research instead of just blindly following other people.

It is my understanding that currently, there is no permitting in place for the

turbines that are in operation and have been since August, due to a loophole. I have not found any pollution studies or air tests on the current state of this power plant, and that seems really irresponsible.

The data on pollutants, emissions, and byproducts that were pulled from the public records request comes from a company that is tied with MZX Tech or xAI. It seems like you guys should have conducted your own testing and protocols.

In your emails back and forth, you kept imploring MZX Tech to do things like put emission controls on the temporary or portable turbines. But do we know if they really did?

On January 9, 2026, the EPA finalized a rule that these turbines are considered stationary and must be permitted for use, and was to be implemented on January 15th. So why are these now unpermitted turbines still constantly running?

The permit is only citing 41 turbines, but does not include the 27 that already up and running. So does that mean that before

August 2026, whenever their loophole thing has closed -- does that mean that there might be 68 turbines running at the power plant since they'll be able to run for their 12 months?

All right. I have three children in my home, and I have noticed some health issues starting to arise. One of my children, his age is nine, he's been in the hospital three times since mid August due to respiratory issues. He missed 22 days of school out of the first six weeks of school. That's 22 days out of 30 school days. The cause is undetermined at this time, but it is possible that this is caused by the power plants since we're so close to it.

Another one now has an albuterol inhaler that needs to stay with her everywhere she goes. She is seven. And before September she was perfectly healthy.

The only child that I have not noticed health issues in is high functioning autistic, and his issue is with the noise.

In the past month or so my eczema has been dramatically worse. It has now spread

from just affecting just my hands to now my feet and my scalp. And these areas of my body are severely itchy, and even cracking, bleeding, and scabbing, making it hard to do day-to-day activities, like even just standing on my feet.

It has been determined by a dermatologist that my eczema is mostly irritated by formaldehyde, which has not been measured by air testing near my home. But this byproduct is -- but is a byproduct of these turbines.

So out of my family of five, three of us have started having negative health impacts. And it's no coincidence that this is happening now. And I feel it will only get worse considering there are only 27 running at the moment.

There is nothing off the top of my head that would cause all of this to worsen other than this power plant. The only thing that has changed is the time we spend outside and it is unbearable -- unbearable to be out there because of the noise.

MR. WHITLOCK: Mr. Jason Haley.

MR. HALEY: My name is Jason Haley. I've lived in Southaven for 20 years in the Colonial Hills subdivision. My house is roughly a half mile away from the site, from the xAI power plant on Stanton Road.

Starting in August of 2025, the noise coming from the Stanton Road site has had a very negative impact on my life. It's disrupted my peace, my quality of life.

The noise is a combination of high pitch noise and low tone noise. The low town noise is heard with -- inside my home. This is heard at night when I'm trying to go to sleep. I'm hearing it when I wake up. It's caused a loss of sleep and headaches. My ears now ring, especially on the nights when it's very, very loud. And there's no escape from this noise. It's torture to be outside. Trying to be outside and enjoy the, you know, time outside, clean my truck out, work around the yard, it's not possible. You're not going to be out there long without being tortured and going back in.

So I started voicing my concerns and the problems this was causing in September. And

I was told by our mayor and local officials, "It'll be better next week. Don't worry about it. We're working on it."

It continues day and night. It's gotten no better. It's only gotten worse. They have now added a sound wall. It made absolutely no difference in the noise level.

The fact that the noise mitigation was not in place before allowing this project shows there's no concern for nearby residents. It's still an ongoing issue. I felt this was an afterthought of noise mitigation more so than the plan.

I've asked many times for this project to paused until some efforts were -- were made to, you know, silence the noise, make it better. There's no pausing of this. It's a around-the-clock construction on top of the around-the-clock turbine use.

You know, this is a race to see who can get -- to lead the A -- the AI space, and there's no concern for people. To me it seems like they've already expected to -- for MDEQ to approve these turbines because they continue to buy land up back there. They're

continuing to build. They're continuing to expand. And no one knows what their full intentions are there.

You know, there are people that live on this same road as this. They're losing sleep. They're constantly having headaches. It's -- it's ridiculous.

It just clearly shows a failure -- failure in the due diligence process and a lack of concern.

So being exposed to constant noise causes sleep disruption, chronic stress. It's very, very annoying. So I've been documenting this noise level with a decibel meter for a while from my backyard.

Decibel level A -- decibel reading A, so dBA, ranges from the mid 40s up to 59. For dBC it has a range of 67 to 79. All right. And so when we talk about decibel readings, even though they say these might be in the limits, that's not the only factor.

The noise is continuous. Low frequency and tone, it stands out from background noise. The low frequency and tone travels miles away, passes through windows and walls.

I've had reports of people 3 miles away hearing this noise.

So just going by the decibel readings, again, doesn't reflect the experience of having -- and having a decibel average does not reflect the overall noise pollution this is causing.

If I were to place my refrigerator -- I've had comparisons, people say, "Oh, you know, this decibel is no louder than your fridge."

I could place every appliance out in my back yard and run it 24/7. People half a mile away are not hearing that.

So what they're planning to do, it's not only going to cause more noise, they will never stop. It's going to continue to add pollution to an area that's already failing in air quality.

They have told the city officials that MZX and xAI and MDEQ, and whatever other consultants they want to hire, that the noise was never going to be an issue. So it's impossible for me to believe what -- anything else they have said about future pollution

issues.

And this is way too close to residents. It's going to cause health issues for us more so than just the noise. This permit should not be approved. This started in August using a loophole in the code calling these mobile turbines. It's not that these turbines are not mobile. They put them on a trailer to get around this. You know, the consultants for MZX Tech look for loopholes, ways to operate, so they're able to rush this project.

That's -- that's all it is. They've been rushing it so they don't have to do anything -- not following the federal laws. It's not just Southaven that's being affected. It's having a negative impact on surrounding areas as well.

So the short-term and long-term health effects should not be ignored overlooked. The permit for 41 gas fired turbines should not be approved. If MDEQ has the best interests of people and not corporations, this should not be a difficult decision.

I have one more thing. Well, I had one

more thing. That puts a damper on this ending. I was going to let y'all hear it because, you know, people keep talking about this noise, but unless you're very experienced in it, you -- you're not going to understand it. And it really sucks that this won't play. All right. So we're not going to hear the noise, which -- y'all are very fortunate not to have to hear this. That's all I have to say.

FEMALE SPEAKER: You can go to his Facebook page, he posts them every night.

(Audio plays.)

MR. HALEY: That's not even the worst of it. That's just (indiscernible). There's a combination of the high pitched too, which is very, very bad. The low tone, like I said, that's what really travels through the house. You hear that all the time. (Indiscernible.) But yeah, it should not be approved. They're not listening any more.

FEMALE SPEAKER: What was the decibel reading?

MR. HALEY: The decibel readings there -- it varies. But for dBA, I was

ranging from the mid 40s up to 59. And for dBC we're looking 67 to 79. That's -- this isn't just every once in a while, this is continuous, day and night.

MR. WHITLOCK: It is 8:00 o'clock, and I will emphasize that at 8:30 there's a hard time that we have to close this. So all those that have yet to speak that still want to -- if you have yeses, and there may be -- there may be undecideds that wish to speak. But I just want to recognize at 8:30 we're going to have to stop this. So I just didn't want it to be a surprise.

Okay. Mr. Eric Nelson. Mr. Eric Nelson?

Ms. Lauren Van.

MS. VAN: All right. Thank you for being here today. My name is Lauren Van. I'm a resident of Walls, Mississippi, roughly four miles from the plant in Southaven.

The question I want you to consider tonight is this: What need could possibly constitute the harm from the pollution and the disproportionate burden our community and our state, the residents that are sitting

here in this room tonight, will experience if xAI continues to operate unchecked?

The mayor of Southaven has been allowed to make a decision, a decision of this magnitude, that affects all of us. The environmental impacts are far-reaching. We all breathe the same air, and the pollution is not isolated to Southaven.

The health impacts from xAI's gas turbines are too great to be overlooked. Bottom line, it's an unprecedented amount of air pollution and it's scary. Worse, the pollution that we will experience is compounded by the site in Memphis.

I brought with me something to hold on to tonight, this leaf, a physical symbol of our natural world, and a reminder for what we're here advocating for tonight: The environment, the plants, the animals, the habitats, and the areas that we call home. The people of this room are only a small representation of the larger community that the pollution from these gas turbines will impact. And this leaf is only a small symbol of the wildlife and ecosystems that will also

be negatively impacted.

I'm calling on this board to do what is right for the community and for the environment and by denying the permit for xAI's operations. Thank you.

MR. WHITLOCK: Mr. Jenkins.

MS. JENKINS: My name is Jenkins.

MR. WHITLOCK: What is your first name?

MS. JENKINS: Devan.

MR. WHITLOCK: Okay. Yes.

MS. JENKINS: Hello, everyone. My name is Devan Jenkins, and my family has lived on Windsor Road for five generations. I am here tonight to ask you to deny the permit for 41 additional natural methane gas turbines next to our homes.

I am speaking for my family, for the earth, and for all of our ancestors who were here long before this wave of development arrived. My grandparents have told me about when Stateline Road was a dense forest. It had wildlife everywhere, gravel roads, and trees that acted as a wall between family and industry.

Over the years we have watched that

protection disappear piece by piece in the name of progress. Today I stand in my driveway, and I can see the very top of the xAI Colossus 2 facility where the trees used to be.

We live with the consequences of that destruction every day. We hear it in the turbines, a deep constant drum that vibrates into our house. It is the strongest in my grandfather's room. He looses sleep over it. He talks about it every day.

Can you imagine being elderly and unable to escape the sound of machinery near your home where -- where it was once peaceful?

We fear it in the air the water. Emissions from gas turbines are known to include pollutants such as formaldehyde and known carcinogens. When you live right beside these facilities, you can't help but wonder where those pollutants go after the rain -- into the soil, into the puddles, into the water our animals drink.

Over the past couple of decades, my family has lost many dogs and several goats to cancer. I cannot prove a direct

connection, but living next to these turbines makes me deeply concerned about the exposure and risk. And the thought of adding even more turbines makes the risk to our animals and family feel even greater.

Additionally, my grandmother has stage three COPD. Poor air quality determines how easily she can breathe at home. More emissions means more risk, more flare ups, and more days when breathing is harder that it should be.

And beyond all of this, a vibrant, living forest was cleared. Decades-old trees that sheltered wildlife, absorbed pollution, and softened sound are gone. A berm cannot fully replace a flourishing ecosystem that was destroyed.

Watching it fall was devastating, and the loss is still felt every day. For you, this may be one permit. For my family and all of us, it is our health, it is our memories, and whether the place we had lived for generations remains livable.

How much more are the people who live here expected to take on? I am asking you

please, consider the cumulative impact on our families and our environment before approving more development.

Please deny this permit in protection of all of our lives, our futures, and our earth. My family has been here for five generations. Please don't make this the generation that can no longer stay.

MR. WHITLOCK: Tina Monteith.

MS. MONTEITH: Hi, how are y'all today? I'm just -- my name is Tina Monteith. And actually, I'm just a concerned citizen. I have lived here in Southaven when basically there was nothing but a McDonald's and a Sonic. So I've been here a long time.

Now I'm -- I'm not going to repeat the health issues and all this other kind of stuff. I'm going to talk about, first, methane. And I'm just going to verify this is what the turbines are basically burning, this methane.

Methane -- you know, I'm -- I'm going to say that methane, even if it's controlled -- I don't know if it's burning, or it's flaring. You guys might know that. That's

something that I would like to see when you guys put your report out.

If it's burning, it's -- the methane is still going in the air from anywhere from 0.1 to 3 percent. Methane, very flammable. So especially as hot as it gets here in the summertime, in the air, it can burn. It can burn trees. It can burn homes, as close as they are.

Also, if I'm not mistaken, I read something -- I don't know if it's (indiscernible) -- there was supposed to have been a 30 percent decrease by the year, I think it was 2030, in methane use. So that may be something that you guys may want to check. Just a concern, you know, that's something that I'm very concerned about.

I bet you guys are very good, and you're just doing your jobs. But this is something -- especially as close to all of the facilities and schools. Also it has an impact on (indiscernible). And that's one of the reasons why the reduction of 30 percent.

I don't know if you guys have ever been to China or seen any of the effects in China

and India. I have. I have traveled over to China, basically looked out my window and could not see the hotel across the street due to factories like xAI.

So this is something that you guys may want to consider and take a look at. I'm not going to go into all the different types of health effects because a lot of people have kind of covered that. The only other things that I can add to it is tendonitis. Also it -- we all have hair in our ears that will be burnt out eventually. It will affect your speech. It will also affect your hearing. It will make you go deaf.

The decibels that I asked Jason about, and you may want to check with OSHA. The turbines -- it especially, for the turbines that will be coming in, OSHA maxes out at 85. These turbines can go up to 155, okay. OSHA requires anyone that is at high decibels to wear earplugs. And you guys should know that. And basically either that or headphones. They only work there for eight hours. You have to think that the people that are this close and hearing those

noises for -- 24/7, okay. Like they said, you have nerve -- nervous system, cardiovascular, hearing, tendonitis, nerves, all these things are attributed to high decibels. And these are people that are not even working at the plant, they're living there 24/7. They have no type of OSHA regulations where they're wearing earplugs or headphones. So just think, what type of protection do we have? And plus let's say I -- I don't know if anybody has done their research. A plant like this is not going to be really bringing a lot of jobs.

They're not going to be paying taxes. Because if anybody looks at most of the corporations that come into DeSoto County, they -- they're tax-free for ten years or more. And this is one of the reasons that basically they picked Mississippi, because any other company, if they came to a state and they're operating without permits, they would either have been shut down or they would have been served a cease-and-desist or been heavily fined or penalized for operating. They would not be operating still

if they were in another state. They have given donations to of city of Southaven, which is -- it's not illegal, but it's a gray area when it comes to evidence. So that's just my opinion.

MR. WHITLOCK: Rodney Paullus, Mr. Rodney Paullus?

MR. PAULLUS: Good evening. I'm going to try to --

MR. WHITLOCK: Excuse me. Can everybody settle down so he can have his time? Thank you. Mr. Paullus.

MR. PAULLUS: Good evening. I'm going to try to not talk about the subjects that have been talked about. My name is Rodney Paullus. I'm a resident of Southaven. I'm relatively new the area, I moved here about six years ago.

I'm here tonight as one of many citizens who -- one of the many concerned citizens who never -- who was never asked whether or not we wanted these turbines in our community. First and foremost, I want to be completely clear, this is not a political issue. This is a public health issue. And I also want to

state for the record that I have a medical doctorate degree, and that I've worked in healthcare for over 18 years. I'm not -- I'm not an engineer or attorney, but as a medical professional, I can't ignore preventable health issues when I see them happening.

Approving this permit without fully counting all the cumulative emissions and the proper compliance to the existing law will place thousands of residents at risk. I feel for the people that live next to the data centers, like Jason Haley. I've driven around the neighborhood behind the data centers, and I clearly heard the noise disruption firsthand. I can only imagine that living -- how living near the data center -- living near the data center, how bad that could be.

The extent of the pollutant -- the extent of the pollutants released by these turbines and the consequential -- and the consequent health problems cannot be accurately predicted because we can't tell the future.

Burning methane gas produces nitrogen

oxides, which contribute to ground-level ozone. They call it ground-level ozone because they don't want you to realize it's actually smog, right. Ozone exposure has been shown to exacerbate asthma and cause chest pain, coughing, throat irritation, and permanently reduce lung function over time. In addition to all that, it can increase cardiovascular stress.

Now, I want everybody to humor me for a minute and just close your eyes. I want you to imagine breathing through a garden hose the size of your index finger. That's kind of like what it's -- what it's -- it's kind of like what breathing is like when you have COPD.

Now I want you to imagine breathing through a drinking straw. That's kind of -- that thin -- and think about how difficult that would be, and the fear that would set in when you realize that you can't really breathe at all.

That's what it feels like during a COPD exacerbation. As an exacerbation hits, that's what it feels like. Imagine that

difficultly. I can guarantee you that if Darren Musselwhite and the city council see an elderly person in a COPD exacerbation turning blue in your office -- or in their office, or had a young child fearfully gasping for air because of a severe asthma attack, they would have fought for the people of DeSoto County instead of selling us out for $20 million.

The statistics you've heard tonight are not hypothetical, they are measurable and predictable. So based on what you've heard here, at minimum, MDEQ needs to shut down the unpermitted turbines, and deny this draft permit, and require full accounting of all pollution sources before any approval is considered.

Your singular responsibility is to protect public health, not just today, but for the next 10, 20, 30 years. If this permit cannot meet -- fully meet those standards without full transparency, full accounting, and enforceable protections, then it shouldn't be approved, period.

The people of Southaven are not

collateral damage. We are not expendable. I respectfully urge the board to listen to what Dr. Pearson said earlier and do the right thing and don't let this happen. Thank you.

MR. WHITLOCK: Mr. Steve Williams. Mr. Steve Williams?

Ms. Chelsea Farmer. Farmer.

MS. FARMER: It's Chestela.

MR. WHITLOCK: Chestela.

MS. FARMER: All right. I'm going to get straight to the point on why we're here. To the MDEQ board, I'm speaking to you as a mother, and as a lifelong resident, and as someone whose health is being directly harmed.

I have been a resident of Southaven for 23 years. I'll be 29 this year, so you can do the math. I grew up here. Southaven is home to me, and it is where I was raised, it's where I raised my children, and where I expected to feel safe.

I suffer from asthma, and my symptoms have significantly worsened. The air in our community has changed, and the impact is undeniable. The smell is so strong at times

that it enters my home. Because I live in Colonial Hills, so I'm about 0.5 miles away from the plant. And the one place where my children I should be feel protected.

I'm experiencing increased shortness of breath, chest tightness, and more frequent asthma flare ups. Breathing has become more difficult than it should ever be. This is not an inconvenience, this is a health crisis inside of my own home.

My family members and my children who stay at home with me are also experiencing increased breathing issues. No parent should have to watch their child struggle to breathe and wonder if the air around them is the cause.

My family shouldn't be -- my family shouldn't be forced to live in -- shouldn't be forced to live in fear of long-term health consequences simply because pollution is being allowed to continue and expand.

Southaven is not just a location on a map, it is my community. It is where my roots are. I never imagined that after 23 years here I would have to fight for the

basic right to breathe clean air in my own house.

It is unacceptable for turbines to operate without proper permitting. And it's unacceptable to consider adding even more permanent turbines when residents are already suffering. Increasing air pollution will only deepen the harm being done to families like mine.

I am strongly urging this permit board to reject MZX Tech's permit. Our health, our children, and our future must come before corporate expansion. You have the authority to protect this community. Please do the right thing.

MR. WHITLOCK: KeShaun Pearson.

MR. K. PEARSON: Before my time gets started, I do have a point of clarification. My question is: The folks that we see before us, are you all the deciding -- making the deciding votes, or is there a larger body making that decision?

MR. WHITLOCK: There is a -- there is another body that will make that final decision.

MR. K. PEARSON: Okay. And so that would be subsequently after this meeting?

MR. WHITLOCK: Yes.

MR. K. PEARSON: After they review all the information. You all are not a part of that?

MR. WHITLOCK: No.

FEMALE SPEAKER: Then why are they here?

(Indiscernible crosstalk.)

MR. WHITLOCK: This is Mr. Pearson's time. Go ahead.

MR. K. PEARSON: Y'all, I had some remarks written down, but --

(Indiscernible crosstalk.)

MR. K. PEARSON: I had some remarks written down, but I will forgo using those tonight, because in this exact moment, I am in the midst of the next generation of fighters for our future.

Our future is dependent upon us locking arms and continuing to move forward our next-generation in environmental justice. What we know is that Elon Musk, xAI, the greater Memphis Chamber of Memphis, Mayor Musselwhite, Mayor Young, these folks are

complicit in environmentally unjust projects that continue to exacerbate the health issues that we know we are all suffering from and with.

I was born and raised in Westwood. And if -- just for a moment, if I can have everybody in here who has either asthma or allergies please raise your hand.

(Audience response.)

MR. K. PEARSON: I want you to know that that is not normal. And we cannot allow that to be normalized. The continuous pollution that continues to poison our lungs, continues to poison our children, is not normal.

This is an MDEQ meeting, but this is our moment. We must continue to push back. We must continue to uphold the projects that we know are the causes of our illnesses, that are the causes of our children suffering. Our entire planet is suffering.

There is no dollar amount that is worth this child growing up and not being able to breathe. There is no dollar amount that they can present, or no data available that will affirm that one human life is worth being

sacrificed.

This company, this xAI, Grok computer, has sent out nonconsensual photographs all across the planet. It is a deteriorating of our social trust. It is a continued proliferation of evil. This project is bad. It is wrong. It is immoral for us to continue to suffer as it continues to poison our planet.

We are suffering worst. The census tracked where there will be the highest level of pollution has 73 percent black people. This is no -- black people will be hurt first and worst most often times.

This ain't a black issue or white issue. This is our issue. And what we can't allow is for organizations and billionaires to continue to sacrifice our trust. Elon Musk burned up to 33 methane gas turbines in Memphis without a permit. And then he turned around and received a permit in reward for the illegal activity.

Mississippi Department of Environmental Quality, what will you do? Will you reward Elon Musk for illegally operating the 27

methane gas turbines that are currently in use? Are we at a place where oligarchs continue to run over the people and be rewarded for doing so? Or will you meet this moment, like the folks in this room, and remind them that the people matter more? Our health matters more.

One company in a solo egregious environmentally unjust act raised our nitrogen oxide levels by 79 percent. One company. And it is continuing to grow throughout our entire region like a cancer.

Now is the time. We are the people. And in remembrance of our iconic leader, Rev. Jesse Jackson, you are somebody. I am somebody. I may be black, but I am somebody. You may be white, but you are somebody. Collectively, we are somebody. And that matters. Say it with me one time. Say, I am.

(Audience response.)

MR. K. PEARSON: Somebody.

(Audience response.)

MR. K. PEARSON: I am.

(Audience response.)

MR. K. PEARSON: Somebody.
(Audience response.)
MR. WHITLOCK: Paul Klein.
MR. KLEIN: I've got to follow that? Good evening, my name is Paul Klein. I'm co-chair of the Climate Reality Project's Memphis and Mid-South chapter. We believe that environmental justice is social justice and that nobody should have to wonder what the air they breathe is doing to their lungs.
On your website, I read that the mission of the Mississippi Department Of Environmental Quality is to safeguard the health, safety, and welfare of present and future generations of Mississippians by conserving and improving our environment, and fostering wise economic growth through focused research and responsible regulation.
When xAI first came to Memphis, they built Colossus using 35 unpermitted turbines without any pollution controls. And a year later received a permit for only 15 of them. Then they moved the rest of them over here, and they've been running them already, creating air and noise pollution, while they

apply to you for xAI, through MZX, to build and permanently run 41 turbines, potentially making it the largest fossil fuel power plant in the whole state of Mississippi. And not even to provide electricity to communities of people, but only to power xAI's enormous data center, Colossus 2, over in Tennessee.

MZX has already violated the Clean Air Act by installing and operating at least 27 turbines at the site without the required air permit. And worse yet, most of those turbines are currently operating without air pollution controls that would be required by such a permit, meaning these turbines are emitting hundreds, or maybe thousands, of tons of unlawful and harmful air pollution.

And the site is now undoubtedly one of the largest emitters in the state. And all of this is occurring in the county with the worst air quality in Mississippi, where EPA certified monitors showed unsafe levels of smog before MZX began operating here illegally.

Furthermore, a recent study commissioned by the Southern Environmental Law Center

found that the emissions from running 41 turbines here will likely result in premature deaths, increased hospital visits, and lost productivity in the affected communities. And the largest estimated fine particulate matter increases will be concentrated in communities that are disproportionately black, highly socially vulnerable, and have elevated asthma prevalence already.

In other words, xAI's operations at the Stanton Road gas plant, and Colossus 2, are likely to continue to impose substantial air pollution burdens on predominantly black and lower wealth communities in both Mississippi and Tennessee that are already suffering from poor air quality.

Now please, live up to the words of your own mission statement. Protect your people. Deny this permit request.

In closing, I am honored to also quote the Rev. Jesse Jackson, who passed this morning. May he rest in peace.

"We must never surrender. America will get better and better. Keep hope alive. Keep hope alive."

(Indiscernible crosstalk.)

MR. WHITLOCK: So at this time, it is 8:31. Unfortunately, we have reached the end. I know there were several who expressed a "yes", and there were several that were undecided.

We have reached the point, though, where we have to end this. I thank you all for coming out and showing tons of passion. And given that a lot of you have written comments, I still ask that you submit them, either in writing out front before you leave or -- excuse me. Excuse me.

Okay. The comment period does not end until 12:00, midnight, tonight, which may be done digitally. Any comment that you wish to submit digitally, please come see us, and we will provide that contact information.

All of these comments, we appreciate and we will duly evaluate all of them. And then our preparation of all documents that we will present before the permit board will incorporate these comments.

Other than that, I thank you all and have a great night.

(Time Noted: 8:33 p.m.)

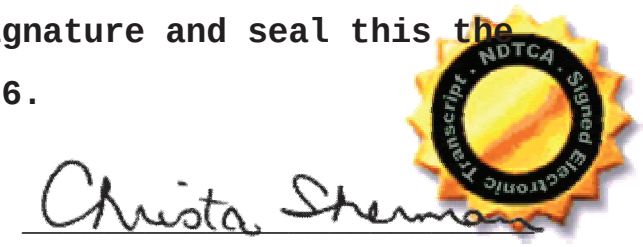
ORIGINAL: JARICUS WHITLOCK
COPY: SHANNON G. LYNN

CERTIFICATE OF COURT REPORTER

I, Christa Sherman, Court Reporter and Notary Public, in and for the State of Mississippi, hereby certify that the foregoing contains a true and correct transcript of the MZX TECH, LLC PUBLIC HEARING as taken by me in the aforementioned matter at the time and place heretofore stated.

I further certify that, to the best of my knowledge, I am not in the employ of or related to any party in this matter and have no interest, monetary or otherwise, in the final outcome of this matter.

Witness my signature and seal this the 22 day of February, 2026.



CHRISTA SHERMAN, CCR #1964

My Commission Expires: October 19, 2027

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APPENDIX F

Comments Received During the Public Hearing

mikalkirk@gmail.com

Members of the MDEQ governing body,

My name is Andy Kirk. I was born at Baptist Memorial Hospital Desoto in 1992. My wife has been a life-long resident of the Greenbrook neighborhood in Southaven since 1996. Together we have been home owners and residents of Ward 3 since 2021, where we are raising our two sons. Their safety and well being are the most important factors in any decision I make, and today I want to introduce you to them.

We bought our first home in April of 2021. Our oldest son, John Mikal who is now 4, was born and brought home a month later. He currently loves trains, his bike, and our dog Winnie. I coached his first ever soccer team last fall, and we practiced multiple times at the Stateline Soccer complex, home to the Desoto County Soccer Association, just two miles from the xAi facility on Stanton Road.

Our youngest son Lewis just turned 20 months old last week. He was born 6 weeks prematurely at Baptist Desoto and spent the first week of his life in the NICU because his lungs had not been fully developed. When we brough him home we knew that his life was the most precious gift, and that throughout his life he would be more susceptible to respiratory health issues like asthma, RSV, and others.

Both of our boys love playing outside in our backyard, at Central Park, Snowden Grove park, visiting our friends and family in Horn Lake, going swimming at their grandparent's house, and visiting the new agricultural education center on Star Landing Rd. While I'm sure most of you, like me, spent the majority of your childhoods outside in the fresh air, I never imagined that I would be concerned about my children spending too much time outside.

Desoto County has the worst quality of air in the state of Mississippi. Memphis has the worst air quality in Tennessee. While there are many factors contributing to that fact, the fact is indisputable, and the last thing our city, county, and region needs is another contributor toward polluted air, and it is an indisputable fact that the 41 turbines applied for by MXZ in addition to the 27 "temporary," turbines already running without permits since August of 2025, have and will significantly contribute to the air pollution of our region.

On February 13, EmPower Analytics Group published the only environmental impact study to date on the proposed MXZ Tech facility. MXZ has been operating 27 turbines without permits since August in violation of Mississippi state law requiring permits for air-polluting equipment, and in violation of an Environmental Protection Agency ruling from earlier this year requiring permits for even temporary turbines to operate. In this study they found that residents in Desoto County will be exposed to the highest increases in particulate matter, and that the cost we are going to have to pay for the increased pollution is anywhere from $30 million to $44 million per year in premature deaths, healthcare costs, missed work, missed school days. Over 30 years the study reports the total cost to be between $588 -- $862 million.

This past week a public records request revealed the most recent water usage bill for the MXZ Tech facility. In just 12 days the facility consumed 7.7 million gallons of clean drinking water. If we extend the same 30 year period we used to calculate the health costs to the water usage, that would equal to over 7 trillion gallons of water used in the next 30 years.

The impacts to our environment, health, and community greatly outweigh any potential benefits for this project. I join my voice with many of my neighbors to demand that you deny the permit.

Thank you,

Andy Kirk

MZX Tech PSD Permit Comment

Charly Park

02.17.2026

As I sat down to write this statement, I knew how I wanted it to end. However – given the gravity of this situation – I believe that the ending should go first. Shelby county made a grave error when they decided to overlook MZX's blatant disregard for the law and for public health. MDEQ has a chance here to make the *right* decision for Desoto County.

I will start with the straw-man argument raised that – since Southaven is situated under the Memphis International Airport and adjacent to I-55 – a "little more" pollution does not matter. Let me make this clear: we are not talking about a minor amount of extra pollution. The proposed emissions for the xAI power plant are well above the PSD significant emission rate. The CO2e (greenhouse gasses, colloquially) projected emissions in particular are especially worrisome: they are 8,548% of the emission rate it would take to trigger the PSD. This is not an exaggeration or inflation of the data; this is a real number with real public health consequences. While MEM and I-55 both contribute to the pollution and smog in Southaven, they contribute net benefits to public infrastructure and transportation. MZX does not and cannot claim a net benefit to either of those categories. MZX does not contribute positively to our community. MZX simply has no business here.

I could talk to you all day about the emission rates and statistics on ecological damage and climate change, but I am not going to do that. Instead, I want to call into question the trustworthiness of MZX to do what's best for our community in good faith. MZX has already blatantly violated the EPA and the Clean Air Act. They have a long and sorted history of running their "temporary turbines" well before permissions were in place for them to do so. They did it in Memphis, and – as expected – they did it again in Southaven. These decisions were not made publicly or with any input from the people who live here and breathe the air. Why should we trust MZX to follow the law set forth when they already believe themselves to be above it? Though there have been excuses made that Southaven gave MZX permissions to do as they see fit, state statute does not

circumvent federal law. Our air, our water, and our environment were violated without our permission and in violation of the law set forth to protect such resources.

Southaven is already suffering from the burden of pollution from Memphis, of which xAI is already heavily contributing to. In fact, Desoto County has received an F rating in air quality from the American Lung Association. The leadership in Southaven has publicly acknowledged this F rating, and in the same breath stated that it's due to Memphis pollution. Let me once again restate that stacking pollutant on top of pollutant is not a solution to our health crisis. According to the CDC, the major killers in North Mississippi are as follows: heart disease, cancer, and lower respiratory disease such as COPD and asthma. These health issues have been proven to be made exponentially worse by the same pollutants that MZX is currently seeking permissions to produce in the area. As someone who is has worked in healthcare for years in North Mississippi, I am gravely concerned for the patients who are at risk if this decision is made lightly. It is unfortunate that the leadership in our city has decided that our air quality and public health are up for sale, but I and the citizens behind me do not agree. I implore MDEQ to listen to us, and to take our best interest to heart.

Our environment is another precious resource that threatens to become collateral damage of MXZ's activities here in Southaven. Massive land clearing has already been conducted, leading to the mass exodus of wildlife from the area surrounding Collosus 2 and the accompanying power plant. As I was speaking to someone who lives in Colonial Hills about the effects they had noticed, they said simply "All of the birds are gone. They have all disappeared."

Clean drinking water and clean air are imperative to society, and they are our most precious resources. Allowing a company with a long track record of circumventing the law for their own benefit would be a devastating decision for the people of Southaven and the surrounding areas of both Desoto and Shelby counties. It was a mistake for Memphis, TN to trust MZX to keep the best interest of their citizens in mind. We are standing on the precipice of the exact same decision here, in Southaven, MS. MDEQ has been given the chance to make the *right* decision. I can only hope that they will take it.

Thank you.

To the Permit Board,

I am speaking to you as a mother, as a lifelong resident, and as someone whose health is being directly harmed. I have been a resident of Southaven for 21 years. I grew up here. Southaven is home to me. It is where I was raised, where I am raising my children, and where I expected to feel safe.

I suffer from asthma, and my symptoms have significantly worsened. The air in our community has changed, and the impact is undeniable. The smell is so strong at times that it enters my home — the one place where my children and I should feel protected.

I am experiencing increased shortness of breath, chest tightness, and more frequent asthma flare-ups. Breathing has become more difficult than it should ever be. This is not an inconvenience. This is a health crisis inside my own home.

My family members and my children who stay at home with me are also experiencing increased breathing issues. No parent should have to watch their child struggle to breathe and wonder if the air around them is the cause. No family should be forced to live in fear of long-term health consequences simply because pollution is being allowed to continue and expand.

Southaven is not just a location on a map — it is my community. It is where my roots are. I never imagined that after 21 years here, I would have to fight for the basic right to breathe clean air in my own house.

It is unacceptable for turbines to operate without proper permitting, and it is unacceptable to consider adding even more permanent turbines when residents are already suffering. Increasing air pollution will only deepen the harm being done to families like mine.

I am ~~demanding that the~~ strongly urging this Permit Board ~~disapprove~~ to Reject MZX Tech's permit. Our health, our children, and our future must come before corporate expansion.

You have the authority to protect this community. Please do the right thing.

Sincerely,

Chestela Farmer



[redacted] Daughter

MZX Tech (xAI) PSD Air Permit Public Comments

Tuesday | Feb 17, 2026 | 6:00–8:30 PM | 1210 Church Road West
Southaven, MS 38671 | Ranger Conference Center

Comment by: Danielle Culbreath

Hello, my name is Danielle Culbreath, and I am a 3rd grader at DeSoto Central Elementary.

I am against the permit for the MZX Tech facility because it's harmful to the environment that I am growing up in.

Please protect the air and water that I will have to breathe and drink.

Thank you.

Hildi Hoopes

Thank you for the opportunity to speak today, an opportunity not extended to us prior to xAI setting up shop in our county. I'm not a professional speaker so this won't be easy for me.

As a citizen of Desoto County, a major concern I have is for those who don't have a voice. As an animal lover, the studies proving adverse side effects on wildlife as well as our precious cats and dogs is nothing short of alarming. Once the birds stop singing and our pets have suffered, it will be too late to press a restart button.

The Bluebird, our symbol happiness, hope, love, and renewal, is one of the many species negatively impacted. Bluebird populations were down by 90% by the mid 20th century. Conservationist led the fight to protect our national treasure. We are now on the cusp of failing them once again. Birds exposed to persistent noise of gas compressors show symptoms similar to humans experiencing PTSD. Studies show chronic stress caused by air pollution, including skewed stress hormone levels due to increased anxiety, distraction and hypervigilance. Instead of corticosteroid levels being high, the opposite was found. Low corticosteroid can be a sign of intense stress, that the body dials down the baseline as a means of self-protection.

Studies show that noise pollution reduces animal habitat and directly influences their fitness and ultimately their numbers. By doing so, making it more difficult for animals to survive. That's a pretty damning picture of what human-made noise can do to natural population of animals.

A Penn State study shows that bluebirds and tree swallows nesting in noisy boxes spent less time incubating their eggs, laid fewer eggs and produced less young than those in quiet boxes. This demonstrates that compressor noises caused behavioral changes, and reducing reproductive success.

Unfortunately, for our furry and feathered friends, generators particularly in industrial settings like data centers, also produce low-frequency noise that can be more distressing to animals than humans. Pets often perceive these sounds as pressure or vibrations rather than just noise. Continuous exposure can lead to anxiety, agitation and restlessness. Animals are unable to communicate therefore suffering in silence.

A recent study from Hong Kong suggests that noise levels acceptable to humans may be too intense for dogs. The researchers concluded that levels for dogs should be less that 20dB that what is recommended for humans.

We have a lot of trees and abundant wildlife who add to the beauty of Desoto County. At the end of day, this is where we hang our hats. When xAI leaves, we'll be here dealing with the repercussions, not only for humans but animals as well.

Sources: Penn State, National Geographic, UC Davis, Florida Museum, Mak, SL, Au, Tang, WF, Li, CH, Lee CC, Chiu WH (2022) A study on Hearing Hazards and sound measurement for Dogs

Gerald (Jerry) Sales

Were there studies performed and completed on water, air, and land pollution before allowing the xAI facility to be constructed in Southaven? Or was the income dollar figure so big, it was decided to proceed without any research? For 5 to 10 years, DeSoto County cities complained about the Memphis aquifer that provides the water used and consumed in DeSoto County as potentially being consumed and contaminated by the City of Memphis.

While the following is not a xAI story, the point is the potential cost of allowing a facility to operate without determining the potential effects to the public and natural resources.

Are we familiar with what is happening in south Memphis for the Sterilization Services of TN Plant (aka SST)? This is a facility that used ethylene oxide (EtO) which is a poisonous gas that is used to sterilize approximately 50% of all medical and dental devices manufactured, which are implanted in humans, some food products, cosmetics, and in industrial applications to manufacture plastics, detergent, and antifreeze. What has happened within a 4-to-5-mile radius of the SST facility in Memphis? Many people in the area for several years were dying from cancer. Now there are law suits popping up for the families' losses.

The Clean Air Act lists EtO as one of the 187 hazardous air pollutants, commonly referred to as air toxics.

I visited and toured an EtO/radiation facility in 1998 in New Jersey. The facility was not in the immediate 4 to 5 area of residential or school properties. I was well aware of the effects of EtO, having spent my entire work career in a business that required EtO or Irradiation for the safety of humans. I questioned the location of the facility in New Jersey at the time. The employees were aware of the potential effects to humans and animals. Point here is, why would the City of Memphis allow a EtO facility in a populated area in the City of Memphis?

While this facility in Southaven is not an EtO facility, the questions are: What might be the long-term effects of having this xAI facility near a residential community? Air, water, noise, land pollution, and potential destroying the Memphis aquifer.

Where will the residents obtain water? From the Mississippi River? Will it necessitate building several large water treatment plants?

My name is Joshua Langston, and I am the elected Alderman from Ward 1 in Horn Lake, Mississippi.

According to environmental surveys, Ward 1 is in the most dangerous "zone" of fallout from the gas turbines of MZX Tech, also known as xAI, as they currently stand, and if more are added. As an elected official, charged with serving those I represent in my Ward, I must raise the health and safety concerns of these turbines, and the ones that would be added if this permit is approved.

While Horn Lake has not been advised or asked about the installation of these turbines, or the data center as a whole, we will none the less suffer from the exposure of nitrogen oxides, formaldehyde, and particle matter these turbines promise.

The pollutants are associated with increased risks of cardiovascular and respiratory illnesses, and as I see in my own child over the last few months, an increase and worsening of asthma and asthma symptoms.

Videos from across the north end of my Ward already show a continuous roar, despite the promise of "sound walls", and the assurance from local officials that it's "not actually that loud".

Without taking into account the potential water use and pollution, and the implications of recent controversies of the artificial intelligence itself, these turbines are currently, right now, a health and safety threat. It's a threat against businesses to the east, residents to the west, communities to the south, cities to the north, and to all residents in between. This is not a single city issue and what businesses they allow; it is a health concern for all of North Mississippi, southwest Tennessee, and if allowed to continue, will be suffered for generations to come.

Lauren Van

Thank you for being here today. My name is Lauren Van, I am a resident of Walls, MS, roughly 4 miles from the plant in Southaven. The question I want you to consider tonight is this: what *need* could possibly constitute the harm from pollution and the disproportionate burden our community and state, the residents sitting right here in this room, will experience if xAI continues to operate unchecked?

The mayor of Southaven has been allowed to make a decision, a decision of this magnitude, that affects all of us. The environmental impacts are far reaching - we all breathe the same air and the pollution is not isolated to Southaven.

The health impacts from xAI's gas turbines are too great to be overlooked. Bottom line: it is an unprecedented amount of air pollution and it's scary. Worse, the pollution we will experience is compounded by the additional site in Memphis.

I brought with me something to hold onto tonight, this leaf, a physical symbol of our natural world, as a reminder for what else we are here advocating for tonight: the environment (the plants, the animals, the habitats, and the areas we call home). The people in this room are only a small representation of the larger community that the pollution will impact and this leaf is only a small symbol of the wildlife and ecosystems that will also be negatively impacted. ~~Thank you~~.

from the gas turbines

I am calling on this board to do what is right for the community and the environment by denying the permit for xAI's operations.

Thank you.

[redacted]

MZX Tech (xAI) PSD Air Permit Public Comments

Tuesday | Feb 17, 2026 | 6:00–8:30 PM | 1210 Church Road West
Southaven, MS 38671 | Ranger Conference Center

Comment by: Natalie Culbreath
Natalie Culbreath

[redacted]

My name is Natalie Culbreath. I am a resident of Southaven, a mom of 3, and the Vice President of the DeSoto Central Primary School Parent Teacher Organization. I am speaking on behalf of all the children of DeSoto County and the surrounding area to demand the MDEQ Permit Board disapprove the Permit allowing MZX Tech to operate. If the permit is approved, the MZX Tech facility would dramatically increase air, light, water, and noise pollution directly harming the health of our children.

MZX is already operating 27 turbines without a permit. The draft permit fails to account for all sources of pollution and fails to protect air quality and public health. The permit underestimates health and economic harm. This permit fails to adequately address water concerns. Ultimately, permitting this facility to operate will result in an unhealthy environment for the citizens of this area. For these reasons, I demand that 27 unpermitted turbines be stopped immediately and that MDEQ deny the permit.

It is my moral imperative as a mother to beg you to protect our children's air and water. It is your job as the department of environmental quality to deny this permit. Thank you for hearing our comments.

Good evening, my name is Paul Klein, Co-Chair of the Climate Reality Project's Memphis and Mid-South Chapter.

We believe that Environmental Justice IS Social Justice, and that nobody should have to wonder what the air they breathe is doing to their lungs.

On your website I read that "the mission of the Mississippi Department of Environmental Quality is to safeguard the health, safety, and welfare of present and future generations of Mississippians by conserving and improving our environment and fostering wise economic growth through focused research and responsible regulation."

When xAI first came to Memphis, they built Colossus using 35 un-permitted turbines without any pollution controls, and a year later received a permit for only 15 of them and they moved the rest of them over here and have been running them already, creating air and noise pollution, while they apply to you for permission for xAI through MZX to build and permanently run 41 turbines, potentially making it the largest fossil-fuel power plant in the whole state of Mississippi! And not even to provide electricity to communities of people, but only to power xAI's enormous datacenter Colossus 2 over in Tennessee.

MZX has already violated the Clean Air Act by installing and operating at least 27 turbines at the site without the required air permit; and worse yet, most of these turbines are currently operating without air pollution controls that would be required by such a permit, meaning these turbines are emitting hundreds or maybe thousands of tons of unlawful and harmful air pollution, and the site is now undoubtedly one of the largest emitters in the state—and all of this is occurring in the county with the worst air quality in Mississippi, where EPA-certified monitors showed unsafe levels of smog *before* MZX began operating here illegally.

Furthermore, a recent study commissioned by the Southern Environmental Law Center found that the emissions from running 41 turbines here will likely result in premature deaths, increased hospital visits, and lost productivity in the affected communities. And the largest estimated fine particulate matter increases will be concentrated in communities that are disproportionately Black, highly socially vulnerable, and have elevated asthma prevalence. In other words, xAI's operations at the Stanton Road Gas Plant and Colossus 2 are likely to continue to impose substantial air pollution burdens on predominantly Black and lower-wealth communities in both Mississippi and Tennessee that are already suffering from poor air quality. Now please, live up to the words of your own mission statement, protect your people and deny this permit request.

In closing, I am honored to quote the Rev Jesse Jackson who passed this morning, may he rest in peace:
"We must never surrender. America will get better and better. Keep hope alive. Keep hope alive! Keep hope alive!"

MZX Tech LLC PSD Permit Comments

Shannon Samsa

Feb. 17, 2026

My name is Shannon Samsa. I live in Southaven, two miles from the MZX Tech power plant site. I hold a master's degree in physician assistant studies. I have completed graduate-level public health coursework and thousands of hours of clinical training, and I am about to begin my career as a medical provider here. I am speaking tonight as someone trained to recognize preventable harm.

Even using MZX and MDEQ's own emission estimates, these 41 turbines are expected to cause measurable health harm. A health impact analysis conducted for SELC by public health experts estimates $30 to $44 million per year in health damages from increased air pollution, including premature deaths, hospital visits, and lost productivity.

The modeling also shows that the highest projected increases in fine particulate matter exposure in multiple areas of DeSoto and Shelby County, with annual increases meeting exceeding 0.5 micrograms per cubic meter, as well as nearby communities in DeSoto County such as Horn Lake.

At a population level, that increase in exposure corresponds to an increase in per-person mortality risk comparable in scale to the average annual risk of death from alcohol-impaired driving in the United States.

We would never sit in this room and knowingly advocate for increasing someone's risk of dying in a drunk driving crash. Yet that is the scale of the risk we are being asked to look away from here.

Most importantly, this analysis likely underestimates the total impact. It evaluates only long-term average PM2.5 exposure and does not include additional pollutants such as formaldehyde, nor does it account for the 27 turbines already on site.

We don't have any studies for the 27 turbines *already* on site, because there is no permit for them.

But I'm not here to talk about numbers or money. I'm here to talk about people. Because those numbers are not theoretical to me. They represent the people I expect to care for. This is my

community. And these will be my patients.

I have personally spoken with residents living near this facility who report relentless noise and vibration from the turbines. They describe headaches. Migraines. Vertigo. Nausea. Sleep disruption. These are not imagined or hypothetical symptoms. Chronic sleep disturbance alone is associated with hypertension, cardiovascular disease, and impaired cognitive function. Persistent stress activation affects the autonomic nervous system. That is physiology.

If a patient with heart failure, emphysema, or asthma comes to me and asks whether increased exposure to the pollution from this plant raises their risk of hospitalization or death, the honest answer is yes. The epidemiology is clear, and the evidence is overwhelming. Fine particulate pollution is linked to increased cardiovascular mortality, respiratory exacerbations, stroke, and premature death. This is recognized by major medical and public health bodies worldwide.

So what am I supposed to tell them?

Am I supposed to tell an elderly patient with heart failure that the additional risk is an acceptable tradeoff?

Am I supposed to tell a parent whose child attends Hope Sullivan Elementary School, one mile from this site, that increased asthma risk was simply unavoidable?

Am I supposed to advise my patients to move?

Approving this permit would mean knowingly adding industrial emissions and sustained environmental stress into a residential community that already struggles with air quality. It means accepting preventable health burden as collateral damage. It means shifting the consequences onto patients and onto the clinicians who will be left managing the fallout.

In healthcare, we are guided by a very simple principle: first, do no harm.

You have the authority to prevent harm here.

Disapprove this permit.

To whom it may concern,

My name is Taylor Logsdon and I would like to point out a few things that I am worried about when it comes to MZX Tech LLC's power plant that is 1771 feet (.33 miles) away from my home. Me and my husband purchased our home in November of 2015. We have lived here for over ten years and in that ten years, we have welcomed 3 children, had many memories in our yard, and have learned to love Southaven. But since August, we are slowly falling out of love with where we have decided to grow our family. Some of our concerns are, the pollutants that are and will be emitted from the MZX Tech power plant and the noises that are coming from it.

I have done plenty of research on this project since I found out in late August. I have submitted a public records request from you guys to do my own research instead of just blindly following some of the people that are against it. It is my understanding that currently, there is no permitting in place for the turbines that are in operation and have been since August due to a loophole. I have not found any pollution studies or air tests on the current state of this power plant, and that seems really irresponsible. The data on pollutants, emissions, and byproducts that were pulled from the public records request comes from a company that is tied with MZX Tech LLC and xAI. It seems like you guys should have conducted your own testing and protocols. In your emails back and fourth, you kept "imploring" MZX Tech LLC to do things like put emission controls on their "temporary" or "portable" turbines, but do we know if they really did? On January 9th 2026, the EPA finalized a rule that these turbines are considered stationary and must be permitted for use and was to be implemented on January 15th 2026. Why are these now unpermitted turbines still constantly running? The permit is only citing 41 turbines, but does not include the 27 already up and running, so does that mean that before August 2026 there could be 68 turbines running at the power plant since they will be able to run for 12 months?

I have 3 children in my home, and I have noticed some health issues starting to arise. One of my children, aged 9, has been in the hospital 3 times since mid-August due to respiratory issues. He missed 22 days out of the first 6 weeks of school. That's 22 days out of 30 school days.The cause is undetermined at this time but it is possible that it is caused by this power plant since we are so close to it. Another one now has an albuterol inhaler that needs to stay with her everywhere she goes. She is 7 and before September, she was a perfectly healthy child. The only child I have not noticed health issues in is high functioning autistic and his issue is with the noise. In the past month or so, my eczema has been dramatically worse, it has now spread from affecting just my hands, to now also include my feet and scalp.These areas of my body are severely itchy, and are even cracking, bleeding and scabbing, making it hard to do day to day activities, like even just standing on my feet. It has been determined by a dermatologist that my eczema is mostly irritated by formaldehyde, which has not been measured by air testing near my home, but is a byproduct of these turbines. So out of my family of 5, 3 of us have started having negative health impacts, and it's no coincidence that this is happening now, and I feel it will only get worse considering there are only 27 turbines running at the moment. There is nothing off the top of my head that would cause all of this to worsen other than this plant. The only thing that has changed is the time that we spend outside, as it is unbearable to be out there due to the noise.

My children have a trampoline, a nice wooden playset, and a swimming pool, and I am almost certain we will not get enjoyment out of our own yard this summer due to this power

plant. The noises from this power plant get so much worse at night causing loss of sleep for me, my husband, my children, and our dogs as this unbearable noise can be heard indoors, above tvs and other household noises. My children's teachers have texted me during and after school concerned with how tired they have been, because honestly they rarely get a good full night's rest anymore. That is detrimental to a child's learning, multiple studies have proven it and my children's grades can attest. My 9 year old has always been a straight A student, since Christmas break, his grades have dropped to low C's. My 7 year old is now failing the 2nd grade, and she had B's and C's before Christmas break. My high functioning autistic son is really bothered by the noises, some days I notice he is more violent than others and on those days, I notice the high pitch noise. He is hitting people, throwing things, and you can tell there is something bothering him. I do have him set up for a therapy appointment to rule out other causes, but I feel like it's important to note that this could be affecting him negatively. There are multiple nights that my dogs wake up at 2 am barking until I let them outside, and when they get outside, they run to my back fence and bark until I make them come back inside. While this noise is a nuisance to me and my family, I try to be a respectable neighbor and not allow my dogs to be out barking at all hours of the night, even though they are only barking at the high pitch noise these turbines emit. I would like to think that if this noise was only during normal working hours, the backlash would be less. The fact that we are losing sleep, is making us more cranky and more ready to fight this.

While these are my main concerns about this plant, this is not all of them and I'm sure others have written responses that cover different issues that I also agree with and stand for. I'd like for you to read and really take into account all of our responses in regard to this PSD Permit. My children cannot speak up about this, as they are younger and do not necessarily understand what they would be reading, so I am standing up for them. This is their home, even more than mine, as I plan to leave this home to them so they can grow their own families. We might not be wealthy in monetary value, but we are wealthy in love, kindness, and compassion. I am calling on you, MDEQ to stop all operations of the 27 unpermitted turbines immediately until proper air testing is conducted and compliance can be attainable, withdraw the draft permit and revise it to include all turbines, "temporary" and "permanent" and to fully account for all air and noise pollution concerns by all means necessary: ie. air testing, air monitoring, noise mitigation, and any other means to ensure that the communities around this facility are not burdened by this power plant. We deserve clean air, and a good night's sleep.

Taylor Logsdon

Taylor Logsdon

Good evening. My name is Stacey Abraham, and I am a resident of Southaven, Mississippi. I live approximately 1.2 miles from the proposed facility, measured in straight-line distance.

I am submitting public comment regarding the PSD air permit, with a focus on environmental protection and public health, particularly for residents who live in close proximity to this site.

While air quality impacts may affect Southaven broadly, those of us living closest to the proposed facility would experience a disproportionate and concentrated exposure burden. Proximity significantly increases risk related to emissions associated with large-scale power generation, including fine particulate matter, nitrogen oxides, and other pollutants known to affect respiratory and cardiovascular health.

As a licensed social worker, my professional ethics require attention to prevention of harm, protection of vulnerable populations, and the cumulative effects of environmental stressors. From that perspective, I am concerned that residents living within close range, especially children, older adults, and individuals with asthma or other chronic conditions—may be overburdened by sustained exposure over time.

I am also concerned about continuous operations and backup generation, particularly during periods of poor air dispersion, when pollutants can concentrate locally rather than dissipate. For residents living nearby, these are not hypothetical impacts, but ongoing environmental conditions tied directly to our health and quality of life.

If this permit is approved, I urge MDEQ to require:

- Enforceable emission limits
- Continuous, transparent air monitoring is accessible to the public
- Clear corrective action protocols if limits are exceeded
- Explicit consideration of cumulative impacts on residents closest to the facility

I respectfully ask the Permit Board to weigh whether the health burden placed on nearby residents is reasonable or excessive given proximity and exposure risk.

Thank you for the opportunity to provide comment and for your consideration of the residents most directly affected by this decision.



Name: Angie Davis E-mail: [redacted]

Have comments?

I've observed the plant being put into a field behind a neighborhood that, for the most part, didn't know the power plant was being built. The power production is with fossil fuels that produce pollution and the plant has an air permit. Rules are being skated or simply ignored. With a plant the size of the one the proposed pollution + environmental impact is unavoidable. We need reassurance that the plant officials are not going to damage our air + environment. Because safety procedures haven't been followed there seems to be a rush to make the power plant and important steps for our safety may be getting skipped

MZX Tech, LLC
Tuesday, February 17, 2026
6:00 pm – 8:30 pm
Ranger Conference Center
1210 Church Road West
Southaven, MS 38671

Name: Brenda B. Bostick E-mail: [redacted]

Have comments? My husband and I have lived in our home (Horn Lake) For 35 years. We have looked Forward to owning our home before retiring, to leisure time spent on our most recent update - a new expanded patio and more time through the week with Family and grandkids. When First hearing about XAI (mostly reading captions on the news), I honestly 'had my head in the sand'. I Fully believed that the 'right' thing would be done to protect the people effected by this XAI plant. I realize I could not have been more mistaken. I came to the meeting tonight (2/17/26) to make my support known! The noise is waking me through the night and/or keeping me awake. I have recently learned about the astounding data concerning air & water pollution. We do not want to move because of decisions made by public officials and irresponsible, money based and driven project (XAI) with no regard for the health and well being of the people. We should not feel forced out of not only our home but the entire community

(to deny the permit and immediately protect the problems)

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and area we have called home (we have lived in Horn Lake 41 years and I have been in Walls / Horn Lake for 52 of my 62 years). We have raised our boys here and they are in Southaven, Nesbit and Hernando with their Families (our 9 grandchildren I am saddened to know that one company with unlimited financial resources and an obvious disregard for public safety and welfare has Flashed large Figures and that Southaven was smitten and sold - i.e. bought. Please consider the impact on the public and do everything possible to stop this nonsense.

MDEQ

Name: Candace Harrison E-mail:

Have comments?

I Cant afford Health Care, I Say NO to Elon Musk project. It affects our environment and health.

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1210 Church Road West
Southaven, MS 38671

Feb. 17, 2026

MDEQ:

My name is Cas Kilroy and I live in Southaven, MS. I am here tonight to voice my opposition to the xAI development. Southaven is my hometown and I do not want my family and I to have to breathe toxic air. Opponents of this development have been accused by our mayor of having a political agenda. If someone wants to characterize it that way in order to diminish our concerns I cannot stop them; I can only say that my aim in being here tonight is to protect my right to clean air. I do not accept the assurances of people with a vested financial in this project that it is "safe." I'm not a scientist, but I know that systems change when you add to them. The pollution from these turbines is more than I want added. Our environment is toxic enough. Our bodies do not need yet another stress on our health. My wellbeing should not suffer so that some venture capitalist can make money as fast and as dirty as possible. It is in your power to stop it here in Desoto County. Thank you for your time.

Cas Kilroy

Cas Kilroy

full name Casper Kilroy

[redacted]

Name: DIANNE TAYLOR CHILDRESS E-mail: [redacted]

Have comments?

PLEASE NO TURBINES. PLEASE DENY THE PERMIT.

I SINCERELY MEANS THIS.

MZX Tech, LLC
Tuesday, February 17, 2026
6:00 pm – 8:30 pm
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Southaven, MS 38671

Good Afternoon,

My name is Dr. Krystal Polk and I am 51 years old and a long time resident of Southaven, MS. I have been here since the age of 3. I have a house on Stanton Road and my house is currently less than .317 miles (100 feet) from the Data Center. I am impacted by air pollution from this site. The noise impact from the plant is a constant sound that is generated constantly throughout the day and night. The sound is a constant roar with periods of high screeching noises. These noises can be heard inside and outside the home. Even when away from the area I am experiencing a constant roar and ringing in my ears from being exposed to the noise. According to the Journal of Research and Review (June 2020), who did a study on the impact of noise pollution on human health. The study revealed that "negative impacts of noise pollution on health are headache, sleeplessness, psychological disorders, lack of concentration at work and other health impacts such as hearing loss, ringing in the ears and learning difficulties, stroke, hypertension and reduced quality of life."

In addition to the noise, quality the Data Center is currently in violation of the Federal Clean Air Act which guarantees that pollutants such as sulfur dioxide, and nitrogen oxides are regulated to prevent the exposure in the atmosphere. Currently the state of MS has received an F on our state report as well as our neighboring city Shelby Co. for their quality of air and therefore with the plants running gas turbines illegally without a permit they are causing even further harmful affects to our air quality. These emissions will only increase with the proposed 41 turbines. I also have asthma and have noticed a significant change in my health with more frequent visits to the doctor as well as asthma and/or allergy flare ups. At one time I was able to stand outside or sit outside and enjoy a lovely evening but the smells have now made it uncomfortable to do that without having some form of respiratory issues such as coughing or shortness of breath. According to the American Lung Association, those who are in danger of the effects of air pollution are children, older adults, pregnant women, and people who live near sources of pollution. Since this Data Center is already running and polluting the air illegally by violating this federal Clean Air Act the people in our communities and surrounding neighbors in the city as well as across state lines are at greater possibility of experiencing short term and long-term effects. Dr. Steve Cole, M.D. a board-certified allergist and asthma doctor who was currently featured on the news stated that people should stay away from pollutants because they are known triggers and can cause respiratory problems. A most recent independent Environmental Health and Infrastructure Analysis on Air Quality, Health and Economic Impacts of the Proposed MZX Tech Facility showed that the results of emissions from these gas turbines could cost in the millions due to the effects that it would have resulting in infant mortality, premature deaths, acquiring of respiratory and cardiac disease and exacerbation of current acute and chronic illnesses.

My last and final point is the effect of pollution or emission from the turbines has on our wildlife. That area was heavily populated with wildlife. Their homes have been disturbed and they are now making new homes in the surrounding area. With the air and noise pollution their lives and homes are affected therefore affecting our ecosystem and environment.

In closing, if they were not truthful concerning what they are currently doing by violating a Federal law of the Clean Air act by running 27 unpermitted gas turbines, then there is a pattern that if given the approval they will not be truthful and abide within its regulations in the future. By approving this permit, you are sacrificing people, children and even yourselves with the short term and long term air pollution effects. This not only affects the people here now in the room

but it will affect your grandchildren and your parents and generations to come. I am asking that this be taken into consideration and the permit denied.

Thank you

Eric Nelson

First I would like to thank those that initiated this awareness to the multitude of issues regarding the xai data center and the power plant, and for keeping us all informed, and for setting up this forum. (Jason, Shannon, others)

My concerns mirror those that have already been discussed at length.

The 24/7 turbine noise invades not only our outdoor activities, but also penetrates into our home disrupting our sleep and degrading our lives. There is no way that building a "berm" is going to stop this noise. It MAY reduce it, but that remains to be noticed. "Reducing" the noise is not an acceptable solution.

We know that this plant is generating harmful air pollution, consuming enormous quantities of our water, and will reduce our property values. Somehow xai has convinced our leadership that the opposite was true: No pollution, no impact on water consumption, and that our property values would actually increase.

If this plays out like installations across the country, then we will also be seeing an increase in our electric and water utility bills.

When we were informed that xai was coming to Southaven (something most of us did not know until all the noise became apparent), our mayor extolled all the virtues, but completely lacked the transparency regarding all these issues we are now dealing with. Perhaps these were part of the NDA that was signed. So although the mayor claimed transparency, we now realize this was not the case.

I know there are many in our city and area that are very excited about, and support this xai powerplant. I would venture a guess that few to none of these people are living in the vicinity and forced to endure all the noise, ~~And for some reason they ignore~~ and accept the xAi assurances regarding the other previously mentioned problems of air quality and resource depletion. I further encourage the ~~"pro"~~ xai supporters to identify whether or not they live in close proximity to the power plant.

My name is Jasmine Bernard. I am 16 and I ask you to deny the MLX permit. I ask you not to make the same negligent mistakes as the public officials who [redacted] right across the stateline in Memphis. With davis & shelby county already receiving an F in air quality, as someone who has lived on both sides of the stateline, I will remind you that we share the same air. Considering this I ask you to look not too far to the future that many people claim to want to protect. Today is your chance as MDEQ to protect the future. xAI's turbines not only emitt pollutants like nitrous oxide, particulate matter, & formaldehyde that most intensely impact the young & the old but it is also draining our aquifer that gives us our fresh drinking water. For context, the xAI facility in Boxtown was initially reported to have 15 turbines, it was later discovered that they lied & had 35, was supposed to [redacted] drain 1 million gallons of wtr a day - that's only for 15 turbines. We are now talking about an estimated 103 known turbines with [redacted] if this permit is allowed to pass. This will increase the initial number reported by xAI by [redacted] almost 7 times, [redacted] 7 million gallons of water drained from the aquifer on a daily basis. And if you don't know what happens when you suck out of the aquifer, it makes it easier for pollutants to seep in, making polluted drinking water an additional major concern of this project. This combined w/ the air pollution will exacerbate existing conditions and with the tendancy of this megalomanic billionaire to skew facts they will continue to deny the right of normal people to live. All this said, I ask you a simple question, when the air is too dirty to breathe & the wtr runs out where do you suggest they/we live? I will conclude with the same remark I left the Memphis mayor with [redacted] all money is not good money, and you do not want Elon Musk's money.

Name: Julie Perry E-mail: [redacted]

Have comments?

I'm extremely concerned about ALL the negative health impacts I've been reading about that come from the pollutants of the gas turbines. Our air quality is already an F & we can't afford to have any thing like this that will bring more pollution. The people of Southaven we have the Right to breathe clean AIR! & it affects our water & we deserve as our Right to clean pollutant free water.

MZX Tech, LLC
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Mississippi Environmental Quality Permit Public Hearing, Southaven, 2/17.26.

I am Kelly Jacobs, my husband Paul and I live in Hernando.

I am here to ask you **NOT to approve any permit for the new Southaven XAI power station operated by** ZX Technology. History has proven that greedy businesses and politicians cannot be trusted to think about the safety of the public's health vs their business plan to make as much money as possible. This is why in 1970, Congress passed the Clean Air and Clean Water Acts. These Federal laws over-rule state laws and prohibit the people of Mississippi from being used as polluted air and water pollution guinea pigs.

On a personal note, recently, my husband's asthma and COPD type symptoms and coughs have significantly increased. Paul has never smoked anything, so please don't think he brought this on himself. DeSoto County has an F rating for its air quality, the only County in our state with this FLUNKING DESIGNATION and I worry that this newest polluter is why he continues to have trouble breathing, stumping his heart and lung doctors. Today you will hear the facts, that this XAI company is operating without lawful permission. **That no tests or measurements of the specific gray water pollution to cool computers and <u>air pollution</u> these turbines are making has been specifically measured in this Southaven neighborhood should appall you.** Would you want your grandchildren and their developing lungs living there? I listened to the Mayor of Southaven at a City Council meeting split hairs on how noisy this power plant can be, but he refused to discuss the health implications of his constituents who are now breathing the exhaust from these gas turbines that **<u>never turn off</u>**. Even more turbines are being requested for a total of 41 air polluters that would run 24 hours a day, 7 days a week. The noise will also increase dramatically, please deny their operational permit. Federal Laws protect our air and water and without proof that this business's air and water pollution is harmless, you must err on the side of the people. You need to enforce the laws and the system that is set up to protect the public. You are our only hope of any enforcement of Federal Law that says we must keep our Air and Water Clean. Because MZX Technology is violating the law by operating without required permits, without proof that their billion dollar company cannot create power in a manner that is safe for Mississippi residents to drink and to breathe, **you must decline to issue a "prevention of significant deterioration construction permit , Air Ref. No. 0680-00119".**

Thank-you.

Kelly & Paul Jacobs, [redacted] Hernando, MS 38632

[redacted]

Kurt Conrad
[redacted]
February 17, 2026

Mississippi Department of Environmental Quality
P.O. Box 2261, Jackson MS 39225

Regarding the PSD permit,

Thank you for this opportunity. I live in Senatobia.

I lived in Silicon Valley and worked in San Francisco when the dot-com bubble burst. I was hired to manage a large pipeline of new projects. All at once, they all lost funding. I'm here to warn you that when these bubbles burst, they cause real harm, to real people, with real local businesses and families.

In this case, we're not even talking long-term risk, but immediate harm. MZX Tech is currently violating the Clean Air Act. Up to 27 gas turbines have been operating illegally for quite some time, causing measurable harms to the people that live near them. In a way, that makes your job much easier. You have hard data to base your decisions on. Why aren't the currently operating gas turbines mentioned in the permit? They're generating baseline impact data for you.

The real questions on the table are *"Who's valuable?"* and thus, *"Who's values deserve priority?"*

On one side you have relatively vulnerable groups that have been systematically marginalized. They already suffer from elevated pollution levels and associated impacts on health and longevity. They're asking you not to make a bad situation worse,

On the other side, you have the world's richest man, who's looking for weak political structures, cheap land, and water supplies to exploit. Knowing that the region's electrical infrastructure is shaky, at best, he chose a fast, highly-polluting option and drops it into a metropolitan residential area; poisoning schools and homes; and harming nearby forests, wildlife, and water systems.

When this topic came up in online forums, I noticed that folks outside the main impact zone tended to take the position, *"41 gas turbines? You're already out of compliance, and it's not that much more air, light, and noise pollution. What's the big deal?"*

So, is the health and quality of life for the citizens that you represent more valuable than helping Musk blow up his competitive balloon? Or do you see your job as allocating sacrifices and distributing spoils?

I recommend that the Mississippi Department of Environmental Quality doesn't approve these permits at this time.

Sincerely,

Kurt Conrad

February 17, 2026

Mississippi Department of Environmental Quality Permit Board

P.O. Box 2261

Jackson, MS 39225

Ladies & Gentlemen of the Mississippi Department of Environmental Quality Permit Board:

Allow me to introduce myself. I am Rebecca Boyle. I live in Southaven, MS with my husband.

We, the people of Southaven, MS, are calling on you, MDEQ Permit Board, to disapprove the MZX Tech permit to run 41 "permanent" gas-fired turbines in Southaven, MS.

The MZX power plant is currently operating on 27 "temporary" gas turbines that have be operational since August 2025 without a permit and without public input.

The Southaven MZX power plant is located in a densely populated area with neighborhoods, churches, schools, and public parks.

These gas turbines are polluting the surrounding neighborhoods with noise, light, and air pollution.

The pollutants from these gas-fired turbines puts children at high risk for asthma and makes other respiratory illnesses worse.

Please, invest in the future of Southaven and say "No" to the MZX Tech permit.

Thank you for your time.

Rebecca Boyle

[redacted]

Southaven, MS 38671

[redacted]

- Increased Smog: The turbines can act as large industrial sources of nitrogen oxides, leading to a 30-60% increase in regional smog.

- Potential for Explosions/Leaks: Nearby pipelines or facilities, particularly in areas with seismic activity, carry risks of rupturing, resulting in fires or explosions.

- Indoor Air Quality Reduction: Harmful, invisible pollutants like benzene, formaldehyde, and fine particulate matter can infiltrate homes.

- Economic Impact: The pollution can cause significant increases in annual health costs for residents,

- Pollutants: These facilities release harmful substances such as nitrogen dioxide, which can lead to increased cases of asthma and other respiratory infections.

Communities near these turbines often experience significantly increased health risks, even in areas several miles away.

4 Why is there no information on what you plan to pull from the aquifer or how it is planned to PROTECT the aquifer? We have all seen the water bill with no sewage fees, while Desoto County is trying to finance a new sanitation system for us specifically because our contract got cancelled to handle waste water from the other side of the state line, but please lets not try to act like its not all the same company

5 Where is the plan for the disposal of toxic e waste? It is my understanding that centers across the nation are piling up e waste because of the lack of disposal sites.

6 We see property after property being snatched up by this company with NO PLAN and NO CONVERSATION. Last week over 250 acres were purchased. There are too many houses in proximity for this and to say "its industrial zoned" is obfuscating, at best. TVA was developed with EPA oversight. We dont hear noise from TVA that keeps us awake ALL NIGHT LONG which rattles our nerves all day long. I didnt buy 2 acres of property in a nice little community to have an AI center in my back yard that I am supposed to ignore because there's a city boundary line between us. We deserve to be told the plan in its entirety so you can't come back later and say well we already did all of this now we HAVE to do that. We have the right to know in its entirety and not be given piecemeal only when we raise a fuss

7.What steps have been taken to protect the insects, plants and animals native to Mississippi? The noise is already proven to drive away wildlife causing systemic failure of multiple species of all 3 systems. What lights are you installing? What protections have you undertaken to protect Horn Lake Creek?

K Langston
[redacted]

Methane turbine engines near residential areas pose significant risks to homes and health, primarily through air pollution (nitrogen oxides, PM2.5, formaldehyde) and, if close to infrastructure, the threat of explosions or leaks. These emissions can cause chronic health issues, such as asthma and respiratory illness, while contributing heavily to smog.

Key Damages and Risks to Nearby Homes:

Severe Air Pollution & Health Hazards: Turbine emissions (nitrogen oxides, particulate matter) can severely degrade local air quality, leading to respiratory illnesses, cardiovascular disease, and, in some cases, premature mortality.

Increased Smog: The turbines can act as large industrial sources of nitrogen oxides, leading to a 30-60% increase in regional smog.

Potential for Explosions/Leaks: Nearby pipelines or facilities, particularly in areas with seismic activity, carry risks of rupturing, resulting in fires or explosions.

Indoor Air Quality Reduction: Harmful, invisible pollutants like benzene, formaldehyde, and fine particulate matter can infiltrate homes.

Economic Impact: The pollution can cause significant increases in annual health costs for residents.

Pollutants: These facilities release harmful substances such as nitrogen dioxide (

), which can lead to increased cases of asthma and other respiratory infections.

Communities near these turbines often experience significantly increased health risks, even in areas several miles away.

K Langston
[redacted]

- Local Opposition: The speed and scale of construction are leading to increased local pushback, with some projects being delayed or cancelled due to community concerns

- Experts generally agree that while rapid expansion is necessary, it must be balanced with sustainable practices,, improved planning, and better community engagement to avoid long-term failures. AI data centers are increasingly adopting water recycling and conservation methods, such as utilizing industrial graywater, rainwater harvesting, and advanced on-site treatment, to reduce reliance on potable water. While some systems can recover 50% to 80% of water, many still rely on evaporative cooling that consumes large volumes, making "net-zero" water goals difficult to achieve.

Key details regarding water management in AI data centers:
Recycling Techniques: Some facilities use closed-loop systems that recycle cooling water, while others implement on-site water treatment to reuse water multiple times.
Alternative Sources: Companies like Google and Amazon are increasingly using non-potable water, such as treated municipal wastewater, for cooling.
Limitations: Despite recycling efforts, evaporation remains a primary cooling method, meaning a significant amount of water is still lost to the atmosphere.
Efficiency Gains: Some advanced designs are aiming for higher efficiency, with some reports suggesting 90% water recycling rates, though this is not universal across all centers.
While water recycling is on the rise, the immense water usage for cooling high-performance AI chips means that data centers still pose significant impacts on local water resources, particularly in water-stressed regions.

Sent via Via Online Submission: https://www.mdeq.ms.gov/bland-jeffrey/ and by email at jbland@mdeq.ms.gov

Mr. Jeffrey Bland
Mississippi Department of Environmental Quality
P.O. Box 2261
Jackson, MS 39225

Re: DeSoto County Branch of the NAACP Comment on Draft Clean Air Act Prevention of Significant Deterioration Construction Permit (Air Ref. No. 0680-00119) for MZX Tech, LLC

Dear Mr. Bland:

On behalf of the DeSoto County Branch of the NAACP, we are writing to comment on the draft construction permit (the "Permit") for the MZX Tech LLC facility at 2875 Stanton Road in Southaven, MS (the "Site"). The draft Permit proposes MZX tech, an xAI affiliate, to construct and operate 41 methane gas-fired turbines generating 1,200 megawatts of power. This is enough power for a mid-sized city, but the MZX Tech power plant isn't providing electricity to the city, even though the plant is surrounded by several residential neighborhoods, homes, and an elementary school.

The DeSoto County Branch of the NAACP has residents within miles of the data center. Indeed, even as Colossus I came under unpermitted operation, that decision impacted our community. MDEQ and this Board has an opportunity to fix this pattern. Our branch has a long history of fighting for civil rights and demanding justice for the residents across the County. This fight is no different. Dirty pollution from methane gas does not cease to exist just because it is coming from a data center. We must view this for what it is: a large polluting power plant that does not need to add more pollution in our communities.

MZX Tech installed 27 turbines without a permit, disregarding federal requirements. Our community has been experiencing many negative impacts including noise and air pollution as a result of these turbines. MZX claims these 27 turbines and impacts are temporary, but now are asking to permanently install and operate 41 gas turbines at the same site. The draft Permit does not mention the 27 unpermitted turbines, nor includes them in emission estimates. The failure of the draft Permit to include these 27 emissions units on the Site renders it deficient and makes it impossible for our community to truly grasp the full scale of the Site's impact on air quality and public health.

The Permit Board must disapprove the draft Permit and instruct MDEQ to:

- Order MZX Tech to cease operating the 27 unpermitted turbines until it obtains a permit for them;
- Withdraw the draft Permit; and
- Revise the draft Permit to include *all* of the turbines on the site before seeking public comment.

Even with the draft Permit, MZX Tech fails to be transparent. The draft Permit does not provide information accurately characterizing the air pollution caused by the 41 turbines, that would require sufficient safeguarding. The draft Permit also dismisses the fact that there is an ongoing violation of the minimum federal ozone standard, it underestimates the amount of harmful particulate matter emissions from the turbine, and underestimates toxic formaldehyde emissions limits. For all of these reasons, the draft Permit fails to meet applicable requirements and **the Permit Board must disapprove the Permit.**

Beyond the substantive air quality concerns, the permitting process itself reflects a concerning pattern of procedural disregard for affected communities. DeSoto County residents and communities who share the impacts of industrial pollution, like Memphis, have highlighted that these decisions cannot be made in a vacuum. They have articulated concrete concerns regarding cumulative air pollution, public health impacts, and regulatory transparency. Yet too often, decisions have proceeded without meaningful engagement or adequate responsiveness to those concerns. Moreover, many advocates from our communities have asked for an extension to ensure the public could participate. The Board denied those requests; however, we remain firm that the public and our Mississippi community must be able to engage fully.

The Permit Board must also disapprove the Permit because both MDEQ and the DeSoto community need to understand the full and true impact of the MZX Tech Site. This includes the impact the operations have on the air quality and making sure they meet regulatory requirements of the Clean Air Act and Mississippi law. The MZX Tech power plant is surrounded by several residential neighborhoods, including Colonial Hills and Horn Lake, and is just a mile from an elementary school. We have already been experiencing the impacts of the 27 unpermitted turbines MZX Tech has installed at 2875 Stanton Road without a permit, including increased noise and air pollution.

The air pollution from both the 27 unpermitted turbines and the proposed 41 turbines will reach beyond the immediately adjacent neighborhoods. Currently, the air shared by Southaven and Memphis is not meeting minimum federal smog standards. The greater Memphis-Clarksdale-

Forrest City metro area, which includes Memphis and Southaven, received an "F" for high ozone days for the most recent reporting period.[1]

Smog makes asthma and other respiratory illnesses worse.[2] Pollutants like smog are especially dangerous for children, who are more likely to develop respiratory illnesses like asthma.[3] Pregnant women and unborn children are also at risk from fossil fuel pollution.[4] According to the Asthma and Allergy Foundation, the Memphis Metro Area, including Memphis and Southaven, has among the highest rates in the U.S. of emergency room visits and deaths due to asthma.[5]

The 41-turbine MZX Tech power plant, not including the already present 27 turbines, is estimated to cause millions of dollars of health damages nationally each year. Shelby and DeSoto counties will be those who experience the greatest impact. Some of the damages include missed days of school and work due to respiratory illnesses.[6]

Mississippi has repeatedly failed to protect its residents from avoidable environmental harms. Time and again, permitting decisions have allowed pollution to be concentrated in marginalized communities with the greatest existing environmental and health burdens. Approval of this permit would constitute yet another avoidable failure. The Permit Board has both the authority and the responsibility to prevent this.

Our communities, already impacted by air pollution, will be bearing the health risks of MZX Tech's massive power plant. We deserve better. We deserve transparent and full information about the Site's operations and air emissions which MDEQ is required to provide. Because the draft Permit fails to provide complete and accurate information, **we demand that the Permit Board disapprove the Permit.**

Sincerely,

Robert Tipton Jr.
DeSoto County Branch President
NAACP

[1] Memphis-Clarksdale-Forrest City, TN-MS-AR, Am. Lung Ass'n (2025), Memphis-Clarksdale-Forrest City, TN-MS-AR | American Lung Association.

[2] Katherine Burgess, *SELC petitions EPA to say Memphis area in violation of ozone standards*, MLK50 JUSTICE THROUGH JOURNALISM (June 6, 2025), https://mlk50.com/2025/06/06/selc-petitions-epa-to-say-memphis-area-in-violation-of-ozone-standards/.

[3] EPA, Health Effects of Ozone Pollution (last visited February 7, 2026), Health Effects of Ozone Pollution | US EPA.

[4] Exposure to Air Pollution During Pregnancy Linked to Neurodevelopmental Issues | Columbia University Mailman School of Public Health; Ambient air pollution in critical windows of exposure and spontaneous miscarriage in a preconception cohort - ScienceDirect.

[5] 2025 Asthma Capitals: The Most Challenging Places to Live with Asthma, Asthma and Allergy Found. of Am. (2025), AAFA 2025 Asthma Capitals Report September 2025 (ranked 3rd for emergency room visits; 5th for deaths).

[6] Report TK.

Name: SHARON Summers E-mail: [redacted]

Have comments?

No to Turbines No to Turbines No to Turbines
Make the right decision Just say NO to permit

MZX Tech, LLC
Tuesday, February 17, 2026
6:00 pm – 8:30 pm
Ranger Conference Center
1210 Church Road West
Southaven, MS 38671

I am here to express concern about the public health impact of increased PM2.5 pollution associated with the proposal submitted by xAI / MZX. PM2.5 is a well-documented harmful pollutant, and the company's proposal understates the risk to this region. Based on current projections, this development raises serious compliance concerns under the Clean Air Act and deserves careful regulatory scrutiny.

The Mid-South already struggles with air quality. On many days our region falls into the "moderate," or yellow, air quality category before this facility is operating at full capacity. That means residents are already experiencing elevated baseline exposure. Adding additional particulate pollution to an already stressed environment increases cumulative health risk, and cumulative exposure is what drives long-term medical harm.

PM2.5 disproportionately affects vulnerable populations: seniors, children, pregnant women, and individuals with preexisting conditions. The Mississippi State Department of Health has declared a Public Health Emergency related to infant mortality. Scientific evidence links PM2.5 exposure to low birth weight, preterm birth, and congenital anomalies, including congenital heart defects. Expanding a pollution source in the middle of a public health crisis works directly against statewide efforts to protect mothers and infants.

This is also a community issue. DeSoto County regularly hosts outdoor festivals, youth sports, and public events that depend on safe air. In 2025 Southaven hosted the Dizzy Dean Baseball World Series, and the Amphitheater at Snowden Grove held more than a dozen major concerts. Increased PM2.5 levels make participation riskier, especially for children and older adults, and threaten the social and economic life of the region.

The city of Southaven is also a certified retirement destination through the Mississippi Hometown Retirement program. Elevated PM2.5 exposure is associated with higher mortality, accelerated disability, and cognitive decline. Allowing air quality to worsen contradicts the city's public commitment to providing a safe environment for older residents.

This decision is not only about development. It is about the government's responsibility to protect public health. The science on PM2.5 is clear. Any approval should prioritize strict emissions accountability and precaution, especially for the most vulnerable members of this community.

Thank you for your time.

Toni Roberts

Name: Tonya Bess-Force E-mail: [redacted]

Have comments? What are you going to do for the people that are now taking meds just to be able to eat or sleep? I use to be very out going played with my son and grandson but now I stay tired all the time and don't have the energy to do much of anything anymore. Enough is enough.
I keep a constant headache that is now being treated by shots. You deal with 62 shots every 3 months. The vibration + noise has to stop.

MZX Tech, LLC
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APPENDIX G

Updated Draft PSD Permit to Construct Air Emissions Equipment

STATE OF MISSISSIPPI
AIR POLLUTION CONTROL PERMIT

AND PREVENTION OF SIGNIFICANT DETERIORATION (PSD) AUTHORITY

TO CONSTRUCT AIR EMISSIONS EQUIPMENT

THIS CERTIFIES THAT

MZX Tech LLC
2875 Stanton Road
Southaven,
Desoto, Mississippi

has been granted permission to construct air emissions equipment to comply with the emission limitations, monitoring requirements and other conditions set forth herein. This permit is issued in accordance with the provisions of the Mississippi Air and Water Pollution Control Law (Section 49-17-1 et. seq., Mississippi Code of 1972), and the regulations and standards adopted and promulgated thereunder and under authority granted by the Environmental Protection Agency under 40 CFR 52.01 and 52.21.

MISSISSIPPI ENVIRONMENTAL QUALITY PERMIT BOARD

_____

AUTHORIZED SIGNATURE
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY

Issued:_____ **Permit No.: 0680-00119**

12592 PER20250001

Draft/Proposed – **March 4, 2026**

SECTION 1. GENERAL CONDITIONS

1.1 This permit is for air pollution control purposes only.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.1.D.)

1.2 Any activities not identified in the application are not authorized by this permit.

(Ref.: Miss. Code Ann. 49-17-29(1)(b))

1.3 The knowing submittal of a permit application with false information may serve as the basis for the Permit Board to void the permit issued pursuant thereto or subject the applicant to penalties for operating without a valid permit pursuant to State Law.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(5).)

1.4 It is the responsibility of the applicant/permittee to obtain all other approvals, permits, clearances, easements, agreements, etc., which may be required including, but not limited to, all required local government zoning approvals or permits.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.1.D(6).)

1.5 The issuance of a permit does not release the permittee from liability for constructing or operating air emissions equipment in violation of any applicable statute, rule, or regulation of state or federal environmental authorities.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(7).)

1.6 It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of the permit, unless halting or reducing activity would create an imminent and substantial endangerment threatening the public health and safety of the lives and property of the people of this state.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(15)(a).)

1.7 The permit and/or any part thereof may be modified, revoked, reopened, and reissued, or terminated for cause. Sufficient cause for a permit to be reopened shall exist when an air emissions stationary source becomes subject to Title V. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or of a notification of planned changes or anticipated noncompliance does not stay any permit condition.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(15)(b).)

1.8 The permit does not convey any property rights of any sort, or any exclusive privilege.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(15)(c).)

1.9 The permittee shall furnish to the Department of Environmental Quality (DEQ) within a reasonable time any information the DEQ may request in writing to determine whether

cause exists for modifying, revoking and reissuing, or terminating the permit or to determine compliance with the permit. Upon request, the permittee shall also furnish to the DEQ copies of records required to be kept by the permit or, for information claimed to be confidential, the permittee shall furnish such records to the DEQ along with a claim of confidentiality. The permittee may furnish such records directly to the Administrator along with a claim of confidentiality.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(15)(d).)

1.10 *Design and Construction Requirements:* The stationary source shall be designed and constructed so as to operate without causing a violation of any Applicable Rules and Regulations, without interfering with the attainment and maintenance of State and National Ambient Air Quality Standards, and such that the emission of air toxics does not result in an ambient concentration sufficient to adversely affect human health and well-being or unreasonably and adversely affect plant or animal life beyond the stationary source boundaries.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.5.A(1)-(3).)

1.11 The necessary facilities shall be constructed to prevent any wastes or other products or substances to be placed in a location where they are likely to cause pollution of the air or waters of the State without the proper environmental permits.

(Ref.: Miss. Code Ann. 49-17-29(1) and (2))

1.12 *Fugitive Dust Emissions from Construction Activities:* The construction of the stationary source shall be performed in such a manner so as to reduce fugitive dust emissions from construction activities to a minimum.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.5.A(4).)

1.13 *General Nuisances:* The permittee shall not cause, permit, or allow the emission of particles or any contaminants in sufficient amounts or of such duration from any process as to be injurious to humans, animals, plants, or property, or to be a public nuisance, or create a condition of air pollution.

(a) The permittee shall not cause or permit the handling, transporting, or storage of any material in a manner which allows or may allow unnecessary amounts of particulate matter to become airborne.

(b) When dust, fumes, gases, mist, odorous matter, vapors, or any combination thereof escape from a building or equipment in such a manner and amount as to cause a nuisance to property other than that from which it originated or to violate any other provision of 11 Miss. Admin. Code Pt. 2, Ch. 1, the Commission may order such corrected in a way that all air and gases or air and gasborne material leaving the building or equipment are controlled or removed prior to discharge to the open air.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 1.3.C.)

1.14 *Right of Entry:* The permittee shall allow the Mississippi Department of Environmental Quality, Office of Pollution Control and the Mississippi Environmental Quality Permit Board and/or their representatives, upon presentation of credentials:

(a) To enter at reasonable times upon the permittee's premises where an air emission source is located or in which any records are required to be kept under the terms and conditions of this permit; and

(b) To have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; and to sample any air contaminants or waste waters, fuel, process material, or other material which affects or may affect emission of air contaminants from any source.

(Ref.: Miss. Code Ann. 49-17-21)

1.15 *Permit Modification or Revocation:* After notice and opportunity for a hearing, the Permit Board may modify the permit or revoke it in whole or in part for good cause shown including, but not limited to, the following:

(a) Persistent violation of any of the terms or conditions of this permit;

(b) Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

(c) A change in federal, state, or local laws or regulations that require either a temporary or permanent reduction or elimination of previously authorized air emission.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.C.)

1.16 *Public Record and Confidential Information:* Except for information determined to be confidential under the Mississippi Air and Water Pollution Control Law, all information obtained in accordance with the terms of this permit shall be available for public inspection at the offices of the Mississippi Department of Environmental Quality, Office of Pollution Control.

(Ref.: Miss. Code Ann. 49-17-39)

1.17 *Permit Transfer:* This permit shall not be transferred except upon approval of the Permit Board.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.16.B.)

1.18 *Severability:* The provisions of this permit are severable. If any provision of the permit, or the application of any provision of the permit to any circumstances, is challenged or held invalid, the validity of the remaining permit provisions and/or portions thereof or their application to other persons or sets of circumstances, shall not be affected thereby.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.1.D(7).)

1.19 *Permit Expiration:* The permit to construct will expire if construction does not begin within eighteen (18) months from the date of issuance, if construction is suspended for eighteen (18) months or more, or if construction is not completed within a reasonable time. The DEQ may extend the 18-month period upon a satisfactory showing that an extension is justified.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.5.C(1)., R. 2.5.C(4)., and R. 5.2.)

1.20 *Certification of Construction:* A new stationary source issued a Permit to Construct cannot begin operation until certification of construction by the permittee.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.5.D(3).)

1.21 *Beginning Operation:* After certification of construction by the permittee, the Permit to Construct shall be deemed to satisfy the requirement for a permit to operate until the date the application for issuance or modification of the Title V Permit or the application for issuance or modification of the State Permit to Operate, whichever is applicable, is due. This provision is not applicable to a source excluded from the requirement for a permit to operate as provided by 11 Miss. Admin. Code Pt. 2, R. 2.13.G.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.5.D(4).)

1.22 *Application for a Permit to Operate:* The application for issuance or modification of the State Permit to Operate or the Title V Permit, whichever is applicable, is due twelve (12) months after beginning operation or such earlier date or time as specified in the Permit to Construct. The Permit Board may specify an earlier date or time for submittal of the application. Beginning operation will be assumed to occur upon certification of construction, unless the permittee specifies differently in writing.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.5.D(5).)

1.23 *Operating Under a Permit to Construct:* Upon submittal of a timely and complete application for issuance or modification of a State Permit to Operate or a Title V Permit, whichever is applicable, the applicant may continue to operate under the terms and conditions of the Permit to Construct and in compliance with the submitted application until the Permit Board issues, modifies, or denies the Permit to Operate.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.5.D(6).)

1.24 Except as otherwise specified herein, the permittee shall be subject to the following provisions with respect to upsets, startups, and shutdowns.

(a) Upsets (as defined in 11 Miss. Admin. Code Pt. 2, R. 1.2.)

(1) For an upset, the Commission may pursue an enforcement action for noncompliance with an emission standard or other requirement of an applicable rule, regulation, or permit. In determining whether to pursue enforcement action, and/or the appropriate enforcement action to take, the Commission may consider whether the source has demonstrated through

properly signed contemporaneous operating logs or other relevant evidence the following:

(i) An upset occurred and that the source can identify the cause(s) of the upset;

(i) The source was at the time being properly operated;

(ii) During the upset the source took all reasonable steps to minimize levels of emissions that exceeded the emission standard or other requirement of an applicable rule, regulation, or permit;

(iii) That within five (5) working days of the time the upset began, the source submitted a written report to the Department describing the upset, the steps taken to mitigate excess emissions or any other noncompliance, and the corrective actions taken and;

(iv) That as soon as practicable but no later than 24 hours of becoming aware of an upset that caused an immediate adverse impact to human health or the environment beyond the source boundary or caused a general nuisance to the public, the source provided notification to the Department.

(2) In any enforcement proceeding by the Commission, the source seeking to establish the occurrence of an upset has the burden of proof.

(3) This provision is in addition to any upset provision contained in any applicable requirement.

(4) These upset provisions apply only to enforcement actions by the Commission and are not intended to prohibit EPA or third party enforcement actions.

(b) Startups and Shutdowns (as defined in 11 Miss. Admin. Code Pt. 2, R. 1.2.)

(1) Startups and shutdowns are part of normal source operation. Emission limitations apply during startups and shutdowns unless source specific emission limitations or work practice standards for startups and shutdowns are defined by an applicable rule, regulation, or permit.

(2) Where the source is unable to comply with existing emission limitations established under the State Implementation Plan (SIP) and defined in 11 Mississippi Administrative Code, Part 2, Chapter 1, the Department will consider establishing source specific emission limitations or work practice standards for startups and shutdowns. Source specific emission limitations or work practice standards established for startups and shutdowns are subject to the requirements prescribed in 11 Miss. Admin. Code Pt. 2, R. 1.10.B(2)(a) through (e).

(3) Where an upset, as defined in 11 Miss. Admin. Code Pt. 2, R. 1.2.,occurs during startup or shutdown, see the upset requirements above.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 1.10.)

1.25 *General Duty:* All air emission equipment shall be operated as efficiently as possible to minimize emissions of air contaminants.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(10).)

1.26 *Compliance Testing:* Regarding compliance testing:

(a) The results of any emissions sampling and analysis shall be expressed both in units consistent with the standards set forth in any Applicable Rules and Regulations or this permit and in units of mass per time.

(b) Compliance testing will be performed at the expense of the permittee.

(c) Each emission sampling and analysis report shall include but not be limited to the following:

(1) detailed description of testing procedures;

(2) sample calculation(s);

(3) results; and

(4) comparison of results to all Applicable Rules and Regulations and to emission limitations in the permit.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.6.B(3), (4), and (6).)

SECTION 2. EMISSION POINT DESCRIPTION

The permittee is authorized to construct and/or modify and operate, upon certification of construction, air emissions equipment, as described in the following table.

Emission Point	Facility Ref. ID	Description
AA-000	TUR-1 through TUR-17	Seventeen 22,100 Horsepower (HP) (16.5 Megawatt (MW)) (185.15 MMBtu/hr) Solar Titan Model PGM-130 Natural Gas-Fired Simple Cycle Combustion Turbines, each equipped with SCR and oxidation catalyst
AA-001	TUR-1	22,100 HP (16.48 MW) (185.15 MMBtu/hr) Solar Titan Model PGM-130 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AA-002	TUR-2	22,100 HP (16.48 MW) (185.15 MMBtu/hr) Solar Titan Model PGM-130 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AA-003	TUR-3	22,100 HP (16.48 MW) (185.15 MMBtu/hr) Solar Titan Model PGM-130 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AA-004	TUR-4	22,100 HP (16.48 MW) (185.15 MMBtu/hr) Solar Titan Model PGM-130 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AA-005	TUR-5	22,100 HP (16.48 MW) (185.15 MMBtu/hr) Solar Titan Model PGM-130 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AA-006	TUR-6	22,100 HP (16.48 MW) (185.15 MMBtu/hr) Solar Titan Model PGM-130 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AA-007	TUR-7	22,100 HP (16.48 MW) (185.15 MMBtu/hr) Solar Titan Model PGM-130 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AA-008	TUR-8	22,100 HP (16.48 MW) (185.15 MMBtu/hr) Solar Titan Model PGM-130 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AA-009	TUR-9	22,100 HP (16.48 MW) (185.15 MMBtu/hr) Solar Titan Model PGM-130 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AA-010	TUR-10	22,100 HP (16.48 MW) (185.15 MMBtu/hr) Solar Titan Model PGM-130 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AA-011	TUR-11	22,100 HP (16.48 MW) (185.15 MMBtu/hr) Solar Titan Model PGM-130 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AA-012	TUR-12	22,100 HP (16.48 MW) (185.15 MMBtu/hr) Solar Titan Model PGM-130 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AA-013	TUR-13	22,100 HP (16.48 MW) (185.15 MMBtu/hr) Solar Titan Model PGM-130 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AA-014	TUR-14	22,100 HP (16.48 MW) (185.15 MMBtu/hr) Solar Titan Model PGM-130 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AA-015	TUR-15	22,100 HP (16.48 MW) (185.15 MMBtu/hr) Solar Titan Model PGM-130 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AA-016	TUR-16	22,100 HP (16.48 MW) (185.15 MMBtu/hr) Solar Titan Model PGM-130 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AA-017	TUR-17	22,100 HP (16.48 MW) (185.15 MMBtu/hr) Solar Titan Model PGM-130 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst

AB-000	TUR-18 through TUR-33	Sixteen 56,312 HP (35 MW) (388.52 MMBtu/hr) Solar Titan Model 350 Natural Gas-Fired Simple Cycle Combustion Turbines, each equipped with SCR and oxidation catalyst
AB-001	TUR-18	56,312 HP (35 MW) (388.52 MMBtu/hr) Solar Titan Model 350 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AB-002	TUR-19	56,312 HP (35 MW) (388.52 MMBtu/hr) Solar Titan Model 350 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AB-003	TUR-20	56,312 HP (35 MW) (388.52 MMBtu/hr) Solar Titan Model 350 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AB-004	TUR-21	56,312 HP (35 MW) (388.52 MMBtu/hr) Solar Titan Model 350 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AB-005	TUR-22	56,312 HP (35 MW) (388.52 MMBtu/hr) Solar Titan Model 350 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AB-006	TUR-23	56,312 HP (35 MW) (388.52 MMBtu/hr) Solar Titan Model 350 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AB-007	TUR-24	56,312 HP (35 MW) (388.52 MMBtu/hr) Solar Titan Model 350 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AB-008	TUR-25	56,312 HP (35 MW) (388.52 MMBtu/hr) Solar Titan Model 350 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AB-009	TUR-26	56,312 HP (35 MW) (388.52 MMBtu/hr) Solar Titan Model 350 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AB-010	TUR-27	56,312 HP (35 MW) (388.52 MMBtu/hr) Solar Titan Model 350 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AB-011	TUR-28	56,312 HP (35 MW) (388.52 MMBtu/hr) Solar Titan Model 350 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AB-012	TUR-29	56,312 HP (35 MW) (388.52 MMBtu/hr) Solar Titan Model 350 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AB-013	TUR-30	56,312 HP (35 MW) (388.52 MMBtu/hr) Solar Titan Model 350 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AB-014	TUR-31	56,312 HP (35 MW) (388.52 MMBtu/hr) Solar Titan Model 350 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AB-015	TUR-32	56,312 HP (35 MW) (388.52 MMBtu/hr) Solar Titan Model 350 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AB-016	TUR-33	56,312 HP (35 MW) (388.52 MMBtu/hr) Solar Titan Model 350 Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AC-000	TUR-34 through TUR-41	Eight 67,538 HP (50 MW) (475.66 MMBtu/hr) ProEnergy Model 6000PE Natural Gas-Fired Simple Cycle Combustion Turbines, each equipped with SCR and oxidation catalyst
AC-001	TUR-34	67,538 HP (50 MW) (475.66 MMBtu/hr) ProEnergy Model 6000PE Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AC-002	TUR-35	67,538 HP (50 MW) (475.66 MMBtu/hr) ProEnergy Model 6000PE Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AC-003	TUR-36	67,538 HP (50 MW) (475.66 MMBtu/hr) ProEnergy Model 6000PE Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst

AC-004	TUR-37	67,538 HP (50 MW) (475.66 MMBtu/hr) ProEnergy Model 6000PE Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AC-005	TUR-38	67,538 HP (50 MW) (475.66 MMBtu/hr) ProEnergy Model 6000PE Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AC-006	TUR-39	67,538 HP (50 MW) (475.66 MMBtu/hr) ProEnergy Model 6000PE Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AC-007	TUR-40	67,538 HP (50 MW) (475.66 MMBtu/hr) ProEnergy Model 6000PE Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AC-008	TUR-41	67,538 HP (50 MW) (475.66 MMBtu/hr) ProEnergy Model 6000PE Natural Gas-Fired Simple Cycle Combustion Turbine equipped with SCR and oxidation catalyst
AE-000		Collection of natural gas fugitive emissions
AF-000		Collection of ammonia fugitive emissions
AG-000	PRS 1-10	Ten 10 MMBtu/hr each Natural Gas-Fired PLUM Model T6500 Pressure Reduction Systems (PRS) equipped with Low NOx burners. Each PRS contains two 5 MMBtu/hr burners.

SECTION 3. EMISSION LIMITATIONS AND STANDARDS

Emission Point	Applicable Requirement	Condition Number(s)	Pollutant / Parameter	Limitation/Standard
Facility-Wide	11 Miss. Admin. Code Pt. 2, R. 1.3.B.	3.1	Opacity	≤ 40%
	11 Miss. Admin. Code Pt. 2, R. 1.3.A.	3.2	Opacity	≤ 40%
	11 Miss. Admin. Code Pt. 2, R. 2.2.B(10).	3.3	HAPs	≤ 24.0 tpy total combined HAPs and ≤ 9.50 tpy for each individual HAP
AA-000, AB-000, and AC-000	11 Miss. Admin. Code Pt. 2, R. 1.3. D(1)(b)	3.4	PM	$E=0.8808*I^{-0.1667}$
	40 CFR 60, Subpart KKKKa – Standards of Performance for Stationary Combustion Turbines 40 CFR 60.4300a, 60.4305(a) and (b), and 60.4315a, Subpart KKKKa	3.5	NOx and SO_2	Applicability
	40 CFR 60.4330a(a)(2) and 60.4372a(b), Subpart KKKKa	3.6	SO_2	0.060 lb SO2 /MMBTU (20 grains S/100scf)
	40 CFR 60.4320a(a), (b)(1)-(3), and (d), and Tables 1 and 2 of Subpart KKKKa	3.7(a)	NOx	15 ppm at 15% O_2 or 24 ng/J (0.055 lb/MMBtu) on a 4-operating-hour rolling average basis; or
		3.7(b)		0.20 kg/MWh-gross (0.43 lb/MWh-gross) 0.20 kg/MWh-net (0.44 lb/MWh-net) on a 30-operating-day average basis; or
		3.7(c)		4-Hour emissions rate of 0.83 lb NOX/MW-rated output; or
		3.7(d)		12-Calendar-month emissions rate of 0.48 ton NOX/MW-rated output
	11 Miss. Admin. Code Pt. 2, R. 2.2.B(10).	3.8(a)	NH_3 (AA-000)	≤ 5 PPMV at 0% O_2 on a dry basis not to exceed 1.28 lb/hr per turbine (excluding startup and shutdown) and ≤ 5.18 tpy per turbine (including startup and shutdown) from Emission Group AA-000
		3.8(b)	NH_3 (AB-000)	≤ 5 PPMV at 0% O_2 on a dry basis not to exceed 2.69 lb/hr per turbine (excluding startup and shutdown) and ≤ 10.53 tpy per turbine (including startup and shutdown) from Emission Group AB-000
		3.8(c)	NH_3 (AC-000)	≤ 10 PPMV at 0% O_2 on a dry basis not to exceed 6.59 lb/hr per turbine (excluding startup and shutdown) and ≤ 28.62 tpy per turbine (including startup and shutdown) from Emission Group AC-000
	11 Miss. Admin. Code Pt. 2, Ch. 5. and 40 CFR 52.21(j)	3.9	Operating Requirements	**BACT:** Startup and shutdown requirements

Emission Point	Applicable Requirement	Condition Number(s)	Pollutant / Parameter	Limitation/Standard
	(PSD BACT Limit)			
AA-000	11 Miss. Admin. Code Pt. 2, Ch. 5. and 40 CFR 52.21(j) **(PSD BACT Limit)**	3.10(a)	CO_2	**BACT:** ≤ 120 lb/MMBtu per turbine
		3.10(b)	PM_{10} (filterable + condensable)	**BACT:** ≤ 0.07 lb/hr per turbine (excluding startup and shutdown) and ≤ 0.27 tpy (including startup and shutdown) per turbine
		3.10(c)	$PM_{2.5}$ (filterable + condensable)	**BACT:** ≤ 0.07 lb/hr per turbine (excluding startup and shutdown) and ≤ 0.27 tpy per turbine (including startup and shutdown)
		3.10(d)	SO_2	**BACT:** ≤ 0.50 lb/hr per turbine (excluding startup and shutdown) and ≤ 2.20 tpy per turbine (including startup and shutdown)
		3.10(e)	NO_x	**BACT:** ≤ 2 PPMV at 15% O_2 on a dry basis not to exceed 1.45 lb/hr per turbine (excluding startup and shutdown) and ≤ 5.6 tpy per turbine (including startup and shutdown)
		3.10(f)	CO	**BACT:** ≤ 2 PPMV at 15% O_2 on a dry basis not to exceed 0.89 lb/hr per turbine (excluding startup and shutdown) and ≤ 3.41 tpy per turbine (including startup and shutdown)
		3.10(g)	VOC	**BACT:** ≤ 2 PPMV at 15% O_2 on a dry basis not to exceed 1.39 lb/hr per turbine (excluding startup and shutdown) and ≤ 5.37 tpy per turbine (including startup and shutdown)
		3.10(h)	Opacity	**BACT:** ≤ 5 %
	11 Miss. Admin. Code Pt. 2, R. 2.2.B(10). **(MACT Avoidance Limit)**	3.10(i)	Formaldehyde	≤ 63.7 PPBV at 15% O_2 on a dry basis not to exceed 0.03 lb/hr per turbine (excluding startup and shutdown) and ≤ 0.12 tpy per turbine (including startup and shutdown)
	11 Miss. Admin. Code Pt. 2, Ch. 5. and 40 CFR 52.21(j) **(PSD BACT Limit)**	3.11	Operating Requirements	**BACT:** Startup and shutdown requirements
		3.12	Fuel restriction	**BACT:** Natural gas only
AB-000	11 Miss. Admin. Code Pt. 2, Ch. 5. and 40 CFR 52.21(j) **(PSD BACT Limit)**	3.13(a)	CO_2	**BACT:** ≤ 120 lb/MMBtu per turbine
		3.13(b)	PM_{10} (filterable + condensable)	**BACT:** ≤ 0.14 lb/hr per turbine (excluding startup and shutdown) and ≤ 0.55 tpy per turbine (including startup and shutdown)
		3.13(c)	$PM_{2.5}$ (filterable + condensable)	**BACT:** ≤ 0.14 lb/hr per turbine (excluding startup and shutdown) and ≤ 0.55 tpy per turbine (including startup and shutdown)
		3.13(d)	SO_2	**BACT:** ≤ 1.05 lb/hr per turbine (excluding startup and shutdown) and

Emission Point	Applicable Requirement	Condition Number(s)	Pollutant / Parameter	Limitation/Standard
				≤ 4.61 tpy per turbine (including startup and shutdown)
		3.13(e)	NO_x	**BACT:** ≤ 2 PPMV at 15% O_2 on a dry basis not to exceed 3.05 lb/hr per turbine (excluding startup and shutdown) and ≤ 11.38 tpy per turbine (including startup and shutdown)
		3.13(f)	CO	**BACT:** ≤ 2 PPMV at 15% O_2 on a dry basis not to exceed 1.86 lb/hr per turbine (excluding startup and shutdown) and ≤ 6.93 tpy per turbine (including startup and shutdown)
		3.13(g)	VOC	**BACT:** ≤ 2 PPMV at 15% O_2 on a dry basis not to exceed 2.93 lb/hr per turbine (excluding startup and shutdown) and ≤ 10.91 tpy per turbine (including startup and shutdown)
		3.13(h)	Opacity	**BACT:** ≤ 5 %
	11 Miss. Admin. Code Pt. 2, R. 2.2.B(10). **(MACT Avoidance Limit)**	3.13(i)	Formaldehyde	≤ 63.7 PPBV at 15% O_2 on a dry basis not to exceed 0.06 lb/hr per turbine (excluding startup and shutdown) and ≤ 0.24 tpy per turbine (including startup and shutdown)
	11 Miss. Admin. Code Pt. 2, Ch. 5. and 40 CFR 52.21(j) **(PSD BACT Limit)**	3.14	Operating Requirements	**BACT:** Startup and shutdown requirements
		3.12	Fuel restriction	**BACT:** Natural gas only
AC-000	11 Miss. Admin. Code Pt. 2, Ch. 5. and 40 CFR 52.21(j) **(PSD BACT Limit)**	3.15(a)	CO_2	**BACT:** ≤ 120 lb/MMBtu per turbine
		3.15(b)	PM_{10} (filterable + condensable)	**BACT:** ≤ 0.17 lb/hr per turbine (excluding startup and shutdown) and ≤ 0.75 tpy per turbine (including startup and shutdown)
		3.15(c)	$PM_{2.5}$ (filterable + condensable)	**BACT:** ≤ 0.17 lb/hr per turbine (excluding startup and shutdown) and ≤ 0.75 tpy per turbine (including startup and shutdown)
		3.15(d)	SO_2	**BACT:** ≤ 1.29 lb/hr per turbine (excluding startup and shutdown) and ≤ 5.64 tpy per turbine (including startup and shutdown)
		3.15(e)	NO_x	**BACT:** ≤ 2 PPMV at 15% O_2 on a dry basis not to exceed 3.74 lb/hr per turbine (excluding startup and shutdown) and ≤ 15.47 tpy per turbine (including startup and shutdown)
		3.15(f)	CO	**BACT:** ≤ 4 PPMV at 15% O_2 on a dry basis not to exceed 4.55 lb/hr per turbine (excluding startup and shutdown) and ≤ 18.83 tpy per turbine (including startup and

Emission Point	Applicable Requirement	Condition Number(s)	Pollutant / Parameter	Limitation/Standard
				shutdown)
		3.15(g)	VOC	**BACT:** ≤ 2.5 PPMV at 15% O_2 on a dry basis not to exceed 4.48 lb/hr per turbine (excluding startup and shutdown) and ≤ 18.53 tpy per turbine (including startup and shutdown)
		3.15(h)	Opacity	**BACT:** ≤ 5 %
	11 Miss. Admin. Code Pt. 2, R. 2.2.B(10). **(MACT Avoidance Limit)**	3.15(i)	Formaldehyde	≤ 91 PPBV at 15% O_2 on a dry basis not to exceed 0.11 lb/hr per turbine (excluding startup and shutdown) and ≤ 0.46 tpy per turbine (including startup and shutdown)
	11 Miss. Admin. Code Pt. 2, Ch. 5. and 40 CFR 52.21(j) **(PSD BACT Limit)**	3.16	Operating Requirements	**BACT:** Startup and shutdown requirements
		3.12	Fuel restriction	**BACT:** Natural gas only
AE-000 and AF-000	11 Miss. Admin. Code Pt. 2, Ch. 5. and 40 CFR 52.21(j) **(PSD BACT Limit)**	3.17	Ammonia	**BACT:** Employ an AVO Leak Detection program
			VOC	
			CO_{2e} and GHG	
AG-000	11 Miss. Admin. Code Pt. 2, Ch. 5. and 40 CFR 52.21(j) **(PSD BACT Limit)**	3.18(a)	NO_x	**BACT:** ≤ 0.049 lb/MMBtu per PRS
		3.18(b)	CO	**BACT:** ≤ 0.082 lb/MMBtu per PRS
		3.12	SO_2, PM, and GHG	**BACT:** Natural gas only
	11 Miss. Admin. Code Pt. 2, R. 1.3.D(1)(a).	3.19	PM (filterable)	0.6 lb/MMBtu
	11 Miss. Admin. Code Pt. 2, R. 1.4.A(1).\	3.20	SO_2	4.8 lb/MMBtu

3.1 For the entire facility, the permittee shall not cause, permit, or allow the discharge into the ambient air from any point source or emissions, any air contaminant of such opacity as to obscure an observer's view to a degree in excess of 40% opacity, equivalent to that provided in 11 Miss. Admin. Code Pt. 2, R. 1.3.A(1). This shall not apply to vision obscuration caused by uncombined water droplets.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 1.3.B.)

3.2 For the entire facility, the permittee shall not cause, permit, or allow the emission of smoke from a point source into the open air from any manufacturing, industrial,

commercial or waste disposal process which exceeds forty (40) percent opacity subject to the exceptions provided in paragraphs (a) and (b) below.

(a) Startup operations may produce emissions which exceed 40% opacity for up to fifteen (15) minutes per startup in any one hour and not to exceed three (3) startups per stack in any twenty-four (24) hour period.

(b) Emissions resulting from soot blowing operations shall be permitted provided such emissions do not exceed 60 percent opacity and provided further that the aggregate duration of such emissions during any twenty-four (24) hour period does not exceed ten (10) minutes per billion BTU gross heating value of fuel in any one hour.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 1.3.A.)

3.3 For the entire facility, the permittee shall not emit greater than 24.0 tons per year (tpy) of total, combined hazardous air pollutants (HAPs) and shall not emit greater than 9.50 tpy of any individual HAP.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(10).)

3.4 For Emission Points AA-000, AB-000, AC-000, the permittee shall not have particulate emissions that exceed the emission rate as determined by the relationship:

$$E = 0.8808*I^{-0.1667}$$

where E is the emission rate in pounds per million BTU per hour heat input and I is the heat input in millions of BTU per hour.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 1.3.D(1)(b).)

3.5 For Emission Points AA-000, AB-000, AC-000, the permittee is subject to and shall comply with all applicable requirements of the Standards of Performance for Stationary Combustion Turbines, 40 CFR 60, Subpart KKKKa, and the General Provisions in Subpart A. Each source qualifies as a new simple cycle, combustion turbine, firing natural gas, at utilization rate > 45 percent.

(Ref.: 40 CFR 60.4300a, 60.4305a(a) and (b), and 60.4315a, Subpart KKKKa)

3.6 For Emission Points AA-000, AB-000, AC-000, the permittee shall not burn any fuel which contains total potential sulfur emissions in excess of 26 ng SO_2 /J (0.060 lb SO_2 /MMBTU) heat input.

(Ref.: 40 CFR 60.4330a(a)(2) and 60.4372a(b), Subpart KKKKa)

3.7 For Emission Points AA-000, AB-000, AC-000, the permittee shall comply with the following NOx emission limitations:

(a) The Input-based NOx emission standard of 15 ppm at 15 percent O_2 or 24 ng/J (0.055 lb/MMBtu) as determined on a 4-operating-hour rolling average basis; or

(b) The Output- based NOx emission standard of 0.20 kg/MWh-gross (0.43 lb/MWh-gross) 0.20 kg/MWh-net (0.44 lb/MWh-net) as determined on a 30-operating-day average basis; or

(c) The 4-Hour emissions rate of 0.83 lb NOx/MW-rated output; or

(d) The 12-Calendar-month emissions rate of 0.48 ton NOx/MW-rated output.

During each operating hour, the permittee must meet the applicable NOx emission standard, which corresponds to a stationary combustion turbine firing natural gas for that operating hour.

The permittee must meet the applicable NOx emissions standard during all times that the affected facility is operating (including periods of startup, shutdown, and malfunction).

(Ref.: 40 CFR 60.4320a(a), (b)(1)-(3), and (d), and Tables 1 and 2 of Subpart KKKKa)

3.8 For Emission Points AA-000, AB-000, AC-000, the permittee shall comply with the following emission limits for each combustion turbine:

(a) For Emission Point AA-000, Ammonia (NH_3) emissions from each turbine shall not exceed 5 PPMV at 0% oxygen on a dry basis and shall not exceed 1.28 lb/hr (determined on a 3-hour rolling average basis) and 5.18 tpy on a 12-month rolling total basis.

(b) For Emission Point AB-000, Ammonia (NH_3) emissions from each turbine shall not exceed 5 PPMV at 0% oxygen on a dry basis and shall not exceed 2.69 lb/hr (determined on a 3-hour rolling average basis) and 10.53 tpy on a 12-month rolling total basis.

(c) For Emission Point AC-000, Ammonia (NH_3) emissions from each turbine shall not exceed 10 PPMV at 0% oxygen on a dry basis and shall not exceed 6.59 lb/hr (determined on a 3-hour rolling average basis) and 28.62 tpy on a 12-month rolling total basis

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(10).)

3.9 For Emission Points AA-000, AB-000, AC-000, shall comply with the following startup and shutdown requirements for the turbines:

(a) Only five (5) turbines from each group (AA-000, AB-000 or AC-000) shall be allowed to operate in startup mode, simultaneously, i.e., at the same time.

(b) Only five (5) turbines from each group (AA-000, AB-000 or AC-000) shall be allowed to operate in shutdown mode, simultaneously, i.e., at the same time.

(c) At no time shall more than five (5) turbines from each group (AA-000, AB-000 or AC-000) be allowed to operate in startup and shutdown mode, simultaneously, i.e., at the same time.

(Ref.: 11 Miss. Admin. Code Pt. 2, Ch. 5. and 40 CFR 52.21(j), **BACT Limit**)

3.10 For Emission Points AA-000, the permittee shall comply with the following emission and operating limits for each combustion turbine:

(a) Carbon Dioxide (CO_2) ≤ 120 lb/MMBtu on a 12-month rolling total basis;

(b) Particulate Matter less than 10 microns (PM_{10}) ≤ 0.07 lb/hr (determined on a 3-hour rolling average basis) and ≤ 0.27 tpy on a 12-month rolling total basis;

(c) Particulate Matter less than 2.5 microns ($PM_{2.5}$) ≤ 0.07 lb/hr (determined on a 3-hour rolling average basis) and ≤ 0.27 tpy on a 12-month rolling total basis;

(d) Sulfur dioxide (SO_2) ≤ 0.50 lb/hr (determined on a 3-hour rolling average basis) and ≤ 2.20 tpy on a 12-month rolling total basis;

(e) Nitrogen Oxides (NO_x) ≤ 2 parts per million by volume (PPMV) at 15% oxygen on a dry basis not to exceed 1.45 lb/hr (determined on a 3-hour rolling average basis) and ≤ 5.60 tpy on a 12-month rolling total basis;

(f) Carbon Monoxide (CO) ≤ 2 PPMV at 15% oxygen on a dry basis not to exceed 0.89 lb/hr (determined on a 3-hour rolling average basis) and ≤ 3.41 tpy on a 12-month rolling total basis;

(g) Volatile Organic Compounds (VOC) ≤ 2 PPMV at 15% oxygen on a dry basis not to exceed 1.39 lb/hr (determined on a 3-hour rolling average basis) and ≤ 5.37 tpy on a 12-month rolling total basis;

(h) Opacity ≤ 5%, and

(i) Formaldehyde ≤ 63.7 parts per billion by volume (PPBV) at 15% oxygen on a dry basis not to exceed 0.03 lb/hr (determined on a 3-hour rolling average basis) and ≤ 0.12 tpy on a 12-month rolling total basis.

(Ref.: 11 Miss. Admin. Code Pt. 2, Ch. 5. and 40 CFR 52.21(j), **PSD BACT Limit** and 11 Miss. Admin. Code Pt. 2, R. 2.2.B(10)., **MACT Avoidance Limit**)

3.11 For Emission Points AA-000, the permittee shall comply with the following startup and shutdown requirements for each turbine:

(a) A startup event begins at the moment the startup sequence is initiated by the facility operator and fuel flow is initiated into the specific combustion turbine and ends at a point not to exceed ten (10) minutes past the attainment of pre-mix steady-state mode. Initial pre-mix steady-state mode will not exceed 50% load.

(b) For periods of startup, the permittee shall limit the period of each turbine startup to ten (10) minutes or less.

(c) A shutdown event begins at the moment the specific combustion turbine reduces load and exits pre-mix steady-state mode (i.e., less than 100% load) during a normal shutdown sequence initiated by the facility operator and ends with the termination of fuel flow to the specific combustion turbine.

(d) For periods of shutdown, the permittee shall limit the period of each turbine shutdown to ten (10) minutes or less.

(e) The permittee shall not use emissions generated during periods of startup or shutdown for determining compliance with the 3-hour rolling average emission rates identified above. However, the permittee shall use the emissions generated during periods of startup or shutdown for determining compliance with the long-term annual (ton per year) emission limits identified above.

(f) The permittee shall operate the combustion turbines in a manner consistent with good air pollution control practices to minimize emissions during startups and shutdowns. This operation shall occur in accordance with the manufacturer's written instructions or other written instructions developed and maintained by the permittee which shall include review of the operating parameters of the unit during startups or shutdowns as necessary to make adjustments to reduce or eliminate excess emissions.

(Ref.: 11 Miss. Admin. Code Pt. 2, Ch. 5. And 40 CFR 52.21(j), **PSD BACT Limit**)

3.12 For Emission Points AA-000, AB-000, AC-000, and AG-000, the permittee shall not fire any fuel other than natural gas.

(Ref.: 11 Miss. Admin. Code Pt. 2, Ch. 5. and 40 CFR 52.21(j), **BACT Limit**)

3.13 For Emission Points AB-000, the permittee shall comply with the following emission and operating limits for each combustion turbine:

(a) $CO_2 \leq 120$ lb/MMBtu on a 12-month rolling total basis;

(b) $PM_{10} \leq 0.14$ lb/hr and ≤ 0.55 tpy on a 12-month rolling total basis;

(c) $PM_{2.5} \leq 0.14$ lb/hr and ≤ 0.55 tpy on a 12-month rolling total basis;

(d) $SO_2 \leq 1.05$ lb/hr and ≤ 4.61 tpy on a 12-month rolling total basis;

(e) $NO_x \leq 2$ PPMV at 15% oxygen on a dry basis not to exceed 3.05 lb/hr (each determined on a 3-hour rolling average basis) and ≤ 11.38 tpy on a 12-month rolling total basis;

(f) CO ≤ 2 PPMV at 15% oxygen on a dry basis not to exceed 1.86 lb/hr (each determined on a 3-hour rolling average basis) and ≤ 6.93 tpy on a 12-month rolling total basis;

(g) VOC ≤ 2 PPMV at 15% oxygen on a dry basis not to exceed 2.93 lb/hr (each determined on a 3-hour rolling average basis) and ≤ 10.91 tpy on a 12-month rolling total basis; and

(h) Opacity ≤ 5%, and

(i) Formaldehyde ≤ 63.7 parts per billion by volume (PPBV) at 15% oxygen on a dry basis not to exceed 0.06 lb/hr (each determined on a 3-hour rolling average basis) and ≤ 0.24 tpy on a 12-month rolling total basis.

(Ref.: 11 Miss. Admin. Code Pt. 2, Ch. 5. and 40 CFR 52.21(j), **PSD BACT Limit**)

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(10)., (**MACT Avoidance Limit**))

3.14 For Emission Points AB-000, the permittee shall comply with the following startup and shutdown requirements for each turbine:

(a) A startup event begins at the moment the startup sequence is initiated by the facility operator and fuel flow is initiated into the specific combustion turbine and ends at a point not to exceed ten (10) minutes past the attainment of pre-mix steady-state mode. Initial pre-mix steady-state mode will not exceed 50% load.

(b) For periods of startup, the permittee shall limit the period of each turbine startup to ten (10) minutes or less.

(c) A shutdown event begins at the moment the specific combustion turbine reduces load and exits pre-mix steady-state mode (i.e., less than 100% load) during a normal shutdown sequence initiated by the facility operator and ends with the termination of fuel flow to the specific combustion turbine.

(d) For periods of shutdown, the permittee shall limit the period of each turbine shutdown to ten (10) minutes or less.

(e) The permittee shall not use emissions generated during periods of startup or shutdown for determining compliance with the 3-hour rolling average emission rates identified above. However, the permittee shall use the emissions generated during periods of startup or shutdown for determining compliance with the long-term annual (ton per year) emission limits identified above.

(f) The permittee shall operate the combustion turbines in a manner consistent with good air pollution control practices to minimize emissions during startups and shutdowns. This operation shall occur in accordance with the manufacturer's written instructions or other written instructions developed and maintained by the permittee which shall include review of the operating parameters of the unit

during startups or shutdowns as necessary to make adjustments to reduce or eliminate excess emissions.

(Ref.: 11 Miss. Admin. Code Pt. 2, Ch. 5. and 40 CFR 52.21(j), **BACT Limit**)

3.15 For Emission Points AC-000, the permittee shall comply with the following emission and operating limits for each combustion turbine:

(a) $CO_2 \leq 120$ lb/MMBtu on a 12-month rolling total basis;

(b) $PM_{10} \leq 0.17$ lb/hr and ≤ 0.75 tpy on a 12-month rolling total basis;

(c) $PM_{2.5} \leq 0.17$ lb/hr and ≤ 0.75 tpy on a 12-month rolling total basis;

(d) $SO_2 \leq 1.29$ lb/hr and ≤ 5.64 tpy on a 12-month rolling total basis;

(e) $NO_x \leq 2$ PPMV at 15% oxygen on a dry basis not to exceed 3.74 lb/hr (determined on a 3-hour rolling average basis) and ≤ 15.47 tpy on a 12-month rolling total basis;

(f) CO ≤ 4 PPMV at 15% oxygen on a dry basis not to exceed 4.55 lb/hr (determined on a 3-hour rolling average basis) and ≤ 18.83 tpy on a 12-month rolling total basis;

(g) VOC ≤ 2.5 PPMV at 15% oxygen on a dry basis not to exceed 4.48 lb/hr (determined on a 3-hour rolling average basis) and ≤ 18.53 tpy on a 12-month rolling total basis;

(h) Opacity $\leq 5\%$, and

(i) Formaldehyde ≤ 91 parts per billion by volume (PPBV) at 15% oxygen on a dry basis not to exceed 0.11 lb/hr (determined on a 3-hour rolling average basis) and ≤ 0.46 tpy on a 12-month rolling total basis.

(Ref.: 11 Miss. Admin. Code Pt. 2, Ch. 5. and 40 CFR 52.21(j), **PSD BACT Limit**)

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(10)., (**MACT Avoidance Limit**))

3.16 For Emission Points AC-000, the permittee shall comply with the following startup and shutdown requirements for each turbine:

(a) A startup event begins at the moment the startup sequence is initiated by the facility operator and fuel flow is initiated into the specific combustion turbine and ends at a point not to exceed thirty (30) minutes past the attainment of pre-mix steady-state mode. Initial pre-mix steady-state mode will not exceed 50% load.

(b) For periods of startup, the permittee shall limit the period of each turbine startup to thirty (30) minutes or less.

(c) A shutdown event begins at the moment the specific combustion turbine reduces load and exits pre-mix steady-state mode (i.e., less than 100% load) during a normal shutdown sequence initiated by the facility operator and ends with the termination of fuel flow to the specific combustion turbine.

(d) For periods of shutdown, the permittee shall limit the period of each turbine shutdown to thirty (30) minutes or less.

(e) The permittee shall not use emissions generated during periods of startup or shutdown for determining compliance with the 3-hour rolling average emission rates identified above. However, the permittee shall use the emissions generated during periods of startup or shutdown for determining compliance with the long-term annual (ton per year) emission limits identified above.

(f) The permittee shall operate the combustion turbines in a manner consistent with good air pollution control practices to minimize emissions during startups and shutdowns. This operation shall occur in accordance with the manufacturer's written instructions or other written instructions developed and maintained by the permittee which shall include review of the operating parameters of the unit during startups or shutdowns as necessary to make adjustments to reduce or eliminate excess emissions.

(Ref.: 11 Miss. Admin. Code Pt. 2, Ch. 5. And 40 CFR 52.21(j))., **PSD BACT Limit**)

3.17 For Emission Points AE-000 and AF-000, the permittee shall develop and employ an Audio-Visual-Olfactory (AVO) program to detect and repair leaks to control Ammonia, VOC, and GHG emissions from fugitive leaks before startup of the facility. The development of the AVO program shall include the creation of a fugitive monitoring plan.

(Ref.: 11 Miss. Admin. Code Pt. 2, Ch. 5. And 40 CFR 52.21(j) **PSD BACT Limit**)

3.18 For Emission Points AG-000, the permittee shall adhere to good combustion practices and combust only pipeline quality natural gas to meet the following emissions standards:

(a) $NO_x \leq 0.049$ lb/MMBtu per PRS;

(b) $CO \leq 0.082$ lb/MMBtu per PRS;

(Ref.: 11 Miss. Admin. Code Pt. 2, Ch. 5. and 40 CFR 52.21(j), **PSD BACT Limit**)

3.19 For Emission Points AG-000, the maximum permissible emission of ash and/or particulate matter from fossil fuel burning installations of less than 10 million BTU per hour heat input shall not exceed 0.6 pounds per million BTU per hour heat input

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 1.3.D(1)(a).)

3.20 For Emission Points AG-000, the maximum discharge of sulfur oxides from any fuel burning installation in which the fuel is burned to primarily produce heat or power by indirect heat transfer shall not exceed 4.8 pounds (measure as sulfur dioxide) per million BTU heat input.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 1.4.A(1).)

SECTION 4. WORK PRACTICES

Emission Point	Applicable Requirement	Condition Number(s)	Pollutant/ Parameter	Work Practice
AA-000, AB-000, and AC-000	40 CFR 60.4333a(a), Subpart KKKKa	4.1	NOx & SO_2	Good air control practices

4.1 For Emission Points AA-000, AB-000 and AC-000, the permittee must operate and maintain the stationary combustion turbine, air pollution control equipment, and monitoring equipment in a manner consistent with good air pollution control practices for minimizing emissions at all times including during startup, shutdown, and malfunction.

(Ref.: 40 CFR 60.4333a(a), Subpart KKKKa)

SECTION 5. MONITORING AND RECORDKEEPING REQUIREMENTS

Emission Point	Applicable Requirement	Condition Number(s)	Pollutant/ Parameter	Monitoring/Recordkeeping Requirement
Facility-Wide	11 Miss. Admin. Code Pt. 2, R. 2.9.	5.1	Recordkeeping	Maintain records for a minimum of 5 years.
	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	5.2	CO_2, PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO, VOC, Ammonia, Formaldehyde, Total HAPs, & GHG	Good Air Pollution Control Practices
		5.3		Develop and implement an operation and maintenance plan
		5.4		Monitoring and recordkeeping requirements
		5.5	GHG	Global Warming Potential
AA-000, AB-000, and AC-000	40 CFR 60.4372a(a), Subpart KKKKa	5.6	Fuel Sulfur Content	Fuel monitoring
	40 CFR 60.4333a(b) and 60.4405a, Subpart KKKKa	5.7	NO_x	Performance Stack Testing
	40 CFR 60.4333a(c) and (c)(2), Subpart KKKKa	5.8	NO_x	CEMS Monitoring Requirements
	40 CFR 60.4345a(a)(1)-(3), (b)-(e), and (g), Subpart KKKKa	5.9	NO_x	CEMS Monitoring Requirements
	40 CFR 60.4350a(a), (b), (c), (d), (e), and (g), Subpart KKKKa	5.10	NO_x	Excess Emissions Monitoring Requirements
	40 CFR 60.4375a(j), Subpart KKKKa	5.11	NO_x	Electronic recordkeeping
AA-000	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	5.12	CO_2, NO_x, CO, VOC, Ammonia, Formaldehyde, & Opacity	Performance stack testing and monitoring requirements
AB-000	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	5.13		Performance stack testing and monitoring requirements
AC-000	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	5.14		Performance stack testing and monitoring requirements
AA-000, AB-000, and AC-000	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	5.15		Performance stack testing and monitoring requirements
	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	5.16	PM_{10} and $PM_{2.5}$	Performance stack testing and monitoring requirements
	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	5.17	SO_2	Monitoring and recordkeeping requirements
	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	5.18	Catalyst bed temperature and ammonia injection rate	Parametric monitoring requirements
	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	5.19	Startups And Shutdowns	Monitoring and recordkeeping requirements

AE-000 and AF-000	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	5.20	VOC, GHG, and CO_{2e}	Maintain AVO plan and repairs made
AE-000 and AF-000	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	5.21	VOC, GHG, and CO_{2e}	AVO Monitoring plan evaluations
AG-000	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	5.22	NO_x & CO	Monitoring and recordkeeping requirements
AG-000	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	5.23	GHG	Monitoring and recordkeeping requirements
AA-000, AB-000, AC-000, and AG-000	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	5.24	Recordkeeping	Monitoring and recordkeeping requirements

5.1 The permittee shall retain all required records, monitoring data, supporting information and reports for a period of at least five (5) years from the date of the monitoring sample, measurement, report, or application. Support information includes, but is not limited to, all calibration and maintenance records, all original strip-chart recordings or other data for continuous monitoring instrumentation, and copies of all reports required by this permit. Copies of such records shall be submitted to DEQ as required by Applicable Rules and Regulations or this permit or upon request.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.9.)

5.2 For the entire facility, at all times, including periods of startup, shutdown, shakedown, tuning and malfunction, the permittee shall, to the extent practicable, maintain and operate the facility, including associated air pollution control equipment, in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to DEQ, which may include, but is not limited to, monitoring results, opacity observation, review of operating maintenance procedures and inspection of the facility.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

5.3 For Points AA-000, AB-000, and AC-000, as soon as practicable following initial startup of each individual combustion turbine, the permittee shall develop and implement an operation and maintenance plan. At a minimum, the plan shall identify measures for assessing the performance of the turbine, the acceptable range of the performance measures for achieving the design electrical output, the methods for monitoring the performance measures, and the routine procedures for maintaining the turbine in good operating condition.

The permittee shall maintain a copy of the current operation and maintenance plan for the facility and shall keep a copy of all prior versions of the plan for a minimum of five (5) years. The permittee shall also keep records of the monitoring data for each of the facility performance measures and all maintenance activities; the permittee shall maintain such records for a minimum of five (5) years following the date they are created.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

5.4 For the entire facility, the permittee shall monitor and record the monthly and consecutive 12-month rolling total of CO_2, PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO, VOC, Ammonia, Formaldehyde, Total HAPs & GHG emissions in tons per year for each pollutant. Such records shall be kept for five (5) years and made available upon request by DEQ personnel.

For Emission Points AA-000, AB-000, and AC-000, emissions shall be calculated based on results of the most recent performance stack tests or CEMS data. For pollutants whereby there are no performance stack test results or CEMS data, applicable emission factors shall be utilized.

Emissions during startup and shutdown activities shall be calculated based on the Startup/Shutdown manufacturer's emissions documentation (where available) or applicable emission factors.

For all other emission sources, emissions shall be calculated based on manufacturer's emissions documentation (where available) or applicable emission factors.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

5.5 For the entire facility, for the purposes of showing compliance with any GHG emission limit in this permit, the Global Warming Potential (GWP) factors listed in 40 CFR 98, Subpart A, Table A-1 as of the issuance date of this permit shall be used. The current GWP factors are listed below:

GHG Pollutant	GWP Factor
CO_2	1
CH_4	28
N_2O	265

(Ref.: 40 CFR 98, Subpart A, Table A-1 – Revised April 25, 2024)

5.6 For Emission Points AA-000, AB-000, and AC-000, the permittee shall monitor and keep records of the total sulfur content of the gaseous fuel combusted in the turbine. The permittee shall maintain on-site records (such as a current, valid purchase contract, tariff sheet, or transportation contract) documenting that total sulfur content for the fuel combusted in the stationary combustion turbines at all times does not exceed potential SO_2 emissions rate of 26 ng/J (0.060 lb/MMBtu) heat input or less.

Representative fuel sampling data following the procedures specified in section 2.3.1.4 or 2.3.2.4 in appendix D to 40 CFR part 75 documenting that the fuel meets the part 75 requirements to be considered either pipeline natural gas or natural gas such that each stationary combustion turbine may not cause to be discharged into the atmosphere any gases that contain SO_2 in excess of 110 ng SO_2/J (0.90 lb SO_2/MWh) gross energy output or 26 ng SO_2/J (0.060 lb SO_2/MMBtu) heat input.

(Ref.: 40 CFR 60.8, 60.4333a(d)(3), 60.4372a(a), and 60.4372a(e)(1), Subpart KKKKa)

5.7 For Emission Points AA-000, AB-000, and AC-000, the permittee shall demonstrate compliance with the NOx emission limitations by conducting an initial performance test on each turbine according to 40 CFR 60.8 using the applicable methods in 40 CFR 60.4405a, as described below.

(a) Perform a minimum of nine RATA reference method runs, with a minimum time per run of 21 minutes, at a single load level, within ±25 percent of 100 percent of the base load rating while the source is combusting the fuel that is a normal primary fuel for that source. The permittee may perform testing at the highest achievable load point, if at least 75 percent of the base load rating cannot be achieved in practice. The ambient temperature must be greater than 0 °F during the RATA runs. The DEQ may approve performance testing below 0 °F if the timing of the required performance test and environmental conditions make it impractical to test at ambient conditions greater than 0 °F.

(b) For each RATA run, concurrently measure the heat input to the unit using a fuel flow meter (or flow meters) or the methodologies in appendix F to 40 CFR part 75, and for units complying with the output-based standard, measure the electrical and thermal output from the unit.

(c) Use the test data both to demonstrate compliance with the applicable NOx emissions standard under 40 CFR 60.4320a and to provide the required reference method data for the RATA of the CEMS described under 40 CFR 60.4342a.

(d) Compliance with the applicable emissions standard in 40 CFR 60.4320a is achieved if the sum of the NOx emissions divided by the heat input (or gross or net energy output) for all the RATA runs, expressed in units of lb/MMBtu, ppm, lb/MWh, or kgs, does not exceed the emissions standard.

(Ref: 40 CFR 60.4333a(b) and 60.4405a, Subpart KKKKa)

5.8 For Emission Points AA-000, AB-000, and AC-000, the permittee must demonstrate continuous compliance using a continuous emissions monitoring system (CEMS) for measuring NOx emissions according to the provisions in 40 CFR 60.4345a. CEMS NOx measurements must be used to determine excess emissions.

For Emission Points AA-000 and AB-000, the permittee must demonstrate continuous compliance with an input-based standard of 15 ppm according to the provisions in 40 CFR 60.4345a.

(Ref: 40 CFR 60.4333a(c) and (c)(2), Subpart KKKKa)

5.9 For Emission Points AA-000, AB-000, and AC-000, each CEMS measuring NOx emissions must meet the requirements below:

(a) The permittee must install, certify, maintain, and operate a NOx monitor to determine the hourly average NOx emissions in the units of the standard with which the permittee is complying.

(b) The permittee must install, calibrate, maintain, and operate either a fuel flow meter (or flow meters) or an O_2 or CO_2 CEMS and a stack flow monitor to continuously measure the heat input to the turbine.

(c) If the permittee elects to comply with an output-based emissions standard, the permittee must also install, calibrate, maintain, and operate both a watt meter (or meters) to continuously measure the gross electrical output from the turbine and either a fuel flow meter (or flow meters) or an O_2 or CO_2 CEMS and a stack flow monitor. If the permittee has a CHP combustion turbine and elects to comply with an output-based emissions standard, the permittee must also install, calibrate, maintain, and operate meters to continuously determine the total useful recovered thermal energy. For steam this includes flow rate, temperature, and pressure. If the permittee has a direct mechanical drive application and elects to comply with the output-based emissions standard, the permittee must submit a plan to the DEQ for approval of how energy output will be determined.

(d) Each NOx CEMS must be installed and certified according to PS 2 in appendix B to 40 CFR 60 Subpart KKKKa. The span value must be 125 percent of the highest applicable standard or highest anticipated hourly NOx emissions rate. Alternatively, span values determined according to section 2.1.2 in appendix A to 40 CFR part 75 may be used.

(e) The permittee shall use NOx and diluent CEMS that are installed and certified according to appendix A of 40 CFR part 75 in lieu of Procedure 1 in appendix F to 40 CFR 60 Subpart KKKKa and the requirements of 40 CFR 60.13 with approval from the DEQ, except that the relative accuracy test audit (RATA) of the CEMS must be performed on a lb/MMBtu basis.

(f) During each full operating hour, both the NOx monitor and the diluent monitor must complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each 15-minute quadrant of the hour. For partial operating hours, at least one data point must be obtained with each monitor for each quadrant of the hour in which the unit operates. For operating hours in which required quality assurance and maintenance activities are performed on the CEMS, a minimum of two data points (one in each of two quadrants) are required for each monitor.

(g) Each fuel flow meter must be installed, calibrated, maintained, and operated according to the manufacturer's instructions. Alternatively, fuel flow meters that meet the installation, certification, and quality assurance requirements in appendix D to 40 CFR part 75 are acceptable for use under 40 CFR subpart KKKKa.

(h) Each watt meter, steam flow meter, and each pressure or temperature measurement device must be installed, calibrated, maintained, and operated according to manufacturer's instructions.

(i) At a minimum, non-out-of-control CEMS hourly averages shall be obtained for 90 percent of all operating hours on a 30-operating-day rolling average basis

(Ref: 40 CFR 60.4345a(a)(1)-(3), (b)-(e), and (g), Subpart KKKKa)

5.10 For Emission Points AA-000, AB-000, and AC-000, for purposes of determining excess NOx emissions:

(a) Excess emissions are defined as the applicable compliance period for the stationary combustion turbine (either 4-operating-hours, 30-operating-days, or 12-calendar-month), during which the average NOx emissions from the affected facility measured by the CEMS is greater than the applicable maximum allowable NOx emissions standard specified in 40 CFR 60.4320a as determined using the applicable procedures to the stationary combustion turbine.

(b) The NOx CEMS data for each operating hour as measured according to the requirements in 40 CFR 60.4345a must be used to determine the hourly average NOx emissions. The hourly average for a given operating hour is the average of all data points for the operating hour. However, for any periods during which the NOx, diluent, flow, watt, steam pressure, or steam temperature monitors (as applicable) are out-of-control, the data points are not used in determining the hourly average NOx emissions. All data points that are not collected during out-of-control periods must be used to determine the hourly average NOx emissions.

(c) For each operating hour in which an hourly average is obtained, the data acquisition and handling system must calculate and record the hourly average NOx emissions in units of lb/MMBtu or lbs, as applicable, using the appropriate equation from EPA Method 19 in appendix A-7 of subpart KKKKa. For any hour in which the hourly average O_2 concentration exceeds 19.0 percent O_2 (or the hourly average CO_2 concentration is less than 1.0 percent CO_2), a diluent cap value of 19.0 percent O_2 or 1.0 percent CO_2 (as applicable) may be used in the emission calculations.

(d) Data used to meet the requirements of this subpart shall not include substitute data values derived from the missing data procedures of 40 CFR part 75, nor shall the data be bias adjusted according to the procedures of 40 CFR part 75. For units complying with the 12-calendar-month mass-based standard, emissions for hours of missing data shall be estimated by using the average emissions rate of non-out-of-control hours within ±10 percent of the hour of missing data within the 12-calendar-month period. If non-out-of-control data is not available, the maximum hourly emissions rate during the 12-calendar-month period shall be used.

(e) All required fuel flow rate, steam flow rate, temperature, pressure, and megawatt data must be reduced to hourly averages. However, for any periods during which the flow, watt, steam pressure, or steam temperature monitors (as applicable) are out-of-control, the data points are not used in determining the appropriate hourly average value.

(f) For each stationary combustion turbine demonstrating compliance on a heat input-based emissions standard, excess NOx emissions are determined on a 4-operating-hour averaging period basis using the NOx CEMS data and procedures specified below as applicable to the NOx emissions standard in table 1 to 40 CFR 60 subpart KKKKa.

(1) For each 4-operating-hour period, compute the 4-operating-hour rolling average NOx emissions as the heat input weighted average of the hourly average of NOx emissions for a given operating hour and the 3 operating hours preceding that operating hour using the applicable equation in 40

CFR 60.4350a(g)(2). Calculate a 4-operating-hour rolling average NOx emissions rate for any 4-operating-hour period when there is valid CEMS data for at least 3 of those hours (e.g., a valid 4-operating-hour rolling average NOx emissions rate cannot be calculated if 1 or more continuous monitors was out-of-control for the entire hour for more than 1 hour during the 4-operating-hour period).

(2) If the permittee elects to comply with the applicable heat input-based emissions rate standard, calculate both the 4-operating-hour rolling average NOx emissions rate and the applicable 4-operating-hour rolling average NOx emissions standard, calculated using hourly values in table 1 to this subpart, using equation 4 to 40 CFR 60.4350a(g)(2).

(Ref: 40 CFR 60.4350a(a), (b), (c), (d), (e), and (g), Subpart KKKKa)

5.11 For Emission Points AA-000, AB-000, and AC-000, any records required to be maintained by 40 CFR 60 subpart KKKKa that are submitted electronically via the EPA's CEDRI may be maintained in electronic format. This ability to maintain electronic copies does not affect the requirement for facilities to make records, data, and reports available upon request to a delegated air agency or the EPA as part of an on-site compliance evaluation.

(Ref.: 40 CFR 60.4375a(j), Subpart KKKKa)

5.12 For Emission Points AA-000, each air emissions unit shall be constructed to comply with the short-term emission limitations and monitoring requirements specified in Section 3 and below, except during periods of startups and shutdowns. The air emissions equipment shall each be constructed to comply with the long-term (on a 12-month rolling total basis) emissions, including during periods of startup and shutdown.

Pollutant	Short-Term Limits	Long-Term Limits	Test Methods
CO_2	120 lb/MMBtu	120 lb/MMBtu	Good Combustion Practices
NO_x	2 PPMV at 15% O_2, not to exceed 1.45 lb/hr	5.60 tpy	Simplified EPA Test Method 1 and EPA Test Method 20, 40 CFR 60, Appendix A
CO	2 PPMV at 15% O_2, not to exceed 0.89 lb/hr	3.41 tpy	EPA Test Method 10, 40 CFR 60, Appendix A
VOC	2 PPMV at 15% O_2, not to exceed 1.39 lb/hr	5.37 tpy	EPA Method 18 or 25A, 40 CFR 60, Appendix A
NH_3	5 PPMV at 0% O_2 not to exceed 1.28 lb/hr	5.18 tpy	EPA Test Method 320, 40 CFR 63, Appendix A
CH_2O	63.7 PPBV at 15% O_2 not to exceed 0.03 lb/hr	0.12 tpy	EPA Test Method 320, 40 CFR 63, Appendix A or ATSM D6384-12e1
Opacity	5%		EPA Test Method 9, 40 CFR 60, Appendix A

The permittee shall demonstrate initial compliance with emission limits, by stack testing in accordance with the applicable EPA Test Methods listed above or an EPA approved alternative within 180 days after startup.

All test methods shall be the current versions, which are in effect upon permit issuance. The stack testing shall be performed when the emission units are operating as close to their maximum capacity (90 % - 100 %) as operating conditions allow.

In lieu of stack testing for NO_x, CO, VOC, NH_3, and Formaldehyde, the permittee can demonstrate compliance with the emission limitations using a Continuous Emission Monitoring System (CEMS). Demonstrating compliance with the ppm, lb/hr, and tpy limits using CEMS data in lieu of EPA Reference Methods is an acceptable practice provided the permittee meets the guidelines established in EPA's general guidance on "Alternative Testing and Monitoring Procedures for Combustion Turbines Regulated under New Source Performance Standards". This includes the use of reference method test data collected during Relative Accuracy Test Audits (RATA) required per 40 CFR 75.

Subsequent stack testing shall be conducted within 25 months of the previous stack test. If a stack test shows that the emissions are at or below 75 percent of the emission limits in Section 3, then the permittee shall stack test once every five (5) years (not to exceed 60 months from previous stack test). If a stack test shows emissions exceeding 75 percent of the emission limit, the permittee shall perform the stack test biennially (not to exceed 25 months from the previous test). The stack testing shall be performed on a biennial basis (not to exceed 25 months from the previous test) until two (2) consecutive stack tests show emissions below 75 percent of the emission limit at which time the stack testing may return to the once per five (5) year (60 month) testing frequency. After the initial stack test, the subsequent stack testing for NO_x shall be performed on the frequency required by Subpart KKKKa and Condition 5.7.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

5.13 For Emission Points AB-000, each air emissions unit shall be constructed to comply with the short-term emission limitations and monitoring requirements specified below, except during periods of startups and shutdowns. The air emissions equipment shall each be constructed to comply with the long-term (on a 12-month rolling total basis) emissions during periods of startup and shutdown.

Pollutant	Short-Term Limits	Long-Term Limits	Test Methods
CO_2	120 lb/MMBtu	120 lb/MMBtu	Good Combustion Practices
NO_x	2 PPMV at 15% O_2, not to exceed 3.05 lb/hr	11.38 tpy	Simplified EPA Test Method 1 and EPA Test Method 20, 40 CFR 60, Appendix A
CO	2 PPMV at 15% O_2, not to exceed 1.86 lb/hr	6.93 tpy	EPA Test Method 10, 40 CFR 60, Appendix A

VOC	2 PPMV at 15% O_2, not to exceed 2.93 lb/hr	10.91 tpy	EPA Method 18 or 25A, 40 CFR 60, Appendix A
NH_3	5 PPMV at 0% O_2 not to exceed 2.69 lb/hr	10.53 tpy	EPA Test Method 320, 40 CFR 63, Appendix A
CH_2O	63.7 PPBV at 15% O_2 not to exceed 0.06 lb/hr	0.24 tpy	EPA Test Method 320, 40 CFR 63, Appendix A or ATSM D6384-12e1
Opacity	5%		EPA Test Method 9, 40 CFR 60, Appendix A

The permittee shall demonstrate initial compliance with emission limits, by stack testing in accordance with the applicable EPA Test Methods listed above or an EPA approved alternative within 180 days after startup.

All test methods shall be the current versions, which are in effect upon permit issuance. The stack testing shall be performed when the emission units are operating as close to their maximum capacity (90 % - 100 %) as operating conditions allow.

In lieu of stack testing for NO_x, CO, VOC, and NH_3, and Formaldehyde, the permittee can demonstrate compliance with the emission limitations using a Continuous Emission Monitoring System (CEMS). Demonstrating compliance with the ppm, lb/hr, and tpy limits using CEMS data in lieu of EPA Reference Methods is an acceptable practice provided the permittee meets the guidelines established in EPA's general guidance on "Alternative Testing and Monitoring Procedures for Combustion Turbines Regulated under New Source Performance Standards". This includes the use of reference method test data collected during Relative Accuracy Test Audits (RATA) required per 40 CFR 75.

Subsequent stack testing shall be conducted within 25 months of the previous stack test. If a stack test shows that the emissions are at or below 75 percent of the emission limits in Section 3, then the permittee shall stack test once every five (5) years (not to exceed 60 months from previous stack test). If a stack test shows emissions exceeding 75 percent of the emission limit, the permittee shall perform the stack test biennially (not to exceed 25 months from the previous test). The stack testing shall be performed on a biennial basis (not to exceed 25 months from the previous test) until two (2) consecutive stack tests show emissions below 75 percent of the emission limit at which time the stack testing may return to the once per five (5) year (60 month) testing frequency. After the initial stack test, the subsequent stack testing for NO_x shall be performed on the frequency required by Subpart KKKKa and Condition 5.7.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

5.14 For Emission Points AC-000, each air emissions unit shall be constructed to comply with the short-term emission limitations and monitoring requirements specified below, except during periods of startups and shutdowns. The air emissions equipment shall each be constructed to comply with the long-term (on a 12-month rolling total basis) emissions during periods of startup and shutdown.

Pollutant	Short-Term Limits	Long-Term Limits	Test Methods
CO_2	120 lb/MMBtu	120 lb/MMBtu	Good Combustion Practices
NO_x	2 PPMV at 15% O_2, not to exceed 3.74 lb/hr	15.47 tpy	Simplified EPA Test Method 1 and EPA Test Method 20, 40 CFR 60, Appendix A
CO	4 PPMV at 15% O_2, not to exceed 4.55 lb/hr	18.83 tpy	EPA Test Method 10, 40 CFR 60, Appendix A
VOC	2.5 PPMV at 15% O_2, not to exceed 4.48 lb/hr	18.53 tpy	EPA Method 18 or 25A, 40 CFR 60, Appendix A
NH_3	10 PPMV at 0% O_2 not to exceed 6.59 lb/hr	28.62 tpy	EPA Test Method 320, 40 CFR 63, Appendix A
CH_2O	91 PPBV at 15% O_2 not to exceed 0.11 lb/hr	0.46 tpy	EPA Test Method 320, 40 CFR 63, Appendix A or ATSM D6384-12e1
Opacity	5%		EPA Test Method 9, 40 CFR 60, Appendix A

The permittee shall demonstrate initial compliance with emission limits, by stack testing in accordance with the applicable EPA Test Methods listed above or an EPA approved alternative within 180 days after startup of each turbine.

All test methods shall be the current versions, which are in effect upon permit issuance. The stack testing shall be performed when the emission units are operating as close to their maximum capacity (90 % - 100 %) as operating conditions allow.

In lieu of stack testing and parametric monitoring for NO_x, CO, VOC, NH_3, and Formaldehyde, the permittee can demonstrate compliance with the emission limitations using a Continuous Emission Monitoring System (CEMS). Demonstrating compliance with the ppm, lb/hr, and tpy limits using CEMS data in lieu of EPA Reference Methods is an acceptable practice provided the permittee meets the guidelines established in EPA's general guidance on "Alternative Testing and Monitoring Procedures for Combustion Turbines Regulated under New Source Performance Standards". This includes the use of reference method test data collected during Relative Accuracy Test Audits (RATA) required per 40 CFR 75.

Subsequent stack testing shall be conducted within 25 months of the previous stack test. If a stack test shows that the emissions are at or below 75 percent of the emission limits in Section 3, then the permittee shall stack test once every five (5) years (not to exceed 60 months from previous stack test). If a stack test shows emissions exceeding 75 percent of the emission limit, the permittee shall perform the stack test biennially (not to exceed 25 months from the previous test). The stack testing shall be performed on a biennial basis (not to exceed 25 months from the previous test) until two (2) consecutive stack tests show emissions below 75 percent of the emission limit at which time the stack testing may return to the once per five (5) year (60 month) testing frequency. After the initial stack test, the subsequent stack testing for NO_x shall be performed on the frequency required by Subpart KKKKa and Condition 5.7.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

5.15 For Emission Points AA-000, AB-000, AC-000, the permittee shall demonstrate compliance with emission limitations denoted in Section 3 and Conditions 5.12, 5.13, 5.14, and 5.16 by stack testing in accordance with specified EPA Reference Test Methods or their EPA approved equivalents within 180 days of startup. Recorded turbine operational information during each performance stack test shall include, but not be limited to:

(a) Generator load/kilowatt output.

(b) Fuel consumption.

(c) SCR Catalyst bed exhaust temperature.

(d) Oxidation Catalyst bed exhaust temperature.

(e) Ammonia solution injection rate.

The recorded turbine operational information shall be used to create operational parameter ranges for catalyst bed temperature and ammonia injection rate.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

5.16 For Emission Points AA-000, AB-000, and AC-000, the permittee shall demonstrate compliance with PM_{10} and $PM_{2.5}$ emissions denoted in Section 3 and the table below.

Emission Group	Pollutant	Short-Term Limits	Long-Term Limits	Test Methods
AA-000	PM_{10}	0.07 lb/hr	0.27 tpy	EPA Test Method 201 or 201A in conjunction with Test Method 202, 40 CFR 51, Appendix M
AA-000	$PM_{2.5}$	0.07 lb/hr	0.27 tpy	EPA Test Method 201 or 201A in conjunction with Test Method 202, 40 CFR 51, Appendix M
AB-000	PM_{10}	0.14 lb/hr	0.55 tpy	EPA Test Method 201 or 201A in conjunction with Test Method 202, 40 CFR 51, Appendix M
AB-000	$PM_{2.5}$	0.14 lb/hr	0.55 tpy	EPA Test Method 201 or 201A in conjunction with Test Method 202, 40 CFR 51, Appendix M
AC-000	PM_{10}	0.17 lb/hr	0.75 tpy	EPA Test Method 201 or 201A in conjunction with Test Method 202, 40 CFR 51, Appendix M
AC-000	$PM_{2.5}$	0.17 lb/hr	0.75 tpy	EPA Test Method 201 or 201A in conjunction with Test Method 202, 40 CFR 51,

				Appendix M

Initial performance stack testing shall be conducted within 180 days of startup on twelve (12) turbines, specifically, four (4) turbines from Emission Group AA-000, four (4) turbines from Emission Group AB-000, and four (4) turbines from Emission Group AC-000. Subsequent testing shall be conducted every 5 years (not to exceed 61 months from the previous test) on a separate set of twelve (12) turbines, specifically, four (4) turbines from Emission Group AA-000, four (4) turbines from Emission Group AB-000, and four (4) turbines from Emission Group AC-000. The testing shall be performed on this schedule until all turbines in Emission Points AA-000, AB-000, and AC-000 are tested.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

5.17 For Emission Points AA-000, AB-000, and AC-000, the permittee shall demonstrate compliance with the BACT Limits for SO_2 by maintaining on site the gas quality characteristics in a current, valid purchase contract, tariff sheet or transportation contract for the natural gas, specifying that the maximum total sulfur content of the fuel is 20.0 grains/100 scf (equivalent to 338 ppmv) or less. The permittee shall monitor the amount of natural gas combusted in the emission points. In addition, the permittee shall follow all manufacturer's recommendations for good combustion practices including all maintenance recommendations.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

5.18 For Emission Points AA-000, AB-000, and AC-000, the permittee shall continuously monitor and keep records of the catalyst bed temperature and the ammonia injection rate. The permittee shall keep records of any instances when the operating parameters range established during the performance stack test are not met. These records shall include date, time, duration, and any corrective actions that are performed.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

5.19 For Emission Points AA-000, AB-000, and AC-000, the permittee shall monitor and keep records of the duration of all startups and shutdowns of the combustion turbines. These records shall include the time and date of such startups and shutdowns and confirmation that good air pollution control practices were followed.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

5.20 For Emission Points AE-000 and AF-000, the permittee shall record and maintain a log of daily AVO inspections and any repairs made to the fugitive sources in accordance with the Fugitive Monitoring Plan.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

5.21 For Emission Points AE-000 and AF-000, the permittee shall reevaluate the Fugitive Monitoring plan annually, not to exceed fourteen (14) months from the previous evaluation.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

5.22 For Emission Points AG-000, the permittee shall demonstrate compliance with the BACT Limits by maintaining on site the gas quality characteristics in a current, valid purchase contract, tariff sheet or transportation contract for the natural gas, and monitoring the amount of natural gas combusted in the emission points. In addition, the permittee shall follow all manufacturer's recommendations for good combustion practices including all maintenance recommendations.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

5.23 For Emission Points AG-000, the permittee shall use the annual heat input and data from 40 CFR 98, Table C-1 to calculate and record $CO_{2(e)}$ emissions on a 12-month rolling average using the Global Warming Potential factors in Condition 5.5.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

5.24 For Emission Points AA-000, AB-000, AC-000, and AG-000, the permittee shall keep a log of all preventative maintenance including any corrective actions or instances when the manufacturer's recommendations were not performed timely.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

SECTION 6. REPORTING REQUIREMENTS

Emission Point	Applicable Requirement	Condition Number(s)	Reporting Requirement
Facility-Wide	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	6.1(a)	Report deviations within five (5) working days
	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	6.1(b)	Semiannual reporting
	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	6.1(c)	Certification by responsible official
	11 Miss. Admin. Code Pt. 2, R. 2.5.C(2).	6.1(d)	Notification of beginning actual construction within 15 days
	11 Miss. Admin. Code Pt. 2, R. 2.5.C(3).	6.1(e)	Notification when construction does not begin or is suspended
	11 Miss. Admin. Code Pt. 2, R. 2.5.D(1) and (3).	6.1(f)	Certification of completion of construction prior to operation
	11 Miss. Admin. Code Pt. 2, R. 2.5.D(2).	6.1(g)	Notification of changes in construction
	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	6.2	Submit stack test protocol 30 days prior to conducting the stack test
	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	6.3	Submit a stack test report within 60 days of conducting the stack test
	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	6.4	Semi-annual reporting
AA-000, AB-000, and AC-000	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	6.5	Submit records of startup, shutdown, and tuning events
	40 CFR 60.4345a(f), 60.4375a, 60.4380a(b), 60.4385a(b), 60.4390a(a) and (f), and 60.4395a, Subpart KKKKa	6.6	Subpart KKKKa Reporting
	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	6.7	Submit records of parametric monitoring data
AE-000 and AF-000	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	6.8	Submit initial Fugitive monitoring plan
	11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).	6.9	Submit report of AVO leaks detected and repairs made

6.1 General Reporting Requirements:

(a) The permittee shall report all deviations from permit requirements, including those attributable to upsets, the probable cause of such deviations, and any corrective actions or preventive measures taken. Said report shall be made within five (5) working days of the time the deviation began.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

(b) Beginning upon issuance of this permit and lasting until issuance or modification of the applicable operating permit, the permittee shall submit reports of any required monitoring by July 31st and January 31st for the preceding six-month period. All instances of deviations from permit requirements must be clearly identified in such reports and all required reports must be certified by a

responsible official consistent with 11 Miss. Admin. Code Pt. 2, R. 2.1.C. Where no monitoring data is required to be reported and/or there are no deviations to report, the report shall contain the appropriate negative declaration. For any air emissions equipment not yet constructed and/or operating the report shall so note and include an estimated date of commencement of construction and/or startup, whichever is applicable.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

(c) Any document required by this permit to be submitted to the DEQ shall contain a certification signed by a responsible official stating that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate and complete.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

(d) Within fifteen (15) days of beginning actual construction, the permittee must notify DEQ in writing that construction has begun.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.5.C(2).)

(e) The permittee must notify DEQ in writing when construction does not begin within eighteen (18) months of issuance or if construction is suspended for eighteen (18) months or more.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.5.C(3).)

(f) Upon the completion of construction or installation of an approved stationary source or modification, and prior to commencing operation, the applicant shall notify the Permit Board that construction or installation was performed in accordance with the approved plans and specifications on file with the Permit Board.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.5.D(1) and (3).)

(g) The Permit Board shall be promptly notified in writing of any change in construction from the previously approved plans and specifications or permit. If the Permit Board determines the changes are substantial, it may require the submission of a new application to construct with “as built” plans and specifications. Notwithstanding any provision herein to the contrary, the acceptance of an “as built” application shall not constitute a waiver of the right to seek compliance penalties pursuant to State Law.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.5.D(2).)

6.2 For the entire facility, the permittee shall submit a stack test protocol at least thirty (30) days prior to the scheduled test date to ensure that all test methods and procedures are acceptable to the DEQ. If the initial stack test protocol is acceptable, subsequent test protocols may be waived if these protocols contain no significant changes.

Also, the DEQ must be notified at least ten (10) days prior to the scheduled test date so that an observer may be present to witness the test(s).

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

6.3 For the entire facility, the permittee shall submit a report of any stack test results within sixty (60) days of conducting the respective stack test.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

6.4 For the entire facility, the permittee shall submit a summary of the 12-month rolling totals for CO_2, PM_{10}, $PM_{2.5}$, SO2, NO_x, CO, VOC, NH_3, Formaldehyde, Total HAP, and GHG emissions during the semiannual reporting period in accordance with Condition 6.1(b). Emissions of each pollutant shall be reported on an emission point by emission point basis.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

6.5 For Emission Points AA-000, AB-000, and AC-000, the permittee shall submit a report which contains the hours of operation during the reporting period for each operating mode. At a minimum, this report shall include the number of startups and shutdowns, duration of each, and the time the combustion unit was in operation until such time the control equipment began to operate. The report shall also state if there were any instances whereby more than five (5) turbines from each emission group (Emission Points AA-000, AB-000, and AC-000) simultaneously operated in periods of startup or shutdown. The information shall be submitted in accordance with Condition 6.1(b).

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

6.6 For Emission Points AA-000, AB-000, and AC-000, the permittee shall comply with all applicable reporting requirements of 40 CFR 60 subpart KKKKa.

(Ref.: 40 CFR 60.4345a(f), 60.4375a, 60.4380a(b), 60.4385a(b), 60.4390a(a) and (f), and 60.4395a, Subpart KKKKa)

6.7 For Emission Points AA-000, AB-000, and AC-000, the permittee shall submit a report which contains the parametric monitoring records required by Condition 5.18. The report shall include any time during the reporting period where the emissions points operated outside of the parametric values established during the most recent performance test. The information shall be submitted in accordance with Condition 6.1(b).

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

6.8 For Emission Points AE-000 and AF-000, the permittee shall submit the Fugitive Monitoring Plan within 180 days from startup of the facility.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

6.9 For Emission Points AE-000 and AF-000, the permittee shall submit semi-annual reports in accordance with Condition 6.1(b) of leaks detected through the Fugitive monitoring plan as well as all repairs made to the fugitive sources. If no leaks are detected and no repairs are made, the permittee shall instead submit a negative declaration.

(Ref.: 11 Miss. Admin. Code Pt. 2, R. 2.2.B(11).)

APPENDIX H

Preliminary Determination ("Statement of Basis")

Pre-Construction Review

and

Preliminary Determination

of Approval for

MZX Tech LLC

Facility No. 0680-00119

Technical Review
by
Jeffrey Bland

Air Quality Analysis
By
Rodney Cuevas
March 5, 2026

I. General Information

MZX Tech LLC, 2875 Stanton Road, Southaven, Mississippi 38671 [(281) 928-3123], has submitted a complete air permit application for a Prevention of Significant Deterioration (PSD) Construction Permit to construct and operate an electrical power generation facility that will produce electricity for its own use and will include simple cycle combustion turbines (CT) and supporting equipment.

II. Project Description

MZX proposes to construct a greenfield, behind-the-meter electric power generation facility in Southaven, Mississippi, which will be classified as a PSD major stationary source. The application for an initial PSD permit proposes the construction and operation of seventeen Solar PGM-130 turbines (16.5 MW each), sixteen Solar Titan 350 turbines (35 MW each), and eight ProEnergy 6000PE turbines (50 MW each), resulting in a continuous generating capacity of approximately 1.2 GW. The Solar PGM-130 and Solar Titan 350 turbines will be equipped with Solar's Dry Low Emissions (DLE)/SoLoNOx control technology, followed by selective catalytic reduction (SCR) and oxidation catalysts. The ProEnergy 6000PE turbines will be equipped with SCR and oxidation catalysts. PLUM Pressure Reduction System (PRS) units, fueled by natural gas and containing two burners each rated at 5.0 MMBtu/hr (10 MMBtu/hr total per unit), will be used to ensure a steady and consistent natural gas supply to the combustion turbines. No black start engines or cooling towers are proposed for the facility.

The facility's electrical power systems will be designed with full redundancy to maintain uninterrupted operations in the event of a power disruption. Tesla battery packs will provide 100 percent backup power, and no backup diesel- or natural gas–fired generators are proposed. The battery packs will be charged during off-peak hours to ensure availability when needed. The facility will not export electricity to the grid; therefore, MZX will not be subject to federal regulations applicable to electric utilities (e.g., 40 CFR Part 75) or other regulations whose applicability is based on net electric sales.

HAP Regulatory Discussion

The site will be an area source of hazardous air pollutant (HAP) emissions with total HAPs less than 25 tpy and each individual HAP less than 10 tpy because the facility is taking limits of 24.0 on total HAPs and 9.5 on individual HAPs. Proposed HAP emissions from the site are shown below. The largest individual HAP emissions are also shown below. All other individual HAP emissions are deemed de minimus.

Hazardous Air Pollutants	PTE Emissions (tons/yr)
Total HAPs	19.07
Formaldehyde	9.49
Acetaldehyde	6.87

HAP emissions from the facility sources are based on a variety of resources. HAP emissions from the combustion turbines are calculated using manufacturer's information and Alpha-Gamma Technologies' memorandum to the US EPA on HAP emission factors for Stationary Combustion Turbines. The emission factor utilized for formaldehyde is 91 ppb, which is guaranteed by the turbine manufacturer.

HAP emissions from the PRS units are calculated using AP-42 Tables 1.4-2 and 1.4-3 (July 1998). HAP emissions projected for the turbines and PRS units are shown below.

Emission Groups	Total HAPs PTE (tons/yr)	Formaldehyde PTE (tons/yr)
AA-000	4.08	2.04
AB-000	7.35	4.32
AC-000	5.60	3.22
AG-000	0.80	< 0.001

Federal Regulatory Discussion

40 CFR 60 Subpart KKKKa - The provisions of 40 CFR 60 Subpart KKKKa - New Source Performance Standards for Stationary Combustion Turbines that commenced construction, modification, or reconstruction after December 13, 2024 (NSPS KKKKa) establishes emission standards and compliance schedules for the control of emissions from stationary combustion turbines that commenced construction, modification, or reconstruction after December 13, 2024. Each of the facility's proposed turbines (Emission Groups AA-000, AB-000, and AC-000) will have construction dates after the NSPS KKKKa effective date. Therefore, each unit will be subject to the applicable NOx and SO_2 emission standards.

MZX is constructing simple cycle turbines, each with a base load greater than 10 MMBtu/hr which will be subject to Subpart KKKKa. MZX has elected to use the lowest NOx emission standard that is applicable as determined using Table 1 to subpart KKKKa for combustion turbine type of new, firing natural gas, at a utilization rate > 45 percent, turbine base load heat input of > 50 MMBtu/hr and ≤ 850 MMBtu/hr. The standard is 15 ppm at 15 percent O_2 or 24 ng/J (0.055 lb/MMBtu).

The Solar units (AA-000 and AB-000) are manufactured with dry lean-premixed combustion technology, SoLoNOx, that meet 9 ppm NOx. The Proenergy units (AC-000) will meet 25 ppm, as delivered, utilizing demineralized water. AC-000 will be equipped with selective catalytic reduction (SCR) to meet the input-based standard of 15 ppm NOx.

By using selective catalytic reduction (SCR) control technology to meet the emission standard for the ProEnergy turbines (AC-000), MZX will conduct initial performance testing on each turbine to demonstrate initial compliance. MZX will utilize a continuous emission monitoring system (CEMS) to verify the proper operation of the emission controls for continuous compliance.

By meeting the 15 ppm NOx emission standard without using SCR control technology on all Solar turbines (AA-000 and AB-000), MZX is allowed to conduct initial performance testing on each turbine to demonstrate initial compliance and demonstrate continuous compliance by conducting annual performance testing. However, MZX has opted to install CEMS on all Solar turbines to verify the proper operation of the emission controls for continuous compliance.

MZX will meet the SO_2 emission limit of 0.060 lb SO_2/MMBtu heat input by only combusting natural gas and maintaining required records.

40 CFR 60 Subpart KKKK - The provisions of 40 CFR 60 Subpart KKKK - New Source Performance Standards for Stationary Combustion Turbines (NSPS KKKK) are applicable to stationary combustion turbines with a heat input at peak load equal to or greater than 10.7 gigajoules (10 MMBtu) per hour, based on the higher heating value of the fuel, which commenced construction, modification, or reconstruction after February 18, 2005. Since each of the facility's proposed turbines (Emission Groups AA-000, AB-000, and AC-000) will have construction dates after the NSPS KKKKa effective date, the units are subject to the applicable provisions of NSPS KKKKa and not subject to NSPS KKKK.

40 CFR 60 Subpart GG - The provisions of 40 CFR 60 Subpart GG - New Source Performance Standards for Stationary Gas Turbines (NSPS GG) are applicable to stationary gas turbines with a heat input at peak load equal to or greater than 10.7 gigajoules (10 million Btu) per hour, based on the lower heating value of the fuel fired, that commences construction, modification, or reconstruction after October 3, 1977. Since each of the facility's proposed turbines (Emission Groups AA-000, AB-000, and AC-000) will have

construction dates after the NSPS KKKKa effective date, the units are subject to the applicable provisions of NSPS KKKKa and not subject to NSPS GG.

40 CFR 60 Subpart TTTT - The provisions of 40 CFR 60 Subpart TTTT - New Source Performance Standards for Greenhouse Gas Emissions for Electric Utility Generating Units (NSPS TTTT) are applicable to stationary combustion turbines that commence construction after January 8, 2014, but on or before May 23, 2023, or commence reconstruction after June 18, 2014, but on or before May 23, 2023, that have a base load rating greater than 250 MMBtu/hr of fossil fuel and serve a generator or generators capable of selling greater than 25 MW of electricity to a utility power distribution system. However, since MZX does not propose to sell power to a utility power distribution system, Subpart TTTT does not apply.

40 CFR 60 Subpart TTTTa -The provisions of 40 CFR 60 Subpart TTTTa - New Source Performance Standards for Greenhouse Gas Emissions for Modified Coal-Fired Steam Electric Generating Units and New Construction and Reconstruction Stationary Combustion Turbine Electric Generating Units (NSPS TTTTa) are applicable to any stationary combustion turbine that commences construction or reconstruction after May 23, 2023, that has a base load rating greater than 250 MMBtu/hr of fossil fuel and serves a generator or generators capable of selling greater than 25 MW of electricity to a utility power distribution system. However, since MZX does not propose to sell power to a utility power distribution system, Subpart TTTTa does not apply.

40 CFR 63 Subpart YYYY - The provisions of 40 CFR 63, Subpart YYYY - National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines (NESHAP YYYY) establish national emission limitations and operating limitations for HAP emissions from stationary combustion turbines located at major sources of HAP emissions. Since MZX will be an area source of HAP emissions and not a major source, the provisions of NESHAP YYYY do not apply.

Mississippi Air Emission Regulations for the Prevention, Abatement, and Control of Air Contaminants

Visible Emissions Standards: 11 Miss. Admin. Code Pt. 2, R. 1.3. A & B - Facility-wide visible emissions are subject to a limit of 40% opacity (with exceptions for startup and soot blowing operations). Due to the units burning pipeline natural gas, MDEQ does not expect visible emission to the atmosphere from the combustion sources to exceed the opacity limit. In case of excess emissions, MZX is required to submit a notice of upset within 5 working days to the MDEQ as specified under 11 Miss. Admin. Code Pt. 2, R. 1.10, Provisions for Upsets, Startups, and Shutdowns.

General Nuisance: 11 Miss. Admin. Code Pt. 2, R. 1.3. C - General nuisance requirements are specified under 11 Miss. Admin. Code Pt. 2, R. 1.3(C). In case of excess emissions, MZX will determine the cause and rectify the situation. In case of excess emissions, MZX is required to submit a notice of upset within 5 working days to the MDEQ as specified under 11 Miss. Admin. Code Pt. 2, R. 1.10, Provisions for Upsets, Startups, and Shutdowns.

Particulate Matter Emissions from Fuel Burning: 11 Miss. Admin. Code Pt. 2,R. 1.3. D(1)(b) - The maximum permissible emission of ash and/or particulate matter from fossil fuel burning installations of greater than 10 MMBTU/hour heat input but less than 10,000 MMBTU/hour shall not exceed an emission rate determined by the following relationship:

$E = 0.8808 \times I^{-0.1667}$

where E is the emission rate in pounds per MMBTU/hour heat input and I is the heat input in MMBTU/hour. By firing pipeline-quality natural gas, MZX will demonstrate a wide margin of compliance with the emission standard.

SO2 Emissions from Fuel Burning: 11 Miss. Admin. Code Pt. 2, R. 1.4. A.(1) - The maximum discharge of sulfur oxides from any fuel burning installation in which the fuel is burned primarily to produce heat or power by indirect heat transfer shall not exceed 4.8 pounds (measured as sulfur dioxide) per MMBtu heat input. By firing pipeline-quality natural gas, MZX will demonstrate a wide margin of compliance with the emission standard.

State Standard: 11 Miss. Admin. Code Pt. 2, R. 2.2.B.(10). - MDEQ may establish limitations and requirements on the emission of air pollutants and on other parameters of a stationary source to assure that the requirements of Applicable Rules and Regulations are met subject to Miss. Code Ann. § 49-17-34(2) and

(3). Ammonia (NH3) is not a regulated pollutant under Mississippi's EPA Approved State Implementation Plan. However, MZX is proposing the NH3 emission limitations found below (Table 4-1 of the application) to minimize any additional environmental impacts. MZX received Vendor Guarantees stipulating that the units will comply with the limitations in Table 4-1 while the units comply with the NOx emission limitations.

Emission Units	Proposed Emission Limit
Solar PGM130	5 ppm (0% O_2)
Solar Titan 350	5 ppm (0% O_2)
ProEnergy 6000PE	10 ppm (0% O_2)

Table 1. PSD Applicability

Pollutant	Project-Related Increases (TPY)	Significant Emission Rate (TPY)	Netting Analysis Required? (Yes/No)	Contemporaneous Emissions (TPY)	Total Net Emissions (TPY)	PSD Review Required? (Yes/No)
PM	19.56	25	No		19.56	No
PM_{10}	19.56	15[1]	Yes		19.56	Yes
$PM_{2.5}$	19.56	10	Yes		19.56	Yes
NO_X[1,2]	423.39	40	Yes		423.39	Yes
SO_2[1]	156.53	40	Yes		156.53	Yes
VOC[2]	417.40	40	Yes		417.40	Yes
CO	364.16	100	Yes		364.16	Yes

[1] As of April 28, 2011, both NO_x and SO_2 are precursors for $PM_{2.5}$. Therefore, if NO_x or SO_2 exceed 40 TPY, the project is considered major for $PM_{2.5}$.

[2] Both NO_x and VOC are considered precursors for ozone with a significant emission rate of 40 TPY each.

The PSD application contains emission data for each proposed emission point and corresponding regulated pollutant.

III. Best Available Control Technology (BACT) Analysis

The application is required to perform a BACT analysis for all pollutants which have a significant net emission increase. Project-related emissions exceed the PSD significant emission rate (SER) thresholds for total particulate matter with an aerodynamic diameter of 10 microns or less (PM10), total particulate matter with an aerodynamic diameter of 2.5 microns or less (PM2.5), nitrogen oxides (NOX), volatile organic compounds (VOC), sulfur dioxide (SO2), carbon monoxide (CO), and greenhouse gases (GHG) in terms of carbon dioxide equivalents (CO2e). Therefore, the proposed project requires a PSD air quality/dispersion modeling analysis.

DeSoto County was reclassified as attainment under the 2008 8-hr Ozone NAAQS effective April 8, 2016. The area is designated as unclassifiable/attainment under the 2015 Ozone NAAAQS, effective January 6, 2018.5 The area is not otherwise a "nonattainment area" with respect to any NAAQS pollutant. Therefore, PSD permitting is potentially applicable with respect to each regulated NSR pollutant, and BACT requirements apply for significant pollutants. However, MZX has elected to voluntarily install emission controls on the combustion turbines that will meet the Lowest Achievable Emission Rate (LAER) for NOx that would apply if the area were to be designated as nonattainment for ozone.

In order to receive a PSD permit, a major stationary source must meet each applicable emissions limitation under the Mississippi State Implementation Plan (SIP) and under EPA's NSPS and NESHAP standards. Additionally, BACT requirements apply for each regulated NSR pollutant that a new major source would have the potential to emit in significant amounts.

MDEQ uses the EPA "top down" framework for conducting control technology reviews in PSD permitting. The top-down methodology identifies all available control techniques, ranks the technically feasible techniques according to their effectiveness, and then selects the most effective method not rejected on economic or other grounds (no control options were rejected for NOx, for which LAER will be voluntarily applied). The top-down methodology for all BACT determinations was initially recommended in 1987.6 A more detailed guidance document was issued in 1990 and subsequently incorporated into EPA's 1990 NSR Workshop Manual. The top-down methodology forms the basis for the present demonstration. Steps of the methodology include;

Step 1: Identify all control technologies

Step 2: Eliminate technically infeasible control technologies

Step 3: Rank remaining control technologies by control effectiveness

Step 4: Evaluate the most effective controls

Step 5: Select BACT

BACT for Solar PGM130 and Solar Titan 350 Combustion Turbines

Step 1: Identify all control technologies

The control technologies available for electric generating combustion turbines are identified below for each pollutant.

#	Pollutant	Technique	Performance
N1	NOx	SCR	2-7 ppmvd (15% O_2)
N2		Dry Low Nox Combustors	9-25 ppmvd (15% O_2)
N3		Water or steam injection	25 ppmvd (15% O_2)
C1	CO	Oxidation Catalyst	2-5 ppmvd (15% O_2)
C2		Good Combustion Practices	2-9 ppmvd
V1	VOC	Oxidation Catalyst	1-4 ppmvd (15% O_2)
V2		Good combustion practices, Gaseous fuel	1-4 ppmvd (15% O_2)
S1	SO2	Low sulfur fuel (pipeline quality natural gas, ULSD)	Applicable fuel speciation
P1	Particulate	Good combustion practices, No visible emissions	5% opacity
G1	CO2	Highly efficient simple cycle design	10,000-13,400 BTU/kW-hr (530-710 kg CO_2/MW-hr)
G2		Low carbon fuels	120-160 lb CO_2/MMBtu

RBLC results for traditional pollutants were given as an attachment in the PSD application submitted by MZX. For greenhouse gases (GHG), MZX reviewed the control techniques identified in EPA's recent rulemaking notice for Subpart TTTTa. The following observations can be made about the control techniques identified at Step 1.

- The most recent permits or RBLC entries identifying SCR as the selected control for NOX reflect a limit of 2 ppm, suggesting that current generation SCR systems are capable of achieving results at the low end of the attested performance ranges. However, SCR control installations predominantly occur on combined cycle projects.
- Performance ranges for both CO and VOC largely overlap, suggesting that comparable levels of performance are achievable using either good combustion practices or an oxidation catalyst (add-on control). Projects incorporating SCR controls are more likely to also include oxidation catalyst, suggesting that an oxidation catalyst may be more cost effective if SCR will also be installed.
- No examples of add-on controls are attested for natural gas-fired turbines in simple cycle mode for SO2, particulate matter, or CO2. Gas turbines have relatively low levels of emissions for these pollutants, and the relevant control technique is typically identified in terms of a fuel specification. Consequently, BACT compliance with PM10 and PM2.5 emissions will be demonstrated by firing natural gas only and MZX employing good combustion practices, as recommended by the respective turbine manufacturers. MZX will be required to perform a one-time stack test on all the turbines to verify the emission rates for PM_{1O} and $PM_{2.5}$. BACT compliance with SO2 emissions will be demonstrated by firing natural gas only and maintaining records of the gas sulfur content in a fuel tariff sheet supplied by the natural gas provider.

- A work practice standard (good combustion practices) is frequently identified as reducing emissions of CO, VOC, and particulate matter.
- Add-on controls for GHG are not commercially available for gas turbines in this size range operating in simple cycle mode.

Notably, the use of the selected gas turbines (operating in simple cycle mode and providing electricity directly to an industrial customer) is driven by a projects need for scalable, rapidly dispatchable, and highly reliable generation based on a defined but highly variable and subject-to-change demand scenario. Add-on CO2 controls, to the extent they may be deemed demonstrated control technology, are not compatible with these basic project criteria and are not considered at Step 1. Similarly, the use of different types of electric generating equipment, or changes to the project to reduce on-site generation needs, likewise constitute impermissible redefinition of the source/project.

Step 2: Eliminate technically infeasible control technologies

At Step 2, any control technique that is potentially available, yet not technically feasible for a particular pollutant stream, is rejected. Of the potentially available techniques surveyed, none of the Step 1 techniques are technically infeasible. Therefore, all of the Step 1 alternatives are progressed to Step 3.

Step 3: Rank remaining control technologies by control effectiveness

No control options were eliminated on the basis of technical infeasibility. Therefore, all options are ranked below based on control efficiency, and the table includes information on cost effectiveness, and energy and secondary environmental impacts.

#	Pollutant	Technique	Performance	Energy and Secondary Environmental Impacts
N1	NOx	SCR	2-7 ppmvd (15% O_2)	Parasitic load, collateral ammonia emissions
N2		Dry Low Nox Combustors	9-25 ppmvd (15% O_2)	Insignificant
N3		Water or steam injection	25 ppmvd (15% O_2)	Increased water consumption
C1	CO	Oxidation Catalyst	2-5 ppmvd (15% O_2)	Insignificant
C2		Good Combustion Practices	2-9 ppmvd	Insignificant
V1	VOC	Oxidation Catalyst	1-4 ppmvd (15% O_2)	Insignificant
V2		Good combustion practices, Gaseous fuel	1-4 ppmvd (15% O_2)	Insignificant
S1	SO_2	Low sulfur fuel (pipeline quality natural gas, ULSD)	Applicable fuel speciation	Insignificant
P1	Particulate Matter	Good combustion practices, No visible emissions	5% opacity	Insignificant
G1	CO_2	Highly efficient simple cycle design	10,000-13,400 BTU/kW-hr (530-710 kg CO_2/MW-hr)	Insignificant
G2		Low carbon fuels	120-160 lb CO_2/MMBtu	Insignificant

Step 4: Evaluate the most effective controls

Because MZX is proposing to use the top-ranked technology for every pollutant, economic impacts were not evaluated. The selected NOX control option includes energy and secondary environmental impacts. However, the energy impacts are relatively modest, and the draft permit contains an ammonia emissions standard that will limit collateral NH3 emissions. These impacts do not provide a basis for selecting a control option other than the top ranked NOx control technology.

Step 5: Select BACT

Based on the above analysis, the following control options and associated emission limits are chosen as BACT. In addition, the BACT limit for NOX meets the criteria for LAER.

Pollutant	Proposed BACT (or LAER) Limit	Comment
NOx (LAER)	2 ppm (15% O_2), achieved with SCR	Top-ranked control option, energy and secondary environmental impacts partly mitigated through collateral pollutant (NH3) emission standard. Compliance to be demonstrated via performance test.
CO	2 ppm (15% O_2), achieved with oxidation catalyst	Top-ranked control option(s). Compliance to be demonstrated via performance test.
VOCs	2 ppm (15% O_2)	Top-ranked control option(s). Compliance to be demonstrated via performance test.
Particulate Matter	Good combustion practices and use of natural gas as fuel	Combustion practices and use of natural gas as fuel
SO_2	Use pipeline natural gas not to exceed 1 gr S per 100 scf	Top-ran ked control option. The sulfur content of the natural gas will be verified periodically through documentation provided by the supplier.
CO_2	Natural gas fuel and efficient equipment design	Top-ranked control option(s),

BACT for ProEnergy 6000PE Combustion Turbines

Step 1: Identify all control technologies

The control technologies available for electric generating combustion turbines are identified below for each pollutant.

#	Pollutant	Technique	Performance
N1	NOx	SCR	2-7 ppmvd (15% O_2)
N2		Dry Low Nox Combustors	9-25 ppmvd (15% O_2)
N3		Water or steam injection	25 ppmvd (15% O_2)
C1	CO	Oxidation Catalyst	2-5 ppmvd (15% O_2)
C2		Good Combustion Practices	2-9 ppmvd
V1	VOC	Oxidation Catalyst	1-4 ppmvd (15% O_2)
V2		Good combustion practices, Gaseous fuel	1-4 ppmvd (15% O_2)
S1	SO_2	Low sulfur fuel (pipeline quality natural gas, ULSD)	Applicable fuel speciation
P1	Particulate Matter	Good combustion practices, No visible emissions	5% opacity
G1	CO_2	Highly efficient simple cycle design	10,000-13,400 BTU/kW-hr (530-710 kg CO_2/MW-hr)
G2		Low carbon fuels	120-160 lb CO_2/MMBtu

RBLC results for traditional pollutants are given as an attachment in the PSD application submitted by MZX. For greenhouse gases (GHG), MZX reviewed EPA's recent rulemaking notice for Subpart TTTTa. The following observations can be made about the control techniques identified at Step 1.

- The most recent permits or RBLC entries identifying SCR as the selected control for NOX reflect a limit of 2 ppm, suggesting that current generation SCR systems are capable of achieving results at the low end of the attested performance ranges. However, SCR control installations predominantly occur on combined cycle projects.
- Performance ranges for both CO and VOC largely overlap, suggesting that comparable levels of performance are achievable using either good combustion practices or an oxidation catalyst (add-on control). Projects incorporating SCR controls are more likely to also include oxidation catalyst, suggesting that an oxidation catalyst may be more cost effective if SCR will also be installed.
    - It is important to note that the performance of an oxidation catalyst depends heavily on operating conditions, particularly exhaust temperature and the inlet concentrations of pollutants such as CO and VOC. While higher temperatures generally enhance oxidation efficiency, the actual outlet concentrations are also influenced by the amount of each pollutant present at the inlet. Consequently, even when a catalyst demonstrates similar control efficiency (e.g., 90%), the resulting outlet concentrations of CO and VOCs can vary depending on the inlet loadings.
- No examples of add-on controls are attested for natural gas-fired turbines in simple cycle mode for SO2, particulate matter, or CO2. Gas turbines have relatively low levels of emissions for these pollutants, and the relevant control technique is typically identified in terms of a fuel specification. Consequently, BACT compliance with PM10 and PM2.5 emissions will be demonstrated by firing natural gas only and MZX employing good combustion practices, as recommended by the respective turbine manufacturers. MZX will be required to perform a one-time stack test on all the turbines to verify the emission rates for PM_{1O} and $PM_{2.5}$. BACT compliance with SO2 emissions will be demonstrated by firing natural gas only and maintaining records of the gas sulfur content in a fuel tariff sheet supplied by the natural gas provider.
- A work practice standard (good combustion practices) is frequently identified as reducing emissions of CO, VOC, and particulate matter.
- Add-on controls for GHG are not commercially available for gas turbines in this size range operating in simple cycle mode.

The use of the selected gas turbines (operating in simple cycle mode and providing electricity directly to an industrial customer) is driven by a project need for scalable, rapidly dispatchable, and highly reliable generation based on a defined but highly variable and subject-to-change demand scenario. Add-on CO2 controls, to the extent they may be deemed demonstrated control technology, are not compatible with these basic project criteria and are not considered at Step 1.

Step 2: Eliminate technically infeasible control technologies

At Step 2, any control technique that is potentially available, yet not technically feasible for a particular pollutant stream, is rejected. Of the potentially available techniques surveyed, none of the Step 1 techniques are technically infeasible. Therefore, all of the Step 1 alternatives are progressed to Step 3.

Step 3: Rank remaining control technologies by control effectiveness

No control options were eliminated on the basis of technical infeasibility. Therefore, all options are ranked below based on control efficiency, and the table includes information on cost effectiveness, and energy and secondary environmental impacts.

#	Pollutant	Technique	Performance	Energy and Secondary Environmental Impacts
N1	NO_X	SCR	2-7 ppmvd (15% O_2)	Parasitic load, collateral ammonia emissions
N2		Dry Low NO_X Combustors	9-25 ppmvd (15% O_2)	Insignificant
N3		Water or steam injection	25 ppmvd (15% O_2)	Increased water consumption
C1	CO	Oxidation Catalyst	2-5 ppmvd (15% O_2)	Insignificant
C2		Good Combustion Practices	2-9 ppmvd	Insignificant
V1	VOCs	Oxidation Catalyst	1-4 ppmvd (15% O_2)	Insignificant
V2		Good combustion practices, Gaseous fuel	1-4 ppmvd (15% O_2)	Insignificant
S1	SO_2	Low sulfur fuel (pipeline quality natural gas, ULSD)	Applicable fuel speciation	Insignificant
P1	Particulate Matter	Good combustion practices, No visible emissions	5% opacity	Insignificant
G1	CO2	Highly efficient simple cycle design	10,000-13,400 BTU/kW-hr (530-710 kg CO_2/MW-hr)	Insignificant
G2		Low carbon fuels	120-160 lb CO_2/MMBtu	Insignificant

Step 4: Evaluate the most effective controls

Because MZX is proposing to use the top-ranked technology for every pollutant, economic impacts were not evaluated.

The selected NO_X control option includes energy and secondary environmental impacts. However, the energy impacts are relatively modest, and the draft permit contains an ammonia emissions standard that will limit collateral NH3 emissions These impacts do not provide a basis for selecting a control option other than the top ranked NO_X control technology.

Step 5: Select BACT

Due to their unique design and size, the ProEnergy 6000PE units exhibit different combustion characteristics compared to the Solar PGM130 and Solar Titan 350 units. Notably, they have higher inlet concentrations of CO and VOC as compared to the Solar units. The CO and VOC limits presented below account for these elevated inlet concentrations and are proposed based on similar oxidation catalyst performance and control efficiencies relative to the Solar units.

Based on the above analysis, the following control options and associated emission limits are chosen as BACT. In addition, the BACT limit for NOX meets the criteria for LAER.

Pollutant	Proposed BACT (or LAER) Limit	Comment
NOx (LAER)	2 ppm (15% O_2), achieved with SCR	Top-ranked control option, energy and secondary environmental impacts partly mitigated through collateral pollutant (NH3) emission standard. Compliance to be demonstrated via performance test.
CO	4 ppm (15% O_2), achieved with oxidation catalyst	Top-ranked control option(s). Compliance to be demonstrated via performance test.
VOC	2.5 ppm (15% O_2)	Top-ranked control option(s). Compliance to be demonstrated via performance test.
Particulate	Good combustion practices and use of natural gas as fuel	Combustion practices and use of natural gas as fuel
SO_2	Use pipeline natural gas not to exceed 1 grain sulfur per 100 scf	Top-ran ked control option. The sulfur content of the natural gas will be verified periodically through documentation provided by the supplier.
CO_2	Natural gas fuel and efficient equipment design	Top-ranked control option(s),

BACT for PLUM Pressure Reduction System

Step 1: Identify all control technologies

Equipment associated with the proposed project includes ten (10) PLUM PRS, each rated at 10 MMBtu/hr. Each unit consists of two (2) 5.0 MMBtu/hr burners for a total of 10.0 MMBtu/hr. The PRS are designed to regulate CNG/RNG gas pressure down to levels required for industrial and power generation equipment. Heat is supplied by natural gas fired burners in order to heat the gas to eliminate freeze-up risks and deliver the gas at the desired conditions.

MZX searched EPA's control technology database and considered relevant existing and proposed federal and state emissions standards to identify potential control options from the proposed PRS.

Generally, NO_X emissions from fuel burning equipment can be controlled through two types of emission control strategies: combustion controls and add-on controls. Combustion controls address thermal NO_X directly by reducing peak flame temperature by, for example, staging combustion and/or recirculating flue gas to reduce the oxygen content of the combustion air. Add-on controls employ various strategies to reduce NO_X emissions to water and nitrogen, which often includes the use of reagents in the presence of a catalyst. Based on the RBLC search results, no add-on control options were identified. Many facilities listed some variation of use of clean fuels (such as natural gas), good combustion practices (e.g., tune-ups), and combustion controls (such as low NOX burners), as BACT. Add-on controls potentially applicable to the proposed PRS include SCR, selective non-catalytic reduction (SNCR), and non-selective catalytic reduction (NSCR). MZX has not identified any case in which add-on controls (SCR, SNCR, and NSCR) have been installed and operated successfully on small fuel-burning equipment similar to the proposed PRS. Therefore, add-on controls are not considered available.

Like NO_X, CO emissions from fuel burning equipment can be controlled through two types of emission control strategies: good combustion practices and add-on controls. For sources such as the proposed PRS, there is typically a trade-off between emissions of NO_X and CO. For example, higher combustion temperatures and residence times may lead to more complete fuel combustion and thus lower CO emissions, but these control techniques may result in excessive NO_X emissions. Good combustion practices strive to

optimize emissions for both pollutants. Add-on controls may employ various types of catalysts to oxidize CO emissions to CO2. Based on the RBLC search results, no add-on control options were identified. Many facilities listed some variation of use of clean fuels such as natural gas and good combustion practices (e.g., tune-ups). Add-on controls potentially applicable to the proposed PRS include oxidation catalysts.

Like CO, VOC emissions from fuel-burning equipment have similar considerations and can be controlled through good combustion practices and add-on controls. Based on the RBLC search results, no add-on control options were identified. Many facilities listed some variation of use of clean fuels such as natural gas and good combustion practices. Add-on controls potentially applicable to the proposed PRS include oxidation catalysts.

For PM, based on the RBLC search results, no add-on control options were identified. Generally, conventional add-on controls often applied to solid fuel boilers, such as baghouses, electrostatic precipitators, and scrubbers, have not been applied to gas fired fuel-burning equipment like the PRS since combustion of natural gas inherently results in low levels of emissions. Instead, many facilities listed some variation of use of clean fuels such as natural gas and good combustion practices as BACT. Accordingly, these control options are the only options considered further.

The only potentially available control option for SO2 emissions from the proposed PRS is the use of clean fuels with inherently low sulfur content. Conventional add-on controls for SO2 applied to solid fuel boilers, such as scrubbers, have never been applied to natural gas fired fuel gas heaters (or boilers) because the use of clean fuels inherently results in a low level of SO2 emissions.

For GHG, based on the RBLC search results, no add-on control options were identified that would reduce GHG emissions from the proposed PRS. Instead, many facilities listed some variation of use of clean fuels (natural gas) and good combustion practices as BACT for GHG emissions. CCS should not be considered as a potentially available control option for sources with minimal GHG emissions such as the small PRS. Accordingly, use of natural gas and good combustion practices are the only potentially available control options for GHG emissions from the proposed PRS.

Step 2: Eliminate technically infeasible control technologies

At Step 2, any control technique that is potentially available, yet not technically feasible for a particular pollutant stream, is rejected.

For NO_X, use of natural gas, good combustion practices, and low NO_X burners are inherent to the proposed project and are technically feasible. Combustion controls such as low NO_X burners are the most effective controls that can be obtained through commercial channels for such units.

For CO and VOC, use of natural gas and good combustion practices are inherent to the proposed project and are technically feasible. Oxidation catalysts are add-on controls which convert emissions of CO and organic compounds to CO2 in the presence of a catalyst without the addition of any chemical reagent. MZX is unaware of any case in which these add-on controls have been installed and operated successfully on small fuel-burning equipment like the proposed PRS. Therefore, oxidation catalysts are not technically feasible.

For PM, use of natural gas and good combustion practices are inherent to the proposed project and are technically feasible.

As stated in the previous section, the only potentially available control option for SO2 emissions from the PRS is the use of clean fuels with inherently low sulfur content. The use of clean fuels with inherently low sulfur content is part of the project and technically feasible.

For GHG, exclusive use of natural gas and good combustion practices for the proposed PRS are inherent to the proposed project and are technically feasible.

Step 3: Rank remaining control technologies by control effectiveness

For NO_X, no ranking of control options is required, as use of natural gas, good combustion practices, and low NO_X burners are the only available and technically feasible control options for NO_X emissions from the proposed PRS.

For CO, VOC, PM, and GHG, no ranking of control options is required, as use of natural gas and good combustion practices are the only available and technically feasible control options for CO emissions from the proposed PRS.

For SO2, no ranking of control options is required, as the use of clean fuels with inherently low sulfur content is the only available and technically feasible control option for SO2 emissions from the PRS.

Step 4: Evaluate the most effective controls

The top control options are being proposed for each of the BACT subject pollutants from the proposed PRS. Therefore, no evaluation of the control options is required.

Step 5: Select BACT

Based on the RBLC search results, NO_X emission limits for natural gas-fired fuel gas heaters with a heat input rating that is close to the proposed PRS units range from 0.011 to 0.10 lb/MMBtu heat input based on the same technologies proposed by MZX. There were no other pollution controls listed as approved BACT in the RBLC.

CO BACT for the proposed PRS is based on the exclusive use of natural gas and good combustion practices. Based on the RBLC search results, CO emission limits for natural gas-fired fuel gas heaters with a heat input rating that is close to the proposed PRS units range from 0.037 to 0.082 lb/MMBtu heat input based on the same technologies proposed by MZX. There were no other pollution controls listed as approved BACT in the RBLC. As previously mentioned, good combustion practices seek to optimize emissions for both NO_X and CO emissions.

VOC BACT for the proposed PRS is based on the exclusive use of natural gas and good combustion practices. Based on the RBLC search results, VOC emission limits for natural gas-fired fuel gas heaters with a heat input rating that is close to the proposed units range from 0.005 to 0.008 lb/MMBtu.

PM BACT for the proposed PRS is based on the exclusive use of natural gas and good combustion practices.

SO_2 BACT for the proposed PRS is based on the use of clean fuels with inherently low sulfur content. The facility proposes to only fire pipeline quality natural gas in the proposed PRS.

GHG BACT for the proposed PRS is based on the exclusive use of natural gas as fuel and good combustion practices.

Based on the foregoing analysis, the following control options and emission limits are BACT for the PLUM Pressure Reduction Systems.

Pollutant	Proposed BACT Limit	Comment
NO_X	0.049 lb/MMBtu	Top-ranked control option(s), based on the use of natural gas, good combustion practices, and low NOx burners.
CO	0.082 lb/MMBtu	Top-ranked control option(s), based on the use of natural gas and good combustion practices.
VOCs	Exclusive use of natural gas	Top-ranked control option(s) based on the use of natural gas and good combustion practices. VOC emission from the proposed PRS should not exceed 0.0054 lb/MMBtu. However, instead of a numerical BSCT limit, MZX is proposing the exclusive use of natural gas as BACT.
$PM/PM_{10}/PM_{2.5}$	Exclusive use of natural gas	Top-ranked control option(s), based on the exclusive use of natural gas and good combustion practices. MZX is proposing exclusive use of natural gas as BACT.
SO_2	1.0 grains sulfur/100 scf burning natural gas, exclusively	Top-ranked control option(s), the sulfur content of the natural gas will be verified periodically through documentation provided by the supplier.
CO_2	Exclusive use of natural gas	Top-ranked control option(s), based on the exclusive use of natural gas.

IV. Source Impact Analysis

The owner or operator of a proposed source or modification is required to demonstrate that allowable emission increases from the proposed source or modification, in conjunction with all other applicable emissions increases or reductions (including secondary emissions), will not cause or contribute to air pollution in violation of: 1) any National Ambient Air Quality Standard (NAAQS) in any air quality control region or 2) any applicable maximum allowable increase over the baseline concentration, or increment, in any area.

This demonstration is often accomplished by conducting air dispersion modeling. The modeled concentrations used to determine compliance with any NAAQS or PSD increment depend on: 1) the type of standard (i.e., deterministic or statistical), 2) the available length of record of meteorological data, and 3) the averaging time of the standard being analyzed. When the analysis is based on 5 years of National Weather Service meteorological data, the following estimates are used:

- For deterministically based standards (e.g., SO_2), the highest, second-highest short-term estimate and the highest annual estimate; and
- For statistically based standards (e.g., PM_{10}), the highest, sixth-highest estimate and highest 5-year average estimate.

A) Existing Air Quality

Any application for a permit under the Prevention of Significant Deterioration program is required to contain an analysis of ambient air quality in the area that the major stationary source or major modification would affect for each of the following pollutants: a) for the source, each pollutant that it would have the potential to emit in a significant amount; b) for the modification, each pollutant for which it would result in a significant net emissions increase.

The existing ambient air quality is defined by the natural and human-generated sources of air pollution. The area surrounding the DeSoto County facility is predominantly rural and in attainment for all regulated pollutants. The pollutants that result in a significant net emission increase as a result of the proposed project and under consideration in this analysis are NOx, CO, SO_2, greenhouse gases (GHG) in terms of CO_2e, PM_{10}, $PM_{2.5}$, volatile organic compounds (VOCs). VOCs and nitrogen oxides (NOx) combine in the atmosphere to form ozone and, therefore, are called precursor emissions. Any significant emissions increase from an emission unit or net emissions increase at a major stationary source that is significant for VOC or NOx, which are precursor pollutants for ozone shall be considered significant for ozone (O_3). Under current guidance if one precursor for a pollutant exceeds the threshold, then all precursors for that pollutant must be taken into consideration and used in calculations.

Proposed Project Emissions

Pollutant	Project Emissions (tpy)	PSD Significant Emission Rate (tpy)	PSD Triggered? (Yes/No)
Filterable PM	19.6	25	No
Total PM_{10}	19.6	15	Yes
Total $PM_{2.5}$	19.5	10	Yes
SO_2	156.5	40	Yes
NO_X	423.4	40	Yes
VOC	417.4	40	Yes
CO	364.2	100	Yes
CO_2e	6,410,729	75,000	Yes

MDEQ operates an ambient air quality network throughout the state of Mississippi and reports its findings in the *"Mississippi Department of Environmental Quality Air Quality Data Summary."* This report looks at the reported levels of the criteria pollutants at various monitoring sites located across the State and compares these levels to the NAAQS to determine the State's compliance with these standards. There is one primary and secondary ozone standard, the 8-hour average. The level of the 8-hour Ozone standard is 70 ppb. MDEQ monitors ozone continuously from March 1 through October 31 each year at the monitoring sites with the exception of the MDEQ NCORE site located in Jackson, MS which monitors ozone year-round.

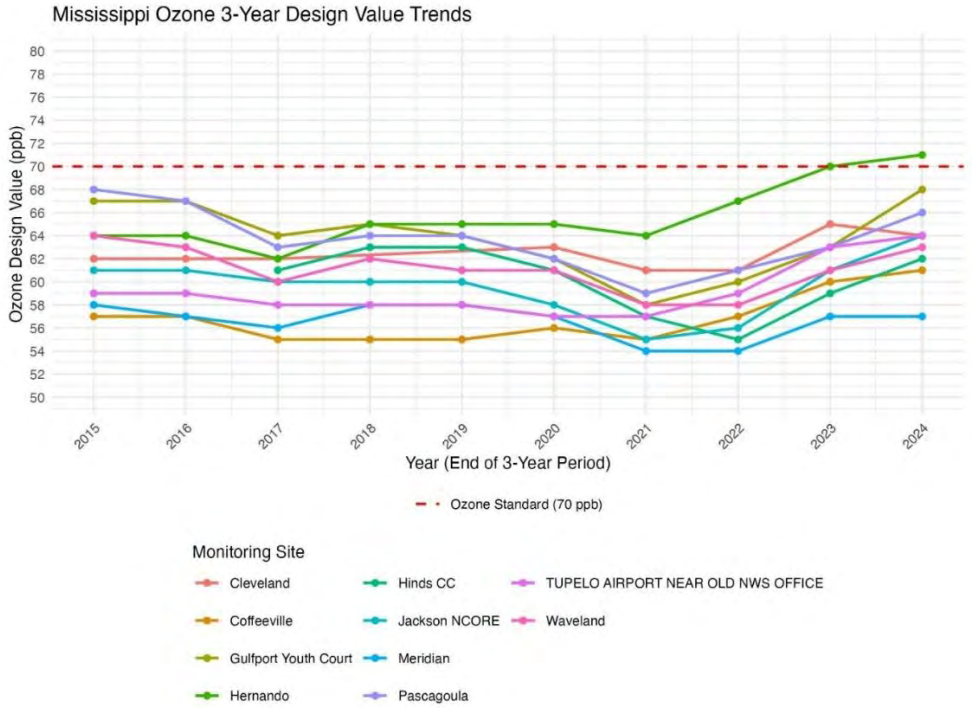
Primary and Secondary 8-Hour Standard- 70 ppb

The 8-hour standard is met when the 3-year average of the annual fourth highest daily maximum 8-hour average concentration (also known as the design value) is less than or equal to 0.070 parts per million (ppm) or 70 parts per billion (ppb).



Site	County	Design Value (ppb)
Cleveland Delta State	Bolivar	64
Hernando	DeSoto	71
Waveland	Hancock	63
Gulfport Youth Court	Harrison	68
Hinds CC	Hinds	62
Jackson NCORE	Hinds	64
Pascagoula	Jackson	66
Meridian	Lauderdale	57
TUPELO AIRPORT NEAR OLD NWS OFFICE	Lee	64
Coffeeville	Yalobusha	61

10 Year Ozone Monitoring Trends at all Mississippi Sites



B) Modeling Procedure

All estimates of ambient concentrations are to be based upon applicable air quality models, databases and other requirements specified in EPA's Guideline on Air Quality Models in Appendix W of 40 CFR Part 51.

The EPA Memorandums, "Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier I Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program," dated April 30, 2019, and "Guidance for Ozone and Fine Particulate Matter Permit Modeling" dated July 29, 2022 reflect EPA's recommendation for how agencies conduct air quality modeling and related technical analyses to satisfy compliance demonstration requirements for ozone and $PM_{2.5}$ under the PSD Permitting Program. In accordance with the above-mentioned Guidance and the Revisions to the Guideline on Air Quality Models (40 CFR Part 51, Appendix), EPA recommends that an applicant use a "two-tiered" demonstration approach to address single-source impacts on ozone and secondary $PM_{2.5}$. The first tier involves the use of existing technical information to evaluate the relationships between precursor emissions and a source's impacts. The second tier involves the application of more sophisticated case-specific chemical transport models (CTMs) (e.g., photochemical grid models).

Using the Tier I Demonstration approach for PSD compliance, the emissions of the individual precursor pollutants are not added together to determine if there is an exceedance but are evaluated individually. If an exceedance occurs for one individual precursor, the precursor pollutants are compared to the hypothetical source's modeled emission rate and impacts (MERPs). The EPA provides access to its MERPs values on its MERPs VIEW Qlik website (https://www.epa.gov/scram/merps-view-qlik). If there is an exceedance of an individual precursor, then upon calculating the potential impacts, all precursors of either ozone or $PM_{2.5}$ are taken into consideration when calculated.

Should the Tier I Demonstration find the critical air quality threshold, or significant impact level (SIL), would not be exceeded when considering the impact of the ozone precursor emissions of VOC and NOx, the proposed project will not cause ozone concentrations exceeding the ozone SIL. No further analysis or modeling will be required.

Description of Proposed Project

MZX Tech LLC (MZX Tech) has a proposed project of constructing and operating an electricity generating station that will include CT units and support equipment. Three (3) different turbine models and ten (10) PLUM PRS will be installed to regulate incoming natural gas pressure and condition the natural gas for use in the combustion turbines. The CT and PLUM units will fire natural gas as fuel.

Ozone

Elevated ground-level ozone concentrations are the result of photochemical reactions among various chemical species. These reactions are more likely to occur under certain ambient conditions (e.g., high ground-level temperatures, light winds, and sunny conditions). The chemical species that contribute to ozone formation, referred to as ozone precursors, include NO_X and VOC emissions from both anthropogenic (e.g., mobile and stationary sources) and natural sources (e.g., vegetation). Pursuant to 40 CFR 52.21, and ambient ozone impact analysis is not required unless a project's emissions increase is greater than 100 tpy of VOC or NO_X. As this project's increase in emissions is greater than 100 tpy of NO_x, an ozone impacts analysis was conducted through evaluation of the MERPs.

EPA has issued guidance specifying a SIL value of 1 ppb, and has developed a demonstration methodology (the MERPs guidance) to provide a framework for a Tier 1 demonstration that can illustrate that a project will not cause or contribute to any exceedance of ambient ozone standards. The April 2019 EPA guidance document titled *Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ Under the PSD Permitting Program* was used in conjunction with the most recent April 2024 EPA guidance, to provide a Tier 1 demonstration that ozone impacts from the project will not cause or contribute to ambient air quality levels of ozone. Both VOC and NO_X emissions increases from the project were considered.

The Tier I Demonstration for MZX Tech LLC has an anticipated increase of 0.797 ppb of ozone. These results were obtained by using the most conservative MERP values to calculate the worst-case scenario. This is below the SIL threshold of 1.0 ppb; therefore no additional modeling or analysis is required.

Model Versions

The model versions being used are

- AERMOD v24142
- AERMAP v24142
- AERMET v24142
- AERSURFACE v24142
- Building Profile Input Program, PRIME version (BPIPPRIME), version 04274
- BREEZE graphical interface, developed by Trinity Consultants, to assist in developing the model input files for AERMOD

MZX used the procedures outlined in the *Guideline* as reference, the AERMOD dispersion modeling for this project was performed using only regulatory default options.

Receptor Grid Spacing

Modeled concentrations were calculated at ground-level receptors placed along the facility's fence line and on a variable Cartesian receptor grid.

- Fence line receptors were spaced no further than 50 meters apart.
- Beyond the fence line, receptors were spaced 100 meters apart on a Cartesian grid extending out to a distance sufficient to resolve the maximum concentration but at least extending outward to 5 km in all directions.
- Additionally, less refined receptor grids extend from the finest grid out to 10 km in each direction, with receptors spaced 250 meters apart from 5 km – 8 km from the facility and 500 meters from 8 km to 10 km from the facility.
- If the SIL is exceeded for any pollutant, additional modeling will be performed to determine the size of the significant impact area (SIA).

For any pollutants exceeding the Clas II SIL, the cumulative modeling for demonstrating compliance with the applicable NAAQS and PSD Increment was conducted for those receptors with impacts equal to or greater than the SIL in the SIL Analyses. Since NO_2 Impacts exceeded the NAAQS, the MAXDCONT option within AERMOD was used to determine if the proposed project was significant (above the corresponding SIL) at the receptors exceeding the standard.

Ambient Air Boundary

Facility Ambient Air Boundary and General Site Layout



The entire MZX Facility will be fenced in, and MZX Tech will use a combination of fencing and security measures to prevent the public from accessing MZX property.

Meteorological Data

Given that site-specific meteorological data was not available for the proposed site, data collected by a representative meteorological site was used. According to Appendix W, the selection of the meteorological data to be used in the modeling

analysis should be based on spatial and climatological (temporal) representative. The representativeness of the data is based on the following:

1. The proximity of the meteorological monitoring site to the area under consideration;
2. The complexity of terrain;
3. The exposure of the meteorological site; and
4. The period during which data are collected.

Site-specific meteorological data or data from the National Weather Service (NWS) stations, universities, Federal Aviation Administration (FAA) stations, military stations, and others should be used if possible. The determination of representativeness of site-specific data for AERMOD applications cannot be solely based on proximity. According to Appendix W, the implementation of NWS Automated Surface Observing Stations (ASOS) in the early 1990's should not preclude the use of NWS ASOS data if such station is determined to be representative of the modeled area. Surface meteorological sites located within 120 km of the proposed site with available comprehensive meteorological data during the 2019-2023 period were evaluated.

Meteorological Surface Stations Near Proposed Facility

Met Station ID	WBAN ID	Site Description	Base Elevation (m)	Distance from MZX (km)	Recoverability 2019-2023
MEM	13893	MEMPHIS	76.8	6.9	99.18%
OLV	13815	OLIVE BRANCH	124.1	22.3	91.65%
AWM	53959	WEST MEMPHIS MUNICIPAL	63.7	24.2	92.19%
NQA	93839	MILLINGTON REGIONAL	102.4	43.4	88.75%
UTM	23903	TUNICA MUNICIPAL	57.0	42.9	59.92%
CKM	00314	CLARKSDALE COUNTY	51.6	84.5	69.41%
HKA	53869	BLYTHEVILLE MUNICIPAL	77.5	110.7	95.06%
JBR	03953	JONESBORO MUNICIPAL	79.9	112.9	89.78%

All sites were analyzed for data completeness with AERMET using the latest available 5-year data set for each site. The three sites with the greatest recoverability (AWM, MEM, HKA) were analyzed further to determine recoverability for every quarter over the 5-year period (2019-2023). MEM showed greater than 90% recoverability for every quarter of each year. AWM shows less than 90% for one quarter and just above 90% for at least two quarters during the 5-year period. HKA also showed less than 90% recoverability for one quarter and had several quarters below 95%. Given that MEM has complete, recent data and is located in such close proximity to the MZX site, MEM was reviewed to confirm representativeness.

Regulatory application of AERMOD necessitates careful evaluation of the meteorological data for input to AERMET. Data representativeness, in the case of AERMOD, means utilizing data of an appropriate type for constructing realistic boundary layer profiles. Calculations of the boundary layer parameters are dependent on the surface characteristics are quantified by the assignment of three variables: albedo, Bowen ratio, and surface roughness length.

Surface Characteristics of Selected Meteorological Stations

Meteorological Station ID	Mean Albedo	Mean Bowen Ratio	Mean Surface Roughness
Proposed MZX Site	0.160	0.697	0.163
MEM	0.170	0.883	0.042

AERSURFACE was used to determine surface characteristics using land cover data from the U.S. Geological Survey (USGS) National Land Cover Data (NLCD) 2016 archives and look-up tables of surface characteristics that vary by land cover type and season. The surface variables were set to vary by season using 12 sectors. For the AERSURFACE analysis, the mean of the surface characteristics generated for average moisture conditions at each of the nearby meteorological stations were compared to the proposed MZX site. The results of the AERSURFACE analysis showed that MEM site has surface characteristics comparable to the proposed MZX site.

Average Yearly Surface Moisture Conditions for MEM

Year	Annual Precipitation [1]	Surface Moisture Classification [2]
2019	73.14	WET
2020	58.85	AVG
2021	51.80	AVG
2022	51.96	AVG
2023	51.96	AVG

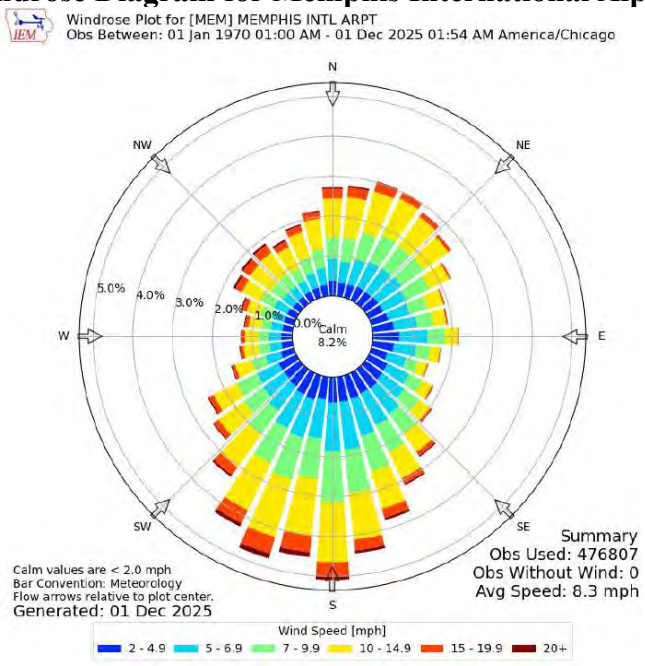
1. https://www.ncdc.noaa.gov/cdo-web/search.
2. https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/county/time- series.

Characterization of surface moisture conditions for the NWS MEM site for year of meteorology is presented in the table. The surface moisture conditions were determined by comparing precipitation for the period of data to be processed to the 30-year climatological record, selecting “wet” conditions if precipitation is in the upper 30th percentile, “dry” conditions if precipitation is in the lower 30th percentile, and “average” conditions if precipitation is in the middle 40th percentile.

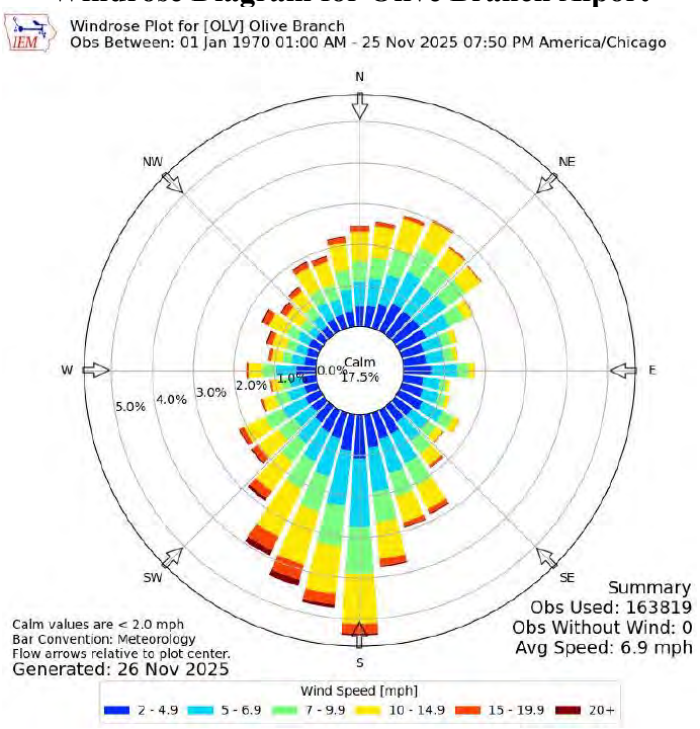
The MEM meteorological site was also evaluated with a land cover analysis, a terrain analysis, a climate analysis, and a wind rose analysis. For land cover analysis, a one-kilometer (km) radius was centered on the meteorological tower

location, and the land use was categorized based on the 2019 NLCD. Impervious and canopy differences among the sites were also examined. The results showed that the MEM site had similar spatial distribution of land use, impervious coverage, and canopy coverage to MZX.

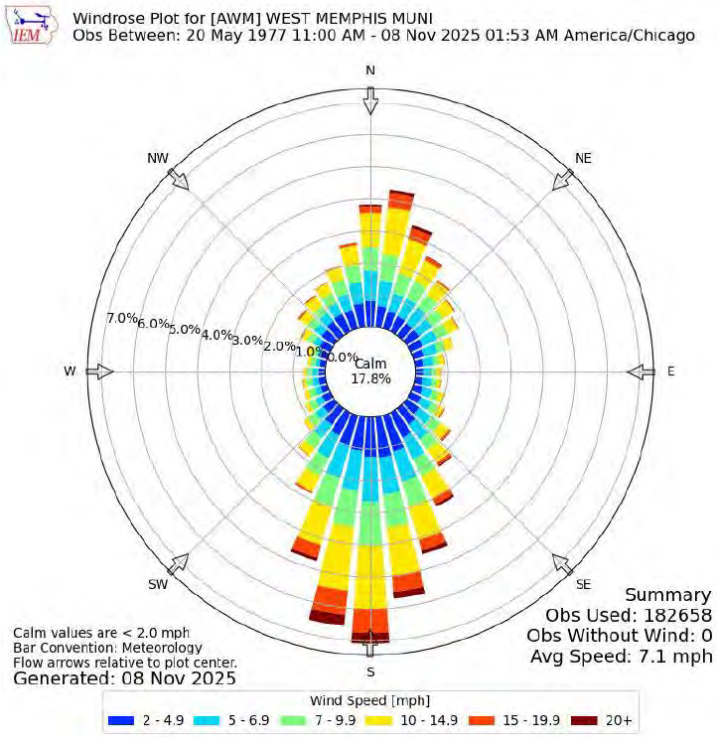
Windrose Diagram for Memphis International Aiport



Windrose Diagram for Olive Branch Aiport



Windrose Diagram for West Memphis Municipal Aiport



In addition to the land cover similarities, windroses for the 3 nearest meteorological stations were reviewed to ensure climatological consistency between the project site and chosen meteorological site. Each of the windroses show prevailing winds with a southerly component and winds much less frequently coming from the western or eastern directions. Overall, the windroses demonstrate consistency in wind flow across the area encompassing the project site and meteorological stations. All windroses were obtained from Iowa State University's "Iowa Environment Mesonet" website.

From the results of all analyses, the MEM NWS site was chosen to best represent the land use, terrain and exposure of the MZX Tech site. According to Appendix W, Section 8.4.2(b), the surface characteristics input to AERMET should be representative of the land cover in the vicinity of the meteorological data, i.e., the location of the meteorological tower for measured data. Therefore, surface characteristics of the MEM NWS site were used in AERMET.

According to Appendix W, the EPA has integrated the ADJ_U* option into AERMET as a regulatory option to address issues with model over-prediction of ambient concentrations from some sources associated with under-prediction of the surface friction velocity (u*) during light wind, stable conditions. The ADJ_U* option is specifically recommended for sources using standard NWS airport meteorological data, site-specific meteorological data without turbulence parameters, or prognostic meteorological inputs derived from prognostic meteorological models. The ADJ_U* option was used in AERMET Stage 3.

For upper air data, the closest upper air site station is located at the NWS in North Little Rock, AR (KLZK, WMO ID 72340). Twice daily soundings from the NWS KLZK radiosonde site for the 2019-2023 period were used in AERMET.

Given the representatives for MEM and KLZK, the meteorological data set for the time period from 2019 to 2023 was processed using the ADJ_U* option in the latest version of AERMET (version 24142). The data were processed and prepared using the surface characteristics of the Memphis International Airport surface station. A surface station elevation of 271 ft was utilized in the modeling analyses.

Stack Parameters

The AERMOD dispersion model allows for emission units to be represented as point, area, or volume sources. Point sources with unobstructed vertical releases will be modeled with their actual stack parameters (i.e., height, diameter, exhaust gas temperature, and gas exit velocity). All proposed emission sources will have vertical, unobstructed stacks and will be modeled as such.

Section B.5: Stack Parameters and Exit Conditions

Emission Point numbering must be consistent throughout the application package and, for existing emission points, should match any MDEQ ID's in the current permit.

Emission Point ID	Orientation (H=Horizontal V=Vertical)	Rain Caps	Height Above Ground	Base Elevation	Exit Temp.	Inside Diameter or Dimensions	Velocity	Moisture by Volume	Geographic Position (degrees/minutes/ seconds)	
		(Yes or No)	(ft)	(ft)	(°F)	(ft)	(ft/sec)	(%)	Latitude	Longitude
TUR-1	Vertical	No	50.00	286	920	9.00	70.42	9.20%	770262.4	3874613.0
TUR-2	Vertical	No	50.00	269	920	9.00	70.42	9.20%	770369.4	3874613.0
TUR-3	Vertical	No	50.00	287	920	9.00	70.42	9.20%	770262.4	3874629.5
TUR-4	Vertical	No	50.00	269	920	9.00	70.42	9.20%	770369.4	3874629.5
TUR-5	Vertical	No	50.00	287	920	9.00	70.42	9.20%	770262.4	3874646.0
TUR-6	Vertical	No	50.00	271	920	9.00	70.42	9.20%	770369.4	3874646.0
TUR-7	Vertical	No	50.00	286	920	9.00	70.42	9.20%	770262.4	3874662.5
TUR-8	Vertical	No	50.00	274	920	9.00	70.42	9.20%	770369.4	3874662.5
TUR-9	Vertical	No	50.00	282	920	9.00	70.42	9.20%	770262.4	3874679.0
TUR-10	Vertical	No	50.00	278	920	9.00	70.42	9.20%	770369.4	3874679.0
TUR-11	Vertical	No	50.00	278	920	9.00	70.42	9.20%	770262.4	3874695.5
TUR-12	Vertical	No	50.00	283	920	9.00	70.42	9.20%	770369.4	3874695.5
TUR-13	Vertical	No	50.00	278	920	9.00	70.42	9.20%	770261.8	3874716.5
TUR-14	Vertical	No	50.00	289	920	9.00	70.42	9.20%	770368.8	3874716.5
TUR-15	Vertical	No	50.00	288	920	9.00	70.42	9.20%	770261.8	3874733.0
TUR-16	Vertical	No	50.00	290	920	9.00	70.42	9.20%	770368.8	3874733.0
TUR-17	Vertical	No	50.00	291	920	9.00	70.42	9.20%	770261.8	3874749.5
TUR-18	Vertical	No	50.00	290	920	9.00	70.42	9.20%	770118.3	3874628.4
TUR-19	Vertical	No	80.00	259	873	11.00	73.55	9.20%	770118.3	3874661.6
TUR-20	Vertical	No	80.00	265	873	11.00	73.55	9.20%	770118.3	3874694.8
TUR-21	Vertical	No	80.00	268	873	11.00	73.55	9.20%	770118.3	3874728.0
TUR-22	Vertical	No	80.00	288	873	11.00	73.55	9.20%	770118.3	3874761.2
TUR-23	Vertical	No	80.00	289	873	11.00	73.55	9.20%	770118.3	3874794.4
TUR-24	Vertical	No	80.00	289	873	11.00	73.55	9.20%	770262.3	3874777.6
TUR-25	Vertical	No	80.00	292	873	11.00	73.55	9.20%	770262.3	3874810.8
TUR-26	Vertical	No	80.00	292	873	11.00	73.55	9.20%	770227.4	3874618.7
TUR-27	Vertical	No	80.00	274	873	11.00	73.55	9.20%	770227.4	3874651.9
TUR-28	Vertical	No	80.00	273	873	11.00	73.55	9.20%	770227.4	3874685.1
TUR-29	Vertical	No	80.00	268	873	11.00	73.55	9.20%	770227.4	3874718.3
TUR-30	Vertical	No	80.00	277	873	11.00	73.55	9.20%	770227.4	3874751.5
TUR-31	Vertical	No	80.00	289	873	11.00	73.55	9.20%	770227.4	3874784.7
TUR-32	Vertical	No	80.00	290	873	11.00	73.55	9.20%	770363.5	3874770.6
TUR-33	Vertical	No	80.00	291	873	11.00	73.55	9.20%	770363.5	3874803.8

Section B.5: Stack Parameters and Exit Conditions

Emission Point numbering must be consistent throughout the application package and, for existing emission points, should match any MDEQ ID's in the current permit.

Emission Point ID	Orientation (H=Horizontal V=Vertical)	Rain Caps	Height Above Ground	Base Elevation	Exit Temp.	Inside Diameter or Dimensions	Velocity	Moisture by Volume	Geographic Position (degrees/minutes/ seconds)	
		(Yes or No)	(ft)	(ft)	(°F)	(ft)	(ft/sec)	(%)	Latitude	Longitude
TUR-34	Vertical	No	80.00	292	873	11.00	73.55	9.20%	770194.0	3875130.1
TUR-35	Vertical	No	70.00	289	652	10.00	78.00	9.20%	770194.0	3875150.5
TUR-36	Vertical	No	70.00	289	652	10.00	78.00	9.20%	770194.0	3875063.3
TUR-37	Vertical	No	70.00	289	652	10.00	78.00	9.20%	770194.0	3875083.2
TUR-38	Vertical	No	70.00	289	652	10.00	78.00	9.20%	770194.0	3874994.9
TUR-39	Vertical	No	70.00	289	652	10.00	78.00	9.20%	770194.0	3875016.2
TUR-40	Vertical	No	70.00	288	652	10.00	78.00	9.20%	770194.0	3874927.5
TUR-41	Vertical	No	70.00	288	652	10.00	78.00	9.20%	770194.0	3874949.9
PRS-1	Vertical	No	25.00	290	400	2.00	6.47	9.20%	770249.0	3874865.0
PRS-2	Vertical	No	25	288	400	2.00	6.47	9.20%	770159.0	3874865.0
PRS-3	Vertical	No	25	291	400	2.00	6.47	9.20%	770249.0	3874845.0
PRS-4	Vertical	No	25	289	400	2.00	6.47	9.20%	770159.0	3874845.0
PRS-5	Vertical	No	25	289	400	2.00	6.47	9.20%	770219.0	3874865.0
PRS-6	Vertical	No	25	289	400	2.00	6.47	9.20%	770219.0	3874845.0
PRS-7	Vertical	No	25	289	400	2.00	6.47	9.20%	770189.0	3874865.0
PRS-8	Vertical	No	25	288	400	2.00	6.47	9.20%	770129.0	3874865.0
PRS-9	Vertical	No	25	289	400	2.00	6.47	9.20%	770189.0	3874845.0
PRS-10	Vertical	No	25	288	400	2.00	6.47	9.20%	770129.0	3874845.0
SSM-1	Vertical	No	50	295	920	9.00	70.42	9.20%	-	-
SSM-2	Vertical	No	80	295	873	11.00	73.55	9.20%	-	-
SSM-3	Vertical	No	70	295	652	10.00	78.00	9.20%	-	-

[1] A WAAS-capable GPS receiver should be used and in the WGS84 or NAD83 coordinate system.

Point Sources

Table C.1 - MZX CO Point Sources

Model ID	Description	UTM x (m)	UTM y (m)	Elevation (m)	Emission Rate (g/s)	Stack Height (m)	Stack Temp (K)	Stack Velocity (m/s)	Stack Diameter (m)
TUR18	350	770,118.3	3,874,628.4	259.1	8.76	24.4	740.37	22.42	3.35
TUR19	350	770,118.3	3,874,661.6	264.9	0.23	24.4	740.37	22.42	3.35
TUR20	350	770,118.3	3,874,694.8	268.5	8.76	24.4	740.37	22.42	3.35
TUR21	350	770,118.3	3,874,728.0	288.0	0.23	24.4	740.37	22.42	3.35
TUR22	350	770,118.3	3,874,761.2	288.5	0.23	24.4	740.37	22.42	3.35
TUR23	350	770,118.3	3,874,794.4	289.3	0.23	24.4	740.37	22.42	3.35
TUR24	350	770,262.3	3,874,777.6	292.1	0.23	24.4	740.37	22.42	3.35
TUR25	350	770,262.3	3,874,810.8	292.0	0.23	24.4	740.37	22.42	3.35
TUR26	350	770,227.4	3,874,618.7	273.7	8.76	24.4	740.37	22.42	3.35
TUR27	350	770,227.4	3,874,651.9	273.4	8.76	24.4	740.37	22.42	3.35
TUR28	350	770,227.4	3,874,685.1	267.7	8.76	24.4	740.37	22.42	3.35
TUR29	350	770,227.4	3,874,718.3	277.3	0.23	24.4	740.37	22.42	3.35
TUR30	350	770,227.4	3,874,751.5	289.3	0.23	24.4	740.37	22.42	3.35
TUR31	350	770,227.4	3,874,784.7	289.6	0.23	24.4	740.37	22.42	3.35
TUR32	350	770,363.5	3,874,770.6	291.2	0.23	24.4	740.37	22.42	3.35
TUR33	350	770,363.5	3,874,803.8	291.5	0.23	24.4	740.37	22.42	3.35
TUR1	130	770,262.4	3,874,613.0	285.6	0.11	15.2	766.48	21.46	2.74
TUR2	130	770,369.4	3,874,613.0	268.6	2.74	15.2	766.48	21.46	2.74
TUR3	130	770,262.4	3,874,629.5	286.7	0.11	15.2	766.48	21.46	2.74
TUR4	130	770,369.4	3,874,629.5	269.0	2.74	15.2	766.48	21.46	2.74
TUR5	130	770,262.4	3,874,646.0	287.2	0.11	15.2	766.48	21.46	2.74
TUR6	130	770,369.4	3,874,646.0	270.5	2.74	15.2	766.48	21.46	2.74
TUR7	130	770,262.4	3,874,662.5	285.6	0.11	15.2	766.48	21.46	2.74
TUR8	130	770,369.4	3,874,662.5	273.5	0.11	15.2	766.48	21.46	2.74
TUR9	130	770,262.4	3,874,679.0	281.7	0.11	15.2	766.48	21.46	2.74
TUR10	130	770,369.4	3,874,679.0	277.9	0.11	15.2	766.48	21.46	2.74
TUR11	130	770,262.4	3,874,695.5	278.4	2.74	15.2	766.48	21.46	2.74
TUR12	130	770,369.4	3,874,695.5	283.4	0.11	15.2	766.48	21.46	2.74
TUR13	130	770,261.8	3,874,716.5	277.8	2.74	15.2	766.48	21.46	2.74
TUR14	130	770,368.8	3,874,716.5	289.1	0.11	15.2	766.48	21.46	2.74
TUR15	130	770,261.8	3,874,733.0	288.2	0.11	15.2	766.48	21.46	2.74
TUR16	130	770,368.8	3,874,733.0	290.5	0.11	15.2	766.48	21.46	2.74
TUR17	130	770,261.8	3,874,749.5	290.6	0.11	15.2	766.48	21.46	2.74
TUR34	Proenergy	770,194.0	3,875,130.1	288.7	0.57	21.3	617.59	23.77	3.05
TUR35	Proenergy	770,194.0	3,875,150.5	288.6	5.23	21.3	617.59	23.77	3.05
TUR36	Proenergy	770,194.0	3,875,063.3	288.8	5.23	21.3	617.59	23.77	3.05
TUR37	Proenergy	770,194.0	3,875,083.2	288.7	5.23	21.3	617.59	23.77	3.05
TUR38	Proenergy	770,194.0	3,874,994.9	288.6	5.23	21.3	617.59	23.77	3.05
TUR39	Proenergy	770,194.0	3,875,016.2	288.4	0.57	21.3	617.59	23.77	3.05
TUR40	Proenergy	770,194.0	3,874,927.5	288.4	0.57	21.3	617.59	23.77	3.05
TUR41	Proenergy	770,194.0	3,874,949.9	288.4	5.23	21.3	617.59	23.77	3.05
PLUM2	PLUM2	770,159.0	3,874,865.0	288.3	0.05	7.6	477.59	1.97	0.61
PLUM3	PLUM3	770,249.0	3,874,845.0	290.6	0.05	7.6	477.59	1.97	0.61
PLUM4	PLUM4	770,159.0	3,874,845.0	288.7	0.05	7.6	477.59	1.97	0.61
PLUM7	PLLUM7	770,189.0	3,874,865.0	288.9	0.05	7.6	477.59	1.97	0.61
PLUM8	PLUM8	770,129.0	3,874,865.0	287.9	0.05	7.6	477.59	1.97	0.61
PLUM9	PLUM9	770,189.0	3,874,845.0	289.2	0.05	7.6	477.59	1.97	0.61
PLUM10	PLUM10	770,129.0	3,874,845.0	288.0	0.05	7.6	477.59	1.97	0.61
PLUM1	PLUM1	770,249.0	3,874,865.0	290.2	0.05	7.6	477.59	1.97	0.61
PLUM5	PLUM5	770,219.0	3,874,865.0	288.7	0.05	7.6	477.59	1.97	0.61
PLUM6	PLUM6	770,219.0	3,874,845.0	289.1	0.05	7.6	477.59	1.97	0.61
PLUM2B	PLUM2	770,161.0	3,874,865.0	288.3	0.05	7.6	477.59	1.97	0.61
PLUM3B	PLUM3	770,251.0	3,874,845.0	290.7	0.05	7.6	477.59	1.97	0.61
PLUM4B	PLUM4	770,161.0	3,874,845.0	288.7	0.05	7.6	477.59	1.97	0.61
PLUM7B	PLLUM7	770,191.0	3,874,865.0	288.9	0.05	7.6	477.59	1.97	0.61
PLUM8B	PLUM8	770,131.0	3,874,865.0	287.9	0.05	7.6	477.59	1.97	0.61
PLUM9B	PLUM9	770,191.0	3,874,845.0	289.2	0.05	7.6	477.59	1.97	0.61
PLUM10B	PLUM10	770,131.0	3,874,845.0	288.0	0.05	7.6	477.59	1.97	0.61
PLUM1B	PLUM1	770,251.0	3,874,865.0	290.4	0.05	7.6	477.59	1.97	0.61
PLUM5B	PLUM5	770,221.0	3,874,865.0	288.7	0.05	7.6	477.59	1.97	0.61
PLUM6B	PLUM6	770,221.0	3,874,845.0	289.1	0.05	7.6	477.59	1.97	0.61

Table C.2 - MZX PM_{10} Point Sources

Model ID	Description	UTM x (m)	UTM y (m)	Elevation (m)	Emission Rate (g/s)	Stack Height (m)	Stack Temp (K)	Stack Velocity (m/s)	Stack Diameter (m)
TUR18	350	770,118.3	3,874,628.4	259.1	0.0176	24.4	740.37	22.42	3.35
TUR19	350	770,118.3	3,874,661.6	264.9	0.0176	24.4	740.37	22.42	3.35
TUR20	350	770,118.3	3,874,694.8	268.5	0.0176	24.4	740.37	22.42	3.35
TUR21	350	770,118.3	3,874,728.0	288.0	0.0176	24.4	740.37	22.42	3.35
TUR22	350	770,118.3	3,874,761.2	288.5	0.0176	24.4	740.37	22.42	3.35
TUR23	350	770,118.3	3,874,794.4	289.3	0.0176	24.4	740.37	22.42	3.35
TUR24	350	770,262.3	3,874,777.6	292.1	0.0176	24.4	740.37	22.42	3.35
TUR25	350	770,262.3	3,874,810.8	292.0	0.0176	24.4	740.37	22.42	3.35
TUR26	350	770,227.4	3,874,618.7	273.7	0.0176	24.4	740.37	22.42	3.35
TUR27	350	770,227.4	3,874,651.9	273.4	0.0176	24.4	740.37	22.42	3.35
TUR28	350	770,227.4	3,874,685.1	267.7	0.0176	24.4	740.37	22.42	3.35
TUR29	350	770,227.4	3,874,718.3	277.3	0.0176	24.4	740.37	22.42	3.35
TUR30	350	770,227.4	3,874,751.5	289.3	0.0176	24.4	740.37	22.42	3.35
TUR31	350	770,227.4	3,874,784.7	289.6	0.0176	24.4	740.37	22.42	3.35
TUR32	350	770,363.5	3,874,770.6	291.2	0.0176	24.4	740.37	22.42	3.35
TUR33	350	770,363.5	3,874,803.8	291.5	0.0176	24.4	740.37	22.42	3.35
TUR1	130	770,262.4	3,874,613.0	285.6	0.0088	15.2	766.48	21.46	2.74
TUR2	130	770,369.4	3,874,613.0	268.6	0.0088	15.2	766.48	21.46	2.74
TUR3	130	770,262.4	3,874,629.5	286.7	0.0088	15.2	766.48	21.46	2.74
TUR4	130	770,369.4	3,874,629.5	269.0	0.0088	15.2	766.48	21.46	2.74
TUR5	130	770,262.4	3,874,646.0	287.2	0.0088	15.2	766.48	21.46	2.74
TUR6	130	770,369.4	3,874,646.0	270.5	0.0088	15.2	766.48	21.46	2.74
TUR7	130	770,262.4	3,874,662.5	285.6	0.0088	15.2	766.48	21.46	2.74
TUR8	130	770,369.4	3,874,662.5	273.5	0.0088	15.2	766.48	21.46	2.74
TUR9	130	770,262.4	3,874,679.0	281.7	0.0088	15.2	766.48	21.46	2.74
TUR10	130	770,369.4	3,874,679.0	277.9	0.0088	15.2	766.48	21.46	2.74
TUR11	130	770,262.4	3,874,695.5	278.4	0.0088	15.2	766.48	21.46	2.74
TUR12	130	770,369.4	3,874,695.5	283.4	0.0088	15.2	766.48	21.46	2.74
TUR13	130	770,261.8	3,874,716.5	277.8	0.0088	15.2	766.48	21.46	2.74
TUR14	130	770,368.8	3,874,716.5	289.1	0.0088	15.2	766.48	21.46	2.74
TUR15	130	770,261.8	3,874,733.0	288.2	0.0088	15.2	766.48	21.46	2.74
TUR16	130	770,368.8	3,874,733.0	290.5	0.0088	15.2	766.48	21.46	2.74
TUR17	130	770,261.8	3,874,749.5	290.6	0.0088	15.2	766.48	21.46	2.74
TUR34	Proenergy	770,194.0	3,875,130.1	288.7	0.0214	21.3	617.59	23.77	3.05
TUR35	Proenergy	770,194.0	3,875,150.5	288.6	0.0214	21.3	617.59	23.77	3.05
TUR36	Proenergy	770,194.0	3,875,063.3	288.8	0.0214	21.3	617.59	23.77	3.05
TUR37	Proenergy	770,194.0	3,875,083.2	288.7	0.0214	21.3	617.59	23.77	3.05
TUR38	Proenergy	770,194.0	3,874,994.9	288.6	0.0214	21.3	617.59	23.77	3.05
TUR39	Proenergy	770,194.0	3,875,016.2	288.4	0.0214	21.3	617.59	23.77	3.05
TUR40	Proenergy	770,194.0	3,874,927.5	288.4	0.0214	21.3	617.59	23.77	3.05
TUR41	Proenergy	770,194.0	3,874,949.9	288.4	0.0214	21.3	617.59	23.77	3.05
PLUM2	PLUM2	770,159.0	3,874,865.0	288.3	0.0003	7.6	477.59	1.97	0.61
PLUM3	PLUM3	770,249.0	3,874,845.0	290.6	0.0003	7.6	477.59	1.97	0.61
PLUM4	PLUM4	770,159.0	3,874,845.0	288.7	0.0003	7.6	477.59	1.97	0.61
PLUM7	PLLUM7	770,189.0	3,874,865.0	288.9	0.0003	7.6	477.59	1.97	0.61
PLUM8	PLUM8	770,129.0	3,874,865.0	287.9	0.0003	7.6	477.59	1.97	0.61
PLUM9	PLUM9	770,189.0	3,874,845.0	289.2	0.0003	7.6	477.59	1.97	0.61
PLUM10	PLUM10	770,129.0	3,874,845.0	288.0	0.0003	7.6	477.59	1.97	0.61
PLUM1	PLUM1	770,249.0	3,874,865.0	290.2	0.0003	7.6	477.59	1.97	0.61
PLUM5	PLUM5	770,219.0	3,874,865.0	288.7	0.0003	7.6	477.59	1.97	0.61
PLUM6	PLUM6	770,219.0	3,874,845.0	289.1	0.0003	7.6	477.59	1.97	0.61
PLUM2B	PLUM2	770,161.0	3,874,865.0	288.3	0.0003	7.6	477.59	1.97	0.61
PLUM3B	PLUM3	770,251.0	3,874,845.0	290.7	0.0003	7.6	477.59	1.97	0.61
PLUM4B	PLUM4	770,161.0	3,874,845.0	288.7	0.0003	7.6	477.59	1.97	0.61
PLUM7B	PLLUM7	770,191.0	3,874,865.0	288.9	0.0003	7.6	477.59	1.97	0.61
PLUM8B	PLUM8	770,131.0	3,874,865.0	287.9	0.0003	7.6	477.59	1.97	0.61
PLUM9B	PLUM9	770,191.0	3,874,845.0	289.2	0.0003	7.6	477.59	1.97	0.61
PLUM10B	PLUM10	770,131.0	3,874,845.0	288.0	0.0003	7.6	477.59	1.97	0.61
PLUM1B	PLUM1	770,251.0	3,874,865.0	290.4	0.0003	7.6	477.59	1.97	0.61
PLUM5B	PLUM5	770,221.0	3,874,865.0	288.7	0.0003	7.6	477.59	1.97	0.61
PLUM6B	PLUM6	770,221.0	3,874,845.0	289.1	0.0003	7.6	477.59	1.97	0.61

Table C.3 - MZX SO_2 Point Sources

Model ID	Description	UTM x (m)	UTM y (m)	Elevation (m)	Emission Rate (g/s)	Stack Height (m)	Stack Temp (K)	Stack Velocity (m/s)	Stack Diameter (m)
TUR18	350	770,118.3	3,874,628.4	259.1	0.1323	24.4	740.37	22.42	3.35
TUR19	350	770,118.3	3,874,661.6	264.9	0.1323	24.4	740.37	22.42	3.35
TUR20	350	770,118.3	3,874,694.8	268.5	0.1323	24.4	740.37	22.42	3.35
TUR21	350	770,118.3	3,874,728.0	288.0	0.1323	24.4	740.37	22.42	3.35
TUR22	350	770,118.3	3,874,761.2	288.5	0.1323	24.4	740.37	22.42	3.35
TUR23	350	770,118.3	3,874,794.4	289.3	0.1323	24.4	740.37	22.42	3.35
TUR24	350	770,262.3	3,874,777.6	292.1	0.1323	24.4	740.37	22.42	3.35
TUR25	350	770,262.3	3,874,810.8	292.0	0.1323	24.4	740.37	22.42	3.35
TUR26	350	770,227.4	3,874,618.7	273.7	0.1323	24.4	740.37	22.42	3.35
TUR27	350	770,227.4	3,874,651.9	273.4	0.1323	24.4	740.37	22.42	3.35
TUR28	350	770,227.4	3,874,685.1	267.7	0.1323	24.4	740.37	22.42	3.35
TUR29	350	770,227.4	3,874,718.3	277.3	0.1323	24.4	740.37	22.42	3.35
TUR30	350	770,227.4	3,874,751.5	289.3	0.1323	24.4	740.37	22.42	3.35
TUR31	350	770,227.4	3,874,784.7	289.6	0.1323	24.4	740.37	22.42	3.35
TUR32	350	770,363.5	3,874,770.6	291.2	0.1323	24.4	740.37	22.42	3.35
TUR33	350	770,363.5	3,874,803.8	291.5	0.1323	24.4	740.37	22.42	3.35
TUR1	130	770,262.4	3,874,613.0	285.6	0.0630	15.2	766.48	21.46	2.74
TUR2	130	770,369.4	3,874,613.0	268.6	0.0630	15.2	766.48	21.46	2.74
TUR3	130	770,262.4	3,874,629.5	286.7	0.0630	15.2	766.48	21.46	2.74
TUR4	130	770,369.4	3,874,629.5	269.0	0.0630	15.2	766.48	21.46	2.74
TUR5	130	770,262.4	3,874,646.0	287.2	0.0630	15.2	766.48	21.46	2.74
TUR6	130	770,369.4	3,874,646.0	270.5	0.0630	15.2	766.48	21.46	2.74
TUR7	130	770,262.4	3,874,662.5	285.6	0.0630	15.2	766.48	21.46	2.74
TUR8	130	770,369.4	3,874,662.5	273.5	0.0630	15.2	766.48	21.46	2.74
TUR9	130	770,262.4	3,874,679.0	281.7	0.0630	15.2	766.48	21.46	2.74
TUR10	130	770,369.4	3,874,679.0	277.9	0.0630	15.2	766.48	21.46	2.74
TUR11	130	770,262.4	3,874,695.5	278.4	0.0630	15.2	766.48	21.46	2.74
TUR12	130	770,369.4	3,874,695.5	283.4	0.0630	15.2	766.48	21.46	2.74
TUR13	130	770,261.8	3,874,716.5	277.8	0.0630	15.2	766.48	21.46	2.74
TUR14	130	770,368.8	3,874,716.5	289.1	0.0630	15.2	766.48	21.46	2.74
TUR15	130	770,261.8	3,874,733.0	288.2	0.0630	15.2	766.48	21.46	2.74
TUR16	130	770,368.8	3,874,733.0	290.5	0.0630	15.2	766.48	21.46	2.74
TUR17	130	770,261.8	3,874,749.5	290.6	0.0630	15.2	766.48	21.46	2.74
TUR34	Proenergy	770,194.0	3,875,130.1	288.7	0.1625	21.3	617.59	23.77	3.05
TUR35	Proenergy	770,194.0	3,875,150.5	288.6	0.1625	21.3	617.59	23.77	3.05
TUR36	Proenergy	770,194.0	3,875,063.3	288.8	0.1625	21.3	617.59	23.77	3.05
TUR37	Proenergy	770,194.0	3,875,083.2	288.7	0.1625	21.3	617.59	23.77	3.05
TUR38	Proenergy	770,194.0	3,874,994.9	288.6	0.1625	21.3	617.59	23.77	3.05
TUR39	Proenergy	770,194.0	3,875,016.2	288.4	0.1625	21.3	617.59	23.77	3.05
TUR40	Proenergy	770,194.0	3,874,927.5	288.4	0.1625	21.3	617.59	23.77	3.05
TUR41	Proenergy	770,194.0	3,874,949.9	288.4	0.1625	21.3	617.59	23.77	3.05
PLUM2	PLUM2	770,159.0	3,874,865.0	288.3	0.0004	7.6	477.59	1.97	0.61
PLUM3	PLUM3	770,249.0	3,874,845.0	290.6	0.0004	7.6	477.59	1.97	0.61
PLUM4	PLUM4	770,159.0	3,874,845.0	288.7	0.0004	7.6	477.59	1.97	0.61
PLUM7	PLLUM7	770,189.0	3,874,865.0	288.9	0.0004	7.6	477.59	1.97	0.61
PLUM8	PLUM8	770,129.0	3,874,865.0	287.9	0.0004	7.6	477.59	1.97	0.61
PLUM9	PLUM9	770,189.0	3,874,845.0	289.2	0.0004	7.6	477.59	1.97	0.61
PLUM10	PLUM10	770,129.0	3,874,845.0	288.0	0.0004	7.6	477.59	1.97	0.61
PLUM1	PLUM1	770,249.0	3,874,865.0	290.2	0.0004	7.6	477.59	1.97	0.61
PLUM5	PLUM5	770,219.0	3,874,865.0	288.7	0.0004	7.6	477.59	1.97	0.61
PLUM6	PLUM6	770,219.0	3,874,845.0	289.1	0.0004	7.6	477.59	1.97	0.61
PLUM2B	PLUM2	770,161.0	3,874,865.0	288.3	0.0004	7.6	477.59	1.97	0.61
PLUM3B	PLUM3	770,251.0	3,874,845.0	290.7	0.0004	7.6	477.59	1.97	0.61
PLUM4B	PLUM4	770,161.0	3,874,845.0	288.7	0.0004	7.6	477.59	1.97	0.61
PLUM7B	PLLUM7	770,191.0	3,874,865.0	288.9	0.0004	7.6	477.59	1.97	0.61
PLUM8B	PLUM8	770,131.0	3,874,865.0	287.9	0.0004	7.6	477.59	1.97	0.61
PLUM9B	PLUM9	770,191.0	3,874,845.0	289.2	0.0004	7.6	477.59	1.97	0.61
PLUM10B	PLUM10	770,131.0	3,874,845.0	288.0	0.0004	7.6	477.59	1.97	0.61
PLUM1B	PLUM1	770,251.0	3,874,865.0	290.4	0.0004	7.6	477.59	1.97	0.61
PLUM5B	PLUM5	770,221.0	3,874,865.0	288.7	0.0004	7.6	477.59	1.97	0.61
PLUM6B	PLUM6	770,221.0	3,874,845.0	289.1	0.0004	7.6	477.59	1.97	0.61

Table C.4 - MZX NO_2 Point Sources (1-hr Averaging Period)

Model ID	Description	UTM x (m)	UTM y (m)	Elevation (m)	Emission Rate (g/s)	Stack Height (m)	Stack Temp (K)	Stack Velocity (m/s)	Stack Diameter (m)
TUR18	350	770,118.3	3,874,628.4	259.1	0.82	24.4	740.37	22.42	3.35
TUR19	350	770,118.3	3,874,661.6	264.9	0.38	24.4	740.37	22.42	3.35
TUR20	350	770,118.3	3,874,694.8	268.5	0.82	24.4	740.37	22.42	3.35
TUR21	350	770,118.3	3,874,728.0	288.0	0.38	24.4	740.37	22.42	3.35
TUR22	350	770,118.3	3,874,761.2	288.5	0.38	24.4	740.37	22.42	3.35
TUR23	350	770,118.3	3,874,794.4	289.3	0.38	24.4	740.37	22.42	3.35
TUR24	350	770,262.3	3,874,777.6	292.1	0.38	24.4	740.37	22.42	3.35
TUR25	350	770,262.3	3,874,810.8	292.0	0.38	24.4	740.37	22.42	3.35
TUR26	350	770,227.4	3,874,618.7	273.7	0.82	24.4	740.37	22.42	3.35
TUR27	350	770,227.4	3,874,651.9	273.4	0.82	24.4	740.37	22.42	3.35
TUR28	350	770,227.4	3,874,685.1	267.7	0.82	24.4	740.37	22.42	3.35
TUR29	350	770,227.4	3,874,718.3	277.3	0.38	24.4	740.37	22.42	3.35
TUR30	350	770,227.4	3,874,751.5	289.3	0.38	24.4	740.37	22.42	3.35
TUR31	350	770,227.4	3,874,784.7	289.6	0.38	24.4	740.37	22.42	3.35
TUR32	350	770,363.5	3,874,770.6	291.2	0.38	24.4	740.37	22.42	3.35
TUR33	350	770,363.5	3,874,803.8	291.5	0.38	24.4	740.37	22.42	3.35
TUR1	130	770,262.4	3,874,613.0	285.6	0.18	15.2	766.48	21.46	2.74
TUR2	130	770,369.4	3,874,613.0	268.6	0.28	15.2	766.48	21.46	2.74
TUR3	130	770,262.4	3,874,629.5	286.7	0.18	15.2	766.48	21.46	2.74
TUR4	130	770,369.4	3,874,629.5	269.0	0.28	15.2	766.48	21.46	2.74
TUR5	130	770,262.4	3,874,646.0	287.2	0.18	15.2	766.48	21.46	2.74
TUR6	130	770,369.4	3,874,646.0	270.5	0.28	15.2	766.48	21.46	2.74
TUR7	130	770,262.4	3,874,662.5	285.6	0.18	15.2	766.48	21.46	2.74
TUR8	130	770,369.4	3,874,662.5	273.5	0.18	15.2	766.48	21.46	2.74
TUR9	130	770,262.4	3,874,679.0	281.7	0.18	15.2	766.48	21.46	2.74
TUR10	130	770,369.4	3,874,679.0	277.9	0.18	15.2	766.48	21.46	2.74
TUR11	130	770,262.4	3,874,695.5	278.4	0.28	15.2	766.48	21.46	2.74
TUR12	130	770,369.4	3,874,695.5	283.4	0.18	15.2	766.48	21.46	2.74
TUR13	130	770,261.8	3,874,716.5	277.8	0.28	15.2	766.48	21.46	2.74
TUR14	130	770,368.8	3,874,716.5	289.1	0.18	15.2	766.48	21.46	2.74
TUR15	130	770,261.8	3,874,733.0	288.2	0.18	15.2	766.48	21.46	2.74
TUR16	130	770,368.8	3,874,733.0	290.5	0.18	15.2	766.48	21.46	2.74
TUR17	130	770,261.8	3,874,749.5	290.6	0.18	15.2	766.48	21.46	2.74
TUR34	Proenergy	770,194.0	3,875,130.1	288.7	0.47	21.3	617.59	23.77	3.05
TUR35	Proenergy	770,194.0	3,875,150.5	288.6	2.58	21.3	617.59	23.77	3.05
TUR36	Proenergy	770,194.0	3,875,063.3	288.8	2.58	21.3	617.59	23.77	3.05
TUR37	Proenergy	770,194.0	3,875,083.2	288.7	2.58	21.3	617.59	23.77	3.05
TUR38	Proenergy	770,194.0	3,874,994.9	288.6	2.58	21.3	617.59	23.77	3.05
TUR39	Proenergy	770,194.0	3,875,016.2	288.4	0.47	21.3	617.59	23.77	3.05
TUR40	Proenergy	770,194.0	3,874,927.5	288.4	0.47	21.3	617.59	23.77	3.05
TUR41	Proenergy	770,194.0	3,874,949.9	288.4	2.58	21.3	617.59	23.77	3.05
PLUM2	PLUM2	770,159.0	3,874,865.0	288.3	0.03	7.6	477.59	1.97	0.61
PLUM3	PLUM3	770,249.0	3,874,845.0	290.6	0.03	7.6	477.59	1.97	0.61
PLUM4	PLUM4	770,159.0	3,874,845.0	288.7	0.03	7.6	477.59	1.97	0.61
PLUM7	PLLUM7	770,189.0	3,874,865.0	288.9	0.03	7.6	477.59	1.97	0.61
PLUM8	PLUM8	770,129.0	3,874,865.0	287.9	0.03	7.6	477.59	1.97	0.61
PLUM9	PLUM9	770,189.0	3,874,845.0	289.2	0.03	7.6	477.59	1.97	0.61
PLUM10	PLUM10	770,129.0	3,874,845.0	288.0	0.03	7.6	477.59	1.97	0.61
PLUM1	PLUM1	770,249.0	3,874,865.0	290.2	0.03	7.6	477.59	1.97	0.61
PLUM5	PLUM5	770,219.0	3,874,865.0	288.7	0.03	7.6	477.59	1.97	0.61
PLUM6	PLUM6	770,219.0	3,874,845.0	289.1	0.03	7.6	477.59	1.97	0.61
PLUM2B	PLUM2	770,161.0	3,874,865.0	288.3	0.03	7.6	477.59	1.97	0.61
PLUM3B	PLUM3	770,251.0	3,874,845.0	290.7	0.03	7.6	477.59	1.97	0.61
PLUM4B	PLUM4	770,161.0	3,874,845.0	288.7	0.03	7.6	477.59	1.97	0.61
PLUM7B	PLLUM7	770,191.0	3,874,865.0	288.9	0.03	7.6	477.59	1.97	0.61
PLUM8B	PLUM8	770,131.0	3,874,865.0	287.9	0.03	7.6	477.59	1.97	0.61
PLUM9B	PLUM9	770,191.0	3,874,845.0	289.2	0.03	7.6	477.59	1.97	0.61
PLUM10B	PLUM10	770,131.0	3,874,845.0	288.0	0.03	7.6	477.59	1.97	0.61
PLUM1B	PLUM1	770,251.0	3,874,865.0	290.4	0.03	7.6	477.59	1.97	0.61
PLUM5B	PLUM5	770,221.0	3,874,865.0	288.7	0.03	7.6	477.59	1.97	0.61
PLUM6B	PLUM6	770,221.0	3,874,845.0	289.1	0.03	7.6	477.59	1.97	0.61

Table C.4b - MZX NO_2 Point Sources (Annual Averaging Period)

Model ID	Description	UTM x (m)	UTM y (m)	Elevation (m)	Emission Rate (g/s)	Stack Height (m)	Stack Temp (K)	Stack Velocity (m/s)	Stack Diameter (m)
TUR18	350	770,118.3	3,874,628.4	259.1	0.34	24.4	740.37	22.42	3.35
TUR19	350	770,118.3	3,874,661.6	264.9	0.34	24.4	740.37	22.42	3.35
TUR20	350	770,118.3	3,874,694.8	268.5	0.34	24.4	740.37	22.42	3.35
TUR21	350	770,118.3	3,874,728.0	288.0	0.34	24.4	740.37	22.42	3.35
TUR22	350	770,118.3	3,874,761.2	288.5	0.34	24.4	740.37	22.42	3.35
TUR23	350	770,118.3	3,874,794.4	289.3	0.34	24.4	740.37	22.42	3.35
TUR24	350	770,262.3	3,874,777.6	292.1	0.34	24.4	740.37	22.42	3.35
TUR25	350	770,262.3	3,874,810.8	292.0	0.34	24.4	740.37	22.42	3.35
TUR26	350	770,227.4	3,874,618.7	273.7	0.34	24.4	740.37	22.42	3.35
TUR27	350	770,227.4	3,874,651.9	273.4	0.34	24.4	740.37	22.42	3.35
TUR28	350	770,227.4	3,874,685.1	267.7	0.34	24.4	740.37	22.42	3.35
TUR29	350	770,227.4	3,874,718.3	277.3	0.34	24.4	740.37	22.42	3.35
TUR30	350	770,227.4	3,874,751.5	289.3	0.34	24.4	740.37	22.42	3.35
TUR31	350	770,227.4	3,874,784.7	289.6	0.34	24.4	740.37	22.42	3.35
TUR32	350	770,363.5	3,874,770.6	291.2	0.34	24.4	740.37	22.42	3.35
TUR33	350	770,363.5	3,874,803.8	291.5	0.34	24.4	740.37	22.42	3.35
TUR1	130	770,262.4	3,874,613.0	285.6	0.16	15.2	766.48	21.46	2.74
TUR2	130	770,369.4	3,874,613.0	268.6	0.16	15.2	766.48	21.46	2.74
TUR3	130	770,262.4	3,874,629.5	286.7	0.16	15.2	766.48	21.46	2.74
TUR4	130	770,369.4	3,874,629.5	269.0	0.16	15.2	766.48	21.46	2.74
TUR5	130	770,262.4	3,874,646.0	287.2	0.16	15.2	766.48	21.46	2.74
TUR6	130	770,369.4	3,874,646.0	270.5	0.16	15.2	766.48	21.46	2.74
TUR7	130	770,262.4	3,874,662.5	285.6	0.16	15.2	766.48	21.46	2.74
TUR8	130	770,369.4	3,874,662.5	273.5	0.16	15.2	766.48	21.46	2.74
TUR9	130	770,262.4	3,874,679.0	281.7	0.16	15.2	766.48	21.46	2.74
TUR10	130	770,369.4	3,874,679.0	277.9	0.16	15.2	766.48	21.46	2.74
TUR11	130	770,262.4	3,874,695.5	278.4	0.16	15.2	766.48	21.46	2.74
TUR12	130	770,369.4	3,874,695.5	283.4	0.16	15.2	766.48	21.46	2.74
TUR13	130	770,261.8	3,874,716.5	277.8	0.16	15.2	766.48	21.46	2.74
TUR14	130	770,368.8	3,874,716.5	289.1	0.16	15.2	766.48	21.46	2.74
TUR15	130	770,261.8	3,874,733.0	288.2	0.16	15.2	766.48	21.46	2.74
TUR16	130	770,368.8	3,874,733.0	290.5	0.16	15.2	766.48	21.46	2.74
TUR17	130	770,261.8	3,874,749.5	290.6	0.16	15.2	766.48	21.46	2.74
TUR34	Proenergy	770,194.0	3,875,130.1	288.7	0.46	21.3	617.59	23.77	3.05
TUR35	Proenergy	770,194.0	3,875,150.5	288.6	0.46	21.3	617.59	23.77	3.05
TUR36	Proenergy	770,194.0	3,875,063.3	288.8	0.46	21.3	617.59	23.77	3.05
TUR37	Proenergy	770,194.0	3,875,083.2	288.7	0.46	21.3	617.59	23.77	3.05
TUR38	Proenergy	770,194.0	3,874,994.9	288.6	0.46	21.3	617.59	23.77	3.05
TUR39	Proenergy	770,194.0	3,875,016.2	288.4	0.46	21.3	617.59	23.77	3.05
TUR40	Proenergy	770,194.0	3,874,927.5	288.4	0.46	21.3	617.59	23.77	3.05
TUR41	Proenergy	770,194.0	3,874,949.9	288.4	0.46	21.3	617.59	23.77	3.05
PLUM2	PLUM2	770,159.0	3,874,865.0	288.3	0.03	7.6	477.59	1.97	0.61
PLUM3	PLUM3	770,249.0	3,874,845.0	290.6	0.03	7.6	477.59	1.97	0.61
PLUM4	PLUM4	770,159.0	3,874,845.0	288.7	0.03	7.6	477.59	1.97	0.61
PLUM7	PLLUM7	770,189.0	3,874,865.0	288.9	0.03	7.6	477.59	1.97	0.61
PLUM8	PLUM8	770,129.0	3,874,865.0	287.9	0.03	7.6	477.59	1.97	0.61
PLUM9	PLUM9	770,189.0	3,874,845.0	289.2	0.03	7.6	477.59	1.97	0.61
PLUM10	PLUM10	770,129.0	3,874,845.0	288.0	0.03	7.6	477.59	1.97	0.61
PLUM1	PLUM1	770,249.0	3,874,865.0	290.2	0.03	7.6	477.59	1.97	0.61
PLUM5	PLUM5	770,219.0	3,874,865.0	288.7	0.03	7.6	477.59	1.97	0.61
PLUM6	PLUM6	770,219.0	3,874,845.0	289.1	0.03	7.6	477.59	1.97	0.61
PLUM2B	PLUM2	770,161.0	3,874,865.0	288.3	0.03	7.6	477.59	1.97	0.61
PLUM3B	PLUM3	770,251.0	3,874,845.0	290.7	0.03	7.6	477.59	1.97	0.61
PLUM4B	PLUM4	770,161.0	3,874,845.0	288.7	0.03	7.6	477.59	1.97	0.61
PLUM7B	PLLUM7	770,191.0	3,874,865.0	288.9	0.03	7.6	477.59	1.97	0.61
PLUM8B	PLUM8	770,131.0	3,874,865.0	287.9	0.03	7.6	477.59	1.97	0.61
PLUM9B	PLUM9	770,191.0	3,874,845.0	289.2	0.03	7.6	477.59	1.97	0.61
PLUM10B	PLUM10	770,131.0	3,874,845.0	288.0	0.03	7.6	477.59	1.97	0.61
PLUM1B	PLUM1	770,251.0	3,874,865.0	290.4	0.03	7.6	477.59	1.97	0.61
PLUM5B	PLUM5	770,221.0	3,874,865.0	288.7	0.03	7.6	477.59	1.97	0.61
PLUM6B	PLUM6	770,221.0	3,874,845.0	289.1	0.03	7.6	477.59	1.97	0.61

Table C.5 - MZX $PM_{2.5}$ Point Sources

Model ID	Description	UTM x (m)	UTM y (m)	Elevation (m)	Emission Rate (g/s)	Stack Height (m)	Stack Temp (K)	Stack Velocity (m/s)	Stack Diameter (m)
TUR18	350	770,118.3	3,874,628.4	259.1	0.0176	24.4	740.37	22.42	3.35
TUR19	350	770,118.3	3,874,661.6	264.9	0.0176	24.4	740.37	22.42	3.35
TUR20	350	770,118.3	3,874,694.8	268.5	0.0176	24.4	740.37	22.42	3.35
TUR21	350	770,118.3	3,874,728.0	288.0	0.0176	24.4	740.37	22.42	3.35
TUR22	350	770,118.3	3,874,761.2	288.5	0.0176	24.4	740.37	22.42	3.35
TUR23	350	770,118.3	3,874,794.4	289.3	0.0176	24.4	740.37	22.42	3.35
TUR24	350	770,262.3	3,874,777.6	292.1	0.0176	24.4	740.37	22.42	3.35
TUR25	350	770,262.3	3,874,810.8	292.0	0.0176	24.4	740.37	22.42	3.35
TUR26	350	770,227.4	3,874,618.7	273.7	0.0176	24.4	740.37	22.42	3.35
TUR27	350	770,227.4	3,874,651.9	273.4	0.0176	24.4	740.37	22.42	3.35
TUR28	350	770,227.4	3,874,685.1	267.7	0.0176	24.4	740.37	22.42	3.35
TUR29	350	770,227.4	3,874,718.3	277.3	0.0176	24.4	740.37	22.42	3.35
TUR30	350	770,227.4	3,874,751.5	289.3	0.0176	24.4	740.37	22.42	3.35
TUR31	350	770,227.4	3,874,784.7	289.6	0.0176	24.4	740.37	22.42	3.35
TUR32	350	770,363.5	3,874,770.6	291.2	0.0176	24.4	740.37	22.42	3.35
TUR33	350	770,363.5	3,874,803.8	291.5	0.0176	24.4	740.37	22.42	3.35
TUR1	130	770,262.4	3,874,613.0	285.6	0.0088	15.2	766.48	21.46	2.74
TUR2	130	770,369.4	3,874,613.0	268.6	0.0088	15.2	766.48	21.46	2.74
TUR3	130	770,262.4	3,874,629.5	286.7	0.0088	15.2	766.48	21.46	2.74
TUR4	130	770,369.4	3,874,629.5	269.0	0.0088	15.2	766.48	21.46	2.74
TUR5	130	770,262.4	3,874,646.0	287.2	0.0088	15.2	766.48	21.46	2.74
TUR6	130	770,369.4	3,874,646.0	270.5	0.0088	15.2	766.48	21.46	2.74
TUR7	130	770,262.4	3,874,662.5	285.6	0.0088	15.2	766.48	21.46	2.74
TUR8	130	770,369.4	3,874,662.5	273.5	0.0088	15.2	766.48	21.46	2.74
TUR9	130	770,262.4	3,874,679.0	281.7	0.0088	15.2	766.48	21.46	2.74
TUR10	130	770,369.4	3,874,679.0	277.9	0.0088	15.2	766.48	21.46	2.74
TUR11	130	770,262.4	3,874,695.5	278.4	0.0088	15.2	766.48	21.46	2.74
TUR12	130	770,369.4	3,874,695.5	283.4	0.0088	15.2	766.48	21.46	2.74
TUR13	130	770,261.8	3,874,716.5	277.8	0.0088	15.2	766.48	21.46	2.74
TUR14	130	770,368.8	3,874,716.5	289.1	0.0088	15.2	766.48	21.46	2.74
TUR15	130	770,261.8	3,874,733.0	288.2	0.0088	15.2	766.48	21.46	2.74
TUR16	130	770,368.8	3,874,733.0	290.5	0.0088	15.2	766.48	21.46	2.74
TUR17	130	770,261.8	3,874,749.5	290.6	0.0088	15.2	766.48	21.46	2.74
TUR34	Proenergy	770,194.0	3,875,130.1	288.7	0.0214	21.3	617.59	23.77	3.05
TUR35	Proenergy	770,194.0	3,875,150.5	288.6	0.0214	21.3	617.59	23.77	3.05
TUR36	Proenergy	770,194.0	3,875,063.3	288.8	0.0214	21.3	617.59	23.77	3.05
TUR37	Proenergy	770,194.0	3,875,083.2	288.7	0.0214	21.3	617.59	23.77	3.05
TUR38	Proenergy	770,194.0	3,874,994.9	288.6	0.0214	21.3	617.59	23.77	3.05
TUR39	Proenergy	770,194.0	3,875,016.2	288.4	0.0214	21.3	617.59	23.77	3.05
TUR40	Proenergy	770,194.0	3,874,927.5	288.4	0.0214	21.3	617.59	23.77	3.05
TUR41	Proenergy	770,194.0	3,874,949.9	288.4	0.0214	21.3	617.59	23.77	3.05
PLUM2	PLUM2	770,159.0	3,874,865.0	288.3	0.0003	7.6	477.59	1.97	0.61
PLUM3	PLUM3	770,249.0	3,874,845.0	290.6	0.0003	7.6	477.59	1.97	0.61
PLUM4	PLUM4	770,159.0	3,874,845.0	288.7	0.0003	7.6	477.59	1.97	0.61
PLUM7	PLLUM7	770,189.0	3,874,865.0	288.9	0.0003	7.6	477.59	1.97	0.61
PLUM8	PLUM8	770,129.0	3,874,865.0	287.9	0.0003	7.6	477.59	1.97	0.61
PLUM9	PLUM9	770,189.0	3,874,845.0	289.2	0.0003	7.6	477.59	1.97	0.61
PLUM10	PLUM10	770,129.0	3,874,845.0	288.0	0.0003	7.6	477.59	1.97	0.61
PLUM1	PLUM1	770,249.0	3,874,865.0	290.2	0.0003	7.6	477.59	1.97	0.61
PLUM5	PLUM5	770,219.0	3,874,865.0	288.7	0.0003	7.6	477.59	1.97	0.61
PLUM6	PLUM6	770,219.0	3,874,845.0	289.1	0.0003	7.6	477.59	1.97	0.61
PLUM2B	PLUM2	770,161.0	3,874,865.0	288.3	0.0003	7.6	477.59	1.97	0.61
PLUM3B	PLUM3	770,251.0	3,874,845.0	290.7	0.0003	7.6	477.59	1.97	0.61
PLUM4B	PLUM4	770,161.0	3,874,845.0	288.7	0.0003	7.6	477.59	1.97	0.61
PLUM7B	PLLUM7	770,191.0	3,874,865.0	288.9	0.0003	7.6	477.59	1.97	0.61
PLUM8B	PLUM8	770,131.0	3,874,865.0	287.9	0.0003	7.6	477.59	1.97	0.61
PLUM9B	PLUM9	770,191.0	3,874,845.0	289.2	0.0003	7.6	477.59	1.97	0.61
PLUM10B	PLUM10	770,131.0	3,874,845.0	288.0	0.0003	7.6	477.59	1.97	0.61
PLUM1B	PLUM1	770,251.0	3,874,865.0	290.4	0.0003	7.6	477.59	1.97	0.61
PLUM5B	PLUM5	770,221.0	3,874,865.0	288.7	0.0003	7.6	477.59	1.97	0.61
PLUM6B	PLUM6	770,221.0	3,874,845.0	289.1	0.0003	7.6	477.59	1.97	0.61

Table C.6 - Offsite NO_2 Point Sources

Model ID	Facility ID	UTM x (m)	UTM y (m)	Elevation (m)	Emission Rate (g/s)	Stack Height (m)	Stack Temp (K)	Stack Velocity (m/s)	Stack Diameter (m)
RKLNA	Arcosa LW BR, LLC	746,870.0	3,888,350.0	66.48	8.48E+00	30.48	329.82	21.88	1.52
RKLNB	Arcosa LW BR, LLC	746,870.0	3,888,370.0	66.57	1.07E+00	24.38	327.59	12.19	0.76
RKLNC	Arcosa LW BR, LLC	746,850.0	3,888,350.0	66.16	5.73E+00	30.48	329.82	21.88	1.52
MSNOX1	Texas Gas Transmissions LLC	759,098.0	3,865,424.0	62.77	1.05E+00	12.19	766.67	17.37	1.83
MSNOX3	Texas Gas Transmissions LLC	759,024.0	3,865,329.0	62.49	6.79E+00	9.45	622.22	48.77	0.49
MSNOX4	Texas Gas Transmissions LLC	759,024.0	3,865,329.0	62.49	7.90E+00	9.45	622.22	48.77	0.49
MSNOX5	Texas Gas Transmissions LLC	759,024.0	3,865,329.0	62.49	7.45E+00	9.45	622.22	48.77	0.49
MSNOX6	Texas Gas Transmissions LLC	759,025.0	3,865,298.0	62.39	8.07E+00	9.45	622.22	48.77	0.49
MSNOX7	Texas Gas Transmissions LLC	759,000.0	3,865,298.0	62.58	4.21E+00	9.45	583.33	32.61	0.58
MSNOX8	Texas Gas Transmissions LLC	759,000.0	3,865,298.0	62.58	3.65E+00	9.45	583.33	32.61	0.58
MSNOX9	Texas Gas Transmissions LLC	759,001.0	3,865,267.0	62.56	3.88E+00	9.45	583.33	32.61	0.58
MSNOX10	Texas Gas Transmissions LLC	758,999.0	3,865,328.0	62.69	1.97E+00	5.79	751.67	24.69	0.20
MSNOX11	Texas Gas Transmissions LLC	758,999.0	3,865,328.0	62.69	1.97E+00	5.79	751.67	24.69	0.20
MSNOX12	Texas Gas Transmissions LLC	758,999.0	3,865,328.0	62.69	1.97E+00	5.79	751.67	24.69	0.20
MSNOX15	Texas Gas Transmissions LLC	759,124.0	3,865,394.0	62.94	4.66E-02	6.71	533.33	3.05	0.61
MSNOX16	Texas Gas Transmissions LLC	759,075.0	3,865,331.0	62.67	2.65E-02	4.27	533.33	3.05	0.46
MSNOX18	Texas Gas Transmissions LLC	758,974.0	3,865,297.0	63.03	6.30E-03	6.71	533.33	7.01	0.15
MSNOX19	Baptist Memorial Hospital	774,126.2	3,873,784.6	97.54	2.39E-02	30.48	0.00	0.00	0.30
MSNOX19A	Baptist Memorial Hospital	774,002.4	3,873,738.8	97.54	1.26E-01	9.14	463.71	3.05	0.53
MSNOX19B	Baptist Memorial Hospital	774,002.4	3,873,738.8	97.54	1.30E-01	9.14	463.71	3.05	0.53
MSNOX19C	Baptist Memorial Hospital	774,002.4	3,873,738.8	97.54	2.52E-01	9.14	444.82	3.05	0.63
MSNOX19D	Baptist Memorial Hospital	774,025.9	3,873,801.2	97.54	1.83E-01	3.96	755.37	169.00	0.25
MSNOX19E	Baptist Memorial Hospital	773,950.7	3,873,768.1	97.54	1.86E-01	5.49	755.37	169.00	0.25
MSNOX19F	Baptist Memorial Hospital	774,054.0	3,873,709.5	97.54	2.52E-01	3.96	755.37	169.00	0.25
MSNOX19G	Baptist Memorial Hospital	774,003.3	3,873,708.0	97.54	2.52E-01	3.96	755.37	169.00	0.25
MSNOX19H	Baptist Memorial Hospital	774,054.0	3,873,709.5	97.54	2.52E-01	3.96	755.37	169.00	0.25
MSNOX19I	Baptist Memorial Hospital	774,051.3	3,873,802.0	97.54	9.55E-02	3.96	725.93	9.75	0.61
MSNOX20A	JT Shannon Lumber Co.	771,492.4	3,871,923.5	87.85	4.10E-01	10.67	491.67	12.19	0.76
MSNOX20B	JT Shannon Lumber Co.	771,491.3	3,871,905.1	87.65	4.00E-02	15.24	491.67	12.19	0.61
MSNOX21	TVA Southaven	770,302.0	3,876,411.3	85.86	3.04E+00	45.72	361.11	20.73	5.49
MSNOX22	TVA Southaven	770,302.0	3,876,358.5	85.87	3.04E+00	45.72	361.11	20.73	5.49
MSNOX23	TVA Southaven	770,302.0	3,876,305.4	85.90	3.04E+00	45.72	361.11	20.73	5.49
MSNOX24	TVA Southaven	770,334.9	3,876,306.2	85.90	2.12E-01	27.74	561.11	10.09	0.66
MSNOX26	Rite Hite Products	773,278.0	3,872,067.0	82.76	1.45E-01	3.05	0.00	0.01	0.30
MSNOX27	Trunkline Gas Co., LLC	792,126.3	3,848,740.9	102.88	1.28E+01	11.58	672.22	14.93	0.61
MSNOX28	Trunkline Gas Co., LLC	792,100.3	3,848,740.3	102.91	1.28E+01	11.58	672.22	14.93	0.61
MSNOX29	Trunkline Gas Co., LLC	792,100.3	3,848,740.3	102.91	1.28E+01	11.58	672.22	14.93	0.61
MSNOX30	Trunkline Gas Co., LLC	792,100.3	3,848,740.3	102.91	1.28E+01	11.58	672.22	14.93	0.61
MSNOX31	Trunkline Gas Co., LLC	792,076.1	3,848,708.8	105.66	1.15E+01	11.89	672.22	50.90	0.41
MSNOX32	Trunkline Gas Co., LLC	792,076.1	3,848,708.8	105.66	1.15E+01	11.89	672.22	50.90	0.41
MSNOX33	Trunkline Gas Co., LLC	792,051.2	3,848,707.3	106.59	1.15E+01	11.89	672.22	50.90	0.41
MSNOX34	Trunkline Gas Co., LLC	792,121.1	3,848,894.9	106.78	5.42E+01	14.02	672.22	9.14	1.83
MSNOX35	Trunkline Gas Co., LLC	792,168.6	3,848,988.9	102.02	3.02E-02	6.10	866.67	34.14	0.25
MSNOX36	Trunkline Gas Co., LLC	792,002.7	3,848,613.2	105.56	2.52E-02	1.22	1005.56	2.01	0.15
MSNOX37	Trunkline Gas Co., LLC	792,049.3	3,848,738.3	106.54	1.89E-02	4.57	644.44	30.48	0.30
MSNOX38	Trunkline Gas Co., LLC	792,049.3	3,848,738.3	106.54	1.89E-02	4.57	644.44	30.48	0.30
MSNOX39	Trunkline Gas Co., LLC	792,144.4	3,848,957.4	102.98	1.89E-02	4.57	644.44	30.48	0.30
MSNOX40	Trunkline Gas Co., LLC	792,200.6	3,848,805.4	100.70	2.52E-03	3.05	644.44	30.48	0.30
MSNOX41	Trunkline Gas Co., LLC	792,174.6	3,848,803.9	103.15	2.52E-03	3.05	644.44	30.48	0.30
MSNOX42	Trunkline Gas Co., LLC	792,002.7	3,848,613.2	105.56	1.51E-02	3.05	255.56	0.01	0.30
MSNOX43	Niteo Products LLC	776,541.5	3,856,525.0	110.92	1.59E-01	3.05	491.67	12.19	0.30
MSNOX44	Nidec Motor Corporation	773,683.0	3,868,716.0	96.56	1.64E-03	3.05	491.67	12.19	0.30
MSNOX45	SXP Shulz Xtruded Products	776,679.0	3,857,023.2	120.15	1.27E-01	3.05	491.67	12.19	0.30
MSNOX46	Evercompounds LLC	786,112.0	3,876,564.4	97.80	1.76E-02	3.05	491.67	12.19	0.30
TNNOX01	TVA Allen	760,344.0	3,884,227.0	66.15	5.36E+00	53.30	359.00	17.30	6.71
TNNOX02	TVA Allen	760,341.0	3,884,181.0	66.23	5.36E+00	53.30	359.00	17.30	6.71
TNNOX03	TVA Allen	760,309.0	3,884,139.0	66.28	2.00E+00	15.20	526.00	10.40	1.22
TNNOX04	TVA Allen	760,061.0	3,884,120.0	65.22	1.10E-01	4.57	679.00	19.80	0.41
TNNOX05	TVA Allen	760,061.0	3,884,116.0	65.19	1.10E-01	4.57	679.00	19.80	0.41
TNNOX06	TVA Allen	760,060.0	3,884,112.0	65.15	1.10E-01	4.57	679.00	19.80	0.41
TNNOX07	Valero Refining Co. TN, LLC	765,865.3	3,886,440.0	70.57	1.10E+00	30.50	616.48	6.10	3.20
TNNOX08	Valero Refining Co. TN, LLC	765,925.9	3,886,526.1	70.60	5.60E-01	44.20	588.71	7.80	1.68
TNNOX09	Valero Refining Co. TN, LLC	765,810.2	3,886,325.6	69.57	3.78E+00	86.00	449.82	7.00	4.21
TNNOX10	Valero Refining Co. TN, LLC	765,882.7	3,886,436.5	70.33	1.05E+00	46.60	616.48	7.90	2.35
TNNOX11	Valero Refining Co. TN, LLC	765,882.7	3,886,436.5	70.33	8.40E-01	46.60	616.48	7.90	2.35
TNNOX12	Valero Refining Co. TN, LLC	765,934.7	3,886,525.9	70.58	3.10E-01	35.10	616.48	9.20	1.13
TNNOX13	Valero Refining Co. TN, LLC	765,915.3	3,886,526.5	70.63	3.90E-01	30.50	616.48	6.10	0.98

C) Air Quality Monitoring Requirements

The ambient air quality analysis is required to contain continuous air quality monitoring data. This data is gathered for purposes of determining whether emissions of any pollutant would cause or contribute to a violation of the standard or any maximum allowable increase. The facility must establish existing air quality in the area and air monitoring is required for each criteria pollutant that is proposed to be emitted at or above the de minimis. This requirement can be satisfied by either: 1) establishing a site-specific ambient monitoring network, or 2) using existing ambient monitoring data. If either the predicted modeled impact from an emission increase or the existing ambient concentration is less than the monitoring de minimis concentration, MDEQ has the discretionary authority to exempt an applicant from preconstruction ambient monitoring.

No de minimis air quality level is provided for ozone. However, any net emissions increase of 100-tpy or more of VOC or NOx (the precursors for ozone formation) require the proposed PSD project to perform an ambient impact analysis, including the gathering of ambient air quality data. The propose project has a proposed emissions increases of 417.4 tpy VOC and 423.4 tpy NOx. Since the proposed project NOx and VOC emissions exceed 100 tpy, MZX must establish existing air quality in the facility project area. To meet this requirement, MZX proposed to use an existing air quality monitor as opposed to establishing their own site-specific ambient monitoring network.

Preconstruction de Minims Chart

Pollutant	Averaging Period	Modeled Concentration ($\mu g/m^3$)	SMC ($\mu g/m3$)	Exceeds SMC (Yes/No)
SO_2	24-hr	2.31	13	No
NO_2	Annual	1.75	14	No
PM_{10}	24-hr	0.40	10	No
CO	8-hr	97.31	575	No

All pollutants and averaging periods are well below their respective SMC and as such, no pre-constructing monitoring is required for the proposed project.

Monitor Selection and Justification

Ambient background monitoring concentrations are necessary for any required full NAAQS analysis for the facility. Full impact analyses will be required for 1-hour and annual NO_2. However, given the vacature of the $PM_{2.5}$ significant monitoring concentration (SMC), per 40 CFR 51.166(I)(5) and CFR 52.21(i)(5)(i)(K), there are no specific pre-construction monitoring exemptions available for $PM_{2.5}$. Given the current, high quality data from existing state-run monitoring networks, MZX is proposing that no preconstruction monitoring be required for $PM_{2.5}$. Additionally, since the project emissions increase will exceed 100 tpy for both NO_x and VOC (precursors to ozone), MZX has selected a background monitor for ozone. Nearby

ambient background monitoring stations were reviewed, and the following stations where chosen as appropriately representative background monitoring stations.

NO_2 Background Monitor

The following site was selected as an appropriately representative background monitor for NO_2:

NO_2 – LH Polk and Colonial Dr., Marion Site (AQS Site ID 05-035-005)

The Marion site is the closest geographically to the MZX site (located less than 30 km to the northwest) and has valid data through the most recent monitoring year (2024). Marion is in a similar climatological region and is surrounded by similar residential and light industrial land use types. It is classified as a near road monitor and as such provides a more conservative background value for use in the NO_2 modeling analysis.

While background concentrations in the form of the NAAQS standards will be derived for use in the NAAQS modeling analyses results summaries, background concentrations may be derived for use in the NAAQS analyses based on a season and hour-of-day approach. Available EPA guidance (e.g., *Clarification on the Use of AERMOD Dispersion Modeling of Demonstrating Compliance with NO_2 National Ambient Air Quality Standard, September 2014*) would be used for derivation of the season and hour of day background concentrations.

$PM_{2.5}$ Background Monitor

$PM_{2.5}$ model impacts are below both the 24-hour and annual SILs. As such, no cumulative modeling analyses including ambient background concentrations were required. Nevertheless, since the SMC for the $PM_{2.5}$ was vacated, there is no currently-established threshold that specifically eliminates pre-construction monitoring requirement and thus it must still be addressed. The vacated SMC was set at 4 ug/m^3 on a 24-hour averaging period basis, far in excess of the 1.2 ug/m^3 SIL which the project models below. There are several $PM_{2.5}$ monitors in the area, each of which have current design values (2022-2024) well below the 24-hour NAAQS of 35 ug/m^3. The Shelby Farms NCORE Monitoring Site (AQA Site ID 47-157-0075) was chosen to address pre-construction monitoring requirements, based on the following:

1. Proximity – the Shelby Farms site is within 25km of the proposed site.

2. Monitoring Objective – The Shelby Farms monitor is an NCORE monitor focused on population exposure rather than other monitors in the area which are near road or have alternative monitoring purposes.

3. Dispersion Environment – While the Shelby Farms monitor is not the geographically closest ambient $PM_{2.5}$ monitor to the proposed site, both are located within the same Core-Based Statistical Area

(CBSA) (Memphis, TN-MS-AR). The monitoring location is also in a more representative area (e.g., not in high traffic or downtown, heavily urban, or industrial Memphis area) than other surrounding monitors. Both the Shelby Farms monitor and proposed project site are in suburban settings, with a mix or forest, light industry and residential communities which have similar surface roughnesses. Both areas are also in gently rolling terrain with similar elevations.

4. Emissions Source Distribution – The Shelby Farms monitor is located generally downwind of the densely populated and industrialized locations in the Memphis area, meaning that it would capture the local and regional sources of pollution typical of the overall area. Since the proposed project site is more upwind of the major industrial and anthropogenic sources, and thus not exposed as frequently to direct pollutant transport, the Shelby Farms monitor provides a conservative estimate of background.

5. Meteorology – Both the Shelby Farms monitor location and proposed project site are in the same terrain regime with the same proximity to major water bodies and other features that influence meteorological conditions. There are no unique features at either site that would lead to more or less frequent temperature inversions or extreme stability events. Given that, along with the proximity of the two sites in general, both the monitor and project locations experience similar weather patterns throughout the year.

NCORE stands for the National Core multipollutant monitoring network. Established by the EPA in 2005, this network consists of approximately 80 monitoring stations across the United States that measure multiple air pollutants and meteorological parameters at a single location.

Ozone Background Monitor

Ozone impacts using the conservative MERP methodology are expected to be well below the EPA-recommended SIL value, thus precluding the need for any cumulative ozone NAAQS review.

However, since the project emissions increase will exceed 100 tpy for both NO_x and VOC (precursors to ozone), a regional characterization of ozone background is provided. The Hernando, MS (AQA Site ID 28-033-0002) site was selected as an appropriately representative background monitor for ozone based on the following factors:

1. Proximity – the Hernando site is within 20km of the proposed project site and is the closest monitor.

2. Monitoring Objective – The Hernando monitoring objective is population exposure rather than other monitors in the are which are near road or have alternative monitoring purposes.

3. Dispersion Environment – Both Hernando and the proposed project site are located within the same CBSA (Memphis, TN-MS-AR). Both sites are also similar suburban settings with a mix of forest, light industry and residential communities with similar surface roughnesses. Both areas are also in gently rolling terrain with similar elevations.

4. Emissions Source Distribution – As described in #3, both the Hernando monitor and proposed project site are located in similar suburban settings. There are a few industrial sources in the project site are located in the immediate vicinity of each site, however ozone is driven more by regional pollutant transport and vehicle traffic. The Hernando monitor is in a slightly more developed area with increased vehicle traffic flowing in the general vicinity which would make it a somewhat conservative estimate of ambient background.

5. Meteorology – Both the Hernando monitor location and proposed project site are in the same terrain regime with the same proximity to major water bodies and other features that influence meteorological conditions. There are no unique features at either site that would lead to more or less frequent temperature inversions or extreme stability events. Given that, along with the proximity of the two sites in general, both the monitor and project locations experience similar weather patterns throughout the year.

The most recent design value period is 2022-2024. The 2022-2024 design value (71 parts per billion [ppb]) is above the ozone NAAQS for the Hernando monitor, however the area continues to be designated attainment for ozone. Further, with the 2025 ozone season ending on October 31, preliminary monitoring data indicates that the 2023-2025 design value will again be below the 70 ppb NAAQS. In any case, the proposed project is not significant for ozone, therefore it will not contribute significant to degradation of the ozone NAAQS in the area.

D) PSD Preliminary Analysis Modeling Impacts

In the preliminary analysis, only the significant increase in potential emissions of a pollutant from a proposed new source, or the significant net emission increase of a pollutant from a proposed modification is modeled. A full impact analysis for a particular pollutant is not required when emissions of that pollutant from a proposed

source or modification would not increase ambient concentrations by more than prescribed significant ambient impact levels.

In accordance with the Revisions to the Guideline on Air Quality Models (40 CFR Part 51, Appendix W) EPA recommends that an applicant use a "two-tiered" demonstration approach to address single-source impacts on ozone and secondary $PM_{2.5}$. The first tier involves the use of existing technical information to evaluate the relationships between precursor emissions and a source's impacts. The second tier involves the application of more sophisticated case-specific chemical transport models (CTMs) (e.g., photochemical grid models). The April 30, 2019, Memorandum, "Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program", reflected EPA's recommendations on how to conduct an air quality modeling and related technical analyses to satisfy compliance demonstration requirements for Ozone and Secondary $PM_{2.5}$ for permit related assessment under the PSD Program.

Ozone Modeling and Hypothetical Source

For ozone, the modeled air quality impact of an increase in precursor emissions from the hypothetical source is expressed in units of ppb or ppm. Consistent with the modeled emissions rates that are input to the air quality model to predict a change in pollutant concentration, MERPs are expressed as an annual emissions rate in tons per year (tpy).

The Shelby County hypothetical source was chosen as the representative source for the ozone and $PM_{2.5}$ MERPs analyses. The greater metropolitan Memphis area is less than 20 km from the project location, and the project site and hypothetical source are in the same regional area for influences on ozone formation from VOC and NOx emissions. The appropriate tpy/stack height combination was chosen for the pollutants in question and the calculations conducted were consistent with EPA guidance to evaluate project-based impacts compared to the ozone SIL.

All MERP data was pulled from the EPA MERPs View Qlik database, for the Shelby County site. The 10-meter stack data was utilized from Qlik. Additionally, for NO_x and VOC, the selected hypothetical source value is 500 tpy.

$PM_{2.5}$ Modeling and MERPS Hypothetical Sources

In April 2018, the EPA released guidance recommending SILs for ozone and $PM_{2.5}$. Although this guidance was not a final agency action and did not create any binding requirements on permitting authorities, permit applicants, or the recommended SILs could be used to demonstrate that a proposed source does not cause or contribute to a exceedance of any NAAQS or PSD increments. On April 30, 2024, the EPA provided supplemental guidance to the SILs for ozone and $PM_{2.5}$ which retained the SILs ozone and 24-hour $PM_{2.5}$ and recommended new, lower SILs for annual $PM_{2.5}$. MZX used the latest recommended Class II SILs for ozone and $PM_{2.5}$ to assess potential secondary pollutant impacts from the proposed facility.

In July 2022, the EPA provided final guidance on how to implement the modeling requirements to show PSD compliance for ozone and $PM_{2.5}$. To make the required NAAQS or PSD increment compliance demonstration, proposed sources should provide full accounting of the combined impacts of each allowable precursor (and the direct component of $PM_{2.5}$) emissions on ambient concentrations of the relevant ozone and $PM_{2.5}$ NAAQS if any precursor(s) (or the direct component of $PM_{2.5}$) would be emitted in a significant amount (i.e., above their SER), then both precursors should be included in the assessment of ozone impacts. For $PM_{2.5}$, if a source would emit a significant amount of one or more of NO_x, SO_2, or direct $PM_{2.5}$ emissions, then the source should include NO_x and SO_2 precursor as well as direct $PM_{2.5}$ emissions in the assessment of $PM_{2.5}$ impacts. Primary impacts of $PM_{2.5}$ were estimated with the AERMOD modeling system.
All MERP data was pulled from the EPA MERPs View Qlik database, for the Shelby County site. The 10-meter stack data was utilized from Qlik. Additionally, for NO_x and SO_2, the selected hypothetical source value is 500 tpy.

NO_2 Modeling Approach and Worst-Case Scenario
MZX Tech modeled the project-associated sources for the significance analysis, including 41 simple cycle combustion turbines and 10 PLUM PRS units that will be installed.

The MZX facility is designed to be a continuous power generation site, it is not a peaking or other type of site where it will undergo frequent startup and shutdown activity. Further, the startup/shutdown cycle for each solar unit completes in ten (10) minutes and each Proenergy unit completes in thirty (30) minutes and there will be no more than six (6) planned startup/shutdown events in a given year. As such no more than one (1) hour of operation in startup/shutdown mode for any specific piece of equipment and no more than 198 hours total across all planned turbines.

MZX will utilized a conservative emission approach to account for the infrequent nature of startup and shutdown activities at the facility. Since no more than five (5) combustion turbines of each model type (e.g., Solar 130, Solar 350, Proenergy) will be in startup mode in any given hour, MZX's approach consists of determining which (five) 5 sources represent the "worst-case" modeled impact during startup.

The "worst-case" operating scenario, for modeling purposes, represents the load and ambient temperature conditions when worst-case concentrations occur because combustion turbine performance varies with generation load and temperature. Rather than modeling various individual load scenarios (e.g., 50%, 75%, 100%), MZX will present a single, conservative modeling case. This case will pair the highest potential emission rates (which typically occur at high loads) with the

poorest plume dispersion characteristics (e.g., the lowest exhaust temperature and velocity, which typically occur at lower loads). The intent of this hybrid approach is to create a scenario that is more conservative than any single, real-world operating condition. If compliance is demonstrated under this overly conservative scenario, it can be assumed that the facility is in compliance under all other operating loads.

Modeled Source Parameters

Proposed Unit	Stack Height (m)	Stack Temp (K)	Stack Velocity (m/s)	Stack Inside Diameter (m)
350	24.4	740.3	22.4	3.35
130	15.2	766.5	21.5	2.74
Proenergy	25.0	617.6	23.8	3.05
Plum	7.6	477.6	2.0	0.61

Since no more than five (5) combustion turbines of each model type (e.g., Solar 130, Solar 350, ProEnergy) will be in startup mode in any given hour, MZX's approach consists of determining which (five) 5 sources represent the "worst-case" modeled impact during startup.

"Worst-Case" Analysis of Combustion Turbine Stacks

Predicted Impact Ranking	Solar 130		Solar 350		Proenergy	
1	TUR2	2.53	TUR27	1.27	TUR35	10.49
2	TUR4	2.50	TUR18	1.27	TUR37	8.29
3	TUR11	2.49	TUR26	1.23	TUR38	6.76
4	TUR6	2.46	TUR20	1.21	TUR36	5.57
5	TUR13	2.42	TUR28	1.20	TUR41	4.52
6	TUR7	2.35	TUR19	1.19	TUR39	3.95
7	TUR8	2.34	TUR32	1.19	TUR40	2.76
8	TUR14	2.32	TUR21	1.19	TUR34	2.51
9	TUR1	2.32	TUR29	1.16		
10	TUR9	2.32	TUR33	1.16		
11	TUR3	2.31	TUR31	1.16		
12	TUR5	2.27	TUR22	1.15		
13	TUR15	2.27	TUR25	1.15		
14	TUR16	2.25	TUR24	1.15		
15	TUR12	2.23	TUR30	1.13		
16	TUR17	2.21	TUR23	1.12		
17	TUR10	2.13				

The five (5) "worst-case" sources will be determined by modeling all combustion turbines at a unit emission rate of 1 gram per second (g/s) to determine which combustion turbines have the highest predicted impact (by turbine type). MZX will then model a scenario where the five Solar 350s, five Solar 130s, and five ProEnergy turbines with the worst-case impacts are in startup mode within the same hour. The modeled emission rate for these units will be a blended hourly rate, calculated by combining the short-duration (e.g., 10 or 30 minutes) startup emissions with the normal maximum hourly rate for the remainder of that hour.

The resulting SIL and full impact models, if necessary, will thus include a total of fifteen (15) combustion turbines at emission rates assuming one startup every hour for short term averaging periods, and the remaining twenty-six (26) combustion turbines will be modeled at normal operating emission rates. For annual averaging periods, all combustion turbines will be modeled at annualized emission rates equivalent to the total annual emissions estimated for the type of combustion turbine plus the total annual startup and shutdown emissions for the type of combustion turbine.

NO_2 Tier 2 Ambient Ratio Method 2

The revised *Guideline* now indicates Ambient Ration Method 2 (ARM2) has a replaced ARM as the regulatory default Tier 2 NO2 modeling method. MZX utilized ARM2 for modeling NO_2 for the 1-hour and annual SIL and NAAQS modeling assessments, and for the annual PSD increment modeling assessment. All emissions data was input into AERMOD model as NO_X, model providing output results in terms of NO_2.

Tier 1 Demonstration for Ozone (NAAQS)

VOC MERP Calculation:

$$1.00ppb\left(\frac{Selected\ Hyopthetical\ MERP)}{MaxConc}\right)$$

$$1.00ppb\left(\frac{500\ tpy}{0.2502931356\ ug/m\text{^}3}\right)$$

$$= 1{,}997.66\ tpy$$

NOx MERP Calculation:

$$1.00ppb\left(\frac{Selected\ Hyopthetical\ MERP)}{MaxConc}\right)$$

$$1.00ppb\left(\frac{500\ tpy}{0.6943982244\ ug/m\text{^}3}\right)$$

$$= 720.05\ tpy$$

$$\left[\left(\frac{NOx\ Increase\ (tpy)}{NOx\ MERP\ (tpy)}\right)+\left(\frac{VOC\ Increase\ (tpy)}{VOC\ MERP\ (tpy)}\right)\right] < 1$$

The recommended ozone SIL of 1-ppb was chosen to represent the critical air quality threshold. The SIL represents a de-minimis impact level, that is, if the maximum concentration of ozone due to a single source is less than the SIL, then it can be concluded that the source has an insignificant contribution to ozone formation. The hypothetical source's modeled emission rate and impacts along with the ozone SIL were used to calculate the MERPs values below:

$$Modeled\ Air\ Quality\ Impact = (Critical\ Air\ Quality\ Threshold)\left(\frac{Project\ Emissions}{MERP}\right)$$

$$Modeled\ Air\ Quality\ Impact = (1ppb\ ozone)\left[\left(\frac{417.4\ TPY\ VOC}{1{,}997.66\ TPY\ VOC}\right)+\left(\frac{423.39\ TPY\ NOx}{720.05\ TPY\ NOx}\right)\right]$$

$$Modeled\ Air\ Quality\ Impact = 0.797\ ppb\ ozone$$

The modeled Air Quality Impact is below the Ozone significant impact level. The proposed project will not cause ozone concentrations to exceed the recommended significant impact level for ozone. Therefore, no further analysis is required.

$PM_{2.5}$ Secondary Impact Assessment

$PM_{2.5}$ 24-Hour

SO_2 MERP Calculation:

$$1.2\ \frac{\mu g}{m^3}\left(\frac{Selected\ Hyopthetical\ MERP)}{MaxConc}\right)$$

$$1.2\ \frac{\mu g}{m^3}\left(\frac{500\ tpy}{0.6711542606\ \frac{\mu g}{m^3}}\right)$$

$$= 893.98\ tpy$$

NOx MERP Calculation:

$$1.2\ \frac{\mu g}{m^3}\left(\frac{Selected\ Hyopthetical\ MERP)}{MaxConc}\right)$$

$$1.2\ \frac{\mu g}{m^3}\left(\frac{500\ tpy}{0.0602609366\ \frac{\mu g}{m^3}}\right)$$

$$= 9{,}956.70\ tpy$$

$$\text{Modeled Air Quality Impact} = (\text{Critical Air Quality Threshold})\left(\frac{\text{Project Emissions}}{\text{MERP}}\right)$$

$$Modeled\ PM_{2.5}\ 24\ \text{Hr Air Quality Impact} = \left(1.2\frac{\mu g}{m^3}\right)\left[\left(\frac{156.53\ \text{TPY}\ SO_2}{893.98\ \text{TPY}\ SO_2}\right) + \left(\frac{423.39\ \text{TPY}\ NO_x}{9{,}956.70\ \text{TPY}\ NO_x}\right)\right]$$

$$\text{Modeled } PM_{2.5}\ 24\ \text{Hour Air Quality Impact} = 0.261\frac{\mu g}{m^3}$$

$PM_{2.5}$ Annual

SO_2 MERP Calculation:

$$0.13\ \frac{\mu g}{m^3}\left(\frac{Selected\ Hyopthetical\ MERP)}{MaxConc}\right)$$

$$0.13\ \frac{\mu g}{m^3}\left(\frac{500\ tpy}{0.0086676497\ \frac{\mu g}{m^3}}\right)$$

$$= 7{,}499.15\ tpy$$

NOx MERP Calculation:

$$0.13\ ug/m\text{^}3\ \left(\frac{Selected\ Hyopthetical\ MERP)}{MaxConc}\right)$$

$$0.13\ \frac{\mu g}{m^3}\left(\frac{500\ tpy}{0.0032613026\ \frac{\mu g}{m^3}}\right)$$

$$= 19{,}9930.69\ tpy$$

$$\text{Modeled Air Quality Impact} = (\text{Critical Air Quality Threshold})\left(\frac{\text{Project Emissions}}{\text{MERP}}\right)$$

$$Modeled\ PM_{2.5}\ \text{Annual Air Quality Impact} = \left(0.13\frac{\mu g}{m^3}\right)\left[\left(\frac{156.53\ \text{TPY}\ SO_2}{7{,}499.15\ \text{TPY}\ SO_2}\right) + \left(\frac{423.39\ \text{TPY}\ NO_x}{19{,}930.69\ \text{TPY}\ NO_x}\right)\right]$$

$$\text{Modeled } PM_{2.5}\ \text{Annual Air Quality Impact} = 0.00548\frac{\mu g}{m^3}$$

$PM_{2.5}$ NAAQS Assessment

$PM_{2.5}$ 24-Hour

$$5\ Year\ Average\ of\ 1st\ High + Secondary\ Impact =$$

$$= 0.58 \frac{\mu g}{m^3}$$

This value is below the SIL of 1.2 $\frac{\mu g}{m^3}$. Therefore, no further analysis is required.

$PM_{2.5}$ Annual

$$5\ Year\ Average\ of\ 1st\ High\ + Secondary\ Impact =$$

$$= 0.066 \frac{\mu g}{m^3}$$

This value is below the SIL of 0.13 $\frac{\mu g}{m^3}$. Therefore, no further analysis is required.

$PM_{2.5}$ Class I At Past 50+ km

$PM_{2.5}$ 24-Hour

SO_2 MERP Calculation:

$$SIL \left(\frac{Selected\ Hyopthetical\ MERP)}{MaxConc}\right)$$

$$0.27\ \frac{\mu g}{m^3}\left(\frac{500\ tpy}{0..0879818127\ tpy}\right)$$

$$= 1{,}534.41\ tpy$$

NOx MERP Calculation:

$$0.27\ \frac{\mu g}{m^3}\left(\frac{Selected\ Hyopthetical\ MERP)}{MaxConc}\right)$$

$$0.27\ \frac{\mu g}{m^3}\left(\frac{500\ tpy}{0.037540704\ \frac{\mu g}{m^3}}\right)$$

$$= 3{,}596.10\ tpy$$

$$\text{Modeled Air Quality Impact} = (\text{Critical Air Quality Threshold})\left(\frac{\text{Project Emissions}}{\text{MERP}}\right)$$

$$Modeled\ PM_{2.5}\ 24\ \text{Hr Air Quality Impact} = \left(0.27\ \frac{\mu g}{m^3}\right)\left[\left(\frac{156.53\ \text{TPY}\ SO_2}{1{,}534.41\ \text{TPY}\ SO_2}\right) + \left(\frac{423.39\ \text{TPY}\ NO_x}{3{,}596.10\ \text{TPY}\ NO_x}\right)\right]$$

$$\text{Modeled } PM_{2.5}\text{ 24 Hour Air Quality Impact} = 0.0593\ \frac{\mu g}{m^3}$$

This value is below the SIL of 0.27 $\frac{\mu g}{m^3}$. Therefore, no further analysis is required.

$PM_{2.5}$ Annual

SO_2 MERP Calculation:

$$0.03\ \frac{\mu g}{m^3}\left(\frac{Selected\ Hyopthetical\ MERP)}{MaxConc}\right)$$

$$0.03\ \frac{\mu g}{m^3}\left(\frac{500\ tpy}{0.0007185287\ \frac{\mu g}{m^3}}\right)$$

$$= 20{,}875.99\ tpy$$

NOx MERP Calculation:

$$0.03\ \frac{\mu g}{m^3}\left(\frac{Selected\ Hyopthetical\ MERP)}{MaxConc}\right)$$

$$0.03\ \frac{\mu g}{m^3}\left(\frac{500\ tpy}{0.0011079253\ \frac{\mu g}{m^3}}\right)$$

$$= 13{,}538.82\ tpy$$

$$\text{Modeled Air Quality Impact} = (\text{Critical Air Quality Threshold})\left(\frac{\text{Project Emissions}}{\text{MERP}}\right)$$

$$\begin{aligned}&\textit{Modeled } PM_{2.5} \text{ Annual Air Quality Impact}\\&= \left(0.03\frac{\mu g}{m^3}\right)\left[\left(\frac{156.53 \text{ TPY } SO_2}{20{,}875.99 \text{ TPY } SO_2}\right)+\left(\frac{423.39 \text{ TPY } NO_x}{13{,}538.82 \text{ TPY } NO_x}\right)\right]\end{aligned}$$

$$\text{Modeled } PM_{2.5} \text{ Annual Air Quality Impact} = 0.00116\frac{\mu g}{m^3}$$

This value is below the SIL of $0.03\ \frac{\mu g}{m^3}$. Therefore, no further analysis is required.

Class II Significance Analysis Results

Pollutant	Averaging Period	Modeled Concentration ($\mu g/m^3$)	$PM_{2.5}$ MERP Contribution ($\mu g/m^3$)	Total $PM_{2.5}$ Impact ($\mu g/m^3$)	SIL	Exceeds SIL	Radius of Significant Impact (km)
SO_2	Annual	0.26	--	--	1	No	N/A
	24-hr	2.40	--	--	5	No	N/A
	3-hr	5.72	--	--	25	No	N/A
	1-hr	6.95	--	--	7.8	No	N/A
NO_2	Annual	3.67	--	--	1	Yes	1.5
	1-hr	71.30	--	--	7.5	Yes	20.9
PM_{10}	Annual	0.06	0.005	0.07	1	No	N/A
	24-hr	0.39	0.261	0.65	5	No	N/A
$PM_{2.5}$	Annual	0.06	0.005	0.07	0.13	No	N/A
	24-hr	0.32	0.261	0.58	1.2	No	N/A
CO	8-hr	97.31	--	--	500	No	N/A
	1-hr	150.47	--	--	2,000	No	N/A

1. PM_{10} and $PM_{2.5}$ results include MERPs contribution to the predicted modeled impact.

All PM_{10}, $PM_{2.5}$, SO_2, and CO modeled impacts for the project are than the applicable Class II SILs. As such, by definition, the project does not cause or contribute to an exceedance of the NAAQS or Class II PSD Increment for PM_{10}, $PM_{2.5}$, SO_2, or CO. However, the NO_2 1-hr and annual modeled impacts for the project exceeded the Class II SIL. As a result, full impact analyses for NO_2 are required and are summarized in subsequent sections.

E) PSD Full Impact Analysis Modeling Impacts

A full impact analysis is required for any pollutant for which the proposed source's estimated ambient pollutant concentrations exceed prescribed significant ambient impact levels. This analysis expands the preliminary analysis in that it considers emissions from: the proposed source; existing sources; residential, commercial, and industrial growth that accompanies the new activity and the new source or

modification. For SO_2, PM_{10}, $PM_{2.5}$ and NO_2, the full impact analysis consists of separate analyses for the NAAQS and PSD increments.

The impact area is a circular area with a radius extending from the source to (1) the most distant point where approved dispersion modeling predicts a significant ambient impact will occur, or (2) a modeling receptor distance of 50 km, whichever is less.

NAAQS

The NAAQS are maximum concentration "ceilings" measured in terms of the total concentration of a pollutant in the atmosphere. For a new or modified source, compliance with any NAAQS is based upon the total estimated air quality, which is the sum of the ambient estimates resulting from existing sources of air pollution and the modeled ambient impact caused by the applicant's proposed emissions increase and associated growth. The applicant is required, at a minimum, to explicitly model all nearby sources as part of the NAAQS analysis. The modeling guideline defines a "nearby" source as any point source within the vicinity of the proposed new source or modification. For PSD purposes, "vicinity" is defined as the impact area. The location of such nearby sources could be anywhere within the impact area or an annular area extending 50 kilometers beyond the impact area.

For any off-site impact calculated in the significance modelling analysis that was greater than the SIL for a given pollutant, a NAAQS analysis incorporating nearby sources was performed (cumulative impact analysis). For the cumulative impact analysis, all sources at the facility and the appropriate inventory sources were included.

1-Hour NO_2 NAAQS

A NAAQS modeling analysis was conducted for those pollutants and averaging periods for which the Significance Analysis results were equaled or exceeded the Class II SIL. The NAAQS and Increment analyses utilized the significant receptors as derived from the Significance Analysis) for use in the refined analysis. Note that modeled concentrations in excess of the NO_2 1-hr NAAQS were found, however, MZX utilized the MAXDCONT option in AERMOD to demonstrate that the project would be insignificant at the time and location of all modeled exceedances. In addition to confirming that the project was not significant at any potential modeled violation, MZX reviewed the locations of the highest modeled concentrations and noted high values are not truly exceedances in ambient air.

NO_2 1-Hour NAAQS Analysis

$$NAAQS\ Value > Modeled\ Air\ Quality\ Impact + Monitered\ Design\ Value$$

$$188\,\frac{\mu g}{m^3} < 325.6\ \frac{\mu g}{m^3}$$

The air quality level is greater than the NAAQS, therefore, a cumulative analysis must be performed.

NO_2 1- hour Cumulative Analysis

MZX Tech's maximum contribution to any exceedance was $4.87\frac{\mu g}{m^3}$, which is below the SIL of $7.5\ \frac{\mu g}{m^3}$. The maximum concentration contribution from MZX Tech was demonstrated in the modeling performed by the facility. Therefore, they do not cause or contribute to the NAAQS violation.

Annual NO_2 NAAQS

$$NAAQS\ Value > Modeled\ Air\ Quality\ Impact + Monitered\ Design\ Value$$

$$100\frac{\mu g}{m^3} > 6.4\ \frac{\mu g}{m^3} + 7.5\ \frac{\mu g}{m^3}$$

$$100\frac{\mu g}{m^3} > 13.9\ \frac{\mu g}{m^3}$$

The air quality level is less than the NAAQS, therefore, no NAAQS violation is found, and the facility does not cause or contribute to a violation.

PSD Class II Increment

A PSD increment is the maximum allowable increase in concentration that is allowed to occur above a baseline concentration for a pollutant. The baseline concentration is defined for each pollutant and, in general, is the ambient concentration existing at the time that the first complete PSD permit application affecting the area is submitted. Emissions increases that consume a portion of the applicable increment are, in general, all those not accounted for in the baseline concentration and specifically include:

- Actual emissions increases occurring after the major source baseline date, which are associated with physical changes or changes in the method of operation at a major stationary source; and
- Actual emissions increase at any stationary source, area source, or mobile source occurring after the minor source baseline date.

A PSD Increment evaluation was conducted for annual NO_2. No impacts in excess of the annual NO_2 Increment were shown by the model and as such, the proposed MZX project will not cause or contribute to any exceedance of the PSD Increment.

Annual NO_2 Increment Impact

PSD Increment Analysis Results

Pollutant	Averaging Period	Modeled Concentration (µg/m³)	Increment (µg/m³)	Exceeds Increment (Yes/No)
NO_2	Annual	6.4	25	No

A PSD Increment evaluation was conducted for annual NO_2. No impacts in excess of the annual NO_2 Increment were shown by the model and as such, the proposed MZX project will not cause or contribute to any exceedance of the PSD Increment.

F) Vegetation and Soils Impact

VOCs are regulated as precursors to tropospheric ozone. Elevated ground-level ozone concentrations can damage plant life and crop production. VOCs interfere with the ability of plants to produce and store food, making them more susceptible to disease, insects, or other pollutants and harsh weather. Ozone is formed by the interaction of NOx, VOCs, and sunlight in the atmosphere. The effect of a proposed project's emissions on local soils and vegetation is often addressed through comparison of modeled impacts to the secondary NAAQS. The secondary NAAQS were established to protect general public welfare and the environment. Impacts below the secondary NAAQS are assumed to indicate a lack of adverse impacts on soils and vegetation.

The results of the significance modeling analyses for those pollutants with impacts less than the SIL and from the full impact analysis with impacts equal to or exceeding the SIL were assessed against the secondary NAAQS standards, which provide protection for public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

Soil and Vegetation Impacts

Pollutant	Averaging Period	Total Concentration (µg/m³)	Secondary NAAQS (µg/m³)	Exceeds Threshold (Yes/No)
SO_2 [1]	Annual	0.25	26	No
NO_2 [2]	Annual	13.9	100	No
PM_{10} [3]	24-hr	0.66	150	No
$PM_{2.5}$ [4]	Annual	0.06	15	No
	24-hr	0.59	35	No

1. Maximum annual SO_2 impacts from the Significance analysis.
2. Maximum annual NO_2 impact from the NAAQS analysis.
3. Maximum 24-hr PM_{10} impact from the Significance analysis.
4. Maximum 24-hr and annual $PM_{2.5}$ impacts from the Significance analysis.

The impacts for each pollutant are below the applicable secondary NAAQS. Thus, there are no adverse impacts expected on soils or vegetation as a result of the proposed project.

G) Associated Growth Impact

An economic growth analysis is intended to assess the amount of new growth that is likely to occur in support of the new project and to estimate emissions resulting from associated growth. Associated growth relates to any residential and commercial/industrial growth that may result from the proposed project. Residential growth depends on the number of new employees and the availability of housing in the area, while associated commercial and industrial growth consists of new sources providing services to the new employees and the facility. The proposed project will not result in change of the current resources necessary to operate and support the project. Therefore, additional economic growth impacts from the proposed project will be minimal. No significant air quality degradation due to associated growth impacts will be expected. Construction activities will also be planned so that adverse air quality or visibility impacts occur.

H) Class I Impact and Visibility

The Federal Land Managers' Air Quality Related Values Work Group (FLAG), Phase I Report – Revised (2010), provides recommendations, specific procedures, and interpretation of results for assessing visibility impacts of new or modified sources on Class I Area resources. Section 3.2., Initial Screening Criteria (New), presents a screening tool, Q/D, (where Q is the total SO_2, NO_x, PM_{10}, and H_2SO_4 annual emissions divided by D, the distance from the Class I Area) to screen out from Air Quality Related Values (AQRV) review for those sources with relatively small amounts of emissions located a large distance from a Class I Area. If this value is less than or equal to 10, the source will be considered to have negligible impacts with respect to Class I AQRV. The Federal Land Manager (FLM) (and the Federal official with direct responsibility for management of the Federal Class I parks as wilderness areas) will not request any further Class I AQRV impact analysis. As a minimum, the permitting authority should notify the FLM of all sources that
exceed the Q/D criteria.

$$Q/D = \frac{(SO_2 + NO_x + PM_{10} + H_2SO_4)}{Distance\ from\ Class\ I\ Area}$$

CLASS I AREA	CLASS I AREA DISTANCE (KM)	AGENCY
Breton National Wildlife Refuge	589.47	Fish & Wildlife Service (FWS)
Caney Creek Wilderness Area	373.73	Forest Service (FS)
Mingo Wilderness Area	221.96	Fish & Wildlife Service (FWS)
Sipsey Wilderness Area	248.97	Forest Service (FS)
Upper Buffalo Wilderness Area	323.10	Forest Service (FS)

Class I areas are federally protected areas for which more stringent air quality standards apply to protect unique, cultural, recreational, and/or historic values. The

following Class I areas are located within 300 km of the proposed facility (with the approximate distance to the proposed facility listed):

- Mingo National Wildlife Refuge
- Sipsey Wilderness

The Federal Land Mangers (FLM) have the authority to protect air quality related values (AQRVs) and to consider, in consultation with the permitting authority, whether a proposed major emitting facility or a proposed modification to an existing major existing major facility will have an adverse impact on such values. AQRVs for which PSD modeling is typically conducted include visibility and deposition of sulfur and nitrogen.

Class I Q/D Screening Analysis

	Mingo Wilderness Area	Sipsey Wilderness Area
SO_2 (tpy)	156.53	156.53
NOx (tpy)	474.58	474.58
PM_{10} (tpy)	20.99	20.99
H_2SO_4 (tpy)	0.15	0.15
Total Emissions (tpy)	652.25	652.25
Distance (km)	215	233
Q/d	3.03	2.80

The ratio of emissions to Class I distance (i.e., Q/D) for this project for the Class I areas within 300 km was considered in order to determine if the FLM would require a full AQRV analysis. The FLM's AQVR Work Group (FLAG) 2010 guidance states that a Q/D value of ten or less indicates that AQVR analyses should not be required. The Q/D ratio for all Class I areas within the 300 km of the facility was evaluated and demonstrated that impact will be less than 10. Initial screening criteria were calculated for the Class I areas using proposed MZX plant maximum daily emission estimates. As shown, the Q/D values are well below 10 and as such, AQRV analyses should not be required for this project.

Class I Significance Analysis Results

Pollutant	Averaging Period	Modeled Concentration ($\mu g/m^3$)	SIL ($\mu g/m^3$)	Exceeds SIL? (Yes/No)
SO_2	Annual	0.01	0.1	No
	24-hr	0.16	0.2	No
	3-hr	0.66	1	No
NO_2	Annual	0.04	0.1	No
PM_{10}	Annual	0.002	0.2	No
	24-hr	0.023	0.3	No
$PM_{2.5}$	Annual	0.003	0.03	No
	24-hr	0.074	0.27	No

1. $PM_{2.5}$ results include MERPs contribution to the predicted modeled impact.

A Significance Analysis was conducted for the Class I areas to determine if an evaluation for the PSD Increment impacts upon the Class I area was required. AEMROD was utilized for the NO_2, SO_2, PM_{10}, and $PM_{2.5}$ analyses, whereby a screening procedure was utilized evaluating an array of receptor located 50 km from the facility at 1-degree intervals for a full 360 degrees, creating a ring of hypothetical receptors at a 50 km distance from the facility to compare project emission increase impacts to those receptors at 50 km. Significance results from those receptors demonstrated that the Class I SILs for PM_{10}, $PM_{2.5}$, SO_2, and NO_2 were not exceeded.

I) Class II Impact and Visibility

The Class II Visibility Analysis evaluates the impact the proposed project will have on local visibility conditions. This analysis is based upon impacts within the significant impact area of the proposed project and is separate from the Class I visibility analysis. Components contributing to visibility impairment include sulfates, NO_X, PM, organic carbon, soot (elemental carbon), and crustal material.

A near-field visibility analysis was conducted for the sensitive receptor closest to the project site, where sensitive receptor is defined as a regional airport, state park, or state historic site located within the project's significant impact area (SIA). The Memphis International Airport (KMEM) is located 6.9 km to the NW of the project site which is within the project SIA for 1-hour NO_2. As such, a near-field visibility analysis was conducted for KMEM, using EPA's VISCREEN model.

VISCREEN Modeling Results

Background	Theta (deg.)	Azimuth (deg.)	Distance (km)	Alpha (deg.)	Delta-E Critical	Delta-E Plume	Contrast Critical	Contrast Plume
Sky	10	150	10.7	19	2.00	0.961	0.05	-0.002
Sky	140	150	10.7	19	2.00	0.317	0.05	-0.004
Terrain	10	84	6.9	84	2.00	0.247	0.05	0.001
Terrain	140	84	6.9	84	2.00	0.073	0.05	0.001

The background visual range input to VISCREEN was 25km, based on Figure 9 in the VISSCREEN User's Guide. The conservative, level 1 default parameters resulted in impacts in excess of the critical values. As such, a level 2 was conducted, using actual meteorological conditions for the region. The worst-case 1% meteorological condition during daytime hours identified for analysis was determined from the data included as part of the electronic modeling file submittal for this analysis. The resulting impacts indicate that there are no visible plume concerns at the nearest sensitive receptor, Memphis International Airport.