

HERCULES

Sludge Characterization and Bench Scale Treatability Work Plan

Hattiesburg, Mississippi

1 March 2010

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Sludge Characterization and Bench Scale Treatability Work Plan

Hattiesburg, Mississippi

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OH003000.MS23.00001

Date:

1 March 2010

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1. Introduction

ARCADIS U.S., Inc. (ARCADIS), has prepared this work plan on behalf of Hercules Incorporated, a wholly owned subsidiary of Ashland Inc. ("Hercules"). This work plan will present the strategy and procedures for evaluating the current conditions in support of completing the proposed closure of the on-site impoundment basin (IB) located at Hercules' 613 West 7th Street facility in Hattiesburg, Mississippi (Figure 1). The evaluation will consist of additional characterization of sludge presently contained in the IB and treatability determinations for sludge presently contained in the IB shown on Figure 2. Sludge characterization activities will focus on determining mass and sludge volumes, profiling potential contaminant concentrations, and determining if the sludge in its present state exhibits hazardous characteristics. The treatability determination will focus on the amenability of the sludge to dewatering and/or solidification efforts through laboratory simulations (i.e., bench scale studies) of processes that can be implemented as full-scale operations in the field. In addition, it will determine potential effluent discharge levels.

2. Purpose and Objectives

The purpose of this work plan is to document the procedures that will be used to evaluate the sludge contained in the IB. The primary objective of the activities proposed in this document will be to gather data that can be used to determine the most cost-effective treatment/disposal option(s) for the sludges. The objectives of this evaluation are to:

- Identify and evaluate those technologies that will provide viable options for closure of the IB;
- Determine the mass and volume of sludge contained in the IB;
- Supplement the characterization of the sludge; and
- Determine the suitability of the sludge for transport on public roadways and acceptance at off-site disposal facilities.

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3. Site Background and Description

3.1 Site History

The Hattiesburg, Mississippi, facility was developed in the 1920s as Hercules Powder Company. Over the years, the facility produced a variety of products, primarily rosin derivatives and paper products. In the mid-1960s, the name of the company that owned the plant was changed to Hercules Incorporated. Additional production plants were added in the 1960s and 1970s. Portions of the plant were demolished in the 1980s. In November 2008, Ashland Inc. purchased the stock of Hercules Incorporated, and Hercules became a wholly owned subsidiary of Ashland Inc. During 2008 and 2009, two active plants on the property produced chemicals for the pulp and paper industry: the Kymene Plant and the AKD Plant. Hercules closed the facility in December 2009. Currently, no active plants are on the property, nor are any such facilities planned.

3.2 Regulatory History

Hercules began conducting improvements to the Hattiesburg facility in 2006. These improvements included the removal of unused facilities from the site. In December 2007, Hercules entered into a "Restrictive Use Agreed Order" (Order No. 534907) with the Mississippi Department of Environmental Quality (MDEQ). Permitted water discharge to the City of Hattiesburg Publicly Owned Treatment Works (POTW) has occurred since March 1999. The current National Pollutant Discharge Elimination System Permit number is MSP091286. Because the IB was no longer necessary, Hercules contracted for the removal and disposal of the IB sludge. Following removal of the sludge, the IB would be backfilled and restored to natural conditions. The initial closure plans included confirmation sampling to ensure that impacted soils were removed.

Hercules notified MDEQ of its intent to close the IB in a letter dated April 22, 2008. In response to the notification, MDEQ requested, in a letter dated June 8, 2008, additional information regarding the closure operations including a request for Hercules to characterize the sludge within the IB prior to removal from the units. MDEQ also sent a letter to Hercules dated August 25, 2009, following several meetings and submittal of a draft closure plan. In the letter, MDEQ outlined additional closure procedures. Those closure procedures addressed particular analysis and characterization of the sludge in regard to the management and disposal of the water and sludge from within the IB. A Groundwater Assessment Report for the area around the IB was submitted to MDEQ

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in November 2009. Hercules is currently discussing the final closure of the IB with MDEQ.

3.3 Site Property Description

The facility is located within the City of Hattiesburg, Lemar County, Mississippi. The facility encompasses approximately 170 acres and is irregular in shape. The property is relatively flat on the southern side with gently rolling hills to the north and west. Surface water drains northward into Greens Creek, which borders the facility on the north side. An aerial photograph showing the layout of the facility is provided as Figure 2.

The surrounding area is a mixture of industrial, commercial, and residential use. The plant is bordered on the north by Old Highway 42. Greens Creek flows eastward through the northern portion of the site and then flows northward and discharges into the Bowie River. Commercial properties are situated along the north side of Old Highway 42 and industrial properties to the north/ northwest of the facility site. Providence Street borders the site to the east with some commercial, residential, and undeveloped property situated on the east side of the street. Hercules also owns a parcel of land on the east side of Providence Street. West 7th Street borders the site to the south with a mixture of commercial and residential properties located on the south side of the street. Hercules also owns a parcel of land located on the south side of 7th Street which is used for parking. A cemetery borders the site on the southwestern side of the property with residential property located to the west of the site.

3.4 General Geology and Hydrogeology

Selected highlights of the geology and hydrogeology of the site, as previously determined by Eco-Systems, Inc. (Eco-Systems), are:

 Soils encountered in borings installed during site investigations were described as silty, sandy, clayey alluvial deposits and fill materials overlying dense, gray, sandy clay, which is interpreted to be the Hattiesburg Formation. In the vicinity of the IB, the shallow soils are expected to consist of fill material, silts, silty clay, and alluvium sands to a depth of approximately 20 to 25 feet below ground surface (ft bgs).
 Below the alluvium material, the Hattiesburg Formation clays are expected to provide an aquitard across the area; F

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- The Hattiesburg Formation, which has been described as dense, gray, silty clay, has been encountered in all site borings that have penetrated the overlying alluvial material. Site soil boring data indicate that the Hattiesburg Formation is consistent across the site. The Hattiesburg Formation is at least 20 feet thick beneath the site and has a hydraulic conductivity of 1.28 x 10⁻⁷ centimeters per second. The Hattiesburg Formation, therefore, serves as a barrier to vertical migration of groundwater at the site; and
- Groundwater occurs at the top of the dense clay of the Hattiesburg Formation.
 Based on the information obtained during the groundwater investigation conducted in September 2009, groundwater in the vicinity of the IB occurs approximately 5 ft bgs within the alluvium formation.

As described in previous investigations conducted by others, in the active portions of the plant operations, the potentiometric surface indicates the presence of a southwest to northeast trending divide. Groundwater northwest of the divide tends to move northwestward toward Greens Creek. Groundwater southeast of the divide tends to move southeastward. North of Greens Creek, the potentiometric surface indicates that groundwater moves generally southward toward Greens Creek. Greens Creek enters the site at the western extremity of the site and flows generally eastward across the northern end of the site. Groundwater within the area of the IB is shown to flow in an easterly to northeasterly direction in the vicinity of the IB on Figure 3 of the 2009 Semi-Annual Monitoring Report (Potentiometric Surface Map, May 12, 2009) (Appendix A).

3.5 Historical Sampling and Analysis

Sludge samples from the site have been analyzed on eight occasions since 1990. Initially, six of these samples were collected from the IB. The analyses conducted for these samples included Toxicity Characteristic Leaching Procedure (TCLP) volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals. Analyses for TCLP pesticides, herbicides, and polychlorinated biphenyls (PCBs); reactivity; corrosivity; and ignitibility were also conducted on five of these samples. Concentrations of benzene, 1,1-dichloroethene, chlorobenzene, 2-butanone, chloroform, methyl phenols, cresols, dieldrin, barium, cadmium, chromium, lead, and selenium have been detected in one or more samples at concentrations less than their respective TCLP limits.

On July 1, 2008, two composite samples (SS-1 and SS-2) were collected from the IB. A hand auger was used to collect the aliquots, which represented a composite of the

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sludge thickness that could be penetrated. The aliquots for SS-1 were collected from the western end of the impoundment and the aliquots for SS-2 were collected from the eastern end. The western end of the IB, which is the influent end, encompasses approximately one-quarter of the total area of the impoundment system and is separated from the eastern end by a series of wooden baffles. The baffles slow the flow of water through the impoundment, which facilitates precipitation of heavier solid material to the bottom. Consequently, sludge on the western side of the baffles generally exhibits a higher solid content than sludge on the eastern side of the baffles. Some of the sludge on the western side of the baffles is covered by a resinous cap of dried sludge ranging from approximately 6 inches to 1 foot in thickness, according to previous investigative efforts. Samples SS-1 and SS-2 were analyzed for TCLP VOCs, SVOCs, pesticides, PCBs, herbicides, and metals; reactive cyanide; reactive sulfide; pH (corrosivity); and percent solids. A map and laboratory reports showing the results of previous sludge investigations are included in Appendix B.

The analytical results indicated that TCLP benzene levels (1.3 milligrams per liter [mg/L] for Sample SS-1) in the sludge within a portion of the western compartment of the IB exceeded the TCLP regulatory level of 0.5 mg/L. Additional sampling is needed to further characterize the benzene profile in the IB.

At the request of Hercules, Eco-Systems conducted re-sampling of SS-1 to confirm the presence of benzene at concentrations above the TCLP limit in the western end of the IB on July 30, 2008. Sample SS-1-073008 was composited from five aliquots that were collected in approximately the same locations as the previous sample SS-1-070108. (The last six digits of the sample I.D. are the collection date.) Sample SS-1-073008 was submitted to TestAmerica Laboratories, Inc. (TestAmerica), for analysis of TCLP VOCs. A split of the sample was also submitted to Bonner Analytical Testing Company (BATCO) for the same analysis.

Analytical results of the sample split submitted to TestAmerica detected benzene at a concentration of 0.44 mg/L, i.e., below the regulatory limit. Analytical results of the sample split submitted to BATCO detected benzene at a concentration of 0.586 mg/L. Other VOCs were not detected in either split of sample SS-1-073008.

After consideration of previous sludge sample analytical results, a third sampling event was conducted on September 4, 2008, to investigate whether benzene concentrations detected in previous samples collected from the western end of the IB were the result of influence from aliquots collected from a localized area of elevated benzene concentrations. During the third sampling event, six samples (SS-5 through SS-10)

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were collected from discrete locations, which are shown in Appendix B. Samples collected from each of the six locations were mixed vertically as described for the July 1, 2008, sampling event. The six discrete samples were submitted to TestAmerica for analysis of TCLP VOCs.

Benzene concentrations in samples SS-5 (5.5 mg/L), SS-6 (3.2 mg/L), and SS-8 (3.2 mg/L) were above the TCLP limit for benzene. Benzene concentrations in samples SS-7 (0.4 mg/L), SS-9 (0.043 mg/L), and SS-10 (0.062 mg/L) were below the TCLP limit for benzene. Carbon tetrachloride and chloroform were also detected in sample SS-8 at concentrations less than TCLP limits for those compounds.

Hercules conducted a groundwater assessment in the vicinity of the IB to determine groundwater flow direction and evaluate groundwater quality. The work was conducted in accordance with a work plan that was approved, with revisions, by MDEQ in a letter dated July 22, 2009. Five permanent monitor wells (MW-20, MW-21, MW-22, MW-23, and MW-24) were installed and sampled in September 2009. Groundwater sampling results indicated the presence of VOCs, SVOCs, Delnav (the cis- and trans- isomers of dioxathion), Dioxenethion, and/or metals in the wells. The results of the groundwater assessment were provided to MDEQ in a report dated November 2009.

3.6 Current Site Conditions

Hercules is currently in the process of dismantling the Hattiesburg facility. No effluent is currently routed to the IB, nor is sludge routinely removed. As necessary, storm water is discharged to the City of Hattiesburg POTW in accordance with the facility's pretreatment permit.

4. Sludge Characterization

4.1 Overview

Sludge characterization will consist of surveying and data collection activities. Data generated from these activities will be used to calculate the volume of sludge in the IB, supplement the understanding of the parameters present in the IB sludge, and conduct a preliminary evaluation of sludge disposal options based on characteristic sampling. A Health and Safety Plan will be developed prior to the start of on-site sampling activities.

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4.2 Mass and Volume Verification

Mass and volume verification of sludges and water will be accomplished through a combination of surveying and measurement of sludge thicknesses in the IB. In addition, measurements in the field will be compared to historical drawings of the IB.

4.2.1 Topographic Survey

Hercules provided ARCADIS with an electronic base survey of the site. The base survey will be used to the extent possible by the surveyors to minimize their field effort. Additional survey data will be collected to include the extent of the IB (including baffles) and pertinent site features within approximately 30 feet of the edges of the above will be conducted.

The surveyors will remain on site during the collection of sludge samples from the IB as described in Section 4.3.1. The locations and water surface elevations of each sample location will be surveyed. The depth to the top of sludge material will be measured to the nearest 0.1 foot and noted on the sample collection log to augment the survey data.

4.2.2 Sludge Thickness Determination

Sludge samples will be collected in aluminum tubes as described in Section 4.3.1. The sludge thickness at each location will be measured after the sampling tube is retrieved to the surface and cut open with metal shears. The sludge thicknesses and elevations throughout the IB will be determined using the measurements and survey data.

4.3 Sample Collection Plan

The sampling procedures described below will be utilized for the collection of sludge and native soil samples shown on Figure 3.

4.3.1 Sludge and Native Soil Characterization Sampling

A flat-bottom boat will be lowered into the IB. A rope of sufficient length to cross the entire basin will be secured to the boat. The opposite end of the boat will be tied to a second length of rope sufficient to cross the entire basin. These ropes will be used to position and stabilize the boat during sampling. The boat will be lowered into one side of the IB. Two people, with all necessary sampling and surveying equipment, will enter

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the boat. Additional employees located on the banks of the IB will pull the boat to each sample location, guide the samplers, stabilize the boat, and provide additional health and safety oversight. A truck-mounted winch will be on standby to facilitate movement of the boat, if necessary

Once in position, sludge and native soil samples will be collected using 3-inch diameter aluminum tubes. The tubes will be advanced by hand until refusal. The length of tube advanced into the sludge by hand will be measured and recorded. At the point of manual refusal, advancement of the tube will be continued with a vibracoring unit. Vibracoring will consist of advancing the aluminum tube into the sludge until native bottom soil is encountered. Once bottom soil is encountered, the sample tube will be advanced approximately 1 foot into the native soil. A survey crew will survey the location and elevation of the water surface at the tube while it remains in the native soil material at the pond bottom. For each sampling location, a measurement will be made and recorded on the sampling log of the distance between the surface of the water and the initial top of sludge. Each aluminum tube will be retrieved to the surface and cut with shears to expose the sludge and soil material. Observations and measurements of the material in the core will be made and documented on Soil/Sediment Sampling Logs and Sample/Core Logs (Appendix C) completed by sampling personnel.

Sludge and native soil characterization samples will be collected from the upper and lower half of the total sludge interval at the eight IB sample locations (Figure 3 and Figure 4). The samples will be placed into laboratory-provided sample containers containing the appropriate preservatives. Each characterization sample will be analyzed for selected VOCs, SVOCs, and metals (Table 1; Figure 4).

In addition to characterization samples, sludge samples will be collected from the upper and lower intervals for Totals and TCLP analysis. The Total and TCLP testing will include those analyses required for waste characterization (Table 1).

4.3.2 Sludge Treatability Sampling

Sludge treatability sampling will be conducted at the locations shown on Figure 3. The main objective of the sludge sampling effort is to collect representative 10-gallon sludge samples from the IB. It is assumed that the surface water will be removed prior to full-scale implementation of dewatering/solidification activities; therefore, free-standing water in the sample will be minimized as much as possible.

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One composite sludge sample will be collected from each location within the IB, unless the sludges appear to be stratified. In that case, a composite sample will be collected from each layer encountered. Treatability sampling in the IB will be conducted concurrently with the characterization sampling using the vibracoring equipment described in Section 4.3.1.

The piping will be inserted into the sludge and retrieved to the surface. At the surface, the length of pipe that was advanced into the sludge will be cut in half. Sludge contained in the upper half of pipe may be containerized separately from sludge contained in the lower half. Each sample will be containerized in two new 5-gallon plastic containers. Proper chain-of-custody procedures will be followed during the transport and relinquishment of sample volumes to the dewatering and geotechnical laboratories.

The sludge samples will be submitted to laboratories for the dewatering and solidification simulations (Sections 5.2 and 5.3) and geotechnical testing (paint filter liquids, moisture content, percent and suspended solids, specific gravity and bulk density, and unconfined compressive strength) described in Section 5.3.4 (Table 2; Figure 4).

4.3.3 Investigation-Derived Waste (IDW)

IDW, including personal protective equipment, disposable sampling equipment, packaging, etc., will be disposed of in a municipal waste landfill. Sludge will be tested and returned to the IB after geotechnical testing or sent off site for disposal depending on the results.

4.3.4 Effluent Analysis

Effluent generated during the dewatering study will be collected in laboratory-provided containers. The effluent samples will be sent to an analytical laboratory for waste characterization and discharge testing. A Water Sampling Log will be completed for each effluent sample (Appendix C). Proper chain-of-custody procedures will be followed during the transport and relinquishment of sample volumes to the analytical laboratory.

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4.3.5 Quality Assurance/Quality Control Sampling

Appropriate analytical Quality Assurance/Quality Control (QA/QC) samples will be prepared as sludge and native soil samples are being collected. All of the QA/QC samples will be containerized and transported to the laboratory in sealed coolers under proper chain-of-custody procedures. The analytical QA/QC samples will include:

- Trip blanks;
- Field blanks: and
- Equipment rinsate blanks.

Trip and field blanks will be collected at a frequency of one per day. All other QA/QC samples will be collected at a frequency of 1 per 20 samples. Trip blanks will be included in any ice chest used to transport samples for VOC analyses to the receiving laboratory.

4.4 Laboratory Analyses

All chemical analyses will be conducted by U.S. Environmental Protection Agency (USEPA) accredited laboratories. Each characterization sample will be analyzed for VOCs by USEPA Method 8260B, SVOCs by USEPA Method 8270C, and Resource Conservation and Recovery Act (RCRA) 8 metals by USEPA Method 6010/7470. The sludge and effluent samples will be analyzed for TCLP-VOCs, TCLP-SVOCs, TCLP-Pesticides and Herbicides, TCLP Metals, reactivity, corrosivity, and ignitability by USEPA Method 1311. Sample containers, hold times, and required preservatives for the chemical analyses are included in Table 1.

4.5 Data Validation

Level I and/or Level II data validation will be performed on reports received from the laboratory. The Level I validation will include a review of data package completeness, holding time compliance, associated field and laboratory blank results, and the report narratives including laboratory notated data quality flags. Level II validation will include a review of sample documentation, data package completeness, sample receipt information, chain-of-custody conformance, reporting limits relative to the project requirements, holding time compliance, laboratory and/or field blank contamination, laboratory control sample and matrix spike precision and accuracy, surrogate

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recoveries, and field duplicate reproducibility. Case narratives will be reviewed to evaluate method performance issues and/or observations encountered and documented by the laboratory relative to data usability. Data will be qualified during the validation using guidelines established in the USEPA National Functional Guidelines modified to incorporate method- and project-specific requirements and professional judgment.

4.6 Comparison Criteria

Data generated at the site will be compared to published standards to aid in determining acceptable options for the final disposition of each material. The TCLP results will be compared to RCRA standards to determine if the material exhibits hazardous characteristics. The data generated from the native soil analyses will be compared to the MDEQ Target Remediation Goals for Restricted Soil use. Effluent data from the dewatering study will be compared to the concentrations listed in Hercules' POTW discharge permit (Table 3).

5. Sludge Treatability Determination

5.1 Overview

The sludge treatability determination will consist of analyzing the composite sludge samples in bench scale evaluations. The purpose of these activities is to provide data that will be used to evaluate dewatering, solidification, consolidation and capping, and/or disposal of the sludge as final closure options. The following dewatering and solidification simulations will be used to ultimately select the most effective and appropriate method of dewatering and/or solidifying the sludge material. The procedures described below and summarized in Table 4 will be used to obtain the data necessary for the treatability evaluation.

5.2 Dewatering Study

The dewatering study will consist of evaluations of filter press, centrifuge, and gravitational dewatering in a laboratory setting.

5.2.1 Criteria

The dewatering study will focus on determining the following:

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- The dewatered material must pass the Paint Filter Liquids Test (USEPA Method 9095A). This test indicates that a material is dry enough for transportation and disposal in a permitted landfill without violating land disposal restrictions; and
- The quality of the effluent as related to the limitations of Hercules' POTW discharge permit (Table 3).

5.2.2 Filter Press

Filter presses operate by introducing material into a specified volume and applying pressure to the volume for a period of time (plate and frame filter press) or by compressing sludge between two filter cloths and passing the filter cloths through pressure zones (belt press). In either case, the liquid entrained in the sludge is forced through the filter media and the dewatered solid is retained. These processes will be simulated in the laboratory.

The filter press simulation will consist of testing sludge material in a Baroid unit prior to conducting the plate and frame filter press simulation. This is due to the reduced volume of material required to run the Baroid test versus the plate and frame simulation. If the sludge does not perform favorably in the Baroid test, the plate and frame simulation may not be conducted.

Effluent generated as a result of this testing will be analyzed for TCLP analytes (Table 1) for characterization purposes and the analytes contained in Hercules' POTW discharge permit (Table 3). The dewatered material will be analyzed for the TCLP analytes (Table 1) and selected analyses contained in Table 2.

5.2.2.1 Baroid Test

As part of the bench scale evaluation, a screening test will be conducted on samples from each area. The Baroid test consists of placing small quantities (200 milliliters or less) of the samples into Baroid equipment and applying pressure to a maximum of 80 pounds per square inch (psi). The Baroid equipment may be used in conjunction with various filter media and chemical treatments to obtain an indication of whether or not that combination of parameters warrants further testing in the recessed chamber unit, which uses a sample volume approximately 12 times greater than the Baroid. All types and quantities of filter media and/or chemical treatments will be

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documented so that additional costs can be accounted for in any full-scale operational estimate.

5.2.2.2 Plate and Frame Simulation

Based on the results of the Baroid tests, filter media and chemical addition combinations will be selected for analysis by a bench scale recessed chamber unit consisting of an air-pressurized mixing chamber connected to a single recessed chamber equipped with filter cloth. The mixing chamber will be gradually pressurized to 200 psi. This unit simulates full-scale plate and frame filter press operations. The same chemical additions used during Baroid analyses, if any, will be used for recessed chamber unit operations.

5.2.2.3 Belt Press

The belt press technology will be tested in the laboratory. In order to promote flocculation, polymers may be introduced to the composite samples prior to each run through the belt press. In addition to geotechnical analyses, a qualitative determination will be made of the generated flocculant's ability to release from the belt material. If the sludge material sticks to the belt material, no further evaluation of this technology will be completed due to concerns of replicating this result during full-scale operations.

5.2.3 Bench Scale Centrifuge

Centrifuge technology will be used to induce phase separation of the composite sample solids from the effluent by subjecting the material to increased gravitational forces. Initial centrifuge simulations will be run without chemical addition. If indicated, polymer may be added to enhance separation of the sludge and effluent. All types and quantities of polymer used for enhancement will be documented so that additional costs can be accounted for in any full-scale operational estimates.

Effluent generated as a result of this testing will be analyzed for the parameters contained in Hercules' POTW discharge permit (Table 3) and TCLP parameters for characterization purposes. The dewatered material will be analyzed for the parameters described in Section 5.3.4.

5.2.4 Stacking Simulation

In order to evaluate the effectiveness of stacking and gravity draining the material, two simulations of passive dewatering will be conducted in the laboratory. The first

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simulation will consist of placing 1 gallon of composite sample in an aluminum pan with drain holes at the bottom. On the fourth day, drainage paths will be introduced in the partially dewatered material to release the effluent. A solids sample will be collected and analyzed on the fifth day.

The second passive dewatering simulation will consist of placing a composite sample into a belt press simulation using Geotube[®] fabric, instead of filter cloth. The belt press will be operated at a reduced pressure to replicate pressures produced from gravitational forces.

5.3 Solidification Study

A sludge solidification study will be conducted to determine if desired characteristics can be imparted to the sludge through reagent amendments. The solidification study will consist of mixing raw sludge samples with various reagents in different percentages. The resultant mixtures will be tested using the procedures described in Section 5.3.4.

5.3.1 Criteria

The criteria for the solidification study are two-fold:

- Solidified material must pass the Paint Filter Liquids Test (USEPA Method 9095A), which indicates that material is dry enough for disposal in a permitted landfill; and
- The solidified sludge material must have an unconfined compressive strength (UCS) of 8 psi after 3 days. This criterion will ensure that the solidified material can support the weight of an engineered cap, if on-site closure is selected as a final remedy.

5.3.2 Reagent Selection

Portland cement, fly ash, and quick lime are commonly used amendments and will be included in the solidification study. These reagents are typically successful in solidification for a wide range of constituents due to their effectiveness, ease of use, ability to scale up from laboratory efforts to field operations, and cost. However, additional amendments and/or combinations may be required. While guided by information obtained from ARCADIS' experience with previous solidification efforts, the

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Sludge Characterization and Bench Scale Treatability Work Plan

Hattiesburg, Mississippi

actual volumetric ratios of soil sample to reagents will be determined during laboratory mixing based on the behavior exhibited by each material during the mixing process. The goal of the solidification/stabilization study is to determine an acceptable amendment mixture for implementation in the field.

5.3.3 Reagent Mix Ratio Design

The solidification/stabilization study will be conducted by mixing various combinations of Portland cement, fly ash, and quick lime in the ratios shown in Table 5. The mixtures will be molded into sample cores. The resultant sample cores will be subjected to compressive strength testing to determine strength characteristics of the mixture. The solidification study will be conducted as follows:

- Samples collected for the solidification study will be containerized as described in Section 4.3 and submitted to a geotechnical laboratory for analysis;
- Two control samples from the IB will be containerized in UCS molds. The molded material will be obtained from the sludge composite samples. The two control sample locations will be chosen at random and strength tested by ASTM International (ASTM) Method D2166. These samples will be labeled "IB Control 1" and "IB Control 2";
- Reagents will be added to the remaining sludge collected from each sample
 location (Table 5). Four UCS molds will be filled from each resultant mixture.
 Each UCS mold will be labeled with the sample location and the percentage of
 reagents added by weight followed by "3 days", "7 days", "14 days", or "28 days";
 and
- Two samples will have UCS molds labeled "3 days", "7 days", "14 days", and
 "28 days" and will be analyzed by ASTM Method D2166 (Unconfined Compressive
 Strength of Cohesive Soil) at the time interval indicated on the sample label, if
 necessary. The remaining UCS samples will be analyzed the third day after they
 are molded.

5.3.4 Geotechnical Testing

All testing will be conducted using the procedures listed below, or equivalents approved by ARCADIS.

Sludge Characterization and Bench Scale Treatability Work Plan

Hattiesburg, Mississippi

5.3.4.1 Paint Filter Liquids Test

All of the samples will be analyzed by the Paint Filter Liquids Test (USEPA Method 9095A). This test stipulates that a 100-gram sample of material not release a drop of liquid within 5 minutes when placed on a 60 x 60 thread-per-inch (24 x 24 threads per centimeter) mesh paint filter.

5.3.4.2 Moisture Content

Moisture content testing will be conducted on raw and treated sludge material. ASTM Method D2216 will be followed for this testing.

5.3.4.3 Percent and Suspended Solids

Suspended solids testing will be conducted on raw sludge material. ASTM Method D422 will be followed for this testing. Percent solids will be calculated.

5.3.4.4 Specific Gravity and Bulk Density

Analyses will be conducted by the laboratory to determine the specific gravity and bulk density of the raw sludge and dewatered/solidified material. ASTM Method D854 or D5057 will be followed for this testing.

5.3.4.5 Unconfined Compressive Strength

Raw and solidified sludge samples will be submitted to a laboratory for UCS analyses. The analyses will be performed in accordance with ASTM Method D2166.

6. Reporting

Upon receipt of the analytical and geotechnical results, a written treatability report will be prepared to document all field activities, including deviations from the procedures stated in this work plan, if determined to be necessary due to unexpected site conditions. Appropriate historical and new data tables, figures, and appendices will be included in the report to support the findings. The report will conclude by presenting recommendations for a path forward based on the results of the bench scale study.

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Sludge Characterization and Bench Scale Treatability Work Plan

Hattiesburg, Mississippi

7. Project Organization

7.1 Project Team Organization

This section of the work plan includes the name, title, and responsibilities of the supervisory personnel to be utilized in the implementation of the work performed during this work plan. When warranted, Hercules will ensure only licensed individuals will be utilized to perform any work or analysis required for this plan. The following personnel have been designated to perform the work pursuant to the work plan, with consideration to their extensive expertise in geological, regulatory, field sampling, Health and Safety, and engineering and construction activities:

7.2 Hercules

The Hercules representative and contact information is as follows:

Timothy Hassett (Environmental Health & Safety, Project Manager)

Hercules Incorporated Ashland Hercules Research Center

500 Hercules Road Wilmington, Delaware 19808-1599

Phone: (302) 995-3456 Fax: (302) 995-3485 Cell: (302) 379-0512

Email: tdhassett@ashland.com

7.3 ARCADIS

ARCADIS is the consultant of record for Hercules for the development and implementation of this work plan. ARCADIS, an environmental consulting firm, will collect surface water and sludge samples, conduct surveys, assemble data, and prepare the reports identified in this work plan. Samples will be submitted to analytical and/or geotechnical laboratories as appropriate.

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Sludge Characterization and Bench Scale Treatability Work Plan

Hattiesburg, Mississippi

ARCADIS

10352 Plaza Americana Drive Baton Rouge, Louisiana 70816

Phone: 225.292.1004 Fax: 225.218.9677

Key project personnel have been assigned specific areas of responsibility. These responsibilities are described below.

Technical Manager

The Technical Manager will be responsible for implementing and directing daily activities, health and safety, and development of reports. The Technical Manager may also serve as a liaison to MDEQ and Hercules.

Technical Manager: Craig Derouen, P.E.

ARCADIS

10352 Plaza Americana Drive Baton Rouge, Louisiana 70816

Phone: 225.292.1004 Fax: 225.218.9677

Email: craig.derouen@arcadis-us.com

Project Quality Assurance Officer

The Project Quality Assurance Officer will be responsible for reviewing reports, verifying that sampling and analytical operations are carried out according to the specifications of the project plans and that all quality control protocols are followed. The Project Quality Assurance Officer or designee will be responsible for performance and system audits of all field, laboratory, and data reduction/verification activities and for specifying corrective action as required. The Project Quality Assurance Officer will also review field QC test results and laboratory operations. In addition, the Project Quality Assurance Officer will prepare, or direct the preparation of, QA reports.

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Sludge Characterization and Bench Scale Treatability Work Plan

Hattiesburg, Mississippi

Project Quality Assurance Officer: John Ellis

ARCADIS

10352 Plaza Americana Drive Baton Rouge, Louisiana 70816

Phone: 225.292.1004 Fax: 225.218.9677

Email: john.ellis@arcadis-us.com

Engineering Reviewer

The Engineering Reviewer will confirm that the scope of services performed conforms to the requirements of the work plan; review assumptions, and solutions; review adequacy of the data collection process and quality of data used in any analyses or evaluation; and confirm that calculations, drawings, logs, etc., have been checked.

Engineering Reviewer: David R. Escudé, P.E.

ARCADIS

10352 Plaza Americana Drive Baton Rouge, Louisiana 70816

Phone: 225.292.1004 Fax: 225.218.9677

Email: david.escude@arcadis-us.com

Subcontractors

The following subcontractors are anticipated to be used for implementing this work plan:

- PSC Reduction Technologies;
- Devonian Group, LLC;
- TestAmerica Laboratories, Inc.;
- Fugro Consultants, Inc.; and
- Additional subcontractors to be determined.

PSC Reduction Technologies (PSC)

8921 Buzbee Drive

Baton Rouge, Louisiana 70809

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Sludge Characterization and Bench Scale Treatability Work Plan

Hattiesburg, Mississippi

PSC specializes in minimization projects. PSC will perform dewatering analyses on the IB samples.

Devonian Group, LLC (Devonian)

148-C Easy Street Lafayette, Louisiana 70506

Devonian is a water well driller licensed by the State of Mississippi. Devonian will provide vibracoring and sampling services in the IB.

TestAmerica Laboratories, Inc. (TestAmerica)

5102 LaRoche Avenue Savannah, Georgia 31404

TestAmerica is an analytical laboratory. TestAmerica will perform chemical analyses on submitted samples.

Fugro Consultants, Inc. (Fugro)

4233 Rhoda Drive Baton Rouge, Louisiana 70816

Fugro is a geotechnical laboratory. Fugro will perform geotechnical analyses on submitted samples.

8. Path Forward

Upon completion of the activities described herein, the characterization data will be validated and included in a treatability report that will document the bench scale activities. The treatability report will also evaluate the need for a pilot study. If a pilot study is determined to be required to test the most successful bench scale technologies in a field setting, a section will be included in the treatability report detailing how such a pilot study would be conducted. The results of the pilot study, if required, will be incorporated into a bid estimate and a closure plan for sludge removal. The bid estimate will aid in determining an estimated overall cost to implement potential closure options. The closure plan will be submitted to MDEQ. Upon MDEQ approval of the closure plan, bid documents, plans, and specifications will be developed and the bidding process will begin.

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Sludge Characterization and Bench Scale Treatability Work Plan

Hattiesburg, Mississippi

9. Project Schedule

A project schedule is provided in Table 6. The schedule is dependent upon MDEQ approval of this document. The activities listed in the schedule progress from MDEQ approval through field implementation of the forthcoming closure plan.

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Analytical Testing, Sludge Characterization and Bench Scale Treatability Work Plan, Hercules Incorporated, Hattiesburg, Mississippi. Table 1.

Parameter	Matrix	Preparation Method	Analytical Method ^(a)	Container ^(b)	Preservative	Holding Time ^(c)
				3 x 40-mL vial with	1	
	Water	5030, 5032	8260/624	Teflon•lined septum	pH < 2 with HCl, Cool 4°C	14 days
VOCs SVOCs Metals (except Mercury) Mercury TCLP Metals (f)	Water	5030, 5032	8260/624	3 x 40-mL vial with Teflon•lined septum	If effervescence is observed, eliminate HCI preservative and Cool 4°C	7 days
	3 x Encore [™] OR 2 x Sodium Bisulfate vial Solid 5035 8260 and 1 x Methanol vial		Cool 4°C	48 hours to preservation for Encore™, then 14 days to analysis		
SVOCs	Water	3510, 3520 ^(d)	8270 (Low Level)/625	2 x 1-L amber G	Cool 4°C ^(e)	7 days to extraction and 40 days to analysis
3,000	Solid	3540, 3550 ^(d)	8270 (Low Level)	1 x 4-oz or 8-oz G	Cool 4°C	14 days to extraction and 40 days to analysis
Metals (except	Water	3005, 3010	6010/6020/200.7	1 x 1-L HDPE	pH < 2 with HNO ₃ , Cool 4°C	6 months
Mercury)	Solid	3050, 3051	6010	1 x 8-oz G	Cool 4°C	6 months
Managemen	Water	NA	7470/245.1	1 x 1-L HDPE	pH < 2 with HNO ₃ , Cool 4°C	28 days
wercury	Solid	NA	7471	1 x 8-oz G	Cool 4°C	28 days
TCLP Metals ^(f) (including Mercury)	Solid Waste Material	1311 for Leach/ 3005, 3010	6010 and 7470 (for Leachate)	1 x 8-oz wide-mouth G	Cool 4°C	28 days from collection to Leach; 28 days to analysis of Leachate
TCLP VOCs ^(f)	Solid Waste Material	1311 for Leach/ 5030	8260 for Leachate	1 x 4-oz G packed full	Cool 4°C	14 days from collection to Leach; 14 days to analysis of Leachate when preserved with HCl to pH < 2

Analytical Testing, Sludge Characterization and Bench Scale Treatability Work Plan, Hercules Incorporated, Hattiesburg, Mississippi. Table 1.

Parameter	Matrix	Preparation Method	Analytical Method ^(a)	Container ^(b)	Preservative	Holding Time ^(c)
TCLP SVOCs (f)	Solid Waste Material	1311 for Leach/ 3510, 3510	8270 for Leachate	1 x 8-oz wide-mouth G	Cool 4°C	14 days from collection to Leach; 40 days to analysis of Leachate
TCLP Pesticides ^(f)	Solid Waste Material	1311 for Leach/ 3510, 3520	8270 for Leachate	1 x 8-oz wide-mouth G	Cool 4°C	14 days from collection to Leach; 40 days to analysis of Leachate
TCLP Herbicides ^(f)	Solid Waste Material	1311 for Leach/ 3510, 3520	8270 for Leachate	1 x 8-oz wide-mouth G	Cool 4°C	14 days from collection to Leach; 40 days to analysis of Leachate
	Aqueous Waste	NA	USEPA Region 4 Guidance for Sulfide	500 mL HDPE	pH > 9 with 2 mL ZnAc and NaOH, Cool 4°C	7 days
Reactivity	Aqueous Waste	NA	9010/9012/9014 for Cyanide	1 x 1-L HDPE	pH > 12 with NaOH	14 days
Reactivity	Solid Waste Material	NA	USEPA Region 4 Guidance for Sulfide	1 x 8-oz wide-mouth G	Cool 4°C	7 days
	Solid Waste Material	NA	9010/9012/9014 for Cyanide	1 x 1-L HDPE	Cool 4°C	Sulfide 7 days
	Aqueous Waste	NA	9040	250 mL HDPE	NA	24 hours
Corrosivity (pH)	Solid Waste Material	NA	9045	1 x 8-oz wide-mouth G	NA	24 hours

Analytical Testing, Sludge Characterization and Bench Scale Treatability Work Plan, Hercules Incorporated, Hattiesburg, Mississippi. Table 1.

Parameter	Matrix	Preparation Method	Analytical Method ^(a)	Container ^(b)	Preservative	Holding Time ^(c)
	Aqueous Waste	NA	1010	500 mL G	NA	NA
Ignitability	Solid Waste Material	NA	1010	1 x 8-oz wide-mouth G	NA	NA
(a)				•	methods will be used only for	wastewater or storm water
(b)		ay be combined wh e containers and n	ere preservatives a ot minimum volume	are the same and adequate sa es required for some of the Ge	ample volume is supplied to the eneral Chemistry Parameters li	
(c)	Maximum holding til	•		ار y.		
<	Less than.			mL	Milliliter.	
°C	Degrees Centigrade) .		OZ	Ounce.	
G	Glass.			SVOC	Semivolatile Organic Compo	
HCI HDPE	Hydrochloric Acid. High Density Polyet	hylene.		VOC	Volatile Organic Compound.	

Table 2. Geotechnical Testing, Sludge Characterization and Bench Scale Treatability Work Plan, Hercules Incorporated, Hattiesburg, Mississippi.

Parameter	Matrix	Preparation Method	Analytical Method	Container	Preservative	Holding Time ^(a)
				2 x 5-gallon plastic		
Paint Filter Liquids Test	Solid	Not Applicable	USEPA 9095A	bucket	None	None
				2 x 5-gallon plastic		
Moisture Content	Solid	Not Applicable	ASTM D2216	bucket	None	None
Percent and Suspended				2 x 5-gallon plastic		
Solids	Water	Not Applicable	160.2	bucket	None	None
			ASTM	2 x 5-gallon plastic		
Specific Gravity	Solid	Not Applicable	D8564/D5057	bucket	None	None
			ASTM	2 x 5-gallon plastic		
Bulk Density	Solid	Not Applicable	D8564/D5057	bucket	None	None
Unconfined				2 x 5-gallon plastic		
Compressive Strength	Solid	Not Applicable	ASTM D2166	bucket	None	None

(a) Maximum holding time allowed from date of collection.

ASTM ASTM International.

USEPA U.S. Environmental Protection Agency.

Table 3.

POTW Discharge Permit Limits, Sludge Characterization and Bench Scale Treatability Work Plan, Hercules Incorporated, Hattiesburg, Mississippi.

	Discharge Limitations							
Parameter	Quantity / Loading Average (Monthly Average)	Quantity / Loading Maximum (Daily Maximum)	Quantity / Loading Units	Quality / Conc. Minimum	Quality / Conc. Average	Quality / Conc. Maximum	Quality / Conc.	
Flow Effluent	Report Monthly Average	Report Daily Maximum	Million Gallons per Day	****	*****	****	*****	
Oil and Grease Effluent Oxygen Demand, Biochemical,	*****	*****	*****	*****	Report Monthly Average	Report Daily Maximum	mg/L	
5-day (20 degrees Celsius) Effluent	*****	*****	****	*****	Report Monthly Average	Report Daily Maximum	mg/L	
pH Effluent	*****	*****	****	5.0 Minimum	*****	11.0 Maximum	SU	
Solids (Total Suspended) Effluent	****	****	****	*****	Report Monthly Average	Report Daily Maximum	mg/L	
1,1,1-Trichloroethane Effluent	0.064 Monthly Average	0.175 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
1,1,2-Trichloroethane Effluent	0.093 Monthly Average	0.371 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
1,1-Dichloroethane Effluent	0.064 Monthly Average	0.172 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
1,1-Dichloroethylene Effluent	0.064 Monthly Average	0.175 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
1,2,4-Trichlorobenzene Effluent	0.572 Monthly Average	2.32 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
1,2-Dichlorobenzene Effluent	0.572 Monthly Average	2.32 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
1,2-Dichloroethane Effluent	0.525 Monthly Average	1.68 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
1,2-Dichloropropane Effluent	0.572 Monthly Average	2.32 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
1,2-Transdichloroethylene Effluent	0.073 Monthly Average	0.193 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
1,3-Dichlorobenzene Effluent	0.414 Monthly Average	1.11 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
1,3-Dichloropropylene Effluent	0.572 Monthly Average	2.32 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
1,4-Dichlorobenzene Effluent	0.414 Monthly Average	1.11 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
2-Nitrophenol Effluent	0.190 Monthly Average	0.674 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
4,6-Dinitro-o-cresol Effluent	0.228 Monthly Average	0.809 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
4-Nitrophenol Effluent	0.473 Monthly Average	1.68 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
Acenaphthene Effluent	0.055 Monthly Average	0.137 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
Anthracene Effluent	0.055 Monthly Average	0.137 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
Benzene Effluent	0.166 Monthly Average	0.391 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
Bis(2-ethylhexyl)phthalate Effluent	0.277 Monthly Average	0.753 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
Carbon tetrachloride Effluent	0.414 Monthly Average	1.11 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
Chlorobenzene Effluent	0.414 Monthly Average	1.11 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
Chloroethane Effluent	0.321 Monthly Average	0.861 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
Chloroform Effluent	324 Monthly Average	0.949 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
Diethyl phthalate Effluent	0.134 Monthly Average	0.330 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
Dimethyl phthalate Effluent	0.055 Monthly Average	0.137 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
Di-N-Butyl Phthalate Effluent	0.058 Monthly Average	0.126 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
Ethyl benzene Effluent	0.414 Monthly Average	1.11 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
Flow Effluent	Report Monthly Average	Report Daily Maximum	Million Gallons per Day	*****	*****	*****	*****	

Page: 1/2

Table 3.

POTW Discharge Permit Limits, Sludge Characterization and Bench Scale Treatability Work Plan, Hercules Incorporated, Hattiesburg, Mississippi.

	Discharge Limitations							
	Quantity /	Quantity /	Quantity /	Quality /	Quality /	Quality /	Quality /	
Parameter	Loading Average (Monthly Average)	Loading Maximum (Daily Maximum)	Loading Units	Conc. Minimum	Conc. Average	Conc. Maximum	Conc.	
Fluoranthene Effluent	0.064 Monthly Average	0.158 Daily Maximum	pounds per day	****	Report Monthly Average	Report Daily Maximum	mg/L	
Fluorene Effluent	0.055 Monthly Average	0.137 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
Hexachlorobenzene Effluent	0.572 Monthly Average	2.32 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
Hexachlorobutadiene Effluent	0.414 Monthly Average	1.11 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
Hexachloroethane Effluent	0.572 Monthly Average	2.32 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
Methyl Chloride Effluent	0.321 Monthly Average	0.861 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
Methylene Chloride Effluent	0.105 Monthly Average	0.496 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
Naphthalene Effluent	0.055 Monthly Average	0.137 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
Nitro-Benzene Effluent	6.53 Monthly Average	18.7 Daily Maximum	pounds per day	*****	Report Monthly Average	•	mg/L	
Phenanthrene Effluent	0.055 Monthly Average	0.137 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
Pyrene Effluent	0.058 Monthly Average	0.140 Daily Maximum	pounds per day	*****	Report Monthly Average	• •	mg/L	
Tetrachloroethylene Effluent	0.152 Monthly Average	0.479 Daily Maximum	pounds per day	*****	Report Monthly Average	• •	mg/L	
Toluene Effluent	0.082 Monthly Average	0.216 Daily Maximum	pounds per day	*****	Report Monthly Average	Report Daily Maximum	mg/L	
Trichloroethylene Effluent	0.076 Monthly Average	0.201 Daily Maximum	pounds per day	*****	Report Monthly Average	•	mg/L	
Vinyl chloride Effluent	0.283 Monthly Average	0.502 Daily Maximum	pounds per day	****	Report Monthly Average	' '	mg/L	

Conc. mg/L POTW SU

Concentration. Milligrams per liter.
Publicly Owned Treatment Works.

Standard units.

Table 4.	Treatability Study Summary, Sludge Charac Hercules Incorporated, Hattiesburg, Mississ	cterization and Bench Scale Treatability Work Plan, sippi.
	Dewatering Study	Solidification Study
Filter Press	- Baroid Test - Plate and Frame Simulation - Belt Press	Reagent Mixing and Testing - Portland Cement - Fly Ash - Quick Lime
Centrifuge		
Stacking Sin	mulation	

Table 5. Reagent Mix Design, Sludge Characterization and Bench Scale Treatability Work Plan, Hercules Incorporated, Hattiesburg, Mississippi.

Mixture Percentage	Reagent
5%	Portland Cement
10%	Portland Cement
15%	Fly Ash
25%	Fly Ash
5%	Quick Lime
10%	Quick Lime

Note: Reagent mixtures will be calculated on a volumetric basis.

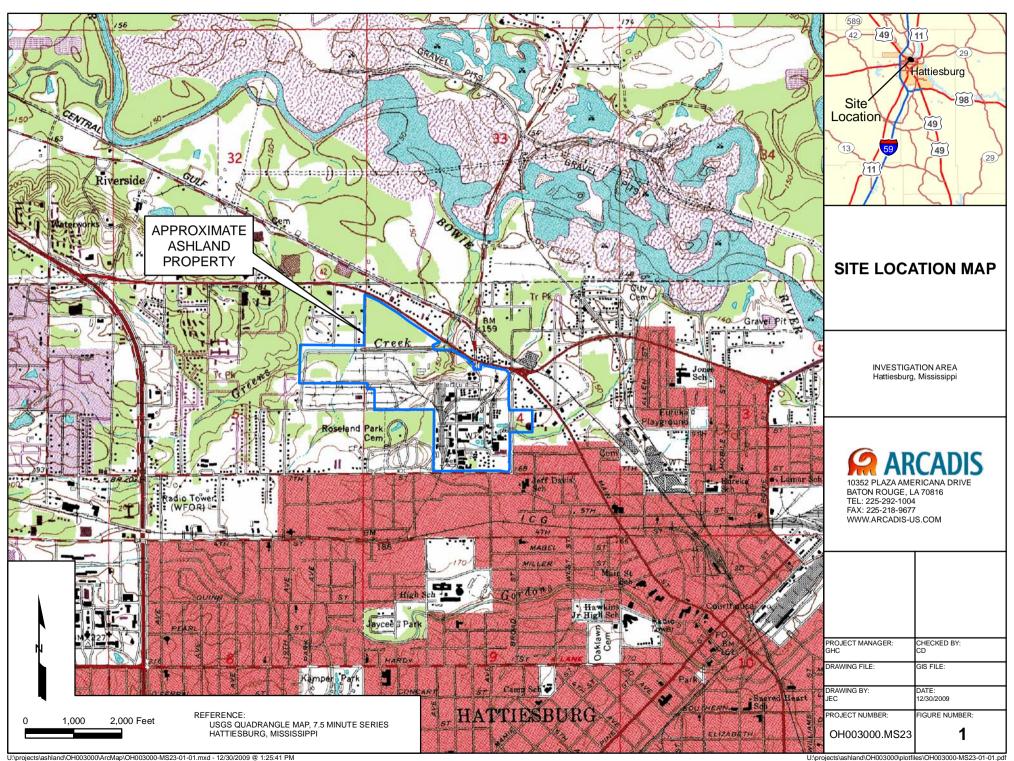
Table 6. Project Schedule, Sludge Characterization and Bench Scale Treatability Work Plan, Hercules Incorporated, Hattiesburg, Mississippi.

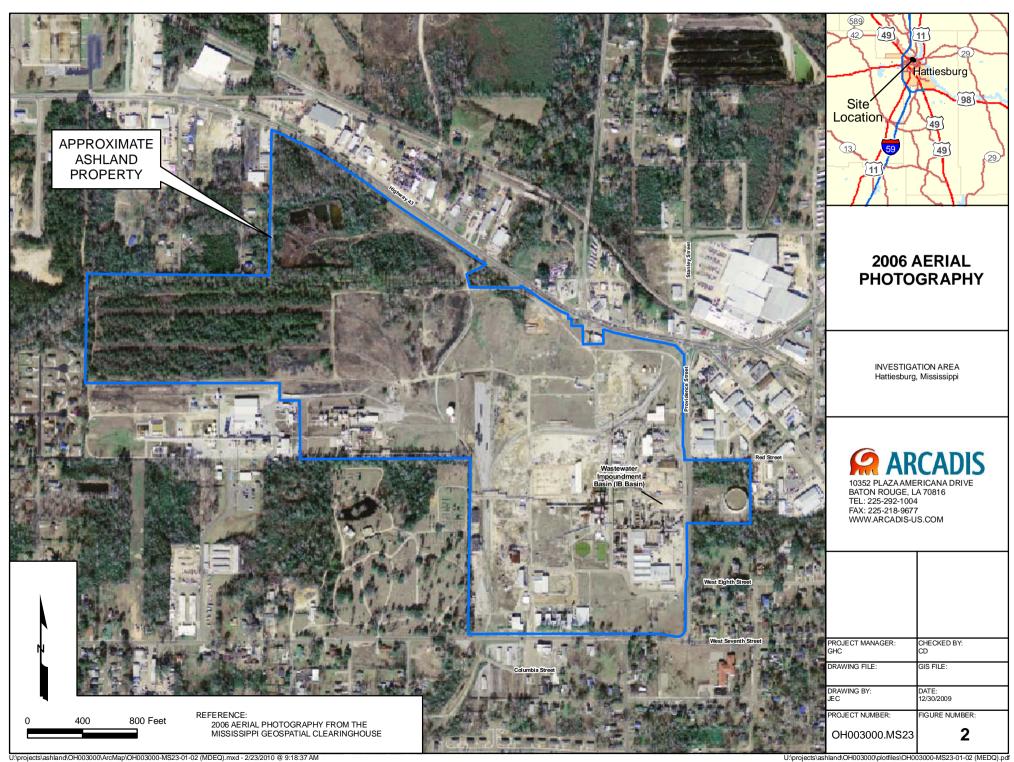
	Length of Time After MDEQ Approval of the Sludge Characterization								
Activity ⁽¹⁾	1 Month	2 Months	3 Months	4 Months	5 Months	6 Months	7-10 Months		
Field Characterization Work									
Bench Scale and Laboratory esting			l						
Submit Characterization and Freatability Information to MDEQ									
Develop Bid Estimate									
evelop Closure Plan									
Submit Sludge Removal Closure Plan to MDEQ									
Development of Bid Documents and Plans and Specifications Contingent upon MDEQ approval of Sludge Removal Closure Plan)						I			
Solicitation of Contractor Bids									
Contractor Bid Evaluation									
ontract Award									
ield Implementation of Closure									

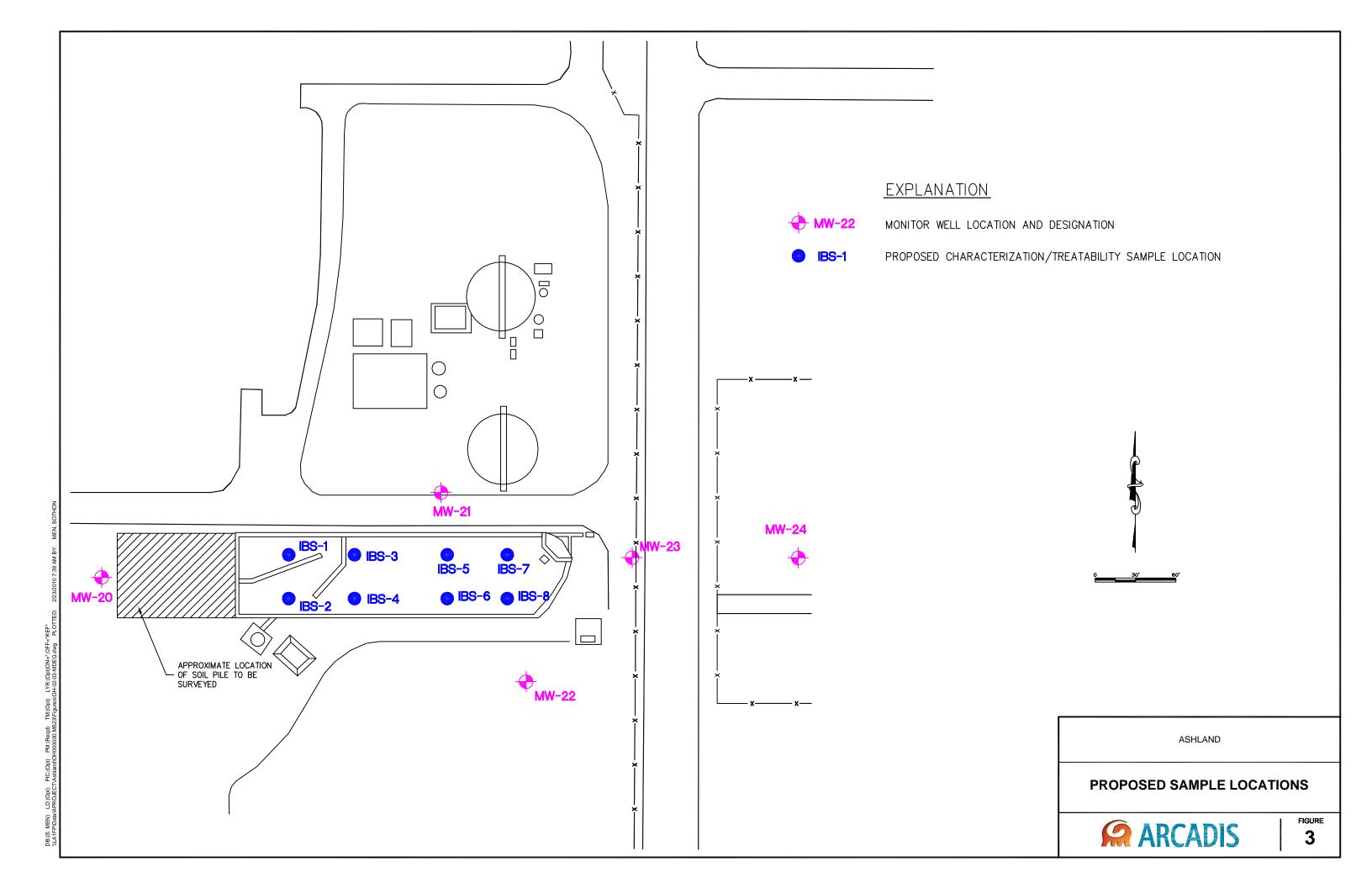
The activities described in this schedule depend upon MDEQ approval of the regulatory strategy and that a pilot study will not be needed.

MDEQ Mississippi Department of Environmental Quality.

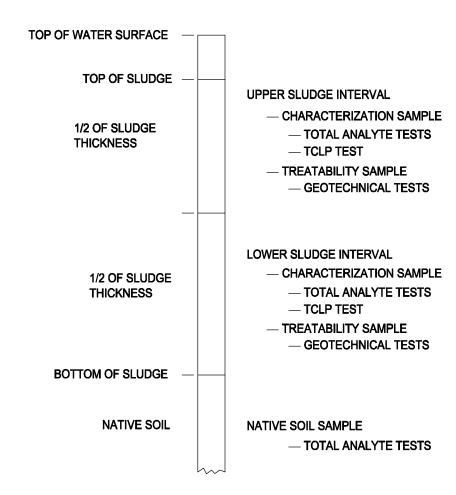
Page:







IB SAMPLING



CHARACTERIZATION SAMPLING*

- TOTAL ANALYTE TESTS
 - VOLATILE ORGANIC COMPOUNDS (VOCs)
 - SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs)
 - RCRA8 METALS

— TCLP TESTS

- TCLP VOCs
- TCLP SVOCs
- TCLP PESTICIDES/HERBICIDES
- TCLP METALS
- REACTIVITY
- CORROSSIVITY
- IGNITABILITY

* SAMPLES WILL BE CONTAINERIZED IN LABORATORY-PROVIDED CONTAINERS.

** SAMPLES WILL BE CONTAINERIZED IN NEW 5-GALLON PLASTIC BUCKETS (2 PER SAMPLE)

TREATABILITY SAMPLING**

- PAINT FILTER LIQUIDS TEST
- MOISTURE CONTENT
- PERCENT SOLIDS
- SUSPENDED SOLIDS
- SPECIFIC GRAVITY
- BULK DENSITY
- UNCONFINED COMPRESSIVE STRENGTH

ASHLAND

SAMPLING PROTOCOL

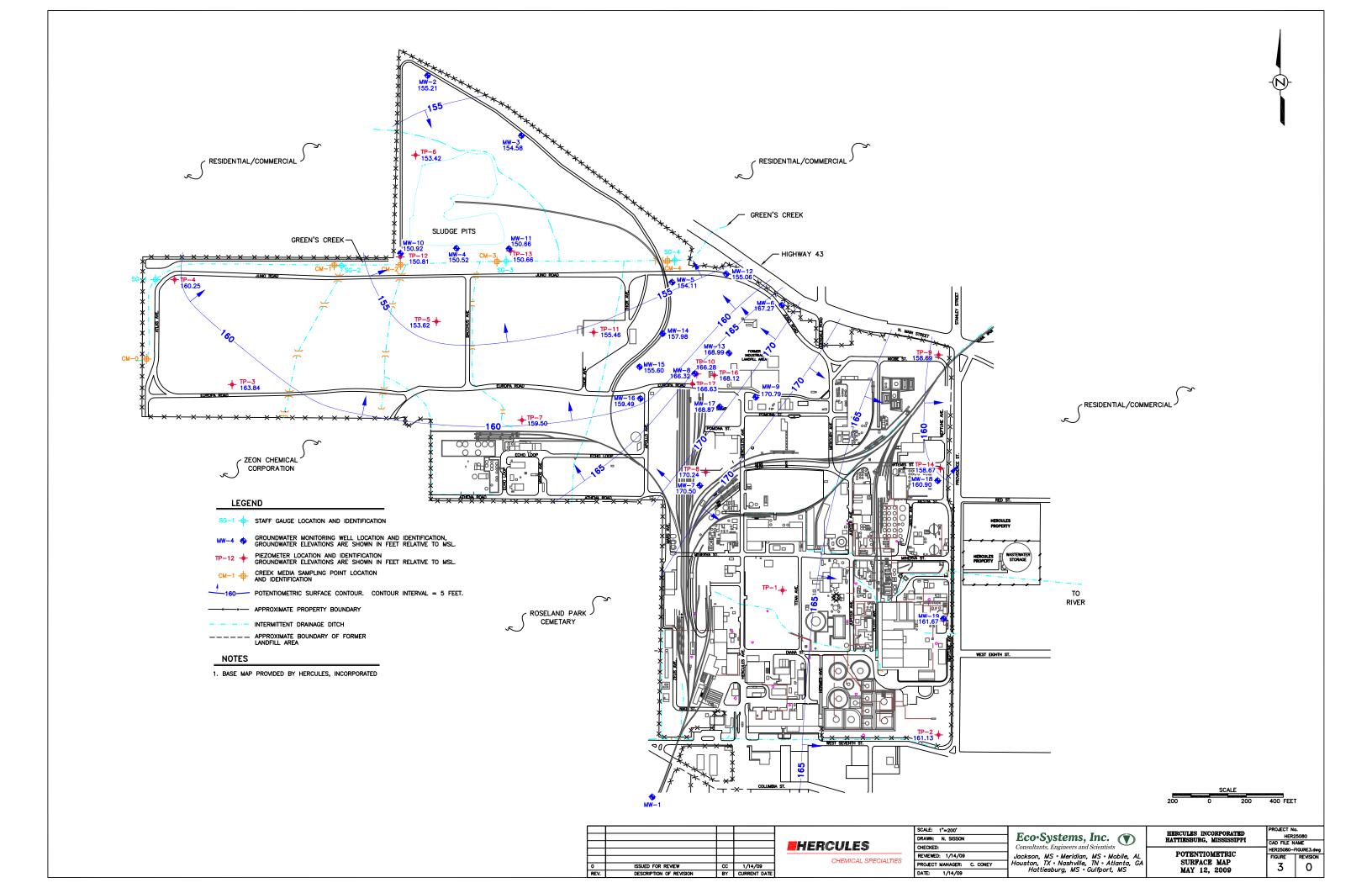


FIGURE 4

ARCADIS

Appendix A

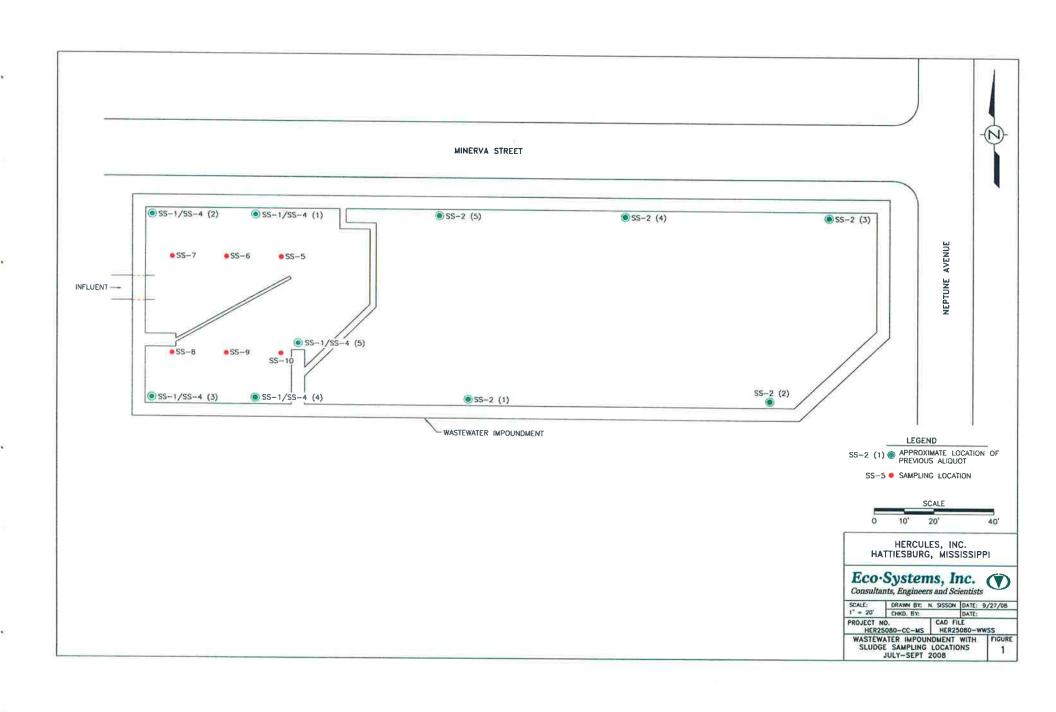
Potentiometric Map (May 12, 2009)



ARCADIS

Appendix B

Previous Sludge Analyses





ANALYTICAL REPORT

Job Number: 680-38282-1

Job Description: Hercules Hattiesburg Sludge TCLP 7/1/08

For:

Hercules Inc.
Research Center - Bldg 8139/15
500 Hercules Road
Wilmington, DE 19808-1599

Attention: Mr. Timothy Hassett

Lideja Julieia

Lidya Gulizia Project Manager I lidya.gulizia@testamericainc.com 07/21/2008

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory. All questions regarding this test report should be directed to the TestAmerica Project Manager who signed this test report.



Job Narrative 680-J38282-1

Receipt

All samples were received in good condition within temperature requirements.

GC/MS VOA

No analytical or quality issues were noted.

GC/MS Semi VOA

No analytical or quality issues were noted.

GC Semi VOA

Method(s) 8151A: Surrogate recovery for the following sample was outside control limits: HER-SS1-070108 (680-38282-1). Re-extraction and re-analysis was performed with acceptable results. Both sets of data have been reported.

No other analytical or quality issues were noted.

Metals

No analytical or quality issues were noted.

General Chemistry

No analytical or quality issues were noted.

Comments

No additional comments.

METHOD SUMMARY

Client: Hercules Inc.

Job Number: 680-38282-1

Description	Lab Location	Method	Preparation Method
Matrix: Solid			
Volatile Organic Compounds by GC/MS	TAL SAV	SW846 8260B	
Toxicity Characteristic Leaching Procedure (ZHE)	TAL SAV		SW846 1311
Purge and Trap on Leachates	TAL SAV		SW846 5030B
Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	TAL SAV	SW846 8270C	
Toxicity Characteristic Leaching Procedure	TAL SAV		SW846 1311
Continuous Liquid-Liquid Extraction	TAL SAV		SW846 3520C
Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography	TAL SAV	SW846 8081A_	8082
Toxicity Characteristic Leaching Procedure	TAL SAV		SW846 1311
Continuous Liquid-Liquid Extraction	TAL SAV		SW846 3520C
Chlorinated Herbicides by GC	TAL SAV	SW846 8151A	
Toxicity Characteristic Leaching Procedure	TAL SAV		SW846 1311
Chlorinated Herbicides by GC - Aqueous Prep	TAL SAV		SW846 8151A
nductively Coupled Plasma - Atomic Emission Spectrometry	TAL SAV	SW846 6010B	
Toxicity Characteristic Leaching Procedure	TAL SAV		SW846 1311
Acid Digestion of Aqueous Samples and Extracts for	TAL SAV		SW846 3010A
lercury in Liquid Waste (Manual Cold Vapor Technique)	TAL SAV	SW846 7470A	
Toxicity Characteristic Leaching Procedure	TAL SAV		SW846 1311
Mercury in Liquid Waste (Manual Cold Vapor	TAL SAV		SW846 7470A
eactive Cyanide Analysis using method 9014	TAL SAV	SW846 9014	
Cyanide, Reactive (SW7.3.3)	TAL SAV		SW846 7.3.3
trimetric Procedure for Acid-Soluble and Acid-Insoluble ulfides	TAL SAV	SW846 9034	
Sulfide, Reactive (SW7.3.4)	TAL SAV		SW846 7.3.4
oil and Waste pH	TAL SAV	SW846 9045C	

Lab References:

TAL SAV = TestAmerica Savannah

Method References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

METHOD / ANALYST SUMMARY

Client: Hercules Inc.

Job Number: 680-38282-1

Method	Analyst	Analyst ID
SW846 8260B	Bearden, Robert	RB
SW846 8270C	Johnson, Brad	ВЈ
SW846 8081A_8082	Kellar, Joshua	JK
SW846 8151A SW846 8151A	Kellar, Joshua Smith, Crystal	JK CAS
SW846 6010B	Bland, Brian	ВСВ
SW846 7470A	Bland, Brian	BCB
SW846 9014	McDonald, Debbie	DM
SW846 9034	McDonald, Debbie	DM
SW846 9045C	Williams, Dyanne	DW

SAMPLE SUMMARY

Client: Hercules Inc.

Job Number: 680-38282-1

Lab Sample ID Clie	ent Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
680-38282-2 HEI	R-SS1-070108	Solid	07/01/2008 1530	07/03/2008 0852
	R-SS2-070108	Solid	07/01/2008 1545	07/03/2008 0852
	R-SS3-070108	Solid	07/01/2008 1700	07/03/2008 0852

SAMPLE RESULTS

Client: Hercules Inc.

Job Number: 680-38282-1

Client Sample ID:

HER-SS1-070108

Lab Sample ID:

680-38282-1

Client Matrix:

Solid

Date Sampled:

07/01/2008 1530

Date Received:

07/03/2008 0852

8260B Volatile Organic Compounds by GC/MS-TCL	8260B	Volatile	Organic	Compounds	bν	GC/MS-TCL	P
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Method:

8260B

Analysis Batch: 680-111100

Instrument ID:

GC/MS Volatiles - A

Preparation: Dilution:

5030B

Leachate Batch: 680-110884

Lab File ID: a0
Initial Weight/Volume:

a0869.d

Date Analyzed:

20 07/09/2008 1803

Loudinate But

Final Weight/Volume:

5 mL 5 mL

Date Prepared: Date Leached: 07/09/2008 1803 07/07/2008 1515

Analyte DryWt Corrected: N Result (mg/L) Qualifier RL Benzene 1.3 0.020 Carbon tetrachloride <0.020 0.020 Chlorobenzene <0.020 0.020 Chloroform 0.19 0.020 1,2-Dichloroethane <0.020 0.020 1,1-Dichloroethene <0.020 0.020 2-Butanone (MEK) <0.20 0.20 Tetrachloroethene <0.020 0.020 Trichloroethene <0.020 0.020 Vinyl chloride < 0.020 0.020

Surrogate	%Rec	Acceptance Limits
4-Bromofluorobenzene	91	75 - 120
Dibromofluoromethane	87	75 - 121
Toluene-d8 (Surr)	102	75 - 120

Client: Hercules Inc. Job Number: 680-38282-1

Client Sample ID:

HER-SS2-070108

Lab Sample ID:

680-38282-2

Client Matrix:

Solid

Date Sampled:

07/01/2008 1545

Date Received:

07/03/2008 0852

8260B Volatile Organic	Compounds	by	GC/MS-TCLP
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Method:

8260B

Analysis Batch: 680-111100

Instrument ID:

GC/MS Volatiles - A

Preparation: Dilution:

5030B

Lab File ID: Initial Weight/Volume:

a0863.d

Date Analyzed:

20

Leachate Batch: 680-110884

5 mL

Date Prepared:

07/09/2008 1606

Final Weight/Volume:

5 mL

Date Leached:

07/09/2008 1606 07/07/2008 1515

Analyte DryWt Corrected: N Result (mg/L) Qualifier RL Benzene 0.21 0.020 Carbon tetrachloride < 0.020 0.020 Chlorobenzene <0.020 0.020 Chloroform < 0.020 0.020 1,2-Dichloroethane < 0.020 0.020 1,1-Dichloroethene < 0.020 0.020 2-Butanone (MEK) <0.20 0.20 Tetrachloroethene <0.020 0.020 Trichloroethene < 0.020 0.020 Vinyl chloride < 0.020 0.020

Surrogate	%Rec	Acceptance Limits
4-Bromofluorobenzene	92	75 - 120
Dibromofluoromethane	85	75 - 121
Toluene-d8 (Surr)	104	75 - 120

Client: Hercules Inc.

Job Number: 680-38282-1

Client Sample ID:

HER-SS3-070108

Lab Sample ID:

680-38282-3

Client Matrix:

Solid

Date Sampled:

07/01/2008 1700

Date Received:

07/03/2008 0852

8260B Volatile Organic Compounds by GC/MS-TCLP

Method:

8260B

Analysis Batch: 680-111100

Instrument ID:

GC/MS Volatiles - A

Preparation:

5030B

. ...a.yolo Batolii ooo 11110a

Lab File ID:

a0864.d

Dilution: Date Analyzed:

20

Leachate Batch: 680-110884

Initial Weight/Volume:

5 mL

Date Prepared:

07/09/2008 1626 07/09/2008 1626

Final Weight/Volume:

5 mL

Date Leached:

07/07/2008 1515

Analyte	DryWt Corrected: N Result (mg/L)	Qualifier	RL
Benzene	<0.020		0.020
Carbon tetrachloride	<0.020		0.020
Chlorobenzene	<0.020		0.020
Chloroform	<0.020		0.020
1,2-Dichloroethane	<0.020		0.020
1,1-Dichloroethene	<0.020		0.020
2-Butanone (MEK)	<0.20		0.20
Tetrachloroethene	<0.020		0.020
Trichloroethene	<0.020		0.020
Vinyl chloride	<0.020		0.020

Surrogate	%Rec	Acceptance Limits
4-Bromofluorobenzene	93	75 - 120
Dibromofluoromethane	89	75 - 121
Toluene-d8 (Surr)	108	75 - 120

Client: Hercules Inc. Job Number: 680-38282-1

Client Sample ID:

HER-SS1-070108

Lab Sample ID:

680-38282-1

Client Matrix: Solid

Date Sampled:

07/01/2008 1530

Date Received: 07/0

07/03/2008 0852

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)-TCLP

Method: Preparation:	8270C 3520C	•	s Batch: 680-111536 atch: 680-110963		Instrument ID: Lab File ID:	GC/MS 8 g3223.d	SemiVolatiles - G
Dilution:	1.0	Leacha	te Batch: 680-110821		Initial Weight/Volu	me:	200 mL
Date Analyzed:	07/12/2008 2133				Final Weight/Volui	me:	1 mL
Date Prepared:	07/09/2008 1404				Injection Volume:		1.0 uL
Date Leached:	07/07/2008 1400				•		
Analyte		DryWt Corrected: N	Result (mg/L)	Qualifier	• •		RL

Analyte	DryWt Corrected: N Result (mg/L)	Qualifier	RL
1,4-Dichlorobenzene	<0.050		0.050
2,4-Dinitrotoluene	<0.050		0.050
Hexachloroethane	<0.050		0.050
Hexachlorobenzene	<0.050		0.050
Hexachlorobutadiene	<0.050		0.050
Methyl Phenols, Total	0.29		0.10
Nitrobenzene	<0.050		0.050
Pentachlorophenol	<0.25		0.25
Pyridine	<0.25		0.25
2,4,5-Trichlorophenol	<0.050		0.050
2,4,6-Trichlorophenol	<0.050		0.050
Surrogate	%Rec		Acceptance Limits
2,4,6-Tribromophenol	76		40 - 139

Surrogate	%Rec	Acceptance Limits
2,4,6-Tribromophenol	76	40 - 139
2-Fluorobiphenyl	69	50 - 113
2-Fluorophenol	66	36 - 110
Nitrobenzene-d5	80	45 - 112
Phenol-d5	71	38 - 116
Terphenyl-d14	38	10 - 121

Client: Hercules Inc. Job Number: 680-38282-1

Client Sample ID:

HER-SS2-070108

Lab Sample ID:

680-38282-2

Client Matrix:

Phenol-d5

Terphenyl-d14

Solid

Date Sampled:

38 - 116

10 - 121

07/01/2008 1545

Date Received:

07/03/2008 0852

	8270C Se	emivo	latile Compounds by Gas Chromatography/l	Mass Spe	ctrometry (GC/MS)	-TCLP	
Method:	8270C		Analysis Batch: 680-111536		Instrument ID:	GC/MS	SemiVolatiles - G
Preparation:	3520C		Prep Batch: 680-110963		Lab File ID: g3224.		i
Dilution:	1.0		Leachate Batch: 680-110821		Initial Weight/Volu	me:	200 mL
Date Analyzed:	07/12/2008	2155			Final Weight/Volum	me:	1 mL
Date Prepared:	07/09/2008	1404			Injection Volume:		1.0 uL
Date Leached:	07/07/2008	1400			,		
Analyte			DryWt Corrected: N Result (mg/L)	Qualifie	r		RL
1,4-Dichlorobenzen	ne		<0.050				0.050
2,4-Dinitrotoluene			<0.050				0.050
Hexachloroethane			<0.050				0.050
Hexachlorobenzene	-		<0.050 0.05			0.050	
Hexachlorobutadier			<0.050				0.050
Methyl Phenols,Tot	al		0.72				0.10
Nitrobenzene			<0.050				0.050
Pentachlorophenol			<0.25				0.25
Pyridine			<0.25				0.25
2,4,5-Trichlorophen			<0.050				0.050
2,4,6-Trichlorophen	ol		<0.050				0.050
Surrogate			%Rec		Acc	ceptance I	_imits
2,4,6-Tribromophenol			71	40 - 139			
2-Fluorobiphenyl			65 50 - 113) - 113		
2-Fluorophenol			57 36 - 110				
Nitrobenzene-d5			68 45 - 112				

60

57

Client: Hercules Inc. Job Number: 680-38282-1

Client Sample ID:

HER-SS3-070108

Lab Sample ID:

680-38282-3

Client Matrix:

Solid

Date Sampled:

07/01/2008 1700

07/03/2008 0852 Date Received:

Method:

8270C

Analysis Batch: 680-111536

Instrument ID:

GC/MS SemiVolatiles - G

Preparation:

Lab File ID:

g3225.d

Dilution:

3520C 1.0

Prep Batch: 680-110963 Leachate Batch: 680-110821

Initial Weight/Volume:

200 mL

Date Analyzed:

07/12/2008 2217 07/09/2008 1404

Final Weight/Volume: Injection Volume:

1 mL

Date Prepared: Date Leached:

07/07/2008 1400

1.0 uL

Analyte	DryWt Corrected: N Result (mg/L)	Qualifier	RL
1,4-Dichlorobenzene	<0.050		0.050
2,4-Dinitrotoluene	<0.050		0.050
Hexachloroethane	< 0.050		0.050
Hexachlorobenzene	<0.050		0.050
Hexachlorobutadiene	<0.050		0.050
Methyl Phenols, Total	0.18		0.10
Nitrobenzene	<0.050		0.050
Pentachlorophenol	<0.25		0.25
Pyridine	<0.25		0.25
2,4,5-Trichlorophenol	<0.050		0.050
2,4,6-Trichlorophenol	<0.050		0.050

Surrogate	%Rec	Acceptance Limits
2,4,6-Tribromophenol	78	40 - 139
2-Fluorobiphenyl	69	50 - 113
2-Fluorophenol	60	36 - 110
Nitrobenzene-d5	66	45 - 112
Phenol-d5	67	38 - 116
Terphenyl-d14	44	10 - 121

Client: Hercules Inc. Job Number: 680-38282-1

Client Sample ID:

HER-SS1-070108

Lab Sample ID:

680-38282-1

Client Matrix:

000-30202-

Solid

Date Sampled:

07/01/2008 1530

Date Received: 07/03

07/03/2008 0852

Method: 8081A_8082 Analysis Batch: 680-111410 GC SemiVolatiles - M Instrument ID: Preparation: 3520C Prep Batch: 680-110858 Lab File ID: mg11028.d Dilution: 1.0 Leachate Batch: 680-110821 Initial Weight/Volume: 20 mL 07/11/2008 1923 Date Analyzed: Final Weight/Volume: 10 mL 07/08/2008 1342 Date Prepared: Injection Volume: 1.0 uL PRIMARY Date Leached: 07/07/2008 1400 Column ID: DryWt Corrected: N Result (mg/L) Analyte Qualifier RL Chlordane (technical) < 0.025 0.025 Endrin < 0.0050 0.0050 gamma-BHC (Lindane) <0.0025 0.0025 Methoxychlor <0.025 0.025 Heptachlor < 0.0025 0.0025 Heptachlor epoxide < 0.0025 0.0025 Toxaphene < 0.25 0.25

Surrogate%RecAcceptance LimitsTetrachloro-m-xylene5635 - 120DCB Decachlorobiphenyl6714 - 115

Client: Hercules Inc. Job Number: 680-38282-1

Client Sample ID:

HER-SS2-070108

Lab Sample ID:

680-38282-2

Client Matrix:

Solid

Date Sampled:

07/01/2008 1545

Date Received: 07/03/2008 0852

Mathad.		anochlorine Pesticides & Polychlorinated Blp		• •
Method:	8081A_8082	Analysis Batch: 680-111410	Instrument ID:	GC SemiVolatiles - M
Preparation:	3520C	Prep Batch: 680-110858	Lab File ID:	mg11029.d
Dilution:	1.0	Leachate Batch: 680-110821	Initial Weight/Vo	
Date Analyzed:	07/11/2008 194		Final Weight/Vol	
Date Prepared:	07/08/2008 134	2	Injection Volume	: 1.0 uL
Date Leached:	07/07/2008 140	0	Column ID:	PRIMARY
Analyte		DryWt Corrected: N Result (mg/L)	Qualifier	RL
Chlordane (technic	cal)	<0.025		0.025
indrin		<0.0050		0.0050
amma-BHC (Linc	lane)	<0.0025		0.0025
Methoxychior		<0.025		0.025
leptachlor		<0.0025		0.0025
Heptachlor epoxide		<0.0025		0.0025
l'oxaphene		<0.25		0.25
Surrogate		%Rec	Acceptance Limit	
Tetrachloro-m-xylene		69	35 - 120	
DCB Decachlorobiphenyl		95	14 - 115	

Client: Hercules Inc. Job Number: 680-38282-1

Client Sample ID:

HER-SS3-070108

Lab Sample ID:

680-38282-3

Client Matrix:

Date Leached:

Solid

Date Sampled:

07/01/2008 1700

Date Received:

07/03/2008 0852

GC SemiVolatiles - M

20 mL

10 mL

mg11030.d

8081A_8082 Organochlorine Pesticides &	Polychlorinated Biphenyls by	Gas Chromatography-TCLP
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Method: 8081A_8082 Analysis Batch: 680-111410 Instrument ID: Preparation: 3520C Prep Batch: 680-110858 Lab File ID: Dilution: 1.0 Leachate Batch: 680-110821 Initial Weight/Volume: Date Analyzed: 07/11/2008 2001 Final Weight/Volume: Date Prepared:

07/08/2008 1342 Injection Volume: 07/07/2008 1400 Column ID:

Injection Volume: 1.0 uL Column ID: PRIMARY

Analyte DryWt Corrected: N Result (mg/L) Qualifier RL Chlordane (technical) < 0.025 0.025 Endrin <0.0050 0.0050 gamma-BHC (Lindane) < 0.0025 0.0025 Methoxychlor <0.025 0.025 Heptachlor < 0.0025 0.0025 Heptachlor epoxide < 0.0025 0.0025 Toxaphene < 0.25 0.25

Surrogate%RecAcceptance LimitsTetrachloro-m-xylene6035 - 120DCB Decachlorobiphenyl5314 - 115

Client: Hercules Inc.

Job Number: 680-38282-1

Client Sample ID:

HER-SS1-070108

Lab Sample ID:

680-38282-1

Client Matrix:

Solid

Date Sampled:

07/01/2008 1530

Date Received:

07/03/2008 0852

8151A Chlorinated Herbicides by GC-TCLP

Method:

8151A

Analysis Batch: 680-111302

Instrument iD:

GC SemiVolatiles - S

Preparation: Dilution:

8151A

Prep Batch: 680-110848

Lab File ID: Initial Weight/Volume:

sf10048.d 10 mL

Date Analyzed:

1.0

Leachate Batch: 680-110821

Final Weight/Volume:

10 mL

Date Prepared:

07/11/2008 0239 07/08/2008 0822

Injection Volume: Column ID:

1 uL

Date Leached:

07/07/2008 1400

PRIMARY

Analyte 2,4-D

DryWt Corrected: N Result (mg/L) < 0.050

Qualifier

RL 0.050 0.050

Silvex (2,4,5-TP)

< 0.050

Acceptance Limits

Surrogate DCAA

%Rec 49

Χ

61 - 120

Client: Hercules Inc.

Job Number: 680-38282-1

Client Sample ID:

HER-SS1-070108

Lab Sample ID:

680-38282-1

Client Matrix:

Solid

Date Sampled:

07/01/2008 1530

Date Received:

07/03/2008 0852

8151A Chlorinated Herbicides by GC-TCLP

Method: Preparation:

Dilution:

Date Analyzed:

Date Prepared:

Date Leached:

8151A

8151A

1.0

07/15/2008 2137 07/14/2008 0804 07/07/2008 1400 Analysis Batch: 680-111770 Prep Batch: 680-111394

Leachate Batch: 680-110821

Run Type: RE

Instrument ID:

GC SemiVolatiles - S

Lab File ID: Initial Weight/Volume:

sg15016.d 10 mL

Final Weight/Volume:

10 mL

Injection Volume:

1 uL

Column ID:

SECONDARY

Analyte 2,4-D

Surrogate

DCAA

DryWt Corrected: N Result (mg/L)

< 0.050 <0.050 Qualifier

RL 0.050

0.050

Silvex (2,4,5-TP)

%Rec

Acceptance Limits

83

61 - 120

Client: Hercules Inc.

Job Number: 680-38282-1

Client Sample ID:

HER-SS2-070108

Lab Sample ID:

680-38282-2

Client Matrix:

Solid

Date Sampled:

07/01/2008 1545

Date Received:

07/03/2008 0852

8151A Chlorinated Herbicides by GC-TCLP

Method:

8151A

Analysis Batch: 680-111302

Instrument ID:

GC SemiVolatiles - S

Preparation:

8151A

Lab File ID:

sf10049.d

Dilution:

Prep Batch: 680-110848

Initial Weight/Volume:

Date Analyzed:

1.0

Leachate Batch: 680-110821

Final Weight/Volume:

10 mL

Date Prepared:

07/11/2008 0258 07/08/2008 0822

Injection Volume:

10 mL 1 uL

Date Leached:

07/07/2008 1400

Column ID:

PRIMARY

Analyte

DryWt Corrected: N Result (mg/L)

Qualifier

RL

2,4-D

< 0.050

0.050

Silvex (2,4,5-TP)

<0.050

0.050

Surrogate DCAA

%Rec 103

Acceptance Limits 61 - 120

Client: Hercules Inc.

Job Number: 680-38282-1

Client Sample ID:

HER-SS3-070108

Lab Sample ID:

680-38282-3

Client Matrix:

Solid

07/11/2008 0317

07/08/2008 0822

07/07/2008 1400

Date Sampled:

07/01/2008 1700

Date Received:

07/03/2008 0852

8151A Chlorinated Herbicides by GC-TCLP

Method: Preparation:

Dilution:

8151A 8151A 1.0

Analysis Batch: 680-111302

Prep Batch: 680-110848

Leachate Batch: 680-110821

Instrument ID:

GC SemiVolatiles - S

Lab File ID: Initial Weight/Volume:

sf10050.d 10 mL

Final Weight/Volume:

10 mL

Injection Volume:

1 uL

Column ID:

PRIMARY

Analyte 2,4-D

DryWt Corrected: N Result (mg/L)

Qualifier

RL0.050

Silvex (2,4,5-TP)

Date Analyzed:

Date Prepared:

Date Leached:

< 0.050

< 0.050

0.050

Acceptance Limits

Surrogate DCAA

%Rec 98

61 - 120

Client: Hercules Inc.

Job Number: 680-38282-1

Client Sample ID:

HER-SS1-070108

Lab Sample ID:

680-38282-1

Client Matrix:

Solid

Date Sampled:

07/01/2008 1530

Date Received:

07/03/2008 0852

Method: Preparation: 6010B 3010A Analysis Batch: 680-111168

Instrument ID: Lab File ID:

ICP/AES - D

Dilution:

1.0

Prep Batch: 680-110926 Leachate Batch: 680-110821

Initial Weight/Volume:

N/A 5 mL

Date Analyzed: Date Prepared:

07/09/2008 1958 07/08/2008 1634 Final Weight/Volume:

50 mL

Date Leached:

07/07/2008 1400

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Arsenic		<0.20		0.20
Barium		<1.0		1.0
Cadmium		<0.10		0.10
Chromium		<0.20		0.20
Lead		<0.20		0.20
Selenium		<0.50		0.50
Silver		<0.10		0.10

7470A Mercury in Liquid Waste (Manual Cold Vapor Technique)-TCLP

Method: Preparation: 7470A 7470A 1.0

Analysis Batch: 680-111272 Prep Batch: 680-111082

Instrument ID: Lab File ID: Initial Weight/Volume:

LEEMAN1 N/A

Dilution: Date Analyzed:

07/10/2008 1516

Leachate Batch: 680-110821

Final Weight/Volume:

0.50 mL 50 mL

Date Prepared: Date Leached:

07/09/2008 1536 07/07/2008 1400

Analyte

DryWt Corrected: N

Result (mg/L)

Qualifier

RL

Mercury

< 0.020

0.020

Client: Hercules Inc. Job Number: 680-38282-1

Client Sample ID:

HER-SS2-070108

Lab Sample ID:

680-38282-2

Client Matrix:

Solid

Date Sampled:

07/01/2008 1545 07/03/2008 0852

Date Received:

		COAOR Industriants C	ounled Discours Atomic Co	iceles Constantin TOLD	
		60 TOB Inductively C	oupled Plasma - Atomic En	nission Spectrometry-TCLP	
Method:	6010B	Anal	ysis Batch: 680-111168	Instrument ID:	ICP/AES - D
Preparation:	3010A	Prep	Batch: 680-110926	Lab File ID:	N/A
Dilution:	1.0	Lead	chate Batch: 680-110821	Initial Weight/Volume:	5 mL
Date Analyzed:	07/09/2008	2003		Final Weight/Volume:	50 mL
Date Prepared:	07/08/2008	1634		· ·	
Date Leached:	07/07/2008	1400			
Analyte		DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Arsenic			<0.20		0.20
Barium			<1.0		1.0
Cadmium			<0.10		0.10
Chromium			<0.20		0.20
Lead			<0.20		0.20
Selenium			< 0.50		0.50
Silver			<0.10		0.10

7470A Mercury in Liquid Waste (Manual Cold Vapor Technique)-TCLP

Method: Preparation: Dilution: Date Analyzed: Date Prepared: Date Leached:	7470A 7470A 1.0 07/10/2008 07/09/2008 07/07/2008	1519 1536	Prep Batch	atch: 680-111272 n: 680-111082 Batch: 680-110821	Instrument ID: Lab File ID: Initial Weight/Volume: Final Weight/Volume:	LEEMAN1 N/A 0.50 mL 50 mL
Analyte		DryWt Corrected:	N	Result (mg/L)	Qualifier	RL
Mercury				<0.020		0.020

Client: Hercules Inc.

Job Number: 680-38282-1

Client Sample ID:

HER-SS3-070108

Lab Sample ID:

680-38282-3

Client Matrix:

Solid

Date Sampled:

07/01/2008 1700

Date Received:

07/03/2008 0852

Method:	
Preparation:	

6010B 3010A Analysis Batch: 680-111168

Instrument ID:

ICP/AES - D

Preparation: Dilution:

1.0

Prep Batch: 680-110926 Leachate Batch: 680-110821 Lab File ID: Initial Weight/Volume: N/A 5 mL

Date Analyzed:

07/09/2008 2008

Final Weight/Volume:

50 mL

Date Prepared: Date Leached: 07/08/2008 1634 07/07/2008 1400

Analyte	DryWt Corrected: N	Result (mg/L)	Qualifier	RL
Arsenic		<0.20		0.20
Barium		<1.0		1.0
Cadmium		<0.10		0.10
Chromium		<0.20		0.20
Lead		<0.20		0.20
Selenium		<0.50		0.50
Silver		<0.10		0.10

7470A Mercury in Liquid Waste (Manual Cold Vapor Technique)-TCLP

Method: Preparation: Dilution: 7470A 7470A 1.0 Analysis Batch: 680-111272 Prep Batch: 680-111082 Leachate Batch: 680-110821

Instrument ID: Lab File ID: Initial Weight/Volume:

Final Weight/Volume:

LEEMAN1 N/A 0.50 mL

50 mL

Date Analyzed:
Date Prepared:
Date Leached:

07/10/2008 1521 07/09/2008 1536 07/07/2008 1400

DryWt Corrected: N

Result (mg/L)

Qualifier

RL

Analyte Mercury

<0.020

0.020

Client: Hercules Inc.

Job Number: 680-38282-1

		General Chemistry		
Client Sample ID:	HER-SS1-070108			
Lab Sample ID: Client Matrix:	680-38282-1 Solid		Date Sampled: Date Received:	07/01/2008 1530 07/03/2008 0852
Analyte	Result	Qual Units		Dil Method
pН	5.59	SU		1.0 9045C
	Anly Batch: 680-110751	Date Analyzed 07/06/2008 04	403	DryWt Corrected: N
Analyte	Result	Qual Units	RL	Dil Method
Cyanide, Reactive	<97	mg/Kg	97	1.0 9014
	Anly Batch: 680-110785	Date Analyzed 07/07/2008 10	·	DryWt Corrected: N
	Prep Batch: 680-110783	Date Prepared: 07/07/2008 08	300	
Sulfide, Reactive	<49	mg/Kg	49	1.0 9034
	Anly Batch: 680-110791	Date Analyzed 07/07/2008 11		DryWt Corrected: N
	Prep Batch: 680-110787	Date Prepared: 07/07/2008 08	300	
Client Sample ID:	HER-SS2-070108			
Lab Sample ID:	680-38282-2		Date Sampled:	07/01/2008 1545
Client Matrix:	Solid		Date Received:	07/03/2008 0852
Analyte	Result	Qual Units		Dil Method
PΗ	6.74	SU		1.0 9045C
	Anly Batch: 680-110751	Date Analyzed 07/06/2008 04	103	DryWt Corrected: N
Analyte	Result	Qual Units	RL	Dil Method
Cyanide, Reactive	<98	mg/Kg	98	1.0 9014
	Anly Batch: 680-110785	Date Analyzed 07/07/2008 10	029	DryWt Corrected: N
	Prep Batch: 680-110783	Date Prepared: 07/07/2008 08	300	,
Sulfide, Reactive	<49	mg/Kg	49	1.0 9034
	Anly Batch: 680-110791	Date Analyzed 07/07/2008 11	08	DryWt Corrected: N
	Prep Batch: 680-110787	Date Prepared: 07/07/2008 08	200	,

Client: Hercules Inc.

Job Number: 680-38282-1

General Chemistry

Client Sample ID:

HER-SS3-070108

Lab Sample ID:

680-38282-3

Solid

Client Matrix:

Date Sampled:

07/01/2008 1700

Date Received: 07/03/2008 0852

Analyte	Result	Qual Units		Dil Method
рH	6.89	SU		1.0 9045C
	Anly Batch: 680-110751	Date Analyzed	07/06/2008 0403	DrvWt Corrected: N

Analyte	Result	Qual Units		RL	Dil	Method
Cyanide, Reactive	<97	mg/Ko]	97	1.0	9014
	Anly Batch: 680-110785	Date Analyzed	07/07/2008 1029		Dry	Wt Corrected: N
	Prep Batch: 680-110783	Date Prepared:	07/07/2008 0800			
Sulfide, Reactive	<48	mg/Kg)	48	1.0	9034
	Anly Batch: 680-110791	Date Analyzed	07/07/2008 1108		Dry	Wt Corrected: N
	Prep Batch: 680-110787	Date Prepared:	07/07/2008 0800		•	

DATA REPORTING QUALIFIERS

Client: Hercules Inc.

Job Number: 680-38282-1

Lab Section	Qualifier	Description
GC Semi VOA		
	Х	Surrogate exceeds the control limits

QUALITY CONTROL RESULTS

Client: Hercules Inc. Job Number: 680-38282-1

Surrogate Recovery Report

8260B Volatile Organic Compounds by GC/MS

Client Matrix: Solid TCLP

		BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	%Rec	%Rec	%Rec
680-38282-1	HER-SS1-070108	91	87	102
680-38282-2	HER-SS2-070108	92	85	104
680-38282-3	HER-SS3-070108	93	89	108
MB 680-111100/5		91	92	97
LB 680-110884/10-A		98	89	99
LCS 680-111100/3		101	106	104

Surrogate	Acceptance Limits
BFB = 4-Bromofluorobenzene	75-120
DBFM = Dibromofluoromethane	75-121
TOL = Toluene-d8 (Surr)	75-120

Client: Hercules Inc. Job Number: 680-38282-1

Surrogate Recovery Report

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Client Matrix: Solid TCLP

		TBP	FBP	2FP	NBZ	PHL	TPH
Lab Sample ID	Client Sample ID	%Rec	%Rec	%Rec	%Rec	%Rec	%Rec
680-38282-1	HER-SS1-070108	76	69	66	80	71	38
680-38282-2	HER-SS2-070108	71	65	57	68	60	57
680-38282-3	HER-SS3-070108	78	69	60	66	67	44
MB 680-110963/14-A		58	65	60	61	62	67
LCS 680-110963/15-A	1	69	69	56	65	64	68

Surrogate	Acceptance Limits
TBP = 2,4,6-Tribromophenol	40-139
FBP = 2-Fluorobiphenyl	50-113
2FP = 2-Fluorophenol	36-110
NBZ = Nitrobenzene-d5	45-112
PHL = Phenol-d5	38-116
TPH = Terphenyl-d14	10-121

Client: Hercules Inc. Job Number: 680-38282-1

Surrogate Recovery Report

8081A 8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Client Matrix: Solid TCLP

		TCX2	DCB2
Lab Sample ID	Client Sample ID	%Rec	%Rec
680-38282-1	HER-SS1-070108	56	67
680-38282-2	HER-SS2-070108	69	95
680-38282-3	HER-SS3-070108	60	53
MB 680-110858/18-A		55	66
LB 680-110821/16-D		63	78
LCS 680-110858/19-A		68	41

Surrogate	Acceptance Limits
TCX = Tetrachloro-m-xylene	35-120
DCB = DCB Decachlorobiphenyl	14-115

Client: Hercules Inc. Job Number: 680-38282-1

Surrogate Recovery Report

8151A Chlorinated Herbicides by GC

Client Matrix: Solid TCLP

		DCPA1	DCPA2
Lab Sample ID	Client Sample ID	%Rec	%Rec
680-38282-1	HER-SS1-070108		49X
680-38282-1 RE	HER-SS1-070108 RE	83	
680-38282-2	HER-SS2-070108		103
680-38282-3	HER-SS3-070108		98
MB 680-110848/15-A		104	
MB 680-111394/12-A		115	
LB 680-110821/16-B		106	
LCS 680-110848/16-A			108
LCS 680-111394/13-A		122X	
680-38282-1 MS	HER-SS1-070108 MS	93	
680-38282-1 MSD	HER-SS1-070108 MSD	103	

Surrogate	Acceptance Limits
DCPA = DCAA	61-120

Client: Hercules inc. Job Number: 680-38282-1

Method Blank - Batch: 680-111100

Method: 8260B Preparation: 5030B

Instrument ID: GC/MS Volatiles - A

 Lab Sample ID:
 MB 680-111100/5
 Analysis Batch:
 680-111100

 Client Matrix:
 Water
 Prep Batch: N/A

 Client Matrix:
 Water
 Prep Batch: N/A
 Lab File ID: aq688.d

 Dilution:
 1.0
 Units: mg/L
 Initial Weight/Volume: 5 ml

 Date Analyzed:
 07/09/2008 1359
 Final Weight/Volume: 5 ml

Date Analyzed: 07/09/2008 1359 Final Weight/Volume: 5 mL

Date Prepared: 07/09/2008 1359

Analyte	Result	Qual RL
Benzene	< 0.0010	0.0010
Carbon tetrachloride	< 0.0010	0.0010
Chlorobenzene	< 0.0010	0.0010
Chloroform	<0.0010	0.0010
1,2-Dichloroethane	<0.0010	0.0010
1,1-Dichloroethene	< 0.0010	0.0010
2-Butanone (MEK)	<0.010	0.010
Tetrachloroethene	<0.0010	0.0010
Trichloroethene	<0.0010	0.0010
Vinyl chloride	<0.0010	0.0010
Surrogate	% Rec	Acceptance Limits
4-Bromofluorobenzene	91	75 - 120
Dibromofluoromethane	92	75 - 121
Toluene-d8 (Surr)	97	75 - 120

Client: Hercules Inc.

Job Number: 680-38282-1

TCLP SPLPE Leachate Blank - Batch: 680-111100

Method: 8260B Preparation: 5030B

75 - 120

TCLP

Lab Sample ID: LB 680-110884/10-A Client Matrix: Solid 20

Analysis Batch: 680-111100 Prep Batch: N/A

Instrument ID: GC/MS Volatiles - A Lab File ID: a0858.d

Dilution:

Toluene-d8 (Surr)

Date Analyzed: 07/09/2008 1429

Initial Weight/Volume: 5 mL Final Weight/Volume: 5 mL

Date Prepared: 07/09/2008 1429 Date Leached: 07/07/2008 1515

Leachate Batch: 680-110884

Units: mg/L

Analyte	Result	Qual	RL
Benzene	<0.020		0.020
Carbon tetrachloride	<0.020		0.020
Chlorobenzene	<0.020		0.020
Chloroform	<0.020		0.020
1,2-Dichloroethane	<0.020		0.020
1,1-Dichloroethene	<0.020		0.020
2-Butanone (MEK)	<0.20		0.20
Tetrachloroethene	<0.020		0.020
Trichloroethene	<0.020		0.020
Vinyl chloride	<0.020		0.020
Surrogate	% Rec	Acceptance Limits	
4-Bromofluorobenzene	98	75 - 120	
Dibromofluoromethane	89	75 - 121	
_	00	73 - 121	

99

Client: Hercules Inc.

Job Number: 680-38282-1

Lab Control Spike - Batch: 680-111100

Method: 8260B Preparation: 5030B

Lab Sample ID: LCS 680-111100/3

Analysis Batch: 680-111100

Client Matrix:

Water

Instrument ID: GC/MS Volatiles - A

Prep Batch: N/A

Lab File ID: aq686.d

Dilution:

1.0

Units: mg/L

Date Analyzed: 07/09/2008 1321

Initial Weight/Volume: 5 mL

Date Prepared: 07/09/2008 1321

Final Weight/Volume: 5 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Benzene	0.0500	0.0497	99	77 440	
Carbon tetrachloride	0.0500	0.0448	90	77 - 119	
Chlorobenzene	0.0500	0.0499	100	71 - 135	
Chloroform	0.0500	0.0526	105	85 - 116	
1,2-Dichloroethane	0.0500	0.0320		82 - 120	
1,1-Dichloroethene	0.0500	0.0480	96	66 - 132	
2-Butanone (MEK)	0.100		110	62 - 141	
Tetrachloroethene	0.0500	0.116	116	33 - 157	
Trichloroethene		0.0546	109	76 - 126	
Vinyl chloride	0.0500	0.0494	99	84 - 115	
This chorac	0.0500	0.0578	116	59 - 144	
Surrogate	% R	ec	Aco	eptance Limits	
4-Bromofluorobenzene	10	1		75 - 120	
Dibromofluoromethane	100	6		75 - 121	
Toluene-d8 (Surr)	104	4		75 - 120	

Client: Hercules Inc.

Job Number: 680-38282-1

Method Blank - Batch: 680-110963

Method: 8270C Preparation: 3520C

Lab Sample ID: MB 680-110963/14-A Client Matrix: Water

Dilution: 1.0

Date Analyzed: 07/12/2008 1729 Date Prepared: 07/09/2008 1404 Analysis Batch: 680-111536 Prep Batch: 680-110963

Units: mg/L

Instrument ID: GC/MS SemiVolatiles - G

Lab File ID: g3212.d

Initial Weight/Volume: 1000 mL Final Weight/Volume: 1 mL Injection Volume: 1.0 uL

Analyte	Result	Qual	RL
1,4-Dichlorobenzene 2,4-Dinitrotoluene Hexachloroethane Hexachlorobenzene Hexachlorobutadiene Methyl Phenols, Total Nitrobenzene Pentachlorophenol Pyridine 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol	<0.010 <0.010 <0.010 <0.010 <0.010 <0.020 <0.050 <0.050 <0.050 <0.010 <0.010		0.010 0.010 0.010 0.010 0.010 0.020 0.010 0.050 0.050 0.010
Surrogate 2,4,6-Tribromophenol 2-Fluorobiphenyl 2-Fluorophenol Nitrobenzene-d5 Phenol-d5 Terphenyl-d14	% Rec 58 65 60 61 62 67	А	0.010 cceptance Limits 40 - 139 50 - 113 36 - 110 45 - 112 38 - 116 10 - 121

Client: Hercules Inc.

Job Number: 680-38282-1

Lab Control Spike - Batch: 680-110963

Method: 8270C Preparation: 3520C

Client Matrix:

Lab Sample ID: LCS 680-110963/15-A

Water

Dilution:

Date Prepared: 07/09/2008 1404

1.0

Date Analyzed: 07/12/2008 1751

Analysis Batch: 680-111536

Prep Batch: 680-110963

Units: mg/L

Instrument ID: GC/MS SemiVolatiles - G

Lab File ID: g3213.d

Initial Weight/Volume: 1000 mL Final Weight/Volume: 1 mL Injection Volume: 1.0 uL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
1,4-Dichlorobenzene	0.100	0.0569	57	38 - 110	
2,4-Dinitrotoluene	0.100	0.0730	73	49 - 128	
Hexachloroethane	0.100	0.0607	61	33 - 110	
Hexachiorobenzene	0.100	0.0687	69	48 - 119	
Hexachlorobutadiene	0.100	0.0629	63	40 - 110	
Nitrobenzene	0.100	0.0626	63	46 - 110	
Pentachlorophenol	0.100	0.0617	62	37 - 132	
Pyridine	0.100	<0.050	43	10 - 110	
2,4,5-Trichlorophenol	0.100	0.0744	74	47 - 122	
2,4,6-Trichlorophenol	0.100	0.0716	72	46 - 120	
Surrogate	% R	ec	Acc	eptance Limits	
2,4,6-Tribromophenol	69			40 - 139	
2-Fluorobiphenyl	69				
2-Fluorophenoi	56			50 - 113	
Nitrobenzene-d5				36 - 110	
Phenol-d5	65			45 - 112	
	64			38 - 116	
Terphenyl-d14	68			10 - 121	

Client: Hercules Inc.

Job Number: 680-38282-1

TCLP SPLPE	Leachate Blank - Batch: 6	80-110858	Method: 8081A_8082 Preparation: 3520C TCLP
Lab Sample ID: Client Matrix: Dilution: Date Analyzed: Date Prepared: Date Leached:	LB 680-110821/16-D Solid 1.0 07/11/2008 1726 07/08/2008 1342 07/07/2008 1400	Analysis Batch: 680-111410 Prep Batch: 680-110858 Units: mg/L Leachate Batch: 680-110821	Instrument ID: GC SemiVolatiles - M Lab File ID: mg11022.d Initial Weight/Volume: 20 mL Final Weight/Volume: 10 mL Injection Volume: 1.0 uL Column ID: PRIMARY
Analyte		Result	Qual RL
Chlordane (techr Endrin gamma-BHC (Lir Methoxychlor Heptachlor Heptachlor epoxi Toxaphene	ndane)	<0.025 <0.0050 <0.0025 <0.025 <0.0025 <0.0025 <0.25	0.025 0.0050 0.0025 0.025 0.0025 0.0025 0.0025
Surrogate		% Rec	Acceptance Limits
Tetrachloro-m-xy DCB Decachlorol		63 78	35 - 120 14 - 115
Method Blank -	Batch: 680-110858		Method: 8081A_8082 Preparation: 3520C
Lab Sample ID: Client Matrix: Dilution: Date Analyzed: Date Prepared:	MB 680-110858/18-A Water 1.0 07/11/2008 1746 07/08/2008 1342	Analysis Batch: 680-111410 Prep Batch: 680-110858 Units: mg/L	Instrument ID: GC SemiVolatiles - M Lab File ID: mg11023.d Initial Weight/Volume: 1000 mL Final Weight/Volume: 10 mL Injection Volume: 1.0 uL Column ID: PRIMARY

Analyte Chlordane (technical) Endrin gamma-BHC (Lindane) Methoxychlor Heptachlor Heptachlor epoxide Toxaphene	Result <0.00050 <0.00010 <0.000050 <0.00050 <0.00050 <0.000050 <0.000050 <0.000050	Qual	RL 0.00050 0.00010 0.000050 0.00050 0.000050 0.000050
Surrogate Tetrachloro-m-xylene DCB Decachlorobiphenyl	% Rec 55 66	Acceptance Limits 35 - 120 14 - 115	

Client: Hercules Inc.

Job Number: 680-38282-1

Lab Control Spike - Batch: 680-110858

Method: 8081A_8082 Preparation: 3520C

Lab Sample ID: LCS 680-110858/19-A Client Matrix: Water Dilution:

1.0 Date Analyzed: 07/11/2008 1805 Date Prepared: 07/08/2008 1342

Analysis Batch: 680-111410 Prep Batch: 680-110858 Units: mg/L

Instrument ID: GC SemiVolatiles - M Lab File ID: mg11024.d Initial Weight/Volume: 1000 mL Final Weight/Volume: 10 mL

Injection Volume: 1.0 uL Column ID: PRIMARY

					•
Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Endrin gamma-BHC (Lindane) Methoxychlor Heptachlor Heptachlor epoxide	0.000203 0.000100 0.000201 0.000100 0.000100	0.000177 0.0000818 <0.00050 0.0000824 0.0000791	87 82 78 82 79	38 - 144 31 - 118 10 - 243 30 - 133 34 - 126	
Surrogate Tetrachloro-m-xylene DCB Decachlorobiphenyl	% Re 68 41	ec	Acc	septance Limits 35 - 120 14 - 115	

Client: Hercules Inc.

Job Number: 680-38282-1

TCLP SPLPE Leachate Blank - Batch: 680-110848

Method: 8151A Preparation: 8151A

TCLP

Lab Sample ID: LB 680-110821/16-B Client Matrix:

Solid

Dilution: 1.0 Date Analyzed: 07/10/2008 2334

Date Prepared: 07/08/2008 0822

Date Leached: 07/07/2008 1400

Instrument ID: GC SemiVolatiles - S

Lab File ID: sf10038.d Initial Weight/Volume: 10 mL Final Weight/Volume: 10 mL

Injection Volume: 1 uL

Column ID:

PRIMARY

Analyte

2,4-D Silvex (2,4,5-TP)

< 0.050 < 0.050 Surrogate

% Rec 106

Analysis Batch: 680-111302

Leachate Batch: 680-110821

Result

Prep Batch: 680-110848

Units: mg/L

0.050 0.050

RL

DCAA

Method Blank - Batch: 680-110848

Method: 8151A Preparation: 8151A

Acceptance Limits

61 - 120

Lab Sample ID: MB 680-110848/15-A

Client Matrix: Water Dilution:

Date Analyzed: Date Prepared: 07/08/2008 0822

07/10/2008 2352

Analysis Batch: 680-111302 Prep Batch: 680-110848

Units: mg/L

Instrument iD: GC SemiVolatiles - S

Lab File ID: sf10039.d

Initial Weight/Volume: 1000 mL Final Weight/Volume: 10 mL

Injection Volume: Column ID:

1 uL PRIMARY

Analyte

DCAA

2.4-D

Silvex (2,4,5-TP)

Result < 0.00050

< 0.00050

Qual

Qual

RL

0.00050 0.00050

Surrogate % Rec

104

Acceptance Limits 61 - 120

Client: Hercules Inc.

Job Number: 680-38282-1

Lab Control Spike - Batch: 680-110848

Method: 8151A Preparation: 8151A

Lab Sample ID: LCS 680-110848/16-A

Client Matrix:

Water

Dilution:

1.0

Date Analyzed: 07/11/2008 0011

Date Prepared: 07/08/2008 0822

Analysis Batch: 680-111302

Prep Batch: 680-110848

Units: mg/L

Instrument ID: GC SemiVolatiles - S Lab File ID:

sf10040.d

Final Weight/Volume:

Initial Weight/Volume: 1000 mL 10 mL

Injection Volume:

Column ID:

1 uL PRIMARY

Analyte

Spike Amount

Result

% Rec.

61 - 127

Qual

2,4-D

Silvex (2,4,5-TP)

0.00200 0.00200

0.00226 0.00175 113 87

55 - 110

Limit

Surrogate DCAA

% Rec

Acceptance Limits

108

61 - 120

Client: Hercules Inc.

Job Number: 680-38282-1

Method Blank - Batch: 680-111394

Method: 8151A Preparation: 8151A

Lab Sample ID: MB 680-111394/12-A

Water

Client Matrix: Dilution:

1.0

Date Analyzed: 07/15/2008 2100 Date Prepared: 07/14/2008 0804

Analysis Batch: 680-111770 Prep Batch: 680-111394

Units: mg/L

Instrument ID: GC SemiVolatiles - S

Lab File ID: sg15014.d Initial Weight/Volume: 1000 mL Final Weight/Volume: 10 mL

Injection Volume: 1 uL Column ID: PRIMARY

Analyte

2,4-D Silvex (2,4,5-TP)

Surrogate DCAA

Result

< 0.00050 < 0.00050

% Rec

Qual

RL 0.00050

0.00050 Acceptance Limits

115

Lab Control Spike - Batch: 680-111394

Lab Sample ID: LCS 680-111394/13-A

Client Matrix: Water Dilution: 1.0

Date Analyzed: Date Prepared:

07/15/2008 2119 07/14/2008 0804 Analysis Batch: 680-111770 Prep Batch: 680-111394

Units: mg/L

Instrument ID: GC SemiVolatiles - S

Lab File ID: sg15015.d Initial Weight/Volume: 1000 mL Final Weight/Volume: 10 mL

Injection Volume:

61 - 120

Method: 8151A Preparation: 8151A

Column ID:

PRIMARY

Qual

Analyte

Surrogate

DCAA

2,4-D Silvex (2,4,5-TP) Spike Amount

0.00200

0.00200

Result 0.00244 0.00176

122 88

% Rec.

Limit 61 - 127 55 - 110

Acceptance Limits 61 - 120

% Rec

122 Χ

Client: Hercules Inc.

Job Number: 680-38282-1

Matrix Spike/

Matrix Spike Duplicate Recovery Report - Batch: 680-111394

Method: 8151A Preparation: 8151A

TCLP

MS Lab Sample ID:

680-38282-1 Solid

Analysis Batch: 680-111770

Instrument ID:

GC SemiVolatiles - S

Client Matrix:

Prep Batch: 680-111394

Lab File ID:

Dilution:

1.0

Initial Weight/Volume:

sg15027.d

Date Analyzed:

07/16/2008 0102

Final Weight/Volume:

10 mL 10 mL

Date Prepared: Date Leached:

07/14/2008 0804 07/07/2008 1400

Injection Volume: 1 uL

MSD Lab Sample ID:

680-38282-1

Leachate Batch: 680-110821

Column ID:

PRIMARY

Client Matrix:

Solid

Analysis Batch: 680-111770

Lab File ID: sg15028.d

Instrument ID: GC SemiVolatiles - S

Dilution:

1.0

Prep Batch: 680-111394

Initial Weight/Volume: 10 mL

10 mL

Date Analyzed: Date Prepared: Date Leached:

07/16/2008 0120 07/14/2008 0804 07/07/2008 1400

Leachate Batch: 680-110821

Final Weight/Volume: Injection Volume:

RPD Limit

1 uL

MS Qual MSD Qual

Column ID:

40

40

PRIMARY

Analyte 2,4-D Silvex (2,4,5-TP) Surrogate

% Rec. MS MSD Limit 104 112 61 - 127 77 86

55 - 110 12 MSD % Rec

RPD

Acceptance Limits

DCAA

93

MS % Rec

103

61 - 120

Client: Hercules Inc.

Job Number: 680-38282-1

Qual

TCLP SPLPE Leachate Blank - Batch: 680-110926

Method: 6010B Preparation: 3010A

TCLP

Lab Sample ID: LB 680-110821/16-C Client Matrix: Solid

Analysis Batch: 680-111168 Prep Batch: 680-110926

Instrument ID: ICP/AES - D Lab File ID: N/A

Dilution: 1.0

Units: mg/L

Initial Weight/Volume: 5 mL Final Weight/Volume: 50 mL

Date Analyzed: 07/09/2008 1857
Date Prepared: 07/08/2008 1634
Date Leached: 07/07/2008 1400

Leachate Batch: 680-110821

Analyte	Result Qual	RL
Arsenic	<0.20	0.20
Barium	<1.0	1.0
Cadmium	<0.10	0.10
Chromium	<0.20	0.20
Lead	<0.20	0.20
Selenium	<0.50	0.50
Silver	<0.10	0.10

Lab Control Spike - Batch: 680-110926

Method: 6010B Preparation: 3010A

Lab Sample ID: LCS 680-110926/15-A
Client Matrix: Water
Dilution: 1.0

Analysis Batch: 680-111168 Prep Batch: 680-110926

Instrument ID: ICP/AES - D Lab File ID: N/A

Date Analyzed: 07/09/2008 1902 Date Prepared: 07/08/2008 1634 Units: mg/L Initial Weight/Volume: 5 mL Final Weight/Volume: 50 mL

Analyte Spike Amount Result % Rec. Limit Arsenic 20.0 19.7 98 75 - 125 Barium 20.0 21.7 108 75 - 125 Cadmium 0.500 0.511 102 75 - 125 Chromium 2.00 2.00 100 75 - 125 Lead 5.00 5.03 101 75 - 125 Selenium 20.0 20.4 102 75 - 125 Silver 0.500 0.512 102 75 - 125

Client: Hercules Inc.

Job Number: 680-38282-1

TCLP SPLPE Leachate Blank - Batch: 680-111082

Method: 7470A Preparation: 7470A

Instrument ID: LEEMAN1

Final Weight/Volume:

Method: 7470A Preparation: 7470A

Lab File ID:

Initial Weight/Volume: 0.50 mL

TCLP

Lab File ID:

Lab Sample ID: LB 680-110821/16-F

Client Matrix:

Solid

Dilution: 1.0 Date Analyzed: 07/10/2008 1456

Date Prepared: 07/09/2008 1536

Date Leached: 07/07/2008 1400 Analysis Batch: 680-111272 Prep Batch: 680-111082

Units: mg/L

Leachate Batch: 680-110821

Analyte Mercury

Result

Analysis Batch: 680-111272

Prep Batch: 680-111082

< 0.020

Qual

RL

0.020

0.50 mL

50 mL

50 mL

Lab Control Spike - Batch: 680-111082

Lab Sample ID: LCS 680-111082/11-A

Client Matrix: Dilution:

Water

Date Analyzed: Date Prepared:

07/10/2008 1458

07/09/2008 1536

1.0

Spike Amount

Units: mg/L

Result

% Rec.

Limit

Instrument ID: LEEMAN1

Initial Weight/Volume:

Final Weight/Volume:

N/A

Qual

Analyte Mercury

0.250

0.243

97

80 - 120

Client: Hercules Inc.

Job Number: 680-38282-1

Method Blank - Batch: 680-110783

Method: 9014 Preparation: 7.3.3

Lab Sample ID: MB 680-110783/1-A

Client Matrix:

Solid

1.0

Dilution:

Date Analyzed:

07/07/2008 1029 Date Prepared: 07/07/2008 0800 Analysis Batch: 680-110785 Prep Batch: 680-110783

Units: mg/Kg

Instrument ID: No Equipment Assigned

Lab File ID: N/A

Method: 9014 Preparation: 7.3.3

Lab File ID:

Initial Weight/Volume:

Final Weight/Volume:

Initial Weight/Volume:

10.00 g

Final Weight/Volume: 250 mL

Analyte

Result

Qual

RL

Cyanide, Reactive

Analysis Batch: 680-110785

Prep Batch: 680-110783

<100

100

10.00 g

250 mL

Lab Control Spike - Batch: 680-110783

Lab Sample ID: LCS 680-110783/2-A Client Matrix:

Solid

Dilution:

Analyte

1.0

Date Analyzed: Date Prepared:

07/07/2008 1029 07/07/2008 0800

% Rec.

Limit

Cyanide, Reactive

Spike Amount

Units: mg/Kg

Result

10 - 120

Instrument ID: No Equipment Assigned

N/A

Qual

239

123

51

Duplicate - Batch: 680-110783

Preparation: 7.3.3

Method: 9014

Lab Sample ID: 680-38282-3

Date Prepared:

Solid

Client Matrix:

1.0

Dilution: Date Analyzed:

07/07/2008 1029

Prep Batch: 680-110783

Units: mg/Kg

Instrument ID: No Equipment Assigned Lab File ID:

N/A

10.27 g

Initial Weight/Volume: Final Weight/Volume:

250 mL

Analyte

07/07/2008 0800

Sample Result/Qual

Analysis Batch: 680-110785

Result

RPD

Limit

Qual

Cyanide, Reactive

<97

<97

NC

50

Client: Hercules Inc.

Job Number: 680-38282-1

Method Blank - Batch: 680-110787

Method: 9034 Preparation: 7.3.4

Lab Sample ID:

MB 680-110787/1-A

Client Matrix:

Solid

Dilution:

1.0

Date Analyzed: Date Prepared:

07/07/2008 1108

07/07/2008 0800

Analysis Batch: 680-110791 Prep Batch: 680-110787

Units: mg/Kg

Instrument ID: No Equipment Assigned

Lab File ID: N/A

Initial Weight/Volume:

10.00 g Final Weight/Volume: 250 mL

Analyte

Result

Qual

RL

Sulfide, Reactive

<50

50

Lab Control Spike - Batch: 680-110787

Method: 9034 Preparation: 7.3.4

Lab Sample ID: LCS 680-110787/2-A

Client Matrix: Dilution:

Solid 1.0

Date Analyzed:

07/07/2008 1108

Date Prepared: 07/07/2008 0800 Analysis Batch: 680-110791 Prep Batch: 680-110787

Units: mg/Kg

Instrument ID: No Equipment Assigned

Lab File ID: N/A

Initial Weight/Volume: 10.00 g

Final Weight/Volume: 250 mL

Analyte

Spike Amount

Result

% Rec.

Limit

Sulfide, Reactive

2660

1480

56

40 - 120

Qual

Duplicate - Batch: 680-110787

Method: 9034 Preparation: 7.3.4

Lab Sample ID: 680-38282-3

Client Matrix: Dilution:

Solid

1.0

Date Analyzed: 07/07/2008 1108

Date Prepared: 07/07/2008 0800

Analysis Batch: 680-110791 Prep Batch: 680-110787

Units: mg/Kg

Instrument ID: No Equipment Assigned

Lab File ID: Initial Weight/Volume:

10.27 g

Final Weight/Volume:

250 mL

Analyte

Sample Result/Qual

Result

RPD

Qual

Sulfide, Reactive

<48

<49

NC

Limit 50

Client: Hercules Inc. Job Number: 680-38282-1

Lab Control Spike - Batch: 680-110751 Method: 9045C

Preparation: N/A

Lab Sample ID: LCS 680-110751/1 Analysis Batch: 680-110751 Instrument ID: GE pH Meter #2
Client Matrix: Solid Prep Batch: N/A Lab File ID: N/A

Dilution: 1.0 Units: SU Initial Weight/Volume: 20.00 g

Date Analyzed: 07/06/2008 0403 Final Weight/Volume: 20.00 mL Date Prepared: N/A

Analyte Spike Amount Result % Rec. Limit Qual

pH 7.00 7.080 101 63 - 158

Duplicate - Batch: 680-110751 Method: 9045C Preparation: N/A

6.89

 Lab Sample ID:
 680-38282-3
 Analysis Batch:
 680-110751
 Instrument ID:
 GE pH Meter #2

Client Matrix: Solid Prep Batch: N/A Lab File ID: N/A
Dilution: 1.0 Units: SU Initial Weight/Volume: 20.03 g

Date Analyzed: 07/06/2008 0403 Final Weight/Volume: 20.00 mL

Date Prepared: N/A

Analyte Sample Result/Qual Result RPD Limit Qual

6.870

0

40

Calculations are performed before rounding to avoid round-off errors in calculated results.

pН

Serial Number 007855

ANALYSIS REQUEST AND CH	HAIN OF CUSTODY	RECORD	O	TestAm	arios	Carana	a b	-	101111		00				
<u>TestAmerica</u>				5102 La Savann	Roche	Avenue	e 				Website Phone: (Fax: (91	(912) 35		c.com	
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Login Sample Receipt Check List

Client: Eco-Systems, Inc.

Job Number: 680-38282-1

Login Number: 38282 Creator: Hail, Karl I List Number: 1

List Source: TestAmerica Savannah

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	Continent
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	One cooler rec'd on ice.
Cooler Temperature is acceptable.	True	and additified diffice.
Cooler Temperature is recorded.	True	1.6 C
COC is present.	True	1.0 C
COC is filled out in ink and legible.		
COC is filled out with all pertinent information.	True True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.		
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested	True	
MO/MODS	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	N/A	
	IV/A	



ATTACHMENT D ANALYTICAL RESULTS - JULY 30, 2008

Return Address:

TestAmerica Savannah 5102 LaRoche Avenue Savannah, GA 31404

Ship To:

ECO-SYSTEMS, INC. c/o: MR. CHARLES CONEY 6360 I-55 NORTH SUITE 330 JACKSON, MS 39211



ANALYTICAL REPORT

Job Number: 680-39035-1

Job Description: HERC Hattiesburg SS1 TCLP VOC 7/30/08

For:

Hercules Inc.
Research Center - Bldg 8139/15
500 Hercules Road
Wilmington, DE 19808-1599

Attention: Mr. Timothy Hassett

Lidya gricia

Lidya Gulizia
Project Manager I
Iidya.gulizia@testamericainc.com
08/07/2008

cc: Mr. Charles Coney

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory. All questions regarding this test report should be directed to the TestAmerica Project Manager who signed this test report.



METHOD SUMMARY

Client: Hercules Inc.

Job Number: 680-39035-1

Description	Lab Location	Method	Preparation Method
Matrix Solid			
Volatile Organic Compounds by GC/MS Toxicity Characteristic Leaching Procedure (ZHE)	TAL SAV TAL SAV	SW846 8260B	SW846 1311
Purge and Trap on Leachates	TAL SAV		SW846 5030B

Lab References:

TAL SAV = TestAmerica Savannah

Method References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

METHOD/ANALYST SUMMARY

Client: Hercules Inc.

Job Number: 680-39035-1

 Method
 Analyst
 Analyst ID

 SW846
 8260B
 Lui, Chung
 CL

SAMPLE SUMMARY

Client: Hercules Inc.

Job Number: 680-39035-1

Lab Sample ID	Sample ID Client Sample ID Client Matrix		Date/Time Sampled	Date/Time Received	
680-39035-1	HER-SS1-073008	Solid	07/30/2008 1105	07/31/2008 0908	•

Analytical Data

Client: Hercules Inc.

Job Number: 680-39035-1

Client Sample ID:

HER-SS1-073008

Lab Sample ID:

680-39035-1

Client Matrix:

Solid

Date Sampled:

07/30/2008 1105

Date Received:

07/31/2008 0908

8260B Volatile Organic Compounds by GC/MS-TCLP

Method: Preparation: 8260B

Analysis Batch: 680-113740

Instrument ID:

GC/MS Volatiles - P

Dilution:

5030B 20

Leachate Batch: 680-113633

Lab File ID:

p1891.d

Date Analyzed:

08/07/2008 1409

Initial Weight/Volume: Final Weight/Volume:

5 mL

Date Prepared:

08/07/2008 1409

5 mL

Date Leached:

08/05/2008 1820

Analyte	DryWt Corrected: N Result (mg/L)	Qualifier	RL
Benzene	0.44	** ** * *** *** *** *** *** *** *** **	er were and the second of the
Carbon tetrachloride	<0.020		0.020
Chlorobenzene	<0.020		0.020
Chloroform	0.043		0.020
1.2-Dichloroethane	<0.020		0.020
1,1-Dichloroethene	· · ·		0.020
2-Butanone (MEK)	<0.020		0.020
Tetrachloroethene	<0.20		0.20
Trichloroethene	<0.020		0.020
Vinyl chloride	<0.020		0.020
Vinyi Cilionae	<0.020		0.020
Surrogate	%Rec		Accontanno Limita
4-Bromofluorobenzene	91	and the second of the second o	Acceptance Limits
Dibromofluoromethane	89		75 - 120
Toluene-d8 (Surr)	96		75 - 121
	90		75 - 120

QUALITY CONTROL RESULTS

Client: Hercules Inc.

Job Number: 680-39035-1

Surrogate Recovery Report

8260B Volatile Organic Compounds by GC/MS

Client Matrix: Solid TCLP

Lab Sample ID	Client Sample ID	BFB %Rec	DBFM %Rec	TOL %Rec
680-39035-1	HER-SS1-073008	91	89	96
MB 680-113740/6		88	93	95
LB 680-113633/14-A		92	92	96
LCS 680-113740/3		92	104	98
LCSD 680-113740/4		92	102	97

Surrogate	Acceptance Limits
BFB = 4-Bromofluorobenzene	75-120
DBFM = Dibromofluoromethane	75-121
TOL = Toluene-d8 (Surr)	75-120

Client: Hercules Inc.

Job Number: 680-39035-1

Surrogate Recovery Report

8260B Volatile Organic Compounds by GC/MS

Client Matrix: Water

		BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	%Rec	%Rec	%Rec
MB 680-113739/6		91	92	97

Surrogate	Acceptance Limits
BFB = 4-Bromofluorobenzene	75-120
DBFM = Dibromofluoromethane	75-121
OL = Toluene-d8 (Surr)	75-120

Client: Hercules Inc.

Job Number: 680-39035-1

Method Blank - Batch: 680-113739

Method: 8260B Preparation: 5030B

Lab Sample ID: MB 680-113739/6

Analysis Batch: 680-113739

Client Matrix:

Water

Instrument ID: GC/MS Volatiles - P C2

Dilution:

Prep Batch: N/A

Lab File ID:

pq814.d

1.0

Units: mg/L

Initial Weight/Volume: 5 mL

Date Analyzed: Date Prepared:

4-Bromofluorobenzene

Dibromofluoromethane

Toluene-d8 (Surr)

08/07/2008 1202 08/07/2008 1202

Final Weight/Volume: 5 mL

Acceptance Limits

75 - 120

75 - 121

75 - 120

Analyte	Result	Qual	DI
Benzene Carbon tetrachloride Chlorobenzene Chloroform 1,2-Dichloroethane 1,1-Dichloroethene 2-Butanone (MEK) Tetrachloroethene Trichloroethene Vinyl chloride	<0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010		RL 0.0010 0.0010 0.0010 0.0010 0.0010 0.010 0.0010 0.0010
Surrogate	<0.0010 % Rec	Acceptance Limits	0.0010

91

92

97

Client: Hercules Inc. Job Number: 680-39035-1

TCLP SPLPE Leachate Blank - Batch: 680-113739

Method: 8260B Preparation: 5030B

TCLP

Lab Sample ID: LB 680-113633/14-A

Analysis Batch: 680-113739

Instrument ID: GC/MS Volatiles - P C2

Client Matrix: Solid

Prep Batch: N/A

Lab File ID: p1886.d

Dilution: 20

Units: mg/L

Initial Weight/Volume: 5 mL

Date Analyzed: 08/07/2008 1254

Final Weight/Volume: 5 mL

Date Prepared: 08/07/2008 1254 Date Leached: 08/05/2008 1820

Leachate Batch: 680-113633

Analyte	Result	Qual	RL
Benzene Carbon tetrachloride Chlorobenzene Chloroform 1,2-Dichloroethane 1,1-Dichloroethene 2-Butanone (MEK) Tetrachloroethene Trichloroethene	<0.020 <0.020 <0.020 <0.020 <0.020 <0.020 <0.020 <0.020 <0.020		0.020 0.020 0.020 0.020 0.020 0.020 0.020 0.20 0.020
Vinyl chloride Surrogate	<0.020 % Rec	A	0.020 0.020
4-Bromofluorobenzene Dibromofluoromethane Toluene-d8 (Surr)	92 92 96	Acceptance Limits 75 - 120 75 - 121 75 - 120	and the second s

Client: Hercules Inc.

Job Number: 680-39035-1

Method Blank - Batch: 680-113740

Method: 8260B Preparation: 5030B

Lab Sample ID: MB 680-113740/6

Analysis Batch: 680-113740

Client Matrix:

Water

Prep Batch: N/A

Lab File ID:

Instrument ID: GC/MS Volatiles - P pq815.d

Dilution:

1.0

Initial Weight/Volume: 5 mL

Date Analyzed: 08/07/2008 1217

Units: mg/L

Final Weight/Volume: 5 mL

75 - 121

75 - 120

Dibromofluoromethane

Toluene-d8 (Surr)

Date Prepared: 08/07/2008 1217

Analyte	Result	Qual	RL
Benzene	<0.0010	A CONTRACTOR OF THE STREET	managara a sa
Carbon tetrachloride	<0.0010		0.0010
Chlorobenzene	<0.0010		0.0010
Chloroform			0.0010
1,2-Dichloroethane	<0.0010		0.0010
1,1-Dichloroethene	<0.0010		0.0010
	<0.0010		0.0010
2-Butanone (MEK)	<0.010		0.010
Tetrachloroethene	<0.0010		0.0010
Trichloroethene	<0.0010		0.0010
Vinyl chloride	<0.0010		0.0010
Surrogate	% Rec	Acceptan	ce Limits
4-Bromofluorobenzene	88	75 -	Commence of the Commence of th

93

95

Client: Hercules Inc.

Job Number: 680-39035-1

Lab Control Spike/

Lab Control Spike Duplicate Recovery Report - Batch: 680-113740

Method: 8260B Preparation: 5030B

LCS Lab Sample ID: LCS 680-113740/3

Client Matrix:

Water

Dilution: 1.0

Date Analyzed: 08/07/2008 0944

Date Prepared:

08/07/2008 0944

Analysis Batch: 680-113740

Prep Batch: N/A

Units: mg/L

Instrument ID: Lab File ID:

GC/MS Volatiles - P

Initial Weight/Volume:

pq805.d

5 mL

Final Weight/Volume:

5 mL

LCSD Lab Sample ID: LCSD 680-113740/4

Water

Client Matrix: Dilution:

1.0

Date Analyzed: 08/07/2008 1014 Date Prepared: 08/07/2008 1014 Analysis Batch: 680-113740

Prep Batch: N/A

Units: mg/L

Instrument ID:

GC/MS Volatiles - P

Lab File ID:

pq807.d

Initial Weight/Volume:

5 mL

Final Weight/Volume:

		% Rec.					
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Benzene	96	93	77 - 119	3	30		
Carbon tetrachloride	114	112	71 - 135	2	30		
Chlorobenzene	97	95	85 - 116	2	30		
Chloroform	114	108	82 - 120	5	30		
1,2-Dichloroethane	94	91	66 - 132	3	30		
1,1-Dichloroethene	109	112	62 - 141	3	30		
2-Butanone (MEK)	90	85	33 - 157	5	30		
Tetrachloroethene	104	104	76 - 126	0	30		
Trichloroethene	101	98	84 - 115	3	30		
Vinyl chloride	104	98	59 - 14 4	7	50 50		
Surrogate	L	CS % Rec	LCSD %	Rec	Accept	tance Limits	
4-Bromofluorobenzene	9:	2	92	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	in the state of the	5 - 120	the second of the second
Dibromofluoromethane	10	04	102			5 - 120 5 - 121	
Toluene-d8 (Surr)	98	3	97			5 - 120	

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Login Sample Receipt Check List

Client: Eco-Systems, Inc.

Job Number: 680-39035-1

Login Number: 39035 Creator: Hall, Karl I

List Source: TestAmerica Savannah

Creator: Hall, K List Number: 1

Radioactivity either was not measured or, if measured, is at or below background The cooler's custody seal, if present, is intact. True The cooler or samples do not appear to have been compromised or tampered with. Samples were received on ice. Cooler Temperature is acceptable. Cooler Temperature is recorded. COC is present. COC is present. COC is filled out in ink and legible. COC is filled out with all pertinent information. True COC is filled out with all pertinent information. True There are no discrepancies between the sample IDs on the containers and the COC. Samples are received within Holding Time. Sample containers have legible labels. Containers are not broken or leaking. Sample collection date/times are provided. Appropriate sample containers are used. Sample bottles are completely filled. True There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	
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Appropriate sample containers are used. Sample bottles are completely filled. True There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	
Sample bottles are completely filled. True There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	
There is sufficient vol. for all requested analyses, incl. any requested True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in True	
if necessary, staff have been informed of any short hold time or quick TAT True	
Multiphasic samples are not present. N/A	
Samples do not require splitting or compositing. N/A	

Serial Number 005570

ANALYSIS REQUEST AND CHAIN OF CUSTODY	DECORD			ochai Mullibei (30337	U		
TestAmerica	HECORD	TestAmerica 5102 LaRoche Savannah, GA	Avenue	Pt	Website: www.testamericainc.com Phone: (912) 354-7858 Fax: (912) 352-0165			
THE LEADER IN ENVIRONMENTAL TESTING		Alternate Labo	ratory Name/		one: x:			
HER 25080-CG MS (STATE)	MATRIX TYPE		REQUI	RED ANALYSIS		PAGE	OF	
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SIGNATURE) / COSTODY INTACT	CUSTODY SEAL NO.	SAVANNAH LOG NO. LATO 3 9035	LABORATORY	REMARKS				

BONNER ANALYTICAL TESTING COMPANY QUANTITATIVE RESULTS AND QUALITY ASSURANCE DATA VOLATILE ORGANICS - GC/MS ANALYSIS DATA

	Client: Hercules Inc. Location: HER-551-073008 File #: 0807416-01	Collected: 07/30/08 11:05 Client Sample Type: TCLP Extracted 08/06/08 17:10 MGJ Analysis Method: 82608 Analyzed: 08/08/08 23:50 MGJ Project Number: 807416 Date Time Analyst	
1		SAMPLE SLANK	

			Detected	SAMPLE		D-tt-2	BLANK			TRIX SPIKE		MATR	IX SPIKE D	UP
	MDL	Regulatory			T —	Detected Amount	ļ		Detected	5	pike	Detected		pike
Compound Name	ug/L (ppb)	Limit (ppb)	Limit (ppb)	Amount ug	% Recovery	Limit (ppb)	Amount ug	% Recovery	Amount Limit (ppb)	Amount ng	% Recovery	Amount Limit (ppb)	Amount ng	% Recover
D029 1,1-Dichloroethene D018 Benzene D040 Trichloroethene D021 Chlorobenzene D043 Vinyl Chloride D035 2-Butanone (MEK) D022 Chloroform D019 Carbon Tetrachloride D028 1,2-Dichloroethene	108 64.0 84.0 66.0 76.0 1000 70.0 72.0 78.0 108	700 500 500 100000 200 200000 6000 500 500 700	ND 526 ND ND ND ND ND ND ND ND			00 00 00 00 00 00 00 00 00			48.6 59.1 54.3 52.8 ND ND ND ND ND	250.0 250.0 250.0 250.0 250.0	97.1 118 109 106	55.1 55.2 48.2 49.6 ND ND ND ND	250.0 250.0 250.0 250.0	110 110 96:3 99.2
Surrogate Compounds			Detected Amount	Spiked Amount	% Recovery	Detected Amount	Spiked Amount	% Recovery	Detected Amount	Spiked Amount	% Recovery	ND Detected Amount	Spiked Amount	* Passyum
2-Dichloroethane-d4 ibromofluoromethane oluene-d8 -Bromofluorobenzene			46.4 48.7 49.0 45.5	250.0 250.0 250.0 250.0	92.8 97.4 98.0 91.0	49.0 51.4 49.5 48.6	250.0 250.0 250.0 250.0	98.0 103 99.0 97.3	48.6 48.8 48.9 47.7	250.0 250.0 250.0 250.0	97.2 97.6 97.8 95.4	45.9 48.8 48.4 47.1	250.0 250.0 250.0 250.0 250.0	93.8 97.6 96.8 94.2

Certified by:

Michael S. Bonner, Ph. D.

Bonner Analytical Testing Company



ATTACHMENT E ANALYTICAL RESULTS - SEPTEMBER 4, 2008

Return Address:

TestAmerica Savannah 5102 LaRoche Avenue Savannah, GA 31404

Ship To:

ECO-SYSTEMS, INC. c/o: MR. CHARLES CONEY 6360 I-55 NORTH SUITE 330 JACKSON, MS 39211



ANALYTICAL REPORT

Job Number: 680-40137-1

Job Description: HERC Hattiesburg Soils TCLP/VOC 9/4/08

For:

Hercules Inc.

Research Center - Bldg 8139/15 500 Hercules Road Wilmington, DE 19808-1599

Attention: Mr. Timothy Hassett

Lideja galieia

Lidya Gulizia Project Manager I lidya.gulizia@testamericainc.com 09/16/2008

cc: Mr. Charles Coney

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory. All questions regarding this test report should be directed to the TestAmerica Project Manager who signed this test report.



METHOD SUMMARY

Client: Hercules Inc.

Job Number: 680-40137-1

Description	Lab Location	Method	Preparation Method
Matrix: Solid			
Volatile Organic Compounds by GC/MS TCLP for Volatiles by Zero-Headspace Extraction (ZHE) Purge and Trap on Leachates	TAL SAV TAL SAV TAL SAV	SW846 8260B	SW846 1311 SW846 5030B

Lab References:

TAL SAV = TestAmerica Savannah

Method References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

METHOD / ANALYST SUMMARY

Client: Hercules Inc.

Job Number: 680-40137-1

 Method
 Analyst
 Analyst ID

 SW846
 8260B
 Lui, Chung
 CL

SAMPLE SUMMARY

Client: Hercules Inc.

Job Number: 680-40137-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
680-40137-1	HER-SS5-090408	Solid	09/04/2008 1253	09/05/2008 0900
680-40137-2	HER-SS6-090408	Solid	09/04/2008 1300	09/05/2008 0900
680-40137-3	HER-SS7-090408	Solid	09/04/2008 1315	09/05/2008 0900
680-40137-4	HER-SS8-090408	Solid	09/04/2008 1325	09/05/2008 0900
680-40137-5	HER-SS9-090408	Solid	09/04/2008 1335	09/05/2008 0900
680-40137-6	HER-SS10-090408	Solid	09/04/2008 1348	09/05/2008 0900

SAMPLE RESULTS

Client: Hercules Inc.

Job Number: 680-40137-1

Client Sample ID:

HER-SS5-090408

Lab Sample ID:

680-40137-1

Client Matrix:

Solid

Date Sampled:

09/04/2008 1253

Date Received:

09/05/2008 0900

8260B Volatile	Organic	Compounds	by GC/MS-TCLP
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Method: Preparation: 8260B

Analysis Batch: 680-117245

Instrument ID:

GC/MS Volatiles - P C2

Dilution:

5030B

Lab File ID:

p0014.d

75 - 120

20

Leachate Batch: 680-116608

Initial Weight/Volume:

5 mL

Date Analyzed:

09/12/2008 1832

Final Weight/Volume:

5 mL

Date Prepared: Date Leached:

09/12/2008 1832 09/08/2008 1610

Analyte	DryWt Corrected: N Result (mg/L)	Qualifier	DI.
Benzene	5.5	E	RL
Carbon tetrachloride	<0.020	_	0.020
Chlorobenzene	<0.020		0.020
Chloroform	· · · · · · ·		0.020
1,2-Dichloroethane	<0.020		0.020
1,1-Dichloroethene	<0.020		0.020
2-Butanone (MEK)	<0.020		0.020
• ,	<0.20		0.20
Tetrachloroethene	<0.020		0.020
Trichloroethene	<0.020		· ·
Vinyl chloride	<0.020		0.020
			0.020
Surrogate	%Rec		
4-Bromofluorobenzene Dibromofluoromethane	AND THE CONTRACT AND DESCRIPTION OF THE PROPERTY OF THE CONTRACT OF THE CONTRA		cceptance Limits
	94		75 - 120
Toluene-d8 (Surr)	104		75 - 121
10146116-46 (0011)	100		75 - 120

Client: Hercules Inc.

Job Number: 680-40137-1

Client Sample ID:

HER-SS5-090408

Lab Sample ID:

680-40137-1

Client Matrix:

Solid

Date Sampled:

09/04/2008 1253

Date Received:

09/05/2008 0900

Method: Preparation: 8260B

Instrument ID:

GC/MS Volatiles - P

5030B

Analysis Batch: 680-117287

Lab File ID:

p0067.d

Dilution:

50

Leachate Batch: 680-116608

Initial Weight/Volume:

5 mL

Date Analyzed:

09/15/2008 1809

Run Type: DL

Final Weight/Volume:

5 mL

Date Prepared: Date Leached:

09/15/2008 1809 09/08/2008 1610

Analyte DryWt Corrected: N Result (mg/L) Qualifier RL Benzene 5.5 D Carbon tetrachloride 0.050 <0.050 0.050 Chlorobenzene < 0.050 0.050 Chloroform <0.050 0.050 1,2-Dichloroethane <0.050 0.050 1,1-Dichloroethene <0.050 2-Butanone (MEK) 0.050 <0.50 Tetrachloroethene 0.50 < 0.050 0.050 Trichloroethene <0.050 0.050 Vinyl chloride < 0.050 0.050

Surrogate	%Rec	
4-Bromofluorobenzene		Acceptance Limits
Dibromofluoromethane	•••	75 - 120
Toluene-d8 (Surr)	96	75 - 121
· olderic do (Odit)	98	75 - 120

Client: Hercules Inc.

Job Number: 680-40137-1

Client Sample ID:

HER-SS6-090408

Lab Sample ID:

680-40137-2

Client Matrix:

Solid

Date Sampled:

09/04/2008 1300

Date Received:

09/05/2008 0900

8260B Volatile Organic Compounds by GC/MS-TCLP

Method: Preparation: 8260B

Analysis Batch: 680-117245

Instrument ID:

GC/MS Volatiles - P C2

Preparation
Dilution:

5030B

Lab File ID:

p0016.d

Date Analyzed:

20

Leachate Batch: 680-116608

Initial Weight/Volume:

e: 5 mL

Date Prepared:

09/12/2008 1901 09/12/2008 1901

Final Weight/Volume:

5 mL

Date Leached: 09/08/2008 1610

Analyte DryWt Corrected: N Result (mg/L) Qualifier RL Benzene 3.2 0.020 Carbon tetrachloride <0.020 0.020 Chlorobenzene < 0.020 0.020 Chloroform <0.020 0.020 1,2-Dichloroethane <0.020 0.020 1,1-Dichloroethene < 0.020 0.020 2-Butanone (MEK) <0.20 Tetrachloroethene 0.20 <0.020 0.020 Trichloroethene < 0.020 0.020 Vinyl chloride < 0.020 0.020

 Surrogate
 %Rec
 Acceptance Limits

 4-Bromofluorobenzene
 93
 75 - 120

 Dibromofluoromethane
 103
 75 - 121

 Toluene-d8 (Surr)
 100
 75 - 120

Client: Hercules Inc.

Job Number: 680-40137-1

Client Sample ID:

HER-SS7-090408

Lab Sample ID:

680-40137-3

Client Matrix:

Solid

Date Sampled:

09/04/2008 1315

Date Received:

09/05/2008 0900

8260B Volatile Organic Compounds by GC/MS-TCLP

Method: Preparation: 8260B

Analysis Batch: 680-117245

Instrument ID:

GC/MS Volatiles - P C2

5030B

Lab File ID:

p0018.d

Dilution:

20

Leachate Batch: 680-116608

Initial Weight/Volume:

5 mL

Date Analyzed:

09/12/2008 1931 09/12/2008 1931

Final Weight/Volume:

5 mL

Date Prepared: Date Leached:

09/08/2008 1610

Analyte	DryWt Corrected: N Result (mg/L)	Qualifier	DI
Benzene Carbon tetrachloride Chlorobenzene Chloroform 1,2-Dichloroethane 1,1-Dichloroethene 2-Butanone (MEK)	0.40 <0.020 <0.020 <0.020 <0.020 <0.020	Qualifier	RL 0.020 0.020 0.020 0.020 0.020 0.020
Tetrachloroethene Trichloroethene Vinyl chloride	<0.20 <0.020 <0.020 <0.020		0.20 0.020 0.020 0.020 0.020

Surrogate 4-Bromofluorobenzene Dibromofluoromethane Toluene-d8 (Surr)	%Rec 95 103 100	Acceptance Limits 75 - 120 75 - 121
	100	75 - 120

Client: Hercules Inc.

Job Number: 680-40137-1

Client Sample ID:

HER-SS8-090408

Lab Sample ID:

680-40137-4

Client Matrix:

000-40137-

Solid

Date Sampled:

09/04/2008 1325

Date Received:

09/05/2008 0900

8260B Volatile Organic Compounds by GC/MS-TCLP

Method: Preparation: 8260B

Analysis Batch: 680-117245

Instrument ID:

GC/MS Volatiles - P C2

n reparation

5030B

Lab File ID:

p0020.d

Dilution:

20

Leachate Batch: 680-116608

Initial Weight/Volume:

: 5 mL

Date Analyzed: Date Prepared: 09/12/2008 2000 09/12/2008 2000

Final Weight/Volume:

5 mL

Date Leached:

09/08/2008 1610

Analyte	DryWt Corrected: N Result (mg/L)	Qualifier RL
Benzene	3.2	The second of th
Carbon tetrachloride	0.14	0.020
Chlorobenzene	<0.020	0.020
Chloroform		0.020
1,2-Dichloroethane	2.6	0.020
1,1-Dichloroethene	<0.020	0.020
	<0.020	0.020
2-Butanone (MEK)	<0.20	0.20
Tetrachloroethene	<0.020	0.020
Trichloroethene	<0.020	
Vinyl chloride	<0.020	0.020
	***************************************	0.020
Surrogate 4-Bromofluorobenzene	%Rec	Acceptance Limits
Dibromofluoromethane	95	75 - 120
Toluene-d8 (Surr)	103	75 - 121
roluerie-do (Sult)	103	75 - 120

Client: Hercules Inc.

Job Number: 680-40137-1

Client Sample ID:

HER-SS9-090408

Lab Sample ID:

680-40137-5

Client Matrix:

Solid

Date Sampled:

09/04/2008 1335

Date Received:

75 - 120

09/05/2008 0900

8260B Volatile	Organic Compounds	by GC/MS-TCLP
----------------	-------------------	---------------

Method: Preparation: 8260B

Analysis Batch: 680-117245

Instrument ID:

5030B

Lab File ID:

GC/MS Volatiles - P C2 p0022.d

Dilution:

20

Leachate Batch: 680-116608

Initial Weight/Volume:

5 mL

Date Analyzed: Date Prepared:

09/12/2008 2030 09/12/2008 2030

Final Weight/Volume:

5 mL

Date Leached:

09/08/2008 1610

Analyte	DryWt Corrected: N Result (mg/L)	Qualifier	DI
Benzene	0.043		RL STATE OF THE ST
Carbon tetrachloride	<0.020		0.020
Chlorobenzene			0.020
Chloroform	<0.020		0.020
1,2-Dichloroethane	<0.020		0.020
1,1-Dichloroethene	<0.020		0.020
	<0.020		0.020
2-Butanone (MEK)	<0.20		0.20
Tetrachloroethene	<0.020		
Trichloroethene	<0.020		0.020
Vinyl chloride	<0.020		0.020
	0.025		0.020
Surrogate	%Rec		
4-Bromofluorobenzene	to the two sections are an experienced as a second contract of the s	The second secon	Acceptance Limits
Dibromofluoromethane	94	***	75 - 120
Toluene-d8 (Surr)	104		75 - 121
i viderie-do (Suit)	100		75 100

100

Client: Hercules Inc.

Job Number: 680-40137-1

Client Sample ID:

HER-SS10-090408

Lab Sample ID:

680-40137-6

Client Matrix:

Solid

Date Sampled:

09/04/2008 1348

Date Received:

09/05/2008 0900

8260B Volatile Organic Compounds by GC/MS-TCLP

Method:

8260B

Analysis Batch: 680-117245

Instrument ID:

GC/MS Volatiles - P C2

Preparation:

5030B

7 daily 515 Datch. 660-11/245

Lab File ID:

p0024.d

Dilution:

20

Leachate Batch: 680-116608

Initial Weight/Volume:

5 mL

Date Analyzed: Date Prepared: 09/12/2008 2059 09/12/2008 2059

Final Weight/Volume:

5 mL

Date Leached:

09/08/2008 1610

Analyte	DryWt Corrected: N Result (mg/L)	Qualifier	DI
Benzene	0.062	The state of the s	RL 0.020
Carbon tetrachloride	<0.020		
Chlorobenzene			0.020
Chloroform	<0.020		0.020
1,2-Dichloroethane	<0.020		0.020
1,1-Dichloroethene	<0.020		0.020
	<0.020		0.020
2-Butanone (MEK)	<0.20		0.20
Tetrachloroethene	<0.020		0.020
Trichloroethene	<0.020		
Vinyl chloride	<0.020		0.020
	-0.020		0.020
Surrogate	%Rec		
4-Bromofluorobenzene			Acceptance Limits
	92		75 - 120

%Rec 92 103 101

75 - 120 75 - 121

75 - 120

DATA REPORTING QUALIFIERS

Client: Hercules Inc.

Job Number: 680-40137-1

Lab Section	Qualifier	Description
GC/MS VOA		
	E	Result exceeded calibration range, secondary dilution required.
	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.

QUALITY CONTROL RESULTS

Client: Hercules Inc.

Job Number: 680-40137-1

Surrogate Recovery Report

8260B Volatile Organic Compounds by GC/MS

Client Matrix: Solid TCLP

Lab Carreta ID	A. –	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	%Rec	%Rec	%Rec
680-40137-1 DL	HER-SS5-090408 DL	90	96	98
680-40137-1	HER-SS5-090408	94	104	100
680-40137-2	HER-SS6-090408	93	103	100
680-40137-3	HER-SS7-090408	95	103	100
680-40137-4	HER-SS8-090408	95	103	103
680-40137-5	HER-SS9-090408	94	104	100
680-40137-6	HER-SS10-090408	92	103	101
MB 680-117245/10		93	104	99
MB 680-117287/12		91	97	96
LB 680-116608/10-A		94	106	101
LCS 680-117245/7		90	101	99
LCS 680-117287/9		91	98	96
LCSD 680-117245/8		96	103	101
LCSD 680-117287/10		89	93	94
		00	90	34

Surrogate	Acceptance Limits
BFB = 4-Bromofluorobenzene	75-120
DBFM = Dibromofluoromethane	75-121
TOL = Toluene-d8 (Surr)	75-120

Client: Hercules Inc.

Job Number: 680-40137-1

Method Blank - Batch: 680-117245

Method: 8260B Preparation: 5030B

Lab Sample ID: MB 680-117245/10

Client Matrix: Water

Dilution: 1.0

Date Prepared: 09/12/2008 1505

Date Analyzed: 09/12/2008 1505

Analysis Batch: 680-117245

Prep Batch: N/A

Units: mg/L

Instrument ID: GC/MS Volatiles - P C2

Lab File ID: pq116.d

Initial Weight/Volume: 5 mL Final Weight/Volume: 5 mL

Analyte	Result	Qual	RL
Benzene Carbon tetrachloride Chlorobenzene Chloroform 1,2-Dichloroethane 1,1-Dichloroethene 2-Butanone (MEK) Tetrachloroethene Trichloroethene Vinyl chloride	<0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010		0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.010 0.0010 0.0010
Surrogate 4-Bromofluorobenzene Dibromofluoromethane Toluene-d8 (Surr)	% Rec 93 104 99	Acceptance Limits 75 - 120 75 - 121 75 - 120	0.0010

Client: Hercules Inc.

Job Number: 680-40137-1

TCLP SPLPE Leachate Blank - Batch: 680-117245

Method: 8260B Preparation: 5030B

TCLP

Lab Sample ID: LB 680-116608/10-A Client Matrix: Solid

Analysis Batch: 680-117245

Instrument ID: GC/MS Volatiles - P C2

Prep Batch: N/A

Lab File ID: p0002.d

Dilution: 20

Units: mg/L

Initial Weight/Volume: 5 mL

Date Analyzed: 09/12/2008 1534

Final Weight/Volume: 5 mL

Date Leached: 09/08/2008 1610

Date Prepared: 09/12/2008 1534

Leachate Batch: 680-116608

Analyte	Result	Qual	RL
Benzene	<0.020		The second of th
Carbon tetrachloride	<0.020		0.020
Chlorobenzene			0.020
Chloroform	<0.020		0.020
1,2-Dichloroethane	<0.020		0.020
1,1-Dichloroethene	<0.020		0.020
	<0.020		0.020
2-Butanone (MEK)	<0.20		0.20
Tetrachloroethene	<0.020		0.020
Trichloroethene	<0.020		
Vinyl chloride	<0.020		0.020
	10.020		0.020
Surrogate	% Rec	Accep	tance Limits
4-Bromofluorobenzene	94	The state of the second	Control of the Contro
Dibromofluoromethane			5 - 120
Toluene-d8 (Surr)	106	7:	5 - 121
· oracito do (odil)	101	7:	5 - 120

Client: Hercules Inc.

Job Number: 680-40137-1

Lab Control Spike/

Lab Control Spike Duplicate Recovery Report - Batch: 680-117245

Method: 8260B

LCS Lab Sample ID: LCS 680-117245/7

Preparation: 5030B

Client Matrix:

Water

Analysis Batch: 680-117245

Instrument ID:

GC/MS Volatiles - P C2

Prep Batch: N/A

Lab File ID:

pq108.d

Dilution:

1.0

Units: mg/L

Initial Weight/Volume:

5 mL

Date Analyzed: Date Prepared:

09/12/2008 1302 09/12/2008 1302

Final Weight/Volume:

5 mL

LCSD Lab Sample ID: LCSD 680-117245/8

Analysis Batch: 680-117245

Instrument ID:

GC/MS Volatiles - P C2

Client Matrix: Dilution:

Water 1.0

Prep Batch: N/A Units: mg/L

Lab File ID:

pq110.d

Date Analyzed:

09/12/2008 1332

Initial Weight/Volume:

5 mL

Date Prepared:

09/12/2008 1332

Final Weight/Volume:

5 mL

		<u>% Rec.</u>					
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Benzene	97	99	77 - 119	3	30		
Carbon tetrachloride	108	109	71 - 135	0			
Chlorobenzene	99	102	85 - 116	3	30		
Chloroform	102	107	82 - 120	4	30		
1,2-Dichloroethane	98	103	66 - 132	6	30		
1,1-Dichloroethene	88	87	62 - 141	1	30		
2-Butanone (MEK)	117	128	33 - 157	9	30		
Tetrachioroethene	94	97	76 - 126	3	30		
Trichloroethene	98	99	84 - 115	3 1	30		
Vinyl chloride	105	104	59 - 144	1	30 50		
Surrogate	L	CS % Rec	LCSD %	Rec		ance Limits	
4-Bromofluorobenzene	9	0	96		* '	5 - 120	*
Dibromofluoromethane	16	01	103			i - 120	
Toluene-d8 (Surr)	9	9	101			- 121	

Client: Hercules Inc.

Job Number: 680-40137-1

Method Blank - Batch: 680-117287

Method: 8260B Preparation: 5030B

Lab Sample ID: MB 680-117287/12

Client Matrix: Water

Dilution:

Date Prepared: 09/15/2008 1208

1.0

Date Analyzed: 09/15/2008 1208

Analysis Batch: 680-117287

Prep Batch: N/A

Units: mg/L

Instrument ID: GC/MS Volatiles - P

Lab File ID: pq129.d

Initial Weight/Volume: 5 mL Final Weight/Volume: 5 mL

Analyte	Result	Qual	RL
Benzene Carbon tetrachloride Chlorobenzene Chloroform 1,2-Dichloroethane 1,1-Dichloroethene 2-Butanone (MEK) Tetrachloroethene	<0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010 <0.0010		0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.010
Vinyl chloride <0.0010	<0.0010 <0.0010 % Rec	Acceptance Limits	0.0010 0.0010
4-Bromofluorobenzene Dibromofluoromethane Toluene-d8 (Surr)	91 97 96	75 - 120 75 - 121 75 - 120	en e

Client: Hercules Inc.

Job Number: 680-40137-1

Lab Control Spike/

Lab Control Spike Duplicate Recovery Report - Batch: 680-117287

Method: 8260B Preparation: 5030B

LCS Lab Sample ID: LCS 680-117287/9

Instrument ID:

Client Matrix:

Water

Analysis Batch: 680-117287

GC/MS Volatiles - P

Prep Batch: N/A

Lab File ID: pq121.d

Dilution:

1.0

Units: mg/L

Initial Weight/Volume:

5 mL

Date Analyzed: Date Prepared: 09/15/2008 1004 09/15/2008 1004

Final Weight/Volume:

5 mL

LCSD Lab Sample ID: LCSD 680-117287/10

Analysis Batch: 680-117287

Client Matrix:

Water

Prep Batch: N/A

Instrument ID: Lab File ID:

GC/MS Volatiles - P pq123.d

Dilution:

1.0

Units: mg/L,

Initial Weight/Volume:

5 mL

Date Analyzed: Date Prepared:

09/15/2008 1040 09/15/2008 1040

Final Weight/Volume:

5 mL

	•	<u>% Rec.</u>					
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Benzene	94	92	77 - 119	3	30		1000
Carbon tetrachloride	106	106	71 - 135	0	30		
Chlorobenzene	98	96	85 - 116	1	30		
Chloroform	105	98	82 - 120	6	30		
1,2-Dichloroethane	94	90	66 - 132	5	30		
1,1-Dichloroethene	84	84	62 - 141	0	30		
2-Butanone (MEK)	113	103	33 - 157	9	30		
Tetrachloroethene	95	95	76 - 126	0	30		
Trichloroethene	94	95	84 - 115	1	30		
Vinyl chloride	112	109	59 - 144	3	50 50		
Surrogate	Lo	CS % Rec	LCSD %	Rec	Accept	ance Limits	
4-Bromofluorobenzene	9.	1	89	We to the state of		i - 120	
Dibromofluoromethane	98	3	93			i - 121	
Toluene-d8 (Surr)	96	6	94			- 120	

Serial Number 005571

TestAmerica				TestAmerica Savannah 5102 LaRoche Avenue Savannah, GA 31404 Website: www.testamericainc.com Phone: (912) 354-7858 Fax: (912) 352-0165													
THE LEADER IN ENVIRONMENTAL TESTING					○ A	liternate	Labor	atory Na	ame/Lo	cation		. 1	Phone:				
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Login Sample Receipt Check List

Client: Hercules Inc.

Job Number: 680-40137-1

Login Number: 40137 Creator: Hall, Karl I List Number: 1

List Source: TestAmerica Savannah

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	3.0 C
COC is present.	True	3.0 0
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	N/A	

Serial Number 305571

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD							stAmerica Savannah 22 LaRoche Avenue vannah, GA 31404				P	Website: www.testamericainc.com Phone: (912) 354-7858 Fax: (912) 352-0165						
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TAL (LAB) PROJECT MANAGER P.O. NUMBER	CONTRACT NO.	ш				ما ہ										STANDARD F	EPORT	
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CLIENT NAME CLIENT E-MAIL		(0)			SS T											EXPEDITED F	REPORT	
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ARCADIS

Appendix C

Field Forms



WATER SAMPLING LOG

Project			Project	No.				
Site Location							— Date:	
Site/Well No.					· · · · · · · · · · · · · · · · · · ·			
Weather								
Evacuation Data					Field Pa	ırameters		
Measuring Point					Color			
MP Elevation (ft)					Odor			
Land Surface Elevation (ft)					Appearar	nce		
Sounded Well Depth (ft bmp)					pH (s.u.)			
Depth To Water (ft bmp)					Conducti	vity (mS/cm)		
Water Level Elevation (ft)						vity (µmhos		
Water Column In Well (ft)					Turbidity		·	
Casing Diameter/Type					-	ure(^O C/ ^O F)	·	
Gallons In Well					•	d Oxygen (m		
Gallons Pumped/Bailed					ORP (mV)			
Prior To Sampling Sample Pump Intake	-				Sampling	Method	()	
Setting (ft bmp) Purge Time					Remarks			
-	Begin:		End		**			
Pumping Rate (gpm)	•							
Evacuation Method								
Constituents Sampled		Contai	ner Description			Number	Preservative	
	—(n)							
	_% :							
	_							
	=					-		
Sampling Personnel							•	
Gal./Ft.	- 1/2" = 0.		2 - 1/2" = 0.26	3 - 1/2"		6" = 1.47		
bmp Below measuring point C/OF Degrees Celsius/Fahren ft Feet gpm Gallons per minute mg/L Milligrams per liter	heit n	ml mS/cm msl NA NR	3" = 0.37 Milliliter Millisiemens per Mean sea level Not Applicable Not Recorded	4" = 0.		NTU PVC s.u. µmhos/cm VOC	Nephelometric Turbidity Units Polyvinyl chloride Standard units Micromhos per centimeter Volatile Organic Compounds	
ppt Parts per thousand		cs	Carbon steel			SS	Stainless steel	



SOIL/SEDIMENT SAMPLING LOG

PROJECT NAME:	
PROJECT NUMBER:	DATE:
SITE LOCATION:	
SAMPLE ID NUMBER:	CODED/REPLICATE NO.:
TIME SAMPLING BEGAN:	ENDING:
WEATHER:	
SITE DESCRIPTION:	
SAMPL	ING DATA
COLLECTION METHOD: DEPTH: COLOR:	
DESCRIPTION:	
ANALYSES REQUIRED	FROM LAB: X OR ARCADIS:
SAMPLING MONITORING (TIP, OVA, HNU,	, etc.)
REMARKS:	
SAMPLING PERSONNEL:	



SAMPLE / CORE LOG

Boring/Well: Project No.:				o.:			Page 1 of 1						
Site Location:						Drilling Started:		rilling ompleted:_					
Land-Su	rface	Elev.:		Surveyed:	Estimated:								
Drilling Fluid: Drilling Method Used:													
Drilling (Contr	actor <u>:</u>				_ Driller:		Help	Helper:				
Prepared By:						Hammer Weight:		Hammer Drop (inches):					
Fill Silty Clay		y Silt	Sandy Silt	Shelby Tube Water First Encountered									
Clay			Sandy Clay			Clayey Sand	∭ Sp	▼ Water I	▼ Water Level After 10 Minutes				
SAMPLE DEPTH (ft)	SAMPLE	RECOVERY (ff)	SYMBOL		VISUAL DESCRIPTION		USCS	PP H V	OVM (wo/F) (ppm)	REMARKS			
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