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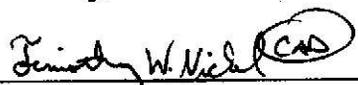
**SWMU 2 Slope Stability  
Work Plan**

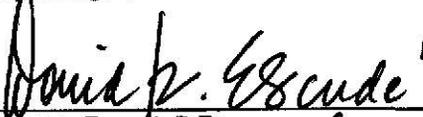
Former Vicksburg Chemical Company  
Vicksburg, Mississippi

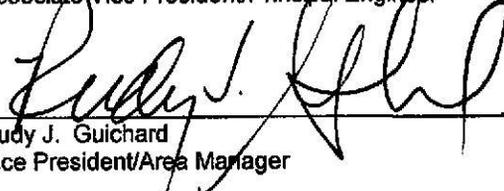
23 March 2007

ARCADIS

  
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**SWMU 2 Slope Stability  
Work Plan**

Former Vicksburg Chemical  
Company  
Vicksburg, Mississippi

Prepared for:  
Mississippi Department of Environmental  
Quality and Mississippi Bluffs Industrial  
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LA002656.0001.00009

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23 March 2007

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**1. Introduction and Work Plan Rationale**

**1.1 Objectives/Rationale**

This Work Plan presents a scope of work for performing a slope stability study on the landfill area at the former Vicksburg Chemical Company (Vicksburg Chemical). The site was formerly a pesticide and herbicide manufacturing facility divided into two areas called the North Plant and South Plant. The landfill area, located in the South Plant, was designated Solid Waste Management Unit (SWMU) 2 during a Resource Conservation and Recovery Act (RCRA) mandated investigation. The primary objective of the activities proposed in this document will be to collect and evaluate soil samples to determine the stability of the existing slopes in the area of the on-site landfill. Secondary objectives will be to characterize the present depth of the landfill and to collect sufficient data to evaluate the landfill's capacity to receive additional material resulting from potential future remedial activities.

All investigative sampling proposed in this Work Plan will be conducted in accordance with the Mississippi Department of Environmental Quality's (MDEQ's) Brownfields Program. Waste characterization and disposal will be completed in accordance with MDEQ-approved methodology specific to this site.

**1.2 Property Background**

**1.2.1 Property Location**

Vicksburg Chemical was formerly owned by Cedar Chemical Corporation (Cedar Chemical). The facility is located south of Interstate 20 on Rifle Range Road within the southwestern section of the city of Vicksburg in Warren County, Mississippi. The site is composed of approximately 535 acres located in Sections 4, 5, 8, 9, and 10, township 15 north, range 3 east (Latitude: North 32° 18' 01", Longitude: West 90° 53' 57"). The site location is shown on Figure 1.

**1.2.2 Property History**

The North Plant began operation in 1961 and produced potassium nitrate, liquid chlorine, and liquid nitrogen tetroxide. The raw materials for the North Plant included potassium chloride and nitric acid. The South Plant began operation in 1953 manufacturing chlorinated pesticides, nitrogen-based herbicides, and other agricultural chemicals. The only active operations at the South Plant after 1992 were the nitric acid

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unit constructed in 1986 and a potassium carbonate unit constructed in 1994. During various periods prior to 1987, the South Plant produced dinitro butyl phenol (dinoseb or DNBP), monosodium methane arsenate (MSMA), diethyl hexyl phosphoric acid (DEHPA), 1-hydroxy-ethylidene-1-1-diphosphonic acid (UNIHIB), toxaphene, methyl parathion, cyanazine (bladex), and atrazine. Toxaphene and methyl parathion are insecticides, while atrazine, dinoseb, and MSMA are herbicides. Raw materials for these operating processes included chlorine, camphene, ortho-secondary butyl phenol (OSBP), sodium arsenate, sodium hydroxide, methyl chloride, sulfuric acid, sodium paranitrophenolate, and phosphorus trichloride.

Originally, the two plants were completely separate, owned and operated by two different companies. The South Plant was originally constructed by Spencer Chemical in 1953. American Metal Climax Corporation (Amax) constructed the North Plant in 1961. After purchasing the South Plant in 1964, Gulf Chemical added a formaldehyde unit in 1966. According to historical environmental documents, Vicksburg Chemical was formed in early 1972 and purchased both the Gulf Oil and Amax facilities (except the formaldehyde plant) in July 1972. In 1978, Vicksburg Chemical was merged into Vertac, Inc., which merged into Vertac Chemical Corporation (VCC) in September 1979. Cedar Chemical acquired the Vicksburg Chemical plant from VCC in February 1986. Fermenta A.B. of Sweden acquired Cedar Chemical in June 1986. Nine West Corporation (Trans Resources, Inc.) acquired Cedar Chemical in January 1988.

In addition to the above-mentioned operations at the plant, the property was the location of two additional operations: 1) an operation by Reagent Chemical to produce aqueous hydrochloric acid from a by-product of the toxaphene operation; and 2) a Gulf formaldehyde plant. The formaldehyde unit owned and formerly operated by Borden Chemical is located inside the former boundary of the South Plant.

### 1.3 Project History

#### 1.3.1 Site-Wide

Vicksburg Chemical initiated a RCRA Facility Investigation (RFI) in 1994 and continued through 2001. The *RCRA Facility Investigation Draft Final Report* (URS 2001a) and *Draft Groundwater Assessment Report* (URS 2001b) were completed in August 2001 and November 2001, respectively. Both reports were submitted to the U.S. Environmental Protection Agency (USEPA) and subsequently

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approved in December 2001. A draft Corrective Measures Study was developed in the spring of 2002.

On March 8, 2002, VCC and Cedar Chemical filed for bankruptcy in the United States Bankruptcy Court for the Southern District of New York. The bankruptcy was contested by MDEQ, the Arkansas Department of Environmental Quality, USEPA Region 4, USEPA Region 6, and the U.S. Department of Justice. The court eventually approved an agreement allowing Vicksburg Chemical to abandon its properties and authorizing MDEQ to direct the transfer of the Vicksburg Chemical property to any entity identified by MDEQ. Since that time, MDEQ has kept the site under its control while structuring an agreement to clean up the plant site in a manner protective of human health and the environment. On December 19, 2005, MDEQ finalized an agreement for Mississippi Silvertip Development, LLC (Silvertip), to remediate the abandoned Vicksburg Chemical site. The developer, Silvertip, intends to create a Mississippi Bluffs Industrial Park to foster the sustainable reuse of the former chemical plant site and adjacent areas. It is anticipated that mixed use (i.e., light industrial, commercial, recreational, and residential) will be possible at the completion of the remedial action. Harcros Chemicals, Inc., is currently leasing portions of the former North Plant to facilitate a chemical blending, mixing, and distribution facility. Concurrently, ARCADIS U.S., Inc. (ARCADIS), is performing the remediation services with MDEQ oversight and control. Silvertip plans to construct high-end commercial and residential sites and a championship golf course on a good portion of the remaining acreage.

1.3.2 SWMU 2

The following text was obtained from the MDEQ's *Preliminary Assessment Report* dated May 12, 2003:

The Inactive Landfill (SWMU 2) is located on a natural hill approximately 30 feet in elevation above the levees of the adjacent Surface Impoundment and between the railroad tracks and Hennessey's Bayou. The inactive disposal facility is approximately 500 feet by 500 feet and was used to receive residues associated with the manufacture of herbicides and insecticides. One pit was excavated atop the hill to store Dinoseb process wastewater. When the neutralization facilities for the Dinoseb process were completed, 200,000 gallons of wastewater was removed from the pond in 1980. Three other disposal pits were also excavated in this area. These pits were used as disposal locations for pallets, fiber and steel drums, and other solid waste material. Dredge materials

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from the Surface Impoundment, contaminated with pesticides and chemical residues, were also placed into the disposal pits. Over 4,000 empty drums once containing cyanuric chloride, Dinoseb, tributylanline, methyl parathion and epichlorohydrin were stored in the three unlined pits. Vicksburg Chemical attempted to dissolve the drums with hydrochloric acid. The volume of acid is unknown. In 1977, the drums which could meet DOT requirements, were removed from the pits and disposed of off site.

The bags from the bag collectors in the Atrazine process area, contaminated with Atrazine, were placed in fiber drums and buried in the landfill. Numerous cyanuric chloride drums were also buried. Erosion of the landfill cover allowed for liberation of hydrochloric acid fumes as runoff reacted with remaining cyanuric chloride. Sixty-four (64) drums containing sulfur,  $PCl_3$ ,  $PSCl_3$  from the methyl parathion process were buried just north of the northernmost holding pond. Drums containing Dinoseb and other products were also buried in the landfill. Most burials occurred between 1972 and 1975. Since September 1975 all waste materials have been taken to permitted industrial waste landfills.

The landfill was initially closed in 1979 by regrading, covering with soil and planting with grass. Additional improvements occurred in 1983 with grading and construction of an engineered cap in accordance with plans by the MDEQ.

In 1988, the existing cover system of the landfill did not appear to be fully performing the purpose for which it was placed. Interim corrective measures have been taken around the landfill unit to correct erosion problems.

### 1.4 Data Needs and Objectives

Additional site data are needed to evaluate the geotechnical properties of the existing landfill. Historical data and observations made during site visits have been used to identify locations of concern. Copies of the historical data identified in Appendix A are considered valid and usable. The objective of this sampling effort is to collect and evaluate soil samples to determine the stability of the existing slopes in the area of the on-site landfill. Secondary objectives are to collect sufficient data to evaluate the landfill's capacity to receive additional material and to determine the depth of the landfill.

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**1.5 Work Plan Approach**

The general Work Plan strategy was developed to obtain samples representative of present site conditions. Personnel and equipment will be deployed to the Vicksburg Chemical site to collect soil samples from locations representative of the landfill area. Samples will be containerized and submitted to a geotechnical laboratory for analysis by the methods presented on Table 1.

**2. Methodology**

**2.1 Sample Locations**

The sample locations for this stability study are shown on Figure 2. These sample locations were selected because they represent areas that will provide information on the present construction of the landfill. The RFI indicated five main impacted areas requiring site remediation. These areas were defined in the *Quality Assurance Project Plan* (QAPP; ARCADIS 2006a) developed for this Site. Four distinct areas were defined in the South Plant and one in the North Plant. The stability study activities proposed in this Work Plan pertain to Area 3 – South Plant – SWMU 2 as presented in the QAPP. Soil samples will be collected from locations within and adjacent to this area to evaluate present site conditions.

**2.2 Sample Collection Procedures**

Some of the tasks that will be conducted during sampling activities have been outlined in detail in the QAPP. The pertinent sections are listed below and incorporated by reference.

**2.2.1 Sampling Equipment and Procedures**

Prior to sampling, a site visit will be conducted by an ARCADIS engineer to finalize the sample locations. Final sample locations will be surveyed and located on a base map for further use. The proposed stability sampling locations are shown on Figure 2.

Samples from 14 borings (B-1 through B-14) will be collected for geotechnical and/or analytical testing. Sample collection equipment will consist of a Geoprobe® or drill rig. The proper use of a Geoprobe® in the collection of samples representative of site conditions is detailed in Section 11.2 in the QAPP. Samples will be collected from the drill rig in a manner consistent with Section 11.2 of the QAPP. In addition to the

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procedures contained in Section 11.2 of the QAPP, borings installed through the landfill material will be cased to prevent the introduction of waste farther into the subsurface. The casing material will extend to the depth of the waste. Based on site topography, the depth of waste is expected to be approximately 40 feet below the top of the landfill. The casing will be grouted in place and allowed to set for approximately 24 hours. Once the casing is set, the additional boring footage beyond the waste will be advanced through the bottom of the casing.

The contents of the landfill are not well documented. When drilling through the landfill, the possibility exists that the drill rig will encounter obstructions that prevent further advancement. In the event that this occurs, the sample location will be moved a short distance to a location that is likely to be representative of the material in that area.

The drill rig will be operated in accordance with the manufacturer's operations manual. Additionally, for safety reasons there will be more than one person on site during field sample collection. Safety precautions to protect workers are included in the Vicksburg Chemical *Health and Safety Plan* (ARCADIS 2006b). Decontamination of field equipment shall be conducted in accordance with the procedures described in Section 10.5 of the QAPP. The proposed stability sampling locations are shown on Figure 2.

Geotechnical samples will be collected from Borings B-1 through B-14. Cohesive or semi-cohesive material will be obtained from each potential sampling interval. The geotechnical engineer will review the boring logs and determine which samples will be sent to the geotechnical laboratory for analysis. The samples will be collected using Shelby tubes or split-spoon samplers. Cohesive samples will be collected using a 3-inch Shelby tube barrel. The core material will be extruded and logged in the field. Undisturbed samples collected from the Shelby tube barrel will be sealed for transport to the laboratory. The extruded samples will be placed into appropriate containers prior to shipment to the laboratory. For cohesionless soils, a split-spoon sampler will be used.

The samples will be containerized immediately upon collection. Undisturbed samples collected for geotechnical analysis will be kept with the containerized samples. The geotechnical samples will remain at ambient temperature until relinquished to the laboratory.

Chemical testing will be conducted to determine the depth of waste and/or impacted subsurface soils in the landfill area. Six samples will be collected and submitted from

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the waste material and/or from the perceived bottom of the waste material. The exact sample locations will be determined in the field. These samples will be collected in accordance with the approved QAPP and tested for the analytical parameters shown in Table 1.

Upon completion of sample collection activities, the boreholes will be plugged and abandoned in accordance with State of Mississippi requirements. The casing material will be grouted in place.

#### 2.2.2 Sample Handling and Analysis

Sample handling and analysis were discussed in detail in Chapters 10 and 11 of the QAPP. These procedures will be followed as applicable to the handling of geotechnical samples during the implementation of this Work Plan. Table 1 contains a summary of the analyses that will be performed on each sample.

#### 2.3 Documentation

Each sample will be described in the field upon collection. The observed characteristics will be documented on field forms (Appendix B) completed by sampling personnel. In addition to the visual soil characteristics, the interval where groundwater was first encountered will be noted on the log. After field activities are completed, the boring log will be updated to include the results of the laboratory analyses and surveying activities.

#### 2.4 Geotechnical Analyses

The samples collected during the implementation of this Work Plan will be containerized and submitted to a geotechnical laboratory for analyses. Table 2 contains a summary of the required analyses for each sample. The results of the testing procedures discussed below will be utilized in the determination the stability of the slopes at SWMU 2.

##### 2.4.1 Laboratory Tests

Soil samples will be submitted to a laboratory for geotechnical or chemical testing. The following geotechnical analyses, or equivalent, will be performed at each boring location in the quantities shown on Table 2:

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- Unconfined Compressive Strength Test: 1) ASTM International (ASTM) D2166, or 2) American Association of State Highway and Transportation Officials (AASHTO) T208;
- Unconsolidated Undrained Triaxial Test: ASTM D2850;
- Consolidation Test: ASTM D2435;
- Moisture Content: ASTM D2216;
- Atterberg Limits: ASTM D4318;
- Soil Density/Unit Weight: ASTM D854;
- Triaxial Permeability Test: ASTM D5084; and
- Visual identification of samples as well as soil classification to be performed on samples.

The following chemical analyses will be performed on a minimum of one landfill waste sample and one sample collected below the bottom of waste. The proposed sampling for each boring location is shown on Table 2:

- Volatile Organic Compounds by USEPA Method SW846-8260;
- Semivolatile Organic Compounds by USEPA Method SW846-8270;
- Organochlorine Pesticides by United USEPA Method SW846-8081;
- Organochlorine Herbicides by USEPA Method SW846-8151; and
- Metals by USEPA Method SW846-6010/6020.

The samples will be collected in containers provided by the laboratory for each analysis. Proper chain-of-custody procedures will be followed during the transport and relinquishment of samples.

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2.4.2 Field Tests

In addition to visual characterization, for cohesionless soils, a standard penetration test (ASTM D1586 – Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils) will be performed in the field at each interval where unconsolidated soils are encountered. Pocket penetrometer testing will be conducted on cohesive soil.

2.5 Survey

The depth and boring location of the samples collected during this evaluation will be recorded. A topographic survey of the entire landfill area, including the boring locations and elevations, will be conducted. All surveying activities will be conducted by a surveyor licensed by the State of Mississippi.

2.6 Investigation Derived Wastes

Waste materials generated during this investigation and corrective action will include soil, sludge, used sampling equipment, decontamination water, and used personal protective equipment. Waste materials will be containerized in 55-gallon drums or similar appropriate containers or will be placed back onto the landfill for incorporation in the final remedy. *The drums will be staged in a secure location and will be incorporated into the remediation to be conducted at the site.* Waste characterization and on-site disposal will be completed in accordance with MDEQ-approved methodology specific to this site.

2.7 Regulatory Involvement

All site activities will be conducted after receiving approval from MDEQ of this SWMU 2 Slope Stability Work Plan. MDEQ will have oversight on all aspects of remediation activities conducted at this Site as per the Agreed Order. Future sampling frequencies, parameter lists, methodology, etc., will be approved by MDEQ prior to field implementation.

3. Reporting

Following the completion of all field activities, the results of the Slope Stability Study activities will be included in the SWMU 2 Slope Stability report that will be prepared for submittal to MDEQ. The report will document all field activities and present an interpretation of surface and subsurface conditions. Appropriate historical and new

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data tables, figures, and appendices will be included in the report to support the text. The report will conclude by presenting recommendations for a path forward to obtain site closure.

**4. Schedule**

The sampling program will be initiated within 3 weeks of receiving written authorization to proceed from MDEQ. It is anticipated that the planned field activities can be completed within 2 to 3 weeks. Analytical data should be received within 3 weeks of completing the Slope Stability Study. A report will be prepared and submitted to MDEQ within 4 weeks of receipt of the analytical results. If field activities are delayed or if additional field activities are required to completely define the nature and extent of subsurface impacts, MDEQ will be promptly notified.

**5. References**

ARCADIS. 2006a. Quality Assurance Project Plan, Vicksburg Chemical Company. September 14.

ARCADIS. 2006b. Health and Safety Plan, Vicksburg Chemical Company. October 27.

MDEQ. 2003. Preliminary Assessment Report, Vicksburg Chemical Company. May 12.

URS. 2001a. RCRA Facility Investigation Draft Final Report, Vicksburg Chemical Company. August.

URS. 2001b. Draft Groundwater Assessment Report, Vicksburg Chemical Company. November.

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Table 1. Summary of Geotechnical Methods, SWMU 2 Slope Stability Work Plan, Former Vicksburg Chemical Company, Vicksburg, Mississippi.

Parameter	Matrix	Method
<b>Geotechnical Laboratory Parameters</b>		
Unconfined Compressive Strength of Cohesive Soil	Solid	ASTM D2166
Unconsolidated-Undrained Triaxial Compression	Solid	ASTM D2850
Consolidation	Solid	ASTM D2435
Moisture Content	Solid	ASTM D2216
Atterberg Limits	Solid	ASTM D4318
Unit Weight	Solid	ASTM D854
Triaxial Permeability	Solid	ASTM D855
Percent Passing the No. 200 Sieve (ASTM D1140) <sup>(1)</sup>	Solid	ASTM D1921
<b>Geotechnical Field Parameters</b>		
Standard Penetration	Solid	ASTM D1586
<b>Analytical Laboratory Parameters</b>		
Volatile Organic Compounds listed in Appendix IX	Solid	SW-846 Method 8260
Semivolatile Organic Compounds listed below:		
Acetophenone	Solid	SW-846 Method 8270
Atrazine	Solid	SW-846 Method 8270
bis-(2-Ethyl)hexyl Phthalate	Solid	SW-846 Method 8270
Cyanazine	Solid	SW-846 Method 8270
4-Nitrophenol	Solid	SW-846 Method 8270
Pentachlorophenol	Solid	SW-846 Method 8270
Organochlorine Pesticide listed below:		
Toxaphene	Solid	SW-846 Method 8081
Organochlorine Herbicide listed below:		
Dinoseb	Solid	SW-846 Method 8151
Metal listed below:		
Arsenic	Solid	SW-846 Method 6010/6020
<sup>(1)</sup>	Test may be conducted on samples collected from the borings presented in Table 2 at the discretion of the geotechnical engineer.	
SW-846	U.S. Environmental Protection Agency Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods	

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Table 2. Summary of Proposed Analyses<sup>(1)</sup>, SWMU 2 Slope Stability Work Plan, Former Vicksburg Chemical Company, Vicksburg, Mississippi.

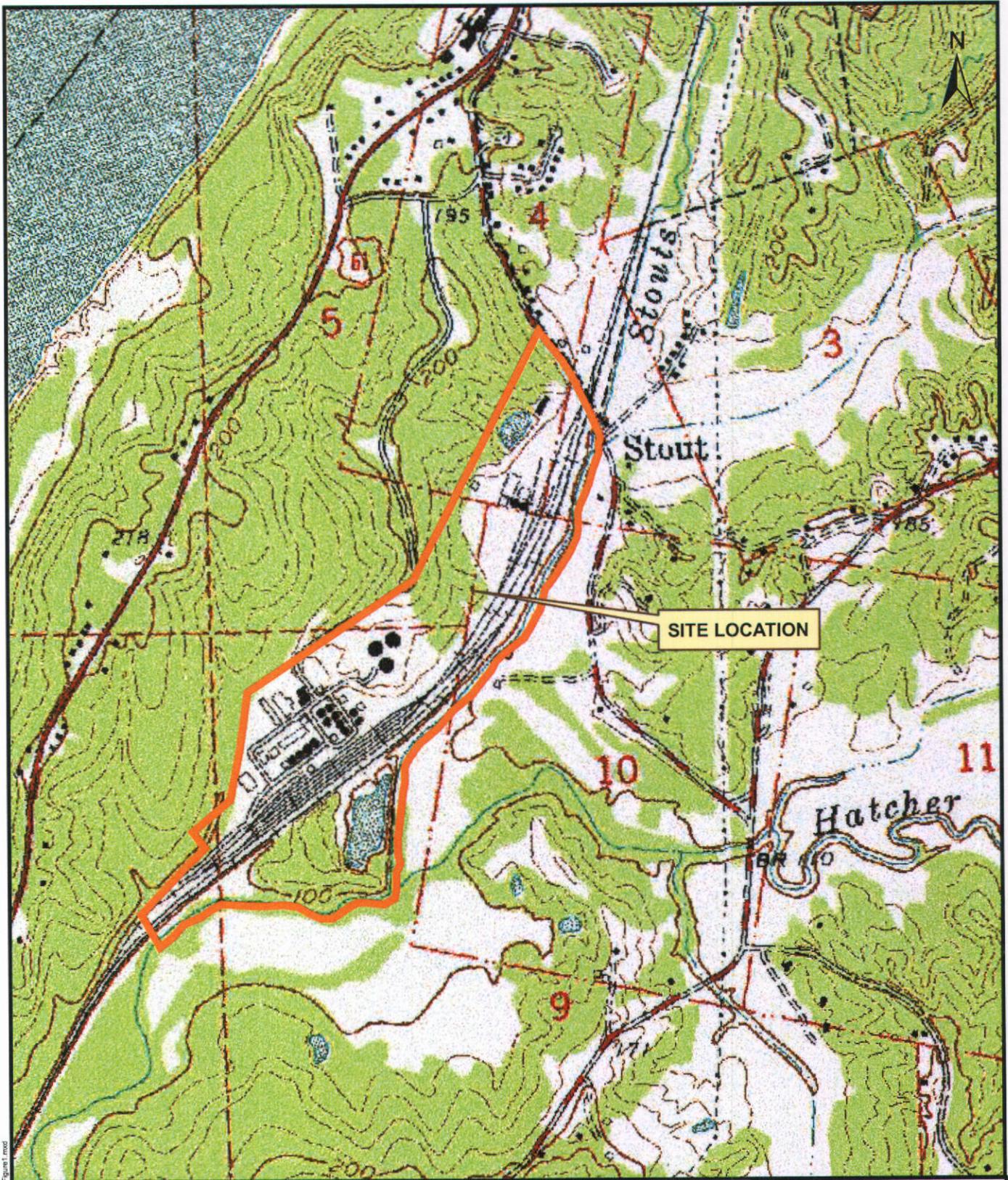
Sample <sup>(2)</sup>	Depth of Boring (feet)	Unconfined Compressive Strength (ASTM D2166)	Unconsolidated-Undrained Triaxial Compression (ASTM D2860)	Consolidation (ASTM D2435)	Moisture Content (ASTM D2216)	Atterberg Limits (ASTM D4318)	Unit Weight (ASTM D854)	Standard Penetration (ASTM D1586)	Triaxial Permeability (ASTM D5084)	Visual Log	Analytical Parameters on Table 2 <sup>(3)</sup>
B-1	40	3 Samples on cohesive soils, except fissured clays	2 Samples on fissured clays and/or silts	4 Samples	4 Samples	4 Samples	5 Samples	Cohesionless soils	2 Samples	Yes	Yes
B-2	40	2 Samples on cohesive soils, except fissured clays	3 Samples on fissured clays and/or silts	3 Samples	3 Samples	4 Samples	4 Samples	Cohesionless soils	2 Samples	Yes	Yes
B-3	40	3 Samples on cohesive soils, except fissured clays	2 Samples on fissured clays and/or silts	4 Samples	4 Samples	4 Samples	4 Samples	Cohesionless soils	2 Samples	Yes	Yes
B-4	80 <sup>(4)</sup>	3 Samples on cohesive soils, except fissured clays	2 Samples on fissured clays and/or silts	3 Samples	4 Samples	4 Samples	4 Samples	Cohesionless soils	2 Samples	Yes	Yes
B-5	40	2 Samples on cohesive soils, except fissured clays	2 Samples on fissured clays and/or silts	4 Samples	4 Samples	3 Samples	3 Samples	Cohesionless soils	2 Samples	Yes	Yes
B-6	40	2 Samples on cohesive soils, except fissured clays	2 Samples on fissured clays and/or silts	3 Samples	3 Samples	3 Samples	3 Samples	Cohesionless soils	2 Samples	Yes	Yes
B-7	40	2 Samples on cohesive soils, except fissured clays	1 sample on fissured clays and/or silts	3 Samples	3 Samples	3 Samples	3 Samples	Cohesionless soils	2 Samples	Yes	Yes
B-8	40	2 Samples on cohesive soils, except fissured clays	1 sample on fissured clays and/or silts	3 Samples	3 Samples	3 Samples	3 Samples	Cohesionless soils	2 Samples	Yes	Yes
B-9	40	3 Samples on cohesive soils, except fissured clays	2 Samples on fissured clays and/or silts	3 Samples	3 Samples	3 Samples	3 Samples	Cohesionless soils	2 Samples	Yes	Yes
B-10	40	2 Samples on cohesive soils, except fissured clays	2 Samples on fissured clays and/or silts	3 Samples	3 Samples	3 Samples	3 Samples	Cohesionless soils	2 Samples	Yes	Yes
B-11	40	4 Samples on cohesive soils, except fissured clays	1 sample on fissured clays and/or silts	3 Samples	3 Samples	3 Samples	3 Samples	Cohesionless soils	2 Samples	Yes	Yes
B-12	80 <sup>(4)</sup>	4 Samples on cohesive soils, except fissured clays	5 Samples on fissured clays and/or silts	7 Samples	7 Samples	7 Samples	9 Samples	Cohesionless soils	2 Samples	Yes	Yes
B-13	80 <sup>(4)</sup>	2 Samples on cohesive soils, except fissured clays	2 Samples on fissured clays and/or silts	3 Samples	3 Samples	3 Samples	3 Samples	Cohesionless soils	2 Samples	Yes	Yes
B-14	30	2 Samples on cohesive soils, except fissured clays	2 Samples on fissured clays and/or silts	3 Samples	3 Samples	3 Samples	3 Samples	Cohesionless soils	2 Samples	Yes	Yes

(1) Proposed field activities. Actual analyses conducted by the laboratory will be based on observed soil characteristics in the field.

(2) Sample locations shown on Figure 2. Eighty-foot deep borings will be sampled continuously for the first 40 feet, then at every 5-foot interval thereafter. Forty-foot deep borings will be sampled continuously for the first 15 feet, then at every 5-foot interval thereafter.

(3) These borings will be evaluated for waste material and sampled at the discretion of the field geologist. A total of six samples will be submitted to the analytical laboratory.

(4) Boring will be advanced to 80 feet or to the depth of waste.



 Former Plant Site

Note: Approximate Property Boundary

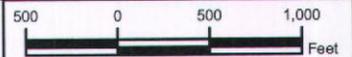
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Baton Rouge, Louisiana 70816  
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**REFERENCE:**

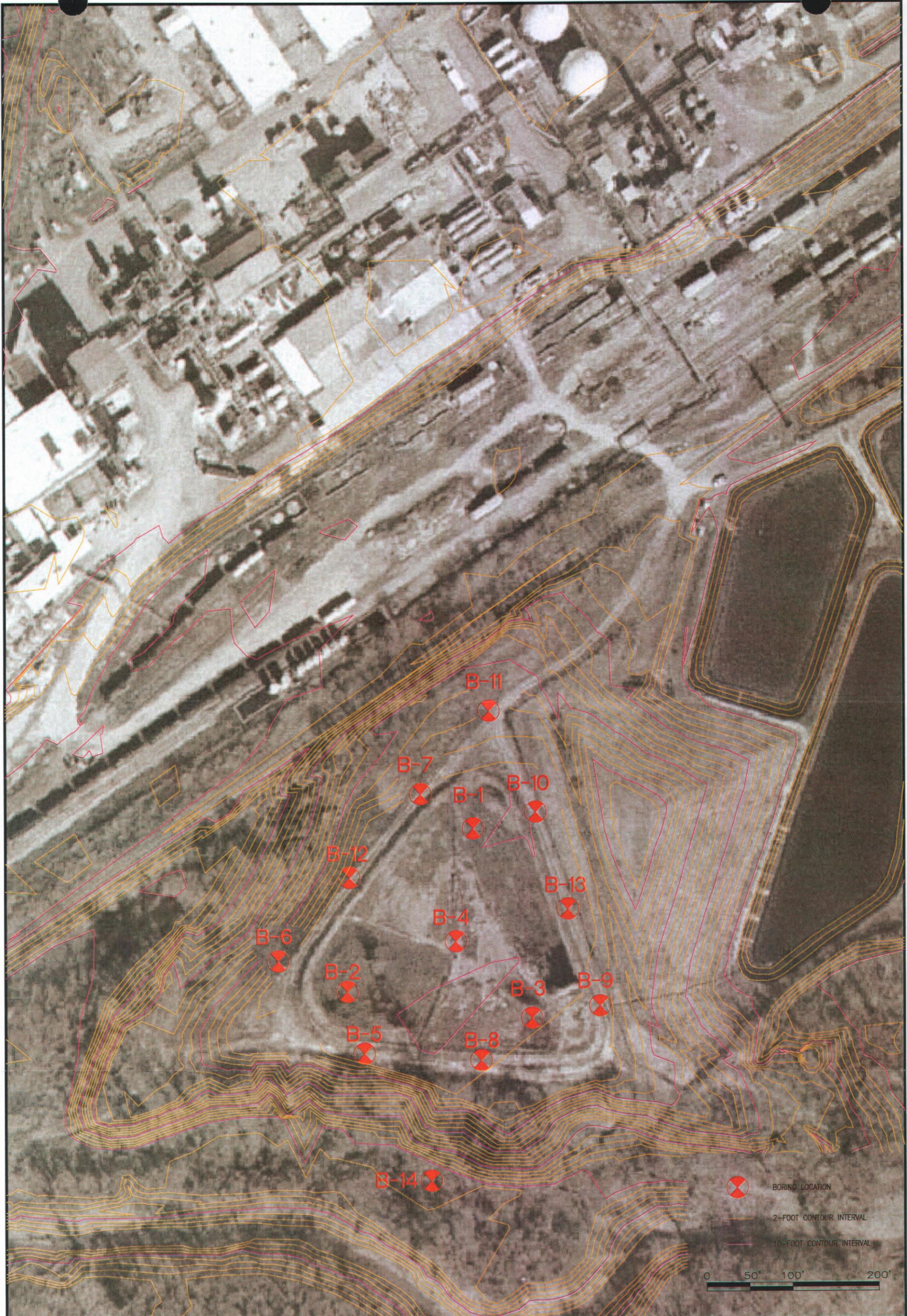
USGS, Vicksburg West Quadrangle, Mississippi  
7.5 Minute Series (Topographic)

**SITE LOCATION MAP**

VICKSBURG CHEMICAL COMPANY  
VICKSBURG, MISSISSIPPI



Project Manager: JE	Completed By: AB
Task Manager: CD	Date: 07/31/2006
Project No.: LA002656.0001	Figure No.: <b>1</b>



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**PROPOSED STABILITY SAMPLING LOCATIONS**

FORMER VICKSBURG CHEMICAL COMPANY SITE

PROJECT NUMBER  
 LA002656.0001  
 DRAWING NUMBER  
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**Appendix A**

Historical Data

## SOIL BORING LOG

PROJECT Vicksburg Chemical Co Landfill LOCATION Vicksburg, MSELEVATION \_\_\_\_\_ DRILLING CONTRACTOR Petra Environmental, Inc.DRILLING METHOD AND EQUIPMENT Geoprobe 5400 Truck MountedWATER LEVEL AND DATE \_\_\_\_\_ START 8/2/00 FINISH 8/2/00 LOGGER H. Dean Lowe

Depth Below Surface (FT)	SAMPLE			Standard Penetration Test PID Results # of # -#-	SOIL DESCRIPTION Soil Name, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USGS Group	Symbolic Notation	COMMENTS Monitoring Well Installation, Geotechnical Properties, Analytical Tests, Instrumentation
	Interval	Type and Number	Recovery (IN)				
1		LFS-1 A(0-4)	48	0.0	Tan fine silt (wea. Loess), friable, dry	ML	
5			48	0.0	Same as above but moist at 4 ft - v. moist at 5.3 ft.	ML	
10			48	0.0	Gray fine silt (wea. Loess) grades to tan at 9.5 ft. wet at 9 ft. v. wet at 11.2 ft.	ML	chemical odor at 9 ft. -- becomes less intense with depth
15			46	0.0	Reddish stained w/ sweet chemical odor	ML	chemical odor
18		ML LFS-1 B(14-16)	47	0.0	Lt. tan - gray fine silt (ML), soft saturated	ML	More intense odor at 18 ft.
20			39	0.0	Brown-tan fine silt (wea. Loess), firm, v. moist - grades to tan at 20 ft. and slightly moist to dry	ML	
25		LFS-1 C(23-24)	46	0.0	yellowish tan fine silt (Loess) soft, saturated grades to tan at 28 ft.	ML	v. slight chemical odor at 25.7
30			38	0.0		ML	

## SOIL BORING LOG

PROJECT Vicksburg Chemical Co Landfill LOCATION Vicksburg, MSELEVATION \_\_\_\_\_ DRILLING CONTRACTOR Petra Environmental, Inc.DRILLING METHOD AND EQUIPMENT Geoprobe 5400 Truck MountedWATER LEVEL AND DATE \_\_\_\_\_ START 8/2/00 FINISH 8/2/00 LOGGER H. Dean Lowe

Depth Below Surface (FT)	SAMPLE			Standard Penetration Test Results #	SOIL DESCRIPTION Soil Name, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USGS Group	Symbolic Log	COMMENTS Monitoring Well Installation, Geotechnical Properties, Analytical Tests, Instrumentation
	Interval	Type and Number	Recovery (IN)				
35	8		38	0.0	Tan fine Silt (wea. Loess), soft, saturated - no odor	ML	
	9		40	0.0			
40	10		30	0.0			
	11		32	0.0	Gray fine silt (unwea. Loess), soft, saturated, no odor	ML	
45					TD at 44 ft.  Well Construction Date Installed: 8/4/00 Constr. Materials: 3/4" ID PVC Backfill: Granular Bentonite Filter Sand: #3 Sand Screen: 3/4" ID PVC 0.010 slot Bottom:  Water Levels Date: 8/4/00 Time: 1500 Depth: 42.45 ft. bgs Time: 1510 Depth: 40.75 ft. bgs	Pipe & Screen 0 - 26 ft. bgs 26 - 48 ft. bgs 43 - 48 ft bgs 48 ft. bgs	

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-1

Date Sampled: 8/2/00

Time Sampled:

Sampling Method: Geoprobe Macro Sampler

Sample Depth: 0 to 4 feet bgs

Type of Soil: fine silt (ML)

Sample Analysis: VOC      Pesticide/PEB  
Cyanide      Atrazine/Cymazine/Dinoseb

Sample Container: VOC = 2oz. Clear Glass  
SVOC = 4oz. Amber Glass  
Pesticide = 4oz. Amber Glass  
Atrazine = 4oz. Amber Glass  
Cyanide = 4oz. Clear Glass

Sample Quantity Collected: 18 oz.

Preservative Used: None

Field Technician: H. Dean Lowe

Signature/Date:  
*H. Dean Lowe* 8/2/00

Remarks:

Sample No. LFS-1 A (0-4 ft. depth)

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-1

Date Sampled: 8/2/00

Time Sampled:

Sampling Method: Geoprobe macro sampler      Sample Depth: 14 to 16 feet bgs

Type of Soil: fine silt (ML)

Sample Analysis: VOC      Pesticide/PCB      Sample Container: VOC = 2 oz. clear Glass  
SVOC      Atrazine/Cyanazine/Dinoseb      Pesticide = 4 oz. Amber Glass  
Cyanide      Atrazine = 4 oz. Amber Glass  
Cyanide = 4 oz. Clear Glass

Sample Quantity Collected: 18 oz.

Preservative Used: None

Field Technician: H. Dean Lowe

Signature / Date:

H. Dean Lowe 8/2/00

Remarks:

Sample No. LFS-1 B (14-16 ft. depth)

# SOIL SAMPLING LOG

PETRA ENVIRONMENTAL, INC.

Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-1

Date Sampled: 8/2/00

Time Sampled:

Sampling Method: Geoprobe macro sampler

Sample Depth: 24 to 26 feet bgs

Type of Soil: fine silt (ML)

Sample Analysis: VOC      Pesticide/PCB  
SVOC      Atrazine/Gamazine/Dinoseb  
Cyanide

Sample Container: VOC = 2 oz. Clear Glass  
SVOC = 4 oz. Amber Glass  
Pesticide = 4 oz. Amber Glass  
Atrazine = 4 oz. Amber Glass  
Cyanide = 4 oz. Clear Glass

Sample Quantity Collected: 18 oz

Preservative Used: None

Field Technician: H. Dean Lowe

Signature / Date:

H. Dean Lowe 8/2/00

Remarks:

Sample No. LFS-1C (24-26 ft. depth)

GROUNDWATER SAMPLING LOG  
 PETRA ENVIRONMENTAL, INC.  
 Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-1

Date Sampled: 8/6/00

Time Sampled: VOC = 0645  
 Metals/Cyanide = 0830  
 SVOC = 0835  
 Pest/PCB & Atrazine = 1000

Sampling Method: VOC = SS Bailer  
 Others = Geoprobe vacuum

Sample Depth: 43-48 feet bgs

Sample Type: Grab

Sample Number(s): LS1-4

Sample Quantity Collected: 3.8 liters

Sample Container: VOC = 40 ml glass vial  
 Cyanide = 500 ml plastic  
 Metals = 250 ml plastic  
 Others = 1 liter amber glass

Sample Analysis: VOC Pesticide/PCB  
 SVOC Atrazine/Kyanazine/Dinoseb  
 Cyanide T. Metals

Preservative: VOC = HCL  
 Cyanide = NaOH  
 Metals = HNO<sub>3</sub>

Purging: N/A well installed with Geoprobe

Time: 0610

SWL(ft): 40.7

Well Depth(ft bgs): 48

Well Vol.(gal): N/A

pH	Cond.	Temp.(degrees )	Vol. Removed.(gal)
1st WV			
2nd WV			
3rd WV			
Ave.			Total

Remarks: \_\_\_\_\_

Sampling: slow well yield = approx. 1 liter per hour

Time:                      WL(ft):

pH:                      Cond(mhos):                      Temp.(degrees C F)

Remarks: \_\_\_\_\_

Field Technician: H. Dean Lowe

Signature / Date:  
 H. Dean Lowe      8/6/00

SOIL BORING LOG

PROJECT Vicksburg Chemical Co Landfill LOCATION Vicksburg, MS

ELEVATION \_\_\_\_\_ DRILLING CONTRACTOR Petra Environmental, Inc.

DRILLING METHOD AND EQUIPMENT Geoprobe 5400 Truck Mounted

WATER LEVEL AND DATE \_\_\_\_\_ START 8/3/00 FINISH 8/3/00 LOGGER H. Dean Lowe

Depth Below Surface (FT)	SAMPLE			Standard Penetration Test (SPT) Results - Test P/D - Results - # of - # of	SOIL DESCRIPTION  Soil Name, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USGS Group	Symbolic Log	COMMENTS  Monitoring Well Installation, Geotechnical Properties, Analytical Tests, Instrumentation
	Interval	Type and Number	Recovery (IN)				
5	1	LFS-2 A (0-4)	47	0.0	Tan fine silt, dry	ML	Fill
				2.2	Tan fine silt (weat. Loess), firm, dry	ML	
10	2		46	0.0	Lt. gray fine silt, firm, moist	ML	Sweet chemical odor @ 4 ft. Pond muck
				8.2	Becomes yellowish tan wet, soft @ 8.6 ft.		Stronger odor @ 8.2 ft. (no register on P/D)
15	3	LFS-2 B (6-10)	36	0.0	Rustred stained fine silt, firm dry	ML	Sweet chemical odor
				9.8	Lt. Gray fine silt, firm to soft, moist to wet	ML	Sweet chemical odor
20	4		43	0.0	Reddish tan fine silt, moist firm-soft, iron stained top 3 ft	ML	Sweet chemical odor
				16.4	Lt. gray fine silt, moist, medium	ML	Sweet chemical odor
25	5		47	0.0	Reddish tan fine silt (weat. Loess) firm, moist	ML	Pond bottom @ 17 ft. Sweet chemical odor
				17.0	Same as above	ML	Sweet chemical odor
30	7	LFS-2 C (27-29)	47	25.5	Wet Same as above	ML	Sweet chemical odor
				0.0	Saturated @ 29 ft. Same as above except Lt. tan	ML	Slight chemical odor
30	8		38	0.0		ML	

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-2

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe Macro Sampler      Sample Depth: 0 to 4 feet bgs

Type of Soil: Silt

Sample Analysis: <sup>voc</sup> Pesticide/RS  
<sup>SVOC</sup> Atrazine, Cyanazine, Dinsoseb  
<sup>Cyanide</sup>

Sample Container: <sup>VOC = 2oz Glass</sup>  
<sup>SVOC = 4oz Amber Glass</sup>  
<sup>Pesticide = 4oz Amber Glass</sup>  
<sup>Atrazine = 4oz Amber Glass</sup>  
<sup>Cyanide = 4oz Clear Glass</sup>

Sample Quantity Collected: 18oz

Preservative Used: None

Field Technician: H. Dean Lowe

Signature / Date: H. Dean Lowe 8/2/00

Remarks:

Sample # LFS-2A (0-4)

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-2

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe Macro Sampler      Sample Depth: 8 to 10 feet bgs

Type of Soil: Silt

VOC = 2oz Glass  
Cyanide = 4oz Glass  
Other = 4oz Amber Glass

Sample Analysis: VOC Pesticide/PEB  
SVOC Atrazine/Cyanazine/Dinoseb  
Cyanide

Sample Container:

Sample Quantity Collected: 18 oz

Preservative Used: None

Field Technician: H. Dean Lowe

Signature / Date: H. Dean Lowe 8/3/00

Remarks:

Sample # LFS-2B (8-10)

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-2

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe macro sampler      Sample Depth: 27 to 29 feet bgs

Type of Soil: silt

Sample Analysis: VOC      Pesticide/PCB  
SVOC      Atrazine/Amazone/Dinoseb  
Cyanide

VOC = 2 oz. Glass  
Cyanide = 4 oz. Glass

Sample Container: Others = 4 oz. Amber Glass

Sample Quantity Collected: 18 oz

Preservative Used: None

Field Technician: H. Dean Lowe

Signature / Date: *H. Dean Lowe*

Remarks:

Sample # LFS-2C (27-29)

GROUNDWATER SAMPLING LOG  
 PETRA ENVIRONMENTAL, INC.  
 Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: *LF5-2*

Date Sampled: *8/4/00*

Time Sampled: *1700*

Sampling Method: *VOC = ~~55~~ Boiler  
 Cyanide = Peristaltic Pump  
 Metals = Peristaltic Pump*

Sample Depth: *43-48* feet bgs

Sample Type: *Grab*

Sample Number(s): *LS2-W*

Sample Quantity Collected: *790 ml*

Sample Container: *VOC = 40 ml glass vial  
 Cyanide = 500ml plastic  
 Metals = 250ml plastic*

Sample Analysis: *VOC  
 Cyanide  
 Ti Metals*

Preservative: *VOC = HCL  
 Cyanide = NaOH  
 Metals = HNO<sub>3</sub>*

Purging: *N/A wells set with Scoprobe*

Time: *7:00* *1633*      SWL(ft): *37.95*

Well Depth(ft bgs): *48*      Well Vol.(gal): *N/A*

	pH	Cond.	Temp.(degrees )	Vol. Removed(gal)
1st WV				
2nd WV				
3rd WV				
Ave.				Total

Remarks: \_\_\_\_\_

Sampling: *Low well yield = approximately 1.2 liters per hour*

Time: \_\_\_\_\_      WL(ft): \_\_\_\_\_

pH: \_\_\_\_\_      Cond(mhos): \_\_\_\_\_      Temp.(degrees C F) \_\_\_\_\_

Remarks: \_\_\_\_\_

Field Technician: *H. Dean Lowe*

Signature / Date:

*H. Dean Lowe 8/4/00*

GROUNDWATER SAMPLING LOG  
 PETRA ENVIRONMENTAL, INC.  
 Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-2

Date Sampled: 8/5/00

Time Sampled: 1300

Sampling Method: Geoprobe vacuum

Sample Depth: 43-48 feet bgs

Sample Type: Grab

Sample Number(s): LS2-W

Sample Quantity Collected: 3 liters

Sample Container: 1 liter - Amber Glass

Sample Analysis: Pesticide / PCB  
 SVOC  
 Atrazine / Cyanazine / Dinoseb

Preservative: None

Purging: N/A well installed with Geoprobe

Time: 1200

SWL(ft): 37.90

Well Depth(ft bgs): 48

Well Vol.(gal): N/A

pH	Cond.	Temp.(degrees )	Vol. Removed.(gal)
1st WV			
2nd WV			
3rd WV			
Ave.			Total
Remarks:			

Sampling: Low well yield = approx. 1.2 liters per hour

Time:      WL(ft):

pH:      Cond(mhos):      Temp.(degrees C F)

Remarks:

Field Technician: H. Dean Lowe

Signature / Date:

H. Dean Lowe 8/5/00

## SOIL BORING LOG

PROJECT Vicksburg Chemical Co Landfill LOCATION Vicksburg, MSELEVATION \_\_\_\_\_ DRILLING CONTRACTOR Petra Environmental, Inc.DRILLING METHOD AND EQUIPMENT Geoprobe 5400 Truck MountedWATER LEVEL AND DATE \_\_\_\_\_ START 8/2/00 FINISH 8/2/00 LOGGER H. Dean Lowe

Depth Below Surface (FT)	SAMPLE			Standard Penetration Test (SPT) Results Blows/ft	SOIL DESCRIPTION Soil Name, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USGS Group	Symbolic Log	COMMENTS Monitoring Well Installation, Geotechnical Properties, Analytical Tests, Instrumentation
	Interval	Type and Number	Recovery (IN)				
	1	LFS-3 A(0-4)	45	0.0	Tan fine silt (Loess fill), med. dry	ML (Fill)	
5	2		41	0.0 63	Becomes reddish tan at 6.3 ft. and slightly moist		Fill
					Reddish tan fine silt (wea. loess), medium, dry to slightly moist		Native soil
10	3		44	0.0	Same as above		
	4	LFS-3 B(14-16)	38	0.0	Same as above	ML	
15	5		40	0.0	Same as above		
20	6		34	0.0	Same as above but less red color		
25	7	LFS-3 C(24-26)	36	0.0	Same as above - v. moist wet at 25.5		
	8		42	0.0	Saturated at 28.1 ft.		
30							

SOIL BORING LOG

PROJECT Vicksburg Chemical Co Landfill LOCATION Vicksburg, MS

ELEVATION \_\_\_\_\_ DRILLING CONTRACTOR Petra Environmental, Inc.

DRILLING METHOD AND EQUIPMENT Geoprobe 5400 Truck Mounted

WATER LEVEL AND DATE \_\_\_\_\_ START 8/2/00 FINISH 8/2/00 LOGGER H. Dean Lowe

Depth Below Surface (FT.)	SAMPLE			Standard Penetration Test Results Feet Per Blow	SOIL DESCRIPTION Soil Name, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USGS Group	Symbolic Log	COMMENTS Monitoring Well Installation, Geotechnical Properties, Analytical Tests, Instrumentation
	Interval	Type and Number	Recovery (IN)				
35	8		42	0.0	Tan fine silt (weat. Loess), soft, saturated	ML	No odor
	9		40	0.0	Same as above		
40	10		37	0.0	Same as above		
					TD = 40 ft.		
					Well Construction Date Installed: 8/4/00 Constr. Materials: 3/4" ID PVC Pipe & Screen Backfill: Granular Bentonite Filter: #3 Sand Screen: 3/4" ID PVC 0.010 slot Bottom:		0-25 ft. bgs 25-45 ft. bgs 43-48 ft. bgs 48 ft. bgs 45
					Water Levels Date: 8/4/00 Time: 1130 Depth: 40.0 Time: 1340 Depth: 40.10 Time: 1547 Depth: 38.91		

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

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Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-3

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe macro sampler      Sample Depth: 0 to 4 feet bgs

Type of Soil: Silt

Sample Analysis: VOC      Pesticide/ARB  
SVOC      Atrazine/Cyanazine/Dinoseb  
Cyanide

Sample Container: VOC = 2oz Glass  
Cyanide = 4oz Glass  
Others = 4oz Amber Glass

Sample Quantity Collected: 18oz

Preservative Used: None

Field Technician: H. Dean Lowe

Signature / Date: *H. Dean Lowe* 8/3/00

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Remarks:

Sample # LFS-3A (0-4)

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-3

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe macro sampler      Sample Depth: 14 to 16 feet bgs

Type of Soil: Silt

Sample Analysis: VOC      Pesticides/PCB  
SVOC      Atrazine/Cyfluthrin/Dinoseb  
Cyanide

Sample Container: VOC = 2 oz Glass  
Cyanide = 4 oz Glass  
Dioxins = 4 oz Amber Glass

Sample Quantity Collected: 18 oz

Preservative Used: None

Field Technician: H. Dean Lowe

Signature / Date: *H. Dean Lowe* 8/3/00

Remarks:

Sample # LFS-3 B(14-16)

**SOIL SAMPLING LOG**

PETRA ENVIRONMENTAL, INC.

Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-3

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe macro sampler      Sample Depth: 24 to 26 feet bgs

Type of Soil: Silt

Sample Analysis: VOC Pesticide/PCB  
SVOC Atrazine/Pyrazinyl/Dinoseb  
Cyanide

Sample Container: VOC = 2 oz Glass  
Cyanide = 4 oz Glass  
Others = 4 oz Amber Glass

Sample Quantity Collected: 18 oz

Preservative Used: None

Field Technician: H. Dean Lowe

Signature / Date: H. Dean Lowe

Remarks:

Sample # LFS-3C (24-26)



## SOIL BORING LOG

PROJECT Vicksburg Chemical Co Landfill LOCATION Vicksburg, MSELEVATION \_\_\_\_\_ DRILLING CONTRACTOR Petra Environmental, Inc.DRILLING METHOD AND EQUIPMENT Geoprobe 5400 Truck MountedWATER LEVEL AND DATE \_\_\_\_\_ START 8/3/00 FINISH 8/3/00 LOGGER H. Dean Love

Depth Below Surface (FT)	SAMPLE			Standard Penetration Test (PT) Results PT	SOIL DESCRIPTION	Symbolic Log	COMMENTS
	Interval	Type and Number	Recovery (IN)				
1	1	LF5-4 A (0-4)	40	<del>50.3</del> 0.0	lt. tan to reddish tan fine silt F, ll	ML	
5	2	LF5-4 B (4-6)	42	50.3 4.6 1.0	Reddish tan fine silt (loc. loess) Firm, moist Yellowish tan @ 4 ft. Tan @ 4.2 - v. wet 6.7 to 8 ft. Dry to slightly moist below 8 ft.	ML	- Mod. Sweet Chemical odor @ 2.7 ft. - strong sweet chemical odor @ 4-4.2 ft. moderate odor below 4.2 ft.
10	3		38	1.0	same as above	ML	Detectable odor
15	4		36	1.3	same as above		
20	5		40	0.0	Becomes v. moist @ 18.2 ft.		slight odor
25	6		36	0.0	same as above but moist - dry		
25	7	LF5-4 C (24-26)	34	0.0	same as above		
30	8		38 <sup>th</sup>	0.0	Saturated @ 28.5 ft. Tan fine silt (wes. loess) Soft		slight odor

SOIL BORING LOG

PROJECT Vicksburg Chemical Co Landfill LOCATION Vicksburg, MS

ELEVATION \_\_\_\_\_ DRILLING CONTRACTOR Petra Environmental, Inc.

DRILLING METHOD AND EQUIPMENT Geoprobe 5400 Truck Mounted

WATER LEVEL AND DATE \_\_\_\_\_ START 8/3/00 FINISH 8/3/00 LOGGER H. Deam Lowe

Depth Below Surface (FT)	SAMPLE			Standard Penetration Test (SPT) Blows	SOIL DESCRIPTION Soil Name, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USGS Group	Symbolic Log	COMMENTS Monitoring Well Installation, Geotechnical Properties, Analytical Tests, Instrumentation
	Interval	Type and Number	Recovery (IN)				
35	8	38	0.0	0.0	Tan fine silt (wea. loess) s. ft., saturated		v. slight sweet cream odor
	9	37	0.0	0.0	same as above	ML	
40	10	34	0.0	0.0	Same as above		v. slight odor
					TO @ 40 ft. Well Construction Date Installed: 8/4/00 Constr. Material: 3/4" ID PVC pipe & screen Backfill: Bentonite Granules: 0-43 ft. bss Filter: #3 sand (2" ID borehole) 20-48 ft. bss Screen: 3/4" ID, 0.010 slot PVC 43-48 ft. bss Casing: 3/4" ID PVC pipe 0-43 ft. bss Bottom: 48 ft. bss  Water Level Date: 8/4/00 Time: 1007 Depth: 42.9 ft. bss Time: 1027 Depth: 42.5 ft. bss Time: 1325 Depth: 38.7 ft. bss Time: 1533 Depth: 37.95 ft. bss		

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-4

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe Micro Sampler      Sample Depth: 0 to 4 feet bgs

Type of Soil: Silt

Sample Analysis: VOC Pest/PCB  
SVOC Atrazine/Cyanazine/Dinoseb  
Cyanide T. Metals

Sample Containers: VOC = 2 oz Glass  
Cyanide = 4 oz Glass  
Others = 4 oz amber Glass

Sample Quantity Collected: 18 oz

Preservative Used: NONE

Field Technician: H. Dean Lowe

Signature / Date:  
*H. Dean Lowe*      8/3/00

Remarks:

Sample # LFS-4A (0-4)

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

---

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-4

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe macro sampler      Sample Depth: 4 to 6 feet bgs

Type of Soil: silt

Sample Analysis: VOC Pest/PCB  
SVOC Atrazine/Cyanazine/Dinoseb  
Cyanide T. Metals

Sample Container: VOC = 2 oz Glass  
Cyanide = 4 oz Glass  
Others = 4 oz amber Glass

Sample Quantity Collected: 18 oz

Preservative Used: NONE

Field Technician: H. Dean Lowe

Signature / Date:  
H. Dean Lowe      8/3/00

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Remarks:

Sample # LFS-4B(4-6)



GROUNDWATER SAMPLING LOG  
 PETRA ENVIRONMENTAL, INC.  
 Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-4

Date Sampled: <sup>HOL</sup> ~~8/4~~ 8/5/00

Time Sampled: VOC, Cyanide, Metals = 1630  
 Pest/PCB, SVOC, Atrazine = 1800

Sampling Method: VOC = ss Bailer  
 others = Geoprobe vacuum

Sample Depth: 43-48 feet bgs

Sample Type: Grab

Sample Number(s): LS4-W

Sample Quantity Collected: 3.8 liters

Sample Container: VOC = 40ml glass vial  
 Cyanide = 50ml plastic  
 Metals = 250ml plastic  
 others = 1 liter Amber Glass

Sample Analysis: VOC Pesticide/PCB  
 SVOC Atrazine/Cyanazine/Dinoseb  
 Cyanide T. Metals

Preservative: VOC = HCL  
 Cyanide = NaOH  
 Metals = HNO3  
 others = None

Purging: N/A well installed w/ Geoprobe

Time: 1802

SWL(ft): 38.5

Well Depth(ft bgs): 48

Well Vol.(gal): N/A

PH	Cond.	Temp.(degrees )	Vol. Removed (gal)
1st WV			
2nd WV			
3rd WV			
Ave.			Total

Remarks:

Sampling: Low well yield = approximately 1 liter per hour

Time:

WL(ft):

pH:

Cond(mhos):

Temp.(degrees C F)

Remarks:

Field Technician: H. Dean Lowe

Signature / Date:

H. Dean Lowe 8/5/00

## SOIL BORING LOG

PROJECT Vicksburg Chemical Co Landfill LOCATION Vicksburg, MSELEVATION \_\_\_\_\_ DRILLING CONTRACTOR Petra Environmental, Inc.DRILLING METHOD AND EQUIPMENT Geoprobe 5400 Truck MountedWATER LEVEL AND DATE \_\_\_\_\_ START 8/3/00 FINISH 8/3/00 LOGGER H. Dean Lowe

Depth Below Surface (FT)	SAMPLE			Standard Penetration Test (SPT) Results Blows/ft	SOIL DESCRIPTION Soil Name, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USGS Group	Symbolic Log	COMMENTS Monitoring Well Installation, Geotechnical Properties, Analytical Tests, Instrumentation
	Interval	Type and Number	Recovery (IN)				
5	1	LFS-5 A (0-4) ms(0-4) ms (0-4)	39	0.0	Lt. tan fine silt w/ thin clay @ base, dry	ML	Fill No Odor
				2.3	Tan fine silt, firm, dry	ML	Fill No odor
10	2	43	43	0.0	Gray-tan silty variegated clay of low plasticity, med., moist Becomes reddish tan @ 7ft.	CL	Fill slight chemical odor
				5.5			
15	3	40	40	0.0	Reddish brown silty clay, firm, with occas. manganese nodules, moist	CL	Chemical odor
				10			
20	4	32	32	0.0	Same as above but variegated	CL	Chemical odor
				0.0			
25	5	LFS-5 B (16-18)	43	6.1	Yellowish colored lense Same as above	CL	strong chemical odor
				0.0			
30	6	32	32	3.7	Same as above	CL	chemical odor
				21.7			
30	7	31	31	0.0	Gray fine silt with humus in top 6", moist, med. dense	ML	No chemical odor
				24.9			
30	8	31	31	0.0	Red silty clay, high plasticity	CH	No chemical odor
				25.2	Tan-gray laminated silt/silty clay	ML/CL	No chemical odor
				0.0	Dk gray silty clay, with black humus specks, moist, stiff medium to low plasticity	CL	No chemical odor
				25.8			
				28.5	Gray v. silty clay, low plasticity v. moist, soft	CL	No chemical odor

SOIL BORING LOG

PROJECT Vicksburg Chemical Co Landfill LOCATION Vicksburg, MS

ELEVATION \_\_\_\_\_ DRILLING CONTRACTOR Petra Environmental, Inc.

DRILLING METHOD AND EQUIPMENT Geoprobe 5400 Truck Mounted

WATER LEVEL AND DATE \_\_\_\_\_ START 8/3/00 FINISH 8/3/00 LOGGER H. Dean Lowe

Depth Below Surface (FT)	SAMPLE			Standard Penetration Test ID Results (ft)	SOIL DESCRIPTION Soil Name, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USGS Group	Symbolic Log	COMMENTS Monitoring Well Installation, Geotechnical Properties, Analytical Tests, Instrumentation
	Interval	Type and Number	Recovery (IN)				
35	8		31	0.0	Gray v. silty clay, low plasticity, with humus specks, v. moist firm to stiff	CL	No chemical odor
	9	LF5-5 C (34-36)	32	0.0	Reddish brown silty clay of moderate to high plasticity, stiff to hard grades to gray	CH	No chemical odor
				33.3			
				0.0			
40	10	30	35	Gray v. silty clay, low plasticity	CL	No chemical odor	
			36.5	Reddish tan fine slightly clayey silt, soft, saturated	ML	No chemical odor	
					TDC @ 40 ft.  Well Construction Date Installed: 8/4/00 Constr. Material: 3/4" pipe (PVC) & screen Backfill: Bentonite granules Filter: #3 sand (2" ID borehole) Screen: 3/4" ID 0.010 slot PVC Casings: 3/4" ID PVC pipe Bottom:  Water Level Date: 8/4/00 Time: 0900 Depth: 43.2 Time: 0915 Depth: 43.0 Time: 0930 Depth: 43.0 Time: 1320 Depth: 43.3 Time: 1540 Depth: 40.65		

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-5

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe macro sampler      Sample Depth: 0 to 4 feet bgs

Type of Soil: Clay

Sample Analysis: VOC Pest/PCB  
SVOC Atrazine/Cyanazine/Dinoseb  
Cyanide

Sample Containers: VOC = 2 oz. Glass  
Cyanide = 4oz. Glass  
Others = 4 oz. Amber Glass

Sample Quantity Collected: 18 oz

Preservative Used: NONE

Field Technician: H. Dean Lowe

Signature / Date:  
*H. Dean Lowe*      8/3/00

Remarks:

Sample # LFS-5A (0-4)

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-5

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe macro sampler      Sample Depth: 0 to 4 feet bgs

Type of Soil: Clay

Sample Analysis: Vbc Pest / PCB  
SVOC Atrazine / Cyanazine / Dinoseb  
Cyanide

Sample Containers: VOC = 2 oz. Glass  
Cyanide = 4oz. Glass  
Others = 4 oz. Amber Glass

Sample Quantity Collected: 18 oz

Preservative Used: NONE

Field Technician: H. Dean Lowe

Signature / Date:

H. Dean Lowe      8/3/00

Remarks:

Sample # LFS-5MS(0-4)

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-5

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe macro sampler      Sample Depth: 0 to 4 feet bgs

Type of Soil: Clay

Sample Analysis: VOC Pest/PCB  
SVOC Atrazine/Ryanazine/Dinoseb  
Cyanide

Sample Containers: VOC = 2 oz. Glass  
Cyanide = 4 oz. Glass  
Others = 4 oz. Amber Glass

Sample Quantity Collected: 18 oz

Preservative Used: NONE

Field Technician: H. Dean Lowe

Signature / Date: *H. Dean Lowe* 8/3/00

Remarks:

Sample # LFS-5 MSD(0-4)

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas     Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill     Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-5

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe macro sampler     Sample Depth: 16 to 18 feet bgs

Type of Soil: Clay

Sample Analysis: VOC Pest / PCB     Sample Containers: VOC = 2 oz. Glass  
SVOC     Cyanide = 4 oz. Glass  
Cyanide     Others = 4 oz. Amber Glass  
Atrazine / Cyanazine / Dinoseb

Sample Quantity Collected: 18 oz

Preservative Used: NONE

Field Technician: H. Dean Lowe

Signature / Date: *H. Dean Lowe*     8/3/00

Remarks:

Sample # LFS-5B (16-18)

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-5

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe macro sampler      Sample Depth: 34 to 36 feet bgs

Type of Soil: Clay

Sample Analysis: VOC Pest / PCB  
SVOC Atrazine / Cyanazine / Dinoseb  
Cyanide

Sample Containers: VOC = 2 oz. Glass  
Cyanide = 4oz. Glass  
Others = 4 oz. Amber Glass

Sample Quantity Collected: 18 oz

Preservative Used: NONE

Field Technician: H. Dean Lowe

Signature / Date:

*H. Dean Lowe*      8/3/00

Remarks:

Sample # LFS-5C (34-36)

GROUNDWATER SAMPLING LOG  
 PETRA ENVIRONMENTAL, INC.  
 Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-5

Date Sampled: 8/6/00

VOC = 0705

Time Sampled: Other = 1200

Sampling Method: <sup>VOC = SS Bailor</sup> Geoprobe Vacuum

Sample Depth: 43-48 feet bgs

Sample Type: Grab

Sample Number(s): L55-W

Sample Quantity Collected: 1.8 liters

Sample Container: <sup>VOC = 40ml glass</sup> Other = 1 liter amber glass

Sample Analysis: <sup>VOC</sup> Pesticide/PCB  
 Atrazine/Cyanazine/Dinoseb  
<sup>SVOC</sup>

Preservative: VOC = HCL  
 Other = None

Purging: N/A well installed with Geoprobe

Time: 0700

SWL(ft): 40.5

Well Depth(ft bgs): 48

Well Vol.(gal): N/A

	pH	Cond.	Temp.(degrees )	Vol. Removed.(gal)
1st WV				
2nd WV				
3rd WV				
Ave.				Total
Remarks:				

Sampling: Well yield = 1.75 liters in 2 1/2 hour. Slower after 2 hours

Time:

WL(ft):

pH:

Cond(mhos):

Temp.(degrees C F)

Remarks:

Field Technician: H. Dean Lowe

Signature / Date:

H. Dean Lowe 8/6/00

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**Appendix B**

Field Forms





# SOIL / SEDIMENT SAMPLING LOG

PROJECT NAME: \_\_\_\_\_

PROJECT NUMBER: \_\_\_\_\_ Date: \_\_\_\_\_

SITE LOCATION: \_\_\_\_\_ CODED/

SAMPLE ID NUMBER: \_\_\_\_\_ REPLICATE NO: \_\_\_\_\_

TIME SAMPLING BEGAN: \_\_\_\_\_ ENDED: \_\_\_\_\_

WEATHER: \_\_\_\_\_

SITE DESCRIPTION: \_\_\_\_\_

## SAMPLING DATA

COLLECTION METHOD: \_\_\_\_\_

DEPTH (ft): \_\_\_\_\_ MOISTURE CONTENT: \_\_\_\_\_

COLOR: \_\_\_\_\_ ODOR: \_\_\_\_\_

DESCRIPTION: \_\_\_\_\_

## ANALYSES REQUIRED

## CONTAINER DESCRIPTION

From Lab: X or GM

\_\_\_\_\_

\_\_\_\_\_

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SAMPLING MONITORING (TIP, OVA, HNU, etc.) \_\_\_\_\_

REMARKS: \_\_\_\_\_

\_\_\_\_\_

SAMPLING PERSONNEL: \_\_\_\_\_



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INDUSTRIAL PARK, LLC**

**SWMU 2 Slope Stability Work  
Plan**

Former Vicksburg Chemical Company  
Vicksburg, Mississippi

17 January 2007

ARCADIS

---

Craig A. Derouen, P.E.  
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Rudy J. Guichard  
Vice President/Area Manager

**SWMU 2 Slope Stability Work  
Plan**

Former Vicksburg Chemical  
Company  
Vicksburg, Mississippi

Prepared for:  
Mississippi Department of Environmental  
Quality and Mississippi Bluffs Industrial  
Park, LLC

Prepared by:  
ARCADIS U.S., Inc.  
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Tel 225 292 1004  
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Our Ref.:  
LA002656.0001.00009

Date:  
17 January 2007

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**Tables**

- 1 Summary of Geotechnical Methods
- 2 Summary of Required Analyses

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- 1 Site Location Map
- 2 Proposed Stability Sampling Locations

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- A Historical Data
- B Field Forms

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**1. Introduction and Work Plan Rationale**

**1.1 Objectives/Rationale**

This Work Plan presents a scope of work for performing a slope stability study on the landfill area at the former Vicksburg Chemical Company (Vicksburg Chemical). The site was formerly a pesticide and herbicide manufacturing facility divided into two areas called the North Plant and South Plant. The landfill area, located in the South Plant, was designated Solid Waste Management Unit (SWMU) 2 during a Resource Conservation and Recovery Act (RCRA) mandated investigation. The primary objective of the activities proposed in this document will be to collect and evaluate soil samples to determine the stability of the existing slopes in the area of the on-site landfill. Secondary objectives will be to characterize the present depth of the landfill and to collect sufficient data to evaluate the landfill's capacity to receive additional material resulting from potential future remedial activities.

All investigative sampling proposed in this Work Plan will be conducted in accordance with the Mississippi Department of Environmental Quality's (MDEQ's) Brownfields Program. Waste characterization and disposal will be completed in accordance with MDEQ-approved methodology specific to this site.

**1.2 Property Background**

**1.2.1 Property Location**

Vicksburg Chemical was formerly owned by Cedar Chemical Corporation (Cedar Chemical). The facility is located south of Interstate 20 on Rifle Range Road within the southwestern section of the city of Vicksburg in Warren County, Mississippi. The site is composed of approximately 535 acres located in Sections 4, 5, 8, 9, and 10, township 15 north, range 3 east (Latitude: North 32° 18' 01", Longitude: West 90° 53' 57"). The site location is shown on Figure 1.

**1.2.2 Property History**

The North Plant began operation in 1961 and produced potassium nitrate, liquid chlorine, and liquid nitrogen tetroxide. The raw materials for the North Plant included potassium chloride and nitric acid. The South Plant began operation in 1953 manufacturing chlorinated pesticides, nitrogen-based herbicides, and other agricultural chemicals. The only active operations at the South Plant after 1992 were the nitric acid

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## SWMU 2 Slope Stability Work Plan

Former Vicksburg Chemical  
Company  
Vicksburg, Mississippi

unit constructed in 1986 and a potassium carbonate unit constructed in 1994. During various periods prior to 1987, the South Plant produced dinitro butyl phenol (dinoseb or DNBP), monosodium methane arsenate (MSMA), diethyl hexyl phosphoric acid (DEHPA), 1-hydroxy-ethylidene-1-1-diphosphonic acid (UNIHIB), toxaphene, methyl parathion, cyanazine (bladex), and atrazine. Toxaphene and methyl parathion are insecticides, while atrazine, dinoseb, and MSMA are herbicides. Raw materials for these operating processes included chlorine, camphene, ortho-secondary butyl phenol (OSBP), sodium arsenate, sodium hydroxide, methyl chloride, sulfuric acid, sodium paranitrophenolate, and phosphorus trichloride.

Originally, the two plants were completely separate, owned and operated by two different companies. The South Plant was originally constructed by Spencer Chemical in 1953. American Metal Climax Corporation (Amax) constructed the North Plant in 1961. After purchasing the South Plant in 1964, Gulf Chemical added a formaldehyde unit in 1966. According to historical environmental documents, Vicksburg Chemical was formed in early 1972 and purchased both the Gulf Oil and Amax facilities (except the formaldehyde plant) in July 1972. In 1978, Vicksburg Chemical was merged into Vertac, Inc., which merged into Vertac Chemical Corporation (VCC) in September 1979. Cedar Chemical acquired the Vicksburg Chemical plant from VCC in February 1986. Fermenta A.B. of Sweden acquired Cedar Chemical in June 1986. Nine West Corporation (Trans Resources, Inc.) acquired Cedar Chemical in January 1988.

In addition to the above-mentioned operations at the plant, the property was the location of two additional operations: 1) an operation by Reagent Chemical to produce aqueous hydrochloric acid from a by-product of the toxaphene operation; and 2) a Gulf formaldehyde plant. The formaldehyde unit owned and formerly operated by Borden Chemical is located inside the former boundary of the South Plant.

### 1.3 Project History

#### 1.3.1 Site-Wide

Vicksburg Chemical initiated a RCRA Facility Investigation (RFI) in 1994 and continued through 2001. The *RCRA Facility Investigation Draft Final Report* (URS 2001a) and *Draft Groundwater Assessment Report* (URS 2001b) were completed in August 2001 and November 2001, respectively. Both reports were submitted to the U.S. Environmental Protection Agency (USEPA) and subsequently

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approved in December 2001. A draft Corrective Measures Study was developed in the spring of 2002.

On March 8, 2002, VCC and Cedar Chemical filed for bankruptcy in the United States Bankruptcy Court for the Southern District of New York. The bankruptcy was contested by MDEQ, the Arkansas Department of Environmental Quality, USEPA Region 4, USEPA Region 6, and the U.S. Department of Justice. The court eventually approved an agreement allowing Vicksburg Chemical to abandon its properties and authorizing MDEQ to direct the transfer of the Vicksburg Chemical property to any entity identified by MDEQ. Since that time, MDEQ has kept the site under its control while structuring an agreement to clean up the plant site in a manner protective of human health and the environment. On December 19, 2005, MDEQ finalized an agreement for Mississippi Silvertip Development, LLC (Silvertip), to remediate the abandoned Vicksburg Chemical site. The developer, Silvertip, intends to create a Mississippi Bluffs Industrial Park to foster the sustainable reuse of the former chemical plant site and adjacent areas. It is anticipated that mixed use (i.e., light industrial, commercial, recreational, and residential) will be possible at the completion of the remedial action. Harcros Chemicals, Inc., is currently leasing portions of the former North Plant to facilitate a chemical blending, mixing, and distribution facility. Concurrently, ARCADIS U.S., Inc. (ARCADIS), is performing the remediation services with MDEQ oversight and control. Silvertip plans to construct high-end commercial and residential sites and a championship golf course on a good portion of the remaining acreage.

1.3.2 SWMU 2

The following text was obtained from the MDEQ's *Preliminary Assessment Report* dated May 12, 2003:

"The Inactive Landfill (SWMU 2) is located on a natural hill approximately 30 feet in elevation above the levees of the adjacent Surface Impoundment and between the railroad tracks and Hennessey's Bayou. The inactive disposal facility is approximately 500 feet by 500 feet and was used to receive residues associated with the manufacture of herbicides and insecticides. One pit was excavated atop the hill to store Dinoseb process wastewater. When the neutralization facilities for the Dinoseb process were completed, 200,000 gallons of wastewater was removed from the pond in 1980. Three other disposal pits were also excavated in this area. These pits were used as disposal locations for pallets, fiber and steel drums, and other solid waste material. Dredge materials

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## SWMU 2 Slope Stability Work Plan

Former Vicksburg Chemical  
Company  
Vicksburg, Mississippi

from the Surface Impoundment, contaminated with pesticides and chemical residues, were also placed into the disposal pits. Over 4,000 empty drums once containing cyanuric chloride, Dinoseb, tributylanline, methyl parathion and epichlorohydrin were stored in the three unlined pits. Vicksburg Chemical attempted to dissolve the drums with hydrochloric acid. The volume of acid is unknown. In 1977, the drums which could meet DOT requirements, were removed from the pits and disposed of off site.

The bags from the bag collectors in the Atrazine process area, contaminated with Atrazine, were placed in fiber drums and buried in the landfill. Numerous cyanuric chloride drums were also buried. Erosion of the landfill cover allowed for liberation of hydrochloric acid fumes as runoff reacted with remaining cyanuric chloride. Sixty-four (64) drums containing sulfur, PCI3, PSCI3 from the methyl parathion process were buried just north of the northernmost holding pond. Drums containing Dinoseb and other products were also buried in the landfill. Most burials occurred between 1972 and 1975. Since September 1975 all waste materials have been taken to permitted industrial waste landfills.

The landfill was initially closed in 1979 by regrading, covering with soil and planting with grass. Additional improvements occurred in 1983 with grading and construction of an engineered cap in accordance with plans by the MDEQ.

In 1988, the existing cover system of the landfill did not appear to be fully performing the purpose for which it was placed Interim corrective measures have been taken around the landfill unit to correct erosion problems."

### 1.4 Data Needs and Objectives

Additional site data are needed to evaluate the geotechnical properties of the existing landfill. Historical data and observations made during site visits have been used to identify locations of concern. Copies of the historical data identified in Appendix A are considered valid and usable. The objective of this sampling effort is to collect and evaluate soil samples to determine the stability of the existing slopes in the area of the on-site landfill. Secondary objectives are to collect sufficient data to evaluate the landfill's capacity to receive additional material and to determine the depth of the landfill.

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**1.5 Work Plan Approach**

The general Work Plan strategy was developed to obtain samples representative of present site conditions. Personnel and equipment will be deployed to the Vicksburg Chemical site to collect soil samples from locations representative of the landfill area. Samples will be containerized and submitted to a geotechnical laboratory for analysis by the methods presented on Table 1.

**2. Methodology**

**2.1 Sample Locations**

The sample locations for this stability study are shown on Figure 2. These sample locations were selected because they represent areas that will provide information on the present construction of the landfill. The RFI indicated five main impacted areas requiring site remediation. These areas were defined in the *Quality Assurance Project Plan* (QAPP; ARCADIS 2006a) developed for this Site. Four distinct areas were defined in the South Plant and one in the North Plant. The stability study activities proposed in this Work Plan pertain to Area 3 – South Plant – SWMU 2 as presented in the QAPP. Soil samples will be collected from locations within and adjacent to this area to evaluate present site conditions.

**2.2 Sample Collection Procedures**

Some of the tasks that will be conducted during sampling activities have been outlined in detail in the QAPP. The pertinent sections are listed below and incorporated by reference.

**2.2.1 Sampling Equipment and Procedures**

Prior to sampling, a site visit will be conducted by an ARCADIS engineer to finalize the sample locations. Final sample locations will be surveyed and located on a base map for further use. The proposed stability sampling locations are shown on Figure 2.

Samples from eleven borings (B-1 through B-11) will be collected for geotechnical analyses. Samples from three borings (B-12 through B-14) will be used to characterize and determine the strata of the landfill. Samples from four borings (B-15 through B-18) will be advanced to the Byram Marl for visual characterization of the subsurface. Sample collection equipment will consist of a Geoprobe® or drill rig. The proper use of

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a Geoprobe® in the collection of samples representative of site conditions is detailed in Section 11.2 in the QAPP. Samples will be collected from the drill rig in a manner consistent with Section 11.2 of the QAPP. The drill rig will be operated in accordance with the manufacturer's operations manual. Additionally, for safety reasons there will be more than one person on site during field sample collection. Safety precautions to protect workers are included in the Vicksburg Chemical *Health and Safety Plan* (ARCADIS 2006b). Decontamination of field equipment shall be conducted in accordance with the procedures described in Section 10.5 of the QAPP. The proposed stability sampling locations are shown on Figure 2.

Geotechnical samples will be collected from Borings B-1 through B-11. Cohesive or semi-cohesive material will be obtained at each 5-foot interval or change in strata, whichever is less. The samples will be collected using Shelby tubes or split-spoon samplers. Cohesive samples will be collected using a 3-inch Shelby tube barrel. Undisturbed samples collected using a Shelby tube barrel will be sealed on each end. The entire Shelby tube will be submitted to the laboratory for analysis. For cohesionless soils, a split-spoon sampler will be used. The extruded sample will be placed into laboratory-provided containers prior to shipment to the laboratory.

The samples will be containerized immediately upon collection. Undisturbed samples collected for geotechnical analysis will be kept with the containerized samples. The geotechnical samples will remain at ambient temperature until relinquished to the laboratory.

Borings B-12 through B-14 will be advanced at the locations shown on Figure 2. These borings will be used to characterize the subsurface strata. Samples will not be collected from these locations.

**2.2.2 Sample Handling and Analysis**

Sample handling and analysis were discussed in detail in Chapters 10 and 11 of the QAPP. These procedures will be followed as applicable to the handling of geotechnical samples during the implementation of this Work Plan. Table 1 contains a summary of the analyses that will be performed on each sample.

**2.3 Documentation**

Each sample will be described in the field upon collection. The observed characteristics will be documented on field forms (Appendix B) completed by sampling

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personnel. In addition to the visual soil characteristics, the interval where groundwater was first encountered will be noted on the log. After field activities are completed, the boring log will be updated to include the results of the laboratory analyses and surveying activities.

**2.4 Geotechnical Analyses**

The samples collected during the implementation of this Work Plan will be containerized and submitted to a geotechnical laboratory for analyses. Table 2 contains a summary of the required analyses for each sample. The results of the testing procedures discussed below will be utilized in the determination the stability of the slopes at SWMU 2.

**2.4.1 Laboratory Tests**

Soil samples will be submitted to a laboratory for geotechnical testing. The following analyses, or equivalent, will be performed at the each boring location as shown on Table 2:

- Unconfined Compressive Strength Test: 1) ASTM International (ASTM) D2166, or 2) American Association of State Highway and Transportation Officials (AASHTO) T208;
- Unconsolidated Undrained Triaxial Test: ASTM D2850;
- Consolidation Test: ASTM D2435;
- Moisture Content: ASTM D2216;
- Atterberg Limits: ASTM D4318;
- Soil Density/Unit Weight: ASTM D854;
- Triaxial Permeability Test: ASTM D5084; and
- Visual identification of samples as well as soil classification to be performed on samples.

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The samples will be collected in containers that meet laboratory requirements for each analysis. Proper chain-of-custody procedures will be followed during the transport and relinquishment of sample volumes.

**2.4.2 Field Tests**

In addition to visual characterization, for cohesionless soils, a standard penetration test (ASTM D1586 – Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils) will be performed in the field on each 3-foot interval.

**2.5 Survey**

The depth and boring location of the samples collected during this evaluation will be recorded. A topographic survey of the entire landfill area, including the boring locations and elevations, will be conducted. All surveying activities will be conducted by a surveyor licensed by the State of Mississippi.

**2.6 Investigation Derived Wastes**

Waste materials generated during this investigation and corrective action will include soil, sludge, used sampling equipment, decontamination water, and used personal protective equipment. Waste materials will be containerized in 55-gallon drums or similar appropriate containers or will be placed back onto the landfill for incorporation in the final remedy. The drums will be staged in a secure location and will be incorporated into the remediation to be conducted at the site. Waste characterization and on-site disposal will be completed in accordance with MDEQ-approved methodology specific to this site.

**2.7 Regulatory Involvement**

All site activities will be conducted after receiving approval from MDEQ of this SWMU 2 Slope Stability Work Plan. MDEQ will have oversight on all aspects of remediation activities conducted at this Site as per the Agreed Order. Future sampling frequencies, parameter lists, methodology, etc., will be approved by MDEQ prior to field implementation.

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**3. Reporting**

Following the completion of all field activities, the results of the Slope Stability Study activities will be included in the SWMU 2 Slope Stability report that will be prepared for submittal to MDEQ. The report will document all field activities and present an interpretation of surface and subsurface conditions. Appropriate historical and new data tables, figures, and appendices will be included in the report to support the text. The report will conclude by presenting recommendations for a path forward to obtain site closure.

**4. Schedule**

The sampling program will be initiated within 3 weeks of receiving written authorization to proceed from MDEQ. It is anticipated that the planned field activities can be completed within 2 to 3 weeks. Analytical data should be received within 3 weeks of completing the Slope Stability Study. A report will be prepared and submitted to MDEQ within 4 weeks of receipt of the analytical results. If field activities are delayed or if additional field activities are required to completely define the nature and extent of subsurface impacts, MDEQ will be promptly notified.

**5. References**

ARCADIS. 2006a. Quality Assurance Project Plan, Vicksburg Chemical Company.  
September 14.

ARCADIS. 2006b. Health and Safety Plan, Vicksburg Chemical Company.  
October 27.

MDEQ. 2003. Preliminary Assessment Report, Vicksburg Chemical Company.  
May 12.

URS. 2001a. RCRA Facility Investigation Draft Final Report, Vicksburg Chemical  
Company. August.

URS. 2001b. Draft Groundwater Assessment Report, Vicksburg Chemical Company.  
November.

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# ARCADIS

Table 1. Summary of Geotechnical Methods, SWMU 2 Stability Study Work Plan, Former Vicksburg Chemical Company, Vicksburg, Mississippi.

Parameter	Matrix	Method
<b>Geotechnical Laboratory Parameters</b>		
Unconfined Compressive Strength of Cohesive Soil	Solid	ASTM D2166
Unconsolidated-Undrained Triaxial Compression	Solid	ASTM D2850
Consolidation Test	Solid	ASTM D2435
Moisture Content	Solid	ASTM D2216
Atterberg Limits	Solid	ASTM D4318
Unit Weight	Solid	ASTM D854
Triaxial Permeability Test	Solid	ASTM D855
Percent Passing the No. 200 Sieve (ASTM D1140) <sup>(1)</sup>	Solid	ASTMD
<b>Geotechnical Field Parameters</b>		
Standard Penetration Test	Solid	ASTM D1586

<sup>(1)</sup> Test may be conducted on samples collected from the borings presented in Table 2 at the discretion of the geotechnical engineer.

# ARCADIS

Table 2. Summary of Proposed Analyses<sup>(1)</sup>, SWMU 2 Stability Study Work Plan, Former Vicksburg Chemical Company, Vicksburg, Mississippi.

Sample <sup>(2)</sup>	Depth of Boring (feet)	Unconfined Compressive Strength (ASTM D2166)	Unconsolidated-Undrained Triaxial Compression (ASTM D2850)	Consolidation Test (ASTM D2435)	Molsture Content (ASTM D2216)	Atterberg Limits (ASTM D4318)	Unit Weight (ASTM D854)	Standard Penetration Test (ASTM D1586)	Triaxial Permeability Test (ASTM D5084)	Visual Log
B-1	80	4 samples on cohesive soils, except fissured clays	5 samples on fissured clays and/or silts		7 samples	7 samples	9 samples	Cohesionless Soils	2 samples	Yes
B-2	80	4 samples on cohesive soils, except fissured clays	5 samples on fissured clays and/or silts		7 samples	7 samples	9 samples	Cohesionless Soils	2 samples	Yes
B-3	80	4 samples on cohesive soils, except fissured clays	5 samples on fissured clays and/or silts		7 samples	7 samples	9 samples	Cohesionless Soils	2 samples	Yes
B-4	80	3 samples on cohesive soils, except fissured clays	2 samples on fissured clays and/or silts	6 Samples	5 samples	5 samples	5 samples	Cohesionless Soils		Yes
B-5	40	2 samples on cohesive soils, except fissured clays	2 samples on fissured clays and/or silts		4 samples	3 samples	3 samples	Cohesionless Soils		Yes
B-6	40	2 samples on cohesive soils, except fissured clays	2 samples on fissured clays and/or silts		3 samples	3 samples	3 samples	Cohesionless Soils		Yes
B-7	40	2 samples on cohesive soils, except fissured clays	1 sample on fissured clays and/or silts		3 samples	3 samples	3 samples	Cohesionless Soils		Yes
B-8	40	2 samples on cohesive soils, except fissured clays	1 sample on fissured clays and/or silts		3 samples	3 samples	3 samples	Cohesionless Soils		Yes
B-9	40	3 samples on cohesive soils, except fissured clays	2 samples on fissured clays and/or silts		3 samples	3 samples	3 samples	Cohesionless Soils		Yes
B-10	40	2 samples on cohesive soils, except fissured clays	2 samples on fissured clays and/or silts		3 samples	3 samples	3 samples	Cohesionless Soils		Yes
B-11	40	4 samples on cohesive soils, except fissured clays	1 sample on fissured clays and/or silts	4 Samples	3 samples	3 samples	3 samples	Cohesionless Soils		Yes

# ARCADIS

Table 2. Summary of Proposed Analyses<sup>(1)</sup>, SWMU 2 Stability Study Work Plan, Former Vicksburg Chemical Company, Vicksburg, Mississippi.

Sample <sup>(2)</sup>	Depth of Boring (feet)	Unconfined Compressive Strength (ASTM D2166)	Unconsolidated-Undrained Triaxial Compression (ASTM D2850)	Consolidation Test (ASTM D2436)	Moisture Content (ASTM D2216)	Atterberg Limits (ASTM D4318)	Unit Weight (ASTM D854)	Standard Penetration Test (ASTM D1586)	Triaxial Permeability Test (ASTM D6084)	Visual Log
B-12 <sup>(3)</sup>	80									Yes
B-13 <sup>(3)</sup>	80									Yes
B-14 <sup>(3)</sup>	80									Yes
B-15 <sup>(4)</sup>	60									Yes
B-16 <sup>(4)</sup>	60									Yes
B-17 <sup>(4)</sup>	60									Yes
B-18 <sup>(4)</sup>	60									Yes

(1) Proposed field activities. Actual analyses conducted by the laboratory will be based on observed soil characteristics in the field.

(2) Sample locations shown on Figure 2. Borings B-1 through B-4 will be sampled continuously for the first 40 feet, then every 5-foot interval thereafter. Borings B-5 through B-11 will be sampled continuously for the first 15 feet, then every 5 feet interval thereafter.

(3) Borings B-12, B-13, and B-14 will not be sampled for geotechnical parameters. They will be advanced continuously to the depth of the landfill contents and logged in the field only.

(4) Borings B-15 through B-18 will not be sampled for geotechnical parameters. They will be advanced continuously to the depth of the Byram Mart and logged in the field only.



 Former Plant Site

Note: Approximate Property Boundary

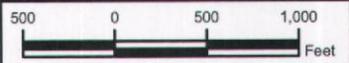
 10352 Plaza Americana Drive  
Baton Rouge, Louisiana 70816  
Tel: 225.292.1004 Fax: 225.218.9677

**REFERENCE:**

USGS, Vicksburg West Quadrangle, Mississippi  
7.5 Minute Series (Topographic)

**SITE LOCATION MAP**

VICKSBURG CHEMICAL COMPANY  
VICKSBURG, MISSISSIPPI



Project Manager: JE	Completed By: AB
Task Manager: CD	Date: 07/31/2006
Project No.: LA002656.0001	Figure No.: 1

U:\projects\Vicksburg\LA002656.0001\_00002\mvt\Vicksburg\_SiteMap\_Figure1.mxd

U:\projects\Vicksburg\LA002656.0001\_00002\pdfs\Vicksburg\_SiteMap.pdf



 BORING LOCATION  
 2-FOOT CONTOUR INTERVAL  
 10-FOOT CONTOUR INTERVAL  


© 2005 ARCADIS G&M, INC.	DRAWN BY T. NICKEL	CHECKED CAD
	PROJECT MANAGER DRE	DEPARTMENT MANAGER DRE
	DATE 01-02-06	TASK/PHASE NUMBER 0008

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

PROPOSED STABILITY SAMPLING LOCATIONS  
 FORMER VICKSBURG CHEMICAL COMPANY SITE

PROJECT NUMBER LA002656.0001
DRAWING NUMBER <b>2</b>

ARCADIS

**Appendix A**

Historical Data

## SOIL BORING LOG

PROJECT Vicksburg Chemical Co Landfill LOCATION Vicksburg, MSELEVATION \_\_\_\_\_ DRILLING CONTRACTOR Petra Environmental, Inc.DRILLING METHOD AND EQUIPMENT Geoprobe 5400 Truck MountedWATER LEVEL AND DATE \_\_\_\_\_ START 8/2/00 FINISH 8/2/00 LOGGER H. Dean Lowe

Depth Below Surface (FT)	SAMPLE			Standard Penetration Test PID Results — — — — — — — — —	SOIL DESCRIPTION Soil Name, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USGS Group	Symbolic Log	COMMENTS Monitoring Well Installation, Geotechnical Properties, Analytical Tests, Instrumentation
	Interval	Type and Number	Recovery (IN)				
1		LFS-1 A(0-4)	48	0.0	Tan fine silt (wea. Loess), friable, dry	ML	
5			48	0.0	Same as above but moist at 4 ft - v. moist at 5.3 ft.		
10			48	9.0 0.0	Gray fine silt (wea. Loess) grades to tan at 9.5 ft. wet at 9 ft. v. wet at 11.2 ft.	ML	chemical odor at 9 ft. -- becomes less intense with depth
15			46	0.0	Reddish stained w/ sweet chemical odor		
		<del>ADL</del> <del>LFS-1</del> LFS-1 B(14-16)	47	0.0 <sup>18</sup>	Lt. tan - gray fine silt (ML), soft saturated	ML	Chemical odor More intense odor at 18 ft.
20			39	0.0	Brown-tan fine silt (wea. Loess), firm, v. moist - grades to tan at 20 ft. and slightly moist to dry		
25		LFS-1 C(23-24)	46	25.7 0.0	yellowish tan fine silt (Loess) soft, saturated grades to tan at 28 ft.	ML	v. slight chemical odor at 25.7
30			38	0.0			

## SOIL BORING LOG

PROJECT Vicksburg Chemical Co Landfill LOCATION Vicksburg, MSELEVATION \_\_\_\_\_ DRILLING CONTRACTOR Petra Environmental, Inc.DRILLING METHOD AND EQUIPMENT Geoprobe 5400 Truck MountedWATER LEVEL AND DATE \_\_\_\_\_ START 8/2/00 FINISH 8/2/00 LOGGER H. Dean Lowe

Depth Below Surface (FT)	SAMPLE			Standard Penetration Test <sup>PID</sup> Results <del>ft</del>	SOIL DESCRIPTION Soil Name, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USGS Group	Symbolic Log	COMMENTS Monitoring Well Installation, Geotechnical Properties, Analytical Tests, Instrumentation
	Interval	Type and Number	Recovery (IN)				
35	8		38	0.0	Tan fine silt (wea. Loess), soft, saturated - no odor	ML	
	9		40	0.0			
40	10		30	0.0			
	11		32	0.0	Gray fine silt (unwea. Loess), soft, saturated, no odor	ML	
45					TD at 44 ft.  Well Construction Date Installed: 8/4/00 Constr. Materials: 3/4" ID PVC Backfill: Granular Bentonite Filler Sand: #3 Sand Screen: 3/4" ID PVC 0.010 slot Bottom:  Water Levels Date: 8/4/00 Time: 1500 Depth: 42-45 ft. bgs Time: 1510 Depth: 40-45 ft. bgs	Pipe & Screen 0 - 26 ft. bgs 26 - 48 ft. bgs 43 - 48 ft. bgs 48 ft. bgs	

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-1

Date Sampled: 8/2/00

Time Sampled:

Sampling Method: Geoprobe Macro Sampler

Sample Depth: 0 to 4 feet bgs

Type of Soil: fine silt (ML)

Sample Analysis: VOC: Cyanide      Pesticide/PEB: Atrazine/Cypermazine/Dinoseb

Sample Container: VOC = 2oz. Clear Glass  
SVOC = 4oz. Amber Glass  
Pesticide = 4oz. Amber Glass  
Atrazine = 4oz. Amber Glass  
Cyanide = 4oz. Clear Glass

Sample Quantity Collected: 18 oz.

Preservative Used: None

Field Technician: H. Dean Lowe

Signature/Date: *H. Dean Lowe* 8/2/00

Remarks:

Sample No. LFS-1 A (0-4 ft. depth)

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-1

Date Sampled: 8/2/00

Time Sampled:

Sampling Method: Geoprobe macro sampler      Sample Depth: 14 to 16 feet bgs

Type of Soil: fine silt (ML)

Sample Analysis: VOC      Pesticide/PCB      Sample Container: VOC = 2 oz. Clear Glass  
SVOC      Atrazine/Cyanazine/Dinoseb      Pesticide = 4 oz. Amber Glass  
Cyanide      Atrazine = 4 oz. Amber Glass  
Cyanide = 4 oz. Clear Glass

Sample Quantity Collected: 18 oz.

Preservative Used: None

Field Technician: H. Dean Lowe

Signature / Date:

H. Dean Lowe 8/2/00

Remarks:

Sample No. LFS-1 B (14-16 ft. depth)

# SOIL SAMPLING LOG

PETRA ENVIRONMENTAL, INC.

Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-1

Date Sampled: 8/2/00

Time Sampled:

Sampling Method: Geoprobe macro sampler

Sample Depth: 24 to 26 feet bgs

Type of Soil: fine silt (ML)

Sample Analysis: VOC      Pesticide/PCB  
SVOC      Atrazine/Cyanazine/Dinoseb  
Cyanide

VOC = 2 oz. Clear Glass  
SVOC = 4 oz. Amber Glass  
Pesticide = 4 oz. Amber Glass  
Atrazine = 4 oz. Amber Glass  
Sample Container: Cyanide = 4 oz Clear Glass

Sample Quantity Collected: 18 oz

Preservative Used: None

Field Technician: H. Dean Lowe

Signature / Date:  
H. Dean Lowe 8/2/00

Remarks:

Sample No. LFS-1C (24-26 ft. depth)

**GROUNDWATER SAMPLING LOG**  
**PETRA ENVIRONMENTAL, INC.**  
 Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-1

Date Sampled: 8/6/00

Time Sampled: VOC = 0645  
 Metals/Cyanide = 0830  
 SVOC = 0835  
 Pest/PCB & Atrazine = 1000

Sampling Method: VOC = 55 Bailler  
 Others = Geoprobe vacuum

Sample Depth: 43-48 feet bgs

Sample Type: Grab

Sample Number(s): LS1-W

Sample Quantity Collected: 3.8 liters

Sample Containers: VOC = 40 ml glass vial  
 Cyanide = 500 ml plastic  
 Metals = 250 ml plastic  
 Others = 1 liter amber glass

Sample Analysis: VOC Pesticide/PCB  
 SVOC Atrazine Cyanazine/Dinoseb  
 Cyanide T. Metals

Preservative: VOC = HCL  
 Cyanide = NaOH  
 Metals = HNO<sub>3</sub>

Purging: N/A well installed with Geoprobe

Time: 0610

SWL(ft): 40.7

Well Depth(ft bgs): 48

Well Vol.(gal): N/A

	pH	Cond.	Temp.(degrees )	Vol. Removed (gal)
1st WW				
2nd WW				
3rd WW				
Ave.				Total
Remarks:				

Sampling: slow well yield = approx. 1 liter per hour

Time:

WL(ft):

pH:

Cond(mhos):

Temp.(degrees C F)

Remarks:

Field Technician: H. Dean Lowe

Signature / Date:

H. Dean Lowe      8/6/00

## SOIL BORING LOG

PROJECT Vicksburg Chemical Co Landfill LOCATION Vicksburg, MS  
 ELEVATION \_\_\_\_\_ DRILLING CONTRACTOR Petra Environmental, Inc.  
 DRILLING METHOD AND EQUIPMENT Geoprobe 5400 Truck Mounted WATER LEVEL AND DATE START 8/3/05 FINISH 8/3/05 LOGGER H. Dean Coase

Depth Below Surface (ft)	SAMPLE		Standard Penetration Test (SPT) Blows/ft	SOIL DESCRIPTION Soil Name, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USGS Group	Soil Symbols	COMMENTS Monitoring Well Installation, Geotechnical Properties, Analytical Tests, Instrumentation
	Interval	Type & Number				
	1	LF5-2 A (0-4)	0.0 2.2 4.0	Tan fine silt, dry Tan fine silt (local loess), firm, dry Lt. gray fine silt, firm, moist	ML ML ML	Fill Sweet chemical odor @ 4 ft. Pond muck
5	2	46	0.0	Becomes yellowish tan wet, soft @ 8.6 ft.	ML	Stronger odor @ 8.2 ft. (no register on PID)
10	3	LF5-2 B (6-10)	0.0 8.2 9.8 10.2	Rusted stained fine silt, firm, dry Lt. Gray fine silt, firm to soft, moist 4.0 wet	ML ML	Sweet chemical odor Sweet chemical odor
15	4	43	0.0 ML 0.0	Reddish tan fine silt, moist firm-soft, iron stained top 3" Lt. gray fine silt, moist, medium	ML ML	Sweet chemical odor Sweet chemical odor
20	5	47	0.0 16.4 17.0	Reddish tan fine silt (won. loess) firm, moist	ML ML	Sweet chemical odor Sweet chemical odor Pond bottom @ 17 ft.
	6	42	0.0	Same as above	ML	Sweet chemical odor
25	7	LF5-2 C (27-29)	25.5 0.0	Wet Same as above	ML	Sweet chemical odor
30	8	38	0.0 <sup>29</sup>	Saturated @ 29 ft. Same as above except Lt. tan	ML	Slight chemical odor

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-2

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe Macro Sampler      Sample Depth: 0 to 4 feet bgs

Type of Soil: Silt

Sample Analysis: VOC      Pesticide/PCB  
SVOC      Atrazine, Cyanazine, diazinon  
Cyanide

Sample Container: VOC = 200 Glass  
SVOC = 400 Amber Glass  
Pesticide = 400 Amber Glass  
Atrazine = 400 Amber Glass  
Cyanide = 400 Clear Glass

Sample Quantity Collected: 18 oz

Preservative Used: None

Field Technician: H. Dean Lowe

Signature / Date: H. Dean Lowe 8/2/00

Remarks:

Sample # LFS-2A (0-4)

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-2

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe Macro Sampler      Sample Depth: 8 to 10 feet bgs

Type of Soil: Silt

Sample Analysis: VOC      Pesticide/PeB  
SUOC      Atrazine/Cyanazine/Dinoseb  
Cyanide

VOC = 2oz Glass  
Cyanide = 4oz Glass  
Other = 4oz Amber Glass

Sample Container:

Sample Quantity Collected: 18 oz

Preservative Used: None

Field Technician: H. Dean Lowe

Signature / Date: *H. Dean Lowe* 8/3/00

Remarks:

Sample # LFS-2B (8-10)

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-2

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe macro sampler      Sample Depth: 27 to 29 feet bgs

Type of Soil: silt

Sample Analysis: VOC      Pesticide/PCB  
SVOC      Atrazine/Cyanazine/Dimethyl  
Cyanide

VOC = 2 oz. Glass  
Cyanide = 4 oz. Glass

Sample Container: Others = 4 oz. Amber Glass

Sample Quantity Collected: 18 oz

Preservative Used: None

Field Technician: H. Dean Lowe

Signature / Date: H. Dean Lowe

Remarks:

Sample # LFS-2C (27-29)

**GROUNDWATER SAMPLING LOG**  
**PETRA ENVIRONMENTAL, INC.**  
 Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: *LF5-2*

Date Sampled: *8/4/00*

Time Sampled: *1700*

Sampling Method: *VOC = ~~55~~ Bailor  
 Cyanide = Peristaltic Pump  
 Metals = Peristaltic Pump*

Sample Depth: *43-48* feet bgs

Sample Type: *Grab*

Sample Number(s): *LS2-W*

Sample Quantity Collected: *790 ml*

Sample Container: *VOC = 40 ml glass vial  
 Cyanide = 500ml plastic  
 Metals = 250ml plastic*

Sample Analysis: *VOC  
 Cyanide  
 Metals*

Preservative: *VOC = HCl  
 Cyanide = NaOH  
 Metals = HNO<sub>3</sub>*

Purging: *N/A wells set with Geoprobe*

Time: *7:40* ~~7:20~~ *1633*      SWL(ft): *37.95'*

Well Depth(ft bgs): *48*      Well Vol.(gal): *N/A*

	pH	Cond.	Temp.(degrees )	Vol. Removed (gal)
1st WV				
2nd WV				
3rd WV				
Ave.				Total
Remarks:				

Sampling: *Low well yield = approximately 1.2 liters per hour*

Time:      WL(ft):

pH:      Cond(mhos):      Temp.(degrees C F)

Remarks:

Field Technician: *H. Dean Lowe*

Signature / Date:

*H. Dean Lowe 8/4/00*

GROUNDWATER SAMPLING LOG  
 PETRA ENVIRONMENTAL, INC.  
 Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-2

Date Sampled: 8/5/00

Time Sampled: 1300

Sampling Method: Geoprobe vacuum

Sample Depth: 43-48 feet bgs

Sample Type: Grab

Sample Number(s): LS 2-W

Sample Quantity Collected: 3 liters

Sample Container: 1 liter - Amber Glass

Sample Analysis: Pesticide / PCB  
 SVOC  
 Atrazine/Cymazine/Dinoseb

Preservative: None

Purging: N/A well installed with Geoprobe

Time: 1200

SWL(ft): 37.90

Well Depth(ft bgs): 48

Well Vol.(gal): N/A

	pH	Cond.	Temp.(degrees )	Vol. Removed.(gal)
1st WV				
2nd WV				
3rd WV				
Ave.				Total

Remarks:

Sampling: Low well yield = approx. 1.2 liters per hour

Time:

WL(ft):

pH:

Cond(mhos):

Temp.(degrees C F)

Remarks:

Field Technician: H. Dean Lowe

Signature / Date:

H. Dean Lowe 8/5/00

SOIL BORING LOG

PROJECT Vicksburg Chemical Co Landfill LOCATION Vicksburg, MS

ELEVATION \_\_\_\_\_ DRILLING CONTRACTOR Petra Environmental, Inc.

DRILLING METHOD AND EQUIPMENT Geoprobe 5400 Truck Mounted

WATERLEVEL AND DATE \_\_\_\_\_ START 8/2/00 FINISH 8/2/00 LOGGER H. Dem Lowe

Depth Below Surface (FT)	SAMPLE			Standard Penetration Test Results (N)	SOIL DESCRIPTION Soil Name, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USGS Group	Symbolic Log	COMMENTS Monitoring Well Installation, Geotechnical Properties, Analytical Tests, Instrumentation
	Interval	Type and Number	Recovery (IN)				
1		LFS-3 A(0-4)	45	0.0	Tan fine silt (Loess fill), med. dry	ML (Fill)	
5					Becomes reddish tan at 6.3 ft. and slightly moist		
			41	0.0 63	Reddish tan fine silt (wees. loess), medium, dry to slightly moist	ML	Native soil
10			44	0.0	Same as above		
		LFS-3 B(14-16)	38	0.0	Same as above		
15			40	0.0	Same as above		
20			34	0.0	Same as above but less red color		
25		LFS-3 C(24-26)	36	0.0	Same as above - v. moist wet at 25.5		
					Saturated at 28.1 ft.		
30			42	0.0			

SOIL BORING LOG

PROJECT Vicksburg Chemical Co Landfill LOCATION Vicksburg, MS

ELEVATION \_\_\_\_\_ DRILLING CONTRACTOR Petra Environmental, Inc.

DRILLING METHOD AND EQUIPMENT Geoprobe 5400 Truck Mounted

WATER LEVEL AND DATE \_\_\_\_\_ START 8/2/00 FINISH 8/2/00 LOGGER H. Dean Lowe

Depth Below Surface (FT.)	SAMPLE			Standard Penetration Test Results F F F H	SOIL DESCRIPTION Soil Name, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USGS Group	Symbolic Log	COMMENTS Monitoring Well Installation, Geotechnical Properties, Analytical Tests, Instrumentation
	Interval	Type and Number	Recovery (IN)				
35	8		42	0.0	Tan fine silt (weat. Loess), soft, saturated	ML	No odor
	9		40	0.0	Same as above		
40	10		37	0.0	Same as above		
					TD = 40 ft.		
					Well Construction Date Installed: 8/4/00 Const. Materials: 3/4" ID PVC Pipe & Screen Backfill: Granular Bentonite Filter: #3 sand Screen: 3/4" ID PVC 0.010 slot Bottom:		
					Water Levels Date: 8/4/00 Time: 1130 Depth: 40.0 Time: 1340 Depth: 40.10 Time: 1547 Depth: 38.91		
							0-25 ft. bss 25-45 ft. bss 43-48 ft. bss 48 ft. bss 45

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

---

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-3

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe macro sampler      Sample Depth: 0 to 4 feet bgs

Type of Soil: Silt

Sample Analysis: VOC      Pesticide/PCB  
SVOC      Atrazine/Cyanazine/Diuron  
Cyanide

VOC = 2oz Glass  
Cyanide = 4oz Glass

Sample Container: Dthws = 4oz Amber Glass

Sample Quantity Collected: 18oz

Preservative Used: None

Field Technician: H. Dean Lowe

Signature / Date: *H. Dean Lowe* 8/3/00

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Remarks:

Sample # LFS-3A (0-4)

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

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Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-3

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe macro sampler      Sample Depth: 14 to 16 feet bgs

Type of Soil: Silt

Sample Analysis: VOC      Pesticide/PCB  
SVOC      Atrazine/Cyanide/Dinoseb  
Cyanide

Sample Container: VOC = 2 oz Glass  
Cyanide = 4 oz Glass  
Dinoseb = 4 oz Amber Glass

Sample Quantity Collected: 18 oz

Preservative Used: None

Field Technician: H. Dean Lowe

Signature / Date: *H. Dean Lowe* 8/3/00

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Remarks:

Sample # LFS-3 B(14-16)

**SOIL SAMPLING LOG**

PETRA ENVIRONMENTAL, INC.

Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-3

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe macro sampler      Sample Depth: 24 to 26 feet bgs

Type of Soil: Silt

Sample Analysis: VOC Pesticide/PCB  
SVOC Atrazine/Carbaryl/Dinoseb  
Cyanide

Sample Container: VOC = 2 oz Glass  
Cyanide = 4 oz Glass  
Others = 4 oz Amber Glass

Sample Quantity Collected: 18 oz

Preservative Used: None

Field Technician: H. Dean Lowe

Signature / Date: H. Dean Lowe

Remarks:

Sample # LFS-3C (24-26)

GROUNDWATER SAMPLING LOG  
 PETRA ENVIRONMENTAL, INC.  
 Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS      Boring Number: LFS - 3

Date Sampled: 8/6/00      Time Sampled: 1300/1520

Sampling Method: <sup>VOC = 55 Bailer</sup> Other = Geoprobe vacuum      Sample Depth: 40-45 feet bgs

Sample Type: Grab      Sample Number(s): LS3 - W

Sample Quantity Collected: <sup>Metals = 250ml</sup> Cyanide = 500ml  
<sup>Pesticide/PCB = 1 liter</sup>

Sample Analysis: <sup>T. Metals</sup> Cyanide  
 Pesticide/PCB      Preservative: <sup>Metals = HNO<sub>3</sub></sup>  
<sup>Cyanide = NaOH</sup>  
<sup>Pesticide = None</sup>

Purging: N/A Well installed with Geoprobe

Time: 0710      SWL(ft): 38.9      Well Depth(ft bgs): 45      Well Vol.(gal): N/A

pH	Cond.	Temp.(degrees )	Vol. Removed.(gal)
1st WV			
2nd WV			
3rd WV			
Ave.			Total
Remarks:			

Sampling: V. low yield & turbid = approx. 1/4 liter per hour

Time:      WL(A):  
 pH:      Cond(mhos):      Temp.(degrees C F)

Remarks:

Field Technician: H. Dean Lowe

Signature / Date:  
 H. Dean Lowe      8/6/00

## SOIL BORING LOG

PROJECT Vicksburg Chemical Co Landfill LOCATION Vicksburg, MSELEVATION \_\_\_\_\_ DRILLING CONTRACTOR Petra Environmental, Inc.DRILLING METHOD AND EQUIPMENT Geoprobe 5400 Truck MountedWATER LEVEL AND DATE \_\_\_\_\_ START 8/3/00 FINISH 8/3/00 LOGGER H. Dean Law

Depth Below Surface (FT)	SAMPLE			Standard Penetration Test (PT) Results	SOIL DESCRIPTION	Symbolic Log	COMMENTS
	Interval	Type and Number	Recovery (IN)				
0	1	LFS-4 A (0-4)	40	ML 50.5 0.0	lt. tan to reddish tan fine silt F. 11	ML	
5	2	LFS-4 B (4-6)	42	50.3 4.6 1.0	Reddish tan fine silt (w/ loess) Firm, moist Yellowish tan @ 4 ft. Tan @ 4.2 v. wet 6.7 to 8 ft. Dry to slightly moist below 8 ft.	ML	- Mod. Sweet Chemical odor @ 2.7 ft. - strong sweet chemical odor @ 4-4.2 ft. Moderate odor below 4.2 ft.
10	3		38	1.0	Same as above		Detectable odor
15	4		36	1.3	Same as above		
20	5		40	0.0	Becomes v. moist @ 18.2 ft.		Slight odor
25	6		36	0.0	Same as above but moist - dry		
25	7	LFS-4 C (24-26)	34	0.0	Same as above		
30	8		38	0.0	Saturated @ 28.5 ft. Tan fine silt (w/ loess) Soft		Slight odor

SOIL BORING LOG

PROJECT Vicksburg Chemical Co Landfill LOCATION Vicksburg, MS

ELEVATION \_\_\_\_\_ DRILLING CONTRACTOR Petra Environmental, Inc.

DRILLING METHOD AND EQUIPMENT Geoprobe 5400 Truck Mounted

WATER LEVEL AND DATE START 8/3/00 FINISH 8/3/00 LOGGER H. Deam Lowe

Depth Below Surface (FT)	SAMPLE			Standard Penetration Test (SPT) Blows/ft	SOIL DESCRIPTION Soil Name, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USGS Group	Symbolic Log	COMMENTS Monitoring Well Installation, Geotechnical Properties, Analytical Tests, Instrumentation
	Interval	Type and Number	Recovery (IN)				
35	8		38	0.0	Tan fine silt (wea. loess) s. ft., saturated		v. slight sweet cream odor
	9		37	0.0	same as above	ML	
40	10		34	0.0	Same as above		v. slight odor
					TD @ 40 ft.  Well Construction Date Installed: 8/4/00 Constr. Material: 3/4" ID PVC pipe & screen Backfill: Bentonite Granules: 0-43 ft. bgs Filter: #3 sand (2" ID borehole) 20-48 ft. bgs Screen: 3/4" ID, 0.010 slot PVC 43-48 ft. bgs Casing: 3/4" ID PVC pipe 0-43 ft. bgs Bottom: 48 ft. bgs  Water Level Date: 8/4/00 Time: 1007 Depth: 42.9 ft. bgs Time: 1027 Depth: 42.5 ft. bgs Time: 1325 Depth: 38.7 ft. bgs Time: 1533 Depth: 37.45 ft. bgs		

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-4

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe Macro Sampler      Sample Depth: 0 to 4 feet bgs

Type of Soil: Silt

Sample Analysis: VOC Pest/PBB  
SVOC Atrazine/Cyanazine/Dinoseb  
Cyanide T. Metals

Sample Container: VOC = 2 oz Glass  
Cyanide = 4 oz Glass  
Others = 4 oz amber Glass

Sample Quantity Collected: 18 oz

Preservative Used: NONE

Field Technician: H. Dean Lowe

Signature / Date:  
*H. Dean Lowe*      8/3/00

Remarks:

Sample # LFS-4A (0-4)

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-4

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe macro sampler      Sample Depth: 4 to 6 feet bgs

Type of Soil: Silt

Sample Analysis: VOC Pest/PCB  
SVOC Atrazine/Cyanazine/Dinoseb  
Cyanide T. Metals

Sample Container: VOC = 2oz Glass  
Cyanide = 4oz Glass  
Others = 4oz amber Glass

Sample Quantity Collected: 18 oz

Preservative Used: NONE

Field Technician: H. Dean Lowe

Signature / Date:  
H. Dean Lowe      8/3/00

Remarks:

Sample # LFS-4B(4-6)

# SOIL SAMPLING LOG

PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS - 4

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe Macro Sampler Sample Depth: 24 to 26 feet bgs

Type of Soil: Silt

VOC Pest/PCB

Sample Analysis: VOC, Aromatic Cyanide, Disocb  
Cyanide = 4oz, Glass  
Others = 4oz, Amber Glass

Sample Quantity Collected: 18 oz

Preservative Used: NONE

Field Technician: H. Dean Lowe

Signature / Date:

H. Dean Lowe 8/3/00

Remarks:

Sample # LFS-4C (24-26)

GROUNDWATER SAMPLING LOG  
 PETRA ENVIRONMENTAL, INC.  
 Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-4

Date Sampled: <sup>HOL</sup> 8/5/00

Time Sampled: VOC, Cyanide, Metals = 1630  
 Pest/PCB, SVOC, Atrazine = 1800

Sampling Method: VOC = SS Bailer  
 others = Geoprobe vacuum

Sample Depth: 43-48 feet bgs

Sample Type: Grab

Sample Number(s): L54-W

Sample Quantity Collected: 3.8 liters

Sample Container: VOC = 40ml glass vial  
 Cyanide = 50ml plastic  
 Metals = 250ml plastic  
 others = 1 liter Amber Glass

Sample Analysis: VOC Pesticide/PCB  
 SVOC Atrazine/Cyanazine/Dinoseb  
 Cyanide T. Metals

Preservative: VOC = HCL  
 Cyanide = NaOH  
 Metals = HNO<sub>3</sub>  
 others = None

Purging: N/A well installed w/ Geoprobe

Time: 1802

SWL(ft): 38.5

Well Depth(ft bgs): 48

Well Vol.(gal): N/A

pH	Cond.	Temp.(degrees )	Vol. Removed.(gal)
1st WV			
2nd WV			
3rd WV			
Ave.			Total
Remarks:			

Sampling: Low well yield = approximately 1 liter per hour

Time:

WL(ft):

pH:

Cond(mhos):

Temp.(degrees C F)

Remarks:

Field Technician: H. Dean Lowe

Signature / Date:

H. Dean Lowe 8/5/00

## SOIL BORING LOG

PROJECT Vicksburg Chemical Co Landfill LOCATION Vicksburg, MS  
 DRILLING CONTRACTOR Petra Environmental, Inc.

DRILLING METHOD AND EQUIPMENT Geoprobe 5400 Truck Mounted

WATER LEVEL AND DATE START 8/3/00 FINISH 8/3/00 LOGGER H. Deza Lowe

Depths Below Surface (ft)	Interval	SAMPLE		Standard Penetration Test (SPT) Blows	SOIL DESCRIPTION Soil Name, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USGS Group	Soil Index	COMMENTS
		Type	Recovery (%)				
5	1	LF5-5 A (0-A) MS(0-A) MS (0-A)	39	0.0 2.3	Lt. tan fine silt w/ thin clay @ base, dry  Tan fine silt, firm, dry	ML  ML	Monitoring Well Installation, Geotechnical Properties, Analytical Tests, Instrumentation  Fill No Odor  Fill No odor
10	2		43	0.0	Gray-tan silty variegated clay of low plasticity, med. moist Becomes reddish tan @ 7ft.	CL	Fill slight chemical odor
15	3		40	0.0	Reddish brown silty clay, firm, with excess manganese nodules, moist	CL	Chemical odor
	4		32	0.0	Same as above but variegated	CL	Chemical odor
	5	LF5-5 B (10-18)	43	6.1 0.0	Yellowish colored lense Same as above	CL	- strong chemical odor  chemical odor
20	6		32	3.7 21.7 0.0	Same as above  Gray fine silt with humus in top 6", moist, med. dense	ML	No chemical odor
25	7		31	0.0 29.9 0.0 25.2 0.0 25.8	Red silty clay, high plasticity tan-gray laminated silty clay Dk gray silty clay, with black humus specks, moist, stiff Medium to low plasticity	CH ML CL	No chemical odor No chemical odor No chemical odor
30	8		31	28.5	Gray v. silty clay, low plasticity v. moist, stiff	CL	No chemical odor

SOIL BORING LOG

PROJECT Vicksburg Chemical Co Landfill LOCATION Vicksburg, MS

ELEVATION \_\_\_\_\_ DRILLING CONTRACTOR Petra Environmental, Inc.

DRILLING METHOD AND EQUIPMENT Geoprobe 5400 Truck Mounted

WATER LEVEL AND DATE \_\_\_\_\_ START 8/3/00 FINISH 8/3/00 LOGGER H. Dean Lowe

Depth Below Surface (FT)	SAMPLE			Standard Penetration Test ID Results (ft)	SOIL DESCRIPTION Soil Name, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, USGS Group	Symbolic Log	COMMENTS Monitoring Well Installation, Geotechnical Properties, Analytical Tests, Instrumentation
	Interval	Type and Number	Recovery (IN)				
35	8		31	0.0	Gray silty clay, low plasticity, with humus specks, v. moist firm to stiff	CL	No chemical odor
	9	US-5 C (34-36)	32	0.0 33.3 0.0 35 0.0	Reddish brown silty clay of moderate to high plasticity, stiff to hard grades to gray	CH	No chemical odor
					Gray v. silty clay, low plasticity	CL	No chemical odor
40	10		30	36.5 0.0	Reddish tan fine slightly clayey silt, soft, saturated	ML	No chemical odor
					TD @ 40 ft.  Well Construction Date Installed: 8/4/00 Constr. Material: 3/4" pipe (PVC) & screen Backfill: Bentonite granules Filter: #3 sand (2" ID borehole) Screen: 3/4" ID 0.010 slot PVC casing: 3/4" ID PVC pipe Bottom:  Water Level Date: 8/4/00 Time: 0900 Depth: 43.2 Time: 0915 Depth: 43.0 Time: 0930 Depth: 43.0 Time: 1320 Depth: 43.3 Time: 1540 Depth: 40.65		





**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

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Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-5

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe macro sampler      Sample Depth: 0 to 4 feet bgs

Type of Soil: Clay

Sample Analysis: VOC Pest/PCB  
SVOC Atrazine/Cyanazine/Dinoseb  
Cyanide

Sample Containers: VOC = 2 oz. Glass  
Cyanide = 4oz. Glass  
Others = 4 oz. Amber Glass

Sample Quantity Collected: 18 oz

Preservative Used: NONE

Field Technician: H. Dean Lowe

Signature / Date:  
*H. Dean Lowe*      8/3/00

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Remarks:

Sample # LFS-5 MSD(0-4)

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-5

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe macro sampler      Sample Depth: 16 to 18 feet bgs

Type of Soil: Clay

Sample Analysis: VOC Pest/PCB  
SVOC Atrazine Cyanazine/Dinoseb  
Cyanide

Sample Containers: VOC = 2 oz. Glass  
Cyanide = 4oz. Glass  
Others = 4 oz. Amber Glass

Sample Quantity Collected: 18 oz

Preservative Used: NONE

Field Technician: H. Dean Lowe

Signature / Date:

*H. Dean Lowe*

8/3/00

Remarks:

Sample # LFS-5B (16-18)

**SOIL SAMPLING LOG**  
PETRA ENVIRONMENTAL, INC.  
Houston, Texas      Baton Rouge, Louisiana

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Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-5

Date Sampled: 8/3/00

Time Sampled:

Sampling Method: Geoprobe macro sampler      Sample Depth: 34 to 36 feet bgs

Type of Soil: Clay

Sample Analysis: VOC Pest / PCB      Sample Containers: VOC = 2 oz. Glass  
SVOC Atrazine Cyanazine / Dinoseb      Cyanide = 4 oz. Glass  
Cyanide      Others = 4 oz. Amber Glass

Sample Quantity Collected: 18 oz

Preservative Used: NONE

Field Technician: H. Dean Lowe

Signature / Date:

*H. Dean Lowe*      8/3/00

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Remarks:

Sample # LFS-5C (34-36)

GROUNDWATER SAMPLING LOG  
 PETRA ENVIRONMENTAL, INC.  
 Houston, Texas      Baton Rouge, Louisiana

Project Name: Vicksburg Chemical Co. Landfill      Site Name: Vicksburg Chemical Co. Plant

Location: Vicksburg, MS

Boring Number: LFS-5

Date Sampled: 8/6/00

VOC = 0705

Time Sampled: Other = 1200

Sampling Method: Geoprobe Vacuum  
 VOC = SS Boiler

Sample Depth: 43-48 feet bgs

Sample Type: Grab

Sample Number(s): L55-W

Sample Quantity Collected: 1.8 liters

Sample Container: VOC = 40ml glass  
 Other = 1 liter amber glass

Sample Analysis: VOC  
 Pesticide/PCB  
 Atrazine/Cyanazine/Dinoseb  
 SVOC

Preservative: VOC = HCL  
 Other = None

Purging: N/A Well installed with Geoprobe

Time: 0700

SWL(ft): 40.5

Well Depth(ft bgs): 48

Well Vol.(gal): N/A

	pH	Cond.	Temp.(degrees )	Vol. Removed.(gal)
1st WV				
2nd WV				
3rd WV				
Ave.				Total
Remarks:				

Sampling: Well yield = 1.75 liters in 2 1/2 hour. Slower after 2 hours

Time:

WL(ft):

pH:

Cond(mhos):

Temp.(degrees C F)

Remarks:

Field Technician: H. Dean Lowe

Signature / Date:

H. Dean Lowe 8/6/00

ARCADIS

**Appendix B**

Field Forms





# SOIL / SEDIMENT SAMPLING LOG

PROJECT NAME: \_\_\_\_\_  
 PROJECT NUMBER: \_\_\_\_\_ Date: \_\_\_\_\_  
 SITE LOCATION: \_\_\_\_\_ CODED/\_\_\_\_\_  
 SAMPLE ID NUMBER: \_\_\_\_\_ REPLICATE NO: \_\_\_\_\_  
 TIME SAMPLING BEGAN: \_\_\_\_\_ ENDED: \_\_\_\_\_  
 WEATHER: \_\_\_\_\_  
 SITE DESCRIPTION: \_\_\_\_\_

## SAMPLING DATA

COLLECTION METHOD: \_\_\_\_\_  
 DEPTH (ft): \_\_\_\_\_ MOISTURE CONTENT: \_\_\_\_\_  
 COLOR: \_\_\_\_\_ ODOR: \_\_\_\_\_  
 DESCRIPTION: \_\_\_\_\_

## ANALYSES REQUIRED

## CONTAINER DESCRIPTION

From Lab: X or GM

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SAMPLING MONITORING (TIP, OVA, HNU, etc.) \_\_\_\_\_

REMARKS: \_\_\_\_\_  
 \_\_\_\_\_

SAMPLING PERSONNEL: \_\_\_\_\_

