# Tronox LLC, Columbus

## General Information

| ID | Branch | SIC | County | Basin | Start | End |
|---|---|---|---|---|---|---|
| 1696 | Chemical | 2491 | Lowndes | Tombigbee River | 10/27/1992 | |

## Address

| Physical Address (Primary) | Mailing Address |
|---|---|
| 2300 14th Avenue North<br>Columbus, MS 39701 | PO Box 268859<br>Oklahoma City, OK 731268859 |

## Telecommunications

| Type | Address or Phone |
|---|---|
| Work phone number | (405) 775-5129 |

## Alternate / Historic AI Identifiers

| Alt ID | Alt Name | Alt Type | Start Date | End Date |
|---|---|---|---|---|
| 2808700020 | Tronox LLC, Columbus | Air-AIRS AFS | 10/12/2000 | 06/01/2002 |
| 168000020 | Kerr McGee Chemical Corporation, Columbus | Air-Construction | 06/12/1998 | |
| 168000020 | Kerr McGee Chemical Corporation, Columbus | Air-Synthetic Minor Operating | 06/06/1997 | 06/01/2002 |
| 168000020 | Kerr McGee Chemical Corporation, Columbus | Air-Synthetic Minor Operating | 06/12/1998 | 06/01/2002 |
| MSR220010 | Kerr McGee Chemical Corporation, Columbus | GP-Wood Treating | 10/27/1992 | 07/13/1997 |
| MSD990866329 | Kerr McGee Chemical Corporation, Columbus | Hazardous Waste-EPA ID | 10/12/2000 | |
| MSD990866329 | Kerr McGee Chemical Corporation, Columbus | Hazardous Waste-TSD | 06/11/2001 | 04/12/2006 |
| MSD990866329 | Tronox LLC, Columbus | Hazardous Waste-TSD | 04/13/2006 | 05/31/2011 |
| 1696 | Kerr McGee Chemical Corporation | Historic Site Name | 10/27/1992 | 04/10/2006 |
| 1696 | Tronox, LLC | Official Site Name | 04/10/2006 | |
| MSP090021 | Kerr McGee Chemical Corporation, Columbus | Water-Pretreatment | 10/11/1994 | 10/10/1999 |
| MSP090021 | Kerr McGee Chemical Corporation, Columbus | Water-Pretreatment | 08/23/2000 | 07/31/2005 |
| MSP090021 | Kerr McGee Chemical Corporation, Columbus | Water-Pretreatment | 10/31/2005 | 04/12/2006 |
| MSP090021 | Tronox LLC, Columbus | Water-Pretreatment | 04/13/2006 | 09/30/2010 |

## Regulatory Programs

| Program | SubProgram | Start Date | End Date |
|---|---|---|---|
| Air | NSPS Subpart Dc | 09/12/1990 | 06/01/2002 |
| Air | SM | 06/06/1997 | 06/01/2002 |
| Hazardous Waste | Large Quantity Generator | 04/01/1997 | |
| Hazardous Waste | TSD - Not Classified | 06/11/2001 | |
| Water | PT CIU | 10/11/1994 | 09/01/2003 |
| Water | PT CIU - Timber Products | 10/11/1994 | 09/01/2003 |

| | | | |
|---|---|---|---|
| | Processing (Subpart 429) | | |
| Water | PT NCS | 09/01/2003 | |
| Water | PT SIU | 10/11/1994 | |

**Locational Data**

| Latitude | Longitude | Metadata | S / T / R | Map Links |
|---|---|---|---|---|
| 33 ° 30 '<br>38 .51<br>(033.510697) | 88 ° 24 '<br>34 .02<br>(088.409450) | **Point Desc:** PG - Plant entrance (General) Data collected by Louis Crawford on 7/11/00. PG - Plant Entrance (General) Data collected by Clift Jeter on 6/13/02. LAT 33deg 30min 36.6sec LON 88deg 24min 35.1sec<br><br>**Method:** GPS Code (Psuedo Range) Differential<br>**Datum:** NAD83<br>**Type:** MDEQ | Section:<br>Township:<br>Range: | SWIMS<br>TerraServer<br>Map It |

10/13/2006 10:29:50 AM

# Kerr McGee Chemical Corporation, Columbus

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| ID | Branch | SIC | County | Basin | Start | End |
|---|---|---|---|---|---|---|
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## Telecommunications

| Type | Address or Phone |
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| Work phone number | (662) 328-7551 |

## Alternate / Historic AI Identifiers

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|---|---|---|---|---|
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| 168000020 | Kerr McGee Chemical Corporation, Columbus | Air-Construction | 06/12/1998 | |
| 168000020 | Kerr McGee Chemical Corporation, Columbus | Air-Synthetic Minor Operating | 06/06/1997 | 06/01/2002 |
| 168000020 | Kerr McGee Chemical Corporation, Columbus | Air-Synthetic Minor Operating | 06/12/1998 | 06/01/2002 |
| MSR220010 | Kerr McGee Chemical Corporation, Columbus | GP-Wood Treating | 10/27/1992 | 07/13/1997 |
| MSD990866329 | Kerr McGee Chemical Corporation, Columbus | Hazardous Waste-EPA ID | 10/12/2000 | |
| MSD990866329 | Kerr McGee Chemical Corporation, Columbus | Hazardous Waste-TSD | 06/11/2001 | 05/31/2011 |
| 1696 | Kerr McGee Chemical Corporation | Official Site Name | 10/27/1992 | |
| MSP090021 | Kerr McGee Chemical Corporation, Columbus | Water-Pretreatment | 10/11/1994 | 10/10/1999 |
| MSP090021 | Kerr McGee Chemical Corporation, Columbus | Water-Pretreatment | 08/23/2000 | 07/31/2005 |

## Regulatory Programs

| Program | SubProgram |
|---|---|
| Air | SM |

| | |
|---|---|
| Hazardous Waste | TSD - Not Classified |
| Water | PT CIU |
| Water | PT CIU - Timber Products Processing (Subpart 429) |
| Water | PT SIU |

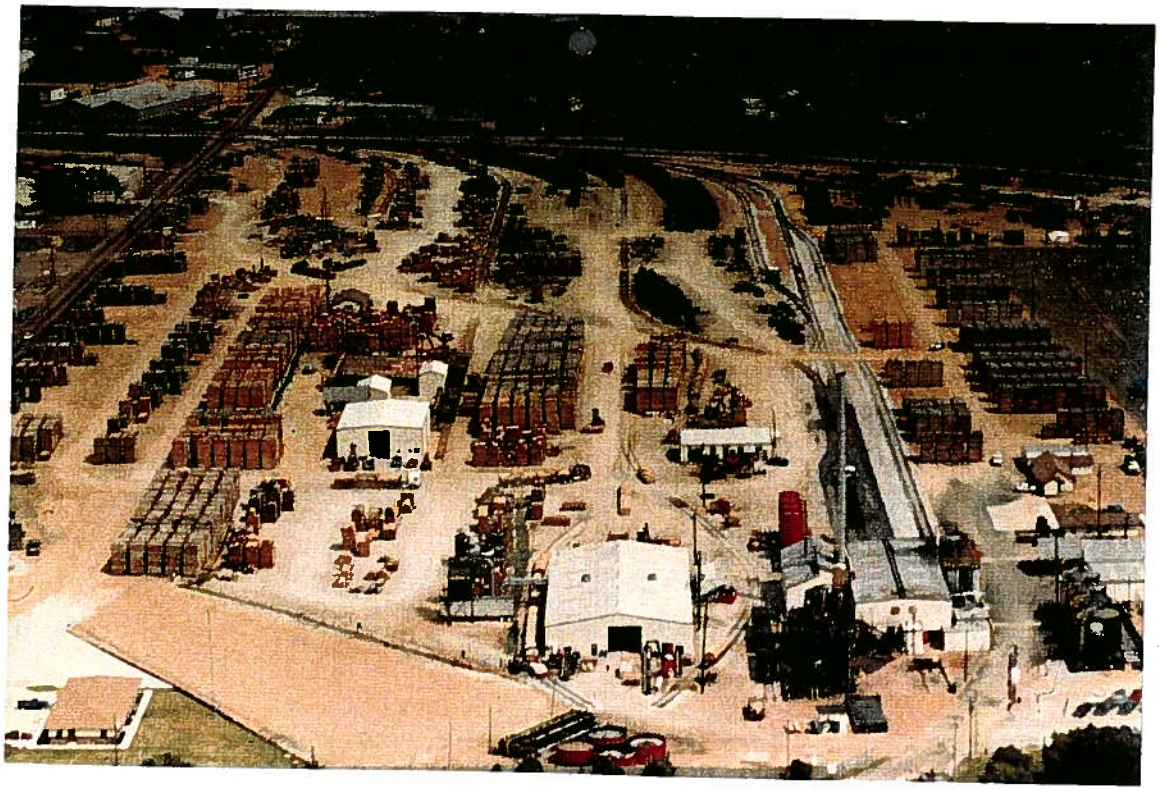
## Locational Data

| Latitude | Longitude | Method | Datum | S / T / R | Map Links |
|---|---|---|---|---|---|
| 33° 30' 38.51 (033.510697) | 88° 24' 34.2 (088.409450) | GPS Code (Psuedo Range) Differential | NAD83 | Section:<br>Township:<br>Range: | SWIMS<br>TerraServer<br>Map It |

*Report Date: 1/28/2005 2:22:45 PM*

# CLEAN AIR ACT
# TITLE V OPERATING PERMIT APPLICATION

VOLUME 1



KERR-McGEE CHEMICAL CORPORATION
FOREST PRODUCTS DIVISION
COLUMBUS, MISSISSIPPI



AquAeTer

Brentwood, Tennessee

*optimizing environmental resources* - water, air, earth

# CLEAN AIR ACT
# TITLE V OPERATING PERMIT APPLICATION

VOLUME 1

RECEIVED
APR -6 1995
DEQ-OPC

Prepared for:

**KERR-MCGEE CHEMICAL CORPORATION**
FOREST PRODUCTS DIVISION
Columbus, Mississippi

Data Coded

Prepared by:

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**AquAeTer, Inc.**
215 Jamestown Park, Suite 204
Brentwood, Tennessee

March 1995

*optimizing environmental resources*
**water, air, earth**

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## EXECUTIVE SUMMARY

## BUSINESS CONFIDENTIAL

# SECTION 1

# INTRODUCTION

# SECTION 1

# INTRODUCTION

The Forest Products Division (FPD) of Kerr-McGee Chemical Corporation (KMCC) is a leading supplier of pressure-treated wood products. Headquartered in Oklahoma City, the division owns and operates wood-treating plants in Madison, Illinois; Indianapolis, Indiana; Columbus, Mississippi; Springfield, Missouri; The Dalles, Oregon; Avoca, Pennsylvania; and Texarkana, Texas, as shown in Figure 1. This report will discuss the Columbus, Mississippi facility as shown in Figures 2 and 3. All facilities treat green and seasoned wood with a preservative to produce crossties, switchties, crossings, bridge timbers, flangeways, lumber, piling, and panel track. Primary customers of these products are Class I, regional, short-line railroads, and railroad contractors. Annual production capacity totals for KMCC may approach 10-million tie equivalents per annum.

## PLANT OPERATIONS

### Wood Treatment

The wood treating process is regulated under the auspices of Federal Insecticide, Fungicide & Rodenticide Act (FIFRA) and utilizes licensed, commercial pesticide applications. Sawmills are operated for double-end trimming, framing and boring mill operations. Pre-plating and end-plating procedures are performed at customer request. Grading of ties occurs when green ties are received and again after seasoning. Seasoning of ties reduces the moisture content of a tie so that the desired penetration of preservative can be achieved during the treating process. Air seasoning involves stacking ties in such a manner that air is permitted to flow around and

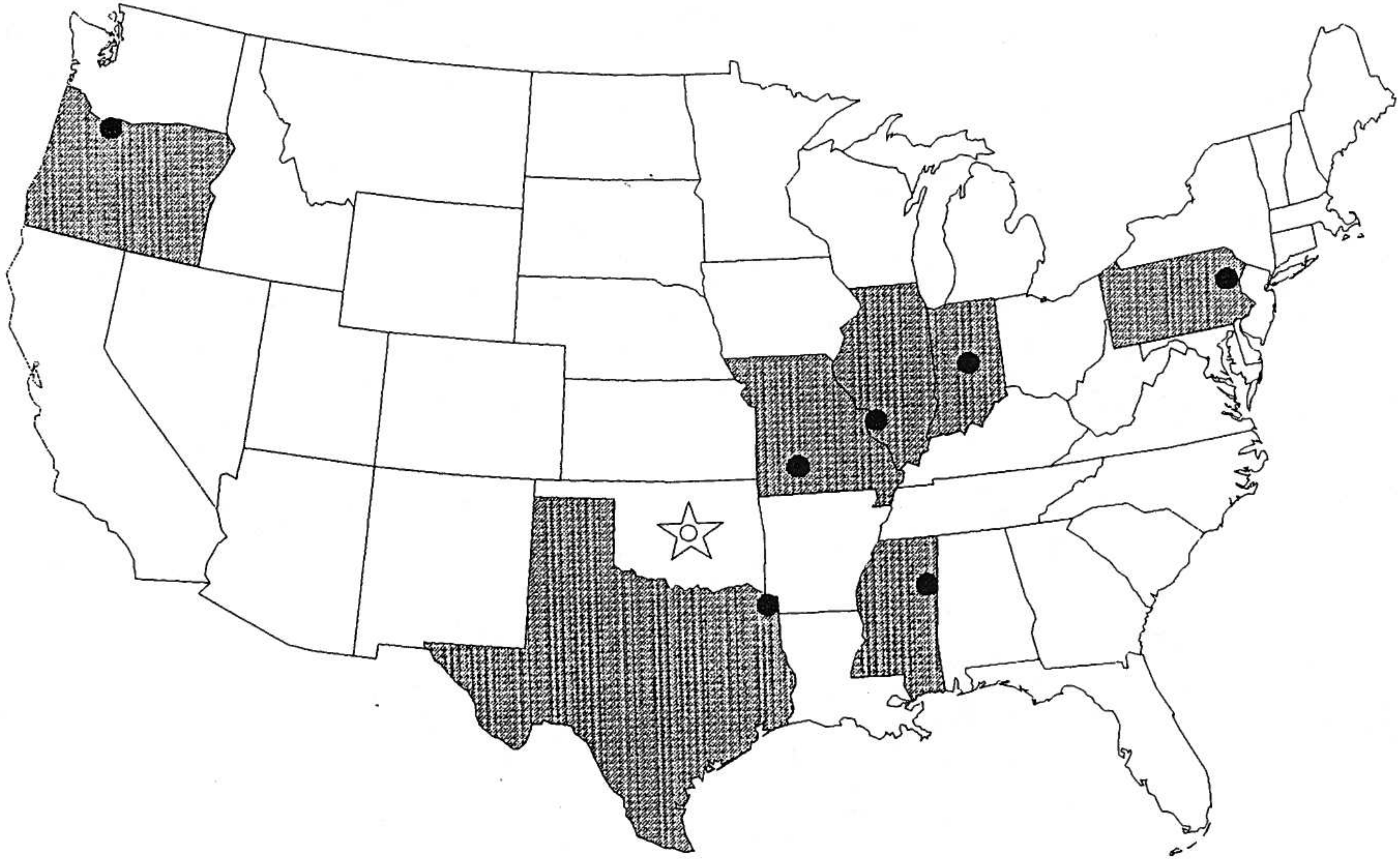


**FIGURE 1**
KERR-McGEE CHEMICAL CORPORATION
FOREST PRODUCT DIVISION FACILITIES

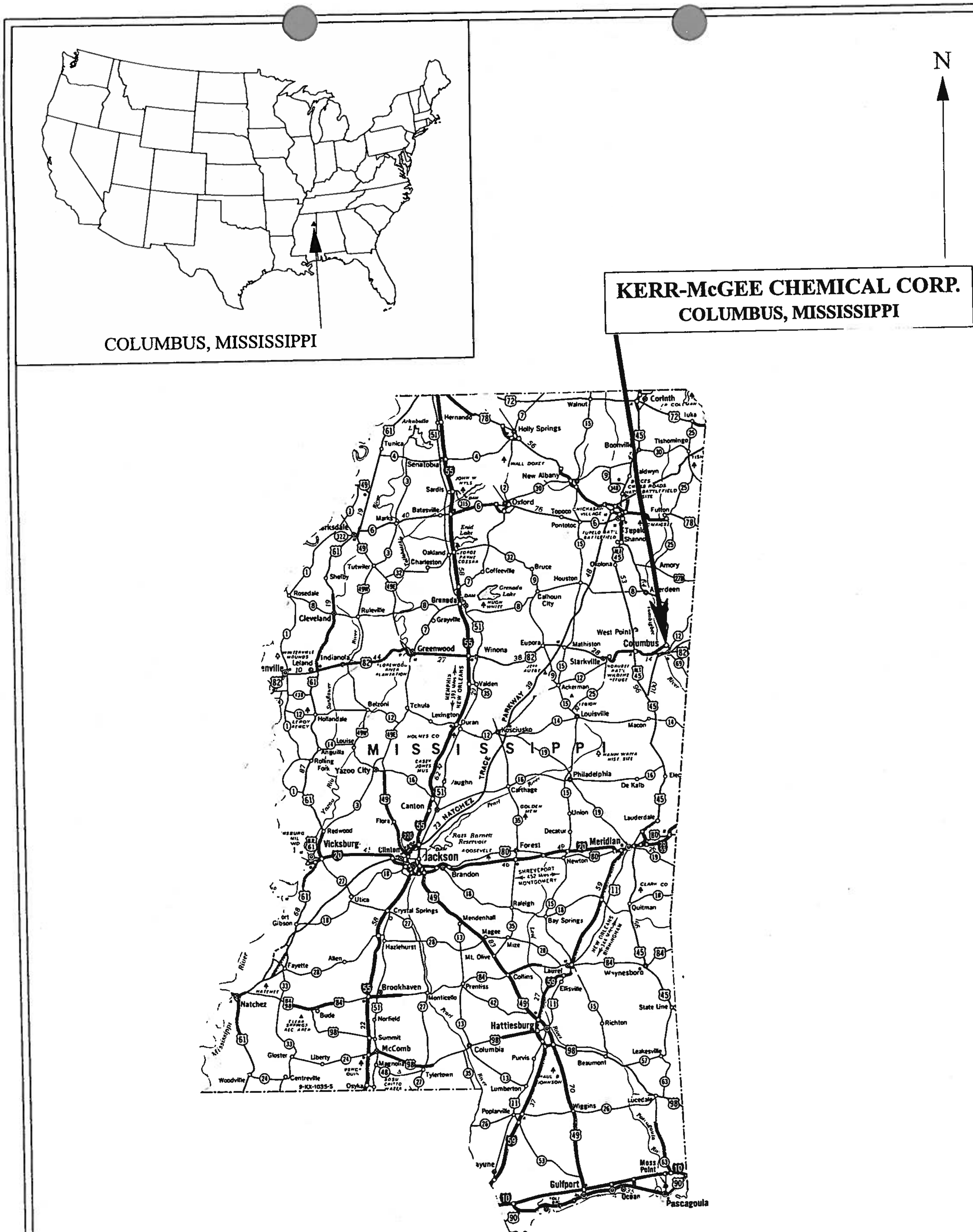
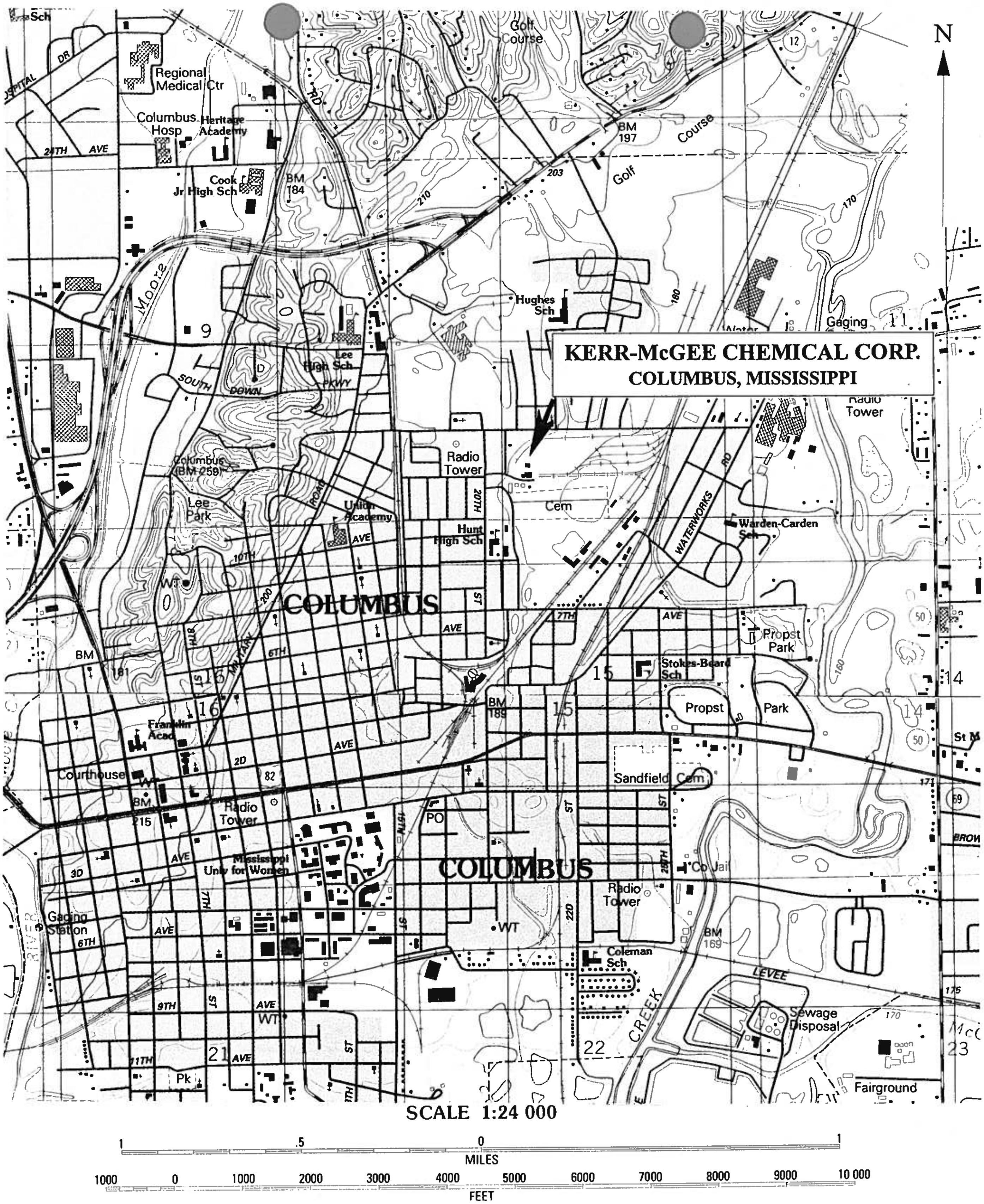



**FIGURE 2**
LOCATION MAP




SOURCE: USGS 7.5 min TOPOGRAPHIC QUADRANGLES: COLUMBUS NORTH & COLUMBUS SOUTH, MS, 1987.

**FIGURE 3**

AREA MAP

between each tie and may require from 6 to 12 months depending on the wood species and drying conditions. Green ties that have not been air seasoned undergo the Boultonizing process in which the vaporization of moisture in ties is accomplished through the application of heated creosote under vacuum in a closed retort. Pre-treatment of water and air effluents, including control measures to reduce emissions to these media, are also performed at all sites. The air flow schematic and wastewater treatment system for air and wood waste emissions are presented in Figures 4 through 6.

Regardless of the seasoning method, the basic process used for pressure impregnation of ties with preservative is the same. Generally, the purchaser will specify the retention or number of pounds of preservative per cubic foot of wood to be retained in the tie. Common retentions are six to eight pounds per cubic foot of wood. The preservative is a creosote-coal tar or creosote-petroleum solution which provides environmentally sound, long-term resistance to decay and damage caused by insects, fungi, or bacteria. Creosote also retards weathering.

Crossties are treated by the empty cell process. The average cylinder is loaded with 500 to 750 ties on rail trams and the cylinder door is sealed. Air pressure in the cylinder is increased to the desired level filling the space around the ties and the cell cavities within the wood structure. Initial air pressure is maintained while the preservative is pumped into the cylinder allowing any air present to be retained in the cell cavities of the wood. After the cylinder is filled with preservative, the pressure is increased and maintained until the preferred injection of preservative into the wood is achieved. After the pressure phase of the cycle is completed, the excess preservative remaining in the cylinder is returned to the work tanks. A vacuum is then drawn on the cylinder causing air trapped in the cells of the wood to expand and thereby force

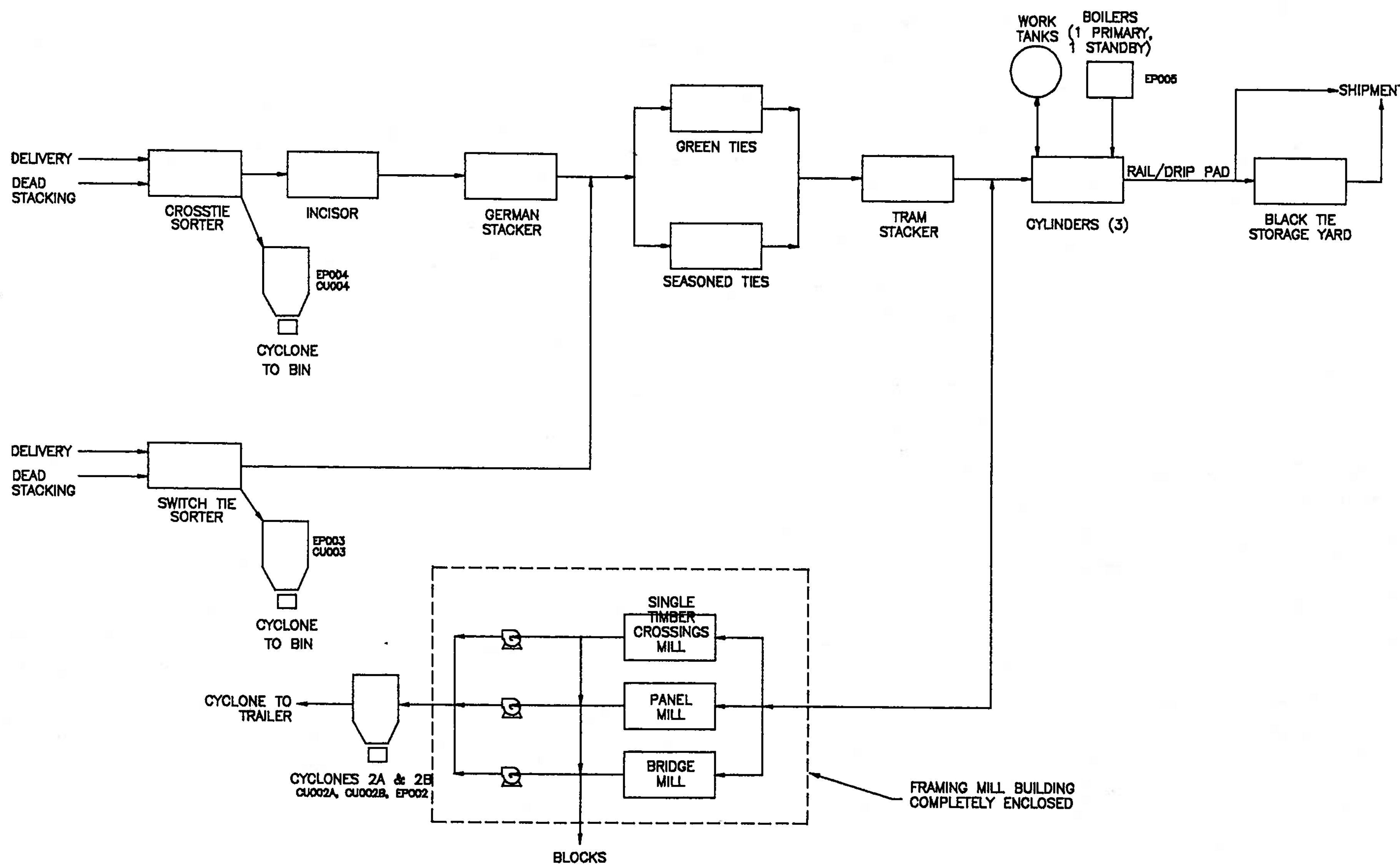
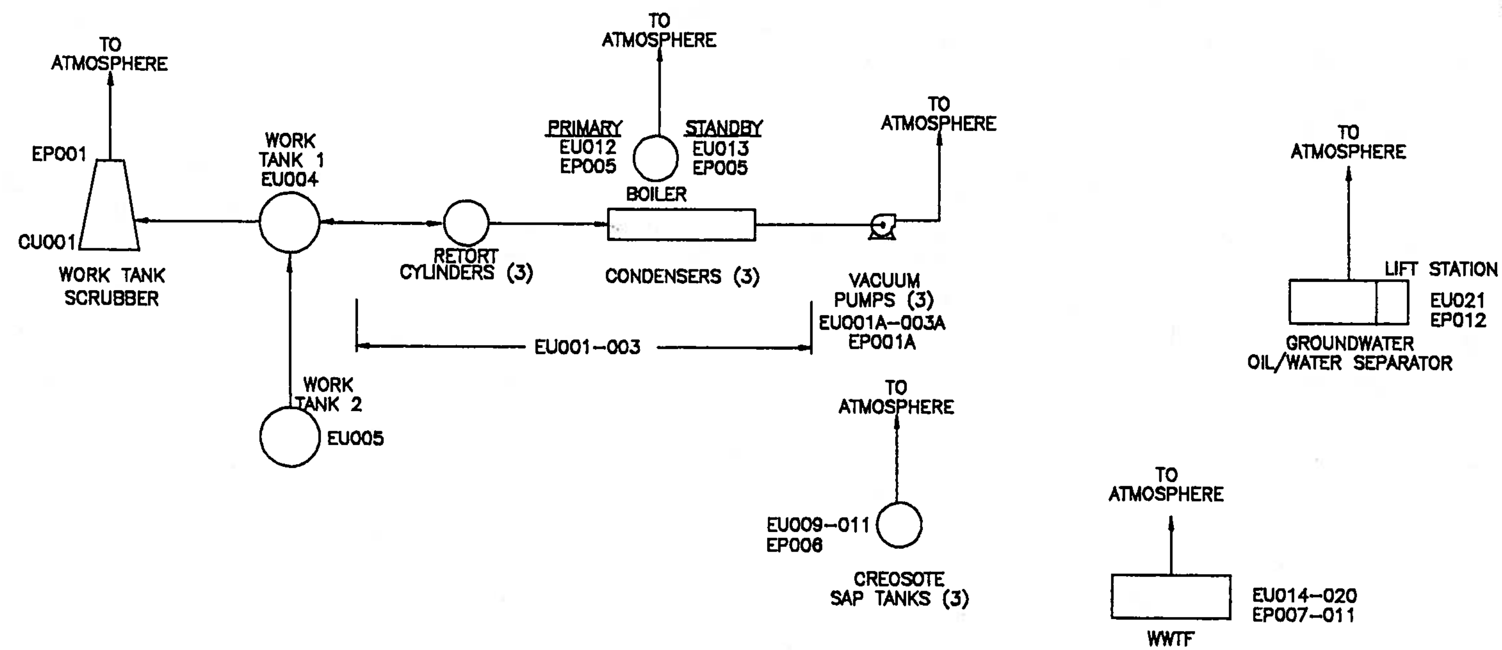



**FIGURE 4**

PROCESS SCHEMATIC
KERR–McGEE – COLUMBUS, MISSISSIPPI



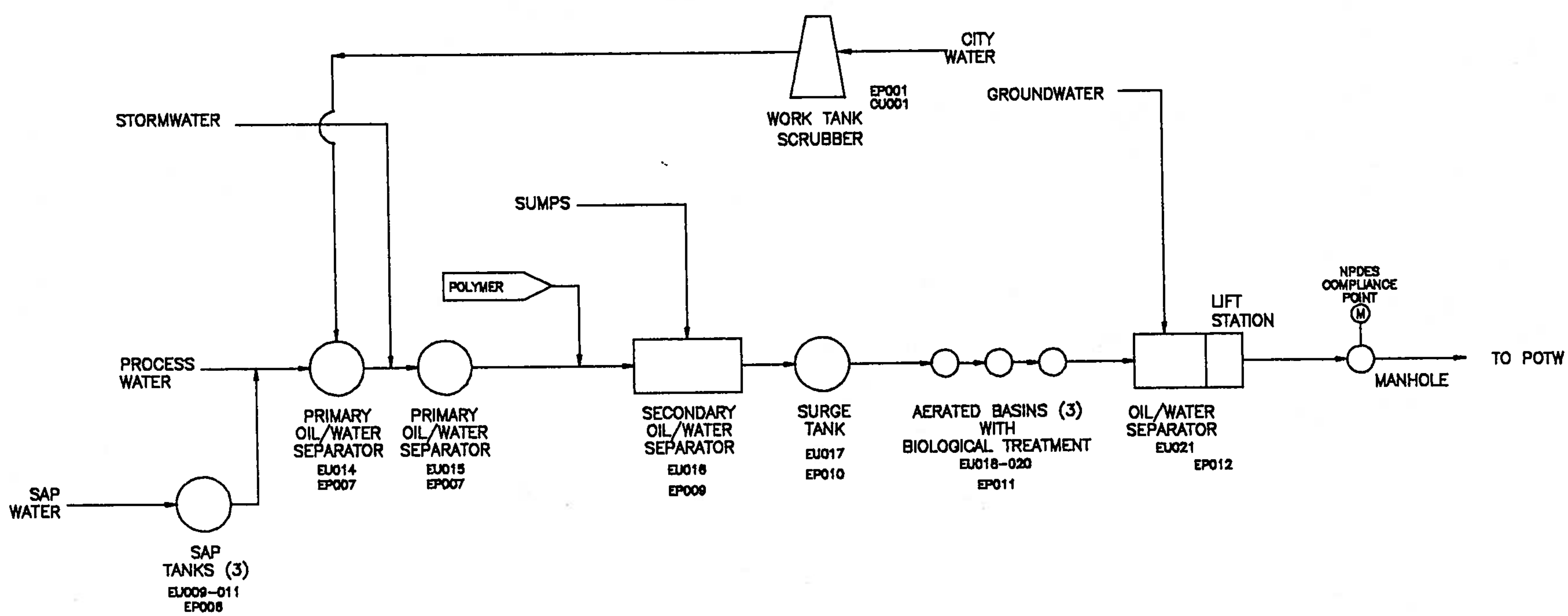

| EMISSION UNITS (EU) | | |
|---|---|---|
| LOCATION | | NUMBER |
| RETORT SYSTEM | 1 | EU001 |
| | 2 | EU002 |
| | 3 | EU003 |
| VACUUM PUMPS | 1 | EU001A |
| | 2 | EU002A |
| | 3 | EU003A |
| WORK TANKS | 1 | EU004 |
| | 2 | EU005 |
| SAP TANKS | 1 | EU009 |
| | 2 | EU010 |
| | 3 | EU011 |
| BOILER (PRIMARY) | 1 | EU012 |
| BOILER (STANDBY) | 1 | EU013 |
| WWTF | | EU014–020 |
| GROUNDWATER OIL/WATER SEPARATOR | | EU021 |

| CONTROL UNIT (CU) | |
|---|---|
| LOCATION | NUMBER |
| SCRUBBER | CU001 |

| EMISSION POINTS (EP) | |
|---|---|
| LOCATION | NUMBER |
| WORK TANK SCRUBBER | EP001 |
| VACUUM PUMPS (3) | EP001A |
| BOILER (PRIMARY & STANDBY) | EP005 |
| SAP TANKS (3) | EP006 |
| WWTF | EP007–011 |
| GROUNDWATER OIL/WATER SEPARATOR | EP012 |

**FIGURE 5**

CURRENTLY PERMITTED AIR EMISSION AIR FLOW SCHEMATIC
KERR–McGEE – COLUMBUS, MISSISSIPPI




| EMISSION UNITS (EU) | | |
|---|---|---|
| LOCATION | | NUMBER |
| SAP TANKS | 1 | EU009 |
| | 2 | EU010 |
| | 3 | EU011 |
| PRIMARY OIL/WATER SEPARATOR | 1 | EU014 |
| PRIMARY OIL/WATER SEPARATOR | 2 | EU015 |
| SECONDARY OIL/WATER SEPARATOR | | E0016 |
| SURGE TANK | | EU017 |
| AERATED BASIN | 1 | EU018 |
| | 2 | EU019 |
| | 3 | EU020 |
| GROUNDWATER OIL/WATER SEPARATOR | | EU021 |

| EMISSION POINTS (EP) | |
|---|---|
| LOCATION | NUMBER |
| SAP TANKS (3) | EP006 |
| PRIMARY OIL/WATER SEPARATORS (2) | EP007 |
| SECONDARY OIL/WATER SEPARATOR | EP009 |
| SURGE TANK 1 | EP010 |
| AERATED BASINS (3) | EP011 |
| GROUNDWATER OIL/WATER SEPARATOR | EP012 |

**FIGURE 6**

EXISTING WASTEWATER TREATMENT SCHEMATIC
KERR–McGEE – COLUMBUS, MISSISSIPPI

most of the excess preservative out of the wood. This leaves the wood cell walls coated with the preservative, rather than filling the cell cavity, resulting in an effective and economic treatment with little or no excess preservative on the wood surfaces.

Once the treating cycle is completed, the cylinder door is opened and the rail trams are pulled from the treating cylinder onto drip pads approved for the capturing and recycling of any drippage (40 CFR 264, Subpart W). Treated ties stored on the plant site for later shipment are stacked tightly in bundles. The Boulton treating cycle is graphically demonstrated with appropriate time sequences in Figure 7.

The facility at Columbus operates three treating cylinders with corresponding vacuum systems. Associated with the cylinders are two work tanks. These processes are heated by either the primary boiler or by stand-by boiler (used during maintenance outages on the primary boiler). The wastewater treatment system consists of two Primary oil/water separators (POWs), secondary oil/water separator (SOWs), surge tank, and three aerated basins, as previously shown in Figure 6. Effluent is discharged to the municipal wastewater treatment publically owned treatment works (POTW). A number of saw mills are operated at the facility including the framing mill, switch tie unloader, and cross tie unloader. All mills exhaust through cyclones. The Columbus facility is 80 acres in area and employs 85 persons.

## EMISSION CONTROL

The facility at Columbus has implemented control devices to lessen potential process emissions to the atmosphere. All saw mills are operated in conjunction with a cyclone to control particulate emissions from woodwaste. The wastewater treatment system is enclosed and some

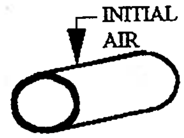
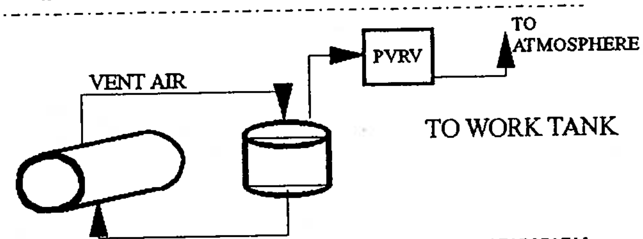
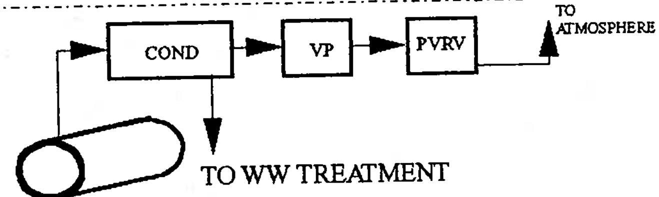
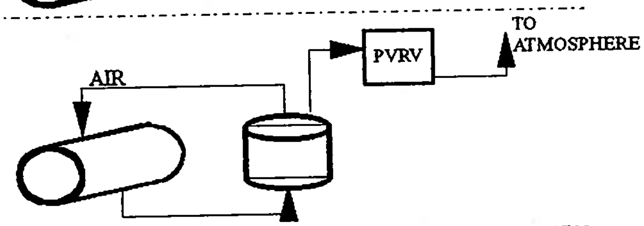
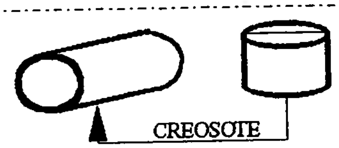
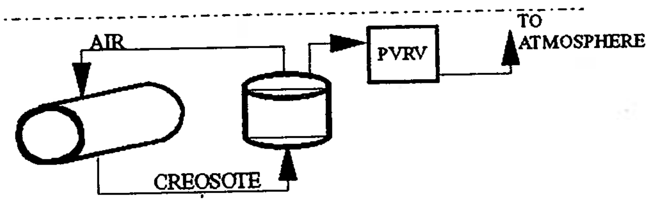
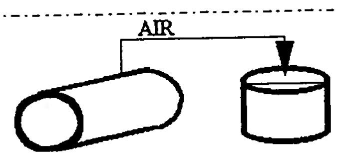
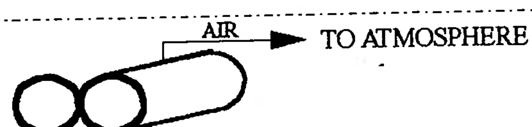
| PROCESS STEP | TIME | PURPOSE | SETUP | EMISSIONS |
|---|---|---|---|---|
| CLOSE DOOR | 30 SEC. | |  | NONE |
| INITIAL AIR | 0.25 MIN. | REPLACE CELLS WATER WITH AIR |   | NONE |
| FILL | 0.25 HR. | BOIL OUT WATER |   | TO WORK TANK |
| VACUUM | 12-14 HRS. | BOIL OUT WATER |   | |
| 1st PUMP BACK | 0.25 HR. | ADD AIR |   | |
| PRESSURIZATION | 2-4 HRS. | TREATING WOOD |   | NONE |
| DEPRESSURIZE (2nd PUMP BACK) | 0.25 HR. | EMPTY TANK |   | |
| FINAL VACUUM | 2-4 HRS. | PREVENT DRIPPING |   | TO WORK TANK |
| OPEN DOOR | 15 MIN. | |   | |

**FIGURE 7**
TREATMENT CYCLE

units covered. Kerr-McGee further plans to install an additional scrubber at Columbus through which all emissions from the wastewater treatment system will be treated prior to emission to the atmosphere.

**AIR PERMITS AND ISSUES**

The facility is currently permitted under an MDEQ, Air Operating Permit Number 1680-00020 and this Permit is presented in Appendix 2. The Permit currently controls emissions from the primary and standby boilers, a work tank, and the saw mills.

Inventory

Site visits have been conducted in order to inventory emissions from the various wood treating facilities of Kerr-McGee in preparation for Title V Operating Permit applications. Although many facilities have prepared an emissions inventory in the past, a complete facility-wide inventory is necessary for a Title V Permit application. Such an inventory includes estimates of actual and potential emissions of all regulated air pollutants from all point and fugitive emissions sources. The calculation of emission factors and the quantification of emissions has been accomplished for this plant and have been incorporated into the Permit application. Air sampling data conducted by the U.S. EPA at a similar KMCC facility located in Avoca, Pennsylvania have also been reviewed and appropriate calculations have been utilized for the estimation of emissions from Columbus, as well as, all other KMCC facilities.

## Emissions

The constituents primarily emitted by the KMCC facilities are: **1)** saw dust-total emissions of which are estimated as PM and PM-10; **2)** road dust-total emissions of which are estimated as PM and PM-10; **3)** $No_x$, $SO_2$, CO, PM and $PM_{10}$, and VOCs from the boilers; and **4)** naphthalene. Naphthalene is found on the list of hazardous air pollutants determined by the EPA. Vacuum pump emission rates during the wood treatment process were based on emissions monitoring tests performed at the KMCC facility at Avoca, Pennsylvania, and one test conducted at the Koppers facility in Susquehanna, Pennsylvania. Science Applications International Corporation (SAIC) monitored the Avoca facility emissions at the request of the U.S. EPA. The Koppers Susquehanna emissions test was conducted by Chester Environmental. All test results were reviewed and adjusted to emission rates in comparative terms of naphthalene. Emissions for the retort and vacuum system were derived from test results deemed reproducible and representative. Emissions from tanks containing creosote preservative and various units of the wastewater treatment system were estimated from literature pertaining to the petroleum and chemical manufacturing industry and additional modeling. The tank emissions were also estimated from the Avoca test results. Synthetic Organic Chemical Manufacturing Industry (SOCMI) and AP-42 (USEPA) emission factors as well as the USEPA Tank Program ZID and Water 8 Models were used.

Particulate material is federally regulated at the level of material that is inhalable or at a nominal particle size of 10 microns. The production of road dust at a site is dependent upon vehicular movement, silt content of the road substrate, and days of precipitation. Evapotranspiration and precipitation curves were developed to predict the number of days dust is possible. The number of wet days at a site, in principle, includes the days of precipitation plus the days following the event when the ground retains moisture. An approach was used whereby the 30-year average monthly evapotranspiration, in inches, was subtracted from the 30-year average monthly precipitation at each site to arrive at a precipitation surplus or deficit for each month. The months having a precipitation surplus were added and multiplied by 30 days in order to obtain the number of wet days per year. The assumption is that the average precipitation falls uniformly throughout the month. Graphical representations of the precipitation-evapotranspiration data accompany the vehicular traffic computation worksheets found within the permit. To determine a final output of dust, factors concerning vehicular weights, number of wheels, and distances travelled are applied.

Processes involving saw milling create the majority of particulate material on-site. Contributions from the Framing Mill and two Unloaders are the most notable. The number of days of precipitation at Columbus limits potential Emissions of road dust at this facility. The volume of wood waste quantified as PM or $PM_{10}$ was calculated as equivalent to the volume of wood displaced by the cut of the saw blade or boring bit used. Wood-working industry factors from the AP-42 guide were applied to these volumes to determine emissions from an enclosure. All emissions were considered as maximums in order to ascertain the potential to emit in accordance with Title V permitting strategies. Particulates are also emitted by the boilers and the emission rate is dependant upon fuel used in the boilers.

The facility at Columbus emits moderate quantities of naphthalene from the retort door and vacuum system. Emissions of naphthalene are also calculated from the process wastewater and groundwater treatment systems. Off gases from the process secondary oil/water separator, equalization tanks, and biological unit are controlled by enclosure only. Working and storage tanks have PVRVs for control of emissions to the atmosphere thereby lessening losses of naphthalene from product holding vessels. The potential to emit from these units comes primarily from these pressure-vacuum relief valves.

Submittal of applications for Title V Operating Permits is required within one year of USEPA approval of a state plan. Strategies for complete submittal of Title V Operating Permit applications are dependent on USEPA approvals and state groupings of industry deadlines during the year to facilitate processing. The Mississippi Department of Environmental Quality (MDEQ) was granted final approval in December 1994. MDEQ has requested that Synthetic Minor Applications be submitted by April 1, 1995.

## REGULATION OF AIR EMISSIONS

### Clean Air Act

The Clean Air Act (CAA) and its Amendments form the basis for most air quality regulations. The CAA establishes an integrated program that includes four major initiatives addressing hazardous, ambient, acid rain, and stratospheric ozone-depleting pollutants. Historically, the CAA has focused on the control of ambient pollutants most associated with urban smog. To that effect, the USEPA is required by the CAA to set National Ambient Air Quality Standards (NAAQS), constituting uniform ceilings or limits, for pollutants emitted from widespread and diverse sources. To date, USEPA has set NAAQS for six criteria, ambient pollutants: inhalable particulates (or $PM_{10}$), lead, carbon monoxide (CO), sulfur dioxides (SOx), nitrogen oxides ($NO_x$), and low-level ozone.

The CAA also has long provided for the control of hazardous or toxic emissions. For such pollutants, USEPA has been required to develop National Emission Standards for Hazardous Air Pollutants (NESHAPs). USEPA issued NESHAPs for eight priority pollutants prior to the Amendments.

Clean Air Act Amendments of 1990. With the passage of the Clean Air Act Amendments of 1990 (CAAA), almost all air emission sources will require an operating permit. The basic vehicle for enforcement of several titles of the Act (for example, air toxics and nonattainment) is this operating permit. A federally enforceable stable operating permit (FESOP) is a permit to operate a facility that emits specific air pollutants regulated under the act. An operating permit will do more than limit the quantity of emissions; directly or indirectly it will affect the operation of the manufacturing or processing operations that are the sources of the emissions. The permit may also restrict the raw materials used or even the products made at the facility. Operating the facility without a permit or in a manner not in accordance with the permit will be illegal.

The list of pollutants regulated under the act has been expanded from 21 to 189 chemicals or compound groups. The new Hazardous Air Pollutant (HAP) program regulates the emission of these compounds in two phases. The first phase takes a technology-based approach to regulating pollutants, rather than the risk-based approach used in the NESHAP program. New sources or major modifications of existing sources of hazardous air pollutants will be covered by a new, as yet to be developed, air toxics review program being designed to ensure that new sources of hazardous air pollutants will be controlled to an efficiency described as maximum achievable control technology (MACT). MACT will be specifically defined by the USEPA and will initially cover selected categories of industrial sources. It is known now that MACT standards will require affected sources to employ control technologies that are 95 percent effective in reducing pollutants. The second phase of the HAP program will require certain facilities, which will be identified by the USEPA in the late 1990s, to determine the residual risk to public health and the environment of the small amount of HAPs that will still be released into the atmosphere after MACT is applied. Creosote woodtreaters have been listed as major sources of HAPs; however, the technical staff of EPA located in Durham, North Carolina is recommending that this industry be removed as a major source.

Federal requirements for new sources, called new source review (NSR) in nonattainment areas and prevention of significant deterioration (PSD) in attainment areas, have been modified slightly by the CAAA but remain substantially the same. Again, almost all of the states run these programs. New plant facilities being built in new locations and existing sources that undergo major modifications will be required to obtain new source permits in addition to new or modified operating permits.

As a result, there will be four permitting programs derived from federal law. For new sources there is PSD, NSR, and the air toxics MACT review, while for all sources there is the Title V operating permit program. Each of these programs is complex. Each is different enough to appear to be unrelated.

## Title V Operating Permit Program

Major sources of hazardous pollutants which are required to apply for an operating permit are identified by the CAAA as sources having the potential to emit, considering controls, 10 tons per year or more of any specific hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants. A facility can also be identified as a major source for having the potential to emit criteria compounds. The degree of severity assigned to a nonattainment area determines the level to which emissions are regulated. The major source thresholds for air pollutants regulated by Title V operating permits are summarized below.

**Table 1. Title V Operating Permit Major Source Thresholds**

| Potential Emissions | Major Source Threshold (tons/yr) |
|---|---|
| Hazardous Air Pollutants (HAPs) | 10 for any single HAP or 25 for any combination of HAPs |
| Volatile Organic Compounds (VOCs) in an ozone nonattainment area | 10 in extreme nonattainment areas |
| | 25 in severe nonattainment areas |
| | 50 in serious nonattainment areas |
| | 100 in the rest of the US |
| Nitrogen Oxides ($NO_x$) in an ozone nonattainment area | 10 in extreme nonattainment areas |
| | 25 in severe nonattainment areas |
| | 50 in serious nonattainment areas |
| | 100 in the rest of the US |
| $PM_{10}$ in a serious $PM_{10}$ nonattainment area | 70 |
| CO in a serious CO nonattainment area | 50 |
| All others | 100 for any regulated pollutant |

Once a facility is subject to the permit program as a major source for any one pollutant, emissions of every regulated air pollutant at the site must be addressed in the permit application. Even if no standards are applicable, emission rates must be identified. Limits included in the Title V permit, are by definition, federally enforceable. This creates an opportunity to use the Title V permit to limit plant emissions of any regulated air pollutant and thus, possibly avoid being subject to other regulatory programs.

The new permit will be issued by the state. Even though the state runs the program, they must grant the USEPA the power to enforce the permit conditions independently of state action, if USEPA deems that necessary. Additionally, USEPA can veto the issuance of a permit. Hence, this new operating permit is referred to as federally enforceable. While it is a misnomer to call this a federal operating permit program because the state will run it, there is no doubt that it imposes federal requirements on facilities.

The federal operating permit program intends to establish the exact emission limitations for each source and each pollutant in one document, the permit, along with all the reporting and record keeping requirements. An USEPA or state inspector can therefore readily assess the actual conditions described in the permit. This also may aid plant personnel, who will know, perhaps for the first time, the requirements and emission limitations.

To make the enforcement job even easier and allow for citizen enforcement, there will be a requirement that each permittee submit a compliance report at least every six months. This compliance report must be certified by a corporate official and contain all required reports spelled out in the permit. The exact nature of the reporting is going to be the subject of intense negotiation as the permit is being developed. It may range from as rigorous as continuous emission monitoring on all stacks to purchases of chemical feedstock. The compliance reports will provide a wealth of information to the agencies and to the public on the compliance status of the facility. Therefore, the general public will have access to be able to detect noncompliance and start enforcement action or move to withdraw the permit and shut down the facility.

# SECTION 2

# SYNTHETIC MINOR ADDENDUM

STATE OF MISSISSIPPI
DEPT. OF ENVIRONMENTAL QUALITY
OFFICE OF POLLUTION CONTROL
P.O. BOX 10385
JACKSON, MS 39289-0385
(601) 961-5171

RECEIVED
APR -6 1995
DEQ-OPC

# APPLICATION ADDENDUM FOR A SYNTHETIC MINOR OPERATING PERMIT

**NOTE:** This addendum should be affixed to the front of either the Application for Title V Air Pollution Control Permit to Operate Air Emissions Equipment or the Application for Air Pollution Control Permit to Construct and/or Operate Air Emissions Equipment. If the Application for Title V Air Pollution Control Permit to Operate Air Emissions Equipment is used, then Sections M, N, and O of that application do not have to be completed.

Data Coded

A Synthetic Minor Source is defined in Regulation APC-S-2 as: Any facility which would otherwise constitute a major source under Commission Regulation APC-S-6, "Air Emissions Operating Permit Regulations for the Purposes of Title V of the Federal Clean Air Act", except that the owner or operator of the facility elects for federally enforceable emissions limitations which may include permit conditions restricting hours of operation, or type or amount of material stored, combusted or processed, or establishing more stringent air pollution control efficiency requirements to lower allowable emissions for air pollutants in the State Permit to Operate below applicability thresholds for a Title V major source.

**Facility Name** Kerr McGee Chemical Corporation - Forest Products Division
**Facility Number** 1680-00020
**City** Columbus **County** Lowndes

**List the limitations/restrictions you are proposing to make your facility a synthetic minor source and the proposed methods of demonstrating compliance with those limitations/restrictions. If necessary, use a separate page for each Emission Point.**

See Attached - Wastewater Treatment Facility Scrubber

Anthony N. Helms
**Printed/Typed Name**

***Signature**

**Date**

***Signature should be the same as on the application form.**

**Synthetic Minor Operating Permit Application**

**Wastewater Treatment Facility Scrubber EP0013**

Processes the scrubber controls emissions from:

Secondary Oil/Water Separator
Secondary Oil/Water Separator Surge Tank
Groundwater Oil/Water Separator
Groundwater Oil/Water Separator Lift Station

The existing scrubber permitted under Mississippi Department of Environmental Quality Air Operating Permit Number 1680-00020 will be moved to the Wastewater Treatment Facility (WWTF). Air emissions from the WWTF will be conveyed to this scrubber. Covers will be placed over the Secondary Oil/Water Separator (SOW) and Surge tank and Groundwater Oil/Water Separator and Lift Station. A vent from each unit will be piped for conveyance to the scrubber. A fan will be used to induce a slight negative pressure on the units. The Groundwater Oil/Water Separator Lift Station will provide the scrubber liquid at a rate of 50 gallons per minute (gpm). After passing through the scrubber, 50 gpm will be drawn off and returned to the Groundwater Oil/Water Separator. The groundwater flow to the SOW is 15.3 gpm and approximately 15.3 gpm will be discharged from the SOW to the City POTW. The flow for the WWTF Scrubber is represented diagrammatically in Figure 2.

Compliance will be demonstrated by maintaining records of total WWTF discharge flow to the municipal water treatment plant. Compliance is achieved for the total permitted flow of 75,000 gallons per day.

**List the limitations/restrictions you are proposing to make your facility a synthetic minor source and the proposed methods of demonstrating compliance with those limitations/restrictions. If necessary, use a separate page for each Emission Point.**

See Attached - Treating System Scrubber

Anthony N. Helms
**Printed/Typed Name**

***Signature**

**Date**

***Signature should be the same as on the application form.**

**Synthetic Minor Operating Permit Application**

**Treating System Scrubber EP001**

Processes the scrubber controls emissions from:

- Primary Oil/Water Separators (2)
- Treating Cylinders (3)
- Vacuum Pumps (3)
- Work Tanks (4)
- Hot Tank
- Reclaim Tank
- Building Sump

A new Venturi scrubber will be installed along with a fan system for applying a negative pressure onto the above listed processes. The Venturi scrubber liquid will feed at a rate of 80 gallons per minute (gpm) from a water Recycle Tank. A return flow of 15 gpm will be sent from the exit scrubber liquor back to the Sap and Vacuum Seal Water Tank. The Wastewater Treatment Facility will receive a 15 gpm overflow from this tank for eventual discharge. An additional overflow of 10 gpm from the Sap and Vacuum Seal Water Tank will return to the scrubber Recycle Tank. The total Venturi scrubber flow is 80 gpm. A removal efficiency of 75 percent has been guaranteed by the manufacturer. The flow for the Treating System Scrubber is represented diagrammatically in Figure 2.

Compliance will be demonstrated by maintaining records of the following: (1) total retort charges per day per year; (2) the total time of each treatment cycle; and (3) the content of creosote will be monitored with each shipment received according to AWPA Standards. Compliance is achieved for continuous operation of each of the three treating cylinders for 8,760 hours per year.

**Synthetic Minor Operating Permit Application**

**Treating System Scrubber EP001**
**Additional Information**

The existing treatment of air emissions will be modified during the term of the Synthetic Minor Operating Permit to include a second air scrubber (EP013). The current work tank scrubber (EP001) will handle emissions from the wastewater treatment facility (WWTF). The new scrubber will manage emissions, presently treated by EP001, to include the following processes: Retort and Associated Vacuum System, Four Work Tanks, Hot Tank, Reclaim Tank, Building Sump, and Two Primary Oil/Water Separators. Additional emissions control and reduction will be instituted by covering all units of the WWTF for venting to the WWTF scrubber (EP001). A separate program plans for the removal of three sap tanks. AP-42 factors indicate that emissions from a covered WWTF unit results in a reduction of emissions by a factor of 25 or to 4-percent of the emissions from the uncovered units. The emissions from the scrubbers assume a 75-percent removal efficiency. Emissions from the WWTF will therefore be reduced by 96-percent for covering the units and a further reduction of 75-percent through the scrubber. A schedule for the implementation of this operating scenario is as follows:

- One month for design and cost approval (end of March 1995).
- Three months for delivery following approval (end of June 1995).
- Two months for constructing pipe connections and perform stack testing (beginning of September 1995).
- Three months for contingency - operational January 1996.

The existing scrubber was initially installed to handle emissions from a New Source Performance Standards (NSPS) liquid storage tank. However, previously unavailable data demonstrate that this tank is not subject to NSPS regulations by definition of volatile organic liquid (40 CFR Part 60, Subpart Kb). Specifically, the liquid stored does not meet the vapor pressure requirements of the standards. This information was presented to the State of Mississippi on October 27, 1994 and deemed acceptable. A Construction Permit for this facility is currently being prepared for the construction of two similar work tanks. These tanks will hold creosote at an approximate temperature of 180°F. Creosote has a vapor pressure at this temperature between 0.47 and 2.00 kPa and is therefore exempt from the 95-percent reduction of emissions required by NSPS (40 CFR Part 60, Subpart Kb 60.112b(3)(ii)). It is requested that this NSPS requirement not be reissued in the Synthetic Minor Operating Permit as there are no NSPS units at this site.

A proposed air emission flow diagram is attached here and in the executive summary (Figure 2). Also presented is an emission summary table for both the existing operating scenario and the proposed operating scenario (Table E-3). As the installation of the new scrubber affects the WWTF, the emissions summary for those units is in terms of controlled emissions. Please note this on the table included in the Section E forms. It is further requested, that the Synthetic Minor Operating Permit be written according to the controls being installed in 1995.

## List of Figures

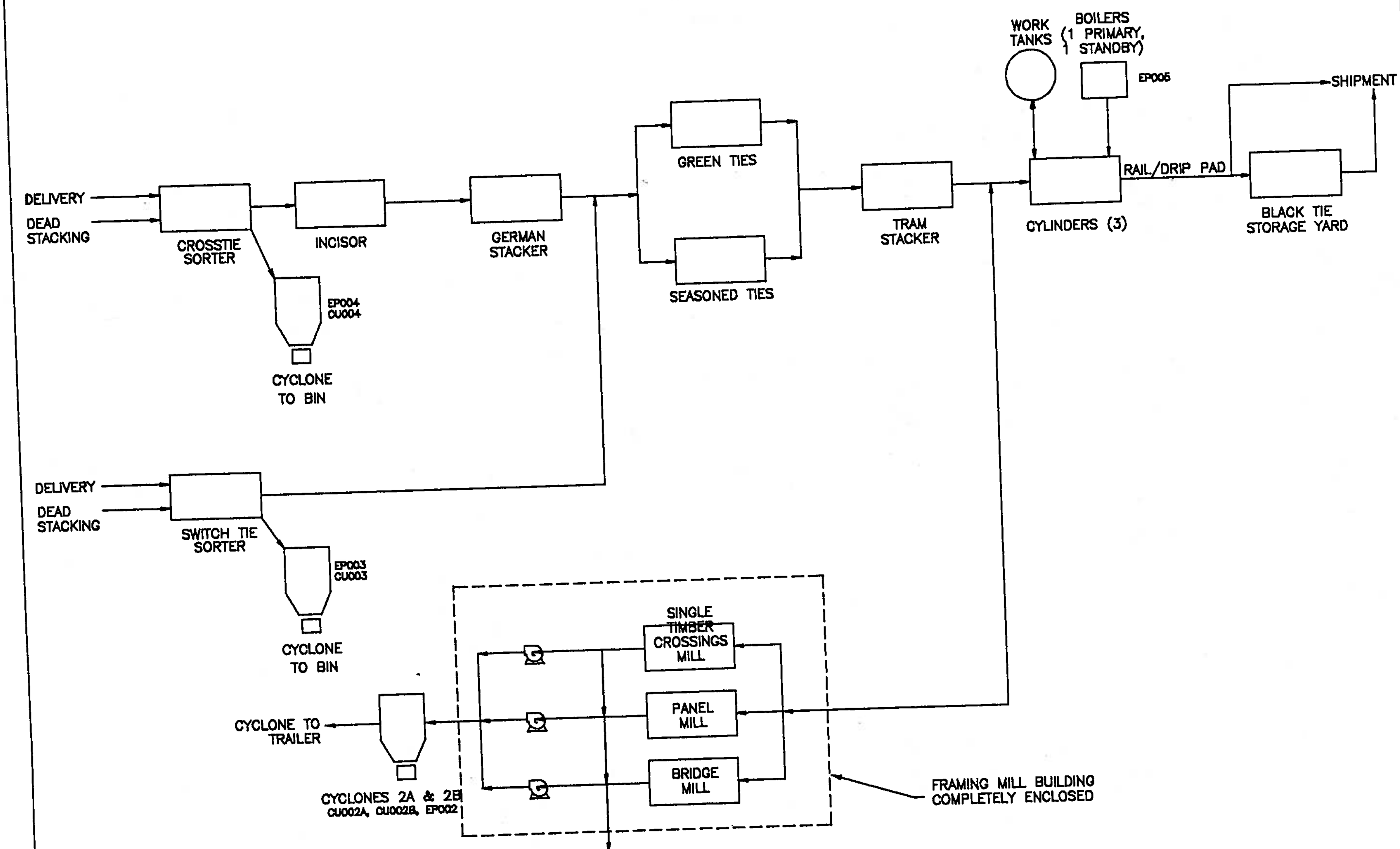
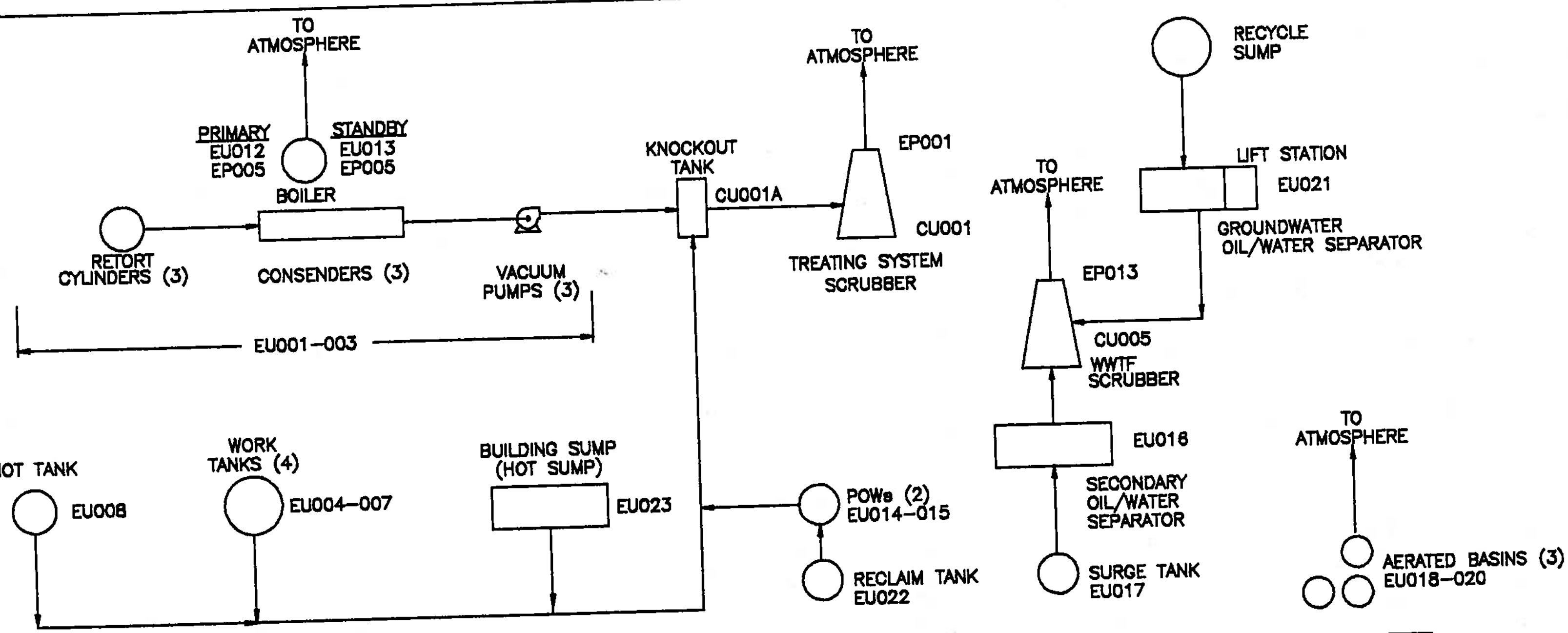



**FIGURE 1**

PROCESS SCHEMATIC

KERR–McGEE – COLUMBUS, MISSISSIPPI



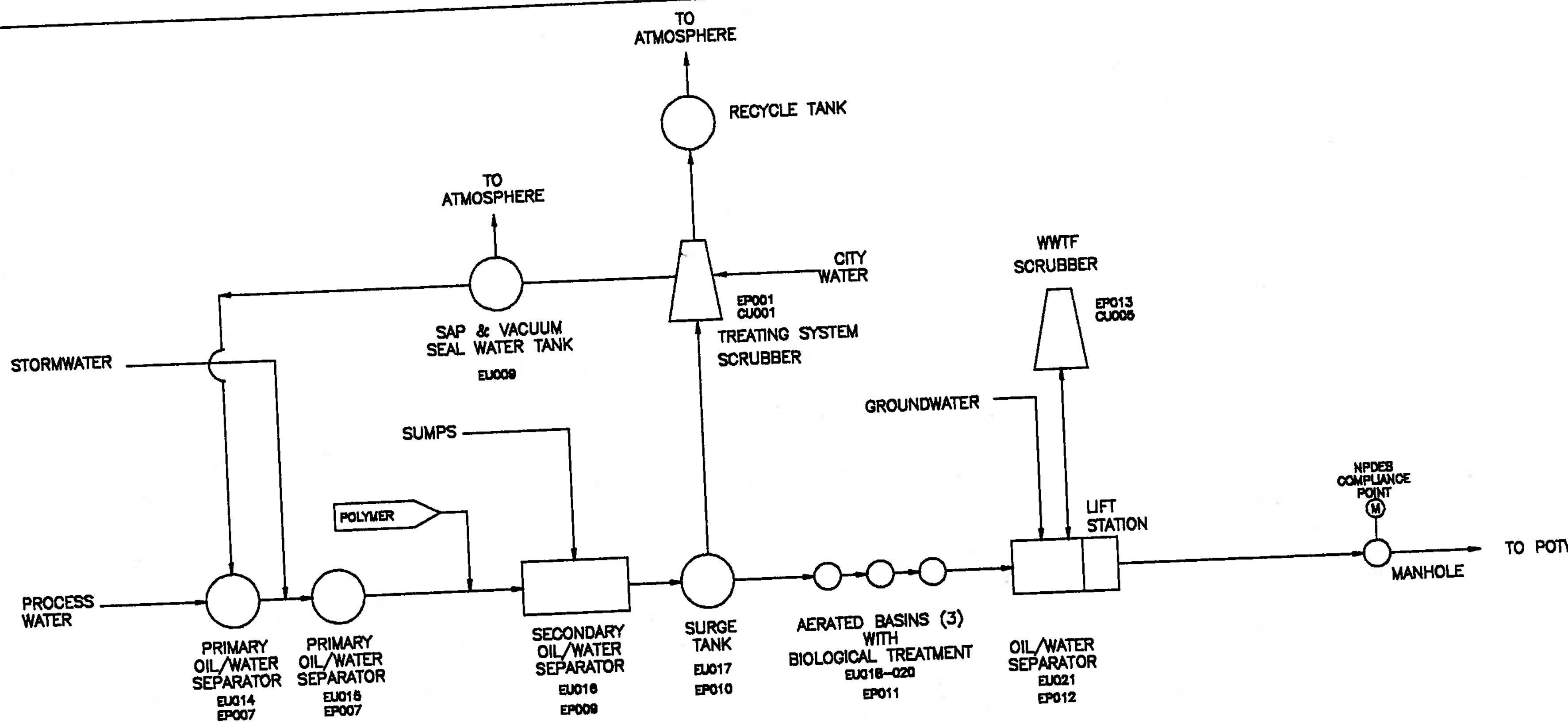

| EMISSION UNITS (EU) | | |
|---|---|---|
| LOCATION | | NUMBER |
| RETORT and VACUUM SYSTEM | 1 | EU001 |
| | 2 | EU002 |
| | 3 | EU003 |
| WORK TANKS | 1 | EU004 |
| | 2 | EU005 |
| | 3 | EU006 |
| | 4 | EU007 |
| HOT TANK | 1 | EU008 |
| BOILER (PRIMARY) | 1 | EU012 |
| BOILER (STANDBY) | 1 | EU013 |
| PRIMARY OIL/WATER SEPARATOR | 1 | EU014 |
| PRIMARY OIL/WATER SEPARATOR | 2 | EU015 |
| SECONDARY OIL/WATER SEPARATOR | 1 | EU016 |
| SURGE TANK | 1 | EU017 |
| AERATED BASINS | 1 | EU018 |
| | 2 | EU019 |
| | 3 | EU020 |
| GROUNDWATER OIL/WATER SEPARATOR | | EU021 |
| RECLAIM TANK | 1 | EU022 |
| BUILDING SUMP | 1 | EU023 |

| CONTROL UNIT (CU) | |
|---|---|
| LOCATION | NUMBER |
| RETORT SCRUBBER | CU001 |
| KNOCKOUT TANK | CU001A |
| WWTF SCRUBBER | CU005 |

| EMISSION POINTS (EP) | |
|---|---|
| LOCATION | NUMBER |
| TREATING SYSTEM SCRUBBER | EP001 |
| BOILER (PRIMARY & STANDBY) | EP005 |
| AERATED BASINS (3) | EP011 |
| WWTF SCRUBBER | EP013 |

**FIGURE 2**

PROPOSED AIR EMISSIONS CONTROLS SCHEMATIC
KERR–McGEE – COLUMBUS, MISSISSIPPI




| EMISSION UNITS (EU) | | |
|---|---|---|
| LOCATION | | NUMBER |
| SAP & VACUUM SEAL WATER TANK | 1 | EU009 |
| PRIMARY OIL/WATER SEPARATOR | 1 | EU014 |
| PRIMARY OIL/WATER SEPARATOR | 2 | EU015 |
| SECONDARY OIL/WATER SEPARATOR | | EU016 |
| SURGE TANK | | EU017 |
| AERATED BASIN | 1 | EU018 |
| | 2 | EU019 |
| | 3 | EU020 |
| GROUNDWATER OIL/WATER SEPARATOR | | EU021 |

| EMISSION POINTS (EP) | |
|---|---|
| LOCATION | NUMBER |
| SAP TANKS (3) | EP006 |
| PRIMARY OIL/WATER SEPARATORS (2) | EP007 |
| SECONDARY OIL/WATER SEPARATOR | EP009 |
| SURGE TANK 1 | EP010 |
| AERATED BASINS (3) | EP011 |
| GROUNDWATER OIL/WATER SEPARATOR | EP012 |

**FIGURE 3**

PROPOSED WASTEWATER TREATMENT SCHEMATIC
KERR–McGEE – COLUMBUS, MISSISSIPPI

# SUPPORT CALCULATIONS

# EP001

# TREATING SYSTEM SCRUBBER

Synthetic Minor Operating Scenario Emission Summary

Emission Point EP001 Treating System Scrubber

| Emission Unit | UTM Coordinates | | Uncontrolled Emission Rate (lbs/day) | | | Uncontrolled Emission Rate (tons/yr) | | | Controlled Emission Rate (lbs/day) | | | Controlled Emission Rate (tons/yr) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | North | East | Naph | HAPs | VOCs | Naph | HAPs | VOCs | Naph | HAPs | VOCs | Naph | HAPs | VOCs |
| Retort and Corresponding Vacuum System | 1397846.59 | 629267.66 | 0.055 | 0.077 | 0.132 | 0.01 | 0.014 | 0.024 | 0.055 | 0.077 | 0.132 | 0.01 | 0.014 | 0.024 |
| Work Tank 1 | 1397893.10 | 629183.30 | 0.578 | 0.755 | 1.376 | 0.105 | 0.138 | 0.251 | 0.144 | 0.189 | 0.344 | 0.026 | 0.034 | 0.063 |
| Work Tank 2 | 1397882.63 | 629207.11 | 0.792 | 1.023 | 1.885 | 0.144 | 0.187 | 0.344 | 0.198 | 0.256 | 0.471 | 0.036 | 0.047 | 0.086 |
| Work Tank 3 | 1397853.69 | 629168.56 | 0.578 | 0.755 | 1.376 | 0.105 | 0.138 | 0.251 | 0.144 | 0.189 | 0.344 | 0.026 | 0.034 | 0.063 |
| Work Tank 4 | 1397851.34 | 629138.43 | 0.578 | 0.755 | 1.376 | 0.105 | 0.138 | 0.251 | 0.144 | 0.189 | 0.344 | 0.026 | 0.034 | 0.063 |
| Hot Tank | 1397879.61 | 629130.39 | – | – | – | – | – | – | 7.01 | 9.04 | 16.82 | 1.28 | 1.65 | 3.05 |
| POWs (2) | 1397878.34<br>1397899.37 | 629142.68<br>629148.80 | 0.204 | 0.274 | 0.485 | 0.037 | 0.050 | 0.089 | 0.051 | 0.068 | 0.121 | 0.009 | 0.013 | 0.022 |
| Building Sump | 1397846.59 | 629267.66 | 0.055 | 0.071 | 0.110 | 0.010 | 0.013 | 0.020 | 0.0006 | 0.0007 | 0.0001 | 0.00001 | 0.00002 | 0.00003 |
| Sap and Vacuum Seal Water Tank | 1397846.59 | 629267.66 | 3.123 | 7.397 | 4.100 | 0.570 | 1.350 | 0.750 | 1.041 | 2.466 | 1.370 | 0.190 | 0.450 | 0.250 |
| Reclaim Tank | 1397878.34 | 629142.68 | 0.01885 | 0.02433 | 0.04477 | 0.00344 | 0.00444 | 0.00817 | 0.00471 | 0.00608 | 0.01119 | 0.00086 | 0.00111 | 0.0028 |

# RETORT AND CORRESPONDING VACUUM SYSTEM

# SUPPORT CALCULATIONS

JOB 940168/3

SHEET NO. 1 OF

CALCULATED BY STM DATE 2-24-95

CHECKED BY DATE

SCALE

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Brentwood, TN 37027
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KMCC - COLUMBUS
EMISSIONS CALCULATIONS

- RETORT AND CORRESPONDING VACUUM SYSTEM

As measured in EPA tests at the Avoca, PA facility and as confirmed by tests at Susquehanna, PA (Koppers facility) Average Naphthalene emissions for the Boulton charge = 0.021 lbs/hr

A factor of 0.8707 will be used to correct for retort size.

$$\frac{77.4 \text{ lbs Naph}}{15.0 \text{ lbs Dbf}} = \frac{0.021 \text{ lbs Naph}}{x \text{ lbs Dbf}} \qquad x = \frac{(15.0 \text{ lbs Dbf})(0.021 \text{ lbs Naph})}{(77.4 \text{ lbs Naph})}$$

$$x = 0.0041 \text{ lbs/hr Dbf}$$

$$\frac{77.4 \text{ lbs Naph}}{7.5 \text{ lbs Quin}} = \frac{0.021 \text{ lbs Naph}}{x \text{ lbs Quin}} \qquad x = \frac{(7.5 \text{ lbs Quin})(0.021 \text{ lbs Naph})}{(77.4 \text{ lbs Naph})}$$

$$x = 0.0020 \text{ lbs/hr Quin}$$

$$\frac{77.4 \text{ lbs Naph}}{0.1 \text{ lbs Biph}} = \frac{0.021 \text{ lbs Naph}}{x \text{ lbs Biph}} \qquad x = \frac{(0.1 \text{ lbs Biph})(0.021 \text{ lbs Naph})}{(77.4 \text{ lbs Naph})}$$

$$x = 2.7 \times 10^{-5} \text{ lbs/hr Biph}$$

Summary,
Retort and corresponding vacuum system losses
0.021 lbs/hr Naphthalene
0.0041 lbs/hr Dibenzofuran
0.0020 lbs/hr Quinoline
$2.7 \times 10^{-5}$ lbs/hr Biphenyl

JOB 940168/3

SHEET NO. 2 OF

CALCULATED BY STM DATE 2-24-95

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KMCC- COLUMBUS
EMISSIONS CALCULATIONS

3 ?

RETORT AND CORRESPONDING VACUUM SYSTEM (continued)

Totals,
Retort and corresponding vacuum system losses for
3 ~~6~~ retorts

$\frac{0.021 \text{ lbs Naph}}{\text{hr}} * \frac{24 \text{ hrs}}{1 \text{ day}} * 3 \text{ retorts} * 0.8707 = 1.3165$ lbs/day Naph

$\frac{0.0041 \text{ lbs Dbf}}{\text{hr}} * \frac{24 \text{ hrs}}{1 \text{ day}} * 3 \text{ retorts} * 0.8707 = 0.2570$ lbs/day Dbf

$\frac{0.0020 \text{ lbs Quin}}{\text{hr}} * \frac{24 \text{ hrs}}{1 \text{ day}} * 3 \text{ retorts} * 0.8707 = 0.1254$ lbs/day Quin

$\frac{2.7 \times 10^{-5} \text{ lbs Biph}}{\text{hr}} * \frac{24 \text{ hrs}}{1 \text{ day}} * 3 \text{ retorts} * 0.8707 = 0.0017$ lbs/day Biph

Short term emissions in lbs/day,
1.3165 lbs/day Naphthalene
0.2570 lbs/day Dibenzofuran
0.1254 lbs/day Quinoline
0.0017 lbs/day Biphenyl

Long-term emissions in tons/yr,

$\frac{1.3165 \text{ lbs Naph}}{\text{day}} * \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} * \frac{365 \text{ days}}{1 \text{ yr}} = 0.2403$ tons/yr Naph

$\frac{0.2570 \text{ lbs Dbf}}{\text{day}} * \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} * \frac{365 \text{ days}}{1 \text{ yr}} = 0.0469$ tons/yr Dbf

JOB 940168/3

SHEET NO. 3 OF

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KMCC - COLUMBUS
EMISSION CALCULATIONS

▶ RETORT AND CORRESPONDING VACUUM SYSTEM (continued)

Long-term emissions in tons/yr,

$\frac{0.1254 \text{ lbs Quin}}{\text{day}} * \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} * \frac{365 \text{ days}}{1 \text{ yr}} = 0.0229$ tons/yr Quin

$\frac{0.0017 \text{ lbs Biph}}{\text{day}} * \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} * \frac{365 \text{ days}}{1 \text{ yr}} = 0.0003$ tons/yr Biph

As measured in EPA tests at the Avoca, PA facility and as confirmed by tests at Susquehanna, PA (Koppers facility) Naphthalene emissions constitute 3 percent of total creosote emissions. Creosote emissions are considered as VOCs.

Therefore,

Short-term emissions in lbs/day,

$\frac{3 \text{ percent Naph}}{100 \text{ percent Creo}} = \frac{1.3165 \text{ lbs/day Naph}}{x \text{ lbs/day Creo}}$ $x = \frac{(100\% \text{ Creo})(1.3165 \text{ lbs/day Naph})}{(3\% \text{ Naph})}$

$x = 43.8833$ lbs/day Creosote or VOC

Long-term emissions in tons/yr,

$\frac{3 \text{ percent Naph}}{100 \text{ percent Creo}} = \frac{0.2403 \text{ tpy Naph}}{x \text{ tpy Creo}}$ $x = \frac{(100\% \text{ Creo})(0.2403 \text{ tpy Naph})}{(3\% \text{ Naph})}$

$x = 8.01$ tons/yr Creosote or VOC

# WORK TANKS

# SUPPORT CALCULATIONS

JOB 940168/3 B

SHEET NO. 1 OF

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Brentwood, TN 37027
(615) 373-8532 FAX (615) 373-8512

KMCC-COLUMBUS

EMISSION CALCULATIONS

WORK TANK NO. 1

Assumptions,

1. Work tanks are closed.
2. Work tanks are equipped with PVRVs.
3. Breathing losses are from atmospheric natural air temperature changes and barometric pressure changes.
4. Working losses are from tank filling and emptying.
5. Overpressurization is not accounted for; Reuping losses are calculated separately.
6. The USEPA Tanks 2.0 Program is used for confirmation.
7. AP42 calculation procedures for breathing losses and working losses are from Section 4.3 Storage of Organic Liquids (USEPA, September, 1985)
8. Avora and Susquehanna data are used to confirm AP42 calculations.
9. Tank temperatures are 180°F or 82.2°C

JOB 990168/3 B

SHEET NO. 2 OF

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KMCC-COLUMBUS
EMISSIONS CALCULATIONS

WORK TANK NO. 1 (continued)

There are two significant types of emissions from fixed roof tanks, breathing and working loss.

Breathing Loss, LB

$$L_B = (2.26 \times 10^{-2})(M_V)\left(\frac{P}{P_A - P}\right)^{0.68}(D)^{1.73}(H)^{0.51}(\Delta T)^{0.50}(F_P)(C)(K_C)$$

where,

$L_B$ = fixed roof breathing loss (lb/yr)

$M_V$ = molecular weight of vapor in work tank (lb/lb mole)

$$M_V = M_a\left(\frac{P_a x_a}{P_t}\right) + M_b\left(\frac{P_b x_b}{P_t}\right)$$

$M_a$ = molecular weight of pure component (lb/lb mole)

$P_a$ = vapor pressure of pure component (psia)

$x_a$ = mole fraction of component in the liquid (psia)

$P_t = P_a x_a + P_b x_b$ by Raoult's Law (psia)

$P_A$ = average atmospheric pressure at tank location (psia)

$P$ = true vapor pressure at bulk liquid conditions (psia)

$D$ = tank diameter (ft)

$H$ = average vapor space height (ft)

$\Delta T$ = average ambient diurnal temperature change (°F)

$F_p$ = paint factor (dimensionless)

$C$ = adjustment factor for small diameter tanks (dimensionless)

$K_C$ = product factor (dimensionless)

Therefore, for Naphthalene

$$M_V = M_a\left(\frac{P_a x_a}{P_t}\right)$$

$M_a$ = 128 lb/lb mole

$P_a$ = 0.141 psia from GERG; refer to Appendix 5

$x_a$ = 0.157 from GERG; refer to Appendix 5

$P_t$ = 0.068 psia from Allied Signal; refer to Appendix 5

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KMCC - COLUMBUS
EMISSIONS CALCULATIONS

WORK TANK NO. 1 (continued)

$Mv = 128 \text{ lb/lb mole} \left(\frac{0.141 \text{ psia} * 0.157}{0.068 \text{ psia}}\right) = 41.6696 \text{ lb/lb mole}$

| | | |
|---|---|---|
| PA | = 14.09 psia | from NOAA Tupelo, MS; refer to Appendix 9 |
| P | = 0.068 psia | from Allied Signal; refer to Appendix 5 |
| D | = 18.0 ft | from KMCC - Columbus |
| H | = 3.0 ft | from KMCC - Columbus |
| $\Delta T$ | = 23.10 °F | from NOAA Tupelo, MS; refer to Appendix 9 |
| Fp | = 1.58 | from AP42 Table 4.3-1 |
| C | = 1.00 | from AP42 Table 4.3-4 |
| Kc | = 0.10 | as per AWPI |

$$L_B = (2.26 \times 10^{-2})(41.67 \text{ lb/lb mole})\left(\frac{0.068 \text{ psia}}{14.09 \text{ psia} - 0.068 \text{ psia}}\right)^{0.68}(18 \text{ ft})^{1.73}(3 \text{ ft})^{0.51}$$

$$(23.10\,°F)^{0.50}(1.58)(1.00)(0.10)$$

$$= (2.26 \times 10^{-2})(41.67)(0.0267)(148.4641)(1.7512)(4.8062)(1.58)(1.00)(0.10)$$

$$= 4.9643 \text{ lbs/yr Naphthalene}$$

| | | | |
|---|---|---|---|
| JOB | 94016813 B | | |
| SHEET NO. | 1 | OF | |
| CALCULATED BY | STM | DATE | 3-1-95 |
| CHECKED BY | | DATE | |
| SCALE | | | |

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KMCC-COLUMBUS
EMISSIONS CALCULATIONS

▶ SAP TANKS
Water8 derived emissions in terms of Naphthalene were modeled at 207.2947 lbs/yr
Short-term emissions in terms of lbs/day,
207.2947 lbs/yr * 1 yr/365 days = 0.5679 lbs/day Naphthalene

$$\frac{77.4 \text{ lbs N}}{15.0 \text{ lbs Dbf}} = \frac{0.5679 \text{ lbs N}}{x \text{ lbs Dbf}} \qquad x = \frac{(15.0 \text{ lbs Dbf})(0.5679 \text{ lbs N})}{(77.4 \text{ lbs N})}$$

x = 0.1101 lbs/day Dibenzofuran

$$\frac{77.4 \text{ lbs N}}{7.5 \text{ lbs Q}} = \frac{0.5679 \text{ lbs N}}{x \text{ lbs Q}} \qquad x = \frac{(7.5 \text{ lbs Q})(0.5679 \text{ lbs N})}{(77.4 \text{ lbs N})}$$

x = 0.0550 lbs/day Quinoline

$$\frac{77.4 \text{ lbs N}}{0.1 \text{ lbs B}} = \frac{0.5679 \text{ lbs N}}{x \text{ lbs B}} \qquad x = \frac{(0.1 \text{ lbs Q})(0.5679 \text{ lbs N})}{(77.4 \text{ lbs N})}$$

x = 0.0007 lbs/day Biphenyl

$$VOC = \frac{0.5679 \text{ lb N}}{0.42} = 1.3521 \text{ lbs/day VOC}$$

This total is for all 3 tanks. This number was divided by 3 to find emissions for each individual tank.

**COLUMBUS**

**Work Tank No. 2 HAP and VOC Emissions**

For emissions in terms of naphthalene, there are
15.0 lbs Dibenzofuran
7.5 lbs Quinoline
0.1 lbs Biphenyl
for every 77.4 lbs Naphthalene

**Therefore, for AP-42 derived Naphthalene breathing losses of 7.02 lbs/yr**

Dibenzofuran losses = $\frac{\text{(15 lbs of Dibenzofuran x 7.02 lbs/yr Naphthalene)}}{\text{(77.4 lbs Naphthalene)}}$

= 1.36 lbs/yr

Quinoline losses = $\frac{\text{(7.5 lbs of Quinoline x 7.02 lbs/yr Naphthalene)}}{\text{(77.4 lbs Naphthalene)}}$

= 0.68 lbs/yr

Biphenyl losses = $\frac{\text{(0.1 lbs of Biphenyl x 7.02 lbs/yr Naphthalene)}}{\text{(77.4 lbs Naphthalene)}}$

= 0.01 lbs/yr

**Summary,**

| | | |
|---|---|---|
| **Total losses** | Naphthalene | 34.58 lbs/yr |
| | Dibenzofuran | 6.70 lbs/yr |
| | Quinoline | 3.35 lbs/yr |
| | Biphenyl | 0.04 lbs/yr |
| | HAPS | 44.68 lbs/yr |
| **Short-term emissions** | Naphthalene | 0.09 lbs/day |
| | Dibenzofuran | 0.02 lbs/day |
| | Quinoline | 0.01 lbs/day |
| | Biphenyl | 0.0001 lbs/day |
| | HAPS | 0.12 lbs/day |
| **Long-term emissions** | Naphthalene | 0.02 tons/yr |
| | Dibenzofuran | 0.00 tons/yr |
| | Quinoline | 0.00 tons/yr |
| | Biphenyl | 0.0000 tons/yr |
| | HAPS | 0.02 tons/yr |

**Therefore, for AP-42 derived Naphthalene working losses of 27.56 lbs/yr**

Dibenzofuran losses = $\frac{\text{(15 lbs of Dibenzofuran x 27.56 lbs/yr Naphthalene)}}{\text{(77.4 lbs Naphthalene)}}$

= 5.34 lbs/yr

Quinoline losses = $\frac{\text{(7.5 lbs of Quinoline x 27.56 lbs/yr Naphthalene)}}{\text{(77.4 lbs Naphthalene)}}$

= 2.67 lbs/yr

Biphenyl losses = $\frac{\text{(0.1 lbs of Biphenyl x 27.56 lbs/yr Naphthalene)}}{\text{(77.4 lbs Naphthalene)}}$

= 0.04 lbs/yr

**Naphthalene emissions are equivalent to 42 percent of creosote emissions as determined by the EPA tests at the Avoca, PA facility. Creosote emissions are considered as VOCs.**

**Therefore,**

**Short-term creosote/VOC emissions** = $\frac{\text{0.0946 lbs/day Naphthalene}}{0.42}$

= 0.23 lbs/day creosote/VOCs

**Long-term creosote/VOC emissions** = $\frac{\text{0.0173 tons/yr Naphthalene}}{0.42}$

= 0.04 tons/yr creosote/VOCs

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SHEET NO. 4 OF

CALCULATED BY SIM DATE 2-26-95

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SCALE

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215 Jamestown Park, Suite 204
Brentwood, TN 37027
(615) 373-8532 FAX (615) 373-8512

KMCC- COLUMBUS
EMISSION CALCULATIONS

WORK TANK NO.1 (continued)

Working Loss, LW

$LW = (2.40\times10^{-5})(MV)(P)(V)(N)(KN)(KC)$

where,

LW = fixed roof working loss (lb/yr)

MV = molecular weight of vapor in storage tank (lb/lbmole)
see $L_B$ for determination

P = true vapor pressure at bulk liquid temperature (psia)

V = tank capacity (gal)

N = number of turnovers per year

$N = \dfrac{\text{total throughput per year (gal)}}{\text{tank capacity, V (gal)}}$

KN = turnover factor (dimensionless)

KC = product factor (dimensionless)

Therefore, for Naphthalene

MV = 41.6696 lb/lb mole

P = 0.068 psia from Allied Signal; refer to Appendix 5

V = 57,000 gal from KMCC-Columbus

$N = \dfrac{\text{amount of creosote purchased + pumpback volume (gal)}}{\text{total tank capacity (gal)}}$

$= \dfrac{(1.5\times10^{6}\ \text{gal/yr}) + (17{,}443\ \text{gal/pb} * 3\ \text{retorts} * 1\ \text{Boulton/retort/day} * 2\ \text{pb/Boulton} * 365\ \text{days/yr})}{(57{,}000\ \text{gal} * 3\ \text{tanks}) + (78{,}000\ \text{gal} * 1\ \text{tank})}$

$= \dfrac{39{,}700{,}170\ \text{gals/yr}}{249{,}000\ \text{gals}} = 159.4384\ \text{turnovers/yr}$

Note: 1,500 pumpbacks per year are entered into the AP42 spreadsheet. This maximum number of pumpbacks results in 216 turnovers per year.

JOB 940168/3 B

SHEET NO. 5 OF

CALCULATED BY STM DATE 2-26-95

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SCALE

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KMCC - COLUMBUS
EMISSION CALCULATIONS

WORK TANK NO. 1 (continued)

Note: Turnovers are calculated as the sum of the volume of creosote purchased (1993 SARA) and pumpback volumes derived from the number of Boulton charges and cylinder void volumes. Further, this number is calculated as an average number of turnovers per tank.

$K_N$ = 0.24 from AP42 Figure 4.3-7

$K_C$ = 0.10 as per AWPI

$L_W = (2.40 \times 10^{-5})(41.66 \text{ lb/lbmole})(0.068 \text{ psia})(57{,}000 \text{ gal})(216)(0.24)(0.10)$

= 20.0900 lbs/yr Naphthalene

JOB 940168/3 B

SHEET NO. 6 OF

CALCULATED BY STM DATE 2-28-95

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SCALE

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KMCC - COLUMBUS
EMISSIONS CALCULATIONS

WORK TANK NO. 1 (continued)

For emissions in terms of Naphthalene only,

For every 77.4 lbs Naphthalene there will also be
15.0 lbs Dibenzofuran
7.5 lbs Quinoline
0.1 lbs Biphenyl

Therefore, for an AP42 derived breathing loss, $L_B$ = 4.96 lbs/yr Naphthalene there will also be

$$\frac{77.4 \text{ lbs N}}{15.0 \text{ lbs Dbf}} = \frac{4.96 \text{ lbs N}}{x \text{ lbs Dbf}} \qquad x = \frac{(15.0 \text{ lbs Dbf})(4.96 \text{ lbs N})}{(77.4 \text{ lbs N})}$$

x = 0.9612 lbs/yr Dibenzofuran

$$\frac{77.4 \text{ lbs N}}{7.5 \text{ lbs Q}} = \frac{4.96 \text{ lbs N}}{x \text{ lbs Dbf}} \qquad x = \frac{(7.5 \text{ lbs Q})(4.96 \text{ lbs N})}{(77.4 \text{ lbs N})}$$

x = 0.4806 lbs/yr Quinoline

$$\frac{77.4 \text{ lbs N}}{0.1 \text{ lbs B}} = \frac{4.96 \text{ lbs N}}{x \text{ lbs B}} \qquad x = \frac{(0.1 \text{ lbs B})(4.96 \text{ lbs N})}{(77.4 \text{ lbs N})}$$

x = 0.0064 lbs/yr Biphenyl

Summary of HAP $L_B$,

4.96 lbs/yr Naphthalene
0.9612 lbs/yr Dibenzofuran
0.4802 lbs/yr Quinoline
0.0064 lbs/yr Biphenyl

JOB 94016813 B

SHEET NO. 7 OF

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KMCC - COLUMBUS
EMISSIONS CALCULATIONS

WORK TANK NO. 1 (continued)

For an AP42 derived working loss, Lw = 20.10 lbs/yr Naphthalene there will also be

$$\frac{77.4 \text{ lbs N}}{15.0 \text{ lbs Dbf}} = \frac{20.10 \text{ lbs N}}{x \text{ lbs Dbf}} \qquad x = \frac{(15.0 \text{ lbs Dbf})(20.10 \text{ lbs N})}{(77.4 \text{ lbs N})}$$

x = 3.8953 lbs/yr Naphthalene

$$\frac{77.4 \text{ lbs N}}{7.5 \text{ lbs Q}} = \frac{20.10 \text{ lbs N}}{x \text{ lbs Q}} \qquad x = \frac{(7.5 \text{ lbs Q})(20.10 \text{ lbs N})}{(77.4 \text{ lbs N})}$$

x = 1.9477 lbs/yr Quinoline

$$\frac{77.4 \text{ lbs N}}{0.1 \text{ lbs B}} = \frac{20.10 \text{ lbs N}}{x \text{ lbs B}} \qquad x = \frac{(0.1 \text{ lbs B})(20.10 \text{ lbs N})}{(77.4 \text{ lbs B})}$$

x = 0.0260 lbs/yr Biphenyl

Summary of HAP Lw,

20.10 lbs/yr Naphthalene
3.8953 lbs/yr Dibenzofuran
1.9477 lbs/yr Quinoline
0.0260 lbs/yr Biphenyl

Totals,

4.96 lbs/yr N $L_B$ + 20.10 lbs/yr N Lw = 25.06 lbs/yr Naphthalene
0.9612 lbs/yr Dbf $L_B$ + 3.8953 lbs/yr Dbf Lw = 4.8565 lbs/yr Dibenzofuran
0.4802 lbs/yr Q $L_B$ + 1.9477 lbs/yr Q Lw = 2.4279 lbs/yr Quinoline
0.0064 lbs/yr B $L_B$ + 0.0260 lbs/yr B Lw = 0.0324 lbs/yr Biphenyl

JOB 940168/3

SHEET NO. 8 OF

CALCULATED BY SIM DATE 2-28-95

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KMCC-COLUMBUS
EMISSIONS CALCULATIONS

▶ WORK TANK NO. 1 (continued)

Short-term emissions in lbs/day

25.06 lbs/yr N * 1 yr/365 days = 0.0687 lbs/day Naphthalene
4.8565 lbs/yr Dbf * 1 yr/365 days = 0.0133 lbs/day Dibenzofuran
2.4279 lbs/yr Q * 1 yr/365 days = 0.0067 lbs/day Quinoline
0.0324 lbs/yr B * 1 yr/365 days = $8.8 \times 10^{-5}$ lbs/day Biphenyl

Long-term emissions in tons/yr

25.06 lbs/yr N * 1 ton/2,000 lbs = 0.0125 tons/yr Naphthalene
4.8565 lbs/yr Dbf * 1 ton/2,000 lbs = 0.0024 tons/yr Dibenzofuran
2.4279 lbs/yr Q * 1 ton/2,000 lbs = 0.0012 tons/yr Quinoline
0.0324 lbs/yr B * 1 ton/2,000 lbs = $1.6 \times 10^{-5}$ tons/yr Biphenyl

Note: All work tank emissions are vented to a scrubber with 75% reduction of HAPs. Calculations here represent uncontrolled emissions. Emissions reported in the operating permit application are reduced by the efficiency factor of the scrubber or (1-0.75).

Naphthalene emissions are equivalent to 42 percent of creosote or VOC emissions as determined by the GERG analytical data. Creosote emissions are equivalent to total VOC emissions. Therefore, short-term creosote emissions in lbs/day

$$\frac{0.0687 \text{ lbs/day N}}{0.42} = 0.1636 \text{ lbs/day Creosote or VOC}$$

Long-term creosote emissions in tons/yr

$$\frac{0.0125 \text{ tons/yr N}}{0.42} = 0.0298 \text{ tons/yr Creosote or VOC}$$

The same Note concerning the scrubber applies.

JOB KMCC 940168-

SHEET NO. 1 OF

CALCULATED BY MRL DATE 3/7/95

CHECKED BY STM DATE 3-7-95

SCALE

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(615) 373-8532 FAX (615) 373-8512

The "Bull" Factor

A factor of 0.10 has been used to adjust AP-42 & SOCMI emission factors for volatile constituents to a representative emission factor for relatively nonvolatile creosote.

Creosote falls out of the pressure definition for NSPS because of its low volatility (see attached sheet)

In early discussions with the U.S. EPA on air emissions from creosote wood treating operations, Mr Jeffrey Bull of KMCC postulated that this factor should be 10% or 0.10. This factor has since been incorporated into the AWPI's SARA emissions cookbook and is widely referred to in the industry as the "Bull" factor.

The basis for the "Bull" factor of 0.10 for low volatile creosote can be assessed by comparing the vapor pressure of a high volatile constituent such as benzene with the most volatile component of creosote, which is, naphthalene.

vapor pressure @ 180°F of benzene = 760 mm Hg
of naphthalene = 7.29 mm Hg

$\therefore$ 7.29 / 760 = 0.0096 = 1%

for NSPS considerations for low volatility creosote vapor pres = 0.467 kPa
NSPS volatile cutoff VP = 3.5 kPa

0.467 / 3.5 kPa = 0.133 = 13.3%

Note: 3.5 kPa @ standard temperature

Use 0.10 as factor to correct for low-volatile creosote

COLUMBUS

Work Tank No. 1 Naphthalene Emissions

**Breathing Loss, Lb, Emissions**

| | | Unit | Symbol |
|---|---|---|---|
| 1. | Molecular Weight of Vapor | 41.66 lb/lb mole | Mv |
| 2. | Average Atmospheric Pressure | 14.09 psia | Pa |
| 3. | True Vapor Pressure at Bulk Liquid Conditions | 0.07 psia | P |
| 4. | Tank Diameter | 18.00 ft | D |
| 5. | Average Vapor Space Height | 3.00 ft | H |
| 6. | Average Ambient Diurnal Temperature Change | 23.10 oF | T |
| 7. | Paint Factor | 1.58 NA | Fp |
| 8. | Adjustment Factor for Small Tanks | 1.00 NA | C |
| 9. | Product Factor | 0.10 NA | Kc |

Lb (lb/yr) = (2.26x10^-2) x (Mv) x ((P/Pa-P)^0.68) x (D^1.73) x (H^0.51) x (T^0.50) x Fp x C x Kc

Therefore, the Lb = 4.96 lb/yr

0.0025 ton/yr

**Working Loss, Lw, Emissions**

| | | Unit | Symbol |
|---|---|---|---|
| 1. | Molecular Weight of Vapor | 41.66 lb/lb mole | Mv |
| 2. | True Vapor Pressure at Bulk Liquid Conditions | 0.07 psia | P |
| 3. | Tank Capacity | 57,000.00 gal | V |
| 4. | Number of Turnovers per Year | 216.58 NA | N |
| 5. | Turnover Factor | 0.24 NA | Kn |
| 6. | Product Factor | 0.10 NA | Kc |

Lw (lb/yr) = (2.40x10^-5) x Mv x P x V x N x Kn x Kc

Therefore, the Lw = 20.14 lb/yr

0.0101 ton/yr

**Molecular Weight of Vapor Determination**

| | | Unit | Symbol |
|---|---|---|---|
| 1. | Molecular Weight of Pure Component | 128 lb/lb mole | Ma |
| 2. | Vapor Pressure of Pure Component | 0.1410 psia | Pa |
| 3. | Mole Fraction of Pure Component | 0.157 | Xa |
| 4. | Vapor Pressure of Bulk Liquid | 0.068 psia | Pt |

Mv (lb/lb mole) = Ma(PaXa)/Pt + Mb(PbXb)/Pt

Therefore the Mv for Naphthalene = 41.655 lb/lb mole

**Process Equipment Data for Turn Over Calculations**

| | | |
|---|---|---|
| Cylinder Length | 100 | |
| Diameter | 8 | |
| Cylinder Volume | 5,024.00 | |
| Volume per tie (ft3) | 3.72 i | |
| No. Ties/tram | 59 ii | |
| No. Trams/charge | 11 iii | |
| Wood Volume (ft3)/Charge | 2,414.28 | Ap = iii*ii*i |
| Cylinder Void Volume (ft3)/Charge | 2,609.72 | Bp |
| Gals. Creosote to Cylinder/Charge based on cylinder void | 19,523.32 | Cp = Bp*7.481 |
| Lbs Creosote/ft3 of Wood | 8.00 | Dp |
| Lbs Creosote Retained in Wood | 19,314.24 | Ep = Dp*Ap |
| Gals. Creosote Retained in Wood (@ d = 9.3 lbs/gal) | 2,080.55 | Fp = Ep/9.3lbs/gal |
| Gals. of Creosote Pumped Back to Work Tank | 17,442.77 | Gp = Cp-Fp |
| Average No. of Cycles | 1,105 Hp | |
| Maximum No. of Cycles | 1,500 Ip | |

**Number of Turnovers**

| | |
|---|---|
| Annual Purchases of Creosote | 1,600,000 a |
| Maximum No. of Cycles; Assume all Boulton | 1,500 Ip |
| No. of Pump Backs per Cycle | 2 b |
| No. of Total Annual Pump Backs | 3,000 c = b*Ip |
| Gals. of Creosote Pumped Back per Cycle | 17,442.77 Gp |
| Annual Gals. Creosote Pumped Back | 52,328,306.98 d = Gp*c |
| Total Annual Gals Creosote Throughput | 53,928,306.98 e = a+d |
| Total Work Tank Capacity | 249,000 |
| Annual Tank Turnovers | 216.58 |

**Tank Capacities (gal)**

| | |
|---|---|
| Tank 1,2, and 3 | 57,000 |
| Tank 4 | 78,000 |
| Total Tank Capacity | 249,000 |

**Assumptions**
1. Cylinders and tanks are interconnected as a closed loop vapor recovery system.
2. The calculation of a turnover factor for working losses considers the volume of creosote recycled as pumpbacks.
   Additionally, the total throughput per year for a work tank considers the volume of creosote recycled as pumpbacks.
3. Evaporative emissions as loading losses are incorporated into the breathing and working losses for large storate tanks.
   (Section 4.4, Transportation and Marketing of Petroleum Liquids, refers to Section 4.3, Storage of Organic Liquids, for large storage tanks.)

**References**

1. AP-42 4.3
2. GERG
3. Allied Signal


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Work Tank No. 1 HAP and VOC Emissions

For emissions in terms of nephthalene, there are 15.0 lbs Dibenzofuran, 7.5 lbs Quinoline, 0.1 lbs Biphenyl for every 77.4 lbs Naphthalene

Therefore, for AP-42 derived Naphthalene breathing losses of 4.96 lbs/yr

Dibenzofuran losses = (15 lbs of Dibenzofuran x 4.96 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 0.96 lbs/yr

Quinoline losses = (7.5 lbs of Quinoline x 4.96 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 0.48 lbs/yr

Biphenyl losses = (0.1 lbs of Biphenyl x 4.96 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 0.01 lbs/yr

Therefore, for AP-42 derived Naphthalene working losses of 20.14 lbs/yr

Dibenzofuran losses = (15 lbs of Dibenzofuran x 20.14 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 3.90 lbs/yr

Quinoline losses = (7.5 lbs of Quinoline x 20.14 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 1.95 lbs/yr

Biphenyl losses = (0.1 lbs of Biphenyl x 20.14 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 0.03 lbs/yr

Summary,

| | | |
|---|---|---|
| Total losses | Naphthalene | 25.10 lbs/yr |
| | Dibenzofuran | 4.86 lbs/yr |
| | Quinoline | 2.43 lbs/yr |
| | Biphenyl | 0.03 lbs/yr |
| | HAPS | 32.43 lbs/yr |
| Short-term emissions | Naphthalene | 0.07 lbs/day |
| | Dibenzofuran | 0.01 lbs/day |
| | Quinoline | 0.01 lbs/day |
| | Biphenyl | 0.0001 lbs/day |
| | HAPS | 0.09 lbs/day |
| Long-term emissions | Naphthalene | 0.01 tons/yr |
| | Dibenzofuran | 0.00 tons/yr |
| | Quinoline | 0.00 tons/yr |
| | Biphenyl | 0.0000 tons/yr |
| | HAPS | 0.02 tons/yr |

Naphthalene emissions are equivalent to 42 percent of creosote emissions as determined by the EPA tests at the Avoca, PA facility. Creosote emissions are considered as VOCs.

Therefore,

Short-term creosote/VOC emissions = 0.0687 lbs/day Naphthalene / 0.42

= 0.16 lbs/day creosote/VOCs

Long-term creosote/VOC emissions = 0.0125 tons/yr Naphthalene / 0.42

= 0.03 tons/yr creosote/VOCs

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COLUMBUS

## Work Tank No. 1 Naphthalene Emissions

### Process Unit Data

| | |
|---|---|
| No. of Cylinders | 1 |
| No. of rueping cycles per cylinder | 2 |
| No. of total annual rueping cycles | 167 |
| Cylinder length (ft) | 100 |
| Diameter (ft) | 8 |
| Wood Charge Volume (ft^3) | 5,036.48 |
| Cylinder Volume (ft^3) | 2,414.28 |
| Cylinder Void Volume (ft^3) | 2,622.20 |
| Cylinder Void Volume (liters) | 74,260.70 V |
| Operating Temperature K | 355.37 K |
| Venting Temperature K' | 293.15 K' |
| Operating Pressure P (atm) | 5.00 P |
| Venting Pressure P' (atm) | 1.00 P' |
| Rueping Air (Venting) Volume | V' |
| PV=nRT | |
| PV/T = nR | |
| P'V'/T' = nR | |
| V' = (PV/T)(T'/P') | 306,293.80 liters |
| Rueping (venting) Air | 10,818.30 ft^3 |

| | |
|---|---|
| Air is 8% Naphthalene | |
| MW Naphthalene (g/mole) | 128.00 |
| density of air g/mole | 28.96 |
| density of 8% Naphthalene Air (g/mole) | 36.88 |
| density of Naphthalene (lb/ft^3) | 0.0001 |

**Naphthalene Rueping Air Emissions** — **1.11 lb/cycle**, **185.83 lb/yr**, **0.09 ton/yr**

| Summary, | | | |
|---|---|---|---|
| Total losses | Naphthalene | 185.83 | lbs/yr |
| | Dibenzofuran | 36.01 | lbs/yr |
| | Quinoline | 18.01 | lbs/yr |
| | Biphenyl | 0.24 | lbs/yr |
| | HAPs | **240.09** | **lbs/yr** |
| Short-term emissions | Naphthalene | 0.0212 | lbs/hr |
| | Dibenzofuran | 0.0041 | lbs/hr |
| | Quinoline | 0.0021 | lbs/hr |
| | Biphenyl | 0.0000 | lbs/hr |
| | HAPs | **0.0274** | **lbs/hr** |
| Long-term emissions | Naphthalene | 0.0929 | tons/yr |
| | Dibenzofuran | 0.0180 | tons/yr |
| | Quinoline | 0.0090 | tons/yr |
| | Biphenyl | 0.0001 | tons/yr |
| | HAPs | **0.1200** | **tons/yr** |

### HAP Emissions

For emissions in terms of Naphthalene, there are 15.0 lbs Dibenzofuran, 7.5 lbs Quinoline, 0.1 lbs Biphenyl for every 77.4 lbs Naphthalene

Therefore, for Naphthalene Rueping losses of 185.83 lbs/yr

Dibenzofuran losses = $\dfrac{\text{(15 lbs Dibenzofuran x 185.83 lbs/yr Naphthalene)}}{\text{(77.4 lbs Naphthalene)}}$

= 36.01 lbs/yr

Quinoline losses = $\dfrac{\text{(7.5 lbs Quinoline x 185.83 lbs/yr Naphthalene)}}{\text{(77.4 lbs Naphthalene)}}$

= 18.01 lbs/yr

Biphenyl losses = $\dfrac{\text{(0.1 lbs Quinoline x 185.83 lbs/yr Naphthalene)}}{\text{(77.4 lbs Naphthalene)}}$

= 0.24 lbs/yr

Naphthalene emissions are equivalent to 42 percent of creosote emissions as determined by analytical measurements. Creosote emissions are considered as VOCs.

**Therefore,**

**Short-term creosote/VOC emissions** = $\dfrac{\text{0.02 lbs/hr Naphthalene}}{0.42}$

= 0.05 lbs/hr creosote/VOCs

**Long-term cresoste/VOC emissions** = $\dfrac{\text{0.09 tons/yr Naphthalene}}{0.42}$

= 0.22 tons/yr creosote/VOCs

COLUMBUS

Work Tank No. 2 Naphthalene Emissions

**Breathing Loss, Lb, Emissions**

| | | Unit | Symbol |
|---|---|---|---|
| 1. Molecular Weight of Vapor | 41.66 | lb/lb mole | Mv |
| 2. Average Atmospheric Pressure | 14.09 | psia | Pa |
| 3. True Vapor Pressure at Bulk Liquid Conditions | 0.07 | psia | P |
| 4. Tank Diameter | 22.00 | ft | D |
| 5. Average Vapor Space Height | 3.00 | ft | H |
| 6. Average Ambient Diurnal Temperature Change | 23.10 | oF | T |
| 7. Paint Factor | 1.58 | NA | Fp |
| 8. Adjustment Factor for Small Tanks | 1.00 | NA | C |
| 9. Product Factor | 0.10 | NA | Kc |

Lb (lb/yr) = (2.26x10^-2) x (Mv) x ((P/Pa-P)^0.68) x (D^1.73) x (H^0.51) x (T^0.50) x Fp x C x Kc

Therefore, the Lb for 1 Work Tank = 7.02 lb/yr
0.0035 ton/yr

**Working Loss, Lw, Emissions**

| | | Unit | Symbol |
|---|---|---|---|
| 1. Molecular Weight of Vapor | 41.66 | lb/lb mole | Mv |
| 2. True Vapor Pressure at Bulk Liquid Conditions | 0.07 | psia | P |
| 3. Tank Capacity | 78,000.00 | gal | V |
| 4. Number of Turnovers per Year | 216.58 | NA | N |
| 5. Turnover Factor | 0.24 | NA | Kn |
| 6. Product Factor | 0.10 | NA | Kc |

Lw (lb/yr) = (2.40x10^-5) x Mv x P x V x N x Kn x Kc

Therefore, the Lw for 1 Work Tank = 27.56 lb/yr
0.0138 ton/yr

**Molecular Weight of Vapor Determination**

| | | Unit | Symbol |
|---|---|---|---|
| 1. Molecular Weight of Pure Component | 128 | lb/lb mole | Ma |
| 2. Vapor Pressure of Pure Component | 0.1410 | psia | Pa |
| 3. Mole Fraction of Pure Component | 0.157 | | Xa |
| 4. Vapor Pressure of Bulk Liquid | 0.068 | psia | Pt |

Mv (lb/lb mole) = Ma(PaXa)/Pt + Mb(PbXb)/Pt

Therefore the Mv for Naphthalene = 41.655 lb/lb mole

**Process Equipment Data for Turn Over Calculations**

| | | |
|---|---|---|
| Cylinder Length | 100 | |
| Diameter | 8 | |
| Cylinder Volume | 5,024.00 | |
| Volume per tie (ft3) | 3.72 | i |
| No. Ties/tram | 59 | ii |
| No. Trams/charge | 11 | iii |
| Wood Volume (ft3)/Charge | 2,414.28 | Ap = iii*ii*i |
| Cylinder Void Volume (ft3)/Charge | 2,609.72 | Bp |
| Gals. Creosote to Cylinder/Charge based on cylinder void | 19,523.32 | Cp = Bp*7.481 |
| Lbs Creosote/ft3 of Wood | 8.00 | Dp |
| Lbs Creosote Retained in Wood | 19,314.24 | Ep = Dp*Ap |
| Gals. Creosote Retained in Wood (@ d = 9.3 lbs/gal) | 2,080.55 | Fp = Ep/9.3lbs/gal |
| Gals. of Creosote Pumped Back to Work Tank | 17,442.77 | Gp = Cp-Fp |
| Average No. of Cycles | 1,105 | Hp |
| Maximum No. of Cycles | 1,500 | lp |

**Number of Turnovers**

| | | |
|---|---|---|
| Annual Purchases of Creosote | 1,600,000 | a |
| Maximum No. of Cycles; Assume all Boulton | 1,500 | lp |
| No. of Pump Backs per Cycle | 2 | b |
| No. of Total Annual Pump Backs | 3,000 | c = b*lp |
| Gals. of Creosote Pumped Back per Cycle | 17,442.77 | Gp |
| Annual Gals. Creosote Pumped Back | 52,328,306.98 | d = Gp*c |
| Total Annual Gals Creosote Throughput | 53,928,306.98 | e = a+d |
| Total Work Tank Capacity | 249,000 | |
| Annual Tank Turnovers | 216.58 | |

**Tank Capacities (gal)**

| | |
|---|---|
| Tanks 1, 2, and 3 | 57,000 |
| Tank 4 | 78,000 |
| Total Tank Capacity | 249,000 |

**Assumptions**
1. Cylinders and tanks are interconnected as a closed loop vapor recovery system.
2. The calculation of a turnover factor for working losses considers the volume of creosote recycled as pumpbacks.
   Additionally, the total throughput per year for a work tank considers the volume of creosote recycled as pumpbacks.
3. Evaporative emissions as loading losses are incorporated into the breathing and working losses for large storate tanks.
   (Section 4.4, Transportation and Marketing of Petroleum Liquids, refers to Section 4.3, Storage of Organic Liquids, for large storage tanks.)

**References**
1. AP-42 4.3
2. GERG
3. Allied Signal

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**COLUMBUS**

**Work Tank No. 2 Naphthalene Emissions**

**Process Unit Data**

| | | |
|---|---|---|
| No. of Cylinders | 1 | |
| No. of rueping cycles per cylinder | 2 | |
| No. of total annual rueping cycles | 229 | |
| Cylinder length (ft) | 100 | |
| Diameter (ft) | 8 | |
| Wood Charge Volume (ft^3) | 5,036.48 | |
| Cylinder Volume (ft^3) | 2,414.28 | |
| Cylinder Void Volume (ft^3) | 2,622.20 | |
| Cylinder Void Volume (liters) | 74,260.70 | V |
| Operating Temperature K | 355.37 | K |
| Venting Temperature K' | 293.15 | K' |
| Operating Pressure P (atm) | 5.00 | P |
| Venting Pressure P' (atm) | 1.00 | P' |
| Rueping Air (Venting) Volume | | V' |
| PV=nRT | | |
| PV/T = nR | | |
| P'V'/T' = nR | | |
| V' = (PV/T)(T'/P') | 306,293.80 | liters |
| Rueping (venting) Air | 10,818.30 | ft^3 |

| | |
|---|---|
| Air is 8% Naphthalene | |
| MW Naphthalene (g/mole) | 128.00 |
| density of air g/mole | 28.96 |
| density of 8% Naphthalene Air (g/mole) | 36.88 |
| density of Naphthalene (lb/ft^3) | 0.0001 |

**Naphthalene Rueping Air Emissions** **1.11 lb/cycle**
**254.35 lb/yr**
**0.13 ton/yr**

**Summary,**

| | | |
|---|---|---|
| Total losses | Naphthalene | 254.35 lbs/yr |
| | Dibenzofuran | 49.29 lbs/yr |
| | Quinoline | 24.65 lbs/yr |
| | Biphenyl | 0.33 lbs/yr |
| | HAPs | 328.62 lbs/yr |
| Short-term emissions | Naphthalene | 0.0290 lbs/hr |
| | Dibenzofuran | 0.0056 lbs/hr |
| | Quinoline | 0.0028 lbs/hr |
| | Biphenyl | 0.0000 lbs/hr |
| | HAPs | 0.0375 lbs/hr |
| Long-term emissions | Naphthalene | 0.1272 tons/yr |
| | Dibenzofuran | 0.0246 tons/yr |
| | Quinoline | 0.0123 tons/yr |
| | Biphenyl | 0.0002 tons/yr |
| | HAPs | 0.1643 tons/yr |

**HAP Emissions**

For emissions in terms of Naphthalene, there are 15.0 lbs Dibenzofuran
7.5 lbs Quinoline
0.1 lbs Biphenyl

for every 77.4 lbs Naphthalene

Therefore, for Naphthalene Rueping losses of 254.35 lbs/yr

Dibenzofuran losses = (15 lbs Dibenzofuran x 254.35 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 49.29 lbs/yr

Quinoline losses = (7.5 lbs Quinoline x 254.35 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 24.65 lbs/yr

Biphenyl losses = (0.1 lbs Quinoline x 254.35 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 0.33 lbs/yr

Naphthalene emissions are equivalent to 42 percent of creosote emissions as determined by analytical measurements. Creosote emissions are considered as VOCs.

Therefore,
Short-term creosote/VOC emissions = 0.03 lbs/hr Naphthalene / 0.42

= 0.07 lbs/hr creosote/VOCs

Long-term creosote/VOC emissions = 0.13 tons/yr Naphthalene / 0.42

= 0.30 tons/yr creosote/VOCs

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**COLUMBUS**

**Work Tank No. 3 Nephthalene Emissions**

| Breathing Loss, Lb, Emissions | | Unit | Symbol |
|---|---|---|---|
| 1. Molecular Weight of Vapor | 41.66 | lb/lb mole | Mv |
| 2. Average Atmospheric Pressure | 14.09 | psia | Pa |
| 3. True Vapor Pressure at Bulk Liquid Conditions | 0.07 | psia | P |
| 4. Tank Diameter | 18.00 | ft | D |
| 5. Average Vapor Space Height | 3.00 | ft | H |
| 6. Average Ambient Diurnal Temperature Change | 23.10 | oF | T |
| 7. Paint Factor | 1.58 | NA | Fp |
| 8. Adjustment Factor for Small Tanks | 1.00 | NA | C |
| 9. Product Factor | 0.10 | NA | Kc |

Lb (lb/yr) = (2.26x10^-2) x (Mv) x ((P/Pa-P)^0.68) x (D^1.73) x (H^0.51) x (T^0.50) x Fp x C x Kc

Therefore, the Lb = 4.96 lb/yr
0.0025 ton/yr

| Working Loss, Lw, Emissions | | Unit | Symbol |
|---|---|---|---|
| 1. Molecular Weight of Vapor | 41.66 | lb/lb mole | Mv |
| 2. True Vapor Pressure at Bulk Liquid Conditions | 0.07 | psia | P |
| 3. Tank Capacity | 57,000.00 | gal | V |
| 4. Number of Turnovers per Year | 218.58 | NA | N |
| 5. Turnover Factor | 0.24 | NA | Kn |
| 6. Product Factor | 0.10 | NA | Kc |

Lw (lb/yr) = (2.40x10^-5) x Mv x P x V x N x Kn x Kc

Therefore, the Lw = 20.14 lb/yr
0.0101 ton/yr

| Molecular Weight of Vapor Determination | | Unit | Symbol |
|---|---|---|---|
| 1. Molecular Weight of Pure Component | 128 | lb/lb mole | Ma |
| 2. Vapor Pressure of Pure Component | 0.1410 | psia | Pa |
| 3. Mole Fraction of Pure Component | 0.157 | | Xa |
| 4. Vapor Pressure of Bulk Liquid | 0.068 | psia | Pt |

Mv (lb/lb mole) = Ma(PaXa)/Pt + Mb(PbXb)/Pt

Therefore the Mv for Naphthalene = 41.655 lb/lb mole

| Process Equipment Data for Turn Over Calculations | | |
|---|---|---|
| Cylinder Length | 100 | |
| Diameter | 8 | |
| Cylinder Volume | 5,024.00 | |
| Volume per tie (ft3) | 3.72 | i |
| No. Ties/tram | 59 | ii |
| No. Trams/charge | 11 | iii |
| Wood Volume (ft3)/Charge | 2,414.28 | Ap = iii*ii*i |
| Cylinder Void Volume (ft3)/Charge | 2,609.72 | Bp |
| Gals. Creosote to Cylinder/Charge based on cylinder void | 19,523.32 | Cp = Bp*7.481 |
| Lbs Creosote/ft3 of Wood | 8.00 | Dp |
| Lbs Creosote Retained in Wood | 19,314.24 | Ep = Dp*Ap |
| Gals. Creosote Retained in Wood (@ d = 9.3 lbs/gal) | 2,080.56 | Fp = Ep/9.3lbs/gal |
| Gals. of Creosote Pumped Back to Work Tank | 17,442.77 | Gp = Cp-Fp |
| Average No. of Cycles | 1,105 | Hp |
| Maximum No. of Cycles | 1,500 | Ip |

| Number of Turnovers | | |
|---|---|---|
| Annual Purchases of Creosote | 1,800,000 | a |
| Maximum No. of Cycles; Assume all Boulton | 1,500 | Ip |
| No. of Pump Backs per Cycle | 2 | b |
| No. of Total Annual Pump Backs | 3,000 | c = b*Ip |
| Gals. of Creosote Pumped Back per Cycle | 17,442.77 | Gp |
| Annual Gals. Creosote Pumped Back | 52,328,306.98 | d = Gp*c |
| Total Annual Gals Creosote Throughput | 53,928,306.98 | e = a+d |
| Total Work Tank Capacity | 249,000 | |
| Annual Tank Turnovers | 218.58 | |

| Tank Capacities (gal) | |
|---|---|
| Tank 1,2, and 3 | 57,000 |
| Tank 4 | 78,000 |
| Total Tank Capacity | 249,000 |

**Assumptions**
1. Cylinders and tanks are interconnected as a closed loop vapor recovery system.
2. The calculation of a turnover factor for working losses considers the volume of creosote recycled as pumpbacks.
   Additionally, the total throughput per year for a work tank considers the volume of creosote recycled as pumpbacks.
3. Evaporative emissions as loading losses are incorporated into the breathing and working losses for large storate tanks.
   (Section 4.4, Transportation and Marketing of Petroleum Liquids, refers to Section 4.3, Storage of Organic Liquids, for large storage tanks.)

**References**


1. AP-42 4.3
2. GERG
3. Allied Signal

**COLUMBUS**

**Work Tank No. 3 HAP and VOC Emissions**

| | | |
|---|---|---|
| **For emissions in terms of naphthalene, there are** | | 15.0 lbs Dibenzofuran |
| | | 7.5 lbs Quinoline |
| | | 0.1 lbs Biphenyl |
| | **for every** | 77.4 lbs Naphthalene |

**Therefore, for AP-42 derived Naphthalene breathing losses of** **4.96 lbs/yr**

Dibenzofuran losses = (15 lbs of Dibenzofuran x 4.96 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 0.96 lbs/yr

Quinoline losses = (7.5 lbs of Quinoline x 4.96 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 0.48 lbs/yr

Biphenyl losses = (0.1 lbs of Biphenyl x 4.96 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 0.01 lbs/yr

**Summary,**

| | | |
|---|---|---|
| **Total losses** | Naphthalene | 25.10 lbs/yr |
| | Dibenzofuran | 4.86 lbs/yr |
| | Quinoline | 2.43 lbs/yr |
| | Biphenyl | 0.03 lbs/yr |
| | HAPS | 32.43 lbs/yr |
| **Short-term emissions** | Naphthalene | 0.07 lbs/day |
| | Dibenzofuran | 0.01 lbs/day |
| | Quinoline | 0.01 lbs/day |
| | Biphenyl | 0.0001 lbs/day |
| | HAPS | 0.09 lbs/day |
| **Long-term emissions** | Naphthalene | 0.01 tons/yr |
| | Dibenzofuran | 0.00 tons/yr |
| | Quinoline | 0.00 tons/yr |
| | Biphenyl | 0.0000 tons/yr |
| | HAPS | 0.02 tons/yr |

**Therefore, for AP-42 derived Naphthalene working losses of** **20.14 lbs/yr**

Dibenzofuran losses = (15 lbs of Dibenzofuran x 20.14 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 3.90 lbs/yr

Quinoline losses = (7.5 lbs of Quinoline x 20.14 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 1.95 lbs/yr

Biphenyl losses = (0.1 lbs of Biphenyl x 20.14 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 0.03 lbs/yr

Naphthalene emissions are equivalent to 42 percent of creosote emissions as determined by the EPA tests at the Avoca, PA facility. Creosote emissions are considered as VOCs.

**Therefore,**

**Short-term creosote/VOC emissions =** 0.0687 lbs/day Naphthalene / 0.42

= 0.16 lbs/day creosote/VOCs

**Long-term creosote/VOC emissions =** 0.0125 tons/yr Naphthalene / 0.42

= 0.03 tons/yr creosote/VOCs

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COLUMBUS

## Work Tank No. 3 Naphthalene Emissions

### Process Unit Data

| | |
|---|---|
| No. of Cylinders | 1 |
| No. of rueping cycles per cylinder | 2 |
| No. of total annual rueping cycles | 167 |
| Cylinder length (ft) | 100 |
| Diameter (ft) | 8 |
| Wood Charge Volume (ft^3) | 5,036.48 |
| Cylinder Volume (ft^3) | 2,414.28 |
| Cylinder Void Volume (ft^3) | 2,622.20 |
| Cylinder Void Volume (liters) | 74,260.70 V |
| Operating Temperature K | 355.37 K |
| Venting Temperature K' | 293.15 K' |
| Operating Pressure P (atm) | 5.00 P |
| Venting Pressure P' (atm) | 1.00 P' |
| Rueping Air (Venting) Volume | V' |
| PV=nRT | |
| PV/T = nR | |
| P'V'/T' = nR | |
| V' = (PV/T)(T'/P') | 306,293.80 liters |
| Rueping (venting) Air | 10,818.30 ft^3 |

| | |
|---|---|
| Air is 8% Naphthalene | |
| MW Naphthalene (g/mole) | 128.00 |
| density of air g/mole | 28.96 |
| density of 8% Naphthalene Air (g/mole) | 36.88 |
| density of Naphthalene (lb/ft^3) | 0.0001 |

| | |
|---|---|
| **Naphthalene Rueping Air Emissions** | **1.11 lb/cycle** |
| | **185.83 lb/yr** |
| | **0.09 ton/yr** |

| **Summary,** | | | |
|---|---|---|---|
| | Total losses | Naphthalene | 185.83 lbs/yr |
| | | Dibenzofuran | 36.01 lbs/yr |
| | | Quinoline | 18.01 lbs/yr |
| | | Biphenyl | 0.24 lbs/yr |
| | | HAPs | 240.09 lbs/yr |
| | Short-term emissions | Naphthalene | 0.0212 lbs/hr |
| | | Dibenzofuran | 0.0041 lbs/hr |
| | | Quinoline | 0.0021 lbs/hr |
| | | Biphenyl | 0.0000 lbs/hr |
| | | HAPs | 0.0274 lbs/hr |
| | Long-term emissions | Naphthalene | 0.0929 tons/yr |
| | | Dibenzofuran | 0.0180 tons/yr |
| | | Quinoline | 0.0090 tons/yr |
| | | Biphenyl | 0.0001 tons/yr |
| | | HAPs | 0.1200 tons/yr |

### HAP Emissions

For emissions in terms of Naphthalene, there are 15.0 lbs Dibenzofuran, 7.5 lbs Quinoline, 0.1 lbs Biphenyl

for every 77.4 lbs Naphthalene

Therefore, for Naphthalene Rueping losses of 185.83 lbs/yr

Dibenzofuran losses = $\dfrac{\text{(15 lbs Dibenzofuran x 185.83 lbs/yr Naphthalene)}}{\text{(77.4 lbs Naphthalene)}}$

= 36.01 lbs/yr

Quinoline losses = $\dfrac{\text{(7.5 lbs Quinoline x 185.83 lbs/yr Naphthalene)}}{\text{(77.4 lbs Naphthalene)}}$

= 18.01 lbs/yr

Biphenyl losses = $\dfrac{\text{(0.1 lbs Quinoline x 185.83 lbs/yr Naphthalene)}}{\text{(77.4 lbs Naphthalene)}}$

= 0.24 lbs/yr

Naphthalene emissions are equivalent to 42 percent of creosote emissions as determined by analytical measurements. Creosote emissions are considered as VOCs.

Therefore,
Short-term creosote/VOC emissions = $\dfrac{\text{0.02 lbs/hr Naphthalene}}{0.42}$

= 0.05 lbs/hr creosote/VOCs

Long-term creosote/VOC emissions = $\dfrac{\text{0.09 tons/yr Naphthalene}}{0.42}$

= 0.22 tons/yr creosote/VOCs

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# HOT TANKS

# SUPPORT CALCULATIONS

JOB 940168/3

SHEET NO. 1 OF

CALCULATED BY STM DATE 3-20-95

CHECKED BY DATE

SCALE

AquAeTer
215 Jamestown Park, Suite 204
Brentwood, TN 37027
(615) 373-8532 FAX (615) 373-8512

KMCC-COLUMBUS
EMISSION CALCULATIONS

- HOT TANK CONTROLLED EMISSIONS

$\frac{10{,}231.14 \text{ lbs Naph}}{1 \text{ yr}} * \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} * (1-0.75) = 1.2789 \text{ tons/yr}$ Naphthalene

$\frac{1{,}982.78 \text{ lbs Dbf}}{1 \text{ yr}} * \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} * (1-0.75) = 0.2478 \text{ tons/yr}$ Dibenzofuran

$\frac{991.39 \text{ lbs Quin}}{1 \text{ yr}} * \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} * (1-0.75) = 0.1239 \text{ tons/yr}$ Quinoline

$\frac{13.22 \text{ lbs Biph}}{1 \text{ yr}} * \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} * (1-0.75) = 0.0017 \text{ tons/yr}$ Biphenyl

COLUMBUS

Work Tank No. 4 Nephthalene Emissions

**Breathing Loss, Lb, Emissions**

| | Unit | Symbol |
|---|---|---|
| 1. Molecular Weight of Vapor | 41.66 lb/lb mole | Mv |
| 2. Average Atmospheric Pressure | 14.09 psia | Pa |
| 3. True Vapor Pressure at Bulk Liquid Conditions | 0.07 psia | P |
| 4. Tank Diameter | 18.00 ft | D |
| 5. Average Vapor Space Height | 3.00 ft | H |
| 6. Average Ambient Diurnal Temperature Change | 23.10 oF | T |
| 7. Paint Factor | 1.58 NA | Fp |
| 8. Adjustment Factor for Small Tanks | 1.00 NA | C |
| 9. Product Factor | 0.10 NA | Kc |

Lb (lb/yr) = (2.26x10^-2) x (Mv) x ((P/Pa-P)^0.68) x (D^1.73) x (H^0.51) x (T^0.50) x Fp x C x Kc
Therefore, the Lb = 4.96 lb/yr
0.0025 ton/yr

**Working Loss, Lw, Emissions**

| | Unit | Symbol |
|---|---|---|
| 1. Molecular Weight of Vapor | 41.66 lb/lb mole | Mv |
| 2. True Vapor Pressure at Bulk Liquid Conditions | 0.07 psia | P |
| 3. Tank Capacity | 57,000.00 gal | V |
| 4. Number of Turnovers per Year | 216.58 NA | N |
| 5. Turnover Factor | 0.24 NA | Kn |
| 6. Product Factor | 0.10 NA | Kc |

Lw (lb/yr) = (2.40x10^-5) x Mv x P x V x N x Kn x Kc
Therefore, the Lw = 20.14 lb/yr
0.0101 ton/yr

**Molecular Weight of Vapor Determination**

| | Unit | Symbol |
|---|---|---|
| 1. Molecular Weight of Pure Component | 128 lb/lb mole | Ma |
| 2. Vapor Pressure of Pure Component | 0.1410 psia | Pa |
| 3. Mole Fraction of Pure Component | 0.157 | Xa |
| 4. Vapor Pressure of Bulk Liquid | 0.068 psia | Pt |

Mv (lb/lb mole) = Ma(PaXa)/Pt + Mb(PbXb)/Pt
Therefore the Mv for Naphthalene = 41.655 lb/lb mole

**Process Equipment Data for Turn Over Calculations**

| | | |
|---|---|---|
| Cylinder Length | 100 | |
| Diameter | 8 | |
| Cylinder Volume | 5,024.00 | |
| Volume per tie (ft3) | 3.72 | i |
| No. Ties/tram | 59 | ii |
| No. Trams/charge | 11 | iii |
| Wood Volume (ft3)/Charge | 2,414.28 | Ap = iii*ii*i |
| Cylinder Void Volume (ft3)/Charge | 2,609.72 | Bp |
| Gals. Creosote to Cylinder/Charge based on cylinder void | 19,523.32 | Cp = Bp*7.481 |
| Lbs Creosote/ft3 of Wood | 8.00 | Dp |
| Lbs Creosote Retained in Wood | 19,314.24 | Ep = Dp*Ap |
| Gals. Creosote Retained in Wood (@ d = 9.3 lbs/gal) | 2,080.55 | Fp = Ep/9.3lbs/gal |
| Gals. of Creosote Pumped Back to Work Tank | 17,442.77 | Gp = Cp-Fp |
| Average No. of Cycles | 1,105 | Hp |
| Maximum No. of Cycles | 1,500 | lp |

**Number of Turnovers**

| | | |
|---|---|---|
| Annual Purchases of Creosote | 1,600,000 | a |
| Maximum No. of Cycles; Assume all Boulton | 1,500 | lp |
| No. of Pump Backs per Cycle | 2 | b |
| No. of Total Annual Pump Backs | 3,000 | c = b*lp |
| Gals. of Creosote Pumped Back per Cycle | 17,442.77 | Gp |
| Annual Gals. Creosote Pumped Back | 52,328,306.98 | d = Gp*c |
| Total Annual Gals Creosote Throughput | 53,928,306.98 | s = a+d |
| Total Work Tank Capacity | 249,000 | |
| Annual Tank Turnovers | 216.58 | |

**Tank Capacities (gal)**

| | |
|---|---|
| Tank 1,2, and 3 | 57,000 |
| Tank 4 | 78,000 |
| Total Tank Capacity | 249,000 |

**Assumptions**
1. Cylinders and tanks are interconnected as a closed loop vapor recovery system.
2. The calculation of a turnover factor for working losses considers the volume of creosote recycled as pumpbacks.
   Additionally, the total throughput per year for a work tank considers the volume of creosote recycled as pumpbacks.
3. Evaporative emissions as loading losses are incorporated into the breathing and working losses for large storate tanks.
   (Section 4.4, Transportation and Marketing of Petroleum Liquids, refers to Section 4.3, Storage of Organic Liquids, for large storage tanks.)

**References**
1. AP-42 4.3
2. GERG
3. Allied Signal

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**COLUMBUS**

**Work Tank No. 4 HAP and VOC Emissions**

For emissions in terms of naphthalene, there are 15.0 lbs Dibenzofuran, 7.5 lbs Quinoline, 0.1 lbs Biphenyl for every 77.4 lbs Naphthalene

Therefore, for AP-42 derived Naphthalene breathing losses of 4.96 lbs/yr

$$\text{Dibenzofuran losses} = \frac{(15 \text{ lbs of Dibenzofuran} \times 4.96 \text{ lbs/yr Naphthalene})}{(77.4 \text{ lbs Naphthalene})} = 0.96 \text{ lbs/yr}$$

$$\text{Quinoline losses} = \frac{(7.5 \text{ lbs of Quinoline} \times 4.96 \text{ lbs/yr Naphthalene})}{(77.4 \text{ lbs Naphthalene})} = 0.48 \text{ lbs/yr}$$

$$\text{Biphenyl losses} = \frac{(0.1 \text{ lbs of Biphenyl} \times 4.96 \text{ lbs/yr Naphthalene})}{(77.4 \text{ lbs Naphthalene})} = 0.01 \text{ lbs/yr}$$

Therefore, for AP-42 derived Naphthalene working losses of 20.14 lbs/yr

$$\text{Dibenzofuran losses} = \frac{(15 \text{ lbs of Dibenzofuran} \times 20.14 \text{ lbs/yr Naphthalene})}{(77.4 \text{ lbs Naphthalene})} = 3.90 \text{ lbs/yr}$$

$$\text{Quinoline losses} = \frac{(7.5 \text{ lbs of Quinoline} \times 20.14 \text{ lbs/yr Naphthalene})}{(77.4 \text{ lbs Naphthalene})} = 1.95 \text{ lbs/yr}$$

$$\text{Biphenyl losses} = \frac{(0.1 \text{ lbs of Biphenyl} \times 20.14 \text{ lbs/yr Naphthalene})}{(77.4 \text{ lbs Naphthalene})} = 0.03 \text{ lbs/yr}$$

Summary,

| | | |
|---|---|---|
| Total losses | Naphthalene | 25.10 lbs/yr |
| | Dibenzofuran | 4.86 lbs/yr |
| | Quinoline | 2.43 lbs/yr |
| | Biphenyl | 0.03 lbs/yr |
| | HAPS | 32.43 lbs/yr |
| Short-term emissions | Naphthalene | 0.07 lbs/day |
| | Dibenzofuran | 0.01 lbs/day |
| | Quinoline | 0.01 lbs/day |
| | Biphenyl | 0.0001 lbs/day |
| | HAPS | 0.09 lbs/day |
| Long-term emissions | Naphthalene | 0.01 tons/yr |
| | Dibenzofuran | 0.00 tons/yr |
| | Quinoline | 0.00 tons/yr |
| | Biphenyl | 0.0000 tons/yr |
| | HAPS | 0.02 tons/yr |

Naphthalene emissions are equivalent to 42 percent of creosote emissions as determined by the EPA tests at the Avoca, PA facility. Creosote emissions are considered as VOCs.

Therefore,

$$\text{Short-term creosote/VOC emissions} = \frac{0.0687 \text{ lbs/day Naphthalene}}{0.42} = 0.16 \text{ lbs/day creosote/VOCs}$$

$$\text{Long-term creosote/VOC emissions} = \frac{0.0125 \text{ tons/yr Naphthalene}}{0.42} = 0.03 \text{ tons/yr creosote/VOCs}$$

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COLUMBUS

**Work Tank No. 4 Naphthalene Emissions**

**Process Unit Data**

| | | |
|---|---|---|
| No. of Cylinders | 1 | |
| No. of rueping cycles per cylinder | 2 | |
| No. of total annual rueping cycles | 167 | |
| Cylinder length (ft) | 100 | |
| Diameter (ft) | 8 | |
| Wood Charge Volume (ft^3) | 5,036.48 | |
| Cylinder Volume (ft^3) | 2,414.28 | |
| Cylinder Void Volume (ft^3) | 2,622.20 | |
| Cylinder Void Volume (liters) | 74,260.70 | V |
| Operating Temperature K | 355.37 | K |
| Venting Temperature K' | 293.15 | K' |
| Operating Pressure P (atm) | 5.00 | P |
| Venting Pressure P' (atm) | 1.00 | P' |
| Rueping Air (Venting) Volume | | V' |
| PV=nRT | | |
| PV/T = nR | | |
| P'V'/T' = nR | | |
| V' = (PV/T)(T'/P') | 306,293.80 | liters |
| Rueping (venting) Air | 10,818.30 | ft^3 |

| | |
|---|---|
| Air is 8% Naphthalene | |
| MW Naphthalene (g/mole) | 128.00 |
| density of air g/mole | 28.96 |
| density of 8% Naphthalene Air (g/mole) | 36.88 |
| density of Naphthalene (lb/ft^3) | 0.0001 |

**Naphthalene Rueping Air Emissions** 1.11 lb/cycle
**185.83 lb/yr**
**0.09 ton/yr**

| Summary, | | | |
|---|---|---|---|
| Total losses | Naphthalene | 185.83 | lbs/yr |
| | Dibenzofuran | 36.01 | lbs/yr |
| | Quinoline | 18.01 | lbs/yr |
| | Biphenyl | 0.24 | lbs/yr |
| | HAPs | **240.09** | lbs/yr |
| Short-term emissions | Naphthalene | 0.0212 | lbs/hr |
| | Dibenzofuran | 0.0041 | lbs/hr |
| | Quinoline | 0.0021 | lbs/hr |
| | Biphenyl | 0.0000 | lbs/hr |
| | HAPs | **0.0274** | lbs/hr |
| Long-term emissions | Naphthalene | 0.0929 | tons/yr |
| | Dibenzofuran | 0.0180 | tons/yr |
| | Quinoline | 0.0090 | tons/yr |
| | Biphenyl | 0.0001 | tons/yr |
| | HAPs | **0.1200** | tons/yr |

**HAP Emissions**

For emissions in terms of Naphthalene, there are 15.0 lbs Dibenzofuran
7.5 lbs Quinoline
0.1 lbs Biphenyl

for every 77.4 lbs Naphthalene

Therefore, for Naphthalene Rueping losses of 185.83 lbs/yr

Dibenzofuran losses = $\frac{\text{(15 lbs Dibenzofuran x 254.35 lbs/yr Naphthalene)}}{\text{(77.4 lbs Naphthalene)}}$

= 36.01 lbs/yr

Quinoline losses = $\frac{\text{(7.5 lbs Quinoline x 254.35 lbs/yr Naphthalene)}}{\text{(77.4 lbs Naphthalene)}}$

= 18.01 lbs/yr

Biphenyl losses = $\frac{\text{(0.1 lbs Quinoline x 254.35 lbs/yr Naphthalene)}}{\text{(77.4 lbs Naphthalene)}}$

= 0.24 lbs/yr

Naphthalene emissions are equivalent to 42 percent of creosote emissions as determined by analytical measurements. Creosote emissions are considered as VOCs.

Therefore,
Short-term creosote/VOC emissions = $\frac{\text{0.03 lbs/hr Naphthalene}}{0.42}$

= 0.05 lbs/hr creosote/VOCs

Long-term creosote/VOC emissions = $\frac{\text{0.13 tons/yr Naphthalene}}{0.42}$

= 0.22 tons/yr creosote/VOCs

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**COLUMBUS**

**Hot Tank HAP Emissions**

| | | |
|---|---|---|
| **For emissions in terms of naphthalene, there are** | | 15.0 lbs Dibenzofuran<br>7.5 lbs Quinoline<br>0.1 lbs Biphenyl |
| | **for every** | 77.4 lbs Naphthalene |

**Therefore, for AP-42 derived Naphthalene steaming losses of 10,231.14 lbs/yr**

Dibenzofuran losses = (15 lbs of Dibenzofuran x 10231.14 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 1,982.78 lbs/yr

Quinoline losses = (7.5 lbs of Quinoline x 10231.14 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 991.39 lbs/yr

Biphenyl losses = (0.1 lbs of Biphenyl x 10231.14 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 13.22 lbs/yr

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**COLUMBUS**

**Hot Tank Naphthalene and VOC Emissions**

| | |
|---|---|
| Steam (150psia; 4" pipe) Flow into Cylinder (gpm) | 28.00 |
| Steam Drying Time (hours) | 1.50 |
| Weight of Liquid flow (lbs/min) | 249.20 |
| Total Weight of Steaming Liquid (lbs) (1) | 22,428.00 |
| Percent VOC of Steaming (2) | 0.10 |
| **VOCs per Steam Dry (lbs)** | **22.43** |
| Percent VOCs as Naphthalene (3) | 41.66 |
| **Naphthalene per Turnover (lbs)** | **9.34** |
| Maximum No. of Steam Drys per day | 3.00 |
| Maximum Annual Steam Drys | 1,095.00 |
| Typical No. of Drys per day | 1.50 |
| Typical Annual Steam Drys | 547.50 |

**MAXIMUM**

| | |
|---|---|
| **Annual VOC Emissions (lbs/yr) =** | **24,558.66** |
| **Annual VOC Emissions (lbs/day) =** | **67.28** |
| **Annual VOC Emissions (tpy) =** | **12.28** |
| **Annual Naphthalene Emissions (lbs/yr) =** | **10,231.14** |
| **Annual Naphthalene Emissions (lbs/day) =** | **28.03** |
| **Annual Naphthalene Emissions (tpy) =** | **5.12** |

**TYPICAL**

| | |
|---|---|
| **Annual VOC Emissions (lbs/yr) =** | **12,279.33** |
| **Annual VOC Emissions (lbs/day) =** | **33.64** |
| **Annual VOC Emissions (tpy) =** | **6.14** |
| **Annual Naphthalene Emissions (lbs/yr) =** | **5,115.57** |
| **Annual Naphthalene Emissions (lbs/day) =** | **14.02** |
| **Annual Naphthalene Emissions (tpy) =** | **2.56** |

1. The flow is based on the steam flow into the treatment cylinder. The actual flow out is much lower due to condensate loss and therefore this is a conservative estimate.

2. The steaming occurs in an empty cylinder with only minimal residual creosote. Prior to steam drying the residual creosote has gone through two vacuum distillations at 24"Hg, first vacuum for 8 - 16 hours and the second for 3 hours after the cylinder is emptied of creosote. The percent distillates (below 212F) is estimated to be less than 0.1 percent. Additionally, The American Wood Preservers Specifications P1-78 specifies that no more than 2% of new or used creosote should distill below 212 degrees F. The GERG data shows no creosote composite sample distills more than 1.4 weight % material below 212 degrees F. The constituents are not water soluable and therefore only distillates below 212 F will be lost.
3. Percent Naphthalene of total VOCs is based on the Percent Molecular Weight of Vapor or Vapor Mole Mass Percent.
4. Retort steam emissions from the drying of wood will be emitted to the scrubber through the condensate tank.

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**PRIMARY OIL/WATER SEPARATORS**

**SUPPORT CALCULATIONS**

**WASTEWATER TREATMENT EMISSION COMPUTATIONS - COLUMBUS**
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| SOURCE | QUANTITY | WATER8 MODEL EMISSIONS | AP-42 FACTOR (c) | | OPERATION TIME | | | FLOW RATE | | | | NAPH-THALENE EMISSIONS | ANNUAL CREOSOTE/ VOC EMISSIONS | ANNUAL CREOSOTE/ VOC EMISSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (lb naph./yr) | Factor | Units | (hr/day) | (days/yr) | (hr/yr) | (gpm) | (mgd) | (Kgal/yr) | (Mgal/yr) | (lb/yr) | (lb/yr) | (tons/yr) |
| 1. COOLING TOWERS (a) | 2 | - | 0.6 | lb VOC/Mgal | 24 | 365 | 8,760 | 200 | 0.288 | 105,120 | 105.1 | - | 0.0 | 0.00 |
| 2. PRIMARY OIL/WATER SEPARATOR TANKS (b) | 2 | 74.4 | - | - | 24 | 365 | 8,760 | 20 | 0.029 | 10,438 | 10.4 | 74.4 | 177.1 | 0.09 |
| 3. SECONDARY OIL/WATER SEPARATOR (b) | | | | | | | | | | | | | | |
| PROCESS WATER | 1 | 323.2 | - | - | 24 | 365 | 8,760 | 20 | 0.029 | 10,438 | 10.4 | 323.2 | 769.6 | 0.38 |
| 4. SURGE TANK (b) | 1 | 96.3 | - | - | 24 | 365 | 8,760 | 20 | 0.029 | 10,438 | 10.4 | 96.3 | 229.3 | 0.11 |
| 5. AERATED TANKS (b) (No Controls) | 3 | 474.8 | - | - | 24 | 365 | 8,760 | 20 | 0.029 | 10,438 | 10.4 | 474.8 | 1,130.5 | 0.5[illegible] |
| 6. GROUNDWATER OIL/WATER SEPARATOR | 1 | 32.3 | - | - | 24 | 365 | 8,760 | 15 | 0.022 | 8,042 | 8.0 | 201.0 | 478.6 | 0.[illegible] |
| | | | | | | | | | | Totals | | 1,170 | 2,785 | 1.[illegible] |

Notes:
(a) Under Mississippi regulations cooling towers are considered insignificant sources.
(b) Emissions estimated from EPA's Water7 Air Emission Model for Wastewater Treatment. The annual poundage is divided by 42.0% (0.42) in order to obtain annual creosote emissions.
(c) AP-42 emission factors were developed for the petroleum industry. A factor of 0.10 times the AP-42 factors has been used to determine low-volatility emissions.
(d) Controlled totals consider emissions after covering (96 % reduction - AP42) and scrubber (75 % efficiency).

Calculations:

| | | |
|---|---|---|
| Operation Time (hr/yr) | = | [hr/day] * [# days/yr] |
| Flow Rate (mgd) | = | [Flow Rate, gpm] * [60 min/hr] * [24 hr/day] / [1000000 gal/Mgal] |
| Flow Rate (Kgal/yr) | = | [Flow Rate, gpm] * [60 min/hr] * [Operation time, hr/yr] / [1000 gal/Kgal] |
| Flow Rate (Mgal/yr) | = | [Flow Rate, gpm] * [60 min/hr] * [Operation time, hr/yr] / [1000000 gal/Mgal] |
| Process Drains | = | [Operation time, hr/yr] * [AP-42 Factor, lb/hr-source] * [# of sources] |
| Total Emissions, lb/yr (cooling tower) | = | [Flow Rate, Mgal/yr] * [AP-42 Factor, lb/hr-flow basis] * [# of units] |
| Annual Emissions, tons/yr | = | [Total Emissions, lb/yr] / [2000 lb/ton] |

EMISSIONS FROM WASTEWATER SOURCES BY INDIVIDUAL HAP

| SOURCE | HAP EMISSIONS (tons/yr) | | | | UNCONTROLLED EMISSIONS | | | CONTROLLED EMISSIONS (d) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Quinoline 7.5% | Biphenyl 0.1% | Naphthalene 77.4% | Dibenzofuran 15.0% | TOTAL HAPS (tons/yr) | NON-HAP VOC (tons/yr) | TOTAL VOC/ CREOSOTE (tons/yr) | NAPHTHALENE (lb/yr) | NAPHTHALENE (tons/yr) | TOTAL VOC/ CREOSOTE (lb/yr) | TOTAL VOC/ CREOSOTE (tons/yr) |
| 1. Cooling Towers | 0.00 | 0.00000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0000 | 0.0 | 0.000 |
| 2. Primary Oil/Water Separator Tanks | 0.00 | 0.00005 | 0.04 | 0.01 | 0.05 | 0.04 | 0.09 | 0.74 | 0.0004 | 1.8 | 0.001 |
| 3. Secondary Oil/Water Separator | | | | | | | | | | | |
| Process Water | 0.02 | 0.00021 | 0.16 | 0.03 | 0.21 | 0.18 | 0.38 | 3.23 | 0.0016 | 7.7 | 0.004 |
| 4. Surge Tank | 0.00 | 0.00006 | 0.05 | 0.01 | 0.06 | 0.05 | 0.11 | 0.96 | 0.0005 | 2.3 | 0.001 |
| 5. Aerated Tanks (No Controls) | 0.02 | 0.00031 | 0.24 | 0.05 | 0.31 | 0.26 | 0.57 | 474.82 | 0.2374 | 1,130.5 | 0.565 |
| 6. Groundwater Oil/Water Separator | 0.01 | 0.00013 | 0.10 | 0.02 | 0.13 | 0.11 | 0.24 | 2.01 | 0.0010 | 4.8 | 0.002 |
| Totals | 0.06 | 0.00076 | 0.58 | 0.11 | 0.76 | 0.64 | 1.39 | 482 | 0.2409 | 1,147 | 0.574 |

# BUILDING SUMP

# SUPPORT CALCULATIONS

JOB 940168/3

SHEET NO. 1 OF 1

CALCULATED BY JSM DATE 3-20-95

CHECKED BY ______ DATE ______

SCALE ______

AquAeTer

215 Jamestown Park, Suite 204
Brentwood, TN 37027
(615) 373-8532 FAX (615) 373-8512

KMCC Columbus Emission Calculations
Building Sump

Emissions from EPA Water8 = 20.6236 lb/hr Naphthalene

The factor for covering is 4%
so 20.6236 lb/hr * .04 = .824944 lb/hr.

The factor for the scrubber is 25%
so .824944 * .25 = .206236 lb/hr Naphthalene

SELECTED PARAMETERS FOR THE WASTE WATER TREATMENT SYSTEM

FILE: COLSUMP8.CwD 02-16-1995

| | |
|---|---|
| UNIT: General specifications | |
| Wind velocity (cm/s at 10 m) | 224 |
| Wastewater temperature (C) | 60 |
| Wastewater flow rate (m3/s) | .00125 |
| total dissolved organics in (mg/l) | 100 |
| inlet suspended solids | 500 |
| Overall biorate (mg/g bio-hr) | 19 |

| | |
|---|---|
| UNIT: equalization HOT SUMP | |
| number units equalization | 1 |
| Wastewater temperature (C) | 60 |
| length of unit (m) | 2 |
| length of unit (m) | 2 |
| depth of unit (m) | 1 |
| Area of agitation (each aerator,m2) | 0 |
| Total number of agitators in the unit | 0 |
| Power of agitation (each aerator,HP) | 0 |
| Impeller diameter (cm) | 0 |
| Impeller rotation (RPM) | 0 |
| Agitator mechanical efficiency | 0 |
| aerator effectiveness, alpha | 0 |
| if there is plug flow, enter 1 | 1 |
| Overall biorate (mg/g bio-hr) | 0 |
| Aeration air flow (m3/s) | 0 |
| active biomass, (g/l) | 0 |
| If covered, then enter 1 | 0 |
| Recycle flow out of unit (m3/s) | 0 |

INLET COMPOUND CONCENTRATIONS

| | |
|---|---|
| NAPHTHALENE | 31 ppmw |

INTERMEDIATE CALCULATIONS COLSUMP8.CwD 02-16-1995

SOURCE: equalization Version 2
COMPOUND: NAPHTHALENE

| | |
|---|---|
| KG quiescent (m/s) | 0.5021E-02 |
| KL quiescent (m/s) | 0.2754E-05 |
| KL OVERALL QUIESCENT (m/s) | 0.2746E-05 |
| KL OVERALL (m/s) | 0.2746E-05 |
| TOTAL FRACTION VOLATILIZED | 0.7662E-02 |
| FRACTION ABSORBED | 0.2370 |
| TOTAL AIR EMISSIONS (g/s) | 0.2969E-03 |
| (Mg/year) | 0.9363E-02 |
| EMISSION FACTOR (g/cm2-s) | 0.7423E-08 |
| UNIT EXIT CONCENTRATION (ppmw) | 23.4164 |

WASTEWATER TREATMENT SUMMARY: NAPHTHALENE Version 2

COLSUMP8.CwD 02-16-1995

COMPOUND PROPERTIES OF NAPHTHALENE at 25 deg. C

| | |
|---|---|
| Type of compound A aromatic | |
| density (g/cc) | 1.14 |
| molecular weight | 128.2 |
| diffusion coef. water (cm2/s) | .0000075 |
| diffusion coef. air (cm2/s) | .059 |
| vapor pressure (mm Hg) | .23 |
| Henry's law constant (atm-m3/mol) | .000483 |
| vapor pressure temp. coefficients | 7.3729 |
| | 1968.36 |
| | 222.61 |
| zero order biorate constant (mg/g-hr) | 42.47 |
| first order biorate constant (l/mg-s) | 1 |
| octanol water partition coefficient | 3.37 |
| UNIFAC code | 28:2;000000000 |

The estimated vapor diffusion coefficient is .0526 cm2/s

The estimated vapor pressure is .26448 mm Hg.

SUMMARY OF AIR EMISSIONS FROM UNITS Version 2

| SOURCE | RATE (grams/sec) | Fraction Air | Fraction Remaining | est. conc (ng/m3) |
|---|---|---|---|---|
| equalization | 2.969024E-04 | 0.0077 | 0.7554 | 0.663E+05 |
| TOTALS, ALL UNITS | 2.969024E-04 | 0.0077 | 0.7554 | |
| total fraction absorbed | | | .2369708 | |

g/s * 69,462.555 = lb/yr

= 20.6236 lb/yr

Version 2

WASTEWATER TREATMENT SUMMARY  COLSUMP8.CwD  02-16-1995

| COMPOUND | RATE (g/s) | Fraction Air | Fraction Bio | Fraction Remain |
|---|---|---|---|---|
| NAPHTHALENE | 0.2969E-03 | 0.00766 | 0.00000 | 0.7554 |

# SAP AND VACUUM SEAL WATER TANK

# SUPPORT CALCULATIONS

INTERMEDIATE CALCULATIONS COLSAP8.CWD 03-01-1995

SOURCE: equalization Version 2
COMPOUND: NAPHTHALENE

| | |
|---|---|
| KG quiescent (m/s) | 0.4858E-02 |
| KL quiescent (m/s) | 0.2754E-05 |
| KL OVERALL QUIESCENT (m/s) | 0.2746E-05 |
| KL OVERALL (m/s) | 0.2746E-05 |
| TOTAL FRACTION VOLATILIZED | 0.7461 |
| FRACTION BIOLOGICALLY REMOVED | 0.1144E-06 |
| FRACTION ABSORBED | 0.0540 |
| TOTAL AIR EMISSIONS (g/s) | 0.2984E-02 |
| (Mg/year) | 0.0941 |
| EMISSION FACTOR (g/cm2-s) | 0.4094E-07 |
| UNIT EXIT CONCENTRATION (ppmw) | 19.9908 |

SELECTED PARAMETERS FOR THE WASTE WATER TREATMENT SYSTEM

FILE: COLSAP8.CWD 03-01-1995

| | |
|---|---|
| UNIT: General specifications | |
| Wind velocity (cm/s at 10 m) | 224 |
| Wastewater temperature (C) | 60 |
| Wastewater flow rate (m3/s) | .00004 |
| total dissolved organics in (mg/l) | 200 |
| inlet suspended solids | 200 |
| Overall biorate (mg/g bio-hr) | 19 |
| UNIT: equalization SAP TANKS 1,2, and 3 | |
| number units equalization | 3 |
| Wastewater temperature (C) | 60 |
| length of unit (m) | 2.7 |
| length of unit (m) | 2.7 |
| depth of unit (m) | 1.143 |
| Area of agitation (each aerator, m2) | 0 |
| Total number of agitators in the unit | 0 |
| Power of agitation (each aerator, HP) | 0 |
| Impeller diameter (cm) | 0 |
| Impeller rotation (RPM) | 0 |
| Agitator mechanical efficiency | 0 |
| aerator effectiveness, alpha | 0 |
| if there is plug flow, enter 1 | 1 |
| Overall biorate (mg/g bio-hr) | 0 |
| Aeration air flow (m3/s) | 0 |
| active biomass, (g/l) | 0 |
| If covered, then enter 1 | 0 |
| Recycle flow out of unit (m3/s) | 0 |

INLET COMPOUND CONCENTRATIONS

| | |
|---|---|
| NAPHTHALENE | 100 ppmw |

WASTEWATER TREATMENT SUMMARY: NAPHTHALENE    Version 2

COLSAP8.CWD  03-01-1995

COMPOUND PROPERTIES OF NAPHTHALENE at 25 deg. C

| | |
|---|---|
| Type of compound | A aromatic |
| density (g/cc) | 1.14 |
| molecular weight | 128.2 |
| diffusion coef. water (cm2/s) | .0000075 |
| diffusion coef. air (cm2/s) | .059 |
| vapor pressure (mm Hg) | .23 |
| Henry's law constant (atm-m3/mol) | .000483 |
| vapor pressure temp. coefficients | 7.3729 |
| | 1968.36 |
| | 222.61 |
| zero order biorate constant (mg/g-hr) | 42.47 |
| first order biorate constant (l/mg-s) | 1 |
| octanol water partition coefficient | 3.37 |
| UNIFAC code | 28:2;000000000 |

The estimated vapor diffusion coefficient is .0526 cm2/s

The estimated vapor pressure is .26448 mm Hg.

SUMMARY OF AIR EMISSIONS FROM UNITS    Version 2

| SOURCE | RATE (grams/sec) | Fraction Air | Fraction Remaining | est. conc (ng/m3) |
|---|---|---|---|---|
| equalization | 2.984266E-03 | 0.7461 | 0.1999 | 0.493E+06 |
| TOTALS, ALL UNITS | 2.984266E-03 | 0.7461 | 0.1999 | |
| total fraction absorbed | | | 5.402486E-02 | |

$$\frac{\text{grams}}{\text{sec}} * 69,462.55 = \frac{\text{lbs}}{\text{yr}}$$

$$2.984266 \times 10^{-3} \text{ grams/sec} * 69,462.55 = 207.2947 \text{ lbs/yr}$$

or

$$= 0.1036 \text{ tons/yr}$$

Version 2

WASTEWATER TREATMENT SUMMARY COLSAP8.CWD 03-01-1995

| COMPOUND | RATE (g/s) | Fraction Air | Fraction Bio | Fraction Remain |
|---|---|---|---|---|
| NAPHTHALENE | 0.2984E-02 | 0.74607 | 0.00000 | 0.1999 |

**EP013**

**WASTEWATER TREATMENT**
**FACILITY SCRUBBER**

**Synthetic Minor Operating Scenario Emission Summary**

**Emission Point** EP013 Wastewater Treatment Facility Scrubber

| Emission Unit | UTM Coordinates | | Uncontrolled Emission Rate (lbs/day) | | | Uncontrolled Emission Rate (tons/yr) | | | Controlled Emission Rate (lbs/day) | | | Controlled Emission Rate (tons/yr) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | North | East | Naph | HAPs | VOCs | Naph | HAPs | VOCs | Naph | HAPs | VOCs | Naph | HAPs | VOCs |
| Groundwater Oil/Water Separator *0.04 *0.25 | 1397973.68 | 629058.79 | 0.551 | 0.712 | 1.311 | 0.101 | 0.130 | 0.239 | 0.138 | 0.178 | 0.328 | 0.025 | 0.032 | 0.060 |
| Secondary Oil/Water Separator *0.04 *0.25 | 1398024.42 | 629043.56 | 0.885 | 1.151 | 2.108 | 0.162 | 0.210 | 0.385 | 0.221 | 0.288 | 0.527 | 0.040 | 0.053 | 0.096 |
| SOW Surge Tank *0.04 *0.25 | 1398010.64 | 629014.51 | 0.264 | 0.329 | 0.628 | 0.048 | 0.060 | 0.115 | 0.066 | 0.082 | 0.157 | 0.012 | 0.015 | 0.029 |
| Reclaim Tank *0.25 | | | - | - | - | - | - | - | | | | | | |
| | | | | | | | | | | | | | | |

# GROUNDWATER OIL/WATER SEPARATOR, SECONDARY OIL/WATER SEPARATOR, AND SECONDARY OIL/WATER SEPARATOR SURGE TANK

# SUPPORT CALCULATIONS

VASTEWATER TREATMENT EMISSION COMPUTATIONS - COLUMBUS
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| SOURCE | QUANTITY | WATER8 MODEL EMISSIONS | AP-42 FACTOR (c) | | OPERATION TIME | | | FLOW RATE | | | | NAPH-THALENE EMISSIONS | ANNUAL CREOSOTE/ VOC EMISSIONS | ANNUAL CREOSOTE/ VOC EMISSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (lb naph./yr) | Factor | Units | (hr/day) | (days/yr) | (hr/yr) | (gpm) | (mgd) | (Kgal/yr) | (Mgal/yr) | (lb/yr) | (lb/yr) | (tons/yr) |
| 1. COOLING TOWERS (a) | 2 | - | 0.6 | lb VOC/Mgal | 24 | 365 | 8,760 | 200 | 0.288 | 105,120 | 105.1 | - | 0.0 | 0.00 |
| 2. PRIMARY OIL/WATER SEPARATOR TANKS (b) | 2 | 74.4 | - | - | 24 | 365 | 8,760 | 20 | 0.029 | 10,438 | 10.4 | 74.4 | 177.1 | 0.09 |
| 3. SECONDARY OIL/WATER SEPARATOR (b) | | | | | | | | | | | | | | |
| PROCESS WATER | 1 | 323.2 | - | - | 24 | 365 | 8,760 | 20 | 0.029 | 10,438 | 10.4 | 323.2 | 769.6 | 0.38 |
| 4. SURGE TANK (b) | 1 | 96.3 | - | - | 24 | 365 | 8,760 | 20 | 0.029 | 10,438 | 10.4 | 96.3 | 229.3 | 0.11 |
| 5. AERATED TANKS (b) (No Controls) | 3 | 474.8 | - | - | 24 | 365 | 8,760 | 20 | 0.029 | 10,438 | 10.4 | 474.8 | 1,130.5 | 0.57 |
| 6. GROUNDWATER OIL/WATER SEPARATOR | 1 | 32.3 | - | - | 24 | 365 | 8,760 | 15 | 0.022 | 8,042 | 8.0 | 201.0 | 478.6 | 0.[illegible] |
| | | | | | | | | | | Totals | | 1,170 | 2,785 | 1.[illegible] |

lotes:
a) Under Mississippi regulations cooling towers are considered insignificant sources.
b) Emissions estimated from EPA's Water7 Air Emission Model for Wastewater Treatment. The annual poundage is divided by 42.0% (0.42) in order to obtain annual creosote emissions.
c) AP-42 emission factors were developed for the petroleum industry. A factor of 0.10 times the AP-42 factors has been used to determine low-volatility emissions.
d) Controlled totals consider emissions after covering (96 % reduction - AP42) and scrubber (75 % efficiency).

alculations:

| | | |
|---|---|---|
| Operation Time (hr/yr) | = | [hr/day] * [# days/yr] |
| Flow Rate (mgd) | = | [Flow Rate, gpm] * [60 min/hr] * [24 hr/day] / [1000000 gal/Mgal] |
| Flow Rate (Kgal/yr) | = | [Flow Rate, gpm] * [60 min/hr] * [Operation time, hr/yr] / [1000 gal/Kgal] |
| Flow Rate (Mgal/yr) | = | [Flow Rate, gpm] * [60 min/hr] * [Operation time, hr/yr] / [1000000 gal/Mgal] |
| Process Drains | = | [Operation time, hr/yr] * [AP-42 Factor, lb/hr-source] * [# of sources] |
| Total Emissions, lb/yr (cooling tower) | = | [Flow Rate, Mgal/yr] * [AP-42 Factor, lb/hr-flow basis] * [# of units] |
| Annual Emissions, tons/yr | = | [Total Emissions, lb/yr] / [2000 lb/ton] |

MISSIONS FROM WASTEWATER SOURCES BY INDIVIDUAL HAP

| SOURCE | HAP EMISSIONS (tons/yr) | | | | UNCONTROLLED EMISSIONS | | | CONTROLLED EMISSIONS (d) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Quinoline 7.5% | Biphenyl 0.1% | Naphthalene 77.4% | Dibenzofuran 15.0% | TOTAL HAPS (tons/yr) | NON-HAP VOC (tons/yr) | TOTAL VOC/ CREOSOTE (tons/yr) | NAPHTHALENE (lb/yr) | NAPHTHALENE (tons/yr) | TOTAL VOC/ CREOSOTE (lb/yr) | TOTAL VOC/ CREOSOTE (tons/yr) |
| 1. Cooling Towers | 0.00 | 0.00000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0000 | 0.0 | 0.000 |
| 2. Primary Oil/Water Separator Tanks | 0.00 | 0.00005 | 0.04 | 0.01 | 0.05 | 0.04 | 0.09 | 0.74 | 0.0004 | 1.8 | 0.001 |
| 3. Secondary Oil/Water Separator | | | | | | | | | | | |
| Process Water | 0.02 | 0.00021 | 0.16 | 0.03 | 0.21 | 0.18 | 0.38 | 3.23 | 0.0016 | 7.7 | 0.004 |
| 4. Surge Tank | 0.00 | 0.00006 | 0.05 | 0.01 | 0.06 | 0.05 | 0.11 | 0.96 | 0.0005 | 2.3 | 0.001 |
| 5. Aerated Tanks (No Controls) | 0.02 | 0.00031 | 0.24 | 0.05 | 0.31 | 0.26 | 0.57 | 474.82 | 0.2374 | 1,130.5 | 0.565 |
| 6. Groundwater Oil/Water Separator | 0.01 | 0.00013 | 0.10 | 0.02 | 0.13 | 0.11 | 0.24 | 2.01 | 0.0010 | 4.8 | 0.002 |
| Totals | 0.06 | 0.00076 | 0.58 | 0.11 | 0.76 | 0.64 | 1.39 | 482 | 0.2409 | 1,147 | 0.574 |

# RECLAIM TANK

# SUPPORT CALCULATIONS

JOB 9401683

SHEET NO. 1 OF

CALCULATED BY STM DATE 3-20-95

CHECKED BY DATE

SCALE

AquAeTer

215 Jamestown Park, Suite 204
Brentwood, TN 37027
(615) 373-8532 FAX (615) 373-8512

KMCC-COLUMBUS

EMISSIONS CALCULATIONS

▶ RECLAIM TANK CONTROLLED EMISSIONS

$\frac{6.87 \text{ lbs Naph}}{1 \text{ yr}} * \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} * (1-0.75) = 0.0009$ tons/yr Naphthalene

$\frac{1.33 \text{ lbs Dbf}}{1 \text{ yr}} * \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} * (1-0.75) = 0.0002$ tons/yr Dibenzofuran

$\frac{0.66 \text{ lbs Quin}}{1 \text{ yr}} * \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} * (1-0.75) = 0.0001$ tons/yr Quinoline

$\frac{0.01 \text{ lbs Biph}}{1 \text{ yr}} * \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} * (1-0.75) = 1.3 \times 10^{-6}$ tons/yr Biphenyl

**COLUMBUS**

**Reclaim Tank HAP and VOC Emissions**

**For emissions in terms of naphthalene, there are**

15.0 lbs Dibenzofuran
7.5 lbs Quinoline
0.1 lbs Biphenyl

**for every** 77.4 lbs Naphthalene

**Therefore, for AP-42 derived Naphthalene breathing losses of** 1.79 lbs/yr

Dibenzofuran losses = (15 lbs of Dibenzofuran x 1.79 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 0.35 lbs/yr

Quinoline losses = (7.5 lbs of Quinoline x 1.79 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 0.17 lbs/yr

Biphenyl losses = (0.1 lbs of Biphenyl x 1.79 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 0.00 lbs/yr

**Summary,**

| | | |
|---|---|---|
| **Total losses** | Naphthalene | 6.87 lbs/yr |
| | Dibenzofuran | 1.33 lbs/yr |
| | Quinoline | 0.67 lbs/yr |
| | Biphenyl | 0.01 lbs/yr |
| | HAPS | 8.88 lbs/yr |
| **Short-term emissions** | Naphthalene | 0.02 lbs/day |
| | Dibenzofuran | 0.00 lbs/day |
| | Quinoline | 0.00 lbs/day |
| | Biphenyl | 0.0000 lbs/day |
| | HAPS | 0.02 lbs/day |
| **Long-term emissions** | Naphthalene | 0.00 tons/yr |
| | Dibenzofuran | 0.00 tons/yr |
| | Quinoline | 0.00 tons/yr |
| | Biphenyl | 0.0000 tons/yr |
| | HAPS | 0.00 tons/yr |

**Therefore, for AP-42 derived Naphthalene working losses of** 5.08 lbs/yr

Dibenzofuran losses = (15 lbs of Dibenzofuran x 5.08 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 0.98 lbs/yr

Quinoline losses = (7.5 lbs of Quinoline x 5.08 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 0.49 lbs/yr

Biphenyl losses = (0.1 lbs of Biphenyl x 5.08 lbs/yr Naphthalene) / (77.4 lbs Naphthalene)

= 0.01 lbs/yr

Naphthalene emissions are equivalent to 42 percent of creosote emissions as determined by the EPA tests at the Avoca, PA facility. Creosote emissions are considered as VOCs.

**Therefore,**

**Short-term creosote/VOC emissions =** 0.0687 lbs/day Naphthalene / 0.42

= 0.04 lbs/day creosote/VOCs

**Long-term creosote/VOC emissions =** 0.0125 tons/yr Naphthalene / 0.42

= 0.01 tons/yr creosote/VOCs

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COLUMBUS

**Reclaim Tank Naphthalene Emissions**

| Breathing Loss, Lb, Emissions | Unit | Symbol |
|---|---|---|
| 1. Molecular Weight of Vapor | 41.66 lb/lb mole | Mv |
| 2. Average Atmospheric Pressure | 14.09 psia | Pa |
| 3. True Vapor Pressure at Bulk Liquid Conditions | 0.07 psia | P |
| 4. Tank Diameter | 10.00 ft | D |
| 5. Average Vapor Space Height | 3.00 ft | H |
| 6. Average Ambient Diurnal Temperature Change | 23.10 oF | T |
| 7. Paint Factor | 1.58 NA | Fp |
| 8. Adjustment Factor for Small Tanks | 1.00 NA | C |
| 9. Product Factor | 0.10 NA | Kc |

Lb (lb/yr) = (2.26x10^-2) x (Mv) x ((P/Pa-P)^0.68) x (D^1.73) x (H^0.51) x (T^0.50) x Fp x C x Kc

Therefore, the Lb = 1.79 lb/yr

0.0009 ton/yr

| Working Loss, Lw, Emissions | Unit | Symbol |
|---|---|---|
| 1. Molecular Weight of Vapor | 41.66 lb/lb mole | Mv |
| 2. True Vapor Pressure at Bulk Liquid Conditions | 0.07 psia | P |
| 3. Tank Capacity | 14,100 gal | V |
| 4. Number of Turnovers per Year | 221.00 NA | N |
| 5. Turnover Factor | 0.24 NA | Kn |
| 6. Product Factor | 0.10 NA | Kc |

Lw (lb/yr) = (2.40x10^-5) x Mv x P x V x N x Kn x Kc

Therefore, the Lw = 5.08 lb/yr

0.0025 ton/yr

**Molecular Weight of Vapor Determination**

1. Molecular Weight of Pure Component
2. Vapor Pressure of Pure Component
3. Mole Fraction of Pure Component
4. Vapor Pressure of Bulk Liquid

Mv (lb/lb mole) = Ma(PaXa)/Pt + Mb(PbXb)/Pt

Therefore the Mv for Naphthalene =

**Assumptions**
1. The Reclaim Tank is connected as a closed loop vapor recovery system.
2. The calculation of a turnover factor for working losses considers the volume of sap water removed from the ties.
3. Evaporative emissions as loading losses are incorporated into the breathing and working losses for large storate tanks. (Section 4.4, Transportation and Marketing of Petroleum Liquids, refers to Section 4.3, Storage of Organic Liquids, for large storage tanks.)

**References**
1. AP-42 4.3
2. GERG
3. Allied Signal

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# INSIGNIFICANT ACTIVITIES

**Insignificant Activities**

| Synthetic Minor | Title V |
| --- | --- |
| 4 Diesel Tanks, 25,348 gals | 4 Diesel Tanks, 25,348 gals |
| 1 Diesel Tank, 1,000 gals | 1 Diesel Tank, 1,000 gals |
| 4 Space Heaters | 4 Space Heaters |
| Groundwater Oil/Water Separator Lift Station | Groundwater Oil/Water Separator Lift Station |
| Scrubber Recycle Tank | |

# FUGITIVES

FUGITIVE EMISSION COMPUTATIONS - COLUMBUS
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| SOURCE | QUANTITY | EMISSION FACTOR (a) (lb/hr-source) | OPERATION TIME | | | NAPH-THALENE EMISSIONS (lb/yr) | ANNUAL CREOSOTE/ VOC EMISSIONS (lb/yr) | ANNUAL CREOSOTE/ VOC EMISSIONS (T/yr) |
|---|---|---|---|---|---|---|---|---|
| | | | (hrs/day) | (days/yr) | (hrs/yr) | | | |
| 1. HEAVY LIQUID PIPELINE VALVES | 121 | 0.0000507 | 24 | 365 | 8,760 | - | 53.74 | 0.03 |
| 2. OPEN ENDED VALVES | 0 | 0.000374 | 24 | 365 | 8,760 | - | 0.00 | 0.00 |
| 3. PRESSURE VENT RELIEF VALVES (b) | 3 | 0.02293 | 24 | 365 | 8,760 | - | 602.60 | 0.30 |
| 4. FLANGES | 88 | 0.000183 | 24 | 365 | 8,760 | - | 141.07 | 0.07 |
| 5. PUMP SEALS | | | | | | | | |
| LIGHT LIQUIDS | 0 | 0.01089 | 24 | 365 | 8,760 | - | 0.00 | 0.00 |
| HEAVY LIQUIDS | 20 | 0.00472 | 24 | 365 | 8,760 | - | 826.94 | 0.41 |
| 6. DRIP PAD (c) | 1 | 0.00784 | 24 | 365 | 8,760 | 68.69 | 163.54 | 0.08 |
| 7. TANK CONTAINMENT FIELD (c) | 1 | 0.00410 | 24 | 365 | 8,760 | 35.92 | 85.51 | 0.04 |
| 8. PROCESS DRAINS (d) | 11 | 0.007 | 24 | 365 | 8,760 | - | 674.52 | 0.34 |
| | | | | | Totals | 104.60 | 2,548 | 1.27 |

(a) Per AWPI, the SOCMI factor is multiplied by 0.1 due to less volatility for this plant than at a SOCMI facility.
(b) One Pressure Vent Relief Valve (PVRV) was assumed per retort. PVRV's on condensers were observed to be inoperative and were calculated as pipeline valves.
(c) The Drip Pad and Tank Containment Area emissions were derived by multiplying factors of 0.1 for thin films and 0.1 for affected areas by the SOW emissions as shown below.
(d) The AP-42 factor for process drains was multiplied by 0.1 due to less volatility for this plant than for a refinery.
(e) A "hot" sump was calculated from Water 8 to account for hot discharge to a central sump receiving direct process water.

Calculations:

| | |
|---|---|
| Annual Emissions (tons/yr) | = [Quantity] * [Emission Factor, lb/hr-source] * [Operation Time, hrs/yr] / [2,000 lb/ton] |
| Drip Pad Annual Emissions (tons/yr) | = [SOW Emissions, lb/yr] / [SOW Area, sq ft] * [0.1, Thin Films] * [0.1, Area of Drips] * [Area of Drip Pad, sq ft] / [0.42] / [2,000 lb/ton] |
| Tank Containment Annual Emissions (tons/yr) | = [SOW Emissions, lb/yr] / [SOW Area, sq ft] * [0.1, Thin Films] * [0.1, Area of Drips] * [Area of Tank Field, sq ft] / [0.42] / [2,000 lb/ton] |

FUGITIVE EMISSIONS BY INDIVIDUAL HAP

| SOURCE | HAP EMISSIONS (tons/yr) | | | | TOTAL HAPS (tons/yr) | TOTAL NON-HAP VOC (tons/yr) | TOTAL CREOSOTE (tons/yr) |
|---|---|---|---|---|---|---|---|
| | Quinoline 7.5% | Biphenyl 0.1% | Naphthalene 77.4% | Dibenzofuran 15.0% | | | |
| 1. HEAVY LIQUID PIPELINE VALVES | 0.0011 | 0.00001 | 0.011 | 0.0022 | 0.015 | 0.01 | 0.03 |
| 2. OPEN ENDED VALVES | 0.0000 | 0.00000 | 0.000 | 0.0000 | 0.000 | 0.00 | 0.00 |
| 3. PRESSURE VENT RELIEF VALVES | 0.0123 | 0.00016 | 0.127 | 0.0245 | 0.163 | 0.14 | 0.30 |
| 4. FLANGES | 0.0029 | 0.00004 | 0.030 | 0.0057 | 0.038 | 0.03 | 0.07 |
| 5. PUMP SEALS | | | | | | | |
| LIGHT LIQUIDS | 0.0000 | 0.00000 | 0.000 | 0.0000 | 0.000 | 0.00 | 0.00 |
| HEAVY LIQUIDS | 0.0168 | 0.00022 | 0.174 | 0.0337 | 0.224 | 0.19 | 0.41 |
| 6. DRIP PAD | 0.0033 | 0.00004 | 0.034 | 0.0067 | 0.044 | 0.04 | 0.08 |
| 7. TANK CONTAINMENT FIELD | 0.0017 | 0.00002 | 0.018 | 0.0035 | 0.023 | 0.02 | 0.04 |
| 8. PROCESS DRAINS | 0.0137 | 0.00018 | 0.142 | 0.0275 | 0.183 | 0.15 | 0.34 |
| Totals | 0.0518 | 0.0007 | 0.5351 | 0.1037 | 0.69 | 0.58 | 1.27 |

## Section A

## Owners Information - Form B

1. Name, Address & Contact for the Owner/Applicant

   A. Company Name: Kerr-McGee Chemical Corporation - Forest Products Div

   B. Mailing Address:

      1. Street Address or P.O. Box: Kerr-McGee Center, P.O. Box 25861
      2. City: Oklahoma City 3. State: Oklahoma
      4. Zip Code: 73125
      5. Telephone No.: (405) 270-2402

   C. Contact:

      1. Name: Nicholas E. Bock
      2. Title: Manager, Environmental & Regulatory Affairs, Forest Products Division

2. Name, Address, Location and Contact for the Facility:

   A. Name: Kerr-McGee Chemical Corporation - Forest Products Division

   B. Mailing Address:
      1. Street Address or P.O. Box: P.O. Box 906
      2. City: Columbus 3. State: Mississippi
      4. Zip Code: 39701
      5. Telephone No.: (601) 328-7551

   C. Site Location:
      1. Street: 2300 14th Avenue & 20th Street
      2. City: Columbus 3. State: Mississippi
      4. County: Lowndes 5. Zip Code: 39703
      6. Telephone No.: (601) 328-7551

   **Note: If the facility is located outside of the City limits, please attach a sketch or description to this application showing the approximate location of the site.**

   D. Contact:

      1. Name: Anthony N. Helms
      2. Title: Plant Manager

3. SIC Code(s)(including any associated with alternate operating scenarios): ______

2491

4. Number of Employees: 85

5. Principal Product(s): Creosote treated wood products

6. Principal Raw Materials: Creosote and Wood

7. Principal Process(es): Wood Preserving

8. Maximum amount of principal product produced or raw material consumed per day:
   Produced: $1.6 \times 10^6$ lbs/day - creosote treated wood products
   Consumed: $1.6 \times 10^6$ lbs/day - wood; 238,000 lbs/day - creosote

9. Facility Operating Schedule: ______

   A. Specify maximum hours per day the operation will occur: 24

   B. Specify maximum days per week the operation will occur: 7

   C. Specify maximum weeks per year the operation will occur: 52

   D. Specify the months the operation will occur: January - December

10. Is this facility a small business as defined by the Small Business Act? No

11. **EACH APPLICATION MUST BE SIGNED BY THE APPLICANT.**

**The application must be signed by a responsible official as defined in Regulation APC-S-6, Section I.A.26.**

***I certify that to the best of my 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.***

| | |
|---|---|
| **Anthony N. Helms** | **Plant Manager** |
| **Printed Name of Responsible Official** | **Title** |
| 4/2/95 | Anthony N. Helms |
| **Date Application Signed** | **Signature of Applicants Responsible Official** |
| **Robert P. Michel** | **Manager-Operations Forest Products Division** |
| **Printed Name of Responsible Official** | **Title** |
| 4/2/95 | Robert P. Michel |
| **Date Application Signed** | **Signature of Applicants Responsible Official** |

# SECTION 3

# TITLE V OPERATING PERMIT APPLICATION

## Section B

## Emission Summary/Facility Summary
## Form C

## EMISSIONS SUMMARY for the ENTIRE FACILITY

List below the total emissions for each pollutant from the entire facility. For stack emissions, use the maximum annual allowable (potential) emissions. For fugitive emissions, use the annual emissions calculated using the maximum operating conditions.

| POLLUTANT Footnote 1 | ANNUAL EMISSION RATE | |
|---|---|---|
| | lb/day | tons/yr |
| Naphthalene | 22.58 | 4.12 |
| Quinoline | 2.19 | 0.40 |
| Dibenzofuran | 4.38 | 0.80 |
| Biphenyl | 0.029 | 0.005 |
| VOCs | 37.15 | 6.78 |
| PM | 236.27 | 43.12 |
| PM10 | 261.42 | 47.71 |
| SOx | 43.18 | 7.88 |
| NOx | 162.19 | 29.60 |
| CO | 40.55 | 7.40 |
| | | |
| | | |
| | | |
| | | |

1. All regulated air pollutants,including hazardous air pollutants emitted from the entire facility should be listed. A list of regulated air pollutants has been provided in Section A.

With the exception of the emissions resulting from insignificant activities and emissions as defined in Regulation APC-S-6, Section VII, the pollutants listed above are all regulated air pollutants reasonably expected to be emitted from the facility.

SIGNATURE (must match signature on page 17)

## SECTION C

For the sections listed below indicate the number that have been completed for each section as part of this application.

| | | |
|---|---|---|
| Section B __1___ | Section L1 _____ | Section M1 _____ |
| Section C __1___ | Section L2 __4___ | Section M2 _____ |
| Section D __2___ | Section L3 _____ | Section M3 _____ |
| Section E __17__ | Section L4 _____ | Section M4 _____ |
| Section F _____ | Section L5 __2___ | Section M5 _____ |
| Section G _____ | Section L6 _____ | Section M6 _____ |
| Section H __2___ | Section L7 _____ | Section M7 __5___ |
| Section I _____ | | Section M8 _____ |
| Section J _____ | | Section N __1___ |
| Section K _____ | | Section O __5___ |

**As a minimum, sections B, C, M, N and O must be completed for the application to be considered complete.**

Please list below all insignificant activities required by APC-S-6, Section VII.B that apply to your facility.

4 Diesel Storage Tanks - 25,348 gal., Fixed Roof, constructed prior to 1976.

1 Diesel Storage Tank - 1,000 gal., Fixed Roof, constructed prior to 1976.

4 space heaters.

Groundwater oil/water separator lift station

## RISK MANAGEMENT PLANS

If the source is required to develop and register a risk management plan pursuant to Section 112(r) of the Title III of the Clean Air Act, the permittee need only specify that it will comply with the requirement to register such a plan. The content of the risk management plan need not itself be incorporated as a permit term.

Please answer the following questions:

I. Are you required to develop and register a risk management plan pursuant to Section 112(r)?

_____ Yes  __X__ No

Only if "yes", answer questions II., III., and/or IV.

II. Have you submitted the risk management plan to the appropriate agency (i.e. Mississippi Emergency Management Agency (MEMA), Federal Emergency Management Agency (FEMA), etc.)?

_____ Yes  _____ No

III. If yes, give agency name and date submitted. ____________________

IV. If no, provide a schedule for developing and submitting the risk management plan to the appropriate agency and providing our agency with certification that this submittal was made.

# SUPPORT CALCULATIONS

JOB 940168/3 B

SHEET NO. 1 OF

CALCULATED BY STM DATE 2-20-95

CHECKED BY DATE

SCALE

AquAeTer
215 Jamestown Park, Suite 204
Brentwood, TN 37027
(615) 373-8532 FAX (615) 373-8512

KMCC - COLUMBUS

EMISSIONS CALCULATIONS

source?

For emissions in terms of Naphthalene,
For every 77.4 lbs Naphthalene, there will also be:
15.0 lbs Dibenzofuran
7.5 lbs Quinoline
0.1 lbs Biphenyl

RETORT DOOR

As estimated in EPA tests at the Avoca, PA facility and measured by Mostardi-Platt at the Madison, IL site,

Average Naphthalene emissions = 0.180 lbs/hr

To account for the 15 minute limit that the door is open per charge,

$$\frac{0.180 \text{ lb Naph}}{1 \text{ hr}} * \frac{1 \text{ hr}}{60 \text{ mins}} * \frac{15 \text{ mins}}{\text{charge}} = 0.045 \text{ lbs/charge Naph}$$

Therefore,

$$\frac{77.4 \text{ lbs Naph}}{15.0 \text{ lbs Dbf}} = \frac{0.045 \text{ lbs Naph}}{x \text{ lbs Dbf}} \qquad x = \frac{(15.0 \text{ lbs Dbf})(0.045 \text{ lbs Naph})}{(77.4 \text{ lbs Naph})}$$

$$x = 0.0087 \text{ lbs/charge Dbf}$$

$$\frac{77.4 \text{ lbs Naph}}{7.5 \text{ lbs Quin}} = \frac{0.045 \text{ lbs Naph}}{x \text{ lbs Quin}} \qquad x = \frac{(7.5 \text{ lbs Quin})(0.045 \text{ lbs Naph})}{(77.4 \text{ lbs Naph})}$$

$$x = 0.0044 \text{ lbs/charge Quin}$$

$$\frac{77.4 \text{ lbs Naph}}{0.1 \text{ lbs Biph}} = \frac{0.045 \text{ lbs Naph}}{x \text{ lbs Biph}} \qquad x = \frac{(0.1 \text{ lbs Biph})(0.045 \text{ lbs Naph})}{(77.4 \text{ lbs Naph})}$$

$$x = 5.81 \times 10^{-5} \text{ lbs/charge Biph}$$

| | |
|---|---|
| JOB 940168/3 B | |
| SHEET NO. 2 OF | |
| CALCULATED BY STM | DATE 2-20-95 |
| CHECKED BY | DATE |
| SCALE | |

AquAeTer
215 Jamestown Park, Suite 204
Brentwood, TN 37027
(615) 373-8532 FAX (615) 373-8512

KMCC- COLUMBUS
EMISSIONS CALCULATIONS

RETORT DOOR (continued)
summary,

| | | |
|---|---|---|
| Retort door losses | 0.045 | lbs/charge Naphthalene |
| | 0.0087 | lbs/charge Dibenzofuran |
| | 0.0044 | lbs/charge Quinoline |
| | $5.81 \times 10^{-5}$ | lbs/charge Biphenyl |

Totals,
Retort door losses for 3 retort doors, 3 dry charges per day per retort

$\frac{0.045 \text{ lbs Naph}}{\text{charge}} * \frac{3 \text{ charges}}{\text{day}} * 3 \text{ retorts} = 0.405 \text{ lbs/day Naph}$

$\frac{0.0087 \text{ lbs Dbf}}{\text{charge}} * \frac{3 \text{ charges}}{\text{day}} * 3 \text{ retorts} = 0.0783 \text{ lbs/day Dbf}$

$\frac{0.0044 \text{ lbs Quin}}{\text{charge}} * \frac{3 \text{ charges}}{\text{day}} * 3 \text{ retorts} = 0.0396 \text{ lbs/day Quin}$

$\frac{5.81 \times 10^{-5} \text{ lbs Biph}}{\text{charge}} * \frac{3 \text{ charges}}{\text{day}} * 3 \text{ retorts} = 0.0005 \text{ lbs/day Biph}$

Short-term emissions in lbs/day,

| | | |
|---|---|---|
| 0.405 | lbs/day | Naphthalene |
| 0.0783 | lbs/day | Dibenzofuran |
| 0.0396 | lbs/day | Quinoline |
| 0.0005 | lbs/day | Biphenyl |

JOB 940168/3

SHEET NO. 3 OF

CALCULATED BY SIM DATE 2-20-95

CHECKED BY DATE

SCALE

AquAeTer
215 Jamestown Park, Suite 204
Brentwood, TN 37027
(615) 373-8532 FAX (615) 373-8512

KMCC - COLUMBUS
EMISSIONS CALCULATIONS

▶ RETORT DOOR (continued)
Long-term emissions in tons/yr,

$\frac{0.405 \text{ lbs Naph}}{\text{day}} * \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} * \frac{365 \text{ days}}{1 \text{ yr}} = 0.0739$ tons/yr Naph

$\frac{0.0783 \text{ lbs Dbf}}{\text{day}} * \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} * \frac{365 \text{ days}}{1 \text{ yr}} = 0.0143$ tons/yr Dbf

$\frac{0.0396 \text{ lbs Quin}}{\text{day}} * \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} * \frac{365 \text{ days}}{1 \text{ yr}} = 0.0072$ tons/yr Quin

$\frac{0.0005 \text{ lbs Biph}}{\text{day}} * \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} * \frac{365 \text{ days}}{1 \text{ yr}} = 9.1 \times 10^{-5}$ tons/yr Biph

?

As measured in EPA tests of the Avoca, PA facility
Average creosote emissions = 5.917 lbs/hr
Creosote emissions are considered as VOCs

Does this include previous VOC's?

Therefore,

$\frac{5.917 \text{ lbs Creo}}{\text{hr}} * \frac{1 \text{ hr}}{60 \text{ mins}} * \frac{15 \text{ mins}}{\text{charge}} = 1.4793$ lbs/charge Creosote or VOCs

Short-term emissions,

$\frac{1.4793 \text{ lbs Creo}}{\text{charge}} * \frac{3 \text{ charges}}{\text{day}} * 3 \text{ retorts} = 13.3137$ lbs/day Creosote or VOCs

Long-term emissions,

$\frac{13.3137 \text{ lbs Creo}}{\text{day}} * \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} * \frac{365 \text{ days}}{1 \text{ yr}} = 2.4298$ tons/yr Creosote or VOCs

## Pumps

?

0.0186 lbs/hr N = 0.4464 lbs/day N = 0.0815 tpy

$$\frac{77.4\ N}{15.0\ Dbf} = \frac{0.4464\ N}{x\ Dbf}$$ x = 0.0865 lbs/day Dbf or 0.0158 tpy

$$\frac{77.4\ N}{7.5\ Q} = \frac{0.4464\ N}{x\ Q}$$ x = 0.0433 lbs/day Q or 0.0079 tpy

$$\frac{77.4\ N}{0.1\ B} = \frac{0.4464\ N}{x\ B}$$ x = 0.0006 lbs/day B or 0.0001 tpy

$$\frac{0.4464\ N}{0.42} = 1.0629 \text{ lbs/day VOCs}$$ or 0.1940 tpy

?

25% – B/M
45% – YS
25% – SC

?

## Retorts – V

?

0.0030 lbs/hr N = 0.072 lbs/day N or 0.0131 tpy

$\frac{77.4\ N}{15.0\ Dcf} = \frac{0.072\ N}{x\ Dcf}$ x = 0.0140 lbs/day Dcf or 0.0026 tpy

$\frac{(15.0)(0.072)}{(77.4)}$

$\frac{77.4\ N}{7.5\ Q} = \frac{0.072\ N}{x\ Q}$ x = 0.0070 lbs/day Quin or 0.0013 tpy

$\frac{77.4\ N}{0.15} = \frac{0.072\ N}{x\ B}$ x = $9.3 \times 10^{-5}$ lbs/day Biphenyl or $1.7 \times 10^{-5}$ tpy

$\frac{0.072}{0.42}$ = 0.1714 lbs/day VOC or 0.0313 tpy

?

# WORK TANKS

1. **Emission Point No./Name:** EP001-Work Tank Scrubber: Work Tank No. 1 (EU004)

2. **Was this tank constructed or modified after August 7, 1977?** ___X___ yes ________ no

   **If yes please give date and explain.** Construction of tank will begin upon receipt of a permit to construct

3. **Product Stored:** Creosote
   **If more than one product is stored, provide the information in 4 A-E for each product.**

4. **Tank Data:**

| | | | |
|---|---|---|---|
| A. | True Vapor Pressure at storage temperature: | 0.068 | psia/°F |
| B. | Reid Vapor Pressure at storage temperature: | NA | psia/°F |
| C. | Density of product at storage temperature: | 9.3 | lb/gal |
| D. | Molecular Weight of product vapor at storage temperature: | 128 | lb/lbmol |
| E. | Throughput for most recent calendar year: | $1.2 \times 10^7$ | gal/yr |
| F. | Tank Capacity: | 57,000 | gal |
| G. | Tank Diameter: | 18 | feet |
| H. | Tank Height / Length: | 30 | feet |
| I. | Average Vapor Space Height: | 3 | feet |

J. **Tank Orientation:** V Vertical or Horizontal

K. **Type of Roof:** D Dome or Cone

L. **Is the Tank Equipped with a Vapor Recovery System?** ___X___ Yes ________ No
   If Yes, describe on separate sheet of paper and attach. Indicate efficiency.

M. **Check the Type of Tank:**
- ___X___ Fixed Roof
- ________ Pressure
- ________ Variable Vapor Space
- ________ Other, describe: ________
- ________ External Floating Roof
- ________ Internal Floating Roof

N. **Check the Closest City:**
- ___X___ Jackson, Ms.
- ________ Memphis, Tn.
- ________ New Orleans, La.
- ________ Birmingham, Al.
- ________ Montgomery, Al.
- ________ Baton Rouge, La.

O. **Check the Tank Paint Color:**
- ________ Aluminum Specular
- ________ Aluminum Diffuse
- ________ Red
- ___X___ Other, describe: Black
- ________ Gray Light
- ________ Gray Medium
- ________ White

P. **Tank Paint Condition:** G Good or Poor

Q. **Check Type of Tank Loading**

1. **Trucks and Rail Cars**
   - ________ Submerged Loading of clean cargo tank
   - ___X___ Submerged Loading : Dedicated Normal Service
   - ________ Submerged Loading : Dedicated Vapor Balance Service
   - ________ Splash Loading of clean cargo tank
   - ________ Splash Loading : Dedicated Normal Service
   - ________ Splash Loading : Dedicated Vapor Balance Service

2. **Marine Vessels - NOT APPLICABLE**
   - ________ Submerged Loading: Ships
   - ________ Submerged Loading: Barges

R. **For External Floating Roof Tanks** NOT APPLICABLE

1. Check the Type of Tank Seal:

   Mechanical Shoe
   - _______ Primary Seal Only
   - _______ With Shoe-Mounted Secondary Seal
   - _______ With Rim-Mounted Secondary Seal

   Liquid Mounted Resilient Seal
   - _______ Primary Seal Only
   - _______ With Shoe-Mounted Secondary Seal
   - _______ With Rim-Mounted Secondary Seal

   Vapor Mounted Resilient Seal
   - _______ Primary Seal Only
   - _______ With Shoe-Mounted Secondary Seal
   - _______ With Rim-Mounted Secondary Seal

2. Type of External Floating Roof: _______ Pontoon
   _______ Double-Deck

S. **For Internal Floating Roof Tanks** NOT APPLICABLE

1. Check the Type of Tank Seal:

   Liquid Mounted Resilient Seal
   - _______ Primary Seal Only
   - _______ With Rim-Mounted Secondary Seal

   Vapor Mounted Resilient Seal
   - _______ Primary Seal Only
   - _______ With Rim-Mounted Secondary Seal

2. Number of Roof Columns: _______
3. Length of Deck Seam _______ feet:
4. Area of Deck: _______ $feet^2$
5. Effective Column Diameter: _______ feet
6. Check the Type of Tank:
   - _______ Bolted with Column Supported Roof
   - _______ Welded with Column Supported Roof
   - _______ Bolted with Self-Supported Roof
   - _______ Welded with Self-Supported Roof

5. Emissions Summary

| | HAPs | VOCs | | HAPs | VOCs | |
|---|---|---|---|---|---|---|
| 1. Breathing Loss: | 0.004 | 0.008 | lb/day | .0007 | .001 | TPY |
| 2. Working Loss: | 0.033 | 0.061 | lb/day | .006 | .011 | TPY |
| 3. Rueping Loss: | 0.303 | 0.559 | lb/day | .055 | .102 | TPY |
| 4. Total Emissions: | 0.340 | 0.628 | lb/day | .062 | .115 | TPY |

6. UTM Coordinates:

A. Zone 16 East B. North 1397893.10 C. East 629182.30

TANK SUMMARY (page 1 of 2) SECTION H

EU005

1. **Emission Point No./Name:** EP001-Work Tank Scrubber: Work Tank No. 2 (~~EU006~~)

2. **Was this tank constructed or modified after August 7, 1977?** ___X___ yes ________ no

**If yes please give date and explain.** Construction of tank will begin upon receipt of a permit to construct

3. **Product Stored:** Creosote
**If more than one product is stored, provide the information in 4 A-E for each product.**

4. **Tank Data:**

| | | | |
|---|---|---|---|
| A. | True Vapor Pressure at storage temperature: | 0.068 | psia/°F |
| B. | Reid Vapor Pressure at storage temperature: | NA | psia/°F |
| C. | Density of product at storage temperature: | 9.3 | lb/gal |
| D. | Molecular Weight of product vapor at storage temperature: | 128 | lb/lbmol |
| E. | Throughput for most recent calendar year: | $1.6 \times 10^7$ | gal/yr |
| F. | Tank Capacity: | 78,000 | gal |
| G. | Tank Diameter: | 22 | feet |
| H. | Tank Height / Length: | 30 | feet |
| I. | Average Vapor Space Height: | 3 | feet |
| J. | Tank Orientation: | V | Vertical or Horizontal |
| K. | Type of Roof: | D | Dome or Cone |

L. **Is the Tank Equipped with a Vapor Recovery System?** ___X___ Yes ________ No
**If Yes, describe on separate sheet of paper and attach. Indicate efficiency.**

M. **Check the Type of Tank:**
- X Fixed Roof
- ____ Pressure
- ____ Variable Vapor Space
- ____ Other, describe: ____
- ____ External Floating Roof
- ____ Internal Floating Roof

N. **Check the Closest City:**
- X Jackson, Ms.
- ____ Memphis, Tn.
- ____ New Orleans, La.
- ____ Birmingham, Al.
- ____ Montgomery, Al.
- ____ Baton Rouge, La.

O. **Check the Tank Paint Color:**
- ____ Aluminum Specular
- ____ Aluminum Diffuse
- ____ Red
- X Other, describe: Black
- ____ Gray Light
- ____ Gray Medium
- ____ White

P. **Tank Paint Condition:** G Good or Poor

Q. **Check Type of Tank Loading**

1. **Trucks and Rail Cars**
   - ____ Submerged Loading of clean cargo tank
   - X Submerged Loading : Dedicated Normal Service
   - ____ Submerged Loading : Dedicated Vapor Balance Service
   - ____ Splash Loading of clean cargo tank
   - ____ Splash Loading : Dedicated Normal Service
   - ____ Splash Loading : Dedicated Vapor Balance Service

2. **Marine Vessels - NOT APPLICABLE**
   - ____ Submerged Loading: Ships
   - ____ Submerged Loading: Barges

R. For External Floating Roof Tanks NOT APPLICABLE

1. Check the Type of Tank Seal:

Mechanical Shoe
- _______ Primary Seal Only
- _______ With Shoe-Mounted Secondary Seal
- _______ With Rim-Mounted Secondary Seal

Liquid Mounted Resilient Seal
- _______ Primary Seal Only
- _______ With Shoe-Mounted Secondary Seal
- _______ With Rim-Mounted Secondary Seal

Vapor Mounted Resilient Seal
- _______ Primary Seal Only
- _______ With Shoe-Mounted Secondary Seal
- _______ With Rim-Mounted Secondary Seal

2. Type of External Floating Roof: _______ Pontoon
_______ Double-Deck

S. For Internal Floating Roof Tanks NOT APPLICABLE

1. Check the Type of Tank Seal:

Liquid Mounted Resilient Seal
- _______ Primary Seal Only
- _______ With Rim-Mounted Secondary Seal

Vapor Mounted Resilient Seal
- _______ Primary Seal Only
- _______ With Rim-Mounted Secondary Seal

2. Number of Roof Columns: _______
3. Length of Deck Seam _______ feet:
4. Area of Deck: _______ $feet^2$
5. Effective Column Diameter: _______ feet
6. Check the Type of Tank:
   - _______ Bolted with Column Supported Roof
   - _______ Welded with Column Supported Roof
   - _______ Bolted with Self-Supported Roof
   - _______ Welded with Self-Supported Roof

5. Emissions Summary

| | | HAPs | VOCs | | HAPs | VOCs | |
|---|---|---|---|---|---|---|---|
| 1. | Breathing Loss: | 0.006 | 0.011 | lb/day | .001 | .002 | TPY |
| 2. | Working Loss: | 0.045 | 0.083 | lb/day | .008 | .015 | TPY |
| 3. | Rueping Loss: | 0.152 | 0.140 | lb/day | .028 | .026 | TPY |
| 4. | Total Emissions: | 0.203 | 0.234 | lb/day | .037 | .043 | TPY |

6. UTM Coordinates:

A. Zone 16 East B. North 1397893.10 C. East 629182.30

# SUPPORT CALCULATIONS

JOB 940163/3 B

SHEET NO. 1 OF

CALCULATED BY STM DATE 2-26-95

CHECKED BY DATE

SCALE

AquAeTer

215 Jamestown Park, Suite 204
Brentwood, TN 37027
(615) 373-8532 FAX (615) 373-8512

KMCC- COLUMBUS

EMISSION CALCULATIONS

WORK TANK NO. 1

Assumptions,

1. Work tanks are closed.
2. Work tanks are equipped with PVRVs.
3. Breathing losses are from atmospheric, natural air temperature changes and barometric pressure changes.
4. Working losses are from tank filling and emptying.
5. Overpressurization is not accounted for; Reuping losses are calculated separately.
6. The USEPA Tanks 2.0 Program is used for confirmation.
7. AP42 calculation procedures for breathing losses and working losses are from Section 4.3 Storage of Organic Liquids (USEPA, September, 1985)
8. Avoca and Susquehanna data are used to confirm AP42 calculations.
9. Tank temperatures are 180°F or 82.2°C

TABLE I

AIR EMISSION
MONITORING PROGRAM

| Equipment | Location | Frequency | Typical Operating Condition | Design Specifications |
|---|---|---|---|---|
| Storage Tank | | | | |
| | 8" Vent/Line | 3/Day | Closed Vent | Closed Vent |
| | Press/Vac Safety Relief | 3/Day | Closed Vent | Closed Vent |
| Scrubber | | | | |
| | Inlet Flow Rate | 3/Week | 120 ACFM | 200 ACFM |
| | Inlet Temp. | 3/Day | 190°F | 200°F |
| | Inlet Press. | 3/Day | 14.6 psia | 14.6 psia |
| | Press. Drop | 3/Day | 1.20 oz. | 1.20 oz. |
| Water Circulation System | | | | |
| | Inlet Flow Rate | 3/Day | 50.1 GPM | 50 GPM |
| | Inlet Temp. | 3/Day | 85°F | 90°F |
| | Inlet Press. | 3/Day | 7.0 psia | 7.0 psia |
| | Level in Scrubber | 3/Day | 18 inches | 18 inches |

The daily inspection schedule for the air emission and control equipment shall include:

1) The creosote storage tank shall be inspected daily for signs of liquid and air emission leakage. The 8" vent line connecting the storage tank to the packed tower scrubber will likewise be checked.

2) The packed tower scrubber will be inspected daily for air emission leakage from flanged connections, and pipe fittings for circulating water leakage.

3) The tank storing the water supply for the scrubber will be checked daily for optimum volume of water.

4) The scrubber's water circulating pump will be checked daily for lubrication needs and mechanical wear and tear.

5) Interlocked electrical controls for the three creosote transfer pumps will be checked each time any of the pumps are used to ensure that the scrubber's water circulating pump system is in operation.

The parameters to be monitored to ensure that the packed tower is operated in conformance with its design specifications are as follows:

<u>Gas Inlet Flow to Scrubber</u>

1) <u>Gas Inlet Flow Rate</u> - The gas inlet flow rate to the scrubber will be checked three times a week for maximum operating loading conditions. The gas inlet flow rate will be measured by timing the storage tank's fill rate in GPM when the large fill pump (900 GPM cap.) is in operation or in simultaneous operation with one or both of the other two smaller fill pumps. The combined operation of the large fill pump with one or both of the other fill pumps will give a maximum operating loading condition. The gas inlet flow rate design capacity is 200 ACFM.

2) <u>Gas Inlet Temperature</u> - The temperature of the air emissions entering the packed tower will be checked once each 8-hour shift during operation of the production process system. The maximum gas inlet temperature is 200°F.

3) <u>Gas Inlet Pressure</u> - The gas inlet pressure will be checked once each 8-hour shift during operation of the system. The manufacturer's maximum gas inlet pressure specification is one (1) atmosphere (14.7 psia).

4) <u>Gas Pressure Drop Across Scrubber</u> - The design pressure drop across the system is 2 inches W.G. (1.2 oz.). The maximum gas inlet pressure and pressure drop across the system will be monitored daily to detect any increases in the pressure drop. Maximum gas inlet pressure will be limited to 6 inches W.G. (3.47 oz.).

<u>Water Inlet Flow to Scrubber</u>

1) <u>Water Inlet Pressure and Flow Rate</u> - The pressure and flow rate of water to the scrubber will be checked once each 8-hour shift during operation to ensure the pump pipelines and spray nozzle are free of blockage and the required 50 GPM of water at 7 psig is being provided at the spray nozzle.

2) <u>Water Inlet Temperature</u> - The temperature of the water used as the scrubbing medium will be checked each 8-hour shift. Makeup water will be added to the water storage tank as necessary to stay below the maximum water inlet temperature of 90°F.

3) Water Level in Storage Compartment - The water level in the scrubber's storage compartment will be checked daily to assure the water level has not reached an excessive level and is blocking the gas inlet. The storage compartment will be drained daily as necessary.

Recordkeeping and Reporting

The KMCC-FPD, Columbus Facility shall keep a copy of the Operating Plan in file for the life of the source.

The storage tank closed vent system and packed tower water scrubber shall be operated and parameters monitored in accordance with the Operating Plan. A record of the measured values of the parameters shall be maintained in file at the facility for at least 2 years.

Appendix G presents the Inspection Checklist Form to record the inspections and values of the parameters that will be monitored in accordance with the Operating Plan.

# APPENDIX A

## Use of Storage Tank

## and

## Countercurrent Packed Tower Water Scrubber

## APPENDIX A

## Use of Storage Tank and Countercurrent Packed Tower Water Scrubber

The tank shall be used as a storage tank that will store hot creosote utilized in the production process wood preserving system. The temperature of the creosote will range from ambient to 200°F.

When a wood preserving treating cylinder (retort) is charged with a load of wood products such as crossties, creosote is pumped from the storage tank to the retort to completely fill all voids. The pumping flow rate is about 900 gpm, and the pump requires about 20 minutes to completely fill the retort. The storage tank is normally maintained at two-thirds full and after the retort is filled, the tank has been reduced to about one-third full.

Following pressure treatment of the wood crossties to the required retention of creosote, the creosote is then pumped from the retort back to the storage tank at the same 900 gpm flow rate.

The packed tower water scrubber shall be operated during the pump back cycle when the creosote is being pumped from the retort to the storage tank. As the tank fills, the vapor displaced will flow to the packed tower.

The electrical control for the pump feeding water to the packed tower will be interlocked with the electrical control for the creosote fill pump, so that the fill pump can only be used when there is water being circulated to the packed tower.

Within the production process system there are two additional smaller pumps that will transfer creosote into the storage tank. They are identified as the creosote recycle pump rated at 50 GPM and the tank car unloading pump rated at 150 GPM. The electrical controls for these two pumps will likewise be interlocked with the packed tower water pump system so that the two creosote transfer pump can only be used when there is water being circulated to the packed tower.

APPENDIX B

Manufacturer's Operating Instructions

for Countercurrent Packed Tower Water Scrubber

APPENDIX B

Manufacturer's Operating Instructions for

Countercurrent Packed Tower Water Scrubber

The Croll-Reynolds countercurrent packed tower water scrubber consists of custom-designed units where the gas flow is directed upwards through a packed bed while the liquid flow is distributed downwards over the packing. This countercurrent flow assures the highest possible efficiency of gas absorption for a particular application. The height of packing was selected to assure the required efficiency for the particular need.

The basic features of all countercurrent packed towers include a side gas inlet, top gas outlet, packing support grate, packed bed, liquid distributor, and mist eliminator. Materials of construction will vary, but these essential features will always be the same. All wetted parts are stainless steel.

The 316 stainless steel packing support grate is a fixed grating located directly above the gas inlet. It is sufficiently open to allow gas to pass through it without causing excessive pressure drop. All openings are small enough to provide sufficient support for the packing used on this particular application.

A flanged top is included in the unit. This opening can be used for inspection of the liquid distributor as well as installing the packing. The packing is shipped loose in boxes and installed at the site. The method of installation will vary with the particular material being used, but for the lightweight 316 stainless steel packing, it is simply necessary to dump the boxes of packing directly into the tower. This should continue until the design height as listed in the specification is reached.

Normally, the packing is supplied in increments of 5 or 10 cubic feet per box. Care must be taken that the proper number of feet of height of packing is installed rather than trying to install all the packing. Normally, some excess packing is included with the unit. This excess packing should not be installed in the unit, as it will cause liquid distribution problems.

When installing the metal packing, it is desirable to have the box of packing lowered into the bottom of the unit and then turned over. Dropping stainless steel packing from high elevations may cause distortion of the packing or damage to the support grate.

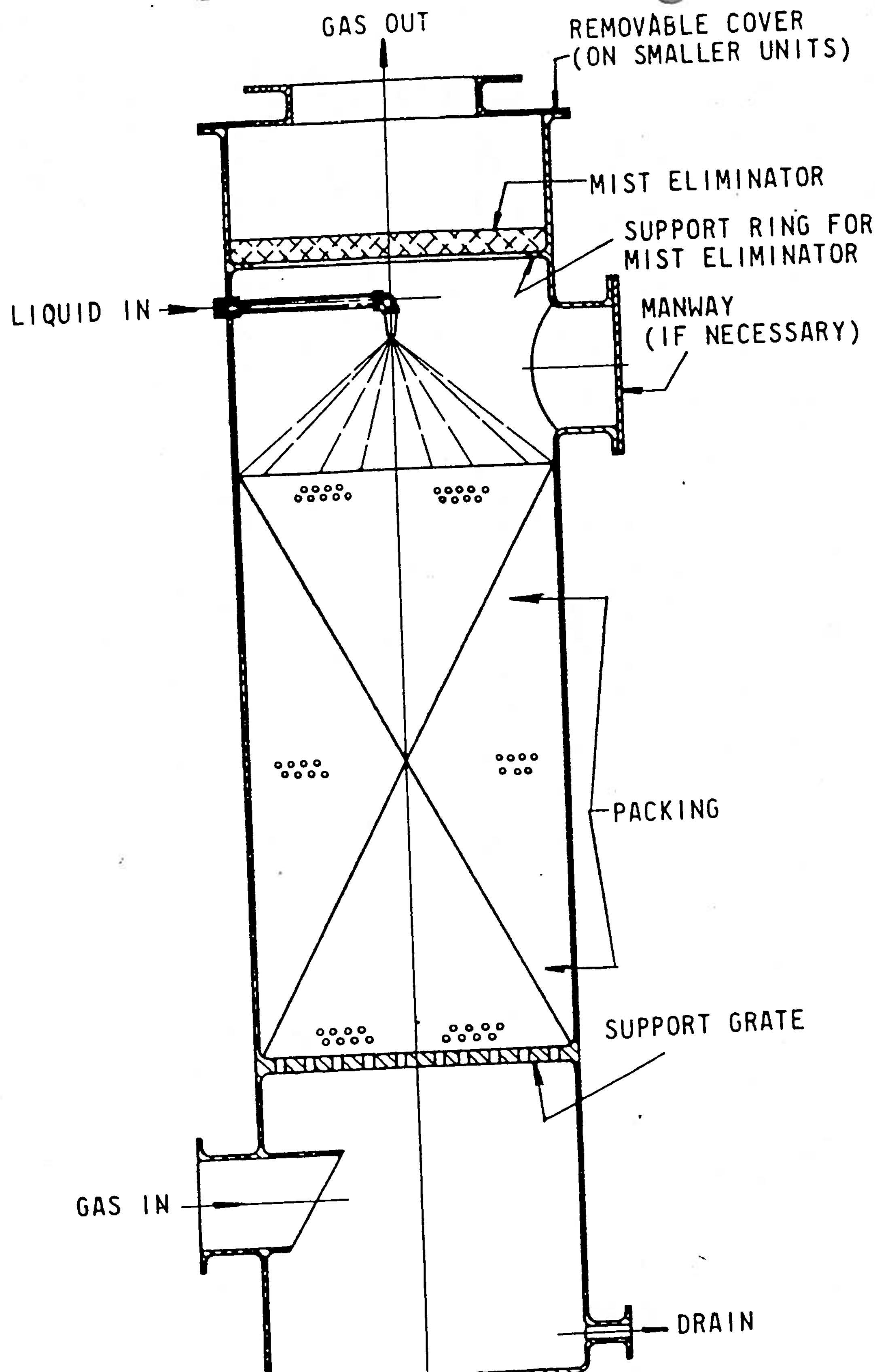
It is not desirable to shake down or try to reduce the voidage in the packing. Shaking, tamping, or walking on the packing should be avoided.

A 304 stainless steel knitted wire mesh mist eliminator is included as a feature of the packed tower. The mist eliminator is extremely efficient and provides the maximum possible elimination of any mist carryover from the packed tower. This item is installed last.

To operate the tower, it is necessary simply to provide the specified liquid pressure of 7 psig at the spray nozzle and to provide adequate draft for the resistance due to pressure drop through the unit.

Should there be an increase in the pressure drop through the packed tower in excess of 2 inches W.G., check the mist eliminator and packing materials to see if they are plugged with foreign substances. Next check the liquid pressure to the liquid distributor. Since the liquid distributor has a spray nozzle system built into it, if the proper pressure is applied, the flow rate will be correct. Excessive flow rates through the liquid distributor can cause additional pressure drop not accounted for in the design.

Check the liquid level in the storage compartment to assure that it has not reached an excessive height and is blocking the gas inlet. After a Croll-Reynolds packed tower is in operation, it requires very little maintenance and should give excellent service if it is kept clean.


GAS OUT
REMOVABLE COVER
(ON SMALLER UNITS)
MIST ELIMINATOR
SUPPORT RING FOR
MIST ELIMINATOR
LIQUID IN
MANWAY
(IF NECESSARY)
PACKING
SUPPORT GRATE
GAS IN
DRAIN

APPENDIX C

Manufacturer's Design Specifications

and Layout Drawing of the

Croll-Reynolds Model No. 18T-10H

Packed Tower Water Scrubber

CR PROPOSAL Customer Inquiry [illegible]

## CROLL-REYNOLDS PACKED TOWER

**TO:** Kerr-McGee Corporation

**MODEL NO.:** 18T-10H

**QUANTITY:** One (1)

**PRICE PER SYSTEM:**

**F.O.B.:**

**TERMS:** Net 30 ☒

**ESTIMATED DELIVERY:**

12-14 Weeks after drawing approval

3 Weeks for drawings

☐ ITEM IN STOCK DELIVERY:

______ Weeks after receipt of order

Deliveries are quoted based on standard shop schedules at the time of quote. Special delivery requirements may be accommodated on an individual basis.

**COMMENTS:**

Since Croll-Reynolds Co. has no control over the mixture or concentration of corrosive elements which may come in contact with the equipment supplied, no guarantee is expressed or implied concerning materials of construction for corrosion resistance.

Customer should make every effort to assure suitability prior to purchase.

## SPECIFICATIONS

### DIMENSIONS

Gas Inlet/Outlet 8" / 8"

Scrubbing Liquid Inlet: 1.5"

Tower Diameter: 18" Height: 17'-0"

Liquid Storage: YES ☒ NO ☐ Capacity 20 Gallons

Tank Connections: Drain 2", Fill -, Overflow 2"

Recycle No, Manway No, Removable Top Yes

Separator Type: Mesh Mist Eliminator

Packing Type Rings Size 1"

### MATERIALS OF CONSTRUCTION

| ITEM | MATERIAL |
|---|---|
| Tower Shell: | "304L" SS or "316L SS" * |
| Packing: | "316" Stainless Steel |
| Mist Eliminator: | "304" " " |
| Liquid Distributor: | "316" " " |

*All wetted parts.

APPROXIMATE WEIGHT

Shipping: 2630 lbs. Operating: 3120 lb.

### CONSTRUCTION DESIGN

In general accordance with: standard good shop practice.

PS 15-69 ☐ ASME Code ☐ ASME Code Stamped ☐

or vessel designed for pressure/vacuum flooded -

Wall Thicknesses: 1/8"

Head Thicknesses Bottom/Top 1/8" / 1/8"

Hold down lugs Included ☒ Not included ☐

Lifting lugs Included ☐ Not included ☒

### OPERATING CONDITIONS

Gas Inlet Rate Capacity: 200 acfm

Gas Inlet Temperature: 200°F

Pressure: 1 Atmosphere

Gas Composition: By Wt. 51.5% $H_2O$, 9.1% $O_2$, 35.2% $N_2$, 4.2% Total Carbon

Liquid Inlet Rate: 50 gpm

Pressure at Liquid Inlet: 7.0 psig

x Specific Gravity:

Liquid Composition: water

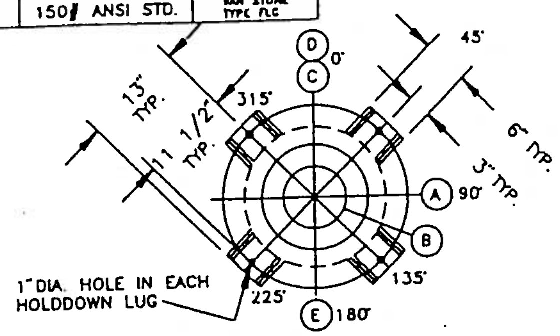
Maximum Liquid Temperature: 90°F (Inlet)

Pressure Drop Across System: 2 Inch(es) W.G.

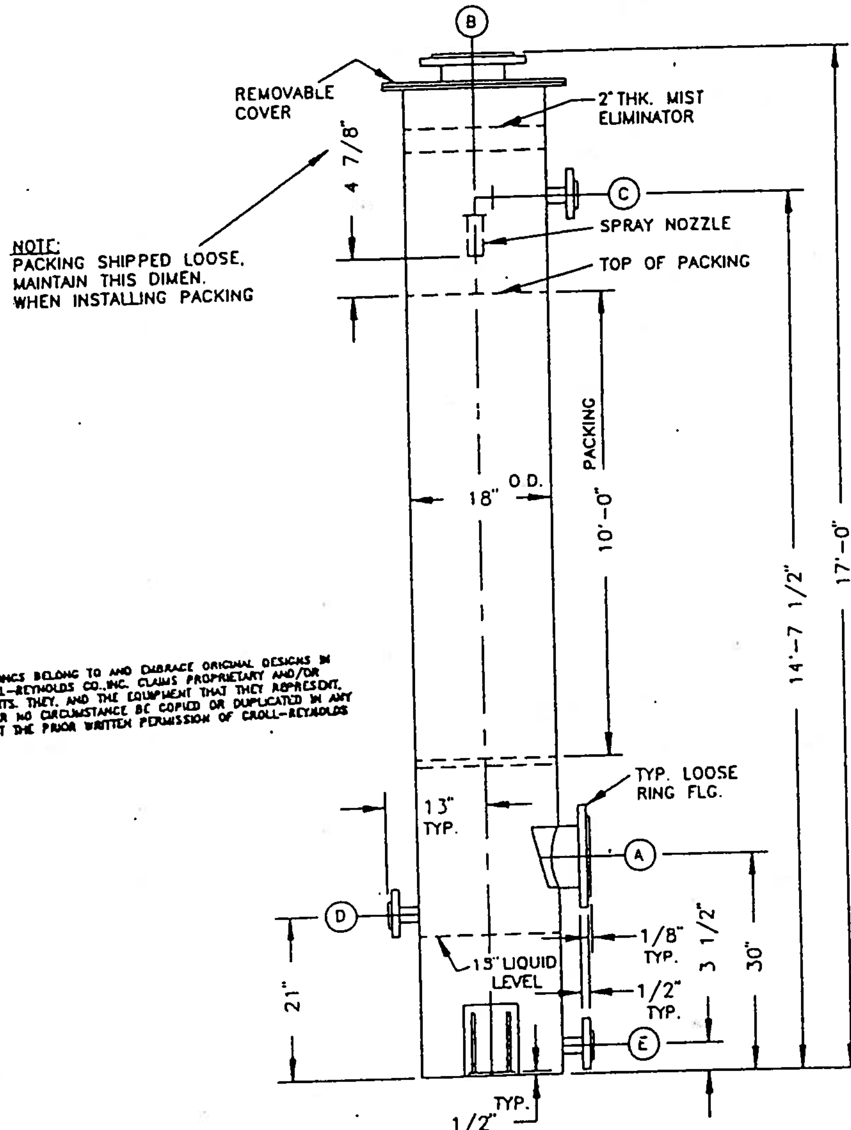
**Proposal by:** Arthur Schlett

**Date:** 11-19-88

| MARK | SIZE | DESCRIPTION | FLANGE O.D. AND DRILLING | REMARKS |
|---|---|---|---|---|
| A | 8" | GAS INLET | 150# ANSI STD. | VAN STONE TYPE FLG |
| B | 8" | GAS OUTLET | 150# ANSI STD. | VAN STONE TYPE FLG |
| C | 2" | LIQUID INLET | 150# ANSI STD. | VAN STONE TYPE FLG |
| D | 2" | OVERFLOW | 150# ANSI STD | VAN STONE TYPE FLG |
| E | 2" | DRAIN | 150# ANSI STD. | VAN STONE TYPE FLG |




PLAN VIEW SHOWING TRUE ORIENT. OF ALL CONN'S. & HOLDDOWN LUGS




THESE DRAWINGS BELONG TO AND EMBRACE ORIGINAL DESIGNS IN WHICH CROLL-REYNOLDS CO.,INC. CLAIMS PROPRIETARY AND/OR PATENT RIGHTS. THEY, AND THE EQUIPMENT THAT THEY REPRESENT, SHALL UNDER NO CIRCUMSTANCE BE COPIED OR DUPLICATED IN ANY WAY WITHOUT THE PRIOR WRITTEN PERMISSION OF CROLL-REYNOLDS CO.,INC.

ELEVATION–FOR TRUE ORIENT. OF ALL CONN'S. & HOLDDOWN LUGS–SEE PLAN VIEW

NOTES:
1.) APPROX. WTS.––EMPTY–2,630 LBS.
OPERATING–3,120 LBS.
2.) HOLDDOWN LUGS FOR PLACEMENT ONLY, NOT DESIGNED FOR WINDLOADING.
3.) BOLT HOLES IN ALL FLG'D. CONN'S. ARE EQUALLY SPACED.
4.) MAT'L. OF CONSTRUCTION
SHELL–S.S. TYPE 316–L
LOOSE RING FLG'S.–CARBON STL.
PACKING & MIST ELIM.–S.S. TYPE 316
SPRAY NOZZLE–S.S. TYPE 316

CERTIFIED CORRECT FOR:
CUST. ORDER NO.– C89-188801
ITEM NO.–
TAG NO.–
C.R. CO. SERIAL NO.– 67459
CROLL-REYNOLDS CO. INC.
ENGINEERING DEPT.
DATE: 4-5-89

| REV | DATE | DESCRIPTION |
|---|---|---|

CROLL-REYNOLDS COMPANY, INC.
WESTFIELD, N.J.

NO.18–10H PACKED TOWER LAYOU

SCALE: 3/4"=1' F.M. 2-27-89 FSB–20433–E

APPENDIX D

Description of Gas Streams

and Material Balance

# WORK TANK SCRUBBER

1. Emission Point No. / Name: EP001 Work Tank Scrubber

2. Manufacturers Name and Model No.: Croll Reynolds 18T-10H

3. Date of construction for existing sources or date of anticipated start-up for new sources: April 4, 1989 - Certification documents attached, letter dated June 27, 1989

4. Scrubber Data:

a) Scrubber type:
- ____ Venturi
- X Packed Tower
- ____ Cyclonic
- ____ Mist Eliminator
- ____ Orifice
- ____ Gravity Tower
- ____ Condenser
- ____ Impingement Plate
- ____ Other: ____

b) Liquid injection rate:
1) Design maximum: 50 gpm @ 7.0 psia
2) Expected average: 50 gpm @ 6.0 pisa

c) Pressure drop: 2.0 inches $H_2O$

d) Scrubbing liquid:
1) ____ Once - through X Recycled
2) If recycled: 10 gpm make - up rate
3) If water, describe settling basin: N/A - city water
4) Solution / Reactant systems:
   a) Chemical make - up: N/A
   b) How is discharge handled, treated? ____

e) Gas flow: X Counter current ____ Concurrent
1) Flow rate: 200 acfm
2) Inlet Temperature: 200 °F

f) Venturi Data: NA
1) Inlet Area: ____ $ft^2$
2) Throat Area: ____ $ft^2$
3) Throat velocity: ____ ft / sec
4) ____ Fixed throat ____ Variable throat

g) Packed or Plate Tower Data:
1) Surface Area: 58 $ft^2/ft^3$
2) Packing depth: 10 ft
3) Type of packing: X Rings ____ Saddles ____ Other:
4) No. of plates: N/A
5) Type of plates: N/A

h) Demisting Data:
1) Mist eliminator filter area: 3.69 $ft^2$ and 2 inches thick
2) Type: ____ Cyclone ____ Vanes X Pad X Other: Mesh

i) Efficiency: 95 % current; 75% requested *

j) Are extra nozzles readily available? ______ Yes __X__ No

How many? ______

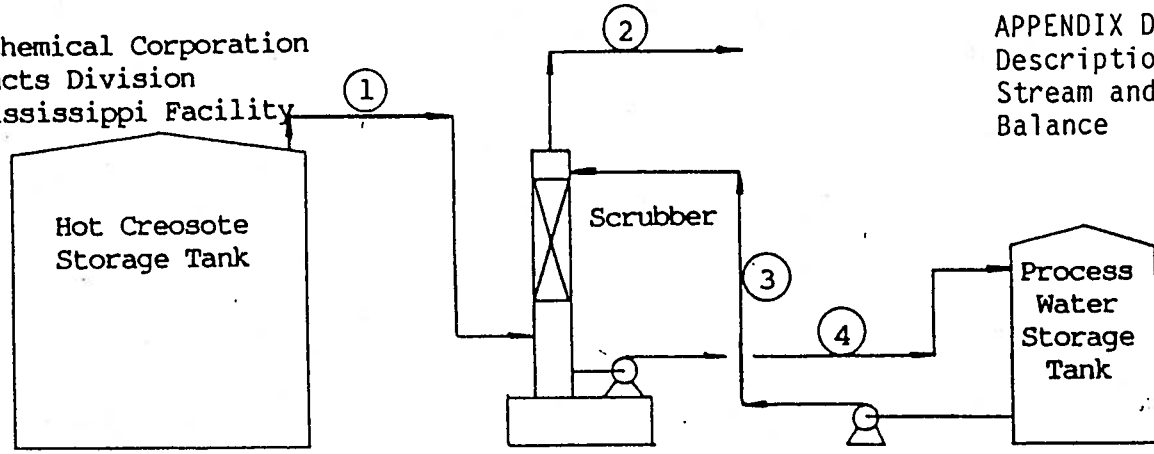
k) Pressure measurement devices installed? ______ Yes __X__ No

5. Which process(es) does the scrubber control emissions from? ______
Work Tank Nos. 1 and 2 and Treating Cylinders 1,2, and 3

* A 95% efficiency is required according to NSPS requirements under 40 CFR 60.112b(3)(ii). Creosote does not fall under NSPS requirements and KMCC is requesting that this be changed to 75% efficiency. Additional units will be added for air emission controls that there will be further reductions in air emissions even though the efficiency is less.

Kerr-McGee Chemical Corporation
Forest Products Division
Columbus, Mississippi Facility

# APPENDIX D
Description of Gas Stream and Material Balance




| Emission Description | Stream 1 | Stream 2 | Stream 3 | Stream 4 |
|---|---|---|---|---|
| $H_2O$ (lb./hr.) | 251.4 | 6.0 | 24989 | 25234 |
| $O_2$ (lb./hr.) | 46.6 | 46.6 | — | — |
| $N_2$ (lb./hr.) | 179.2 | 179.2 | — | < 1 |
| Hydrocarbon Vapor (lb./hr.) | 19.5 | 0.8 | — | < 1 |
| Creosote (lb./hr.) | — | — | 1 | 20 |
| Total (lb./hr.) | 496.7 | 232.6 | 24990 | 25254 |
| HC Vapor Mole. Wt. | 123 | 80 | — | — |
| ACFM | 174 | 55 | — | — |
| Actual GPM | — | — | 50.1 | 50.7 |
| Temp., °F | 190 | 85 | 85 | 87 |
| Pressure (psia) | 14.6 | 14.6 | 7.0 | — |

APPENDIX E

Manufacturer's Operating Conditions

and

Performance Data for

Packed Tower

## APPENDIX E

## OPERATING CONDITIONS AND PERFORMANCE DATE

Model No.: 18T-10H ____________ Croll-Reynolds Job No.: 67459

I. OPERATING CONDITIONS

A. Gas Inlet Rate Capacity: 200 ____________ acfm

B. Gas Inlet Temperature: 200°F ____________

C. Gas Inlet Pressure: 1 atmospheric ____________

D. Gas Composition: by wt: 51.5% $H_2$, 9.1% $O_2$, 35.2% $N_2$
4% total carbon

E. Liquid Inlet Rate:
1. 50 ____________ gpm
2. ____________ gpm

F. Pressure At Liquid Inlet:
1. 7 ____________ psig
x specific gravity: ____________
2. ____________ psig
x specific gravity: ____________

G. Liquid Composition:
1. water ____________
2. ____________

H. Maximum Liquid Temperature: 90°F ____________

I. Pressure Drop Across System: 2 ____________ Inch(es) W.G.

APPENDIX F

Construction Permit No. 1680-00020

MISSISSIPPI DEPARTMENT OF NATURAL RESOURCES
Bureau of Pollution Control
P.O. Box 10385
Jackson, Mississippi 39289-0385
(601) 961-5171

April 4, 1989

Certified Mail No. P 962 285 440

Mr. Peter C. Gaskin, Environmental Control
Kerr-McGee Chemical Corporation,
Forest Products Division
P.O. Box 906
Columbus, Mississippi 39701

Dear Mr. Gaskin:

Re: Construction Permit No. 1680-00020
Columbus, Mississippi

We have completed our review of the plans and specifications for the above referenced permit and approval is hereby indicated for air pollution control purposes only. Enclosed please find Construction Permit No, 1680-00020 construction of the air emissions equipment and air pollution control equipment.

Prior to startup of the air emissions equipment at this facility, a Performance Evaluation Permit must be obtained from the Permit Board. In order to obtain the Performance Evaluation Permit, it will be necessary to submit certification by a professional engineer registered in the State of Mississippi that construction was completed in accordance with the approved plans and specifications and a written request for the permit.

Any appeal of this permit action must be made within the 30 day period provided for in Section 49-17-29(4)(b) Mississippi Code of 1972.

If you have any questions or if we can be of any service, please let me know.

Very truly yours,

Bobby V. Whitaker

Bobby V. Whitaker
North Air Emissions Section

BVW:sr
Enclosure

RECEIVED
APR 6 1989
KERR-McGEE CORP.
FOREST PRODUCTS DIV.

# STATE OF MISSISSIPPI AIR POLLUTION CONTROL PERMIT

## TO CONSTRUCT AIR EMISSIONS EQUIPMENT

THIS CERTIFIES THAT

Kerr-McGee Chemical Corporation
Forest Products Division
14th Avenue & 20th Street North
Columbus, Mississippi

has been granted permission to construct air emissions equipment to comply with 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.

Issued this 14th day of February, 1989

MISSISSIPPI NATURAL RESOURCES PERMIT BOARD

DIRECTOR, BUREAU OF POLLUTION CONTROL
MISSISSIPPI DEPARTMENT OF NATURAL RESOURCES

Permit No. 1680-00020
Emission Point 004

## PART I
## GENERAL CONDITIONS

1. The plans, specifications, schedules, dates and other data submitted to the Permit Board are filed with and considered as a part of this permit.

2. All air pollution control facilities shall be designed and constructed such as to allow proper operation and maintenance of this permit.

3. The necessary facilities shall be constructed so that solids removed in the course of control of air emissions may be disposed of in a manner such as to prevent the solids from becoming windborne and to prevent the materials from entering State waters.

4. The air pollution control facilities shall be constructed such that diversion from or bypass of collection and control facilities is not needed except (i) where unavoidable to prevent loss of life or severe property damage or (ii) when approved by the Mississippi Natural Resources Permit Board.

5. The construction of facilities shall be performed in such a manner as to reduce both point source and fugitive dust emissions to a minimum.

6. The permittee shall allow the Mississippi Department of Natural Resources Bureau of Pollution Control and the Mississippi Natural Resources Permit Board and/or their representatives upon presentation of credentials:

   a. To enter 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. At reasonable times 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 emission.

7. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to:

   a. Violation of any 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 any condition that requires either a temporary or permanent reduction or elimination of authorized air emissions.

8. Except for data determined to be confidential under the Mississippi Air & Water Pollution Control Law, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Mississippi Department of Natural Resources Bureau of Pollution Control.

9. The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

10. Nothing herein contained shall be construed as releasing the permittee from any liability for damage to persons or property by reason of the installation, maintenance, or operation of the air cleaning facility, or from compliance with the applicable statutes of the State, or with local laws, regulations, or ordinances.

11. This permit is non-transferable.

12. This permit is for air pollution control purposes only.

13. Approval to construct will expire should construction not begin within one (1) year of the issuance of this permit, or should construction be suspended for one (1) year or more.

14. This permit shall become void upon completion of construction. The permittee shall furnish the Bureau of Pollution Control written notification of construction completion within 15 days of such date.

15. Prior to startup of air emissions equipment at this source, a Performance Evaluation Permit must be obtained. The permittee shall submit certification by a professional engineer registered in the State of Mississippi that construction completed in accordance with the approved plans and specifications and a written request for the permit.

# PART II
# EMISSION LIMITATIONS AND MONITORING REQUIREMENTS

Beginning February 14, 1989, the permittee is authorized to construct air emissions equipment for the emission of air contaminants from a 57,000 gallon creosote storage tank, controlled by a scrubber, Emission Point 004.

The air emissions equipment shall be constructed to comply with the emission limitations and monitoring requirements specified below.

## EMISSION LIMITATIONS

Volatile Organic Compounds (VOC) 0.8 lb/hr, 3.5 tons/year, and reduction of control equipment inlet VOC by 95% as set forth by 40 CFR 60.112b(a)(3).

## REPORTING & RECORDKEEPING

The permittee shall provide notices and reports, and maintain records as required by 40 CFR 60, Section 60.115b.

## TESTING & PROCEDURES

The permittee shall demonstrate compliance with the required control efficiency for VOC emissions as required by 40 CFR 60.113b.

## PART III
## OTHER REQUIREMENTS

(1) The operator of the equipment covered by this permit shall operate and maintain this equipment to assure that the emission rates will not, at any time, exceed the rates allowed by the Mississippi Air Emission Regulations.

(2) The permittee is required to meet all applicable conditions and requirements contained in New-Source Performance Standards (NSPS), Subpart Kb.

(3) The permitted system must be controlled by a closed vent system and scrubber. The closed vent system shall be designed to collect all VOC vapors and gases discharged from the storage vessel and operated with no detectable emissions as indicated by an instrument reading of less than 500 ppm above background. The control device shall be designed and operated to reduce inlet VOC emissions by 95% or greater.

(4) The permittee is allowed to store only creosote in the storage vessel. The amount of creosote stored must be recorded at all times. The maximum true vapor pressure of the stored creosote must be recorded at all times.

COMPLIANCE DEMONSTRATION
BY RECORDKEEPING

SECTION M7

1. Emission Point No./Name : EP001 Work Tank Scrubber

2. Pollutant: Naphthalene, Dibenzofuran, Biphenyl, Quinoline, VOCs

3. Material or parameter being monitored or recorded: Number of charges per day/ annually

4. Method of monitoring and recordkeeping: Reporting and recordkeeping as required by 40 CFR 60, Section 60.115b. Testing and procedures as required by 40 CFR 60, Section 60, Section 60.113b.

5. List any EPA methods used: NA - See Appendix 5 for data evaluations

6. Compliance shall be demonstrated:
X Daily ____ Weekly ____ Monthly ____ Quarterly

COMPLIANCE CERTIFICATION SECTION O

1. Emission Point No./Name : EP001 Work Tank Scrubber

2. Indicate the source compliance status:

A. X Where this source is currently in compliance, we will continue to operate and maintain this source to assure compliance for the duration of the permit.

B. _____ The Current Emissions Requirements and Status form (previous page) includes new requirements that apply or will apply to this source during the term of the permit. We will meet such requirements on a timely basis.

C. _____ This source is not in compliance. The following statement of corrective action is submitted to describe action which we will take to achieve compliance.

1. _____ Attached is a brief description of the problem and the proposed solution.

2. _____ We will achieve compliance according to the following schedule.

**Progress reports will be submitted:**

Starting date: ________ and every six (6) months thereafter

| Problem | Action | Deadline |
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# GREEN/DRY TIE PROCESSING

## MANUFACTURING PROCESSES (page 1 of 2) SECTION E

1. Emission Point No./ Name: EP002 Framing Mill Cyclone Collectors A and B

2. Process Description: Wood cutting operations on units of wood in sizes of 7 in x 9 in x 8.5 ft with different types of cutting devices. All framing cutting operations are completely enclosed in a building. All sawdust is controlled by a two-stage cyclone - CU002 A&B.

3. Was this unit constructed or modified after August 7, 1977? ________ yes ___X___ no
If yes please give date and explain.

4. Rated Capacity (ties/day): 3,600 ties/day → represents output

5. Raw Material Input:

$\frac{3600 \text{ ties}}{24 \text{ hr}} \Big| \frac{175 \text{ lb}}{\text{tie}} = 26{,}250 \text{ lbs/hr} = 13.125 \frac{\text{tons}}{\text{hr}}$

| MATERIAL | TIES/DAY AVERAGE | TIES/DAY MAXIMUM | TIES/YEAR |
|---|---|---|---|
| Wood ties | 2,520 | 3,600 | 1,314,000 |
| | | | |
| | | | |
| | | | |
| | | | |

6. Product Output:

| PRODUCT or BY-PRODUCT | QUANTITY/DAY AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| Wood ties | 2,520 ties/day | 3,600 ties/day | 1,314,000 ties/yr |
| Wood waste | 7,197.33 lbs/day | 14,394.65 lbs/day | 2,627 tons/yr |
| | | | |
| | | | |
| | | | |

7. Stack Data:

| | | CU002 A/B | | | CU002 A/B |
|---|---|---|---|---|---|
| A. | Height: | 50/40 | C. | Exit gas velocity: | 11.7/ 13.3 |
| B. | Inside diameter: | 7/13 | D. | Exit gas temperature: | Amb/Amb |

8. UTM Coordinates:
A. Zone 16 East B. North 1398087.86 C. East 629291.09

# SUPPORT CALCULATIONS

13. POLLUTANT EMISSIONS:

Emission rate calculations are attached under Support Calculations.

| EMISSION POINT NO. | POLLUTANT (note 1) | CONTROL EQUIPMENT | | ACTUAL EMISSION RATE 4 Dust Bins per Week | | | PROPOSED ALLOWABLE EMISSION RATE | | |
|---|---|---|---|---|---|---|---|---|---|
| | | yes/no * | effic. | note 2 | lb/day | tn/yr | note 2 | lb/day(a) | tn/yr(a) |
| EP002 | PM | Yes | 90 | lbs/hr | 87.59 | 15.98 | lbs/hr | 218.4 | 39.86 |
| EP002 | PM10 | Yes | 90 | lbs/hr | 43.79 | 7.99 | lbs/hr | 218.4 | 39.86 |
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1. All regulated air pollutants including hazardous air pollutants emitted from this source should be listed. A list of regulated air pollutants has been provided in Section A.
2. Provide emission rate in units of applicable emission standard, e.g. lb/MMbtu, gr/dscf, etc. This may not apply to every emission point or every pollutant from an emission point.

(a) These emission rates are based on existing Air Operating Permit No. 1680-00020. Although actual emission rates are lower, we are using the Permit rates to provide more operating flexibility.

* If yes, attach appropriate Air Pollution Control Data Sheet from Section L or manufacturers specifications if other.

## CYCLONES

SECTION L2

1. Emission Point No. / Name: EP002 Framing Cyclone Collector A

2. Manufacturers Name and Model No.: D&N Size 12

3. Date of construction for existing sources or date of anticipated start-up for new sources: ________

4. Cyclone Data:

a) Cyclone type ( if more than 1, put total number ) :

____ Simple ____ Potbellied

X High Efficiency ____ Multiclone

b) Efficiency: 90 %

c) Pollutant viscosity: ____ poise

d) Flow Rate: 13,000 acfm (approximate)

e) Pollutant size entering cyclone: +60 microns

f) Pressure drop: 3 - 5 inches $H_2O$

g) Baffles or Louvers (specify): Baffles

h) Cyclone dimensions:

Inlet: 1.4 ft
Outlet: 3.5 ft
Body diameter: 7 ft
Body height: 10.5 ft
Cone height: 17.5 ft

i) Wet spray: ____ Yes X No

1. No. of Nozzles: ____
2. Type of liquid used: ____
3. Flow rate: ____ gpm
4. Make-up rate: ____ gpm
5. % recycled: ____ %

j) Fan location:

1. Downstream: ____ Direct emission
X Auxiliary Stack
2. Upstream: ____ No cap ( vertical emissions )
X Fixed cap ( diffuse emissions )
____ Wind respondent cap ( horizontal emissions )

5. Which process(es) does the cyclone(s) control emissions from? Framing Mill (EU023)

6. Attach a diagram of the cyclone(s) used.

## CYCLONES

SECTION L2

1. Emission Point No. / Name: EP002 Framing Cyclone Collector B

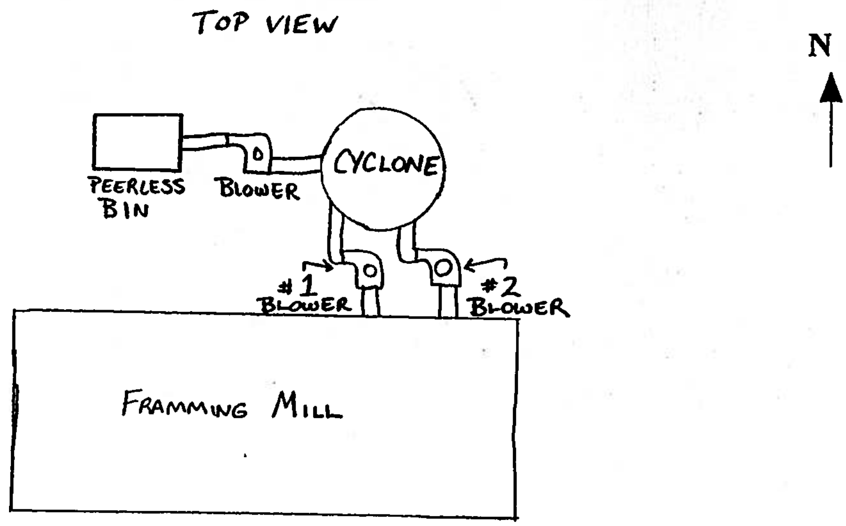
2. Manufacturers Name and Model No.: D&N Size 39

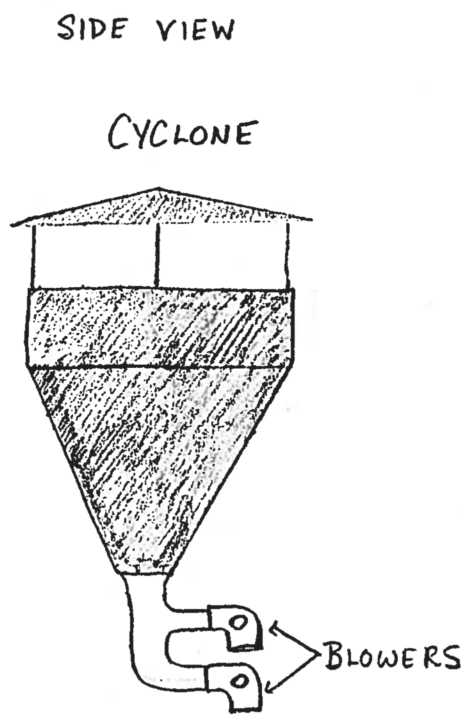
3. Date of construction for existing sources or date of anticipated start-up for new sources: ______

4. Cyclone Data:
   a) Cyclone type ( if more than 1, put total number ) :
      ______ Simple
      ______ Potbellied
      X High Efficiency
      ______ Multiclone
   b) Efficiency: 90 %
   c) Pollutant viscosity: ______ poise
   d) Flow Rate: 5,500 acfm
   e) Pollutant size entering cyclone: +60 microns
   f) Pressure drop: 3 - 5 inches $H_2O$
   g) Baffles or Louvers (specify): Baffles - centrifical force setting chamber
   h) Cyclone dimensions:
      Inlet: 2.66 ft
      Outlet: 6.5 ft
      Body diameter: 13.3 ft
      Body height: 19.5 ft
      Cone height: 33.5 ft
   i) Wet spray: ______ Yes X No
      1. No. of Nozzles: ______
      2. Type of liquid used: ______
      3. Flow rate: ______ gpm
      4. Make-up rate: ______ gpm
      5. % recycled: ______ %
   j) Fan location:
      1. Downstream: ______ Direct emission
         X Auxiliary Stack
      2. Upstream: ______ No cap ( vertical emissions )
         X Fixed cap ( diffuse emissions )
         ______ Wind respondent cap ( horizontal emissions )

5. Which process(es) does the cyclone(s) control emissions from? Framing Mill (EU023)

6. Attach a diagram of the cyclone(s) used.




**FRAMING MILL CYCLONE**

## COMPLIANCE DEMONSTRATION BY RECORDKEEPING

SECTION M7

1. Emission Point No./Name : EP002 Framing Mill Cyclone collectors A and B

2. Pollutant: PM & PM10

3. Material or parameter being monitored or recorded: PM & PM10

4. Method of monitoring and recordkeeping: The number of dust bins that are emptied each week are recorded. The number of dust bins determine the tons per year of fugitive PM and PM10 from the framing mill processes.

5. List any EPA methods used: NA

6. Compliance shall be demonstrated:

____ Daily X Weekly ____ Monthly ____ Quarterly

COMPLIANCE CERTIFICATION SECTION O

1. Emission Point No./Name : EP002 Framing Mill Cyclone collectors A and B

2. Indicate the source compliance status:

A. X Where this source is currently in compliance, we will continue to operate and maintain this source to assure compliance for the duration of the permit.

B. ______ The Current Emissions Requirements and Status form (previous page) includes new requirements that apply or will apply to this source during the term of the permit. We will meet such requirements on a timely basis.

C. ______ This source is not in compliance. The following statement of corrective action is submitted to describe action which we will take to achieve compliance.

1. ______ Attached is a brief description of the problem and the proposed solution.

2. ______ We will achieve compliance according to the following schedule.

**Progress reports will be submitted:**

Starting date: ______________ and every six (6) months thereafter

| Problem | Action | Deadline |
|---|---|---|
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PLANT: Columbus
PROCESS UNIT: Framing Mill (Crossings, Panels, Bridge)
EMISSION: Maximum Particulates: PM, PM-10

**Wood Waste Emission Factor**

The variety of cuts, all to customer specifications, made at each of the three saw mills, precludes any wood waste estimates based on saw cuts. Therefore, wood waste will be quantified by the number of 30 yard containers filled and removed weekly.

| | Width (in) | Depth (in) | Length (ft) |
|---|---|---|---|
| 1. Dimensions of tie (W x L x D) | 6 | 8 | 8.5 |
| 2. Weight of tie (lb) | 175 | | |
| 3. Cubic feet of tie (ft3) | 2.83 | | |
| 4. Pound per cubic foot (lb/ft3) | 61.76 | | |
| 5. Weight of cubic foot of sawdust (lb/ft3) | 31.185 | | |
| 6. Weight of cubic yard of sawdust (lb/yd3) | 842.00 | | |

$\frac{30\ yd^3}{bin} \Big| \frac{208\ bins}{yr} \Big| \frac{842\ lbs}{yd^3} = 5{,}254{,}080\ \frac{lbs}{yr}$

= (.9)(Total Sawdust)

**Maximum Emissions**

| | Unit | |
|---|---|---|
| Number of units | 1 | |
| Maximum number of 30-CuYd bins filled | 4 bins/week | |
| | 208 bins/yr | |
| Maximum ~~volume~~ of wood waste produced | 5,254,049 lb/yr | 14394.65 lb/day |
| | 2,627.02 ton/yr | |
| Maximum pounds of wood waste/container | 25,259.85 lbs/bin | = 90% of wood waste Collected By Cyclone |
| Maximum pounds of PM/container | 2807 ~~2,525.99~~ lbs/bin | PM is assumed to be 10 percent of wood w |
| Maximum pounds of PM-10/container | 1403 ~~1,262.99~~ lbs/bin | PM-10 is assumed to be 50 percent of PM |
| **Fugitive PM loss from Container** | 25.26 lbs/bin | 1 percent emission rate from AP-42 |
| **Fugitive PM-10 loss from Container** | 12.63 lbs/bin | 1 percent emission rate from AP-42 |
| PM Collected By Cyclone | 2,806.65 lbs/bin | = PM Cyclone Collects per bin |
| PM-10 Collected By Cyclone | 1,403.33 lbs/bin | |
| **Fugitive PM loss from Cyclone** | **280.67** lbs/bin | of Fugitive PM from Cyclone per bin |
| **Fugitive PM-10 loss from Cyclone** | **140.33** lbs/bin | of Fugitive PM-10 from Cyclone per bin |
| Total PM Generated By Framing Mill Building | 2,954.37 lbs/bin | = Cyclone Collects 95% PM Framing Mill Buildi |
| Total PM-10 Generated By Framing Mill Building | 1,477.18 lbs/bin | |
| PM Uncollected from Building by Cyclone | 147.72 lbs/bin | = 5% Building PM Uncollected by Cyclone |
| PM-10 Uncollected from Building by Cyclone | 73.86 lbs/bin | |
| **Building Fugitive PM** | **1.48** lbs/bin | = Building Controls 99% of 5% Fugitive PM |
| **Building Fugitive PM-10** | **0.74** lbs/bin | |
| **Total Fugitive PM from Framing Mill** | **307.40 lbs/bin** | |
| **Total Fugitive PM-10 from Framing Mill** | **153.70 lbs/bin** | |
| Annual Number of Bins | 208 | |
| **Total Annual Fugitive PM** | **31.97 ton/yr** | |
| | 175.18 lbs/day | |
| **Total Annual Fugitive PM-10** | **15.98 ton/yr** | |
| | 87.59 lbs/day | |

01:56 PM 15-Mar-95

**Assumptions**

1. Pound per cubic foot of tie is based on a 6 x 8 tie at 175 lb.

**References**

1. Emission factors for wood waste were found in AP-42 10.4.3

f:\data\0168\columbus\frame.wk3

## CYCLONES **SECTION L2**

1. Emission Point No. / Name: EP004 Cross tie Unloader Cyclone

2. Manufacturers Name and Model No.: To be provided

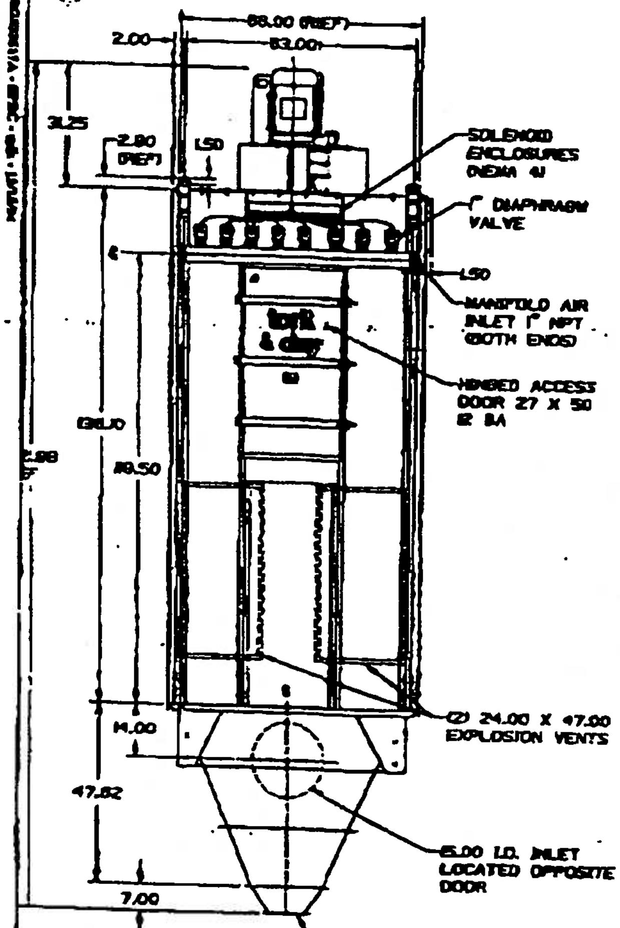
3. Date of construction for existing sources or date of anticipated start-up for new sources: January, 1995

4. Cyclone Data:
   a) Cyclone type ( if more than 1, put total number ) :
      - ______ Simple
      - X High Efficiency
      - ______ Potbellied
      - ______ Multiclone
   b) Efficiency: 90 %
   c) Pollutant viscosity: ______ poise
   d) Flow Rate: ______ acfm
   e) Pollutant size entering cyclone: ______ microns
   f) Pressure drop: ______ inches $H_2O$
   g) Baffles or Louvers (specify): ______
   h) Cyclone dimensions:
      - Inlet: ______ ft
      - Outlet: ______ ft
      - Body diameter: ______ ft
      - Body height: ______ ft
      - Cone height: ______ ft
   i) Wet spray: ______ Yes X No
      1. No. of Nozzles: ______
      2. Type of liquid used: ______
      3. Flow rate: ______ gpm
      4. Make-up rate: ______ gpm
      5. % recycled: ______ %
   j) Fan location:
      1. Downstream: ______ Direct emission
         ______ Auxiliary Stack
      2. Upstream: ______ No cap ( vertical emissions )
         ______ Fixed cap ( diffuse emissions )
         ______ Wind respondent cap ( horizontal emissions )

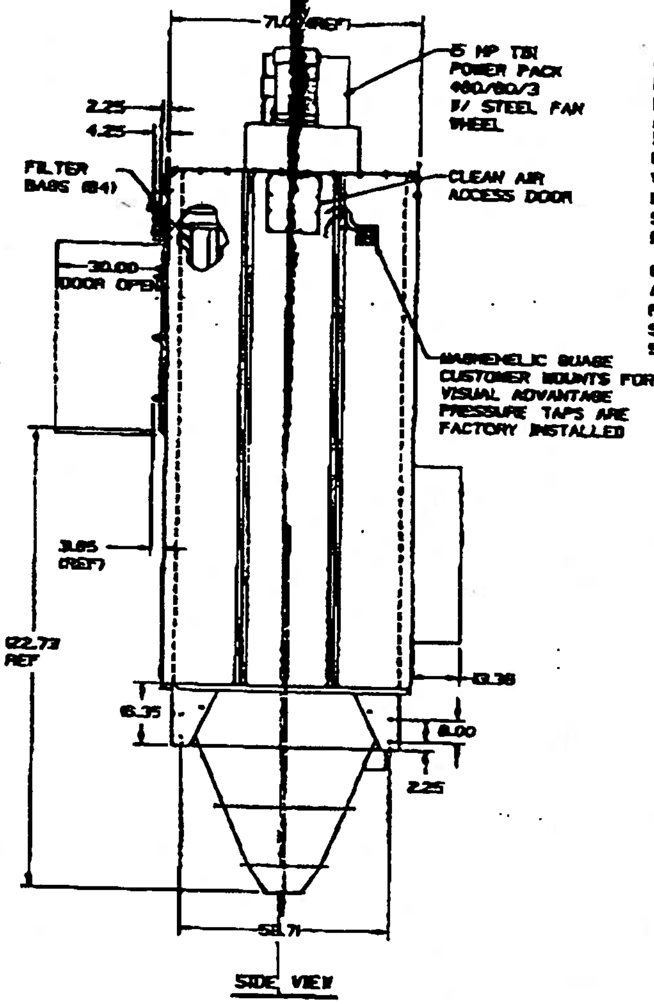
5. Which process(es) does the cyclone(s) control emissions from? Cross tie Unloader (EU025)

6. Attach a diagram of the cyclone(s) used.

| CADD | A | - | REMOVE LEG PACK | DEC 6, 1991 |
|---|---|---|---|---|




PAGE 2-2 &

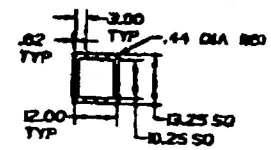



## SPECIFICATIONS FOR MODEL 64PJD W/ HOPPER 48" CLEARANCE

| | |
|---|---|
| NO. OF FILTER BAGS | 64 |
| FILTER BAG DIMENSIONS | 4.7 DIA X 120" LG (80 FT) |
| ACTUAL FILTER AREA | 788 SQ FT (80 FT) |
| STANDARD FILTER MATERIAL | POLY. FELT 16 OZ. (UNTREATED) |
| NO. OF VALVES | 8 |
| WIND LOAD RATING | 100 MPH |
| HOUSING RATING | ±17" $H_2O$ |
| SEISMIC RATING | ZONE 4 |
| ROOF LOADS | 30 LBS PER SQ FT SNOWLOAD +800 LBS EQUIPMENT |
| COMPRESSED AIR REQUIRED | 90-100 PSIG |
| AIR CONSUMPTION | 1.82 SCF / PULSE |
| REMOTE MOUNTED TIMER | 120 VAC 50-60 HZ (NEMA 4) |
| STANDARD FINISH | BLUE |
| SHIPPING WT (APPROX) | 3595 LBS (80 FT) |

NOTE:

1. UNIT IS CONSTRUCTED OF 12 GA MILD STEEL.




HOPPER TRANSITION FLANGE

REES-MEMPHIS

64PJD PULSE JET DUST COLLECTOR W/HOPPER

16-333817-A

A

COMPLIANCE DEMONSTRATION
BY RECORDKEEPING

SECTION M7

1. Emission Point No./Name : EP004 Cross tie Unloader Cyclone

2. Pollutant: PM and PM10

3. Material or parameter being monitored or recorded: Number of ties cut per day.

4. Method of monitoring and recordkeeping: Daily process records will document the number of ties cut per day. Each tie is double-end trimmed.

5. List any EPA methods used: NA

6. Compliance shall be demonstrated:

X Daily Weekly____ Monthly____ Quarterly

# COMPLIANCE CERTIFICATION

# SECTION O

1. Emission Point No./Name : EP004 Cross tie Unloader Cyclone

2. Indicate the source compliance status:

   A. __X__ Where this source is currently in compliance, we will continue to operate and maintain this source to assure compliance for the duration of the permit.

   B. _____ The Current Emissions Requirements and Status form (previous page) includes new requirements that apply or will apply to this source during the term of the permit. We will meet such requirements on a timely basis.

   C. _____ This source is not in compliance. The following statement of corrective action is submitted to describe action which we will take to achieve compliance.

      1. _____ Attached is a brief description of the problem and the proposed solution.

      2. _____ We will achieve compliance according to the following schedule.

**Progress reports will be submitted:**

Starting date: __________ and every six (6) months thereafter

| Problem | Action | Deadline |
|---|---|---|
| | | |
| | | |
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| | | |

# SUPPORT CALCULATIONS

PLANT: Columbus
PROCESS UNIT: Cross tie Unloader
EMISSION: PM

max based on what?

53.76 lbs/ft³

?

**Wood Waste Emission Factor**

**Saw Cut - 7x9 tie**

| | Width (in) | Depth (in) | Length (ft) |
|---|---|---|---|
| 1. Dimensions of tie (W x L x D) | 7 | 9 | 8.5 |
| 2. Weight of tie (lb) | 200 | | |
| 3. Cubic feet of tie (ft3) | 3.72 | | |
| 4. Pound per cubic foot (lb/ft3) | 53.78 | | |
| 5. Saw cut (in) | 0.25 | | |
| 6. Cubic feet of saw cut (ft3) | 0.0091 $= \frac{7 \times 9 \times .25}{144 \times 12}$ | | |
| 7. Pounds of wood waste per cut (lb/cut) | 0.49 ✓ | | |
| 8. Pounds of wood waste per tie (lb/tie) | **0.98** | | |

2 cuts/tie.

| Maximum ~~By-Product~~ | Unit |
|---|---|
| Number of units | 1 |
| ~~Maximum~~ number of ties processed | 9,000 ties/day |
| | 3,285,000 ties/yr |
| Maximum volume of wood waste produced | 8,824 lb/day |
| | 1,610 ton/yr |
| Maximum volume of PM produced | 88.24 lb/day |
| | 16.10 ton/yr |
| **Typical By-Product** | |
| Number of units | 1 |
| Typical number of ties processed | 7,500 ties/day |
| | 2,737,500 ties/yr |
| Typical volume of wood waste produced | 7,353 lb/day |
| | 1,342 ton/yr |
| Typical volume of PM produced | 73.53 lb/day |
| | 13.42 ton/yr |

61.84 lbs/ft³

**Saw Cut - 6x8 tie**

| | Width (in) | Depth (in) | Length (ft) |
|---|---|---|---|
| 1. Dimensions of tie (W x L x D) | 6 | 8 | 8.5 |
| 2. Weight of tie (lb) | 175 | | |
| 3. Cubic feet of tie (ft3) | 2.83 | | |
| 4. Pound per cubic foot (lb/ft3) | 61.76 | | |
| 5. Saw cut (in) | 0.25 | | |
| 6. Cubic feet of saw cut (ft3) | 0.0069 | | |
| 7. Pounds of wood waste per cut (lb/cut) | 0.43 | | |
| 8. Pounds of wood waste per tie (lb/tie) | **0.86** | | |

| **Maximum By-Product** | |
|---|---|
| Number of units | 1 |
| Maximum volume of wood waste produced | 7,569 lb/day |
| | 3.78 ton/yr |
| Maximum volume of PM produced | 75.69 lb/day |
| | 0.04 ton/yr |
| **Typical By-Product** | |
| Number of units | 1 |
| Typical volume of wood waste produced | 2,348,346 lb/day |
| | 1,174.17 ton/yr |
| Typical volume of PM produced | 23,483.46 lb/day |
| | 11.74 ton/yr |

# ties?

# ties

**Spike**

| | Diameter (in) | Depth (in) |
|---|---|---|
| 1. Dimensions of bit | 0.5625 | 5 |
| 2. Cubic feet of spike (ft3) | 0.0007 ✓ | |
| 3. Pounds of wood waste per spike (lb/spike | 0.0444 ✓ | |
| 4. Pounds of wood waste per tie (lb/tie) | **0.36** | |

#spikes/tie?

| **Maximum By-Product** | |
|---|---|
| Number of units | 1 |
| Maximum volume of wood waste produced | 1,166,559 lb/day |
| | 583.28 ton/yr |
| Maximum volume of PM produced | 11,665.59 lb/day |
| | 5.83 ton/yr |
| **Typical By-Product** | |
| Number of units | 1 |
| Typical volume of wood waste produced | 972,133 lb/day |
| | 486.07 ton/yr |
| Typical volume of PM produced | 9,721.33 lb/day |
| | 4.86 ton/yr |

?

**Bore - 7x9 tie**

| | Diameter (in) | Depth (in) |
|---|---|---|
| 1. Dimensions of bit | 0.5625 | 7 |
| 2. Cubic feet of bore (ft3) | 0.00101 | |
| 3. Pounds of wood waste per bore (lb/bore) | 0.05411 | |
| 4. Pounds of wood waste per tie (lb/tie) | **0.43** | |

5/16" size of bit

# bores/tie?

4 bores/end => 8 bores/tie

| **Maximum By-Product** | |
|---|---|
| Number of units | 1 |
| Maximum volume of wood waste produced | 1,422,091 lb/day |
| | 711.05 ton/yr |
| Maximum volume of PM produced | 14,220.91 lb/day |
| | 7.11 ton/yr |
| **Typical By-Product** | |
| Number of units | 1 |
| Typical volume of wood waste produced | 1,185,076 lb/day |
| | 592.54 ton/yr |
| Typical volume of PM produced | 11,850.76 lb/day |
| | 5.93 ton/yr |

**Bore - 6x8 tie**

| | Diameter (in) | Depth (in) |
|---|---|---|
| 1. Dimensions of bit | 0.5625 | 6 |
| 2. Cubic feet of bore (ft3) | 0.00086 | |
| 3. Pounds of wood waste per bore (lb/bore) | 0.05327 | |
| 4. Pounds of wood waste per tie (lb/tie) | **0.43** | |

| **Maximum By-Product** | |
|---|---|
| Number of units | 1 |
| Maximum volume of wood waste produced | 1,399,871 lb/day |
| | 699.94 ton/yr |
| Maximum volume of PM produced | 13,998.71 lb/day |
| | 7.00 ton/yr |
| **Typical By-Product** | |
| Number of units | 1 |
| Typical volume of wood waste produced | 1,166,559 lb/day |
| | 583.28 ton/yr |
| Typical volume of PM produced | 11,665.59 lb/day |
| | 5.83 ton/yr |

!

X

3/8" > 1/4"

**Assumptions**

1. The width of the saw cut or bit cut is equivalent in mass to the amount of sawdust produced.
2. As spikes are invariable drilled at 5 inches, ~~the heavier pound~~ per cubic foot value for 6x8 ties was used.

**References**


1. AP-42 10.4


F:\DATA\0168\COLUMBUS\XSORTER.WK3
27-Feb-95
06:08 PM

**PLANT:** Columbus
**PROCESS UNIT:** Cross tie Unloader
**EMISSION:** ~~PM-10~~ PM

PM10 .3 1/2 of PM

| Maximum Emissions | | To Control | To Atmosphere | Portion that is PM-10 | Unit |
|---|---|---|---|---|---|
| 1. Maximum volume of PM produced | 16.10 | | | | tons/yr |
| 2. Saw to capture system | | 15.30 | | | tons/yr |
| a. to atmosphere from cyclone | | | 1.53 | 0.76 | tons/yr |
| b. into bin | | 13.77 | | | tons/yr |
| c. to atmosphere from bin - fugitive | | | 0.14 | 0.07 | tons/yr |
| 3. Saw to building | | 0.81 | | | tons/yr |
| **Total Emittable to Atmosphere** | | | 1.67 PM | 0.83 | tons/yr |

| Typical Emissions | | | | | |
|---|---|---|---|---|---|
| 1. Typical volume of PM produced | 13.42 | | | | tons/yr |
| 2. Saw to capture system | | 12.75 | | | tons/yr |
| a. to atmosphere from cyclone | | | 1.27 | 0.64 | tons/yr |
| b. into bin | | 11.47 | | | tons/yr |
| c. to atmosphere from bin - fugitive | | | 0.11 | 0.06 | tons/yr |
| 3. Saw to building | | 0.67 | | | tons/yr |
| **Total Emittable to Atmosphere** | | | 1.39 | 0.69 | tons/yr |

F:\DATA\0168\DALLES\ABI_EMS.WK3

# BOILERS

FUEL BURNING EQUIPMENT (page 1 of 2) SECTION D

1. Emission Point No. / Name: EP005 - Primary Boiler

2. Equipment Description: CB D-6 Boiler

3. Was this unit constructed or modified after August 7, 1977? ______ Yes __X__ No
If yes please give date and explain. On April 20, 1989, wood waste was eliminated as a fuel source. The boiler currently utilizes Natural Gas. No. 2 Fuel Oil is utilized as a stand-by fuel only during times of Natural Gas curtailment.

4. Rated Capacity: 34 MMBTU/hr 5. Type of burner: Forced draft gas, atomizing oil

6. Usage Type (i.e. Space Heat, Process, etc.) : Boiler, steam

7. Complete the following table, identifying each type of fuel and the amount used. Specify the units for heat content, hourly usage, and yearly usage.

| FUEL TYPE | HEAT CONTENT | % SULFUR | % ASH | MAXIMUM HOURLY USAGE | ACTUAL YEARLY USAGE |
|---|---|---|---|---|---|
| Natural Gas | 1,000/cu ft | <0.2 | <0.05 | 15,000 cu ft | $1.3 \times 10^8$ |
| #2 Fuel Oil (stand-by) | 140,000/gal | <0.5 | <0.01 | 100 gals | 876,000 |
| | | | | | |
| | | | | | |
| | | | | | |

8. Please list any fuel components that are hazardous air pollutants and the percentage in the fuel.
N/A

9. Operating Schedule: 24 hours/day 7 days/week 52 weeks/year

10. Stack Data:
A. Height: ______ C. Exit gas velocity: ______
B. Inside diameter: ______ D. Exit gas temperature: ______

?

11. UTM Coordinates:
A. Zone 16 East B. North 1397885.60 C. East 629281.99

Engineering Plus
did UTM

12. POLLUTANT EMISSIONS:
Emission rate calculations, monitoring data, or stack test data must be attached!

34 MMBTU.

| EMISSION POINT NO. | POLLUTANT (note 1) | CONTROL EQUIPMENT | | ACTUAL EMISSION RATE | | | PROPOSED ALLOWABLE EMISSION RATE | | | Nat Gas lb/hr | Fuel oil lb/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | yes/no * | effic. | note 2 | lb/hr | tn/yr (a) | note 2 | lb/hr | tn/yr | | |
| EP005 | $SO_x$ | NO | N/A | lb/MMBTU | 0.02 | 0.01 | lb/MMBTU | 163.2(c) | 7.84(b) | .02 | |
| EP005 | $NO_x$ | NO | N/A | lb/MMBTU | 4.76 | 20.85 | lb/MMBTU | 4.76 (a) | 20.85(a) | | |
| EP005 | CO | NO | N/A | lb/MMBTU | 1.20 | 0.43 | lb/MMBTU | 1.20 (a) | 5.21(a) | | |
| EP005 | PM | NO | N/A | lb/MMBTU | 0.09 | 0.37 | lb/MMBTU | ~~16.6 (c)~~ | 0.50(b) | .085 | 0.2 |
| EP005 | PM-10 | NO | N/A | lb/MMBTU | 0.09 | 0.37 | lb/MMBTU | ~~16.6 (c)~~ | 0.50(b) | .085 | 0.2 |
| EP005 | VOCs | NO | N/A | lb/MMBTU | 0.10 | 0.042 | lb/MMBTU | 0.1 (a) | 0.42(a) | | |

0.2

1. All regulated air pollutants including hazardous air pollutants emitted from this source should be listed. A list of regulated air pollutants has been provided in Section A.
2. Provide emission rate in units of applicable emission standard, e.g. lb/MMbtu, gr/dscf, etc. This may not apply to every emission point or every pollutant from an emission point.

* If yes, attach appropriate Air Pollution Control Data Sheet from Section L or manufacturers specifications if other.

NOTE: The maximum or proposed allowable emission rate is calculated as 3 months operation with No. 2 Fuel Oil and 9 months operation with Natural Gas. Natural Gas is typically burned continuously except during times of curtailment when No. 2 Fuel Oil is substituted. If possible, the source would burn only Natural Gas. Particulate matter (PM, PM-10) and sulfur dioxide ($SO_2$) are emitted at a greater rate with the burning of No. 2 Fuel Oil. The maximum anticipated Natural Gas curtailment has been estimated at 3 months. Therefore, in order to determine a maximum potential to emit, 3 months of oil plus 9 months of Natural Gas use were calculated for these emission rates. The other criteria pollutants, nitrous oxide (NOx), carbon monoxide (CO), and volatile organic compounds (VOC), are emitted at a greater rate with the burning of Natural Gas. These emissions were therefore calculated as 12 months of Natural Gas use. It is requested that this operating scenario be adopted into the federally-enforceable state operating permit.

(a) These emission rates are based on 12 months operation w/Natural Gas or the maximum emission rates.
(b) These emission rates are based on 3 months operation w/No. 2 Fuel Oil and 9 months operation w/Natural Gas.
(c) These emission rates are based on existing Air Operating Permit No. 1680-00020.

## FUEL BURNING EQUIPMENT (page 1 of 2) SECTION D

1. Emission Point No. / Name: EP005 - Stand-by Boiler

fuel oil

2. Equipment Description: Vogt 14435 Woodwaste Boiler

burner modified? can't burn fuel oil.

3. Was this unit constructed or modified after August 7, 1977? X Yes ______ No
If yes please give date and explain. On April 20, 1989, wood waste was eliminated as a fuel source. The boiler currently utilizes natural gas and does not have the capacity to burn fuel oil. The source is not subject to NSPS regulation as modification was made prior to June 9, 1989 (40 CFR Part 60.40c-47c subpart Dc).

4. Rated Capacity: 14.3 MMBTU/hr 5. Type of burner: Forced draft gas - can't burn fuel oil?

6. Usage Type (i.e. Space Heat, Process, etc.) : Boiler, steam

7. Complete the following table, identifying each type of fuel and the amount used. Specify the units for heat content, hourly usage, and yearly usage.

| FUEL TYPE | HEAT CONTENT | % SULFUR | % ASH | MAXIMUM HOURLY USAGE | ACTUAL YEARLY USAGE |
|---|---|---|---|---|---|
| Natural Gas | 1,000/cu ft | <0.5 | <0.05 | 12,000 cu ft | $1.1 \times 10^8$ |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

8. Please list any fuel components that are hazardous air pollutants and the percentage in the fuel.

N/A

9. Operating Schedule: 24 hours/day 7 days/week 52 weeks/year
(**Stand-by use only**)

10. Stack Data:
A. Height: ______
B. Inside diameter: ______
C. Exit gas velocity: ______
D. Exit gas temperature: ______

11. UTM Coordinates:
A. Zone 16 East B. North 1397881.99 C. East 629265.96

# FUEL BURNING EQUIPMENT (page 2 of 2)



12. POLLUTANT EMISSIONS:

14.3 MMBTU

Emission rate calculations are attached under support calculations.

| EMISSION POINT NO. | POLLUTANT (note 1) | CONTROL EQUIPMENT | | ACTUAL EMISSION RATE | | | PROPOSED ALLOWABLE EMISSION RATE | | |
|---|---|---|---|---|---|---|---|---|---|
| | | yes/no * | effic. | note 2 | lb/hr | tn/1mo | note 2 | lb/hr | tn/yr |
| EP005 | $SO_x$ | NO | N/A | lb/MMBTU | 0.02 | 0.01 | lb/MMBTU | 68.60 | 0.04 ✓ |
| EP005 | $NO_x$ | NO | N/A | lb/MMBTU | 4.76 | 1.71 | lb/MMBTU | 4.76 | 8.77 ✓ |
| EP005 | CO | NO | N/A | lb/MMBTU | 1.19 | 0.43 | lb/MMBTU | 1.19 | 2.19 ✓ |
| EP005 | PM | NO | N/A | lb/MMBTU | 0.10 | 0.04 | lb/MMBTU | 31.30 | 0.16 ✓ |
| EP005 | PM-10 | NO | N/A | lb/MMBTU | 0.10 | 0.04 | lb/MMBTU | 31.30 | 0.16 ✓ |
| EP005 | VOCs | NO | N/A | lb/MMBTU | 0.10 | 0.04 | lb/MMBTU | 0.10 | 0.18 ✓ |

see last pg. of sub section

1. All regulated air pollutants including hazardous air pollutants emitted from this source should be listed. A list of regulated air pollutants has been provided in Section A.
2. Provide emission rate in units of applicable emission standard, e.g. lb/MMbtu, gr/dscf, etc. This may not apply to every emission point or every pollutant from an emission point.

* If yes, attach appropriate Air Pollution Control Data Sheet from Section L or manufacturers specifications if other.

COMPLIANCE DEMONSTRATION
BY RECORDKEEPING

SECTION M7

1. Emission Point No./Name : EP005 Primary and Stand-By Boilers

2. Pollutant: PM, PM10, SOx, NOx, CO, VOCS

3. Material or parameter being monitored or recorded: Sulfur content of fuel

4. Method of monitoring and recordkeeping: Fuel supplier certification

5. List any EPA methods used: N/A

6. Compliance shall be demonstrated:

X Daily(A) ____ Weekly ____ Monthly ____ Quarterly

(A) upon receipt of No. 2 Fuel Oil shipment

## COMPLIANCE CERTIFICATION — SECTION O

1. Emission Point No./Name : EP005 Primary and Stand-by Boilers

2. Indicate the source compliance status:

   A. __X__ Where this source is currently in compliance, we will continue to operate and maintain this source to assure compliance for the duration of the permit.

   B. _____ The Current Emissions Requirements and Status form (previous page) includes new requirements that apply or will apply to this source during the term of the permit. We will meet such requirements on a timely basis.

   C. _____ This source is not in compliance. The following statement of corrective action is submitted to describe action which we will take to achieve compliance.

      1. _____ Attached is a brief description of the problem and the proposed solution.

      2. _____ We will achieve compliance according to the following schedule.

**Progress reports will be submitted**:
Starting date: __________ and every six (6) months thereafter

| Problem | Action | Deadline |
|---|---|---|
| | | |
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# SUPPORT CALCULATIONS

JOB 940168/3 B

SHEET NO. 1 OF

CALCULATED BY STM DATE 2-26-95

CHECKED BY DATE

SCALE

AquAeTer
215 Jamestown Park, Suite 204
Brentwood, TN 37027
(615) 373-8532 FAX (615) 373-8512

KMCC - COLUMBUS

EMISSIONS CALCULATIONS

$\frac{34 \times 10^6 \text{ Btu/hr}}{140\text{k Btu/gal}} = \frac{243 \text{ gal}}{\text{hr}}$

?

PRIMARY AND STANDBY BOILERS

The boilers are operated as a primary heat generator and a stand-by or alternative heat generator.

Emission factors for Fuel Oil and Natural Gas are given by AP42.

The maximum capacity for the boilers is rated at 34 and 14.3 million BTU/hr Natural Gas and 100 gallons/hr Fuel Oil.

The boilers are fired with low sulfur (< 0.5 % wt) No.2 Oil only when necessary.

According to the AP42, boilers can be approximately classified by gross heat rate. The boilers at Columbus are therefore classified as Industrial for $10 \times 10^6$ to $100 \times 10^6$ BTU/hr.

Uncontrolled Emission Factors for Natural Gas Combustion

Emission factors are expressed as weight per volume fuel fired.

| Emission | | $lb/MM\ ft^3$ |
|---|---|---|
| Particulates: | PM | 2.5 ✓ |
| | PM-10 | 2.5 ✓ |
| $SO_2$ | | 0.6 ✓ |
| NOx | | 140 ✓ |
| CO | | 35 ✓ |
| VOCs | | 2.8 ✓ |

1,000 $BTU/ft^3$ of Natural Gas

Therefore,

Particulates: PM, PM-10

$$\frac{2.5 \text{ lb}}{MMft^3} * \frac{ft^3}{1{,}000 \text{ BTU}} * \frac{34 \text{ MMBTU}}{hr} = 0.085 \text{ lbs/hr PM, PM-10}$$

JOB 940168/3 B

SHEET NO. 2 OF

CALCULATED BY STM DATE 2-26-95

CHECKED BY DATE

SCALE

AquAeTer

215 Jamestown Park, Suite 204
Brentwood, TN 37027
(615) 373-8532 FAX (615) 373-8512

KMCC- COLUMBUS
EMISSION CALCULATIONS

▶ BOILERS (continued)

$$SO_2 = \frac{0.6\ lb}{MMft^3} * \frac{ft^3}{1{,}000\ BTU} * \frac{34\ MMBTU}{hr} = 0.0204\ lbs/hr\ SO_2$$

$$NOx = \frac{140\ lb}{MMft^3} * \frac{ft^3}{1{,}000\ BTU} * \frac{34\ MMBTU}{hr} = 4.76\ lbs/hr\ NOx$$

$$CO = \frac{35\ lb}{MMft^3} * \frac{ft^3}{1{,}000\ BTU} * \frac{34\ MMBTU}{hr} = 1.19\ lbs/hr\ CO$$

$$VOCs = \frac{2.8\ lb}{MMft^3} * \frac{ft^3}{1{,}000\ BTU} * \frac{34\ MMBTU}{hr} = 0.0952\ lbs/hr\ VOC$$

Summary,
Short-term emissions in lbs/hr

Nat. Gas

| | |
|---|---|
| Particulates: PM, PM-10 | = 0.085 lbs/hr |
| $SO_2$ | = 0.0204 lbs/hr |
| NOx | = 4.76 lbs/hr |
| CO | = 1.19 lbs/hr |
| VOCs | = 0.0952 lbs/hr |

Long-term emissions in tons/yr

$$PM, PM\text{-}10 = \frac{0.085\ lbs}{hr} * \frac{1\ ton}{2{,}000\ lbs} * \frac{8760\ hrs}{yr} = 0.3723\ tons/yr\ PM, PM\text{-}10$$

$$SO_2 = \frac{0.0204\ lbs}{hr} * \frac{1\ ton}{2{,}000\ lbs} * \frac{8760\ hrs}{yr} = 0.0894\ tons/yr\ SO_2$$

$$NOx = \frac{4.76\ lbs}{hr} * \frac{1\ ton}{2{,}000\ lbs} * \frac{8760\ hrs}{yr} = 20.8488\ tons/yr\ NOx$$

JOB 940168/3 B

SHEET NO. 3 OF

CALCULATED BY STM DATE 2-26-95

CHECKED BY DATE

SCALE

AquAeTer

215 Jamestown Park, Suite 204
Brentwood, TN 37027
(615) 373-8532 FAX (615) 373-8512

KMCC-COLUMBUS
EMISSION CALCULATIONS

BOILERS (continued)

$$CO = \frac{1.19\ lbs}{hr} * \frac{1\ ton}{2{,}000\ lbs} * \frac{8760\ lbs}{yr} = 5.2122\ tons/yr\ CO$$

$$VOCs = \frac{0.0952\ lbs}{hr} * \frac{1\ ton}{2{,}000\ lbs} * \frac{8760\ lbs}{yr} = 0.4170\ tons/yr\ VOC$$

Uncontrolled Emission factors for Fuel oil - Distillate oil
All emission factors are expressed as weight per volume fuel fired.

| Emission | $lb/10^3\ gal$ |
|---|---|
| Particulates: PM | 2 |
| PM-10 | 2 |
| $SO_2$ | (142)(weight % of sulfur in the oil) |
| NOx | 20 |
| CO | 5 |
| VOCs | 0.2 |

why not 283 gal/hr → Nozzle limits to 100 gals/hr

Particulates: PM, PM-10

$$\frac{2\ lb}{1{,}000\ gal} * \frac{100\ gal}{hr} = 0.2\ lbs/hr\ PM, PM\text{-}10$$

$$SO_2 = \frac{(142)(0.5)\ lb}{1{,}000\ gal} * \frac{100\ gal}{hr} = 7.1\ lbs/hr\ SO_2$$

$$NOx = \frac{20\ lb}{1{,}000\ gal} * \frac{100\ gal}{hr} = 2.0\ lbs/hr\ NOx$$

$$CO = \frac{5\ lb}{1{,}000\ gal} * \frac{100\ gal}{hr} = 0.5\ lbs/hr\ CO$$

| | | | |
|---|---|---|---|
| JOB | 940168/3 B | | |
| SHEET NO. | 4 | OF | |
| CALCULATED BY | SJM | DATE | 2-26-95 |
| CHECKED BY | | DATE | |
| SCALE | | | |

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KMCC-COLUMBUS
EMISSION CALCULATIONS

BOILERS (continued)

$VOCs = \frac{0.2\ lb}{1{,}000\ gal} * \frac{100\ gal}{hr} = 0.02\ lbs/hr\ VOCs$

Summary

Short-term emissions in lbs/hr,

| | | | |
|---|---|---|---|
| Particulates: PM, PM-10 | = | 0.2 | lbs/hr |
| $SO_2$ | = | 7.1 | lbs/hr |
| NOx | = | 2.0 | lbs/hr |
| CO | = | 0.5 | lbs/hr |
| VOCs | = | 0.02 | lbs/hr |

Long-term emissions in tons/yr,

$PM, PM\text{-}10 = \frac{0.2\ lbs}{hr} * \frac{1\ ton}{2{,}000\ lbs} * \frac{8760\ hrs}{yr} = 0.876\ tons/yr$ PM, PM-10

$SO_2 = \frac{7.1\ lbs}{hr} * \frac{1\ ton}{2{,}000\ lbs} * \frac{8760\ hrs}{yr} = 31.098\ tons/yr\ SO_2$

$NOx = \frac{2.0\ lbs}{hr} * \frac{1\ ton}{2{,}000\ lbs} * \frac{8760\ hrs}{yr} = 8.76\ tons/yr\ NOx$

$CO = \frac{0.5\ lbs}{hr} * \frac{1\ ton}{2{,}000\ lbs} * \frac{8760\ hrs}{yr} = 2.19\ tons/yr\ CO$

$VOCs = \frac{0.02\ lbs}{hr} * \frac{1\ ton}{2{,}000\ lbs} * \frac{8760\ lbs}{yr} = 0.0876\ tons/yr\ VOC$

| | | | |
|---|---|---|---|
| JOB | 940168/38 | | |
| SHEET NO. | 5 | OF | |
| CALCULATED BY | STM | DATE | 2-26-95 |
| CHECKED BY | | DATE | |
| SCALE | | | |

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KMCC-COLUMBUS
EMISSIONS CALCULATIONS

AA-001

▶ BOILERS (continued)

Assume 3 months operation with Fuel Oil and 9 months operation with Natural Gas

$PM, PM\text{-}10 = \frac{0.876 \text{ tons}}{yr} * \frac{3 \text{ mo.s}}{12 \text{ mo.s}} + \frac{0.3723 \text{ tons}}{yr} * \frac{9 \text{ mo.s}}{12 \text{ mo.s}} = 0.4982 \text{ tons/yr } PM, PM\text{-}10$

$SO_2 = \frac{31.098 \text{ tons}}{yr} * \frac{3 \text{ mo.s}}{12 \text{ mo.s}} + \frac{0.0894 \text{ tons}}{yr} * \frac{9 \text{ mo.s}}{12 \text{ mo.s}} = 7.8416 \text{ tons/yr } SO_2$

$NOx = \frac{8.76 \text{ tons}}{yr} * \frac{3 \text{ mo.s}}{12 \text{ mo.s}} + \frac{20.8488 \text{ tons}}{yr} * \frac{9 \text{ mo.s}}{12 \text{ mo.s}} = 17.8266 \text{ tons/yr } NOx$

$CO = \frac{2.19 \text{ tons}}{yr} * \frac{3 \text{ mo.s}}{12 \text{ mo.s}} + \frac{5.2122 \text{ tons}}{yr} * \frac{9 \text{ mo.s}}{12 \text{ mo.s}} = 4.4567 \text{ tons/yr } CO$

$VOC = \frac{0.0876 \text{ tons}}{yr} * \frac{3 \text{ mo.s}}{12 \text{ mo.s}} + \frac{0.4170 \text{ tons}}{yr} * \frac{9 \text{ mo.s}}{12 \text{ mo.s}} = 0.3347 \text{ tons/yr } VOC$

JOB 940168B

SHEET NO. 5 OF 5

CALCULATED BY MRC DATE 2/28/95

CHECKED BY STM DATE 3-8-95

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For maximum emissions, the emission rates that resulted in the maximum emissions was used. For example, natural gas is typically used continuously with oil being used about 1 month per year due to natural gas curtailment. TDS would use natural gas continuously if it was available. Therefore, for max emissions, the natural gas emission rates were used for $NO_x$, CO & VOC, since this results in the highest emissions. Oil is used about 1 month per year due to gas curtailment. The max anticipated gas curtailment has been estimated at 3 months. For PM, $PM_{10}$ and $SO_2$, oil emission rates are the highest, Therefore, for these 3 constituents, a 9 month natural gas and a 3 month oil emission calculation was assumed.

$$PM, PM_{10} = \overset{oil}{0.7884 \frac{tons}{yr}} * \frac{3\ mo}{12\ mo} + \overset{gas}{0.3066 \frac{tons}{yr}} * \frac{9\ mo}{12\ mo} = 0.4271 \frac{tons}{yr}$$

$$SO_2 = \overset{oil}{27.9882 \frac{tons}{yr}} * \frac{3\ mo}{12\ mo} + \overset{gas}{0.0736 \frac{ton}{yr}} * \frac{9\ mo}{12\ mo} = 7.0523 \frac{tons}{yr}$$

$$NO_x = \overset{gas}{17.1696 \frac{ton}{yr}} * \frac{12\ mo}{12\ mo} = 17.1696 \frac{tons}{yr}$$

$$CO = 4.2924 \frac{tons}{yr} * \frac{12\ mo}{12\ mo} = 4.2924 \frac{tons}{yr}$$

$$VOC_s = 0.3434 \frac{tons}{yr} * \frac{12\ mo}{12\ mo} = \overset{0.3434}{\cancel{0.1056}} \ tons/yr$$

| | | | |
|---|---|---|---|
| **Plant** | **Columbus** | | |
| **Process Unit** | **Primary Boiler** | | |
| **Emissions** | **Criteria Pollutants** | | Abbreviation |
| Boiler Size (MMBTU/Hr) | 34.0 | | A |
| BTU's per cubic ft of Natural Gas | 1,000 | | B |
| Annual Hours of Production | 8,760 | | C |
| Maximum Annual BTUs Capacity | 297,840 | D = A*C | D |
| Burning Capacity ft3 NG/Hr | 34,000 | E = A/B | E |
| Maximum Annual MMCubic ft of NG | 298 | F = C*E | F |
| No. 2 Fuel Oil Capacity; gal/hr | 100.00 | | G |
| Weekly Fuel Oil Cap. gal/week | 16,800.00 | H = G *24*7 | H |
| Monthly Fuel Oil Cap. gal/month | 72,000.00 | I = G*24*30 | I |
| Annual Fuel Oil Cap. gal/yr | 873,600.00 | J = H * 52 | J |

**Emission Factors for Uncontrolled Natural Gas Combustion**

| Boiler Type | Particulates PM lbs/MMcuft | Particulates PM10 lbs/MMcuft | Sulfur Dioxide lbs/MMcuft | Nitrogen Oxides lbs/MMcuft | Carbon Monoxide lbs/MMcuft | Volatile Non-Methane Organics lbs/MMcuft |
|---|---|---|---|---|---|---|
| **Industrial Boilers (a)** | 2.5 | 2.5 | 0.6 | 140 | 35 | 2.8 |

**Emission Factors for Uncontrolled Fuel Oil Combustion**

| Boiler Type | Particulates PM lb/1000 gal | Particulates PM10 lb/1000 gal | Sulfur Dioxide lb/1000 gal | Nitrogen Oxides lb/1000 gal | Carbon Monoxide lb/1000 gal | Volatile Non-Methane Organics lb/1000 gal |
|---|---|---|---|---|---|---|
| **Industrial Boilers (a)** | 2 | 2 | 142(S) | 20 | 5 | 0.2 |

**Maximum Annual Emissions Based on BTU Combustion Capacity Burning Natural Gas**

| Emission Rate | PM | PM10 | Sulfur Dioxide | Nitrogen Oxides | Carbon Monoxide | Volatile Non-Methane Organics | Total Criteria Pollutants TPY |
|---|---|---|---|---|---|---|---|
| **Lbs per Hour** | 0.085 | 0.085 | 0.020 | 4.760 | 1.190 | 0.095 | 6.236 |
| **Tons Per Year** | 0.372 | 0.372 | 0.089 | 20.849 | 5.212 | 0.417 | 27.312 |

**Maximum Annual Emissions Based on BTU Combustion Capacity Burning No. 2 Fuel Oil**

| Emission Rate | PM | PM10 | Sulfur Dioxide | Nitrogen Oxides | Carbon Monoxide | Volatile Non-Methane Organics | Total Criteria Pollutants |
|---|---|---|---|---|---|---|---|
| **Lbs per Hour** | 0.200 | 0.200 | 7.100 | 2.000 | 0.500 | 0.020 | 10.02 |
| **Tons Per Year** | 0.876 | 0.876 | 31.098 | 8.76 | 2.19 | 0.0876 | 43.8876 |

| Emission Rate | PM | PM10 | Sulfur Dioxide | Nitrogen Oxides | Carbon Monoxide | Volatile Non-Methane Organics | Total Criteria Pollutants |
|---|---|---|---|---|---|---|---|
| **Tons Natural Gas Emissions per 9 Months** | 0.279 | 0.279 | 0.067 | 15.637 | 3.909 | 0.313 | 20.484 |
| **Tons No. 2 Fuel Oil Emissions per 3 Months** | 0.219 | 0.219 | 7.775 | 2.190 | 0.548 | 0.022 | 10.972 |
| **Combined Tons per Year** | 0.498 | 0.498 | 7.842 | 17.827 | 4.457 | 0.335 | 31.456 |

Notes:
(a) Industrial boilers are classifed as having a heat input of 10 - 100 million BTUs (MMBTU) per hour.

F:\DATA\0168\COLUMBUS\BOIL_1.WK3
17-Mar-95
10:50 AM

| | | | |
|---|---|---|---|
| **Plant** | **Columbus** | | |
| **Process Unit** | **Secondary Boiler** | | |
| **Emissions** | **Criteria Pollutants** | | Abbreviation |
| Boiler Size (MMBTU/Hr) | 14.3 | | A |
| BTU's per cubic ft of Natural Gas | 1,000 | | B |
| Annual Hours of Production | 8,760 | | C |
| Maximum Annual BTUs Capacity | 125,268 | D = A*C | D |
| Burning Capacity ft3 NG/Hr | 14,300 | E = A/B | E |
| Maximum Annual MMCubic ft of NG | 125 | F = C*E | F |
| No. 2 Fuel Oil Capacity; gal/hr | 100.00 | | G |
| Weekly Fuel Oil Cap. gal/week | 16,800.00 | H = G *24*7 | H |
| Monthly Fuel Oil Cap. gal/month | 72,000.00 | I = G*24*30 | I |
| Annual Fuel Oil Cap. gal/yr | 873,600.00 | J = H * 52 | J |

**Emission Factors for Uncontrolled Natural Gas Combustion**

| Boiler Type | Particulates PM lbs/MMcuft | Particulates PM10 lbs/MMcuft | Sulfur Dioxide lbs/MMcuft | Nitrogen Oxides lbs/MMcuft | Carbon Monoxide lbs/MMcuft | Volatile Non-Methane Organics lbs/MMcuft |
|---|---|---|---|---|---|---|
| Industrial Boilers (a) | 2.5 | 2.5 | 0.6 | 140 | 35 | 2.8 |

**Maximum Annual Emissions Based on BTU Combustion Capacity Burning Natural Gas**

| Emission Rate | PM | PM10 | Sulfur Dioxide | Nitrogen Oxides | Carbon Monoxide | Volatile Non-Methane Organics | Total Criteria Pollutants TPY |
|---|---|---|---|---|---|---|---|
| Lbs per Hour | 0.036 | 0.036 | 0.009 | 2.002 | 0.501 | 0.040 | 2.623 |
| Tons Per Year | 0.157 | 0.157 | 0.038 | 8.769 | 2.192 | 0.175 | 11.487 |

Notes:
(a) Industrial boilers are classifed as having a heat input of 10 - 100 million BTUs (MMBTU) per hour.

F:\DATA\0168\COLUMBUS\BOIL_2.WK3
17-Mar-95
10:50 AM

# SAP TANKS

## MANUFACTURING PROCESSES (page 1 of 2) SECTION E

1. Emission Point No./ Name: EU009 Sap Tank 1

2. Process Description:

3. Was this unit constructed or modified after August 7, 1977? X yes ____ no
   If yes please give date and explain. Sap tanks were removed. Refer to Synthetic Minor Addendum

4. Rated Capacity (tons/hr): N/A

Raw Material Input:

| MATERIAL | QUANTITY/HR AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |

6. Product Output:

| PRODUCT or BY-PRODUCT | QUANTITY/HR AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |

7. Stack Data:
   A. Height: (Packed) ______ C. Exit gas velocity: ______
   B. Inside diameter: ______ D. Exit gas temperature: ______

8. UTM Coordinates:
   A. Zone 16 East B. North 1397846.59 C. East 629267.66

13. POLLUTANT EMISSIONS:

Emission rate calculations, monitoring data, or stack test data must be attached!

| EMISSION POINT NO. | POLLUTANT (note 1) | CONTROL EQUIPMENT | | ACTUAL EMISSION RATE | | | PROPOSED ALLOWABLE (A) EMISSION RATE (3) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | yes/no * | effic. | note 2 | lb/day | tn/yr | note 2 | lb/day | tn/day |
| EU009 | Naphthalene | NO | | lb/day | 0.60 | 0.1 | | | |
| EU009 | Dibenzofuran | NO | | lb/day | 0.1 | 0.1 | | | |
| EU009 | Quinoune | NO | | lb/day | 0.1 | 0.1 | | | |
| EU009 | Biphenyl | NO | | lb/day | 0.1 | 0.1 | | | |
| EU009 | VOCs | NO | | lb/day | 1.40 | 0.25 | | | |
| | | | | | | | | | |
| | | | | | | | | | |

1. All regulated air pollutants including hazardous air pollutants emitted from this source should be listed. A list of regulated air pollutants has been provided in Section A.

2. Provide emission rate in units of applicable emission standard, e.g. lb/MMbtu, gr/dscf, etc. This may not apply to every emission point or every pollutant from an emission point.

3. Emission rate with an assumed cyclone collection efficiency of 75%.

* If yes, attach appropriate Air Pollution Control Data Sheet from Section L or manufacturers specifications if other.

(A) Proposed allowable emission rates are not estimated as these units will be removed.

## MANUFACTURING PROCESSES (page 1 of 2) SECTION E

1. Emission Point No./ Name: EU010 Sap Tank 2

2. Process Description:

3. Was this unit constructed or modified after August 7, 1977? X yes ____ no
If yes please give date and explain. Sap tanks were removed. Refer to Synthetic Minor Addendum

4. Rated Capacity (tons/hr): N/A

Raw Material Input:

| MATERIAL | QUANTITY/HR AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |

6. Product Output:

| PRODUCT or BY-PRODUCT | QUANTITY/HR AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |

7. Stack Data:
   - A. Height: (Packed) ______
   - B. Inside diameter: ______
   - C. Exit gas velocity: ______
   - D. Exit gas temperature: ______

8. UTM Coordinates:
   A. Zone 16 East B. North 1397846.59 C. East 629267.66

## MANUFACTURING PROCESSES (page 2 of 2) SECTION E

13. POLLUTANT EMISSIONS:

Emission rate calculations, monitoring data, or stack test data must be attached!

| EMISSION POINT NO. | POLLUTANT (note 1) | CONTROL EQUIPMENT | | ACTUAL EMISSION RATE | | | PROPOSED ALLOWABLE (A) EMISSION RATE (3) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | yes/no * | effic. | note 2 | lb/day | tn/yr | note 2 | lb/day | tn/yr |
| EU010 | Naphthalene | NO | | lb/day | 0.60 | 0.1 | | | |
| EU010 | Dibenzofuran | NO | | lb/day | 0.1 | 0.1 | | | |
| EU010 | Quinoune | NO | | lb/day | 0.1 | 0.1 | | | |
| EU010 | Biphenyl | NO | | lb/day | 0.1 | 0.1 | | | |
| EU010 | VOCs | NO | | lb/day | 1.40 | 0.25 | | | |
| | | | | | | | | | |
| | | | | | | | | | |

1. All regulated air pollutants including hazardous air pollutants emitted from this source should be listed. A list of regulated air pollutants has been provided in Section A.

2. Provide emission rate in units of applicable emission standard, e.g. lb/MMbtu, gr/dscf, etc. This may not apply to every emission point or every pollutant from an emission point.

3. Emission rate with an assumed cyclone collection efficiency of 75%.

* If yes, attach appropriate Air Pollution Control Data Sheet from Section L or manufacturers specifications if other.

(A) Proposed allowable emission rates are not estimated as these units will be removed.

MANUFACTURING PROCESSES (page 1 of 2) SECTION E

1. Emission Point No./ Name: EU011 Sap Tank 3

2. Process Description:

3. Was this unit constructed or modified after August 7, 1977? X yes ______ no
If yes please give date and explain. Sap tanks were removed. Refer to Synthetic Minor Addendum

4. Rated Capacity (tons/hr): N/A

Raw Material Input:

| MATERIAL | QUANTITY/HR AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |

6. Product Output:

| PRODUCT or BY-PRODUCT | QUANTITY/HR AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |

7. Stack Data:
   A. Height: (Packed) ______
   B. Inside diameter: ______
   C. Exit gas velocity: ______
   D. Exit gas temperature: ______

8. UTM Coordinates:
   A. Zone 16 East B. North 1397846.59 C. East 629267.66

# MANUFACTURING PROCESSES (page 2 of 2)
## SECTION E

13. POLLUTANT EMISSIONS:

Emission rate calculations, monitoring data, or stack test data must be attached!

| EMISSION POINT NO. | POLLUTANT (note 1) | CONTROL EQUIPMENT | | ACTUAL EMISSION RATE | | | PROPOSED ALLOWABLE (A) EMISSION RATE (3) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | yes/no * | effic. | note 2 | lb/day | tn/yr | note 2 | lb/day | tn/yr |
| EU011 | Naphthalene | NO | | lb/day | 0.60 | 0.1 | | | |
| EU011 | Dibenzofuran | NO | | lb/day | 0.1 | 0.1 | | | |
| EU011 | Quinoune | NO | | lb/day | 0.1 | 0.1 | | | |
| EU011 | Biphenyl | NO | | lb/day | 0.1 | 0.1 | | | |
| EU011 | VOCs | NO | | lb/day | 1.40 | 0.25 | | | |
| | | | | | | | | | |
| | | | | | | | | | |

1. All regulated air pollutants including hazardous air pollutants emitted from this source should be listed. A list of regulated air pollutants has been provided in Section A.

2. Provide emission rate in units of applicable emission standard, e.g. lb/MMbtu, gr/dscf, etc. This may not apply to every emission point or every pollutant from an emission point.

3. Emission rate with an assumed cyclone collection efficiency of 75%.

* If yes, attach appropriate Air Pollution Control Data Sheet from Section L or manufacturers specifications if other.

(A) Proposed allowable emission rates are not estimated as these units will be removed.

# SUPPORT CALCULATIONS

JOB 94016813 B

SHEET NO. 1 OF

CALCULATED BY STM DATE 3-1-95

CHECKED BY DATE

SCALE

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KMCC-COLUMBUS
EMISSIONS CALCULATIONS

?

SAP TANKS
water derived emissions in terms of Naphthalene were modeled at 207.2947 lbs/yr
Short-term emissions in terms of lbs/day.
207.2947 lbs/yr * 1 yr/365 days = 0.5679 lbs/day Naphthalene

$\frac{77.4 \text{ lbs N}}{15.0 \text{ lbs Dbf}} = \frac{0.5679 \text{ lbs N}}{x \text{ lbs Dbf}}$ $x = \frac{(15.0 \text{ lbs Dbf})(0.5679 \text{ lbs N})}{(77.4 \text{ lbs N})}$

x = 0.1101 lbs/day Dibenzofuran

$\frac{77.4 \text{ lbs N}}{7.5 \text{ lbs Q}} = \frac{0.5679 \text{ lbs N}}{x \text{ lbs Q}}$ $x = \frac{(7.5 \text{ lbs Q})(0.5679 \text{ lbs N})}{(77.4 \text{ lbs N})}$

x = 0.0550 lbs/day Quinoline

$\frac{77.4 \text{ lbs N}}{0.1 \text{ lbs B}} = \frac{0.5679 \text{ lbs N}}{x \text{ lbs B}}$ $x = \frac{(0.1 \text{ lbs B})(0.5679 \text{ lbs N})}{(77.4 \text{ lbs N})}$

x = 0.0007 lbs/day Biphenyl

$VOC = \frac{0.5679 \text{ lb N}}{0.42} = 1.3521$ lbs/day VOC

This total is for all 3 tanks. This number was divided by 3 to find emissions for each individual tank.

# WASTEWATER TREATMENT SYSTEMS

## MANUFACTURING PROCESSES (page 2 of 2) — SECTION E

13. POLLUTANT EMISSIONS:

Emission rate calculations, monitoring data, or stack test data must be attached!

| EMISSION POINT NO. | POLLUTANT (note 1) | CONTROL EQUIPMENT | | ACTUAL EMISSION RATE | | | PROPOSED ALLOWABLE EMISSION RATE (3) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | yes/no * | effic. | note 2 | lb/hr | tn/yr | note 2 | lb/hr | tn/yr |
| N/A | Naphthalene | NO | N/A | lbs/hr - source | .123 | .430 | lbs/hr - source | .123 | .5394 |
| N/A | Quinoline | NO | N/A | lb/hr - source | .0119 | .041 | lbs/hr - source | .0119 | .0523 |
| N/A | Dibenzofuran | NO | N/A | lbs/hr - source | .024 | .083 | lbs/hr - source | .024 | .1045 |
| N/A | Biphenyl | NO | N/A | lbs/hr - source | .00016 | .005 | lbs/hr - source | .00016 | .0007 |
| N/A | VOCs | NO | N/A | lbs/hr - source | .292 | .799 | lbs/hr - source | .292 | 1.28 |
| | | | | | | | | | |
| | | | | | | | | | |

1. All regulated air pollutants including hazardous air pollutants emitted from this source should be listed. A list of regulated air pollutants has been provided in Section A.

2. Provide emission rate in units of applicable emission standard, e.g. lb/MMbtu, gr/dscf, etc. This may not apply to every emission point or every pollutant from an emission point.

3. Emission rate with an assumed cyclone collection efficiency of 75%.

* If yes, attach appropriate Air Pollution Control Data Sheet from Section L or manufacturers specifications if other.

# SUPPORT CALCULATIONS

JOB 940168/3

SHEET NO. 1 OF

CALCULATED BY STM DATE 2-26-95

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KMCC-COLUMBUS
EMISSIONS CALCULATIONS

▷ MISCELLANEOUS FUGITIVE EMISSIONS

Fugitive VOC emissions in the Synthetic Organic Chemicals Manufacturing Industry (SOCMI) are reduced by a factor of 10 to account for the lower volatility of creosote as compared to petroleum products (as per AWPI).

Heavy Liquid Valves
121 valves * 0.000507 lbs/hr VOC * 0.1 = 0.0061 lbs/hr VOC

Pressure Relief Valves
3 valves * 0.2293 lbs/hr VOC * 0.1 = 0.0688 lbs/hr VOC

Heavy Liquid Pump Seals
20 pump seals * 0.0472 lbs/hr VOC * 0.1 = 0.0944 lbs/hr VOC

Flanges
88 flanges * 0.00183 lbs/hr VOC * 0.1 = 0.0161 lbs/hr VOC

Summary
Short-term emissions in lbs/day VOC
Heavy Liquid Valves = 0.0061 lbs/hr * 24 hrs/day = 0.1464 lbs/day
Pressure Relief Valves = 0.0688 lbs/hr * 24 hrs/day = 1.6512 lbs/day
Heavy Liquid Pump Seals = 0.0944 lbs/hr * 24 hrs/day = 2.2656 lbs/day
Flanges = 0.0161 lbs/hr * 24 hrs/day = 0.3864 lbs/day

JOB 94016813 B

SHEET NO. 2 OF

CALCULATED BY STM DATE 2-26-95

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KMCC - COLUMBUS
EMISSIONS CALCULATIONS

MISCELLANEOUS FUGITIVE EMISSIONS (continued)
Long-term emissions in tons/yr VOC
Heavy Liquid valves

$\frac{0.0061 \text{ lbs}}{\text{hr}} * \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} * \frac{8760 \text{ hrs}}{1 \text{ yr}} = 0.0267$ tons/yr

Pressure Relief Valves

$\frac{0.0688 \text{ lbs}}{\text{hr}} * \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} * \frac{8760 \text{ hrs}}{1 \text{ yr}} = 0.3013$ tons/yr

Heavy Liquid Pump Seals

$\frac{0.0944 \text{ lbs}}{\text{hr}} * \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} * \frac{8760 \text{ hrs}}{1 \text{ yr}} = 0.4135$ tons/yr

Flanges

$\frac{0.0161 \text{ lbs}}{\text{hr}} * \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} * \frac{8760 \text{ hrs}}{1 \text{ yr}} = 0.0705$ tons/yr

From analytical measurements of an industry composite creosote, Naphthalene is equivalent to 42 percent of creosote or VOC emissions.
Therefore
Short-term emissions in lbs/day Naphthalene
Heavy Liquid Valves
0.1464 lbs/day * 0.42 = 0.0615 lbs/day

Pressure Relief Valves
1.6512 lbs/day * 0.42 = 0.6935 lbs/day

JOB 940168/3 B

SHEET NO. 3 OF

CALCULATED BY STM DATE 2-26-95

CHECKED BY DATE

SCALE

AquAeTer

215 Jamestown Park, Suite 204
Brentwood, TN 37027
(615) 373-8532 FAX (615) 373-8512

KMCC - COLUMBUS
EMISSIONS CALCULATIONS

MISCELLANEOUS FUGITIVE EMISSIONS (continued)

Heavy Liquid Pump Seals
2.2656 lbs/day * 0.42 = 0.9516 lbs/day

Flanges
0.3864 lbs/day * 0.42 = 0.1623 lbs/day

Long-term emissions in tons/yr Naphthalene

Heavy Liquid Valves
0.0267 tons/yr * 0.42 = 0.0112 tons/yr

Pressure Relief Valves
0.3013 tons/yr * 0.42 = 0.1265 tons/yr

Heavy Liquid Pump Seals
0.4135 tons/yr * 0.42 = 0.1737 tons/yr

Flanges
0.0705 tons/yr * 0.42 = 0.0296 tons/yr

FUGITIVE EMISSION COMPUTATIONS - COLUMBUS
F:\DATA\0168\COLUMBUS\FUGIT-V.WK3

| SOURCE | QUANTITY | EMISSION FACTOR (a) (lb/hr-source) | OPERATION TIME | | | NAPH-THALENE EMISSIONS (lb/yr) | ANNUAL CREOSOTE/ VOC EMISSIONS (lb/yr) | ANNUAL CREOSOTE/ VOC EMISSIONS (T/yr) |
|---|---|---|---|---|---|---|---|---|
| | | | (hrs/day) | (days/yr) | (hrs/yr) | | | |
| 1. HEAVY LIQUID PIPELINE VALVES | 121 | 0.0000507 | 24 | 365 | 8,760 | - | 53.74 | 0.03 |
| 2. OPEN ENDED VALVES | 0 | 0.000374 | 24 | 365 | 8,760 | - | 0.00 | 0.00 |
| 3. PRESSURE VENT RELIEF VALVES (b) | 3 | 0.02293 | 24 | 365 | 8,760 | - | 602.60 | 0.30 |
| 4. FLANGES | 88 | 0.000183 | 24 | 365 | 8,760 | - | 141.07 | 0.07 |
| 5. PUMP SEALS | | | | | | | | |
| LIGHT LIQUIDS | 0 | 0.01089 | 24 | 365 | 8,760 | - | 0.00 | 0.00 |
| HEAVY LIQUIDS | 20 | 0.00472 | 24 | 365 | 8,760 | - | 826.94 | 0.41 |
| 6. DRIP PAD (c) | 1 | 0.00784 | 24 | 365 | 8,760 | 68.69 | 163.54 | 0.08 |
| 7. TANK CONTAINMENT FIELD (c) | 1 | 0.00410 | 24 | 365 | 8,760 | 35.92 | 85.51 | 0.04 |
| 8. PROCESS DRAINS (d) | 11 | 0.007 | 24 | 365 | 8,760 | - | 674.52 | 0.34 |
| 9. "HOT" SUMP (e) | 1 | - | 24 | 365 | 8,760 | 20.6 | 49.05 | 0.02 |
| | | | | | Totals | 125.20 | 2,597 | 1.30 |

(a) Per AWPI, the SOCMI factor is multiplied by 0.1 due to less volatility for this plant than at a SOCMI facility.
(b) One Pressure Vent Relief Valve (PVRV) was assumed per retort. PVRV's on condensers were observed to be inoperative and were calculated as pipeline valves.
(c) The Drip Pad and Tank Containment Area emissions were derived by multiplying factors of 0.1 for thin films and 0.1 for affected areas by the SOW emissions as shown below.
(d) The AP-42 factor for process drains was multiplied by 0.1 due to less volatility for this plant than for a refinery.
(e) A "hot" sump was calculated from Water 8 to account for hot discharge to a central sump receiving direct process water.

Calculations:

| | |
|---|---|
| Annual Emissions (tons/yr) | = [Quantity] * [Emission Factor, lb/hr-source] * [Operation Time, hrs/yr] / [2,000 lb/ton] |
| Drip Pad Annual Emissions (tons/yr) | = [SOW Emissions, lb/yr] / [SOW Area, sq ft] * [0.1, Thin Films] * [0.1, Area of Drips] * [Area of Drip Pad, sq ft] / [0.42] / [2,000 lb/ton] |
| Tank Containment Annual Emissions (tons/yr) | = [SOW Emissions, lb/yr] / [SOW Area, sq ft] * [0.1, Thin Films] * [0.1, Area of Drips] * [Area of Tank Field, sq ft] / [0.42] / [2,000 lb/ton] |

FUGITIVE EMISSIONS BY INDIVIDUAL HAP

| SOURCE | HAP EMISSIONS (tons/yr) | | | | TOTAL HAPS (tons/yr) | TOTAL NON-HAP VOC (tons/yr) | TOTAL CREOSOTE (tons/yr) |
|---|---|---|---|---|---|---|---|
| | Quinoline 7.5% | Biphenyl 0.1% | Naphthalene 77.4% | Dibenzofuran 15.0% | | | |
| 1. HEAVY LIQUID PIPELINE VALVES | 0.0011 | 0.00001 | 0.011 | 0.0022 | 0.015 | 0.01 | 0.03 |
| 2. OPEN ENDED VALVES | 0.0000 | 0.00000 | 0.000 | 0.0000 | 0.000 | 0.00 | 0.00 |
| 3. PRESSURE VENT RELIEF VALVES | 0.0123 | 0.00016 | 0.127 | 0.0245 | 0.163 | 0.14 | 0.30 |
| 4. FLANGES | 0.0029 | 0.00004 | 0.030 | 0.0057 | 0.038 | 0.03 | 0.07 |
| 5. PUMP SEALS | | | | | | | |
| LIGHT LIQUIDS | 0.0000 | 0.00000 | 0.000 | 0.0000 | 0.000 | 0.00 | 0.00 |
| HEAVY LIQUIDS | 0.0168 | 0.00022 | 0.174 | 0.0337 | 0.224 | 0.19 | 0.41 |
| 6. DRIP PAD | 0.0033 | 0.00004 | 0.034 | 0.0067 | 0.044 | 0.04 | 0.08 |
| 7. TANK CONTAINMENT FIELD | 0.0017 | 0.00002 | 0.018 | 0.0035 | 0.023 | 0.02 | 0.04 |
| 8. PROCESS DRAINS | 0.0137 | 0.00018 | 0.142 | 0.0275 | 0.183 | 0.15 | 0.34 |
| 9. "HOT" SUMP | 0.0010 | 0.00001 | 0.010 | 0.0020 | 0.013 | 0.01 | 0.02 |
| Totals | 0.0528 | 0.0007 | 0.5454 | 0.1057 | 0.70 | 0.59 | 1.30 |

**STORAGE PILE**

## MANUFACTURING PROCESSES (page 1 of 2) SECTION E

1. Emission Point No./ Name: Black Tie Storage Yard

2. Process Description: Storage area for finished product - treated ties

3. Was this unit constructed or modified after August 7, 1977? ________ yes ___X____ no
   If yes please give date and explain. ________

4. Rated Capacity (tons/hr): N/A

Raw Material Input:

| MATERIAL | QUANTITY/HR AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |

6. Product Output:

| PRODUCT or BY-PRODUCT | QUANTITY/HR AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| Treated Ties | 83,100 | 138,500 | 332,400 |
| | | | |
| | | | |
| | | | |
| | | | |

7. Stack Data: N/A
   - A. Height: ______
   - B. Inside diameter: ______
   - C. Exit gas velocity: ______
   - D. Exit gas temperature: ______

8. UTM Coordinates:
   - A. Zone N/A
   - B. North ______
   - C. East ______

13. POLLUTANT EMISSIONS:

Emission rate calculations, monitoring data, or stack test data must be attached!

| EMISSION POINT NO. | POLLUTANT (note 1) | CONTROL EQUIPMENT | | ACTUAL EMISSION RATE | | | PROPOSED ALLOWABLE EMISSION RATE (3) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | yes/no * | effic. | note 2 | lb/hr | tn/yr | note 2 | lb/hr | tn/yr |
| Fugitive | Naphthalene | NO | N/A | # ties on site | .523 | 1.830 | # ties on site | .523 | 2.29 |
| Fugitive | Quinoline | NO | N/A | # ties on site | .050 | .176 | # ties on site | .050 | 0.22 |
| Fugitive | Dibenzofuran | NO | N/A | # ties on site | .100 | .351 | # ties on site | .100 | 0.44 |
| Fugitive | Biphenyl | NO | N/A | # ties on site | .009 | .032 | # ties on site | .009 | 0.04 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

1. All regulated air pollutants including hazardous air pollutants emitted from this source should be listed. A list of regulated air pollutants has been provided in Section A.

2. Provide emission rate in units of applicable emission standard, e.g. lb/MMbtu, gr/dscf, etc. This may not apply to every emission point or every pollutant from an emission point.

3. Emission rate with an assumed cyclone collection efficiency of 75%.

* If yes, attach appropriate Air Pollution Control Data Sheet from Section L or manufacturers specifications if other.

# SUPPORT CALCULATIONS

# COLUMBUS - ESTIMATED NAPHTHALENE EMISSIONS FROM A BLACK TIE STORAGE YARD

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| | | | | | |
|---|---|---|---|---|---|
| Facility | Kerr-McGee Chemical Corporation | | | | |
| Location | Columbus, MS | | | | |
| Max. Ties On Site | 138,500 | | | | |
| Min. Ties On Site | 27,700 | | | | |
| Ties/Unit | 27,700 | | Equivalent Annual Production is 332400 ties/yr. | | |
| S.A. of Six 49-tie Bundles | 1,212 ft² | | Most conservative surface area from reply to EPA. | | |
| Diameter of Test Pole | 11 in | | | | |
| Length of Test Pole | 40 ft | | | | |
| No. of Test Poles | 6 poles | | | | |
| S.A. of Test Poles | 699 ft² | | | | |
| Emissions (mg/hr): | N1(t) = | 18,104 | * exp ( | 0.46683 * t), | t <= 0.25 days |
| (Based on 6 poles with a | N2(t) = | 36,697 | * exp ( | -2.43497 * t), | 0.25 < t <= 1.0 day |
| 699 ft² surface area) | N3(t) = | 3,347 | * exp ( | -0.04358 * t), | t > 1.0 day |
| Emissions (lb/day/ft²): | N1(t) = | 1.370E-03 | * exp ( | 0.46683 * t), | t <= 0.25 days |
| (Based on 6 poles with a | N2(t) = | 2.777E-03 | * exp ( | -2.43497 * t), | 0.25 < t <= 1.0 day |
| 699 ft² surface area) | N3(t) = | 2.533E-04 | * exp ( | -0.04358 * t), | t > 1.0 day |
| Calculated 24-hr Average California Pole Test Temperature = | | | 80 °F | | |
| Temperature Correction Factor for Other Geographic Locations = exp[-11,161.25*(1/(T, °F+460)-1/(80+460))] | | | | | |
| Assumes 30 days/month | | | | | |

| Month | Black Tie Units on Site | No. of Black Ties | No. of 294-Tie Stacks | Total Yard Surface Area (ft²) | Percent of Ties __ Months Old: 0 mo. (0-30 d) | 1 mo. (30-60 d) | 2 mo. (60-90 d) | 3 mo. (90-120 d) | 4 mo. (120-150 d) | Tram Emissions: Surface Area (27700 ties/mo) (ft²/month) | N1 Rate (lb/ft²) 0-0.25 d | N2 Rate (lb/ft²) 0.25-1.0 d | Yard Emissions * Percent of Ties __ Months Old Rate N3(t) Emissions (lb naphthalene/ft² treated surface area): 1.0-30 d | 30-60 d | 60-90 d | 90-120 d | 120-150 d | Tram Sum | Yard Sum | Columbus, MS Average Temperature (°F) | Temperature Correction Factor | Total Naphthalene Emissions (lb) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | 83,100 | 283 | 342,576 | 33.3 | 33.3 | 33.3 | | | 103,047 | 3.63E-04 | 5.21E-04 | 1.33E-03 | 3.82E-04 | 1.03E-04 | | | 8.84E-04 | 1.82E-03 | 41.2 | 0.202 | 144 |
| 2 | 4 | 110,800 | 377 | 456,767 | 25.0 | 25.0 | 25.0 | 25.0 | | 103,047 | 3.63E-04 | 5.21E-04 | 9.98E-04 | 2.87E-04 | 7.76E-05 | 2.10E-05 | | 8.84E-04 | 1.38E-03 | 44.9 | 0.238 | 172 |
| 3 | 5 | 138,500 | 471 | 570,959 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 103,047 | 3.63E-04 | 5.21E-04 | 7.99E-04 | 2.29E-04 | 6.21E-05 | 1.68E-05 | 4.54E-06 | 8.84E-04 | 1.11E-03 | 52.6 | 0.331 | 240 |
| 4 | 4.43 | 122,671 | 417 | 505,707 | 22.6 | 22.6 | 22.6 | 22.6 | 9.7 | 103,047 | 3.63E-04 | 5.21E-04 | 9.02E-04 | 2.59E-04 | 7.01E-05 | 1.90E-05 | 2.20E-06 | 8.84E-04 | 1.25E-03 | 62.6 | 0.502 | 364 |
| 5 | 3.86 | 106,843 | 363 | 440,454 | 25.9 | 25.9 | 25.9 | 22.2 | | 103,047 | 3.63E-04 | 5.21E-04 | 1.04E-03 | 2.97E-04 | 8.05E-05 | 1.87E-05 | | 8.84E-04 | 1.43E-03 | 70.4 | 0.688 | 496 |
| 6 | 3.29 | 91,014 | 310 | 375,202 | 30.4 | 30.4 | 30.4 | 8.7 | | 103,047 | 3.63E-04 | 5.21E-04 | 1.22E-03 | 3.49E-04 | 9.45E-05 | 7.30E-06 | | 8.84E-04 | 1.67E-03 | 77.7 | 0.915 | 656 |
| 7 | 2.71 | 75,186 | 256 | 309,949 | 36.8 | 36.8 | 26.3 | | | 103,047 | 3.63E-04 | 5.21E-04 | 1.47E-03 | 4.23E-04 | 8.17E-05 | | | 8.84E-04 | 1.98E-03 | 80.9 | 1.035 | 728 |
| 8 | 2.14 | 59,357 | 202 | 244,697 | 46.7 | 46.7 | 6.7 | | | 103,047 | 3.63E-04 | 5.21E-04 | 1.86E-03 | 5.35E-04 | 2.07E-05 | | | 8.84E-04 | 2.42E-03 | 80.1 | 1.004 | 686 |
| 9 | 1.57 | 43,529 | 148 | 179,444 | 63.6 | 36.4 | | | | 103,047 | 3.63E-04 | 5.21E-04 | 2.54E-03 | 4.17E-04 | | | | 8.84E-04 | 2.96E-03 | 74.1 | 0.796 | 495 |
| 10 | 1 | 27,700 | 94 | 114,192 | 100.0 | | | | | 103,047 | 3.63E-04 | 5.21E-04 | 3.99E-03 | | | | | 8.84E-04 | 3.99E-03 | 62.3 | 0.496 | 272 |
| 11 | 1 | 27,700 | 94 | 114,192 | 100.0 | | | | | 103,047 | 3.63E-04 | 5.21E-04 | 3.99E-03 | | | | | 8.84E-04 | 3.99E-03 | 51.1 | 0.311 | 170 |
| 12 | 2 | 55,400 | 188 | 228,384 | 50.0 | 50.0 | | | | 103,047 | 3.63E-04 | 5.21E-04 | 2.00E-03 | 5.74E-04 | | | | 8.84E-04 | 2.57E-03 | 44.1 | 0.229 | |
| | | | | | | | | | | | | | Emissions for maximum on-site storage of 138500 ties is: | | | | | | | | Total (lb/yr) | 4,578 |
| | | | | | | | | | | | | | Annual Production is 332400 ties/yr | | | | | | | | Total (tons/yr) | 2.29 |

| INDIVIDUAL HAP EMISSIONS (tons/yr) | | | | | TOTAL |
|---|---|---|---|---|---|
| HAP | Quinoline | Biphenyl | Naphthalene | Dibenzofuran | HAPs |
| Percentage | 7.5% | 1.5% | 77.4% | 15.0% | (tons/yr) |
| Totals (tons/yr) | 0.22 | 0.04 | 2.29 | 0.44 | 3.00 |

Note: Black tie storage yard emissions were based on measured naphthalene emissions only. The additional three HAPs will therefore be additive.

# ROAD DUST

MANUFACTURING PROCESSES (page 1 of 2) SECTION E

1. Emission Point No./ Name: Road Dust

2. Process Description: Routine generation of dust particles from use of company vehicles on non-paved roads onsite

3. Was this unit constructed or modified after August 7, 1977? ________ yes __X__ no
If yes please give date and explain. ________

4. Rated Capacity (tons/hr): N/A

5. Raw Material Input:

| MATERIAL | QUANTITY/HR AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |

6. Product Output:

| PRODUCT or BY-PRODUCT | QUANTITY/HR AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |

7. Stack Data:
A. Height: ______
B. Inside diameter: ______
C. Exit gas velocity: ______
D. Exit gas temperature: ______

8. UTM Coordinates:
A. Zone N/A
B. North ______
C. East ______

13. POLLUTANT EMISSIONS:

Emission rate calculations, monitoring data, or stack test data must be attached!

| EMISSION POINT NO. | POLLUTANT (note 1) | CONTROL EQUIPMENT | | ACTUAL EMISSION RATE 4 Dust Bins per Week | | | PROPOSED ALLOWABLE EMISSION RATE | | |
|---|---|---|---|---|---|---|---|---|---|
| | | yes/no * | effic. | note 2 | lb/hr | tn/yr | note 2 | lb/hr | tn/yr |
| N/A | PM10 | NO | N/A | lb/VMT | 1.35 | 4.715 | lb/VMT | 1.35 | 5.9016 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

1. All regulated air pollutants including hazardous air pollutants emitted from this source should be listed. A list of regulated air pollutants has been provided in Section A.
2. Provide emission rate in units of applicable emission standard, e.g. lb/MMbtu, gr/dscf, etc. This may not apply to every emission point or every pollutant from an emission point.

* If yes, attach appropriate Air Pollution Control Data Sheet from Section L or manufacturers specifications if other.

NOTE: VMT = Vehicle Miles Traveled

# SUPPORT CALCULATIONS

PARTICULATE EMISSIONS - COLUMBUS VEHICULAR TRAFFIC COMPUTATION SHEET
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| VEHICLE | QTY | AVERAGE DISTANCE TRAVELED | | | MEAN VEHICLE SPEED (mph) | MEAN VEHICLE WEIGHT (tons) | MEAN NUMBER OF WHEELS (#) | EMISSION FACTOR (b) (lb/VMT) | EMISSIONS (b) (lb/day) | ANNUAL EMISSIONS (b) (tons/yr) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | NO. OF TRIPS (trips/vehicle/day) | AVG RUN (ft/trip) | VEHICLE MILES TRAVELED (VMT in miles/day (b) | | | | | | |
| 1. DELIVERY TRUCKS, (WOOD - INBOUND) | 12 | 1 | 7,920 | 18.00 | 5 | 27.5 | 18 | 0.8691 | 15.6446 | 2.8473 |
| 2. DELIVERY TRUCKS, (OUTBOUND) | 4 | 1 | 2,640 | 2.00 | 5 | 27.5 | 18 | 0.8691 | 1.7383 | 0.3164 |
| 3. FORK TRUCKS, TAYLOR TEH-300L, | 7 | 50 | 500 | 33.14 | 5 | 15.0 | 4 | 0.2681 | 8.8842 | 1.6169 |
| 4. FORK LIFT, WINHAM W-8 | 1 | 25 | 100 | 0.47 | 5 | 8.0 | 4 | 0.1726 | 0.0817 | 0.0149 |
| 5. FORK LIFT, NASCO DF-8 | 1 | 25 | 100 | 0.47 | 5 | 8.0 | 4 | 0.1726 | 0.0817 | 0.0149 |
| 6. FORK LIFT, NISSAN WF 30A35V | 1 | 25 | 100 | 0.47 | 5 | 3.8 | 4 | 0.1016 | 0.0481 | 0.0088 |
| 7. FORK LIFT, JOHN DEERE 644B | 2 | 50 | 500 | 9.47 | 5 | 17.0 | 4 | 0.2926 | 2.7708 | 0.5043 |
| 8. MOBILE DIESEL, PRENTICE KNUCKLEBOOM (210 | 3 | 4 | 1,400 | 3.18 | 5 | 6.0 | 4 | 0.1411 | 0.4491 | 0.0817 |
| 9. MOBILE DIESEL, PRENTICE KNUCKLEBOOM (210 | 4 | 4 | 1,400 | 4.24 | 5 | 6.0 | 4 | 0.1411 | 0.5988 | 0.1090 |
| 10. TIMBERJACK SKIDDER, 230D (a) | 1 | 5 | 500 | 0.47 | 5 | 6.0 | 4 | 0.1411 | 0.0668 | 0.0122 |
| 11. BACKHOE, FORD 455C | 1 | 10 | 1,100 | 2.08 | 5 | 6.3 | 4 | 0.1452 | 0.3026 | 0.0551 |
| 12. 1/2 TON PICKUPS | 9 | 10 | 1,350 | 23.01 | 5 | 2.5 | 4 | 0.0765 | 1.7598 | 0.3203 |
| | | | | | | | | | Total (tons/yr ) | 5.9016 |

(a) The Timberjack is only driven on a concrete drip pad, therefore, there are no dust emissions.
(b) Calculations:

| | |
|---|---|
| Vehicle Miles Traveled/Day (VMT/day) | = [# of Vehicles] * [Trips/Day/Vehicle] * [Avg. Trip Length, ft] / [5,280 ft/mile] |
| Emission Factor (lb/VMT) | = [(Particle Size, μm)*5.9] * [% Silt/12] * [(Speed, mph)/30] * [((Vehicle Wt., tons)/3)^0.7] * [(# Wheels/4)^0.5] * [(365 - # Wet Days)/365] |
| Emissions (lb/day) | = [Emission Factor, lb/VMT] * [Miles Traveled, VMT/day] |
| Annual Emissions (tons/yr) | = [Emissions, lb/day] * [7 days/week] * [52 weeks/yr] / [2,000 lb/ton] |

VARIABLES
Particle Size Multiplier

| SIZE | X | selection |
|---|---|---|
| < = 30 μm | 0.8 | 0.36 |
| < = 15 μm | 0.5 | |
| < = 10 μ | 0.36 | |
| < = 5 μm | 0.2 | |
| < = 2.5 μ | 0.095 | |

| Road Type | % silt | selection |
|---|---|---|
| Gravel | 5 | 5 |
| Dirt | 28.5 | |
| C Limestone | 9.6 | |

| Rain Days (by Site) AP-42 | p | selection |
|---|---|---|
| Madison, Illinois | 115 | 110 |
| Avoca, Pennsylvania | 130 | |
| The Dalles, Oregon | 165 | |
| Columbus, Mississippi | 110 | |
| Texarkana, Texas | 100 | |
| Springfield, Illinois | 115 | |
| Indianapolis, Indiana | 125 | |

Precipitation/Evapotranspiration Data for Columbus

| Month | Precip (in) | Evap (in) | Surplus/(Deficit) | Wet days |
|---|---|---|---|---|
| Jan | 5.65 | 0.85 | 4.80 | 30 |
| Feb | 4.63 | 1.76 | 2.87 | 30 |
| Mar | 6.94 | 3.63 | 3.31 | 30 |
| Apr | 5.66 | 6.08 | (0.42) | 0 |
| May | 5.22 | 7.75 | (2.53) | 0 |
| Jun | 3.72 | 8.41 | (4.69) | 0 |
| Jul | 4.59 | 8.10 | (3.51) | 0 |
| Aug | 2.84 | 7.31 | (4.47) | 0 |
| Sep | 3.64 | 5.79 | (2.15) | 0 |
| Oct | 2.99 | 4.47 | (1.48) | 0 |
| Nov | 4.63 | 2.51 | 2.12 | 30 |
| Dec | 5.61 | 1.21 | 4.40 | 30 |
| | | | Wet days | 150 |

**Assumptions**
1. Assumes 52 wks/yr, 7 days/wk, 24 hrs/day operation
2. The greater number of Wet (or Rain) Days from the AP-42 or Weather Data was used.

# FUGITIVE EMISSION UNITS

## MANUFACTURING PROCESSES (page 1 of 2) SECTION E

1. Emission Point No./ Name: Fugitive Emissions

2. Process Description: Fugitive emissions from plant processes including valves, flanges, seals, sumps, black tie storage, tank containment, and retort drip pad

3. Was this unit constructed or modified after August 7, 1977? X yes ____ no
If yes please give date and explain. Routine maintenance activities

4. Rated Capacity (tons/hr): Various

Raw Material Input:

| MATERIAL | QUANTITY/HR AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |

6. Product Output:

| PRODUCT or BY-PRODUCT | QUANTITY/HR AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |

7. Stack Data: N/A
A. Height: ____
B. Inside diameter: ____
C. Exit gas velocity: ____
D. Exit gas temperature: ____

8. UTM Coordinates:
A. Zone N/A
B. North ____
C. East ____

WASTEWATER TREATMENT EMISSION COMPUTATIONS - COLUMBUS
F:\DATA\0168\COLUMBUS\WWATER-V.WK3 03/20/95 12:11 PM

7.2 lbs/hr

| SOURCE | QUANTITY | WATER8 MODEL EMISSIONS | AP-42 FACTOR (c) | | OPERATION TIME | | | FLOW RATE | | | | NAPH-THALENE EMISSIONS | ANNUAL CREOSOTE/ VOC EMISSIONS | ANNUAL CREOSOTE/ VOC EMISSIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (lb naph./yr) | Factor | Units | (hr/day) | (days/yr) | (hr/yr) | (gpm) | (mgd) | (Kgal/yr) | (Mgal/yr) | (lb/yr) | (lb/yr) | (tons/yr) |
| 1. COOLING TOWERS (a) | 2 | - | 0.6 | lb VOC/Mgal | 24 | 365 | 8,760 | 200 | 0.288 | 105,120 | 105.1 | - | 0.0 | 0.00 |
| 2. PRIMARY OIL/WATER SEPARATOR TANKS (b) | 2 | 74.4 | - | - | 24 | 365 | 8,760 | 20 | 0.029 | 10,438 | 10.4 | 74.4 | 177.1 | 0.09 |
| 3. SECONDARY OIL/WATER SEPARATOR (b) | | | | | | | | | | | | | | |
| PROCESS WATER | 1 | 323.2 | - | - | 24 | 365 | 8,760 | 20 | 0.029 | 10,438 | 10.4 | 323.2 | 769.6 | 0.38 |
| 4. SURGE TANK (b) | 1 | 96.3 | - | - | 24 | 365 | 8,760 | 20 | 0.029 | 10,438 | 10.4 | 96.3 | 229.3 | 0.11 |
| 5. AERATED TANKS (b) | 3 | 474.8 | - | - | 24 | 365 | 8,760 | 20 | 0.029 | 10,438 | 10.4 | 474.8 | 1,130.5 | 0.57 |
| 6. GROUNDWATER OIL/WATER SEPARATOR | 1 | 32.3 | - | - | 24 | 365 | 8,760 | 15 | 0.022 | 8,042 | 8.0 | 201.0 | 478.6 | [illegible] |
| | | | | | | | | | | Totals | | 1,170 | 2,785 | [illegible] |

Notes:
(a) Under Mississippi regulations cooling towers are considered insignificant sources.
(b) Emissions estimated from EPA's Water7 Air Emission Model for Wastewater Treatment. The annual poundage is divided by 42.0% (0.42) in order to obtain annual creosote emissions.
(c) AP-42 emission factors were developed for the petroleum industry. A factor of 0.10 times the AP-42 factors has been used to determine low-volatility emissions.

Calculations:

| | | |
|---|---|---|
| Operation Time (hr/yr) | = | [hr/day] * [# days/yr] |
| Flow Rate (mgd) | = | [Flow Rate, gpm] * [60 min/hr] * [24 hr/day] / [1000000 gal/Mgal] |
| Flow Rate (Kgal/yr) | = | [Flow Rate, gpm] * [60 min/hr] * [Operation time, hr/yr] / [1000 gal/Kgal] |
| Flow Rate (Mgal/yr) | = | [Flow Rate, gpm] * [60 min/hr] * [Operation time, hr/yr] / [1000000 gal/Mgal] |
| Process Drains | = | [Operation time, hr/yr] * [AP-42 Factor, lb/hr-source] * [# of sources] |
| Total Emissions, lb/yr (cooling tower) | = | [Flow Rate, Mgal/yr] * [AP-42 Factor, lb/hr-flow basis] * [# of units] |
| Annual Emissions, tons/yr | = | [Total Emissions, lb/yr] / [2000 lb/ton] |

EMISSIONS FROM WASTEWATER SOURCES BY INDIVIDUAL HAP

| SOURCE | HAP EMISSIONS (tons/yr) | | | | UNCONTROLLED EMISSIONS | | |
|---|---|---|---|---|---|---|---|
| | Quinoline 7.5% | Biphenyl 0.1% | Naphthalene 77.4% | Dibenzofuran 15.0% | TOTAL HAPS (tons/yr) | NON-HAP VOC (tons/yr) | TOTAL VOC/ CREOSOTE (tons/yr) |
| 1. Cooling Towers | 0.00 | 0.00000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2. Primary Oil/Water Separator Tanks | 0.00 | 0.00005 | 0.04 | 0.01 | 0.05 | 0.04 | 0.09 |
| 3. Secondary Oil/Water Separator | | | | | | | |
| Process Water | 0.02 | 0.00021 | 0.16 | 0.03 | 0.21 | 0.18 | 0.38 |
| 4. Surge Tank | 0.00 | 0.00006 | 0.05 | 0.01 | 0.06 | 0.05 | 0.11 |
| 5. Aerated Tanks (No Controls) | 0.02 | 0.00031 | 0.24 | 0.05 | 0.31 | 0.26 | 0.57 |
| 6. Groundwater Oil/Water Separator | 0.01 | 0.00013 | 0.10 | 0.02 | 0.13 | 0.11 | 0.24 |
| Totals | 0.06 | 0.00076 | 0.58 | 0.11 | 0.76 | 0.64 | 1.39 |

# SUPPORT CALCULATIONS

## MANUFACTURING PROCESSES (page 2 of 2) — SECTION E

13. POLLUTANT EMISSIONS:

Emission rate calculations, monitoring data, or stack test data must be attached!

| EMISSION POINT NO. | POLLUTANT (note 1) | CONTROL EQUIPMENT | | ACTUAL EMISSION RATE (a) | | | PROPOSED ALLOWABLE EMISSION RATE (3) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | yes/no * | effic. | note 2 | lb/hr | tn/yr | note 2 | lb/hr | tn/yr |
| EP012 | Naphthalene | No | | lb/hr | .023 | .10 | lb/hr | .023 | .10 |
| EP012 | Quinoline | No | | lb/hr | .002 | 0.01 | lb/hr | .002 | 0.01 |
| EP012 | Dibenzofuran | No | | lb/hr | .005 | .02 | lb/hr | .005 | .02 |
| EP012 | Biphenyl | No | | lb/hr | .00003 | .00013 | lb/hr | .00003 | .00013 |
| EP012 | VOCs | No | | lb/hr | .055 | .24 | lb/hr | .055 | .24 |
| | | | | | | | | | |
| | | | | | | | | | |

1. All regulated air pollutants including hazardous air pollutants emitted from this source should be listed. A list of regulated air pollutants has been provided in Section A.

2. Provide emission rate in units of applicable emission standard, e.g. lb/MMbtu, gr/dscf, etc. This may not apply to every emission point or every pollutant from an emission point.

3. Emission rate with an assumed cyclone collection efficiency of 75%.

* If yes, attach appropriate Air Pollution Control Data Sheet from Section L or manufacturers specifications if other.

(a) Emissions are continuous.

## MANUFACTURING PROCESSES (page 1 of 2) SECTION E

1. Emission Point No./ Name: EP012 - Groundwater Oil/Water Separator

2. Process Description: Separation and recovery of creosote from ground water

3. Was this unit constructed or modified after August 7, 1977? X yes ____ no
   If yes please give date and explain. Unit added in 1994

4. Rated Capacity (tons/hr): N/A

Raw Material Input:

| MATERIAL | QUANTITY/HR AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |

6. Product Output:

| PRODUCT or BY-PRODUCT | QUANTITY/HR AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |

7. Stack Data: Scrubber
   A. Height: (Packed) 10 ft
   B. Inside diameter: 2 ft
   C. Exit gas velocity: 200 acfm
   D. Exit gas temperature: 200° F

8. UTM Coordinates:
   A. Zone 16 East
   B. North 1397973.68
   C. East 629058.79

13. POLLUTANT EMISSIONS:

Emission rate calculations, monitoring data, or stack test data must be attached!

| EMISSION POINT NO. | POLLUTANT (note 1) | CONTROL EQUIPMENT | | ACTUAL EMISSION RATE (a) | | | PROPOSED ALLOWABLE EMISSION RATE (3) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | yes/no * | effic. | note 2 | lb/hr | tn/yr | note 2 | lb/hr | tn/yr |
| EP011 | Naphthalene | NO | | lb/hr | .055 | .24 | lb/hr | .055 | .24 |
| EP011 | Quinoline | NO | | lb/hr | .005 | .02 | lb/hr | .005 | .02 |
| EP011 | Dibenzofuran | NO | | lb/hr | .011 | .05 | lb/hr | .011 | .05 |
| EP011 | Biphenyl | NO | | lb/hr | .00007 | .00031 | lb/hr | .00007 | .00031 |
| EP011 | VOCs | NO | | lb/hr | .13 | .57 | lb/hr | .13 | .57 |
| | | | | | | | | | |
| | | | | | | | | | |

1. All regulated air pollutants including hazardous air pollutants emitted from this source should be listed. A list of regulated air pollutants has been provided in Section A.

2. Provide emission rate in units of applicable emission standard, e.g. lb/MMbtu, gr/dscf, etc. This may not apply to every emission point or every pollutant from an emission point.

3. Emission rate with an assumed cyclone collection efficiency of 75%.

* If yes, attach appropriate Air Pollution Control Data Sheet from Section L or manufacturers specifications if other.

(a) Emissions are continuous.

## MANUFACTURING PROCESSES (page 1 of 2) SECTION E

1. Emission Point No./ Name: EP011 - Aerated Basins (3)

2. Process Description: Additional equalization and dampening of flow variation

3. Was this unit constructed or modified after August 7, 1977? ________ yes ________ no
If yes please give date and explain. ________

4. Rated Capacity (tons/hr): N/A

Raw Material Input:

| MATERIAL | QUANTITY/HR AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |

6. Product Output:

| PRODUCT or BY-PRODUCT | QUANTITY/HR AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |

7. Stack Data: Scrubber
   - A. Height: (Packed) 10 ft
   - B. Inside diameter: 2 ft
   - C. Exit gas velocity: 200 acfm
   - D. Exit gas temperature: 200° F

8. UTM Coordinates:
   - A. Zone 16 East
   - B. North #1 1397987.76, #2 1397973.34, #3 1397997.62
   - C. East #1 628999.20, #2 629020.74, #3 629033.43

# MANUFACTURING PROCESSES (page 2 of 2)
## SECTION E

13. POLLUTANT EMISSIONS:

Emission rate calculations, monitoring data, or stack test data must be attached!

| EMISSION POINT NO. | POLLUTANT (note 1) | CONTROL EQUIPMENT | | ACTUAL EMISSION RATE (a) | | | PROPOSED ALLOWABLE EMISSION RATE (3) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | yes/no * | effic. | note 2 | lb/hr | tn/yr | note 2 | lb/hr | tn/yr |
| EP010 | Naphthalene | No | | lb/hr | .009 | .05 | lb/hr | .011 | .05 |
| EP010 | Quinoline | No | | lb/hr | 0 | 0 | lb/hr | 0 | 0 |
| EP010 | Dibenzofuran | No | | lb/hr | .0018 | .01 | lb/hr | .002 | .01 |
| EP010 | Biphenyl | No | | lb/hr | .0001 | .0006 | lb/hr | .0001 | .0006 |
| EP010 | VOCs | No | | lb/hr | .003 | .11 | lb/hr | .025 | .11 |
| | | | | | | | | | |
| | | | | | | | | | |

1. All regulated air pollutants including hazardous air pollutants emitted from this source should be listed. A list of regulated air pollutants has been provided in Section A.

2. Provide emission rate in units of applicable emission standard, e.g. lb/MMbtu, gr/dscf, etc. This may not apply to every emission point or every pollutant from an emission point.

3. Emission rate with an assumed cyclone collection efficiency of 75%.

* If yes, attach appropriate Air Pollution Control Data Sheet from Section L or manufacturers specifications if other.

(a) Emissions are continuous.

## MANUFACTURING PROCESSES (page 1 of 2) SECTION E

1. Emission Point No./ Name: EP010 - Surge Tank

2. Process Description: Stabilizes organic loading to aerated settling basins

3. Was this unit constructed or modified after August 7, 1977? ________ yes ________ no
If yes please give date and explain.

4. Rated Capacity (tons/hr): N/A

Raw Material Input:

| MATERIAL | QUANTITY/HR AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |

6. Product Output:

| PRODUCT or BY-PRODUCT | QUANTITY/HR AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |

7. Stack Data: Scrubber
   A. Height: (Packed) 10 ft
   B. Inside diameter: 2 ft
   C. Exit gas velocity: 200 acfm
   D. Exit gas temperature: 200° F

8. UTM Coordinates:
   A. Zone 16 East
   B. North 1398024.42
   C. East 629043.56

# MANUFACTURING PROCESSES (page 2 of 2)
## SECTION E

13. POLLUTANT EMISSIONS:

Emission rate calculations, monitoring data, or stack test data must be attached!

| EMISSION POINT NO. | POLLUTANT (note 1) | CONTROL EQUIPMENT | | ACTUAL EMISSION RATE (a) | | | PROPOSED ALLOWABLE EMISSION RATE (3) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | yes/no * | effic. | note 2 | lb/hr | tn/yr | note 2 | lb/hr | tn/yr |
| EP009 | Naphthalene | No | | lb/hr | .037 | .16 | lb/hr | .037 | .16 |
| EP009 | Quinoline | No | | lb/hr | .005 | .02 | lb/hr | .005 | .02 |
| EP009 | Dibenzofuran | No | | lb/hr | .007 | .03 | lb/hr | .007 | .03 |
| EP009 | Biphenyl | No | | lb/hr | .00005 | .00021 | lb/hr | .00005 | .00021 |
| EP009 | VOCs | No | | lb/hr | .087 | .38 | lb/hr | .087 | .38 |
| | | | | | | | | | |
| | | | | | | | | | |

1. All regulated air pollutants including hazardous air pollutants emitted from this source should be listed. A list of regulated air pollutants has been provided in Section A.

2. Provide emission rate in units of applicable emission standard, e.g. lb/MMbtu, gr/dscf, etc. This may not apply to every emission point or every pollutant from an emission point.

3. Emission rate with an assumed cyclone collection efficiency of 75%.

* If yes, attach appropriate Air Pollution Control Data Sheet from Section L or manufacturers specifications if other

(a) Emissions are continuous..

## MANUFACTURING PROCESSES (page 1 of 2) SECTION E

1. Emission Point No./ Name: EP009 - Secondary Oil/Water Separator

2. Process Description: Separation and recovery of creosote

3. Was this unit constructed or modified after August 7, 1977? ________ yes ________ no
If yes please give date and explain.

4. Rated Capacity (tons/hr): N/A

Raw Material Input:

| MATERIAL | QUANTITY/HR AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |

6. Product Output:

| PRODUCT or BY-PRODUCT | QUANTITY/HR AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |

7. Stack Data: Scrubber
A. Height: (Packed) 10 ft
B. Inside diameter: 2 ft
C. Exit gas velocity: 200 acfm
D. Exit gas temperature: 200° F

8. UTM Coordinates:
A. Zone 16 East
B. North 1398024.42
C. East 629043.56

13. POLLUTANT EMISSIONS:

Emission rate calculations, monitoring data, or stack test data must be attached!

| EMISSION POINT NO. | POLLUTANT (note 1) | CONTROL EQUIPMENT | | ACTUAL EMISSION RATE (a) | | | PROPOSED ALLOWABLE EMISSION RATE (3) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | yes/no * | effic. | note 2 | lb/hr | tn/yr | note 2 | lb/hr | tn/yr |
| EP007 | Naphthalene | No | | lb/hr | .009 | .04 | lb/hr | .009 | .04 |
| EP007 | Quinoline | No | | lb/hr | 0 | 0 | lb/hr | 0 | 0 |
| EP007 | Dibenzofuran | No | | lb/hr | .002 | .01 | lb/hr | .002 | .01 |
| EP007 | Biphenyl | No | | lb/hr | .00001 | .00005 | lb/hr | .00001 | .00005 |
| EP007 | VOCs | No | | lb/hr | .021 | .09 | lb/hr | .021 | .09 |
| | | | | | | | | | |
| | | | | | | | | | |

1. All regulated air pollutants including hazardous air pollutants emitted from this source should be listed. A list of regulated air pollutants has been provided in Section A.

2. Provide emission rate in units of applicable emission standard, e.g. lb/MMbtu, gr/dscf, etc. This may not apply to every emission point or every pollutant from an emission point.

3. Emission rate with an assumed cyclone collection efficiency of 75%.

* If yes, attach appropriate Air Pollution Control Data Sheet from Section L or manufacturers specifications if other.

(a) Emissions are continuous.

MANUFACTURING PROCESSES (page 1 of 2) SECTION E

1. Emission Point No./ Name: EP007 - Primary Oil/Water Separators (2)

2. Process Description: Additional equalization and dampening of flow variations

3. Was this unit constructed or modified after August 7, 1977? ________ yes ________ no
If yes please give date and explain.

4. Rated Capacity (tons/hr): N/A

Raw Material Input:

| MATERIAL | QUANTITY/HR AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |

6. Product Output:

| PRODUCT or BY-PRODUCT | QUANTITY/HR AVERAGE | QUANTITY/HR MAXIMUM | QUANTITY/YEAR |
|---|---|---|---|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |

7. Stack Data: Scrubber
A. Height: (Packed) 10 ft
B. Inside diameter: 2 ft
C. Exit gas velocity: 200 acfm
D. Exit gas temperature: 200° F

8. UTM Coordinates:
A. Zone 16 East
B. North #1 1397878.34
#2 1397899.39
C. East #1 629142.68
#2 629142.80

## Section D

## Current Emission Status
## Form N

List applicable state and federal regulations and applicable test methods for determining compliance with each applicable requirement. Clearly identify federal regulations from state requirements. Provide the compliance status as of the day the application is signed.

| Emission Point No. | Applicable Requirement | Pollutant | Test Method | Limits | Compliance Status IN / OUT |
|---|---|---|---|---|---|
| EP005 | 40 CFR 60.42c | $SO_2$ | Fuel certification | no > 0.5 wt percent sulfur | IN |
| EP002-EP005 | 40 CFR 60.43c | PM | Fuel certification | no > 20% opacity/6 min avg. | IN |
| EP001, EP006 | 40 CFR 70.2 | VOCs | Measured data, AP42, SOCMI, EPA Water 8 | 100 tpy | IN |
| EP002-EP005 | APC-S-1.3(2)(3) | PM/opacity | Material Balance/AP-42 | Narrative | IN |
| EP005 | APC-S-1.4(1)(a) | Sulfur Dioxide | Manufacter's specification | not > 4.8 lbs/mmBTU | IN |
| EP001, EP006 | APC-S-1.8 | HAPs | Measured data, AP42, SOCMI, EPA Water 8 | Narrative | IN |
| EP001, EP006 | 40 CFR 63 | HAPs | Measured data, AP42, SOCMI, EPA Water 8 | 10 tpy each, 25 tpy total | IN |

KERR-McGEE CHEMICAL CORPORATION
P.O. BOX 906 • COLUMBUS, MISSISSIPPI 39703-0906

RECEIVED
APR 26 1995
Dept. of Environmental Quality
Office of Pollution Control

April 25, 1995

Mesha Williams
Department of Environmental Quality
Air Permitting Branch
P. O. Box 10385
Jackson, MS 39289-0385

Dear Ms. Williams:

Following is a tentative schedule for construction of two new work tanks at our Columbus, MS facility. This is in regard to your letter dated April 12, 1995.

| Projected Date | Task | Estimated Completion |
|---|---|---|
| December 1994 | Design Foundation - Tanks and Piping | December 1994 |
| April 10, 1995 | Contract on Foundation Let | April 10, 1995 |
| April 10, 1995 | Contract on Tanks Let | April 10, 1995 |
| April 10, 1995 | Contract on Piping Let | April 10, 1995 |
| May 8, 1995 | Construct Foundation | 30 Days[1] |
| May 8, 1995 | Order air scrubber, fans, and ancillary equipment | 90 Days[2] |

---

[1]After Approval of Permit Modification

[2]Receipt of Equipment

FOREST PRODUCTS

| Projected Date | Task | Estimated Completion |
|---|---|---|
| May 8, 1995 | Put out Bid for installation of air scrubber, fans, and ancillary equipment | 30 Days |
| June 1995 | Construction and installation of work tanks | 45 Days |
| Mid July 1995 | Construction and installation of piping | 45 Days |
| Mid July 1995 | Let contract on installation of air scrubber, fans and ancillary equipment | Mid July 1995 |
| August 1995 | Installation of air scrubber, fans and ancillary equipment | 45 Days |
| Fall 1995 | Start up system with two new work tanks | |

Upon receipt of our permit modification we will issue a revised schedule with more specific dates. If you have any questions or comments concerning this schedule, please advise.

Sincerely,

KERR-McGEE CHEMICAL CORPORATION
FOREST PRODUCTS DIVISION

Charles J. Swann

Charles J. Swann
Supervisor Treating Operations

CJS/tjj

cc: A. N. Helms
N. Bock
J. Upmore

# TANKS PROGRAM 2.0
## EMISSIONS REPORT - DETAIL FORMAT
## TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification

| | |
|---|---|
| Identification No.: | EU006 |
| City: | Columbus |
| State: | MS |
| Company: | Kerr-McGee Chemical Corp. |
| Type of Tank: | Horizontal Fixed Roof |

Tank Dimensions

| | |
|---|---|
| Shell Length (ft): | 30 |
| Diameter (ft): | 18 |
| Volume(gallons): | 57000 |
| Is tank underground? (Y/N): | N |
| Turnovers: | 216 |
| Net Throughput (gal/yr): | 12300000 |

Paint Characteristics

| | |
|---|---|
| Shell Color/Shade: | Gray/Medium |
| Shell Condition: | Good |

Breather Vent Settings

| | |
|---|---|
| Vacuum Setting (psig): | 0.00 |
| Pressure Setting (psig): | 0.00 |

Meteorological Data Used in Emission Calculations: Jackson, Mississippi

# TANKS PROGRAM 2.0
## EMISSIONS REPORT - DETAIL FORMAT
## TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

**Identification**

| | |
|---|---|
| Identification No.: | EU007 |
| City: | Columbus |
| State: | MS |
| Company: | Kerr-McGee Chemical Corp. |
| Type of Tank: | Horizontal Fixed Roof |

**Tank Dimensions**

| | |
|---|---|
| Shell Length (ft): | 30 |
| Diameter (ft): | 18 |
| Volume(gallons): | 57000 |
| s tank underground? (Y/N): | N |
| rnovers: | 216 |
| et Throughput (gal/yr): | 12300000 |

**Paint Characteristics**

| | |
|---|---|
| Shell Color/Shade: | Gray/Medium |
| Shell Condition: | Good |

**Breather Vent Settings**

| | |
|---|---|
| Vacuum Setting (psig): | 0.00 |
| Pressure Setting (psig): | 0.00 |

Meteorological Data Used in Emission Calculations: Jackson, Mississippi

KERR-McGEE CHEMICAL CORPORATION
P.O. BOX 906 • COLUMBUS, MISSISSIPPI 39703-0906



April 25, 1995

Mesha Williams
Department of Environmental Quality
Air Permitting Branch
P. O. Box 10385
Jackson, MS 39289-0385

Dear Ms. Williams:

Following is a tentative schedule for construction of two new work tanks at our Columbus, MS facility. This is in regard to your letter dated April 12, 1995.

| Projected Date | Task | Estimated Completion |
|---|---|---|
| December 1994 | Design Foundation - Tanks and Piping | December 1994 |
| April 10, 1995 | Contract on Foundation Let | April 10, 1995 |
| April 10, 1995 | Contract on Tanks Let | April 10, 1995 |
| April 10, 1995 | Contract on Piping Let | April 10, 1995 |
| May 8, 1995 | Construct Foundation | 30 Days[1] |
| May 8, 1995 | Order air scrubber, fans, and ancillary equipment | 90 Days[2] |

---

[1]After Approval of Permit Modification

[2]Receipt of Equipment

KM Forest Products

| Projected Date | Task | Estimated Completion |
|---|---|---|
| May 8, 1995 | Put out Bid for installation of air scrubber, fans, and ancillary equipment | 30 Days |
| June 1995 | Construction and installation of work tanks | 45 Days |
| Mid July 1995 | Construction and installation of piping | 45 Days |
| Mid July 1995 | Let contract on installation of air scrubber, fans and ancillary equipment | Mid July 1995 |
| August 1995 | Installation of air scrubber, fans and ancillary equipment | 45 Days |
| Fall 1995 | Start up system with two new work tanks | |

Upon receipt of our permit modification we will issue a revised schedule with more specific dates. If you have any questions or comments concerning this schedule, please advise.

Sincerely,

KERR-McGEE CHEMICAL CORPORATION
FOREST PRODUCTS DIVISION

Charles J. Swann

Charles J. Swann
Supervisor Treating Operations

CJS/tjj

cc: A. N. Helms
N. Bock
J. Upmore

# TANKS PROGRAM 2.0
## EMISSIONS REPORT - DETAIL FORMAT
## TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification

| | |
|---|---|
| Identification No.: | EU006 |
| City: | Columbus |
| State: | MS |
| Company: | Kerr-McGee Chemical Corp. |
| Type of Tank: | Horizontal Fixed Roof |

Tank Dimensions

| | |
|---|---|
| Shell Length (ft): | 30 |
| Diameter (ft): | 18 |
| Volume(gallons): | 57000 |
| Is tank underground? (Y/N): | N |
| Turnovers: | 216 |
| Net Throughput (gal/yr): | 12300000 |

Paint Characteristics

| | |
|---|---|
| Shell Color/Shade: | Gray/Medium |
| Shell Condition: | Good |

Breather Vent Settings

| | |
|---|---|
| Vacuum Setting (psig): | 0.00 |
| Pressure Setting (psig): | 0.00 |

Meteorological Data Used in Emission Calculations: Jackson, Mississippi

Identification

| | |
|---|---|
| Identification No.: | EU007 |
| City: | Columbus |
| State: | MS |
| Company: | Kerr-McGee Chemical Corp. |
| Type of Tank: | Horizontal Fixed Roof |

Tank Dimensions

| | |
|---|---|
| Shell Length (ft): | 30 |
| Diameter (ft): | 18 |
| Volume(gallons): | 57000 |
| Is tank underground? (Y/N): | N |
| Turnovers: | 216 |
| Net Throughput (gal/yr): | 12300000 |

Paint Characteristics

| | |
|---|---|
| Shell Color/Shade: | Gray/Medium |
| Shell Condition: | Good |

Breather Vent Settings

| | |
|---|---|
| Vacuum Setting (psig): | 0.00 |
| Pressure Setting (psig): | 0.00 |

Meteorological Data Used in Emission Calculations: Jackson, Mississippi

# TANKS PROGRAM 2.0
## EMISSIONS REPORT - DETAIL FORMAT
## LIQUID CONTENTS OF STORAGE TANK

| Mixture/Component | Month | Daily Liquid Surf. Temperatures (deg F) Avg. | Min. | Max. | Liquid Bulk Temp. (deg F) | Vapor Pressures (psia) Avg. | Min. | Max. | Vapor Mol. Weight | Liquid Mass Fract. | Vapor Mass Fract. | Mol. Weight | Basis for Vapor Pressure Calculations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cresol (-o) | All | 73.89 | 62.97 | 84.81 | 67.68 | 0.0038 | 0.0021 | 0.0066 | 108.140 | | | 108.14 | Option 2: A=6.9110, B=1435.500, C=165.160 |

Annual Emission Calculations

| | |
|---|---|
| Standing Losses (lb): | 10.4084 |
| Vapor Space Volume (cu ft): | 4850.11 |
| Vapor Density (lb/cu ft): | 0.0001 |
| Vapor Space Expansion Factor: | 0.082167 |
| Vented Vapor Saturation Factor: | 0.998193 |
| | |
| Tank Vapor Space Volume | |
| Vapor Space Volume (cu ft): | 4850.11 |
| Tank Diameter (ft): | 18 |
| Effective Diameter (ft): | 26 |
| Vapor Space Outage (ft): | 9.00 |
| Tank Shell Height (ft): | 30 |
| | |
| Vapor Density | |
| Vapor Density (lb/cu ft): | 0.0001 |
| Vapor Molecular Weight (lb/lb-mole): | 108.140000 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.003795 |
| Daily Avg. Liquid Surface Temp. (deg R): | 533.56 |
| Daily Average Ambient Temp. (deg. R): | 524.27 |
| Ideal Gas Constant R (psia cuft /(lb-mole-deg R)): | 10.731 |
| Liquid Bulk Temperature (deg R): | 527.35 |
| Tank Paint Solar Absorptance: | 0.68 |
| Daily Total Solar Insolation Factor (Btu/sqftday): | 1409.00 |
| | |
| Vapor Space Expansion Factor | |
| Vapor Space Expansion Factor: | 0.082167 |
| Daily Vapor Temperature Range (deg R): | 43.68 |
| Daily Vapor Pressure Range (psia): | 0.004442 |
| Breather Vent Press. Setting Range(psia): | 0.00 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.003795 |
| Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia): | 0.002118 |
| Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia): | 0.006560 |
| Daily Avg. Liquid Surface Temp. (deg R): | 533.56 |
| Daily Min. Liquid Surface Temp. (deg R): | 522.64 |
| Daily Max. Liquid Surface Temp. (deg R): | 544.48 |
| Daily Ambient Temp. Range (deg.R): | 23.40 |

DETAIL CALCULATIONS (AP-42), CONT.

Annual Emission Calculations

| | |
|---|---|
| Vented Vapor Saturation Factor | |
| Vented Vapor Saturation Factor: | 0.998193 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.003795 |
| Vapor Space Outage (ft): | 9.00 |
| | |
| Withdrawal Losses (lb): | 36.7458 |
| Vapor Molecular Weight (lb/lb-mole): | 108.140000 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.003795 |
| Annual Net Throughput (gal/yr): | 12300000 |
| Turnover Factor: | 0.3057 |
| Tank Diameter (ft): | 18 |
| Working Loss Product Factor: | 1.00 |
| | |
| Total Losses (lb): | 47.15 |

Annual Emissions Report

| Liquid Contents | Losses (lbs.): Standing | Withdrawal | Total |
|---|---|---|---|
| Cresol (-o) | 10.41 | 36.75 | 47.15 |
| Total: | 10.41 | 36.75 | 47.15 |

$$\frac{47.15\ \text{lbs}}{\text{yr}} \times \frac{1\ \text{ton}}{2000\ \text{lbs}} \times = .024\ \text{TPY}$$

# TANKS PROGRAM 2.0
## EMISSIONS REPORT - DETAIL FORMAT
## LIQUID CONTENTS OF STORAGE TANK

| Mixture/Component | Month | Daily Liquid Surf. Temperatures (deg F) Avg. | Min. | Max. | Liquid Bulk Temp. (deg F) | Vapor Pressures (psia) Avg. | Min. | Max. | Vapor Mol. Weight | Liquid Mass Fract. | Vapor Mass Fract. | Mol. Weight | Basis for Vapor Pressure Calculations |
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DETAIL CALCULATIONS (AP-42), CONT.

Annual Emission Calculations

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| Tank Diameter (ft): | 18 |
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| | |
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Annual Emissions Report

| Liquid Contents | Losses (lbs.): Standing | Withdrawal | Total |
|---|---|---|---|
| Cresol (-o) | 10.41 | 36.75 | 47.15 |
| Total: | 10.41 | 36.75 | 47.15 |

$$\frac{47.15\ \cancel{\text{lbs}}}{\text{yr}} \times \frac{1\ \text{ton}}{2000\ \cancel{\text{lbs}}} = \underline{.024\ \text{TPY}}$$