HERCULES

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July 13, 2015

VIA ELECTRONIC DELIVERY

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Subject: Submission of Final Phase I and II Investigation Report
Hercules Incorporated, Hattiesburg Facility
Hattiesburg, Forrest County, Mississippi
USEPA RCRA 3013(a) Administrative Order
USEPA ID No. MSD 008 182 081
Docket No. RCRA-04-2011-4251
MDEQ AI No. 2022

Dear Messrs. Lamberth, Norman, and Sanders:

On May 14, 2015, Hercules Incorporated (Hercules; a wholly owned subsidiary of Ashland, Inc.) received comments from the U.S. Environmental Protection Agency (USEPA) and Mississippi Department of Environmental Quality (MDEQ) on the Revised DRAFT Phase I and II Investigation Report. The comments pertained to the Revised DRAFT document that was submitted on October 30, 2014. All comments in Enclosure 1 of the USEPA letter have been addressed through modification of the text and figures. Comments provided in Enclosure 2 of the USEPA letter were also addressed if additional activities were required. Section 9 of the report provides a path forward for additional field activities that will be conducted. Information received from the additional activities will be provided to the USEPA and MDEQ in separate reports that will focus on specific technical issues. As discussed with the USEPA and MDEQ, we believe the data sets generated to date along with the data collection activities discussed in Section 9 of the report will provide sufficient information to complete the human health and ecological risk assessments for the site.

As specified in Paragraph 95 of the Order, the following certification is made:

I certify that the information contained in and accompanying this submission is true, accurate, and complete. As to those identified portions of this submission for which I cannot personally verify the truth and accuracy, I certify as the facility official having supervisory responsibility for the person who, acting upon my direct instructions, made the verification, that this information is true, accurate, and complete.

Signature: Michael S. Roe

Name: Michael S. Roe

Title: Secretary – Hercules Incorporated

If there are any questions concerning this submittal, please contact Hercules Project Coordinator Mr. Timothy Hassett at (302) 995-3456.

Sincerely,

Michael S. Roe

Michael S. Roe
Secretary
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MSR/cep

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FINAL - Phase I and II Investigation Report

USEPA RCRA 3013(a)
Administrative Order
EPA ID No. MSD 008 182 081
Docket No. RCRA-04-2011-4251
MDEQ AI No. 2022

Hattiesburg, Mississippi

July 13, 2105

ARCADIS

John Ellis
Principal Scientist



I have reviewed this document in sufficient depth to accept full responsibility for its contents.

Michael M. Gates, RPG

FINAL
Phase I and II Investigation Report

USEPA RCRA 3013(a)
Administrative Order
Hattiesburg, Mississippi

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Executive Summary

This Final Phase I and Phase II Investigation Report (Investigation Report) summarizes the investigative activities conducted at the Hercules Incorporated (Hercules) facility located in Hattiesburg, Mississippi. These activities were conducted in response to the May 9, 2011, 3013(a) Administrative Order (the AO) issued by Region 4 of the U.S. Environmental Protection Agency (USEPA). This Investigation Report addresses comments provided by USEPA in letters dated March 11, 2014, and May 14, 2015. Certain interim measure activities pertaining to Area #1 and Area #2 that were identified in the 3008(h) Administrative Order on Consent (Consent Order) dated July 3, 2014, are also discussed. In addition to discussing the work completed for the AO, a description of the investigative activities that have been conducted at the facility since the 1980s is also provided.

The Phase I Investigation focused on assessing off-site conditions and was initiated in February 2012. Activities completed include a water well survey of the surrounding area, collection of soil, groundwater, surface water, sediment, soil gas, and ambient air samples. This effort resulted in the collection of more than 150 samples that were analyzed for a comprehensive chemical analyte list (typically the Appendix IX list).

The data collected during the Phase I activities were screened against the USEPA Regional Screen Levels (RSLs) and the Mississippi Department of Environmental Quality (MDEQ) Tier 1 Target Remediation Goals. The results were presented in the Constituents of Potential Concern (COPCs) Technical Report dated November 16, 2012. The outcome of the screening allowed for a focused chemical analyte list for the Phase II investigation.

The Phase II Investigation focused on assessing on-site conditions and was initiated in November 2012. Activities that were conducted included the collection of soil, groundwater, surface water, sediment, and ambient air samples. This effort resulted in the collection of more than 200 samples that were analyzed for the refined chemical analyte list.

The results of the Phase I and II sampling identified three distinct areas requiring additional investigation. These areas are identified as Area #1, Area #2, and Area #3. Area #1 is an area of off-site impacts in groundwater along the eastern boundary of the facility along Providence Street and West 8th Street. Area #2 is an area primarily on Hercules property south of West 7th Street. Area #3 is an area on the Hercules property near Zeon Chemicals, L.P. (Zeon).

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In May 2012, a geophysical investigation was conducted along Providence Street and the eastern boundary of the Hercules facility. The investigation was designed to provide information on the subsurface lithology, preferential groundwater flow paths (due to differences in water saturation compared to less saturated soil), and the delineation of accumulations of non-aqueous phase liquids (NAPL). Based on this survey, temporary wells were installed during several mobilizations. In January 2013, a permanent monitoring well was installed on an off-site residential property.

Area #1 was further investigated in September 2013 and included installation of 13 temporary monitoring wells and collection of groundwater samples for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). In addition, one sample was collected from existing well MW-129D. A memorandum was submitted to USEPA on June 24, 2014, summarizing the data collected in September 2013 and proposed additional work in Area #1. In July 2014, 18 new monitoring wells were installed in Area #1 and sampled for VOCs and SVOCs. Finally, in July 2014, one ambient air sample and one crawl space air sample were collected at the 135 West 8th Street property.

Area #2 was investigated in September 2013 and included an underground utility survey, identification of potential underground storage tanks (USTs), collection of soil samples, installation of temporary wells, and collection of groundwater samples. This effort resulted in the collection of 11 temporary well samples and four soil samples analyzed for VOCs and SVOCs. A memorandum was submitted to USEPA on June 24, 2014, summarizing the data collected in September/October 2013 and proposed additional work in Area #2. In July 2014, four additional temporary wells were installed and samples were analyzed for VOCs and SVOCs. Excavation activities were conducted in July 2014 in an effort to locate and remove the USTs and evaluate the scale structure. No USTs were located and the scale was determined to not be a source of COPCs.

Area #3 was investigated in September 2013 and included the installation of temporary wells and collection of groundwater samples. This effort resulted in the collection of seven temporary well samples analyzed for VOCs and SVOCs. A memorandum was submitted to USEPA on June 24, 2014, summarizing the data collected in September 2013. No further investigation was proposed in Area #3.

For this Investigation Report, data were screened against applicable human health and ecological screening standards, where available. Based on this screening, a focused list of COPCs has been defined for each media for both human health and ecological

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evaluation. Following the additional supplemental investigations described in Section 9 of this report, a human health risk assessment and screening level ecological risk assessment will be conducted as outlined in Sections 9 and 10 of the Revised Phase II Work Plan dated July 20, 2012.

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1. Introduction

Hercules Incorporated (Hercules) submits this Final Phase I and Phase II Investigation Report (Investigation Report) to comply with the May 9, 2011, Administrative Order (the AO) issued by Region 4 of the U.S. Environmental Protection Agency (USEPA). The AO was issued pursuant to Section 3013(a) of the Resource Conservation and Recovery Act (RCRA), 42 United States Code §6934(a), and is specific to the Hercules' Hattiesburg, Mississippi, site (**Figures 1** and **2**); referred to as the "Site" or the "former Hercules Plant" herein. The AO contemplated this two-step process, whereby Phase I would initially focus on off-Site conditions and subsequent Phase II would focus on on-Site conditions.

Follow-up investigations based on the findings of the original Phase I and II work were conducted in three areas: (1) Area #1 for off-Site impacts in groundwater along the eastern boundary of the facility along Providence Street and West 8th Street; (2) Area #2 primarily on Hercules property and south of West 7th Street; and, (3) Area #3 on the Hercules property near Zeon Chemicals, L.P. (Zeon). The USEPA subsequently issued a RCRA Administrative Order on Consent (Consent Order) pursuant to Section 3008(h) on July 3, 2014. The Consent Order focused on interim measures for several areas at the Site. The areas included Area #1, Area #2, the Impoundment Basin (IB) decommissioning work, and the Providence Street sewer repair.

Data collected from supplemental assessments of Area #1 and Area #2 are included in this Investigation Report. In addition, additional work proposed to supplement the investigation in certain areas of the Site is further discussed in Section 9. The results of the IB decommissioning work and supplemental work beyond the scope of this Investigation Report will be submitted under separate covers. The Providence Street Sewer repair report was submitted on June 10, 2015.

1.1 Purpose and Scope

The scope of the AO and the activities required under the AO is to assess the presence, magnitude, extent, direction, and rate of movement of the constituents to be investigated under the AO (the Constituents). The investigation approach includes incorporating and utilizing existing sampling data previously collected as part of Site-related assessments conducted by Hercules, USEPA, or the State of Mississippi (the State) that relate to the purposes of the AO.

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Activities include completed assessments to characterize the source(s) of Site-related Constituents, characterize the potential pathways of migration of Constituents, define the degree and extent of the presence of any Constituents, and identify actual or potential human and/or ecological receptors. Detected Constituents were investigated to determine the nature and extent of these Constituents relative to any identified or potential human or ecological receptors.

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1.2 Planning and Implementation

1.2.1 Phase I Activities

Pursuant to the AO, Hercules submitted a Phase I Sampling and Analysis Work Plan on July 14, 2011. Hercules submitted the Revised Phase I Sampling and Analysis Work Plan (Revised Phase I Work Plan; ARCADIS 2011a) on December 16, 2011, pursuant to the AO and USEPA's August 25, 2011, "Review of Phase I Sampling and Analysis Work Plan dated July 14, 2011", August 30, 2011, "Review of Phase I Sampling and Analysis Work Plan, dated July 14, 2011," and December 9, 2011, "Approval of Phase I Work Plan" letters.

As discussed during the June 9, 2011, USEPA meeting in Atlanta, Georgia, and subsequent comments provided during conference calls, components of the Phase II activities were also addressed in the Revised Phase I Work Plan. Specifically, a portion of the groundwater assessment identified in the AO as part of Phase II was conducted under Phase I as required to properly assess the potential migration of Constituents to off-Site properties. Hercules began Phase I sample collection activities in February 2012 and the primary Phase I activities were completed in April 2012. Continuation of Phase I off-Site investigations (Area #1) were conducted in September 2012 and January 2013.

1.2.2 Phase II Activities

Pursuant to the AO, Hercules submitted a Phase II Sampling and Analysis Work Plan on September 20, 2011. On March 19, 2012, USEPA issued a disapproval of the September 20, 2011, Phase II Sampling and Analysis Work Plan. A Revised Phase II Sampling and Analysis Work Plan (Revised Phase II Work Plan; ARCADIS 2012a) was submitted to USEPA on July 23, 2012. A conditional approval of the Revised Phase II Work Plan was granted by USEPA in a letter dated August 6, 2012.

Within the letter, USEPA did not approve the preliminary constituents of concern (COCs) list proposed in the document, but requested the preparation of a technical memorandum presenting the process for screening data obtained during July 2011 monitoring well sampling and the Phase I activities and selection of constituents of potential concern (COPCs) based on the screening process. The COPC report (ARCADIS 2012b) provided a description of the evaluation used to screen the existing data and proposed a COPC list for future investigative activities at the Site.

The USEPA approved the COPC report on November 1, 2012. Hercules initiated Phase II sample collection activities in November 2012.

1.2.3 Follow-Up Activities

The results of the Phase I and Phase II sampling identified three distinct areas requiring additional investigation. These areas are identified as Area #1, Area #2, and Area #3. Area #1 is an area of off-Site impacts in groundwater along the eastern boundary of the facility along Providence Street and West 8th Street. Area #2 is an area primarily on Hercules property south of West 7th Street. Area #3 is an area on the Hercules property near Zeon.

In July 2013, three separate work plans were submitted to USEPA (Follow-Up Area #1 Work Plan [ARCADIS 2013a], Follow-Up Area #2 Work Plan [ARCADIS 2013b], and Follow-Up Area #3 Work Plan [ARCADIS 2013c]), outlining the supplemental sampling proposed in each area. Sample collection in Areas #1 through #3 was performed in September 2013.

In June 2014, three separate memos presenting the results of the September 2013 sampling were submitted to USEPA (Follow-Up Area #1 Letter [ARCADIS 2014a], Follow-Up Area #2 Letter [ARCADIS 2014b], and Follow-Up Area #3 Letter [ARCADIS 2014c]). Additional investigation activities were proposed in the memos for Area #1 and Area #2. No further investigation was proposed in Area #3. The proposed supplemental activities were performed in Areas #1 and #2 in July and August 2014. The data from each of these investigations are included in this Investigation Report. Finally, additional work necessary in these areas is also presented in Section 9.

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2. Background

2.1 Site Location

The former Hercules Plant is located on approximately 200 acres of land north of West 7th Street in Hattiesburg, Forrest County, Mississippi (**Figure 1**). There are some smaller parcels south of West 7th Street that are owned by Hercules. The Site is located in Township 4 North, Range 13 West, within Sections 4 and 5 just north of Hattiesburg, Mississippi. The geographic coordinates of the front gate of the Site are 31° 20' 20" North latitude and 89° 18' 25" West longitude. The physical address of the Site is 613 West 7th Street, Hattiesburg, Mississippi.

The Site is bordered to the north by Highway 42, beyond which is the Illinois-Central & Gulf Railroad, as well as various residential and commercial properties. The southern property boundary is bordered by West 7th Street and by Roseland Park cemetery and Zeon to the south-southwest. Across from these locations are residential areas. The eastern and western boundaries are bordered by residential and commercial areas. A Site areal map is included as **Figure 2**. The Site is zoned for industrial use and this zoning category is unlikely to change in the future due to the establishment of a Restricted Use Agreed Order (RUAO, No. 5349 07), size of the property, and available infrastructure.

2.2 Plant Operations

The former Hercules Plant in Hattiesburg, Mississippi, began operations in 1923. Throughout the facility's history, the operations consisted of extracting and/or working with rosins from pine stumps to produce rosin derivatives, paper chemicals, and Delnav® (dioxathion), an agricultural insecticide (miticide). Structures at the Site included offices, a laboratory, a powerhouse, production buildings, a wastewater treatment plant, settling ponds, a landfill, and central loading and packaging areas. The plant began to reduce production in the 1980s and shut down at the end of 2009. Former process areas were primarily located on the southern and eastern portions of the Site at the locations shown on **Figure 3**. The following process areas were located at the former Hercules Plant:

- **Power House (1920s to 2000s):** This area used boilers to produce steam used in other parts of the plant. The Power House also used spray ponds for cooling. Chemicals used at various times in the Power House area include boiler treatment chemicals and fuel (natural gas, oil, or wood stumps).

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- **Field Storage (1920s to 1980s):** This area was used to store substances used in various parts of the plant. The stored chemicals were transferred to each process area as necessary.

- **Laboratory (1920s to 2000s):** This area was used to perform analytical testing for the facility. It stored and used various chemicals in laboratory quantities.

- **Primary Operations (1924 to 1982):** Primary operations consisted of milling, extracting, and refining processes conducted to separate rosin from its plant carrier (primarily pine stumps). Milling was a mechanical process. The following chemicals were used at various times in extraction and refining processes: benzene, methyl isobutyl ketone (MIBK), pexite, plant gas, solvenol, and terpenes.

- **Poly-Pale™ (1937 to 2005):** The Poly-Pale™ unit produced polymerized resin by dimerization. The following chemicals were used at various times in the Poly-Pale™ area: benzene, cyclohexane, Dowtherm™ (a mixture of 73 percent diphenyl oxide and 27 percent 1,1'-biphenyl), lime, sulfuric acid, rosin, and toluene.

- **Pilot Plant (1939 to 1982):** The Pilot Plant was used to demonstrate that experimental bench processes could be scaled up for production. Dowtherm™ was used in this area in addition to various rosin polymerization and hydrogenation constituents.

- **Hard Resins/Continuous Esterification Unit (CEU) Area (1939 to 2004):** The Hard Resins/CEU area produced rosin and resin derivatives. The following chemicals were used at various times in the Hard Resins area: acetic acid, alcohol, Dowtherm™, fumaric acid, glycerin, magnesium oxide, maleic anhydride, methanol, mineral spirits, paraformaldehyde, pentaerythritol, phthalic anhydride, toluene, rosin, and triphenylphosphite.

- **Hydroperoxides/Paramenthane Hydrogen Peroxides (PMHP) (1940s to 1980s):** This unit produced hydrogen peroxides and PMHP. Chemicals used at various times in this area include paracymene (p-cymene) and paramenthane.

- **Rubber Chemicals/Resin 731 (1940s to 1980s):** This area produced modified rosins by dehydrogenation. The following chemicals were used in this area: Dowtherm™ and rosin.

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- **Staybelite/Foral/Staybelite Resin (1940s to 1990s):** This area produced modified rosins by hydrogenation. The following chemicals were used in this area: Dowtherm™, hydrogen, palladium on carbon catalyst, Raney nickel catalyst, and rosin.

- **Catalyst Regen (1940s to 2000s):** This area was used to regenerate catalyst used in other process areas. The following chemicals were used at various times in the Catalyst Regen area: Raney cobalt catalyst, Raney nickel catalyst, and sodium hydroxide.

- **Delnav® (1950 to 1987):** The Delnav® unit primarily produced the pesticide Delnav®. Delnav® consists of the cis- and trans- isomers of dioxathion. The pesticides toxaphene and TORAK® were also produced in the Delnav® unit for a limited period of time. The following chemicals were used in the Delnav® area: benzene, carbon tetrachloride, chlorine, cis/trans-dioxathion, cyclohexane, 1,4-dioxane, di-tert-butyl peroxide, ethanol, hydrochloric acid, NDCEP-N(1,2-dichloroethyl)phthalimide, ortholeum, and phosphorus penta-sulfide.

- **CEU (1950s to 1990):** This area produced modified rosins. Dowtherm™, glycerin, and rosin were used in this area.

- **Paste size (1950s to 1980s):** This area was used to produce a paper coating for better printability. Potassium hydroxide and sodium hydroxide were used in this area.

- **Rosin Amine/Rosin Amine Derivatives (RAD) (1951 to 2005):** The RAD unit produced rosin amine derivatives. The following chemicals were at various times used in the RAD area: acetic acid, ammonia, Dowtherm™, ethylene oxide, isopropanol, sodium methylate, rosin, and triethanolamine.

- **Terpene Derivatives (1953 to 1983):** The Terpene Derivatives unit produced terpene derivatives, such as p-cymene, paramenthane, and synthetic pine oil.

- **Liquid Loading (1960 to 1982):** This area served as the primary liquid loading point. Chemicals managed at various times in the liquid loading area include pine oil, terpenes, and turpentine.

- **Kymene™ (1964 to 2009):** The Kymene™ unit produced a wet strength resin paper chemical. Chemicals used at various times in this area include adipic acid,

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diethylene triamine, epichlorohydrin, formic acid, hexamethylenediamine, sulfuric acid, and urea.

- **Tall Oil (1965 to 1972):** The Tall Oil unit produced tall oil rosin and fatty acids. Crude tall oil was used in this area.

- **Paracol™/AKD/Defoamer Paracol™ (1966 to 2009):** The Paracol™/AKD unit produced paper chemical emulsion. Chemicals used at various times in this area include biocides, stearamide, hydrocarbon wax, and polymerized fatty acid.

- **Effluent Treatment (1969 to present):** The Effluent Treatment area was the facility's wastewater treatment area. The facility had a separate storm water system and industrial sewer. These systems were used to keep non-contact storm water and process wastewater separate. Non-contact storm water collected at the Site was ultimately discharged to the Bouie River through various conveyances. Facility wastewater flowed through the IB, then underwent dissolved air flotation treatment. The effluent stream then underwent neutralization and entered an equalization tank. Effluent from the equalization tank flowed through carbon absorption towers with eventual discharge to a National Pollutant Discharge Elimination System (NPDES) outfall. The following chemicals are used in the Effluent Treatment area for neutralization: sodium hydroxide and sulfuric acid.

- **Vinsalyn (1970s to 1980s):** This area was used to produce a thermoplastic binder. The following chemicals were used at various times in the Vinsalyn area: tall oil pitch and Vinsol ® (rosin).

- **Defoamer (1970 to 2008):** This unit produced rosin-based defoamer. The following chemicals were used at various times in the Defoamer area: biocides, silica, and stearamide.

- **Metal Resinates (1982 to 1998):** Produced rosin/printing ink solution. The following chemicals were used in this area: calcium hydroxide, printing ink solvent, rosin, toluene, and zinc oxide.

- **Neuphor™ (1986 to 2008):** The Neuphor™ unit produced paper chemicals. The following chemicals were used at various times in the Neuphor™ area: agefloc, fumaric acid, Kymene™, maleic anhydride, rosin, and sodium lignin sulfonate.

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Process operations were shut down at the end of 2009. Some facility structures have been demolished. Prior to demolition, the contents of any tank, vessel, piping, or storage container were emptied. The contents were then recycled, reused, sold, or properly disposed off-Site. Process equipment, tankage, and piping have also been emptied and decontaminated, with the exception of tanks ET-10, ET-18, and ET-19, which are associated with the Effluent Treatment process. **Figure 4** shows the configuration of buildings and tanks located at the Site in 2011.

The Site perimeter is secured by chain-link fencing with controlled access points. Security cameras are placed around the Site for monitoring purposes. Security personnel are present at the facility from 7 A.M. to 11 P.M, Monday through Friday. On Saturday and Sunday, security personnel are present for a minimum of one hour each day to inspect the facility. Logs used to maintain a record of on-Site visitors are maintained at the security office.

As part of plant demolition and decommissioning activities, Hercules has been working with the Mississippi Department of Environmental Quality (MDEQ) to decommission the on-Site wastewater treatment IB. The IB Decommissioning Work Plan submitted in August 2010 and revised January 2011 (ARCADIS 2011b), was approved by MDEQ and work began in 2012. Due to operational issues with the mechanical dewatering process caused by the waxy nature of the IB sludge, activities were suspended. Hercules is working with MDEQ and USEPA to implement a new plan to decommission the IB. A Draft Interim Measures Work Plan (IMWP), which was required by the 3008(h) Consent Order, was submitted to USEPA and MDEQ on August 22, 2014. The IMWP provided additional information on the IB decommissioning activities. Storm water that falls in the IB continues to be tested and managed under the conditions of the most recent MDEQ pre-treatment discharge permit.

Hercules has had air, storm water, NPDES, and State-issued Water Pollution Control (pre-treatment) permits that covered discharges from the Site when it was in operation. Hercules continues to conduct sampling and reporting activities associated with storm water and pre-treatment discharges. There are currently no active air emissions from the facility because there are no active manufacturing processes.

In 2005, after Site investigations conducted under the MDEQ Voluntary Evaluation Program were approved, a Corrective Action Plan (CAP) was submitted to the MDEQ by Groundwater & Environmental Services, Inc. (GES) (GES 2005). The MDEQ approved the 2005 CAP, which called for a remedy that included monitored natural attenuation (MNA) with institutional controls. Additionally, Hercules and MDEQ

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established a RUAO in 2008 for management of the Site (RUAO, No. 5349 07). The RUAO has been the primary regulatory mechanism driving current environmental monitoring at the Site.

The components of the 2005 CAP and RUAO are discussed further in Section 2.4. A monitoring program has been implemented and controls were established to restrict the on-Site land use and activities. The monitoring program for groundwater and surface water is currently conducted on a semiannual basis and consists of water level gauging and analysis of select samples for volatile organic compounds (VOCs), and annual collection of samples for dioxathion/dioxenethion.

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2.3 Previous Investigations

Various investigations have been conducted at the former Hercules Plant since the 1980s. The work has included geophysical investigations and sampling of soil, groundwater, surface water, and stream sediment for analysis of various constituents, including VOCs, semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), metals, cyanide, dioxathion, and dioxenethion. The results of previous investigations are discussed in multiple reports submitted to, or developed by, MDEQ and/or USEPA. Summaries of the non-routine groundwater monitoring reports are listed below:

- *Report of Investigation Preliminary Groundwater Monitoring Study, Subsurface Disposal Corporation, September 1980*

  The investigation was conducted to assess the hydrogeologic conditions in the area of the sludge pits and the IB. Two borings (B-1 and B-2), which were subsequently converted to monitoring wells, were advanced to a depth of approximately 100 feet below ground surface (ft bgs). Water-bearing zones were identified at approximately 60 to 70 ft bgs and 75 to 100 ft bgs. Analysis of the groundwater did not reveal the presence of any Site-related constituents. The logs for B-1 and B-2 are included in **Appendix A**.

- *Preliminary Assessment,* Mississippi Bureau of Pollution Control, December 1989.

  A state preliminary assessment was completed in December 1989 and indicated two source areas, which included approximately 38 acres of contaminated soil and a cluster of six unlined surface impoundments containing approximately 900,000 cubic

feet of material. These quantities were defined using five sampling locations. Constituents such as acetone, benzene, toluene, methyl ethyl ketone (MEK), PCBs, cadmium, cobalt, lead, and mercury were identified in the soil. The surface impoundment contained arsenic, benzene, toluene, MEK, and heavy metals.

- *Site Inspection Report*, Black & Veatch (B&V) Waste Science and Technology Corp., April 1993 (commissioned by USEPA).

  In 1992, a Site inspection, field investigation, and geophysical survey were conducted by B&V as a contractor for USEPA to collect information regarding potentially hazardous environmental conditions at the Site. The USEPA was concerned about potential releases to groundwater, surface water, soil, and air and the potential threats to human health and ecology. The geophysical survey program was initiated to identify sample locations and evaluate former areas where drums, sludge, boiler ash, and other process wastes were reportedly land filled, land applied, or buried.

  Four sediment (HI-SD-01 through HI-SD-04), two surface water (HI-SW-01 and HI-SW-02), five surface soils (HI-SS-01 through HI-SS-05), two subsurface soils (HI-SB-01 and HI-SB-5), and three groundwater (HI-MW-B1 [installed by Subsurface Corporation], HI-TW-01, and HI-TW-05) samples were collected from a number of strategic locations selected based on historical information, hydrological data, field observations, and geophysical survey results. Samples were analyzed for parameters in the Target Compound List (TCL) and Target Analyte List including organics, pesticides, PCBs, metals, and cyanide.

  Surface water sample results summarized in the 1993 B&V report indicated that arsenic and sodium concentrations exceeded background concentrations. The inorganics barium, copper, iron, magnesium, manganese, nickel, and zinc were detected at concentrations above background or the sample quantitation limit. No TCL organics were detected in sediment or surface water samples.

- *Work Plan for Well Installation,* Bonner Analytical Testing Company (BATCO), June 1997; *Installation, Sampling, and Analysis Report,* BATCO, December 1997; and *Quarterly Monitor Well Sampling Event Reports,* BATCO, June 1998 through October 1998.

  BATCO prepared a report dated December 1, 1998, which presented results of four quarterly groundwater monitoring events conducted between December 1997

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and December 1998. BATCO installed six shallow groundwater monitoring wells (MW-1 to MW-6) in December 1997. The wells were competed at depths between 10 and 20 ft bgs.

The results of the four quarterly sampling events are summarized in the December 1, 1998, report and indicate no significant detections of the eight RCRA metals (low levels of metals were detected above the laboratory method detection limit [MDL] in various wells over the quarterly events, as well as several detections of the non-RCRA metals beryllium, nickel, copper, and zinc). Acetone was detected above the MDL twice in two different wells. MEK and isopropyl benzene (cumene) were each detected once, and an aromatic hydrocarbon compound was tentatively identified in one well. An organophosphate compound was tentatively identified in all four sampling events in MW-4. In general, MW-4, located near the sludge pits, indicated low levels of metals and the organic compounds discussed above.

- *Site Investigation Work Plan,* Eco-Systems, Inc. (Eco-Systems), February 1999.

A Site investigation was conducted in accordance with the *Site Investigation Work Plan* (Eco-Systems 1999) and additional comments from MDEQ in an approval letter dated April 5, 1999. The activities described in the work plan centered on efforts to determine whether dioxathion, the miticide contained in Delnav®, was present in Site soil and groundwater. The investigation also included an evaluation of the groundwater flow regime and refinement of the Site hydrogeologic model.

The scope of the 1999 – 2000 investigation included the installation of 14 Piezometers (TP-1 to TP-14), five monitoring wells (MW-7 to MW-11), and four Staff Gauges (SG-1 to SG-4) to provide hydrogeologic and groundwater quality information near the former dioxathion production areas and near the former wastewater sludge pits. Piezometers TP-1 through TP-14 were installed to evaluate groundwater flow conditions in the uppermost saturated interval beneath the Site. Monitoring Wells MW-7, MW-8, and MW-9 were installed to assess groundwater quality at points near the former Delnav® production areas, and Monitoring Wells MW-10 and MW-11 were installed to assess groundwater quality between the sludge disposal pits and Greens Creek.

Prior to the sampling of the new and existing monitoring wells, questions arose regarding the analytical method for dioxathion and the quality of dioxathion for use as a laboratory standard. As a result, Hercules in conjunction with MDEQ's consultant (Mississippi State University) developed analytical protocols for soil and

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groundwater. These protocols were documented in the *Sampling and Analysis Protocol for Determination of Dioxathion in Water* (Hercules 2002).

Because the quality of available analytical standards was questionable, Hercules contracted with Sigma-Aldrich Chemicals to synthesize dioxathion standards. In August 2002, dioxathion of a suitable quality had been manufactured to be used as a laboratory standard, and Hercules and MDEQ agreed to implement the monitoring plan.

In October 2002, groundwater samples were collected from Monitoring Wells MW-1, MW-4, MW-5, MW-8, MW-9, and MW-11 for analyses of dioxathion and dioxenethion by both BATCO and the Mississippi State Chemical Laboratory to test the newly established protocol. Monitoring Wells MW-5 and MW-6 were also sampled for analysis of VOCs and SVOCs.

Isomers of dioxathion were detected in Monitoring Wells MW-4, MW-5, MW-8, MW-9, and MW-11; however, no concentrations were detected at concentrations above the MDEQ Tier 1 Target Remediation Goals (TRGs). No VOCs or SVOCs were detected above the MDL in samples collected from MW-5 and MW-6. A complete summary of the sampling/analytical methods and results of the October 2002 sampling was provided in the *Site Investigation Report* (Eco-Systems 2003a).

In December 2002, groundwater samples were collected for analysis of dioxathion (MW-1 through MW-11), VOCs (MW-4 and MW-7 through MW-11), and SVOCs (MW-7 through MW-11). Samples were analyzed by BATCO and a split sample for MW-11 was collected by MDEQ. Concentrations of dioxathion, dioxenethion, VOCs, and SVOCs were detected at various locations. Various VOCs were detected at concentrations exceeding the TRGs in Monitoring Wells MW-4, MW-8, MW-9, and MW-11. No other constituents were detected at concentrations above the applicable TRGs.

- *Interim Groundwater Monitoring Report,* Eco-Systems, January 2003; and *Site Investigation Report,* Eco-Systems, April 2003.

  The *Interim Groundwater Monitoring Report (*Eco-Systems 2003b) was submitted describing the results of this sampling and recommending confirmation sampling prior to completing the remaining activities outlined in the 1999 Work Plan. In response, MDEQ issued a letter dated February 3, 2003, approving the proposed

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confirmation sampling and requesting completion of the work plan tasks. In addition, MDEQ requested submittal of a supplemental work plan for groundwater delineation and a geophysical survey. A summary of the December 2002 sampling was provided in the *Site Investigation Report* (Eco-Systems 2003a).

On February 11, 2003, groundwater, surface water, and stream sediment samples were collected in accordance with the February 3, 2003, MDEQ request. A summary of the sampling/analytical methods and results of the February 2003 sampling was provided in the *Site Investigation Report* (Eco-Systems 2003a).

Monitoring Wells MW-4, MW-8, MW-9, and MW-11 were sampled for confirmation of the 2002 VOC results. In addition, surface water and sediment samples were collected from five locations (CM-1 through CM-5) in Greens Creek for analysis of dioxathion and VOCs. Total organic carbon (TOC) and grain size analyses were also performed on sediment samples. Duplicate samples of surface water and sediment were collected by MDEQ at location CM-3.

VOCs were detected in groundwater at concentrations exceeding the TRGs in Monitoring Wells MW-4, MW-8, MW-9, and MW-11. The sample collected from MW-8 had the highest reported VOC concentrations.

Various VOCs were detected in each of the samples collected from surface water locations CM-1 (upgradient) through CM-5. The greatest number of VOCs were detected in the surface water sample collected from CM-1 (the westernmost and upgradient location), possibly indicating an upstream source for VOCs. Dioxathion was detected in surface water at CM-2 and dioxenethion was detected in surface water at CM-3, CM-4, and CM-5.

Various VOCs were detected in each of the samples collected from stream sediment locations CM-1 through CM-5. Similar to results for the surface water samples, the greatest number of VOCs was detected in the sediment sample collected from CM-1 (upgradient). Dioxathion was detected in sediment at CM-1, CM-3, and CM-5. TOC was reported in sediment samples at concentrations ranging between 2 and 7 parts per million. The sample collected from CM-3 showed primarily silt and clay and the samples collected from CM-4 and CM-5 showed primarily sand and gravel.

- *Work Plan for Supplemental Site Investigation,* Eco-Systems, June 2003; and *Supplemental Site Investigation Report,* Eco-Systems, November 2003.

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A supplemental Site investigation was conducted in accordance with the *Work Plan for Supplemental Site Investigation* (Eco-Systems 2003c) approved by MDEQ in a letter dated July 11, 2003. The supplemental work plan was prepared at the request of MDEQ to delineate the lateral and vertical extent of COCs in groundwater, collect hydrogeologic information, conduct a geophysical investigation to delineate the lateral boundaries of the waste in the former landfill and locate accumulations of buried metal in the landfill and in a potential burial area identified in the western portion of the Site, conduct single-well response tests to provide hydraulic conductivity estimates, and collect surface water and stream sediment from Greens Creek to evaluate locations upstream from previous sampling locations.

To obtain the required data, Hercules advanced 18 Geoprobe® borings (GP-1 through GP-18) to define the lateral and vertical extent of VOCs in groundwater and to investigate groundwater quality in the vicinity of select piezometers, collected groundwater samples from permanent Monitoring Wells MW-1, MW-4, MW-10, and MW-11 for analysis of VOCs and dioxathion, conducted a geophysical investigation using ground conductivity and magnetic intensity methods with a Geonics, Ltd., EM31 at two areas of the Site (former landfill area and small grid area located west of the main plant), and collected surface water samples from two locations (upstream location CM-0 and previous location CM-1) and a stream sediment sample from one location (upstream location CM-0).

The results of the above activities provided a summary of known conditions in the area and further defined the extent of on-Site areas. The geophysical survey defined the boundary of the former industrial land farm and identified several locations with subsurface metal in the small grid area. Carbon tetrachloride, benzene, and naphthalene isoconcentration maps depicting the extent of these constituents detected in groundwater are included in the *Supplemental Site Investigation Report* (Eco-Systems 2003d).

- *Hattiesburg, Mississippi, Investigations,* MDEQ, April 2004.

  As part of a response to requests by the public, MDEQ conducted a sampling event in April 2004 in the drainage pathways discharging from the former Hercules Plant. Four sediment samples (two from Greens Creek and two from the former "Hercules Ditch") and three surface water samples (two from Greens Creek and one from the former "Hercules Ditch") were collected and analyzed for VOCs, SVOCs, pesticides/PCBs, metals, and dioxathion. Samples collected from

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locations S-1 and S-2 were collected from Greens Creek across Highway 42 from the facility. Samples from locations S-3 and S-4 were collected downgradient of an on-Site process water storage tank (Tank ET-10, referred to in the memorandum as the "NPDES tank"). No surface water was collected from location S-3 because it was dry.

Concentrations of toluene below the MDEQ TRG were detected in soil collected at locations S-3 and S-4. No other constituents were detected in soil and no constituents were detected in surface water. While some trace concentrations of target analytes were detected, the report concluded that "the results of these samples did not detect any compounds above MDEQ's target remediation goal levels."

- *Remedial Action Evaluation,* Eco-Systems, July 2004; *and Corrective Action Plan Revision 01,* GES, January 2005.

  A Remedial Action Evaluation was prepared to evaluate and recommend remedial alternatives for the following areas: Sludge Pits, Landfill, Greens Creek, and Groundwater. Each of the remedial alternatives was evaluated with respect to the protection of human health and the environment based on the following criteria: long-term effectiveness; potential to reduce mobility, toxicity, or volume; short-term effectiveness; implementability; and cost efficiency. The following conclusions were presented:

  - Sludge Pits: sludge does not pose a significant risk to human health and the environment; potential direct exposure risk for Site workers and wildlife; potential indirect exposure risk resulting from leaching and natural weather events overflowing the pit berms;

  - Landfill: no current risk to human health and the environment; future land use changes could expose landfill materials and/or mobilize constituents from the landfill into the groundwater or nearby surface water;

  - Groundwater: VOCs are present in on-Site groundwater at concentrations above TRGs; however, no VOCs above TRGs are present in off-Site groundwater; and

  - Greens Creek: surface water and sediment containing VOCs and dioxathion do not pose a significant risk to human health and the environment; the results

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from samples collected upstream of former Hercules Plant property may indicate an off-Site source.

In the final revised 2005 CAP (GES 2005), the primary components of the proposed remedial alternatives consisted of groundwater and surface monitoring networks, deed restrictions, and fencing as summarized below for each evaluated area:

- Sludge Pits: MNA combined with institutional controls/deed restrictions to restrict current/future land use and ensure that contaminated groundwater does not migrate from the sludge pits at unacceptable levels;
- Landfill: MNA combined with deed restrictions to restrict future land use and ensure that contaminated groundwater does not migrate from the landfill at unacceptable levels;
- Groundwater: MNA combined with deed restrictions to restrict future land use in the area of groundwater containing VOCs in excess of TRGs and to ensure that contaminated groundwater does not migrate from the Site at unacceptable levels; and
- Greens Creek: MNA combined with institutional controls/deed restrictions to restrict current/future land use of Greens Creek to ensure that contaminated water does not migrate at unacceptable levels from Greens Creek.

The 2005 CAP also called for contingency plans for specific units if groundwater monitoring indicated a potential release. These contingency plans included such actions as installation of an engineered cap, installation of a horizontal barrier, or implementation of in-situ chemical oxidation.

- *Memorandum, Sludge Sample Analyses, Hattiesburg, Mississippi,* Eco-Systems, October 2008.

  In 2008, Hercules conducted sludge characterization sampling as part of plans to decommission the IB. The initial sampling event conducted on July 1, 2008, included collection of composite samples from the western end of the IB (SS-1), eastern end of the IB (SS-2), and wastewater-holding tank ET-10 (SS-3). Individual sample aliquots were collected from various locations via hand auger and combined in the field to produce composite samples. Prior to collection,

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each aliquot location was vertically mixed to the extent practicable by advancing and extracting the hand auger from the surface to the limit of the auger rods. Samples were submitted for toxicity characteristic leaching procedure (TCLP) analysis of VOCs, SVOCs, pesticides, PCBs, herbicides, and metals and also for reactive cyanide, reactive sulfide, pH, and percent solids.

Based on the results of this initial sampling, two additional events were conducted to confirm and further characterize sludge at the west end of the IB, where a TCLP benzene concentration (1.3 milligrams per liter [mg/L]) was detected above the TCLP limit for benzene (0.5 mg/L) in SS-1.

On July 30, 2008, one composite sludge sample (SS-1-073008) was collected to confirm the benzene concentrations detected in SS-1 during the July 1 sampling event. The confirmation sample was collected following the same procedures and from the same general aliquot locations as was completed for the original sample SS-1. Samples were analyzed for TCLP-VOCs by TestAmerica Laboratories, Inc. (TestAmerica) and BATCO. One benzene result (0.586 mg/L) was detected above the TCLP limit in the confirmation sample analyzed by BATCO, while the result of the TestAmerica analysis (0.44 mg/L) was below the TCLP limit.

In September 2008, a third sludge sampling event was conducted to investigate whether a potential localized source area for VOCs existed within the western end of the IB. Six discrete soil samples (SS-5 through SS-10) were collected and analyzed for VOCs by TCLP. Three of the samples contained concentrations of benzene below the TCLP limit, while the other three samples (SS-5 at 5.5 mg/L, SS-6 at 3.2 mg/L, and SS-8 at 3.2 mg/L) contained concentrations of benzene above the TCLP limit.

- *Groundwater Assessment Report*, Eco-Systems, November 2009.

  Hercules submitted a work plan to MDEQ in July 2009 to evaluate groundwater conditions near the IB. The work plan outlined the locations and procedures for the installation and sampling of five monitoring wells. MDEQ approved the work plan with revisions in a letter dated July 22, 2009. On September 15-16, 2009, five soil borings were advanced near the IB. Each boring was converted to a monitoring well (MW-20 through MW-24). Groundwater samples were collected from each monitoring well and analyzed for VOCs, SVOCs, pesticides, PCBs, metals, and Delnav®. The analytical results were compared to TRGs.

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Concentrations of VOCs and SVOCs were reported above the TRGs. Pesticides, PCBs, metals, and Delnav® groundwater concentrations were reported below TRGs for each of these analyses. Based on the VOC and SVOC results, Monitoring Wells MW-20 through MW-24 were included in routine groundwater sampling events beginning in 2010.

- *Sludge Characterization and Bench Scale Treatability Work Plan*, ARCADIS, March 2010; *Sludge Characterization and Bench Scale Treatability Report, A*RCADIS, August 2010; *and Response to Sludge Characterization and Bench Scale Treatability Report*, ARCADIS, January 2011.

  The focus of this investigation was to collect data necessary to assess potential options for managing the sludge contained in the IB. Hercules is working with MDEQ toward the implementation of a decommissioning plan to remove and properly dispose of the sludge within the IB and decommission this unit.

- USEPA Sludge Pit Sampling (2010)

  In September 2010, at the request of MDEQ, representatives of the Science and Ecosystem Support Division (SESD) conducted a sampling investigation at the on-Site sludge disposal area. Between September 28-29, 2010, SESD representatives collected 13 subsurface waste samples (HERC01 through HERC13) ranging from depths between 0 and 7 ft bgs. Twelve of the locations were collected from the Sludge Pit area (referred to in the SESD report as the "back forty" area). These samples were collected from various areas within the Sludge Pit, which are delineated by berms and represent areas where the facility placed IB sludge at different times. One sample (HERC08) was collected from a lined pond referred to in the SESD report as the "wetlands" area. Samples were collected based on visual observations and results from field screening conducted with a Thermo Toxic Vapor Analyzer 1000B.

  Samples were analyzed by the SESD laboratory for total VOCs, SVOCs, metals, and/or toxicity characteristics. The USEPA compared the analytical data to the TRGs for unrestricted soil use and the USEPA Regional Screening Levels (RSLs). Benzene (10 samples), ethylbenzene (one sample), isopropylbenzene (one sample), toluene (11 samples), 1,1'-biphenyl (one sample), naphthalene (seven samples), arsenic (four samples), chromium VI (13 samples), and vanadium (nine samples) exceeded the MDEQ TRGs and/or residential USEPA RSLs.

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The USEPA analyzed samples with detected total analyte concentrations by the TCLP method. Benzene was above the TCLP regulatory limit of 0.5 mg/L in six of the samples. No other VOCs, SVOCs, or metals exceeded their respective TCLP limits or exceeded USEPA or MDEQ regulatory levels. A summary of the investigation activities and analytical results was provided in the *Field Investigation Report* (SESD 2011).

As demonstrated by the chronology of reports presented above, Hercules has worked with MDEQ for more than 20 years to understand the environmental conditions at the Site. **Figure 5** is a composite map that shows the location where previous sampling was conducted at the Site prior to the Phase I and Phase II investigations conducted under the AO. Based on the mutual understanding of Site conditions (i.e., the delineation of impacted areas, an understanding of groundwater flow regimes, and exposure pathways), in 2005 MDEQ and Hercules began formalized corrective action and ongoing management activities in a RUAO. Since the implementation of the RUAO, Hercules and MDEQ have continued to work together to address environmental issues not covered by the RUAO.

2.4 Corrective Action Plan and Restrictive Use Agreed Order

The 2005 CAP (GES 2005) summarized the findings of the Site investigations between 1999 and 2003 as follows:

- Delineation of the lateral limits of the Landfill based on geophysical investigation has been completed;
- VOCs were detected in groundwater at concentrations above MDEQ Tier 1 TRGs near the Landfill and other areas of the Site;
- VOCs and dioxathion were detected at concentrations less than TRGs in surface water and sediment samples collected from Greens Creek with some indication of upstream off-Site sources (i.e., upgradient sample showed similar constituents as seen on-Site and downstream from the Site);
- VOCs and dioxathion were detected in one of three groundwater monitoring wells located hydraulically downgradient of the sludge pits; and
- There was no indication of migration of VOCs or dioxathion onto off-Site properties via groundwater or surface water.

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Additionally, the 2005 CAP presented the following conclusions:

- Sources, source area COC concentrations, and vertical and horizontal extent of groundwater containing COCs were defined sufficiently for remedial planning purposes;

- The existing data did not indicate that the Site posed a significant threat to human health and the environment in its use as a chemical production facility at that time; and,

- If changes in land use occur or additional information is obtained, the current risk scenario for the Site could also change.

Based on an evaluation of the data obtained during the previous Site investigations, a remedy consisting of MNA and institutional controls was proposed in the 2005 CAP to address the environmental conditions at the Site. In 2005, MDEQ approved the implementation of MNA of groundwater and surface water and institutional controls as proposed in the 2005 CAP.

On March 8, 2005, after the submission of the 2005 CAP but prior to the implementation of the RUAO discussed below, the MDEQ provided their assessment of environmental conditions in the area, including those at Hercules, in correspondence addressed to Hattiesburg Mayor Johnny Dupree. The MDEQ letter included an attachment an unsigned February 24, 2004, letter to the "Mobile-Bouie Street Neighborhood" from MDEQ. The 2004 MDEQ letter indicated that:

> *For Hercules … The only contamination found to date of any significance is groundwater contamination near the center of the property in the old Delnav process area adjacent to the old landfill site. The investigation to date does not show any groundwater contamination off of the Hercules property. Additionally, samples of surface water and sediments have been take[n] in Greens Creek … and no contamination of concern has been found.*

In January 2008, Hercules entered into a RUAO with MDEQ to restrict the land use and activities on-Site, while constituents in Site-wide groundwater attenuate. In conjunction with the RUAO, Hercules executed a Notice of Land Use Restrictions documenting that soil and groundwater contained benzene, chlorobenzene, carbon tetrachloride, chloroform, 1,2-dichloroethane, and toluene in excess of MDEQ's TRGs. As a result, the following restrictions were placed on the property:

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- There shall be no excavating, drilling, or other activities that could create exposure to contaminated media without approval from MDEQ;

- The groundwater at the Site shall not be used, unless otherwise approved by MDEQ;

- Monitoring wells shall be protected and maintained. In the event that a monitoring well is destroyed or damaged or is no longer needed, a plan for repair, reinstallation or abandonment of the well(s) must be submitted to MDEQ for approval; and

- No wells shall be installed without prior approval from MDEQ.

MDEQ indicated in the RUAO that, "…once the requirements of it have been completed that (1) the Site was protective of the public health and the environment; and (2) no further corrective actions were required at this time."

The Site has been operated in accordance with the 2005 CAP and RUAO since 2007. Compliance with the RUAO has consisted of routine groundwater sampling and reporting. Since 2007, Hercules has conducted groundwater sampling and submitted routine groundwater monitoring reports to MDEQ in accordance with the RUAO.

In the event that Site conditions change, the following contingency plans were included in the CAP:

- Sludge Pit Area Contingency Plan: Installation of an engineered cap;

- Landfill Area Contingency Plan: Implementation of in-situ chemical oxidation or installation of a horizontal containment barrier;

- Groundwater Area Contingency Plan: Implementation of in-situ chemical oxidation; and

- Greens Creek Area Contingency Plan: Address the potential migration of constituents from the Sludge Pit Area.

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3. Preliminary Conceptual Site Model Summary

The regional geology, Site-specific geology, known physical characteristics of the Site, and observations made of the community near the Site were composited into a graphical Conceptual Site Model (CSM) included in **Figure 6**. The graphic CSM highlights potential areas of release (i.e., former production operations, wastewater IB, landfill, and sludge pits), impacted media, transport mechanisms, and potential exposure pathways specific to the Site. As shown on the CSM, soil, groundwater, surface water, and soil gas to indoor air pathways potentially exist on-Site and off-Site and, therefore, were the focus of the data collection efforts of the Phase I, Phase II, and subsequent Area Investigations.

Additional detail related to the development and use of the CSM to investigate conditions at the Site is provided in the sections below. Data collected during subsequent phases of investigation were used to continuously refine and update the CSM so that a better understanding of the nature of impacts, migration pathways, and potential receptors could be developed.

4. Regional Geology

The Site is located within the Pine Hills physiographic region of the Coastal Plain physiographic province (Foster 1941). The topography of the region is characterized by a maturely dissected plain, which slopes generally to the southeast. The topography is dominated by the valleys of the Bouie and Leaf Rivers coupled with the nearly flat or gently rolling bordering terrace uplands.

The geologic formations beneath the Site are as follows (in descending order):

- Pleistocene alluvial and terrace deposits;
- The Miocene-Aged Hattiesburg Formation;
- The Miocene-Aged Catahoula Formation; and
- The Chickasawhay Limestone.

Previously published geologic material that is the basis for this description is provided in **Appendix A**.

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Alluvial and Terrace Deposits

The recent alluvial and terrace deposits consist of sand, gravel, silts, and clays. The thicknesses of the alluvial and terrace deposits are variable due to erosion. The Camp Shelby cross section (Brown 1944) shows these deposits in the area of Hattiesburg as varying between approximately 25 to 80 feet thick, and including clay, sand, and gravel.

Hattiesburg Formation

Beneath the alluvial and terrace deposits lies the Hattiesburg Formation, which consists of thick beds of massive clays, with some limestone but very little sand (Foster 1941). Data from wells in the vicinity of the Site as well as outcrops in the northeastern corner of the county indicate that the clay is underlain by interbedded sands and clays, with the sands increasing in prominence and becoming gravelly toward the base (Foster 1941). Other outcrops indicate that the thick clay bed is overlain by and grades upward into alternating fine-grained silty sands and clays (Foster 1941), which in some portions has been partly consolidated to a soft sandstone. The Camp Shelby cross section shows the Hattiesburg formation as approximately 150 feet thick, and consisting primarily of clay, with sand present up to approximately 70 feet thick (Brown 1944).

Catahoula Formation

The Catahoula sandstone is a non-marine deposit underlying the Hattiesburg Formation (Brown 1944). The Catahoula Sandstone is not exposed near the Site, but information on its depth and thickness is available from Foster (1941) and Brown (1944). Foster (1941) suggests it is present at depths of 300 to 400 ft bgs in Forest County. Brown (1944) shows the top of the Catahoula at approximately 300 to 350 ft bgs and up to approximately 700 feet thick.

Chickasawhay Limestone

The Chickasawhay Limestone is the top of the thickest Tertiary marine sequence outcropping in Mississippi (Brown 1944), and is beneath the Catahoula sandstone. The Chickasawhay limestone is not considered a viable aquifer.

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4.1 Site-Specific Geology

The Site-specific expression of the regional geologic units is described in the following section, and is based on the evaluation of the soil descriptions of nearly 200 soil borings installed at the Site and surrounding areas, plus a number of historical deep well logs and geophysical logs from the Site and surrounding facilities. Because the Phase I and II investigations have targeted the shallow water-bearing strata at the Site, the majority of the soil borings completed for this Investigation Report are shallower than 20 to 30 ft bgs.

Surficial soils in the vicinity of the Site include the Prentice-Urban Land Complex, the Trebloc silt loam, and the Brassfield-Urban Land Complex. In general, these soils are described as poorly to moderately well drained and strongly acidic. The parent material from which the soil was derived is mainly marine deposits of sandy, loamy, and clayey material.

The soils encountered in the upper subsurface are consistent with the Pleistocene alluvial and terrace deposits, with descriptions that include gray and tan, fine-grained sand with varying amounts of silt, clay, and gravel (**Appendix A**). The bottom of many of these borings encounters a unit consistent with the top of the clay of the Hattiesburg Formation.

One boring advanced during the Phase II activities (AO-GP-37) in the central portion of the Site did not encounter any of the alluvial or terrace sand deposits. The only material encountered in this boring was clay and silty clay. To further understand the thickness of the permeable zones within the alluvial and terrace deposits and the depth to the underlying Hattiesburg Formation, figures presenting top of clay elevation (structure contour map) and the Site-wide sand thickness (isopach map) are included as **Figures 7** and **8**, respectively. Based on these figures, the following key observations are made:

- The highest clay elevation is located along a north-northeast trending line, extending from just east of the former landfill area to west of the former Office/Laboratory located at the southern boundary of the Site (**Figure 7**). This north-northeast trending line area coincides with the highest topographic elevations at the Site, as presented in the regional digital elevation model (**Figure 9**).

- The clay elevation is lower to the east-southeast and west-northwest away from this clay ridge.

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- The lowest clay elevations are located in the northwestern portion of the Site, in the area of the former Sludge Pits, and at the southeastern portion of the Site, near West 8th Street.

- In general, the areas where the sand was the thickest corresponded with the areas in which the clay elevation was lowest, including the northwestern portion of the Site, in the area of the former Sludge Pits, and at the southeastern portion of the Site, near West 8th Street (**Figure 8**).

- Additionally, the area in the vicinity of the former landfill exhibits a thick sandy interval, interpreted as additional thickness of fill material in this area.

Underlying the alluvial and terrace deposits is a gray to orange-brown, stiff, silty, and/or sandy clay, which is consistent with descriptions of the Hattiesburg Formation. It appears that the Hattiesburg Formation has been encountered in the Site borings that have penetrated the overlying alluvial material indicating the formation is consistent across the Site. Two borings have been advanced down into the Hattiesburg Formation to evaluate the nature of the formation. Boring EB-1 was installed north of the Sludge Pit area to 32 ft bgs, while boring AO-GP-L1-B was advanced in the southeastern portion of the site to 40 ft bgs. Both borings indicated the Hattiesburg was present beneath the Site, and testing from EB-1 indicated a hydraulic conductivity of 1.28×10^{-7} centimeters per second (cm/sec).

As discussed above, shallow stratigraphy at the Site is composed of interbedded sands, silts, and clays, which are typical of alluvial deposits. Inspection of the cross sections in **Appendix A** reveals that some borings may have been terminated in a clay interval that may not correspond to the Hattiesburg formation. To better understand the shallow stratigraphy, additional investigations using detailed mapping of the shallow permeable units will be completed. Areas where shallow clays were encountered will be targeted. These investigations are discussed in Section 9. Upon completing these investigations, a better understanding of the potential constituent migration pathways will be available. As requested by USEPA, if permeable material greater than 10 feet is encountered, multiple groundwater samples are collected. These data also help to define the potential migration pathways.

Additionally, the passive flux meter (PFM) investigation discussed in Section 9 allows for an evaluation of transport pathways across the permeable zones. As discussed later, these data along with other investigative data outlines in Section 9 will be used to develop a more robust understanding of the potential constituent migration pathways.

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A number of deeper borings and geophysical logs have also been used to further evaluate the stratigraphy beneath the Site at depth, including:

- Seven wells drilled in 1920, located on the southern part of the Site (north of Area #2). Boring 1 was drilled to 1,002 ft bgs and borings 2 through 7 were drilled to approximately 500 ft bgs.
- Subsurface Disposal Corporation well B-1, located in the northern portion of the Site, drilled to 105 ft bgs in 1980.
- Subsurface Disposal Corporation B-2, located in the southeastern portion of the Site, drilled to 110 ft bgs in 1980.
- Hercules Well #1 and Hercules Electric Log #6, located in the eastern portion of the Site (northwest of Area #1). Hercules Well #1 was drilled to 480 ft bgs in 1952; Electric Log #6 was run in 1980 to a depth to 570 ft bgs. Based on information provided on the log and well registration information, it appears that Electric Log #6 was completed in the boring that was a replacement for the 1952 Hercules Well #1.
- Hercules Well #2 (Well Registration No. D-38), located on the southern part of the Site (north of Area #2), drilled to 705 ft bgs in 1965.
- Hercules Well #3, located on-Site along the eastern border of Area #3, was drilled to 689 ft bgs in 1967. The well was abandoned and re-installed at the same depth in 1996. A geophysical log (Well Registration No. D-014) was run in this borehole.
- Three wells (Well Registration Nos.B-140, B-141, B-142), located on the Richton, Tie & Timber property (approximately 0.5 mile northeast of the Site) were drilled to approximately 90 ft bgs in 2005.
- Two wells (Well Registration Nos. D-61 and D-70), located on the Murray Envelope property (approximately 600 feet northeast of the Site) were drilled to 105 ft bgs and 422 ft bgs in 1967 and 1968, respectively.
- Two geophysical electric logs were collected on the Zeon property (southwest of the Site, west of Area #3). The well corresponding to Well Registration No. D-133 was drilled to 719 ft bgs in 1990. Zeon Chemical Well 1-A was drilled to 700 ft bgs in 2011.

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- One well (Registration No. D-109), located on the Zeon property (in Area #3) was drilled to 702 feet in 1988.

- Five monitoring wells were installed on the Zeon property in 1986. MW-1 through MW-4, and MW-6, were drilled to approximately 100 ft bgs.

The logs and registration forms (when available) for these wells are included as **Appendix A**. In order to evaluate the deeper geologic units at the Site, two cross sections have been prepared that use the deep borings. Both cross sections were prepared along a transect that runs southwest to northeast, through the northwestern section of the Site and extending off-Site. The locations of the wells that illustrate the deep geologic data are shown on **Figure 10**. **Figure 11** shows geology in a cross section to approximately 250 ft bgs, and **Figure 12** shows geology to approximately 1,000 ft bgs. Based on a review of the cross sections, the following key observations can be made:

- The alluvial and terrace deposits in the area are around 30 feet thick at the Site.

- The Hattiesburg Formation extends from approximately 30 feet to 250 ft bgs, and is composed mostly of low-permeability clay; however, some sand zones are present and may potentially be somewhat laterally continuous.

- The Catahoula Formation extends from approximately 250 ft bgs to at least 1,000 ft bgs (which is the maximum depth of borings in the area). The Catahoula is composed mostly of higher-permeability sands, with some zones of low-permeability clay that range from approximately 50 to 100 feet thick.

The electric log for the Hercules Well #6 was completed on January 30, 1980. As stated above, this appears to be the replacement well for Hercules Well #1 (which was subsequently sampled [PW-HI-01]). Spontaneous potential and resistivity tools were used to log the geology of the open borehole. The log interval was from 40 ft bgs to 566 ft bgs. Inspection of the log revealed three significant sand units. The first sand unit was encountered at approximately 250 ft bgs and extended to a depth of approximately 310 ft bgs. The second sand unit was encountered at a depth of approximately 390 ft bgs and extended to a depth of approximately 450 ft bgs. The third sand unit was encountered at a depth of approximately 485 ft bgs and extended to a depth of approximately 500 ft bgs. These sand units represent the Catahoula formation. The log also revealed a lack of significant (greater than a few feet) sand units in the upper 250 feet (Hattiesburg Formation), which is consistent with the CSM for the Site.

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The second geophysical electric log was completed on June 20, 1996, in the replacement Hercules Well #3. Gamma ray, spontaneous potential, and resistivity tools were used to log the geology in the open borehole. The log interval was from 24 ft bgs to 686 ft bgs. Three significant sand units were also encountered and correlate well with the sand units observed in the #6 log. The first sand unit was encountered at approximately 240 ft bgs and extended to a depth of approximately 285 ft bgs. The second sand unit was encountered at approximately 350 ft bgs and extended to a depth of approximately 510 ft bgs. The third sand unit was encountered at a depth of approximately 575 ft bgs and extended to the total depth of the log (686 ft bgs).

A geophysical electric log was also completed for the Zeon production well; however, the log was not available to review. The State Well Report (D-109) was reviewed and the following geologic description was provided for the Zeon well:

Description of Formation	From (Depth) (feet)	To (Depth) (feet)
Top soil / sand	Ground Level	50
Clay	50	260
Sand	260	300
Clay	300	350
Sand	350	430
Clay	430	435
Sand	435	518
Clay	518	575
Sand	575	700

As described above, there are existing data gaps regarding the presence and continuity of sand zones in the Hattiesburg Formation. Additional scope of work presented in Section 9 is anticipated to provide data to assess lateral continuity and water quality of the uppermost (60 to 90 ft bgs) sandy interval present within the Hattiesburg Formation.

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4.2 Site Hydrogeology

Water level information is routinely collected from monitoring wells and piezometers. Water level information was also collected from temporary wells installed during the Phase I, Phase II, and Follow-Up Investigations and was used to calculate purge volumes; however, top-of-casing elevations for the temporary wells were not surveyed nor were the water level measurements obtained on a single day and these data should not be used to evaluate the potentiometric surface. In July 2014, 17 new monitoring wells were installed in Area #1. Subsequent water level data will be collected from these wells as part of supplemental groundwater monitoring efforts, and potentiometric surface maps for Area #1 will be generated for the groundwater sampling events that are planned.

Groundwater in the uppermost, saturated interval beneath the Site tends to follow the surface topography. Potentiometric surface maps for December 2013 and May 2014 are provided as **Figures 13** and **14**, respectively. In the former production areas located in the southeastern portion of the Site, the potentiometric surface indicates the presence of a groundwater divide, which trends southwestward and northeastward. Review of the potentiometric surface maps indicates that groundwater located to the northwest of the divide moves northwestward toward Greens Creek. North of Greens Creek, the potentiometric surface indicates that groundwater flows from off-Site properties onto the Site in a southerly direction toward Greens Creek. Groundwater southeast of the divide moves southeastward. Additional historic potentiometric surface maps are provided in **Appendix A**.

Slug testing was conducted at on-Site Monitoring Wells MW-2 (Northern Area), MW-6 (Former Landfill Area), and MW-7 (Former Production Area) (Eco-Systems 2004). Estimates of hydraulic conductivity were calculated using methods described by Bouwer and Rice (Bouwer and Rice 1976; Bouwer 1989). Hydraulic conductivity estimates varied from 1.31×10^{-3} cm/sec (3.71 feet per day [ft/day]) for MW-6 to 4.19×10^{-3} cm/sec (11.9 ft/day) for MW-2, with an average of 2.51×10^{-3} cm/sec (7.12 ft/day). Using the Site hydraulic conductivity estimates, a literature value for effective porosity of 33 percent for sand (McWorter and Sunada 1977), and historic potentiometric data, the average horizontal groundwater velocities from three areas of the Site were evaluated using Darcy's Law as follows.

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Area	Hydraulic Conductivity (ft/day)	Effective Porosity (%)	Hydraulic Gradient (ft/ft)	Groundwater Velocity (ft/day / ft/yr)
Northern Area (MW-2)	11.9	33%	0.006	0.216 / 78.8
Former Landfill Area (MW-6)	3.71	33%	0.03	0.337 / 123
Former Production Area (MW-7)	8.14	33%	0.007	0.173 / 63.0

ft/ft Foot per feet.
ft/yr Feet per year.

Due to the importance of understanding actual and localized flow velocities, additional data will be collected during the subsequent investigations to better refine the hydraulic conductivity and effective porosity across the Site.

4.3 Topography and Surface Water

The topography of the Site ranges from 170 to 150 feet mean sea level (ft msl). Topography slopes generally to the south in the Sludge Disposal Area and to the north-northwest in the former Industrial Landfill Area and the Former Delnav® Production Area (**Figure 9**). Surface water drainage patterns at the Site conform generally to the topography. A topographic divide located south-southeast of the Former Delnav® Production Area separates surface water drainage flowing in a north to northwesterly direction from surface water that flows in an east to southeasterly direction. On-Site surface water flow pathways are depicted on **Figure 15**.

The east-trending, perennial stream Greens Creek and its natural and man-made tributaries are the main surface drainage features in the area (Drainage A). Greens Creek leaves the Site at its northeastern corner, enters a culvert that runs beneath Highway 42 and subsequently flows into the Bouie River, located approximately 0.5 mile to the north/northeast. Two unnamed intermittent drainage features are also present. One flows from the northeastern corner of the Site (Drainage B) and the other flows from the southeastern portion of the Site (Drainage C).

In the sludge pit area, a drainage ditch enters the Site from the West. This ditch previously flowed north of the sludge pit area in a generally southeasterly direction and discharged into Greens Creek. To minimize the off-Site flow of surface water onto the

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property in the vicinity of the sludge pit area, this ditch was rerouted to direct water southward along the Site fence line until it ultimately discharges into Greens Creek.

The northeastern drainage (Drainage B) flows intermittently, collecting storm water from the northeastern areas of the Site and then travels through a culvert under Highway 42 and a neighboring industrial property, where it then flows into an open ditch and into the Bouie River. The southeastern drainage (Drainage C) flows intermittently, collecting storm water from the southern areas of the Site and residential and industrial properties east and south of the Site. Storm water enters two culverts, which transports the surface water approximately 3,000 feet before it discharges into a surface drainage feature that flows to the Bouie River. Historically, this southeastern drainage directed permitted process water discharge through a surface feature the entire length to the Bouie River, which was the focus of the previous MDEQ investigation (MDEQ 2004) described in Section 2.3. The MDEQ investigation determined that constituent concentrations were not detected above MDEQ TRGs. These on-Site drainage features are depicted on **Figure 16**.

Elevations of surface water within Greens Creek are significantly lower than the groundwater. This indicates that groundwater may contribute to flow in Greens Creek due to the hydraulic connection between the uppermost-saturated interval and Greens Creek. The flux of the water moving from the alluvial material to the creek is likely low due to silt and clay in the creek bed and the hydraulic conductivity of the sand adjacent to the creek. Observations made during several Site visits corroborate this low flux because only an occasional minor seep was observed.

4.3.1 Storm Water Outfalls

Storm water that falls on the Site flows to a conveyance system that consists predominantly of earthen ditches. As shown on **Figures 15** and **16**, the ditches aggregate and route the storm water flow to one of five outfall locations included in the Site's Storm Water Pollution Prevention Plan (Hercules 2010).

4.3.2 Groundwater Flow Pathways

Groundwater in the first water-bearing zone predominantly flows in two different directions on-Site, northwesterly and southeasterly (**Figures 13** and **14**). This water-bearing zone is underlain by the Hattiesburg Formation, a competent clay layer extending underneath the entire Site. Naturally occurring subsurface groundwater flow is the primary factor influencing potential Constituent transport in the subsurface.

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Hercules does not have any groundwater extraction nor injection systems located in the first water-bearing zone that would alter this flow.

North of the groundwater divide, groundwater flows toward Greens Creek. This naturally occurring flow direction results in the migration of groundwater in a northwesterly direction in the vicinity of the former landfill area. Groundwater ultimately discharges into Greens Creek. Based on the discussion presented in Section 4.2, the groundwater velocity could be approximately 123 ft/yr in this area. It should be noted that a review of the groundwater Constituent plume located in the vicinity of the former landfill does not indicate a plume that migrates at this rate. This observation is consistent with retardation and other attenuation mechanisms. Further evaluation of this area is outlined in Section 9.

North of Greens Creek, groundwater flows from off-Site properties onto the Site in a southerly direction. This groundwater flows underneath the sludge pits and is discharged into Greens Creek. As discussed in Section 4.2, the groundwater velocity could be approximately 79 ft/yr in this area.

South of the groundwater divide, groundwater flows to the southeast, with a turn to a more easterly direction as it approaches the Site property line.

The flow of groundwater near the City sewer pipe beneath Providence Street which runs north-south, parallel to the Site's eastern property line, is considered by MDEQ and USEPA to be a potential subsurface flow pathway and was investigated during the implementation of the approved Revised Phase II Work Plan. Hercules began replacing the City's sanitary sewer piping beneath Providence Street from the West 7th Street to Red Street intersections in August 2014. The sewer replacement activities were designed to minimize the influence of preferential pathways that may later contribute to constituent transport in the subsurface along the sewer pipe. These included the installation of hydraulic barriers at defined intervals along the length of the replaced piping. The sewer replacement work has been completed and a summary of activities was provided in the *Construction Completion Report Providence Street Sewer Replacement Project* dated June 10, 2015 (ARCADIS 2015).

As later discussed in Section 9, a flux study in several areas of the Site is proposed to further evaluate groundwater flow, including activities in the vicinity of the City sewer. The results of the flux study will be used to evaluate potential Constituent migration in this area. This study will be conducted after replacement of the sewer pipe. The results of the flux study will take into consideration understanding of the Site

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groundwater movement gained in previous investigations, including the vicinity of the replaced sewer, the IB, the sludge pits, and the former landfill.

4.3.3 Dense Non-Aqueous Phase Liquid Flow Pathways

It is important to note that some of the factors that control Dense Non-Aqueous Phase Liquid (DNAPL) movement are different from factors that control groundwater movement and must also be understood. The Interstate Technology & Regulatory Council (ITRC) document "Integrated DNAPL Site Strategy" (2011) identifies a number of factors that control DNAPL distribution. DNAPL transport is density-driven, meaning it will migrate to depth into the aquifer system until it encounters a barrier to vertical transport. As the ITRC (2011) points out, one of the most critical factors to understand is the aquifer geology and heterogeneity, which can create natural vertical barriers to downward migration. Additionally, DNAPL will preferentially move through zones with the highest permeability, which is often a small portion of the aquifer; as a result, DNAPL has the potential to take a variable vertical flow path in the subsurface, particularly within interbedded shallow sand and clay layers.

Figure 7 represents a map of the top of the deepest clay surface encountered in each boring at the Site. **Figure 8** represents the thickness of the sand units encountered Site-wide. This information can be used to help inform where DNAPL migration pathways may exist. These features, along with the DNAPL characteristics, localized aquifer geology, and DNAPL migration potential are discussed further within this Investigation Report in Section 8.3.3.1 and also taken into consideration for the recommended future DNAPL investigative techniques described in Section 9.

4.4 Preliminary Conceptual Exposure Model

A component of the CSM is a preliminary conceptual exposure model. An exposure model evaluates potential exposure pathways that may result in exposure of a target population. An exposure pathway consists of the following four elements: (1) a source and mechanism of constituent release to the environment; (2) a retention or transport medium for the released constituent; (3) a point of potential contact by the receptor with the impacted medium (the exposure point); and (4) a route of exposure to the receptor at the exposure point (e.g., ingestion, inhalation, or dermal contact).

The conceptual exposure model provides the framework for the exposure assessment. It characterizes the primary and secondary potential sources and their release mechanisms and identifies the primary potential exposure points, receptors, and

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exposure routes. Exposure points are places or "points" where exposure could potentially occur, and exposure routes are the basic pathways through which constituents may potentially be taken up by the receptor.

The conceptual exposure model incorporates the Site-specific analytical data with Constituent-specific fate and transport information to identify migration pathways and activity and use patterns to identify the unique receptors and exposure pathways. **Figure 17** includes the sources, release mechanisms, transport pathways, and potential receptors for the Site. These are discussed in detail below.

F I N A L

4.4.1 Sources

Operations began at the former Hercules Plant in 1923. Rosin derivatives, paper chemicals, and Delnav® were produced at the Site. Structures at the Site included offices, a laboratory, a powerhouse, production buildings, a wastewater treatment plant, settling ponds, a landfill, and central loading and packaging areas. Site-related Constituents associated with these operations have been detected in soil, groundwater, surface water, and sediment on the former Hercules Plant property.

Detected Constituent concentrations may act as continuing sources of impacts if mobilized by the naturally occurring flow of groundwater through these areas. Completed investigation activities conducted under the AO with USEPA's concurrence have identified the general source areas at the Site. Additional data will be collected that will help to refine the source areas and areas of concern at the Site. These data will be used in the risk assessment to evaluate potential exposures and risks to human health and the environment.

4.4.2 Release Mechanisms

Constituents detected in environmental media during the Site investigations have included organic and inorganic Constituents. The migration of Constituents released in the past is influenced by Site environmental factors and the physical and chemical properties of the Constituents. Migration from the former Hercules Plant could potentially occur via several mechanisms.

When the former Hercules Plant was active, normal permitted operations and potential inadvertent releases could have resulted in distribution of Constituents. Because the former Hercules Plant is no longer operational, these types of releases are not expected to occur; however, the potentially impacted soils at the Site can act as a

source of Constituents to other media. Migration into air may occur via volatilization or fugitive dust emissions, while transport into the surface water can occur via surface runoff and groundwater discharge. Migration into groundwater can occur by infiltrating rainwater through impacted soil, with subsequent leaching and transport. One other process that will influence migration is the attenuation of certain Constituents through naturally occurring processes. Many of the Constituents detected at the Site are amenable to these natural attenuation processes.

4.4.3 Potential Receptors

The Site is inactive and thus exposure of current Site workers is not expected to be significant because they do not routinely work around former process areas or disposal locations (landfill, sludge pits) and there are no significant subsurface construction activities. In the future, however, the Site could be redeveloped for industrial use and hypothetical future construction workers and Site workers could be exposed to Constituents in soil on the Site. The evaluation of hypothetical future Site workers is a more conservative assessment of Site worker exposure because these workers are more likely to work around the Site.

It is unlikely that exposure to Constituents in groundwater by current or hypothetical future Site workers would occur because of the absence of potable-use groundwater wells and restrictions on the use of on-Site groundwater as a potable water supply. Hypothetical future construction workers who may have to excavate into groundwater could be potential receptors. Utility workers maintaining subsurface utilities could contact Site Constituents in soil or in shallow groundwater as well.

The Site is surrounded by commercial, industrial, and residential land uses. Data collected during the implementation of the Work Plans under the AO were used to evaluate the potential exposure to Site-related Constituents by potential off-Site receptors. Trespassers to the Site could contact surface soil and/or surface water and sediments both on the Site and off the Site, if they were to walk along the surface water features. Off-site residents could contact Constituents that have migrated to off-Site soils. They may also inhale Site-related Constituents that could be found in the soil gas and/or ambient air.

Potential receptors for exposure to groundwater in the Catahoula Formation would be residents, if constituents were detected in Catahoula Formation public supply wells. The investigations completed to date indicate that the Catahoula aquifer is isolated from the alluvial and Hattiesburg formations. Additionally, Site-related constituents are

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not present in on-site Catahoula wells above standards; however, arsenic was detected above the USEPA RSL but below the Maximum Contaminant Level (MCL), and this detection appears indicative of background conditions.

4.4.4 Potential Exposure Pathways

With the possible exception of utility or construction workers, there are currently no points of exposure to shallow groundwater on-Site or off-Site. Workers on the property could be exposed to Site-related Constituents in the surface soil through incidental ingestion, dermal contact, and inhalation of vapors or dust. While the presence of trespassers is unlikely, any trespassers on the property could contact the surface soils and sludge pits and be exposed to Site-related Constituents. If the hypothetical trespasser were to wade in the surface water on or leaving the former Hercules Plant property, they could contact Constituents in the surface water or sediments. Additionally, aquatic and terrestrial biota are identified as potential receptors.

Shallow groundwater on-Site contains Site-related Constituents and there are Constituents present in the groundwater beyond the property line along the eastern property boundary. If groundwater is extracted for some purpose, then the potential exists for this exposure pathway to be complete. Information collected to date demonstrates that there is no current use of the shallow groundwater in the area known to be impacted by Site-related Constituents. Additionally, the Notice of Land Use Restrictions filed and recorded with the Forrest County Chancery Clerk's office on February 25, 2008 (Appendix D of the Revised Phase II Work Plan) prohibits the use of groundwater at the Site.

The VOCs associated with the former Hercules Plant that are present off-Site could migrate from the groundwater into the vapor phase resulting in potential exposure. When the risk assessment is prepared, the available data will be reviewed. The data will be used to determine whether or not this exposure pathway will be quantified in the risk assessment.

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5. Project Objectives

5.1 Administrative Order Objectives

The objectives of the sampling events as included in the AO are to:

- Determine the presence of the Site-related Constituents at on-Site locations;

- Evaluate the nature and extent of the Site-related Constituents at on-Site and off-Site locations;

- Evaluate the Site-related Constituents' potential impact to human health and the environment;

- Determine the presence, magnitude, extent, direction, and rate of movement of the Site-related Constituents within and beyond the Site boundaries; and

- Document the procedures to characterize source areas, characterize potential migration pathways, and identify actual or potential human and/or ecological receptors.

As required by the AO, data were obtained that can be used to determine if impacts exist on-Site and/or off-Site. Media that were evaluated included drinking water, surface water, sediment, groundwater, soil, soil gas, ambient air, and City of Hattiesburg sewer collection system. This report provides a summary of the data collected to date and provides a path forward for future work.

5.2 Data Quality Objectives

Data collected in accordance with the procedures described in the approved Work Plans were evaluated in accordance with the objectives described in the Quality Assurance Project Plan (QAPP; ARCADIS 2011c). Data quality objectives (DQOs) established for this project are included in the QAPP.

6. Analytical Program

The DQO process described in the Guidance for Quality Assurance (QA) Project Plans (USEPA 2002) was followed. It was determined that the DQOs would focus on the usage and incorporation of existing data with data obtained through assessment activities to characterize the source(s) of any Site-related Constituents, characterize the potential pathways of migration of these Constituents, define the degree and extent of the presence of these Constituents, and identify actual or potential human and/or ecological receptors. The DQOs further defined how data would be validated and deemed usable for this project. The usable data were evaluated against the appropriate Mississippi and USEPA standards as prescribed in the AO.

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Based on the evaluations of the July 2011 sampling data (which included analysis of an expanded analyte list during completion of a semiannual groundwater event [ARCADIS 2012b]) and discussions with USEPA, historical analytical data, and a review of the manufacturing processes at the Site, the following analyte list was used for the Phase I soil and groundwater assessment activities:

- Appendix IX. VOCs (SW-846 8260B or equivalent drinking water standards);
- Appendix IX. SVOCs (SW-846 8270C or equivalent drinking water standards);
- Appendix IX. Metals (SW-846 6010 or equivalent drinking water standards);
- Appendix IX. Pesticides (USEPA 8081A or equivalent drinking water standards);
- Appendix IX. Herbicides (USEPA 8151 or equivalent drinking water standards);
- Appendix IX. PCBs (USEPA 8082 or equivalent drinking water standards);
- Appendix IX. Dioxins and Furans (USEPA 1613 or equivalent drinking water standards); and,
- Appendix IX. Cis- and Trans-Dioxathion/Dioxenethion (BATCO 088.1).

Surface water and groundwater samples obtained during Phase I activities were analyzed for VOCs, SVOCs, and metals. Selected surface water and groundwater samples were also analyzed for pesticides, herbicides, dioxins, furans, and PCBs. This resulted in approximately 10 percent of the surface water and groundwater samples during initial Phase I activities being analyzed for the complete list of analytes. Specific locations were communicated to USEPA and MDEQ prior to sampling. This preliminary Constituent list was revised after completion of the initial Phase I investigation.

Based on the Constituent evaluation submitted to USEPA in the COPC report (ARCADIS 2012b) and the findings of the initial Phase I investigation results, the preliminary Constituent list was revised and the following analyte list was used for the Phase II assessment activities:

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Analytical Method	Soil Gas/ Ambient Air	Groundwater	Soil	Surface Water	Sediment
TO-15 VOCs	X				
Appendix IX VOCs		X	X	X	X
Appendix IX SVOCs		X	X	X	X
Appendix IX Metals		X	X	X	X[3]
Appendix IX Dioxins/ Furans		X[4]	X[1]	X[4]	X
Appendix IX Pesticides		X[4]	X	X[4]	X[2]
Cis- and Trans-Dioxathion/ Dioxenethion			X[2]	X	X
Appendix IX PCBs		X[4]		X[4]	
Appendix IX Herbicides					
Sulfide					

1 Dioxins/furans analysis will only be conducted on soil samples collected from 0 to 2 ft bgs.
2 Ecological only.
3 To include cyanide.
4 Only 20 percent of samples collected will be analyzed for these constituents.

While this analyte list was used to conduct the Phase II sampling, additional modifications to this analyte list may be made for future sampling activities. Any revisions to the COPC list will be approved by USEPA and MDEQ prior to implementation.

7. Data Management and Validation

7.1 Datasets

This section summarizes the data collected during the Phase I and Phase II investigations, the follow-up investigations in Area #1, Area #2, and Area #3, and the routine groundwater monitoring data. The collective data were used to characterize potential on-Site and off-Site impacts from historical activities at the Site. Copies of the analytical data reports are presented in **Appendix B** (Level II laboratory reports) and **Appendix C** (Level IV laboratory reports). The data validation reports are provided in **Appendix D** of this report.

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7.1.1 Phase I Data

From February through June 2012, ARCADIS collected the following soil, groundwater, sediment, surface water, soil gas, and ambient air samples in accordance with the approved Revised Phase I Work Plan (ARCADIS 2011a):

Sample Type	Number
Temporary Groundwater	23
Monitoring Well	23
Soil	61
Surface Water	15
Sediment	14
Industrial Well Water	5
Agricultural Well Water	1
Soil Gas	5
Ambient Air	1
Crawl Space Air	1

Summaries of these data are provided in **Appendix E**. These data were initially screened against the May 2012 RSLs in the tables; however, the evaluation completed for this report screened the entire dataset against the May 2014 RSLs.

7.1.2 Phase II Data

Between September 2012 and March 2013, ARCADIS collected soil, groundwater, sediment, surface water, sewer, and ambient air samples in accordance with the approved Revised Phase II Work Plan (ARCADIS 2012a). Additionally, data collected for the work along Providence Street (Area #1) are included in the dataset due to the timing of the sampling. The following samples were collected during the implementation of the Phase II Work Plan:

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Sample Type	Number
Temporary Groundwater	64
Monitoring Well	23
Soil	57
Surface Water	20
Sediment	22
Ambient Air	1
Crawl Space Air	1
City Sewer	2

Summaries of these data are provided in **Appendix F**. These data were initially screened against the November 2012 RSLs in the tables; however, the evaluation completed for this report screened the entire dataset against the May 2014 RSLs.

7.1.3 Area #1 Follow-Up Data

In September 2013, ARCADIS collected the following groundwater samples in accordance with the approved Follow-Up Area #1 Work Plan (ARCADIS 2013a):

Sample Type	Number
Temporary Groundwater	13
Monitoring Well	1

Summaries of these data are provided in **Appendix G**. These data were initially screened against the November 2012 RSLs in the tables; however, the evaluation completed for this report screened the entire dataset against the May 2014 RSLs and the MDEQ Tier 1 TRGs.

In July/August 2014, ARCADIS installed 17 new monitoring wells and one DNAPL recovery well. In addition, the following groundwater samples were collected in accordance with the Follow-Up Area #1 Letter (ARCADIS 2014a):

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Sample Type	Number
Monitoring Well	18
Ambient Air	1
Crawl Space Air	1

Summaries of these data are provided in **Appendix H**. These data were screened against the May 2014 RSLs and the MDEQ Tier 1 TRGs.

7.1.4 Area #2 Follow-Up Data

In September 2013, the following soil and groundwater samples were collected in accordance with the Follow-Up Area #2 Work Plan (ARCADIS 2013b):

Sample Type	Number
Temporary Groundwater	13
Soil	3

Summaries of these data are provided in **Appendix G**. These data were initially screened against the November 2012 RSLs in the tables; however, the evaluation completed for this report screened the entire dataset against the May 2014 RSLs and the MDEQ Tier 1 TRGs.

In July 2014, ARCADIS collected groundwater samples in accordance with the Follow-Up Area #2 Letter (ARCADIS 2014b). Additionally, excavations were made to locate and remove the potential USTs, if present, and to evaluate the scale as a potential source of Site-related COPCs. The excavations did not locate any USTs and the components of the scale that were identified (only a concrete structure) are not a source. The following samples were collected during the implementation of the Area #2 Letter scope of work:

Sample Type	Number
Temporary Groundwater	4

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Summaries of these data are provided in **Appendix H**. These data were screened against the May 2014 RSLs and the MDEQ Tier 1 TRGs.

7.1.5 Area #3 Follow-Up Data

In September 2013, ARCADIS collected the following groundwater samples in accordance with the Follow-Up Area #3 Work Plan (ARCADIS 2013c):

Sample Type	Number
Temporary Groundwater	7

Summaries of these data are provided in **Appendix G.** These data were initially screened against the November 2012 RSLs in the tables; however, the evaluation completed for this report screened the entire dataset against the May 2014 RSLs and the MDEQ Tier 1 TRGs.

7.1.6 Routine Groundwater Monitoring Data

During the course of previous investigations, a permanent well network was established at the Site. The details of this well network are included in **Table 1**. Per the RUAO, the existing permanent well network at the Site is sampled semiannually for VOCs, and annually for dioxathion and dioxenethion. The permanent monitoring wells are installed near previously assessed areas. Data collected between July 2011 and May 2014 as part of the RUAO are included in the evaluation presented in this Investigation Report. Summaries of these monitoring events are provided in the following sections.

7.1.6.1 *2011 Routine Groundwater Monitoring Data*

In July 2011, groundwater samples were collected as part of the RUAO monitoring program. Due to the proximity of the existing well network to areas to be evaluated per the AO, samples collected from these wells were sampled for additional parameters with the intent of including the data in the Phase I investigation evaluation. The permanent monitoring wells were sampled for Appendix IX VOCs in July 2011 and selected permanent monitoring wells were also sampled for the entire Phase I analyte list. These data were presented in the 2011 First Semiannual Report (ARCADIS 2011d) and data tables are included in **Appendix G**.

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In December 2011, groundwater samples were collected from the RUAO permanent monitoring wells and analyzed for Appendix IX VOCs. These data were presented in the 2011 Second Semiannual Report (ARCADIS 2012c) and data tables are included in **Appendix G**.

7.1.6.2 *2012 Routine Groundwater Monitoring Data*

Based on the timing of the ongoing Phase I and II investigations, only one RUAO sampling event was conducted in 2012. In October and November 2012, groundwater samples were collected from the RUAO permanent monitoring wells. These wells were sampled in a similar manner to the July 2011 sampling (i.e., Appendix IX VOC samples were collected from the wells and a subset of these wells was sampled for the Phase II analyte list). These data were presented in the 2012 Second Semiannual Report (ARCADIS 2013d) and data tables are included in **Appendix G**.

7.1.6.3 *2013 Routine Groundwater Monitoring Data*

In June 2013, groundwater samples were collected from the RUAO permanent monitoring wells and analyzed in accordance with the RUAO (i.e., Appendix IX VOCs). These data were presented in the 2013 First Semiannual Report (ARCADIS 2013e) and data tables are included in **Appendix G**.

In December 2013, groundwater samples were collected from the permanent RUAO monitoring wells. Wells were sampled in accordance with the RUAO (i.e., Appendix IX VOCs and dioxathion/dioxenethion in a subset of wells). In addition, samples were analyzed for Appendix IX SVOCs. These data were presented in the 2013 Second Semiannual Report (ARCADIS 2014d) and data summary tables are presented in **Appendix G**.

7.1.6.4 *2014 Routine Groundwater Monitoring Data*

In May 2014, groundwater samples were collected from the RUAO permanent monitoring wells. Wells were sampled in accordance with the RUAO (i.e., Appendix IX VOCs). In addition, samples were analyzed for Appendix IX SVOCs. The data collected for the 2014 RUAO were presented in the 2014 First Semiannual Groundwater Monitoring Report (ARCADIS 2014e) and data summary tables are presented in **Appendix G**.

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7.2 Dataset Summary

Copies of the analytical data reports for the aforementioned datasets are presented in **Appendix B** (Level II laboratory reports) and **Appendix C** (Level IV laboratory reports). The data validation reports are provided in **Appendix D** of this report. Tables summarizing these datasets are provided in Appendices E through H as follows:

- Appendix E: Phase I data;
- Appendix F: Phase II data;
- Appendix G: Area #1, Area #2, and Area #3 investigations and the RUAO routine groundwater data; and
- Appendix H: July 2014 sampling in Area #1 and Area #2.

It should be noted that the data tables provided in **Appendices E** through **H** may reference outdated versions of the RSLs or other screening criteria based on the timing of the sampling; however, the evaluation completed for this report screened the entire dataset against the May 2014 RSLs and other current screening criteria (e.g. MDEQ Tier 1 TRGs, National Recommended Water Quality Criteria, Mississippi Water Quality Criteria, USEPA Ecological Screening Levels). Therefore, **Appendices E** through **H** are provided only to present the full dataset for each sample location, not to present a comparison of data to current screening criteria. The tables presented in Section 8 (Tables 3 through 6 [private wells], Tables 8 through 13 [surface water and sediment], Tables 15 and 16 [shallow groundwater], Tables 17 through 20 [soil], Tables 22 and 23 [soil gas], and Tables 24 and 25 [ambient and crawl space air]), provide a comparison of data to current screening criteria.

7.3 Data Validation

As specified in the project QAPP (ARCADIS 2011c) that was submitted with the Revised Phase I Work Plan (ARCADIS 2011a), approximately 10 percent of the samples from each medium-specific matrix were validated. In general, the data are acceptable for use. The data validation reports are provided in **Appendix D** of this report.

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7.4 Data Usability

The datasets collected during the various investigation phases were combined to focus any further investigations at the Site. The following identifies the criteria used to create the datasets.

The depth to groundwater at the Site ranges from 3 to 10 ft bgs. Based on a review of general depth to first-encountered groundwater, soil samples collected deeper than 10 ft bgs are generally considered to be saturated; however, at the request of USEPA, all soil data were included in the data evaluated in this report. The appropriate depth for direct exposure to soil and groundwater by a construction worker will be determined during the human health risk assessment (HHRA). In the risk assessment, the soil will be segregated based on potential exposure scenarios and potential receptor.

Soil data were quantitatively evaluated to identify areas of contaminant releases, including any non-aqueous phase liquid (NAPL) releases. The soil data collected at depths overlying the Hattiesburg Clay were evaluated for indications of NAPL presence. Boring logs were reviewed and data were screened against published saturation values for soil and solubility values for water as supplemental lines of evidence. Soil vapor screening data were used only as qualitative purposes due to the limitations of this line of evidence (i.e., interferences). Based on this review, no additional indications of DNAPL were noted.

Where duplicate samples were collected and analyzed, both results are presented in the tables; however, only the maximum detected concentration or the maximum detection limit for non-detected constituents was used in the data evaluation. Where constituents were analyzed using more than one method (e.g., naphthalene), the results were reported with the analyte group corresponding to each method. Laboratory-qualified and validated data are retained within the dataset for the screening.

7.5 Data Evaluation Methodology

Medium-specific data were segregated based on the location relative to the Site (i.e., on-Site or off-Site). The on-Site and off-Site medium-specific datasets are summarized to include the frequency of detection, the range of detection limits, the range of detected values, and the location of the maximum detected concentration. The maximum detected concentration was compared to applicable criteria to identify COPCs for potential human and ecological receptors. If the maximum detected

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concentration for a given Constituent was greater than the applicable screening level(s), the Constituent was identified as a COPC. Constituents without screening levels (either human health or ecological) were also identified as COPCs.

7.5.1 Data Evaluation for Protection of Human Health

Criteria used in the human health evaluation include:

- MDEQ Tier 1 Restricted and Unrestricted Soil and Groundwater TRGs (MDEQ 2002);
- USEPA Residential and Industrial Soil, Air, and Tapwater RSLs 2014a), adjusted for a non-cancer hazard index (HI) of 0.1 for RSLs based on non-carcinogenic endpoints; and
- USEPA National Recommended Water Quality Criteria (NRWQC) (USEPA 2014b).

In some cases, screening levels were not available for all constituents. Where appropriate, surrogates were selected and their screening levels were compared to the constituent concentrations. In general, this only occurred for the dioxathion isomers and dioxenethion (cis-dioxathion used as a surrogate) and inorganics. Where surrogates were used, table footnotes provide additional information.

Because the laboratory did not report specific valence states of mercury (elemental mercury versus other forms such as mercuric chloride), the RSLs for elemental mercury were used as a conservative measure. MDEQ provides TRGs for inorganic mercury (does not include methylated mercury forms) rather than elemental mercury so this is only an issue when the RSLs are used for screening levels. The federal drinking water action level for lead was used as the screening level for groundwater. For dioxins and furans, the individual congener-specific MDEQ screening levels were used where available. When the USEPA RSLs were used (surface water evaluation only), the 2005 World Health Organization (WHO) mammalian toxic equivalency factors were used to adjust the 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) RSL to RSLs for the individual congeners. It should be noted that the published MDEQ TRG for groundwater for acetophenone is incorrect and that the USEPA RSL Tapwater RSL should be used (Willie McKercher [MDEQ], personal communication).

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7.5.2 Data Evaluation for Protection of Ecological Receptors

Data were segregated based on environmental medium for the ecological evaluation and the following datasets were identified: surface soil 0 to 1 ft bgs (including on-Site and off-Site samples), surface soil 0 to 2 ft bgs (including on-Site and off-Site samples), sediment, and surface water (including creek samples and samples from on-Site ditches). Priority was given to the surface soil 0 to 1 ft bgs dataset (which represented the primary on-Site grass-covered areas and off-Site areas), but to allow for additional spatial coverage, the 0 to 2 ft bgs dataset collected as part of the human health investigation was also evaluated as discussed during the June 4-5, 2012, ecological Site visit. This is considered a conservative evaluation as additional COPCs were identified in the 0 to 2 ft bgs dataset.

The media-specific datasets (i.e., surface water, sediment, and soil) were summarized to identify the frequency of detection, the range of detection limits, the range of detected values, and the location of the maximum detected concentration. COPCs were generally identified by comparing the maximum detected concentration to the applicable ecological screening level (ESLs). If the maximum detected concentration for a given Constituent was greater than the ESL, the Constituent was identified as a COPC. Constituents without screening levels were also identified as COPCs.

ESLs used in the ecological evaluation were selected from the following sources in order of hierarchy:

Soil

- USEPA Region 4 ESLs (USEPA 2011a);
- USEPA Ecological Soil Screening Levels (USEPA 2003a);
- USEPA Region 5 ESLs (USEPA 2003 b); and
- USEPA Region 3 ESLs (USEPA 2006).

Sediment

- USEPA Region 4 ESLs (USEPA 2001);
- USEPA Region 5 ESLs (USEPA 2003); and

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- USEPA Region 3 ESLs (USEPA 2006).

Surface Water

- Mississippi Water Quality Criteria - Freshwater Aquatic Life Chronic (MDEQ 2007);
- USEPA Region 4 ESLs (USEPA 2001);
- USEPA Region 5 ESLs (USEPA 2003); and
- USEPA Region 3 ESLs (USEPA 2006).

Some Constituents, especially those in the same class of compounds, behave similarly. Consequently, detected concentrations of these Constituents were summed together by sample for the ecological evaluation, in some media where appropriate, as following:

- Total DDx (for soil only): p,p'-dichlorodiphenyl dichloroethane (4,4′-DDD); p,p'-dichlorodiphenyl dichloroethylene (4,4′-DDE); p,p'-dichlorodiphenyl trichloroethane (4,4′-DDT);
- Total PCBs; and
- Total high molecular weight (HMW) polynuclear aromatic hydrocarbons (PAHs) and total low molecular weight (LMW) PAHs (for soil only).

LMW-PAHs included 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene. HMW-PAHs included benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene.

8. Environmental Investigation – Phase I and Phase II

The scope of work for the investigations described below was designed to meet the requirements of the AO. Due to the similar nature of the work performed during the implementation of the Revised Phase I Work Plan, the Revised Phase II Work Plan, and follow-up investigations in Area #1, Area #2, and Area #3, the field work was conducted in accordance with the Health and Safety Plan submitted as Appendix E of the Revised Phase I Work Plan (ARCADIS 2011a).

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A detailed discussion of the field procedures that were employed to complete the field tasks is provided in the following subsections. Field procedures were completed in accordance with the USEPA Field Branches Quality System and Technical Procedures (USEPA 2011b).

8.1 Private Water Well Inventory and Sampling

The AO required that Hercules perform "an inventory of all wells on and within a 4-mile radius of the Site, and a schedule for sampling of all such wells either on or within a 0.5-mile radius of the Facility." Details of the well inventory were discussed at a technical meeting on June 9, 2011, and the USEPA provided clarification that the inventory should include public and private drinking water, irrigation, and production supply wells where water is extracted for human consumption, or where humans may come in direct contact with the water. Other types of wells such as those used for groundwater monitoring, environmental remediation, heat pump wells, injection wells, or dry wells would not need to be included in the inventory.

Initial response actions performed by Hercules shortly after receiving the AO included performing a public records search of registered wells that exist within a 4-mile radius of the Site. The initial well inventory was conducted by Environmental Data Resources, Inc. (EDR). The Site property boundary as defined in Exhibits 2 and 3 of the AO was provided to EDR. The search was conducted on data contained in the following public databases:

- Public Water Systems data from the Federal Reporting Data System;
- Public Water Systems Violation and Enforcement Data;
- Mississippi Radon;
- National Radon Database;
- U.S. Geological Survey (USGS) Water Wells;
- USGS Public Wells;
- Permitted Wells;
- USGS Private Wells;

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- Health Department Wells; and
- Oil and Gas Well Location Listing.

The EDR well inventory identified 806 well records within the search radius as shown on **Figure 18**. The well inventory search radius was refined to show only the registered wells that exist on or within a 0.5-mile radius of the Site and those wells are shown on **Figure 19**. The map provided with the EDR report erroneously listed Wells 173 and 212 as being located within the 0.5-mile radius of the Site; however, these wells are 217 feet and 100 feet farther than the 0.5-mile radius from the Site, respectively.

This initial public records survey indicates that 20 wells potentially exist within a 0.5-mile radius of the Site; however, Hercules was concerned that there may be other wells within this radius that are not listed in public records or these wells may not be present. Therefore, further investigation into the existence of wells in the area was performed as described in the following sections.

8.1.1 Private Water Well Locations

An initial evaluation of public records was performed as described above to identify public and private drinking water wells as specified in the AO. Site records indicated that historical well surveys, including the 1993 B&V Waste Science and Technology Corporation report (1993 B&V), have also been performed. The 1993 B&V report documented that five municipal suppliers of potable water having wells within a 4-mile radius of the Site existed at that time. The EDR well survey identified 19 public supply wells. The locations of the identified public supply wells are shown on **Figure 20**.

A neighborhood survey of residents and businesses located within a 0.5-mile radius of the Site was performed by distributing a questionnaire to collect information on the presence and use of public and private wells. A copy of the questionnaire is provided in **Appendix I**. The questionnaire was mailed to 1,809 addresses (residents and businesses) located within the 0.5-mile radius to inform them of the importance of the survey and requested that respondents provide information regarding wells on their property. The address information was obtained from the City of Hattiesburg and questionnaires were sent to the owners of the parcels. As of September 12, 2011, 389 questionnaires had been returned. A summary of the responses is included in **Appendix I**. Parcels where the owner stated a well was present are shown on **Figure 19**.

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The survey was further supported by performing a "windshield" survey of properties within the 0.5-mile radius on December 8, 2011. The survey looked for signs typically associated with private water well use (e.g., staining on structures and sidewalks, small enclosures or well houses). Well verification was performed using a door-to-door follow-up survey to further support either a questionable windshield survey observation, or a response from the questionnaire that required clarification. Data collected from survey responses, the windshield survey, and other public information sources mentioned above were compiled into a geographic information system database for use in determining wells that might require sampling.

Based on the well survey results, three off-Site properties within the 0.5-mile radius of the Site were identified to have four private wells capable of being sampled. Additional well locations were identified, but due to prior deterioration of these wells (either complete removal or plugging) samples could not be obtained from those locations. Hercules pursued access to the three properties and access agreements were presented to each well owner for review and approval. The sampling event was scheduled with each well owner once the access agreement was signed.

The sampling team performed a short interview with each well owner during the sampling event to determine information regarding the well and water use at the property. Interviews were conducted with the owners (or their current tenants) using a form developed to record specific information on the well. Each completed form was added to the data record for the investigation. A copy of each interview form is provided in **Appendix I**. A summary of the information gathered during the well survey is provided in **Table 2**.

The following sections provide well construction and water use information obtained for the Hercules supply wells and the three properties where private wells were identified within the 0.5-mile radius of the Site. Sample locations are included on **Figure 19**.

8.1.1.1 *Private Residential Well (PW-CMS-01)*

A well was identified on a residential property approximately 900 feet north of the Hercules northern property boundary, north of the Sludge Pits (**Figure 19**). Based on information gathered during an in-person interview, this well is used by the residential property owner for landscape and livestock irrigation (**Table 2**). Drinking water for the residence is provided by the City. The well owner indicated the well is approximately 35 feet in depth and appears to be screened in the shallow alluvial and terrace deposits. This is the same water-bearing zone monitored at the Site.

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8.1.1.2 *Off-Site Industrial Supply Wells (PW-ZC-01 and PW-ZC-02)*

Two wells were identified on industrial property between 150 and 200 feet south of the southwestern border of the Hercules property boundary, south of the Former Pine Tree Stump Pile (**Figure 19**). Based on the data gathered during a database search and an in-person interview, these two wells are used to provide water for manufacturing industrial activities on a parcel located adjacent to the Hercules property (**Table 2**). Drinking water for the facility is provided by the City.

The total depth of the well located on the west side of the property (Map ID PW-ZC-01) is approximately 650 feet and the total depth of the east well (Map ID PW-ZC-02) is approximately 640 feet. These wells are screened in the Catahoula Formation, in water-bearing zones much deeper than the first groundwater-bearing zone monitored on-Site. The Catahoula Formation is the source of the City's drinking water supply.

8.1.1.3 *Off-Site Industrial Supply Well (PW-RTT-01)*

One well was identified at a commercial property approximately 2,300 feet northeast of the Hercules facility, measuring from the property line near the intersection of Providence Street and Highway 43 (**Figure 19**). Based on the data gathered during a database search, water well record reviews, and an in-person interview, this well is used to supply water for commercial activities at the facility (**Table 2**). Drinking water for the facility is provided by the City.

Based on database information and water well records (the property owner was not able to provide construction details), the well is 91 feet deep and screened in the Hattiesburg Formation. There are registration forms for two other wells on this property, both of which are approximately 90 feet deep; however, neither of these wells were located during the field survey. The Hattiesburg Formation is not used as a public drinking water supply in this area. Private Well PW-RTT-01 is screened deeper than the first groundwater-bearing zone monitored on-Site.

8.1.1.4 *Hercules Industrial Supply Wells (PW-HI-01, PW-HI-02, and PW-HI-03)*

There are currently three Hercules supply wells (HI-01, HI-02, and HI-03) located within the boundaries of the Site (**Figure 19**). These wells were formerly used to provide water for Hercules' manufacturing activities. Water obtained from the wells has not been used for drinking purposes, and the wells are currently not in service. Drinking water for the facility is provided by the City. Based on the data gathered during a

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database search and an in-person interview, the total depth of these wells range from approximately 460 to 690 ft bgs (**Table 2**). These wells are screened in the Catahoula Formation, in water-bearing zones deeper than the first groundwater-bearing zone monitored on-Site.

8.1.2 On-Site and Private Water Well Sampling Procedure

The private off-Site wells that were sampled were equipped with operable pump systems. The existing pumping systems were used for purging each well. Samples were collected from pre-installed valves or spigots in the piping systems. On February 27, 2012, samples were collected from Private Well PW-CMS-01. On February 28, 2012, samples were collected from Private Off-Site Industrial Supply Wells PW-ZC-01 and PW-ZC-02. On April 3, 2012, samples were collected from Private Off-Site Industrial Supply Well PW-RTT-01.

A private water well contractor was used to purge and sample the two viable Hercules supply wells because there were no operable pumping systems in these wells. On March 13 and March 15, 2012, samples were collected from Hercules Wells PW-HI-01 and PW-HI-03. The purging and sampling process consisted of installation of a high volume submersible pump in the well and purging approximately 20,000 gallons of water prior to sampling. After purging, groundwater samples were collected from a sample port installed in the purge water piping. Hercules Well PW-HI-02 did not yield a sufficient volume. The water well contractor indicated that the screen was most likely damaged, which was preventing recharge to the well. As a result, PW-HI-02 was not sampled.

Hercules utilized the procedures obtained in the current USEPA SESD guidance document (SESDPROC-305-R1), as appropriate, during the collection of water well samples for laboratory analysis. Conditions that required deviations from practices in the guidance were documented in field books and well sampling sheets. Samples that were collected from water wells were preserved, handled, and shipped in accordance with SESDPROC-305-R1 and the project-specific QAPP.

8.1.3 Data Evaluation

8.1.3.1 *Off-Site Shallow Private Well PW-CMS-01*

Off-Site Shallow Private Well PW-CMS-01 was sampled once in February 2012 during the Phase I Investigation. Data were compared to the current MDEQ Groundwater

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Tier 1 TRGs and the USEPA Tapwater RSLs as presented in **Table 3**. The full dataset for PM-CMS-01 is presented in **Table E-10** of **Appendix E**.

The following Constituents were detected in off-Site shallow groundwater at concentrations below applicable screening levels:

- 1,4-dioxane, acetophenone, and various inorganics (i.e., metals and sulfide).

The following Constituents are considered COPCs for off-Site shallow groundwater based on either detections above applicable screening levels (**Figure 21**) or the absence of screening levels:

- Arsenic (although the maximum detected concentration of arsenic did not exceed the Safe Drinking Water Act MCL of 10 micrograms per liter [µg/L]).
- Sulfide due to absence of screening limit.

8.1.3.2 *Off-Site Industrial Well PW-RTT-01 (Hattiesburg Formation)*

Off-Site private groundwater well location PW-RTT-01 was sampled in April 2012 during the Phase I Investigation. Data were compared to the current MDEQ Groundwater Tier 1 TRGs and the USEPA Tapwater RSLs as presented in **Table 4**. The full dataset for PW-RTT-01 is presented in **Table E-9** of **Appendix E**.

The following Constituents were detected in off-Site Hattiesburg formation groundwater at concentrations below applicable screening levels:

- 1,1-dichloroethene, trans-1,2-dichloroethene, diethylphthalate, dioxenethion, barium, cobalt, and nickel.

The following Constituents are considered COPCs for off-Site Hattiesburg formation groundwater based on either detections above applicable screening levels, (**Figure 21**) or the absence of screening levels:

- Benzene, tetrachloroethylene (PCE), trichloroethylene (TCE), vinyl chloride, 1,4-dioxane, and arsenic (although the maximum detected concentration of arsenic did not exceed the MCL of 10 µg/L).
- Diphenyl ether and sulfide due to a lack of screening values.

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8.1.3.3 *On-Site Industrial Wells PW-HI-01 and PW-HI-03 (Catahoula Formation)*

On-Site industrial groundwater well locations (Hercules Supply Wells #1 [PW-HI-01] and #3 [PW-HI-03]) were sampled in March 2012 during the Phase I Investigation. Data were compared to MDEQ Groundwater Tier 1 TRGs and USEPA Tapwater RSLs as presented in **Table 5**. The full dataset for PW-HI-01 and PW-HI-03 is presented in **Table E-9** of **Appendix E**.

The following Constituents were detected in on-Site Catahoula groundwater at concentrations below applicable screening levels:

- Ethylbenzene, toluene, total xylenes, octachlorodibenzo-p-dioxin (OCDD), barium, copper, and lead.

The following Constituents are considered COPCs for on-Site Catahoula groundwater based on either detections above applicable screening levels (**Figure 21**) or the absence of screening levels:

- Arsenic (although the maximum detected concentration of arsenic did not exceed the MCL of 10 µg/L).

8.1.3.4 *Off-Site Industrial Wells PW-ZC-01 and PW-ZC-02 (Catahoula Formation)*

Off-Site industrial groundwater well locations (PW-ZC-01 and PW-ZC-02) were sampled once in February 2012 during the Phase I Investigation. Data were compared to MDEQ Groundwater Tier 1 TRGs and USEPA Tapwater RSLs as presented in **Table 6**. The full dataset for PW-ZC-01 and PW-ZC-02 is presented in **Table E-9** of **Appendix E**.

The following Constituents were detected in off-Site Catahoula groundwater at concentrations below applicable screening levels:

- Total xylenes, acetophenone, and barium.

The following Constituents are considered COPCs for off-Site Catahoula groundwater based on either detections above applicable screening levels (**Figure 21**) or the absence of screening levels:

- 1,1'-biphenyl and sulfide.

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8.1.3.5 *Private Water Well Findings Summary*

A figure illustrating the distribution of COPCs detected in the on-Site and off-Site water wells is included as **Figure 21**. As noted on the figure and discussed above, arsenic was the only constituent detected in the off-Site shallow private well (PW-CMS-01) above a standard. This detection appears indicative of background conditions. Additionally, the on-Site groundwater plumes in the shallow alluvial aquifer have been delineated to the north. No further evaluation of PW-CMS-01 is necessary at this time.

There are detections of Constituents in the off-Site Hattiesburg Formation well (PW-RTT-01) north of the Site above screening standards. Currently, no pathway has been identified that would allow Site Constituents to migrate to this well. The shallow alluvial groundwater plumes, which are delineated to the north, demonstrate that migration in this zone towards the PW-RTT-01 well is not occurring. As discussed in Section 9, additional groundwater investigations will be completed in the Hattiesburg Formation on-Site. If impacts are found on-Site in this zone, additional evaluations will be required to determine if the constituents present in PW-RTT-01 are migrating from the Site.

Evaluation of the on-Site Catahoula Formation industrial supply wells (PW-HI-01 and PW-HI-03) reveals that arsenic was the only constituent detected above a standard. This detection appears indicative of background conditions. No further evaluation of the on-Site Catahoula Formation wells is necessary at this time.

Evaluation of the off-Site Catahoula Formation industrial supply wells (PW-ZC-01 and PW-ZC-02) reveals that 1,1'-biphenyl was detected above a screening standard in one well (PW-ZC-01). Currently, no pathway has been identified that would allow this constituent to migrate from the Site to this well. There are no detections of this constituent in the on-Site Catahoula Formation industrial supply wells. Well PW-ZC-01 is along the western boundary of the Site. During the Area #3 investigation an elevated detection of 1,1'-biphenyl was detected on the western property line in the shallow alluvial aquifer. The source of the detection is not known at this time, but given the location, it is possible the source is off-Site. Well PW-ZC-01 will be re-sampled to evaluate the 1,1'-biphenyl detection.

8.2 Surface Water and Sediment Sampling

A survey was conducted to identify any significant wetlands, creeks, lakes, or other surface water bodies, including any ditches (collectively called "water bodies"), located

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on and within a 0.5-mile radius of the Site. A preliminary evaluation of the potential for these water bodies to be used for public recreational purposes, or whether they may contain threatened and endangered (T&E) species, was included in this survey. Based on the location and hydrogeologic characteristics of these water bodies, the water bodies that could potentially be connected to discharges from the facility were identified for sampling and analysis of surface water and sediment. The connection of Site discharges to surface water bodies was initially determined from evaluation of the topographic map (**Figure 1**) and the digital elevation model maps (**Figure 9**), and was confirmed through field observations.

One plant species, two fish species, one amphibian species, three reptile species, one bird species, and one mammal species for Forrest County are listed as threatened or endangered by the U.S. Fish and Wildlife Service (http://www.fws.gov/MississippiES/_pdf/MS_county_list_TE_%202014_Final.pdf). These species are provided below along with their status codes (C = Candidate; E = Endangered; CH = Critical Habitat; T = Threatened):

C Black pinesnake (*Pituophis melanoleucus ssp*. *Lodingi*)

ECH Dusky gopher frog (*Rana sevosa*)

T Gopher tortoise (*Gopherus polyphemus*)

TCH Gulf sturgeon (*Acipenser oxyrinchus desotoi*)

T Louisiana black bear (*Ursus americanus luteolus*)

E Louisiana quillwort (*Isoetes louisianensis*)

C Pearl darter (*Percina aurora)* (Pascagoula River System)

E Red-cockaded woodpecker (*Picoides borealis)*

T Yellow-blotched map turtle (*Graptemys flavimaculata)*

Based on observations of the ecological habitats present during the ecological visit on June 4-5, 2012, the Site does not appear to provide suitable habitat for any of these species, which are typically habitat specialists. Additionally, Greens Creek does not

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provide suitable habitat for the Gulf sturgeon, pearl darter, and yellow-blotched map turtle.

Preliminary analysis of surface water on the Site has identified three major drainages (Drainages A, B, and C [**Figure 15**]). These drainages were sampled during implementation of the Revised Phase I Work Plan, as discussed below. Additional intermittent drainage ditches throughout the property were sampled during the implementation of the Revised Phase II Work Plan, as discussed below. The Bouie River is located approximately 0.5 mile northeast of the Site. No additional water bodies were identified.

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8.2.1 Surface Water and Sediment Sampling Locations

Initial actions performed by Hercules in response to the AO included performing a review of available maps, historical reports, and related resources that identify surface water features within and beyond the 0.5-mile search radius specified by USEPA. There are numerous small drainage features on the Site that collect storm water runoff from rain events, but these ditches are typically dry except in periods of heavy rainfall.

A detailed evaluation of hydrologic setting at the Site was performed by B&V, on behalf of the USEPA, and summarized in 1993 B&V Report. The report concluded that the Site is predominantly drained by the following three waterways (**Figure 15**):

- The perennial Greens Creek, which flows in an easterly direction (Drainage A);
- An unnamed, intermittent drainage ditch that flows in a northerly direction and exits the northeastern corner of the Site, crosses North Main Street, and flows within a culvert below a neighboring industrial facility until it daylights approximately 1,000 feet northeast of the former Hercules Plant property line (Drainage B); and
- An unnamed, intermittent drainage ditch located in the southeastern portion of the Site. This drainage flows south of the Site's wastewater treatment plant and exists in both culverted and open conditions along its generally easterly flow path (Drainage C).

The Site's three main drainages flow northeast for approximately 0.5 to 1.0 mile before entering the Bouie River, which flows in a southeasterly direction (B&V 1993). Depending on which pathway surface water enters the Bouie River from the Site, it then travels between 0.9 and 1.9 miles southeast and enters the Leaf River. The

Bouie and Leaf Rivers are utilized for sport and commercial fishing according to the 1993 B&V report; however, the report states that Greens Creek is too small to be used for fishing or swimming.

Field observations during the June 4-5, 2012, ecological site visit included verifying Site drainages and confirmed that Greens Creek was too shallow for swimming and fishing. Greens Creek being too small for fishing and swimming was previously documented in the B&V Site Inspection Report (1993), based on an interview with the Mississippi Department of Wildlife, Fisheries and Parks. During the implementation of the Revised Phase II Work Plan, the designated use of Greens Creek was determined to be Fish and Wildlife, the default designated use of Mississippi State waters.

Surface water and sediment sample locations are shown on **Figure 22**. The rationale for selecting the sampling locations was provided in the Work Plans and is summarized in **Table 7**. The majority of the sample locations were for the three main drainages, or tributaries to those drainages, to fully characterize Constituent concentrations within the drainages and to identify habitat characteristics in and around these features. The remaining sample locations were along the southern property boundary (West 7th Street).

At each surface water and sediment sampling location, a screening-level assessment of surface water use, habitat, and potential for T&E species was performed to capture visual observations at the time of the sampling. Additionally, sampling locations were evaluated during the June 4-5, 2012, ecological Site visit and the potential for T&E species was addressed at the beginning of this section.

Co-located surface water and sediment samples (where possible) were collected to evaluate Constituent concentrations. Each drainage was sampled along its flow path on approximately 500-foot intervals until a distance of approximately 2,640 feet was reached from the former Hercules Plant property boundary. In the case of Greens Creek, which originates upgradient of the Site, co-located surface water and sediment samples were collected on the upstream reach on 500-foot intervals until the 0.5-mile boundary was reached. Sampling was not performed in closed culverts or conveyances that were not readily accessible and open to the surface. The majority of Drainage C (**Figure 15**) was within closed culverts.

It should be noted that sediment and/or surface water were not collected at some locations (see rationale provided in **Table 7**). For example, samples were not collected from AO-SW/SD-08, located downgradient along Greens Creek flowing to Bouie River

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from the Site (**Figure 22**). Conditions at this location were deemed unsafe and inaccessible by ARCADIS and MDEQ, as the slope of the bank was too steep to be sampled safely. Additionally, sediment or surface water samples were not collected at some locations due to lack of available sample material.

During Phase I, March 12 to 20, 2012, samples were collected from AO-SW/SD-01 through AO-SW/SD-16. During Phase II, November 7 to 16, 2012, samples were collected from AO-SW/SD-17 through AO-SW/SD-37. During the RUAO event, November 8 and 9, 2012, samples were collected from Greens Creek, CM-SW/SD-1 through CM-SW/SD-4. Logs from the surface water sampling events are included in **Appendix J**. Logs from the sediment sampling events are included in **Appendix K**.

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8.2.2 Surface Water Sampling Procedure

The USEPA SESD guidance document SESDPROC-201-R1 was utilized during the collection of surface water samples for laboratory analysis. Surface water sampling was performed and documented in accordance with procedures outlined in the document and with the standard operating procedure (SOP) provided in Appendix J of the Revised Phase I Work Plan. Where conflicts existed between the two guidance documents, the SESD guidance prevailed.

No conditions that required deviations from practices in the guidance were noted during implementation of the sampling. Surface water samples were preserved, handled, and shipped in accordance with SESDPROC-201-R1 and the project-specific QAPP.

8.2.3 Surface Water Evaluation

Surface water was sampled at both on-Site and off-Site locations. Off-Site surface water locations were sampled during Phase I and Phase II Investigation events in March and November 2012, respectively. Full datasets for the off-Site surface water samples are provided in **Appendix E**, **Table E-5** (Phase I samples) and **Appendix F**, **Table F-5** (Phase II samples). On-Site surface water locations were sampled during the Phase II Investigation in November 2012. Full datasets for the on-Site surface water samples are provided in **Appendix F**, **Table F-5**.

For the human health evaluation, the surface water data were separated by on-Site and off-Site locations because individuals might access surface water separately on or off the Site. Data were compared to the draft USEPA NRWQC (USEPA 2014b). If a

USEPA NRWQC was not available, data were compared to the USEPA (2014a) Tapwater RSL as presented in **Table 8** (on-Site) and **Table 9** (off-Site).

For the ecological evaluation, the surface water data were combined. These data were compared to ESLs as presented in **Table 10**. As a conservative measure, samples collected in Greens Creek were considered off-Site samples (CM-1 through CM-4). As such, these data were evaluated to identify COPCs for both human health and ecological potential receptors.

It should be noted that the reporting limits for several analytes exceed their corresponding surface water screening values. The primary analytical methods used during the investigation for water matrices are provided in the USEPA SW-846 Test Methods for Evaluating Solid Waste, Third Edition, Update IV, and the Clean Water Act (CWA) USEPA Method 500 and USEPA Method 1613. Target reporting limits (RLs), as compared to laboratory MDLs, were specified in the QAPP (ARCADIS 2011c). Because the laboratory also reports "J" qualified estimated values, any low level detections occurring between the MDL and the RL would be reported, thus effectively lowering the level at which constituents can be detected.

Various VOCs, SVOCs, and inorganic constituents were detected in both on-Site and off-Site surface water at concentrations below applicable screening levels.

The following Constituents are considered human health COPCs for on-Site surface water based on either detections above applicable screening levels (**Figure 23**) or the absence of screening levels:

- VOCS: 1,4-dioxane, acetonitrile, bromodichloromethane, and dibromochloromethane;
- SVOCs: the seven "probable" carcinogenic PAHs, diphenyl ether, and o,o,o-triethylphosphorothioate; and,
- Inorganics: arsenic, cobalt, and mercury.

The following Constituents are considered human health COPCs for off-Site surface water based on either detections above applicable screening levels (**Figure 23**) or the absence of screening levels:

- VOCS: 1,4-dioxane, benzene, carbon tetrachloride, chloroform, and vinyl chloride;

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- SVOCs: 1,1'-biphenyl, 3-nitroaniline, bis(2-ethylhexyl)phthalate, diphenyl ether, naphthalene, and o,o,o-triethylphosphorothioate; and,

- Inorganics: arsenic, cobalt, thallium, and sulfide.

The following Constituents are considered ecological COPCs for surface water based on either detections above applicable screening levels (**Figure 24**) or the absence of screening levels:

- VOCS: bromodichloromethane and dibromochloromethane;

- SVOCs: 3-nitroaniline, acetophenone, bis(2-chloro-1-methylethyl)ether, bis(2-ethylhexyl)phthalate, and diphenyl ether;

- PAHs: chrysene;

- Dioxathion/dioxenethion: cis-dioxathion and dioxenethion;

- Dioxins and furans: all six detected dioxins and furans; and

- Inorganics: barium, beryllium, cadmium, copper, lead, mercury, nickel, silver, zinc, and sulfide.

Figures illustrating the distribution of constituents detected at concentrations exceeding screening levels are included as **Figure 23** (human health) and **Figure 24** (ecological). As noted on the figures, the exceedances are present both on-Site and off-Site. Additionally, there are exceedances both upgradient and downgradient from the Site. Several of the exceedances are the result of no screening standards being available for a compound. Many of the exceedances are just slightly above the screening standards. The following section provides a delineation evaluation for COPCs in surface water.

8.2.3.1 *Delineation of VOCs in Surface Water*

Delineation of acetonitrile, bromodichloromethane, and dibromochloromethane in on-Site surface water is based on infrequent detection (1 of 16 samples) at a single sampling location. For 1,4-dioxane, downgradient sampling locations are either not detected or below the screening level demonstrating that delineation has been achieved. For off-Site surface water, delineation of carbon tetrachloride and vinyl

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chloride is based on infrequent detection (1 of 43 samples) at isolated sampling locations.

For benzene, downgradient sampling locations are either not detected or below the screening level demonstrating that delineation has been achieved. Chloroform concentrations do not exceed NRWQC at downgradient and terminal sampling locations supporting delineation. Ecological screening indicates that bromodichloromethane, dibromochloromethane, 3-nitroaniline, and bis(2-chloro-1-methylethyl)ether are delineated based on infrequent detection (1 of 43 samples) at isolated sampling locations.

8.2.3.2 *Delineation of SVOCs in Surface Water*

Delineation of chrysene in on-Site surface water is based on infrequent detection (1 of 16 samples) at a single sampling location. For off-Site surface water, delineation of 3-nitroaniline and naphthalene is based on infrequent detection (1 of 43 samples) at isolated sampling locations. Although diphenyl ether and o,o,o-triethylphosphorothioate do not have SLs, downgradient sampling locations are either not detected or at lower concentrations than on-Site locations indicating that delineation has been achieved.

Detections of 1,1'-biphenyl that occurred at terminal sampling locations were either B qualified (present in laboratory blanks) or J qualified low level detections, suggesting that delineation is complete.

The maximum detected concentration of bis(2-ethylhexyl)phthalate is at an upgradient location, with most downgradient locations not detected or at lower concentrations. Although acetophenone and diphenyl ether do not have ESLs, downgradient sampling locations are either not detected or at lower J qualified concentrations than on-Site locations, indicating that delineation has been achieved. For diphenyl ether, this is further supported when using the ESL for the structurally similar 1,1'-biphenyl as a comparison.

8.2.3.3 *Delineation of Dioxathion/Dioxenethion in Surface Water*

Ecological benchmarks are not available for cis-dioxathion and dioxenethion; therefore, these Constituents were selected as COPCs. The extent of cis-dioxathion was limited to on-Site locations, and dioxenethion was only detected once off-Site at AO-SW-06, less than 100 feet from the property boundary supporting delineation of the constituent.

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8.2.3.4 *Delineation of Metals in Surface Water*

Both arsenic and cobalt are present at similar or higher concentrations at off-Site upgradient locations than at terminal sampling locations. Although copper and lead exceeded ESLs at terminal sampling locations, concentrations were similar at off-Site upgradient locations indicating that delineation of these naturally occurring metals is not necessary.

Based on the sporadic nature of the exceedances in surface water and either lack of detections on-Site (at a presumed source), or similar concentrations present at off-Site upgradient locations, delineation appears complete for surface water.

8.2.4 Sediment Sampling Procedure

The USEPA SESD guidance document SESDPROC-200-R2 was utilized during the collection of sediment samples for laboratory analysis. Sediment sampling was performed and documented in accordance with procedures outlined in the document and with the SOP provided in Appendix K of the Revised Phase I Work Plan. Where conflicts existed between the two guidance documents, the SESD guidance prevailed.

No conditions that required deviations from practices in the guidance were noted during implementation of the sampling. Sediment samples were collected from within the upper 0- to 6-inch sediment layer present at each location. Each sediment sample was preserved, handled, and shipped in accordance with SESDPROC-200-R2 and the project-specific QAPP.

8.2.5 Data Evaluation

Sediment was sampled both on-Site and off-Site, with samples collected in Greens Creek being considered off-Site samples (CM-1 through CM-4) because the creek originates off-Site and flows through the Site. The data were evaluated to identify COPCs for both human health and ecological potential receptors. For the human health evaluation, the sediment data were separated by on-Site and off-Site locations because individuals might access sediment separately on or off the Site. For ecological receptors, the on-Site and off-Site datasets were combined.

Off-Site sediment locations were sampled during Phase I and Phase II Investigations in March and November 2012. Full datasets for the off-Site sediment samples are provided in **Appendix E**, **Table E-7** for Phase I samples and **Appendix F**, **Table F-7**

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for Phase II samples. On-Site sediment locations were sampled during the Phase II Investigation in November 2012. Full datasets for the on-Site sediment samples are presented in **Appendix F**, **Table F-7**. Data were compared to the MDEQ Tier 1 Unrestricted and Restricted Soil TRGs, and the USEPA Residential and Industrial Soil RSLs. A summary of the human health comparison for on-Site sediment is presented in **Table 11**, and for off-Site sediment in **Table 12**.

Sediment data from the Phase I and Phase II sampling events were also compared to the ESLs, as presented in **Table 13**. Full datasets for the off-Site sediment samples ecological evaluation are provided in **Appendix E**, **Table E-8** for Phase I samples and **Appendix F**, **Table F-8** for Phase II samples.

Various VOCs, SVOCs, dioxins/furans, and inorganic Constituents were detected in on-Site and off-Site sediment at concentrations below applicable screening levels. In addition, dioxathion isomers and dioxenethion was detected in off-Site sediment at concentrations below applicable screening levels.

The following Constituents are considered human health COPCs for on-Site sediment based on either detections above applicable screening levels (**Figure 25**) or the absence of screening levels:

- SVOCs: the seven “probable” carcinogenic PAHs and diphenyl ether;
- Dioxathion/dioxenethion: cis-dioxathion;
- Dioxins and furans: 1,2,3,4,6,7,8-HpCDD, 1,2,3,6,7,8-HxCDF, and OCDD; and,
- Inorganics: arsenic, cobalt, mercury, thallium, and cyanide.

The following Constituents are considered human health COPCs for off-Site sediment either based on either detections above applicable screening levels (**Figure 25**) or the absence of screening levels:

- VOCS: vinyl chloride (detected once out of 19 samples);
- SVOCs: the seven “probable” carcinogenic PAHs and diphenyl ether;
- Dioxins and furans: 1,2,3,4,6,7,8-HpCDD and OCDD; and,

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- Inorganics: arsenic, cobalt, nickel, thallium, and vanadium.

The following Constituents are considered ecological COPCs for sediment based on either detections above applicable screening levels (**Figures 26** through **28**) or the absence of screening levels:

- VOCS: 2-butanone, acetone, benzene, carbon disulfide, isobutanol, and toluene;
- SVOCs: 1,1'-biphenyl, 4-methylphenol, aniline, 3-nitroaniline, benzyl alcohol, bis(2-ethylhexyl)phthalate, diphenyl ether, and phenol;
- Pesticides: 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, dieldrin, and heptachlor;
- PCBs: Aroclor 1260 (detected only once in 14 samples) and total PCBs;
- Dioxathion/dioxenethion: cis-dioxathion, trans-dioxathion, and dioxenethion;
- Dioxins and furans: all 17 detected dioxins and furans; and,
- Inorganics: arsenic, barium, beryllium, cadmium, cobalt, copper, lead, mercury, nickel, thallium, tin, vanadium, zinc, and cyanide.

Figures illustrating the distribution of all Constituents detected above screening levels in sediment are provided as **Figure 25** (human health) and **Figures 26** through **28** (ecological). As noted on the figures, the exceedances are present both on-Site and off-Site. Additionally, there are exceedances both upgradient and downgradient. Several of the exceedances are the result of no screening standards being available for a compound. Many of the exceedances are just slightly above the screening standards. The following section provides a delineation evaluation for COPCs in sediment.

8.2.5.1 *Delineation of VOCs in Sediment*

Delineation of acetone, 2-butanone, and carbon disulfide at terminal sampling locations is based on the pattern of sporadic detections and similar concentrations detected at off-Site upgradient sampling locations.

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8.2.5.2 *Delineation of SVOCs in Sediment*

Although benzo(a)pyrene was detected at terminal sampling locations AO-SD-10 and AO-SD-14, delineation appears to be complete based on the pattern of sporadic detections and similar concentrations detected at off-Site upgradient locations. This conclusion is supported by the urban nature of the landscape surrounding these water bodies and probable sources that are not related to historical facility operations.

Delineation of diphenyl ether is based on downgradient sampling locations that are either not detected or at lower concentrations than on-Site locations. This is further supported when using the ESL for the structurally similar 1,1'-biphenyl as a comparison.

8.2.5.3 *Delineation of Metals in Sediment*

Although arsenic, cobalt, and thallium exceeded ESLs at terminal sampling locations, sediment concentrations were similar or higher at off-Site upgradient locations. Based on the sporadic nature of the exceedances in sediment and either lack of detections on site (at a presumed source) or similar concentrations present at off-Site upgradient locations, delineation appears complete for sediment.

8.3 Shallow Groundwater Sampling (Temporary and Permanent Monitoring Wells)

8.3.1 Groundwater Sampling Locations

Temporary and permanent monitoring wells were installed and sampled to investigate the presence of the Site-related Constituents in groundwater. The rationale for selecting the groundwater sampling locations shown on **Figure 29** is provided in **Table 14**.

8.3.1.1 *Phase I and Phase II Investigations*

During Phase I, March 12 to 26, 2012, samples were collected from AO-GP-01, AO-GP-03, AO-GP-04, and AO-GP-19 through AO-GP-33. During Phase II, November 16 to 20, 2012, samples were collected from AO-GP-02, AO-GP-05 through AO-GP-18, and AO-GP-34 through AO-GP-40 (**Figure 29**). Water sampling logs from these sampling events are included in **Appendix L**. Sample/Core Logs from these sampling events are included in **Appendix A**.

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8.3.1.2 *Area #1 Investigation*

During the Phase I activities, the presence of DNAPL was detected in samples from temporary well AO-GP-28D. Consequently, subsequent activities focused assessment efforts in this area. The area was later identified as Area #1.

In an effort to further define the extent of impacts at the AO-GP-28 location, a geophysical survey was completed in the area in May 2012. Electrical resistivity (Res) and induced polarization (IP) are surface geophysical investigation methods used in the investigation to provide information on subsurface lithology, preferential groundwater flow paths (due to differences in water saturation when compared to less saturated soil), and the delineation of accumulations of NAPL. These techniques are applied at the surface and provide non-invasive measurements. Res is used primarily for lithology and groundwater flow path measurements, while IP is used to detect accumulations of NAPL. Both techniques were conducted on-Site and in adjacent off-Site properties. The survey was performed in two dimensions by installing linear cables and electrodes along the surface.

Two-dimensional (2-D) electrical resistivity data and IP data were acquired along four linear transects across the area of interest. The Res equipment used during this investigation consisted of an Advanced Geosciences, Inc. (Austin, Texas) SuperSting™ R8/IP memory earth resistivity system with an 112-electrode switch box, electrode cables with both a 3-meter and 6-meter connector spacing, and stainless steel electrodes.

The electrodes are high grade stainless steel and are approximately 12 inches long and ¼ inch in diameter. They were hammered into the ground surface to a depth of 6 to 8 inches below ground surface, and sparingly wetted with a dilute salt solution to improve electrical coupling with the ground surface. The electrodes were then connected to the cables and connected to the SuperSting R8/IP meter via an external switch box.

Upon completion of each acquisition, data for each array type were downloaded and processed/inverted in the field as soon as the survey was complete to evaluate quality assurance before moving the line to a new location. Res and IP data were stored in the internal memory of the SuperSting R8/IP and downloaded to a laptop computer upon completion of each survey.

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Based on an evaluation of the Res/IP data, several geophysical anomalies were identified in the subsurface. An IP anomaly is an indication by the geophysical tool of an area where potential impacts may be present. To test the anomalies, temporary wells were proposed at every anomaly. The temporary wells were assigned identification numbers that corresponded to the line from which it was acquired. For instance, the first anomaly identified on Line 1 was tested with temporary well AO-GP-L1-A.

Temporary wells were installed in Area #1 in September 2012. Additional temporary wells were installed in January 2013 and two permanent wells (MW-129S and MW-129D) were installed downgradient of the former Hercules Plant to monitor groundwater conditions near a daycare facility. In September 2013, groundwater samples were collected from the additional temporary wells and the existing permanent well MW-129D (MW-129S was dry). In July 2014, 18 permanent wells were installed (including one DNAPL recovery well) and samples were collected from the 17 new monitoring wells and one existing monitoring well (MW-129D). Sample locations are included on **Figure 30**. Groundwater sampling logs from these events are included in **Appendix L**. Sample/Core Logs from these sampling events are included in **Appendix A**.

8.3.1.3 *Area 2 Investigation*

Area #2 groundwater samples were collected from temporary wells in September 2013 and July 2014. Sample locations are included on **Figure 31**. Logs from these sampling events are included in **Appendix L**. Sample/Core Logs from these sampling events are included in **Appendix A**.

8.3.1.4 *Area 3 Investigation*

Area #3 groundwater samples were collected from temporary wells in September 2013 and July 2014. Sample locations are included on **Figure 32**. Logs from these sampling events are included in **Appendix L**. Sample/Core Logs from these sampling events are included in **Appendix A**.

8.3.2 Groundwater Sampling Procedures

The USEPA SESD guidance document SESDPROC-301-R2 was utilized during the collection of groundwater samples for laboratory analysis. Groundwater sampling was performed and documented in accordance with procedures outlined in the document

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and with the SOP provided in Appendix L of the Revised Phase I Work Plan. Where conflicts existed between the two guidance documents, the SESD guidance prevailed.

No conditions that required deviations from practices in the guidance were noted during implementation of the sampling. Groundwater samples were preserved, handled, and shipped in accordance with SESDPROC-301-R2 and the project-specific QAPP. A groundwater sample was collected from each of the groundwater monitoring wells (either temporary or permanent) following installation and well development. Samples from the monitoring wells were collected using low-flow/low-stress sampling techniques in accordance with the procedures specified in the SOP.

Monitoring wells were purged prior to collecting groundwater samples to ensure that representative formation water was sampled. The monitoring wells were purged and sampled in the same order as that for water-level measurements (upgradient to downgradient), or least to most contaminated (where known based upon prior sampling results). Prior to introduction into the well, all non-dedicated equipment and materials were decontaminated.

8.3.3 Data Evaluation

The on-Site and off-Site shallow groundwater monitoring wells and/or temporary monitoring wells were sampled during the Phase I and Phase II Site investigations. Area #1, Area #2 and Area #3 were sampled in 2013. Area #1 and Area #2 were sampled again in July 2014. Data were compared to the MDEQ Groundwater Tier 1 TRGs and the USEPA Tapwater RSLs, as presented in **Table 15** (on-Site) and **Table 16** (off-Site). The full datasets for shallow groundwater samples can be found in **Appendix E**, **Tables E-1** and **E-2** for Phase I samples, and in **Appendix F**, **Tables F-1** and **F-2** for Phase II samples. The data collected in September 2013 for Area #1, Area #2, and Area #3 are summarized in **Appendix G**, **Tables G-1** through **G-3**. The data collected in July 2014 for Area #1 and Area #2 are summarized in **Appendix H**, **Tables H-1** through **H-4**. The following sections summarize the data and compare detected constituents to screening levels.

8.3.3.1 *DNAPL*

DNAPL was initially encountered at the boring AO-GP-28D location during implementation of the Revised Phase I Work Plan. DNAPL was also encountered at boring AO-GP-06 during implementation of the Revised phase II Work Plan. Samples

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of the DNAPL were collected from both locations. These data are summarized in **Appendix E**, **Table E-13** and **Appendix F**, **Table F-14**, respectively.

The DNAPL present in AO-GP-28D is composed primarily of carbon tetrachloride (110,000 milligrams per kilogram [mg/kg]), 1,1'-biphenyl (240,000 mg/kg), and diphenyl ether (550,000 mg/kg). The DNAPL present in AO-GP-06 is composed primarily of 1,1'-biphenyl (110,000 mg/kg), diphenyl ether (280,000 mg/kg), and Aroclor-1254 (54 mg//kg).

To assist with the evaluation of the potential extent of DNAPL around AO-GP-06 and AO-GP-28D, a top of clay structure map (**Figure 7**) and alluvial (shallow) aquifer isopach map (**Figure 8**) depicting the sand thickness were prepared. Furthermore, available subsurface strata are presented in multiple cross sections included in **Appendix A**. The collective information can be used to understand the potential transport pathways for the DNAPL detected in these areas.

Review of **Figure 7** and **Appendix A** cross sections **A-7** and **A-16** indicates that the underlying clay in the AO-GP-06 area slopes to the northeast, east, and southeast. The sand unit appears to thin to the northeast, east (toward AO-GP-07), and southeast, then thickens to the west. DNAPL is anticipated to flow in the thicker interval based primarily on gravity and preferential flow paths created by natural heterogeneity of aquifer materials. Based on the underlying clay structure, the potential DNAPL migration would be expected to the east/southeast in this area. There have been no observations of DNAPL in borings and wells east/southeast of this area; however, further investigation is proposed in the vicinity of AO-GP-06.

The underlying clay contour map (**Figure 7**) and subsurface strata presented in **Appendix A** cross-sections **A-9** and **A-22** reveals that the AO-GP-28D location (Area #1) is in a structural low. There are other borings to the north and east of AO-GP-28D with top of clay elevations similar or slightly lower; however, DNAPL has not been observed in these borings. As noted on the isopach map (**Figure 8**), the alluvial sands in this area thicken. The extent of DNAPL off-Site in Area #1 is defined.

From a Site-wide perspective, the extent of DNAPL has been delineated. Additional evaluation of the presence of DNAPL will be conducted in AO-GP-06 and AO-GP-28D areas utilizing vertically-continuous sensing techniques to assess potential variable DNAPL flow paths and further refine the extent of the DNAPL presence and groundwater impacts. This evaluation is discussed in Section 9.

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8.3.3.2 *On-Site Shallow Groundwater COPC Summary*

PCBs and herbicides were not detected in on-Site groundwater monitoring well locations. Dioxins and furans were detected in on-Site groundwater; however, no COPCs were identified. VOCs, SVOCs, pesticides, dioxathion/dioxenethion, and inorganics were identified as COPCs for on-Site groundwater based on either detections above applicable screening levels or the absence of screening levels, as follows:

- VOCs: 1,1,2-trichloroethane (1,1,2-TCA), 1,1-dichloroethane (1,1-DCA), 1,2-DCA, 1,1-dichloroethene (1,1-DCE), 1,2,3-trichloropropane (analyzed by two methods), 1,2-dibromoethane, 1,2-dichloropropane, 1,4-dioxane, 2-hexanone, 4-methyl-2-pentanone, acetone, acrolein, benzene, carbon disulfide, carbon tetrachloride, chlorobenzene, chloroform, chloromethane, ethylbenzene, iodomethane, methacrylonitrile, methylene chloride, naphthalene, PCE, toluene, TCE, vinyl chloride, and total xylenes;

- SVOCs: 1,1'-biphenyl, 1,4-dichlorobenzene, 1,4-naphtoquionone, bis(2-chloro-1-methyethyl)ether, 2-methylnaphthalene, 2-methylphenol, 2-nitrophenol, 3,4-methylphenol, 4,6-dinitro-2-methylphenol, 4-methlyphenol, acenaphthene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzyl alcohol, bis(2-chloroethyl)ether, chrysene, dibenz(a,h)anthracene, dibenzofuran, dimethoate, diphenyl ether, fluorene, hexachlorophene, indeno(1,2,3-cd)pyrene, isosafrole, methyl parathion, naphthalene, nitrobenzene, n-nitroso-di-n-butylamine, n-nitrosomorpholine, o,o,o-triethylphosphorothioate, and pentachlorophenol;

- Pesticides: dieldrin, alpha-hexachlorocyclohexane, gamma-hexachlorocyclohexane, and heptachlor; and,

- Inorganics: arsenic, barium, beryllium, cadmium, cobalt, lead, mercury, nickel, thallium, vanadium, and sulfide.

8.3.3.3 *Off-Site Shallow Groundwater COPC Summary*

PCBs, herbicides, and pesticides were not detected in off-Site groundwater monitoring well locations. Dioxin and furan congeners were detected; however, no COPCs were identified. VOCs, SVOCs, and inorganics were identified as COPCs for off-Site

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shallow groundwater based on either detections above applicable screening levels or the absence of screening levels, as follows:

- VOCs: 1,1,1,2-tetrachloroethane, 1,1-DCE, 1,4-dioxane, benzene, bromodichloromethane, bromomethane, carbon disulfide, carbon tetrachloride, chlorobenzene, chloroform, chloromethane, ethylbenzene, methylene chloride, propionitrile, PCE, toluene, TCE, and total xylenes;

- SVOCs: 1,1'-biphenyl, 2-methylnaphthalene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, dibenz(a,h)anthracene, diphenyl ether, indeno(1,2,3-cd)pyrene, naphthalene, nitrobenzene, and n-nitrosomethylethylamine;

- Dioxathion/dioxenethion: cis-dioxathion and dioxenethion; and,

- Inorganics: antimony, arsenic, cobalt, lead, mercury, thallium, and vanadium.

Isoconcentration maps for benzene, carbon tetrachloride, chlorobenzene, chloroform, ethylbenzene, toluene, total xylenes, 1,4-dioxane, and 1,1'-biphenyl are provided as **Figures 33** through **41**, respectively. As requested by the USEPA, an isoconcentration map for diphenyl ether has been included as **Figure 42**. These constituents represent the most frequently detected and widely distributed constituents at the Site.

Inspection of these maps reveals that in general, the shallow groundwater plumes at the Site are delineated. These maps reveal that there are nine general areas of concern. These areas of concern include:

- Area #1;

- Area #2;

- Area #3;

- Former Landfill/Delnav® Area;

- IB Area;

- Sludge Pits;

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- Former Poly Pale Area;
- Former Extracting and Refining Area; and,
- Former Hydroperoxides/PMHP Area.

Based on discussions with USEPA and MDEQ, additional permanent wells have been installed at the Site for future evaluations. These new wells along with the existing permanent wells will be used to evaluate the various plumes. Some additional groundwater investigation will be completed in selected areas to further refine the plume boundaries. These areas are further identified in Section 9.3 of this Investigation Report.

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8.4 Soil Sampling

8.4.1 Soil Sampling Locations

Soil sampling locations were selected to determine if historical plant operation areas have impacted soil quality and to quantify any potential human health or ecological risks that may be associated with those areas. Soil samples were selected to assess soil quality in shallow (0 to 2 ft bgs) and subsurface soil (greater than 2 ft bgs). Direct-push techniques (DPT) and manual soil sampling techniques were used to collect soil samples from the locations shown on **Figures 29** and **43**. Soil sampling locations during the Phase I investigation coincided with drilling to support groundwater sampling, as discussed above. The rationale for selecting the locations sampled during the Phase II and Area #2 Investigation is included in **Table 14**.

Soil samples were collected from the following intervals in each boring advanced using DPT and retained for chemical analyses:

- The soil sample at the 0 to 2 ft bgs interval;
- The soil sample exhibiting the highest organic vapor analyzer reading;
- The soil sample collected at the soil/groundwater interface;
- The soil sample at the base of the boring; and,
- Soil samples that were visibly stained.

During Phase I, March 12 to 26, 2012, samples were collected from AO-GP-01, AO-GP-03, AO-GP-04, and AO-GP-19 through AO-GP-33. During Phase II, November 6 to 14, 2012, samples were collected from AO-GP-02, AO-GP-05 through AO-GP-18, and AO-GP-34 through AO-GP-40. During the investigation along Providence Street (Area #1) samples were collected from MW-129-SI on January 17, 2013. During the Area #2 investigation, soil samples were collected from AO-GP-21E (S1), AO-GP-21E (S2), and AO-GP-21S (2). Logs from these sampling events are included in **Appendix K**.

Manual soil sampling techniques consisted of using hand-auger equipment to obtain soil samples. Soil samples were collected from the following intervals and retained for chemical analyses:

- The soil sample at the 0 to 1 ft bgs interval; and,
- The soil sample at the 1 to 2 ft bgs interval.

Surface soil samples were collected at 500-foot intervals along the culverted portion of Drainage C to evaluate the potential for current exposure resulting from historic flows. These samples were collected from the 0 to 1 ft bgs interval using a clean, stainless steel hand auger. During Phase I, March 19 to 20, 2012, samples were collected from AO-SS-02 through AO-SS-08. During Phase II, November 15, 2012, samples were collected from AO-SS-09 through AO-SS-19. Logs from these sampling events are included in **Appendix K**.

8.4.2 Soil Sampling Procedure

The USEPA SESD guidance document SESDPROC-300-R2 was utilized during the collection of soil samples for laboratory analysis. Soil sampling was performed and documented in accordance with procedures outlined in the document and with the SOPs provided in Appendix N of the Revised Phase I Work Plan. Where conflicts existed between the two guidance documents, the SESD guidance prevailed. No conditions that required deviations from practices in the guidance were noted during implementation of the sampling activities. Soil samples were preserved, handled, and shipped in accordance with SESDPROC-300-R2 and the project-specific QAPP.

The lithology of the soil samples collected was described through visual observations of the soil/bedrock cores using the Unified Soil Classification System (USCS) and/or the American Society for Testing and Materials (ASTM) Standard D 2488 for

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Description and Identification of Soils. Boring/Sample Core Logs were used to record lithologic logging observations (**Appendix A**).

8.4.3 Soil Sample Collection

Soil samples were obtained using DPT (Geoprobe® device) or hand auger. One and a half-inch acetate sleeves were driven into the ground by the DPT device and retrieved to the surface. Upon retrieval of the soil core and removal from the acetate sleeve, a qualified geologist or hydrogeologist conducted a visual inspection, lithologic characterization, and field screening in accordance with the procedures in the QAPP. Relevant data (i.e., soil type, color, physical characteristics, texture, mineralogy, moisture content, and any observed evidence of contamination) collected during these activities was recorded onto the Sample/Core logs (**Appendix A**).

8.4.4 Data Evaluation

Soil samples were collected from several depths. For the human health screening, soil collected from all depth ranges was evaluated. For the ecological screening, surface soil collected to depths of 1 ft bgs and 2 ft bgs were evaluated. During the human health and ecological risk assessments, data for the respective appropriate exposure depths will be summarized and evaluated for risk assessment purposes. In addition, soil data were screened against published saturation values for soil and solubility values for water as supplemental lines of evidence to evaluate the potential presence of NAPL.

On-Site and off-Site soil locations were sampled during Phase I and Phase II Investigations. Full datasets for on-Site and off-Site soil are provided in **Appendix E**, **Table E-3** for Phase I samples, and **Appendix F**, **Table F-3** for Phase II samples. The data collected for Area #2 is summarized in **Appendix G**, **Table G-1**. Data were compared to the MDEQ Tier 1 Unrestricted and Restricted Soil TRGs and the USEPA Residential and Industrial Soil RSLs as presented in **Table 17** (on-Site soil) and **Table 18** (off-Site soil). Surface soil data from the Phase I and Phase II investigations were also compared to ESLs, as presented in **Tables 19** (0 to 1 ft bgs) and **20** (0 to 2 ft bgs).

8.4.4.1 *Soil COPC Summary*

Figures 44 through **47** illustrate the distribution of constituents detected above human health screening levels in soil (all sampled depths). **Figures 48** through **50** provide soil

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isocontour maps (maximum concentration at each location) for benzene, 1,1'-biphenyl, and dioxathion in soil. A summary of findings is provided below.

VOCs, SVOCs, pesticides, dioxathion/dioxenethion, dioxins and furans, and inorganics were identified as COPCs for on-Site soils based on either detections above applicable screening levels (**Figures 44** through **47**) or the absence of screening levels, as follows:

- VOCs: benzene, carbon tetrachloride, chlorobenzene, chloroform, chloromethane, ethylbenzene, iodomethane, toluene, and total xylenes;
- SVOCs: 1,1'-biphenyl, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, diphenyl ether, indeno(1,2,3-cd)pyrene, naphthalene, nitrobenzene, and o,o,o-triethylphosphorothioate;
- Pesticides: dieldrin, alpha-hexachlorocyclohexane, delta-hexachlorocyclohexane, and toxaphene;
- Dioxathion/dioxenethion: cis-dioxathion and dioxenethion;
- Dioxins and furans: 11 congeners.
- Inorganics: antimony, arsenic, cobalt, copper, lead, mercury, thallium, and vanadium.

Dioxathion and dioxenethion were detected in off-Site soils at concentrations below screening levels. VOCs, SVOCs, pesticides, PCBs, dioxin and furans, and inorganics were identified as COPCs for off-Site soils based on either detections above applicable screening levels (**Figures 44** through **47**) or the absence of screening levels, as follows:

- VOCs: carbon tetrachloride, chloroform, and iodomethane.
- SVOCs: benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, diphenyl ether, and indeno(1,2,3-cd)pyrene;
- Pesticides: dieldrin and toxaphene;

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- PCBs: Aroclor 1254;
- Dioxins and furans: four congeners; and,
- Inorganics: arsenic, cobalt, thallium, and sulfide.

In soil collected from 0 to 1 ft bgs, SVOCs, pesticides, PCBs, dioxathion/dioxenethion, dioxins and furans, and inorganics were identified as ecological COPCs based on either detections above applicable screening levels (**Figure 51**) or the absence of screening levels, as follows:

- SVOCs: 2,6-dinitrotoluene, bis(2-ethylhexyl)phthalate, diphenyl ether, and o,o,o-triethylphosphorothioate;
- Pesticides: DDT and metabolites (DDD and DDE), dieldrin, alpha-hexachlorocyclohexane, delta-hexachlorocyclohexane; gamma-hexachlorocyclohexane, and toxaphene;
- PCB: Total PCBs;
- Dioxathion/dioxenethion: cis-dioxathion, trans-dioxathion, and dioxenethion;
- Dioxins and furans: all 17 congeners; and,
- Inorganics: antimony, cadmium, chromium, cobalt, copper, lead, mercury, nickel, vanadium, zinc, and sulfide.

In soil collected from 0 to 2 ft bgs, VOCs, SVOCs, pesticides, PCBs, dioxathion/dioxenethion, dioxins and furans, and inorganics were identified as ecological COPCs based on either detections above applicable screening levels (**Figures 52** through **55**) or the absence of screening levels, as follows:

- VOCs: benzene, carbon disulfide, carbon tetrachloride, chloroform, ethylbenzene, toluene, and total xylenes;
- SVOCs: 2,6-dinitrotoluene, bis(2-ethylhexyl)phthalate, dibenzofuran, diphenyl ether, o,o,o-triethylphosphorothioate, pentachlorobenzene; sulfotep, LMW-PAHs, and HMW-PAHs;

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- Pesticides: DDT and metabolites (DDD and DDE), dieldrin, alpha-hexachlorocyclohexane, delta-hexachlorocyclohexane, gamma-hexachlorocyclohexane, and toxaphene;
- PCB: Total PCBs;
- Dioxathion/dioxenethion: cis-dioxathion, trans-dioxathion, and dioxenethion;
- Dioxins and furans: all 17 congeners; and,
- Inorganics: antimony, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, silver, vanadium, zinc, and sulfide.

The distribution of metals in soil appears to reflect natural background variation. For example, the mean arsenic concentration for Mississippi Lower Coastal Plain soils was reported as 5.79 mg/kg (range: 0.26 – 22 mg/kg) by Pettry and Switzer (2001). Most concentrations of arsenic detected during this investigation are less than 5.79 mg/kg, suggesting that only background concentrations are present.

Based on the distribution of COPC exceedances in soil, there appears to be four primary potential source areas located on-Site. These areas are centered near the following sample locations: AO-GP-06, AO-SS-11/AO-SS-12, AO-GP-11/AO-GP-12, and AO-GP-21. Isoconcentration maps for benzene, 1,1'-biphenyl, and dioxathion (**Figures 48** through **50**) illustrate these potential source areas. As later discussed in Section 9.3 of this Investigation Report, additional soil investigation is proposed in the Poly Pale area (near AO-GP-11 and AO-GP-12S/D) to refine the extent of benzene in soil.

Figure 51 illustrates the distribution of COPCs identified for surface soil (0- to1-foot depth). Exceedances of the ESLs are located at three primary areas centered near the following sample locations: AO-SS-11, AO-SS-15, and AO-SS-02 through AO-SS-08.

Figures 52 through **55** illustrate the distribution of COPCs identified for surface soil (0-to 2-foot depth). Some additional isolated areas with exceedances of the ESLs are apparent on-Site when considering the 0- to 2-foot depth dataset; however, these exceedances are delineated by surrounding sample locations. A potential secondary area of concern is located in the Drainage C area, where pesticides and PCBs are the primary COPCs (locations AO-SS-02 through AO-SS-08). The ESL exceedances

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potentially associated with the Drainage C area require additional assessment, as presented in Section 9.3.7.

8.4.4.2 *Potential Indicators of DNAPL*

The soil data were screened against published soil saturation and groundwater data were screened against water solubility values as additional indications of potential presence of NAPL at the Site. Exceedances of soil saturation (mg/kg) and/or water solubility levels (µg/L) would indicate that the potential for accumulation of a specific compound beyond sorption and/or dissolved conditions could be present. In addition, the field logs for borings and samples with notable results were reviewed for potential indicators of NAPL presence. Screening of the soil data against soil saturation values did not reveal exceedances for compounds known to be present in DNAPL at the Site; however, solubility values were exceeded in groundwater at on-Site and off-Site locations. Specifically, solubility exceedances were reported for chrysene, indeno(1,2,3-cd)pyrene, and 1,1'-biphenyl as described in further detail below.

- Chrysene exceeded the solubility value in on-Site monitoring well MW-20. Sampling is routinely completed at this location and the presence of NAPL has not been identified.

- Although indeno(1,2,3-cd)pyrene exceeded the solubility criterion in on-Site location AO-GP-30S; the remaining groundwater data, soil vapor screening, field observations during drilling and sampling, and soil data do not support the presence of NAPL in this location.

- Similarly, indeno(1,2,3-cd)pyrene exceeded the solubility level in off-Site location AO-GP-L1-B(E)D; however, permanent monitoring wells MW-34S and MW-34D were later installed at this location and NAPL has not been identified in the area.

- The solubility value for 1,1'-biphenyl was also exceeded in off-Site location AO-GP-28D. As previously discussed, this location has reported the presence of DNAPL and samples indicate 1,1'-biphenyl is one of the main DANPL components confirming the results of the solubility screening.

- As commented by the USEPA, additional notable results include 1,1'-biphenyl soil data at location AO-GP-11 (between 0.84 to 2,000 mg/kg), with higher concentrations than those reported at AO-GP-06 and AO-GP-28D (ranging

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between 1.1 and 670 mg/kg) where DNAPL has been reported. The field log for this location was reviewed and the groundwater concentration of 1,1'-biphenyl for AO-GP-11 (3,400 µg/L) was also compared against data for AO-GP-28D (1,600,000 µg/L). The evaluation indicates that low to medium soil vapor screening levels were detected within the shallow portion of the boring, dissolved concentrations do not exceed solubility values for 1,1'-biphenyl at AO-GP-11, concentrations at locations with DNAPL are up to three orders of magnitude higher than AO-GP-11 conditions, and additional indications of DNAPL were not supported. The AO-GP-11 area (Poly Pale™) will be further investigated as described in Section 9.3.

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8.5 Soil Gas Sampling

Soil gas sampling was conducted to assist in the delineation and evaluation of the vapor intrusion exposure pathway. The overall goal of the soil gas sampling program was to confirm that VOCs associated with historical plant operations are not migrating within the vadose zone at concentrations that could be of concern for vapor intrusion. A focused number of soil gas samples were collected from the southeastern portion of the Site as part of the Phase I investigation.

8.5.1 Soil Gas Sampling Locations

Soil gas samples were collected in the public right-of-way or private property near the southeastern boundary of the Site, approximately 1 to 2 feet above the water table. The exact location of the samples was determined in the field and was subject to subsurface utility restrictions and access agreements. Five soil gas samples were collected at the locations shown on **Figure 56**. The rationale for selecting the sampling locations is included in **Table 21**. During Phase I, March 27 to April 2, 2012, samples were collected from AO-SG-01 through AO-SG-05.

8.5.2 Soil Gas Sampling Procedure

Soil gas sampling probes were installed as temporary (or semi-permanent) points consistent with the SOP SESDPROC-307-R2. Specifically, 6-inch stainless steel screens (or implants) were installed using a DPT drilling rig. An extraction pit was created around the stainless steel screen using glass beads, as specified in the SOP. The sample probe was finished at the ground surface with a temporary well cover. Soil gas samples were collected at least 48 hours after the sample probe was allowed to come to equilibrium. At this time, the vapor probe was connected to a sample

container (SUMMA® canister) at ground surface. Samples were collected at a flow rate no greater than 200 milliliters per minute for 30 minutes for a 6-liter SUMMA® canister. After the prescribed sampling period, the sample containers were closed and disconnected. Soil gas samples were preserved, handled, and shipped in accordance with SESDPROC-307-R2 and the project-specific QAPP.

8.5.3 Data Evaluation

On-Site and off-Site soil gas data were collected during the Phase I Site investigation in March and April 2012. Full datasets for soil gas samples are included in **Appendix E**, **Table E-11**. Soil gas samples were analyzed for VOCs. Data were compared to the USEPA Adjusted Residential and Industrial Air RSLs as presented in **Table 22** (on-Site soil gas) and **Table 23** (off-Site soil gas). The USEPA Residential and Industrial Air RSLs were multiplied by a factor of 10 to account for attenuation of the soil gas migrating from the soil gas into a building. Following is a summary of the soil gas evaluation for on-Site and off-Site data.

8.5.3.1 *On-Site Soil Gas Evaluation*

A total of 17 VOCs were detected in on-Site soil gas. Six constituents (1,2,4-trimethylbenzene, benzene, carbon tetrachloride, chloroform, ethylbenzene, and TCE) had maximum concentrations exceeding the screening levels and were identified as COPCs (**Figure 56**). Additionally, 1,3,5-trimethylbenzene is considered a COPC based on the absence of an applicable screening level.

Additional soil gas evaluations are not necessary at this time because the groundwater plumes are in general delineated.

8.5.3.2 *Off-Site Soil Gas Evaluation*

Nine VOCs were detected in off-Site soil gas samples. Five constituents (1,2,4-trimethylbenzene, carbon tetrachloride, chloroform, chloromethane, and methylene chloride) had maximum detected concentrations exceeding the screening levels and were identified as COPCs (**Figure 56**).

Additional soil gas evaluations are not necessary at this time because the groundwater plumes are in general delineated.

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8.6 Ambient and Crawl Space Air Sampling

Based on the soil gas sampling results and data evaluation, a crawl space and ambient air sampling program was implemented. The sampling program was developed in accordance with Figure 15 in the Revised Phase I Work Plan, Detection Flow Chart for Soil Gas and Vapor Intrusion.

8.6.1 Ambient Air and Crawl Space Air Location

Air samples were collected from the crawl space and ambient air at the residence at 135 West 8th Street (AO-BDB) on May 1 and 2, 2012, to evaluate the potential for vapor intrusion. After this sampling event, four additional rounds of ambient air and crawl space sampling were conducted with USEPA approval. The additional sampling was conducted on June 27, 2012, January 23 and March 21, 2013, and July 31, 2014. The air samples were collected from the same two locations for each event. Sample locations are shown on **Figure 57**.

8.6.2 Ambient Air and Crawl Space Air Sampling Procedure

Ambient air sampling was conducted consistent with SOPs provided in the Revised Phase I Work Plan and SESDPROC-303-R4, as appropriate. Prior to sampling, a Site reconnaissance was conducted at each building. The overall goal of the Site reconnaissance was to complete a building survey that identified construction conditions, heating, ventilation, and air conditioning operation, any preferential vapor migration pathways (i.e., sump pump), and products that were stored or used within the crawl space of the building.

Each TO-15 sample was collected with a 6-liter SUMMA® canister. Each canister was equipped with regulators set to obtain a sample over 24 hours. Samples were collected and analyzed for VOCs via USEPA TO-15. Additionally, 1,1'-biphenyl was analyzed via USEPA TO-17 in the samples collected in March 2013. The TO-17 sample was collected by flowing a measured quantity of air over an absorbent media. The absorbent media was submitted to the analytical laboratory and analyzed by TO-17. Sampling logs are provided in **Appendix M** and the analytical reports are provided in **Appendix B**.

Review of the sampling notes revealed that the SUMMA® canister utilized for the May 2012 ambient air sampling had less pressure in the field than when it was shipped from the laboratory. This indicates that the canister leaked during shipment and may have

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contained some air inside prior to sampling, potentially resulting in contamination of the canister. As such, the ambient air sample collected in May 2012 has been removed from the analysis presented in this report. No issues were noted with the crawl space sample collected in May 2012, and this sample is thought to be representative of conditions at that point in time.

8.6.3 Ambient Air Data

Ambient air samples were collected at an off-Site location (135 West 8th Street) in May and June 2012, January and March 2013, and July 2014. Full datasets for ambient air data are presented in **Appendix E**, **Table E-12** (2012 samples), in **Appendix F**, **Table F-12** (2013 samples), and **Appendix H**, **Table H-5** (2014 sample). Data were compared to the USEPA Residential and Industrial Air RSLs, as presented in **Table 24**. Ambient air analytical data from the May 2012 sampling event were not used in the comparison to screening levels based on data quality issues (the SUMMA® canister had lost pressure during shipment, indicating a leak) and high reporting limits.

A total of 23 VOCs were detected, and eight constituents (1,2-DCA, 1,4-dichlorobenzene, benzene, carbon tetrachloride, chloroform, chloromethane, TCE, and vinyl chloride) are considered COPCs based on exceedances of the RSLs. Additionally, 1,2-dichloro-1,1,2,2-tetrafluoroethane and 1,3-dichlorobenzene were considered COPCs based on the absence of applicable screening levels.

8.6.4 Crawl Space Air Data

Crawl space samples were collected at 135 West 8th Street in May and June 2012, January and March 2013, and July 2014. Full datasets for crawl space air data are presented in **Appendix E**, **Table E-12** (2012 samples), in **Appendix F**, **Table F-12** (2013 samples), and **Appendix H**, **Table H-5** (2014 sample). Data were compared to the USEPA Residential and Industrial Air RSLs as presented in **Table 25**.

A total of 21 VOCs were detected, and five constituents (1,2,4-trimethylbenzene, 1,4-dichlorobenzene, benzene, carbon tetrachloride, and chloroform) are considered COPCs based on exceedances of the RSLs. Additionally, 1,3,5-trimethylbenzene, 1,2-dichloro-1,1,2,2-tetrafluoroethane, and cis-1,2-dichloroethene (cis-1,2-DCE) were considered COPCs because there are no applicable screening levels.

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8.6.5 Air Data Evaluation

A letter documenting the air sampling results was submitted to USEPA and MDEQ on June 24, 2014. As discussed in the letter, a multiple lines of evidence (MLE) evaluation for the Site suggests that vapor intrusion from Site-related constituents in groundwater is not occurring. The MLE evaluation confirms that, although concentrations of a limited number of VOCs in the crawl space exceed RSLs, these constituents are also detected in ambient air samples. This finding is expected, given that the crawl space is designed to have significant ambient airflow, thereby limiting the potential for vapors to be present under the floor.

Additionally, the concentration of the four constituents above RSLs and one constituent above a modified RSL based on a non-cancer hazard quotient of 0.1 are consistent with, or well below, the USEPA's typical residential indoor air background levels. It should be noted that several constituents detected in ambient air and/or the crawl space were identified as COPCs based on the absence of applicable screening levels. Further, clay lenses are present in the vadose zone and are expected to limit soil gas movement to some degree.

Multiple rounds of sampling data confirm that vapor intrusion is not occurring based on the similarity of concentrations in ambient and crawl space air. This is also confirmed by the lack of detection of 1,1'-biphenyl, a key indicator compound for the Site. Sampling confirmed that this constituent is not present in the crawl space air. Finally, the consistency in crawl space and ambient air results confirms that these constituents are present in background. If a Site-related source was the primary source of the constituents in air, greater variability in concentrations due to Site-specific conditions such as wind patterns, barometric pressure, and vadose zone conditions would be expected.

In the HHRA, these data will be evaluated and discussed prior to further evaluation in the risk assessment. At this time, Hercules owns the 135 West 8th Street property. No one lives on the property and, therefore, no potential receptors exist. Continued monitoring of ambient air and crawl space air is not warranted at this time.

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8.7 City of Hattiesburg Sewer Sampling

8.7.1 Sewer Sampling Locations

On October 1, 2010, MDEQ collected water samples from two manholes (A370 and A372) located beneath Providence Street. These manholes are connected to the City of Hattiesburg sewer collection system. The approximate locations of the manholes are shown on **Figure 58**. Acetone was detected in the sample collected from the A370 manhole location. Acetone, benzene, carbon tetrachloride, chloroform, and toluene were detected in the sample collected from the A372 manhole location. A copy of the analytic al results from the October 2010 sewer sampling is included in **Appendix N**; however, these data are not included in the evaluation presented in this Investigation Report.

On December 22, 2010, MDEQ collected four additional sewer water samples from manholes that provide access to the City of Hattiesburg sewer collection system. Sewer water samples PROVIDENCE 001 (located on Stanley Street between Providence Street and Highway 11), REDUS GENEVA 002 (located at intersection of Redus Street and Geneva Street), 8th ATLANTA 003 (located at intersection of 8th Street and Atlanta Street), and CURRIE CUT-THROUGH 004 (located at Currie Street, southeast of Oak Street) were submitted for VOC analysis by Method 8260.

Acetone, benzene, carbon tetrachloride, chloroform, and toluene were detected in the PROVIDENCE 001 sample. Carbon tetrachloride and chloroform were detected in the REDUS GENEVA 002 sample at concentrations less than the values reported in the PROVIDENCE 001 sample. 1,2,4-Trimethylbenzene and acetone were detected in the 8th ATLANTA 003 sample. Detections of 1,3,5-trimethylbenzene, chloroform, m&p-xylene, o-xylene, and toluene were reported at concentrations less than the method quantitation limit (MQL). Acetone and chloroform were detected in the CURRIE CUT-THROUGH 004 sample. 1,2,4-Trimethylbenze, 1,3,5-trimethylbenzene, ethylbenzene, m&p-xylene, o-xylene, and toluene were detected at concentrations below the MQL. A copy of the analytic al results from the December 2010 sewer sampling is included in **Appendix N**; however, these data are not included in the evaluation presented in this Investigation Report.

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8.7.2 Sewer Sampling Procedures

During the Phase I Investigation, Hercules collected grab samples on November 13, 2012, of the water contained in manholes A370 and A372 to assess potential impacts from the Site to the City of Hattiesburg wastewater treatment plant. The manholes are located along Providence Street (**Figure 58**). These samples were submitted for the same analyses as the groundwater samples collected from on-Site locations.

8.7.3 Data Evaluation

The data for detected constituents in the November 2012 sewer samples are presented in **Table 26** and **Figure 58**. Review of data collected from the two sanitary sewer manholes revealed the presence of several VOCs, SVOCs, and metals. VOC constituents that were detected included: 2-butanone, acetone, benzene, carbon tetrachloride, chlorobenzene, chloroform, and toluene. SVOC constituents that were detected included: 1,1'-bipenyl, 4-methylphenol, benzyl alcohol, diethyl phthalate, diphenyl ether, and phenol. Inorganic constituents detected include: arsenic, barium, cobalt, copper, lead, nickel, and zinc.

The Constituent concentrations are well below the concentrations reported in groundwater adjacent to the sewer. Although the presence of these Constituents in the sanitary sewer indicates that groundwater seepage may be occurring, the amount appears minimal. Additionally, the Site has a Water Pollution Control Permit from MDEQ (Permit No. MSP091286), which allows discharge of many of these Constituents at levels much greater than those detected within the sewer manholes.

The permit allows for the discharge of water originating from the Hercules Site, including the IB, to City manhole A372. The permit discharge limitations are based on mass loading rates developed when the Site was in production. Any water discharged from the Site enters the City's sanitary sewer piping and is routed to the City's publicly owned treatment works (POTW). The Site reports its discharge activities to MDEQ on the required Discharge Monitoring Report (DMR) forms. Additional investigation related to groundwater velocities and contaminant mass transport rates in the vicinity of the sewers is proposed in Section 9.6.

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9. Path Forward

9.1 Surface Water

Based on the sporadic nature of the exceedances in surface water and either lack of detections on-Site (at a presumed source) or similar concentrations present at off-Site upgradient locations, delineation appears complete for surface water. Completion of both the HHRA and the screening level ecological risk assessment (SLERA) will allow for Site-specific standards to be developed.

If concentrations of Constituents that were reported during the Phase I and II investigations are greater than the HHRA and SLERA standards, additional evaluations may be proposed. This approach is consistent with the decision flow chart presented in the Phase I and Phase II Work Plans. Routine sampling of the existing Greens Creek monitoring points (CM-01 to CM-05) will continue as part of the activities required by the RUAO.

An investigation of the potential discharge into Greens Creek is currently ongoing. These investigations are detailed in Sections 9.3.2 and 9.3.5. These data, along with the routine Greens Creek data, will be used to determine the appropriate path forward. The results of the ongoing investigation will be submitted under separate cover.

9.2 Sediment

Based on the sporadic nature of the exceedances in sediment and either lack of detections on-Site (at a presumed source) or similar concentrations present at off-Site upgradient locations, delineation appears complete for sediment and no further sediment sampling is proposed at this time. Completion of both the HHRA and the SLERA will allow for Site-specific standards to be developed.

If concentrations of Constituents that were reported are greater than the HHRA and SLERA standards, additional evaluations may be proposed. This approach is consistent with the decision flow chart presented in the Phase I and Phase II Work Plans.

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9.3 Soil and Groundwater

Based on the data collected from Phase I, Phase II, Area #1, Area #2, and Area #3, as well as comments from USEPA and MDEQ, the following additional soil and groundwater investigations are proposed:

- Collection of high-resolution relative permeability data from approximately 35 locations across the Site;
- Installation of PFMs in selected monitoring wells to directly measure groundwater velocities and contaminant mass flux rates;
- Investigate DNAPL and groundwater impacts detected at AO-GP-06 and GP-28D;
- Investigate soil and groundwater impacts in the Poly-Pale™ area;
- Investigate the groundwater/surface water interaction in Monitoring Well MW-5 and Creek Monitoring points CM-04 and CM-05 with respect to 1,4-dioxane concentrations;
- Installation of five groundwater monitoring wells into the uppermost sandy interval of the Hattiesburg Formation to evaluate continuity of the interval and assess water quality;
- Investigate soil exceedances in Drainage C area; and,
- Convert selected temporary monitoring wells into permanent wells.

Figure 59 depicts the areas for additional investigation. The PFM study was conducted between February and March 2015, with results currently under review. In addition, the conversion of temporary monitoring wells into permanent wells was completed in February 2015. **Figure 60** depicts the temporary well network that was converted to permanent wells, including the network in Area #2. Additional detail on each of these activities is presented below.

9.3.1 High-Resolution Permeability Profiling (Site Wide)

In order to refine the understanding of the Site geology and permeability, a hydraulic profiling tool (HPT) will be employed at approximately 35 locations Site-wide. The HPT

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is advanced through unconsolidated soils using a standard direct-push drilling rig. The HPT tool is attached to the end of a drill string and enables a continuous metered injection of small volumes of water (typically between 200 to 300 milliliters per minute) during advancement of the probe. At the same time, the fluid backpressure due to injection into the surrounding formation, as well as the flow rate, are measured and logged continuously during boring advancement.

After correcting for atmospheric and hydrostatic pressure effects, the flow and pressure data are plotted as relative hydraulic conductivity by recognizing that hydraulic conductivity (K) is the constant of proportionality, flow divided by pressure (Q/P). The HPT borings will be advanced through the alluvial deposits to a depth where the underlying Hattiesburg clay is expected to be encountered based on existing borings from the Site. To ensure adequate characterization of the alluvial deposits and account for the potential presence of multiple permeable sand layers separated by clay layers, the HPT borings will be terminated after 5 feet of low-permeability soils are observed on the HPT.

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9.3.2 Measurement of Groundwater Velocity and Mass Flux Rates

In order to refine the understanding of groundwater velocities and contaminant transport rates, a study was completed between February and March 2015 using PFMs installed in 13 wells (**Figure 59**). These 13 wells were selected because they are in areas of the Site where groundwater velocities and contaminant flux rates need to be better defined, such as adjacent to the sewer and adjacent to Greens Creek. PFMs are an established, widely accepted method to measure groundwater velocity and mass flux compounds in groundwater. The ITRC includes PFMs in the ITRC report *Use and Measurement of Mass Flux and Mass Discharge* (2010).

PFMs consist of a self-contained, permeable nylon mesh tube filled with a sorbent material that is impregnated with known amounts of an alcohol tracer mixture. The PFMs are constructed to order by their manufacturer, EnviroFlux, and shipped in a dedicated sample shipping tube that also acts as a deployment and collection device. Standard PFMs are 5-foot long sections, but multiple PFMs can be installed in a single well to get adequate coverage over longer screened intervals.

The PFMs are inserted into a monitoring well to allow groundwater to flow horizontally through the cartridge under ambient hydraulic gradients. The alcohol tracer leaches out from the sorbent at rates proportional to the groundwater flux. Concurrently, as impacted groundwater passes through the PFM under ambient conditions, Site

Constituents are preferentially sorbed to the activated carbon materials of the PFM. After a specified deployment period, the PFM is retrieved and samples are collected from the sorbent material and analyzed for tracer and select Constituents.

The contaminant masses are used to calculate time-weighted contaminant flux, while residual tracer mass is used to calculate a cumulative groundwater flux. Deployment times for PFMs are generally 1 to 4 weeks, and are dependent on Site-specific conditions, including groundwater velocity and Site-specific Constituents. The data collected during the PFM study and the results will be submitted under separate cover.

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9.3.3 Investigate DNAPL and Groundwater Impacts Detected at AO-GP-06 and GP-28D

DNAPL and elevated groundwater concentrations of Site Constituents were detected in Phase I and II activities at AO-GP-06 and AO-GP-28D. Additional investigation is planned to delineate the extent of DNAPL using laser-induced fluorescence (LIF) and to evaluate the extent of dissolved-phase groundwater impacts using transects of groundwater samples.

The Ultra-Violet Optical Screening Tool (UVOST) is a vertically-continuous sensing technology based on the principle of LIF. When ultra-violet laser light encounters PAHs, the light energy excites the PAHs which then fluoresce in response. The UVOST contains the light source and a window to capture the fluorescence response, all mounted onto direct-push drilling equipment; therefore, by advancing the UVOST, data will be collected at a high resolution (e.g., centimeters) and will identify if DNAPL is present.

In 2014, a sample of the DNAPL in the two subject areas was collected and provided to a UVOST subcontractor. The subcontractor confirmed the UVOST tool responds positively to the presence of the DNAPL at the Site. Additionally, the electrical conductivity (EC) sensor on the UVOST will collect data that can be used to identify zones with higher and lower relative permeability, as higher permeability zones generally have lower EC readings. The UVOST and EC tools will allow for real-time data acquisition and field adjustments to complete the assessment of variable DNAPL flow paths, particularly within interbedded shallow sand and clay layers.

At the on-Site area west of AO-GP-28D area, 13 UVOST borings are planned, conducted on three transects. At the AO-GP-06 area, 16 UVOST borings are planned, conducted on three transects. Following the UVOST borings, vertically discrete groundwater samples will be collected using either a screen-point or temporary well

approach to refine the extent of groundwater impacts in each area. At the AO-GP-06 area, six sets of shallow and deep groundwater sampling locations are planned. At the AO-GP-28D area, five sets of shallow and deep groundwater sampling locations are planned. The comprehensive set of data (i.e., Phase I, Phase II, RUAO monitoring, and follow-up investigations) will also facilitate evaluation of the extent of the diphenyl plume.

As requested by the USEPA, the DNAPL investigation for the AO-GP-28D area will be expanded to collect a soil sample from a depth of 7 to 9 feet at AO-GP-26. Evaluation of the area for data gaps (see **Appendix A**, cross section II-II' in **Figure A-20**) indicates the 7 to 9 ft bgs will complete assessment in the area. The top of the clay was identified at approximately 10 ft bgs and the sampled screen interval of 3 to 8 ft bgs adequately evaluates the permeable layers on top of the clay layer.

9.3.4 Investigate Soil and Groundwater Impacts in the Poly-Pale™ Area

Additional investigation will take place in the Poly-Pale™ area to refine the extent of VOCs and SVOCs in soil and groundwater. The investigation will be centered around AO-GP-11 and AO-GP-12S/D, as those are the locations with the highest soil and groundwater concentrations.

The investigation will consist of the following:

- Seven soil borings will be advanced to the underlying clay in a ring around locations AO-GP-11 and AO-GP-12S/D;
- Soil samples will be collected in accordance with the rationale presented in the Phase I and II Work Plans;
- If the initial seven borings do not delineate the extent of constituents, an additional six borings will be advanced in a ring that is approximately 50 feet farther out from AO-GP-11 and AO-GP-12S/D; and,
- Select temporary monitoring wells were converted into permanent monitoring wells (**Figure 60**).

To ensure adequate characterization and account for the potential presence of multiple permeable sand layers separated by clay layers, the soil borings will be terminated after at least 2 feet of low-permeability soils (i.e., silty clay, sandy clay, and/or clay) are encountered. The Constituents identified in this area are anticipated to respond to field

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screening protocols and allow for field adjustments to complete assessment of the vertical and horizontal distribution of Constituents in soil and groundwater.

9.3.5 Groundwater/Surface Water Interaction Investigation along Greens Creek

Concentrations of 1,4-dioxane in Monitoring Well MW-5 adjacent to Greens Creek have recently triggered the need for additional characterization to investigate the potential discharge of 1,4-dioxane into Greens Creek. Potential response actions would follow Site characterization and would focus on transport zones. Additionally, information on potential response actions necessary to mitigate the discharge to Greens Creek will be collected.

The additional Site characterization will consist of the following:

- Up to 21 HPT borings advanced in the area along Greens Creek in order to identify the high and low permeability zones in the area. The HPT work would be conducted as described in Section 9.3.1. Borings will be installed in transects as indicated on **Figure 59**;
- After mapping the permeable zones, groundwater samples will be collected from locations next to selected HPT borings. It is anticipated that at each boring, two groundwater samples will be collected, but the number of samples will be defined based on relative thickness of the permeable zone at each location;
- Collect geochemical parameters from temporary wells and permanent wells to evaluate potential response actions:
  - Dissolved gasses (ethane, ethane, methane, propane);
  - Sulfate/hydrogen sulfide;
  - Total and dissolved iron and manganese;
  - Nitrate/nitrite;
  - Alkalinity;
  - Chloride;

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  - TOC; and,
  - Bio-Traps (for enzyme-potential measurements).

- Installation of PFMs, as described in Section 9.3.2, in five wells adjacent to Greens Creek (MW-4, MW-5, MW-12, MW-13, and MW-15) in order to directly measure the groundwater velocity and flux.

Once the groundwater flux is better defined, supplemental assessment will be completed to evaluate the characteristics of Greens Creek (i.e., flow conditions and stream dynamics). These data will be use to refine the understanding of surface water interactions. The results of these investigations will be submitted under separate cover.

Collection of these data will allow for evaluation of hydraulic containment remedies as well as in-situ and ex-situ treatment options. Treatment options can include various advanced oxidation processes such as hydrogen peroxide and/or ozone, or ultraviolet light. Adsorption with resins and bioremediation can also be considered for treatment options.

9.3.6 Evaluation of Groundwater Quality in the Uppermost Sandy Interval of the Hattiesburg Formation

As indicated in Section 4, several boring logs from the Site and the immediate vicinity indicate the presence of a sandy interval of variable thickness within the Hattiesburg Formation, present at approximately 60 to 90 ft bgs. Five monitoring wells will be installed and screened in this interval on-Site to assess the lateral continuity and water quality. The locations of the proposed wells are shown on **Figure 59**.

The wells will be installed using sonic drilling which will allow for the isolation of the upper alluvium zone from the target zone. The isolation will reduce the potential for cross contamination during drilling and well installation operations. The wells will be installed once the uppermost sandy interval of Hattiesburg Formation is reached (anticipated depth of approximately 60 to 90 ft bgs). Soil samples will be collected continuously for lithologic descriptions only. An outer isolation casing installed during drilling will remain in-place until grouting of the well is achieved. Once grouting is completed, the outer isolation casing will be removed and additional grout will be added to ensure the alluvial aquifer is sealed off from the Hattiesburg Formation.

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Monitoring wells will be constructed of 2-inch-diameter polyvinyl chloride and will be completed with above-grade materials (i.e., protective casings, concrete pads, and bollards at each pad corner). Installation will be completed in accordance with the Phase I and II Work Plans.

Based on the groundwater data from the off-Site private well (PW-CMS-01), no additional sampling appears warranted. MDEQ has indicated that the acetophenone Tier I TRG is incorrect. When this exceedance is dismissed, only arsenic and sulfide are listed as COPCs for this location. The detected arsenic concentration is below the MCL and appears indicative of background conditions. The sulfide concentration is below the secondary drinking water standard for sulfate and appears indicative of background conditions.

Data from Well PW-RTT-01 indicate the presence of several VOCs and SVOCs. Based on the distance from the Site, the installation of the wells into the uppermost sandy interval of the Hattiesburg Formation will evaluate this pathway.

Review of the deep well data from Wells PW-ZC-02, PW-HI-01, and PW-HI-03 reveals no issues that warrant re-sampling or additional investigation at these locations in the Catahoula formation.

9.3.7 Re-Sampling of Catahoula Well

Based on the detection of 1,1'-biphenyl in Catahoula Well PW-ZC-01, this well will be re-sampled. Because this well is off-Site, an access agreement will be required prior to re-sampling.

9.3.8 Drainage C Soil Sampling

Based on the localized exceedances at off-Site locations, additional soil sampling is proposed to complete delineation at the Drainage C area. Specifically, additional surface soil characterization will be conducted to evaluate the potential presence of Constituents in the area prior to being culverted. Two surface soil samples (0-1 ft bgs) will be collected from approximately 25 feet on either side at each existing sample locations AO-SS-02 through AO-SS-08 (**Figure 59**). As a result, 14 additional soil samples are proposed for the supplemental investigation. This distribution of sample locations should provide adequate characterization of the horizontal extent of the primary drainage area of any previous accumulation within Drainage C.

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Completion of the HHRA and SLERA will allow Site-specific standards to be developed. If Constituent concentrations that were reported are greater than the HHRA and SLERA standards, additional evaluations will be proposed. This approach is consistent with the decision flow chart presented in the Work Plans.

9.3.9 Supplemental Soil Sampling for SLERA

Based on the number of surface soil samples (0-1 ft bgs) collected and evaluated to date, the need for additional samples from this interval was evaluated to ensure a comprehensive data set is available for the SLERA. The proposed sampling program for the Drainage C area includes 14 additional surface soil samples tor characterization of off-Site locations (see Section 9.3.8). Combined with the existing 18 surface soil samples (**Table 19**), this will result in a total of 32 surface soil samples.

To further increase spatial coverage of the on-Site property, seven additional surface soil samples (0-1 ft bgs) are proposed at locations AO-GP-02, AO-GP-07, AO-GP-08, AO-GP-10, AO-GP-11, AO-GP-16, and AO-GP-34. These previously sampled locations had exceedances of ecological screening levels in samples from the 0-2 ft bgs interval and represent adequate spatial coverage of the potential ecological habitats of the on-Site property. After these seven samples are collected, a total of 39 surface soil samples will be available for evaluation in the SLERA.

9.4 Chromium Data Evaluation

In response to the USEPA concern regarding the inclusion of chromium as a COPC, speciation of chromium (i.e., trivalent chromium and hexavalent chromium) is proposed for selected samples to confirm screening results for the surface water, groundwater, and soil media. Specifically, the available data will be evaluated and the two locations per media with the highest reported chromium concentrations will be selected. These locations will be re-sampled for chromium speciation. The results will be screened against the appropriate TRGs and RSLs.

9.5 Air

Review of the ambient air and crawl space data collected to date indicates that the conditions observed in the crawl space of the residence located at 135 West 8th Street appear indicative of background conditions. Although concentrations in the crawl space exceed RSLs, they are consistent with or well below typical residential indoor air background levels. Additionally, the presence of similar constituents at similar

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concentrations in both the ambient air and crawl space demonstrates that exchange of air is occurring.

In August 2014, Hercules purchased the property at 135 West 8th Street and the former residents have moved out, leaving the building unoccupied. Therefore, at this time, Hercules proposes to discontinue the ambient air and crawl space sampling program.

9.6 Sewer

As discussed in Section 4.3.2, Hercules conducted sewer replacement activities along Providence Street. It is anticipated that the replacement of the sanitary sewer piping will minimize infiltration of groundwater originating from the Site into the sanitary sewer system. Based on the historic minimal discharge of groundwater to Hattiesburg's POTW and the replacement of the sanitary sewer, no further sampling is recommended.

However, to understand groundwater velocities and contaminant mass transport rates in the vicinity of the sewers, the PFM study discussed in Section 9.3.2 will be conducted in several wells adjacent to the Providence Street sewer after the construction is complete. The results of the PFM study will be provided under separate cover.

10. Summary of Human Health and Ecological Constituents of Potential Concern and Proposed Risk Assessment Process

This section summarizes the human health and ecological constituents of potential concern. The identification of COPCs in this Investigation Report is preliminary and may be refined in the future.

10.1 Human Health Constituents of Potential Concern

The human health COPCs by medium and location (on-Site or off-Site) are presented in **Table 27**. All Constituent classes were detected and all, with the exception of herbicides, are considered for further evaluation during the risk assessment by their respective environmental medium and location. The only herbicide detected was pentachlorophenol, which is also analyzed following the SVOC method. If additional sampling is necessary, pentachlorophenol will be analyzed only as an SVOC.

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10.2 Human Health Risk Assessment

The HHRA will be conducted to evaluate the effect of constituents identified in Site soil, groundwater, soil gas and air, sediment, and surface water on human health. Based on land use considerations, human exposure to this Site is expected to be limited because the Site is a closed industrial facility with continuous fencing and a locked gate. Residential use of the property is not likely to occur based on zoning for the Site and the deed restrictions necessary for compliance with the RUAO. Understanding that Land use could change sometime in the future, the risk assessment will evaluate exposure of hypothetical future youth trespassers, Site workers, and construction workers. As a conservative measure, hypothetical future residential use of the Site will also be included as an uncertainty analysis within the HHRA.

Potential human health risks associated with current and reasonably expected future Site conditions and land use will be evaluated, and the results of the HHRA will be used to evaluate the potential need for and the degree of remedial measures necessary to achieve Site closure based on Site-specific human health concerns (if any). The HHRA will be presented as a stand-alone report and will draw upon the information summarized in this report and any subsequent investigations (if necessary). The methodology used in the exposure assessment, toxicity assessment, risk characterization, development of risk-based remediation goals (if necessary), and uncertainty analysis was provided in Section 9 of the Revised Phase II Work Plan.

10.3 Ecological Constituents of Potential Concern

The ecological COPCs by medium are presented in **Table 28**. All Constituent classes with the exception of herbicides are considered for further evaluation during the SLERA by their respective environmental medium and location. The only herbicide detected, pentachlorophenol, was not identified as an ecological COPC when analyzed as an SVOC or an herbicide.

10.4 Ecological Risk Assessment

The SLERA will evaluate the potential risk to terrestrial and aquatic wildlife that may be exposed to Site-related Constituents. As discussed during the ecological Site visit on June 4-5, 2012, this will include an evaluation of “attractive nuisance” wildlife risks appropriate for those industrial areas of the Site that do not represent high-quality ecological habitat. The SLERA is designed to provide a conservative estimate of the potential risks that may exist for wildlife and incorporate uncertainty in a precautionary

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manner. The purpose of the SLERA is to either indicate the need for a more rigorous and focused evaluation (i.e., a baseline ecological risk assessment [BERA]), or to indicate that there is a high probability of no adverse risks for wildlife and, therefore, no need for further evaluation (USEPA 1997 and 2000).

The ERA for this Site will be conducted in a manner consistent with the following USEPA and MDEQ guidance:

- "Ecological Risk Assessment Guidance for Superfund" (USEPA 1997);
- "Guidelines for Ecological Risk Assessment" (USEPA 1998); and,
- USEPA Region 4 Preferred Wildlife Exposure Parameters and Toxicity Reference Values.

The comprehensive USEPA eight-step ERA process, provided in **Appendix O**, incorporates refinements recommended by USEPA Region 4 (USEPA 2000). Steps 1 and 2 comprise the traditional SLERA, and Steps 3 through 8 comprise the BERA process. Step 3 can be subdivided into Step 3a as a refinement of the SLERA results, and Step 3b as the refinement of measurement endpoints for the BERA. The USEPA encourages the submittal of the results of Steps 1 through 3a as a single deliverable document (USEPA 2000). Therefore, the screening-level approach for this Site will consist of a SLERA/BERA 3a evaluation. The elements associated with Step 1 of the ecological risk assessment have been completed as part of the Phase I and Phase II investigation data collection.

As illustrated on the exhibit (**Appendix O**), the eight-step process includes points for communication with USEPA and MDEQ and collaborative decision-making, consistent with the USEPA paradigm (USEPA 1997 and 2000). These points are called scientific management decision points (SMDPs). As can be seen on the exhibit, the first SMDP is purposefully flexible (per the USEPA paradigm) to occur after Steps 2 or 3a, depending on the results obtained at Step 2.

The following courses of action will be considered in the SMDP at the end of the SLERA/BERA 3a process:

1. No further action is warranted – there is adequate information to conclude that significant ecological risks are unlikely;

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2. Further assessment of ecological risks – the information is not adequate to make a decision at this point; or

3. Remedial action – for the media and constituents that are identified at the end of SLERA/BERA 3a as possibly being associated with significant ecological risks (in order to evaluate whether cost-effective actions can be implemented to reduce or prevent risks to wildlife).

The risk assessment will present the results of the SLERA/BERA 3a process and the SMDP. A detailed discussion of the elements of the ERA approach for the Site is provided in Section 10 of the Revised Phase II Work Plan.

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Tables

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Table 1. Summary of Monitoring Well, Temporary Well, and Piezometer Details, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Well Number	Screen Interval (ft bgs)	Total Depth of Well (ft bgs)	Casing Diameter (in.)	Construction Material	Total Depth of Borehole (ft bgs)	Well Completion (FM/AG)	TOC Elevation (ft)[1]	Current Status
Monitoring Wells								
MW-1	7 - 17	17	2	PVC	17	AG	174.03	Active Permanent Well
MW-2	7 - 17	17	2	PVC	17	AG	160.07	Active Permanent Well
MW-3	5 - 15	15	2	PVC	15	AG	160.03	Active Permanent Well
MW-4	5 - 15	15	2	PVC	15	AG	159.75	Active Permanent Well
MW-5	5 - 15	15	2	PVC	15	AG	160.99	Active Permanent Well
MW-6	8-18	18	2	PVC	18	AG	174.05	Active Permanent Well
MW-7	10.4 - 20.4	20.4	2	PVC	20.8	FM	183.96	Active Permanent Well
MW-8	6 - 16	16	2	PVC	16.3	AG	179.99	Active Permanent Well
MW-9	7.2 - 17.2	17.2	2	PVC	17.5	AG	181.97	Active Permanent Well
MW-10	6.7 - 14.7	14.7	2	PVC	14.7	AG	159.88	Active Permanent Well
MW-11	6.7 - 14	14	2	PVC	14	FM	157.18	Active Permanent Well
MW-12	4-9	9	2	PVC	10	AG	162.17	Active Permanent Well
MW-13	6 - 16	16	2	PVC	16	AG	175.23	Active Permanent Well
MW-14	11.5 - 22	22	2	PVC	22	AG	169.23	Active Permanent Well
MW-15	14 - 24	24	2	PVC	24	AG	172.21	Active Permanent Well
MW-16	16 - 26	26	2	PVC	26	AG	175.62	Active Permanent Well
MW-17	10 - 20.0	20	2	PVC	22	AG	186.13	Active Permanent Well
MW-18	4 - 14	14	2	PVC	14	AG	164.74	Active Permanent Well
MW-19	7.75 - 17.5	17.5	2	PVC	22	AG	171.62	Active Permanent Well
MW-20	4 - 14	14	2	PVC	15	AG	167.93	Active Permanent Well
MW-21	6 - 16	16	2	PVC	16	FM	163.09	Active Permanent Well
MW-22	5 - 15	15	2	PVC	17	AG	167.05	Active Permanent Well
MW-23	5 - 14	14	2	PVC	15	FM	162.10	Active Permanent Well
MW-24	4 - 13	13	2	PVC	14	AG	164.50	Active Permanent Well
MW-25	2 - 12	12	1	PVC	28	AG	161.32	Active Permanent Well
MW-26-S	3 - 13	13	1	PVC	32	FM	169.41	Active Permanent Well
MW-26-D	17 - 22	22	1	PVC	32	FM	169.37	Active Permanent Well
MW-27-S	5 - 15	15	1	PVC	24	FM	168.63	Active Permanent Well
MW-27-D	16 -21	21	1	PVC	24	FM	168.56	Active Permanent Well
MW-28	19.5 - 24.5	25	4	Stainless Steel	26	FM	168.35	Active Permanent Well
MW-28S	7-12	12	1	PVC	26	AG	171.45	Active Permanent Well
MW-28D	19.5-24.5	24.5	1	PVC	26	AG	169.12	Active Permanent Well
MW-29-S	6 - 16	16	1	PVC	24	FM	168.37	Active Permanent Well
MW-29-D	17 - 22	22	1	PVC	24	FM	168.43	Active Permanent Well
MW-30-S	6 - 16	16	1	PVC	24	FM	168.27	Active Permanent Well
MW-30-D	18 - 23	23	1	PVC	24	FM	168.61	Active Permanent Well
MW-31-S	6 - 16	16	1	PVC	24	FM	168.43	Active Permanent Well
MW-31-D	18 - 23	23	1	PVC	24	FM	168.45	Active Permanent Well
MW-32-S	6 - 16	16	1	PVC	24	FM	167.13	Active Permanent Well
MW-32-D	17 - 22	22	1	PVC	24	FM	167.74	Active Permanent Well
MW-33-S	3 - 13	13	1	PVC	40	AG	170.38	Active Permanent Well
MW-33-D	19 - 29	29	1	PVC	40	AG	170.40	Active Permanent Well
MW-34-S	4 - 14	14	1	PVC	29	FM	167.70	Active Permanent Well
MW-34-D	19 - 29	29	1	PVC	29	FM	167.67	Active Permanent Well
MW-72	4 - 14	14	1	PVC	14	AG	173.84	New Permanent Well
MW-129-D	17-22	22	2	PVC	24	FM	170.44	Active Permanent Well
MW-129-S	7-12	12	2	PVC	24	FM	170.87	Active Permanent Well
Piezometers								
TP-1	6.8 - 16.8	16.8	1	PVC	17	AG	Destroyed	Destroyed
TP-2	6.8 - 16.8	16.8	1	PVC	17	AG	171.72	Active
TP-3	9.6 - 14.6	14.6	1	PVC	16	AG	169.74	Active
TP-4	5 - 10	10	1	PVC	14	AG	163.64	Active
TP-5	9 - 14	14	1	PVC	15	AG	160.54	Active
TP-6	10 - 15	15	1	PVC	17	FM[2]	158.63	Active
TP-7	5.3 - 10.3	10.3	1	PVC	12	FM[2]	167.17	Active
TP-8	12.5 - 17.5	17.5	1	PVC	18.5	FM[2]	183.79	Active
TP-9	4 - 9	9	1	PVC	10	FM	163.44	Active
TP-10	8 - 14.5	14.5	1	PVC	17	AG	179.69	Active
TP-11	8 - 13	15	1	PVC	15	FM[2]	162.26	Active
TP-12	5 - 13	13	1	PVC	17	AG	159.95	Active
TP-13	4 - 11	11	1	PVC	14	AG	156.99	Active
TP-14	7.6 - 12.6	12.6	1	PVC	14	AG	162.59	Active
TP-16	--	--	--	--	--	--	179.72	Active
TP-17	--	--	--	--	--	--	182.71	Active

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Table 1. Summary of Monitoring Well, Temporary Well, and Piezometer Details, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Well Number	Screen Interval (ft bgs)	Total Depth of Well (ft bgs)	Casing Diameter (in.)	Construction Material	Total Depth of Borehole (ft bgs)	Well Completion (FM/AG)	TOC Elevation (ft)[1]	Current Status
Temporary Geoprobe Wells								
AO-GP-01	6-11	11	1	PVC	14	AG	158.81	Converted to MW-35
AO-GP-02D	6-11	11	1	PVC	12	AG	167.20	P&A
AO-GP-02S	1-6	6	1	PVC	6	AG	167.74	P&A
AO-GP-03	5-10	10	1	PVC	12	AG	165.92	P&A
AO-GP-03N	4.5-9.5	9.5	1	PVC	10	AG	164.46	Converted to MW-45
AO-GP-03N(2)	4-14	14	1	PVC	14	AG	165.36	Converted to MW-44
AO-GP-03N(3)	6.5-11.25	11.25	1	PVC	14	AG	168.93	Converted to MW-43
AO-GP-03-S	5-10	10	1	PVC	12	AG	163.18	P&A
AO-GP-03-S(2)	4.5-9.5	9.5	1	PVC	12	AG	163.81	Converted to MW-48
AO-GP-03W	3-8	8	1	PVC	13	AG	165.41	Converted to MW-47
AO-GP-04	5.5-10.5	10.5	1	PVC	13.25	AG	168.37	Converted to MW-49
AO-GP-05	7.5-12.5	12.5	1	PVC	16	AG	166.60	Converted to MW-46
AO-GP-06	7-12	12	1	PVC	16	AG	176.55	Converted to MW-38
AO-GP-07D	13-18	18	1	PVC	20	AG	165.66	Converted to MW-37D
AO-GP-07S	0-5	5	1	PVC	20	AG	166.24	Converted to MW-37S
AO-GP-08	11-16	16	1	PVC	20	AG	176.90	Converted to MW-42
AO-GP-09D	15.5-20.5	20.5	1	PVC	24	AG	184.74	Converted to MW-40D
AO-GP-09S	11-16	16	1	PVC	16	AG	184.4	Converted to MW-40S
AO-GP-10D	9-14	14	1	PVC	16	AG	176.48	Converted to MW-41D
AO-GP-10S	5-10	10	1	PVC	10	AG	177.65	Converted to MW-41S
AO-GP-11	12-17	17	1	PVC	20	AG	178.00	Converted to MW-50
AO-GP-12D	13-18	18	1	PVC	20	AG	178.18	Converted to MW-52D
AO-GP-12S	8-13	13	1	PVC	13	AG	176.30	Converted to MW-52S
AO-GP-13D	17-22	22	1	PVC	24	AG	172.16	Converted to MW-53D
AO-GP-13S	11-16	16	1	PVC	16	AG	171.98	Converted to MW-53S
AO-GP-14	7.5-12.5	12.5	1	PVC	16	AG	166.19	Converted to MW-51
AO-GP-15	9-14	14	1	PVC	16	AG	171.6	Converted to MW-54
AO-GP-16	7-12	12	1	PVC	16	AG	172.53	Converted to MW-56
AO-GP-17	7-12	12	1	PVC	16	AG	171.92	Converted to MW-61
AO-GP-18D	11-16	16	1	PVC	20	AG	169.49	Converted to MW-60D
AO-GP-18S	5-10	10	1	PVC	10	AG	165.98	Converted to MW-60S
AO-GP-19D	19-24	24	1	PVC	27	AG	169.90	P&A
AO-GP-19S	8-13	13	1	PVC	13	AG	171.06	P&A
AO-GP-20	7.5-12.5	12.5	1	PVC	14	AG	172.24	P&A
AO-GP-21	6.5-11.5	11.5	1	PVC	18	AG	171.22	P&A
AO-GP-21E	5-15	15	1	PVC	16	AG	171.11	Converted to MW-64
AO-GP-21E(2)	5-15	15	1	PVC	16	AG	172.48	P&A
AO-GP-21E(2)-S2	5-15	15	1	PVC	16	AG	170.92	Converted to MW-66
AO-GP-21E(2)-S3	5.5-15.5	15.5	1	PVC	16	AG	173.93[2]	Converted to MW-67
AO-GP-21E(3)	7-12	12	1	PVC	16	AG	173.32	Converted to MW-71
AO-GP-21E(S1)	4-14	14	1	PVC	16	AG	170.81	P&A
AO-GP-21E(S2)	4-14	14	1	PVC	16	AG	170.33	P&A
AO-GP-21E(3)-S2	6.5-16.5	16.5	1	PVC	20	AG	174.11[2]	P&A
AO-GP-21E(N)	3.5-13.5	13.5	1	PVC	16	AG	171.21[2]	Converted to MW-65
AO-GP-21E(S3)	8-13	13	1	PVC	16	AG	173.60	P&A
AO-GP-21E-N1b	4.5-14.5	14.5	1	PVC	16	AG	170.20	P&A
AO-GP-21N	7-12	12	1	PVC	16	AG	172.83	P&A
AO-GP-21S(2)	4-14	14	1	PVC	16	AG	170.89	P&A
AO-GP-21S(3)	4-14	14	1	PVC	16	AG	171.25	P&A
AO-GP-21W	9-14	14	1	PVC	16	AG	170.98	Converted to MW-69
AO-GP-21W(S2)	4-14	14	1	PVC	16	AG	170.85	Converted to MW-68
AO-GP-21W(S5)	4.5-14.5	14.5	1	PVC	16	AG	171.19[2]	Converted to MW-70
AO-GP-22	3.5-8.5	8.5	1	PVC	10	AG	166.87	P&A
AO-GP-23	3-8	8	1	PVC	10	AG	171.01	P&A
AO-GP-24D	16-21	21	1	PVC	22	AG	172.52	Converted to MW-63D
AO-GP-24S	7.5-12.5	12.5	1	PVC	12.5	AG	171.65	Converted to MW-63S
AO-GP-25	4-9	9	1	PVC	10	AG	164.51	P&A
AO-GP-26	3-8	8	1	PVC	14	AG	162.92	P&A
AO-GP-27	4-9	9	1	PVC	10	AG	164.01	P&A
AO-GP-28S	7-12	12	1	PVC	26	AG	171.45	Converted to MW-28S
AO-GP-28D	19.5-24.5	24.5	1	PVC	26	AG	169.12	Converted to MW-28D
AO-GP-29S	7-12	12	1	PVC	26	AG	171.28	P&A
AO-GP-29D	19.5-24.5	24.5	1	PVC	26	AG	168.74	P&A
AO-GP-30D	14.5-19.5	19.5	1	PVC	22	AG	168.38	P&A
AO-GP-30S	6.5-11.5	11.5	1	PVC	11.5	AG	169.43	P&A
AO-GP-31	5-10	10	1	PVC	12	AG	163.32	Converted to MW-39

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Well Number	Screen Interval (ft bgs)	Total Depth of Well (ft bgs)	Casing Diameter (in.)	Construction Material	Total Depth of Borehole (ft bgs)	Well Completion (FM/AG)	TOC Elevation (ft)[1]	Current Status
Temporary Geoprobe Wells (continued)								
AO-GP-32	4-9	9	1	PVC	10	AG	154.06	P&A
AO-GP-33	6-11	11	1	PVC	18	AG	160.41	P&A
AO-GP-34D	17-22	22	1	PVC	24	AG	167.00	Converted to MW-36D
AO-GP-34S	12-17	17	1	PVC	17	AG	167.12	Converted to MW-36S
AO-GP-35	5-10	10	1	PVC	12	AG	163.37	P&A
AO-GP-36D	7-12	12	1	PVC	14	AG	165.60	P&A
AO-GP-36S	1-6	6	1	PVC	6	AG	166.40	P&A
AO-GP-38	8-13	13	1	PVC	16	AG	171.51	Converted to MW-55
AO-GP-39	6-11	11	1	PVC	12	AG	171.51	Converted to MW-57
AO-GP-40	6-11	11	1	PVC	12	AG	170.57	Converted to MW-62
AO-GP-L1-500(D)	19-24	24	1	PVC	24	AG	168.89	P&A
AO-GP-L1-500(S)	8-13	13	1	PVC	13	AG	168.10	P&A
AO-GP-L1-A (E) D	15-20	20	1	PVC	20	AG	178.91	P&A
AO-GP-L1-A (E) S	8-13	13	1	PVC	13	AG	178.91	P&A
AO-GP-L1-A(D)	15.5-20.5	20.5	1	PVC	24	AG	171.06	P&A
AO-GP-L1-A(S)	9-14	14	1	PVC	14	AG	169.90	P&A
AO-GP-L1-B (E) D	19-24	24	1	PVC	28	AG	172.0 [2]	Converted to MW-34D
AO-GP-L1-B (E) S	8-13	13	1	PVC	13	AG	172.0 [2]	Converted to MW-34S
AO-GP-L1-B(D)	19.5-24.5	24.5	1	PVC	40	AG	169.23	Converted to MW-33D
AO-GP-L1-B(S)	8-13	13	1	PVC	13	AG	167.58	Converted to MW-33S
AO-GP-L1-C(D)	17-22	22	1	PVC	24	AG	171.29	Converted to MW-59D
AO-GP-L1-C(S)	10-15	15	1	PVC	15	AG	168.68	Converted to MW-59S
AO-GP-L1-D(D)	16.5-21.5	21.5	1	PVC	24	AG	172.27	Converted to MW-58D
AO-GP-L1-D(S)	9-14	14	1	PVC	14	AG	170.24	Converted to MW-58S
AO-GP-L1-E(S)	6.5-11.5	11.5	1	PVC	12	AG	170.34	P&A
AO-GP-L2-C (D)	16.5-21.5	21.5	1	PVC	24	AG	170.10	Converted to MW-26D
AO-GP-L2-C (S)	10-15	15	1	PVC	15	AG	174.73	Converted to MW-26S
AO-GP-L2-D	4.5-14.5	14.5	1	PVC	16	AG	176.27	P&A
AO-GP-L2-0(D)	17-22	22	1	PVC	24	AG	169.0 [2]	P&A
AO-GP-L2-0(S)	10-15	15	1	PVC	15	AG	169.0 [2]	P&A
AO-GP-L3-0-D	22-27	27	1	PVC	28	AG	168.54	P&A
AO-GP-L3-0-S	7-12	12	1	PVC	28	AG	168.54	P&A
AO-GP-L3-200 (D)	16.5-21.5	21.5	1	PVC	24	AG	171.65	P&A
AO-GP-L3-200 (S)	4-14	14	1	PVC	14	AG	170.27	P&A
AO-GP-L3-A (D)	4-21	21	1	PVC	24	AG	171.80	Converted to MW-30D
AO-GP-L3-A (S)	4-14	14	1	PVC	14	AG	169.77	Converted to MW-30S
AO-GP-L3-B (D)	17.5-22.5	22.5	1	PVC	24	AG	170.53	P&A
AO-GP-L3-B (S)	7-12	12	1	PVC	12	AG	171.31	P&A
AO-GP-L3-C	5-15	15	1	PVC	18	AG	161.07	P&A
AO-GP-L4-200-D	17.5-22.5	22.5	1	PVC	24	AG	168.58	P&A
AO-GP-L4-200-S	9-14	14	1	PVC	24	AG	168.58	P&A
AO-GP-L4-250-D	18-23	23	1	PVC	24	AG	168.76	P&A
AO-GP-L4-250-S	11-16	16	1	PVC	24	AG	168.76	P&A
AO-GP-L4-A (D)	15.5-20.5	20.5	1	PVC	24	AG	171.52	P&A
AO-GP-L4-A (S)	4-14	14	1	PVC	14	AG	169.39	P&A
AO-GP-L4-B (D)	15-20	20	1	PVC	24	AG	170.53	P&A
AO-GP-L4-B (S)	7-12	12	1	PVC	12	AG	171.19	P&A
AO-GP-L4-C	4-14	14	1	PVC	16	AG	168.29	P&A
AO-GP-L4-D	5.5-10.5	10.5	1	PVC	12	AG	162.728	P&A
AO-GP-L5-100-D	17.5-22.5	22.5	1	PVC	24	AG	170.62	Converted to MW-31D
AO-GP-L5-100-S	7-12	12	1	PVC	24	AG	170.62	Converted to MW-31S
AO-GP-L5-200-D	16.5-21.5	21.5	1	PVC	24	AG	169.13	P&A
AO-GP-L5-200-S	9-14	14	1	PVC	24	AG	169.13	P&A
AO-GP-L5-250-D	16-21	21	1	PVC	24	AG	168.87	P&A
AO-GP-L5-250-S	10-15	15	1	PVC	24	AG	168.87	P&A
AO-GP-L5-300-D	3-13	13	1	PVC	16	AG	161.60	P&A

Notes:

[1] Elevations are in feet relative to mean sea level. For all temporary geoprobe wells the TOC elevation is the ground surface elevation.

[2] Estimate based on limited data.

-- Data not available.

AG Above ground.

FM Flush mount.

ft Feet.

ft bgs Feet below ground surface.

P&A Wells to be plugged and abandoned.

TOC Top of casing.

Table 2. Water Well Survey Information, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

MAP ID (SAMPLE ID)	DATABASE SITE ID	LOCATION	WELL DEPTH	TYPE/USE	DIAMETER	SCREEN LENGTH	AQUIFER	DATE CONSTRUCTED	WELL SURVEY AND SAMPLING INFORMATION	BORING/WELL/ GEOPHYSICAL LOG ID
136	MSPR30000014908	Half Mile	94	H	--	--	--	--	Property owner did not respond to postcard questionnaire. Property was inaccessible. Land use via property appraiser's website is agricultural.	--
	USGS2404573	Half Mile	94	--	--	--	Hattiesburg Formation	1/1/1971		
	MSC100000049200	Half Mile	94	Domestic	2	--	Hattiesburg	1/1/1971		
(PW-CMS-01)	--	Half Mile	35	Domestic/ Irrigation	--	--	--	~ 2004	Property accessed and inspected following receipt of postcard questionnaire. Property includes single-family home and commercial business. In-person interview was conducted with property owner. Owner indicated that one operating well was present on site (total depth of approximately 35 ft. bgs) and used for landscape and livestock irrigation. Owner also indicated she owned two parcels to the east, with property line at Green's Creek.	--
139	MSP300000000987	Half Mile	0	IN	--	--	N/A - River Intake	--	Property inspected, but no well was present. Former Hercules river pump station was present at this location.	--
142 (PW-RTT-01)	MSC100000049137	Half Mile	87	Industrial	4	20	Hattiesburg	11/11/2005	Well was identified near the EDR-identified location (Map ID 142). Site operates as wood yard/wood storage lot. Site was accessed and inspected and in-person survey was conducted with site operator representative. Site operator indicated well was active and used for industrial purposes (washing of logs prior to mill shipment). Well inspection identified well pump connection. Well was sampled in April 2012 (sample ID PW-RTT-01). Three 2005 MDEQ State Well Reports were obtained for three wells on this property (B-140, B-141, and B-142); however, only one well was observed.	B-140 (2005)
	MSC100000049138	Half Mile	92	Industrial	4	20	Hattiesburg	11/12/2005		B-141 (2005)
	MSC100000049139	Half Mile	91	Industrial	4	20	Hattiesburg	11/14/2005		B-142 (2005)
153	USGS2404666	Half Mile	422	--	--	--	Catahoula Formation, Upper	1/1/1968	Property inspected from street but no positive confirmation of well. MDEQ previously performed environmental assessment at facility. A 1968 Mississippi Board of Water Commisioners Water Well Driller's Log (D-70) was obtained for this well.	D-70 (1968)
	MSP300000000970	Half Mile	422	IN	--	--	Miocene Aquifer System	--		
	MSC100000049015	Half Mile	422	--	6	--	Miocene	7/11/1968		
155	MSC100000049003	Half Mile	265	Industrial	4	--	Hattiesburg	4/14/1993	Property inspected from street but no positive confirmation of well.	--
	USGS2404656	Half Mile	265	--	--	--	Hattiesburg	4/14/1993		
158	MSC100000048829	Half Mile	138	Domestic	2	--	Hattiesburg	1/1/1957	Windshield survey did not indicate presence of well.	--
	USGS2404628	Half Mile	138	--	--	--	Hattiesburg Formation	1/1/1957		
	MSPR30000014728	Half Mile	138	H	--	--	122HBRG	--		
159	MSC100000048830	Half Mile	105	Industrial	4	--	Alluvial Deposits	1/1/1967	Property inspected from street but no positive confirmation of well. The USGS database information indicated that two wells are located on this property. A 1967 Mississippi Board of Water Commisioners Water Well Driller's Log (D-61) was obtained for the 105 ft. well.	D-61 (1967)
	USGS2404626	Half Mile	105	--	--	--	Alluvium	1/1/1967		
	USGS2404625	Half Mile	671	--	--	--	Catahoula Formation, Middle	1/1/1967		--
160	USGS2404627	On-Site	654	--	--	--	Catahoula Formation, Middle	3/7/1990	Hercules property was inspected, but no well was identified at or near this location (Map ID 160). During in-person interview, operator representative indicated that he was not aware of any wells in this location.	--
161	MSC100000048799	On-Site	668	Industrial	16	--	Catahoula	6/20/1996	Hercules property was inspected, but no well was identified at or near this location (Map ID 160). During in-person interview, operator representative indicated that he was not aware of any wells in this location.	--
	USGS2404617	On-Site	668	--	--	--	Catahoula Aquifer	6/20/1996		
164 (PW-ZC-01)	MSC100000048752	Half Mile	650	Industrial	8	30	Middle Catahoula	1/15/1988	EDR coordinates place this well on the Hercules property (Map ID 164); however, based on owner information provided in EDR report and observations during field well survey, this well is located on adjacent parcel operated by Zeon Chemicals, west of Map ID 164. In-person survey was conducted with site operator representative. Well inspection identified a well pump connection. Site operator representative indicated the well was active and used for industrial purposes. Well was sampled in February 2012 (sample ID PW-ZC-01). A 1988 Mississippi Board of Water Commisioners Water Well Driller's Log D-109 was obtained for this well.	D-109 (1988)
	USGS2404604	On-Site	641	--	--	--	Catahoula Formation, Middle	1/15/1988		
166 (PW-HI-03)	MSP300000000964	On-Site	640	IN	--	--	Miocene Aquifer System	--	Well was identified on Hercules property west of the EDR-identified location (Map ID 166). In-person survey was conducted with site operator representative. Site operator representative indicated that this well, referred to as Well #3, has been inactive since approximately 2009 and was previously used for industrial purposes. Well inspection identified a well pump connection. Well was sampled in March 2012 (sample ID PW-HI-03). The following documents were obtained dated 1967: A Mississippi Board of Water Commisioners Water Well Driller's Log (No. D-60); Well Log (Well No. 4). The following documents were obtained dated 1996: A Mississippi Bureau of Geology Electrical Log (No. D-014); Well Log (Well No. 3A).	D-014 (1996); Well No. 3A (1996)
	MSC100000048730	On-Site	640	Industrial	16	--	Miocene	7/10/1996		
	MSC100000048729	On-Site	671	Abandoned	18	--	Miocene	3/1/1967		D-60 (1967); Well No. 4 (1967)
	MSP300000000963	On-Site	671	AB	--	--	Miocene Aquifer System	--		
168 (PW-HI-01)	MSC100000048700	On-Site	466	Industrial	18	--	Miocene	5/2/1980	Well was identified on Hercules property close to the EDR-identified location (Map ID 168). An in-person survey was conducted with site operator representative. Site operator representative indicated that this well, referred to as Well #1, has been inactive since approximately 2009 and was previously used for industrial purposes. Well inspection identified cap on well and no well pump connection. Well was sampled in March 2012 (sample ID PW-HI-01). A 1980 Geophysical Survey Electric Log (Well No. 6) was obtained for this well. A 1952 Well Log (Well No. 2) was also obtained for the previoius well installed and subsequently abandoned at this location.	Well No. 6 (1980); Well No. 2 (1952)
	MSP300000000962	On-Site	466	IN	--	--	Miocene Aquifer System	--		

Table 2. Water Well Survey Information, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

MAP ID (SAMPLE ID)	DATABASE SITE ID	LOCATION	WELL DEPTH	TYPE/USE	DIAMETER	SCREEN LENGTH	AQUIFER	DATE CONSTRUCTED	WELL SURVEY AND SAMPLING INFORMATION	BORING/WELL/ GEOPHYSICAL LOG ID
169 (PW-ZC-02)	MSP300000000961	Half Mile	650	IN	--	--	Miocene Aquifer System	--	Well was identified north of the EDR-identified location (Map ID 169). An in-person survey was conducted with site operator representative. Well inspection identified a well pump connection. Site operator representative indicated the well was active and used for industrial purposes. Well was sampled in February 2012 (sample ID PW-ZC-02). A 1990 Mississippi Department of Natural Resources, Bureau of Land and Water Resources Water Well Driller's Log was identified for this well.	D-133 (1990)
	MSC100000048682	Half Mile	654	Industrial	20	--	Middle Catahoula	6/13/1991		
174	MSC100000048621	Half Mile	350	Domestic	2	20	--	6/12/1979	Property owner address is the same as the property owner of Well ID 169/PW-ZC-02. No additional wells were located at this property during the field survey. A windshield survey of the EDR well location did not identify any wells. No postcard received from owner.	--
175	MSC100000048622	Half Mile	325	Unused	8	--	Upper Catahoula	1/1/1947	No postcard received from owner. No well was observed during windshield survey.	--
	USGS2404579	Half Mile	325	--	--	--	Catahoula Formation, Upper	1/1/1947		
178	MSP300000000960	Half Mile	353	AB	--	--	Miocene Aquifer System	--	Property owner returned postcard questionnaire indicating well was present on property. Property was accessed and inspected. Well was present; however, pump and other equipment were lodged in well, and well could not be sampled. USEPA stated that well did not have to be sampled due to condition. However, a water tower was present on site. Property was overgrown and appeared to be abandoned. Well listed in EDR database as abandoned.	--
	MSC100000048596	Half Mile	353	Abandoned	8	--	Miocene	4/1/1965		
181	MSC100000048483	Half Mile	501	Unused	8	--	Upper Catahoula	1/1/1943	Windshield survey did not indicate presence of a well. The Former Dixie Pine facility, identified in the EDR database as the well owner, was located southeast of the Hercules facility, outside the 1/2 mile radius.	--
	USGS2404744	Half Mile	501	--	--	--	Catahoula Formation, Upper	1/1/1943		
183	USGS2404743	Half Mile	687	--	--	--	Catahoula Formation, Middle	1/1/1965	The well location provided in the EDR database report indicates the well is located in the Roseland Park Cemetery. The presence of a well could not be verified.	--
184	MSP300000000957	On-Site	687	IN	--	--	Miocene Aquifer System	--	Well was identified on Hercules property close to the EDR-identified location (Map ID 184). An in-person survey was conducted with site operator representative. Site operator representative indicated that this well, referred to as Well #2 (HI-02), has been inactive since approximately 2009 and was previously used for industrial purposes. Well inspection identified cap on well and no well pump connection. Sampling efforts were unsuccessful due to insufficient recharge for sampling. The following documents were obtained dated 1965: A Mississippi Board of Water Commissioners Water Well Drillers Log (D-38); a 1965 Installation Report (Well Number 2).	D-38 (1965); Well Number 2 (1965)
	MSC100000048469	On-Site	687	Not Renewed	10	--	Miocene	9/1/1965		
207	MSC100000048345	Half Mile	576	Domestic	5	--	Middle Catahoula	1/1/1954	Windshield survey did not indicate presence of a well. No postcard questionnaire was received from property owner.	--
	MSPR30000014563	Half Mile	576	H	--	--	122CTHLM	--		
	USGS2404688	Half Mile	576	--	--	--	Catahoula Formation, Middle	1/1/1954		

Notes:
This table was created by compiling data provided in the June 2, 2011, EDR DataMap™ Well Search Report (Inquiry No. 3078218.1w). Additional information was obtained via in-person surveys. Well logs were provided by MDEQ and/or property owner.
-- No data available.

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Table 3. Summary of Constituents Deteched in an off-site Shallow Private Groundwater Well, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incoroprated, Hattiesburg, Mississippi.

Constituent [a]		Frequency of Detection [b]			Detected Concentrations			Location of Maximum Concentration (Sample Date)	MDEQ Groundwater Tier 1 TRG [c]	USEPA Tapwater Regional Screening Level [d]	Is Constituent a COPC? [e]	
		Number of Detections	Number of Samples	(%)	Minimum (µg/L)	-	Maximum (µg/L)		(µg/L)	(µg/L)	(YES, no)	Rationale
Semivolatile Organic Compounds												
1,4-Dioxane		1	1	100	4.70E-01	-	4.70E-01	PW-CMS-01 (2/27/2012)	6.09E+00	7.80E-01	no	BSL
Acetophenone	[f]	1	1	100	1.60E-01	-	1.60E-01	PW-CMS-01 (2/27/2012)	NA	1.90E+02	no	BSL
Inorganics												
Arsenic		1	1	100	7.60E-01	-	7.60E-01	PW-CMS-01 (2/27/2012)	5.00E+01	5.20E-02	**YES**	ASL
Barium		1	1	100	5.00E+01	-	5.00E+01	PW-CMS-01 (2/27/2012)	2.00E+03	3.80E+02	no	BSL
Copper		1	1	100	1.40E+01	-	1.40E+01	PW-CMS-01 (2/27/2012)	1.30E+03	8.00E+01	no	BSL
Iron		1	1	100	5.50E+01	-	5.50E+01	PW-CMS-01 (2/27/2012)	1.10E+04	1.40E+03	no	BSL
Lead	[g]	1	1	100	1.20E+00	-	1.20E+00	PW-CMS-01 (2/27/2012)	1.50E+01	1.50E+01	no	BSL
Manganese		1	1	100	1.40E+01	-	1.40E+01	PW-CMS-01 (2/27/2012)	7.30E+02	4.30E+01	no	BSL
Selenium		1	1	100	6.10E-01	-	6.10E-01	PW-CMS-01 (2/27/2012)	5.00E+01	1.00E+01	no	BSL
Zinc		1	1	100	1.60E+01	-	1.60E+01	PW-CMS-01 (2/27/2012)	1.10E+04	6.00E+02	no	BSL
Sulfide		1	1	100	1.40E+03	-	1.40E+03	PW-CMS-01 (2/27/2012)	NA	NA	**YES**	NSL

ASL	Above screening level.	µg/L	Microgram per liter.	TRG	Target Remediation Goal.
BSL	Below screening level.	NA	Not available.	USEPA	United States Environmental Protection Agency.
COPC	Constituent of potential concern.	NSL	No screening level.		
MDEQ	Mississippi Department of Environmental Quality.	RSL	Regional Screening Level.		

[a] All constituents detected in at least one off-site potable groundwater well are presented.
[b] Frequency of detection is equal to the number of detections divided by the total number of samples analyzed. For duplicate samples, the highest detected value or the lowest detection limit was selected.
[c] MDEQ Tier 1 Target Remediation Goal (TRG) (MDEQ 2002).
[d] USEPA Tapwater Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects.
[e] A constituent with a maximum concentration greater than the minimum of the MDEQ TRG or the USEPA Tapwater RSL is considered a COPC. A constituent with a maximum concentration below the screening level is not considered a COPC. A constituent with no screening level is conservatively identified as a COPC.
[f] MDEQ has indicated that the published TRG for acetophenone is incorrect and that the USEPA RSL should be used. Therefore, the MDEQ TRG is shown as "NA".
[g] The USEPA RSL for lead is equal to the drinking water action level.

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Table 4. Summary of Constituents Detected in Off-Site Hattiesburg Formation Groundwater, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]		Frequency of Detection [b] Number of Detections		Number of Samples	(%)	Detected Concentrations Minimum (µg/L)	-	Maximum (µg/L)	Location of Maximum Concentration (Sample Date)	MDEQ Groundwater Tier 1 TRG [c] (µg/L)	USEPA Tapwater Regional Screening Level [d] (µg/L)	Is Constituent a COPC? [e] (YES, no)	Rationale
Volatile Organic Compounds													
1,1-Dichloroethene		1	-	1	100	5.60E-01	-	5.60E-01	PW-RTT-01 (4/3/2012)	7.00E+00	2.80E+01	no	BSL
Benzene		1	-	1	100	7.60E-01	-	7.60E-01	PW-RTT-01 (4/3/2012)	5.00E+00	4.50E-01	**YES**	ASL
Tetrachloroethene		1	-	1	100	1.20E+01	-	1.20E+01	PW-RTT-01 (4/3/2012)	5.00E+00	4.10E+00	**YES**	ASL
trans-1,2-Dichloroethene		1	-	1	100	5.10E-01	-	5.10E-01	PW-RTT-01 (4/3/2012)	1.00E+02	3.60E+01	no	BSL
Trichloroethene		1	-	1	100	7.70E+01	-	7.70E+01	PW-RTT-01 (4/3/2012)	5.00E+00	2.80E-01	**YES**	ASL
Vinyl chloride		1	-	1	100	1.90E+00	-	1.90E+00	PW-RTT-01 (4/3/2012)	2.00E+00	1.90E-02	**YES**	ASL
Semivolatile Organic Compounds													
1,4-Dioxane		1	-	1	100	2.50E+00	-	2.50E+00	PW-RTT-01 (4/3/2012)	6.09E+00	7.80E-01	**YES**	ASL
Diethylphthalate		1	-	1	100	1.10E-01	-	1.10E-01	PW-RTT-01 (4/3/2012)	2.92E+04	1.50E+03	no	BSL
Diphenyl ether		1	-	1	100	2.50E+01	-	2.50E+01	PW-RTT-01 (4/3/2012)	NA	NA	**YES**	NSL
Dioxathion/Dioxenethion													
Dioxenethion	[f]	1	-	1	100	5.51E+00	-	5.51E+00	PW-RTT-01 (4/3/2012)	5.48E+01	NA	no	BSL
Inorganics													
Arsenic		1	-	1	100	5.00E+00	-	5.00E+00	PW-RTT-01 (4/3/2012)	5.00E+01	5.20E-02	**YES**	ASL
Barium		1	-	1	100	1.40E+02	-	1.40E+02	PW-RTT-01 (4/3/2012)	2.00E+03	3.80E+02	no	BSL
Cobalt		1	-	1	100	1.00E+00	-	1.00E+00	PW-RTT-01 (4/3/2012)	2.19E+03	6.00E-01	**YES**	ASL
Nickel	[g]	1	-	1	100	3.40E+00	-	3.40E+00	PW-RTT-01 (4/3/2012)	7.30E+02	3.90E+01	no	BSL
Sulfide		1	-	1	100	1.50E+03	-	1.50E+03	PW-RTT-01 (4/3/2012)	NA	NA	**YES**	NSL

–	Not applicable.	MDEQ	Mississippi Department of Environmental Quality.	RSL	Regional Screening Level.
ASL	Above screening level.	µg/L	Microgram per liter.	TRG	Target Remediation Goal.
BSL	Below screening level.	NA	Not available.	USEPA	United States Environmental Protection Agency.
COPC	Constituent of potential concern.	NSL	No screening level.		

[a] All constituents detected in at least one off-site groundwater sample from the Hattiesburg Formation are presented.

[b] Frequency of detection is equal to the number of detections divided by the total number of samples analyzed. For duplicate samples, the highest detected value or the lowest detection limit was selected.

[c] MDEQ Tier 1 Target Remediation Goal (TRG) (MDEQ 2002).

[d] USEPA Tapwater Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects.

[e] A constituent with a maximum concentration greater than the minimum of USEPA Tapwater RSL or the MDEQ TRG is considered a COPC. A constituent with a maximum concentration below the screening level is not considered a COPC. A constituent with no screening level is conservatively identified as a COPC.

[f] The MDEQ TRG for dioxathion is used as a surrogate.

[g] The USEPA RSL for nickel is the USEPA RSL for nickel soluble salts.

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Table 5. Summary of Constituents Detected in On-Site Catahoula Formation Groundwater, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]	Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Date)	MDEQ Groundwater Tier 1 TRG [c]	USEPA Tapwater Regional Screening Level	Is Constituent a COPC? [e]	
	Number of Detections		Number of Samples	(%)	Minimum (µg/L)	-	Maximum (µg/L)	Minimum (µg/L)	-	Maximum (µg/L)		(µg/L)	(µg/L)	(YES, no)	Rationale
Volatile Organic Compounds															
Ethylbenzene	1	-	2	50	1.00E+00	-	1.00E+00	4.30E-01	-	4.30E-01	PW-HI-03 (3/15/2012)	7.00E+02	1.50E+00	no	BSL
Toluene	1	-	2	50	1.00E+00	-	1.00E+00	1.20E+00	-	1.20E+00	PW-HI-03 (3/15/2012)	1.00E+03	1.10E+02	no	BSL
Xylenes (total)	1	-	2	50	2.00E+00	-	2.00E+00	2.50E+00	-	2.50E+00	PW-HI-03 (3/15/2012)	1.00E+04	1.90E+01	no	BSL
Dioxins and Furans															
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	1	-	2	50	9.50E-05	-	9.50E-05	4.90E-06	-	4.90E-06	PW-HI-01 (3/13/2012)	4.46E-04	NA	no	BSL
Inorganics															
Arsenic	1	-	2	50	2.50E+00	-	2.50E+00	2.40E+00	-	2.40E+00	PW-HI-01 (3/13/2012)	5.00E+01	5.20E-02	**YES**	ASL
Barium	2	-	2	100	–	-	–	4.90E+01	-	8.70E+01	PW-HI-01 (3/13/2012)	2.00E+03	3.80E+02	no	BSL
Copper	1	-	2	50	5.00E+00	-	5.00E+00	3.10E+00	-	3.10E+00	PW-HI-01 (3/13/2012)	1.30E+03	8.00E+01	no	BSL
Lead [f]	1	-	2	50	1.50E+00	-	1.50E+00	8.90E-01	-	8.90E-01	PW-HI-01 (3/13/2012)	1.50E+01	1.50E+01	no	BSL

–	Not applicable.	COPC	Constituent of potential concern.	RSL	Regional Screening Level.
ASL	Above screening level.	MDEQ	Mississippi Department of Environmental Quality.	TRG	Target Remediation Goal.
BSL	Below screening level.	µg/L	Microgram per liter.	USEPA	United States Environmental Protection Agency.

[a] All constituents detected in at least one on-site groundwater sample from the Catahoula Formation are presented.
[b] Frequency of detection is equal to the number of detections divided by the total number of samples analyzed. For duplicate samples, the highest detected value or the lowest detection limit was selected.
[c] MDEQ Tier 1 Target Remediation Goal (TRG) (MDEQ 2002).
[d] USEPA Tapwater Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects.
[e] A constituent with a maximum concentration greater than the minimum of the MDEQ TRG or the USEPA Tapwater RSL is considered a COPC. A constituent with a maximum concentration below the screening level is not considered a COPC.
[f] The USEPA RSL for lead is equal to the drinking water action level.

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Table 6. Summary of Constituents Detected in Off-Site Catahoula Formation Groundwater, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]	Frequency of Detection [b]			Detection Limits		Detected Concentrations		Location of Maximum Concentration (Sample Date)	Exposure Point Concentration [x]	MDEQ Groundwater Tier 1 TRG [c]	USEPA Tapwater Regional Screening Level [d]	Is Constituent a COPC? [e]	
	Number of Detections	Number of Samples	(%)	Minimum (µg/L)	Maximum (µg/L)	Minimum (µg/L)	Maximum (µg/L)			(µg/L)	(µg/L)	(YES, no)	Rationale
Volatile Organic Compounds													
Xylenes (total)	1	2	50	2.00E+00	2.00E+00	6.20E-01	6.20E-01	PW-ZC-02 (2/28/2012)	m	1.00E+04	1.90E+01	no	BSL
Semivolatile Organic Compounds													
1,1'-Biphenyl	1	2	50	1.00E+00	1.00E+00	9.90E-02	9.90E-02	PW-ZC-01 (2/28/2012)	m	3.04E+02	8.30E-02	**YES**	ASL
Acetophenone [f]	1	2	50	9.60E-01	9.60E-01	1.50E-01	1.50E-01	PW-ZC-02 (2/28/2012)	m	NA	1.90E+02	no	BSL
Inorganics													
Barium	2	2	100	–	–	5.30E+01	5.60E+01	PW-ZC-01 (2/28/2012)	m	2.00E+03	3.80E+02	no	BSL
Sulfide	2	2	100	–	–	1.10E+03	1.60E+03	PW-ZC-01 (2/28/2012)	m	NA	NA	**YES**	NSL

ASL	Above screening level.	µg/L	Microgram per liter.
BSL	Below screening level.	NA	Not available.
COPC	Constituent of potential concern.	NSL	No screening level.
MDEQ	Mississippi Department of Environmental Quality.	RSL	Regional Screening Level.
TRG	Target Remediation Goal.		
USEPA	United States Environmental Protection Agency.		

[a] All constituents detected in at least one off-site groundwater sample from the Catahoula Formation are presented.

[b] Frequency of detection is equal to the number of detections divided by the total number of samples analyzed. For duplicate samples, the highest detected value or the lowest detection limit was selected.

[c] MDEQ Tier 1 Target Remediation Goal (TRG) (MDEQ 2002).

[d] USEPA Tapwater Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects.

[e] A constituent with a maximum concentration greater than the minimum of the MDEQ TRG or the USEPA Tapwater RSL is considered a COPC. A constituent with a maximum concentration below the screening level is not considered a COPC. A constituent with no screening level is conservatively identified as a COPC.

[f] MDEQ has indicated that the published TRG for acetophenone is incorrect and that the USEPA RSL should be used. Therefore, the MDEQ TRG is shown as "NA".

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Table 7. Surface Water and Sediment Sample Location Rationale, Phase I and Phase II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Sample Location	Area	Sampling Conducted (Phase)	Relationship of Flow Direction to Origination on Hercules	Rationale
AO-SW-01	Drainage A	I	Upgradient	Water flowing onto Hercules property from Greens Creek.
AO-SD-01				
AO-SW-02	Drainage A	I	Upgradient	Water flowing onto Hercules property from Greens Creek.
AO-SD-02				
AO-SW-03	Drainage A	I	Upgradient	Water flowing onto Hercules property from Greens Creek.
AO-SD-03				
AO-SW-04	Drainage A	I	Upgradient	Water flowing onto Hercules property from Greens Creek.
AO-SD-04				
AO-SW-05	Drainage A	I	Upgradient	Water flowing onto Hercules property from Greens Creek.
AO-SD-05				
AO-SW-06	Drainage A	I	Downgradient	Greens Creek water flowing to Bouie River from Hercules.
AO-SD-06				
AO-SW-07	Drainage A	I	Downgradient	Greens Creek water flowing to Bouie River from Hercules property.
AO-SD-07				
AO-SW-08[(1)]	Drainage A	I	Downgradient	Greens Creek water flowing to Bouie River from Hercules property.
AO-SD-08[(2)]				
AO-SW-09	Drainage A	I	Downgradient	Greens Creek water flowing to Bouie River from Hercules property.
AO-SD-09				

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Table 7. Surface Water and Sediment Sample Location Rationale, Phase I and Phase II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Sample Location	Area	Sampling Conducted (Phase)	Relationship of Flow Direction to Origination on Hercules	Rationale
AO-SW-10	Drainage A	I	Downgradient	Greens Creek water flowing to Bouie River from Hercules property.
AO-SD-10				
AO-SW-11	Drainage B	I	Downgradient	Water flowing offsite from Hercules property toward Bouie River.
AO-SD-11[3]				
AO-SW-12	Drainage B	I	Downgradient	Water flowing offsite from Hercules property toward Bouie River.
AO-SD-12				
AO-SW-13	Drainage B	I	Downgradient	Water flowing offsite from Hercules property toward Bouie River.
AO-SD-13				
AO-SW-14	Drainage B	I	Downgradient	Water flowing offsite from Hercules property toward Bouie River.
AO-SD-14				
AO-SW-15	Drainage C	I	Downgradient	Water flowing from Drainage C to Bouie River.
AO-SD-15				
AO-SW-16	Drainage C	I	Downgradient	Water flowing from Drainage C to Bouie River.
AO-SD-16				
AO-SW-17	Sludge Pits	II	Upgradient	Water flowing onto Hercules property from residential/commercial area.
AO-SD-17				
AO-SW-18[4]	Sludge Pits	II	Upgradient	Water flowing onto Hercules property from residential/commercial area.
AO-SD-18				

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Table 7. Surface Water and Sediment Sample Location Rationale, Phase I and Phase II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Sample Location	Area	Sampling Conducted (Phase)	Relationship of Flow Direction to Origination on Hercules	Rationale
AO-SW-19[4]	Sludge Pits	II	Downgradient	Water discharging to Greens Creek after flowing through Hercules property.
AO-SD-19				
AO-SW-20	Surface Water Drainage into Greens Creek	II	Downgradient	Water discharging to Greens Creek after flowing through Hercules property.
AO-SD-20				
AO-SW-21	Surface Water Drainage into Greens Creek	II	Downgradient	Water discharging to Greens Creek after flowing through Hercules property.
AO-SD-21				
AO-SW-22[4]	Surface Water Drainage into Greens Creek	II	Downgradient	Water discharging to Greens Creek after flowing through Hercules property.
AO-SD-22				
AO-SW-23	Surface Water Drainage into Greens Creek	II	Downgradient	Water discharging to Greens Creek after flowing through Hercules property.
AO-SD-23				
AO-SW-24	Surface Water Drainage to off-site Conveyance Leading to the Bouie River	II	Downgradient	Water discharging off site after flowing through Hercules property.
AO-SD-24				
AO-SW-25	Near Zeon Chemical	II	Upgradient	Water flowing onto Hercules property from Zeon Chemical.
AO-SD-25				
AO-SW-26	Near Cemetery	II	Upgradient	Water flowing onto Hercules property from the cemetery.
AO-SD-26				
AO-SW-27	From Tall Oil Plant	II	Downgradient	Water discharging to Greens Creek after flowing through Hercules property.
AO-SD-27				
AO-SW-28[4]	From Tall Oil Plant	II	Downgradient	Water discharging to Greens Creek after flowing through Hercules property.
AO-SD-28				

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Table 7. Surface Water and Sediment Sample Location Rationale, Phase I and Phase II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Sample Location	Area	Sampling Conducted (Phase)	Relationship of Flow Direction to Origination on Hercules	Rationale
AO-SW-29	Near Cemetery	II	Upgradient	Water flowing onto Hercules property from the cemetery.
AO-SD-29				
AO-SW-30	Former Process Areas	II	Downgradient	Water discharging to City culvert.
AO-SD-30				
AO-SW-31	Near Providence Street	II	Downgradient	Water discharging to City culvert after flowing through Hercules property.
AO-SD-31				
AO-SW-32	Former Process Areas	II	Upgradient	Water flowing through Hercules property prior to discharging to City culvert.
AO-SD-32				
AO-SW-33	Former Process Areas	II	Upgradient	Water flowing through Hercules property prior to discharging to City culvert.
AO-SD-33				
AO-SW-34[4]	Near W. 7th Street	II	Upgradient	Water flowing onto Hercules property from the cemetery.
AO-SD-34				
AO-SW-35	Near W. 7th Street	II	Downgradient	Water flowing through Hercules property prior to discharging to City culvert.
AO-SD-35[5]				
AO-SW-36	Former Process Areas	II	Upgradient	Water flowing through Hercules property prior to discharging to City culvert.
AO-SD-36[6]				
AO-SW-37	Near Former Field Storage	II	Upgradient	Water flowing through Hercules property prior to discharging to City culvert.
AO-SD-37[6]				
AO-SS-01[7]	Drainage C	I	Downgradient	Surface soil sample over culverted storm water drain.
AO-SS-02	Drainage C	I	Downgradient	Surface soil sample over culverted storm water drain.
AO-SS-03	Drainage C	I	Downgradient	Surface soil sample over culverted storm water drain.

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Table 7. Surface Water and Sediment Sample Location Rationale, Phase I and Phase II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Sample Location	Area	Sampling Conducted (Phase)	Relationship of Flow Direction to Origination on Hercules	Rationale
AO-SS-04	Drainage C	I	Downgradient	Surface soil sample over culverted storm water drain.
AO-SS-05	Drainage C	I	Downgradient	Surface soil sample over culverted storm water drain.
AO-SS-06	Drainage C	I	Downgradient	Surface soil sample over culverted storm water drain.
AO-SS-07	Drainage C	I	Downgradient	Surface soil sample over culverted storm water drain.
AO-SS-08	Drainage C	I	Downgradient	Surface soil sample over culverted storm water drain.
CM-00[8]	Drainage A	II	Upgradient	Surface water sampling in Greens Creek.
CM-01	Drainage A	II	Through Property	Surface water and sediment sampling in Greens Creek.
CM-02	Drainage A	II	Through Property	Surface water and sediment sampling in Greens Creek.
CM-03	Drainage A	II	Through Property	Surface water and sediment sampling in Greens Creek.
CM-04	Drainage A	II	Through Property	Surface water and sediment sampling in Greens Creek.
CM-05[9]	Drainage A	II	Downgradient	Surface water sampling in Greens Creek.

(1) Sample not collected due to limited acess.
(2) Sample not collected due to limited acess to location.
(3) Sample not collected because a pipe was located there.
(4) Sample not collected due to lack of surface water.
(5) Location eleminated by MDEQ.
(6) Sample not collected due to lack of sediment.
(7) Sample not collected because actual surface water and sediment samples were collected.
(8) Samples collected at this location were named AO-SW-05 and AO-SD-05.
(9) Sampled collected were named AO-SW-06 and AO-SD-06.

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Table 8. Summary of Constituents Detected in On-Site Surface Water, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]		Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Date)	National Recommended Water Quality Criteria [c]	USEPA Tapwater Regional Screening Level [d]	Is Constituent a COPC? [e]	
		Number of Detections		Number of Samples	(%)	Minimum (µg/L)	-	Maximum (µg/L)	Minimum (µg/L)	-	Maximum (µg/L)		(µg/L)	(µg/L)	(YES, no)	Rationale
Volatile Organic Compounds																
Acetone		3	-	16	19	2.50E+01	-	2.50E+01	8.60E+00	-	2.10E+01	SW-AO-SW-24 (11/8/2012)	NA	1.40E+03	no	BSL
Acetonitrile		1	-	16	6	4.00E+01	-	4.00E+01	2.00E+01	-	2.00E+01	SW-AO-SW-24 (11/8/2012)	NA	1.30E+01	**YES**	ASL
Benzene		1	-	16	6	1.00E+00	-	1.00E+00	6.50E-01	-	6.50E-01	SW-AO-SW-36 (11/16/2012)	2.20E+00	4.50E-01	no	BSL
Bromodichloromethane		1	-	16	6	1.00E+00	-	1.00E+00	2.80E+00	-	2.80E+00	SW-AO-SW-35 (11/7/2012)	5.50E-01	1.30E-01	**YES**	ASL
Bromoform		1	-	16	6	1.00E+00	-	1.00E+00	5.40E-01	-	5.40E-01	SW-AO-SW-35 (11/7/2012)	4.30E+00	9.20E+00	no	BSL
Chloroform		1	-	16	6	1.00E+00	-	1.00E+00	3.70E+00	-	3.70E+00	SW-AO-SW-35 (11/7/2012)	5.70E+00	2.20E-01	no	BSL
Dibromochloromethane		1	-	16	6	1.00E+00	-	1.00E+00	1.70E+00	-	1.70E+00	SW-AO-SW-35 (11/7/2012)	4.00E-01	1.70E-01	**YES**	ASL
Tetrachloroethene		1	-	16	6	1.00E+00	-	1.00E+00	1.70E-01	-	1.70E-01	SW-AO-SW-24 (11/8/2012)	6.90E-01	4.10E+00	no	BSL
Toluene	[f]	3	-	16	19	1.00E+00	-	1.00E+00	4.20E-01	-	5.80E+00	SW-AO-SW-36 (11/16/2012)	1.30E+03	1.10E+02	no	BSL
Semivolatile Organic Compounds																
1,4-Dioxane		10	-	16	63	1.90E+00	-	9.70E+00	6.90E-01	-	4.40E+01	SW-AO-SW-24 (11/8/2012)	NA	7.80E-01	**YES**	ASL
Acenaphthene		1	-	16	6	1.90E-01	-	1.90E+00	1.20E-01	-	1.20E-01	SW-AO-SW-26 (11/13/2012)	6.70E+02	5.30E+01	no	BSL
Acetophenone		8	-	16	50	9.60E-01	-	9.70E+00	1.50E-01	-	4.10E-01	SW-AO-SW-31 (11/7/2012)	NA	1.90E+02	no	BSL
Benz(a)anthracene		0	-	16	0	1.90E-01	-	1.90E+00	–	-	–	–	3.80E-03	3.40E-02	**YES**	cPAH
Benzo(a)pyrene		0	-	16	0	1.90E-01	-	1.90E+00	–	-	–	–	3.80E-03	3.40E-03	**YES**	cPAH
Benzo(b)fluoranthene		0	-	16	0	1.90E-01	-	1.90E+00	–	-	–	–	3.80E-03	3.40E-02	**YES**	cPAH
Benzo(k)fluoranthene		0	-	16	0	1.90E-01	-	1.90E+00	–	-	–	–	3.80E-03	3.40E-01	**YES**	cPAH
Benzyl alcohol		7	-	16	44	9.50E-01	-	9.70E+00	1.40E-01	-	4.10E+00	SW-AO-SW-17 (11/14/2012)	NA	2.00E+02	no	BSL
Bis(2-ethylhexyl)phthalate		5	-	16	31	1.90E+00	-	1.90E+01	6.40E-01	-	1.20E+00	SW-AO-SW-26 (11/13/2012)	1.20E+00	5.60E+00	no	BSL
Butylbenzylphthalate		4	-	16	25	9.50E-01	-	9.70E+00	1.20E-01	-	1.50E-01	SW-AO-SW-32 (11/12/2012)	1.50E+03	1.60E+01	no	BSL
Chrysene		1	-	16	6	1.90E-01	-	1.90E+00	4.60E-02	-	4.60E-02	SW-AO-SW-26 (11/13/2012)	3.80E-03	3.40E+00	**YES**	ASL
Dibenz(a,h)anthracene		0	-	16	0	1.90E-01	-	1.90E+00	–	-	–	–	3.80E-03	3.40E-03	**YES**	cPAH
Diethylphthalate		2	-	16	13	9.50E-01	-	9.70E+00	1.50E-01	-	2.00E-01	SW-AO-SW-26 (11/13/2012)	1.70E+04	1.50E+03	no	BSL
Di-n-butylphthalate		1	-	16	6	9.50E-01	-	9.70E+00	6.40E-01	-	6.40E-01	SW-AO-SW-30 (11/8/2012)	2.00E+03	9.00E+01	no	BSL
Diphenyl ether		4	-	16	25	9.50E-01	-	9.70E+00	1.40E-01	-	2.90E+00	SW-AO-SW-24 (11/8/2012)	NA	NA	**YES**	NSL
Fluoranthene		1	-	16	6	1.90E-01	-	1.90E+00	1.70E-01	-	1.70E-01	SW-AO-SW-26 (11/13/2012)	1.30E+02	8.00E+01	no	BSL
Indeno(1,2,3-cd)pyrene		0	-	16	0	1.90E-01	-	1.90E+00	–	-	–	–	3.80E-03	3.40E-02	**YES**	cPAH
o,o,o-Triethylphosphorothioate		6	-	16	38	9.50E-01	-	9.70E+00	1.10E+00	-	2.20E+01	SW-AO-SW-36 (11/16/2012)	NA	NA	**YES**	NSL
Pyrene		1	-	16	6	1.90E-01	-	1.90E+00	1.10E-01	-	1.10E-01	SW-AO-SW-26 (11/13/2012)	8.30E+02	1.20E+01	no	BSL
Dioxathion/Dioxenethion																
cis-Dioxathion	[g]	4	-	16	25	1.02E+01	-	1.09E+01	2.48E+00	-	1.93E+01	SW-AO-SW-30 (11/8/2012)	5.48E+01	NA	no	BSL
Dioxenethion	[g]	3	-	16	19	1.01E+01	-	1.09E+01	3.16E+00	-	1.43E+01	SW-AO-SW-37 (11/16/2012)	5.48E+01	NA	no	BSL
Dioxins and Furans																
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	[h]	5	-	6	83	4.90E-05	-	4.90E-05	9.70E-07	-	4.50E-06	SW-AO-SW-21 (11/9/2012)	NA	6.00E-05	no	BSL
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	[h]	3	-	6	50	4.70E-05	-	4.70E-05	4.40E-07	-	7.60E-07	SW-AO-SW-21 (11/9/2012)	NA	6.00E-05	no	BSL
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	[h]	1	-	6	17	4.70E-05	-	4.90E-05	5.40E-07	-	5.40E-07	SW-AO-SW-23 (11/7/2012)	NA	6.00E-06	no	BSL
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	[h]	1	-	6	17	4.70E-05	-	4.90E-05	2.50E-07	-	2.50E-07	SW-AO-SW-36 (11/16/2012)	NA	6.00E-07	no	BSL
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	[h]	6	-	6	100	–	-	–	5.00E-07	-	1.80E-06	SW-AO-SW-21 (11/9/2012)	NA	2.00E-03	no	BSL
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	[h]	6	-	6	100	–	-	–	4.40E-06	-	4.20E-05	SW-AO-SW-21 (11/9/2012)	NA	2.00E-03	no	BSL

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Table 8. Summary of Constituents Detected in On-Site Surface Water, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]		Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Date)	National Recommended Water Quality Criteria [c]	USEPA Tapwater Regional Screening Level [d]	Is Constituent a COPC? [e]	
		Number of Detections		Number of Samples	(%)	Minimum (µg/L)		Maximum (µg/L)	Minimum (µg/L)		Maximum (µg/L)		(µg/L)	(µg/L)	(YES, no)	Rationale
Inorganics																
Arsenic		9	-	16	56	2.50E+00	-	2.50E+00	1.60E+00	-	3.50E+00	SW-AO-SW-24 (11/8/2012)	1.80E-02	5.20E-02	**YES**	ASL
Barium		15	-	16	94	4.60E+01	-	4.60E+01	3.00E+00	-	4.50E+02	SW-AO-SW-24 (11/8/2012)	1.00E+03	3.80E+02	no	BSL
Beryllium	[i]	1	-	16	6	5.00E-01	-	5.00E-01	7.50E-01	-	7.50E-01	SW-AO-SW-29 (11/12/2012)	4.00E+00	2.50E+00	no	BSL
Cadmium	[j]	3	-	16	19	5.00E-01	-	5.00E-01	1.50E-01	-	3.90E-01	SW-AO-SW-32 (11/12/2012)	5.00E+00	9.20E-01	no	BSL
Cobalt		15	-	16	94	5.00E-01	-	5.00E-01	3.00E-01	-	7.40E+00	SW-AO-SW-36 (11/16/2012)	NA	6.00E-01	**YES**	ASL
Copper	[k]	8	-	16	50	5.00E+00	-	1.70E+01	1.30E+00	-	1.80E+01	SW-AO-SW-17 (11/14/2012)	1.30E+03	8.00E+01	no	BSL
Lead	[l]	11	-	16	69	1.50E+00	-	1.50E+00	5.10E-01	-	5.20E+00	SW-AO-SW-29 (11/12/2012), SW-AO-SW-30 (11/8/2012)	NA	1.50E+01	no	BSL
Mercury	[m]	1	-	16	6	2.00E-01	-	2.00E-01	1.00E-01	-	1.00E-01	SW-AO-SW-30 (11/8/2012)	NA	6.30E-02	**YES**	ASL
Nickel		13	-	16	81	5.00E+00	-	5.00E+00	2.00E+00	-	3.00E+01	SW-AO-SW-29 (11/12/2012)	6.10E+02	3.90E+01	no	BSL
Vanadium	[n]	1	-	16	6	1.00E+01	-	1.00E+01	3.90E+00	-	3.90E+00	SW-AO-SW-17 (11/14/2012)	NA	8.60E+00	no	BSL
Zinc		12	-	16	75	2.00E+01	-	2.00E+01	9.00E+00	-	2.20E+02	SW-AO-SW-32 (11/12/2012)	7.40E+03	6.00E+02	no	BSL

–	Not applicable.	cPAH	Carcinogenic Polycyclic Aromatic Hydrocarbon.	RSL	Regional Screening Level.
ASL	Above screening level.	µg/L	Microgram per liter.	USEPA	United States Environmental Protection Agency.
BSL	Below screening level.	NA	Not available.		
COPC	Constituent of potential concern.	NSL	No screening level.		

[a] All constituents detected in at least one on-site surface water sample are presented.
[b] Frequency of detection is equal to the number of detections divided by the total number of samples analyzed. For duplicate samples, the highest detected value or the lowest detection limit was selected.
[c] National Recommended Water Quality Criterion for protection of human health based on consumption of water and organisms (USEPA 2014b).
[d] USEPA Tapwater Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects.
[e] A constituent with a maximum concentration greater than the National Recommended Water Quality Criterion (NRWQC) or the USEPA Tapwater RSL, if no NRWQC is available, is considered a COPC. A constituent with a maximum concentration below the applicable screening level is not considered a COPC. A constituent with no screening levels is conservatively identified as a COPC.
[f] National Recommended Water Quality Criterion for toluene is equal to the Maximum Contaminant Level (USEPA 2014b).
[g] No National Recommended Water Quality Criterion or USEPA Tapwater RSL available. The value shown is the Mississippi Department of Environmental Quality Groundwater Tier 1 Target Remediation Goal for cis-dioxathion.
[h] The toxicity equivalence factor (TEF) (WHO 2005) has been applied to the USEPA Tapwater RSL for 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) to derive dioxin and furan congener-specific screening levels.
[i] National Recommended Water Quality Criterion for beryllium is equal to the Maximum Contaminant Level (USEPA 2014b).
[j] National Recommended Water Quality Criterion for cadmium is equal to the Maximum Contaminant Level (USEPA 2014b).
[k] National Recommended Water Quality Criterion for copper is based on organoleptic effects (USEPA 2014b).
[l] The USEPA RSL for lead is equal to the drinking water action level.
[m] The USEPA RSL for mercury is conservatively assumed to be elemental mercury.
[n] The USEPA RSL for vanadium is for vanadium and compounds.

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Table 9. Summary of Constituents Detected in Off-Site Surface Water, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]		Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Date)	National Recommended Water Quality	USEPA Tapwater Regional Screening Level [d]	Is Constituent a COPC? [e]	
		Number of Detections		Number of Samples	(%)	Minimum (µg/L)	-	Maximum (µg/L)	Minimum (µg/L)	-	Maximum (µg/L)		(µg/L)	(µg/L)	(YES, no)	Rationale
Volatile Organic Compounds																
1,4-Dioxane	[f]	2	-	15	13	5.00E+01	-	5.00E+01	5.90E+01	-	6.90E+01	SW-AO-SW-07 (3/14/2012)	NA	7.80E-01	**YES**	ASL
2-Butanone		3	-	43	7	1.00E+01	-	1.00E+01	2.00E+00	-	5.90E+00	CM-05 (6/14/2013)	NA	5.60E+02	no	BSL
4-Methyl-2-pentanone		1	-	43	2	1.00E+01	-	1.00E+01	2.30E+00	-	2.30E+00	SW-AO-SW-15 (3/13/2012)	NA	1.20E+02	no	BSL
Acetone		10	-	43	23	2.50E+01	-	2.50E+01	7.70E+00	-	3.00E+01	SW-AO-CM-01 (11/9/2012)	NA	1.40E+03	no	BSL
Benzene		9	-	43	21	1.00E+00	-	1.00E+00	3.00E-01	-	1.40E+01	SW-AO-SW-15 (3/13/2012)	2.20E+00	4.50E-01	**YES**	ASL
Carbon disulfide		1	-	43	2	2.00E+00	-	2.00E+00	3.00E+00	-	3.00E+00	SW-AO-SW-15 (3/13/2012)	NA	8.10E+01	no	BSL
Carbon tetrachloride		1	-	43	2	1.00E+00	-	1.00E+00	6.30E+01	-	6.30E+01	SW-AO-SW-15 (3/13/2012)	2.30E-01	4.50E-01	**YES**	ASL
Chlorobenzene	[g]	1	-	43	2	1.00E+00	-	1.00E+00	4.90E-01	-	4.90E-01	SW-AO-SW-15 (3/13/2012)	1.30E+02	7.80E+00	no	BSL
Chloroform		13	-	43	30	1.40E-01	-	1.00E+00	1.80E-01	-	3.00E+01	SW-AO-SW-15 (3/13/2012)	5.70E+00	2.20E-01	**YES**	ASL
Tetrachloroethene		1	-	43	2	1.00E+00	-	1.00E+00	1.60E-01	-	1.60E-01	SW-AO-SW-12 (3/13/2012)	6.90E-01	4.10E+00	no	BSL
Toluene	[h]	3	-	43	7	1.00E+00	-	1.00E+00	9.40E-01	-	2.70E+01	CM-02 (12/3/2013)	1.30E+03	1.10E+02	no	BSL
Trichloroethene		1	-	43	2	1.00E+00	-	1.00E+00	4.10E-01	-	4.10E-01	SW-AO-SW-12 (3/13/2012)	2.50E+00	2.80E-01	no	BSL
Vinyl chloride		1	-	43	2	1.00E+00	-	1.00E+00	2.00E-01	-	2.00E-01	SW-AO-SW-12 (3/13/2012)	2.50E-02	1.90E-02	**YES**	ASL
Semivolatile Organic Compounds																
1,1'-Biphenyl		5	-	25	20	9.50E-01	-	9.80E+00	9.90E-02	-	2.90E+00	SW-AO-SW-11 (3/13/2012)	NA	8.30E-02	**YES**	ASL
1,4-Dichlorobenzene		1	-	31	3	9.50E-01	-	9.80E+00	1.90E-01	-	1.90E-01	SW-AO-SW-16 (3/12/2012)	6.30E+01	4.80E-01	no	BSL
1,4-Dioxane	[f]	19	-	31	61	1.90E+00	-	4.00E+00	3.10E-01	-	9.20E+01	CM-05 (12/3/2013)	NA	7.80E-01	**YES**	ASL
3-Nitroaniline		1	-	31	3	4.70E+00	-	4.80E+01	3.30E+00	-	3.30E+00	CM-05(RESAMPLE) (5/22/2014)	NA	NA	**YES**	NSL
4,6-Dinitro-2-methylphenol		1	-	31	3	4.70E+00	-	4.90E+01	1.40E-01	-	1.40E-01	SW-AO-CM-02 (11/9/2012)	1.30E+01	1.50E-01	no	BSL
Acetophenone		12	-	31	39	9.50E-01	-	9.80E+00	1.00E-01	-	3.10E-01	SW-AO-SW-11 (3/13/2012)	NA	1.90E+02	no	BSL
Benzyl alcohol		4	-	31	13	9.40E-01	-	9.80E+00	1.40E-01	-	2.30E-01	SW-AO-CM-03 (11/8/2012)	NA	2.00E+02	no	BSL
Bis(2-chloro-1-methylethyl)ether		1	-	31	3	9.40E-01	-	9.80E+00	2.70E-01	-	2.70E-01	SW-AO-SW-15 (3/13/2012)	1.40E+03	3.60E-01	no	BSL
Bis(2-ethylhexyl)phthalate		11	-	31	36	1.90E+00	-	2.00E+01	6.10E-01	-	7.70E+00	CM-00 (5/22/2014)	1.20E+00	5.60E+00	**YES**	ASL
Butylbenzylphthalate		5	-	31	16	9.40E-01	-	9.80E+00	1.20E-01	-	1.40E-01	SW-AO-SW-03 (3/20/2012)	1.50E+03	1.60E+01	no	BSL
Diethylphthalate		10	-	31	32	9.50E-01	-	9.80E+00	1.10E-01	-	3.60E-01	SW-AO-SW-02 (3/20/2012)	1.70E+04	1.50E+03	no	BSL
Di-n-octylphthalate		2	-	31	6	9.40E-01	-	9.80E+00	4.20E-01	-	4.20E-01	M-00 (12/3/2013),CM-01 (12/3/2013)	NA	2.00E+01	no	BSL
Diphenyl ether		8	-	25	32	9.50E-01	-	9.80E+00	1.10E-01	-	1.00E+02	SW-AO-SW-11 (3/13/2012)	NA	NA	**YES**	NSL
Naphthalene		1	-	31	3	1.90E-01	-	2.00E+00	3.60E-01	-	3.60E-01	SW-AO-SW-15 (3/13/2012)	NA	1.70E-01	**YES**	ASL
o,o,o-Triethylphosphorothioate		10	-	31	32	9.40E-01	-	2.00E+00	5.00E-01	-	2.20E+00	CM-05(RESAMPLE) (5/22/2014), SW-AO-SW-07 (3/14/2012)	NA	NA	**YES**	NSL
Phenol		2	-	31	6	9.40E-01	-	9.80E+00	2.60E+00	-	5.90E+00	SW-AO-SW-15 (3/13/2012)	1.00E+04	5.80E+02	no	BSL
Herbicides																
Pentachlorophenol		1	-	5	20	2.40E-01	-	2.40E-01	6.30E-02	-	6.30E-02	SW-AO-SW-02 (3/20/2012)	2.70E-01	4.00E-02	no	BSL
Dioxathion/Dioxenethion																
Dioxenethion	[i]	1	-	7	14	5.00E-01	-	1.09E+01	5.82E-01	-	5.82E-01	SW-AO-SW-06 (3/15/2012)	5.48E+01	NA	no	BSL
Dioxins and Furans																
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	[j]	4	-	5	80	4.80E-05	-	4.80E-05	1.50E-06	-	3.10E-06	SW-AO-SW-01 (3/20/2012)	NA	6.00E-05	no	BSL
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	[j]	5	-	5	100	–	-	–	2.60E-05	-	6.60E-05	SW-AO-SW-05 (3/16/2012)	NA	2.00E-03	no	BSL

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Table 9. Summary of Constituents Detected in Off-Site Surface Water, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]		Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Date)	National Recommended Water Quality	USEPA Tapwater Regional Screening Level [d]	Is Constituent a COPC? [e]	
		Number of Detections		Number of Samples	(%)	Minimum (µg/L)	-	Maximum (µg/L)	Minimum (µg/L)	-	Maximum (µg/L)		(µg/L)	(µg/L)	(YES, no)	Rationale
Inorganics																
Arsenic		18	-	19	95	2.50E+00	-	2.50E+00	1.40E+00	-	2.40E+00	SW-AO-SW-11 (3/13/2012)	1.80E-02	5.20E-02	**YES**	ASL
Barium		19	-	19	100	–	-	–	3.50E+01	-	9.90E+01	SW-AO-SW-07 (3/14/2012), SW-AO-SW-09 (3/14/2012)	1.00E+03	3.80E+02	no	BSL
Beryllium	[k]	1	-	19	5	5.00E-01	-	5.00E-01	1.50E-01	-	1.50E-01	SW-AO-SW-02 (3/20/2012)	4.00E+00	2.50E+00	no	BSL
Chromium	[l]	1	-	19	5	5.00E+00	-	5.00E+00	2.50E+00	-	2.50E+00	SW-AO-SW-10 (3/14/2012)	1.00E+02	2.20E+03	no	BSL
Cobalt		19	-	19	100	–	-	–	3.40E-01	-	5.00E+00	SW-AO-SW-15 (3/13/2012)	NA	6.00E-01	**YES**	ASL
Copper	[m]	13	-	19	68	5.00E+00	-	5.00E+00	1.50E+00	-	6.40E+00	SW-AO-SW-09 (3/14/2012)	1.30E+03	8.00E+01	no	BSL
Lead	[n]	8	-	19	42	1.50E+00	-	1.50E+00	5.60E-01	-	3.00E+00	SW-AO-SW-16 (3/12/2012)	NA	1.50E+01	no	BSL
Nickel	[o]	15	-	19	79	5.00E+00	-	5.00E+00	2.00E+00	-	2.30E+01	SW-AO-SW-15 (3/13/2012)	6.10E+02	3.90E+01	no	BSL
Silver		1	-	19	5	1.00E+00	-	1.00E+00	3.60E-01	-	3.60E-01	SW-AO-SW-01 (3/20/2012)	NA	9.40E+00	no	BSL
Thallium		1	-	19	5	1.00E+00	-	1.00E+00	2.60E-01	-	2.60E-01	SW-AO-SW-04 (3/20/2012)	2.40E-01	2.00E-02	**YES**	ASL
Zinc		15	-	19	79	2.00E+01	-	2.00E+01	8.70E+00	-	5.50E+01	SW-AO-SW-15 (3/13/2012)	7.40E+03	6.00E+02	no	BSL
Sulfide		2	-	3	67	1.00E+03	-	1.00E+03	1.30E+03	-	1.80E+03	SW-AO-SW-05 (3/16/2012)	NA	NA	**YES**	NSL

–	Not applicable.	cPAH	Carcinogenic Polycyclic Aromatic Hydrocarbon.	RSL	Regional Screening Level.
ASL	Above screening level.	µg/L	Microgram per Liter.	USEPA	United States Environmental Protection Agency.
BSL	Below screening level.	NA	Not available.		
COPC	Constituent of potential concern.	NSL	No screening level.		

[a] All constituents detected in at least one off-site surface water sample are presented.
[b] Frequency of detection is equal to the number of detections divided by the total number of samples analyzed. For duplicate samples, the highest detected value or the lowest detection limit was selected.
[c] National Recommended Water Quality Criterion for protection of human health based on consumption of water and organisms (USEPA 2014b).
[d] USEPA Tapwater Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects.
[e] A constituent with a maximum concentration greater than the National Recommended Water Quality Criterion (NRWQC) or the USEPA Tapwater RSL, if no NRWQC is available, is considered a COPC. A constituent with a maximum concentration below the applicable screening level is not considered a COPC. A constituent with no screening levels is conservatively identified as a COPC.
[f] Constituent was analyzed by two different laboratory methods and was detected by both methods in at least one sample. Data summaries for both methods are provided.
[g] National Recommended Water Quality Criterion for chlorobenzene is based on organoleptic effects (USEPA 2014b).
[h] National Recommended Water Quality Criterion for toluene is equal to the Maximum Contaminant Level (USEPA 2014b).
[i] No National Recommended Water Quality Criterion or USEPA Tapwater RSL available. The value shown is the Mississippi Department of Environmental Quality Groundwater Tier 1 Target Remediation Goal for cis-dioxathion.
[j] The toxicity equivalence factor (TEF) (WHO 2005) has been applied to the USEPA Tapwater RSL for 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) to derive dioxin and furan congener-specific screening levels.
[k] National Recommended Water Quality Criterion for beryllium is equal to the Maximum Contaminant Level (USEPA 2014b).
[l] The National Recommended Water Quality Criterion for chromium is based on the Maximum Contaminant Level for total chromium (USEPA 2014b). The USEPA RSL for chromium III was used for total chromium (USEPA 2014a).
[m] National Recommended Water Quality Criterion for copper is based on organoleptic effects (USEPA 2014b).
[n] The USEPA RSL for lead is equal to the drinking water action level.
[o] The USEPA RSL for nickel is the RSL for nickel soluble salts.

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Table 10. Summary of Constituents Detected in Surface Water, Ecological Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]		Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Date)	Ecological Screening Levels [c]		Is Constituent a COPC? [d]	
		Number of Detections		Number of Samples	(%)	Minimum (µg/L)	-	Maximum (µg/L)	Minimum (µg/L)	-	Maximum (µg/L)		(µg/L)	Ref	(YES, no)	Rationale
Volatile Organic Compounds																
1,4-Dioxane	[e]	2	-	15	13	5.00E+01	-	5.00E+01	5.90E+01	-	6.90E+01	SW-AO-SW-07 (3/14/2012)	2.20E+04	(3)	no	BSL
2-Butanone		3	-	59	5	1.00E+01	-	1.00E+01	2.00E+00	-	5.90E+00	CM-05 (6/14/2013)	2.20E+03	(3)	no	BSL
4-Methyl-2-pentanone		1	-	59	2	1.00E+01	-	1.00E+01	2.30E+00	-	2.30E+00	SW-AO-SW-15 (3/13/2012)	1.70E+02	(3)	no	BSL
Acetone		13	-	59	22	2.50E+01	-	2.50E+01	7.70E+00	-	3.00E+01	SW-AO-CM-01 (11/9/2012)	1.70E+03	(3)	no	BSL
Acetonitrile		1	-	59	2	4.00E+01	-	4.00E+01	2.00E+01	-	2.00E+01	SW-AO-SW-24 (11/8/2012)	1.20E+04	(3)	no	BSL
Benzene		10	-	59	17	1.00E+00	-	1.00E+00	3.00E-01	-	1.40E+01	SW-AO-SW-15 (3/13/2012)	5.30E+01	(2)	no	BSL
Bromodichloromethane		1	-	59	2	2.50E-01	-	1.00E+00	2.80E+00	-	2.80E+00	SW-AO-SW-35 (11/7/2012)	NA		**YES**	NSL
Bromoform		1	-	59	2	1.00E+00	-	1.00E+00	5.40E-01	-	5.40E-01	SW-AO-SW-35 (11/7/2012)	2.93E+02	(2)	no	BSL
Carbon disulfide		1	-	59	2	2.00E+00	-	2.00E+00	3.00E+00	-	3.00E+00	SW-AO-SW-15 (3/13/2012)	1.50E+01	(3)	no	BSL
Carbon tetrachloride		1	-	59	2	1.00E+00	-	1.00E+00	6.30E+01	-	6.30E+01	SW-AO-SW-15 (3/13/2012)	3.52E+02	(2)	no	BSL
Chlorobenzene		1	-	59	2	1.00E+00	-	1.00E+00	4.90E-01	-	4.90E-01	SW-AO-SW-15 (3/13/2012)	1.95E+02	(2)	no	BSL
Chloroform		14	-	59	24	1.40E-01	-	1.00E+00	1.80E-01	-	3.00E+01	SW-AO-SW-15 (3/13/2012)	2.89E+02	(2)	no	BSL
Dibromochloromethane		1	-	59	2	1.00E+00	-	1.00E+00	1.70E+00	-	1.70E+00	SW-AO-SW-35 (11/7/2012)	NA		**YES**	NSL
Tetrachloroethene		2	-	59	3	1.00E+00	-	1.00E+00	1.60E-01	-	1.70E-01	SW-AO-SW-24 (11/8/2012)	8.40E+01	(2)	no	BSL
Toluene		6	-	59	10	1.00E+00	-	1.00E+00	4.20E-01	-	2.70E+01	CM-02 (12/3/2013)	1.75E+02	(2)	no	BSL
Trichloroethene		1	-	59	2	1.00E+00	-	1.00E+00	4.10E-01	-	4.10E-01	SW-AO-SW-12 (3/13/2012)	4.70E+01	(3)	no	BSL
Vinyl chloride		1	-	59	2	1.00E+00	-	1.00E+00	2.00E-01	-	2.00E-01	SW-AO-SW-12 (3/13/2012)	9.30E+02	(3)	no	BSL
Semivolatile Organic Compounds																
1,1'-Biphenyl		5	-	41	12	9.50E-01	-	9.80E+00	9.90E-02	-	2.90E+00	SW-AO-SW-11 (3/13/2012)	1.40E+01	(4)	no	BSL
1,4-Dichlorobenzene		1	-	47	2	9.50E-01	-	9.80E+00	1.90E-01	-	1.90E-01	SW-AO-SW-16 (3/12/2012)	1.12E+01	(2)	no	BSL
1,4-Dioxane	[e]	29	-	47	62	1.90E+00	-	9.70E+00	3.10E-01	-	9.20E+01	CM-05 (12/3/2013)	2.20E+04	(3)	no	BSL
3-Nitroaniline		1	-	47	2	4.70E+00	-	4.90E+01	3.30E+00	-	3.30E+00	CM-05(RESAMPLE) (5/22/2014)	NA		**YES**	NSL
4,6-Dinitro-2-methylphenol		1	-	47	2	4.70E+00	-	4.90E+01	1.40E-01	-	1.40E-01	SW-AO-CM-02 (11/9/2012)	2.30E+00	(2)	no	BSL
Acetophenone		20	-	47	43	9.50E-01	-	9.80E+00	1.00E-01	-	4.10E-01	SW-AO-SW-31 (11/7/2012)	NA		**YES**	NSL
Benzyl alcohol		11	-	47	23	9.40E-01	-	9.80E+00	1.40E-01	-	4.10E+00	SW-AO-SW-17 (11/14/2012)	8.60E+00	(3)	no	BSL
Bis(2-chloro-1-methylethyl)ether		1	-	47	2	9.40E-01	-	9.80E+00	2.70E-01	-	2.70E-01	SW-AO-SW-15 (3/13/2012)	NA		**YES**	NSL
Bis(2-ethylhexyl)phthalate		16	-	47	34	1.90E+00	-	2.00E+01	6.10E-01	-	7.70E+00	CM-00 (5/22/2014)	3.00E-01	(3)	**YES**	ASL
Butylbenzylphthalate		9	-	47	19	9.40E-01	-	9.80E+00	1.20E-01	-	1.50E-01	SW-AO-SW-32 (11/12/2012)	2.20E+01	(2)	no	BSL
Diethylphthalate		12	-	47	26	9.50E-01	-	9.80E+00	1.10E-01	-	3.60E-01	SW-AO-SW-02 (3/20/2012)	5.21E+02	(2)	no	BSL
Di-n-butylphthalate		1	-	47	2	9.40E-01	-	9.80E+00	6.40E-01	-	6.40E-01	SW-AO-SW-30 (11/8/2012)	9.70E+00	(3)	no	BSL
Di-n-octylphthalate		2	-	47	4	9.40E-01	-	9.80E+00	4.20E-01	-	4.20E-01	CM-00 (12/3/2013), CM-01 (12/3/2013)	3.00E+01	(3)	no	BSL
Diphenyl ether		12	-	41	29	9.50E-01	-	9.80E+00	1.10E-01	-	1.00E+02	SW-AO-SW-11 (3/13/2012)	NA		**YES**	NSL
o,o,o-Triethylphosphorothioate		16	-	47	34	9.40E-01	-	9.70E+00	5.00E-01	-	2.20E+01	SW-AO-SW-36 (11/16/2012)	5.82E+01	(3)	no	BSL
Phenol		2	-	47	4	9.40E-01	-	9.80E+00	2.60E+00	-	5.90E+00	SW-AO-SW-15 (3/13/2012)	1.02E+02	(1)	no	BSL
Polycyclic Aromatic Hydrocarbons																
Acenaphthene		1	-	47	2	1.90E-01	-	2.00E+00	1.20E-01	-	1.20E-01	SW-AO-SW-26 (11/13/2012)	1.70E+01	(2)	no	BSL
Chrysene		1	-	47	2	1.90E-01	-	2.00E+00	4.60E-02	-	4.60E-02	SW-AO-SW-26 (11/13/2012)	NA		**YES**	NSL
Fluoranthene		1	-	47	2	1.90E-01	-	2.00E+00	1.70E-01	-	1.70E-01	SW-AO-SW-26 (11/13/2012)	3.98E+01	(2)	no	BSL
Naphthalene		1	-	47	2	1.90E-01	-	2.00E+00	3.60E-01	-	3.60E-01	SW-AO-SW-15 (3/13/2012)	6.20E+01	(2)	no	BSL
Pyrene		1	-	47	2	1.90E-01	-	2.00E+00	1.10E-01	-	1.10E-01	SW-AO-SW-26 (11/13/2012)	3.00E-01	(3)	no	BSL

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Table 10. Summary of Constituents Detected in Surface Water, Ecological Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]	Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Date)	Ecological Screening Levels [c]		Is Constituent a COPC? [d]	
	Number of Detections		Number of Samples	(%)	Minimum (µg/L)	-	Maximum (µg/L)	Minimum (µg/L)	-	Maximum (µg/L)		(µg/L)	Ref	(YES, no)	Rationale
Herbicides															
Pentachlorophenol	1	-	5	20	2.40E-01	-	2.40E-01	6.30E-02	-	6.30E-02	SW-AO-SW-02 (3/20/2012)	6.70E+00	(1)	no	BSL
Dioxathion/Dioxenethion															
cis-Dioxathion	4	-	23	17	2.50E+00	-	1.09E+01	2.48E+00	-	1.93E+01	SW-AO-SW-30 (11/8/2012)	NA		**YES**	NSL
Dioxenethion	4	-	23	17	5.00E-01	-	1.09E+01	5.82E-01	-	1.43E+01	SW-AO-SW-37 (11/16/2012)	NA		**YES**	NSL
Dioxins and Furans															
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	9	-	11	82	4.80E-05	-	4.90E-05	9.70E-07	-	4.50E-06	SW-AO-SW-21 (11/9/2012)	NA		**YES**	NSL
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	3	-	11	27	4.70E-05	-	4.80E-05	4.40E-07	-	7.60E-07	SW-AO-SW-21 (11/9/2012)	NA		**YES**	NSL
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	1	-	11	9	4.70E-05	-	4.90E-05	5.40E-07	-	5.40E-07	SW-AO-SW-23 (11/7/2012)	NA		**YES**	NSL
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	1	-	11	9	4.70E-05	-	4.90E-05	2.50E-07	-	2.50E-07	SW-AO-SW-36 (11/16/2012)	NA		**YES**	NSL
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	6	-	11	55	9.50E-05	-	9.50E-05	5.00E-07	-	1.80E-06	SW-AO-SW-21 (11/9/2012)	NA		**YES**	NSL
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	11	-	11	100	–	-	–	4.40E-06	-	6.60E-05	SW-AO-SW-05 (3/16/2012)	NA		**YES**	NSL
Inorganics															
Arsenic	27	-	35	77	2.50E+00	-	2.50E+00	1.40E+00	-	3.50E+00	SW-AO-SW-24 (11/8/2012)	1.50E+02	(1)	no	BSL
Barium	34	-	35	97	4.60E+01	-	4.60E+01	3.00E+00	-	4.50E+02	SW-AO-SW-24 (11/8/2012)	2.20E+02	(3)	**YES**	ASL
Beryllium	2	-	35	6	5.00E-01	-	5.00E-01	1.50E-01	-	7.50E-01	SW-AO-SW-29 (11/12/2012)	5.30E-01	(2)	**YES**	ASL
Cadmium	3	-	35	9	5.00E-01	-	5.00E-01	1.50E-01	-	3.90E-01	SW-AO-SW-32 (11/12/2012)	1.50E-01	(1)	**YES**	ASL
Chromium	1	-	35	3	5.00E+00	-	5.00E+00	2.50E+00	-	2.50E+00	SW-AO-SW-10 (3/14/2012)	1.10E+01	(2)	no	BSL
Cobalt	34	-	35	97	5.00E-01	-	5.00E-01	3.00E-01	-	7.40E+00	SW-AO-SW-36 (11/16/2012)	2.40E+01	(3)	no	BSL
Copper	21	-	35	60	5.00E+00	-	1.70E+01	1.30E+00	-	1.80E+01	SW-AO-SW-17 (11/14/2012)	5.00E+00	(1)	**YES**	ASL
Lead	19	-	35	54	1.50E+00	-	1.50E+00	5.10E-01	-	5.20E+00	SW-AO-SW-29 (11/12/2012), SW-AO-SW-30 (11/8/2012)	1.18E+00	(1)	**YES**	ASL
Mercury	1	-	35	3	2.00E-01	-	2.00E-01	1.00E-01	-	1.00E-01	SW-AO-SW-30 (11/8/2012)	1.20E-02	(1)	**YES**	ASL
Nickel	28	-	35	80	5.00E+00	-	5.00E+00	2.00E+00	-	3.00E+01	SW-AO-SW-29 (11/12/2012)	2.90E+01	(1)	**YES**	ASL
Silver	1	-	35	3	1.00E+00	-	1.00E+00	3.60E-01	-	3.60E-01	SW-AO-SW-01 (3/20/2012)	1.20E-02	(2)	**YES**	ASL
Thallium	1	-	35	3	1.00E+00	-	1.00E+00	2.60E-01	-	2.60E-01	SW-AO-SW-04 (3/20/2012)	4.00E+00	(2)	no	BSL
Vanadium	1	-	35	3	1.00E+01	-	1.00E+01	3.90E+00	-	3.90E+00	SW-AO-SW-17 (11/14/2012)	1.20E+01	(3)	no	BSL
Zinc	27	-	35	77	2.00E+01	-	2.00E+01	8.70E+00	-	2.20E+02	SW-AO-SW-32 (11/12/2012)	6.50E+01	(1)	**YES**	ASL
Sulfide	2	-	3	67	1.00E+03	-	1.00E+03	1.30E+03	-	1.80E+03	SW-AO-SW-05 (3/16/2012)	2.00E+00	(2)	**YES**	ASL

–	Not applicable.	µg/L	Microgram per liter.
ASL	Above screening level.	NA	Not available.
BSL	Below screening level.	NSL	No screening level.
COPC	Constituent of potential concern.	USEPA	United States Environmental Protection Agency.

[a] All detected constituents are presented.

[b] Frequency of detection is equal to the number of detections divided by the total number of samples analyzed. For duplicate samples, the highest detected value or the lowest detection limit was selected.

[c] Ecological surface water screening levels were from the following sources in order of priority:
(1) Mississippi Water Quality Criteria - Freshwater Aquatic Life Chronic (MDEQ 2007).
(2) Region 4 Ecological Screening Levels (USEPA 2001a; R4).
(3) Region 5 Ecological Screening Levels (USEPA 2003b; R5).
(4) Region 3 Ecological Screening Levels (USEPA 2003a; R3).

[d] A constituent with a maximum concentration greater than the ecological screening level is considered a COPC. A constituent with a maximum concentration below the screening level is not considered a COPC. A constituent with no screening level is conservatively identified as a COPC.

[e] Constituent was analyzed by two different laboratory methods and was detected by both methods in at least one sample. Data summaries for both methods are provided.

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Table 11. Summary of Constituents Detected in On-Site Sediment, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]		Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Date)	MDEQ Tier 1 Unrestricted Soil TRG [c]	MDEQ Tier 1 Restricted Soil TRG [d]	USEPA Residential Regional Screening Level [e]	USEPA Industrial Regional Screening Level [f]	Is Constituent a COPC? [g]	
		Number of Detections		Number of Samples	(%)	Minimum (mg/kg)	-	Maximum (mg/kg)	Minimum (mg/kg)	-	Maximum (mg/kg)		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(YES, no)	Rationale
Volatile Organic Compounds																		
2-Butanone		3	-	18	17	2.40E-02	-	8.40E+01	1.50E-02	-	8.60E-01	SD-AO-SD-33 (11/7/2012)	8.45E+01	8.45E+01	2.70E+03	1.90E+04	no	BSL
Acetone		8	-	18	44	5.00E-02	-	1.70E+02	1.60E-02	-	1.20E+01	SD-AO-SD-33 (11/7/2012)	7.82E+03	1.04E+05	6.10E+03	6.70E+04	no	BSL
Carbon disulfide		5	-	18	28	4.70E-03	-	1.70E+01	2.90E-03	-	1.70E+00	SD-AO-SD-19 (11/12/2012)	7.97E+00	7.97E+00	7.70E+01	3.50E+02	no	BSL
Isobutanol		1	-	18	6	1.90E-01	-	6.70E+02	5.30E-01	-	5.30E-01	SD-AO-SD-27 (11/14/2012)	2.35E+04	6.13E+05	1.80E+03	2.50E+04	no	BSL
Toluene		4	-	18	22	4.70E-03	-	1.70E+01	1.90E-03	-	1.80E+01	SD-AO-SD-30 (11/8/2012)	3.80E+01	3.80E+01	4.90E+02	4.70E+03	no	BSL
Semivolatile Organic Compounds																		
1,1'-Biphenyl		6	-	18	33	4.00E-02	-	1.20E+00	1.80E-01	-	3.60E+00	SD-AO-SD-24 (11/8/2012)	3.91E+03	1.02E+04	4.70E+00	2.00E+01	no	BSL
1,4-Dioxane		1	-	18	6	4.00E-02	-	3.80E+00	8.20E-02	-	8.20E-02	SD-AO-SD-23 (11/7/2012)	5.81E+01	5.20E+02	5.30E+00	2.30E+01	no	BSL
Benz(a)anthracene		6	-	18	33	8.20E-03	-	7.70E-01	5.90E-02	-	9.90E-02	SD-AO-SD-24 (11/8/2012)	8.75E-01	7.84E+00	1.50E-01	2.90E+00	**YES**	cPAH
Benzo(a)pyrene		7	-	18	39	8.20E-03	-	7.70E-01	5.40E-02	-	2.70E-01	SD-AO-SD-27 (11/14/2012)	8.75E-02	7.84E-01	1.50E-02	2.90E-01	**YES**	ASL
Benzo(b)fluoranthene		6	-	18	33	8.20E-03	-	7.70E-01	6.50E-02	-	2.80E-01	SD-AO-SD-28 (11/13/2012)	8.75E-01	7.84E+00	1.50E-01	2.90E+00	**YES**	ASL
Benzo(g,h,i)perylene		6	-	18	33	8.20E-03	-	7.70E-01	4.00E-02	-	1.60E-01	SD-AO-SD-27 (11/14/2012)	2.35E+03	6.13E+04	NA	NA	no	BSL
Benzo(k)fluoranthene		6	-	18	33	8.20E-03	-	7.70E-01	4.70E-02	-	1.50E-01	SD-AO-SD-22 (11/8/2012), SD-AO-SD-28 (11/13/2012)	8.75E+00	7.84E+01	1.50E+00	2.90E+01	**YES**	cPAH
Benzyl alcohol		1	-	18	6	3.80E-01	-	3.80E+00	1.60E-02	-	1.60E-02	SD-AO-SD-25 (11/13/2012)	2.35E+04	2.04E+05	6.20E+02	8.20E+03	no	BSL
Bis(2-ethylhexyl)phthalate		4	-	18	22	8.10E-02	-	7.60E+00	7.70E-02	-	1.50E+01	SD-AO-SD-33 (11/7/2012)	4.56E+01	4.09E+02	3.80E+01	1.60E+02	no	BSL
Chrysene		9	-	18	50	8.20E-03	-	7.70E-01	4.40E-02	-	2.20E-01	SD-AO-SD-28 (11/13/2012)	8.75E+01	7.84E+02	1.50E+01	2.90E+02	**YES**	cPAH
Dibenz(a,h)anthracene		0	-	18	0	8.20E-03	-	7.70E-01	–	-	–	–	8.75E-02	7.84E-01	1.50E-02	2.90E-01	**YES**	cPAH
Diphenyl ether		8	-	18	44	4.00E-02	-	1.20E+00	9.40E-02	-	1.60E+01	SD-AO-SD-31 (11/7/2012)	NA	NA	NA	NA	**YES**	NSL
Fluoranthene		9	-	18	50	8.20E-03	-	7.70E-01	5.20E-02	-	3.30E-01	SD-AO-SD-27 (11/14/2012)	3.13E+03	8.17E+04	2.30E+02	3.00E+03	no	BSL
Indeno(1,2,3-cd)pyrene		4	-	18	22	8.20E-03	-	7.70E-01	5.10E-02	-	6.70E-02	SD-AO-SD-22 (11/8/2012)	8.75E-01	7.84E+00	1.50E-01	2.90E+00	**YES**	cPAH
Naphthalene		1	-	18	6	8.20E-03	-	7.70E-01	4.20E-02	-	4.20E-02	SD-AO-SD-34 (11/8/2012)	1.94E+02	2.47E+02	3.80E+00	1.70E+01	no	BSL
Phenanthrene		6	-	18	33	8.20E-03	-	7.70E-01	3.10E-02	-	1.20E-01	SD-AO-SD-24 (11/8/2012)	2.35E+03	6.13E+04	NA	NA	no	BSL
Pyrene		8	-	18	44	8.20E-03	-	7.70E-01	5.60E-02	-	3.00E-01	SD-AO-SD-28 (11/13/2012)	2.35E+03	6.13E+04	1.70E+02	2.30E+03	no	BSL
Pesticides																		
4,4'-Dichlorodiphenyldichloroethane (DDD)		3	-	18	17	1.90E-03	-	2.10E-02	8.00E-04	-	1.10E-01	SD-AO-SD-33 (11/7/2012)	2.66E+00	2.38E+01	2.20E+00	9.60E+00	no	BSL
4,4'-Dichlorodiphenyldichloroethene (DDE)		6	-	18	33	1.90E-03	-	2.10E-02	1.60E-03	-	4.90E-02	SD-AO-SD-33 (11/7/2012)	1.88E+00	1.68E+01	1.60E+00	6.80E+00	no	BSL
4,4'-Dichlorodiphenyltrichloroethane (DDT)		9	-	18	50	2.10E-03	-	2.10E-02	9.00E-04	-	3.10E-02	SD-AO-SD-33 (11/7/2012)	1.88E+00	1.68E+01	1.90E+00	8.60E+00	no	BSL
Dieldrin		5	-	18	28	1.90E-03	-	2.10E-02	5.40E-04	-	3.00E-02	SD-AO-SD-33 (11/7/2012)	3.99E-02	3.58E-01	3.30E-02	1.40E-01	no	BSL
Endosulfan sulfate	[h]	1	-	18	6	1.90E-03	-	2.10E-02	8.20E-04	-	8.20E-04	SD-AO-SD-28 (11/13/2012)	4.69E+02	1.23E+03	3.70E+01	4.90E+02	no	BSL
Heptachlor		1	-	18	6	1.90E-03	-	2.10E-02	3.80E-03	-	3.80E-03	SD-AO-SD-33 (11/7/2012)	1.27E-01	1.95E-01	1.20E-01	5.10E-01	no	BSL
Dioxathion/Dioxenethion																		
cis-Dioxathion	[i]	18	-	18	100	–	-	–	1.13E-01	-	9.93E+02	SD-AO-SD-27 (11/14/2012)	1.17E+02	3.07E+03	NA	NA	**YES**	ASL
Dioxenethion	[i]	5	-	18	28	1.83E+00	-	1.99E+00	1.39E-01	-	7.19E+00	SD-AO-SD-33 (11/7/2012)	1.17E+02	3.07E+03	NA	NA	no	BSL
trans-Dioxathion	[i]	12	-	18	67	1.86E+00	-	1.95E+00	2.60E-01	-	3.44E+01	SD-AO-SD-33 (11/7/2012)	1.17E+02	3.07E+03	NA	NA	no	BSL
Dioxins and Furans																		
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)		18	-	18	100	–	-	–	8.30E-06	-	1.40E-03	SD-AO-SD-33 (11/7/2012)	4.26E-04	3.82E-03	NA	NA	**YES**	ASL
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)		18	-	18	100	–	-	–	1.50E-06	-	2.20E-04	SD-AO-SD-33 (11/7/2012)	4.26E-04	3.82E-03	NA	NA	no	BSL
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)		15	-	18	83	4.80E-06	-	4.80E-06	2.70E-07	-	1.70E-05	SD-AO-SD-33 (11/7/2012)	4.26E-04	3.82E-03	NA	NA	no	BSL
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		15	-	18	83	4.60E-06	-	4.80E-06	2.80E-07	-	1.20E-05	SD-AO-SD-30 (11/8/2012)	4.26E-05	3.82E-04	NA	NA	no	BSL
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)		15	-	18	83	4.60E-06	-	4.80E-06	2.60E-07	-	2.40E-05	SD-AO-SD-33 (11/7/2012)	4.26E-05	3.82E-04	NA	NA	no	BSL
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		18	-	18	100	–	-	–	2.80E-07	-	5.90E-05	SD-AO-SD-30 (11/8/2012)	1.03E-04	9.23E-04	NA	NA	no	BSL
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)		18	-	18	100	–	-	–	1.20E-07	-	4.50E-05	SD-AO-SD-28 (11/13/2012)	4.26E-05	3.82E-04	NA	NA	**YES**	ASL
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)		18	-	18	100	–	-	–	4.20E-07	-	4.10E-05	SD-AO-SD-30 (11/8/2012)	1.03E-04	9.23E-04	NA	NA	no	BSL
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)		4	-	18	22	4.60E-06	-	5.40E-06	6.50E-08	-	9.70E-07	SD-AO-SD-33 (11/7/2012)	4.26E-05	3.82E-04	NA	NA	no	BSL
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)		18	-	18	100	–	-	–	6.90E-08	-	7.50E-06	SD-AO-SD-30 (11/8/2012)	8.52E-06	7.63E-05	NA	NA	no	BSL
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)		12	-	18	67	4.60E-06	-	4.90E-06	2.30E-07	-	4.10E-06	SD-AO-SD-33 (11/7/2012)	8.52E-05	7.63E-04	NA	NA	no	BSL
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)		14	-	18	78	4.60E-06	-	4.80E-06	3.40E-07	-	1.20E-05	SD-AO-SD-33 (11/7/2012)	4.26E-05	3.82E-04	NA	NA	no	BSL
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)		14	-	18	78	4.80E-06	-	4.90E-06	1.10E-07	-	7.60E-06	SD-AO-SD-33 (11/7/2012)	8.52E-06	7.63E-05	NA	NA	no	BSL
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)		10	-	18	56	9.20E-07	-	1.10E-06	8.90E-08	-	1.50E-06	SD-AO-SD-30 (11/8/2012)	4.26E-06	3.82E-05	4.90E-06	2.20E-05	no	BSL
2,3,7,8-Tetrachlorodibenzofuran (TCDF)		16	-	18	89	9.60E-07	-	9.70E-07	6.20E-08	-	8.70E-06	SD-AO-SD-33 (11/7/2012)	4.26E-05	3.82E-04	NA	NA	no	BSL
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)		18	-	18	100	–	-	–	3.50E-06	-	6.30E-04	SD-AO-SD-33 (11/7/2012)	4.26E-03	3.82E-02	NA	NA	no	BSL
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)		18	-	18	100	–	-	–	1.10E-04	-	2.00E-02	SD-AO-SD-33 (11/7/2012)	4.26E-03	3.82E-02	NA	NA	**YES**	ASL

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Table 11. Summary of Constituents Detected in On-Site Sediment, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]		Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Date)	MDEQ Tier 1 Unrestricted Soil TRG [c]	MDEQ Tier 1 Restricted Soil TRG [d]	USEPA Residential Regional Screening Level [e]	USEPA Industrial Regional Screening Level [f]	Is Constituent a COPC? [g]	
		Number of Detections		Number of Samples	(%)	Minimum (mg/kg)	-	Maximum (mg/kg)	Minimum (mg/kg)	-	Maximum (mg/kg)		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(YES, no)	Rationale
Inorganics																		
Antimony	[j]	7	-	18	39	9.90E-01	-	2.00E+00	7.70E-01	-	2.60E+00	SD-AO-SD-27 (11/14/2012)	3.13E+01	8.17E+01	3.10E+00	4.70E+01	no	BSL
Arsenic		18	-	18	100	–	-	–	1.10E+00	-	8.40E+00	SD-AO-SD-30 (11/8/2012)	4.26E-01	3.82E+00	6.70E-01	3.00E+00	**YES**	ASL
Barium		17	-	18	94	4.60E+01	-	4.60E+01	5.90E+00	-	1.60E+02	SD-AO-SD-24 (11/8/2012)	5.48E+03	1.43E+04	1.50E+03	2.20E+04	no	BSL
Beryllium		18	-	18	100	–	-	–	4.50E-02	-	4.80E-01	SD-AO-SD-34 (11/8/2012)	1.56E+02	1.02E+03	1.60E+01	2.30E+02	no	BSL
Cadmium		18	-	18	100	–	-	–	1.90E-02	-	2.90E+00	SD-AO-SD-33 (11/7/2012)	3.91E+01	1.02E+03	7.00E+00	9.80E+01	no	BSL
Chromium	[k]	18	-	18	100	–	-	–	3.80E+00	-	4.70E+01	SD-AO-SD-33 (11/7/2012)	1.17E+05	3.07E+06	1.20E+04	1.80E+05	no	BSL
Cobalt		18	-	18	100	–	-	–	4.60E-01	-	2.00E+01	SD-AO-SD-33 (11/7/2012)	4.69E+03	1.23E+04	2.30E+00	3.50E+01	**YES**	ASL
Copper		16	-	18	89	8.50E+00	-	1.70E+01	1.70E+00	-	1.10E+02	SD-AO-SD-19 (11/12/2012)	3.13E+03	8.17E+03	3.10E+02	4.70E+03	no	BSL
Lead		18	-	18	100	–	-	–	1.90E+00	-	1.50E+02	SD-AO-SD-33 (11/7/2012)	4.00E+02	1.70E+03	4.00E+02	8.00E+02	no	BSL
Mercury	[l]	18	-	18	100	–	-	–	1.20E-02	-	1.00E+00	SD-AO-SD-30 (11/8/2012)	1.00E+01	6.13E+01	9.40E-01	4.00E+00	**YES**	ASL
Nickel	[m]	18	-	18	100	–	-	–	1.60E+00	-	1.30E+02	SD-AO-SD-33 (11/7/2012)	1.56E+03	4.08E+03	1.50E+02	2.20E+03	no	BSL
Selenium		11	-	18	61	5.60E-01	-	1.10E+00	2.80E-01	-	8.90E-01	SD-AO-SD-33 (11/7/2012)	3.91E+02	1.02E+03	3.90E+01	5.80E+02	no	BSL
Silver		9	-	18	50	1.10E-01	-	2.00E-01	5.30E-02	-	3.90E-01	SD-AO-SD-19 (11/12/2012)	3.91E+02	1.02E+03	3.90E+01	5.80E+02	no	BSL
Thallium	[n]	13	-	18	72	1.10E-01	-	1.40E-01	4.10E-02	-	1.90E-01	SD-AO-SD-29 (11/12/2012)	5.48E+00	1.43E+02	7.80E-02	1.20E+00	**YES**	ASL
Tin		3	-	18	17	9.90E+00	-	2.20E+01	5.50E+00	-	1.50E+02	SD-AO-SD-19 (11/12/2012)	4.69E+04	1.23E+05	4.70E+03	7.00E+04	no	BSL
Vanadium	[o]	18	-	18	100	–	-	–	2.00E+00	-	2.70E+01	SD-AO-SD-29 (11/12/2012)	5.48E+02	1.43E+03	3.90E+01	5.80E+02	no	BSL
Zinc		18	-	18	100	–	-	–	5.00E+00	-	1.90E+03	SD-AO-SD-33 (11/7/2012)	2.35E+04	6.13E+04	2.30E+03	3.50E+04	no	BSL
Cyanide	[p]	3	-	18	17	5.50E-01	-	1.10E+00	4.80E-01	-	2.30E+00	SD-AO-SD-31 (11/7/2012)	1.56E+03	4.08E+03	2.10E+00	1.30E+01	**YES**	ASL

–	Not applicable.	cPAH	Carcinogenic Polycyclic Aromatic Hydrocarbon.	NSL	No screening level.
ASL	Above screening level.	MDEQ	Mississippi Department of Environmental Quality.	RSL	Regional Screening Level.
BSL	Below screening level.	mg/kg	Milligram per kilogram.	TRG	Target Remediation Goal.
COPC	Constituent of potential concern.	NA	Not available.	USEPA	United States Environmental Protection Agency.

[a] All constituents detected in at least one on-site sediment sample are presented.
[b] Frequency of detection is equal to the number of detections divided by the total number of samples analyzed. For duplicate samples, the highest detected value or the lowest detection limit was selected.
[c] MDEQ Tier 1 Unrestricted Soil Target Remediation Goal (TRG) (MDEQ 2002).
[d] MDEQ Tier 1 Restricted Soil Target Remediation Goal (TRG) (MDEQ 2002).
[e] USEPA Residential Soil Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects.
[f] USEPA Industrial Soil Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects.
[g] A constituent with a maximum concentration greater than the minimum of the MDEQ TRG or the USEPA RSL is considered a COPC. A constituent with a maximum concentration below the screening level is not considered a COPC. A constituent with no screening level is conservatively identified as a COPC.
[h] The USEPA RSLs for endosulfan are used as a surrogate.
[i] The MDEQ TRGs for dioxathion are used as surrogates for dioxathion isomers and for dioxenethion.
[j] The USEPA RSLs for antimony are the USEPA RSLs for metallic antimony.
[k] The MDEQ TRGs and USEPA RSLs for chromium III are used for total chromium.
[l] The USEPA RSLs for elemental mercury are conservatively used for mercury.
[m] The USEPA RSLs for nickel are the USEPA RSLs for nickel soluble salts.
[n] The USEPA RSLs for thallium are the USEPA RSLs for thallium soluble salts.
[o] The USEPA RSLs for vanadium are the USEPA RSLs for vanadium and compounds.
[p] The MDEQ TRGs for free cyanide were used.

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Table 12. Summary of Constituents Detected in Off-Site Sediment, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]		Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Date)	MDEQ Tier 1 Unrestricted Soil TRG [c]	MDEQ Tier 1 Restricted Soil TRG [d]	USEPA Residential Regional Screening Level [e]	USEPA Industrial Regional Screening Level [f]	Is Constituent a COPC? [g]	
		Number of Detections		Number of Samples	(%)	Minimum (mg/kg)		Maximum (mg/kg)	Minimum (mg/kg)		Maximum (mg/kg)		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(YES, no)	Rationale
Volatile Organic Compounds																		
1,1-Dichloroethene		1	-	18	6	4.50E-03	-	1.30E-02	3.70E-03	-	3.70E-03	SD-AO-SD-12 (3/13/2012)	7.72E-02	1.18E-01	2.30E+01	1.00E+02	no	BSL
trans-1,2-Dichloroethene		1	-	18	6	4.50E-03	-	1.30E-02	1.20E-02	-	1.20E-02	SD-AO-SD-12 (3/13/2012)	1.56E+03	3.07E+03	1.60E+02	2.30E+03	no	BSL
2-Butanone		7	-	18	39	2.40E-02	-	3.40E-02	2.60E-03	-	5.10E-02	SD-AO-SD-13 (3/13/2012)	8.45E+01	8.45E+01	2.70E+03	1.90E+04	no	BSL
Acetone		8	-	18	44	4.90E-02	-	6.90E-02	1.70E-02	-	3.60E-01	SD-AO-SD-13 (3/13/2012)	7.82E+03	1.04E+05	6.10E+03	6.70E+04	no	BSL
Benzene		1	-	18	6	4.50E-03	-	1.30E-02	1.50E-01	-	1.50E-01	SD-AO-SD-15 (3/13/2012)	8.87E-01	1.36E+00	1.20E+00	5.10E+00	no	BSL
Carbon disulfide		5	-	18	28	4.90E-03	-	6.90E-03	3.30E-03	-	1.20E-02	SD-AO-SD-15 (3/13/2012)	7.97E+00	7.97E+00	7.70E+01	3.50E+02	no	BSL
Carbon tetrachloride		1	-	18	6	4.50E-03	-	1.30E-02	1.60E-03	-	1.60E-03	SD-AO-SD-15 (3/13/2012)	3.71E-01	5.69E-01	6.50E-01	2.90E+00	no	BSL
Chlorobenzene		1	-	18	6	4.50E-03	-	1.30E-02	3.60E-02	-	3.60E-02	SD-AO-SD-15 (3/13/2012)	1.19E+00	1.19E+00	2.80E+01	1.30E+02	no	BSL
Chloroform		1	-	18	6	4.50E-03	-	1.30E-02	1.90E-03	-	1.90E-03	SD-AO-SD-15 (3/13/2012)	3.12E-01	4.78E-01	3.20E-01	1.40E+00	no	BSL
Tetrachloroethene		1	-	18	6	4.50E-03	-	1.30E-02	1.50E-01	-	1.50E-01	SD-AO-SD-12 (3/13/2012)	1.19E+01	1.82E+01	8.10E+00	3.90E+01	no	BSL
Toluene		5	-	18	28	4.90E-03	-	6.90E-03	1.20E-03	-	3.60E-03	SD-AO-SD-13 (3/13/2012)	3.80E+01	3.80E+01	4.90E+02	4.70E+03	no	BSL
Trichloroethene		1	-	18	6	4.50E-03	-	1.30E-02	3.40E-02	-	3.40E-02	SD-AO-SD-12 (3/13/2012)	5.17E+00	7.92E+00	4.10E-01	1.90E+00	no	BSL
Vinyl chloride		1	-	18	6	4.50E-03	-	1.30E-02	6.30E-02	-	6.30E-02	SD-AO-SD-12 (3/13/2012)	4.26E-01	9.39E-01	5.90E-02	1.70E+00	**YES**	ASL
Semivolatile Organic Compounds																		
1,1'-Biphenyl		4	-	18	22	3.90E-02	-	4.10E-01	4.40E-02	-	4.20E+00	SD-AO-SD-15 (3/13/2012)	3.91E+03	1.02E+04	4.70E+00	2.00E+01	no	BSL
4-Methylphenol		1	-	18	6	3.90E-02	-	7.70E-01	2.90E-02	-	2.90E-02	SD-AO-SD-14 (3/13/2012)	3.91E+02	1.02E+04	6.20E+02	8.20E+03	no	BSL
Acenaphthene		2	-	18	11	8.10E-03	-	1.60E-01	6.30E-03	-	6.30E-03	SD-AO-SD-02 (3/20/2012), SD-AO-SD-14 (3/13/2012)	4.69E+03	1.23E+05	3.50E+02	4.50E+03	no	BSL
Aniline		1	-	18	6	7.80E-02	-	1.50E+00	1.40E-01	-	1.40E-01	SD-AO-SD-16 (3/12/2012)	1.12E+02	1.00E+03	4.30E+01	4.10E+02	no	BSL
Anthracene		2	-	18	11	8.10E-03	-	1.60E-01	3.90E-03	-	9.40E-03	SD-AO-SD-14 (3/13/2012)	2.35E+04	6.13E+05	1.70E+03	2.30E+04	no	BSL
Benz(a)anthracene		4	-	18	22	7.90E-03	-	1.60E-01	4.60E-03	-	3.80E-02	SD-AO-SD-14 (3/13/2012)	8.75E-01	7.84E+00	1.50E-01	2.90E+00	**YES**	cPAH
Benzo(a)pyrene		7	-	18	39	8.40E-03	-	1.60E-01	4.10E-03	-	6.40E-02	SD-AO-CM-04 (11/8/2012)	8.75E-02	7.84E-01	1.50E-02	2.90E-01	**YES**	ASL
Benzo(b)fluoranthene		7	-	18	39	7.90E-03	-	8.40E-02	4.90E-03	-	1.60E-01	SD-AO-SD-13 (3/13/2012)	8.75E-01	7.84E+00	1.50E-01	2.90E+00	**YES**	ASL
Benzo(g,h,i)perylene		6	-	18	33	7.90E-03	-	1.60E-01	5.10E-03	-	5.20E-02	SD-AO-CM-04 (11/8/2012)	2.35E+03	6.13E+04	NA	NA	no	BSL
Benzo(k)fluoranthene		7	-	18	39	8.40E-03	-	1.60E-01	3.50E-03	-	7.10E-02	SD-AO-CM-04 (11/8/2012)	8.75E+00	7.84E+01	1.50E+00	2.90E+01	**YES**	cPAH
Benzyl alcohol		5	-	18	28	3.90E-02	-	7.70E-01	9.40E-03	-	1.40E-01	SD-AO-SD-12 (3/13/2012)	2.35E+04	2.04E+05	6.20E+02	8.20E+03	no	BSL
Bis(2-ethylhexyl)phthalate		5	-	18	28	7.90E-02	-	1.50E+00	7.90E-03	-	8.90E-01	SD-AO-SD-01 (3/20/2012)	4.56E+01	4.09E+02	3.80E+01	1.60E+02	no	BSL
Chrysene		7	-	18	39	7.90E-03	-	1.60E-01	6.10E-03	-	8.10E-02	SD-AO-CM-04 (11/8/2012)	8.75E+01	7.84E+02	1.50E+01	2.90E+02	**YES**	cPAH
Dibenz(a,h)anthracene		1	-	18	6	7.90E-03	-	1.60E-01	1.20E-02	-	1.20E-02	SD-AO-SD-14 (3/13/2012)	8.75E-02	7.84E-01	1.50E-02	2.90E-01	**YES**	cPAH
Diphenyl ether		7	-	18	39	3.90E-02	-	4.10E-01	3.60E-02	-	2.80E+01	SD-AO-SD-15 (3/13/2012)	NA	NA	NA	NA	**YES**	NSL
Fluoranthene		10	-	18	56	8.40E-03	-	8.20E-02	6.40E-03	-	1.80E-01	SD-AO-SD-13 (3/13/2012)	3.13E+03	8.17E+04	2.30E+02	3.00E+03	no	BSL
Fluorene		2	-	18	11	8.10E-03	-	1.60E-01	6.30E-03	-	7.00E-03	SD-AO-SD-02 (3/20/2012)	3.13E+03	8.17E+04	2.30E+02	3.00E+03	no	BSL
Indeno(1,2,3-cd)pyrene		6	-	18	33	7.90E-03	-	1.60E-01	4.60E-03	-	5.40E-02	SD-AO-CM-04 (11/8/2012)	8.75E-01	7.84E+00	1.50E-01	2.90E+00	**YES**	cPAH
Naphthalene		1	-	18	6	7.90E-03	-	1.60E-01	7.50E-03	-	7.50E-03	SD-AO-SD-14 (3/13/2012)	1.94E+02	2.47E+02	3.80E+00	1.70E+01	no	BSL
Phenanthrene		5	-	18	28	8.10E-03	-	1.60E-01	3.40E-03	-	4.40E-02	SD-AO-SD-07 (3/14/2012)	2.35E+03	6.13E+04	NA	NA	no	BSL
Phenol		1	-	18	6	3.90E-02	-	7.70E-01	9.30E-02	-	9.30E-02	SD-AO-SD-15 (3/13/2012)	4.69E+04	1.23E+05	1.80E+03	2.50E+04	no	BSL
Pyrene		9	-	18	50	8.40E-03	-	8.40E-02	6.20E-03	-	1.30E-01	SD-AO-SD-13 (3/13/2012)	2.35E+03	6.13E+04	1.70E+02	2.30E+03	no	BSL
Pesticides																		
4,4'-Dichlorodiphenyldichloroethane (DDD)		2	-	18	11	2.00E-03	-	7.60E-03	3.60E-04	-	1.60E-02	SD-AO-SD-12 (3/13/2012)	2.66E+00	2.38E+01	2.20E+00	9.60E+00	no	BSL
4,4'-Dichlorodiphenyldichloroethene (DDE)		4	-	18	22	2.00E-03	-	4.40E-03	6.30E-04	-	7.20E-03	SD-AO-SD-12 (3/13/2012)	1.88E+00	1.68E+01	1.60E+00	6.80E+00	no	BSL
4,4'-Dichlorodiphenyltrichloroethane (DDT)		5	-	18	28	2.00E-03	-	5.40E-03	5.70E-04	-	1.30E-02	SD-AO-SD-13 (3/13/2012)	1.88E+00	1.68E+01	1.90E+00	8.60E+00	no	BSL
Dieldrin		6	-	18	33	2.00E-03	-	7.60E-03	4.50E-04	-	2.00E-03	SD-AO-SD-16 (3/12/2012)	3.99E-02	3.58E-01	3.30E-02	1.40E-01	no	BSL
Polychlorinated Biphenyls																		
Aroclor 1260		1	-	14	7	3.60E-02	-	7.60E-02	6.60E-02	-	6.60E-02	SD-AO-SD-15 (3/13/2012)	1.00E+00	1.00E+01	2.40E-01	1.00E+00	no	BSL
Total PCBs		1	-	14	7	3.60E-02	-	7.60E-02	6.60E-02	-	6.60E-02	SD-AO-SD-15 (3/13/2012)	1.00E+00	1.00E+01	2.40E-01	1.00E+00	no	BSL
Dioxathion/Dioxenethion																		
cis-Dioxathion	[h]	12	-	18	67	8.26E-02	-	1.95E+00	1.29E-01	-	2.02E+00	SD-AO-CM-04 (11/8/2012)	1.17E+02	3.07E+03	NA	NA	no	BSL
Dioxenethion	[h]	7	-	18	39	5.02E-04	-	1.97E+00	1.71E-02	-	1.08E+00	SD-AO-SD-01 (3/20/2012)	1.17E+02	3.07E+03	NA	NA	no	BSL
trans-Dioxathior	[h]	5	-	18	28	5.06E-04	-	1.97E+00	7.47E-02	-	2.64E-01	SD-AO-SD-15 (3/13/2012)	1.17E+02	3.07E+03	NA	NA	no	BSL

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Table 12. Summary of Constituents Detected in Off-Site Sediment, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]		Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Date)	MDEQ Tier 1 Unrestricted Soil TRG [c]	MDEQ Tier 1 Restricted Soil TRG [d]	USEPA Residential Regional Screening Level [e]	USEPA Industrial Regional Screening Level [f]	Is Constituent a COPC? [g]	
		Number of Detections		Number of Samples	(%)	Minimum (mg/kg)		Maximum (mg/kg)	Minimum (mg/kg)		Maximum (mg/kg)		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(YES, no)	Rationale
Dioxins and Furans																		
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)		18	-	18	100	–	-	–	1.20E-05	-	1.40E-03	SD-AO-SD-13 (3/13/2012)	4.26E-04	3.82E-03	NA	NA	**YES**	ASL
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)		17	-	18	94	6.30E-06	-	6.30E-06	7.40E-08	-	1.70E-04	SD-AO-SD-13 (3/13/2012)	4.26E-04	3.82E-03	NA	NA	no	BSL
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)		8	-	18	44	4.80E-06	-	6.30E-06	3.50E-07	-	1.60E-05	SD-AO-SD-13 (3/13/2012)	4.26E-04	3.82E-03	NA	NA	no	BSL
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		14	-	18	78	4.90E-06	-	6.30E-06	3.00E-07	-	1.70E-05	SD-AO-SD-13 (3/13/2012)	4.26E-05	3.82E-04	NA	NA	no	BSL
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)		12	-	18	67	4.90E-06	-	6.30E-06	3.10E-07	-	9.80E-06	SD-AO-SD-13 (3/13/2012)	4.26E-05	3.82E-04	NA	NA	no	BSL
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		18	-	18	100	–	-	–	5.50E-07	-	4.90E-05	SD-AO-SD-13 (3/13/2012)	1.03E-04	9.23E-04	NA	NA	no	BSL
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)		16	-	18	89	5.00E-06	-	6.30E-06	6.00E-08	-	2.30E-05	SD-AO-SD-13 (3/13/2012)	4.26E-05	3.82E-04	NA	NA	no	BSL
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)		18	-	18	100	–	-	–	4.30E-07	-	4.00E-05	SD-AO-SD-13 (3/13/2012)	1.03E-04	9.23E-04	NA	NA	no	BSL
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)		1	-	18	6	4.80E-06	-	6.30E-06	4.30E-07	-	4.30E-07	SD-AO-SD-13 (3/13/2012)	4.26E-05	3.82E-04	NA	NA	no	BSL
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)		8	-	18	44	4.80E-06	-	6.30E-06	1.30E-07	-	7.70E-06	SD-AO-SD-13 (3/13/2012)	8.52E-06	7.63E-05	NA	NA	no	BSL
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)		1	-	18	6	4.80E-06	-	6.30E-06	1.70E-06	-	1.70E-06	SD-AO-SD-13 (3/13/2012)	8.52E-05	7.63E-04	NA	NA	no	BSL
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)		7	-	18	39	4.80E-06	-	6.30E-06	2.10E-07	-	5.50E-06	SD-AO-SD-13 (3/13/2012)	4.26E-05	3.82E-04	NA	NA	no	BSL
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)		3	-	18	17	4.80E-06	-	6.30E-06	3.10E-07	-	2.90E-06	SD-AO-SD-13 (3/13/2012)	8.52E-06	7.63E-05	NA	NA	no	BSL
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)		1	-	18	6	9.60E-07	-	1.30E-06	2.70E-07	-	2.70E-07	SD-AO-SD-13 (3/13/2012)	4.26E-06	3.82E-05	4.90E-06	2.20E-05	no	BSL
2,3,7,8-Tetrachlorodibenzofuran (TCDF)		4	-	18	22	9.70E-07	-	1.30E-06	2.60E-07	-	2.70E-06	SD-AO-SD-13 (3/13/2012)	4.26E-05	3.82E-04	NA	NA	no	BSL
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)		17	-	18	94	1.30E-05	-	1.30E-05	1.40E-07	-	4.60E-04	SD-AO-SD-16 (3/12/2012)	4.26E-03	3.82E-02	NA	NA	no	BSL
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)		18	-	18	100	–	-	–	1.20E-04	-	1.20E-02	SD-AO-SD-13 (3/13/2012)	4.26E-03	3.82E-02	NA	NA	**YES**	ASL
Inorganics																		
Arsenic		18	-	18	100	–	-	–	4.60E-01	-	1.40E+01	SD-AO-SD-01 (3/20/2012)	4.26E-01	3.82E+00	6.70E-01	3.00E+00	**YES**	ASL
Barium		18	-	18	100	–	-	–	6.50E+00	-	7.60E+02	SD-AO-SD-01 (3/20/2012)	5.48E+03	1.43E+04	1.50E+03	2.20E+04	no	BSL
Beryllium		17	-	18	94	1.10E-01	-	1.10E-01	8.10E-02	-	4.20E+00	SD-AO-SD-04 (3/20/2012)	1.56E+02	1.02E+03	1.60E+01	2.30E+02	no	BSL
Cadmium		12	-	18	67	6.00E-02	-	1.20E-01	2.90E-02	-	8.80E-01	SD-AO-CM-03 (11/8/2012)	3.91E+01	1.02E+03	7.00E+00	9.80E+01	no	BSL
Chromium	[i]	18	-	18	100	–	-	–	1.20E+00	-	3.00E+01	SD-AO-SD-01 (3/20/2012)	1.17E+05	3.07E+06	1.20E+04	1.80E+05	no	BSL
Cobalt		18	-	18	100	–	-	–	4.70E-01	-	1.80E+02	SD-AO-SD-15 (3/13/2012)	4.69E+03	1.23E+04	2.30E+00	3.50E+01	**YES**	ASL
Copper		18	-	18	100	–	-	–	7.80E-01	-	5.50E+01	SD-AO-SD-13 (3/13/2012)	3.13E+03	8.17E+03	3.10E+02	4.70E+03	no	BSL
Lead		18	-	18	100	–	-	–	1.60E+00	-	8.70E+01	SD-AO-SD-09 (3/14/2012)	4.00E+02	1.70E+03	4.00E+02	8.00E+02	no	BSL
Mercury	[j]	7	-	18	39	2.10E-02	-	2.60E-02	9.30E-03	-	1.80E-01	SD-AO-SD-13 (3/13/2012)	1.00E+01	6.13E+01	9.40E-01	4.00E+00	no	BSL
Nickel	[k]	17	-	18	94	1.10E+00	-	1.10E+00	1.10E+00	-	5.30E+02	SD-AO-SD-15 (3/13/2012)	1.56E+03	4.08E+03	1.50E+02	2.20E+03	**YES**	ASL
Selenium		4	-	18	22	6.10E-01	-	2.30E+00	3.40E-01	-	7.90E-01	SD-AO-SD-01 (3/20/2012)	3.91E+02	1.02E+03	3.90E+01	5.80E+02	no	BSL
Silver		4	-	18	22	1.10E-01	-	3.10E-01	7.50E-02	-	1.70E+00	SD-AO-SD-13 (3/13/2012)	3.91E+02	1.02E+03	3.90E+01	5.80E+02	no	BSL
Thallium	[l]	8	-	18	44	2.00E-01	-	2.60E-01	8.60E-02	-	5.20E-01	SD-AO-SD-01 (3/20/2012)	5.48E+00	1.43E+02	7.80E-02	1.20E+00	**YES**	ASL
Vanadium	[m]	18	-	18	100	–	-	–	1.50E+00	-	5.50E+01	SD-AO-SD-01 (3/20/2012)	5.48E+02	1.43E+03	3.90E+01	5.80E+02	**YES**	ASL
Zinc		18	-	18	100	–	-	–	4.90E+00	-	6.70E+02	SD-AO-SD-13 (3/13/2012)	2.35E+04	6.13E+04	2.30E+03	3.50E+04	no	BSL
Cyanide	[n]	5	-	18	28	5.40E-01	-	7.80E-01	2.50E-01	-	6.30E-01	SD-AO-SD-13 (3/13/2012), SD-AO-SD-15 (3/13/2012)	1.56E+03	4.08E+03	2.10E+00	1.30E+01	no	BSL

–	Not applicable.	cPAH	Carcinogenic Polycyclic Aromatic Hydrocarbon.	NSL	No screening level.
ASL	Above screening level.	MDEQ	Mississippi Department of Environmental Quality.	RSL	Regional Screening Level.
BSL	Below screening level.	mg/kg	Milligram per kilogram.	TRG	Target Remediation Goal.
COPC	Constituent of potential concern.	NA	Not available.	USEPA	United States Environmental Protection Agency.

[a] All constituents detected in at least one off-site sediment sample are presented.
[b] Frequency of detection is equal to the number of detections divided by the total number of samples analyzed. For duplicate samples, the highest detected value or the lowest detection limit was selected.
[c] MDEQ Tier 1 Unrestricted Soil Target Remediation Goal (TRG) (MDEQ 2002).
[d] MDEQ Tier 1 Restricted Soil Target Remediation Goal (TRG) (MDEQ 2002).
[e] USEPA Residential Soil Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects.
[f] USEPA Industrial Soil Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects.
[g] A constituent with a maximum concentration greater than the minimum of the MDEQ TRG or the USEPA RSL is considered a COPC. A constituent with a maximum concentration below the screening level is not considered a COPC. A constituent with no screening level is conservatively identified as a COPC.
[h] The MDEQ TRGs for dioxathion are used as a surrogate for dioxathion isomers and for dioxenethion.
[i] The MDEQ TRGs and USEPA RSLs for chromium III are used for total chromium.
[j] The USEPA RSLs for mercury are conservatively assumed to be the USEPA RSLs for elemental mercury.
[k] The USEPA RSLs for nickel are the USEPA RSLs for nickel soluble salts.
[l] The USEPA RSLs for thallium are the USEPA RSLs for thallium soluble salts.
[m] The USEPA RSLs for vanadium are the USEPA RSLs for vanadium and compounds.
[n[The MDEQ TRGs for free cyanide were used.

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Table 13. Summary of Constituents Detected in Sediment, Ecological Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]	Frequency of Detection [b]			Detection Limits		Detected Concentrations		Location of Maximum Concentration (Sample Date)	Ecological Screening Levels [c]		Is Constituent a COPC? [d]	
	Number of Detections	Number of Samples	(%)	Minimum (mg/kg)	Maximum (mg/kg)	Minimum (mg/kg)	Maximum (mg/kg)		(mg/kg)	Ref	(YES, no)	Rationale
Volatile Organic Compounds												
1,1-Dichloroethene	1	36	3	4.50E-03	1.70E+01	3.70E-03	3.70E-03	AO-SD-12 (3/13/2012)	1.94E-02	(2)	no	BSL
2-Butanone	10	36	28	2.40E-02	8.40E+01	2.60E-03	8.60E-01	AO-SD-33 (11/7/2012)	4.24E-02	(2)	**YES**	ASL
Acetone	16	36	44	4.90E-02	1.70E+02	1.60E-02	1.20E+01	AO-SD-33 (11/7/2012)	9.90E-03	(2)	**YES**	ASL
Benzene	1	36	3	4.50E-03	1.70E+01	1.50E-01	1.50E-01	AO-SD-15 (3/13/2012)	1.42E-01	(2)	**YES**	ASL
Carbon disulfide	10	36	28	4.70E-03	1.70E+01	2.90E-03	1.70E+00	AO-SD-19 (11/12/2012)	2.39E-02	(2)	**YES**	ASL
Carbon tetrachloride	1	36	3	4.50E-03	1.70E+01	1.60E-03	1.60E-03	AO-SD-15 (3/13/2012)	1.45E+00	(2)	no	BSL
Chlorobenzene	1	36	3	4.50E-03	1.70E+01	3.60E-02	3.60E-02	AO-SD-15 (3/13/2012)	2.91E-01	(2)	no	BSL
Chloroform	1	36	3	4.50E-03	1.70E+01	1.90E-03	1.90E-03	AO-SD-15 (3/13/2012)	1.21E-01	(2)	no	BSL
Isobutanol	1	36	3	1.80E-01	6.70E+02	5.30E-01	5.30E-01	AO-SD-27 (11/14/2012)	NA		**YES**	NSL
Tetrachloroethene	1	36	3	4.50E-03	1.70E+01	1.50E-01	1.50E-01	AO-SD-12 (3/13/2012)	9.90E-01	(2)	no	BSL
Toluene	9	36	25	4.70E-03	1.70E+01	1.20E-03	1.80E+01	AO-SD-30 (11/8/2012)	1.22E+00	(2)	**YES**	ASL
trans-1,2-Dichloroethene	1	36	3	4.50E-03	1.70E+01	1.20E-02	1.20E-02	AO-SD-12 (3/13/2012)	6.54E-01	(2)	no	BSL
Trichloroethene	1	36	3	4.50E-03	1.70E+01	3.40E-02	3.40E-02	AO-SD-12 (3/13/2012)	1.12E-01	(2)	no	BSL
Vinyl chloride	1	36	3	4.50E-03	1.70E+01	6.30E-02	6.30E-02	AO-SD-12 (3/13/2012)	2.02E-01	(2)	no	BSL
Semivolatile Organic Compounds												
1,1'-Biphenyl	10	36	28	3.90E-02	1.20E+00	4.40E-02	4.20E+00	AO-SD-15 (3/13/2012)	1.22E+00	(3)	**YES**	ASL
1,4-Dioxane	1	36	3	3.90E-02	3.80E+00	8.20E-02	8.20E-02	AO-SD-23 (11/7/2012)	1.19E-01	(2)	no	BSL
4-Methylphenol	1	36	3	3.90E-02	3.80E+00	2.90E-02	2.90E-02	AO-SD-14 (3/13/2012)	2.02E-02	(2)	**YES**	ASL
Aniline	1	36	3	7.80E-02	7.60E+00	1.40E-01	1.40E-01	AO-SD-16 (3/12/2012)	3.10E-04	(2)	**YES**	ASL
Benzyl alcohol	6	36	17	3.90E-02	3.80E+00	9.40E-03	1.40E-01	AO-SD-12 (3/13/2012)	1.04E-03	(2)	**YES**	ASL
Bis(2-ethylhexyl)phthalate	9	36	25	7.90E-02	7.60E+00	7.90E-03	1.50E+01	AO-SD-33 (11/7/2012)	1.82E-01	(1)	**YES**	ASL
Diphenyl ether	15	36	42	3.90E-02	1.20E+00	3.60E-02	2.80E+01	AO-SD-15 (3/13/2012)	NA		**YES**	NSL
Phenol	1	36	3	3.90E-02	3.80E+00	9.30E-02	9.30E-02	AO-SD-15 (3/13/2012)	4.91E-02	(2)	**YES**	ASL
Polycyclic Aromatic Hydrocarbons												
Acenaphthene	2	36	6	8.10E-03	7.70E-01	6.30E-03	6.30E-03	AO-SD-02 (3/20/2012), AO-SD-14 (3/13/2012)	3.30E-01	(1)	no	BSL
Anthracene	2	36	6	8.10E-03	7.70E-01	3.90E-03	9.40E-03	AO-SD-14 (3/13/2012)	3.30E-01	(1)	no	BSL
Benz(a)anthracene	10	36	28	7.90E-03	7.70E-01	4.60E-03	9.90E-02	AO-SD-24 (11/8/2012)	3.30E-01	(1)	no	BSL
Benzo(a)pyrene	14	36	39	8.20E-03	7.70E-01	4.10E-03	2.70E-01	AO-SD-27 (11/14/2012)	3.30E-01	(1)	no	BSL
Benzo(b)fluoranthene	13	36	36	7.90E-03	7.70E-01	4.90E-03	2.80E-01	AO-SD-28 (11/13/2012)	1.04E+01	(2)	no	BSL
Benzo(g,h,i)perylene	12	36	33	7.90E-03	7.70E-01	5.10E-03	1.60E-01	AO-SD-27 (11/14/2012)	1.70E-01	(2)	no	BSL
Benzo(k)fluoranthene	13	36	36	8.20E-03	7.70E-01	3.50E-03	1.50E-01	AO-SD-22 (11/8/2012), AO-SD-28 (11/13/2012)	2.40E-01	(2)	no	BSL
Chrysene	16	36	44	7.90E-03	7.70E-01	6.10E-03	2.20E-01	AO-SD-28 (11/13/2012)	3.30E-01	(1)	no	BSL
Dibenz(a,h)anthracene	1	36	3	7.90E-03	7.70E-01	1.20E-02	1.20E-02	AO-SD-14 (3/13/2012)	3.30E-01	(1)	no	BSL
Fluoranthene	19	36	53	8.20E-03	7.70E-01	6.40E-03	3.30E-01	AO-SD-27 (11/14/2012)	3.30E-01	(1)	no	BSL
Fluorene	2	36	6	8.10E-03	7.70E-01	6.30E-03	7.00E-03	AO-SD-02 (3/20/2012)	3.30E-01	(1)	no	BSL
Indeno(1,2,3-cd)pyrene	10	36	28	7.90E-03	7.70E-01	4.60E-03	6.70E-02	AO-SD-22 (11/8/2012)	2.00E-01	(2)	no	BSL
Naphthalene	2	36	6	7.90E-03	7.70E-01	7.50E-03	4.20E-02	AO-SD-34 (11/8/2012)	3.30E-01	(1)	no	BSL
Phenanthrene	11	36	31	8.10E-03	7.70E-01	3.40E-03	1.20E-01	AO-SD-24 (11/8/2012)	3.30E-01	(1)	no	BSL
Pyrene	17	36	47	8.20E-03	7.70E-01	6.20E-03	3.00E-01	AO-SD-28 (11/13/2012)	3.30E-01	(1)	no	BSL

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Constituent [a]	Frequency of Detection [b]			Detection Limits		Detected Concentrations		Location of Maximum Concentration (Sample Date)	Ecological Screening Levels [c]		Is Constituent a COPC? [d]	
	Number of Detections	Number of Samples	(%)	Minimum (mg/kg)	Maximum (mg/kg)	Minimum (mg/kg)	Maximum (mg/kg)		(mg/kg)	Ref	(YES, no)	Rationale
Pesticides												
4,4'-Dichlorodiphenyldichloroethane (DDD)	5	36	14	1.90E-03	2.10E-02	3.60E-04	1.10E-01	AO-SD-33 (11/7/2012)	3.30E-03	(1)	**YES**	ASL
4,4'-Dichlorodiphenyldichloroethene (DDE)	10	36	28	1.90E-03	2.10E-02	6.30E-04	4.90E-02	AO-SD-33 (11/7/2012)	3.30E-03	(1)	**YES**	ASL
4,4'-Dichlorodiphenyltrichloroethane (DDT)	14	36	39	2.00E-03	2.10E-02	5.70E-04	3.10E-02	AO-SD-33 (11/7/2012)	3.30E-03	(1)	**YES**	ASL
Dieldrin	11	36	31	1.90E-03	2.10E-02	4.50E-04	3.00E-02	AO-SD-33 (11/7/2012)	3.30E-03	(1)	**YES**	ASL
Endosulfan sulfate	1	36	3	1.90E-03	2.10E-02	8.20E-04	8.20E-04	AO-SD-28 (11/13/2012)	3.46E-02	(2)	no	BSL
Heptachlor	1	36	3	1.80E-03	2.10E-02	3.80E-03	3.80E-03	AO-SD-33 (11/7/2012)	6.00E-04	(2)	**YES**	ASL
Polychlorinated Biphenyls												
Aroclor 1260	1	14	7	3.60E-02	7.60E-02	6.60E-02	6.60E-02	AO-SD-15 (3/13/2012)	3.30E-02	(1)	**YES**	ASL
Total PCBs	1	14	7	3.60E-02	7.60E-02	6.60E-02	6.60E-02	AO-SD-15 (3/13/2012)	3.30E-02	(1)	**YES**	ASL
Dioxathion/Dioxenethion												
cis-Dioxathion	30	36	83	8.26E-02	1.95E+00	1.13E-01	9.93E+02	AO-SD-27 (11/14/2012)	NA		**YES**	NSL
Dioxenethion	12	36	33	5.02E-04	1.99E+00	1.71E-02	7.19E+00	AO-SD-33 (11/7/2012)	NA		**YES**	NSL
trans-Dioxathion	17	36	47	5.06E-04	1.97E+00	7.47E-02	3.44E+01	AO-SD-33 (11/7/2012)	NA		**YES**	NSL
Dioxins and Furans												
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	36	36	100	–	–	8.30E-06	1.40E-03	AO-SD-13 (3/13/2012), AO-SD-33 (11/7/2012)	NA		**YES**	NSL
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	35	36	97	6.30E-06	6.30E-06	7.40E-08	2.20E-04	AO-SD-33 (11/7/2012)	NA		**YES**	NSL
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	23	36	64	4.80E-06	6.30E-06	2.70E-07	1.70E-05	AO-SD-33 (11/7/2012)	NA		**YES**	NSL
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	29	36	81	4.60E-06	6.30E-06	2.80E-07	1.70E-05	AO-SD-13 (3/13/2012)	NA		**YES**	NSL
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	27	36	75	4.60E-06	6.30E-06	2.60E-07	2.40E-05	AO-SD-33 (11/7/2012)	NA		**YES**	NSL
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	36	36	100	–	–	2.80E-07	5.90E-05	AO-SD-30 (11/8/2012)	NA		**YES**	NSL
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	34	36	94	5.00E-06	6.30E-06	6.00E-08	4.50E-05	AO-SD-28 (11/13/2012)	NA		**YES**	NSL
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	36	36	100	–	–	4.20E-07	4.10E-05	AO-SD-30 (11/8/2012)	NA		**YES**	NSL
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	5	36	14	4.60E-06	6.30E-06	6.50E-08	9.70E-07	AO-SD-33 (11/7/2012)	NA		**YES**	NSL
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	26	36	72	4.80E-06	6.30E-06	6.90E-08	7.70E-06	AO-SD-13 (3/13/2012)	NA		**YES**	NSL
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	13	36	36	4.60E-06	6.30E-06	2.30E-07	4.10E-06	AO-SD-33 (11/7/2012)	NA		**YES**	NSL
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	21	36	58	4.60E-06	6.30E-06	2.10E-07	1.20E-05	AO-SD-33 (11/7/2012)	NA		**YES**	NSL
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	17	36	47	4.80E-06	6.30E-06	1.10E-07	7.60E-06	AO-SD-33 (11/7/2012)	NA		**YES**	NSL
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	11	36	31	9.20E-07	1.30E-06	8.90E-08	1.50E-06	AO-SD-30 (11/8/2012)	1.20E-07	(2)	**YES**	ASL
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	20	36	56	9.60E-07	1.30E-06	6.20E-08	8.70E-06	AO-SD-33 (11/7/2012)	NA		**YES**	NSL
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	35	36	97	1.30E-05	1.30E-05	1.40E-07	6.30E-04	AO-SD-33 (11/7/2012)	NA		**YES**	NSL
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	36	36	100	–	–	1.10E-04	2.00E-02	AO-SD-33 (11/7/2012)	NA		**YES**	NSL

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Constituent [a]	Frequency of Detection [b]			Detection Limits		Detected Concentrations		Location of Maximum Concentration (Sample Date)	Ecological Screening Levels [c]		Is Constituent a COPC? [d]	
	Number of Detections	Number of Samples	(%)	Minimum (mg/kg)	Maximum (mg/kg)	Minimum (mg/kg)	Maximum (mg/kg)		(mg/kg)	Ref	(YES, no)	Rationale
Inorganics												
Antimony	7	36	19	9.90E-01	4.50E+00	7.70E-01	2.60E+00	AO-SD-27 (11/14/2012)	1.20E+01	(1)	no	BSL
Arsenic	36	36	100	–	–	4.60E-01	1.40E+01	AO-SD-01 (3/20/2012)	7.24E+00	(1)	**YES**	ASL
Barium	35	36	97	4.60E+01	4.60E+01	5.90E+00	7.60E+02	AO-SD-01 (3/20/2012)	NA		**YES**	NSL
Beryllium	35	36	97	1.10E-01	1.10E-01	4.50E-02	4.20E+00	AO-SD-04 (3/20/2012)	NA		**YES**	NSL
Cadmium	30	36	83	6.00E-02	1.20E-01	1.90E-02	2.90E+00	AO-SD-33 (11/7/2012)	1.00E+00	(1)	**YES**	ASL
Chromium	36	36	100	–	–	1.20E+00	4.70E+01	AO-SD-33 (11/7/2012)	5.23E+01	(1)	no	BSL
Cobalt	36	36	100	–	–	4.60E-01	1.80E+02	AO-SD-15 (3/13/2012)	5.00E+01	(2)	**YES**	ASL
Copper	34	36	94	8.50E+00	1.70E+01	7.80E-01	1.10E+02	AO-SD-19 (11/12/2012)	1.87E+01	(1)	**YES**	ASL
Lead	36	36	100	–	–	1.60E+00	1.50E+02	AO-SD-33 (11/7/2012)	3.02E+01	(1)	**YES**	ASL
Mercury	25	36	69	2.10E-02	2.60E-02	9.30E-03	1.00E+00	AO-SD-30 (11/8/2012)	1.30E-01	(1)	**YES**	ASL
Nickel	35	36	97	1.10E+00	1.10E+00	1.10E+00	5.30E+02	AO-SD-15 (3/13/2012)	1.59E+01	(1)	**YES**	ASL
Selenium	15	36	42	5.60E-01	2.30E+00	2.80E-01	8.90E-01	AO-SD-33 (11/7/2012)	2.00E+00	(3)	no	BSL
Silver	13	36	36	1.10E-01	3.10E-01	5.30E-02	1.70E+00	AO-SD-13 (3/13/2012)	2.00E+00	(1)	no	BSL
Thallium	21	36	58	1.10E-01	2.60E-01	4.10E-02	5.20E-01	AO-SD-01 (3/20/2012)	NA		**YES**	NSL
Tin	3	36	8	9.90E+00	4.50E+01	5.50E+00	1.50E+02	AO-SD-19 (11/12/2012)	NA		**YES**	NSL
Vanadium	36	36	100	–	–	1.50E+00	5.50E+01	AO-SD-01 (3/20/2012)	NA		**YES**	NSL
Zinc	36	36	100	–	–	4.90E+00	1.90E+03	AO-SD-33 (11/7/2012)	1.24E+02	(1)	**YES**	ASL
Cyanide	8	36	22	5.40E-01	1.10E+00	2.50E-01	2.30E+00	AO-SD-31 (11/7/2012)	1.00E-04	(2)	**YES**	ASL

–	Not applicable.	COPC	Constituent of potential concern.	NSL	No screening level.
ASL	Above screening level.	mg/kg	Milligram per kilogram.	PCBs	Polychlorinated biphenyls.
BSL	Below screening level.	NA	Not available.	USEPA	United States Environmental Protection Agency.

[a] All detected constituents are presented.

[b] Frequency of detection is equal to the number of detections divided by the total number of samples analyzed. For duplicate samples, the highest detected value or the lowest detection limit was selected.

[c] Ecological sediment screening levels were from the following sources in order of priority:
(1) Region 4 Ecological Screening Levels (USEPA 2001; R4).
(2) Region 5 Ecological Screening Levels (USEPA 2003b; R5).
(3) Region 3 Ecological Screening Levels (USEPA 2003a; R3).

[d] A constituent with a maximum concentration above the ecological screening level is considered a COPEC. A constituent with a maximum concentration below the screening level is not considered a COPEC. A constituent with no screening level is conservatively identified as a COPEC.

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Table 14. Soil and Groundwater Sample Location Rationale, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Sample Location	Area	Sampling Conducted (Phase)	Rationale
AO-GP-01	Sludge Pits	I	Establish conditions on western boundary of sludge pits near the Hercules property.
AO-GP-02	Tall Oil	II	Establish conditions near Tall Oil loading/unloading rack.
AO-GP-03	Tall Oil/Area #3	I/Area #3	Establish conditions between Hercules property and Zeon Chemical.
AO-GP-03N	Area #3	Area #3	Establish groundwater conditions at an on-site property near the Zeon Chemical facility.
AO-GP-03N(2)	Area #3	Area #3	Establish groundwater conditions at an on-site property near the Zeon Chemical facility.
AO-GP-03N(3)	Area #3	Area #3	Establish groundwater conditions at an on-site property near the Zeon Chemical facility.
AO-GP-03S	Area #3	Area #3	Establish groundwater conditions at an on-site property near the Zeon Chemical facility.
AO-GP-03S(2)	Area #3	Area #3	Establish groundwater conditions at an on-site property near the Zeon Chemical facility.
AO-GP-03W	Area #3	Area #3	Establish groundwater conditions at an on-site property near the Zeon Chemical facility.
AO-GP-04	Tall Oil	I	Establish conditions between Hercules property and cemetery.
AO-GP-05	Tall Oil	II	Establish conditions near unit.
AO-GP-06	Hydroperoxides	II	Establish conditions near former tank farm.
AO-GP-07	Hydroperoxides	II	Establish conditions near unit.
AO-GP-08	Hydroperoxides	II	Establish conditions near Hydroperoxides loading/unloading rack.
AO-GP-09	Terpene Derivatives	II	Establish conditions near unit.
AO-GP-10	Terpene Derivatives	II	Establish conditions near unit.
AO-GP-11	Poly-Pale	II	Establish conditions near former Dowtherm Storage Unit.
AO-GP-12	Poly-Pale	II	Establish conditions near unit.
AO-GP-13	Vinsalyn/Paste Size	II	Establish conditions near unit.
AO-GP-14	Catalyst Regen	II	Establish conditions near Providence Street boundary.
AO-GP-15	Extracting	II	Establish conditions near unit.
AO-GP-16	Refining	II	Establish conditions near unit.
AO-GP-17	Liquid Loading	II	Establish conditions near unit.
AO-GP-18	Field Storage	II	Establish conditions near former tank farm.
AO-GP-19	Hard Resins	I	Establish conditions near Providence Street boundary.
AO-GP-20	Fuel Storage	I	Establish conditions near fuel storage between Hercules property and cemetery.
AO-GP-21	Fuel Storage	I	Establish conditions at former fueling operations in parking area at an on-site property south of W. 7th St.
AO-GP-21E (S1)	Area #2	Area #2	Establish conditions at an on-site property south of W. 7th St. Not sampled. Delineation extended away from this location.
AO-GP-21E (S2)	Area #2	Area #2	Establish conditions at an on-site property south of W. 7th St. Not sampled. Delineation extended away from this location.
AO-GP-21E(2)	Area #2	Area #2	Establish conditions at an on-site property south of W. 7th St.
AO-GP-21E(2)-S2	Area #2	Area #2	Establish conditions at an on-site property south of W. 7th St.
AO-GP-21E(2)-S3	Area #2	Area #2	Establish conditions at an off-site property south of W. 7th St.
AO-GP-21E(3)	Area #2	Area #2	Establish conditions at an on-site property south of W. 7th St.
AO-GP-21E(3)-S2	Area #2	Area #2	Establish conditions at an on-site property south of W. 7th St.
AO-GP-21E(N)	Area #2	Area #2	Establish conditions at an on-site property south of W. 7th St.
AO-GP-21E(S3)	Area #2	Area #2	Establish conditions at an on-site property south of W. 7th St.
AO-GP-21E-N1b	Area #2	Area #2	Establish conditions at an on-site property south of W. 7th St.

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Table 14. Soil and Groundwater Sample Location Rationale, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Sample Location	Area	Sampling Conducted (Phase)	Rationale
AO-GP-21N	Area #2	Area #2	Establish conditions at an on-site property south of W. 7th St.
AO-GP-21S (2)	Area #2	Area #2	Establish conditions at an on-site property south of W. 7th St. Not sampled. Delineation extended away from this location.
AO-GP-21S(3)	Area #2	Area #2	Establish conditions at an on-site property south of W. 7th St.
AO-GP-21W	Area #2	Area #2	Establish conditions at an on-site property south of W. 7th St.
AO-GP-21W(S2)	Area #2	Area #2	Establish conditions at an on-site property south of W. 7th St.
AO-GP-21W(S5)	Area #2	Area #2	Establish conditions at an on-site property south of W. 7th St.
AO-GP-22	Field Storage/Laboratory	I	Establish conditions near field storage and laboratory.
AO-GP-23	Field Storage	I	Establish conditions near former tank farm.
AO-GP-24	Fuel Oil Unloading	I	Establish conditions near unloading operation.
AO-GP-25	Near Providence Street Boundary	I	Establish conditions near Providence Street property boundary.
AO-GP-26	Near Providence Street Boundary	I	Establish conditions near Providence Street property boundary.
AO-GP-27	Near Greens Creek Entrance	I	Establish conditions near property boundary and utility corridor.
AO-GP-28	Near Providence Street Boundary	I	Establish conditions near Providence Street property boundary.
AO-GP-29	Near Providence Street Boundary	I	Establish conditions near Providence Street property boundary.
AO-GP-30	Near Providence Street Boundary	I	Establish conditions near Providence Street property boundary.
AO-GP-31	Near Providence Street Boundary	I	Establish conditions near Providence Street property boundary.
AO-GP-32	Near Hwy 42	I	Establish conditions near Hwy 42 property boundary.
AO-GP-33	Near Hwy 42	I	Establish conditions near Hwy 42 property boundary.
AO-GP-34	Sludge Pits	II	Establish groundwater conditions near Sludge Pits. Soil was not sampled.
AO-GP-35	Northeast corner	II	Establish conditions near intersection of Hwy 42 and Providence Street
AO-GP-36	Tall Oil	II	Establish conditions near unit.
AO-GP-37	South of Terpene Derivatives	II	Establish conditions south of Terpene Derivatives Unit.
AO-GP-38	Extracting	II	Establish conditions near unit.
AO-GP-39	Refining	II	Establish conditions near unit.
AO-GP-40	Field Storage	II	Establish conditions near field storage area.
AO-GP-L1-500(D)	Area #1	Area #1	Establish groundwater conditions at on-site near the southeastern property boundary.
AO-GP-L1-500(S)	Area #1	Area #1	Establish groundwater conditions at on-site near the southeastern property boundary.
AO-GP-L1-A(D)	Area #1	Area #1	Establish groundwater conditions at on-site near the southeastern property boundary.
AO-GP-L1-A(E)D	Area #1	Area #1	Establish groundwater conditions at on-site near the southeastern property boundary.
AO-GP-L1-A(E)S	Area #1	Area #1	Establish groundwater conditions at on-site near the southeastern property boundary.
AO-GP-L1-A(S)	Area #1	Area #1	Establish groundwater conditions at on-site near the southeastern property boundary.
AO-GP-L1-B(D)	Area #1	Area #1	Establish groundwater conditions at on-site near the southeastern property boundary.
AO-GP-L1-B(E)D	Area #1	Area #1	Establish groundwater conditions at on-site near the southeastern property boundary.
AO-GP-L1-B(E)S	Area #1	Area #1	Establish groundwater conditions at on-site near the southeastern property boundary.

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Table 14. Soil and Groundwater Sample Location Rationale, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Sample Location	Area	Sampling Conducted (Phase)	Rationale
AO-GP-L1-B(S)	Area #1	Area #1	Establish groundwater conditions at on-site near the southeastern property boundary.
AO-GP-L1-C(D)	Area #1	Area #1	Establish groundwater conditions at on-site near the southeastern property boundary.
AO-GP-L1-C(S)	Area #1	Area #1	Establish groundwater conditions at on-site near the southeastern property boundary.
AO-GP-L1-D(D)	Area #1	Area #1	Establish groundwater conditions at on-site near the southeastern property boundary.
AO-GP-L1-D(S)	Area #1	Area #1	Establish groundwater conditions at on-site near the southeastern property boundary.
AO-GP-L1-E(S)	Area #1	Area #1	Establish groundwater conditions at on-site near the southeastern property boundary.
AO-GP-L2-0(D)	Area #1	Area #1	Establish groundwater conditions at on-site near the southeastern property boundary.
AO-GP-L2-0(S)	Area #1	Area #1	Establish groundwater conditions at on-site near the southeastern property boundary.
AO-GP-L2-C (D)	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L2-C (S)	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L2-D	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L3-0-D	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L3-0-S	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L3-200 (D)	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L3-200 (S)	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L3-A (D)	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L3-A (S)	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L3-B (D)	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L3-B (S)	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L3-C	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L4-200-D	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L4-200-S	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L4-250-D	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L4-250-S	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L4-A (S)	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L4-A(D)	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L4-B (D)	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L4-B (S)	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L4-C	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L4-D	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L5-100-D	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L5-100-S	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L5-200-D	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L5-200-S	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L5-250-D	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L5-250-S	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.
AO-GP-L5-300-D	Area #1	Area #1	Establish groundwater conditions at an off-site property east of Providence St.

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Table 14. Soil and Groundwater Sample Location Rationale, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Sample Location	Area	Sampling Conducted (Phase)	Rationale
AO-SS-02	Drainage C	Hercules Ditch	Surface soil sample over culverted storm water drain.
AO-SS-03	Drainage C	Hercules Ditch	Surface soil sample over culverted storm water drain.
AO-SS-04	Drainage C	Hercules Ditch	Surface soil sample over culverted storm water drain.
AO-SS-05	Drainage C	Hercules Ditch	Surface soil sample over culverted storm water drain.
AO-SS-06	Drainage C	Hercules Ditch	Surface soil sample over culverted storm water drain.
AO-SS-07	Drainage C	Hercules Ditch	Surface soil sample over culverted storm water drain.
AO-SS-08	Drainage C	Hercules Ditch	Surface soil sample over culverted storm water drain.
AO-SS-09	Delnav	II	Establish soil conditions near unit. Groundwater was not sampled.
AO-SS-10	Delnav	II	Establish soil conditions near unit. Groundwater was not sampled.
AO-SS-11	Delnav	II	Establish soil conditions near unit. Groundwater was not sampled.
AO-SS-12	Delnav	II	Establish soil conditions near unit. Groundwater was not sampled.
AO-SS-13	Delnav	II	Establish soil conditions near unit. Groundwater was not sampled.
AO-SS-14	Field Storage	II	Establish soil conditions near unit. Groundwater was not sampled.
AO-SS-15	Field Storage	II	Establish soil conditions near unit. Groundwater was not sampled.
AO-SS-16	Field Storage	II	Establish soil conditions near unit. Groundwater was not sampled.
AO-SS-17	Field Storage	II	Establish soil conditions near unit. Groundwater was not sampled.
AO-SS-18	Field Storage	II	Establish soil conditions near unit. Groundwater was not sampled.
AO-SS-19	Field Storage	II	Establish soil conditions near unit. Groundwater was not sampled.
MW-129-D	Area #1	Area #1	Monitor groundwater conditions at an off-site residential property used as a daycare.
MW-129-S1	Area #1	Area #1	Establish conditions at an off-site residential property used as a daycare.
MW-25	Area #1	Area #1	Monitor groundwater conditions at an on-site property east of Providence St.
MW-26D	Area #1	Area #1	Monitor groundwater conditions at an off-site property east of Providence St.
MW-26S	Area #1	Area #1	Monitor groundwater conditions at an off-site property east of Providence St.
MW-27D	Area #1	Area #1	Monitor groundwater conditions at an off-site property east of Providence St.
MW-27S	Area #1	Area #1	Monitor groundwater conditions at an off-site property east of Providence St.
MW-29D	Area #1	Area #1	Monitor groundwater conditions at an off-site property east of Providence St.
MW-29S	Area #1	Area #1	Monitor groundwater conditions at an off-site property east of Providence St.
MW-30D	Area #1	Area #1	Monitor groundwater conditions at an off-site property east of Providence St.
MW-30S	Area #1	Area #1	Monitor groundwater conditions at an off-site property east of Providence St.
MW-31D	Area #1	Area #1	Monitor groundwater conditions at an off-site property east of Providence St.
MW-31S	Area #1	Area #1	Monitor groundwater conditions at an off-site property east of Providence St.
MW-32D	Area #1	Area #1	Monitor groundwater conditions at an off-site property east of Providence St.
MW-32S	Area #1	Area #1	Monitor groundwater conditions at an off-site property east of Providence St.
MW-33D	Area #1	Area #1	Monitor groundwater conditions at an on-site property west of Providence St.
MW-33S	Area #1	Area #1	Monitor groundwater conditions at an on-site property west of Providence St.
MW-34D	Area #1	Area #1	Monitor groundwater conditions at an off-site property east of Providence St.
MW-34S	Area #1	Area #1	Monitor groundwater conditions at an off-site property east of Providence St.

Note: Groundwater samples were not collected at the AO-SS- xx sample locations.

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Table 15. Summary of Constituents Detected in On-Site Shallow Groundwater, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]		Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Date)	MDEQ Groundwater Tier 1 TRG [c]	USEPA Tapwater Regional Screening Level [d]	Is Constituent a COPC? [e]	
		Number of Detections		Number of Samples	(%)	Minimum (µg/L)	-	Maximum (µg/L)	Minimum (µg/L)	-	Maximum (µg/L)		(µg/L)	(µg/L)	(YES, no)	Rationale
Volatile Organic Compounds																
1,1,2-Trichloroethane		1	-	219	0	1.00E+00	-	5.00E+02	2.70E-01	-	2.70E-01	AO-GP-21W (S5) (7/11/2014)	5.00E+00	4.10E-02	**YES**	ASL
1,1-Dichloroethane		6	-	219	3	1.00E+00	-	5.00E+02	3.30E-01	-	5.10E+00	GW-AO-GP-17 (11/16/2012)	7.98E+02	2.70E+00	**YES**	ASL
1,1-Dichloroethene		37	-	219	17	1.00E+00	-	5.00E+02	1.20E-01	-	2.40E+01	MW-21 (5/22/2014)	7.00E+00	2.80E+01	**YES**	ASL
1,2,3-Trichloropropane	[f]	1	-	191	1	1.00E+00	-	5.00E+02	2.60E+00	-	2.60E+00	MW-21 (5/22/2014)	6.23E-03	7.50E-04	**YES**	ASL
1,2-Dichlorobenzene	[f]	1	-	19	5	1.00E+00	-	1.00E+00	1.50E+00	-	1.50E+00	GW-AO-GP-04 (3/30/2012)	6.00E+02	3.00E+01	no	BSL
1,2-Dichloroethane		3	-	219	1	1.00E+00	-	5.00E+02	3.30E-01	-	1.30E+00	AO-GP-21W (S5) (7/11/2014)	5.00E+00	1.70E-01	**YES**	ASL
1,2-Dichloropropane		9	-	219	4	1.00E+00	-	5.00E+02	2.80E-01	-	5.10E+00	MW-21 (5/22/2014)	5.00E+00	4.40E-01	**YES**	ASL
1,4-Dichlorobenzene	[f]	1	-	19	5	1.00E+00	-	1.00E+00	3.30E-01	-	3.30E-01	GW-AO-GP-04 (3/30/2012)	7.50E+01	4.80E-01	no	BSL
1,4-Dioxane	[f]	1	-	19	5	5.00E+01	-	5.00E+01	8.30E+01	-	8.30E+01	GW-AO-GP-03 (4/2/2012)	6.09E+00	7.80E-01	**YES**	ASL
2-Butanone		17	-	219	8	1.00E+01	-	5.00E+03	1.10E+00	-	3.10E+02	MW-23 (12/5/2013)	1.91E+03	5.60E+02	no	BSL
2-Hexanone		3	-	219	1	1.00E+01	-	5.00E+03	4.20E+00	-	8.50E+00	GW-AO-GP-09S (11/17/2012)	1.46E+03	3.80E+00	**YES**	ASL
4-Methyl-2-pentanone		25	-	219	11	1.00E+01	-	5.00E+03	1.30E+00	-	1.50E+03	GW-AO-GP-09S (11/17/2012)	1.39E+02	1.20E+02	**YES**	ASL
Acetone		78	-	219	36	2.50E+01	-	1.30E+04	5.10E+00	-	2.30E+04	GW-AO-GP-09S (11/17/2012)	6.08E+02	1.40E+03	**YES**	ASL
Acrolein		1	-	219	0	2.00E+01	-	1.00E+04	6.00E+01	-	6.00E+01	AO-GP-21W (S5) (7/11/2014)	4.16E-02	4.20E-03	**YES**	ASL
Benzene		90	-	219	41	1.00E+00	-	5.00E+02	2.90E-01	-	2.80E+04	GW-AO-GP-12S (11/19/2012)	5.00E+00	4.50E-01	**YES**	ASL
Carbon disulfide		26	-	219	12	2.00E+00	-	1.00E+03	8.40E-01	-	6.70E+02	MW-21 (5/22/2014)	1.04E+03	8.10E+01	**YES**	ASL
Carbon tetrachloride		26	-	219	12	1.00E+00	-	5.00E+02	5.20E-01	-	5.60E+04	MW-17 (11/1/2012)	5.00E+00	4.50E-01	**YES**	ASL
Chlorobenzene		88	-	219	40	1.00E+00	-	5.00E+02	2.80E-01	-	1.00E+03	MW-17 (6/13/2013)	1.00E+02	7.80E+00	**YES**	ASL
Chloroform		44	-	219	20	1.40E-01	-	5.00E+02	2.80E-01	-	9.70E+03	MW-17 (6/13/2013)	1.55E-01	2.20E-01	**YES**	ASL
Chloromethane		1	-	219	0	1.00E+00	-	5.00E+02	4.00E+00	-	4.00E+00	AO-GP-21W (S5) (7/11/2014)	1.43E+00	1.90E+01	**YES**	ASL
cis-1,2-Dichloroethene		2	-	92	2	1.00E+00	-	5.00E+02	6.50E-01	-	3.40E+01	ASH-MW17-120811 (12/8/2011)	7.00E+01	3.60E+00	**YES**	ASL
Ethyl methacrylate		1	-	219	0	1.00E+00	-	5.00E+02	1.20E+00	-	1.20E+00	AO-GP-21W (S5) (7/11/2014)	5.48E+02	4.60E+01	no	BSL
Ethylbenzene		62	-	219	28	1.00E+00	-	5.00E+02	1.20E-01	-	8.90E+02	AO-GP-21E (9/26/2013)	7.00E+02	1.50E+00	**YES**	ASL
Iodomethane		2	-	219	1	5.00E+00	-	2.50E+03	7.20E+00	-	3.70E+01	GW-AO-GP-12D (11/19/2012)	NA	NA	**YES**	NSL
Isobutanol		1	-	219	0	4.00E+01	-	2.00E+04	9.00E+01	-	9.00E+01	GW-AO-GP-39 (11/19/2012)	1.83E+03	5.90E+02	no	BSL
Methacrylonitrile		2	-	219	1	2.00E+01	-	1.00E+04	8.80E+01	-	8.80E+01	AO-GP-21E(N) (7/10/2014), AO-GP-21W (S5) (7/11/2014)	1.04E+00	1.90E-01	**YES**	ASL
Methyl methacrylate		2	-	219	1	1.00E+00	-	5.00E+02	3.70E+00	-	9.00E+00	AO-GP-21E(N) (7/10/2014)	1.42E+03	1.40E+02	no	BSL
Methylene chloride		19	-	219	9	5.00E+00	-	2.50E+03	2.60E+00	-	5.20E+02	MW-17 (6/13/2013)	5.00E+00	1.10E+01	**YES**	ASL
Naphthalene	[f]	2	-	19	11	5.00E+00	-	5.00E+00	2.40E+00	-	5.70E+02	GW-AO-GP-21 (4/3/2012)	6.20E+00	1.70E-01	**YES**	ASL
Styrene		5	-	219	2	1.00E+00	-	5.00E+02	1.10E-01	-	6.20E+00	GW-AO-GP-09S (11/17/2012)	1.00E+02	1.20E+02	no	BSL
Tetrachloroethene		15	-	219	7	1.00E+00	-	5.00E+02	1.70E-01	-	8.90E+01	MW-17 (6/13/2013)	5.00E+00	4.10E+00	**YES**	ASL
Toluene		62	-	219	28	1.00E+00	-	5.00E+02	3.80E-01	-	5.50E+04	AO-GP-03N(2) (9/27/2013)	1.00E+03	1.10E+02	**YES**	ASL
Trichloroethene		9	-	219	4	1.00E+00	-	5.00E+02	3.50E-01	-	2.50E+00	GW-AO-GP-14 (11/17/2012)	5.00E+00	2.80E-01	**YES**	ASL
Vinyl chloride		5	-	219	2	1.00E+00	-	5.00E+02	2.00E-01	-	5.90E+00	MW-14 (5/20/2014)	2.00E+00	1.90E-02	**YES**	ASL
Xylenes (total)		44	-	219	20	2.00E+00	-	1.00E+03	2.00E-01	-	2.00E+03	AO-GP-21E (9/26/2013)	1.00E+04	1.90E+01	**YES**	ASL
Volatile Organic Compounds	[g]															
1,2-Dibromoethane		1	-	47	2	1.90E-02	-	2.20E-02	1.50E-02	-	1.50E-02	GW-AO-GP-25 (3/28/2012)	5.00E-02	7.50E-03	**YES**	ASL
1,2,3-Trichloropropane	[f]	1	-	28	4	1.90E-01	-	2.20E-01	1.40E+00	-	1.40E+00	GW-AO-GP-14 (11/17/2012)	6.23E-03	7.50E-04	**YES**	ASL
Semivolatile Organic Compounds																
1,1'-Biphenyl		31	-	145	21	9.50E-01	-	4.80E+03	9.70E-02	-	3.40E+03	GW-AO-GP-11 (11/19/2012), MW-22 (11/1/2012)	3.04E+02	8.30E-02	**YES**	ASL
1,2-Dichlorobenzene	[f]	1	-	157	1	9.50E-01	-	4.80E+03	1.20E+00	-	1.20E+00	GW-AO-GP-04 (3/30/2012)	6.00E+02	3.00E+01	no	BSL
1,4-Dichlorobenzene	[f]	7	-	157	4	9.50E-01	-	4.80E+03	9.70E-02	-	9.60E-01	GW-AO-GP-13D (11/17/2012)	7.50E+01	4.80E-01	**YES**	ASL
1,4-Dioxane	[f]	86	-	157	55	1.90E+00	-	9.70E+03	3.00E-01	-	1.30E+04	ASH-MW08-072611 (7/26/2011)	6.09E+00	7.80E-01	**YES**	ASL
1,4-Naphthoquinone		1	-	157	1	9.50E-01	-	4.80E+03	2.00E+02	-	2.00E+02	MW-5 (12/4/2013)	NA	NA	**YES**	NSL
Bis(2-chloro-1-methylethyl)ether		4	-	157	3	9.50E-01	-	4.80E+03	1.90E-01	-	1.70E+01	AO-GP-03 (9/27/2013)	2.60E-01	3.60E-01	**YES**	ASL
2,3,4,6-Tetrachlorophenol		1	-	157	1	9.50E-01	-	4.80E+03	4.20E+00	-	4.20E+00	GW-AO-GP-21 (4/3/2012)	1.10E+03	2.40E+01	no	BSL
2,4,5-Trichlorophenol		1	-	157	1	9.50E-01	-	4.80E+03	1.80E+00	-	1.80E+00	GW-AO-GP-21 (4/3/2012)	3.65E+03	1.20E+02	no	BSL
2,4-Dichlorophenol		1	-	157	1	9.50E-01	-	4.80E+03	3.70E-01	-	3.70E-01	GW-AO-GP-36D (11/19/2012)	1.10E+02	4.60E+00	no	BSL
2,4-Dimethylphenol		1	-	157	1	1.90E+00	-	9.70E+03	1.40E+01	-	1.40E+01	AO-GP-21E (9/26/2013)	7.30E+02	3.60E+01	no	BSL
2-Chloronaphthalene		1	-	157	1	9.50E-01	-	4.80E+03	2.30E-01	-	2.30E-01	AO-GP-03N (9/27/2013)	4.87E+02	7.50E+01	no	BSL
2-Chlorophenol		1	-	157	1	9.50E-01	-	4.80E+03	1.30E-01	-	1.30E-01	AO-GP-03N (9/27/2013)	3.04E+01	9.10E+00	no	BSL

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Table 15. Summary of Constituents Detected in On-Site Shallow Groundwater, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]		Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Date)	MDEQ Groundwater Tier 1 TRG [c]	USEPA Tapwater Regional Screening Level [d]	Is Constituent a COPC? [e]	
		Number of Detections		Number of Samples	(%)	Minimum (µg/L)	-	Maximum (µg/L)	Minimum (µg/L)	-	Maximum (µg/L)		(µg/L)	(µg/L)	(YES, no)	Rationale
2-Methylnaphthalene		12	-	157	8	1.90E-01	-	1.00E+03	4.90E-01	-	1.60E+02	AO-GP-21E (9/26/2013)	1.22E+02	3.60E+00	**YES**	ASL
2-Methylphenol		6	-	157	4	1.90E+00	-	9.70E+03	2.00E+00	-	1.70E+02	MW-23 (11/9/2012)	1.83E+03	9.30E+01	**YES**	ASL
2-Nitrophenol		1	-	157	1	9.50E-01	-	4.80E+03	6.40E-01	-	6.40E-01	GW-AO-GP-31 (3/28/2012)	4.16E-01	NA	**YES**	ASL
3,4-Methylphenol		4	-	49	8	1.90E+00	-	1.00E+03	3.80E+00	-	6.60E+02	ASH-MW23-072611 (7/26/2011)	1.83E+03	9.30E+01	**YES**	ASL
4,6-Dinitro-2-methylphenol		1	-	157	1	4.70E+00	-	2.40E+04	1.20E+01	-	1.20E+01	AO-GP-03 (9/27/2013)	3.65E+00	1.50E-01	**YES**	ASL
4-Chloro-3-methylphenol		2	-	157	1	9.50E-01	-	4.80E+03	2.80E+00	-	5.50E+00	AO-GP-21E (9/26/2013)	7.30E+04	1.40E+02	no	BSL
4-Methylphenol		11	-	108	10	1.90E+00	-	9.70E+03	6.40E-01	-	3.30E+03	GW-AO-GP-09S (11/17/2012)	1.83E+02	1.90E+02	**YES**	ASL
Acenaphthene		21	-	157	13	1.90E-01	-	1.00E+03	1.10E-01	-	9.70E+01	MW-23 (11/9/2012)	3.65E+02	5.30E+01	**YES**	ASL
Acetophenone		22	-	157	14	9.50E-01	-	4.80E+03	9.90E-02	-	3.80E+01	AO-GP-21E (9/26/2013)	NA	1.90E+02	no	BSL
Benz(a)anthracene		0	-	157	0	1.90E-01	-	1.00E+03	–	-	–	–	9.17E-02	3.40E-02	**YES**	cPAH
Benzo(a)pyrene		0	-	157	0	1.90E-01	-	1.00E+03	–	-	–	–	2.00E-01	3.40E-03	**YES**	cPAH
Benzo(b)fluoranthene		0	-	157	0	1.90E-01	-	1.00E+03	–	-	–	–	9.17E-02	3.40E-02	**YES**	cPAH
Benzo(g,h,i)perylene		2	-	157	1	1.90E-01	-	1.00E+03	1.00E-01	-	1.70E-01	GW-AO-GP-40 (11/20/2012)	1.10E+03	NA	no	BSL
Benzo(k)fluoranthene		1	-	157	1	1.90E-01	-	1.00E+03	1.60E-01	-	1.60E-01	GW-AO-GP-30S (3/29/2012)	9.17E-01	3.40E-01	**YES**	cPAH
Benzyl alcohol		21	-	157	13	9.50E-01	-	4.80E+03	1.30E-01	-	2.40E+02	MW-21 (11/9/2012)	1.10E+04	2.00E+02	**YES**	ASL
Bis(2-chloroethyl)ether		4	-	157	3	9.50E-01	-	4.80E+03	2.60E-01	-	3.50E+01	MW-23 (5/22/2014)	9.20E-03	1.40E-02	**YES**	ASL
Bis(2-ethylhexyl)phthalate		17	-	157	11	1.90E+00	-	9.70E+03	6.20E-01	-	5.30E+00	MW-3(RESAMPLE) (5/22/2014), MW-24 (5/20/2014)	6.00E+00	5.60E+00	no	BSL
Butylbenzylphthalate		5	-	157	3	9.50E-01	-	4.80E+03	1.40E-01	-	1.20E+00	AO-GP-03-N(3) (9/27/2013)	2.69E+03	1.60E+01	no	BSL
Chrysene		7	-	157	4	1.90E-01	-	1.00E+03	7.10E-02	-	1.10E+01	MW-20 (5/20/2014)	9.17E+00	3.40E+00	**YES**	ASL
Dibenz(a,h)anthracene		1	-	157	1	1.90E-01	-	1.00E+03	1.10E-01	-	1.10E-01	GW-AO-GP-30S (3/29/2012)	9.17E-03	3.40E-03	**YES**	ASL
Dibenzofuran		13	-	157	8	9.50E-01	-	4.80E+03	2.30E-01	-	5.10E+01	MW-23 (11/9/2012)	2.43E+01	7.90E-01	**YES**	ASL
Diethylphthalate		16	-	157	10	9.50E-01	-	4.80E+03	1.10E-01	-	1.80E+00	MW-11 (5/21/2014)	2.92E+04	1.50E+03	no	BSL
Dimethoate		1	-	157	1	1.90E+00	-	9.70E+03	2.40E+00	-	2.40E+00	AO-GP-03-N(3) (9/27/2013)	NA	4.00E-01	**YES**	ASL
Dimethylphthalate		1	-	157	1	9.50E-01	-	4.80E+03	1.50E-01	-	1.50E-01	AO-GP-21W (S5) (7/11/2014)	3.65E+05	NA	no	BSL
Di-n-butylphthalate		3	-	157	2	9.50E-01	-	4.80E+03	4.30E-01	-	5.60E-01	AO-GP-L1-E(S) (9/28/2012)	3.65E+03	9.00E+01	no	BSL
Di-n-octylphthalate		9	-	157	6	9.50E-01	-	4.80E+03	1.70E-01	-	1.20E+01	MW-2 (5/19/2014)	2.00E+01	2.00E+01	no	BSL
Diphenyl ether		85	-	137	62	9.50E-01	-	4.80E+03	1.00E-01	-	1.20E+04	MW-19 (11/1/2012), MW-22 (11/1/2012)	NA	NA	**YES**	NSL
Ethyl parathion		1	-	157	1	1.90E+00	-	9.70E+03	8.40E+00	-	8.40E+00	AO-GP-03-N(3) (9/27/2013)	2.19E+02	8.60E+00	no	BSL
Fluoranthene		1	-	157	1	1.90E-01	-	1.00E+03	1.30E-01	-	1.30E-01	AO-GP-L1-D(S) (9/28/2012)	1.46E+03	8.00E+01	no	BSL
Fluorene		15	-	157	10	1.90E-01	-	1.00E+03	9.90E-02	-	4.60E+01	MW-23 (11/9/2012)	2.43E+02	2.90E+01	**YES**	ASL
Hexachlorophene		2	-	138	1	4.70E+02	-	2.40E+06	6.80E+01	-	3.30E+02	AO-GP-03-N(3) (9/27/2013)	1.10E+01	6.00E-01	**YES**	ASL
Indeno(1,2,3-cd)pyrene		1	-	157	1	1.90E-01	-	1.00E+03	9.80E-02	-	9.80E-02	GW-AO-GP-30S (3/29/2012)	9.17E-02	3.40E-02	**YES**	ASL
Isophorone		1	-	157	1	9.50E-01	-	4.80E+03	1.00E-01	-	1.00E-01	AO-GP-L1-C(D) (9/28/2012)	7.05E+01	7.80E+01	no	BSL
Isosafrole		1	-	157	1	9.50E-01	-	4.80E+03	5.20E+02	-	5.20E+02	MW-5 (12/4/2013)	NA	NA	**YES**	NSL
Methyl parathion		1	-	157	1	9.50E-01	-	4.80E+03	4.10E+00	-	4.10E+00	AO-GP-03-N(3) (9/27/2013)	9.13E+00	4.50E-01	**YES**	ASL
Naphthalene	[f]	26	-	157	17	1.90E-01	-	1.00E+03	1.20E-01	-	4.30E+02	AO-GP-21E-N1B (9/26/2013)	6.20E+00	1.70E-01	**YES**	ASL
Nitrobenzene		1	-	157	1	9.50E-01	-	4.80E+03	3.10E-01	-	3.10E-01	MW-4 (12/4/2013)	3.53E+00	1.40E-01	**YES**	ASL
n-Nitroso-di-n-butylamine		2	-	157	1	9.50E-01	-	4.80E+03	2.70E-01	-	7.50E-01	AO-GP-21E(S3) (9/26/2013)	1.89E-03	2.70E-03	**YES**	ASL
n-Nitrosomorpholine		1	-	157	1	9.50E-01	-	4.80E+03	1.30E+02	-	1.30E+02	MW-23 (5/22/2014)	NA	1.20E-02	**YES**	ASL
o,o,o-Triethylphosphorothioate		30	-	157	19	9.50E-01	-	9.90E+02	4.30E-01	-	1.20E+04	ASH-MW17-072611, MW-17 (11/1/2012)	NA	NA	**YES**	NSL
Pentachlorophenol		4	-	156	3	4.70E+00	-	2.40E+04	3.60E+00	-	4.40E+01	GW-AO-GP-21 (4/3/2012)	1.00E+00	4.00E-02	**YES**	ASL
Phenanthrene		10	-	157	6	1.90E-01	-	1.00E+03	1.20E-01	-	3.90E+01	MW-23 (11/9/2012)	1.10E+03	NA	no	BSL
Phenol		42	-	157	27	9.50E-01	-	4.80E+03	1.60E-01	-	5.10E+02	GW-AO-GP-09S (11/17/2012)	2.19E+04	5.80E+02	no	BSL
Pyridine		1	-	156	1	4.70E+00	-	2.40E+04	8.20E-01	-	8.20E-01	AO-GP-L1-D(D) (9/28/2012)	3.65E+01	2.00E+00	no	BSL
Pesticides																
Dieldrin		1	-	16	6	4.70E-02	-	9.90E-01	2.50E-02	-	2.50E-02	GW-AO-GP-09D (11/17/2012)	4.19E-03	1.70E-03	**YES**	ASL
Endosulfan I	[h]	1	-	16	6	4.70E-02	-	4.90E-01	1.60E-02	-	1.60E-02	GW-AO-GP-04 (3/30/2012)	2.19E+02	1.00E+01	no	BSL
Hexachlorocyclohexane, alpha-		3	-	16	19	4.70E-02	-	5.10E-02	2.50E-01	-	1.50E+00	ASH-MW17-072611 (7/26/2011)	1.06E-02	7.10E-03	**YES**	ASL
Hexachlorocyclohexane, gamma-		1	-	16	6	4.70E-02	-	4.90E-01	4.50E-01	-	4.50E-01	ASH-MW08-072611 (7/26/2011)	2.00E-01	4.10E-02	**YES**	ASL
Heptachlor		1	-	16	6	4.70E-02	-	4.90E-01	2.20E-02	-	2.20E-02	GW-AO-GP-09D (11/17/2012)	4.00E-01	2.00E-03	**YES**	ASL
Herbicides																
2,4-Dichlorophenoxy acetic acid		1	-	10	10	4.80E-01	-	5.10E-01	1.00E+01	-	1.00E+01	ASH-MW23-072611 (7/26/2011)	7.00E+01	1.70E+01	no	BSL

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Table 15. Summary of Constituents Detected in On-Site Shallow Groundwater, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]		Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Date)	MDEQ Groundwater Tier 1 TRG [c]	USEPA Tapwater Regional Screening Level [d]	Is Constituent a COPC? [e]	
		Number of Detections		Number of Samples	(%)	Minimum (µg/L)	-	Maximum (µg/L)	Minimum (µg/L)	-	Maximum (µg/L)		(µg/L)	(µg/L)	(YES, no)	Rationale
Dioxathion/Dioxenethion																
cis-Dioxathion	[i]	9	-	16	56	2.37E+00	-	1.04E+01	3.59E+00	-	2.01E+02	MW-17 (12/5/2013)	5.48E+01	NA	**YES**	ASL
Dioxenethion	[i]	12	-	16	75	5.00E-01	-	1.04E+01	5.62E+00	-	6.23E+03	MW-17 (12/5/2013)	5.48E+01	NA	**YES**	ASL
trans-Dioxathion	[i]	9	-	16	56	2.37E+00	-	1.04E+01	3.35E+00	-	2.86E+01	MW-17 (12/5/2013)	5.48E+01	NA	no	BSL
Dioxins and Furans																
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)		5	-	8	63	4.70E-05	-	4.70E-05	6.60E-07	-	3.60E-06	GW-AO-GP-34D (11/16/2012)	4.46E-05	NA	no	BSL
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)		2	-	8	25	4.70E-05	-	4.80E-05	2.00E-07	-	2.80E-07	GW-AO-GP-39 (11/19/2012)	4.46E-05	NA	no	BSL
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)		4	-	8	50	9.40E-05	-	9.50E-05	2.40E-07	-	1.00E-06	GW-AO-GP-11 (11/19/2012)	4.46E-04	NA	no	BSL
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)		5	-	8	63	9.40E-05	-	9.50E-05	5.90E-06	-	2.50E-04	GW-AO-GP-34D (11/16/2012)	4.46E-04	NA	no	BSL
Inorganics																
Arsenic		62	-	77	81	2.50E+00	-	2.50E+00	1.30E+00	-	9.30E+01	GW-AO-GP-39 (11/19/2012)	5.00E+01	5.20E-02	**YES**	ASL
Barium		77	-	77	100	–	-	–	2.00E+01	-	7.10E+02	GW-AO-GP-14 (11/17/2012)	2.00E+03	3.80E+02	**YES**	ASL
Beryllium		22	-	77	29	5.00E-01	-	5.00E-01	1.50E-01	-	1.30E+01	GW-AO-GP-11 (11/19/2012)	4.00E+00	2.50E+00	**YES**	ASL
Cadmium		4	-	77	5	5.00E-01	-	5.00E-01	1.30E-01	-	9.50E-01	GW-AO-GP-26 (4/2/2012)	5.00E+00	9.20E-01	**YES**	ASL
Chromium	[j]	13	-	77	17	5.00E+00	-	5.00E+00	2.60E+00	-	1.90E+02	GW-AO-GP-11 (11/19/2012)	5.48E+04	2.20E+03	no	BSL
Cobalt		71	-	77	92	5.00E-01	-	5.00E-01	1.20E-01	-	5.00E+01	GW-AO-GP-26 (4/2/2012)	2.19E+03	6.00E-01	**YES**	ASL
Copper		22	-	77	29	5.00E+00	-	5.00E+00	1.10E+00	-	2.30E+01	GW-AO-GP-07D (11/19/2012)	1.30E+03	8.00E+01	no	BSL
Lead	[k]	17	-	77	22	1.50E+00	-	2.20E+00	5.00E-01	-	3.10E+01	GW-AO-GP-02D (11/20/2012)	1.50E+01	1.50E+01	**YES**	ASL
Mercury	[l]	1	-	77	1	2.00E-01	-	2.00E-01	1.10E-01	-	1.10E-01	GW-AO-GP-12S (11/19/2012)	2.00E+00	6.30E-02	**YES**	ASL
Nickel	[m]	48	-	77	62	5.00E+00	-	5.00E+00	2.00E+00	-	1.30E+02	GW-AO-GP-11 (11/19/2012)	7.30E+02	3.90E+01	**YES**	ASL
Selenium		8	-	77	10	2.50E+00	-	2.50E+00	1.10E+00	-	5.00E+00	MW-23 (11/9/2012)	5.00E+01	1.00E+01	no	BSL
Silver		1	-	77	1	1.00E+00	-	1.00E+00	5.60E-01	-	5.60E-01	GW-AO-GP-18D (11/16/2012)	1.83E+02	9.40E+00	no	BSL
Thallium	[n]	4	-	77	5	1.00E+00	-	1.00E+00	2.50E-01	-	4.70E-01	GW-AO-GP-02D (11/20/2012)	2.00E+00	2.00E-02	**YES**	ASL
Tin		5	-	77	6	5.00E+00	-	5.00E+00	1.70E+00	-	8.20E+00	MW-22 (11/1/2012)	2.19E+04	1.20E+03	no	BSL
Vanadium	[o]	19	-	77	25	1.00E+01	-	1.00E+01	3.30E+00	-	3.30E+02	GW-AO-GP-11 (11/19/2012)	2.56E+02	8.60E+00	**YES**	ASL
Zinc		26	-	77	34	2.00E+01	-	2.00E+01	8.50E+00	-	5.40E+02	GW-AO-GP-26 (4/2/2012)	1.10E+04	6.00E+02	no	BSL
Sulfide		1	-	2	50	1.00E+03	-	1.00E+03	3.10E+03	-	3.10E+03	GW-AO-GP-04 (3/30/2012)	NA	NA	**YES**	NSL

–	Not applicable.	cPAH	Carcinogenic Polycyclic Aromatic Hydrocarbon.	NSL	No screening level.
ASL	Above screening level.	MDEQ	Mississippi Department of Environmental Quality.	RSL	Regional Screening Level.
BSL	Below screening level.	µg/L	Microgram per liter.	TRG	Target Remediation Goal.
COPC	Constituent of potential concern.	NA	Not available.	USEPA	United States Environmental Protection Agency.

[a] All constituents detected in at least one on-site shallow groundwater sample are presented.
[b] Frequency of detection is equal to the number of detections divided by the total number of samples analyzed. For duplicate samples, the highest detected value or the lowest detection limit was selected.
[c] MDEQ Tier 1 Target Remediation Goal (TRG) (MDEQ 2002).
[d] USEPA Tapwater Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects.
[e] A constituent with a maximum concentration greater than the minimum of the MDEQ TRG or the USEPA Tapwater RSL is considered a COPC. A constituent with a maximum concentration below the screening level is not considered a COPC. A constituent with no screening level is conservatively identified as a COPC.
[f] Constituent was analyzed by two different laboratory methods and was detected by both methods in at least one sample. Data summaries for both methods are provided.
[g] Select volatile organic compounds were also analyzed by USEPA Method 8011 in order to achieve lower detection limits.
[h] The USEPA RSL for endosulfan is used as a surrogate.
[i] The MDEQ TRG for dioxathion is used as a surrogate for dioxathion isomers and for dioxenethion.
[j] The USEPA RSL for chromium III is used for total chromium.
[k] The USEPA RSL for lead is equal to the drinking water action level.
[l] The USEPA RSL for mercury is conservatively assumed to be the USEPA RSL for elemental mercury.
[m] The USEPA RSL for nickel is the USEPA RSL for nickel soluble salts.
[n] The USEPA RSL for thallium is the USEPA RSL for thallium soluble salts.
[o] The USEPA RSL for vanadium is the USEPA RSL for vanadium and compounds.

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Table 16. Summary of Constituents Detected in Off-Site Shallow Groundwater, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]	Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Date)	MDEQ Groundwater Tier 1 TRG [c]	USEPA Tapwater Regional Screening Level [d]	Is Constituent a COPC? [e]	
	Number of Detections		Number of Samples	(%)	Minimum (µg/L)	-	Maximum (µg/L)	Minimum (µg/L)	-	Maximum (µg/L)		(µg/L)	(µg/L)	(YES, no)	Rationale
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	1	-	63	2	1.00E+00	-	1.30E+03	4.40E-01	-	4.40E-01	GW-AO-GP-L2-C (D) (1/24/2013)	4.06E-01	5.70E-01	**YES**	ASL
1,1-Dichloroethene	1	-	63	2	1.00E+00	-	1.30E+03	1.40E+01	-	1.40E+01	GW-AO-GP-L2-C (D) (1/24/2013)	7.00E+00	2.80E+01	**YES**	ASL
1,2-Dichloropropane	1	-	63	2	1.00E+00	-	1.30E+03	2.50E-01	-	2.50E-01	GW-AO-GP-L2-C (D) (1/24/2013)	5.00E+00	4.40E-01	no	BSL
2-Butanone	2	-	63	3	1.00E+01	-	1.30E+04	4.40E+00	-	5.00E+00	GW-AO-GP-L2-C (D) (1/24/2013)	1.91E+03	5.60E+02	no	BSL
4-Methyl-2-pentanone	1	-	63	2	1.00E+01	-	1.30E+04	5.60E+01	-	5.60E+01	GW-AO-GP-L2-C (D) (1/24/2013)	1.39E+02	1.20E+02	no	BSL
Acetone	11	-	63	18	2.50E+01	-	3.10E+04	5.10E+00	-	6.90E+01	GW-AO-GP-L2-C (D) (1/24/2013)	6.08E+02	1.40E+03	no	BSL
Acetonitrile	1	-	63	2	4.00E+01	-	5.00E+04	1.20E+01	-	1.20E+01	MW-27-D (7/29/2014)	1.25E+02	1.30E+01	no	BSL
Benzene	12	-	63	19	1.00E+00	-	1.00E+03	6.80E-01	-	2.90E+03	AO-GP-21E(2)-S2 (9/26/2013)	5.00E+00	4.50E-01	**YES**	ASL
Bromodichloromethane	1	-	63	2	1.00E+00	-	1.30E+03	8.50E-01	-	8.50E-01	GW-AO-GP-L2-C (D) (1/24/2013)	1.68E-01	1.30E-01	**YES**	ASL
Bromomethane	3	-	63	5	1.00E+00	-	5.00E+03	1.50E+00	-	3.50E+00	GW-AO-GP-L2-C (D) (1/24/2013)	8.52E+00	7.50E-01	**YES**	ASL
Carbon disulfide	7	-	63	11	2.00E+00	-	2.50E+03	7.20E-01	-	6.10E+02	GW-AO-GP-28S (3/27/2012)	1.04E+03	8.10E+01	**YES**	ASL
Carbon tetrachloride	19	-	63	30	1.00E+00	-	5.00E+01	5.60E-01	-	1.20E+05	GW-AO-GP-28D (3/30/2012)	5.00E+00	4.50E-01	**YES**	ASL
Chlorobenzene	8	-	63	13	1.00E+00	-	1.00E+03	5.40E+00	-	4.00E+02	GW-AO-GP-28D (3/30/2012)	1.00E+02	7.80E+00	**YES**	ASL
Chloroform	20	-	63	32	1.00E+00	-	5.00E+01	3.30E-01	-	2.30E+04	GW-AO-GP-28D (3/30/2012)	1.55E-01	2.20E-01	**YES**	ASL
Chloromethane	1	-	63	2	1.00E+00	-	1.30E+03	1.10E+01	-	1.10E+01	GW-AO-GP-L2-C (D) (1/24/2013)	1.43E+00	1.90E+01	**YES**	ASL
Ethylbenzene	3	-	63	5	1.00E+00	-	1.30E+03	1.60E+00	-	4.10E+02	AO-GP-21E(2)-S2 (9/26/2013)	7.00E+02	1.50E+00	**YES**	ASL
Isobutanol	1	-	63	2	4.00E+01	-	5.00E+04	1.10E+01	-	1.10E+01	MW-27-D (7/29/2014)	1.83E+03	5.90E+02	no	BSL
Methyl methacrylate	1	-	63	2	1.00E+00	-	1.30E+03	6.80E-01	-	6.80E-01	MW-27-D (7/29/2014)	1.42E+03	1.40E+02	no	BSL
Methylene chloride	4	-	63	6	5.00E+00	-	6.30E+03	2.40E+00	-	2.00E+02	MW-26-S (8/1/2014)	5.00E+00	1.10E+01	**YES**	ASL
Propionitrile	1	-	63	2	2.00E+01	-	2.50E+04	4.60E+00	-	4.60E+00	MW-27-D (7/29/2014)	NA	NA	**YES**	NSL
Tetrachloroethene	2	-	63	3	1.00E+00	-	1.30E+03	1.50E-01	-	1.00E+01	GW-AO-GP-L2-C (D) (1/24/2013)	5.00E+00	4.10E+00	**YES**	ASL
Toluene	3	-	63	5	1.00E+00	-	1.30E+03	5.40E+01	-	1.90E+02	AO-GP-21E(2)-S2 (9/26/2013)	1.00E+03	1.10E+02	**YES**	ASL
Trichloroethene	2	-	63	3	1.00E+00	-	1.00E+03	9.90E-01	-	2.50E+02	GW-AO-GP-28D (3/30/2012)	5.00E+00	2.80E-01	**YES**	ASL
Xylenes (total)	3	-	63	5	2.00E+00	-	2.50E+03	2.50E+00	-	9.50E+02	AO-GP-21E(2)-S2 (9/26/2013)	1.00E+04	1.90E+01	**YES**	ASL
Semivolatile Organic Compounds															
1,1'-Biphenyl	13	-	61	21	9.30E-01	-	4.80E+00	5.10E-01	-	1.60E+06	GW-AO-GP-28D (3/30/2012)	3.04E+02	8.30E-02	**YES**	ASL
1,4-Dioxane	5	-	62	8	1.90E+00	-	3.90E+05	3.20E-01	-	6.90E+01	MW-26-S (8/1/2014)	6.09E+00	7.80E-01	**YES**	ASL
2-Methylnaphthalene	2	-	62	3	1.90E-01	-	3.90E+04	1.50E+01	-	4.70E+01	AO-GP-21E(2)-S2 (9/26/2013)	1.22E+02	3.60E+00	**YES**	ASL
3,4-Methylphenol	4	-	19	21	1.90E+00	-	1.90E+01	7.50E-01	-	7.70E+00	AO-GP-L5-100-S (9/20/2013)	1.83E+03	9.30E+01	no	BSL
4-Methylphenol	4	-	43	9	1.90E+00	-	3.90E+05	6.30E-01	-	1.10E+02	MW-26-S (8/1/2014)	1.83E+02	1.90E+02	no	BSL
Acetophenone	10	-	62	16	9.50E-01	-	1.90E+05	9.70E-02	-	1.50E+01	AO-GP-21E(2)-S2 (9/26/2013)	NA	1.90E+02	no	BSL
Benz(a)anthracene	2	-	62	3	1.90E-01	-	3.90E+04	1.10E-01	-	6.30E-01	AO-GP-L1-B(E)D (9/27/2012)	9.17E-02	3.40E-02	**YES**	ASL
Benzo(a)pyrene	1	-	62	2	1.90E-01	-	3.90E+04	5.60E-01	-	5.60E-01	AO-GP-L1-B(E)D (9/27/2012)	2.00E-01	3.40E-03	**YES**	ASL
Benzo(b)fluoranthene	1	-	62	2	1.90E-01	-	3.90E+04	7.00E-01	-	7.00E-01	AO-GP-L1-B(E)D (9/27/2012)	9.17E-02	3.40E-02	**YES**	ASL
Benzo(g,h,i)perylene	1	-	62	2	1.90E-01	-	3.90E+04	7.10E-01	-	7.10E-01	AO-GP-L1-B(E)D (9/27/2012)	1.10E+03	NA	no	BSL
Benzo(k)fluoranthene	1	-	62	2	1.90E-01	-	3.90E+04	7.40E-01	-	7.40E-01	AO-GP-L1-B(E)D (9/27/2012)	9.17E-01	3.40E-01	**YES**	ASL
Benzyl alcohol	19	-	62	31	9.30E-01	-	1.90E+05	1.30E-01	-	1.60E+02	MW-26-S (8/1/2014)	1.10E+04	2.00E+02	no	BSL
Bis(2-ethylhexyl)phthalate	18	-	62	29	1.90E+00	-	3.90E+05	6.30E-01	-	1.10E+01	MW-29-S (7/30/2014)	6.00E+00	5.60E+00	**YES**	ASL
Butylbenzylphthalate	8	-	62	13	9.30E-01	-	1.90E+05	1.20E-01	-	5.10E-01	AO-GP-L4-200-S (9/23/2013)	2.69E+03	1.60E+01	no	BSL
Chrysene	3	-	62	5	1.90E-01	-	3.90E+04	8.80E-02	-	7.90E-01	AO-GP-L1-B(E)D (9/27/2012)	9.17E+00	3.40E+00	**YES**	cPAH
Dibenz(a,h)anthracene	1	-	62	2	1.90E-01	-	3.90E+04	7.40E-01	-	7.40E-01	AO-GP-L1-B(E)D (9/27/2012)	9.17E-03	3.40E-03	**YES**	ASL
Dibenzofuran	2	-	62	3	9.30E-01	-	1.90E+05	1.10E-01	-	6.10E-01	AO-GP-L5-250-S (9/19/2013)	2.43E+01	7.90E-01	no	BSL
Diethylphthalate	7	-	62	11	9.30E-01	-	1.90E+05	1.20E-01	-	3.60E-01	AO-GP-L1-B(E)D (9/27/2012)	2.92E+04	1.50E+03	no	BSL
Dimethylphthalate	1	-	62	2	9.30E-01	-	1.90E+05	5.20E-01	-	5.20E-01	AO-GP-21E(3)-S2 (7/10/2014)	3.65E+05	NA	no	BSL
Di-n-butylphthalate	1	-	62	2	9.30E-01	-	1.90E+05	5.40E-01	-	5.40E-01	AO-GP-21E(3)-S2 (7/10/2014)	3.65E+03	9.00E+01	no	BSL
Di-n-octylphthalate	1	-	62	2	9.30E-01	-	1.90E+05	6.50E-01	-	6.50E-01	AO-GP-L1-B(E)D (9/27/2012)	2.00E+01	2.00E+01	no	BSL
Diphenyl ether	21	-	61	34	9.30E-01	-	1.00E+00	1.00E-01	-	4.70E+06	GW-AO-GP-28D (3/30/2012)	NA	NA	**YES**	NSL
Fluoranthene	3	-	62	5	1.90E-01	-	3.90E+04	1.00E-01	-	2.10E-01	AO-GP-L1-B(E)D (9/27/2012)	1.46E+03	8.00E+01	no	BSL
Indeno(1,2,3-cd)pyrene	1	-	62	2	1.90E-01	-	3.90E+04	5.90E-01	-	5.90E-01	AO-GP-L1-B(E)D (9/27/2012)	9.17E-02	3.40E-02	**YES**	ASL
Naphthalene	4	-	62	6	1.90E-01	-	3.90E+04	3.50E-01	-	2.60E+02	AO-GP-21E(2)-S2 (9/26/2013)	6.20E+00	1.70E-01	**YES**	ASL
Nitrobenzene	1	-	62	2	9.30E-01	-	1.90E+05	1.60E+00	-	1.60E+00	AO-GP-L1-A(E)S (9/27/2012)	3.53E+00	1.40E-01	**YES**	ASL
n-Nitrosomethylethylamine	1	-	62	2	1.90E+00	-	3.90E+05	4.60E-01	-	4.60E-01	AO-GP-L1-B(E)S (9/27/2012)	3.04E-03	3.50E-03	**YES**	ASL
Phenol	13	-	62	21	9.30E-01	-	1.90E+05	2.10E-01	-	4.20E+01	MW-26-S (8/1/2014)	2.19E+04	5.80E+02	no	BSL
Pyrene	3	-	62	5	1.90E-01	-	3.90E+04	1.00E-01	-	2.30E-01	AO-GP-L1-B(E)D (9/27/2012)	1.83E+02	1.20E+01	no	BSL

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Table 16. Summary of Constituents Detected in Off-Site Shallow Groundwater, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]		Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Date)	MDEQ Groundwater Tier 1 TRG [c]	USEPA Tapwater Regional Screening Level [d]	Is Constituent a COPC? [e]	
		Number of Detections		Number of Samples	(%)	Minimum (µg/L)	-	Maximum (µg/L)	Minimum (µg/L)	-	Maximum (µg/L)		(µg/L)	(µg/L)	(YES, no)	Rationale
Dioxins and Furans																
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)		1	-	3	33	4.80E-05	-	4.80E-05	1.10E-07	-	1.10E-07	MW-129-D (9/24/2013)	4.46E-05	NA	no	BSL
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)		1	-	3	33	4.80E-05	-	4.80E-05	6.50E-08	-	6.50E-08	MW-129-D (9/24/2013)	4.46E-06	NA	no	BSL
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)		1	-	3	33	9.50E-05	-	9.60E-05	3.00E-07	-	3.00E-07	MW-129-D (9/24/2013)	4.46E-04	NA	no	BSL
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)		3	-	3	100	–	-	–	6.40E-07	-	4.50E-06	GW-MW-129-S1-D (1/25/2013)	4.46E-04	NA	no	BSL
Inorganics																
Antimony	[f]	1	-	8	13	5.00E+00	-	5.00E+00	2.40E+00	-	2.40E+00	GW-AO-GP-28D (3/30/2012)	6.00E+00	7.80E-01	**YES**	ASL
Arsenic		4	-	8	50	2.50E+00	-	2.50E+00	2.10E+00	-	2.50E+01	GW-AO-GP-28D (3/30/2012)	5.00E+01	5.20E-02	**YES**	ASL
Barium		8	-	8	100	–	-	–	4.70E+01	-	3.40E+02	GW-AO-GP-28D (3/30/2012)	2.00E+03	3.80E+02	no	BSL
Beryllium		7	-	8	88	5.00E-01	-	5.00E-01	1.60E-01	-	1.60E+00	GW-AO-GP-28S (3/27/2012)	4.00E+00	2.50E+00	no	BSL
Cadmium		1	-	8	13	5.00E-01	-	5.00E-01	3.30E-01	-	3.30E-01	GW-AO-GP-28D (3/30/2012)	5.00E+00	9.20E-01	no	BSL
Chromium	[g]	3	-	8	38	5.00E+00	-	5.00E+00	3.10E+00	-	9.20E+01	GW-AO-GP-28D (3/30/2012)	5.48E+04	2.20E+03	no	BSL
Cobalt		8	-	8	100	–	-	–	5.50E-01	-	2.20E+01	GW-AO-GP-28S (3/27/2012)	2.19E+03	6.00E-01	**YES**	ASL
Copper		5	-	8	63	5.00E+00	-	5.00E+00	1.10E+00	-	2.60E+01	GW-AO-GP-28D (3/30/2012)	1.30E+03	8.00E+01	no	BSL
Lead	[h]	4	-	8	50	1.50E+00	-	1.50E+00	6.10E-01	-	3.50E+01	GW-AO-GP-28D (3/30/2012)	1.50E+01	1.50E+01	**YES**	ASL
Mercury	[i]	1	-	8	13	2.00E-01	-	2.00E-01	1.40E-01	-	1.40E-01	GW-AO-GP-29D (3/27/2012)	2.00E+00	6.30E-02	**YES**	ASL
Nickel	[j]	5	-	8	63	5.00E+00	-	5.00E+00	2.00E+00	-	2.80E+01	GW-AO-GP-28D (3/30/2012)	7.30E+02	3.90E+01	no	BSL
Thallium	[k]	3	-	8	38	1.00E+00	-	1.00E+00	2.90E-01	-	3.90E-01	GW-AO-GP-29S (3/27/2012)	2.00E+00	2.00E-02	**YES**	ASL
Tin		1	-	8	13	5.00E+00	-	5.00E+00	9.80E+00	-	9.80E+00	GW-AO-GP-28D (3/30/2012)	2.19E+04	1.20E+03	no	BSL
Vanadium	[l]	3	-	8	38	1.00E+01	-	1.00E+01	3.60E+00	-	8.60E+01	GW-AO-GP-28D (3/30/2012)	2.56E+02	8.60E+00	**YES**	ASL
Zinc		5	-	8	63	2.00E+01	-	2.00E+01	1.10E+01	-	6.30E+01	GW-AO-GP-28D (3/30/2012)	1.10E+04	6.00E+02	no	BSL

–	Not applicable.	cPAH	Carcinogenic Polycyclic Aromatic Hydrocarbon.	NSL	No screening level.
ASL	Above screening level.	MDEQ	Mississippi Department of Environmental Quality.	RSL	Regional Screening Level.
BSL	Below screening level.	µg/L	Microgram per liter.	TRG	Target Remediation Goal.
COPC	Constituent of potential concern.	NA	Not available.	USEPA	United States Environmental Protection Agency.

[a] All constituents detected in at least one off-site shallow groundwater sample are presented.
[b] Frequency of detection is equal to the number of detections divided by the total number of samples analyzed. For duplicate samples, the highest detected value or the lowest detection limit was selected.
[c] MDEQ Tier 1 Target Remediation Goal (TRG) (MDEQ 2002).
[d] USEPA Tapwater Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects.
[e] A constituent with a maximum concentration greater than the minimum of USEPA Tapwater RSL or the MDEQ TRG is considered a COPC. A constituent with a maximum concentration below the screening level is not considered a COPC. A constituent with no screening level is conservatively identified as a COPC.
[f] The USEPA RSL for antimony is the USEPA RSL for metallic antimony.
[g] The USEPA RSL for chromium III is used for total chromium.
[h] The USEPA RSL for lead is equal to the drinking water action level.
[i] The USEPA RSL for mercury is conservatively assumed to be the USEPA RSL for elemental mercury.
[j] The USEPA RSL for nickel is the USEPA RSL for nickel soluble salts.
[k] The USEPA RSL for thallium is the USEPA RSL for thallium soluble salts.
[l] The USEPA RSL for vanadium is the USEPA RSL for vanadium and compounds.

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Table 17. Summary of Constituents Detected in On-Site Soil, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]	Frequency of Detection [b]			Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Depth) (Sample Date)	MDEQ Tier 1 Unrestricted Soil TRG [c]	MDEQ Tier 1 Restricted Soil TRG [d]	USEPA Residential Regional Screening Level [e]	USEPA Industrial Regional Screening Level [f]	Is Constituent a COPC? [g]	
	Number of Detections	Number of Samples	(%)	Minimum (mg/kg)	-	Maximum (mg/kg)	Minimum (mg/kg)	-	Maximum (mg/kg)		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(YES, no)	Rationale
Volatile Organic Compounds																
1,1-Dichloroethane	1	147	1	3.60E-03	-	1.10E+01	2.90E-03	-	2.90E-03	SS-AO-GP-17 (12-14) (11/7/2012)	1.16E+02	1.16E+02	3.60E+00	1.60E+01	no	BSL
1,1-Dichloroethene	1	147	1	3.60E-03	-	1.10E+01	3.50E-03	-	3.50E-03	SS-AO-GP-17 (12-14) (11/7/2012)	7.72E-02	1.18E-01	2.30E+01	1.00E+02	no	BSL
1,2-Dichloroethane	1	147	1	3.60E-03	-	1.10E+01	2.80E-01	-	2.80E-01	SS-AO-GP-12 (18-20) (11/8/2012)	4.06E-01	6.21E-01	4.60E-01	2.00E+00	no	BSL
2-Butanone	28	147	19	1.80E-02	-	5.70E+01	2.20E-03	-	4.70E-01	SS-AO-GP-21 (5-7) (3/20/2012)	8.45E+01	8.45E+01	2.70E+03	1.90E+04	no	BSL
2-Hexanone	2	147	1	1.80E-02	-	5.70E+01	3.10E-03	-	3.90E-03	SS-AO-GP-18 (4-6) (11/8/2012)	3.13E+03	8.18E+04	2.00E+01	1.30E+02	no	BSL
4-Methyl-2-pentanone	3	147	2	1.80E-02	-	5.70E+01	8.00E-01	-	2.60E+00	SS-AO-GP-09 (10-12) (11/13/2012)	6.26E+03	1.63E+05	5.30E+02	5.60E+03	no	BSL
Acetone	50	146	34	3.60E-02	-	1.10E+02	1.00E-02	-	3.10E+01	SS-AO-GP-09 (10-12) (11/13/2012)	7.82E+03	1.04E+05	6.10E+03	6.70E+04	no	BSL
Benzene	28	147	19	3.60E-03	-	1.80E+00	5.80E-04	-	1.50E+02	SS-AO-GP-11 (0-2) (11/8/2012)	8.87E-01	1.36E+00	1.20E+00	5.10E+00	**YES**	ASL
Carbon disulfide	9	147	6	3.60E-03	-	1.80E+00	1.10E-03	-	7.70E+00	SS-AO-GP-11 (0-2) (11/8/2012)	7.97E+00	7.97E+00	7.70E+01	3.50E+02	no	BSL
Carbon tetrachloride	2	147	1	3.60E-03	-	1.10E+01	2.50E-03	-	5.70E-01	SS-AO-GP-09 (10-12) (11/13/2012)	3.71E-01	5.69E-01	6.50E-01	2.90E+00	**YES**	ASL
Chlorobenzene	5	147	3	3.60E-03	-	1.10E+01	2.40E-03	-	1.40E-01	SS-AO-GP-11 (13-15) (11/8/2012)	1.19E+00	1.19E+00	2.80E+01	1.30E+02	no	BSL
Chloroform	1	147	1	3.60E-03	-	1.10E+01	2.00E-03	-	2.00E-03	SS-AO-GP-08 (16-18) (11/12/2012)	3.12E-01	4.78E-01	3.20E-01	1.40E+00	no	BSL
Ethylbenzene	12	147	8	3.60E-03	-	1.10E+01	1.20E-03	-	1.60E+01	AO-GP-21E (S1) (4-6) (9/25/2013)	3.95E+02	3.95E+02	5.80E+00	2.50E+01	**YES**	ASL
Iodomethane	1	147	1	3.60E-03	-	1.10E+01	3.00E-03	-	3.00E-03	SS-AO-GP-25 (2-4) (3/15/2012)	NA	NA	NA	NA	**YES**	NSL
Toluene	24	147	16	3.60E-03	-	1.80E+00	7.70E-04	-	2.80E+02	SS-AO-GP-11 (0-2) (11/8/2012)	3.80E+01	3.80E+01	4.90E+02	4.70E+03	**YES**	ASL
Xylenes (total)	9	147	6	7.30E-03	-	2.30E+01	2.20E-03	-	9.00E+01	AO-GP-21E (S1) (4-6) (9/25/2013)	3.18E+02	3.18E+02	5.80E+01	2.50E+02	**YES**	ASL
Semivolatile Organic Compounds																
1,1'-Biphenyl	24	147	16	3.60E-02	-	4.10E+00	8.30E-03	-	2.00E+03	SS-AO-GP-11 (13-15) (11/8/2012)	3.91E+03	1.02E+04	4.70E+00	2.00E+01	**YES**	ASL
1,3-Dichlorobenzene	1	147	1	3.40E-02	-	1.90E+02	7.10E-03	-	7.10E-03	SS-AO-SS-17 (1-2) (11/15/2012)	7.04E+01	1.84E+03	NA	NA	no	BSL
1,4-Dichlorobenzene	2	147	1	3.40E-02	-	1.90E+02	1.40E-02	-	1.40E-02	SS-AO-GP-10 (8-10) (11/13/2012), SS-AO-SS-17 (1-2) (11/15/2012)	2.66E+01	2.38E+02	2.60E+00	1.10E+01	no	BSL
1,4-Dioxane	3	146	2	3.40E-02	-	1.90E+02	8.80E-03	-	6.00E-02	SS-AO-GP-09 (20-22) (11/13/2012)	5.81E+01	5.20E+02	5.30E+00	2.30E+01	no	BSL
2,4-Dimethylphenol	1	147	1	6.70E-02	-	3.80E+02	9.80E-03	-	9.80E-03	SS-AO-GP-39 (4-6) (11/7/2012)	1.56E+03	4.08E+04	1.20E+02	1.60E+03	no	BSL
2,6-Dinitrotoluene	1	147	1	3.40E-02	-	1.90E+02	3.10E-01	-	3.10E-01	SS-AO-SS-14 (0-1) (11/15/2012)	7.82E+01	2.04E+03	3.60E-01	1.50E+00	no	BSL
2-Methylnaphthalene	20	147	14	6.80E-03	-	3.90E+01	7.80E-03	-	1.50E+01	AO-GP-21E (S1) (4-6) (9/25/2013)	1.56E+03	4.09E+04	2.30E+01	3.00E+02	no	BSL
2-Methylphenol	2	147	1	3.40E-02	-	1.90E+02	8.00E-03	-	1.20E-02	SS-AO-GP-10 (4-6) (11/13/2012)	3.91E+03	1.02E+05	3.10E+02	4.10E+03	no	BSL
4-Methylphenol	4	144	3	3.40E-02	-	1.90E+02	3.30E-02	-	4.10E+00	SS-AO-GP-09 (10-12) (11/13/2012)	3.91E+02	1.02E+04	6.20E+02	8.20E+03	no	BSL
Acenaphthene	10	147	7	6.80E-03	-	3.90E+01	4.20E-03	-	2.10E+00	SS-AO-GP-12 (0-2) (11/8/2012)	4.69E+03	1.23E+05	3.50E+02	4.50E+03	no	BSL
Acenaphthylene	1	147	1	6.80E-03	-	3.90E+01	4.00E-01	-	4.00E-01	SS-AO-GP-12 (0-2) (11/8/2012)	4.69E+03	1.23E+05	NA	NA	no	BSL
Acetophenone	6	147	4	3.40E-02	-	1.90E+02	3.00E-02	-	7.80E+00	AO-GP-21E (S1) (4-6) (9/25/2013)	2.63E+03	2.63E+03	7.80E+02	1.20E+04	no	BSL
Aniline	3	147	2	6.70E-02	-	3.80E+02	1.30E-02	-	1.50E-02	SS-AO-GP-04 (10.75-12) (3/14/2012), SS-AO-GP-32 (0-2) (3/13/2012)	1.12E+02	1.00E+03	4.30E+01	4.10E+02	no	BSL
Anthracene	8	147	5	6.80E-03	-	3.90E+01	3.90E-03	-	4.40E+00	SS-AO-GP-12 (0-2) (11/8/2012)	2.35E+04	6.13E+05	1.70E+03	2.30E+04	no	BSL
Benz(a)anthracene	8	147	5	6.80E-03	-	3.90E+01	4.40E-03	-	7.10E+00	SS-AO-GP-12 (0-2) (11/8/2012)	8.75E-01	7.84E+00	1.50E-01	2.90E+00	**YES**	ASL
Benzo(a)pyrene	8	147	5	6.80E-03	-	3.90E+01	4.50E-03	-	6.30E+00	SS-AO-GP-12 (0-2) (11/8/2012)	8.75E-02	7.84E-01	1.50E-02	2.90E-01	**YES**	ASL
Benzo(b)fluoranthene	7	147	5	6.80E-03	-	3.90E+01	4.80E-03	-	6.60E+00	SS-AO-GP-12 (0-2) (11/8/2012)	8.75E-01	7.84E+00	1.50E-01	2.90E+00	**YES**	ASL
Benzo(g,h,i)perylene	2	147	1	6.80E-03	-	3.90E+01	1.10E-01	-	2.70E+00	SS-AO-GP-12 (0-2) (11/8/2012)	2.35E+03	6.13E+04	NA	NA	no	BSL
Benzo(k)fluoranthene	5	147	3	6.80E-03	-	3.90E+01	3.60E-03	-	5.40E+00	SS-AO-GP-12 (0-2) (11/8/2012)	8.75E+00	7.84E+01	1.50E+00	2.90E+01	**YES**	ASL
Benzyl alcohol	11	147	7	3.40E-02	-	1.90E+02	7.90E-03	-	2.10E-01	SS-AO-GP-31 (0-2) (3/14/2012)	2.35E+04	2.04E+05	6.20E+02	8.20E+03	no	BSL
Bis(2-ethylhexyl)phthalate	48	147	33	7.20E-02	-	3.80E+02	6.30E-03	-	1.80E+00	SS-AO-GP-09 (0-2) (11/13/2012)	4.56E+01	4.09E+02	3.80E+01	1.60E+02	no	BSL
Chrysene	15	147	10	6.80E-03	-	3.90E+01	4.70E-03	-	6.90E+00	SS-AO-GP-12 (0-2) (11/8/2012)	8.75E+01	7.84E+02	1.50E+01	2.90E+02	**YES**	cPAH
Dibenz(a,h)anthracene	2	147	1	6.80E-03	-	3.90E+01	6.80E-02	-	1.50E+00	SS-AO-GP-12 (0-2) (11/8/2012)	8.75E-02	7.84E-01	1.50E-02	2.90E-01	**YES**	ASL
Dibenzofuran	6	147	4	3.40E-02	-	1.90E+02	1.30E-02	-	2.00E+00	SS-AO-GP-12 (0-2) (11/8/2012)	3.13E+02	8.18E+03	7.20E+00	1.00E+02	no	BSL
Diethylphthalate	3	147	2	3.40E-02	-	1.90E+02	9.90E-03	-	1.70E-02	SS-AO-GP-27 (8-10) (3/13/2012)	1.97E+03	1.97E+03	4.90E+03	6.60E+04	no	BSL
Di-n-butylphthalate	2	147	1	1.70E-01	-	9.90E+02	3.40E-01	-	1.20E+01	SS-AO-SS-18 (1-2) (11/15/2012)	2.28E+03	2.28E+03	6.20E+02	8.20E+03	no	BSL
Diphenyl ether	35	147	24	3.60E-02	-	4.10E+00	7.40E-03	-	6.30E+03	SS-AO-GP-11 (13-15) (11/8/2012)	NA	NA	NA	NA	**YES**	NSL
Fluoranthene	29	147	20	6.80E-03	-	3.90E+01	4.00E-03	-	1.80E+01	SS-AO-GP-12 (0-2) (11/8/2012)	3.13E+03	8.17E+04	2.30E+02	3.00E+03	no	BSL
Fluorene	9	147	6	6.80E-03	-	3.90E+01	4.70E-03	-	3.50E+00	SS-AO-GP-12 (0-2) (11/8/2012)	3.13E+03	8.17E+04	2.30E+02	3.00E+03	no	BSL

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Table 17. Summary of Constituents Detected in On-Site Soil, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]		Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Depth) (Sample Date)	MDEQ Tier 1 Unrestricted Soil TRG [c]	MDEQ Tier 1 Restricted Soil TRG [d]	USEPA Residential Regional Screening Level [e]	USEPA Industrial Regional Screening Level [f]	Is Constituent a COPC? [g]	
		Number of Detections		Number of Samples	(%)	Minimum		Maximum	Minimum		Maximum							
						(mg/kg)		(mg/kg)	(mg/kg)		(mg/kg)		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(YES, no)	Rationale
Indeno(1,2,3-cd)pyrene		2	-	147	1	6.80E-03	-	3.90E+01	9.40E-02	-	2.40E+00	SS-AO-GP-12 (0-2) (11/8/2012)	8.75E-01	7.84E+00	1.50E-01	2.90E+00	**YES**	ASL
Naphthalene		21	-	147	14	6.80E-03	-	3.90E+01	4.80E-03	-	2.20E+01	AO-GP-21E (S1) (4-6) (9/25/2013)	1.94E+02	2.47E+02	3.80E+00	1.70E+01	**YES**	ASL
o,o,o-Triethylphosphorothioate		10	-	147	7	6.70E-02	-	3.80E+02	1.30E-01	-	3.50E+01	SS-AO-SS-10 (1-2) (11/15/2012)	NA	NA	NA	NA	**YES**	NSL
Pentachlorobenzene		1	-	147	1	3.40E-02	-	1.90E+02	4.30E-01	-	4.30E-01	SS-AO-SS-10 (1-2) (11/15/2012)	6.26E+01	1.63E+03	4.90E+00	6.60E+01	no	BSL
Phenanthrene		31	-	147	21	6.80E-03	-	3.90E+01	2.70E-03	-	1.90E+01	SS-AO-GP-12 (0-2) (11/8/2012)	2.35E+03	6.13E+04	NA	NA	no	BSL
Phenol		1	-	147	1	3.40E-02	-	1.90E+02	4.70E-01	-	4.70E-01	SS-AO-GP-12 (8-10) (11/8/2012)	4.69E+04	1.23E+05	1.80E+03	2.50E+04	no	BSL
Pyrene		18	-	147	12	6.80E-03	-	3.90E+01	4.20E-03	-	1.60E+01	SS-AO-GP-12 (0-2) (11/8/2012)	2.35E+03	6.13E+04	1.70E+02	2.30E+03	no	BSL
Sulfotep		1	-	147	1	3.40E-02	-	1.90E+02	6.50E-01	-	6.50E-01	SS-AO-SS-12 (1-2) (11/15/2012)	NA	NA	3.10E+00	4.10E+01	no	BSL
Pesticides																		
4,4'-Dichlorodiphenyldichloroethane (DDD)		14	-	144	10	1.70E-03	-	4.80E-02	9.40E-04	-	1.80E-01	SS-AO-GP-31 (0-2) (3/14/2012)	2.66E+00	2.38E+01	2.20E+00	9.60E+00	no	BSL
4,4'-Dichlorodiphenyldichloroethene (DDE)		15	-	144	10	1.70E-03	-	4.80E-02	2.90E-04	-	4.50E-01	SS-AO-GP-31 (0-2) (3/14/2012)	1.88E+00	1.68E+01	1.60E+00	6.80E+00	no	BSL
4,4'-Dichlorodiphenyltrichloroethane (DDT)		17	-	144	12	1.70E-03	-	4.80E-02	1.00E-03	-	1.00E+00	SS-AO-SS-10 (1-2) (11/15/2012)	1.88E+00	1.68E+01	1.90E+00	8.60E+00	no	BSL
Dieldrin		13	-	144	9	1.70E-03	-	4.80E-02	6.30E-04	-	1.20E+00	SS-AO-SS-10 (1-2) (11/15/2012)	3.99E-02	3.58E-01	3.30E-02	1.40E-01	**YES**	ASL
Endosulfan I	[h]	2	-	144	1	1.70E-03	-	4.80E-02	2.10E-04	-	3.30E-04	SS-AO-GP-21 (2-4) (3/20/2012)	4.69E+02	1.23E+03	3.70E+01	4.90E+02	no	BSL
Endosulfan sulfate	[h]	1	-	144	1	1.70E-03	-	4.80E-02	1.90E-03	-	1.90E-03	SS-AO-GP-09 (0-2) (11/13/2012)	4.69E+02	1.23E+03	3.70E+01	4.90E+02	no	BSL
Heptachlor		2	-	144	1	1.70E-03	-	4.80E-02	3.90E-04	-	4.20E-04	SS-AO-GP-06 (0-2) (11/12/2012)	1.27E-01	1.95E-01	1.20E-01	5.10E-01	no	BSL
Hexachlorocyclohexane, alpha-		3	-	144	2	1.70E-03	-	4.80E-02	1.30E-03	-	5.30E-01	SS-AO-SS-10 (1-2) (11/15/2012)	1.01E-01	9.08E-01	8.50E-02	3.70E-01	**YES**	ASL
Hexachlorocyclohexane, beta-		3	-	144	2	1.70E-03	-	4.80E-02	9.00E-04	-	2.50E-01	SS-AO-SS-10 (1-2) (11/15/2012)	3.55E-01	3.18E+00	3.00E-01	1.30E+00	no	BSL
Hexachlorocyclohexane, delta-	[i]	2	-	144	1	1.70E-03	-	4.80E-02	2.80E-04	-	6.50E-01	SS-AO-SS-10 (1-2) (11/15/2012)	3.55E-01	3.18E+00	3.00E-01	1.30E+00	**YES**	ASL
Hexachlorocyclohexane, gamma-		6	-	144	4	1.70E-03	-	4.80E-02	4.80E-04	-	2.00E-01	SS-AO-SS-10 (1-2) (11/15/2012)	4.91E-01	4.40E+00	5.60E-01	2.50E+00	no	BSL
Toxaphene		8	-	144	6	1.70E-01	-	4.80E+00	1.60E-01	-	9.50E+00	SS-AO-SS-10 (1-2) (11/15/2012)	5.81E-01	5.20E+00	4.80E-01	2.10E+00	**YES**	ASL
Dioxathion/Dioxenethion																		
cis-Dioxathion	[j]	47	-	92	51	5.03E-04	-	1.94E+00	2.94E-02	-	1.54E+03	SS-AO-SS-12 (1-2) (11/15/2012)	1.17E+02	3.07E+03	NA	NA	**YES**	ASL
Dioxenethion	[j]	47	-	92	51	4.99E-04	-	1.94E+00	2.30E-02	-	2.24E+02	SS-AO-SS-12 (1-2) (11/15/2012)	1.17E+02	3.07E+03	NA	NA	**YES**	ASL
trans-Dioxathion	[j]	38	-	92	41	4.99E-04	-	1.94E+00	7.28E-02	-	1.43E+01	SS-AO-GP-34 (0-2) (11/14/2012)	1.17E+02	3.07E+03	NA	NA	no	BSL
Dioxins and Furans																		
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)		92	-	92	100	–	-	–	7.70E-07	-	4.30E-03	SS-AO-SS-13 (0-1) (11/15/2012)	4.26E-04	3.82E-03	NA	NA	**YES**	ASL
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)		64	-	92	70	5.40E-06	-	7.10E-06	4.50E-08	-	2.00E-04	SS-AO-SS-13 (0-1) (11/15/2012)	4.26E-04	3.82E-03	NA	NA	no	BSL
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)		46	-	92	50	5.10E-06	-	7.10E-06	2.10E-07	-	2.90E-05	SS-AO-GP-11 (0-2) (11/8/2012)	4.26E-04	3.82E-03	NA	NA	no	BSL
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		62	-	92	67	4.90E-06	-	7.00E-06	7.70E-08	-	5.50E-05	SS-AO-SS-13 (0-1) (11/15/2012)	4.26E-05	3.82E-04	NA	NA	**YES**	ASL
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)		52	-	92	57	5.40E-06	-	7.10E-06	9.00E-08	-	9.60E-05	SS-AO-GP-09 (0-2) (11/13/2012)	4.26E-05	3.82E-04	NA	NA	**YES**	ASL
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		74	-	92	80	5.40E-06	-	7.00E-06	7.90E-08	-	1.40E-04	SS-AO-SS-13 (0-1) (11/15/2012)	1.03E-04	9.23E-04	NA	NA	**YES**	ASL
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)		54	-	92	59	5.40E-06	-	7.10E-06	6.90E-08	-	6.30E-05	SS-AO-GP-11 (0-2) (11/8/2012)	4.26E-05	3.82E-04	NA	NA	**YES**	ASL
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)		85	-	92	92	5.50E-06	-	7.00E-06	2.20E-07	-	1.30E-04	SS-AO-SS-13 (0-1) (11/15/2012)	1.03E-04	9.23E-04	NA	NA	**YES**	ASL
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)		17	-	92	19	4.90E-06	-	7.10E-06	1.20E-07	-	2.00E-06	SS-AO-SS-13 (0-1) (11/15/2012)	4.26E-05	3.82E-04	NA	NA	no	BSL
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)		57	-	92	62	5.40E-06	-	7.10E-06	8.70E-08	-	2.60E-05	SS-AO-SS-13 (0-1) (11/15/2012)	8.52E-06	7.63E-05	NA	NA	**YES**	ASL
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)		32	-	92	35	5.00E-06	-	7.10E-06	7.00E-08	-	2.90E-05	SS-AO-SS-11 (0-1) (11/15/2012)	8.52E-05	7.63E-04	NA	NA	no	BSL
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)		47	-	92	51	5.30E-06	-	7.10E-06	1.00E-07	-	1.30E-05	SS-AO-GP-09 (0-2) (11/13/2012)	4.26E-05	3.82E-04	NA	NA	no	BSL
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)		41	-	92	45	5.10E-06	-	7.10E-06	5.80E-08	-	6.30E-05	SS-AO-GP-09 (0-2) (11/13/2012)	8.52E-06	7.63E-05	NA	NA	**YES**	ASL
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)		29	-	92	32	9.80E-07	-	1.40E-06	2.20E-08	-	5.80E-06	SS-AO-SS-13 (0-1) (11/15/2012)	4.26E-06	3.82E-05	4.90E-06	2.20E-05	**YES**	ASL
2,3,7,8-Tetrachlorodibenzofuran (TCDF)		45	-	92	49	1.10E-06	-	1.40E-06	4.20E-08	-	1.80E-04	SS-AO-SS-09 (0-1) (11/15/2012)	4.26E-05	3.82E-04	NA	NA	**YES**	ASL
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)		65	-	92	71	1.10E-05	-	1.40E-05	5.10E-08	-	5.00E-04	SS-AO-GP-14 (0-2) (11/6/2012)	4.26E-03	3.82E-02	NA	NA	no	BSL
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)		92	-	92	100	–	-	–	3.20E-05	-	5.00E-02	SS-AO-SS-13 (0-1) (11/15/2012)	4.26E-03	3.82E-02	NA	NA	**YES**	ASL

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Table 17. Summary of Constituents Detected in On-Site Soil, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]		Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Depth) (Sample Date)	MDEQ Tier 1 Unrestricted Soil TRG [c]	MDEQ Tier 1 Restricted Soil TRG [d]	USEPA Residential Regional Screening Level [e]	USEPA Industrial Regional Screening Level [f]	Is Constituent a COPC? [g]	
		Number of Detections		Number of Samples	(%)	Minimum (mg/kg)		Maximum (mg/kg)	Minimum (mg/kg)		Maximum (mg/kg)		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(YES, no)	Rationale
Inorganics																		
Antimony	[k]	13	-	144	9	9.10E-01	-	2.70E+00	5.60E-01	-	3.20E+00	SS-AO-GP-17 (0-2) (11/7/2012)	3.13E+01	8.17E+01	3.10E+00	4.70E+01	**YES**	ASL
Arsenic		144	-	144	100	–	-	–	1.70E-01	-	1.00E+01	SS-AO-GP-26 (10-12) (3/20/2012)	4.26E-01	3.82E+00	6.70E-01	3.00E+00	**YES**	ASL
Barium		144	-	144	100	–	-	–	1.80E+00	-	2.40E+02	SS-AO-GP-03 (10.5-12) (3/14/2012)	5.48E+03	1.43E+04	1.50E+03	2.20E+04	no	BSL
Beryllium		138	-	144	96	4.50E-02	-	9.90E-02	2.90E-02	-	1.80E+00	SS-AO-GP-14 (12-14) (11/6/2012), SS-AO-GP-19 (24-26) (3/15/2012), SS-AO-GP-26 (10-12) (3/20/2012)	1.56E+02	1.02E+03	1.60E+01	2.30E+02	no	BSL
Cadmium		94	-	144	65	4.50E-02	-	1.20E-01	1.30E-02	-	1.20E+00	SS-AO-GP-34 (0-2) (11/14/2012)	3.91E+01	1.02E+03	7.00E+00	9.80E+01	no	BSL
Chromium	[l]	144	-	144	100	–	-	–	7.70E-01	-	2.30E+02	SS-AO-SS-10 (1-2) (11/15/2012)	1.17E+05	3.07E+06	1.20E+04	1.80E+05	no	BSL
Cobalt		144	-	144	100	–	-	–	6.10E-02	-	3.20E+01	SS-AO-GP-12 (18-20) (11/8/2012)	4.69E+03	1.23E+04	2.30E+00	3.50E+01	**YES**	ASL
Copper		143	-	144	99	5.00E-01	-	5.00E-01	2.80E-01	-	7.90E+02	SS-AO-SS-10 (1-2) (11/15/2012)	3.13E+03	8.17E+03	3.10E+02	4.70E+03	**YES**	ASL
Lead		144	-	144	100	–	-	–	4.60E-01	-	6.10E+02	SS-AO-GP-11 (0-2) (11/8/2012)	4.00E+02	1.70E+03	4.00E+02	8.00E+02	**YES**	ASL
Mercury	[m]	72	-	144	50	1.80E-02	-	2.70E-02	8.00E-03	-	8.40E+00	SS-AO-GP-16 (0-2) (11/7/2012)	1.00E+01	6.13E+01	9.40E-01	4.00E+00	**YES**	ASL
Nickel	[n]	143	-	144	99	5.00E-01	-	5.00E-01	4.10E-01	-	9.80E+01	SS-AO-SS-13 (0-1) (11/15/2012)	1.56E+03	4.08E+03	1.50E+02	2.20E+03	no	BSL
Selenium		53	-	144	37	4.50E-01	-	1.30E+00	2.60E-01	-	1.20E+00	SS-AO-GP-01 (4-6) (3/12/2012), SS-AO-GP-16 (6-8) (11/7/2012)	3.91E+02	1.02E+03	3.90E+01	5.80E+02	no	BSL
Silver		18	-	144	13	9.10E-02	-	2.70E-01	5.70E-02	-	1.10E+01	SS-AO-GP-09 (0-2) (11/13/2012)	3.91E+02	1.02E+03	3.90E+01	5.80E+02	no	BSL
Thallium	[o]	127	-	144	88	9.10E-02	-	2.30E-01	3.50E-02	-	4.70E-01	SS-AO-GP-30 (19-21) (3/16/2012)	5.48E+00	1.43E+02	7.80E-02	1.20E+00	**YES**	ASL
Tin		11	-	144	8	9.10E+00	-	2.70E+01	2.60E+00	-	1.40E+01	SS-AO-SS-16 (0-1) (11/15/2012)	4.69E+04	1.23E+05	4.70E+03	7.00E+04	no	BSL
Vanadium	[p]	144	-	144	100	–	-	–	6.20E-01	-	4.90E+01	SS-AO-GP-40 (10-12) (11/8/2012)	5.48E+02	1.43E+03	3.90E+01	5.80E+02	**YES**	ASL
Zinc		143	-	144	99	2.00E+00	-	2.00E+00	6.90E-01	-	4.20E+02	SS-AO-GP-34 (0-2) (11/14/2012)	2.35E+04	6.13E+04	2.30E+03	3.50E+04	no	BSL
Cyanide	[q]	4	-	48	8	5.20E-01	-	6.90E-01	2.40E-01	-	4.00E-01	SS-AO-GP-23 (2-4) (3/19/2012)	1.56E+03	4.08E+03	2.10E+00	1.30E+01	no	BSL

–	Not applicable.	cPAH	Carcinogenic Polycyclic Aromatic Hydrocarbon.	NSL	No screening level.
ASL	Above screening level.	MDEQ	Mississippi Department of Environmental Quality.	RSL	Regional Screening Level.
BSL	Below screening level.	mg/kg	Milligram per kilogram.	TRG	Target Remediation Goal.
COPC	Constituent of potential concern.	NA	Not available.	USEPA	United States Environmental Protection Agency.

[a] All constituents detected in at least one on-site soil sample are presented.
[b] Frequency of detection is equal to the number of detections divided by the total number of samples analyzed. For duplicate samples, the highest detected value or the lowest detection limit was selected.
[c] MDEQ Tier 1 Unrestricted Soil Target Remediation Goal (TRG) (MDEQ 2002).
[d] MDEQ Tier 1 Restricted Soil Target Remediation Goal (TRG) (MDEQ 2002).
[e] USEPA Residential Soil Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects.
[f] USEPA Industrial Soil Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects.
[g] A constituent with a maximum concentration greater than the minimum of the MDEQ TRG or the USEPA RSL is considered a COPC. A constituent with a maximum concentration below the screening level is not considered a COPC. A constituent with no screening level is conservatively identified as a COPC.
[h] The MDEQ TRGs for endosulfan are used as surrogates.
[i] The MDEQ TRGs for technical hexachlorocyclohexane are used as surrogates.
[j] The MDEQ TRGs for dioxathion are used as surrogates for dioxathion isomers and for dioxenethion.
[k] The USEPA RSLs for antimony are the USEPA RSLs for metallic antimony.
[l] The MDEQ TRGs and USEPA RSLs for chromium III are used for total chromium.
[m] The USEPA RSLs for mercury are conservatively assumed to be the USEPA RSLs for elemental mercury.
[n] The USEPA RSLs for nickel are the USEPA RSLs for nickel soluble salts.
[o] The USEPA RSLs for thallium are the USEPA RSLs for thallium soluble salts.
[p] The USEPA RSLs for vanadium are the USEPA RSLs for vanadium and compounds.
[q] The MDEQ TRGs for free cyanide were used for cyanide.

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Table 18. Summary of Constituents Detected in Off-Site Soil, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]		Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Depth)	MDEQ Tier 1 Unrestricted Soil TRG [c]	MDEQ Tier 1 Restricted Soil TRG [d]	USEPA Residential Regional Screening Level [e]	USEPA Industrial Regional Screening Level [f]		Is Constituent a COPC? [g]	
		Number of Detections		Number of Samples	(%)	Minimum (mg/kg)	-	Maximum (mg/kg)	Minimum (mg/kg)	-	Maximum (mg/kg)		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)		(YES, no)	Rationale
Volatile Organic Compounds																			
2-Butanone		7	-	16	44	1.90E-02	-	4.80E+00	3.60E-03	-	2.50E-02	AO-SS-06 (0 - 1)	8.45E+01	8.45E+01	2.70E+03	1.90E+04	1.90E+04	no	BSL
Acetone		10	-	16	63	4.10E-02	-	9.50E+00	1.10E-02	-	3.10E-01	AO-SS-06 (0 - 1)	7.82E+03	1.04E+05	6.10E+03	6.70E+04	6.70E+04	no	BSL
Benzene		7	-	16	44	3.80E-03	-	6.20E-03	8.30E-04	-	3.50E-01	AO-GP-28 (24 - 26)	8.87E-01	1.36E+00	1.20E+00	5.10E+00	5.10E+00	no	BSL
Bromomethane		2	-	16	13	3.80E-03	-	9.50E-01	1.90E-03	-	2.00E-03	AO-SS-02 (0 - 1)	2.97E+00	2.97E+00	6.80E-01	3.00E+00	3.00E+00	no	BSL
Carbon tetrachloride		3	-	16	19	3.80E-03	-	6.20E-03	3.20E-02	-	2.40E+01	AO-GP-28 (24 - 26)	3.71E-01	5.69E-01	6.50E-01	2.90E+00	2.90E+00	**YES**	ASL
Chloroform		3	-	16	19	3.80E-03	-	6.20E-03	5.40E-03	-	3.50E+00	AO-GP-28 (24 - 26)	3.12E-01	4.78E-01	3.20E-01	1.40E+00	1.40E+00	**YES**	ASL
Iodomethane		1	-	16	6	3.80E-03	-	9.50E-01	7.00E-03	-	7.00E-03	AO-GP-28 (0 - 2)	NA	NA	NA	NA	NA	**YES**	NSL
Toluene		5	-	16	31	3.80E-03	-	9.50E-01	1.20E-03	-	1.90E-03	AO-SS-02 (0 - 1), AO-SS-03 (0 - 1)	3.80E+01	3.80E+01	4.90E+02	4.70E+03	4.70E+03	no	BSL
Semivolatile Organic Compounds																			
1,1'-Biphenyl		4	-	16	25	3.70E-02	-	4.10E-01	9.30E-03	-	1.10E+00	AO-GP-28 (24 - 26)	3.91E+03	1.02E+04	4.70E+00	2.00E+01	2.00E+01	no	BSL
4-Methylphenol		1	-	16	6	3.60E-02	-	4.10E-01	2.10E-02	-	2.10E-02	AO-SS-02 (0 - 1)	3.91E+02	1.02E+04	6.20E+02	8.20E+03	8.20E+03	no	BSL
Benz(a)anthracene		3	-	16	19	7.20E-03	-	8.30E-02	4.20E-02	-	1.30E-01	AO-SS-08 (0 - 1)	8.75E-01	7.84E+00	1.50E-01	2.90E+00	2.90E+00	**YES**	cPAH
Benzo(a)pyrene		4	-	16	25	7.20E-03	-	8.30E-02	3.40E-02	-	1.60E-01	AO-SS-08 (0 - 1)	8.75E-02	7.84E-01	1.50E-02	2.90E-01	2.90E-01	**YES**	ASL
Benzo(b)fluoranthene		2	-	16	13	7.20E-03	-	8.30E-02	6.70E-02	-	3.20E-01	AO-SS-08 (0 - 1)	8.75E-01	7.84E+00	1.50E-01	2.90E+00	2.90E+00	**YES**	ASL
Benzo(g,h,i)perylene		2	-	16	13	7.20E-03	-	8.30E-02	4.70E-02	-	8.30E-02	AO-SS-08 (0 - 1)	2.35E+03	6.13E+04	NA	NA	NA	no	BSL
Benzo(k)fluoranthene		4	-	16	25	7.20E-03	-	8.40E-02	3.70E-02	-	1.00E-01	AO-SS-03 (0 - 1)	8.75E+00	7.84E+01	1.50E+00	2.90E+01	2.90E+01	**YES**	cPAH
Bis(2-ethylhexyl)phthalate		7	-	16	44	7.10E-02	-	8.20E-01	7.40E-03	-	3.90E-01	AO-SS-03 (0 - 1)	4.56E+01	4.09E+02	3.80E+01	1.60E+02	1.60E+02	no	BSL
Chrysene		4	-	16	25	7.20E-03	-	8.30E-02	4.50E-02	-	1.60E-01	AO-SS-08 (0 - 1)	8.75E+01	7.84E+02	1.50E+01	2.90E+02	2.90E+02	**YES**	cPAH
Dibenz(a,h)anthracene		0	-	16	0	7.20E-03	-	8.40E-02	–	-	–	–	8.75E-02	7.84E-01	1.50E-02	2.90E-01	2.90E-01	**YES**	cPAH
Di-n-butylphthalate		2	-	16	13	1.80E-01	-	2.10E+00	2.30E-02	-	2.40E-02	AO-GP-29 (24 - 26)	2.28E+03	2.28E+03	6.20E+02	8.20E+03	8.20E+03	no	BSL
Diphenyl ether		7	-	16	44	3.70E-02	-	4.10E-01	3.10E-02	-	3.70E+00	AO-GP-28 (24 - 26)	NA	NA	NA	NA	NA	**YES**	NSL
Fluoranthene		5	-	16	31	7.20E-03	-	8.30E-02	5.10E-03	-	2.20E-01	AO-SS-08 (0 - 1)	3.13E+03	8.17E+04	2.30E+02	3.00E+03	3.00E+03	no	BSL
Indeno(1,2,3-cd)pyrene		1	-	16	6	7.20E-03	-	8.30E-02	6.80E-02	-	6.80E-02	AO-SS-08 (0 - 1)	8.75E-01	7.84E+00	1.50E-01	2.90E+00	2.90E+00	**YES**	cPAH
Phenanthrene		3	-	16	19	7.20E-03	-	8.30E-02	3.60E-03	-	9.60E-02	AO-SS-08 (0 - 1)	2.35E+03	6.13E+04	NA	NA	NA	no	BSL
Pyrene		4	-	16	25	7.20E-03	-	8.30E-02	4.60E-02	-	2.70E-01	AO-SS-08 (0 - 1)	2.35E+03	6.13E+04	1.70E+02	2.30E+03	2.30E+03	no	BSL
Pesticides																			
4,4'-Dichlorodiphenyldichloroethane (DDD)		2	-	16	13	1.80E-03	-	4.70E-03	1.00E-02	-	1.30E-02	AO-SS-08 (0 - 1)	2.66E+00	2.38E+01	2.20E+00	9.60E+00	9.60E+00	no	BSL
4,4'-Dichlorodiphenyldichloroethene (DDE)		9	-	16	56	1.90E-03	-	4.70E-03	1.40E-03	-	1.90E-01	AO-GP-28 (0 - 2)	1.88E+00	1.68E+01	1.60E+00	6.80E+00	6.80E+00	no	BSL
4,4'-Dichlorodiphenyltrichloroethane (DDT)		8	-	16	50	1.90E-03	-	4.70E-03	1.40E-03	-	1.90E-01	AO-SS-08 (0 - 1)	1.88E+00	1.68E+01	1.90E+00	8.60E+00	8.60E+00	no	BSL
Aldrin		1	-	16	6	1.80E-03	-	2.40E-03	1.80E-03	-	1.80E-03	AO-SS-03 (0 - 1)	3.76E-02	3.37E-01	3.10E-02	1.40E-01	1.40E-01	no	BSL
Dieldrin		4	-	16	25	1.90E-03	-	4.70E-03	8.10E-04	-	4.20E-02	AO-SS-03 (0 - 1)	3.99E-02	3.58E-01	3.30E-02	1.40E-01	1.40E-01	**YES**	ASL
Endosulfan I	[h]	1	-	16	6	1.80E-03	-	2.40E-03	3.40E-04	-	3.40E-04	MW-129-S1 (0 - 2)	4.69E+02	1.23E+03	3.70E+01	4.90E+02	NA	no	BSL
Endosulfan II	[h]	1	-	16	6	1.90E-03	-	4.70E-03	3.00E-04	-	3.00E-04	MW-129-S1 (0 - 2)	4.69E+02	1.23E+03	3.70E+01	4.90E+02	NA	no	BSL
Heptachlor		1	-	16	6	1.80E-03	-	2.40E-03	1.50E-04	-	1.50E-04	MW-129-S1 (0 - 2)	1.27E-01	1.95E-01	1.20E-01	5.10E-01	5.10E-01	no	BSL
Heptachlor epoxide		2	-	16	13	1.80E-03	-	2.40E-03	2.40E-04	-	3.30E-03	AO-SS-03 (0 - 1)	7.02E-02	6.29E-01	5.90E-02	2.50E-01	2.50E-01	no	BSL
Hexachlorocyclohexane, alpha-		1	-	16	6	1.80E-03	-	2.40E-03	1.50E-04	-	1.50E-04	MW-129-S1 (0 - 2)	1.01E-01	9.08E-01	8.50E-02	3.70E-01	3.70E-01	no	BSL
Hexachlorocyclohexane, delta-	[i]	1	-	16	6	1.80E-03	-	2.40E-03	2.00E-04	-	2.00E-04	MW-129-S1 (0 - 2)	3.55E-01	3.18E+00	3.00E-01	1.30E+00	NA	no	BSL
Hexachlorocyclohexane, gamma-		1	-	16	6	1.80E-03	-	2.40E-03	1.30E-04	-	1.30E-04	MW-129-S1 (0 - 2)	4.91E-01	4.40E+00	5.60E-01	2.50E+00	2.50E+00	no	BSL
Toxaphene		4	-	16	25	1.80E-01	-	2.40E-01	3.30E-01	-	1.40E+00	AO-SS-06 (0 - 1)	5.81E-01	5.20E+00	4.80E-01	2.10E+00	2.10E+00	**YES**	ASL
Polychlorinated Biphenyls																			
Aroclor 1254		1	-	16	6	3.50E-02	-	4.70E-02	4.10E-01	-	4.10E-01	AO-SS-03 (0 - 1)	1.00E+00	1.00E+01	1.10E-01	1.00E+00	1.00E+00	**YES**	ASL
Dioxathion/Dioxenethion																			
cis-Dioxathion	[j]	7	-	13	54	8.34E-02	-	8.52E-02	1.07E-01	-	1.57E+00	AO-SS-07 (0 - 1)	1.17E+02	3.07E+03	NA	NA	NA	no	BSL
Dioxenethion	[j]	8	-	13	62	1.67E-02	-	1.71E-02	2.45E-02	-	1.37E+00	AO-SS-04 (0 - 1)	1.17E+02	3.07E+03	NA	NA	NA	no	BSL
trans-Dioxathion	[j]	5	-	13	39	8.34E-02	-	8.52E-02	2.75E-01	-	8.26E-01	AO-SS-06 (0 - 1)	1.17E+02	3.07E+03	NA	NA	NA	no	BSL

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Table 18. Summary of Constituents Detected in Off-Site Soil, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]		Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Depth)	MDEQ Tier 1 Unrestricted Soil TRG [c]	MDEQ Tier 1 Restricted Soil TRG [d]	USEPA Residential Regional Screening Level [e]	USEPA Industrial Regional Screening Level [f]		Is Constituent a COPC? [g]	
		Number of Detections		Number of Samples	(%)	Minimum (mg/kg)		Maximum (mg/kg)	Minimum (mg/kg)		Maximum (mg/kg)		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)		(YES, no)	Rationale
Dioxins and Furans																			
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)		12	-	16	75	6.20E-06	-	7.60E-06	2.10E-06	-	2.80E-03	AO-SS-08 (0 - 1)	4.26E-04	3.82E-03	NA	NA	NA	**YES**	ASL
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)		11	-	16	69	5.60E-06	-	7.60E-06	1.10E-07	-	5.10E-04	AO-SS-08 (0 - 1)	4.26E-04	3.82E-03	NA	NA	NA	**YES**	ASL
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)		8	-	16	50	5.60E-06	-	7.60E-06	1.20E-07	-	4.30E-05	AO-SS-08 (0 - 1)	4.26E-04	3.82E-03	NA	NA	NA	no	BSL
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		11	-	16	69	5.60E-06	-	7.60E-06	6.40E-08	-	1.80E-05	AO-SS-08 (0 - 1)	4.26E-05	3.82E-04	NA	NA	NA	no	BSL
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)		9	-	16	56	5.60E-06	-	7.60E-06	1.60E-07	-	1.60E-05	AO-SS-08 (0 - 1)	4.26E-05	3.82E-04	NA	NA	NA	no	BSL
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		11	-	16	69	5.60E-06	-	7.60E-06	1.10E-07	-	7.80E-05	AO-SS-08 (0 - 1)	1.03E-04	9.23E-04	NA	NA	NA	no	BSL
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)		9	-	16	56	5.60E-06	-	7.60E-06	2.20E-07	-	8.30E-05	AO-SS-08 (0 - 1)	4.26E-05	3.82E-04	NA	NA	NA	**YES**	ASL
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)		11	-	16	69	5.60E-06	-	7.60E-06	1.40E-07	-	5.00E-05	AO-SS-08 (0 - 1)	1.03E-04	9.23E-04	NA	NA	NA	no	BSL
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)		4	-	16	25	5.60E-06	-	3.10E-05	8.30E-08	-	5.30E-07	AO-SS-07 (0 - 1)	4.26E-05	3.82E-04	NA	NA	NA	no	BSL
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)		10	-	16	63	5.60E-06	-	7.60E-06	9.30E-08	-	5.50E-06	AO-SS-08 (0 - 1)	8.52E-06	7.63E-05	NA	NA	NA	no	BSL
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)		6	-	16	38	5.60E-06	-	3.10E-05	4.70E-08	-	1.60E-06	AO-SS-07 (0 - 1)	8.52E-05	7.63E-04	NA	NA	NA	no	BSL
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)		11	-	16	69	5.60E-06	-	7.60E-06	3.40E-08	-	8.20E-06	AO-SS-08 (0 - 1)	4.26E-05	3.82E-04	NA	NA	NA	no	BSL
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)		8	-	16	50	5.60E-06	-	3.10E-05	1.30E-07	-	2.30E-06	AO-SS-07 (0 - 1)	8.52E-06	7.63E-05	NA	NA	NA	no	BSL
2,3,7,8-Tetrachlorodibenzofuran (TCDF)		9	-	16	56	1.10E-06	-	6.10E-06	8.50E-08	-	1.40E-06	AO-SS-03 (0 - 1)	4.26E-05	3.82E-04	NA	NA	NA	no	BSL
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)		11	-	16	69	1.10E-05	-	1.50E-05	2.10E-07	-	1.40E-03	AO-SS-08 (0 - 1)	4.26E-03	3.82E-02	NA	NA	NA	no	BSL
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)		14	-	16	88	5.30E-05	-	1.30E-04	1.50E-05	-	2.10E-02	AO-SS-08 (0 - 1)	4.26E-03	3.82E-02	NA	NA	NA	**YES**	ASL
Inorganics																			
Antimony	[k]	1	-	16	6	1.10E+00	-	2.70E+00	1.10E+00	-	1.10E+00	AO-SS-08 (0 - 1)	3.13E+01	8.17E+01	3.10E+00	4.70E+01	4.70E+01	no	BSL
Arsenic		16	-	16	100	–	-	–	3.30E-01	-	5.60E+00	AO-SS-07 (0 - 1)	4.26E-01	3.82E+00	6.70E-01	3.00E+00	3.00E+00	**YES**	ASL
Barium		16	-	16	100	–	-	–	8.80E+00	-	1.10E+02	AO-GP-28 (24 - 26), AO-GP-29 (24 - 26), MW-129-S1 (22 - 24)	5.48E+03	1.43E+04	1.50E+03	2.20E+04	2.20E+04	no	BSL
Beryllium		14	-	16	88	1.00E-01	-	1.30E-01	7.80E-02	-	1.40E+00	AO-GP-28 (24 - 26)	1.56E+02	1.02E+03	1.60E+01	2.30E+02	2.30E+02	no	BSL
Cadmium		12	-	16	75	5.40E-02	-	1.30E-01	1.70E-02	-	5.40E-01	AO-SS-08 (0 - 1)	3.91E+01	1.02E+03	7.00E+00	9.80E+01	9.80E+01	no	BSL
Chromium	[l]	16	-	16	100	–	-	–	3.60E+00	-	1.90E+01	AO-GP-28 (0 - 2)	1.17E+05	3.07E+06	1.20E+04	1.80E+05	1.80E+05	no	BSL
Cobalt		16	-	16	100	–	-	–	3.60E-01	-	1.60E+01	AO-SS-02 (0 - 1)	4.69E+03	1.23E+04	2.30E+00	3.50E+01	3.50E+01	**YES**	ASL
Copper		16	-	16	100	–	-	–	6.90E-01	-	2.20E+02	AO-SS-03 (0 - 1)	3.13E+03	8.17E+03	3.10E+02	4.70E+03	4.70E+03	no	BSL
Lead		16	-	16	100	–	-	–	3.00E+00	-	3.50E+02	AO-SS-03 (0 - 1)	4.00E+02	1.70E+03	4.00E+02	8.00E+02	8.00E+02	no	BSL
Mercury	[m]	13	-	16	81	1.90E-02	-	2.40E-02	1.10E-02	-	2.50E-01	AO-SS-02 (0 - 1)	1.00E+01	6.13E+01	9.40E-01	4.00E+00	4.00E+00	no	BSL
Nickel	[n]	16	-	16	100	–	-	–	1.10E+00	-	9.10E+01	AO-SS-03 (0 - 1)	1.56E+03	4.08E+03	1.50E+02	2.20E+03	2.20E+03	no	BSL
Selenium		1	-	16	6	5.40E-01	-	1.30E+00	3.40E-01	-	3.40E-01	MW-129-S1 (0 - 2)	3.91E+02	1.02E+03	3.90E+01	5.80E+02	5.80E+02	no	BSL
Silver		2	-	16	13	1.10E-01	-	2.70E-01	1.40E-01	-	2.00E-01	AO-SS-08 (0 - 1)	3.91E+02	1.02E+03	3.90E+01	5.80E+02	5.80E+02	no	BSL
Thallium	[o]	11	-	16	69	2.10E-01	-	2.60E-01	4.00E-02	-	3.10E-01	AO-GP-29 (24 - 26)	5.48E+00	1.43E+02	7.80E-02	1.20E+00	1.20E+00	**YES**	ASL
Tin		1	-	16	6	1.10E+01	-	2.70E+01	1.10E+01	-	1.10E+01	AO-SS-08 (0 - 1)	4.69E+04	1.23E+05	4.70E+03	7.00E+04	7.00E+04	no	BSL
Vanadium	[p]	16	-	16	100	–	-	–	3.50E+00	-	2.80E+01	AO-GP-29 (24 - 26)	5.48E+02	1.43E+03	3.90E+01	5.80E+02	5.80E+02	no	BSL
Zinc		16	-	16	100	–	-	–	3.10E+00	-	1.90E+02	AO-SS-08 (0 - 1)	2.35E+04	6.13E+04	2.30E+03	3.50E+04	3.50E+04	no	BSL
Cyanide		1	-	16	6	5.20E-01	-	6.80E-01	4.80E-01	-	4.80E-01	AO-SS-06 (0 - 1)	1.56E+03	4.08E+03	2.10E+00	1.30E+01	1.30E+01	no	BSL
Sulfide	[q]	1	-	13	8	5.40E+01	-	8.60E+01	5.90E+01	-	5.90E+01	AO-SS-07 (0 - 1)	NA	NA	NA	NA	NA	**YES**	NSL

–	Not applicable.	cPAH	Carcinogenic polycyclic aromatic hydrocarbon.	NSL	No screening level.
ASL	Above screening level.	MDEQ	Mississippi Department of Environmental Quality.	RSL	Regional Screening Level.
BSL	Below screening level.	mg/kg	Milligram per kilogram.	TRG	Target Remediation Goal.
COPC	Constituent of potential concern.	NA	Not available.	USEPA	United States Environmental Protection Agency.

[a] All constituents detected in at least one off-site soil sample are presented.
[b] Frequency of detection is equal to the number of detections divided by the total number of samples analyzed. For duplicate samples, the highest detected value or the lowest detection limit was selected.
[c] MDEQ Tier 1 Unrestricted Soil Target Remediation Goal (TRG) (MDEQ 2002).
[d] MDEQ Tier 1 Restricted Soil Target Remediation Goal (TRG) (MDEQ 2002).
[e] USEPA Residential Soil Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects.
[f] USEPA Industrial Soil Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects.
[g] A constituent with a maximum concentration greater the minimium of MDEQ TRG or the USEPA RSL is considered a COPC. A constituent with a maximum concentration below the screening level is not considered a COPC. A constituent with no screening level is conservatively identified as a COPC.
[h] The MDEQ TRGs for endosulfan are used as surrogates.
[i] The MDEQ TRGs and USEPA RSLs for technical hexachlorocyclohexane are used as surrogates.
[j] The MDEQ TRGs for dioxathion are used as surrogates for dioxathion isomers and for dioxenethion.
[k] The USEPA RSLs for anitmony are the USEPA RSLs for metalic antimony.
[l] The MDEQ TRGs and USEPA RSLs for chromium III are used for total chromium.
[m] The USEPA RSLs for mercury are conservatively assumed to be the USEPA RSLs for elemental mercury.
[n] The USEPA RSLs for nickel are the USEPA RSLs for nickel soluble salts.
[o] The USEPA RSLs for thallium are the USEPA RSLs for thallium soluble salts.
[p] The USEPA RSLs for vanadium are the USEPA RSLs for vandium and compounds.
[q] The MDEQ TRGs for free cyanide were used for cyanide.

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Table 19. Summary of Constituents Detected in Soil (0-1 foot below ground surface), Ecological Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]	Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Depth)	Ecological Screening Levels [c]		Is Constituent a COPC? [d]	
	Number of Detections		Number of Samples	(%)	Minimum (mg/kg)	-	Maximum (mg/kg)	Minimum (mg/kg)	-	Maximum (mg/kg)		(mg/kg)	ref	(YES, no)	Rationale
Volatile Organic Compounds															
2-Butanone	6	-	18	33	2.00E-02	-	2.90E-02	3.60E-03	-	2.50E-02	AO-SS-06 (0 - 1)	8.96E+01	(3)	no	BSL
Acetone	10	-	18	56	4.00E-02	-	5.20E-02	1.30E-02	-	3.10E-01	AO-SS-06 (0 - 1)	2.50E+00	(3)	no	BSL
Benzene	8	-	18	44	4.10E-03	-	6.00E-03	5.80E-04	-	8.50E-03	AO-SS-02 (0 - 1)	5.00E-02	(1)	no	BSL
Bromomethane	1	-	18	6	4.00E-03	-	6.20E-03	2.00E-03	-	2.00E-03	AO-SS-02 (0 - 1)	2.35E-01	(3)	no	BSL
Carbon tetrachloride	1	-	18	6	4.00E-03	-	6.20E-03	2.50E-03	-	2.50E-03	AO-SS-11 (0 - 1)	1.00E-01	(1)	no	BSL
Toluene	5	-	18	28	4.00E-03	-	6.00E-03	1.20E-03	-	1.90E-03	AO-SS-02 (0 - 1), AO-SS-03 (0 - 1)	5.00E-02	(1)	no	BSL
Semivolatile Organic Compounds															
1,1'-Biphenyl	1	-	18	6	3.60E-02	-	3.80E+00	1.30E-02	-	1.30E-02	AO-SS-02 (0 - 1)	6.00E+01	(1)	no	BSL
2,6-Dinitrotoluene	1	-	18	6	3.60E-02	-	3.80E+00	3.10E-01	-	3.10E-01	AO-SS-14 (0 - 1)	3.28E-02	(3)	**YES**	ASL
4-Methylphenol	1	-	18	6	3.60E-02	-	3.80E+00	2.10E-02	-	2.10E-02	AO-SS-02 (0 - 1)	5.00E-01	(1)	no	BSL
Bis(2-ethylhexyl)phthalate	5	-	18	28	7.60E-02	-	7.70E+00	8.20E-03	-	3.90E-01	AO-SS-03 (0 - 1)	1.00E-01	(1)	**YES**	ASL
Diphenyl ether	4	-	18	22	3.60E-02	-	3.80E+00	4.40E-02	-	2.60E-01	AO-SS-07 (0 - 1)	NA		**YES**	NSL
o,o,o-Triethylphosphorothioate	5	-	18	28	7.20E-02	-	7.70E+00	5.70E-01	-	4.70E+00	AO-SS-09 (0 - 1)	8.18E-01	(3)	**YES**	ASL
Polycyclic Aromatic Hydrocarbons															
Benz(a)anthracene	4	-	18	22	7.30E-03	-	7.80E-01	4.20E-02	-	1.30E-01	AO-SS-08 (0 - 1)	See HMW PAHs		–	–
Benzo(a)pyrene	5	-	18	28	7.30E-03	-	7.80E-01	3.40E-02	-	1.60E-01	AO-SS-08 (0 - 1)	See HMW PAHs		–	–
Benzo(b)fluoranthene	4	-	18	22	7.30E-03	-	7.80E-01	4.60E-02	-	3.20E-01	AO-SS-08 (0 - 1)	See HMW PAHs		–	–
Benzo(g,h,i)perylene	2	-	18	11	7.30E-03	-	7.80E-01	4.70E-02	-	8.30E-02	AO-SS-08 (0 - 1)	See HMW PAHs		–	–
Benzo(k)fluoranthene	3	-	18	17	7.30E-03	-	7.80E-01	3.70E-02	-	1.00E-01	AO-SS-03 (0 - 1)	See HMW PAHs		–	–
Chrysene	5	-	18	28	7.30E-03	-	7.80E-01	4.50E-02	-	1.60E-01	AO-SS-08 (0 - 1)	See HMW PAHs		–	–
Fluoranthene	6	-	18	33	7.30E-03	-	7.80E-01	5.10E-03	-	2.20E-01	AO-SS-08 (0 - 1)	See HMW PAHs		–	–
Indeno(1,2,3-cd)pyrene	1	-	18	6	7.30E-03	-	7.80E-01	6.80E-02	-	6.80E-02	AO-SS-08 (0 - 1)	See HMW PAHs		–	–
Naphthalene	1	-	18	6	7.30E-03	-	7.80E-01	4.60E-02	-	4.60E-02	AO-SS-11 (0 - 1)	See LMW PAHs		–	–
Phenanthrene	4	-	18	22	7.30E-03	-	7.80E-01	3.60E-03	-	1.40E-01	AO-SS-11 (0 - 1)	See LMW PAHs		–	–
Pyrene	5	-	18	28	7.30E-03	-	7.80E-01	4.60E-02	-	2.70E-01	AO-SS-08 (0 - 1)	See HMW PAHs		–	–
Total HMW PAHs	7	-	18	39	–	-	–	5.10E-03	-	4.44E-01	AO-SS-07 (0 - 1)	1.10E+00	(1)	no	BSL
Total LMW PAHs	3	-	18	17	–	-	–	3.60E-03	-	4.60E-02	AO-SS-11 (0 - 1)	2.90E+01	(1)	no	BSL
Pesticides															
4,4'-Dichlorodiphenyldichloroethane (DDD)	3	-	18	17	1.70E-03	-	1.90E-02	2.40E-03	-	2.10E-02	AO-SS-12 (0 - 1)	See Total DDX		–	–
4,4'-Dichlorodiphenyldichloroethene (DDE)	7	-	18	39	1.70E-03	-	1.90E-02	1.10E-03	-	9.40E-02	AO-SS-08 (0 - 1)	See Total DDX		–	–
4,4'-Dichlorodiphenyltrichloroethane (DDT)	5	-	18	28	1.70E-03	-	1.90E-02	1.40E-02	-	1.90E-01	AO-SS-08 (0 - 1)	See Total DDX		–	–
DDT and metabolites (DDD and DDE)	8	-	18	44	–	-	–	1.10E-03	-	2.97E-01	AO-SS-08 (0 - 1)	2.10E-02	(1)	**YES**	ASL
Aldrin	1	-	18	6	1.70E-03	-	1.90E-02	1.80E-03	-	1.80E-03	AO-SS-03 (0 - 1)	2.50E-03	(1)	no	BSL
Dieldrin	5	-	18	28	1.70E-03	-	1.80E-02	7.00E-04	-	2.10E-01	AO-SS-10 (0 - 1)	2.80E-04	(1)	**YES**	ASL
Heptachlor	1	-	18	6	1.70E-03	-	1.90E-02	3.90E-04	-	3.90E-04	AO-SS-18 (0 - 1)	5.98E-03	(3)	no	BSL
Heptachlor epoxide	1	-	18	6	1.70E-03	-	1.90E-02	3.30E-03	-	3.30E-03	AO-SS-03 (0 - 1)	1.52E-01	(3)	no	BSL
Hexachlorocyclohexane, alpha-	2	-	18	11	1.70E-03	-	1.90E-02	1.30E-03	-	3.60E-02	AO-SS-10 (0 - 1)	2.50E-03	(1)	**YES**	ASL
Hexachlorocyclohexane, beta-	1	-	18	6	1.70E-03	-	1.90E-02	1.50E-03	-	1.50E-03	AO-SS-12 (0 - 1)	1.00E-03	(1)	**YES**	ASL
Hexachlorocyclohexane, gamma-	3	-	18	17	1.70E-03	-	1.90E-02	2.50E-03	-	1.60E-02	AO-SS-12 (0 - 1)	5.00E-05	(1)	**YES**	ASL
Toxaphene	8	-	18	44	1.70E-01	-	9.60E-01	2.10E-01	-	4.40E+00	AO-SS-13 (0 - 1)	1.19E-01	(3)	**YES**	ASL
Polychlorinated Biphenyls															
Aroclor 1254	1	-	7	14	3.80E-02	-	4.10E-02	4.10E-01	-	4.10E-01	AO-SS-03 (0 - 1)	See Total PCBs		–	–
Total PCBs	1	-	7	14	3.80E-02	-	4.10E-02	4.10E-01	-	4.10E-01	AO-SS-03 (0 - 1)	2.00E-02	(1)	**YES**	ASL
Dioxathion/Dioxenethion															
cis-Dioxathion	12	-	18	67	1.67E+00	-	1.94E+00	1.07E-01	-	1.03E+03	AO-SS-11 (0 - 1)	NA		**YES**	NSL
Dioxenethion	10	-	18	56	1.70E-02	-	1.94E+00	5.09E-02	-	2.12E+02	AO-SS-11 (0 - 1)	NA		**YES**	NSL
trans-Dioxathion	7	-	18	39	8.38E-02	-	1.94E+00	2.75E-01	-	1.98E+00	AO-SS-16 (0 - 1)	NA		**YES**	NSL

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Table 19. Summary of Constituents Detected in Soil (0-1 foot below ground surface), Ecological Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]	Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Depth)	Ecological Screening Levels [c]		Is Constituent a COPC? [d]	
	Number of Detections		Number of Samples	(%)	Minimum (mg/kg)	-	Maximum (mg/kg)	Minimum (mg/kg)	-	Maximum (mg/kg)		(mg/kg)	ref	(YES, no)	Rationale
Dioxins and Furans															
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	18	-	18	100	–	-	–	5.10E-06	-	4.30E-03	AO-SS-13 (0 - 1)	NA		**YES**	NSL
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	18	-	18	100	–	-	–	7.30E-08	-	5.10E-04	AO-SS-08 (0 - 1)	NA		**YES**	NSL
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	15	-	18	83	5.10E-06	-	6.10E-06	7.60E-07	-	4.30E-05	AO-SS-08 (0 - 1)	NA		**YES**	NSL
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	17	-	18	94	5.60E-06	-	5.60E-06	2.10E-07	-	5.50E-05	AO-SS-13 (0 - 1)	NA		**YES**	NSL
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	17	-	18	94	5.60E-06	-	5.60E-06	1.20E-07	-	6.10E-05	AO-SS-13 (0 - 1)	NA		**YES**	NSL
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	18	-	18	100	–	-	–	7.90E-08	-	1.40E-04	AO-SS-13 (0 - 1)	NA		**YES**	NSL
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	17	-	18	94	5.60E-06	-	5.60E-06	1.10E-07	-	8.30E-05	AO-SS-08 (0 - 1)	NA		**YES**	NSL
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	18	-	18	100	–	-	–	2.20E-07	-	1.30E-04	AO-SS-13 (0 - 1)	NA		**YES**	NSL
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	6	-	18	33	5.10E-06	-	3.10E-05	3.10E-07	-	2.00E-06	AO-SS-13 (0 - 1)	NA		**YES**	NSL
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	18	-	18	100	–	-	–	8.70E-08	-	2.60E-05	AO-SS-13 (0 - 1)	NA		**YES**	NSL
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	10	-	18	56	5.10E-06	-	3.10E-05	6.20E-07	-	2.90E-05	AO-SS-11 (0 - 1)	NA		**YES**	NSL
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	17	-	18	94	5.60E-06	-	5.60E-06	1.00E-07	-	1.10E-05	AO-SS-13 (0 - 1)	NA		**YES**	NSL
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	15	-	18	83	5.10E-06	-	3.10E-05	3.60E-07	-	2.10E-05	AO-SS-11 (0 - 1)	NA		**YES**	NSL
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	6	-	18	33	1.00E-06	-	6.10E-06	5.50E-08	-	5.80E-06	AO-SS-13 (0 - 1)	1.99E-07	(3)	**YES**	ASL
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	16	-	18	89	1.10E-06	-	6.10E-06	4.40E-08	-	1.80E-04	AO-SS-09 (0 - 1)	3.86E-05	(3)	**YES**	ASL
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	17	-	18	94	1.10E-05	-	1.10E-05	2.30E-06	-	1.40E-03	AO-SS-08 (0 - 1)	NA		**YES**	NSL
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	18	-	18	100	–	-	–	1.40E-04	-	5.00E-02	AO-SS-13 (0 - 1)	NA		**YES**	NSL
Inorganics															
Antimony	2	-	18	11	9.10E-01	-	2.40E+00	1.10E+00	-	2.90E+00	AO-SS-16 (0 - 1)	2.90E-01	(1)	**YES**	ASL
Arsenic	18	-	18	100	–	-	–	3.10E-01	-	5.60E+00	AO-SS-07 (0 - 1)	1.00E+01	(1)	no	BSL
Barium	18	-	18	100	–	-	–	4.30E+00	-	2.30E+02	AO-SS-12 (0 - 1)	3.30E+02	(1)	no	BSL
Beryllium	17	-	18	94	4.50E-02	-	4.50E-02	7.80E-02	-	5.20E-01	AO-SS-13 (0 - 1)	3.60E+01	(1)	no	BSL
Cadmium	16	-	18	89	4.50E-02	-	5.20E-02	2.10E-02	-	1.10E+00	AO-SS-16 (0 - 1)	3.80E-01	(1)	**YES**	ASL
Chromium	18	-	18	100	–	-	–	1.00E+00	-	4.40E+01	AO-SS-13 (0 - 1)	4.00E-01	(1)	**YES**	ASL
Cobalt	18	-	18	100	–	-	–	1.60E-01	-	1.60E+01	AO-SS-02 (0 - 1)	1.30E+01	(1)	**YES**	ASL
Copper	18	-	18	100	–	-	–	8.40E-01	-	2.20E+02	AO-SS-03 (0 - 1)	4.00E+01	(1)	**YES**	ASL
Lead	18	-	18	100	–	-	–	2.30E+00	-	3.50E+02	AO-SS-03 (0 - 1)	1.60E+01	(1)	**YES**	ASL
Mercury	18	-	18	100	–	-	–	8.00E-03	-	5.20E-01	AO-SS-11 (0 - 1)	1.00E-01	(1)	**YES**	ASL
Nickel	18	-	18	100	–	-	–	3.20E+00	-	9.80E+01	AO-SS-13 (0 - 1)	3.00E+01	(1)	**YES**	ASL
Selenium	7	-	18	39	4.50E-01	-	1.20E+00	2.80E-01	-	3.90E-01	AO-SS-16 (0 - 1)	8.10E-01	(1)	no	BSL
Silver	4	-	18	22	9.10E-02	-	2.30E-01	7.00E-02	-	2.00E-01	AO-SS-08 (0 - 1)	2.00E+00	(1)	no	BSL
Thallium	15	-	18	83	9.10E-02	-	2.30E-01	5.30E-02	-	2.10E-01	AO-SS-10 (0 - 1)	1.00E+00	(1)	no	BSL
Tin	3	-	18	17	9.10E+00	-	2.40E+01	2.60E+00	-	1.40E+01	AO-SS-16 (0 - 1)	5.30E+01	(1)	no	BSL
Vanadium	18	-	18	100	–	-	–	1.10E+00	-	3.00E+01	AO-SS-10 (0 - 1), AO-SS-12 (0 - 1)	2.00E+00	(1)	**YES**	ASL
Zinc	18	-	18	100	–	-	–	2.00E+00	-	2.50E+02	AO-SS-16 (0 - 1)	5.00E+01	(1)	**YES**	ASL
Cyanide	1	-	7	14	5.20E-01	-	6.20E-01	4.80E-01	-	4.80E-01	AO-SS-06 (0 - 1)	9.00E-01	(1)	no	BSL
Sulfide	1	-	7	14	5.40E+01	-	7.50E+01	5.90E+01	-	5.90E+01	AO-SS-07 (0 - 1)	NA		**YES**	NSL

–	Not applicable.	HMW	High molecular weight.	NSL	No screening level.
ASL	Above screening level.	LMW	Low molecular weight.	PAHs	Polycyclic aromatic hydrocarbons.
BSL	Below screening level.	mg/kg	Milligram per kilogram.	PCBs	Polychlorinated biphenyls.
COPC	Constituent of potential concern.	NA	Not available.	USEPA	United States Environmental Protection Agency.

[a] All detected constituents are presented.

[b] Frequency of detection is equal to the number of detections divided by the total number of samples analyzed. For duplicate samples, the highest detected value or the lowest detection limit was selected.

[c] Ecological soil screening levels were from the following sources in order of priority:
(1) Region 4 Draft Ecological Soil Screening Levels (USEPA 2012; R4).
(2) USEPA Ecological Soil Screening Levels (USEPA 2013b; EcoSSL).
(3) Region 5 Ecological Screening Levels (USEPA 2003b; R5).
(4) Region 3 Ecological Screening Levels (USEPA 2003a; R3).

[d] A constituent with a maximum concentration greater the ecological screening level is considered a COPC. A constituent with a maximum concentration below the screening level is not considered a COPC. A constituent with no screening level is conservatively identified as a COPC.

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Table 20. Summary of Constituents Detected in Soil (0-2 feet below ground surface), Ecological Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]	Frequency of Detection [b]			Detection Limits		Detected Concentrations		Location of Maximum Concentration	Ecological Screening Levels [c]		Is Constituent a COPC? [d]	
	Number of Detections	Number of Samples	(%)	Minimum (µg/kg)	Maximum (µg/kg)	Minimum (µg/kg)	Maximum (µg/kg)	(Sample Depth)	(µg/kg)	Ref	(YES, no)	Rationale
Volatile Organic Compounds												
2-Butanone	21	65	32	1.90E-02	5.70E+01	2.70E-03	2.40E-01	AO-SS-10 (1 - 2)	8.96E+01	(3)	no	BSL
2-Hexanone	1	65	2	1.90E-02	5.70E+01	3.10E-03	3.10E-03	AO-GP-06 (0 - 2)	1.26E+01	(3)	no	BSL
4-Methyl-2-pentanone	1	65	2	1.90E-02	5.70E+01	8.00E-01	8.00E-01	AO-GP-16 (0 - 2)	4.43E+02	(3)	no	BSL
Acetone	28	64	44	3.90E-02	1.10E+02	1.10E-02	3.10E-01	AO-SS-06 (0 - 1)	2.50E+00	(3)	no	BSL
Benzene	14	65	22	3.80E-03	3.60E-01	5.80E-04	1.50E+02	AO-GP-11 (0 - 2)	5.00E-02	(1)	**YES**	ASL
Bromomethane	2	65	3	3.80E-03	1.10E+01	1.90E-03	2.00E-03	AO-SS-02 (0 - 1)	2.35E-01	(3)	no	BSL
Carbon disulfide	1	65	2	3.80E-03	3.60E-01	7.70E+00	7.70E+00	AO-GP-11 (0 - 2)	9.41E-02	(3)	**YES**	ASL
Carbon tetrachloride	2	65	3	3.80E-03	1.10E+01	2.50E-03	1.10E-01	AO-GP-28 (0 - 2)	1.00E-01	(1)	**YES**	ASL
Chloroform	1	65	2	3.80E-03	1.10E+01	2.70E-02	2.70E-02	AO-GP-28 (0 - 2)	1.00E-03	(1)	**YES**	ASL
Ethylbenzene	1	65	2	3.80E-03	1.10E+01	3.60E-01	3.60E-01	AO-GP-13 (0 - 2)	5.00E-02	(1)	**YES**	ASL
Iodomethane	1	65	2	3.80E-03	1.10E+01	7.00E-03	7.00E-03	AO-GP-28 (0 - 2)	1.23E+00	(3)	no	BSL
Toluene	14	65	22	3.80E-03	8.20E-03	7.70E-04	2.80E+02	AO-GP-11 (0 - 2)	5.00E-02	(1)	**YES**	ASL
Xylenes (total)	1	65	2	7.60E-03	2.30E+01	2.40E+00	2.40E+00	AO-GP-13 (0 - 2)	5.00E-02	(1)	**YES**	ASL
Semivolatile Organic Compounds												
1,1'-Biphenyl	11	65	17	3.60E-02	4.10E+00	1.30E-02	1.10E+01	AO-GP-12 (0 - 2)	6.00E+01	(1)	no	BSL
1,3-Dichlorobenzene	1	65	2	3.40E-02	4.10E+00	7.10E-03	7.10E-03	AO-SS-17 (1 - 2)	3.77E+01	(3)	no	BSL
1,4-Dichlorobenzene	1	65	2	3.40E-02	4.10E+00	1.40E-02	1.40E-02	AO-SS-17 (1 - 2)	5.46E-01	(3)	no	BSL
2,6-Dinitrotoluene	1	65	2	3.40E-02	4.10E+00	3.10E-01	3.10E-01	AO-SS-14 (0 - 1)	3.28E-02	(3)	**YES**	ASL
4-Methylphenol	2	65	3	3.40E-02	4.10E+00	2.10E-02	2.40E-01	AO-SS-18 (1 - 2)	5.00E-01	(1)	no	BSL
Acetophenone	2	65	3	3.40E-02	4.10E+00	1.50E-01	1.60E+00	AO-SS-10 (1 - 2)	3.00E+02	(3)	no	BSL
Aniline	1	65	2	6.90E-02	8.10E+00	1.50E-02	1.50E-02	AO-GP-32 (0 - 2)	5.68E-02	(3)	no	BSL
Benzyl alcohol	3	65	5	3.40E-02	4.10E+00	8.00E-03	2.10E-01	AO-GP-31 (0 - 2)	6.58E+01	(3)	no	BSL
Bis(2-ethylhexyl)phthalate	21	65	32	7.20E-02	8.10E+00	6.30E-03	1.80E+00	AO-GP-09 (0 - 2)	1.00E-01	(1)	**YES**	ASL
Dibenzofuran	2	65	3	3.40E-02	4.10E+00	1.30E-02	2.00E+00	AO-GP-12 (0 - 2)	NA		**YES**	NSL
Di-n-butylphthalate	2	65	3	1.80E-01	2.10E+01	3.40E-01	1.20E+01	AO-SS-18 (1 - 2)	2.00E+02	(1)	no	BSL
Diphenyl ether	15	65	23	3.60E-02	4.10E+00	2.40E-02	5.50E+01	AO-GP-12 (0 - 2)	NA		**YES**	NSL
o,o,o-Triethylphosphorothioate	10	65	15	6.90E-02	8.10E+00	1.30E-01	3.50E+01	AO-SS-10 (1 - 2)	8.18E-01	(3)	**YES**	ASL
Pentachlorobenzene	1	65	2	3.40E-02	4.10E+00	4.30E-01	4.30E-01	AO-SS-10 (1 - 2)	2.50E-03	(1)	**YES**	ASL
Sulfotep	1	65	2	3.40E-02	4.10E+00	6.50E-01	6.50E-01	AO-SS-12 (1 - 2)	5.96E-01	(3)	**YES**	ASL
Polycyclic Aromatic Hydrocarbons												
2-Methylnaphthalene	5	65	8	7.00E-03	8.30E-01	1.30E-02	1.00E+00	AO-GP-12 (0 - 2)	See LMW PAHs		–	–
Acenaphthene	5	65	8	7.00E-03	8.30E-01	4.20E-03	2.10E+00	AO-GP-12 (0 - 2)	See LMW PAHs		–	–
Acenaphthylene	1	65	2	7.00E-03	8.30E-01	4.00E-01	4.00E-01	AO-GP-12 (0 - 2)	See LMW PAHs		–	–
Anthracene	4	65	6	7.00E-03	8.30E-01	5.00E-03	4.40E+00	AO-GP-12 (0 - 2)	See LMW PAHs		–	–
Benz(a)anthracene	8	65	12	7.00E-03	8.30E-01	4.20E-02	7.10E+00	AO-GP-12 (0 - 2)	See HMW PAHs		–	–
Benzo(a)pyrene	10	65	15	7.00E-03	8.30E-01	5.10E-03	6.30E+00	AO-GP-12 (0 - 2)	See HMW PAHs		–	–
Benzo(b)fluoranthene	7	65	11	7.00E-03	8.30E-01	4.80E-03	6.60E+00	AO-GP-12 (0 - 2)	See HMW PAHs		–	–
Benzo(g,h,i)perylene	4	65	6	7.00E-03	8.30E-01	4.70E-02	2.70E+00	AO-GP-12 (0 - 2)	See HMW PAHs		–	–
Benzo(k)fluoranthene	8	65	12	7.00E-03	8.30E-01	3.60E-03	5.40E+00	AO-GP-12 (0 - 2)	See HMW PAHs		–	–
Chrysene	15	65	23	7.00E-03	8.30E-01	4.80E-03	6.90E+00	AO-GP-12 (0 - 2)	See HMW PAHs		–	–
Dibenz(a,h)anthracene	2	65	3	7.00E-03	8.30E-01	6.80E-02	1.50E+00	AO-GP-12 (0 - 2)	See HMW PAHs		–	–
Fluoranthene	23	65	35	7.00E-03	8.30E-01	4.30E-03	1.80E+01	AO-GP-12 (0 - 2)	See HMW PAHs		–	–
Fluorene	4	65	6	7.00E-03	8.30E-01	5.20E-03	3.50E+00	AO-GP-12 (0 - 2)	See LMW PAHs		–	–
Indeno(1,2,3-cd)pyrene	3	65	5	7.00E-03	8.30E-01	6.80E-02	2.40E+00	AO-GP-12 (0 - 2)	See HMW PAHs		–	–
Naphthalene	7	65	11	7.00E-03	8.30E-01	1.60E-02	2.40E+00	AO-GP-12 (0 - 2)	See LMW PAHs		–	–
Phenanthrene	21	65	32	7.00E-03	8.30E-01	3.50E-03	1.90E+01	AO-GP-12 (0 - 2)	See LMW PAHs		–	–
Pyrene	15	65	23	7.00E-03	8.30E-01	4.20E-03	1.60E+01	AO-GP-12 (0 - 2)	See HMW PAHs		–	–
Total HMW PAHs	26	65	40	–	–	4.30E-03	7.29E+01	AO-GP-12 (0 - 2)	1.10E+00	(1)	**YES**	ASL
Total LMW PAHs	23	65	35	–	–	3.60E-03	3.28E+01	AO-GP-12 (0 - 2)	2.90E+01	(1)	**YES**	ASL

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Table 20. Summary of Constituents Detected in Soil (0-2 feet below ground surface), Ecological Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]	Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Depth)	Ecological Screening Levels [c]		Is Constituent a COPC? [d]	
	Number of Detections		Number of Samples	(%)	Minimum (µg/kg)	-	Maximum (µg/kg)	Minimum (µg/kg)	-	Maximum (µg/kg)		(µg/kg)	Ref	(YES, no)	Rationale
Pesticides															
4,4'-Dichlorodiphenyldichloroethane (DDD)	11	-	65	17	1.70E-03	-	4.80E-02	9.70E-04	-	1.80E-01	AO-GP-31 (0 - 2)	See Total DDX		–	–
4,4'-Dichlorodiphenyldichloroethene (DDE)	19	-	65	29	1.70E-03	-	4.80E-02	3.90E-04	-	4.50E-01	AO-GP-31 (0 - 2)	See Total DDX		–	–
4,4'-Dichlorodiphenyltrichloroethane (DDT)	22	-	65	34	1.70E-03	-	4.80E-02	1.00E-03	-	1.00E+00	AO-SS-10 (1 - 2)	See Total DDX		–	–
DDT and metabolites (DDD and DDE)	15	-	30	50	–	-	–	9.70E-04	-	1.00E+00	AO-SS-10 (1 - 2)	2.10E-02	(1)	**YES**	ASL
Aldrin	1	-	65	2	1.70E-03	-	4.80E-02	1.80E-03	-	1.80E-03	AO-SS-03 (0 - 1)	2.50E-03	(1)	no	BSL
Dieldrin	16	-	65	25	1.70E-03	-	4.80E-02	6.30E-04	-	1.20E+00	AO-SS-10 (1 - 2)	2.80E-04	(1)	**YES**	ASL
Endosulfan I	1	-	65	2	1.70E-03	-	4.80E-02	3.40E-04	-	3.40E-04	MW-129-S1 (0 - 2)	1.19E-01	(3)	no	BSL
Endosulfan II	1	-	65	2	1.70E-03	-	4.80E-02	3.00E-04	-	3.00E-04	MW-129-S1 (0 - 2)	1.19E-01	(3)	no	BSL
Endosulfan sulfate	1	-	65	2	1.70E-03	-	4.80E-02	1.90E-03	-	1.90E-03	AO-GP-09 (0 - 2)	3.58E-02	(3)	no	BSL
Heptachlor	3	-	65	5	1.70E-03	-	4.80E-02	1.50E-04	-	4.20E-04	AO-GP-06 (0 - 2)	5.98E-03	(3)	no	BSL
Heptachlor epoxide	2	-	65	3	1.70E-03	-	4.80E-02	2.40E-04	-	3.30E-03	AO-SS-03 (0 - 1)	1.52E-01	(3)	no	BSL
Hexachlorocyclohexane, alpha-	4	-	65	6	1.70E-03	-	4.80E-02	1.50E-04	-	5.30E-01	AO-SS-10 (1 - 2)	2.50E-03	(1)	**YES**	ASL
Hexachlorocyclohexane, beta-	3	-	65	5	1.70E-03	-	4.80E-02	9.00E-04	-	2.50E-01	AO-SS-10 (1 - 2)	1.00E-03	(1)	**YES**	ASL
Hexachlorocyclohexane, delta-	3	-	65	5	1.70E-03	-	4.80E-02	2.00E-04	-	6.50E-01	AO-SS-10 (1 - 2)	9.94E+00	(3)	no	BSL
Hexachlorocyclohexane, gamma-	7	-	65	11	1.70E-03	-	4.80E-02	1.30E-04	-	2.00E-01	AO-SS-10 (1 - 2)	5.00E-05	(1)	**YES**	ASL
Toxaphene	12	-	65	19	1.70E-01	-	4.80E+00	1.60E-01	-	9.50E+00	AO-SS-10 (1 - 2)	1.19E-01	(3)	**YES**	ASL
Polychlorinated Biphenyls															
Aroclor 1254	1	-	21	5	3.60E-02	-	4.30E-02	4.10E-01	-	4.10E-01	AO-SS-03 (0 - 1)	See Total PCBs		–	–
Total PCBs	1	-	20	5	3.70E-02	-	4.30E-02	4.10E-01	-	4.10E-01	AO-SS-03 (0 - 1)	2.00E-02	(1)	**YES**	ASL
Dioxathion/Dioxenethion															
cis-Dioxathion	40	-	64	63	8.25E-02	-	1.94E+00	1.07E-01	-	1.54E+03	AO-SS-12 (1 - 2)	NA		**YES**	NSL
Dioxenethion	31	-	64	48	1.69E-02	-	1.94E+00	3.33E-02	-	2.24E+02	AO-SS-12 (1 - 2)	NA		**YES**	NSL
trans-Dioxathion	36	-	64	56	8.38E-02	-	1.94E+00	9.42E-02	-	1.43E+01	AO-GP-34 (0 - 2)	NA		**YES**	NSL
Dioxins and Furans															
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	65	-	65	100	–	-	–	2.70E-06	-	4.30E-03	AO-SS-13 (0 - 1)	NA		**YES**	NSL
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	65	-	65	100	–	-	–	4.50E-08	-	5.10E-04	AO-SS-08 (0 - 1)	NA		**YES**	NSL
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	52	-	65	80	5.10E-06	-	6.20E-06	1.20E-07	-	4.30E-05	AO-SS-08 (0 - 1)	NA		**YES**	NSL
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	57	-	65	88	4.90E-06	-	6.20E-06	7.70E-08	-	5.50E-05	AO-SS-13 (0 - 1)	NA		**YES**	NSL
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	57	-	65	88	5.50E-06	-	6.20E-06	9.00E-08	-	9.60E-05	AO-GP-09 (0 - 2)	NA		**YES**	NSL
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	61	-	65	94	5.50E-06	-	6.20E-06	7.90E-08	-	1.40E-04	AO-SS-13 (0 - 1)	NA		**YES**	NSL
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	57	-	65	88	5.50E-06	-	6.20E-06	1.10E-07	-	8.30E-05	AO-SS-08 (0 - 1)	NA		**YES**	NSL
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	63	-	65	97	5.50E-06	-	6.20E-06	2.20E-07	-	1.30E-04	AO-SS-13 (0 - 1)	NA		**YES**	NSL
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	19	-	65	29	4.90E-06	-	3.10E-05	1.20E-07	-	2.00E-06	AO-SS-13 (0 - 1)	NA		**YES**	NSL
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	56	-	65	86	5.50E-06	-	6.30E-06	8.70E-08	-	2.60E-05	AO-SS-13 (0 - 1)	NA		**YES**	NSL
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	37	-	65	57	5.00E-06	-	3.10E-05	7.00E-08	-	2.90E-05	AO-SS-11 (0 - 1)	NA		**YES**	NSL
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	54	-	65	83	5.30E-06	-	6.20E-06	1.00E-07	-	1.30E-05	AO-GP-09 (0 - 2)	NA		**YES**	NSL
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	49	-	65	75	5.10E-06	-	3.10E-05	5.80E-08	-	6.30E-05	AO-GP-09 (0 - 2)	NA		**YES**	NSL
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	28	-	65	43	9.80E-07	-	6.10E-06	2.20E-08	-	5.80E-06	AO-SS-13 (0 - 1)	1.99E-07	(3)	**YES**	ASL
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	53	-	65	82	1.10E-06	-	6.10E-06	4.20E-08	-	1.80E-04	AO-SS-09 (0 - 1)	3.86E-05	(3)	**YES**	ASL
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	62	-	65	95	1.10E-05	-	1.20E-05	5.10E-08	-	1.40E-03	AO-SS-08 (0 - 1)	NA		**YES**	NSL
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	65	-	65	100	–	-	–	1.40E-04	-	5.00E-02	AO-SS-13 (0 - 1)	NA		**YES**	NSL

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Table 20. Summary of Constituents Detected in Soil (0-2 feet below ground surface), Ecological Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]	Frequency of Detection [b]			Detection Limits		Detected Concentrations		Location of Maximum Concentration	Ecological Screening Levels [c]		Is Constituent a COPC? [d]	
	Number of Detections	Number of Samples	(%)	Minimum (µg/kg)	Maximum (µg/kg)	Minimum (µg/kg)	Maximum (µg/kg)	(Sample Depth)	(µg/kg)	Ref	(YES, no)	Rationale
Inorganics												
Antimony	13	65	20	9.10E-01	2.50E+00	5.60E-01	3.20E+00	AO-GP-17 (0 - 2)	2.90E-01	(1)	**YES**	ASL
Arsenic	65	65	100	–	–	2.30E-01	6.90E+00	AO-SS-13 (1 - 2)	1.00E+01	(1)	no	BSL
Barium	65	65	100	–	–	2.70E+00	2.30E+02	AO-SS-12 (0 - 1)	3.30E+02	(1)	no	BSL
Beryllium	63	65	97	4.50E-02	5.20E-02	4.10E-02	6.20E-01	AO-GP-27 (0 - 2)	3.60E+01	(1)	no	BSL
Cadmium	58	65	89	4.50E-02	1.10E-01	1.40E-02	1.20E+00	AO-GP-34 (0 - 2)	3.80E-01	(1)	**YES**	ASL
Chromium	65	65	100	–	–	7.70E-01	2.30E+02	AO-SS-10 (1 - 2)	4.00E-01	(1)	**YES**	ASL
Cobalt	65	65	100	–	–	1.10E-01	1.60E+01	AO-SS-02 (0 - 1)	1.30E+01	(1)	**YES**	ASL
Copper	65	65	100	–	–	3.30E-01	7.90E+02	AO-SS-10 (1 - 2)	4.00E+01	(1)	**YES**	ASL
Lead	65	65	100	–	–	1.00E+00	6.10E+02	AO-GP-11 (0 - 2)	1.60E+01	(1)	**YES**	ASL
Mercury	61	65	94	2.10E-02	2.20E-02	8.00E-03	8.40E+00	AO-GP-16 (0 - 2)	1.00E-01	(1)	**YES**	ASL
Nickel	65	65	100	–	–	4.10E-01	9.80E+01	AO-SS-13 (0 - 1)	3.00E+01	(1)	**YES**	ASL
Selenium	27	65	42	4.50E-01	1.20E+00	2.60E-01	1.10E+00	AO-GP-39 (0 - 2)	8.10E-01	(1)	**YES**	ASL
Silver	16	65	25	9.10E-02	2.50E-01	5.70E-02	1.10E+01	AO-GP-09 (0 - 2)	2.00E+00	(1)	**YES**	ASL
Thallium	56	65	86	9.10E-02	2.30E-01	3.80E-02	2.40E-01	AO-GP-27 (0 - 2)	1.00E+00	(1)	no	BSL
Tin	11	65	17	9.10E+00	2.50E+01	2.60E+00	1.40E+01	AO-SS-16 (0 - 1)	5.30E+01	(1)	no	BSL
Vanadium	65	65	100	–	–	9.40E-01	4.30E+01	AO-SS-13 (1 - 2)	2.00E+00	(1)	**YES**	ASL
Zinc	65	65	100	–	–	6.90E-01	4.20E+02	AO-GP-34 (0 - 2)	5.00E+01	(1)	**YES**	ASL
Cyanide	2	21	10	5.20E-01	6.30E-01	3.60E-01	4.80E-01	AO-SS-06 (0 - 1)	9.00E-01	(1)	no	BSL
Sulfide	1	20	5	5.40E+01	7.50E+01	5.90E+01	5.90E+01	AO-SS-07 (0 - 1)	NA		**YES**	NSL

–	Not applicable.	HMW	High molecular weight.	NSL	No screening level.
ASL	Above screening level.	LMW	Low molecular weight.	PAHs	Polycyclic aromatic hydrocarbons.
BSL	Below screening level.	mg/kg	Milligram per kilogram.	PCBs	Polychlorinated biphenyls.
COPC	Constituent of potential concern.	NA	Not available.	USEPA	United States Environmental Protection Agency.

[a] All detected constituents are presented.

[b] Frequency of detection is equal to the number of detections divided by the total number of samples analyzed. For duplicate samples, the highest detected value or the lowest detection limit was selected.

[c] Ecological soil screening levels were from the following sources in order of priority:
(1) Region 4 Draft Ecological Soil Screening Levels (USEPA 2012; R4).
(2) USEPA Ecological Soil Screening Levels (USEPA 2013b; EcoSSL).
(3) Region 5 Ecological Screening Levels (USEPA 2003b; R5).
(4) Region 3 Ecological Screening Levels (USEPA 2003a; R3).

[d] A constituent with a maximum concentration greater the ecological screening level is considered a COPC. A constituent with a maximum concentration below the screening level is not considered a COPC. A constituent with no screening level is conservatively identified as a COPC.

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Table 21. Soil Gas Sample Location Rationale, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Sample Location	Area	Phase Sampling Conducted	Rationale
AO-SG-01	Southeast Corner of Hercules near Providence Street.	I	Establish off-site soil gas conditions near eastern boundary of Hercules property near Providence Street (near boring ID AO-GP-28).
AO-SG-02	Southeast Corner of Hercules near Providence Street.	I	Establish off-site soil gas conditions near eastern boundary of Hercules property near Providence Street (near boring ID AO-GP-29).
AO-SG-03	Southeast Corner of Hercules near Providence Street.	I	Establish soil gas conditions near eastern boundary of Hercules property near Providence Street (near boring ID AO-GP-19).
AO-SG-04	Southeast Corner of Hercules near Providence Street.	I	Establish soil gas conditions near eastern boundary of Hercules property near Providence Street (near boring ID AO-GP-30).
AO-SG-05	Southeast Corner of Hercules near Providence Street.	I	Establish soil gas conditions near eastern boundary of Hercules property near Providence Street (near boring ID AO-GP-24).

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Table 22. Summary of Constituents Detected in On-Site Soil Gas, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]	Frequency of Detection [b]			Detection Limits		Detected Concentrations		Location of Maximum Concentration (Sample Date)	Residential Air Regional Screening Level [c]	USEPA Adjusted Industrial Air Regional Screning Level [d]	Is Constituent a COPC? [e]	
	Number of Detections	Number of Samples	(%)	Minimum ($\mu g/m^3$)	Maximum ($\mu g/m^3$)	Minimum ($\mu g/m^3$)	Maximum ($\mu g/m^3$)		($\mu g/m^3$)	($\mu g/m^3$)	(YES, no)	Rationale
Volatile Organic Compounds												
1,2,4-Trimethylbenzene	1	3	33	8.90E+00	9.80E+00	1.50E+01	1.50E+01	SG-AO-SG-04 (4/2/2012)	7.30E+00	3.10E+01	**YES**	ASL
1,3,5-Trimethylbenzene	1	3	33	8.90E+00	9.80E+00	3.90E+00	3.90E+00	SG-AO-SG-04 (4/2/2012)	NA	NA	**YES**	NSL
Benzene	2	3	67	5.80E+00	5.80E+00	5.40E+00	3.50E+01	SG-AO-SG-04 (4/2/2012)	3.60E+00	1.60E+01	**YES**	ASL
Carbon tetrachloride	1	3	33	1.30E+01	1.30E+01	5.90E+01	5.90E+01	SG-AO-SG-03 (3/28/2012)	4.70E+00	2.00E+01	**YES**	ASL
Chloroethane	1	3	33	4.80E+00	5.30E+00	1.20E+00	1.20E+00	SG-AO-SG-04 (4/2/2012)	1.00E+04	4.40E+04	no	BSL
Chloroform	3	3	100	–	–	2.20E+00	6.30E+00	SG-AO-SG-04 (4/2/2012)	1.20E+00	5.30E+00	**YES**	ASL
Chloromethane	1	3	33	9.40E+00	1.00E+01	2.30E+01	2.30E+01	SG-AO-SG-04 (4/2/2012)	9.40E+01	3.90E+02	no	BSL
Dichlorodifluoromethane	1	3	33	9.00E+00	9.90E+00	3.60E+00	3.60E+00	SG-AO-SG-04 (4/2/2012)	1.00E+02	4.40E+02	no	BSL
Ethylbenzene	1	3	33	7.90E+00	8.70E+00	1.60E+01	1.60E+01	SG-AO-SG-04 (4/2/2012)	1.10E+01	4.90E+01	**YES**	ASL
Methylene chloride	3	3	100	–	–	3.60E+00	1.00E+01	SG-AO-SG-04 (4/2/2012)	6.30E+02	2.60E+03	no	BSL
Styrene	1	3	33	7.70E+00	8.50E+00	6.30E+00	6.30E+00	SG-AO-SG-04 (4/2/2012)	1.00E+03	4.40E+03	no	BSL
Tetrachloroethene	2	3	67	1.20E+01	1.20E+01	5.40E+00	2.10E+01	SG-AO-SG-04 (4/2/2012)	4.20E+01	1.80E+02	no	BSL
Toluene	2	3	67	6.90E+00	6.90E+00	1.10E+01	7.90E+01	SG-AO-SG-04 (4/2/2012)	5.20E+03	2.20E+04	no	BSL
Trichloroethene	1	3	33	9.80E+00	1.10E+01	2.50E+00	2.50E+00	SG-AO-SG-04 (4/2/2012)	2.10E+00	8.80E+00	**YES**	ASL
Trichlorofluoromethane	2	3	67	1.10E+01	1.10E+01	1.80E+00	3.30E+00	SG-AO-SG-04 (4/2/2012)	7.30E+02	3.10E+03	no	BSL
m,p-Xylene [f]	2	3	67	7.90E+00	7.90E+00	5.20E+00	3.30E+01	SG-AO-SG-04 (4/2/2012)	1.00E+02	4.40E+02	no	BSL
o-Xylene	1	3	33	7.90E+00	8.70E+00	1.30E+01	1.30E+01	SG-AO-SG-04 (4/2/2012)	1.00E+02	4.40E+02	no	BSL

–	Not applicable.	COPC	Constituent of potential concern.	NSL	No screening level.	
ASL	Above screening level.	$\mu g/m^3$	Microgram per cubic meter.	RSL	Regional Screening Level.	
BSL	Below screening level.	NA	Not available.	USEPA	United States Environmental Protection Agency.	

[a] All constituents detected in at least one on-site soil gas sample are presented.
[b] Frequency of detection is equal to the number of detections divided by the total number of samples analyzed. For duplicate samples, the highest detected value or the lowest detection limit was selected.
[c] USEPA Residential Air Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects, multiplied by a factor of 10 to account for attenuation into a building.
[d] USEPA Industrial Air Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects, multiplied by a factor of 10 to account for attenuation into a building.
[e] A constituent with a maximum concentration greater the USEPA Residential adjusted Air RSL is considered a COPC. A constituent with a maximum concentration below the screening level is not considered a COPC. A constituent with no screening level is conservatively identified as a COPC.
[f] The USEPA RSLs for total xylenes are used as surrogates.

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Table 23. Summary of Constituents Detected in Off-Site Soil Gas, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]	Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Date)	USEPA Adjusted Residential Air Regional Screening ($\mu g/m^3$)	USEPA Adjusted Industrial Air Regional Screning ($\mu g/m^3$)	Is Constituent a COPC? [e]	
	Number of Detections		Number of Samples	(%)	Minimum ($\mu g/m^3$)	-	Maximum ($\mu g/m^3$)	Minimum ($\mu g/m^3$)	-	Maximum ($\mu g/m^3$)				(YES, no)	Rationale
Volatile Organic Compounds															
1,2,4-Trimethylbenzene	1	-	2	50	5.90E+03	-	5.90E+03	8.10E+00	-	8.10E+00	SG-AO-SG-02 (3/27/2012)	7.30E+00	3.10E+01	**YES**	ASL
Carbon tetrachloride	1	-	2	50	1.30E+01	-	1.30E+01	4.90E+05	-	4.90E+05	SG-AO-SG-01 (3/27/2012)	4.70E+00	2.00E+01	**YES**	ASL
Chloroform	2	-	2	100	–	-	–	1.90E+00	-	2.90E+04	SG-AO-SG-01 (3/27/2012)	1.20E+00	5.30E+00	**YES**	ASL
Chloromethane	1	-	2	50	1.00E+01	-	1.00E+01	5.00E+03	-	5.00E+03	SG-AO-SG-01 (3/27/2012)	9.40E+01	3.90E+02	**YES**	ASL
Methylene chloride	2	-	2	100	–	-	–	3.00E+00	-	5.50E+03	SG-AO-SG-01 (3/27/2012)	6.30E+02	2.60E+03	**YES**	ASL
Toluene	1	-	2	50	4.50E+03	-	4.50E+03	5.00E+00	-	5.00E+00	SG-AO-SG-02 (3/27/2012)	5.20E+03	2.20E+04	no	BSL
Trichlorofluoromethane	1	-	2	50	6.70E+03	-	6.70E+03	1.60E+00	-	1.60E+00	SG-AO-SG-02 (3/27/2012)	7.30E+02	3.10E+03	no	BSL
m,p-Xylene [f]	1	-	2	50	5.20E+03	-	5.20E+03	7.30E+00	-	7.30E+00	SG-AO-SG-02 (3/27/2012)	1.00E+02	4.40E+02	no	BSL
o-Xylene	1	-	2	50	5.20E+03	-	5.20E+03	3.00E+00	-	3.00E+00	SG-AO-SG-02 (3/27/2012)	1.00E+02	4.40E+02	no	BSL

–	Not applicable.	COPC	Constituent of potential concern.
ASL	Above screening level.	RSL	Regional Screening Level.
BSL	Below screening level.	USEPA	United States Environmental Protection Agency.
$\mu g/m^3$	Microgram per cubic meter.		

[a] All constituents detected in at least one off-site soil gas sample are presented.
[b] Frequency of detection is equal to the number of detections divided by the total number of samples analyzed. For duplicate samples, the highest detected value or the lowest detection limit was selected.
[c] USEPA Residential Air Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects, multiplied by a factor of 10 to account for attenuation into a building.
[d] USEPA Industrial Air Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects, multiplied by a factor of 10 to account for attenuation into a building.
[e] A constituent with a maximum concentration greater USEPA Residential adjusted Air RSL is considered a COPC. A constituent with a maximum concentration below the screening level is not considered a COPC. A constituent with no screening level is conservatively identified as a COPC.
[f] The USEPA RSLs for total xylenes are used as surrogates.

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Table 24. Summary of Constituents Detected in Off-Site Ambient Air at 135 West 8th Street, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]	Frequency of Detection [b]				Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Date)	Residential Air Regional Screening Level	USEPA Industrial Air Regional Screening Level [d]	Is Constituent a COPC? [e]	
	Number of Detections		Number of Samples	(%)	Minimum	-	Maximum	Minimum	-	Maximum					
					($\mu g/m^3$)		($\mu g/m^3$)	($\mu g/m^3$)		($\mu g/m^3$)		($\mu g/m^3$)	($\mu g/m^3$)	(YES, no)	Rationale
Volatile Organic Compounds															
1,1,2-Trichloro-1,2,2-trifluoroethane	4	-	4	100	–	-	–	3.90E-01	-	5.70E-01	AA-AO-BDB-01 (06/27/12)	3.10E+03	1.30E+04	no	BSL
1,2,4-Trimethylbenzene	1	-	4	25	3.90E-01	-	3.90E-01	2.30E-01	-	2.30E-01	AA-AO-BDB-01 (07/31/14)	7.30E-01	3.10E+00	no	BSL
1,2-Dichloroethane	1	-	4	25	3.20E-01	-	3.20E-01	4.80E-01	-	4.80E-01	AA-AO-BDB-4 (03/21/13)	1.10E-01	4.70E-01	**YES**	ASL
1,2-Dichloro-1,1,2,2-tetrafluoroethane	3	-	4	75	5.60E-01	-	5.60E-01	9.80E-02	-	1.30E-01	AA-AO-BDB-4 (03/21/13)	NA	NA	**YES**	NSL
1,3-Dichlorobenzene	1	-	4	25	4.80E-01	-	4.80E-01	4.30E-01	-	4.30E-01	AA-AO-BDB-4 (03/21/13)	NA	NA	**YES**	NSL
1,4-Dichlorobenzene	1	-	4	25	4.80E-01	-	4.80E-01	3.30E-01	-	3.30E-01	AA-AO-BDB-01 (07/31/14)	2.60E-01	1.10E+00	**YES**	ASL
Benzene	4	-	4	100	–	-	–	4.00E-01	-	8.20E-01	AA-AO-BDB-4 (03/21/13)	3.60E-01	1.60E+00	**YES**	ASL
Bromomethane	1	-	4	25	3.10E-01	-	3.10E-01	8.20E-02	-	8.20E-02	AA-AO-BDB-01 (07/31/14)	5.20E-01	2.20E+00	no	BSL
Carbon tetrachloride	4	-	4	100	–	-	–	2.90E-01	-	6.10E-01	AA-AO-BDB-01 (06/27/12)	4.70E-01	2.00E+00	**YES**	ASL
Chloroethane	2	-	4	50	2.10E-01	-	2.10E-01	6.90E-02	-	5.10E-01	AA-AO-BDB-4 (03/21/13)	1.00E+03	4.40E+03	no	BSL
Chloroform	4	-	4	100	–	-	–	9.20E-02	-	4.00E-01	AA-AO-BDB-4 (03/21/13)	1.20E-01	5.30E-01	**YES**	ASL
Chloromethane	4	-	4	100	–	-	–	9.10E-01	-	1.10E+01	AA-AO-BDB-4 (03/21/13)	9.40E+00	3.90E+01	**YES**	ASL
Dichlorodifluoromethane	4	-	4	100	–	-	–	2.20E+00	-	2.60E+00	AA-AO-BDB-4 (03/21/13)	1.00E+01	4.40E+01	no	BSL
Ethylbenzene	3	-	4	75	3.50E-01	-	3.50E-01	1.80E-01	-	7.20E-01	AA-AO-BDB-01 (06/27/12)	1.10E+00	4.90E+00	no	BSL
Methylene chloride	4	-	4	100	–	-	–	1.20E+00	-	2.40E+00	AA-AO-BDB-4 (03/21/13)	6.30E+01	2.60E+02	no	BSL
Styrene	1	-	4	25	3.40E-01	-	3.40E-01	1.30E-01	-	1.30E-01	AA-AO-BDB-01 (07/31/14)	1.00E+02	4.40E+02	no	BSL
Tetrachloroethene	2	-	4	50	5.40E-01	-	5.40E-01	1.10E+00	-	1.40E+00	AA-AO-BDB-01 (01/22/13)	4.20E+00	1.80E+01	no	BSL
Toluene	4	-	4	100	–	-	–	4.40E-01	-	2.70E+01	AA-AO-BDB-01 (07/31/14)	5.20E+02	2.20E+03	no	BSL
Trichloroethene	1	-	4	25	2.10E-01	-	2.10E-01	6.20E+00	-	6.20E+00	AA-AO-BDB-01 (06/27/12)	2.10E-01	8.80E-01	**YES**	ASL
Trichlorofluoromethane	4	-	4	100	–	-	–	1.10E+00	-	1.40E+00	AA-AO-BDB-01 (06/27/12)	7.30E+01	3.10E+02	no	BSL
Vinyl chloride	1	-	4	25	2.00E-01	-	2.00E-01	3.80E-01	-	3.80E-01	AA-AO-BDB-4 (03/21/13)	1.70E-01	2.80E+00	**YES**	ASL
m,p-Xylene [f]	3	-	4	75	3.50E-01	-	3.50E-01	4.80E-01	-	1.40E+00	AA-AO-BDB-01 (06/27/12)	1.00E+01	4.40E+01	no	BSL
o-Xylene	3	-	4	75	3.50E-01	-	3.50E-01	2.30E-01	-	3.10E-01	AA-AO-BDB-01 (06/27/12)	1.00E+01	4.40E+01	no	BSL

–	Not applicable.	$\mu g/m^3$	Microgram per cubic meter.
ASL	Above screening level.	NA	Not available.
BSL	Below screening level.	NSL	No screening level.
COPC	Constituent of potential concern.	USEPA	United States Environmental Protection Agency.

[a] All detected off-site ambient air constituents are presented.
[b] Frequency of detection is equal to the number of detections divided by the total number of samples analyzed. For duplicate samples, the highest detected value or the lowest detection limit was selected.
[c] USEPA Residential Air Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects.
[d] USEPA Industrial Air Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects.
[e] A constituent with a maximum concentration greater than the USEPA Residential Air RSL is considered a COPC. A constituent with a maximum concentration below the screening level is not considered a COPC. A constituent with no screening level is conservatively identified as a COPC.
[f] The USEPA RSLs for total xylenes are used as surrogates.

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Table 25. Summary of Constituents Detected in Crawl Space Air at 135 West 8th Street, Human Health Comparison Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]	Frequency of Detection [b]			Detection Limits		Detected Concentrations		Location of Maximum Concentration (Sample Date)	Exposure Point Concentration [x]	USEPA Residential Air Regional Screening Level [c]	USEPA Industrial Air Regional Screening Level [d]	Is Constituent a COPC? [e]	
	Number of Detections	Number of Samples	(%)	Minimum ($\mu g/m^3$)	Maximum ($\mu g/m^3$)	Minimum ($\mu g/m^3$)	Maximum ($\mu g/m^3$)			($\mu g/m^3$)	($\mu g/m^3$)	(YES, no)	Rationale
Volatile Organic Compounds													
1,1,2-Trichloro-1,2,2-trifluoroethane	5	5	100	–	–	4.70E-01	7.20E-01	CS-AO-BDB-01 (01/22/13)	m	3.10E+03	1.30E+04	no	BSL
1,2,4-Trimethylbenzene	3	5	60	3.90E-01	9.80E-01	1.40E-01	1.50E+00	CS-AO-BDB-01 (06/27/12)	m	7.30E-01	3.10E+00	**YES**	ASL
1,3,5-Trimethylbenzene	1	5	20	3.90E-01	9.80E-01	8.90E-01	8.90E-01	CS-AO-BDB-01 (06/27/12)		NA	NA	**YES**	NSL
1,2-Dichloroethane	1	5	20	3.20E-01	8.10E-01	8.40E-02	8.40E-02	CS-AO-BDB-01 (01/22/13)	m	1.10E-01	4.70E-01	no	BSL
1,2-Dichloro-1,1,2,2-tetrafluoroethai	4	5	80	1.40E+00	1.40E+00	9.90E-02	1.50E-01	CS-AO-BDB-01 (01/22/13)	m	NA	NA	**YES**	NSL
1,4-Dichlorobenzene	1	5	20	4.80E-01	1.20E+00	3.00E-01	3.00E-01	CS-AO-BDB-01 (07/31/14)	m	2.60E-01	1.10E+00	**YES**	ASL
Benzene	5	5	100	–	–	2.30E-01	7.50E-01	CS-AO-BDB-01 (07/31/14)	m	3.60E-01	1.60E+00	**YES**	ASL
Carbon tetrachloride	5	5	100	–	–	4.60E-01	6.80E-01	CS-AO-BDB-01 (06/27/12)	m	4.70E-01	2.00E+00	**YES**	ASL
Chloroethane	1	5	20	2.10E-01	5.30E-01	8.10E-02	8.10E-02	CS-AO-BDB-01 (07/31/14)	m	1.00E+03	4.40E+03	no	BSL
Chloroform	4	5	80	9.80E-01	9.80E-01	9.60E-02	1.80E+00	CS-AO-BDB-01 (07/31/14)	m	1.20E-01	5.30E-01	**YES**	ASL
Chloromethane	5	5	100	–	–	8.20E-01	1.30E+00	CS-AO-BDB-01 (06/27/12), CS-AO-BDB-01 (01/22/13)	m	9.40E+00	3.90E+01	no	BSL
cis-1,2-Dichloroethene	1	5	20	3.20E-01	7.90E-01	1.50E-01	1.50E-01	CS-AO-BDB-01 (06/27/12)		NA	NA	**YES**	NSL
Dichlorodifluoromethane	5	5	100	–	–	2.10E+00	3.20E+00	CS-AO-BDB-01 (01/22/13)	m	1.00E+01	4.40E+01	no	BSL
Ethylbenzene	2	5	40	3.50E-01	8.70E-01	2.30E-01	4.50E-01	CS-AO-BDB-01 (06/27/12)	m	1.10E+00	4.90E+00	no	BSL
Methylene chloride	4	5	80	1.00E+00	1.00E+00	5.50E-01	5.00E+00	CS-AO-BDB-01 (06/27/12)	m	6.30E+01	2.60E+02	no	BSL
Styrene	1	5	20	3.40E-01	8.50E-01	2.70E-01	2.70E-01	CS-AO-BDB-01 (06/27/12)	m	1.00E+02	4.40E+02	no	BSL
Tetrachloroethene	1	5	20	5.40E-01	1.40E+00	3.00E-01	3.00E-01	CS-AO-BDB-4 (03/21/13)	m	4.20E+00	1.80E+01	no	BSL
Toluene	5	5	100	–	–	8.50E-01	2.20E+01	CS-AO-BDB-01 (07/31/14)	m	5.20E+02	2.20E+03	no	BSL
Trichlorofluoromethane	5	5	100	–	–	1.20E+00	2.90E+00	CS-AO-BDB-01 (06/27/12)	m	7.30E+01	3.10E+02	no	BSL
m,p-Xylene [f]	5	5	100	–	–	2.50E-01	2.40E+00	CS-AO-BDB-01 (06/27/12)	m	1.00E+01	4.40E+01	no	BSL
o-Xylene	3	5	60	3.50E-01	8.70E-01	1.50E-01	1.10E+00	CS-AO-BDB-01 (06/27/12)	m	1.00E+01	4.40E+01	no	BSL

–	Not applicable.	$\mu g/m^3$	Microgram per cubic meter.
ASL	Above screening level.	NA	Not available.
BSL	Below screening level.	NSL	No screening level.
COPC	Constituent of potential concern.	USEPA	United States Environmental Protection Agency.

[a] All detected off-site ambient air constituents are presented.

[b] Frequency of detection is equal to the number of detections divided by the total number of samples analyzed. For duplicate samples, the highest detected value or the lowest detection limit was selected.

[c] USEPA Residential Air Regional Screening Level (RSL) (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects.

[d] USEPA Industrial Air RSL (USEPA 2014a), adjusted for a hazard index of 0.1 for RSLs based on noncarcinogenic effects.

[e] A constituent with a maximum concentration greater USEPA Residential Air RSL is considered a COPC. A constituent with a maximum concentration below the screening level is not considered a COPC. A constituent with no screening level is conservatively identified as a COPC.

[f] The USEPA RSLs for total xylenes are used as surrogates.

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Table 26. Summary of Constituents Detected in an On-Site City Sewer, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent [a]	Frequency of Detection [b]			Detection Limits			Detected Concentrations			Location of Maximum Concentration (Sample Date)
	Number of Detections	Number of Samples	(%)	Minimum (µg/L)	-	Maximum (µg/L)	Minimum (µg/L)	-	Maximum (µg/L)	
Volatile Organic Compounds										
2-Butanone	2	2	100	–	-	–	1.20E+00	-	2.50E+00	SE-A370 (11/13/2012)
Acetone	2	2	100	–	-	–	5.80E+01	-	9.20E+01	SE-A370 (11/13/2012)
Benzene	1	2	50	1.00E+00	-	1.00E+00	2.00E+00	-	2.00E+00	SE-A372 (11/13/2012)
Carbon tetrachloride	1	2	50	1.00E+00	-	1.00E+00	5.90E+01	-	5.90E+01	SE-A372 (11/13/2012)
Chlorobenzene	1	2	50	1.00E+00	-	1.00E+00	5.30E-01	-	5.30E-01	SE-A372 (11/13/2012)
Chloroform	2	2	100	–	-	–	2.70E+00	-	1.60E+01	SE-A372 (11/13/2012)
Toluene	2	2	100	–	-	–	6.60E+00	-	8.10E+00	SE-A370 (11/13/2012)
Semivolatile Organic Compounds										
1,1'-Biphenyl	1	2	50	9.60E+00	-	9.60E+00	2.50E+00	-	2.50E+00	SE-A372 (11/13/2012)
4-Methylphenol	2	2	100	–	-	–	2.00E+01	-	2.20E+01	SE-A370 (11/13/2012)
Benzyl alcohol	2	2	100	–	-	–	5.10E+00	-	1.20E+01	SE-A370 (11/13/2012)
Diethylphthalate	2	2	100	–	-	–	2.70E+00	-	3.50E+00	SE-A370 (11/13/2012)
Diphenyl ether	2	2	100	–	-	–	1.80E+01	-	3.90E+01	SE-A372 (11/13/2012)
Phenol	2	2	100	–	-	–	7.30E+00	-	8.70E+00	SE-A372 (11/13/2012)
Inorganics										
Arsenic	1	2	50	2.50E+00	-	2.50E+00	1.30E+00	-	1.30E+00	SE-A372 (11/13/2012)
Barium	2	2	100	–	-	–	4.80E+01	-	4.90E+01	SE-A370 (11/13/2012)
Cobalt	2	2	100	–	-	–	3.50E-01	-	4.30E-01	SE-A372 (11/13/2012)
Copper	2	2	100	–	-	–	1.10E+01	-	1.30E+01	SE-A370 (11/13/2012)
Lead	2	2	100	–	-	–	1.10E+00	-	1.20E+00	SE-A372 (11/13/2012)
Nickel	2	2	100	–	-	–	2.60E+00	-	8.50E+00	SE-A370 (11/13/2012)
Zinc	2	2	100	–	-	–	3.70E+01	-	4.60E+01	SE-A370 (11/13/2012)

– Not applicable.
µg/L Microgram per liter.

[a] All constituents detected in the sewer are presented.
[b] Frequency of detection is equal to the number of detections divided by the total number of samples analyzed.

Table 27. Summary of Constituents of Potential Concern, Human Health Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent of Potential Concern [a]		Constituent of Potential Concern for Human Health Receptors															
		On-Site						Off-Site									
		Surface Water	Sediment	Shallow Groundwater	Deep Groundwater (Catahoula)	Soil	Soil Gas	Shallow Private Well	Surface Water	Sediment	Shallow Groundwater	Deep Groundwater (Hattiesburg)	Deep Groundwater (Catahoula)	Soil	Soil Gas	Ambient Air	Crawl Space Air
Volatile Organic Compounds																	
1,1,1,2-Tetrachloroethane		–	–	–	–	–	–	–	–	–	YES	–	–	–	–	–	–
1,1,2-Trichloroethane		–	–	YES	–	–	–	–	–	–	–	–	–	–	–	–	–
1,1-Dichloroethane		–	–	YES	–	no	–	–	–	–	–	–	–	–	–	–	–
1,1-Dichloroethene		–	–	YES	–	no	–	–	–	no	YES	no	–	–	–	–	–
1,2,3-Trichloropropane	[b]	–	–	YES	–	–	–	–	–	–	–	–	–	–	–	–	–
1,2,4-Trimethylbenzene		–	–	–	–	–	YES	–	–	–	–	–	–	–	YES	no	YES
1,3,5-Trimethylbenzene		–	–	–	–	–	YES	–	–	–	–	–	–	–	–	–	YES
1,2-Dichloroethane		–	–	YES	–	no	–	–	–	–	–	–	–	–	–	YES	no
1,2-Dichloropropane		–	–	YES	–	–	–	–	–	–	no	–	–	–	–	–	–
1,2-Dichloro-1,1,2,2-tetrafluoroethane		–	–	–	–	–	–	–	–	–	–	–	–	–	–	YES	YES
1,3-Dichlorobenzene		–	–	–	–	–	–	–	–	–	–	–	–	–	–	YES	–
1,4-Dichlorobenzene	[b]	–	–	no	–	–	–	–	–	–	–	–	–	–	–	YES	YES
1,4-Dioxane	[b]	–	–	YES	–	–	–	–	YES	–	–	–	–	–	–	–	–
2-Hexanone		–	–	YES	–	no	–	–	–	–	–	–	–	–	–	–	–
4-Methyl-2-pentanone		–	–	YES	–	no	–	–	no	–	no	–	–	–	–	–	–
Acetone		no	no	YES	–	no	–	–	no	no	no	–	–	no	–	–	–
Acetonitrile		YES	–	–	–	–	–	–	–	–	no	–	–	–	–	–	–
Acrolein		–	–	YES	–	–	–	–	–	–	–	–	–	–	–	–	–
Benzene		no	–	YES	–	YES	YES	–	YES	no	YES	YES	–	no	–	YES	YES
Bromodichloromethane		YES	–	–	–	–	–	–	–	–	YES	–	–	–	–	–	–
Bromomethane		–	–	–	–	–	–	–	–	–	YES	–	–	no	–	no	–
Carbon disulfide		–	no	YES	–	no	–	–	no	no	YES	–	–	–	–	–	–
Carbon tetrachloride		–	–	YES	–	YES	YES	–	YES	no	YES	–	–	YES	YES	YES	YES
Chlorobenzene		–	–	YES	–	no	–	–	no	no	YES	–	–	–	–	–	–
Chloroform		no	–	YES	–	no	YES	–	YES	no	YES	–	–	YES	YES	YES	YES
Chloromethane		–	–	YES	–	–	no	–	–	–	YES	–	–	–	YES	YES	no
cis-1,2-Dichloroethene		–	–	YES	–	–	–	–	–	–	–	–	–	–	–	–	YES
Dibromochloromethane		YES	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Ethylbenzene		–	–	YES	no	YES	YES	–	–	–	YES	–	–	–	–	no	no
Iodomethane		–	–	YES	–	YES	–	–	–	–	–	–	–	YES	–	–	–
Methacrylonitrile		–	–	YES	–	–	–	–	–	–	–	–	–	–	–	–	–
Methylene chloride		–	–	YES	–	–	no	–	–	–	YES	–	–	–	YES	no	no
Naphthalene	[b]	–	–	YES	–	–	–	–	–	–	–	–	–	–	–	–	–
Propionitrile		–	–	–	–	–	–	–	–	–	YES	–	–	–	–	–	–
Tetrachloroethene		no	–	YES	–	–	no	–	no	no	YES	YES	–	–	–	no	no
Toluene		no	no	YES	no	YES	no	–	no	no	YES	–	–	no	no	no	no
Trichloroethene		–	–	YES	–	–	YES	–	no	no	YES	YES	–	–	–	YES	–
Vinyl chloride		–	–	YES	–	–	–	–	YES	YES	–	YES	–	–	–	YES	–
Xylenes (total)		–	–	YES	no	YES	–	–	–	–	YES	–	no	–	–	–	–
Volatile Organic Compounds																	
1,2-Dibromoethane		–	–	YES	–	–	–	–	–	–	–	–	–	–	–	–	–
1,2,3-Trichloropropane	[b]	–	–	YES	–	–	–	–	–	–	–	–	–	–	–	–	–
Semivolatile Organic Compounds																	
1,1'-Biphenyl		–	no	YES	–	YES	–	–	YES	no	YES	–	YES	no	–	–	–
1,4-Dichlorobenzene	[b]	–	–	YES	–	no	–	–	no	–	–	–	–	–	–	–	–
1,4-Dioxane	[b]	YES	no	YES	–	no	–	no	YES	–	YES	YES	–	–	–	–	–
1,4-Naphthoquinone		–	–	YES	–	–	–	–	–	–	–	–	–	–	–	–	–
2-Methylphenol		–	–	YES	–	no	–	–	–	–	–	–	–	–	–	–	–
2-Methylnaphthalene		–	–	YES	–	no	–	–	–	–	YES	–	–	–	–	–	–
2-Nitrophenol		–	–	YES	–	–	–	–	–	–	–	–	–	–	–	–	–
3,4-Methylphenol		–	–	YES	–	–	–	–	–	–	no	–	–	–	–	–	–
3-Nitroaniline		–	–	–	–	–	–	–	YES	–	–	–	–	–	–	–	–
4,6-Dinitro-2-methylphenol		–	–	YES	–	–	–	–	no	–	–	–	–	–	–	–	–
4-Methylphenol		–	–	YES	–	no	–	–	–	no	no	–	–	no	–	–	–
Acenaphthene		no	–	YES	–	no	–	–	–	no	–	–	–	–	–	–	–
Benz(a)anthracene		YES	YES	YES	–	YES	–	–	no	YES	YES	YES	–	–	YES	–	–	–
Benzo(a)pyrene		YES	YES	YES	–	YES	–	–	no	YES	YES	YES	–	–	YES	–	–	–
Benzo(b)fluoranthene		YES	YES	YES	–	YES	–	–	no	YES	YES	YES	–	–	YES	–	–	–
Benzo(k)fluoranthene		YES	YES	YES	–	YES	–	–	no	YES	YES	YES	–	–	YES	–	–	–
Benzyl alcohol		no	no	YES	–	no	–	–	no	no	no	–	–	–	–	–	–	–
Bis(2-chloroethyl)ether		–	–	YES	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Bis(2-chloro-1-methylethyl)ether		–	–	YES	–	–	–	–	no	–	–	–	–	–	–	–	–	–

Table 27. Summary of Constituents of Potential Concern, Human Health Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent of Potential Concern [a]		Constituent of Potential Concern for Human Health Receptors															
		On-Site						Off-Site									
		Surface Water	Sediment	Shallow Groundwater	Deep Groundwater (Catahoula)	Soil	Soil Gas	Shallow Private Well	Surface Water	Sediment	Shallow Groundwater	Deep Groundwater (Hattiesburg)	Deep Groundwater (Catahoula)	Soil	Soil Gas	Ambient Air	Crawl Space Air
Semivolatile Organic Compounds																	
Bis(2-ethylhexyl)phthalate		no	no	no	–	no	–	–	**YES**	no	**YES**	–	–	no	–	–	–
Chrysene		**YES**	**YES**	**YES**	–	**YES**	–	–	no	**YES**	**YES**	–	–	**YES**	–	–	–
Dibenz(a,h)anthracene		**YES**	**YES**	**YES**	–	**YES**	–	–	no	**YES**	**YES**	–	–	**YES**	–	–	–
Dibenzofuran		–	–	**YES**	–	no	–	–	–	–	no	–	–	–	–	–	–
Dimethoate		–	–	**YES**	–	–	–	–	–	–	–	–	–	–	–	–	–
Diphenyl ether		**YES**	**YES**	**YES**	–	**YES**	–	–	**YES**	**YES**	**YES**	**YES**	–	**YES**	–	–	–
Fluorene		–	–	**YES**	–	no	–	–	–	no	–	–	–	–	–	–	–
Hexachlorophene		–	–	**YES**	–	–	–	–	–	–	–	no	–	–	–	–	–
Indeno(1,2,3-cd)pyrene		**YES**	**YES**	**YES**	–	**YES**	–	–	no	**YES**	**YES**	–	–	**YES**	–	–	–
Isosafrole		–	–	**YES**	–	–	–	–	–	–	–	–	–	–	–	–	–
Methyl parathion		–	–	**YES**	–	–	–	–	–	–	–	–	–	–	–	–	–
Naphthalene	[b]	–	no	**YES**	–	**YES**	–	–	**YES**	no	**YES**	–	–	–	–	–	–
Nitrobenzene		–	–	**YES**	–	–	–	–	–	–	**YES**	–	–	–	–	–	–
n-Nitroso-di-n-butylamine		–	–	**YES**	–	–	–	–	–	–	–	–	–	–	–	–	–
n-Nitrosomethylethylamine		–	–	–	–	–	–	–	–	–	**YES**	–	–	–	–	–	–
n-Nitrosomorpholine		–	–	**YES**	–	–	–	–	–	–	–	–	–	–	–	–	–
o,o,o-Triethylphosphorothioate		**YES**	–	**YES**	–	**YES**	–	–	**YES**	–	–	–	–	–	–	–	–
Pentachlorophenol	[b]	–	–	**YES**	–	–	–	–	–	–	–	–	–	–	–	–	–
Pesticides																	
Dieldrin		–	no	**YES**	–	**YES**	–	–	–	no	–	–	–	**YES**	–	–	–
Heptachlor		–	no	**YES**	–	no	–	–	–	–	–	–	–	no	–	–	–
Hexachlorocyclohexane, alpha-		–	–	**YES**	–	**YES**	–	–	–	–	–	–	–	no	–	–	–
Hexachlorocyclohexane, delta-		–	–	–	–	**YES**	–	–	–	–	–	–	–	no	–	–	–
Hexachlorocyclohexane, gamma-		–	–	**YES**	–	no	–	–	–	–	–	–	–	no	–	–	–
Toxaphene		–	–	–	–	**YES**	–	–	–	–	–	–	–	**YES**	–	–	–
Polychlorinated Biphenyls																	
Aroclor 1254		–	–	–	–	–	–	–	–	–	–	–	–	**YES**	–	–	–
Herbicides																	
Dioxathion/Dioxenethion																	
cis-Dioxathion		no	**YES**	**YES**	–	**YES**	–	–	–	no	–	–	–	no	–	–	–
Dioxenethion		no	no	**YES**	–	**YES**	–	–	no	no	–	no	–	no	–	–	–
Dioxins and Furans																	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)		no	**YES**	no	–	**YES**	–	–	no	**YES**	–	–	–	**YES**	–	–	–
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)		no	no	no	–	no	–	–	–	no	no	–	–	**YES**	–	–	–
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		–	no	–	–	**YES**	–	–	–	no	–	–	–	no	–	–	–
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)		–	no	–	–	**YES**	–	–	–	no	–	–	–	no	–	–	–
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		–	no	–	–	**YES**	–	–	–	no	–	–	–	no	–	–	–
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)		–	**YES**	–	–	**YES**	–	–	–	no	no	–	–	**YES**	–	–	–
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)		no	no	–	–	**YES**	–	–	–	no	–	–	–	no	–	–	–
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)		no	no	–	–	**YES**	–	–	–	no	–	–	–	no	–	–	–
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)		–	no	–	–	**YES**	–	–	–	no	–	–	–	no	–	–	–
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)		–	no	–	–	**YES**	–	–	–	no	–	–	–	–	–	–	–
2,3,7,8-Tetrachlorodibenzofuran (TCDF)		–	no	–	–	**YES**	–	–	–	no	–	–	–	no	–	–	–
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)		no	**YES**	no	no	**YES**	–	–	no	**YES**	no	–	–	**YES**	–	–	–
Inorganics																	
Antimony		–	no	–	–	**YES**	–	–	–	–	**YES**	–	–	no	–	–	–
Arsenic		**YES**	**YES**	**YES**	**YES**	**YES**	–	**YES**	**YES**	**YES**	**YES**	**YES**	–	**YES**	–	–	–
Barium		no	no	**YES**	no	no	–	no	no	no	no	no	no	no	–	–	–
Beryllium		no	no	**YES**	–	no	–	–	no	no	no	–	–	no	–	–	–
Cadmium		no	no	**YES**	–	no	–	–	–	no	no	–	–	no	–	–	–
Cobalt		**YES**	**YES**	**YES**	–	**YES**	–	–	**YES**	**YES**	**YES**	**YES**	–	**YES**	–	–	–
Copper		no	no	no	no	**YES**	–	no	no	no	no	–	–	no	–	–	–
Lead		no	no	**YES**	no	**YES**	–	no	no	no	**YES**	–	–	no	–	–	–
Mercury		**YES**	**YES**	**YES**	–	**YES**	–	–	–	no	**YES**	–	–	no	–	–	–
Nickel		no	no	**YES**	–	no	–	–	no	**YES**	no	no	–	no	–	–	–
Thallium		–	**YES**	**YES**	–	**YES**	–	–	**YES**	**YES**	**YES**	–	–	**YES**	–	–	–
Vanadium		no	no	**YES**	–	**YES**	–	–	–	**YES**	**YES**	–	–	no	–	–	–
Cyanide		–	**YES**	–	–	no	–	–	–	no	–	–	–	no	–	–	–
Sulfide		–	–	**YES**	–	–	–	**YES**	**YES**	–	–	**YES**	**YES**	**YES**	–	–	–

– Not detected or not analyzed in that medium.
COPC Constituent of potential concern.

[a] See media-specific tables for on- and off-site media-specific selection of constituents of potential concern for more detail.
[b] Constituent was analyzed by two different laboratory methods and was identified as a COPC by both methods. The COPC selection summaries for both methods are provided.

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Table 28. Summary of Constituents of Potential Concern, Ecological Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

	Constituent of Potential Concern for Ecological Receptors			
	On- and Off-Site			
Constituent of Potential Concern [a]	**Surface Water**	**Sediment**	**Soil (0 to 1 ft bgs)**	**Soil (0 to 2 ft bgs)**
Volatile Organic Compounds				
2-Butanone	no	**YES**	no	no
Acetone	no	**YES**	no	no
Benzene	no	**YES**	no	**YES**
Bromodichloromethane	**YES**	–	–	–
Carbon disulfide	no	**YES**	–	**YES**
Carbon tetrachloride	no	no	no	**YES**
Chloroform	no	no	–	**YES**
Dibromochloromethane	**YES**	–	–	–
Ethylbenzene	–	–	–	**YES**
Isobutanol	–	**YES**	–	–
Toluene	no	**YES**	no	**YES**
Xylenes (total)	–	–	–	**YES**
Semivolatile Organic Compounds				
1,1'-Biphenyl	no	**YES**	no	no
2,6-Dinitrotoluene	–	–	**YES**	**YES**
3-Nitroaniline	**YES**	–	–	–
4-Methylphenol	–	**YES**	no	no
Acetophenone	**YES**	–	–	no
Aniline	–	**YES**	–	no
Benzyl alcohol	no	**YES**	–	no
Bis(2-chloro-1-methylethyl)ether	**YES**	–	–	–
Bis(2-ethylhexyl)phthalate	**YES**	**YES**	**YES**	**YES**
Dibenzofuran	–	–	–	**YES**
Diphenyl ether	**YES**	**YES**	**YES**	**YES**
o,o,o-Triethylphosphorothioate	no	–	**YES**	**YES**
Pentachlorobenzene	–	–	–	**YES**
Phenol	no	**YES**	–	–
Sulfotep	–	–	–	**YES**
Polycyclic Aromatic Hydrocarbons				
Chrysene	**YES**	no	–	–
Total HMW PAHs	–	–	no	**YES**
Total LMW PAHs	–	–	no	**YES**
Pesticides				
4,4'-Dichlorodiphenyldichloroethane (DDD)	–	**YES**	–	–
4,4'-Dichlorodiphenyldichloroethene (DDE)	–	**YES**	–	–
4,4'-Dichlorodiphenyltrichloroethane (DDT)	–	**YES**	–	–
DDT and metabolites (DDD and DDE)	–	–	**YES**	**YES**
Dieldrin	–	**YES**	**YES**	**YES**
Heptachlor	–	**YES**	no	no
Hexachlorocyclohexane, alpha-	–	–	**YES**	**YES**
Hexachlorocyclohexane, beta-	–	–	**YES**	**YES**
Hexachlorocyclohexane, gamma-	–	–	**YES**	**YES**
Toxaphene	–	–	**YES**	**YES**
Polychlorinated Biphenyls				
Aroclor 1260	–	**YES**	–	–
Total PCBs	–	**YES**	**YES**	**YES**
Dioxathion/Dioxenethion				
cis-Dioxathion	**YES**	**YES**	**YES**	**YES**
Dioxenethion	**YES**	**YES**	**YES**	**YES**
trans-Dioxathion	–	**YES**	**YES**	**YES**

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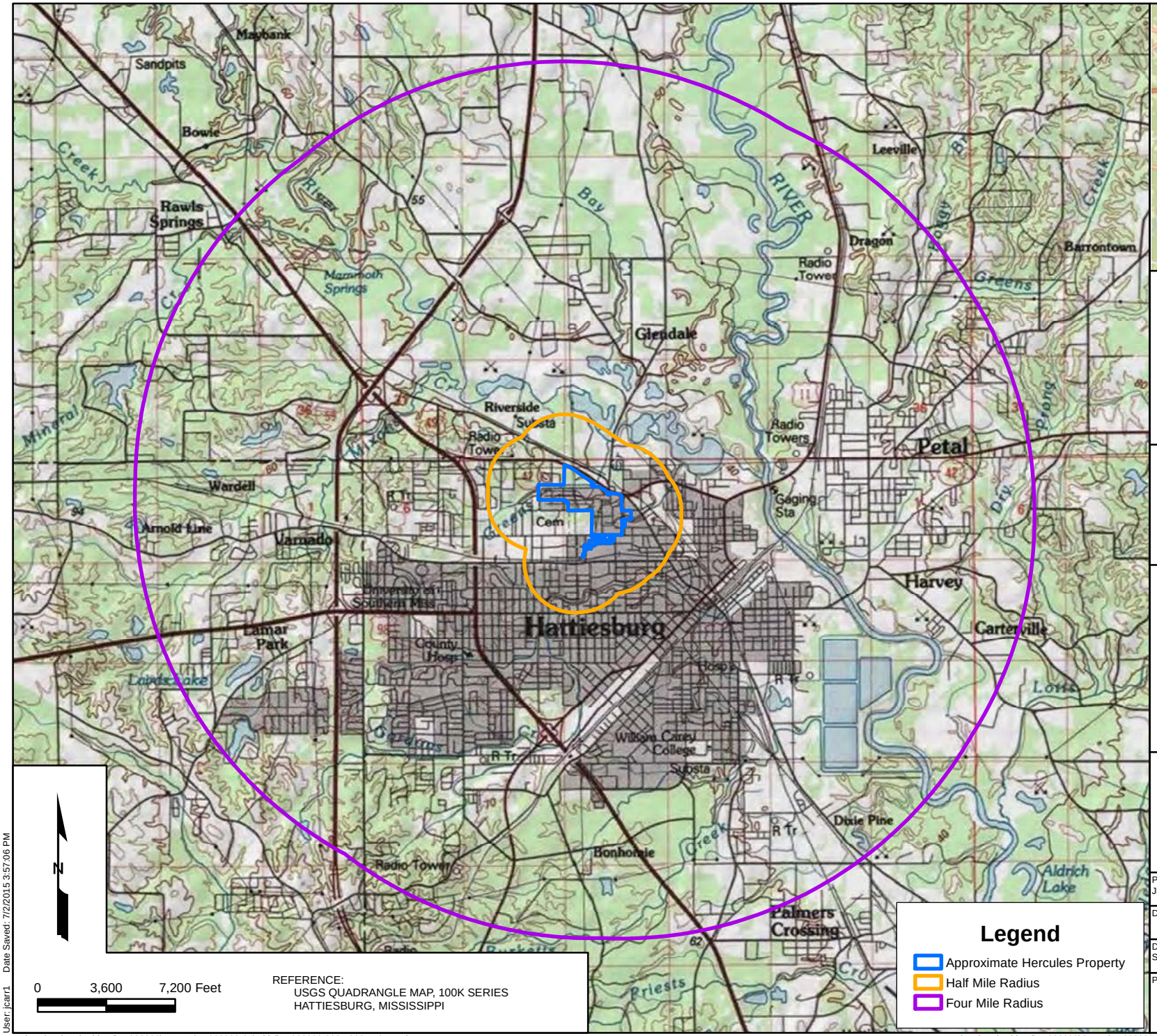
Table 28. Summary of Constituents of Potential Concern, Ecological Criteria, Phase I and II Investigation Report, USEPA RCRA 3013(a), Administrative Order, Hercules Incorporated, Hattiesburg, Mississippi.

Constituent of Potential Concern [a]	Constituent of Potential Concern for Ecological Receptors			
	On- and Off-Site			
	Surface Water	Sediment	Soil (0 to 1 ft bgs)	Soil (0 to 2 ft bgs)
Dioxins and Furans				
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	**YES**	**YES**	**YES**	**YES**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	**YES**	**YES**	**YES**	**YES**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	–	**YES**	**YES**	**YES**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	–	**YES**	**YES**	**YES**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	–	**YES**	**YES**	**YES**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	–	**YES**	**YES**	**YES**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	–	**YES**	**YES**	**YES**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	**YES**	**YES**	**YES**	**YES**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	–	**YES**	**YES**	**YES**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	**YES**	**YES**	**YES**	**YES**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	–	**YES**	**YES**	**YES**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	–	**YES**	**YES**	**YES**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	–	**YES**	**YES**	**YES**
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	–	**YES**	**YES**	**YES**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	–	**YES**	**YES**	**YES**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	**YES**	**YES**	**YES**	**YES**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	**YES**	**YES**	**YES**	**YES**
Inorganics				
Antimony	–	no	**YES**	**YES**
Arsenic	no	**YES**	no	no
Barium	**YES**	**YES**	no	no
Beryllium	**YES**	**YES**	no	no
Cadmium	**YES**	**YES**	**YES**	**YES**
Chromium	no	no	**YES**	**YES**
Cobalt	no	**YES**	**YES**	**YES**
Copper	**YES**	**YES**	**YES**	**YES**
Lead	**YES**	**YES**	**YES**	**YES**
Mercury	**YES**	**YES**	**YES**	**YES**
Nickel	**YES**	**YES**	**YES**	**YES**
Selenium	–	no	no	**YES**
Silver	**YES**	no	no	**YES**
Thallium	no	**YES**	no	no
Tin	–	**YES**	no	no
Vanadium	no	**YES**	**YES**	**YES**
Zinc	**YES**	**YES**	**YES**	**YES**
Cyanide	–	**YES**	no	no
Sulfide	**YES**	–	**YES**	**YES**

– Not detected or not analyzed in that medium.
bgs Below ground surface.
ft Feet.
[a] See media-specific tables for on- and off-site media-specific selection of constituents of potential concern for more detail.

Figures



SITE LOCATION MAP

Phase I and II Investigation Report

HERCULES INCORPORATED
Hattiesburg, Mississippi

ARCADIS
10352 PLAZA AMERICANA DRIVE
BATON ROUGE, LA 70816
TEL: 225-292-1004
FAX: 225-218-9677
WWW.ARCADIS-US.COM

PROJECT MANAGER: JE	CHECKED BY: CD
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DRAWING BY: SDR	DATE: 07/02/2015
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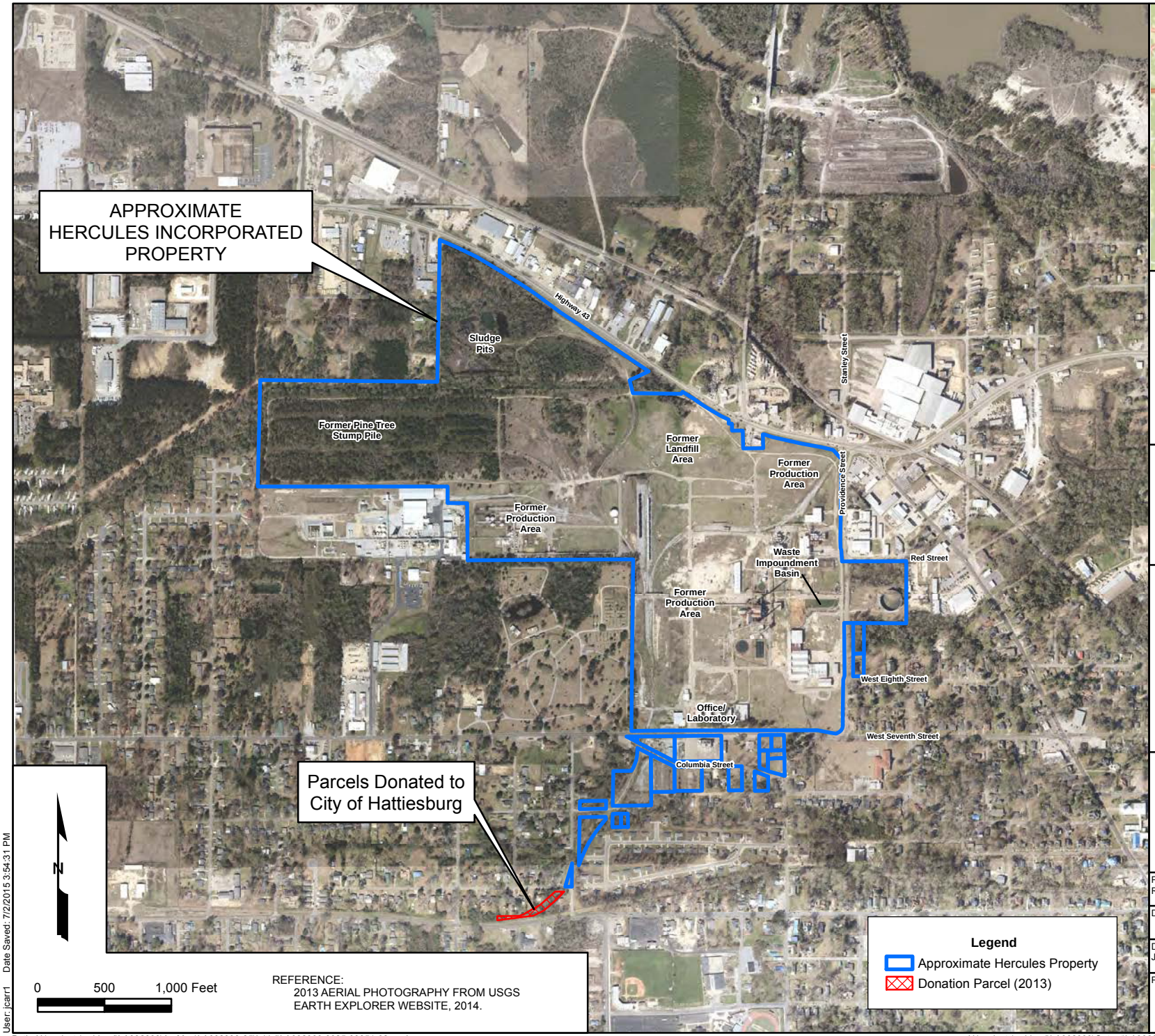



SITE AERIAL MAP

Phase I and II Investigation Report

HERCULES INCORPORATED
613 W. 7th Street
Hattiesburg, Mississippi

ARCADIS
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PROJECT MANAGER: RJE	CHECKED BY: CD
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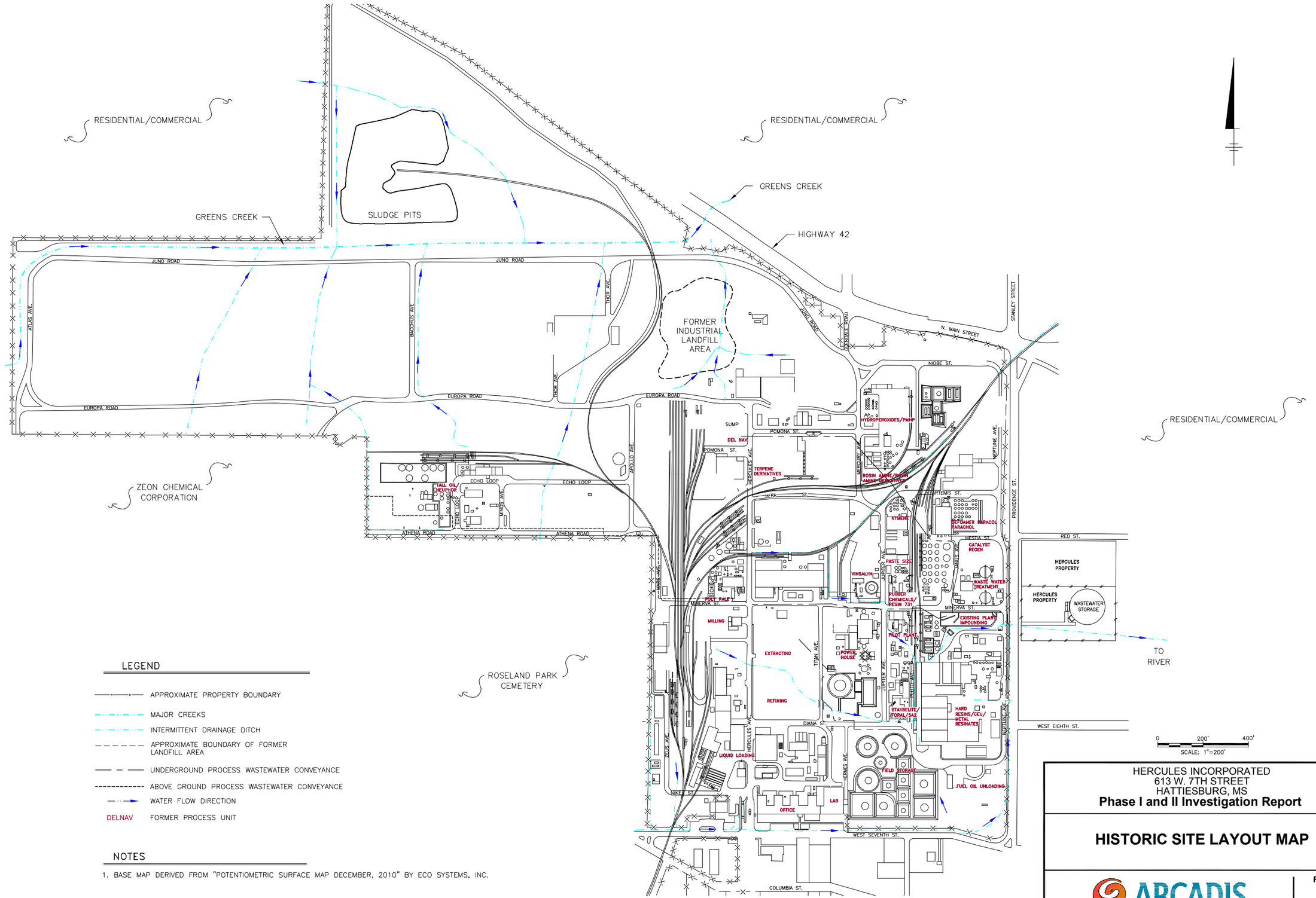

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- MAJOR CREEKS
- INTERMITTENT DRAINAGE DITCH
- APPROXIMATE BOUNDARY OF FORMER LANDFILL AREA
- UNDERGROUND PROCESS WASTEWATER CONVEYANCE
- ABOVE GROUND PROCESS WASTEWATER CONVEYANCE
- WATER FLOW DIRECTION
- DELNAV — FORMER PROCESS UNIT

NOTES

1. BASE MAP DERIVED FROM "POTENTIOMETRIC SURFACE MAP DECEMBER, 2010" BY ECO SYSTEMS, INC.

HERCULES INCORPORATED
613 W. 7TH STREET
HATTIESBURG, MS
Phase I and II Investigation Report

HISTORIC SITE LAYOUT MAP

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FIGURE
3

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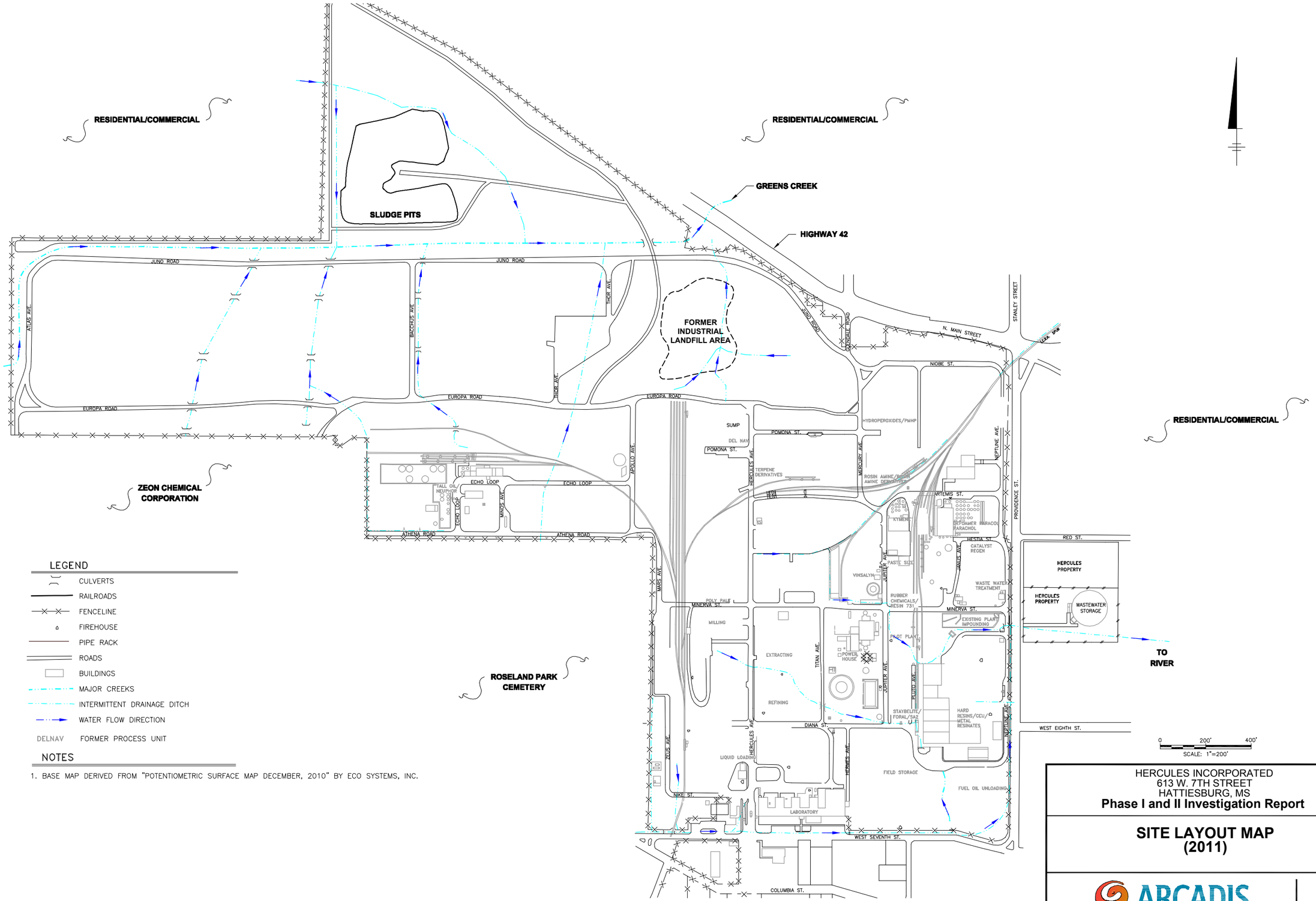

LEGEND

- CULVERTS
- RAILROADS
- FENCELINE
- FIREHOUSE
- PIPE RACK
- ROADS
- BUILDINGS
- MAJOR CREEKS
- INTERMITTENT DRAINAGE DITCH
- WATER FLOW DIRECTION
- DELNAV FORMER PROCESS UNIT

NOTES

1. BASE MAP DERIVED FROM "POTENTIOMETRIC SURFACE MAP DECEMBER, 2010" BY ECO SYSTEMS, INC.

HERCULES INCORPORATED
613 W. 7TH STREET
HATTIESBURG, MS
Phase I and II Investigation Report

SITE LAYOUT MAP (2011)

ARCADIS

FIGURE
4

DB: R. PETRIE S. BELL LD: SOTHON MEN PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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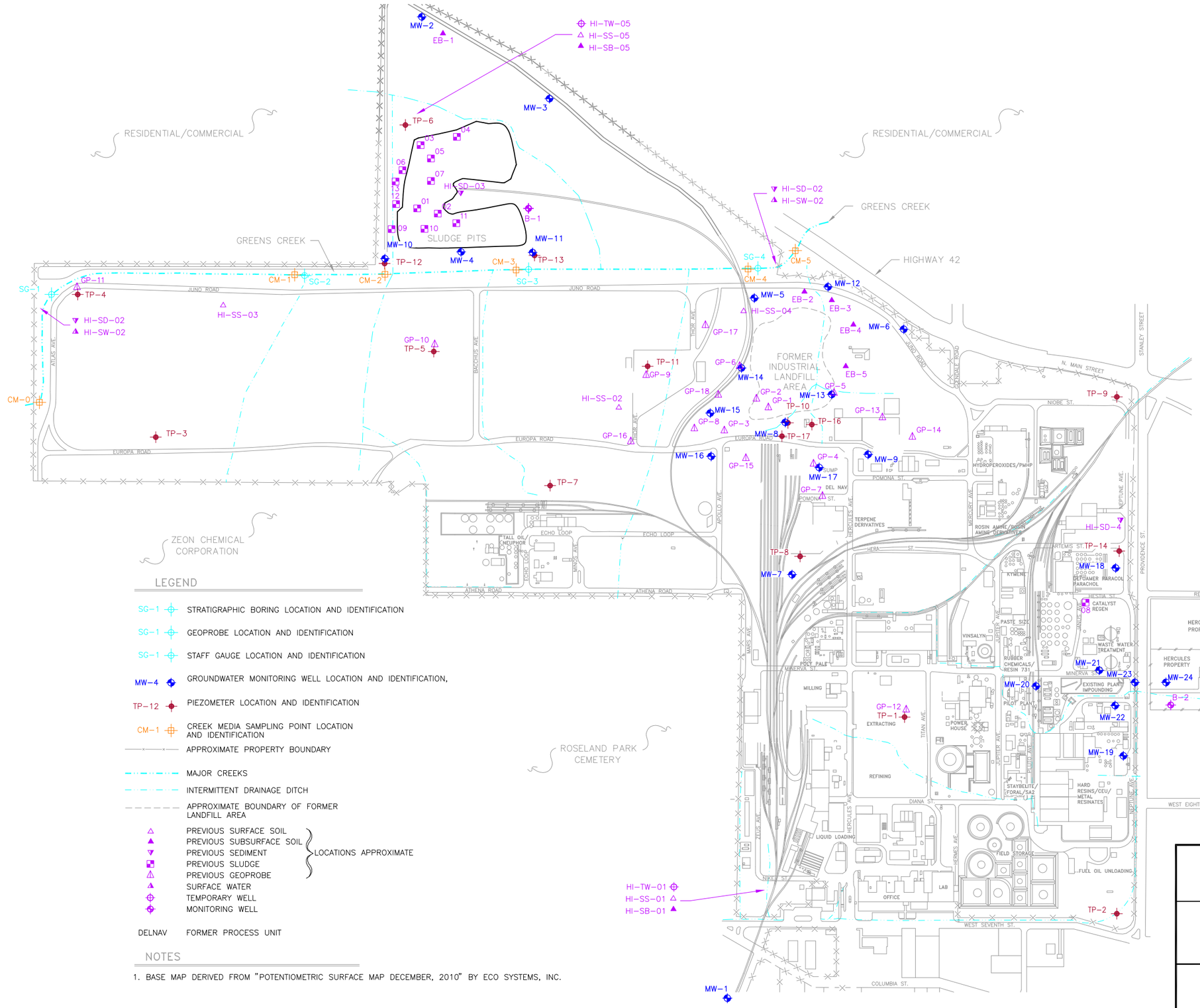

LEGEND

- SG-1 — STRATIGRAPHIC BORING LOCATION AND IDENTIFICATION
- SG-1 — GEOPROBE LOCATION AND IDENTIFICATION
- SG-1 — STAFF GAUGE LOCATION AND IDENTIFICATION
- MW-4 — GROUNDWATER MONITORING WELL LOCATION AND IDENTIFICATION,
- TP-12 — PIEZOMETER LOCATION AND IDENTIFICATION
- CM-1 — CREEK MEDIA SAMPLING POINT LOCATION AND IDENTIFICATION
- APPROXIMATE PROPERTY BOUNDARY
- MAJOR CREEKS
- INTERMITTENT DRAINAGE DITCH
- APPROXIMATE BOUNDARY OF FORMER LANDFILL AREA
- PREVIOUS SURFACE SOIL
- PREVIOUS SUBSURFACE SOIL
- PREVIOUS SEDIMENT
- PREVIOUS SLUDGE
- PREVIOUS GEOPROBE

(LOCATIONS APPROXIMATE)

- SURFACE WATER
- TEMPORARY WELL
- MONITORING WELL

DELNAV — FORMER PROCESS UNIT

NOTES

1. BASE MAP DERIVED FROM "POTENTIOMETRIC SURFACE MAP DECEMBER, 2010" BY ECO SYSTEMS, INC.

HERCULES INCORPORATED
613 W. 7TH STREET
HATTIESBURG, MS
Phase I and II Investigation Report

PREVIOUS SAMPLE LOCATION MAP

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FIGURE
5

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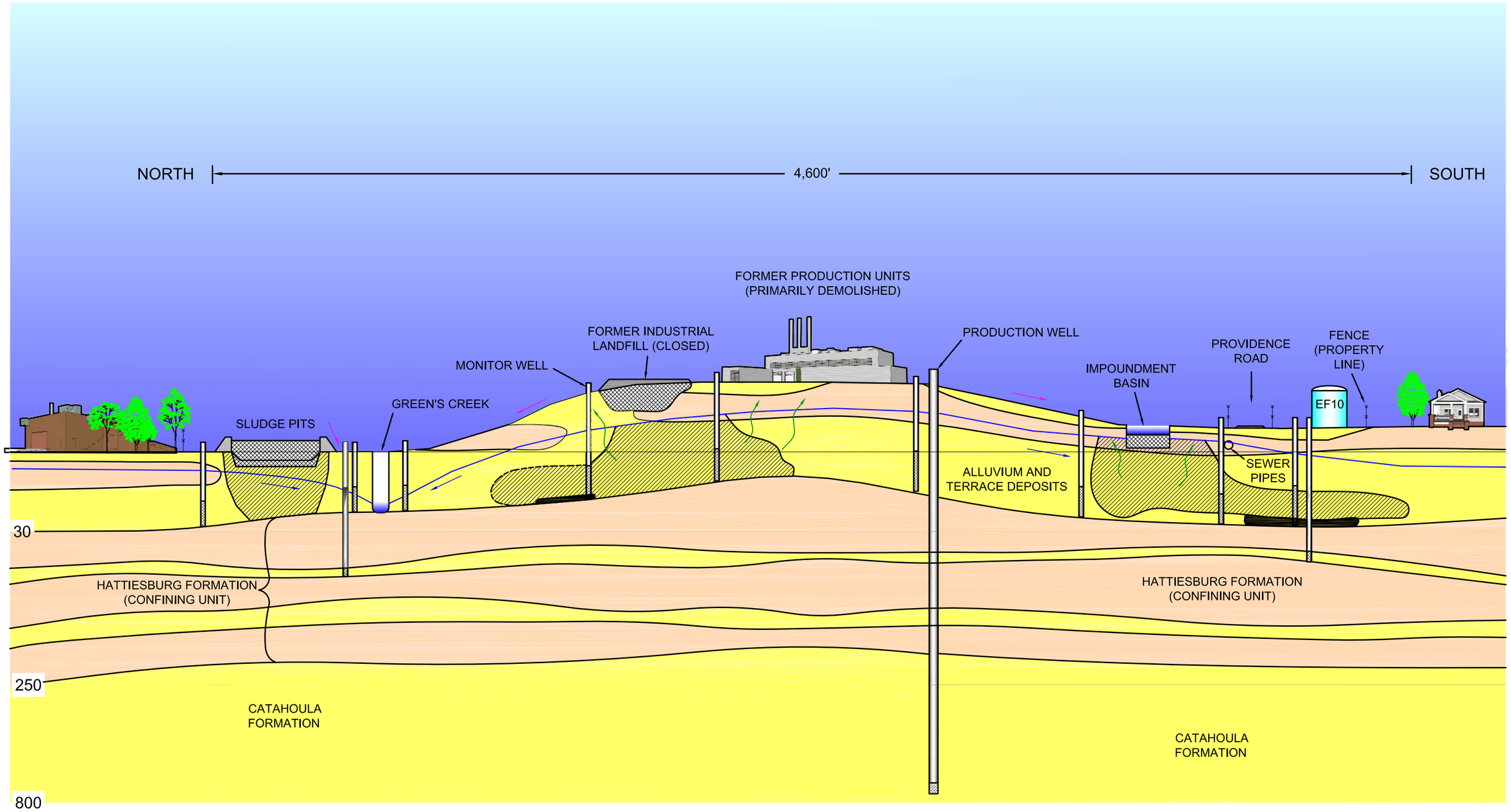

LOW PERMEABILITY MATERIAL
(CLAY, SILTY CLAY, SANDY CLAY)

PERMEABLE MATERIAL
(SAND, SILTY SAND, SANDY SILT, SILT)

GROUNDWATER IMPACTS

DNAPL

POTENTIOMETRIC SURFACE

DIRECTION OF GROUNDWATER FLOW

POTENTIAL VAPOR PATHWAY

SURFACE WATER RUNOFF

HERCULES INCORPORATED
613 W. 7TH STREET
HATTIESBURG, MS
Phase I and II Investigation Report

CONCEPTUAL SITE MODEL

ARCADIS

FIGURE
6

CITY:NOVI DIV/GROUP:ENV DB: PIC: PM: TM: TR: PROJECT NUMBER:
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TOP OF CLAY STRUCTURE MAP HATTIESBURG FORMATION

Phase I and II Investigation Report

HERCULES INCORPORATED
613 W. 7th Street
Hattiesburg, Mississippi

ARCADIS
10352 PLAZA AMERICANA DRIVE
BATON ROUGE, LA 70816
TEL: 225-292-1004
FAX: 225-218-9677
WWW.ARCADIS-US.COM

Legend

Approximate Hercules Property

Top of Hattiesburg Formation (ft)

164 ft

148 ft

Note:
Top of clay has been interpolated beyond the south and southeast of the site based on offsite investigations conducted between 2012-2014

N

0 250 500 Feet

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/02/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 7

User: jcarr1 Date Saved: 7/2/2015 3:52:41 PM

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ALLUVIAL (SHALLOW) AQUIFER ISOPACH MAP

Phase I and II Investigation Report

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Hattiesburg, Mississippi

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FAX: 225-218-9677
WWW.ARCADIS-US.COM

Legend

Approximate Hercules Property

Thickness of Alluvial (Shallow) Aquifer (ft)

- High : 28 ft

Low : 0 ft

N

0 250 500 Feet

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/02/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 8

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DIGITAL ELEVATION/ TOPOGRAPHIC MAP

Phase I and II Investigation Report

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Hattiesburg, Mississippi

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TEL: 225-292-1004
FAX: 225-218-9677
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Legend

- Approximate Hercules Property
- Donation Parcel (2013)

Elevation in feet

119 - 121	140 - 141	160 - 161	180 - 181
122 - 123	142 - 143	162 - 163	182 - 183
124 - 124	144 - 145	164 - 165	184 - 186
125 - 126	146 - 147	166 - 167	187 - 188
127 - 129	148 - 149	168 - 169	189 - 190
130 - 131	150 - 151	170 - 171	191 - 192
132 - 133	152 - 153	172 - 173	193 - 194
134 - 135	154 - 155	174 - 175	195 - 196
136 - 137	156 - 157	176 - 177	197 - 198
138 - 139	158 - 159	178 - 179	199 - 200

N

0 250 500 Feet

REFERENCE:
CONTOURS GENERATED FROM USDA DIGITAL ELEVATION MODEL, 2010.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/02/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 9

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DEEP BORING LOCATION MAP

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FAX: 225-218-9677
WWW.ARCADIS-US.COM

Legend

- Sampled Well Location
- Borings from 1931 Sanborn Map
- Deep Boring Location
- Approximate Hercules Property
- Parcels Donated to City

PW-CMS-01
B-140
B-141
B-142
PW-RTT-01
B-1
D-61
D-70
Zeon MW-1
Zeon 1A
Zeon MW-2
PW-ZC-02
PW-ZC-01
D-133
D-109
Hercules Well 3
D-60
D-014
PW-HI-03
Hercules Well 1
PW-HI-01
Hercules Electric Log 6
Zeon MW-4
Zeon MW-3
Zeon MW-6
B-2
1931 Borings
D-33
PW-HI-02

N

0 250 500 Feet

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/02/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 10

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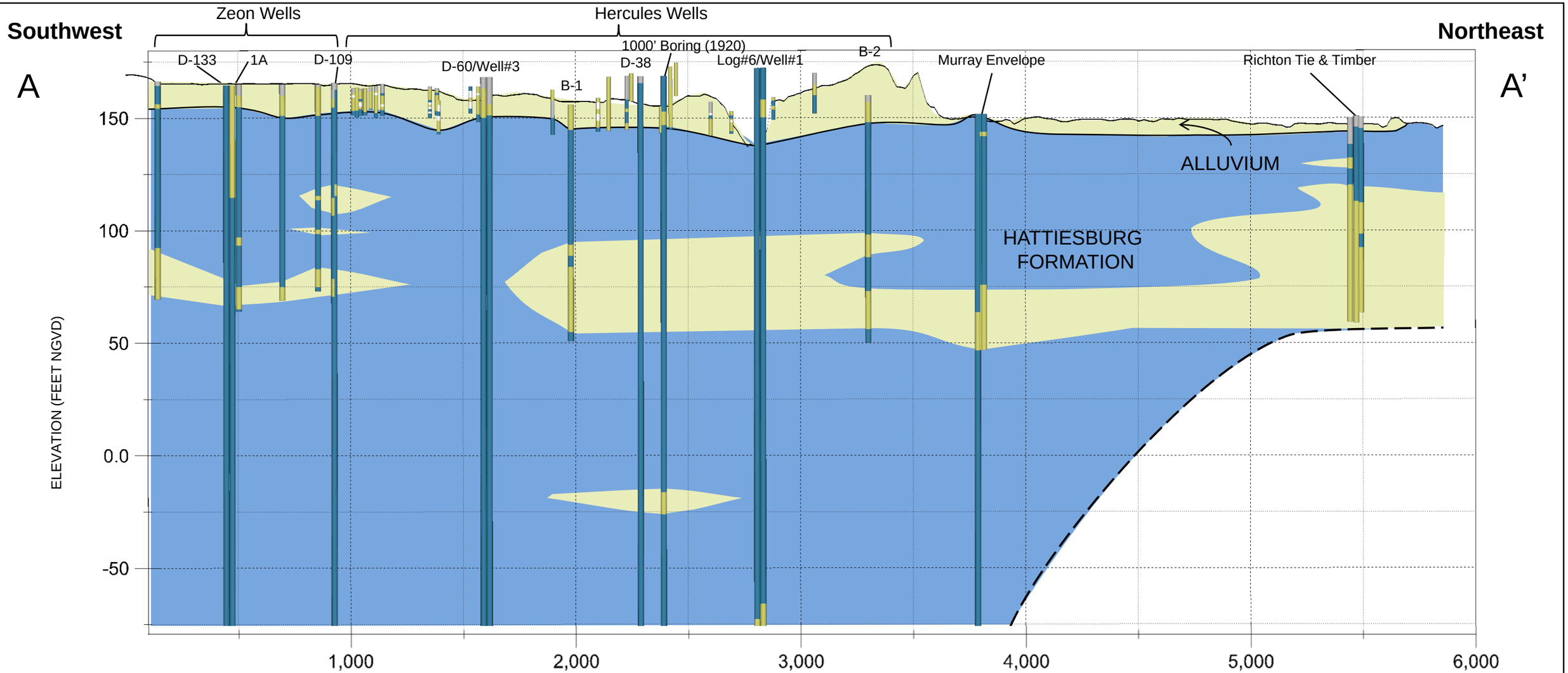
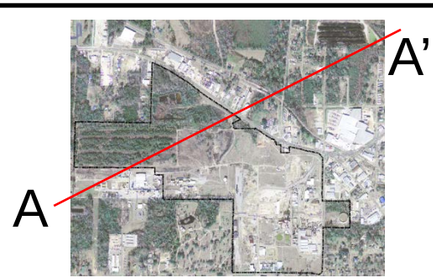


GEOLOGY FROM BORING LOGS

- FILL/TOPSOIL
- HIGH PERMEABILITY UNIT
- LOW PERMEABILITY UNIT
- UNKNOWN GEOLOGIC CONTACT

Notes:

1. Ground surface is shown along transect A-A'.
2. All borings are projected onto transect A-A'.
3. Alluvial borings (< 50' deep) are shown within a 500' radius of transect A-A'.



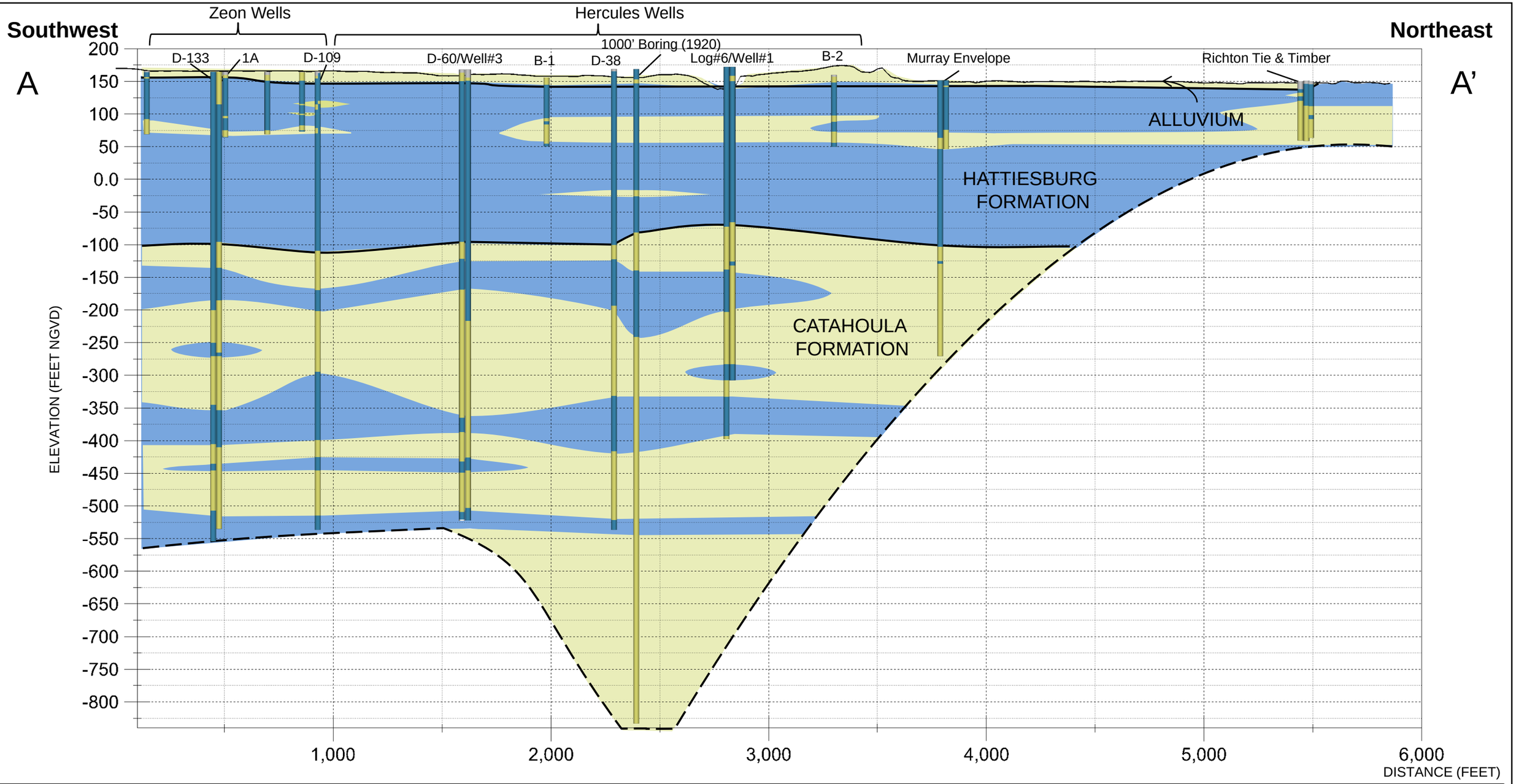
HERCULES INCORPORATED
613 W. 7th Street
Hattiesburg, Mississippi

Deep Cross Section
250 Feet Below Ground Surface

ARCADIS

FIGURE
11

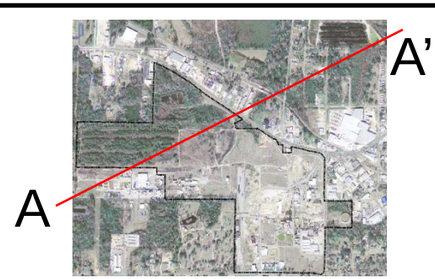
\\arcadis-us\officedata\Brighton-MI\COMMON\Ashland Hercules\EVS\Output\Deep Cross Section Figure_rev.pdf



GEOLOGY FROM BORING LOGS

- FILL/TOPSOIL
- HIGH PERMEABILITY UNIT
- LOW PERMEABILITY UNIT
- UNKNOWN GEOLOGIC CONTACT

Notes:
1. Ground surface is shown along transect A-A'.
2. All borings are projected onto transect A-A'.



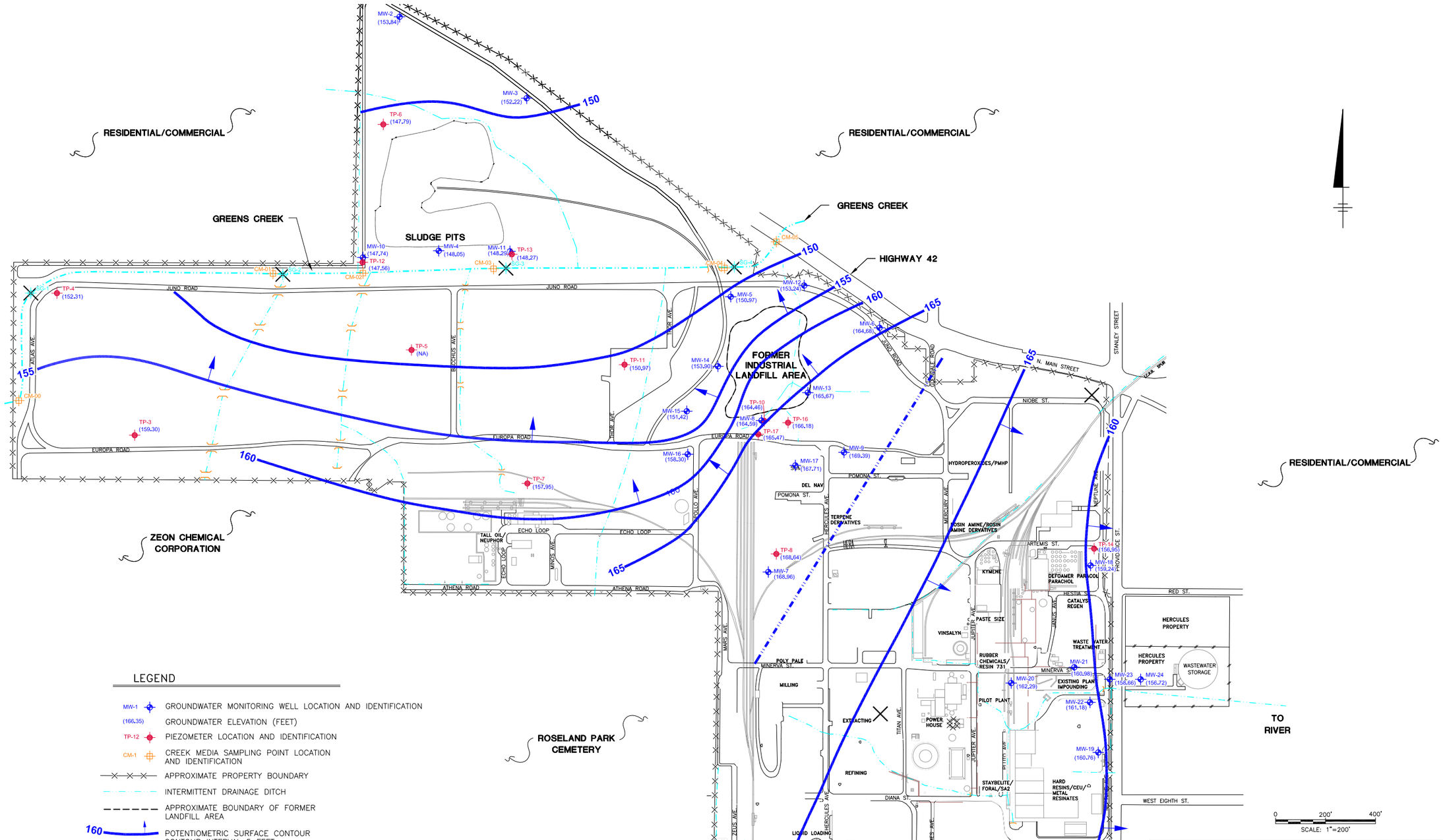
HERCULES INCORPORATED
613 W. 7th Street
Hattiesburg, Mississippi

Deep Cross Section
1000 Feet Below Ground Surface

ARCADIS

FIGURE 12

\\arcadis-us\officedata\Brighton-MI\COMMON\Ashland Hercules\EVS\Output\Deep Cross Section Figure_rev.pdf



LEGEND

MW-1	GROUNDWATER MONITORING WELL LOCATION AND IDENTIFICATION
(166.35)	GROUNDWATER ELEVATION (FEET)
TP-12	PIEZOMETER LOCATION AND IDENTIFICATION
CM-1	CREEK MEDIA SAMPLING POINT LOCATION AND IDENTIFICATION
	APPROXIMATE PROPERTY BOUNDARY
	INTERMITTENT DRAINAGE DITCH
	APPROXIMATE BOUNDARY OF FORMER LANDFILL AREA
160	POTENTIOMETRIC SURFACE CONTOUR CONTOUR INTERVAL 5 FEET
	APPROXIMATE LOCATION OF HYDRAULIC DIVIDE
DELNAV	FORMER PROCESS UNIT
(NA)	NOT ACCESSIBLE

NOTES

1. BASE MAP BASED ON FIELD SURVEY WORK PERFORMED IN OCTOBER 2008 AS PROVIDED BY HERCULES INCORPORATED
2. CONTOUR INTERVAL IS 5 FEET.

HERCULES INCORPORATED
613 W. 7TH STREET
HATTIESBURG, MS

Phase I and II Investigation Report

POTENTIOMETRIC SURFACE MAP (DECEMBER 2013)

ARCADIS

FIGURE
13

CITY: SYRACUSE, NY DIV/GROUP: ENVCAD DB: R. PETRIE N.SMITHGALL, W.JONES LD: S. MEN PIC: J. REID PM: J. ELLIS TM: H. ENGLISH LYR:(Opt)ON=*;OFF=*REF*
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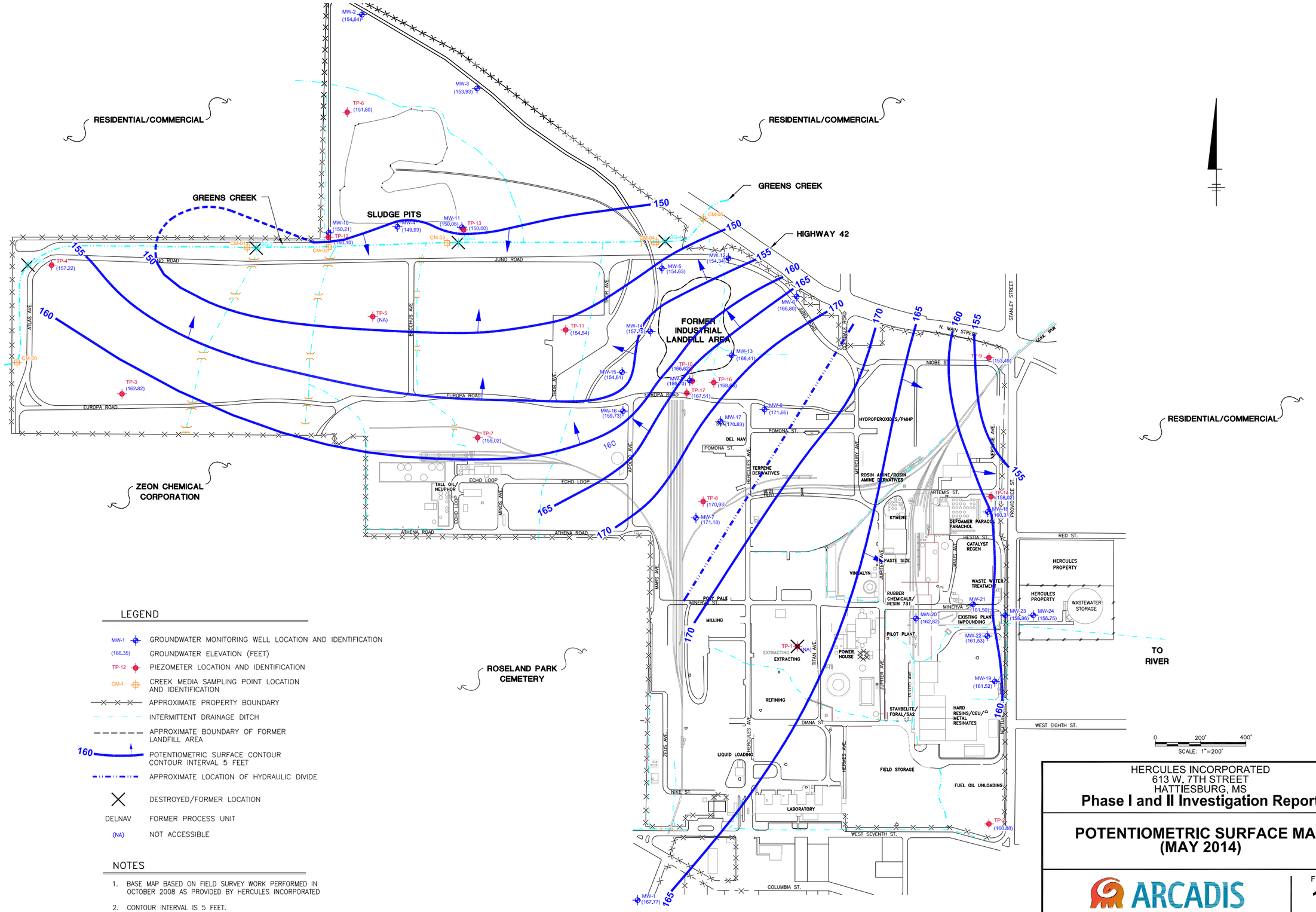

LEGEND

- MW-1 — GROUNDWATER MONITORING WELL LOCATION AND IDENTIFICATION
- (166,35) — GROUNDWATER ELEVATION (FEET)
- TP-12 — PIEZOMETER LOCATION AND IDENTIFICATION
- CM-1 — CREEK MEDIA SAMPLING POINT LOCATION AND IDENTIFICATION
- APPROXIMATE PROPERTY BOUNDARY
- INTERMITTENT DRAINAGE DITCH
- APPROXIMATE BOUNDARY OF FORMER LANDFILL AREA
- 160 — POTENTIOMETRIC SURFACE CONTOUR CONTOUR INTERVAL 5 FEET
- APPROXIMATE LOCATION OF HYDRAULIC DIVIDE
- DESTROYED/FORMER LOCATION
- DELNAV — FORMER PROCESS UNIT
- (NA) — NOT ACCESSIBLE

NOTES

1. BASE MAP BASED ON FIELD SURVEY WORK PERFORMED IN OCTOBER 2008 AS PROVIDED BY HERCULES INCORPORATED
2. CONTOUR INTERVAL IS 5 FEET.

HERCULES INCORPORATED
613 W. 7TH STREET
HATTIESBURG, MS

Phase I and II Investigation Report

POTENTIOMETRIC SURFACE MAP (MAY 2014)

ARCADIS

FIGURE 14

CITY: SYRACUSE, NY DIV/GROUP: ENVCAD DB: R. PETRIE N.SMITHGALL, W.JONES LD: S. MEN PIC: J. REID PM: J. ELLIS TM: H. ENGLISH LYR:(On);OFF=*REF*
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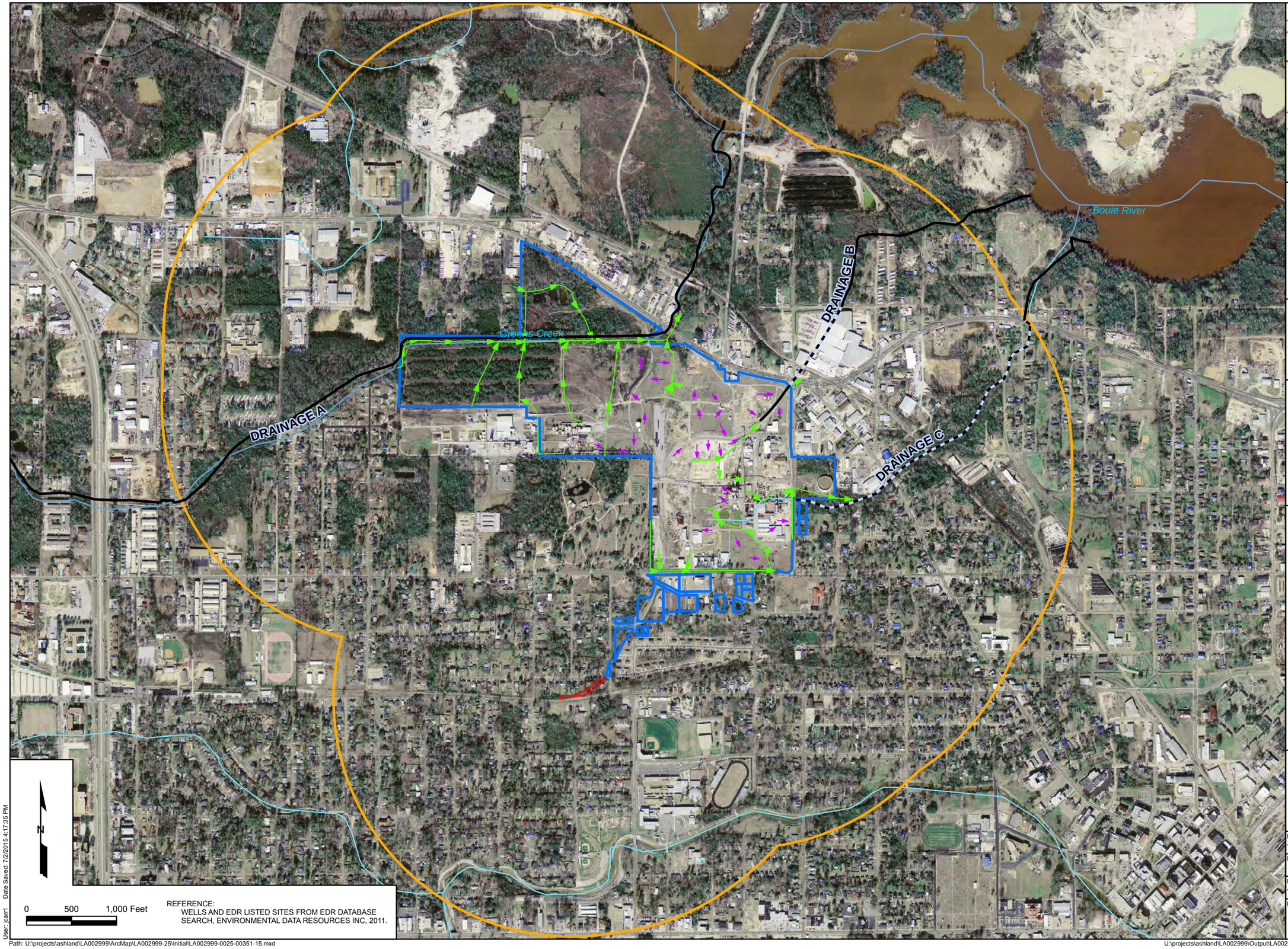



SURFICIAL DRAINAGE MAP

Phase I and II Investigation Report

HERCULES INCORPORATED
613 W. 7th Street
Hattiesburg, Mississippi

ARCADIS
10352 PLAZA AMERICANA DRIVE
BATON ROUGE, LA 70816
TEL: 225-292-1004
FAX: 225-218-9677
WWW.ARCADIS-US.COM

Legend

- Culverted Ditch
- Open Ditch
- Sheet Flow Direction
- Water Flow Direction
- Half Mile Radius
- Approximate Hercules Property
- Donation Parcel (2013)

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/02/2015
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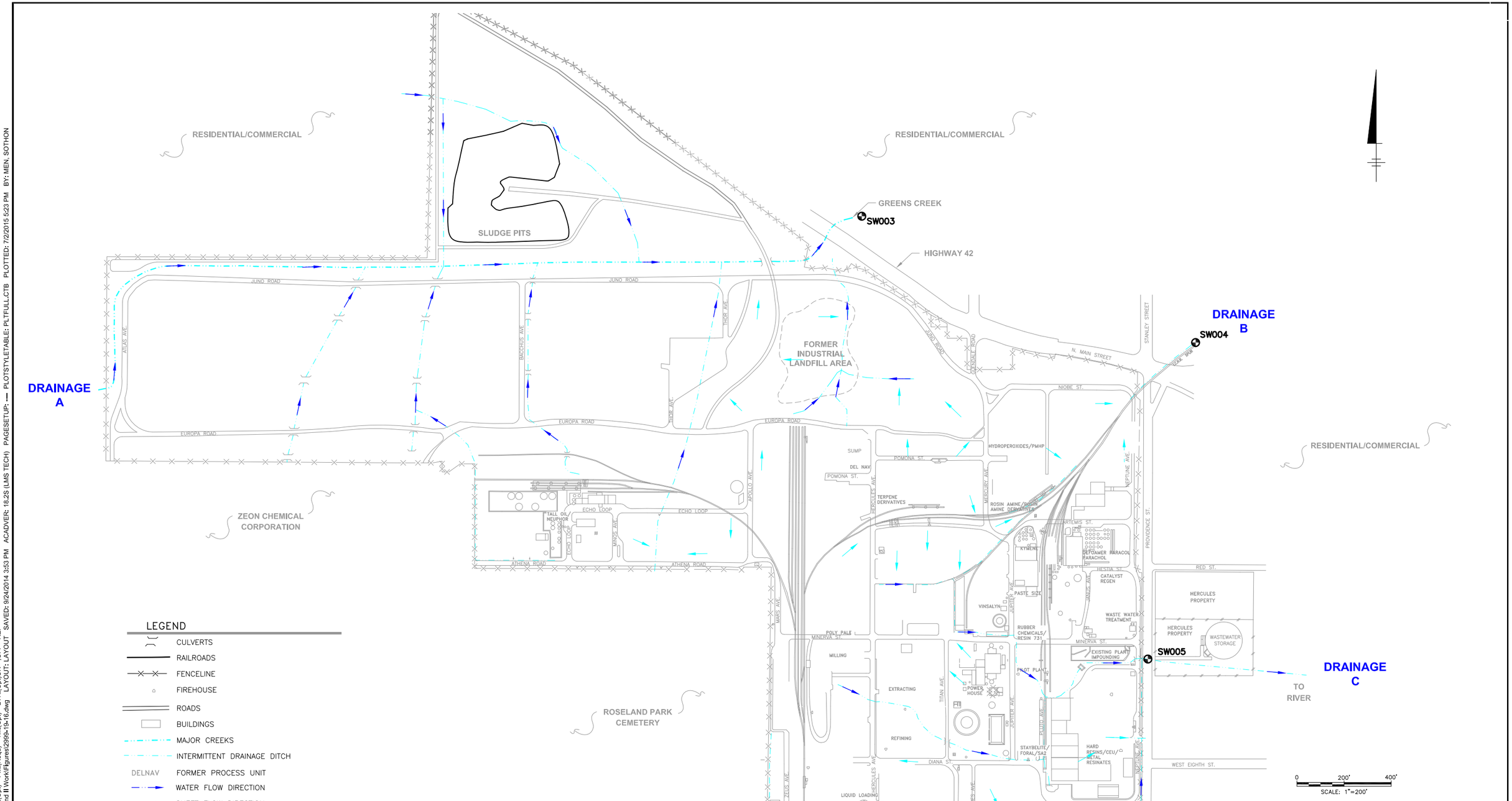

LEGEND

- CULVERTS
- RAILROADS
- FENCELINE
- FIREHOUSE
- ROADS
- BUILDINGS
- MAJOR CREEKS
- INTERMITTENT DRAINAGE DITCH
- DELNAV FORMER PROCESS UNIT
- WATER FLOW DIRECTION
- SHEET FLOW DIRECTION
- SW004 STORMWATER OUTFALL LOCATION AND IDENTIFICATION

NOTES

1. BASE MAP PROVIDED BY HERCULES, INCORPORATED.

HERCULES INCORPORATED
613 W. 7TH STREET
HATTIESBURG, MS
Phase I and II Investigation Report

ON-SITE SURFICIAL DRAINAGE MAP

ARCADIS

FIGURE
16

DB: R. PETRIE S. BELL LD: SOTHON MEN PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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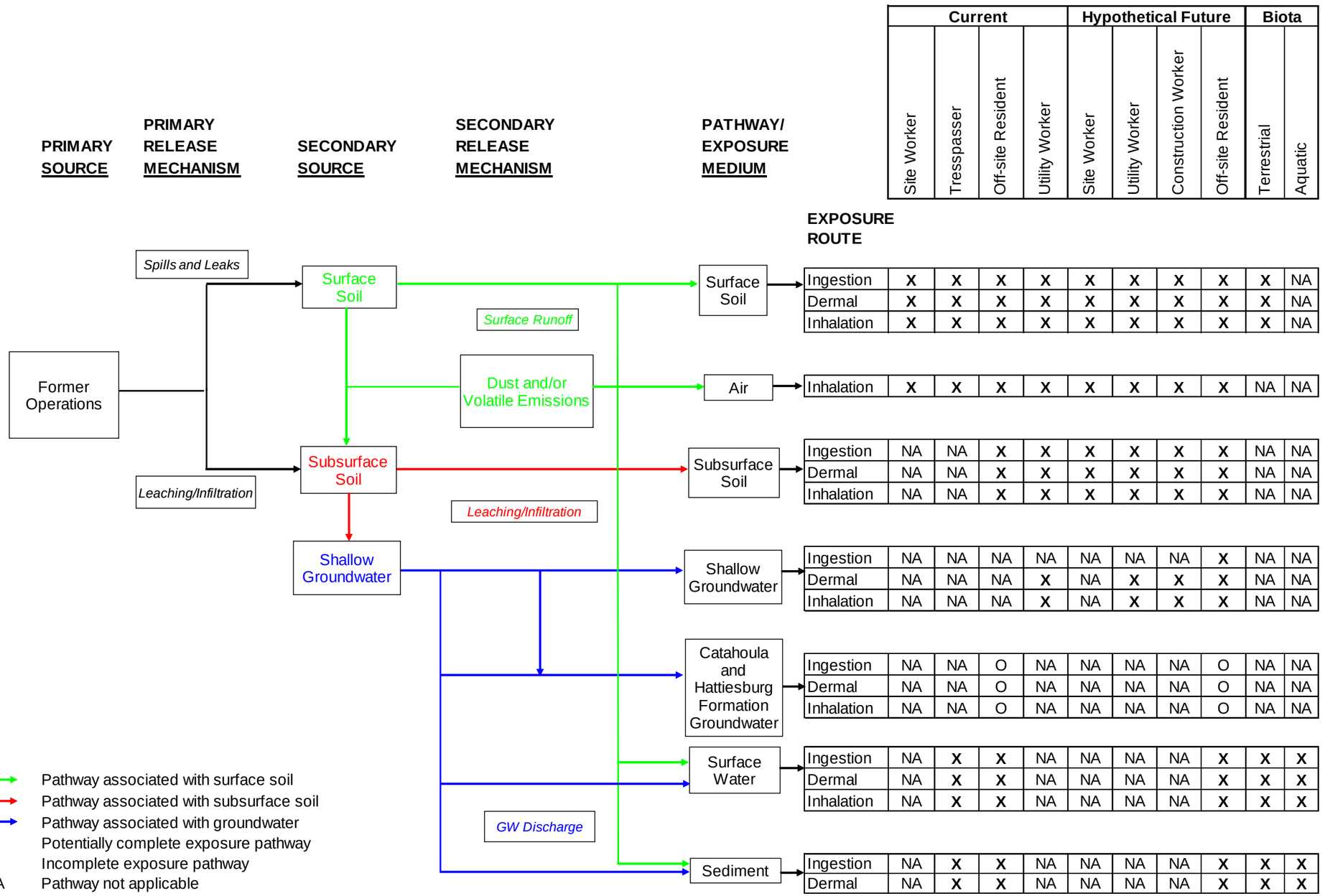

	Current				Hypothetical Future				Biota	
EXPOSURE ROUTE	Site Worker	Tresspasser	Off-site Resident	Utility Worker	Site Worker	Utility Worker	Construction Worker	Off-site Resident	Terrestrial	Aquatic
Surface Soil – Ingestion	X	X	X	X	X	X	X	X	X	NA
Surface Soil – Dermal	X	X	X	X	X	X	X	X	X	NA
Surface Soil – Inhalation	X	X	X	X	X	X	X	X	X	NA
Air – Inhalation	X	X	X	X	X	X	X	X	NA	NA
Subsurface Soil – Ingestion	NA	NA	X	X	X	X	X	X	NA	NA
Subsurface Soil – Dermal	NA	NA	X	X	X	X	X	X	NA	NA
Subsurface Soil – Inhalation	NA	NA	X	X	X	X	X	X	NA	NA
Shallow Groundwater – Ingestion	NA	NA	NA	NA	NA	NA	NA	X	NA	NA
Shallow Groundwater – Dermal	NA	NA	NA	X	NA	X	X	X	NA	NA
Shallow Groundwater – Inhalation	NA	NA	NA	X	NA	X	X	X	NA	NA
Catahoula and Hattiesburg Formation Groundwater – Ingestion	NA	NA	O	NA	NA	NA	NA	O	NA	NA
Catahoula and Hattiesburg Formation Groundwater – Dermal	NA	NA	O	NA	NA	NA	NA	O	NA	NA
Catahoula and Hattiesburg Formation Groundwater – Inhalation	NA	NA	O	NA	NA	NA	NA	O	NA	NA
Surface Water – Ingestion	NA	X	X	NA	NA	NA	NA	X	X	X
Surface Water – Dermal	NA	X	X	NA	NA	NA	NA	X	X	X
Surface Water – Inhalation	NA	X	X	NA	NA	NA	NA	X	X	X
Sediment – Ingestion	NA	X	X	NA	NA	NA	NA	X	X	X
Sediment – Dermal	NA	X	X	NA	NA	NA	NA	X	X	X

HERCULES INCORPORATED
613 W. 7TH STREET
HATTIESBURG, MS
Phase I and II Investigation Report

PRELIMINARY CONCEPTUAL SITE MODEL FOR POTENTIAL EXPOSURE PATHWAYS

ARCADIS

FIGURE
17

DB: R. PETRIE S. BELL LD: SOTHON MEN PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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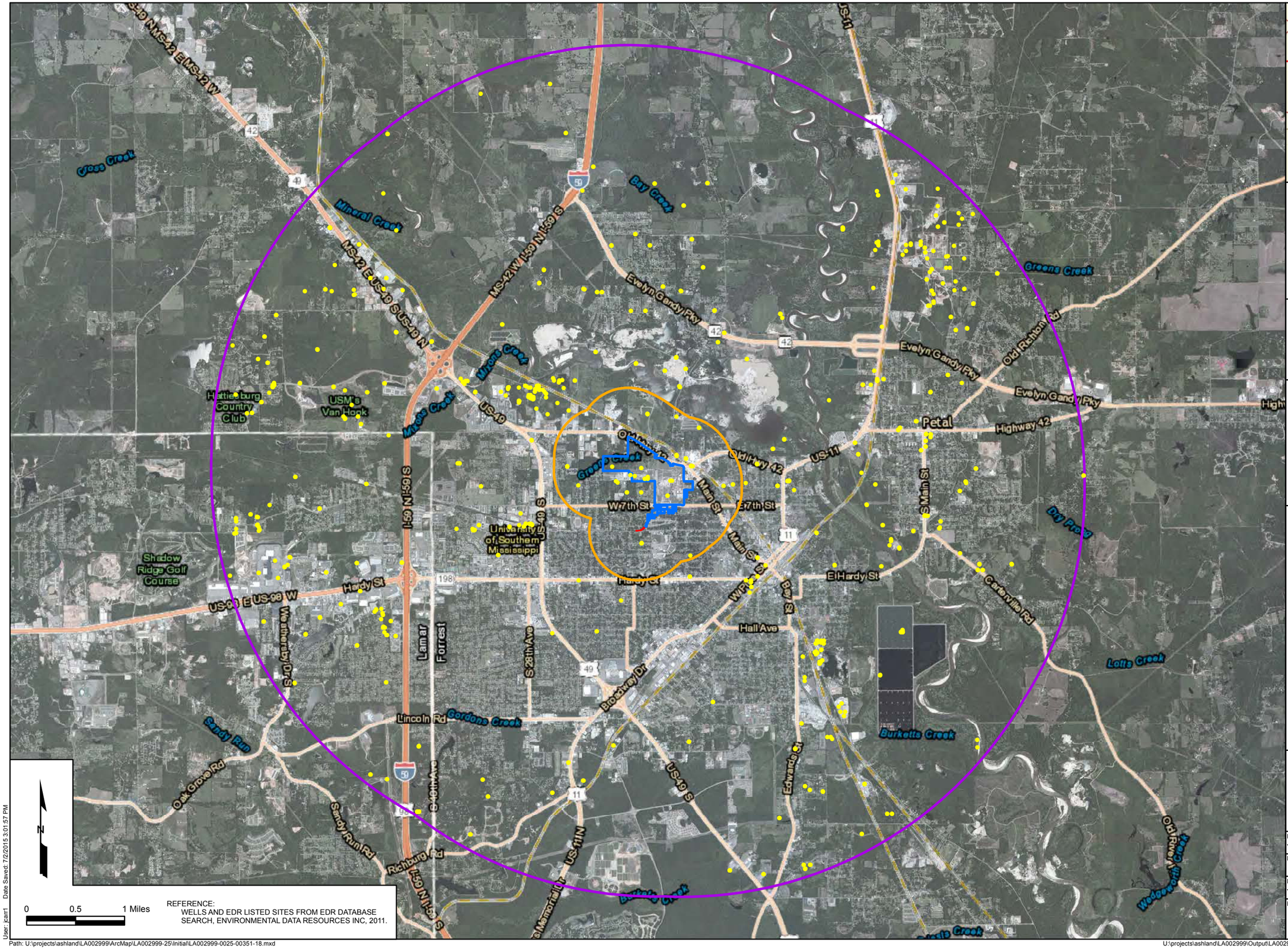

EDR IDENTIFIED WELLS WITHIN FOUR MILES OF SITE

Phase I and II Investigation Report

HERCULES INCORPORATED
613 W. 7th Street
Hattiesburg, Mississippi

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10352 PLAZA AMERICANA DRIVE
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TEL: 225-292-1004
FAX: 225-218-9677
WWW.ARCADIS-US.COM

Legend

- EDR Identified Wells
- Approximate Hercules Property
- Half Mile Radius
- Four Mile Radius
- Donation Parcel (2013)

No public supply wells within 1/2 mile of site.
19 public supply wells within 4 miles of site.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/02/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 18

User: jcarr1 Date Saved: 7/2/2015 3:01:57 PM

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SAMPLED WELL KEY		
SAMPLE ID	WELL TYPE	CORRESPONDING EDR WELL ID
PW-RTT-01	Industrial	142
PW-CMS-01	Irrigation	136
PW-HI-01	Industrial	168
PW-HI-03	Industrial	166
PW-ZC-01	Industrial	164
PW-ZC-02	Industrial	169



WATER WELLS WITHIN ONE-HALF MILE OF SITE

Phase I and II Investigation Report

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Hattiesburg, Mississippi

ARCADIS
10352 PLAZA AMERICANA DRIVE
BATON ROUGE, LA 70816
TEL: 225-292-1004
FAX: 225-218-9677
WWW.ARCADIS-US.COM

Legend

- Landowner responded to postcard questionnaire as of 09/12/2011 indicating a water well was present on their property.
- Well field-verified as present
- 178 EDR Database Well Location
- Sampled Wells
- Approximate Hercules Property
- Half Mile Radius
- Donation Parcel (2013)

PW-CMS-01 = Sample ID
2-029B-03-196.00 = Parcel ID

Note:
Field verification determined that most wells indictated as present in the postcard questionnaires were either not present or not functional.

**Well ID 184 (Hercules Supply Well #2) was located in the field/present but later discovered to be damaged and could not be sampled.*

EDR DATA	
MAP ID	WELL DEPTH
136	94
139	0
142	91
153	422
155	265
158	138
159	105
160	654
161	668
164	641
166	640
168	466
169	650
173	0
174	350
175	325
178	353
181	501
183	687
184	687
207	576
212	0

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/02/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 19

N

0 500 1,000 Feet

REFERENCE:
HATTIESBURG ZONING PROVIDED BY THE CITY OF HATTIESBURG, MS, 2011.

User: jcarr1 Date Saved: 7/2/2015 2:55:52 PM

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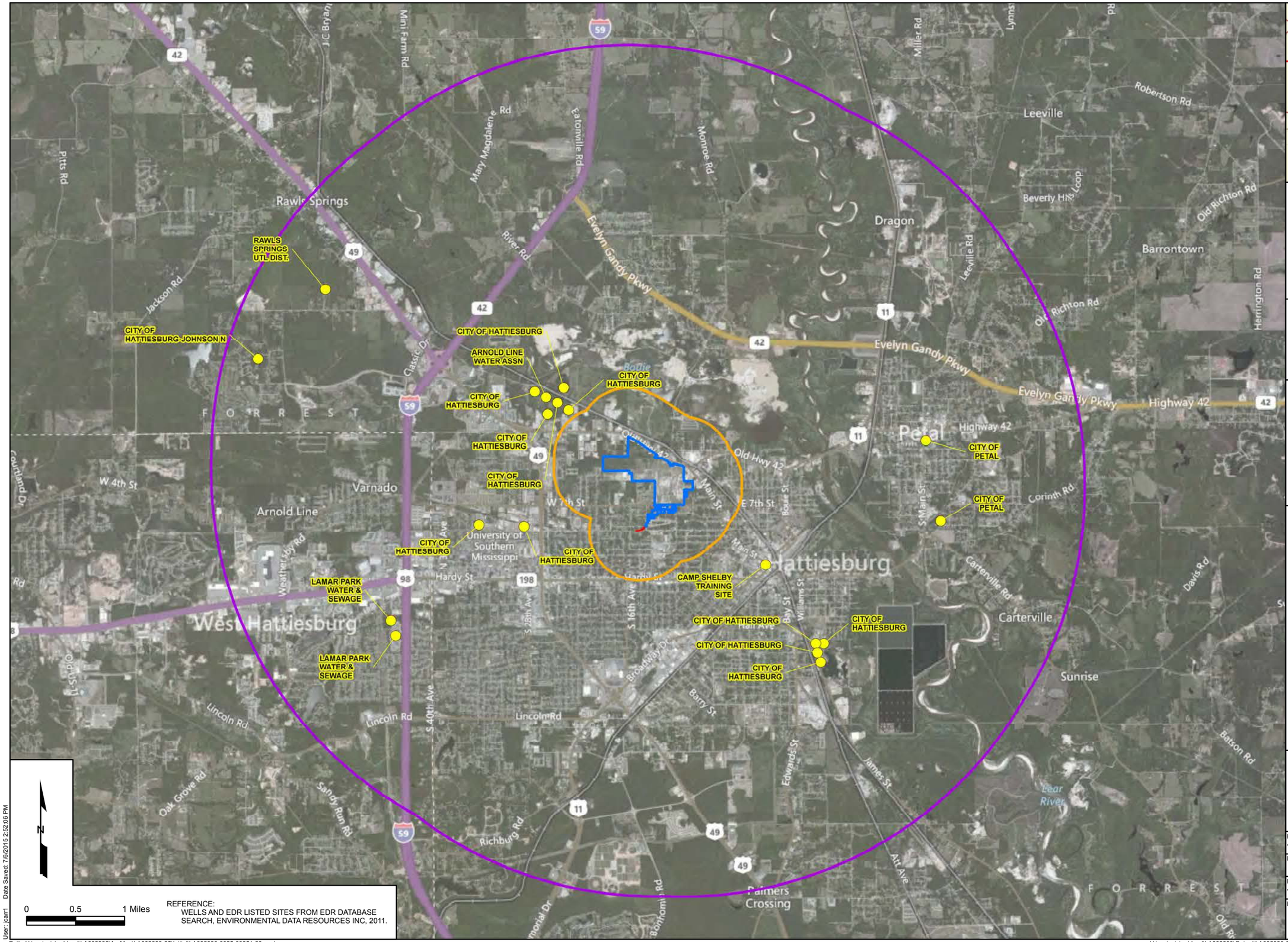



EDR IDENTIFIED PUBLIC SUPPLY WELLS

Phase I and II Investigation Report

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Hattiesburg, Mississippi

ARCADIS
10352 PLAZA AMERICANA DRIVE
BATON ROUGE, LA 70816
TEL: 225-292-1004
FAX: 225-218-9677
WWW.ARCADIS-US.COM

Legend

- Public Supply Well
- Approximate Hercules Property
- Half Mile Radius
- Four Mile Radius
- Donation Parcel (2013)

No public supply wells within 1/2 mile of site.
19 public supply wells within 4 miles of site.

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/02/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 20

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PRIVATE/INDUSTRIAL WATER WELL GROUNDWATER EXCEEDANCES (HUMAN HEALTH)

Phase I and II Investigation Report

HERCULES INCORPORATED
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Private Well

Private Well

Private Well

Private Well

PW-HI-02

	PW-CMS-01 02/27/12 Alluvial
Benzene	<0.50
Tetrachloroethene	<0.50
Trichloroethene	<0.50
Vinyl Chloride	<0.50
1,1'-Biphenyl	<0.98 J
1,4-Dioxane	**0.47 J**
Arsenic	**0.76 J**
Cobalt	<10

	PW-ZC-01 02/28/12 Catahoula Formation
Benzene	<1.0
Tetrachloroethene	<1.0
Trichloroethene	<1.0
Vinyl Chloride	<1.0
1,1'-Biphenyl	**0.099 J**
1,4-Dioxane	<1.9 J
Arsenic	<2.5
Cobalt	<0.50

	PW-ZC-02 02/28/12 Catahoula Formation
Benzene	<1.0
Tetrachloroethene	<1.0
Trichloroethene	<1.0
Vinyl Chloride	<1.0
1,1'-Biphenyl	<1.0 J
1,4-Dioxane	<2.0 J
Arsenic	<2.5
Cobalt	<0.50

	PW-RTT-01 04/03/12 Hattiesburg Formation
Benzene	**0.76 J**
Tetrachloroethene	**12**
Trichloroethene	**77**
Vinyl Chloride	**1.9**
1,1'-Biphenyl	<0.96
1,4-Dioxane	**2.5**
Arsenic	**5**
Cobalt	**1**

	PW-HI-03 03/15/12 Catahoula Formation
Benzene	<1.0
Tetrachloroethene	<1.0
Trichloroethene	<1.0
Vinyl Chloride	<1.0
1,1'-Biphenyl	<0.95
1,4-Dioxane	<1.9
Arsenic	<2.5
Cobalt	<0.50

	PW-HI-01 03/13/12 Catahoula Formation
Benzene	<1.0
Tetrachloroethene	<1.0
Trichloroethene	<1.0
Vinyl Chloride	<1.0
1,1'-Biphenyl	<0.94
1,4-Dioxane	<1.9
Arsenic	**2.4 J**
Cobalt	<0.50

Legend

- Sampled Well Location
- Hercules Industrial Well
- Sampled Well Location
- Private Well
- Culverted Ditch
- Open Ditch
- Approximate Hercules Property
- Donation Parcel (2013)
- Half Mile Radius

Screening Critiera	MDEQ Groundwater Tier 1 TRG (2002)	USEPA Tapwater RSL (May 2014)
Benzene	5.00E+00	4.50E-01
Tetrachloroethene	5.00E+00	4.10E+00
Trichloroethene	5.00E+00	2.80E-01
Vinyl Chloride	2.00E+00	1.90E-02
1,1'-Biphenyl	3.04E+02	8.30E-02
1,4-Dioxane	6.09E+00	7.80E-01
Arsenic	5.00E+01	5.20E-02
Cobalt	2.19E+03	6.00E-01

Note: Hercules well HI-02 could not be sampled due to insufficient recharge during purging.
Results are shown for all compounds with concentrations exceeding screening criteria in at least one sample.
All units in micrograms per liter (ug/L)
Bold - Compound detected.
Shaded cells indicate that the reported result exceeds screening criteria.
J - Indicates an estimated value.

N

0 500 1,000 Feet

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/02/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 21

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SURFACE WATER, SEDIMENT, AND DRAINAGE C SURFACE SOIL SAMPLE LOCATIONS

Phase I and II Investigation Report

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Legend

- Agricultural, Private Well (Shallow Aquifer)
- Creek Monitoring Location
- Surface Soil Sample
- Surface Water/Sediment Sample
- Surface Water/Sediment Location Not Sampled (AO-SW-08 & AO-SD-08)
- Culverted Ditch
- Open Ditch
- Approximate Hercules Property
- Donation Parcel (2013)
- Half Mile Radius

A0-SW-01 = Surface Water Sample Location
A0-SD-01 = Sediment Sample Location
A0-SS-01 = Surface Soil Sample Location

N

0 500 1,000 Feet

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/02/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 22

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SURFACE WATER SAMPLE EXCEEDANCES (HUMAN HEALTH)

Phase I and II Investigation Report

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Legend

- Creek Monitoring Location
- Surface Water Sample
- Location with Exceedance
- Culverted Ditch
- Open Ditch
- Approximate Hercules Property
- Donation Parcel (2013)
- Half Mile Radius

Screening Criteria	USEPA Tapwater RSL (May 2014)	National Recommended Water Quality Criteria
Acetonitrile	1.30E+01	--
Benzene	4.50E-01	2.20E+00
Bromodichloromethane	1.30E-01	5.50E-01
Carbon Tetrachloride	4.50E-01	2.30E-01
Chloroform	2.20E-01	5.70E+00
Dibromochloromethane	1.70E-01	4.00E-01
Vinyl Chloride	1.90E-02	2.50E-02
1,1-Biphenyl	8.30E-02	--
1,4-Dioxane	7.80E-01	--
bis(2-Ethylhexyl)phthalate	5.60E+00	1.20E+00
Chrysene	3.40E+00	3.80E-03
Naphthalene	1.70E-01	--
Pentachlorophenol	4.00E-02	2.70E-01
Arsenic	5.20E-02	1.80E-02
Cobalt	6.00E-01	--
Thallium	2.00E-02	2.40E-01
Mercury	6.30E-02	--

Notes: Results are shown for all compounds with concentrations exceeding screening criteria in at least one sample.
All units in micrograms per liter (ug/L).
Bold - Compound detected.
Shaded cells indicate that the reported result exceeds screening criteria.
[ ] - Indicates results for a field duplicate sample.
B - Indicates compound was found in the blank and sample.
E - Serial dilution results not within 10%. Applicable only if analyte concentration is at least 50X the IDL in original sample.
J - Indicates value is estimated.
NA - Not analyzed for particular constituent.
NS - Surface water samples not collected at this SW/SED location due to insufficient water for sampling.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/02/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 23

0 500 1,000 Feet

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

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SURFACE WATER SAMPLE EXCEEDANCES (ECOLOGICAL)

Phase I and II Investigation Report

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Legend

- Creek Monitoring Location
- Surface Water Sample
- Location with Exceedance
- Culverted Ditch
- Open Ditch
- Approximate Hercules Property
- Donation Parcel (2013)
- Half Mile Radius

Screening Criteria	Ecological Screening Level
bis(2-Ethylhexyl)phthalate	3.00E-01
Barium	2.20E+02
Beryllium	5.30E-01
Cadmium	1.50E-01
Copper	5.00E+00
Lead	1.18E+00
Nickel	2.90E+01
Silver	1.20E-02
Zinc	6.50E+01
Mercury	1.20E-02
Sulfide	2.00E+00

Notes: Results are shown for all compounds with concentrations exceeding screening criteria in at least one sample.
All units in micrograms per liter (ug/L)
Bold - Compound detected.
Shaded cells indicate that the reported result exceeds screening criteria.
[ ] - Indicates results for a field duplicate sample.
B - Indicates Compound was found in the blank and sample.
J - Indicates value is estimated.
NA - Not analyzed for particular constituent.
NS - Surface water not collected at this SW/SED location due to insufficient water for sampling.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 09.19.2014
PROJECT NUMBER: LA002999.0019	FIGURE NUMBER: 24

0 500 1,000 Feet

REFERENCE:
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SEDIMENT SAMPLE EXCEEDANCES (HUMAN HEALTH)

Phase I and II Investigation Report
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Legend

- Creek Monitoring Point
- Shallow Soil Sample
- Sediment Sample
- Location with Exceedance
- Approximate Hercules Property
- Parcels Donated to City

Location ID: / Date Collected:	AO-SD-20 11/13/12
Vinyl Chloride	<0.0058
Benzo(a)pyrene	<0.096
Benzo(b)fluoranthene	<0.096
cis-Dioxathion	**13.5**
1,2,3,4,6,7,8-HpCDD	**0.0000083**
1,2,3,6,7,8-HxCDF	**0.00000012 QJ**
Octachlorodibenzo-p-Dioxin	**0.00011 B**
Arsenic	**1.8**
Cobalt	**0.76**
Nickel	**2.5**
Thallium	<0.12
Vanadium	**6.2**
Mercury	**0.012 J**
Cyanide	<0.72

Location ID: / Date Collected:	AO-SD-18 11/12/12
Vinyl Chloride	<4.6
Benzo(a)pyrene	<0.082
Benzo(b)fluoranthene	<0.082
cis-Dioxathion	**8.26**
1,2,3,4,6,7,8-HpCDD	**0.00061**
1,2,3,6,7,8-HxCDF	**0.000009 Q**
Octachlorodibenzo-p-Dioxin	**0.0052 EJ**
Arsenic	**5.4**
Cobalt	**6.7**
Nickel	**9.4**
Thallium	**0.16**
Vanadium	**21**
Mercury	**0.066**
Cyanide	**0.48 J**

Location ID: / Date Collected:	AO-SD-17 11/14/12
Vinyl Chloride	<0.013
Benzo(a)pyrene	<0.14
Benzo(b)fluoranthene	<0.14
cis-Dioxathion	**3.91**
1,2,3,4,6,7,8-HpCDD	**0.00033**
1,2,3,6,7,8-HxCDF	**0.000012 Q**
Octachlorodibenzo-p-Dioxin	**0.0025 B**
Arsenic	**3.3**
Cobalt	**3.6**
Nickel	**6.7**
Thallium	**0.18 J**
Vanadium	**18**
Mercury	**0.081**
Cyanide	<1.1

Location ID: / Date Collected:	AO-CM-02 11/09/12
Vinyl Chloride	<0.005
Benzo(a)pyrene	<0.081
Benzo(b)fluoranthene	<0.081
cis-Dioxathion	**0.129 J**
1,2,3,4,6,7,8-HpCDD	**0.000029**
1,2,3,6,7,8-HxCDF	**0.00000057 QJ**
Octachlorodibenzo-p-Dioxin	**0.00028 B**
Arsenic	**1.4**
Cobalt	**4.2**
Nickel	**8**
Thallium	**0.15**
Vanadium	**13**
Mercury	**0.0093 J**
Cyanide	<0.6

Location ID: / Date Collected:	AO-CM-04 11/08/12
Vinyl Chloride	<0.0069
Benzo(a)pyrene	**0.064 J**
Benzo(b)fluoranthene	**0.069 J**
cis-Dioxathion	**2.02**
1,2,3,4,6,7,8-HpCDD	**0.000019 B**
1,2,3,6,7,8-HxCDF	**0.0000049 QBJ**
Octachlorodibenzo-p-Dioxin	**0.002 B**
Arsenic	**2.5**
Cobalt	**3**
Nickel	**5.7**
Thallium	**0.086 J**
Vanadium	**12**
Mercury	**0.03**
Cyanide	<0.71 H

Location ID: / Date Collected:	AO-SD-10 03/14/12
Vinyl Chloride	<0.0052
Benzo(a)pyrene	**0.0072 J**
Benzo(b)fluoranthene	**0.0096**
cis-Dioxathion	<0.0826
1,2,3,4,6,7,8-HpCDD	**0.000013**
1,2,3,6,7,8-HxCDF	**0.0000013 J**
Octachlorodibenzo-p-Dioxin	**0.00012 B**
Arsenic	**0.46 J**
Cobalt	**0.47**
Nickel	<1.1
Thallium	<0.23
Vanadium	**1.5**
Mercury	<0.024
Cyanide	<0.6

Location ID: / Date Collected:	AO-SD-09 03/14/12
Vinyl Chloride	<0.0054
Benzo(a)pyrene	**0.022**
Benzo(b)fluoranthene	**0.03**
cis-Dioxathion	**1.26 J**
1,2,3,4,6,7,8-HpCDD	**0.0002**
1,2,3,6,7,8-HxCDF	**0.00000073 J**
Octachlorodibenzo-p-Dioxin	**0.0035 B**
Arsenic	**1.6**
Cobalt	**1.2**
Nickel	**1.8**
Thallium	<0.26
Vanadium	**3.5**
Mercury	<0.028
Cyanide	**0.46 J**

Location ID: / Date Collected:	AO-SD-13 03/13/12
Vinyl Chloride	<0.013
Benzo(a)pyrene	<0.16 J
Benzo(b)fluoranthene	**0.16 J**
cis-Dioxathion	**1.47 J**
1,2,3,4,6,7,8-HpCDD	**0.0014**
1,2,3,6,7,8-HxCDF	**0.000023 Q**
Octachlorodibenzo-p-Dioxin	**0.012 EJ**
Arsenic	**7.4**
Cobalt	**8.3 J**
Nickel	**23**
Thallium	**0.21 J**
Vanadium	**23 J**
Mercury	**0.18**
Cyanide	**0.63 J**

Location ID: / Date Collected:	AO-SD-14 03/13/12
Vinyl Chloride	<0.0066
Benzo(a)pyrene	**0.041**
Benzo(b)fluoranthene	**0.056**
cis-Dioxathion	**1.27 J**
1,2,3,4,6,7,8-HpCDD	**0.000013 J**
1,2,3,6,7,8-HxCDF	**0.0000017 J**
Octachlorodibenzo-p-Dioxin	**0.0017 J**
Arsenic	**3.9**
Cobalt	**4.2 J**
Nickel	**8.4**
Thallium	**0.24 J**
Vanadium	**14 J**
Mercury	**0.03**
Cyanide	<0.78

Location ID: / Date Collected:	AO-SD-07 03/14/12
Vinyl Chloride	<0.006
Benzo(a)pyrene	<0.083 J
Benzo(b)fluoranthene	<0.083 J
cis-Dioxathion	**0.229 J**
1,2,3,4,6,7,8-HpCDD	**0.000016**
1,2,3,6,7,8-HxCDF	**0.00000045 J**
Octachlorodibenzo-p-Dioxin	**0.00012 B**
Arsenic	**0.76**
Cobalt	**0.91 J**
Nickel	**1.8**
Thallium	<0.23
Vanadium	**2.9**
Mercury	<0.025
Cyanide	<0.6

Location ID: / Date Collected:	AO-SD-06 03/15/12
Vinyl Chloride	<0.0054 [<0.0052]
Benzo(a)pyrene	**0.0057 J [<0.084 J]**
Benzo(b)fluoranthene	**0.0049 J [<0.084 J]**
cis-Dioxathion	<0.0838 [<0.085]
1,2,3,4,6,7,8-HpCDD	**0.000023 [0.000013]**
1,2,3,6,7,8-HxCDF	**0.00000048 J [<0.0000049]**
Octachlorodibenzo-p-Dioxin	**0.00024 B [0.0001 B]**
Arsenic	**0.6 [0.32 J]**
Cobalt	**0.67 J [0.37 J]**
Nickel	**1.3 [0.72 J]**
Thallium	<0.24 [<0.25]
Vanadium	**2.3 [1.7]**
Mercury	<0.026 [<0.021]
Cyanide	<0.62 [<0.62]

Location ID: / Date Collected:	AO-SD-12 03/13/12
Vinyl Chloride	**0.063**
Benzo(a)pyrene	<0.084 J
Benzo(b)fluoranthene	<0.084 J
cis-Dioxathion	**0.453 J**
1,2,3,4,6,7,8-HpCDD	**0.00023 J**
1,2,3,6,7,8-HxCDF	**0.0000062 J**
Octachlorodibenzo-p-Dioxin	**0.0024 J**
Arsenic	**2**
Cobalt	**1.2 J**
Nickel	**3.2**
Thallium	<0.25
Vanadium	**4 J**
Mercury	**0.028**
Cyanide	<0.6

Location ID: / Date Collected:	AO-SD-16 03/12/12
Vinyl Chloride	<0.0045
Benzo(a)pyrene	<0.08 J
Benzo(b)fluoranthene	<0.08 J
cis-Dioxathion	**1.53 J**
1,2,3,4,6,7,8-HpCDD	**0.0002 J**
1,2,3,6,7,8-HxCDF	**0.0000039 J**
Octachlorodibenzo-p-Dioxin	**0.0018 J**
Arsenic	**1.9**
Cobalt	**1.3 J**
Nickel	**4.2**
Thallium	<0.22
Vanadium	**4.8 J**
Mercury	<0.022
Cyanide	<0.57

Location ID: / Date Collected:	AO-SD-03 03/20/12
Vinyl Chloride	<0.0061
Benzo(a)pyrene	<0.082
Benzo(b)fluoranthene	<0.082
cis-Dioxathion	<0.0848
1,2,3,4,6,7,8-HpCDD	**0.000012**
1,2,3,6,7,8-HxCDF	**0.00000031 QJ**
Octachlorodibenzo-p-Dioxin	**0.00012 B**
Arsenic	**5.8**
Cobalt	**1.5**
Nickel	**1.3**
Thallium	<0.22
Vanadium	**10**
Mercury	<0.022
Cyanide	**0.25 J**

Location ID: / Date Collected:	AO-SD-02 03/20/12
Vinyl Chloride	<0.0049
Benzo(a)pyrene	**0.0041 J**
Benzo(b)fluoranthene	<0.0079
cis-Dioxathion	**0.634**
1,2,3,4,6,7,8-HpCDD	**0.00002**
1,2,3,6,7,8-HxCDF	**0.00000063 J**
Octachlorodibenzo-p-Dioxin	**0.00041 B**
Arsenic	**4.3**
Cobalt	**3.2**
Nickel	**1.1 J**
Thallium	<0.23
Vanadium	**12**
Mercury	<0.024
Cyanide	<0.58

Location ID: / Date Collected:	AO-SD-05 03/16/12
Vinyl Chloride	<0.0054
Benzo(a)pyrene	<0.081 J
Benzo(b)fluoranthene	<0.081 J
cis-Dioxathion	**0.415**
1,2,3,4,6,7,8-HpCDD	**0.000019**
1,2,3,6,7,8-HxCDF	**0.00000025 J**
Octachlorodibenzo-p-Dioxin	**0.00028 J**
Arsenic	**2.2**
Cobalt	**1.6**
Nickel	**2.5**
Thallium	<0.24
Vanadium	**6 J**
Mercury	<0.023
Cyanide	<0.6

Location ID: / Date Collected:	AO-CM-01 11/09/12
Vinyl Chloride	<0.0049
Benzo(a)pyrene	**0.0054 J**
Benzo(b)fluoranthene	**0.0074 J**
cis-Dioxathion	<1.79
1,2,3,4,6,7,8-HpCDD	**0.000015**
1,2,3,6,7,8-HxCDF	**0.00000006 QJ**
Octachlorodibenzo-p-Dioxin	**0.00014 B**
Arsenic	**0.78**
Cobalt	**1.7**
Nickel	**4.5**
Thallium	**0.12**
Vanadium	**11**
Mercury	**0.015 J**
Cyanide	<0.6

Location ID: / Date Collected:	AO-SD-04 03/20/12
Vinyl Chloride	<0.0054
Benzo(a)pyrene	<0.0085
Benzo(b)fluoranthene	<0.0085
cis-Dioxathion	<0.0834
1,2,3,4,6,7,8-HpCDD	**0.000014**
1,2,3,6,7,8-HxCDF	<0.0000063
Octachlorodibenzo-p-Dioxin	**0.00013 B**
Arsenic	**3.2**
Cobalt	**9.4**
Nickel	**20**
Thallium	**0.19 J**
Vanadium	**21**
Mercury	<0.025
Cyanide	**0.38 J**

Location ID: / Date Collected:	AO-SD-01 03/20/12
Vinyl Chloride	<0.005
Benzo(a)pyrene	<0.073
Benzo(b)fluoranthene	<0.073
cis-Dioxathion	**0.437**
1,2,3,4,6,7,8-HpCDD	**0.000035**
1,2,3,6,7,8-HxCDF	**0.000001 QJ**
Octachlorodibenzo-p-Dioxin	**0.00042 B**
Arsenic	**14**
Cobalt	**140**
Nickel	**10**
Thallium	**0.52**
Vanadium	**55**
Mercury	<0.021
Cyanide	<0.54

Location ID: / Date Collected:	AO-SD-21 11/09/12
Vinyl Chloride	<0.0068
Benzo(a)pyrene	<0.099
Benzo(b)fluoranthene	<0.099
cis-Dioxathion	**17.9**
1,2,3,4,6,7,8-HpCDD	**0.000073**
1,2,3,6,7,8-HxCDF	**0.000001 QJ**
Octachlorodibenzo-p-Dioxin	**0.00092 B**
Arsenic	**2**
Cobalt	**2.2**
Nickel	**6.5**
Thallium	**0.068 J**
Vanadium	**16**
Mercury	**0.093**
Cyanide	<0.71

Location ID: / Date Collected:	AO-SD-25 11/13/12
Vinyl Chloride	<0.0047
Benzo(a)pyrene	<0.0082
Benzo(b)fluoranthene	<0.0082
cis-Dioxathion	**18.7**
1,2,3,4,6,7,8-HpCDD	**0.000029**
1,2,3,6,7,8-HxCDF	**0.00000016 QJ**
Octachlorodibenzo-p-Dioxin	**0.00057 B**
Arsenic	**1.7**
Cobalt	**1.2**
Nickel	**1.6**
Thallium	**0.12**
Vanadium	**12**
Mercury	**0.016 J**
Cyanide	<0.6

Location ID: / Date Collected:	AO-SD-27 11/14/12
Vinyl Chloride	<0.0068
Benzo(a)pyrene	**0.27**
Benzo(b)fluoranthene	<0.1
cis-Dioxathion	**993**
1,2,3,4,6,7,8-HpCDD	**0.00023**
1,2,3,6,7,8-HxCDF	**0.0000033 QJ**
Octachlorodibenzo-p-Dioxin	**0.0022 B**
Arsenic	**3.8**
Cobalt	**1.6**
Nickel	**5.6**
Thallium	<0.14
Vanadium	**8.5**
Mercury	**0.073**
Cyanide	<0.71

Location ID: / Date Collected:	AO-SD-26 11/13/12
Vinyl Chloride	<0.005
Benzo(a)pyrene	**0.097**
Benzo(b)fluoranthene	**0.11**
cis-Dioxathion	**1.62 J**
1,2,3,4,6,7,8-HpCDD	**0.00005**
1,2,3,6,7,8-HxCDF	**0.0000013 QJ**
Octachlorodibenzo-p-Dioxin	**0.00056 B**
Arsenic	**1.1**
Cobalt	**0.46**
Nickel	**2.3**
Thallium	<0.12
Vanadium	**2**
Mercury	**0.013 J**
Cyanide	<0.6

Location ID: / Date Collected:	AO-SD-28 11/13/12
Vinyl Chloride	<0.0098
Benzo(a)pyrene	**0.15 J**
Benzo(b)fluoranthene	**0.28**
cis-Dioxathion	**238**
1,2,3,4,6,7,8-HpCDD	**0.00032**
1,2,3,6,7,8-HxCDF	**0.000045 Q**
Octachlorodibenzo-p-Dioxin	**0.0029 B**
Arsenic	**3.5**
Cobalt	**2.2**
Nickel	**9.4**
Thallium	**0.12 J**
Vanadium	**22**
Mercury	**0.081**
Cyanide	<0.92

Location ID: / Date Collected:	AO-SD-29 11/12/12
Vinyl Chloride	<17
Benzo(a)pyrene	<0.11
Benzo(b)fluoranthene	<0.11
cis-Dioxathion	**12.5**
1,2,3,4,6,7,8-HpCDD	**0.000011**
1,2,3,6,7,8-HxCDF	**0.00000017 J**
Octachlorodibenzo-p-Dioxin	**0.0011 B**
Arsenic	**5.8**
Cobalt	**2.3**
Nickel	**7.8**
Thallium	**0.19**
Vanadium	**27**
Mercury	**0.083**
Cyanide	<0.85

Location ID: / Date Collected:	AO-SD-19 11/12/12
Vinyl Chloride	<5.6
Benzo(a)pyrene	**0.1**
Benzo(b)fluoranthene	**0.16**
cis-Dioxathion	**55.2**
1,2,3,4,6,7,8-HpCDD	**0.00015**
1,2,3,6,7,8-HxCDF	**0.0000021 J**
Octachlorodibenzo-p-Dioxin	**0.0028 B**
Arsenic	**2.8**
Cobalt	**4.6**
Nickel	**13**
Thallium	**0.098 J**
Vanadium	**12**
Mercury	**0.13**
Cyanide	<0.62

Location ID: / Date Collected:	AO-CM-03 11/08/12
Vinyl Chloride	<0.0054
Benzo(a)pyrene	<0.0084
Benzo(b)fluoranthene	<0.0084
cis-Dioxathion	<1.95
1,2,3,4,6,7,8-HpCDD	**0.000018 B**
1,2,3,6,7,8-HxCDF	<0.000005
Octachlorodibenzo-p-Dioxin	**0.00028 B**
Arsenic	**4.1**
Cobalt	**13**
Nickel	**24**
Thallium	**0.35**
Vanadium	**41**
Mercury	<0.024
Cyanide	<0.6 H

Location ID: / Date Collected:	AO-SD-22 11/08/12
Vinyl Chloride	<0.0055
Benzo(a)pyrene	**0.12**
Benzo(b)fluoranthene	**0.17**
cis-Dioxathion	**20.6**
1,2,3,4,6,7,8-HpCDD	**0.00024 B**
1,2,3,6,7,8-HxCDF	**0.0000069 QB**
Octachlorodibenzo-p-Dioxin	**0.0029 B**
Arsenic	**4.6**
Cobalt	**4.1**
Nickel	**16**
Thallium	**0.067 J**
Vanadium	**12**
Mercury	**0.11**
Cyanide	<0.64 H

Location ID: / Date Collected:	AO-SD-24 11/09/12
Vinyl Chloride	<0.0075
Benzo(a)pyrene	<0.13
Benzo(b)fluoranthene	<0.13
cis-Dioxathion	**148**
1,2,3,4,6,7,8-HpCDD	**0.00018 B**
1,2,3,6,7,8-HxCDF	**0.0000058 QB**
Octachlorodibenzo-p-Dioxin	**0.0018 B**
Arsenic	**5.5**
Cobalt	**3.7**
Nickel	**29**
Thallium	**0.053 J**
Vanadium	**10**
Mercury	**0.089**
Cyanide	<0.93 H

Location ID: / Date Collected:	AO-SD-34 11/08/12
Vinyl Chloride	<0.0073
Benzo(a)pyrene	<0.081
Benzo(b)fluoranthene	<0.081
cis-Dioxathion	**14.3**
1,2,3,4,6,7,8-HpCDD	**0.00023 B**
1,2,3,6,7,8-HxCDF	**0.000014 QB**
Octachlorodibenzo-p-Dioxin	**0.0021 B**
Arsenic	**3.6**
Cobalt	**6.9**
Nickel	**9.5**
Thallium	**0.1 J**
Vanadium	**17**
Mercury	**0.072**
Cyanide	<0.59 H

Location ID: / Date Collected:	AO-SD-32 11/07/12
Vinyl Chloride	<0.76
Benzo(a)pyrene	**0.054 J**
Benzo(b)fluoranthene	**0.065 J**
cis-Dioxathion	**3.76**
1,2,3,4,6,7,8-HpCDD	**0.000078 B**
1,2,3,6,7,8-HxCDF	**0.0000044 QBJ**
Octachlorodibenzo-p-Dioxin	**0.00095 B**
Arsenic	**4**
Cobalt	**2.7**
Nickel	**30**
Thallium	<0.11
Vanadium	**7.3**
Mercury	**0.076**
Cyanide	<0.57

Location ID: / Date Collected:	AO-SD-33 11/07/12
Vinyl Chloride	<0.011 [<1.2]
Benzo(a)pyrene	<0.15 [<1.5]
Benzo(b)fluoranthene	<0.15 [<1.5]
cis-Dioxathion	**15.2 [20.8]**
1,2,3,4,6,7,8-HpCDD	**0.0014 B [0.001 B]**
1,2,3,6,7,8-HxCDF	**0.000016 B [0.000025 QB]**
Octachlorodibenzo-p-Dioxin	**0.02 BE [0.011 BE]**
Arsenic	**4.7 [5.4]**
Cobalt	**20 [20]**
Nickel	**130 [120]**
Thallium	**0.067 J [0.09 J]**
Vanadium	**16 [16]**
Mercury	**0.29 [0.45]**
Cyanide	**0.93 J [<1.]**

Location ID: / Date Collected:	AO-SD-30 11/08/12
Vinyl Chloride	<1
Benzo(a)pyrene	<0.77
Benzo(b)fluoranthene	<0.77
cis-Dioxathion	**0.989 J**
1,2,3,4,6,7,8-HpCDD	**0.0013 B**
1,2,3,6,7,8-HxCDF	**0.000018 QB**
Octachlorodibenzo-p-Dioxin	**0.012 BE**
Arsenic	**8.4**
Cobalt	**15**
Nickel	**35**
Thallium	**0.16 J**
Vanadium	**20**
Mercury	**1**
Cyanide	<1.1 H

Location ID: / Date Collected:	AO-SD-31 11/07/12
Vinyl Chloride	<0.0052
Benzo(a)pyrene	<0.082
Benzo(b)fluoranthene	<0.082
cis-Dioxathion	**0.113 J**
1,2,3,4,6,7,8-HpCDD	**0.000036 B**
1,2,3,6,7,8-HxCDF	**0.0000038 QBJ**
Octachlorodibenzo-p-Dioxin	**0.00049 B**
Arsenic	**2.5**
Cobalt	**16**
Nickel	**34**
Thallium	<0.12
Vanadium	**11**
Mercury	**0.035**
Cyanide	**2.3**

Location ID: / Date Collected:	AO-SD-15 03/13/12
Vinyl Chloride	<0.0048
Benzo(a)pyrene	<0.076 J
Benzo(b)fluoranthene	<0.076 J
cis-Dioxathion	**0.328 J**
1,2,3,4,6,7,8-HpCDD	**0.000028 J**
1,2,3,6,7,8-HxCDF	**0.00000089 J**
Octachlorodibenzo-p-Dioxin	**0.00041 J**
Arsenic	**1.9**
Cobalt	**180 J**
Nickel	**530**
Thallium	<0.2
Vanadium	**6.8 J**
Mercury	**0.063**
Cyanide	**0.63**

Location ID: / Date Collected:	AO-SD-35 NS

Location ID: / Date Collected:	AO-SD-11 NS

Location ID: / Date Collected:	AO-SD-36 NS

Location ID: / Date Collected:	AO-SD-37 NS

Location ID: / Date Collected:	AO-SD-23 11/07/12
Vinyl Chloride	<0.005
Benzo(a)pyrene	**0.078**
Benzo(b)fluoranthene	**0.1**
cis-Dioxathion	**3.99**
1,2,3,4,6,7,8-HpCDD	**0.00016 B**
1,2,3,6,7,8-HxCDF	**0.0000039 QBJ**
Octachlorodibenzo-p-Dioxin	**0.0018 B**
Arsenic	**5.5**
Cobalt	**2.5**
Nickel	**8.1**
Thallium	**0.041 J**
Vanadium	**6.5**
Mercury	**0.022**
Cyanide	<0.55

Screening Criteria	MDEQ Tier 1 Unrestricted Soil TRG	MDEQ Tier 1 Restricted Soil TRG	Residential Soil RSL (May 2014)	Industrial Soil RSL (May 2014)
Vinyl Chloride	4.26E-01	9.39E-01	5.90E-02	1.70E+00
Benzo(a)pyrene	8.75E-02	7.84E-01	1.50E-02	2.90E-01
Benzo(b)fluoranthene	8.75E-01	7.84E+00	1.50E-01	2.90E+00
cis-Dioxathion	1.17E+02	3.07E+03	- -	- -
1,2,3,4,6,7,8-HpCDD	4.26E-04	3.82E-03	- -	- -
1,2,3,6,7,8-HxCDF	4.26E-05	3.82E-04	- -	- -
OCDD	4.26E-03	3.82E-02	- -	- -
Arsenic	4.26E-01	3.82E+00	6.70E-01	3.00E+00
Cobalt	4.69E+03	1.23E+04	2.30E+00	3.50E+01
Nickel	1.56E+03	4.08E+03	1.50E+02	2.20E+03
Thallium	5.48E+00	1.43E+02	7.80E-02	1.20E+00
Vanadium	5.48E+02	1.43E+03	3.90E+01	5.80E+02
Mercury	1.00E+01	6.13E+01	9.40E-01	4.00E+00
Cyanide	1.56E+03	4.08E+03	2.10E+02	1.30E+01

Notes: Exceedance is a detection above a MDEQ or EPA standard.
All units in milligrams per killogram (mg/kg)
Results are shown for all compounds with concentrations exceeding screening criteria in at least one sample.
Bold - Compound detected.
Shaded cells indicate that the reported result exceeds screening criteria.
B - In Dioxin results, indicates method blank contamination. The associated method blank contains the target analyte at a reportable level.
E - Serial dilution results not within 10%.
Applicable only if analyte concentration is at least 50X the IDL in original sample.
H - Sample was prepped or analyzed beyond the specified holding time.
J - Indicates an estimated value.
Q - Estimated maximum possible concentration (EMPC).
NS - Not sampled. At some SW/SED sample locations, sediment was not collected. Rationale for each location is provided in report table.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/02/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 25

0 350 700
Graphic Scale in Feet

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

Date Saved: 7/2/2015 10:42:25 AM

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SEDIMENT SAMPLE EXCEEDANCES VOCs & SVOCs (ECOLOGICAL)

Phase I and II Investigation Report

HERCULES INCORPORATED
613 W. 7th Street
Hattiesburg, Mississippi

ARCADIS
10352 PLAZA AMERICANA DRIVE
BATON ROUGE, LA 70816
TEL: 225-292-1004
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Legend

- Agricultural, Private Well (Shallow Aquifer)
- Creek Monitoring Point
- Shallow Soil Sample
- Sediment Sample
- Location with Exceedance
- Approximate Hercules Property
- Donation Parcel (2013)

Screening Criteria	Ecological Screening Level
2-Butanone	4.24E-02
Acetone	9.90E-03
Benzene	1.42E-01
Carbon Disulfide	2.39E-02
Toluene	1.22E+00
1,1'-Biphenyl	1.22E+00
4-Methylphenol	2.02E-02
Aniline	3.10E-04
Benzyl Alcohol	1.04E-03
bis(2-Ethylhexyl)phthalate	1.82E-01
Phenol	4.91E-02

Note: Results are shown for all compounds with concentrations exceeding screening criteria in at least one sample.
All units in milligrams per kilogram (mg/kg)
Bold - Compound detected.
Shaded cells indicate that the reported result exceeds screening criteria.
B - In Dioxin results, indicates method blank contamination. The associated method blank contains the target analyte at a reportable level. In all other methods, indicates Compound was found in the blank and sample.
J - Indicates an estimated value.
NA - Not analyzed for particular constituent.
NS - Not sampled.
[ ] - Indicates result for a field duplicate sample.
* - Indicates laboratory duplicate analysis was outside control limits.

Location ID:	AO-SD-21
Date Collected:	11/09/12
2-Butanone	<0.034
Acetone	<0.068 *
Benzene	<0.0068
Carbon Disulfide	<0.0068
Toluene	<0.0068
1,1'-Biphenyl	<0.49
4-Methylphenol	<0.49
Aniline	<0.97
Benzyl Alcohol	<0.49
bis(2-Ethylhexyl)phthalate	<0.97
Phenol	<0.49

Location ID:	AO-CM-01
Date Collected:	11/09/12
2-Butanone	<0.024
Acetone	<0.049 *
Benzene	<0.0049
Carbon Disulfide	<0.0049
Toluene	<0.0049
1,1'-Biphenyl	**0.044**
4-Methylphenol	<0.04
Aniline	<0.079
Benzyl Alcohol	<0.04
bis(2-Ethylhexyl)phthalate	<0.079
Phenol	<0.04

Location ID:	AO-SD-05
Date Collected:	03/16/12
2-Butanone	<0.027
Acetone	<0.054
Benzene	<0.0054
Carbon Disulfide	<0.0054
Toluene	<0.0054
1,1'-Biphenyl	<0.4 J
4-Methylphenol	<0.4 J
Aniline	<0.8 J
Benzyl Alcohol	<0.4 J
bis(2-Ethylhexyl)phthalate	<0.8 J
Phenol	<0.4 J

Location ID:	AO-SD-04
Date Collected:	03/20/12
2-Butanone	**0.0046 J**
Acetone	**0.022 J**
Benzene	<0.0054
Carbon Disulfide	<0.0054
Toluene	<0.0054
1,1'-Biphenyl	<0.042
4-Methylphenol	<0.042
Aniline	<0.084
Benzyl Alcohol	<0.042
bis(2-Ethylhexyl)phthalate	**0.012 J**
Phenol	<0.042

Location ID:	AO-SD-03
Date Collected:	03/20/12
2-Butanone	<0.031
Acetone	<0.061
Benzene	<0.0061
Carbon Disulfide	<0.0061
Toluene	<0.0061
1,1'-Biphenyl	<0.4
4-Methylphenol	<0.4
Aniline	<0.81
Benzyl Alcohol	<0.4
bis(2-Ethylhexyl)phthalate	**0.49 J**
Phenol	<0.4

Location ID:	AO-SD-02
Date Collected:	03/20/12
2-Butanone	<0.025
Acetone	**0.017 J**
Benzene	<0.0049
Carbon Disulfide	<0.0049
Toluene	<0.0049
1,1'-Biphenyl	<0.039
4-Methylphenol	<0.039
Aniline	<0.078
Benzyl Alcohol	<0.039
bis(2-Ethylhexyl)phthalate	**0.031 J**
Phenol	<0.039

Location ID:	AO-SD-01
Date Collected:	03/20/12
2-Butanone	**0.0026 J**
Acetone	**0.023 J**
Benzene	<0.005
Carbon Disulfide	**0.0035 J**
Toluene	<0.005
1,1'-Biphenyl	<0.36
4-Methylphenol	<0.36
Aniline	<0.72
Benzyl Alcohol	<0.36
bis(2-Ethylhexyl)phthalate	**0.89**
Phenol	<0.36

Location ID:	AO-SD-20
Date Collected:	11/13/12
2-Butanone	<0.029 *
Acetone	<0.058
Benzene	<0.0058
Carbon Disulfide	<0.0058
Toluene	<0.0058
1,1'-Biphenyl	<0.47
4-Methylphenol	<0.47
Aniline	<0.94
Benzyl Alcohol	<0.47
bis(2-Ethylhexyl)phthalate	<0.94
Phenol	<0.47

Location ID:	AO-SD-25
Date Collected:	11/13/12
2-Butanone	<0.024
Acetone	**0.016 J***
Benzene	<0.0047
Carbon Disulfide	<0.0047
Toluene	<0.0047
1,1'-Biphenyl	<0.04
4-Methylphenol	<0.04
Aniline	<0.081
Benzyl Alcohol	**0.016 J**
bis(2-Ethylhexyl)phthalate	<0.081
Phenol	<0.04

Location ID:	AO-SD-27
Date Collected:	11/14/12
2-Butanone	**0.052**
Acetone	**0.84**
Benzene	<0.0068
Carbon Disulfide	**0.0029 J**
Toluene	<0.0068
1,1'-Biphenyl	<0.49
4-Methylphenol	<0.49
Aniline	<0.99
Benzyl Alcohol	<0.49
bis(2-Ethylhexyl)phthalate	<0.99
Phenol	<0.49

Location ID:	AO-SD-26
Date Collected:	11/13/12
2-Butanone	<0.025
Acetone	<0.05 *
Benzene	<0.005
Carbon Disulfide	<0.005
Toluene	<0.005
1,1'-Biphenyl	<0.4
4-Methylphenol	<0.4
Aniline	<0.8
Benzyl Alcohol	<0.4
bis(2-Ethylhexyl)phthalate	<0.8
Phenol	<0.4

Location ID:	AO-SD-17
Date Collected:	11/14/12
2-Butanone	<0.065
Acetone	**0.13**
Benzene	<0.013
Carbon Disulfide	<0.013
Toluene	<0.013
1,1'-Biphenyl	<0.71
4-Methylphenol	<0.71
Aniline	<1.4
Benzyl Alcohol	<0.71
bis(2-Ethylhexyl)phthalate	<1.4
Phenol	<0.71

Location ID:	AO-SD-22
Date Collected:	11/08/12
2-Butanone	<0.027
Acetone	<0.055
Benzene	<0.0055
Carbon Disulfide	<0.0055
Toluene	<0.0055
1,1'-Biphenyl	<0.43
4-Methylphenol	<0.43
Aniline	<0.87
Benzyl Alcohol	<0.43
bis(2-Ethylhexyl)phthalate	**0.098 J**
Phenol	<0.43

Location ID:	AO-CM-03
Date Collected:	11/08/12
2-Butanone	<0.027
Acetone	<0.054
Benzene	<0.0054
Carbon Disulfide	<0.0054
Toluene	<0.0054
1,1'-Biphenyl	<0.042
4-Methylphenol	<0.042
Aniline	<0.083
Benzyl Alcohol	<0.042
bis(2-Ethylhexyl)phthalate	**0.0079 J**
Phenol	<0.042

Location ID:	AO-SD-06
Date Collected:	03/15/12
2-Butanone	<0.027 [<0.026]
Acetone	<0.054 [<0.052 B]
Benzene	<0.0054 [<0.0052]
Carbon Disulfide	<0.0054 [<0.0052]
Toluene	<0.0054 [<0.0052]
1,1'-Biphenyl	<0.043 [<0.41]
4-Methylphenol	<0.043 [<0.41 J]
Aniline	<0.085 [<0.83 J]
Benzyl Alcohol	**0.011 J [<0.41 J]**
bis(2-Ethylhexyl)phthalate	<0.085 B [<0.83 J]
Phenol	<0.043 [<0.41 J]

Location ID:	AO-SD-19
Date Collected:	11/12/12
2-Butanone	<28
Acetone	<56
Benzene	<5.6
Carbon Disulfide	**1.7 J**
Toluene	<5.6
1,1'-Biphenyl	**0.21 J**
4-Methylphenol	<0.41
Aniline	<0.82
Benzyl Alcohol	<0.41
bis(2-Ethylhexyl)phthalate	<0.82
Phenol	<0.41

Location ID:	AO-SD-28
Date Collected:	11/13/12
2-Butanone	<0.049
Acetone	**0.025 J***
Benzene	<0.0098
Carbon Disulfide	<0.0098
Toluene	**0.0019 J**
1,1'-Biphenyl	<1.2
4-Methylphenol	<1.2
Aniline	<2.5
Benzyl Alcohol	<1.2
bis(2-Ethylhexyl)phthalate	<2.5
Phenol	<1.2

Location ID:	AO-SD-29
Date Collected:	11/12/12
2-Butanone	<84
Acetone	<170
Benzene	<17
Carbon Disulfide	<17
Toluene	<17
1,1'-Biphenyl	**0.18 J**
4-Methylphenol	<0.55
Aniline	<1.1
Benzyl Alcohol	<0.55
bis(2-Ethylhexyl)phthalate	<1.1
Phenol	<0.55

Location ID:	AO-SD-34
Date Collected:	11/08/12
2-Butanone	**0.015 J**
Acetone	**0.18**
Benzene	<0.0073
Carbon Disulfide	<0.0073
Toluene	<0.0073
1,1'-Biphenyl	<0.4
4-Methylphenol	<0.4
Aniline	<0.79
Benzyl Alcohol	<0.4
bis(2-Ethylhexyl)phthalate	<0.79
Phenol	<0.4

Location ID:	AO-SD-32
Date Collected:	11/07/12
2-Butanone	<3.8 *
Acetone	<7.6 *
Benzene	<0.76
Carbon Disulfide	**0.24 JB**
Toluene	**1**
1,1'-Biphenyl	<0.38
4-Methylphenol	<0.38
Aniline	<0.75
Benzyl Alcohol	<0.38
bis(2-Ethylhexyl)phthalate	**0.14 J**
Phenol	<0.38

Location ID:	AO-SD-23
Date Collected:	11/07/12
2-Butanone	<0.025 *
Acetone	<0.05 *
Benzene	<0.005
Carbon Disulfide	<0.005
Toluene	<0.005
1,1'-Biphenyl	<0.38
4-Methylphenol	<0.38
Aniline	<0.76
Benzyl Alcohol	<0.38
bis(2-Ethylhexyl)phthalate	**0.077 J**
Phenol	<0.38

Location ID:	AO-CM-04
Date Collected:	11/08/12
2-Butanone	<0.034
Acetone	<0.069
Benzene	<0.0069
Carbon Disulfide	<0.0069
Toluene	<0.0069
1,1'-Biphenyl	**0.17 J**
4-Methylphenol	<0.48
Aniline	<0.96
Benzyl Alcohol	<0.48
bis(2-Ethylhexyl)phthalate	<0.96
Phenol	<0.48

Location ID:	AO-SD-24
Date Collected:	11/08/12
2-Butanone	<0.038
Acetone	**0.033 J**
Benzene	<0.0075
Carbon Disulfide	<0.0075
Toluene	<0.0075
1,1'-Biphenyl	**3.6**
4-Methylphenol	<0.64
Aniline	<1.3
Benzyl Alcohol	<0.64
bis(2-Ethylhexyl)phthalate	<1.3
Phenol	<0.64

Location ID:	AO-SD-07
Date Collected:	03/14/12
2-Butanone	<0.03
Acetone	<0.06 B
Benzene	<0.006
Carbon Disulfide	<0.006
Toluene	<0.006
1,1'-Biphenyl	<0.41
4-Methylphenol	<0.41 J
Aniline	<0.82 J
Benzyl Alcohol	<0.41 J
bis(2-Ethylhexyl)phthalate	<0.82 J
Phenol	<0.41 J

Location ID:	AO-SD-10
Date Collected:	03/14/12
2-Butanone	<0.026
Acetone	<0.052
Benzene	<0.0052
Carbon Disulfide	<0.0052
Toluene	<0.0052
1,1'-Biphenyl	<0.042
4-Methylphenol	<0.042
Aniline	<0.083
Benzyl Alcohol	**0.015 J**
bis(2-Ethylhexyl)phthalate	<0.083 B
Phenol	<0.042

Location ID:	AO-SD-09
Date Collected:	03/14/12
2-Butanone	<0.027
Acetone	<0.054 B
Benzene	<0.0054
Carbon Disulfide	<0.0054
Toluene	<0.0054
1,1'-Biphenyl	<0.044
4-Methylphenol	<0.044
Aniline	<0.088
Benzyl Alcohol	**0.0094 J**
bis(2-Ethylhexyl)phthalate	<0.088 B
Phenol	<0.044

Location ID:	AO-SD-30	
Date Collected:	11/07/12	11/08/12
2-Butanone	NA	<5.2
Acetone	NA	**3.1 J***
Benzene	NA	<1
Carbon Disulfide	NA	<1
Toluene	NA	**18 B**
1,1'-Biphenyl	NA	**1.9 J**
4-Methylphenol	NA	<3.8
Aniline	NA	<7.6
Benzyl Alcohol	NA	<3.8
bis(2-Ethylhexyl)phthalate	NA	<7.6
Phenol	NA	<3.8

Location ID:	AO-SD-14
Date Collected:	03/13/12
2-Butanone	**0.008 J**
Acetone	**0.1**
Benzene	<0.0066
Carbon Disulfide	<0.0066
Toluene	**0.0026 J**
1,1'-Biphenyl	<0.054
4-Methylphenol	**0.029 J**
Aniline	<0.11
Benzyl Alcohol	**0.016 J**
bis(2-Ethylhexyl)phthalate	**0.021 JB**
Phenol	<0.054

Location ID:	AO-SD-13
Date Collected:	03/13/12
2-Butanone	**0.051 J**
Acetone	**0.36**
Benzene	<0.013
Carbon Disulfide	**0.011 J**
Toluene	**0.0036 J**
1,1'-Biphenyl	**0.38 J**
4-Methylphenol	<0.77 J
Aniline	<1.5 J
Benzyl Alcohol	<0.77 J
bis(2-Ethylhexyl)phthalate	**0.3 JB**
Phenol	<0.77 J

Location ID:	AO-SD-12
Date Collected:	03/13/12
2-Butanone	**0.014 J**
Acetone	**0.096**
Benzene	<0.0058
Carbon Disulfide	**0.0033 J**
Toluene	**0.0012 J**
1,1'-Biphenyl	<0.41 J
4-Methylphenol	<0.41 J
Aniline	<0.83 J
Benzyl Alcohol	**0.14 J**
bis(2-Ethylhexyl)phthalate	**0.2 JB**
Phenol	<0.41 J

Location ID:	AO-SD-15
Date Collected:	03/13/12
2-Butanone	**0.0057 J**
Acetone	**0.066**
Benzene	**0.15**
Carbon Disulfide	**0.012**
Toluene	**0.0032 J**
1,1'-Biphenyl	**4.2 J**
4-Methylphenol	<0.38 J
Aniline	<0.75 J
Benzyl Alcohol	<0.38 J
bis(2-Ethylhexyl)phthalate	<0.75 J
Phenol	**0.093 J**

Location ID:	AO-SD-31
Date Collected:	11/07/12
2-Butanone	<0.026 *
Acetone	<0.052 *
Benzene	<0.0052
Carbon Disulfide	**0.0029 J**
Toluene	<0.0052
1,1'-Biphenyl	**1.7**
4-Methylphenol	<0.41
Aniline	<0.81
Benzyl Alcohol	<0.41
bis(2-Ethylhexyl)phthalate	<0.81
Phenol	<0.41

Location ID:	AO-SD-33
Date Collected:	11/07/12
2-Butanone	**<0.053 * [0.86 J*]**
Acetone	**0.034 J* [12 *]**
Benzene	<0.011 [<1.2]
Carbon Disulfide	**<0.011 [0.85 JB]**
Toluene	**0.063 [2.1]**
1,1'-Biphenyl	**0.49 J [<7.4]**
4-Methylphenol	<0.73 [<7.4]
Aniline	<1.5 [<15]
Benzyl Alcohol	<0.73 [<7.4]
bis(2-Ethylhexyl)phthalate	**0.41 J [15]**
Phenol	<0.73 [<7.4]

Location ID:	AO-SD-16
Date Collected:	03/12/12
2-Butanone	**0.0048 J**
Acetone	**0.034 J**
Benzene	<0.0045
Carbon Disulfide	**0.0033 J**
Toluene	**0.0029 J**
1,1'-Biphenyl	<0.39 J
4-Methylphenol	<0.39 J
Aniline	**0.14 J**
Benzyl Alcohol	<0.39 J
bis(2-Ethylhexyl)phthalate	**0.14 JB**
Phenol	<0.39 J

AO-SD-10, AO-SD-09, AO-SD-14, AO-SD-13, AO-SD-17, AO-SD-07, AO-SD-12, AO-SD-18, AO-SD-19, AO-SD-02, CM-02, CM-03, CM-01, AO-SD-22, AO-SD-21, AO-SD-20, AO-SD-23, CM-04, AO-SD-06, AO-SD-24, AO-SD-16, AO-SD-05, AO-SD-37, AD-37 NS, AO-SD-04, AO-SD-36, AO-SD-27, AD-SD-36 NS, AO-SD-03, AO-SD-25, AO-SD-26, AO-SD-28, AO-SD-30, AO-SW-11, AO-SW-11 NS, AO-SS-08, AO-SS-07, AO-SS-06, AO-SS-05, AO-SS-04, AO-SS-03, AO-SS-02, AO-SD-02, AO-SD-29, AO-SD-31, AO-SD-15, AO-SD-01, AO-SD-32, AO-SD-33, AO-SD-34, AO-SD-35, AD-SD-35 NS

0 350 700 Feet

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

PROJECT MANAGER: JEC	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/02/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 26

Date Saved: 7/2/2015 10:38:30 AM
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U:\projects\ashland\LA002999\Output\LA002999-25\Initial\LA002999-0025-00351-26.pdf

SEDIMENT SAMPLE EXCEEDANCES PESTICIDE, PCBs, DIOXINS, & FURANS (ECOLOGICAL)

Phase I and II Investigation Report

HERCULES INCORPORATED
613 W. 7th Street
Hattiesburg, Mississippi

ARCADIS
10352 PLAZA AMERICANA DRIVE
BATON ROUGE, LA 70816
TEL: 225-292-1004
FAX: 225-218-9677
WWW.ARCADIS-US.COM

Legend

- Agricultural, Private Well (Shallow Aquifer)
- Creek Monitoring Point
- Shallow Soil Sample
- Sediment Sample
- Location with Exceedance
- Approximate Hercules Property
- Donation Parcel (2013)

Screening Criteria	Ecological Screening Level
4,4'-DDD	3.30E-03
4,4'-DDE	3.30E-03
4,4'-DDT	3.30E-03
Dieldrin	3.30E-03
Heptachlor	6.00E-04
Aroclor-1260	3.30E-02
2,3,7,8-TCDD	1.20E-07

Note: Results are shown for all compounds with concentrations exceeding screening criteria in at least one sample.
All units in milligrams per kilogram (mg/kg)
Bold - Compound detected.
Shaded cells indicate that the reported result exceeds screening criteria.
J - Indicates an estimated value.
NA - Not analyzed for particular constituent.
NS - Not sampled.
p - The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.
Q - Estimated maximum possible concentration (EMPC).
[ ] - Indicates result for a field duplicate sample.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/02/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 27

Location ID:	AO-CM-02
Date Collected:	11/09/12
4,4'-DDD	<0.0021
4,4'-DDE	<0.0021
4,4'-DDT	<0.0021
Dieldrin	**0.00045 J**
Heptachlor	<0.0021
Aroclor-1260	NA
2,3,7,8-TCDD	<0.00000097

Location ID:	AO-SD-18
Date Collected:	11/12/12
4,4'-DDD	<0.002
4,4'-DDE	<0.002
4,4'-DDT	**0.0018 J**
Dieldrin	**0.0021 p**
Heptachlor	<0.002
Aroclor-1260	NA
2,3,7,8-TCDD	**0.00000042 J**

Location ID:	AO-SD-17
Date Collected:	11/14/12
4,4'-DDD	<0.0036
4,4'-DDE	**0.0021 J**
4,4'-DDT	**0.0038**
Dieldrin	**0.0016 J**
Heptachlor	<0.0036
Aroclor-1260	NA
2,3,7,8-TCDD	<0.0000011

Location ID:	AO-SD-22
Date Collected:	11/08/12
4,4'-DDD	**0.0008 Jp**
4,4'-DDE	<0.0022
4,4'-DDT	**0.0051 p**
Dieldrin	<0.0022
Heptachlor	<0.0022
Aroclor-1260	NA
2,3,7,8-TCDD	**0.00000024 QJ**

Location ID:	AO-CM-03
Date Collected:	11/08/12
4,4'-DDD	<0.0021
4,4'-DDE	<0.0021
4,4'-DDT	<0.0021
Dieldrin	<0.0021
Heptachlor	<0.0021
Aroclor-1260	NA
2,3,7,8-TCDD	<0.00000099

Location ID:	AO-SD-06
Date Collected:	03/15/12
4,4'-DDD	<0.0042 [<0.0041]
4,4'-DDE	<0.0042 [<0.0041]
4,4'-DDT	<0.0042 [0.00057 J]
Dieldrin	<0.0042 [<0.0041]
Heptachlor	<0.0022 [<0.0021]
Aroclor-1260	<0.042 [<0.041]
2,3,7,8-TCDD	<0.00000099 [<0.00000098]

Location ID:	AO-SD-07
Date Collected:	03/14/12
4,4'-DDD	<0.0041
4,4'-DDE	<0.0041
4,4'-DDT	<0.0041
Dieldrin	**0.00052 J**
Heptachlor	<0.0021
Aroclor-1260	<0.041
2,3,7,8-TCDD	<0.00000098

Location ID:	AO-SD-10
Date Collected:	03/14/12
4,4'-DDD	<0.0041
4,4'-DDE	<0.0041
4,4'-DDT	**0.00074 J**
Dieldrin	<0.0041
Heptachlor	<0.0021
Aroclor-1260	<0.041
2,3,7,8-TCDD	<0.00000097

Location ID:	AO-SD-09
Date Collected:	03/14/12
4,4'-DDD	<0.0044
4,4'-DDE	<0.0044
4,4'-DDT	<0.0044
Dieldrin	<0.0044
Heptachlor	<0.0023
Aroclor-1260	<0.044
2,3,7,8-TCDD	<0.00000099

Location ID:	AO-SD-30	
Date Collected:	11/07/12	11/08/12
4,4'-DDD	NA	<0.0039
4,4'-DDE	NA	**0.0088 p**
4,4'-DDT	NA	**0.019**
Dieldrin	NA	<0.0039
Heptachlor	NA	<0.0039
Aroclor-1260	NA	NA
2,3,7,8-TCDD	NA	**0.0000015 Q**

Location ID:	AO-SD-21
Date Collected:	11/09/12
4,4'-DDD	<0.0024
4,4'-DDE	<0.0024
4,4'-DDT	<0.0024
Dieldrin	<0.0024
Heptachlor	<0.0024
Aroclor-1260	NA
2,3,7,8-TCDD	<0.00000099

Location ID:	AO-CM-01
Date Collected:	11/09/12
4,4'-DDD	<0.002
4,4'-DDE	<0.002
4,4'-DDT	<0.002
Dieldrin	<0.002
Heptachlor	<0.002
Aroclor-1260	NA
2,3,7,8-TCDD	<0.00000099

Location ID:	AO-SD-19
Date Collected:	11/12/12
4,4'-DDD	<0.021
4,4'-DDE	<0.021
4,4'-DDT	<0.021
Dieldrin	<0.021
Heptachlor	<0.021
Aroclor-1260	NA
2,3,7,8-TCDD	<0.00000099

Location ID:	AO-SD-14
Date Collected:	03/13/12
4,4'-DDD	<0.0054
4,4'-DDE	**0.00081 J**
4,4'-DDT	<0.0054
Dieldrin	<0.0054
Heptachlor	<0.0028
Aroclor-1260	<0.054
2,3,7,8-TCDD	<0.00000097 J

Location ID:	AO-SD-24
Date Collected:	11/08/12
4,4'-DDD	<0.0033
4,4'-DDE	<0.0033
4,4'-DDT	<0.0033
Dieldrin	**0.0046**
Heptachlor	<0.0033
Aroclor-1260	NA
2,3,7,8-TCDD	**0.00000021 QJ**

Location ID:	AO-SD-13
Date Collected:	03/13/12
4,4'-DDD	<0.0076
4,4'-DDE	**0.0051 J**
4,4'-DDT	**0.013 p**
Dieldrin	<0.0076
Heptachlor	<0.0039
Aroclor-1260	<0.076
2,3,7,8-TCDD	**0.00000027 J**

Location ID:	AO-SD-12
Date Collected:	03/13/12
4,4'-DDD	**0.016**
4,4'-DDE	**0.0072 J**
4,4'-DDT	**0.0048 J**
Dieldrin	**0.0017 Jp**
Heptachlor	<0.0021
Aroclor-1260	<0.041
2,3,7,8-TCDD	<0.00000098 J

Location ID:	AO-SD-05
Date Collected:	03/16/12
4,4'-DDD	<0.004
4,4'-DDE	<0.004
4,4'-DDT	<0.004
Dieldrin	**0.0012 J**
Heptachlor	<0.0021
Aroclor-1260	<0.04
2,3,7,8-TCDD	<0.00000099

Location ID:	AO-SD-04
Date Collected:	03/20/12
4,4'-DDD	<0.0042
4,4'-DDE	<0.0042
4,4'-DDT	<0.0042
Dieldrin	<0.0042
Heptachlor	<0.0022
Aroclor-1260	<0.042
2,3,7,8-TCDD	<0.0000013

Location ID:	AO-SD-03
Date Collected:	03/20/12
4,4'-DDD	<0.004
4,4'-DDE	<0.004
4,4'-DDT	<0.004
Dieldrin	<0.004
Heptachlor	<0.0021
Aroclor-1260	<0.04
2,3,7,8-TCDD	<0.0000012

Location ID:	AO-SD-20
Date Collected:	11/13/12
4,4'-DDD	<0.0023
4,4'-DDE	<0.0023
4,4'-DDT	<0.0023
Dieldrin	<0.0023
Heptachlor	<0.0023
Aroclor-1260	NA
2,3,7,8-TCDD	<0.00000092

Location ID:	AO-SD-02
Date Collected:	03/20/12
4,4'-DDD	<0.0039
4,4'-DDE	<0.0039
4,4'-DDT	<0.0039
Dieldrin	<0.0039
Heptachlor	<0.002
Aroclor-1260	<0.039
2,3,7,8-TCDD	<0.0000012

Location ID:	AO-SD-01
Date Collected:	03/20/12
4,4'-DDD	<0.0036
4,4'-DDE	<0.0036
4,4'-DDT	<0.0036
Dieldrin	**0.00077 Jp**
Heptachlor	<0.0018
Aroclor-1260	<0.036
2,3,7,8-TCDD	<0.0000011

Location ID:	AO-SD-25
Date Collected:	11/13/12
4,4'-DDD	<0.0021
4,4'-DDE	<0.0021
4,4'-DDT	<0.0021
Dieldrin	<0.0021
Heptachlor	<0.0021
Aroclor-1260	NA
2,3,7,8-TCDD	<0.00000095

Location ID:	AO-SD-27
Date Collected:	11/14/12
4,4'-DDD	<0.005
4,4'-DDE	<0.005
4,4'-DDT	<0.005
Dieldrin	<0.005
Heptachlor	<0.005
Aroclor-1260	NA
2,3,7,8-TCDD	**0.00000016 QJ**

Location ID:	AO-SD-28
Date Collected:	11/13/12
4,4'-DDD	<0.0032
4,4'-DDE	<0.0032
4,4'-DDT	<0.0032
Dieldrin	<0.0032
Heptachlor	<0.0032
Aroclor-1260	NA
2,3,7,8-TCDD	**0.00000027 QJ**

Location ID:	AO-SD-29
Date Collected:	11/12/12
4,4'-DDD	<0.0057
4,4'-DDE	**0.0026 J**
4,4'-DDT	**0.0013 J**
Dieldrin	<0.0057
Heptachlor	<0.0057
Aroclor-1260	NA
2,3,7,8-TCDD	<0.00000097

Location ID:	AO-SD-26
Date Collected:	11/13/12
4,4'-DDD	<0.0041
4,4'-DDE	<0.0041
4,4'-DDT	<0.0041
Dieldrin	<0.0041
Heptachlor	<0.0041
Aroclor-1260	NA
2,3,7,8-TCDD	<0.00000096

Location ID:	AO-SD-34
Date Collected:	11/08/12
4,4'-DDD	<0.01
4,4'-DDE	**0.0024 Jp**
4,4'-DDT	**0.0085 Jp**
Dieldrin	<0.01
Heptachlor	<0.01
Aroclor-1260	NA
2,3,7,8-TCDD	**0.000001 Q**

Location ID:	AO-SD-32
Date Collected:	11/07/12
4,4'-DDD	<0.0019
4,4'-DDE	<0.0019
4,4'-DDT	**0.0014 Jp**
Dieldrin	<0.0019
Heptachlor	<0.0019
Aroclor-1260	NA
2,3,7,8-TCDD	**0.00000015 QJ**

Location ID:	AO-SD-23
Date Collected:	11/07/12
4,4'-DDD	**0.001 J**
4,4'-DDE	**0.0016 J**
4,4'-DDT	**0.0009 Jp**
Dieldrin	**0.00054 Jp**
Heptachlor	<0.0019
Aroclor-1260	NA
2,3,7,8-TCDD	**0.000000089 QJ**

Location ID:	AO-CM-04
Date Collected:	11/08/12
4,4'-DDD	**0.00036 Jp**
4,4'-DDE	**0.00063 J**
4,4'-DDT	**0.0014 Jp**
Dieldrin	**0.00048 Jp**
Heptachlor	<0.0025
Aroclor-1260	NA
2,3,7,8-TCDD	<0.00000098

Location ID:	AO-SD-15
Date Collected:	03/13/12
4,4'-DDD	<0.0038
4,4'-DDE	<0.0038
4,4'-DDT	<0.0038
Dieldrin	<0.0038
Heptachlor	<0.0019
Aroclor-1260	**0.066 J**
2,3,7,8-TCDD	<0.00000096 J

Location ID:	AO-SD-31
Date Collected:	11/07/12
4,4'-DDD	<0.0021
4,4'-DDE	<0.0021
4,4'-DDT	<0.0021
Dieldrin	<0.0021
Heptachlor	<0.0021
Aroclor-1260	NA
2,3,7,8-TCDD	<0.00000098

Location ID:	AO-SD-33
Date Collected:	11/07/12
4,4'-DDD	**0.11 [0.0039 Jp]**
4,4'-DDE	**0.049 [<0.015]**
4,4'-DDT	**0.031 Jp [0.0039 Jp]**
Dieldrin	**0.03 Jp [0.0078 J]**
Heptachlor	**0.0038 Jp [<0.015]**
Aroclor-1260	NA
2,3,7,8-TCDD	**0.0000011 Q [0.0000011]**

Location ID:	AO-SD-16
Date Collected:	03/12/12
4,4'-DDD	<0.0039
4,4'-DDE	<0.0039
4,4'-DDT	<0.0039
Dieldrin	**0.002 J**
Heptachlor	<0.002
Aroclor-1260	<0.039
2,3,7,8-TCDD	<0.00000097 J

AD-SD-37 NS
AD-SD-36 NS
AO-SW-11 NS
AD-SD-35 NS

0 350 700 Feet

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

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SEDIMENT SAMPLE EXCEEDANCES METALS (ECOLOGICAL)

Phase I and II Investigation Report

HERCULES INCORPORATED
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Hattiesburg, Mississippi

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Legend

- Agricultural, Private Well (Shallow Aquifer)
- Creek Monitoring Point
- Shallow Soil Sample
- Sediment Sample
- Location with Exceedance
- Approximate Hercules Property
- Donation Parcel (2013)

Screening Criteria	Ecological Screening Level
Arsenic	7.24E+00
Cadmium	1.00E+00
Cobalt	5.00E+01
Copper	1.87E+01
Lead	3.02E+01
Nickel	1.59E+01
Zinc	1.24E+02
Mercury	1.30E-01
Cyanide	1.00E-04

Note: Results are shown for all compounds with concentrations exceeding screening criteria in at least one sample.
All units in milligrams per kilogram (mg/kg)
Bold - Compound detected.
Shaded cells indicate that the reported result exceeds screening criteria.
B - In Dioxin results, indicates method blank contamination. The associated method blank contains the target analyte at a reportable level.
In all other methods, indicates Compound was found in the blank and sample.
H - Sample was prepped or analyzed beyond the specified holding time.
J - Indicates an estimated value.
NA - Not analyzed for particular constituent.
NS - Not sampled.
[ ] - Indicates result for a field duplicate sample.

Location ID:	AO-SD-21
Date Collected:	11/09/12
Arsenic	2
Cadmium	0.32
Cobalt	2.2
Copper	19
Lead	19
Nickel	6.5
Zinc	200
Mercury	0.093
Cyanide	<0.71

Location ID:	AO-CM-01
Date Collected:	11/09/12
Arsenic	0.78
Cadmium	<0.06
Cobalt	1.7
Copper	3.3
Lead	5.8
Nickel	4.5
Zinc	14
Mercury	0.015 J
Cyanide	<0.6

Location ID:	AO-SD-05
Date Collected:	03/16/12
Arsenic	2.2
Cadmium	<0.12
Cobalt	1.6
Copper	1.4
Lead	4.4
Nickel	2.5
Zinc	10 J
Mercury	<0.023
Cyanide	<0.6

Location ID:	AO-SD-04
Date Collected:	03/20/12
Arsenic	3.2
Cadmium	0.11 J
Cobalt	9.4
Copper	10
Lead	8.4
Nickel	20
Zinc	59
Mercury	<0.025
Cyanide	0.38 J

Location ID:	AO-SD-03
Date Collected:	03/20/12
Arsenic	5.8
Cadmium	<0.11
Cobalt	1.5
Copper	1.2
Lead	5.3
Nickel	1.3
Zinc	8.2
Mercury	<0.022
Cyanide	0.25 J

Location ID:	AO-SD-02
Date Collected:	03/20/12
Arsenic	4.3
Cadmium	<0.12
Cobalt	3.2
Copper	1.7
Lead	16
Nickel	1.1 J
Zinc	8.6
Mercury	<0.024
Cyanide	<0.58

Location ID:	AO-SD-01
Date Collected:	03/20/12
Arsenic	14
Cadmium	0.093 J
Cobalt	140
Copper	10
Lead	74
Nickel	10
Zinc	19
Mercury	<0.021
Cyanide	<0.54

Location ID:	AO-CM-02
Date Collected:	11/09/12
Arsenic	1.4
Cadmium	0.029 J
Cobalt	4.2
Copper	5.1
Lead	7.5
Nickel	8
Zinc	31
Mercury	0.0093 J
Cyanide	<0.6

Location ID:	AO-SD-18
Date Collected:	11/12/12
Arsenic	5.4
Cadmium	0.63
Cobalt	6.7
Copper	<17 B
Lead	27
Nickel	9.4
Zinc	210
Mercury	0.066
Cyanide	0.48 J

Location ID:	AO-SD-17
Date Collected:	11/14/12
Arsenic	3.3
Cadmium	0.64
Cobalt	3.6
Copper	25
Lead	32
Nickel	6.7
Zinc	210
Mercury	0.081
Cyanide	<1.1

Location ID:	AO-SD-22
Date Collected:	11/08/12
Arsenic	4.6
Cadmium	0.25
Cobalt	4.1
Copper	42
Lead	28
Nickel	16
Zinc	78
Mercury	0.11
Cyanide	<0.64 H

Location ID:	AO-CM-03
Date Collected:	11/08/12
Arsenic	4.1
Cadmium	0.88
Cobalt	13
Copper	16
Lead	19
Nickel	24
Zinc	79
Mercury	<0.024
Cyanide	<0.6 H

Location ID:	AO-SD-06
Date Collected:	03/15/12
Arsenic	0.6 [0.32 J]
Cadmium	<0.12 [<0.12]
Cobalt	0.67 J [0.37 J]
Copper	1.1 J [0.71 J]
Lead	3.5 [2.2]
Nickel	1.3 [0.72 J]
Zinc	6.5 J [4.9 J]
Mercury	<0.025 [<0.021]
Cyanide	<0.62 [<0.62]

Location ID:	AO-SD-07
Date Collected:	03/14/12
Arsenic	0.76
Cadmium	<0.12
Cobalt	0.91 J
Copper	1.1 J
Lead	3
Nickel	1.8
Zinc	7.5 J
Mercury	<0.025
Cyanide	<0.6

Location ID:	AO-SD-10
Date Collected:	03/14/12
Arsenic	0.46 J
Cadmium	0.035 J
Cobalt	0.47
Copper	0.78 J
Lead	1.6
Nickel	<1.1
Zinc	4.9 J
Mercury	<0.024
Cyanide	<0.6

Location ID:	AO-SD-09
Date Collected:	03/14/12
Arsenic	1.6
Cadmium	0.057 J
Cobalt	1.2
Copper	2.9 J
Lead	87
Nickel	1.8
Zinc	14 J
Mercury	<0.026
Cyanide	0.46 J

Location ID:	AO-SD-30	
Date Collected:	11/07/12	11/08/12
Arsenic	NA	8.4
Cadmium	NA	0.49
Cobalt	NA	15
Copper	NA	38
Lead	NA	51
Nickel	NA	35
Zinc	NA	360
Mercury	NA	1
Cyanide	NA	<1.1 H

Location ID:	AO-SD-19
Date Collected:	11/12/12
Arsenic	2.8
Cadmium	0.47
Cobalt	4.6
Copper	110
Lead	73
Nickel	13
Zinc	180
Mercury	0.13
Cyanide	<0.62

Location ID:	AO-SD-24
Date Collected:	11/08/12
Arsenic	5.5
Cadmium	0.12
Cobalt	3.7
Copper	14
Lead	13
Nickel	29
Zinc	59
Mercury	0.089
Cyanide	<0.93 H

Location ID:	AO-SD-14
Date Collected:	03/13/12
Arsenic	3.9
Cadmium	0.1 J
Cobalt	4.2 J
Copper	5.6
Lead	30 J
Nickel	8.4
Zinc	42
Mercury	0.03
Cyanide	<0.78

Location ID:	AO-SD-13
Date Collected:	03/13/12
Arsenic	7.4
Cadmium	0.73
Cobalt	8.3 J
Copper	55
Lead	86 J
Nickel	23
Zinc	670
Mercury	0.18
Cyanide	0.63 J

Location ID:	AO-SD-12
Date Collected:	03/13/12
Arsenic	2
Cadmium	0.19
Cobalt	1.2 J
Copper	12
Lead	30 J
Nickel	3.2
Zinc	180
Mercury	0.028
Cyanide	<0.6

Location ID:	AO-SD-20
Date Collected:	11/13/12
Arsenic	1.8
Cadmium	0.063
Cobalt	0.76
Copper	5
Lead	8.3
Nickel	2.5
Zinc	28
Mercury	0.012 J
Cyanide	<0.72

Location ID:	AO-SD-23
Date Collected:	11/07/12
Arsenic	5.5
Cadmium	0.051
Cobalt	2.5
Copper	5.4
Lead	11
Nickel	8.1
Zinc	29
Mercury	0.022
Cyanide	<0.55

Location ID:	AO-CM-04
Date Collected:	11/08/12
Arsenic	2.5
Cadmium	0.089
Cobalt	3
Copper	7.3
Lead	17
Nickel	5.7
Zinc	37
Mercury	0.03
Cyanide	<0.71 H

Location ID:	AO-SD-16
Date Collected:	03/12/12
Arsenic	1.9
Cadmium	0.12
Cobalt	1.3 J
Copper	11
Lead	6.5 J
Nickel	4.2
Zinc	44
Mercury	<0.022
Cyanide	<0.57

Location ID:	AO-SD-27
Date Collected:	11/14/12
Arsenic	3.8
Cadmium	0.44
Cobalt	1.6
Copper	11
Lead	18
Nickel	5.6
Zinc	470
Mercury	0.073
Cyanide	<0.71

Location ID:	AO-SD-28
Date Collected:	11/13/12
Arsenic	3.5
Cadmium	1
Cobalt	2.2
Copper	52
Lead	38
Nickel	9.4
Zinc	320
Mercury	0.081
Cyanide	<0.92

Location ID:	AO-SD-29
Date Collected:	11/12/12
Arsenic	5.8
Cadmium	0.019 J
Cobalt	2.3
Copper	<8.5 B
Lead	15
Nickel	7.8
Zinc	19
Mercury	0.083
Cyanide	<0.85

Location ID:	AO-SD-31
Date Collected:	11/07/12
Arsenic	2.5
Cadmium	0.11
Cobalt	16
Copper	8.9
Lead	4.8
Nickel	34
Zinc	60
Mercury	0.035
Cyanide	2.3

Location ID:	AO-SD-25
Date Collected:	11/13/12
Arsenic	1.7
Cadmium	0.025 J
Cobalt	1.2
Copper	1.7
Lead	11
Nickel	1.6
Zinc	5
Mercury	0.016 J
Cyanide	<0.6

Location ID:	AO-SD-26
Date Collected:	11/13/12
Arsenic	1.1
Cadmium	0.14
Cobalt	0.46
Copper	2.6
Lead	1.9
Nickel	2.3
Zinc	75
Mercury	0.013 J
Cyanide	<0.6

Location ID:	AO-SD-34
Date Collected:	11/08/12
Arsenic	3.6
Cadmium	0.46
Cobalt	6.9
Copper	11
Lead	23
Nickel	9.5
Zinc	140
Mercury	0.072
Cyanide	<0.59 H

Location ID:	AO-SD-32
Date Collected:	11/07/12
Arsenic	4
Cadmium	0.072
Cobalt	2.7
Copper	13
Lead	18
Nickel	30
Zinc	39
Mercury	0.076
Cyanide	<0.57

Location ID:	AO-SD-33
Date Collected:	11/07/12
Arsenic	4.7 [5.4]
Cadmium	2.9 [1.8]
Cobalt	20 [20]
Copper	76 [83]
Lead	150 [150]
Nickel	130 [120]
Zinc	1,900 [1,900]
Mercury	0.29 [0.45]
Cyanide	0.93 J [<1.1]

Location ID:	AO-SD-15
Date Collected:	03/13/12
Arsenic	1.9
Cadmium	0.079 J
Cobalt	180 J
Copper	10
Lead	8.9 J
Nickel	530
Zinc	51
Mercury	0.063
Cyanide	0.63

AD-37 NS

AD-36 NS

AO-SW-11 NS

AD-35 NS

AO-SD-01 AO-SD-02 AO-SD-03 AO-SD-04 AO-SD-05 AO-SD-17 AO-SD-18 AO-CM-01 CM-01 CM-02 AO-SD-19 AO-SD-20 AO-SD-21 CM-03 AO-SD-22 AO-SD-37 AO-SD-23 CM-04 AO-SD-24 AO-SD-06 AO-SD-07 AO-SD-10 AO-SD-09 AO-SD-14 AO-SD-13 AO-SD-12 AO-SD-16 AO-SS-08 AO-SS-07 AO-SS-06 AO-SS-05 AO-SS-04 AO-SS-03 AO-SS-02 AO-SD-36 AO-SD-27 AO-SD-25 AO-SD-26 AO-SD-28 AO-SD-29 AO-SW-11 AO-SD-30 AO-SD-31 AO-SD-15 AO-SD-32 AO-SD-33 AO-SD-34 AO-SD-35

N

0 350 700 Feet

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

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GREENS CREEK (NOTE 1)

HIGHWAY 42

TO RIVER

ZEON CHEMICAL CORPORATION

ROSELAND PARK CEMETERY

SLUDGE PITS

FORMER INDUSTRIAL LANDFILL AREA

FOLLOW-UP AREA #3

FOLLOW-UP AREA #2

FOLLOW-UP AREA #1

JUNO ROAD · EUROPA ROAD · ATHENA ROAD · ECHO LOOP · MINERVA ST. · DIANA ST. · NIKE ST. · WEST SEVENTH ST. · RED ST. · N. MAIN STREET · NIOBE ST. · POMONA ST. · ARTEMIS ST. · COLUMBIA ST.

ACRES AVE · BACCHUS AVE · THOR AVE · APOLLO AVE · MARS AVE · MINOS AVE · HERCULES AVE · JUPITER AVE · TITAN AVE · PLUTO AVE · NEPTUNE AVE · MERCURY AVE · ATLAS AVE · ARGUS AVE · DANDALE ROAD · STANLEY STREET · PROVIDENCE ST.

LEGEND

AO-SW-01	PHASE I/II SURFACE WATER/SEDIMENT SAMPLE LOCATION
AO-GP-01	PHASE I/II DIRECT PUSH SOIL/GROUNDWATER SAMPLE LOCATION
AO-SG-01	SOIL GAS SAMPLE LOCATION AND DESIGNATION
S-1	ZEON MONITORING WELL LOCATION AND DESIGNATION
MW-1	ZEON DEEP MONITORING WELL LOCATION AND DESIGNATION
AO-BDB-AA	AMBIENT AIR SAMPLE LOCATION AND DESIGNATION
AO-BDB-CS	CRAWL SPACE SAMPLE LOCATION AND DESIGNATION
PW-HI-01	HERCULES INDUSTRIAL WELL LOCATION AND DESIGNATION
PW-ZC-01	ZEON INDUSTRIAL WELL LOCATION AND DESIGNATION
MW-129D	AREA #1 MONITORING WELL LOCATION AND DESIGNATION
MW-4	GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
TP-12	PIEZOMETER LOCATION AND DESIGNATION
	WATER FLOW DIRECTION
CM-1	CREEK MEDIA SAMPLING POINT LOCATION AND DESIGNATION
	APPROXIMATE PROPERTY BOUNDARY
	INTERMITTENT DRAINAGE DITCH
	APPROXIMATE BOUNDARY OF FORMER LANDFILL AREA
	SURFACE SOIL
	SUBSURFACE SOIL
	SEDIMENT
	SLUDGE
	GEOPROBE
	SURFACE WATER
	TEMPORARY WELL
	MONITORING WELL
	UNDERGROUND PROCESS WASTEWATER CONVEYANCE
	ABOVE GROUND PROCESS WASTEWATER CONVEYANCE
DELNAV	FORMER PROCESS UNIT
*	SAMPLED FOR GROUNDWATER ONLY
AO-SS-09	PHASE II HAND AUGER SAMPLE LOCATION
A372	CITY SEWER SAMPLE LOCATION

0 200' 400'
SCALE: 1"=200'

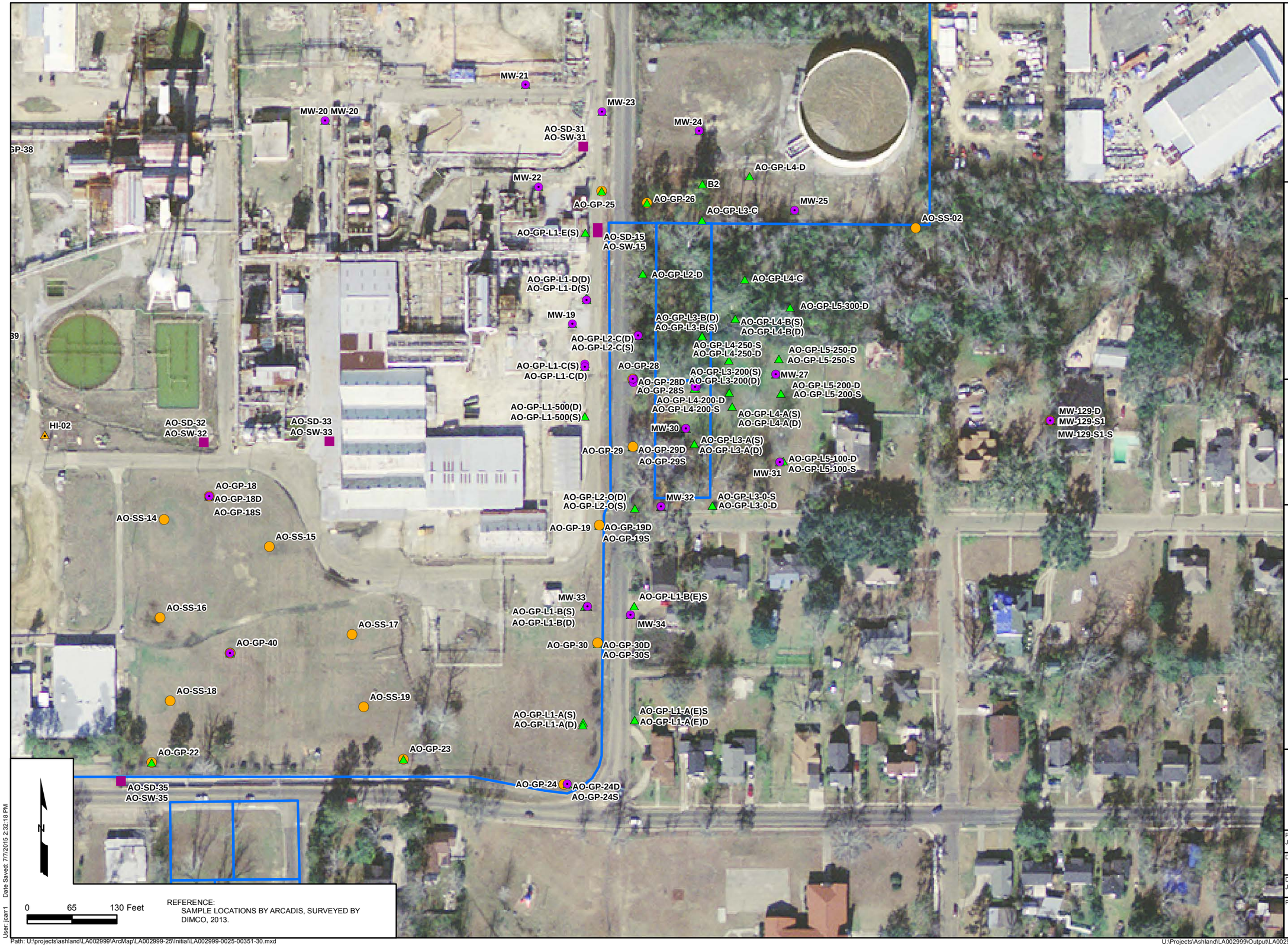
HERCULES INCORPORATED
613 W. 7TH STREET
HATTIESBURG, MS

Phase I and II Investigation Report

SAMPLE LOCATION MAP

ARCADIS

FIGURE
29



REFERENCE:
SAMPLE LOCATIONS BY ARCADIS, SURVEYED BY DIMCO, 2013.

SAMPLE LOCATIONS AREA #1

Phase I and II Investigation Report

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Legend

- Industrial Well (Deep Aquifer)
- Monitor Well
- Soil Sample Location
- Groundwater Sample Location
- GW & Soil Sample Location
- Surface Water/Sediment Sample Location
- Approxmate Property

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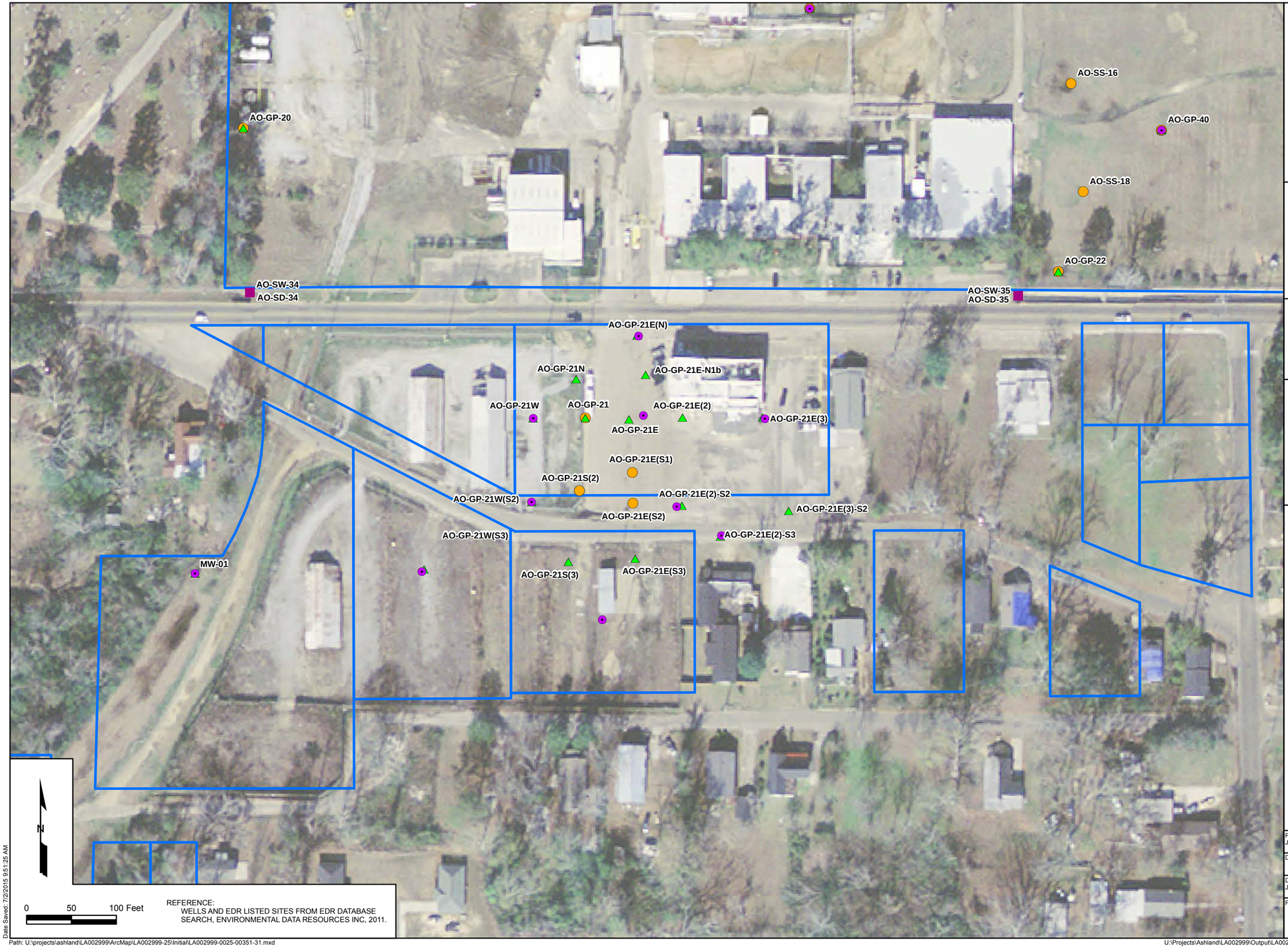

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

SAMPLE LOCATIONS AREA #2

HERCULES INCORPORATED
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Legend

- Soil Sample Location
- Groundwater Sample Location
- GW & Soil Sample Location
- Monitor Well
- Surface Water/Sediment Sample Location
- Approximate Hercules Property

PROJECT MANAGER: JE	CHECKED BY: CD
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SAMPLE LOCATIONS AREA #3

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Legend

- Soil Sample Location
- Groundwater Sample Location
- GW & Soil Sample Location
- Industrial Well (Deep Aquifer)
- Monitor Well
- Zeon Monitor Wells
- Zeon Monitor Wells (Deep)
- Approximate Hercules Property

PROJECT MANAGER: JE	CHECKED BY: CD
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BENZENE IN GROUNDWATER ISOCONCENTRATION MAP

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Legend

- Temporary Well (Shallow Aquifer)
- Monitor Well (Shallow Aquifer)
- GW Sample Locations W/Exceedances
- 10 — Isoconcentration Line (µg/L) - Dashed where inferred
- Approximate Hercules Property
- AO-GP-28S 930 — GW Sample Locations with Exceedances
- AO-GP-29S <1.0 — GW Sample Locations with reported values below EPA or MDEQ Standard

Note:
- Exceedance is a detection above a MDEQ or EPA standard.
- All concentrations in micrograms per liter.
- Contour interval is logarithmic.
- If a shallow and deep well are present at a location, then the highest concentration is used in contouring.

MDEQ Tier I TRG = 5.0 µg/L
USEPA RSLs (May 2014) = 0.45 ug/L

Sample dates for temporary groundwater data points shown on this figure ranges from March 2012 to July 2014.

Results for permanent monitoring wells shown on this figure are from May 2014, with the exception of new wells MW-25 MW-30S, MW-30D, MW-32S, MW-32D, sampled in July 2014. Data for other permanent wells installed in July/Aug 2014 is not shown, as representative/similar temporary well data is already presented.

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0 225 450 Feet

REFERENCE:
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CARBON TETRACHLORIDE IN GROUNDWATER ISOCONCENTRATION MAP

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Legend

- Temporary Well (Shallow Aquifer)
- Monitor Well (Shallow Aquifer)
- GW Sample Locations W/Exeedances
- Isoconcentration Line (ug/L) - Dashed where inferred
- Approximate Hercules Property

AO-GP-28S 930 — Groundwater Sample Locations with Exceedances

AO-GP-29S <1.0 — Groundwater Sample Locations with reported values below EPA or MDEQ Standard

Note:
- Exceedance is a detection above a MDEQ or EPA standard.
- All concentrations in micrograms per liter.
- Contour interval is logarithmic.
- If a shallow and deep well are present at a location, then the highest concentration is used in contouring.

MDEQ Tier I TRG = 5.0 µg/L
USEPA RSLs (May 2014) = 0.45 ug/L

Sample dates for temporary groundwater data points shown on this figure ranges from March 2012 to July 2014.

Results for permanent monitoring wells shown on this figure are from May 2014, with the exception of new wells MW-25 MW-30S, MW-30D, MW-32S, MW-32D, sampled in July 2014. Data for other permanent wells installed in July/Aug 2014 is not shown, as representative/similar temporary well data is already presented.

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DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 34

0 225 450 Feet

REFERENCE:
WELL LOCATIONS FROM SURVEY BY DIMCO 2012-14.

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Path: U:\projects\ashland\LA002999\ArcMap\LA002999-25\Initial\LA002999-0025-00351-34.mxd

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CHLOROBENZENE IN GROUNDWATER ISOCONCENTRATION MAP

HERCULES INCORPORATED
613 W. 7th Street
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ARCADIS
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BATON ROUGE, LA 70816
TEL: 225-292-1004
FAX: 225-218-9677
WWW.ARCADIS-US.COM

Legend

- Temporary Well (Shallow Aquifer)
- Monitor Well (Shallow Aquifer)
- GW Sample Locations W/Exeedances
- Isoconcentration Line (µg/L) - Dashed where inferred
- Approximate Hercules Property

AO-GP-28S 930 — GW Sample Locations with Exceedances

AO-GP-29S <1.0 — GW Sample Locations with reported values below EPA or MDEQ Standard

Note:
- Exceedance is a detection above a MDEQ or EPA standard.
- All concentrations in micrograms per liter.
- Contour interval is logarithmic.
- If a shallow and deep well are present at a location, then the highest concentration is used in contouring.

MDEQ Tier I TRG = 100 µg/L
USEPA RSLs (May 2014) = 7.80 ug/L

Sample dates for temporary groundwater data points shown on this figure ranges from March 2012 to July 2014.

Results for permanent monitoring wells shown on this figure are from May 2014, with the exception of new wells MW-25 MW-30S, MW-30D, MW-32S, MW-32D, sampled in July 2014. Data for other permanent wells installed in July/Aug 2014 is not shown, as representative/similar temporary well data is already presented.

N

0 225 450 Feet

REFERENCE:
WELL LOCATIONS FROM SURVEY BY DIMCO 2012-14.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 35

Date Saved: 7/7/2015 2:33:37 PM

Path: U:\projects\ashland\LA002999\ArcMap\LA002999-25\Initial\LA002999-0025-00351-35.mxd

U:\Projects\Ashland\LA002999\Output\LA002999-25\Initial\LA002999-25-00351-35.pdf

CHLOROFORM IN GROUNDWATER ISOCONCENTRATION MAP

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Legend

- Temporary Well (Shallow Aquifer)
- Monitor Well (Shallow Aquifer)
- GW Sample Locations W/Exeedances
- Isoconcentration Line (µg/L) - Dashed where inferred
- Approximate Hercules Property

AO-GP-28S 930 — GW Sample Locations with Exceedances

AO-GP-29S <1.0 — GW Sample Locations with reported values below EPA or MDEQ Standard

Note:
•Exceedance is a detection above a MDEQ or EPA standard.
•All concentrations in micrograms per liter.
•Contour interval is logarithmic.
•If a shallow and deep well are present at a location, then the highest concentration is used in contouring.

MDEQ Tier I TRG = 0.2 µg/L
USEPA RSLs (May 2014) = 0.22 ug/L

Sample dates for temporary groundwater data points shown on this figure ranges from March 2012 to July 2014.

Results for permanent monitoring wells shown on this figure are from May 2014, with the exception of new wells MW-25 MW-30S, MW-30D, MW-32S, MW-32D, sampled in July 2014. Data for other permanent wells installed in July/Aug 2014 is not shown, as representative/similar temporary well data is already presented.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 36

N

0 225 450 Feet

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

Date Saved: 7/7/2015 2:34:02 PM

Path: U:\projects\ashland\LA002999\ArcMap\LA002999-25\Initial\LA002999-0025-00351-36.mxd

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ETHYLBENZENE IN GROUNDWATER ISOCONCENTRATION MAP

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Legend

- Temporary Well (Shallow Aquifer)
- Monitor Well (Shallow Aquifer)
- GW Sample Locations W/Exeedances
- 10 — Isoconcentration Line (µg/L) - Dashed where inferred
- Approximate Hercules Property

AO-GP-28S 930 — GW Sample Locations with Exceedances

AO-GP-29S <1.0 — GW Sample Locations with reported values below EPA or MDEQ Standard

Note:
- Exceedance is a detection above a MDEQ or EPA standard.
- All concentrations in micrograms per liter.
- Contour interval is logarithmic.
- If a shallow and deep well are present at a location, then the highest concentration is used in contouring.

MDEQ Tier I TRG = 700 µg/L
USEPA RSLs (May 2014) = 1.5 ug/L

Sample dates for temporary groundwater data points shown on this figure ranges from March 2012 to July 2014.

Results for permanent monitoring wells shown on this figure are from May 2014, with the exception of new wells MW-25 MW-30S, MW-30D, MW-32S, MW-32D, sampled in July 2014. Data for other permanent wells installed in July/Aug 2014 is not shown, as representative/similar temporary well data is already presented.

N

0 225 450 Feet

REFERENCE:
WELL LOCATIONS FROM SURVEY BY DIMCO 2012-14.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 37

Date Saved: 7/7/2015 2:34:41 PM

Path: U:\projects\ashland\LA002999\ArcMap\LA002999-25\Initial\LA002999-0025-00351-37.mxd

U:\Projects\Ashland\LA002999\Output\LA002999-25\Initial\LA002999-25-00351-37.pdf

TOLUENE IN GROUNDWATER ISOCONCENTRATION MAP

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Legend

- Temporary Well (Shallow Aquifer)
- Monitor Well (Shallow Aquifer)
- GW Sample Locations W/Exeedances
- Isoconcentration Line (µg/L) - Dashed where inferred
- Approximate Hercules Property

AO-GP-28S 930 — GW Sample Locations with Exceedances

AO-GP-29S <1.0 — GW Sample Locations with reported values below EPA or MDEQ Standard

Note:
- Exceedance is a detection above a MDEQ or EPA standard.
- All concentrations in micrograms per liter.
- Contour interval is logarithmic.
- If a shallow and deep well are present at a location, then the highest concentration is used in contouring.

MDEQ Tier I TRG = 1,000 µg/L
USEPA RSLs (May 2014) = 110.00 ug/L

Sample dates for temporary groundwater data points shown on this figure ranges from March 2012 to July 2014.

Results for permanent monitoring wells shown on this figure are from May 2014, with the exception of new wells MW-25 MW-30S, MW-30D, MW-32S, MW-32D, sampled in July 2014. Data for other permanent wells installed in July/Aug 2014 is not shown, as representative/similar temporary well data is already presented.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 38

N

0 225 450 Feet

REFERENCE:
WELL LOCATIONS FROM SURVEY BY DIMCO 2012-14.

Date Saved: 7/7/2015 2:35:30 PM

Path: U:\projects\ashland\LA002999\ArcMap\LA002999-25\Initial\LA002999-0025-00351-38.mxd

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TOTAL XYLENE IN GROUNDWATER ISOCONCENTRATION MAP

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Legend

- Temporary Well (Shallow Aquifer)
- Monitor Well (Shallow Aquifer)
- GW Sample Locations W/Exeedances
- Isoconcentration Line (µg/L) - Dashed where inferred
- Approximate Hercules Property

AO-GP-28S 930 GW Sample Locations with Exceedances

AO-GP-29S <1.0 GW Sample Locations with reported values below EPA or MDEQ Standard

Note:
- Exceedance is a detection above a MDEQ or EPA standard.
- All concentrations in micrograms per liter.
- Contour interval is logarithmic.
- If a shallow and deep well are present at a location, then the highest concentration is used in contouring.

MDEQ Tier I TRG = 10,000 µg/L
USEPA RSLs (May 2014) = 19.00 ug/L

Sample dates for temporary groundwater data points shown on this figure ranges from March 2012 to July 2014.

Results for permanent monitoring wells shown on this figure are from May 2014, with the exception of new wells MW-25 MW-30S, MW-30D, MW-32S, MW-32D, sampled in July 2014. Data for other permanent wells installed in July/Aug 2014 is not shown, as representative/similar temporary well data is already presented.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 39

N

0 225 450 Feet

REFERENCE:
WELL LOCATIONS FROM SURVEY BY DIMCO 2012-14.

Date Saved: 7/7/2015 2:36:00 PM

Path: U:\projects\ashland\LA002999\ArcMap\LA002999-25\Initial\LA002999-0025-00351-39.mxd

U:\Projects\Ashland\LA002999\Output\LA002999-19\revised_phase_I-II\initial\LA002999-19-00351-38.pdf

1,4-DIOXANE IN GROUNDWATER ISOCONCENTRATION MAP

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Legend

- Temporary Well (Shallow Aquifer)
- Monitor Well (Shallow Aquifer)
- GW Sample Locations W/Exeedances
- Isoconcentration Line (µg/L) - Dashed where inferred
- Approximate Hercules Property

AO-GP-28S 930 — Groundwater Sample Locations with Exceedances

AO-GP-29S <1.0 — Groundwater Sample Locations with reported values below EPA or MDEQ Standard

Note:
- Exceedance is a detection above a MDEQ or EPA standard.
- All concentrations in micrograms per liter.
- Contour interval is logarithmic.
- If a shallow and deep well are present at a location, then the highest concentration is used in contouring.

MDEQ Tier I TRG = 6.1 µg/L
USEPA RSLs (May 2014) = 0.78 ug/L

Sample dates for temporary groundwater data points shown on this figure ranges from March 2012 to July 2014.

Results for permanent monitoring wells shown on this figure are from May 2014, with the exception of new wells MW-25 MW-30S, MW-30D, MW-32S, MW-32D, sampled in July 2014. Data for other permanent wells installed in July/Aug 2014 is not shown, as representative/similar temporary well data is already presented.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 40

N

0 225 450 Feet

REFERENCE:
WELL LOCATIONS FROM SURVEY BY DIMCO 2012-14.

Date Saved: 7/7/2015 2:36:28 PM

Path: U:\projects\ashland\LA002999\ArcMap\LA002999-25\Initial\LA002999-0025-00351-40.mxd

U:\Projects\Ashland\LA002999\Output\LA002999-25\Initial\LA002999-25-00351-40.pdf

1,1'-BIPHENYL IN GROUNDWATER ISOCONCENTRATION MAP

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Legend

- Temporary Well (Shallow Aquifer)
- Monitor Well (Shallow Aquifer)
- GW Sample Locations W/Exeedances
- Isoconcentration Line (µg/L) - Dashed where inferred
- Approximate Hercules Property

AO-GP-28S 930 — GW Sample Locations with Exceedances

AO-GP-29S <1.0 — GW Sample Locations with reported values below EPA or MDEQ Standard

Note:
- Exceedance is a detection above a MDEQ or EPA standard.
- All concentrations in micrograms per liter.
- Contour interval is logarithmic.
- If a shallow and deep well are present at a location, then the highest concentration is used in contouring.

MDEQ Tier I TRG = 304.2 µg/L
USEPA RSLs (May 2014) = 0.08 ug/L

Sample dates for temporary groundwater data points shown on this figure ranges from March 2012 to July 2014.

Results for permanent monitoring wells shown on this figure are from May 2014, with the exception of new wells MW-25 MW-30S, MW-30D, MW-32S, MW-32D, sampled in July 2014. Data for other permanent wells installed in July/Aug 2014 is not shown, as representative/similar temporary well data is already presented.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 41

N

0 225 450 Feet

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

Date Saved: 7/7/2015 2:36:55 PM

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DIPHENYL ETHER IN GROUNDWATER ISOCONCENTRATION MAP

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Legend

- Temporary Well (Shallow Aquifer)
- Monitor Well (Shallow Aquifer)
- Isoconcentration Line (µg/L) - Dashed where inferred
- Approximate Hercules Property

AO-GP-29S <1.0 GW Sample Locations with reported values

Note:
- Compound does not have MDEQ or EPA standards.
- All concentrations in micrograms per liter.
- Contour interval is logarithmic.
- If a shallow and deep well are present at a location, then the highest concentration is used in contouring.

Sample dates for temporary groundwater data points shown on this figure ranges from March 2012 to July 2014.

Results for permanent monitoring wells shown on this figure are from May 2014, with the exception of new wells MW-25 MW-30S, MW-30D, MW-32S, MW-32D, sampled in July 2014. Data for other permanent wells installed in July/Aug 2014 is not shown, as representative/similar temporary well data is already presented.

N

0 225 450 Feet

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/07/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 42

Date Saved: 7/8/2015 5:15:54 PM

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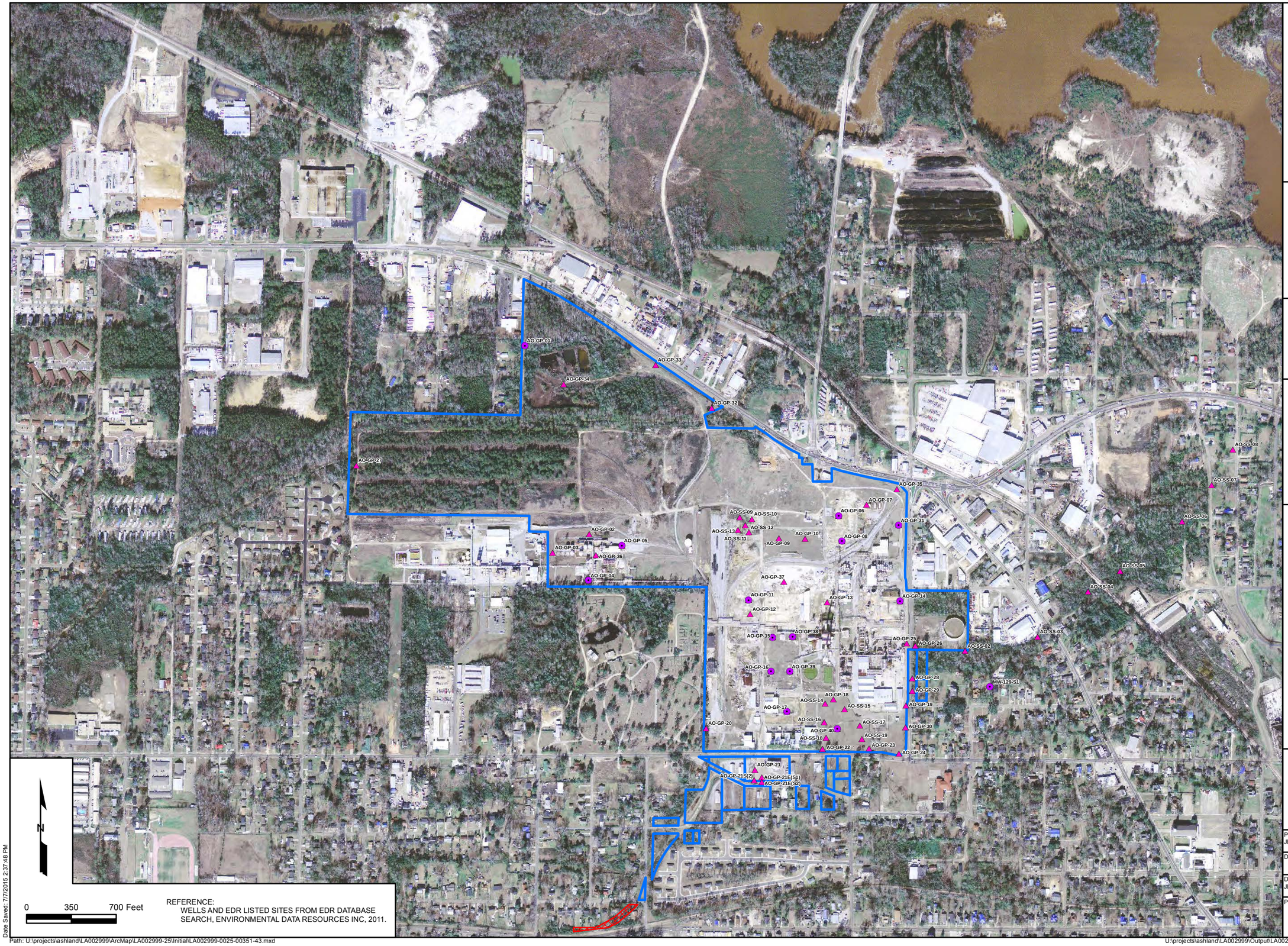
U:\Projects\Ashland\LA002999\Output\LA002999-25\Initial\LA002999-19-00351-42.pdf



REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

SOIL SAMPLE LOCATION MAP

Phase I and II Investigation Report

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Legend

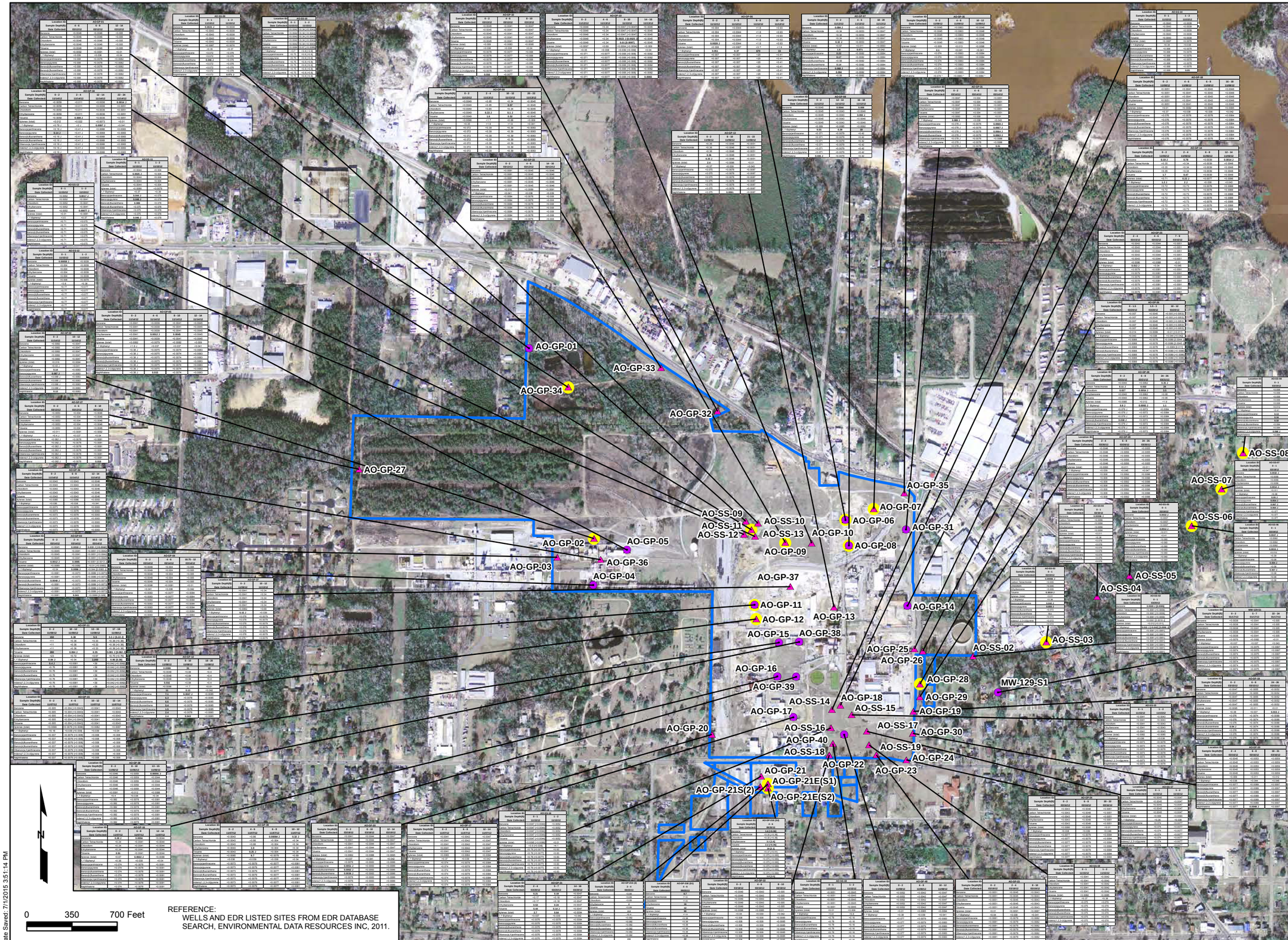
- Soil Sample Location
- Monitor Well (Shallow Aquifer)
- Approximate Hercules Property
- Donation Parcel (2013)

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 43

Date Saved: 7/7/2015 2:37:48 PM

Path: U:\projects\ashland\LA002999\ArcMap\LA002999-25\Initial\LA002999-0025-00351-43.mxd

U:\projects\ashland\LA002999\Output\LA002999-25\Initial\LA002999-0025-00351-43.pdf



REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

SOIL SAMPLE EXCEEDANCES VOCs & SVOCs (HUMAN HEALTH)

Phase I and II Investigation Report

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Legend

- Soil Sample Location
- Monitor Well (Shallow Aquifer)
- Location with Exceedance
- Approximate Hercules Property
- Donation Parcel (2013)

Screening Criteria	USEPA Industrial RSL (May 2014)	USEPA Residential RSL (May 2014)	MDEQ Tier 1 Restricted Soil TRG	MDEQ Tier 1 Unrestricted Soil
Benzene	5.70E+00	1.20E+00	1.30E+00	8.87E-01
Carbon Tetrachloride	2.90E+00	6.50E-01	5.00E-01	3.77E-01
Chloroform	1.40E+00	3.20E-01	4.70E-01	3.12E-01
Ethylbenzene	2.50E+01	5.80E+00	3.95E+02	3.95E+02
Toluene	4.70E+00	4.90E+00	3.80E+01	3.80E+01
Xylenes (total)	2.50E+02	5.80E+01	3.10E+02	3.10E+02
1,1-Biphenyl	2.00E+01	4.70E+00	1.02E+04	3.91E+03
Benzo(a)anthracene	2.90E+00	1.50E-01	7.84E+00	8.79E-01
Benzo(a)pyrene	2.90E-01	1.50E-02	7.84E-01	8.79E-02
Benzo(b)fluoranthene	2.90E+00	1.50E-01	7.84E+00	8.79E-01
Benzo(k)fluoranthene	2.90E+01	1.50E+00	7.84E+01	8.79E+00
Benzo(g,h,i)anthracene	2.90E+01	1.50E+00	7.84E+01	8.79E+00
Chlorobenzene	2.90E+00	1.50E-01	7.84E+00	8.79E-01
Naphthalene	1.70E+01	3.80E+00	2.47E+02	1.94E+02

Note: Results are shown for all compounds with concentrations exceeding screening criteria in at least one sample.
All units in milligrams per kilogram (mg/kg)
Bold - Compound detected.
Shaded cells indicate that the reported result exceeds screening criteria.
B - In Dioxin results, indicates method blank contamination. The associated method blank contains the target analyte at a reportable level. In all other methods, indicates Compound was found in the blank and sample.
C - Co-eluting isomer.
D - Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution may be flagged with a D
E - Serial dilution results not within 10%. Applicable only if analyte concentration is at least 50X the IDL in original sample.
J - Indicates an estimated value.
Q - Estimated maximum possible concentration (EMPC).
p - The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 44

Date Saved: 7/1/2015 3:51:14 PM

Path: U:\projects\ashland\LA002999\ArcMap\LA002999-25\Initial\LA002999-0025-00351-44.mxd

F:\Projects\Ashland\LA002999\Output\LA002999-25\Initial\LA002999-25-00351-44.pdf

SOIL SAMPLE EXCEEDANCES PESTICIDES, PCBs, AND DIOXATHION (HUMAN HEALTH)

Phase I and II Investigation Report

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Legend

- Soil Sample
- Monitor Well (Shallow Aquifer)
- Location with Exceedance
- Approximate Hercules Property
- Donation Parcel (2013)

Notes: Results are shown for all compounds with concentrations exceeding screening criteria in at least one sample.
All units in milligrams per kilogram (mg/kg)
Bold - Compound detected.
Shaded cells indicate that the reported result exceeds screening criteria.
"D - Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution may
be flagged with a D"
J - Indicates an estimated value.
NA - Not analyzed for particular constituent.
p - The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 45

0 350 700 Feet

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

Date Saved: 7/1/2015 3:48:19 PM

Path: U:\projects\ashland\LA002999\ArcMap\LA002999-25\Initial\LA002999-0025-00351-45.mxd

SOIL SAMPLE EXCEEDANCES METALS (HUMAN HEALTH)

Phase I and II Investigation Report

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Legend

- Soil Sample
- Monitor Well (Shallow Aquifer)
- Location with Exceedance
- Approximate Hercules Property
- Donation Parcel (2013)

Note: Results are shown for all compounds with concentrations exceeding screening criteria in at least one sample.
All units in milligrams per kilogram (mg/kg)
Bold - Compound detected.
Shaded cells indicate that the reported result exceeds screening criteria.
B - In Dioxin results, indicates method blank contamination. The associated method blank contains the target analyte at a reportable level. In all other methods, indicates Compound was found in the blank and sample.
J - Indicates an estimated value.
NA - Not analyzed for particular constituent.
p - The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.
[ ] - Indicates result for a field duplicate sample.
* - Indicates laboratory duplicate analysis was outside control limits.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 46

0 350 700 Feet

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

Date Saved: 7/1/2015 3:46:13 PM

Path: U:\projects\ashland\LA002999\ArcMap\LA002999-25\Initial\LA002999-0025-00351-46.mxd

Screening Criteria	USEPA Industrial RSL (May 2014)	USEPA Residential RSL (May 2014)	MDEQ Tier 1 Restricted Soil TRG	MDEQ Tier 1 Unrestricted Soil TRG
Antimony	4.70E+01	3.10E+00	8.17E+01	3.13E+01
Arsenic	3.00E+00	6.70E-01	3.82E+00	4.26E-01
Cobalt	3.50E+01	2.30E+00	1.23E+04	4.66E+02
Copper	4.70E+03	3.10E+02	8.17E+03	3.13E+03
Lead	8.00E+02	4.00E+02	1.70E+03	4.00E+02
Thallium	1.20E+00	7.80E-02	1.43E+02	5.48E+00
Vanadium	5.80E+02	3.90E+01	1.43E+03	5.48E+02
Mercury	4.00E+00	9.40E-01	6.13E+01	1.00E+01

SOIL SAMPLE EXCEEDANCES DIOXINS AND FURANS (HUMAN HEALTH)

Phase I and II Investigation Report

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Legend

- Soil Sample
- Monitor Well (Shallow Aquifer)
- Location with Exceedance
- Approximate Hercules Property
- Donation Parcel (2013)

Screening Criteria	USEPA Industrial RSL (May 2014)	USEPA Residential RSL (May 2014)	MDEQ Tier 1 Re-entered Soil TRG	MDEQ Tier 1 Unrestricted Soil
1,2,3,4,6,7,8-HpCDD	--	--	3.82E-03	4.26E-04
1,2,3,4,6,7,8-HpCDF	--	--	3.82E-04	4.26E-05
1,2,3,4,7,8-HxCDD	--	--	3.82E-04	4.26E-05
1,2,3,4,7,8-HxCDF	--	--	3.82E-04	4.26E-05
1,2,3,6,7,8-HxCDD	--	--	3.82E-04	4.26E-05
1,2,3,6,7,8-HxCDF	--	--	3.82E-04	4.26E-05
1,2,3,7,8,9-HxCDD	--	--	3.82E-04	4.26E-05
1,2,3,7,8,9-HxCDF	--	--	3.82E-04	4.26E-05
1,2,3,7,8-PeCDD	--	--	7.63E-05	8.52E-06
1,2,3,7,8-PeCDF	--	--	7.63E-04	8.52E-05
2,3,7,8-TCDD	2.60E-05	4.90E-06	3.82E-05	4.26E-06
2,3,7,8-TCDF	--	--	3.82E-04	4.26E-05
Octachlorodibenzo-p-Dioxin	--	--	3.82E-02	4.26E-03

Note: Results are shown for all compounds with concentrations exceeding screening criteria in at least one sample.
All units in milligrams per kilogram (mg/kg)
Bold - Compound detected.
Shaded cells indicate that the reported result exceeds screening criteria.
All units in milligrams per kilogram (mg/kg)
B - In Dioxin results, indicates method blank contamination. The associated method blank contains the target analyte at a reportable level.
C - Co-eluting isomer.
E - Serial dilution results not within 10%. Applicable only if analyte concentration is at least 50X the IDL in original sample.
J - Indicates an estimated value.
NA - Not analyzed for particular constituent.
Q - Estimated maximum possible concentration (EMPC).
[ ] - Indicates result is from a field duplicate sample.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 47

N

0 350 700 Feet

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

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BENZENE SOIL ISOCONCENTRATION MAP

HERCULES INCORPORATED
613 W. 7th Street
Hattiesburg, Mississippi

ARCADIS
10352 PLAZA AMERICANA DRIVE
BATON ROUGE, LA 70816
TEL: 225-292-1004
FAX: 225-218-9677
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Legend

- Soil Sample Locations
- Isoconcentration Line (mg/kg)
- Dashed where inferred
- Approximate Hercules Property

AO-GP-28S 930 — Soil Sample Locations with Exceedances

AO-GP-29S 1.0 — Soil Sample Locations with reported values below EPA or MDEQ Standard

Note:
- The results presented represent the maximum concentration at each boring location, inclusive of all sampled depths.
- All units in milligrams per kilogram (mg/kg).
- Contour interval is logarithmic.
- J - Indicates an estimated value.

Location ID	Sample Depth (ft bgs)	Date Collected	Benzene (mg/kg)
AO-GP-03	10.5 - 12	03/14/12	**0.033 J**
AO-GP-07	0 - 2	11/13/12	**0.084 J**
AO-GP-08	16 - 18	11/12/12	**0.008**
AO-GP-11	0 - 2	11/08/12	**150**
AO-GP-12	8 - 10	11/08/12	**31**
AO-GP-14	2 - 4	11/06/12	**0.78**
AO-GP-16	0 - 2	11/07/12	**0.28 J**
AO-GP-21	2 - 4	03/20/12	**0.21**
AO-GP-21E (S1)	4 - 6	09/25/13	**8.7**
AO-GP-21E (S2)	4 - 6	09/25/13	**1.6**
AO-GP-28	24 - 26	03/21/12	**0.35 J**
AO-GP-34	22 - 24	11/14/12	**0.0014 J**
AO-GP-38	13 - 15	11/06/12	**0.00091 J**
AO-GP-39	10 - 12	11/07/12	**0.32 J**
AO-SS-02	0 - 1	03/20/12	**0.0085 J**
AO-SS-03	0 - 1	03/19/12	**0.00083 J**
AO-SS-04	0 - 1	03/19/12	**0.00086 J**
AO-SS-05	0 - 1	03/19/12	**0.0032 J**
AO-SS-06	0 - 1	03/19/12	**0.0047 J**
AO-SS-07	0 - 1	03/19/12	**0.0032 J**
AO-SS-09	0 - 1	11/15/12	**0.0021 J**
AO-SS-12	0 - 1	11/15/12	**0.00058 J**
AO-SS-13	1 - 2	11/15/12	**0.0017 J**

Human Health Screening Criteria					
Sample Name:	Units	USEPA Industrial RSL (2014)	USEPA Residential RSL (2014)	MDEQ Tier 1 Restricted	MDEQ Tier 1 Unrestricted
Benzene	mg/kg	5.1	1.2	1.36	0.887

N

0 225 450 Feet

REFERENCE:
WELL LOCATIONS FROM SURVEY BY DIMCO 2012-14.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 48

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1,1'-BIPHENYL SOIL ISOCONCENTRATION MAP

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Legend

- Soil Sample Locations
- 10 — Isoconcentration Line (mg/kg)
- Dashed where inferred
- Approximate Hercules Property

AO-GP-28S 930 — Soil Sample Locations with Exceedances

AO-GP-29S 1.0 — Soil Sample Locations with reported values below EPA or MDEQ Standard

Note:
- The results presented represent the maximum concentration at each boring location, inclusive of all sampled depths.
- All units in milligrams per kilogram (mg/kg).
- Contour interval is logarithmic.
- J - Indicates an estimated value.

Location ID	Sample Depth (ft)	Date Collected	1,1'-Biphenyl (mg/kg)
AO-GP-03	2 - 4	03/14/12	**0.0096 J**
AO-GP-06	6 - 8	11/12/12	**670**
AO-GP-07	0 - 2	11/13/12	**1.8**
AO-GP-08	16 - 18	11/12/12	**19**
AO-GP-11	13 - 15	11/08/12	**2,000**
AO-GP-12	0 - 2	11/08/12	**11**
AO-GP-14	2 - 4	11/06/12	**2 J**
AO-GP-19	24 - 26	03/15/12	**0.015 J**
AO-GP-25	2 - 4	03/15/12	**0.013 J**
AO-GP-28	24 - 26	03/21/12	**1.1**
AO-GP-31	0 - 2	03/14/12	**0.089 J**
AO-GP-34	12 - 14	11/14/12	**0.0097 J**
AO-GP-35	0 - 2	11/09/12	**2.1**
AO-GP-37	0 - 2	11/09/12	**0.15 J**
AO-SS-02	0 - 1	03/20/12	**0.013 J**

Human Health Screening Criteria

Sample Name:	Units	USEPA Industrial RSL (2014)	USEPA Residential RSL (2014)	MDEQ Tier 1 Restricted	MDEQ Tier 1 Unrestricted
1,1'-Biphenyl	mg/kg	20	4.7	10208	3911

0 225 450 Feet

REFERENCE:
WELL LOCATIONS FROM SURVEY BY DIMCO 2012-14.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JWC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 49

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DIOXATHION SOIL ISOCONCENTRATION MAP

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Legend

- Soil Sample Locations
- 10 Isoconcentration Line (mg/kg)
- Dashed where inferred
- Approximate Hercules Property
- AO-GP-28S 930 — Soil Sample Locations with Exceedances
- AO-GP-29S 1.0 — Soil Sample Locations with reported values below EPA or MDEQ Standard

Note:
- The results presented represent the maximum concentration at each boring location, inclusive of all sampled depths.
- All units in milligrams per kilogram (mg/kg).
- Contour interval is logarithmic.
- J - Indicates an estimated value.

Location ID	Sample Depth (ft)	Date Collected	Dioxenethion (mg/kg)
AO-GP-01	12 - 14	03/12/12	**0.045**
AO-GP-03	0 - 2	03/14/12	**0.316**
AO-GP-04	0 - 2	03/14/12	**0.648 J**
AO-GP-07	0 - 2	11/13/12	**1.73 J**
AO-GP-11	0 - 2	11/08/12	**2.4**
AO-GP-12	0 - 2	11/08/12	**3.29**
AO-GP-14	0 - 2	11/06/12	**14.9**
AO-GP-15	0 - 2	11/07/12	**1.44**
AO-GP-19	6 - 8	03/15/12	**0.0499**
AO-GP-21	2 - 4	03/20/12	**0.412**
AO-GP-22	0 - 2	03/19/12	**0.327**
AO-GP-23	0 - 2	03/19/12	**1.87**
AO-GP-24	0 - 2	03/16/12	**0.0546**
AO-GP-25	2 - 4	03/15/12	**0.2**
AO-GP-26	0 - 1.5	03/20/12	**0.0967**
AO-GP-27	0 - 2	03/13/12	**1.46**
AO-GP-28	0 - 2	03/21/12	**0.0351**
AO-GP-30	2 - 4	03/16/12	**0.0473**
AO-GP-31	0 - 2	03/14/12	**1.56 J**
AO-GP-32	0 - 2	03/13/12	**0.0333**
AO-GP-33	0 - 2	03/13/12	**1.99**
AO-GP-34	0 - 2	11/14/12	**20.2**
AO-GP-35	0 - 2	11/09/12	**0.478**
AO-GP-37	0 - 2	11/09/12	**0.634**
AO-SS-02	0 - 1	03/20/12	**0.234**
AO-SS-03	0 - 1	03/19/12	**0.12**
AO-SS-04	0 - 1	03/19/12	**1.37**
AO-SS-06	0 - 1	03/19/12	**0.193**
AO-SS-07	0 - 1	03/19/12	**0.0509**
AO-SS-08	0 - 1	03/19/12	**0.26**
AO-SS-10	1 - 2	11/15/12	**2.79**
AO-SS-11	0 - 1	11/15/12	**212**
AO-SS-12	1 - 2	11/15/12	**224**
AO-SS-13	0 - 1	11/15/12	**0.809 J**
AO-SS-16	0 - 1	11/15/12	**3.86 J**
AO-SS-19	0 - 1	11/15/12	**1.96**

Human Health Screening Criteria

Sample Name:	Units	USEPA Industrial RSL (2014)	USEPA Residential RSL (2014)	MDEQ Tier 1 Restricted	MDEQ Tier 1 Unrestricted
cis-Dioxathion	mg/kg	- -	- -	3066	117

N

0 225 450 Feet

REFERENCE:
WELL LOCATIONS FROM SURVEY BY DIMCO 2012-14.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 50

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SOIL SAMPLE EXCEEDANCES (0 - 1') (ECOLOGICAL)

Phase I and II Investigation Report

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Legend

- Soil Sample
- Monitor Well (Shallow Aquifer)
- Location with Exceedance
- Approximate Hercules Property
- Donation Parcel (2013)

Screening Criteria	Ecological Screening Value
2,6-Dinitrotoluene	3.28E-02
bis(2-Ethylhexyl)phthalate	1.00E-01
o,o,o-Triethylphosphorothioate	8.18E-01
DDT and metabolites (DDD and DDE)	2.10E-02
Alpha-BHC	2.50E-03
Beta-BHC	1.00E-03
Dieldrin	2.80E-04
Gamma-BHC (Lindane)	5.00E-05
Toxaphene	1.19E-01
2,3,7,8-TCDD	1.99E-07
2,3,7,8-TCDF	3.86E-05
Antimony	2.90E-01
Cadmium	3.80E-01
Chromium	4.00E-01
Cobalt	1.30E+01
Copper	4.00E+01
Lead	1.60E+01
Nickel	3.00E+01
Vanadium	2.00E+00
Zinc	5.00E+01
Mercury	1.00E-01

Notes:
Results are shown for all compounds with concentrations exceeding screening criteria in at least one sample.
All units in milligrams per kilogram (mg/kg)
Bold - Compound detected.
Shaded cells indicate that the reported result exceeds screening criteria.
J - Indicates an estimated value.
p - The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.
Q - Estimated maximum possible concentration (EMPC).
[ ] - Indicates result from a field duplicate sample.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 51

Location ID:	AO-SS-08
Sample Depth(ft):	0 - 1
Date Collected:	03/19/12
2,6-Dinitrotoluene	<0.41
bis(2-Ethylhexyl)phthalate	**0.12 J**
o,o,o-Triethylphosphorothioate	<0.83
DDT and metabolites (DDD and DDE)	**0.297**
Alpha-BHC	<0.0021
Beta-BHC	<0.0021
Dieldrin	**0.03**
Gamma-BHC (Lindane)	<0.0021
Toxaphene	<0.21
2,3,7,8-TCDD	<0.0000061
2,3,7,8-TCDF	<0.0000061
Antimony	**1.1 J**
Cadmium	**0.54**
Chromium	**9.2**
Cobalt	**2.3**
Copper	**26**
Lead	**220**
Nickel	**8.6**
Vanadium	**7.8**
Zinc	**190**
Mercury	**0.2**

Location ID:	AO-SS-07
Sample Depth(ft):	0 - 1
Date Collected:	03/19/12
2,6-Dinitrotoluene	<0.38
bis(2-Ethylhexyl)phthalate	<0.76
o,o,o-Triethylphosphorothioate	<0.76
DDT and metabolites (DDD and DDE)	**0.0073**
Alpha-BHC	<0.002
Beta-BHC	<0.002
Dieldrin	<0.0038
Gamma-BHC (Lindane)	<0.002
Toxaphene	**0.83 p**
2,3,7,8-TCDD	<0.0000012
2,3,7,8-TCDF	**0.00000097 J**
Antimony	<2.2
Cadmium	**0.11**
Chromium	**5.1**
Cobalt	**3.1**
Copper	**29**
Lead	**39**
Nickel	**10**
Vanadium	**9.6**
Zinc	**42**
Mercury	**0.12**

Location ID:	AO-SS-06
Sample Depth(ft):	0 - 1
Date Collected:	03/19/12
2,6-Dinitrotoluene	<0.39
bis(2-Ethylhexyl)phthalate	<0.78
o,o,o-Triethylphosphorothioate	<0.78
DDT and metabolites (DDD and DDE)	**0.0264**
Alpha-BHC	<0.002
Beta-BHC	<0.002
Dieldrin	<0.0039
Gamma-BHC (Lindane)	<0.002
Toxaphene	**1.4**
2,3,7,8-TCDD	<0.0000012
2,3,7,8-TCDF	**0.00000092 J**
Antimony	<2.4
Cadmium	**0.27**
Chromium	**3.8**
Cobalt	**4.9**
Copper	**23**
Lead	**32**
Nickel	**40**
Vanadium	**5.2**
Zinc	**63**
Mercury	**0.23**

Location ID:	AO-SS-05
Sample Depth(ft):	0 - 1
Date Collected:	03/19/12
2,6-Dinitrotoluene	<0.41
bis(2-Ethylhexyl)phthalate	<0.82
o,o,o-Triethylphosphorothioate	<0.82
DDT and metabolites (DDD and DDE)	**0.0282**
Alpha-BHC	<0.0021
Beta-BHC	<0.0021
Dieldrin	<0.0041
Gamma-BHC (Lindane)	<0.0021
Toxaphene	**0.33 p**
2,3,7,8-TCDD	<0.0000012
2,3,7,8-TCDF	**0.00000057 QJ**
Antimony	<2.3
Cadmium	**0.029 J**
Chromium	**3.6**
Cobalt	**1.3**
Copper	**17**
Lead	**20**
Nickel	**10**
Vanadium	**3.5**
Zinc	**11**
Mercury	**0.15**

Location ID:	AO-SS-04
Sample Depth(ft):	0 - 1
Date Collected:	03/19/12
2,6-Dinitrotoluene	<0.38
bis(2-Ethylhexyl)phthalate	**0.079 J**
o,o,o-Triethylphosphorothioate	<0.77
DDT and metabolites (DDD and DDE)	ND
Alpha-BHC	<0.002
Beta-BHC	<0.002
Dieldrin	<0.0038
Gamma-BHC (Lindane)	<0.002
Toxaphene	<0.2
2,3,7,8-TCDD	<0.0000011
2,3,7,8-TCDF	**0.00000048 QJ**
Antimony	<2.3
Cadmium	**0.23**
Chromium	**5.9**
Cobalt	**3.1**
Copper	**16**
Lead	**17**
Nickel	**14**
Vanadium	**5.5**
Zinc	**59**
Mercury	**0.079**

Location ID:	AO-SS-10
Sample Depth(ft):	0 - 1
Date Collected:	11/15/12
2,6-Dinitrotoluene	<3.7
bis(2-Ethylhexyl)phthalate	<7.4
o,o,o-Triethylphosphorothioate	**2 J**
DDT and metabolites (DDD and DDE)	ND
Alpha-BHC	**0.036**
Beta-BHC	<0.019
Dieldrin	**0.21 p**
Gamma-BHC (Lindane)	<0.019
Toxaphene	**1.5 Jp**
2,3,7,8-TCDD	<0.0000012
2,3,7,8-TCDF	**0.0000022**
Antimony	<1.1
Cadmium	**0.064**
Chromium	**21**
Cobalt	**2.3**
Copper	**41**
Lead	**29**
Nickel	**7.7**
Vanadium	**30**
Zinc	**44**
Mercury	**0.11**

Location ID:	AO-SS-09
Sample Depth(ft):	0 - 1
Date Collected:	11/15/12
2,6-Dinitrotoluene	<0.36
bis(2-Ethylhexyl)phthalate	<0.71
o,o,o-Triethylphosphorothioate	**4.7**
DDT and metabolites (DDD and DDE)	ND
Alpha-BHC	**0.0013 J**
Beta-BHC	<0.0092
Dieldrin	<0.0092
Gamma-BHC (Lindane)	<0.0092
Toxaphene	<0.92
2,3,7,8-TCDD	**0.0000012**
2,3,7,8-TCDF	**0.00018**
Antimony	<1.1
Cadmium	**0.29**
Chromium	**17**
Cobalt	**2.3**
Copper	**28**
Lead	**23**
Nickel	**12**
Vanadium	**22**
Zinc	**120**
Mercury	**0.21**

Location ID:	AO-SS-11
Sample Depth(ft):	0 - 1
Date Collected:	11/15/12
2,6-Dinitrotoluene	<0.37
bis(2-Ethylhexyl)phthalate	<0.73
o,o,o-Triethylphosphorothioate	**0.95**
DDT and metabolites (DDD and DDE)	ND
Alpha-BHC	<0.019
Beta-BHC	<0.019
Dieldrin	**0.18 p**
Gamma-BHC (Lindane)	**0.0044 Jp**
Toxaphene	**0.99 Jp**
2,3,7,8-TCDD	**0.0000015**
2,3,7,8-TCDF	**0.000054**
Antimony	<1.1
Cadmium	**0.29**
Chromium	**19**
Cobalt	**2.3**
Copper	**36**
Lead	**19**
Nickel	**37**
Vanadium	**17**
Zinc	**92**
Mercury	**0.52**

Location ID:	AO-SS-12
Sample Depth(ft):	0 - 1
Date Collected:	11/15/12
2,6-Dinitrotoluene	<3.8
bis(2-Ethylhexyl)phthalate	<7.5
o,o,o-Triethylphosphorothioate	**0.88 J**
DDT and metabolites (DDD and DDE)	**0.021**
Alpha-BHC	<0.0096
Beta-BHC	**0.0015 J**
Dieldrin	<0.0096
Gamma-BHC (Lindane)	**0.016**
Toxaphene	<0.96
2,3,7,8-TCDD	**0.00000014 Q**
2,3,7,8-TCDF	**0.000058**
Antimony	<1
Cadmium	**0.55**
Chromium	**24**
Cobalt	**3.5**
Copper	**24**
Lead	**36**
Nickel	**55**
Vanadium	**30**
Zinc	**150**
Mercury	**0.39**

Location ID:	AO-SS-13
Sample Depth(ft):	0 - 1
Date Collected:	11/15/12
2,6-Dinitrotoluene	<3.5
bis(2-Ethylhexyl)phthalate	<7
o,o,o-Triethylphosphorothioate	**0.57 J**
DDT and metabolites (DDD and DDE)	ND
Alpha-BHC	<0.018
Beta-BHC	<0.018
Dieldrin	<0.018
Gamma-BHC (Lindane)	**0.0025 Jp**
Toxaphene	**4.4 p**
2,3,7,8-TCDD	**0.0000058 Q**
2,3,7,8-TCDF	**0.000043**
Antimony	<0.96
Cadmium	**0.37**
Chromium	**44**
Cobalt	**3.6**
Copper	**35**
Lead	**37**
Nickel	**98**
Vanadium	**23**
Zinc	**210**
Mercury	**0.3**

Location ID:	AO-SS-14
Sample Depth(ft):	0 - 1
Date Collected:	11/15/12
2,6-Dinitrotoluene	**0.31 J**
bis(2-Ethylhexyl)phthalate	<0.67
o,o,o-Triethylphosphorothioate	<0.67
DDT and metabolites (DDD and DDE)	ND
Alpha-BHC	<0.0017
Beta-BHC	<0.0017
Dieldrin	<0.0017
Gamma-BHC (Lindane)	<0.0017
Toxaphene	<0.17
2,3,7,8-TCDD	<0.000001
2,3,7,8-TCDF	**0.000000044 QJ**
Antimony	<0.91
Cadmium	<0.045
Chromium	**1**
Cobalt	**0.16**
Copper	**0.84**
Lead	**2.3**
Nickel	**3.2**
Vanadium	**1.1**
Zinc	**2**
Mercury	**0.012 J**

Location ID:	AO-SS-15
Sample Depth(ft):	0 - 1
Date Collected:	11/15/12
2,6-Dinitrotoluene	<0.036
bis(2-Ethylhexyl)phthalate	**0.0082 J**
o,o,o-Triethylphosphorothioate	<0.072
DDT and metabolites (DDD and DDE)	ND
Alpha-BHC	<0.0018
Beta-BHC	<0.0018
Dieldrin	<0.0018
Gamma-BHC (Lindane)	<0.0018
Toxaphene	<0.18
2,3,7,8-TCDD	<0.0000011
2,3,7,8-TCDF	<0.0000011
Antimony	<1
Cadmium	<0.052
Chromium	**13**
Cobalt	**2**
Copper	**2.2**
Lead	**6.7**
Nickel	**4.5**
Vanadium	**24**
Zinc	**9.7**
Mercury	**0.008 J**

Location ID:	AO-SS-16
Sample Depth(ft):	0 - 1
Date Collected:	11/15/12
2,6-Dinitrotoluene	<3.9 [<0.038]
bis(2-Ethylhexyl)phthalate	<7.7 [<0.076]
o,o,o-Triethylphosphorothioate	<7.7 [<0.076]
DDT and metabolites (DDD and DDE)	ND
Alpha-BHC	<0.004 [<0.0019]
Beta-BHC	<0.004 [<0.0019]
Dieldrin	<0.004 [<0.0019]
Gamma-BHC (Lindane)	<0.004 [<0.0019]
Toxaphene	<0.4 [<0.19]
2,3,7,8-TCDD	**0.00000039 J [<0.00000011]**
2,3,7,8-TCDF	**0.0000014 [<0.0000011]**
Antimony	**2.9 [<1]**
Cadmium	**1.1 [<0.052]**
Chromium	**18 [8.9]**
Cobalt	**2.4 [1.3]**
Copper	**89 [1.3]**
Lead	**220 [5.1]**
Nickel	**14 [2.8]**
Vanadium	**15 [16]**
Zinc	**250 [5.2]**
Mercury	**0.34 [<0.021]**

Location ID:	AO-SS-18
Sample Depth(ft):	0 - 1
Date Collected:	11/15/12
2,6-Dinitrotoluene	<3.8
bis(2-Ethylhexyl)phthalate	<7.7
o,o,o-Triethylphosphorothioate	<7.7
DDT and metabolites (DDD and DDE)	ND
Alpha-BHC	<0.002
Beta-BHC	<0.002
Dieldrin	<0.002
Gamma-BHC (Lindane)	<0.002
Toxaphene	**0.21 p**
2,3,7,8-TCDD	**0.000000055 QJ**
2,3,7,8-TCDF	**0.0000012 J**
Antimony	<1.1
Cadmium	**0.15**
Chromium	**10**
Cobalt	**2.1**
Copper	**23**
Lead	**27**
Nickel	**5.7**
Vanadium	**17**
Zinc	**48**
Mercury	**0.075**

Location ID:	AO-SS-19
Sample Depth(ft):	0 - 1
Date Collected:	11/15/12
2,6-Dinitrotoluene	<0.37
bis(2-Ethylhexyl)phthalate	<0.74
o,o,o-Triethylphosphorothioate	<0.74
DDT and metabolites (DDD and DDE)	ND
Alpha-BHC	<0.0095
Beta-BHC	<0.0095
Dieldrin	<0.0095
Gamma-BHC (Lindane)	<0.0095
Toxaphene	<0.95
2,3,7,8-TCDD	<0.0000011
2,3,7,8-TCDF	**0.00000085 QJ**
Antimony	<1.1
Cadmium	**0.029 J**
Chromium	**6.2**
Cobalt	**1.6**
Copper	**9**
Lead	**32**
Nickel	**3.4**
Vanadium	**9.8**
Zinc	**16**
Mercury	**0.024**

Location ID:	AO-SS-17
Sample Depth(ft):	0 - 1
Date Collected:	11/15/12
2,6-Dinitrotoluene	<0.36
bis(2-Ethylhexyl)phthalate	<0.73
o,o,o-Triethylphosphorothioate	<0.73
DDT and metabolites (DDD and DDE)	**0.0011**
Alpha-BHC	<0.0018
Beta-BHC	<0.0018
Dieldrin	**0.0007 Jp**
Gamma-BHC (Lindane)	<0.0018
Toxaphene	<0.18
2,3,7,8-TCDD	<0.0000011
2,3,7,8-TCDF	**0.00000024 QJ**
Antimony	<1.1
Cadmium	**0.021 J**
Chromium	**7**
Cobalt	**1.9**
Copper	**4.2**
Lead	**9**
Nickel	**3.5**
Vanadium	**13**
Zinc	**8.5**
Mercury	**0.027**

Location ID:	AO-SS-03
Sample Depth(ft):	0 - 1
Date Collected:	03/19/12
2,6-Dinitrotoluene	<0.36
bis(2-Ethylhexyl)phthalate	**0.39 J**
o,o,o-Triethylphosphorothioate	<0.71
DDT and metabolites (DDD and DDE)	**0.0182**
Alpha-BHC	<0.0018
Beta-BHC	<0.0018
Dieldrin	**0.042**
Gamma-BHC (Lindane)	<0.0018
Toxaphene	<0.18
2,3,7,8-TCDD	<0.0000021
2,3,7,8-TCDF	**0.0000014 QJ**
Antimony	<2
Cadmium	**0.33**
Chromium	**6.3**
Cobalt	**1.4**
Copper	**220**
Lead	**350**
Nickel	**91**
Vanadium	**4**
Zinc	**68**
Mercury	**0.026**

Location ID:	AO-SS-02
Sample Depth(ft):	0 - 1
Date Collected:	03/20/12
2,6-Dinitrotoluene	<0.04 [<0.04]
bis(2-Ethylhexyl)phthalate	**0.014 J [0.009J, J]**
o,o,o-Triethylphosphorothioate	<0.08 [<0.079]
DDT and metabolites (DDD and DDE)	**0.0177**
Alpha-BHC	<0.002 [<0.002]
Beta-BHC	<0.002 [<0.002]
Dieldrin	<0.004 [<0.0039]
Gamma-BHC (Lindane)	<0.002 [<0.002]
Toxaphene	**0.31 p [0.7]**
2,3,7,8-TCDD	<0.000012 [<0.0000013]
2,3,7,8-TCDF	**0.00000058 QJ [<0.0000013]**
Antimony	<2.3 [<2.2]
Cadmium	**0.13 [0.11]**
Chromium	**4.2 [5.5]**
Cobalt	**1.6 [12]**
Copper	**30 [32]**
Lead	**27 [31]**
Nickel	**28 [24]**
Vanadium	**6.2 [5.9]**
Zinc	**34 [27]**
Mercury	**0.23 [0.25]**

AO-SS-08
AO-SS-07
AO-SS-06
AO-SS-05
AO-SS-04
AO-SS-03
AO-SS-02
AO-SS-09
AO-SS-11
AO-SS-10
AO-SS-12
AO-SS-13
AO-SS-14
AO-SS-15
AO-SS-17
AO-SS-16
AO-SS-18
AO-SS-19

N

0 350 700 Feet

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

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SOIL SAMPLE EXCEEDANCES (0-2') VOCs (ECOLOGICAL)

Phase I and II Investigation Report

HERCULES INCORPORATED
613 W. 7th Street
Hattiesburg, Mississippi

ARCADIS
10352 PLAZA AMERICANA DRIVE
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TEL: 225-292-1004
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WWW.ARCADIS-US.COM

Legend

- Soil Sample
- Monitor Well (Shallow Aquifer)
- Location with Exceedance
- Approximate Hercules Property
- Donation Parcel (2013)

Screening Criteria	Ecological Screening Level
Benzene	5.00E-02
Carbon Disulfide	9.41E-02
Carbon Tetrachloride	1.00E-01
Chloroform	1.00E-03
Ethylbenzene	5.00E-02
Toluene	5.00E-02
Xylenes (total)	5.00E-02

Note: Results are shown for all compounds with concentrations exceeding screening criteria in at least one sample.
All units in milligrams per kilogram (mg/kg)
Bold - Compound detected.
Shaded cells indicate that the reported result exceeds screening criteria.
J - Indicates an estimated value.
[ ] - Indicates result for a field duplicate sample.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 52

0 350 700 Feet

REFERENCE:
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SOIL SAMPLE EXCEEDANCES (0-2') SVOCs (ECOLOGICAL)

Phase I and II Investigation Report

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Legend

- Soil Sample
- Monitor Well (Shallow Aquifer)
- Location with Exceedance
- Approximate Hercules Property
- Donation Parcel (2013)

Screening Criteria	Ecological Screening Level
2,6-Dinitrotoluene	3.28E-02
Anthracene	1.00E-01
Benzo(a)anthracene	5.21E+00
Benzo(a)pyrene	1.00E-01
bis(2-Ethylhexyl)phthalate	1.00E-01
Chrysene	4.73E+00
Fluoranthene	1.00E-01
Naphthalene	1.00E-01
o,o,o-Triethylphosphorothioate	8.18E-01
Pentachlorobenzene	2.50E-03
Phenanthrene	1.00E-01
Pyrene	1.00E-01
Sulfotep	5.96E-01

Note: Results are shown for all compounds with concentrations exceeding screening criteria in at least one sample.
All units in milligrams per kilogram (mg/kg)
Bold - Compound detected.
Shaded cells indicate that the reported result exceeds screening criteria.
B - In Dioxin results, indicates method blank contamination. The associated method blank contains the target analyte at a reportable level. In all other methods, indicates Compound was found in the blank and sample.
J - Indicates an estimated value.
[ ] - Indicates result for a field duplicate sample.
* - Indicates laboratory duplicate analysis was outside control limits.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 53

0 350 700 Feet

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SOIL SAMPLE EXCEEDANCES (0-2') DIOXINS/FURANS (ECOLOGICAL)

Phase I and II Investigation Report

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Legend

- Soil Sample
- Monitor Well (Shallow Aquifer)
- Location with Exceedance
- Approximate Hercules Property
- Donation Parcel (2013)

Screening Criteria	Ecological Screening Level
4,4'-DDD	2.50E-03
4,4'-DDE	2.50E-03
4,4'-DDT	2.50E-03
Alpha-BHC	2.50E-03
Beta-BHC	1.00E-03
Dieldrin	2.80E-04
Gamma-BHC (Lindane)	5.00E-05
Toxaphene	1.19E-01
2,3,7,8-TCDD	1.99E-07
2,3,7,8-TCDF	3.86E-05

Note: Results are shown for all compounds with concentrations exceeding screening criteria in at least one sample.
All units in milligrams per kilogram (mg/kg)
Bold - Compound detected.
Shaded cells indicate that the reported result exceeds screening criteria.
B - In Dioxin results, indicates method blank contamination. The associated method blank contains the target analyte at a reportable level. In all other methods, indicates Compound was found in the blank and sample.
"D - Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution may be flagged with a D"
E - Serial dilution results not within 10%. Applicable only if analyte concentration is at least 50X the IDL in original sample.
J - Indicates an estimated value.
p - The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.
Q - Estimated maximum possible concentration (EMPC).
[ ] - Indicates result for a field duplicate sample.
X - Surrogate is outside control limits

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 54

0 350 700 Feet

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

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SOIL SAMPLE EXCEEDANCES (0-2') METALS (ECOLOGICAL)

Phase I and II Investigation Report

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Legend

- Soil Sample
- Monitor Well (Shallow Aquifer)
- Location with Exceedance
- Approximate Hercules Property
- Donation Parcel (2013)

Screening Criteria	Ecological Screening Level
Antimony	2.90E-01
Cadmium	3.80E-01
Chromium	4.00E-01
Cobalt	1.30E+01
Copper	4.00E+01
Lead	1.60E+01
Nickel	3.00E+01
Selenium	8.10E-01
Silver	2.00E+00
Vanadium	2.00E+00
Zinc	5.00E+01
Mercury	1.00E-01

Note: Results are shown for all compounds with concentrations exceeding screening criteria in at least one sample.
All units in milligrams per kilogram (mg/kg)
Bold - Compound detected.
Shaded cells indicate that the reported result exceeds screening criteria.
B - In Dioxin results, indicates method blank contamination. The associated method blank contains the target analyte at a reportable level. In all other methods, indicates Compound was found in the blank and sample.
J - Indicates an estimated value.
[ ] - Indicates result for a field duplicate sample.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 55

0 350 700 Feet

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

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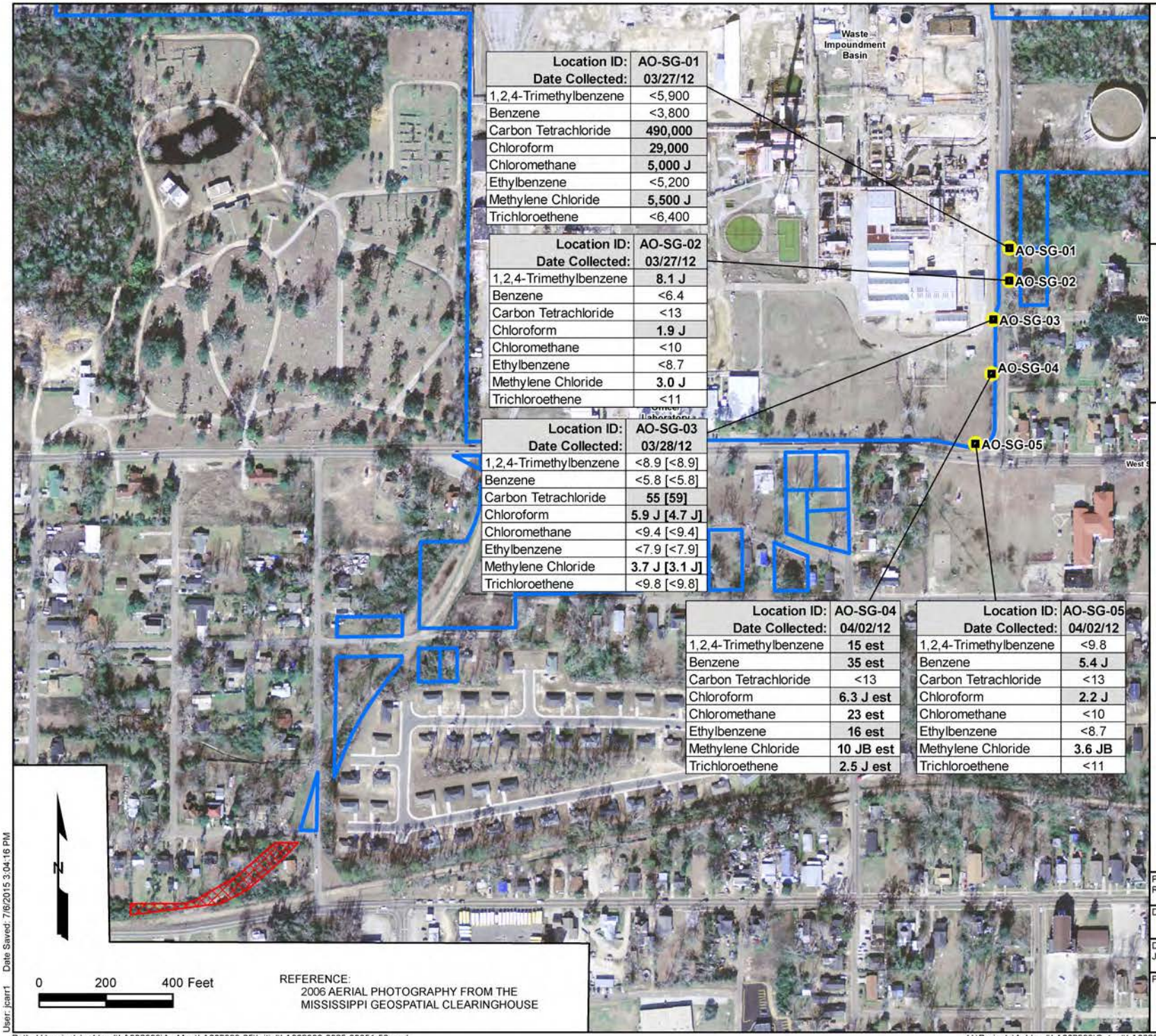

Location ID:	AO-SG-01
Date Collected:	03/27/12
1,2,4-Trimethylbenzene	<5,900
Benzene	<3,800
Carbon Tetrachloride	**490,000**
Chloroform	**29,000**
Chloromethane	**5,000 J**
Ethylbenzene	<5,200
Methylene Chloride	**5,500 J**
Trichloroethene	<6,400

Location ID:	AO-SG-02
Date Collected:	03/27/12
1,2,4-Trimethylbenzene	**8.1 J**
Benzene	<6.4
Carbon Tetrachloride	<13
Chloroform	**1.9 J**
Chloromethane	<10
Ethylbenzene	<8.7
Methylene Chloride	**3.0 J**
Trichloroethene	<11

Location ID:	AO-SG-03
Date Collected:	03/28/12
1,2,4-Trimethylbenzene	<8.9 [<8.9]
Benzene	<5.8 [<5.8]
Carbon Tetrachloride	**55 [59]**
Chloroform	**5.9 J [4.7 J]**
Chloromethane	<9.4 [<9.4]
Ethylbenzene	<7.9 [<7.9]
Methylene Chloride	**3.7 J [3.1 J]**
Trichloroethene	<9.8 [<9.8]

Location ID:	AO-SG-04
Date Collected:	04/02/12
1,2,4-Trimethylbenzene	**15 est**
Benzene	**35 est**
Carbon Tetrachloride	<13
Chloroform	**6.3 J est**
Chloromethane	**23 est**
Ethylbenzene	**16 est**
Methylene Chloride	**10 JB est**
Trichloroethene	**2.5 J est**

Location ID:	AO-SG-05
Date Collected:	04/02/12
1,2,4-Trimethylbenzene	<9.8
Benzene	**5.4 J**
Carbon Tetrachloride	<13
Chloroform	**2.2 J**
Chloromethane	<10
Ethylbenzene	<8.7
Methylene Chloride	**3.6 JB**
Trichloroethene	<11

REFERENCE:
2006 AERIAL PHOTOGRAPHY FROM THE MISSISSIPPI GEOSPATIAL CLEARINGHOUSE

SOIL-GAS SAMPLE EXCEEDANCES

Phase I and II Investigation Report

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Legend
- Approximate Hercules Property
- Soil-Gas Sample Location
- Location with Exceedance
- Donation Parcel (2013)

Screening Criteria	USEPA Adjusted Industrial Air RSL (May 2014)	USEPA Adjusted Residential Air RSL (May 2014)
1,2,4-Trimethylbenzene	3.10E+01	7.30E+00
Benzene	1.60E+01	3.60E+00
Carbon Tetrachloride	2.00E+01	4.70E+00
Chloroform	5.30E+00	1.20E+00
Chloromethane	3.90E+02	9.40E+01
Ethylbenzene	4.90E+01	1.10E+01
Methylene Chloride	2.60E+03	6.30E+02
Trichloroethene	8.80E+00	2.10E+00

NOTES:
Results are shown for all compounds with concentrations exceeding screening criteria in at least one sample.
All units in micrograms per cubic meter (µg/m3).
BOLD - Compound detected.
Shaded cells indicate that the reported result exceeds screening criteria.
B - Indicates compound was detected in the blank and sample.
est - Indicates an estimated value due to the uncertainty of the dilution factor resulting from low pressure.
J - Indicates an estimated value.
Adjusted RSL - The RSL is multiplied by a factor of 10 to account for attenuation into a building.

PROJECT MANAGER: RJE	CHECKED BY: CD
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DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 56

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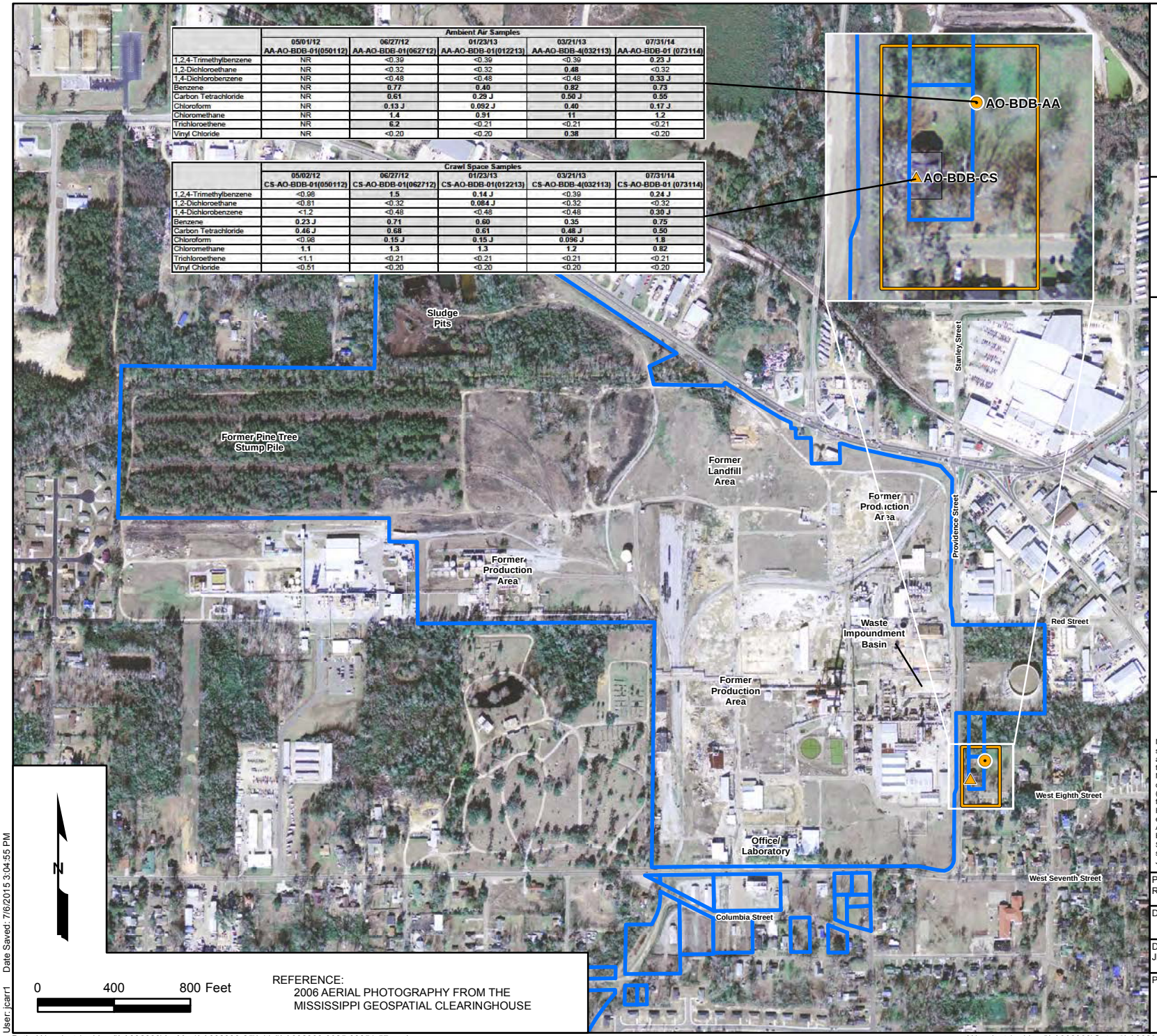
AIR SAMPLE EXCEEDANCES

Air Sampling Results
135 West 8th Street

HERCULES INCORPORATED
613 W. 7th Street
Hattiesburg, Mississippi



	Ambient Air Samples				
	05/01/12 AA-AO-BDB-01(050112)	06/27/12 AA-AO-BDB-01(062712)	01/23/13 AA-AO-BDB-01(012213)	03/21/13 AA-AO-BDB-4(032113)	07/31/14 AA-AO-BDB-01 (073114)
1,2,4-Trimethylbenzene	NR	<0.39	<0.39	<0.39	**0.23 J**
1,2-Dichloroethane	NR	<0.32	<0.32	**0.48**	<0.32
1,4-Dichlorobenzene	NR	<0.48	<0.48	<0.48	**0.33 J**
Benzene	NR	**0.77**	**0.40**	**0.82**	**0.73**
Carbon Tetrachloride	NR	**0.61**	**0.29 J**	**0.50 J**	**0.55**
Chloroform	NR	**0.13 J**	**0.092 J**	**0.40**	**0.17 J**
Chloromethane	NR	**1.4**	**0.91**	**11**	**1.2**
Trichloroethene	NR	**6.2**	<0.21	<0.21	<0.21
Vinyl Chloride	NR	<0.20	<0.20	**0.38**	<0.20

	Crawl Space Samples				
	05/02/12 CS-AO-BDB-01(050112)	06/27/12 CS-AO-BDB-01(062712)	01/23/13 CS-AO-BDB-01(012213)	03/21/13 CS-AO-BDB-4(032113)	07/31/14 CS-AO-BDB-01 (073114)
1,2,4-Trimethylbenzene	<0.98	**1.5**	**0.14 J**	<0.39	**0.24 J**
1,2-Dichloroethane	<0.81	<0.32	**0.084 J**	<0.32	<0.32
1,4-Dichlorobenzene	<1.2	<0.48	<0.48	<0.48	**0.30 J**
Benzene	**0.23 J**	**0.71**	**0.60**	**0.35**	**0.75**
Carbon Tetrachloride	**0.46 J**	**0.68**	**0.61**	**0.48 J**	**0.50**
Chloroform	<0.98	**0.15 J**	**0.15 J**	**0.096 J**	**1.8**
Chloromethane	**1.1**	**1.3**	**1.3**	**1.2**	**0.82**
Trichloroethene	<1.1	<0.21	<0.21	<0.21	<0.21
Vinyl Chloride	<0.51	<0.20	<0.20	<0.20	<0.20

REFERENCE:
2006 AERIAL PHOTOGRAPHY FROM THE MISSISSIPPI GEOSPATIAL CLEARINGHOUSE

Legend

- Ambient Air Sample Location
- Crawl Space Sample Location
- Single Family Home Purchased by Hercules
- Approximate Hercules Property

Screening Levels	USEPA Industrial Air RSL (May 2014)	USEPA Residential Air RSL (May 2014)
1,2,4-Trimethylbenzene	3.10E+00	7.30E-01
1,2-Dichloroethane	4.70E-01	1.10E-01
1,4-Dichlorobenzene	1.10E+00	2.60E-01
Benzene	1.60E+00	3.60E-01
Carbon Tetrachloride	2.00E+00	4.70E-01
Chloroform	5.30E-01	1.20E-01
Chloromethane	3.90E+01	9.40E+00
Trichloroethene	8.80E-01	2.10E-01
Vinyl Chloride	2.80E+00	1.70E-01

Notes: AO-BDB-01 and AO-BDB-4 represent the same sample location. AO-BDB-4 was the sample location ID assigned during the event in March 2013 (representing the fourth sample collected from that location).
NR - The ambient air results collected in May 2012 are considered non-reportable because of data quality issues (summa canister leak), therefore they are not shown on this figure.
Results are shown for all compounds with concentrations exceeding screening criteria in at least one sample.
All units in micrograms per cubic meter (ug/m3).
Bold - Compound detected.
Shaded cells indicate that the reported result exceeds screening criteria.
J - Indicates an estimated value.

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PROJECT MANAGER: RJE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 57

User: jcarr1 Date Saved: 7/6/2015 3:04:55 PM

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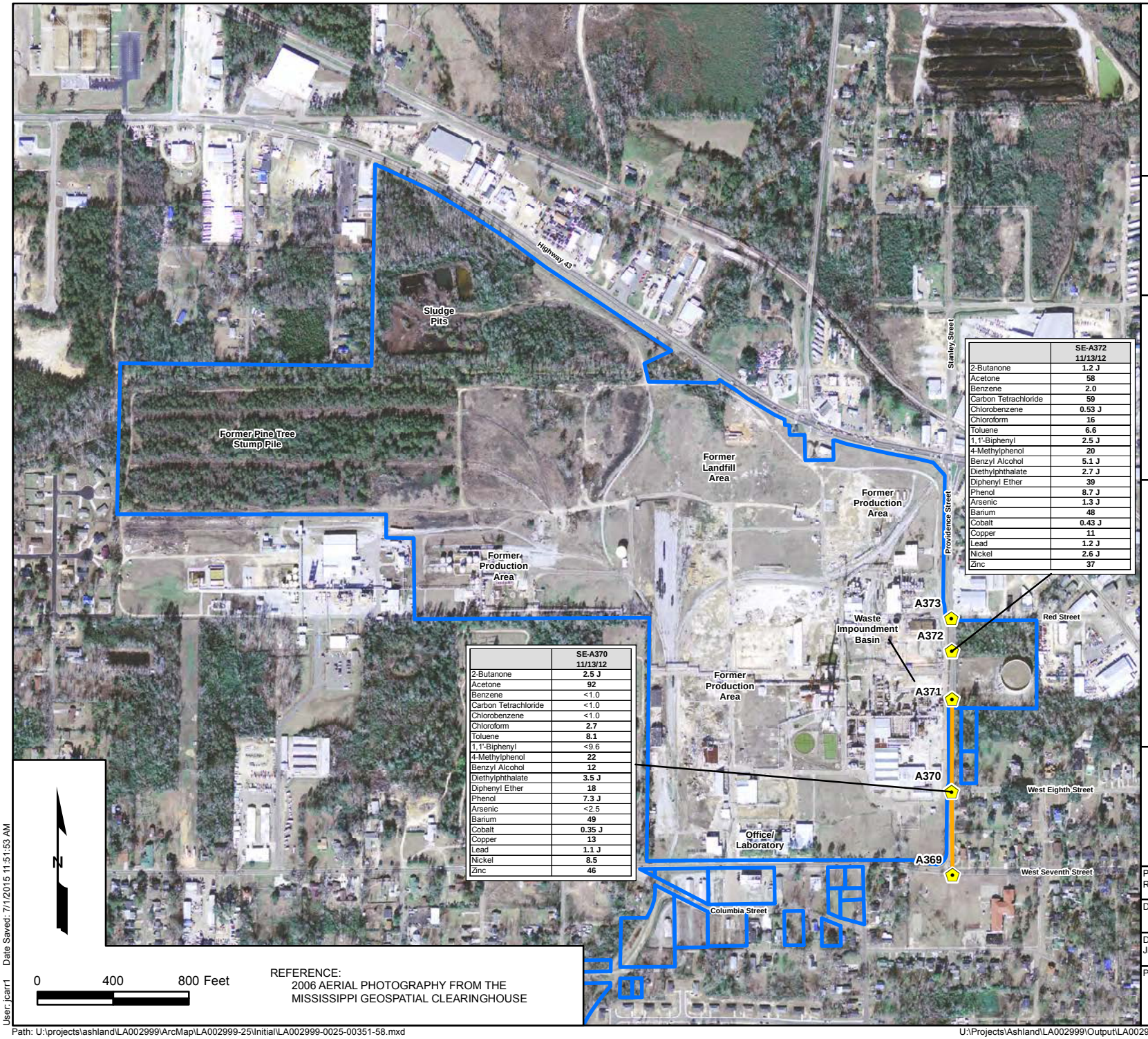

	SE-A372 11/13/12
2-Butanone	1.2 J
Acetone	58
Benzene	2.0
Carbon Tetrachloride	59
Chlorobenzene	0.53 J
Chloroform	16
Toluene	6.6
1,1'-Biphenyl	2.5 J
4-Methylphenol	20
Benzyl Alcohol	5.1 J
Diethylphthalate	2.7 J
Diphenyl Ether	39
Phenol	8.7 J
Arsenic	1.3 J
Barium	48
Cobalt	0.43 J
Copper	11
Lead	1.2 J
Nickel	2.6 J
Zinc	37

	SE-A370 11/13/12
2-Butanone	2.5 J
Acetone	92
Benzene	<1.0
Carbon Tetrachloride	<1.0
Chlorobenzene	<1.0
Chloroform	2.7
Toluene	8.1
1,1'-Biphenyl	<9.6
4-Methylphenol	22
Benzyl Alcohol	12
Diethylphthalate	3.5 J
Diphenyl Ether	18
Phenol	7.3 J
Arsenic	<2.5
Barium	49
Cobalt	0.35 J
Copper	13
Lead	1.1 J
Nickel	8.5
Zinc	46

REFERENCE:
2006 AERIAL PHOTOGRAPHY FROM THE MISSISSIPPI GEOSPATIAL CLEARINGHOUSE

SEWER SAMPLE RESULTS

HERCULES INCORPORATED
613 W. 7th Street
Hattiesburg, Mississippi

ARCADIS
10352 PLAZA AMERICANA DRIVE
BATON ROUGE, LA 70816
TEL: 225-292-1004
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WWW.ARCADIS-US.COM

Legend

- Manholes
- Approximate Bypass Hose Location
- Approximate Hercules Property

Results are shown for all compounds detected in at least one sample.

All units in micrograms per liter (ug/L).

Bold - Compound detected.
J - Indicates an estimated value.

PROJECT MANAGER: RJE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 07/01/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 58

User: jcarr1 Date Saved: 7/1/2015 11:51:53 AM

Path: U:\projects\ashland\LA002999\ArcMap\LA002999-25\Initial\LA002999-0025-00351-58.mxd

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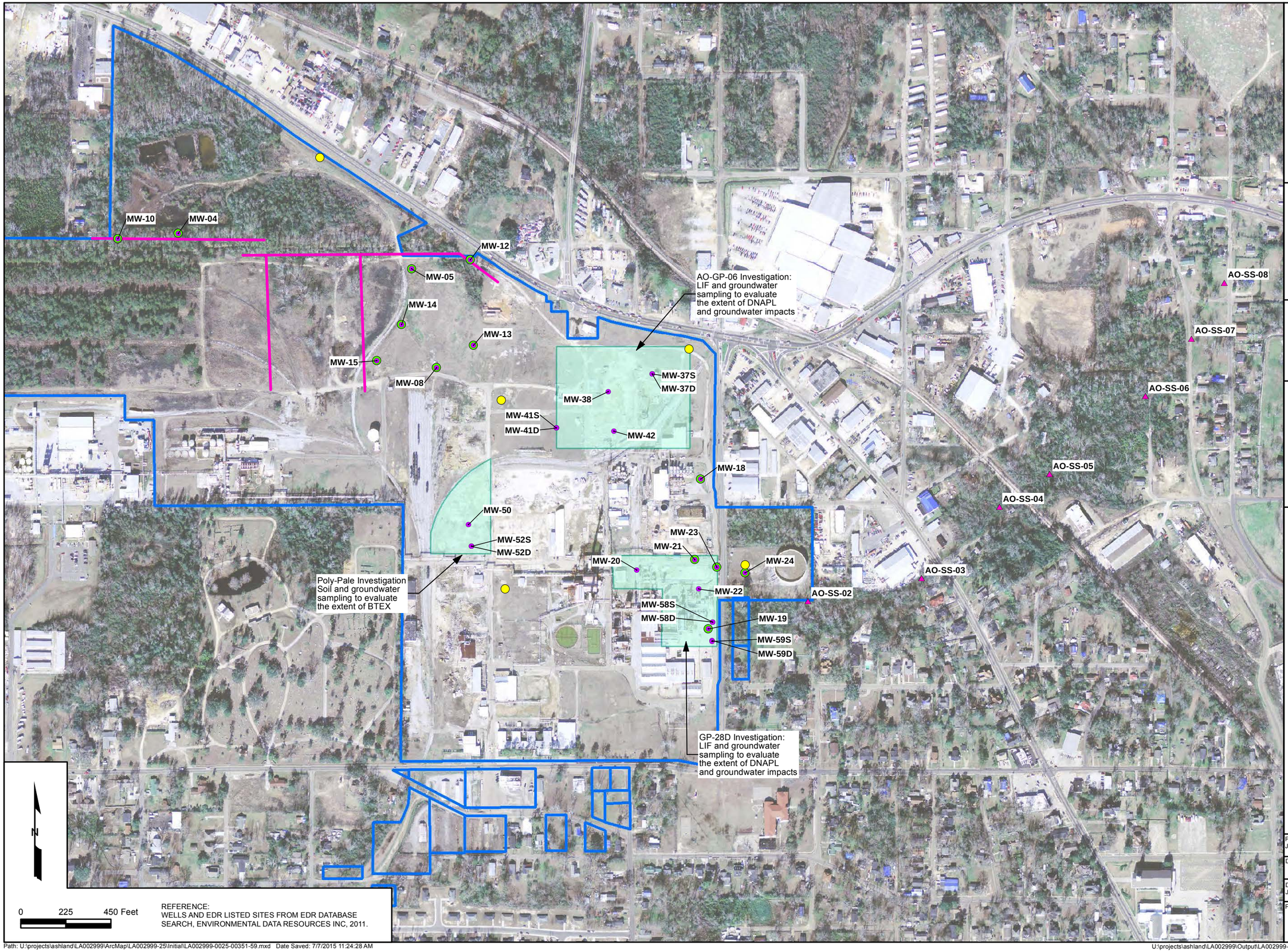

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

PROPOSED SUPPLEMENTAL SAMPLING

HERCULES INCORPORATED
613 W. 7th Street
Hattiesburg, Mississippi

ARCADIS
10352 PLAZA AMERICANA DRIVE
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TEL: 225-292-1004
FAX: 225-218-9677
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Legend

- Soil Sample Location
- Monitor Well (Shallow Aquifer)
- Deep Well (Hattiesburg Formation)
- Well with Passive Flux Meter Installed
- HPT Investigation Transect
- Area of Investigation
- Approxmate Property Line

Note:
Additional HPT boring may be advanced based on field observations.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE: LA002999-0019-00351-52.mxd
DRAWING BY: JEC	DATE: 07/07/2015
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 59

Path: U:\projects\ashland\LA002999\ArcMap\LA002999-25\Initial\LA002999-0025-00351-59.mxd Date Saved: 7/7/2015 11:24:28 AM

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TEMPORARY WELL CONVERSIONS

HERCULES INCORPORATED
613 W. 7th Street
Hattiesburg, Mississippi

ARCADIS
10352 PLAZA AMERICANA DRIVE
BATON ROUGE, LA 70816
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FAX: 225-218-9677
WWW.ARCADIS-US.COM

Legend

- Temporary Well (Shallow Aquifer)
- Monitor Well (Shallow Aquifer)
- Monitor Well (Hattiesburg Formation)
- Approxmate Property

AO-GP-17\MW-62 — Location of temporary wells converted to permanent well

MW-10 — Existing well

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 10/28/2014
PROJECT NUMBER: LA002999.0025	FIGURE NUMBER: 60

N

0 225 450 Feet

REFERENCE:
WELLS AND EDR LISTED SITES FROM EDR DATABASE SEARCH, ENVIRONMENTAL DATA RESOURCES INC, 2011.

Date Saved: 7/7/2015 2:29:19 PM

Path: U:\projects\ashland\LA002999\ArcMap\LA002999-25\Initial\LA002999-0025-00351-60.mxd

U:\projects\ashland\LA002999\Output\LA002999-25\Initial\LA002999-0025-00351-60.pdf

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Appendix A

Geologic Information

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Appendix B

Level II Laboratory Reports

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Appendix C

Level IV Laboratory Reports

Appendix D

Data Validation Reports

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Appendix E

Phase I Data Tables

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Appendix F

Phase II Data Tables

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Appendix G

Area #1, Area #2, Area #3
Investigation and RUAO Data Tables

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Appendix H

July 2014 Sampling Data Tables

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Appendix I

Water Well Information

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Appendix J

Surface Water Sampling Logs

Appendix K

Soil/Sediment Sampling Logs

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Appendix L

Groundwater Sampling Logs

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Appendix M

Air Sampling Logs

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Appendix N

Analytical Data, MDEQ Sewer Sampling

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Appendix O

Expanded Eight-Step Ecological Risk Assessment Process