VOLUME I

RCRA FACILITY INVESTIGATION

PHASE III RFI DRAFT REPORT SWMUs S, T, AND V

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ENTERPRISES LLC
Shell & Texaco Working Together

Prepared for
Equilon Wood River Refining Company
Roxana, Illinois

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GLOSSARY OF ABBREVIATIONS AND ACROYNMS

ASD	Alternate Source Demonstration
BTEX	Benzene, toluene, ethylbenzene, xylene
CAP	Corrective Action Program
CLP	Contract Laboratory Program
CMS	Corrective Measures Study
COC	Chain-of-Custody
DCS	Duplicate Control Samples
DQAP	Data Quality Assurance Plan
DQO	Data Quality Objectives
DRO	Diesel Range Organics
eV	Electron Volt
EVS	Environmental Visualization System
FSP	Field Sampling Plan
GC	Gas Chromatograph
GRO	Gasoline Range Organics
HSP	Health and Safety Plan
ICP	Inductively Coupled Plasma
IEPA	Illinois Environmental Protection Agency
IPCB	Illinois Pollution Control Board
J	Estimated Value
LCS	Laboratory Control Samples
mg/kg	Milligrams per kilogram
µg/kg	Micrograms per kilogram
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Non detect
NGVD	National Geodetic Vertical Datum
NPDES	National Permit Discharge Elimination System
OVM	Organic Vapor Meter
PAH	Polynuclear aromatic hydrocarbons
PID	Photoionization Detector
ppb	part per billion
PPE	Personal Protective Equipment
ppm	part per million
PRG	Preliminary Remediation Goals
QA	Quality Assurance

GLOSSARY OF ABBREVIATIONS AND ACROYNMS

QC	Quality Control
R	Unusable Data
RBC	Risk-Based Concentrations
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RHCL	Refinery Hazardous Constituents List
SCEM	Site Conceptual Exposure Model
SCS	Single Control Samples
SDG	Sample Delivery Group
SOP	Standard Operating Procedure
SS	Subsurface Soil Sample
SVOC	Semivolatile Organic Compounds
SWMU	Solid Waste Management Unit
TACO	Tiered Approach to Corrective Action Objectives
TCLP	Toxicity Characteristic Leaching Procedure
TCO	Total Chromatographable Organics
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
U	Not Detected; Value Becomes Reporting Limit Due to Blank Contamination
UJ	Reporting Limit Estimated
URSGWC	URS Greiner Woodward Clyde
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
UTL	Upper Tolerance Level
VOC	Volatile Organic Compounds
WRRC	Wood River Refining Company
WWTP	Wastewater Treatment Plant

EXECUTIVE SUMMARY

Equilon Wood River Refining Company (WRRC) is performing a RCRA Facility Investigation (RFI) at its petroleum refinery in Madison County, Illinois. The RFI is being implemented in accordance with a RCRA hazardous waste management permit jointly issued by the U.S. Environmental Protection Agency (USEPA) and the Illinois Environmental Protection Agency (IEPA). The conditions for RCRA Corrective Action are contained in the USEPA portion of the permit.

The purpose of the RFI is to characterize the nature and extent of known or potential releases of hazardous waste or hazardous constituents from Solid Waste Management Units (SWMUs) at the facility to support risk management decisions. This report describes the Phase III RFI activities associated with SWMUs S, T and V. The work was conducted in accordance with a work plan approved by USEPA Region 5 on September 1, 1999.

SWMUs S, T and V are located west of the main refining areas of WRRC. SWMUs S and T are located in the area referred to as the West Property and SWMU V is in the area referred to as the Riverfront Property and are briefly described as follows:

- SWMU S comprises approximately 53 acres and was formerly occupied by the White Star Refinery. The current configuration of the SWMU area includes the wastewater treatment plant in the northern half, and asphalt storage tanks on the southern half. A large portion of the SWMU area is covered with structures or paved with asphalt or gravel.

- SWMU T comprises approximately 42 acres and was formerly the site of the International Shoe Co. Wood River Tannery (Tannery). The area is generally inactive, being used primarily for contractor staging. Most of the aboveground portion of the Tannery structures have been removed. Two potential source areas were identified through historical research, fill areas and tank areas.

- SWMU V contains the Active Polishing Lagoons and a Former Lagoon and Dredged Material Area. The lagoons provide tertiary treatment for the facility wastewater. Areas surrounding the active lagoons contain dredged material from the lagoons and also include the location of a former lagoon.

EXECUTIVE SUMMARY

The approach to the Phase III RFI for SWMUs S, T and V is risk-based, in which data were collected according to a Site Conceptual Exposure Model (SCEM) and the Data Quality Objectives (DQO) process in order to provide efficient data collection and adequate data for future risk assessment activities, as warranted. The scope of this data collection effort was the result of the DQO process, using the SCEM to guide the exposure media to be sampled, and taking into consideration USEPA's comments and input to the work plan.

The primary potential human receptors include site workers and visitors. Potential exposure by offsite receptors is judged to be insignificant. The potential exposure pathways include: inhalation of volatiles, primarily from surface and shallow subsurface soils; inhalation of particulates from wind-blown surface soil; and incidental ingestion and dermal contact with near surface soils.

Phase III soil samples were collected from 38 locations during November 1999 using Geoprobe® and conventional auger drilling techniques. One groundwater sample was also collected from an existing monitoring well. Samples were collected from various depth intervals based on the SCEM (0 to 1 ft, >1 to 5 ft, and > 5ft) and USEPA's comments. Samples were field screened for volatile organic compounds (VOCs), and selected for analysis based on the field screening results, the SCEM and USEPA comments. Sample totals included 83 investigative soil samples plus 53 quality assurance and quality control samples (9 field duplicates, 8 matrix spike and 8 matrix spike duplicates, 9 equipment blanks, and 19 trip blanks). Samples were analyzed for combinations of the Appendix IX and the Refinery Hazardous Constituent List (RHCL) VOCs, semivolatile organic compounds (SVOCs), polynuclear aromatic hydrocarbons (PAHs), petroleum hydrocarbons (as diesel range organics [DRO] and gasoline range organics [GRO], and metals/inorganics. Physical and geochemical tests (moisture content, pH and total organic carbon [TOC]) were performed on selected samples for possible future use.

The chemical data were reviewed and validated in accordance with the work plan and project Data Quality Assurance Plan (approved October 15, 1999). Data were then integrated with the relevant Phase I and II data (1990-1991) and compiled based on the SCEM. Data were compared with background metals results and available human health-based screening levels for soil obtained from the IEPA's Tiered Approach to Corrective Action Objectives (TACO) rules for the industrial/commercial land use scenarios. The TACO Tier 1 screening values are conservative and non-site-specific. Under TACO, no further action is warranted for chemicals that are below the Tier 1 soil objectives. TACO values were not available for all detected analytes. Where

available, USEPA's Preliminary Remediation Goals (Region 9) or Risk Based Concentrations (Region 3) were used. In a few cases, values were verbally provided by IEPA. For the few that remained, detections were included on the summary tables to be conservative.

The Phase III results met the objectives described in the work plan, i.e., obtaining soil samples over SWMU areas not previously sampled to provide additional nature and extent characterization and to address specific USEPA comments. The results are summarized below.

SWMU S

Soil samples were collected from two general areas: 1) the wastewater treatment plant area; and 2) the asphalt storage tank area, to better characterize the extent of releases discovered during the Phase I and II RFI investigations.

The results of sampling in both areas indicate surface and subsurface soils have been impacted by a relatively well defined group of constituents that are characteristic of petroleum refining. VOCs detected primarily consist of toluene and xylenes. SVOCs are most commonly represented by 1-methylnaphthalene and bis(2-ethylhexyl)phthalate. PAHs tend to be detected more often and by more analytes than the other groups. Metals are detected frequently, but for the most part are within or near background levels. Metals that tend to stand out concentration-wise, include chromium and lead, although they were still detected infrequently. In general, the most constituents and highest concentrations were detected in samples from the fill and clay soils, which extend to a depth of approximately 10 to 15 ft beneath the area. There were a few locations where constituents were detected in the deepest samples collected (e.g., Boring 304 at 20 ft in the wastewater treatment plant area and Boring 302 at 24 ft in the asphalt tank area). These samples were in the underlying sand unit but above the water table.

The comparison of historical and Phase III data from the wastewater treatment plant area to Tier 1 screening levels indicates that the area does not pose a significant human health concern. There were only a few analytes that exceeded their respective screening levels (organics - benzo(a)pyrene and 1,2,3-trichloropropane, and inorganics - arsenic and beryllium). For the organics, the frequency and magnitude of exceedance was low (e.g., less than 5 times the screening level for benzo(a)pyrene in 4 samples). The potential for exposure is also low given that most of the area is paved or covered with structures. The inorganic results were generally within or close to the background/TACO screening levels (i.e., less than two times).

The results of the Tier 1 screening process for the asphalt storage tank area also indicates that the area does not pose a significant risk. None of the organics detected exceeded the applicable Tier 1 objectives. As in the wastewater treatment plant area, inorganics were generally detected at concentrations within or just above background and/or Tier 1 levels, but should not pose a concern. For example, the background values for arsenic and beryllium are close to or even above the Tier 1 levels. The highest value for arsenic was 9.5 mg/kg and for beryllium was 1.3 mg/kg, however, the background value for arsenic is 7 mg/kg and 0.73 mg/kg for beryllium. Therefore, even the highest detected concentrations of arsenic and beryllium are only 1 to 2 times the background levels. This suggests that these compounds do not pose a significant concern for this SWMU.

SWMU T

The Tannery is represented by several sub-areas that are grouped in two categories, fill areas and tank areas. Phase III objectives included the collection of additional samples to better characterize some of these areas.

Fill Areas

Soil samples collected from the South Fill area are generally characterized by detections of PAHs and metals, with a few VOCs and SVOCs. Detections were found to depths of 10 ft. The highest organic concentration detected was 14,000 µg/kg (fluoranthene). The highest metals concentration was 1,390 mg/kg (zinc). Constituents that exceeded the Tier 1 objectives included one SVOC, certain PAHs and metals. In the case of PAHs however, the detections occurred in only one sample. Many of the metals results exceeded the objectives for only the soil to groundwater pathway. These objectives are very low and can even be exceeded for values within background. As a result, this area is not believed to represent a significant threat to human health.

The East Fill area occupies a relatively large part of the property and is an area where excess construction fill from the refinery was placed over the years. The chemical characteristics of the fill are similar to the South Fill area in that the primary constituents are PAHs and metals with relatively fewer VOCs. The highest organic concentration detected was 1,900 µg/kg (pyrene). The highest metals concentration was 1,100 mg/kg (barium). Hydrocarbons were detected at a maximum concentration of 690 mg/kg. The depth/thickness of the fill is highly variable

depending on the area. For example, as much as 10 ft is believed to be present in areas where former Tannery buildings were demolished and filled in. A specific portion of the East Fill area was assessed because there was believed to be a water reservoir in the basement of one of the former buildings. No water or evidence of Tannery-related wastes were observed. The fill placed in this area was similar to that described above in terms of the constituents detected. Tier 1 screening levels were exceeded for a few PAHs and certain metals. As with the South Fill area, many of the exceedances were associated with the soil to groundwater exposure route, and would not have exceeded the objectives for direct contact (i.e., ingestion, inhalation).

Tank Areas

Six tank areas were further evaluated under Phase III. These tanks were, based on historical site maps, suspected to contain various petroleum fractions (e.g., gasoline, fuel oil, mineral spirits) and process chemicals (e.g., chromate). Most of the tanks are gone and closure information is not available.

Tank 1 was suspected to be a gasoline underground storage tank (UST). Soil samples from borings drilled in the suspected area were non detect for target analytes. As such there are no indications of a release, and no further action is necessary.

Tanks 2 and 3 are in the same area. Tank 2 reportedly was a gasoline UST and Tank 3 was a fuel oil UST. Tank 3 is visible from the ground surface, and is full of water. Soil samples from borings in the area contained petroleum hydrocarbons in shallow soils (4,930 mg/kg at 3 ft) but not in deeper soils (10 ft). No other petroleum constituents were detected (e.g., BTEX, PAHs). These results support a no further action determination for this area.

Tank 4 was suspected to be a gasoline UST. Samples from soil borings in the area contained various petroleum-related VOCs, SVOCs, and PAHs. This location is generally within the East Fill area, so the extent to which detections are related to the fill is unknown. Representative analytes and the maximum detections include: ethylbenzene (140 μg/kg); 2-methylnaphthalene (390 μg/kg); pyrene (1,100 μg/kg); TPH 31,100 mg/kg. One of two borings drilled to a depth of 16 ft was non-detect for petroleum constituents. The other sample contained hydrocarbons at a concentration of 650 mg/kg. There were no exceedances of the Tier 1 screening levels for petroleum constituents in this area (no screening level was available for TPH). Based on these results and the current site model, this area does not pose a significant concern for human health.

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Tank 5 is the area of two mineral spirits tanks (Stanisol), one a UST and the other an aboveground tank which is still present. Soil samples collected from borings in the area indicate releases of petroleum products that are attributed to the subject tanks. Hydrocarbons were detected to depths of 14 ft, the depth to groundwater in the area, at two locations with concentrations of 4.5 and 4.7 mg/kg. One groundwater sample was collected during Phase III from an existing monitoring well in this area. Hydrocarbons were detected in this sample at a concentration of 0.61 mg/l. This is comparable to the results obtained during the Phase II RFI. None of the detected concentrations exceeded the available Tier 1 screening levels.

No further work was needed for the Tank 6 area.

Tank 7 is the area where three aboveground chromate tanks were once located. Phase III samples were analyzed for metals, based on the reported contents of the tanks and the results of prior sampling. Chromium detections ranged from background levels to a high of 704 mg/kg (sample from 1 ft depth). In deeper borings, samples from two borings from a depth of 12 ft contained chromium at concentrations of 400 mg/kg and 20 mg/kg. There does not appear to be a clear pattern associated with these results. Chromium detections exceeded the Tier 1 screening levels from each of the depths sampled (1 ft, 4 ft and 12 ft), however the sample results from 4 ft and 12 ft only exceeded the soil to groundwater pathway screening values. These results should not pose a significant threat. Chromium is relatively immobile in soil and has not been detected during previous groundwater sampling in this area (during Phase II).

SWMU V

Soil and sediment samples were collected from two sub-areas of the SWMU (active lagoon area and former lagoon dredged material area). Sampling was conducted in the active polishing lagoons to assess potential releases from the lagoons. Sampling was conducted in the areas north and west of the active lagoons to characterize the former lagoon and dredged material areas. Phase III analyses focused primarily on metals, based on the results of Phase I and II sampling, with emphasis on chromium.

Chromium in the lagoon sediment was found at concentrations on the order of 3,000 to 4,000 mg/kg (one sample contained 15,000 mg/kg). Chromium concentrations in the underlying soils were most often near background levels. These data indicate that chromium is not very

susceptible to leaching, and does not pose a significant concern. As such, the active lagoons should be removed from further study.

The results of sampling in the former lagoon and dredged material area indicate that chromium is the primary constituent of concern. Within the former lagoon area, chromium concentrations ranged from approximately 331 to 21,000 mg/kg. The chromium concentrations for soil samples collected from below the interpreted base of the former lagoon were generally near background levels (samples collected from approximately 12 ft). There were two localized exceptions to this where the deeper samples contained chromium concentrations of 3,100 and 6,400 mg/kg. Leach-testing (via TCLP) of these samples confirmed that the chromium is not very leachable. The highest concentration of chromium (TCLP) was 0.048 mg/L, which is well below the Tier I soil to groundwater screening value of 0.1 mg/L. In the areas where dredged material was placed, but outside the former lagoon, chromium concentrations followed a similar pattern. Chromium was detected in surface and shallow soil samples at concentrations between approximately 1,500 and 5,500 mg/kg, however concentrations were near background at a depth of 12 ft.

The results of a comparison of site data with Tier 1 objectives indicates that an exposure potential may exist with respect to near-surface soils. The chromium results for deep soil samples (total and leachable) indicate that the area does not pose a significant threat for migration of chromium to groundwater.

The Tier I approach utilized for the screening evaluation for SWMUs S, T, and V is highly conservative. This included selecting the lowest or most conservative screening level for the general or construction worker, ingestion or inhalation pathways, using all the sample point concentrations for the comparisons (versus a statistical representation for a realistic exposure scenario [e.g., 95% upper confidence limit for soils from 0 to 5 ft]), and deriving the screening levels without the use of site-specific exposure factors. Additionally, for SWMU T, the comparison included using the soil component of groundwater ingestion pathway. This was done to be conservative, even though area-wide groundwater sampling has not revealed any significant concerns. Overall for the three SWMUs, twenty two out of forty two analytes detected that had Tier 1 values had no exceedances, twelve out of fifteen analytes detected that had alternate screening values had no exceedances, and the remaining four analytes that did not have screening values were retained for further consideration. In summary, given the current site conditions and usage, there are believed to be no exposure concerns.

SECTIONONE Introduction And Site Background

1.1 PROJECT AND FACILITY DESCRIPTION

The Equilon Wood River Refining Company (WRRC) is performing a Phase III Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) at its Wood River Refinery in Madison County, Illinois. The WRRC is a division of Equilon Enterprises LLC (Equilon is a joint venture between the Shell Oil Company and Texaco). The purpose of the RFI is to characterize the nature and extent of potential releases from Solid Waste Management Units (SWMUs) at the facility, and to collect data to support risk management decisions.

This report describes the Phase III activities conducted for SWMUs S (Former White Star Refinery), SWMU T (Inactive International Shoe Tannery) and SWMU V (Active Polishing Lagoon and Surrounding Area). The work was performed in accordance with a Phase III RFI Work Plan approved by the U.S. Environmental Protection Agency (USEPA) Region 5, Chicago, Illinois in a letter to WRRC dated September 1, 1999.

The refinery is located in Madison County, Illinois approximately 15 miles northeast of St. Louis, Missouri (**Figure 1-1**). The site currently covers approximately 1,900 acres. The property is bounded on the west by the Mississippi River and extends east for approximately 9,000 ft. The communities of Hartford, Roxana, South Roxana, Wood River and Wanda, Illinois border the site.

1.2 SWMU BACKGROUND INFORMATION

SWMU S is an active area of the West Property that was occupied by the White Star Refinery in the early 1900s. This area comprises approximately 53 acres. The area is bounded on the north by Rand Avenue, on the west by WRRC's active Sulfur Recovery Unit and an inactive acid plant, on the south by the Clark Oil refinery, and on the east by Illinois Route 111 (**Figure 1-2**). The former White Star Refinery operated from 1919 until the mid-1930s. Shell Oil Company acquired the property in 1954. The current configuration of the SWMU S area generally consists of the wastewater treatment plant (WWTP) in the northern half and asphalt storage tanks on the southern half. Two RCRA regulated surface impoundments (Pond 1 and 2) are located within the WWTP area. WRRC has received adjusted standards from the Illinois Pollution Control Board (IPCB) to operate Pond 1 and Pond 2 in non-hazardous service. As such, the ponds are

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not addressed as part of this investigation. The vast majority of SWMU S is covered with structures (e.g., tanks, units), or is paved with asphaltic concrete or gravel.

SMWU T is located in the western portion of the West Property and is the site of the former International Shoe Company–Wood River Tannery (Tannery). This area comprises approximately 42 acres. The area is bounded on the north by Rand Avenue, on the west by multiple sets of railroad tracks and the town of Hartford, on the south by the Clark Oil refinery, and on the east by the Sulfur Recovery Unit (**Figure 1-3**). The Tannery operated from 1916 to 1964. Since being acquired by Shell in 1967, most of the aboveground portions of structures have been removed. The area is used primarily for contractor staging.

SWMU V is located on the Riverfront Property and contains two distinct sub-units, the active polishing lagoons and the inactive lagoon and dredged material area. The SWMU occupies approximately 6 acres. The SWMU is bounded on the north by the Amoco Riverfront property, on the west by the Mississippi River, on the east by Illinois Route 3, and on the south by Clark Oil property (**Figure 1-4**). The lagoons were originally part of the Tannery. The lagoon system currently provides tertiary treatment for facility wastewater. Treated water from the WWTP flows to these lagoons prior to discharge to the Mississippi River. The lagoons used to operate in parallel, however the south lagoon is now blocked and receives no inflow. Discharge from the lagoons is regulated under WRRC's NPDES permit. The Riverfront Property also includes barge loading and groundwater production facilities.

The areas to the north and west of the active polishing lagoons contain dredged material from the lagoons and the remnants of a former lagoon. The practice of placing dredged material alongside the lagoons has ceased. The last dredging of the active polishing lagoons occurred in 1997 when material from the north and west lagoon was removed and placed in the south lagoon. Little is known about the use of the former lagoon. Based on aerial photographs, the lagoon appeared to have been constructed sometime between 1945 and 1955. In a 1966 photo, the lagoon appeared to be inactive. The Riverfront area is occasionally inundated with floodwaters from the Mississippi River. Much of the area surrounding the lagoons is covered with low-lying vegetation.

1.3 REGULATORY BACKGROUND AND PROJECT CHRONOLOGY

Under the RFI, Phase I and II investigations were performed at SWMUs S, T, and V between 1990 and 1992. The results of these investigations are contained in reports to USEPA dated January 27, 1991 and September 11, 1992. Based on USEPA comments both reports were revised, finalized and reissued in September 1995 (Shell, 1995). In a letter to WRRC dated May 17, 1999, USEPA requested preparation and submittal of a Phase III work plan for SWMUs S, T and V due to detections of hazardous constituents in soils and because groundwater in those areas is not within the formalized capture area[1] of the facility's groundwater pumping system. The letter included specific recommendations for data to be gathered under Phase III.

WRRC prepared and submitted the Phase III Work Plan in August 1999 (WRRC, 1999). The work plan was conditionally approved by USEPA in a letter dated September 1, 1999. The approval conditions are paraphrased below:

1. Collection of additional soil samples for metals analysis in specific areas at SWMU V.
2. Suggested that a limited number of groundwater samples be collected at SWMU V (not required).
3. Provide information on the source material at SWMU V.
4. Integration of historical results into the Phase III report.
5. Implementation schedule.

Items 1, 3, 4 and 5 are acknowledged and were implemented. WRRC elected not to collect groundwater samples at SWMU V at this time (condition No. 2). This report summarizes the results of the sampling at SWMU V and includes a discussion of the appropriateness of groundwater sampling at SWMU V.

WRRC submitted revisions to the Data Quality Assurance Plan (DQAP) to USEPA on October 5th and 12th for the purpose of approving Savannah Laboratories for RFI work. USEPA approved the revisions in a letter to WRRC dated October 15, 1999. In a letter to USEPA dated

[1] The Corrective Action Program (CAP), administered through the IEPA, requires the control, withdrawal and monitoring of groundwater beneath the North and Main properties.

November 23, 1999, Savannah requested approval for a wet-sample homogenization technique for metals analysis preparation. This technique, currently used by Savannah, differs from the method prescribed by USEPA[2]. In a conference call between Savannah, URS Greiner Woodward Clyde (URSGWC) and USEPA on November 23, 1999 USEPA verbally approved this change. EPA confirmed the approval via e-mail on December 14, 1999.

1.4 OBJECTIVES AND APPROACH TO THE RFI

The overall objective of the Phase III investigation of SWMUs S, T and V was to obtain adequate site characterization data necessary for technically sound risk management decision-making, including:

- Providing further characterization of the nature and extent of wastes contained in, and releases to soils from SWMUs S, T and V, as needed, based on the Site Conceptual Exposure Model (SCEM) and Data Quality Objectives (DQO) processes, and comments from USEPA.

- Assessment of whether further action at these SWMUs is warranted, by a screening risk evaluation. Specifically, the data obtained from the Phase I and II investigations (referred to as "historical" in this report) and the Phase III data were compared with human health-based screening levels published by the Illinois Environmental Protection Agency (IEPA).

The objectives were met as described in this report. Specific data quality objectives are discussed in Section 2.

1.5 REPORT ORGANIZATION

This report is organized in the following sections.

Section 1	Introduction And Site Background	This section provides facility and SWMU background information, regulatory requirements, and project objectives.

[2] USEPA Memorandum dated July 16, 1996 as referenced in the work plan approval letter for SWMU U/AB.

Section 2	Technical Approach	This section presents the approach for performing the Phase III investigation. It identifies the Phase III data needs and describes the data evaluation criteria.
Section 3	Investigation Program	This section presents the procedural aspects of the Phase III investigation program and addresses sampling scope, quality assurance, and other aspects of data collection.
Section 4	Field Investigation Results, Laboratory Analysis And Screening Risk Evaluation	This section presents the results of the Phase III investigation, integrated with the Phase I and II data, and provides the information needed to perform the screening risk evaluation. The investigation results are further evaluated against IEPA-published screening levels to provide a framework for future decision-making.
Section 5	Summary And Conclusions	The results of the investigation are summarized and conclusions presented.
Section 6	References	

Supporting tables and figures follow the section in which they are referenced. Appendices are organized as follows:

Appendix A - Field Data

- Field Activities Report
- Soil Boring logs
- Background Results

Appendix B - Quality Assurance Data

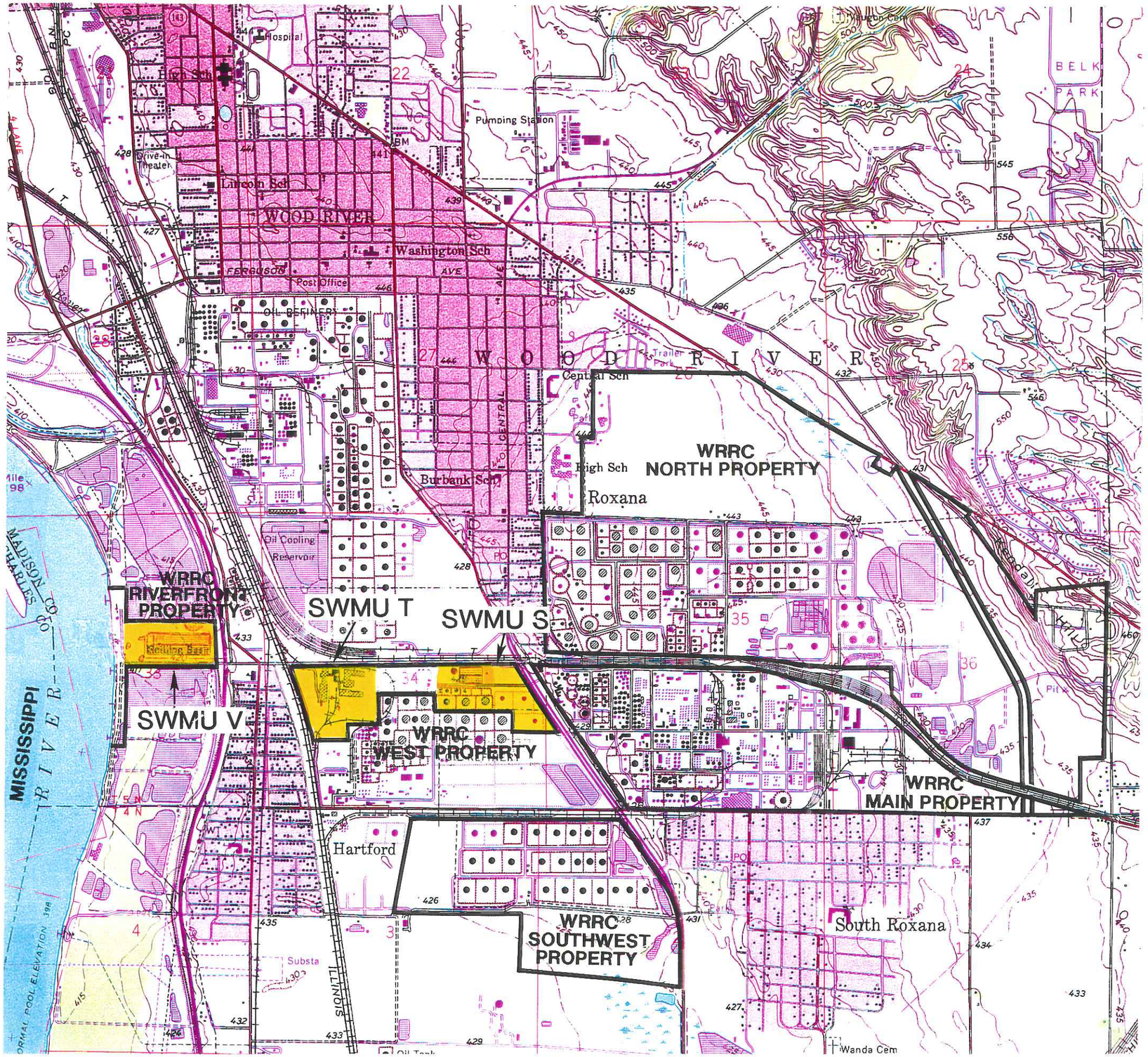
- Quality Assurance Report

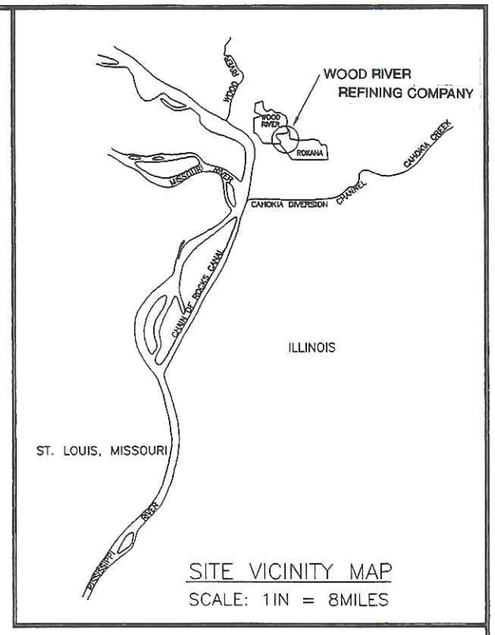
Appendix C - Phase III Analytical Data

- Summary of Analytical Results

Volumes II and III contain the following:

- Phase III Analytical Results





SITE VICINITY MAP
SCALE: 1IN = 8MILES

LEGEND

WRRC Property Boundary

SWMU LOCATIONS

BASE MAP REFERENCE:
Compiled from a portion of Woodriver, IL–MO.
U.S.G.S 7.5 minute topographic quadrangle
1955 (Photorevised 1968 & 1974).

N

0 2000 4000
SCALE FEET

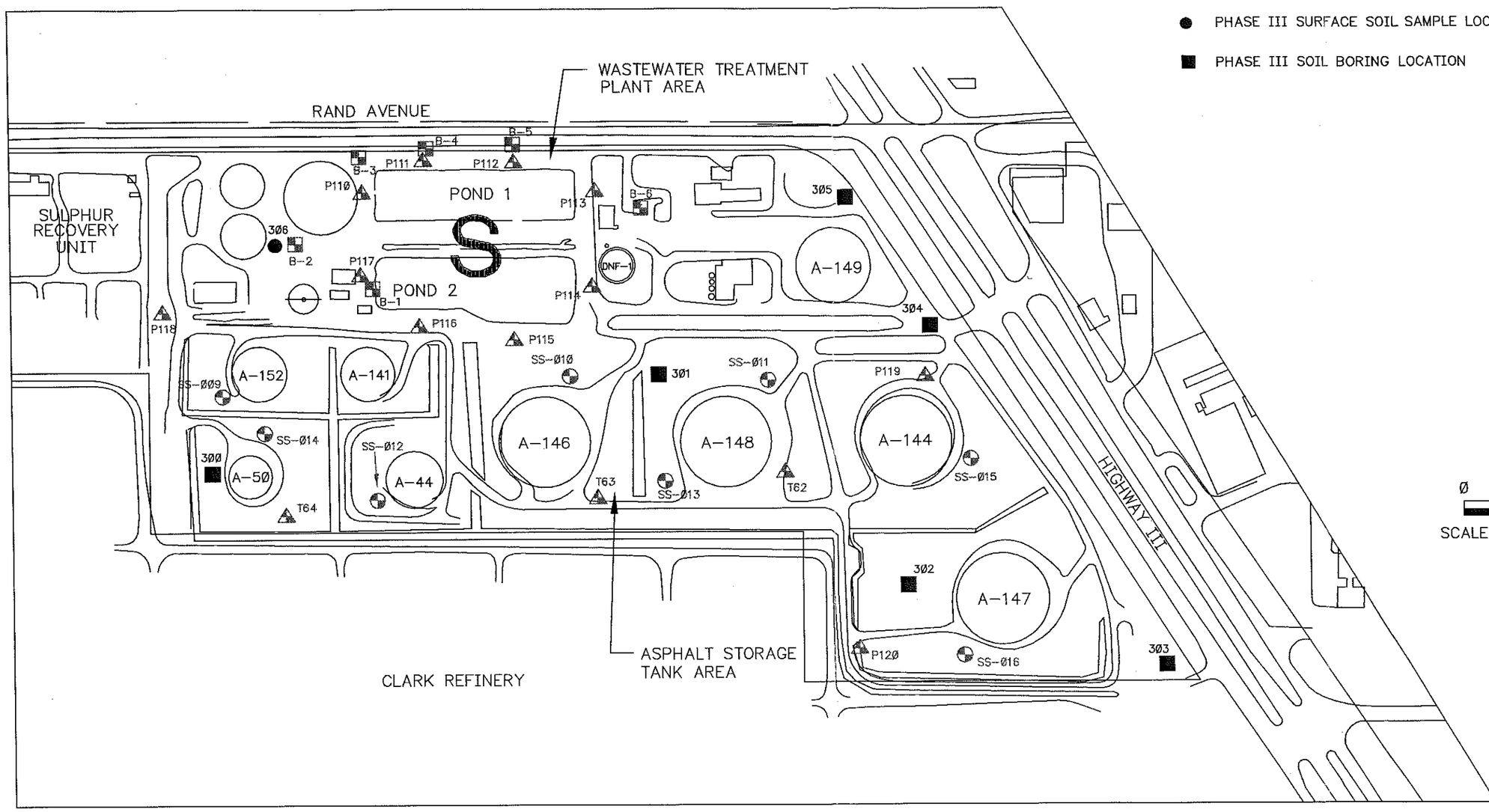
Contour Interval = 10FT

EQUILON WOOD RIVER REFINING COMPANY RCRA FACILITY INVESTIGATION SWMUs S, T & V	PROJECT NO. 2389C8602F.01
URS Greiner Woodward Clyde A Division of URS Corporation	
DRN. BY: hjh 6/2/99 DSGN. BY: djd CHKD. BY:	Site Location Map
	FIG. NO. 1–1

File: D:_C8602F\TASK300\FIG1–1.DWG Last edited: 03/13/96 @ 4:45 p.m. @ WCC–ST.LOUIS

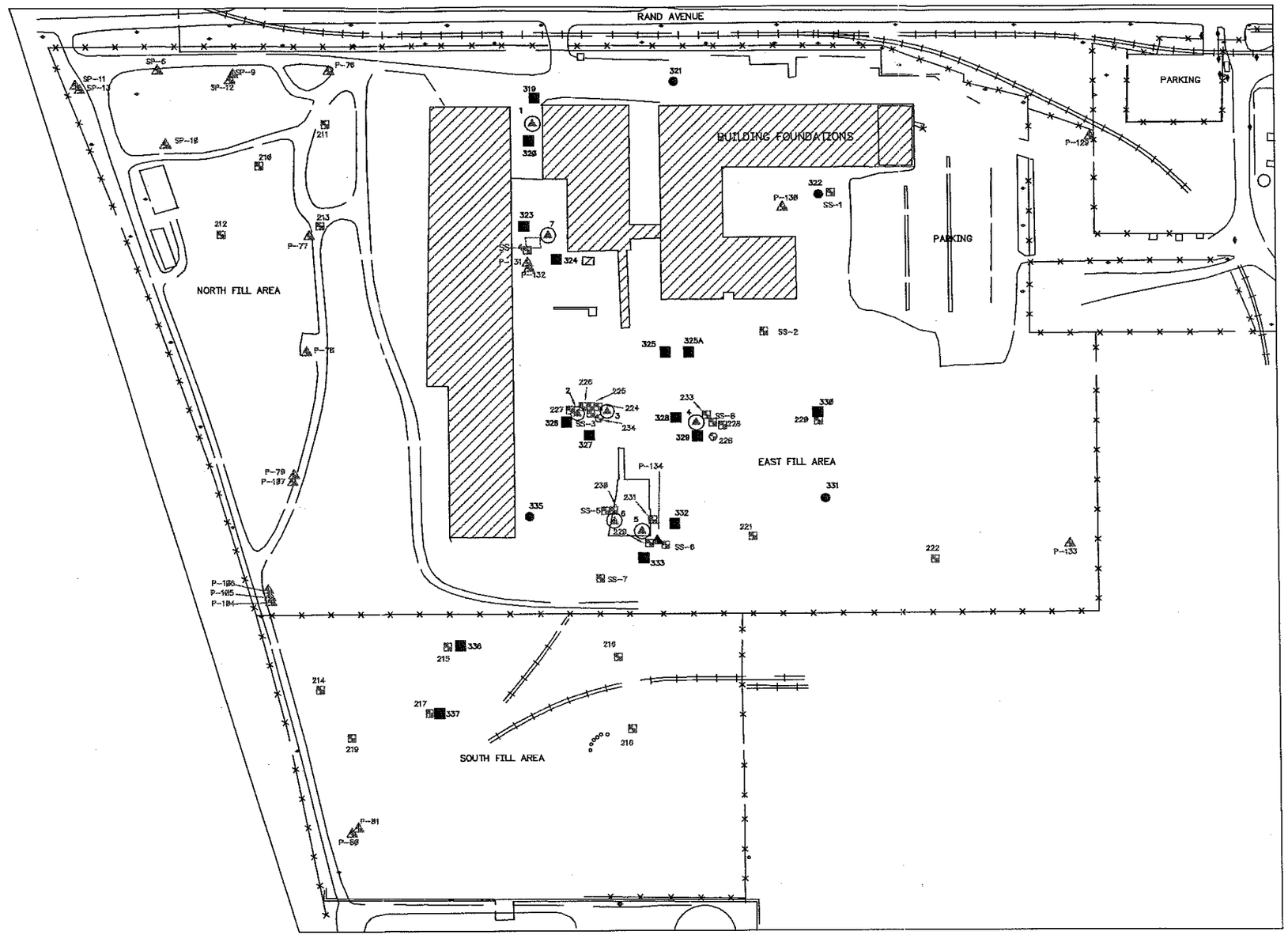
LEGEND

- EXISTING MONITORING WELL LOCATION
- PHASE I OR II BORING LOCATION
- SOIL BORING LOCATION FROM ALTERNATE SOURCE DEMONSTRATION
- PHASE III SURFACE SOIL SAMPLE LOCATION
- PHASE III SOIL BORING LOCATION



EQUILON WOOD RIVER REFINING COMPANY PHASE III RFI, SWMUs S, T AND V		PROJECT NO. 2389C8602F.01
URS Greiner Woodward Clyde A Division of URS Corporation		
DRN. BY: djd 4/18/00 DSGN. BY: at CHKD. BY: RSB 4/24	SWMU S SAMPLE LOCATIONS	FIG. NO. 1-2

File: K:\ENVIRON\2389C8602F.01 (WRRC STV)\FIG1-2.DWG Last edited: 04/24/00 @ 11:37 a.m. @ WCC-ST.LOUIS



200 0 200

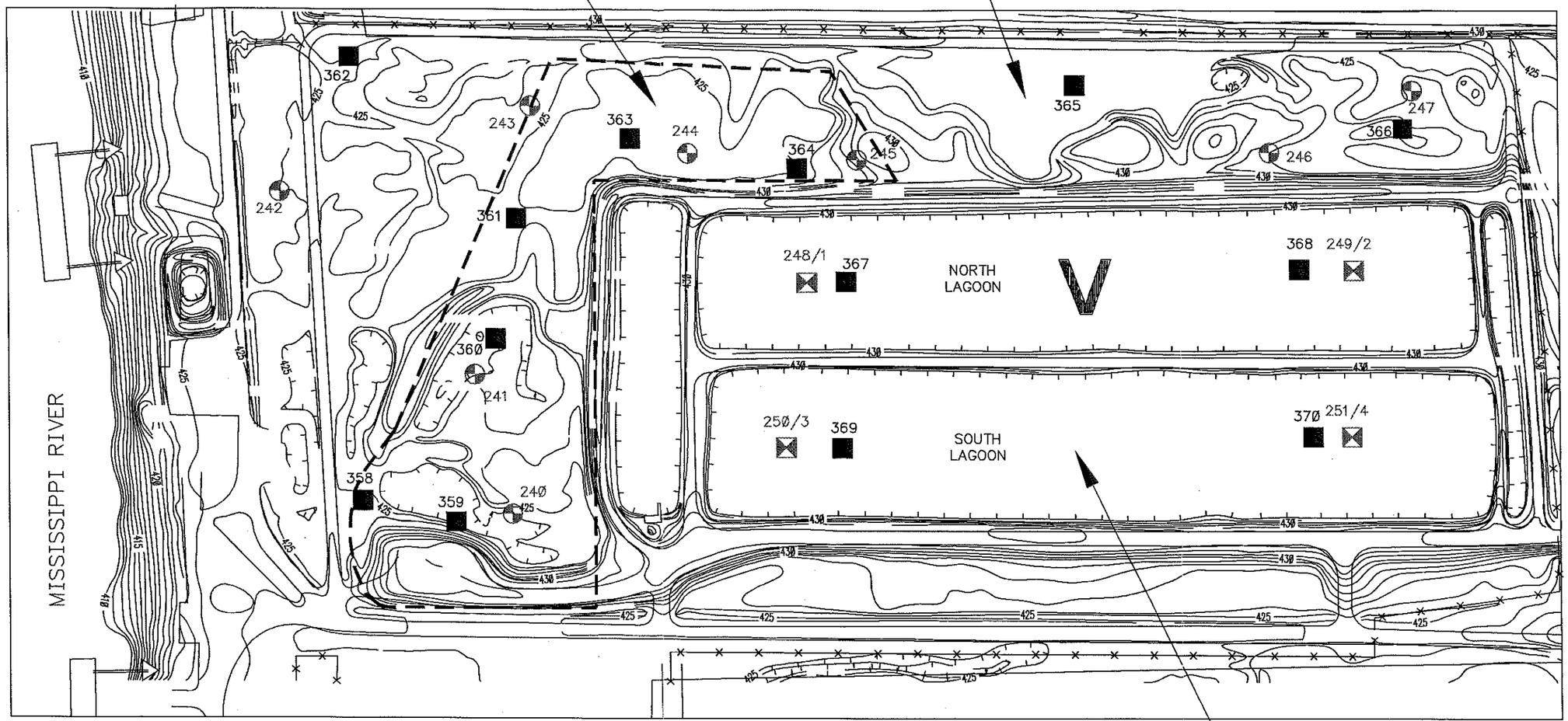
SCALE FEET

LEGEND

- EXISTING MONITORING WELL LOCATION
- PHASE II TEST PIT LOCATION
- TANK LOCATION
- PHASE I OR II BORING LOCATION
- PHASE III SURFACE AND SHALLOW SUBSURFACE SOIL BORING LOCATION
- PHASE III SOIL BORING LOCATION

EQUILON WOOD RIVER REFINING COMPANY PHASE III RFI, SWMUs S, T, AND V	PROJECT NO. 2389C8602F.01
URS Greiner Woodward Clyde A Division of URS Corporation	
DRN. BY: djd 8/19/99 DSGN. BY: at CHKD. BY: KBS 5/12	SWMU T SAMPLE LOCATIONS
	FIG. NO. 1-3

File: K:\ENVIRON\2389C8602F.01 (WRRC STV)\AREA-TB.DWG Last edited: 04/19/00 @ 11:49 a.m. @ WCC-ST.LOUIS



N

0 150
SCALE FEET

LEGEND

- PHASE I OR II BORING LOCATION
- PHASE I OR II SEDIMENT SAMPLE LOCATION
- PHASE III SAMPLE LOCATION

EQUILON WOOD RIVER REFINING COMPANY PHASE III RFI, SWMUs S, T AND V	PROJECT NO. 2389C8602F.01
URS Greiner Woodward Clyde A Division of URS Corporation	
DRN. BY: djd 8/19/99 DSGN. BY: at CHKD. BY: ABB 4/25	SWMU V SAMPLE LOCATIONS
	FIG. NO. 1-4

File: K:\ENVIRON\2389C8602F.01 (WRRC STV)\FIG1-4.DWG Last edited: 04/25/00 @ 09:31 a.m. © WCC-ST.LOUIS

The Site Conceptual Exposure Model (SCEM) and USEPA's Data Quality Objectives (DQO) process were used to help scope the Phase III RFI to support efficient data collection for risk management decision-making. The SCEM for SWMUs S, T and V identifies the potential sources of contamination, release mechanisms, migration pathways, exposure routes, potential receptors, and exposure pathway completeness. The SCEM was developed based on current understanding of the SWMU history, features, integrity, hydrogeology and environmental setting, and serves as the basis for identifying the exposure media and developing DQOs. DQOs are statements derived using the current DQO process guidance (USEPA, 1993) to identify data needs and uses, data types and data quantity and quality to ensure that the collected data will fulfill the project objectives.

The technical approach encompasses a risk-based evaluation of data collected in accordance with the SCEM and DQOs to help determine whether further evaluation is appropriate for SWMUs S, T and V. The data are segregated and compiled for comparison with health-based screening levels to eliminate chemicals which do not pose an unacceptable risk and to focus further efforts on those (if any) that have exceeded the screening levels. This approach is consistent with current USEPA policy and recent initiatives[3] which base corrective action decisions substantially on risk-based evaluations.

2.1 SITE CONCEPTUAL EXPOSURE MODEL

These SWMUs consist of the inactive White Star Refinery (SWMU S), the inactive International Shoe Tannery (SMWU T), and the active polishing lagoons and inactive lagoon and dredged material area (SWMU V). Hazardous chemical constituents that are most likely associated with these SWMUs include volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polynuclear aromatic hydrocarbons (PAHs), and inorganics (i.e., metals).

The SCEM diagrams for SWMUs S, T and V are presented in **Figures 2-1**, **2-2**, and **2-3**. The potential human exposure pathways that are identified in the SCEM are summarized in the table below. Potential receptors include site workers and visitors.

[3] "Corrective Action for Releases from Solid Waste Management Units at Hazardous Waste Management Facilities," 61 FR 19432, May 1, 1996.

SWMU	Soil		Air	
	Ingestion	Dermal Contact	Inhalation of Particulates	Inhalation of Vapors
S	✓	✓	✓ (judged potentially complete but insignificant)	✓ (judged potentially complete but insignificant)
T	✓	✓	✓	✓
V	✓	✓	✓ (judged potentially complete but insignificant)	

2.2 DATA QUALITY OBJECTIVES

Specific data quality objectives for the Phase III investigation are based on data needs indicated by the SCEM and USEPA's comments. The DQOs are summarized below.

- Collecting soil samples over areas of SWMUs S, T and V not previously sampled to provide additional nature and extent characterization and to address specific USEPA comments.
- Collecting surface and shallow subsurface soil samples for chemical and physical properties tests for use in the screening risk evaluation or future risk evaluations, as necessary.

2.3 DATA EVALUATION CRITERIA

SWMU data were compiled and compared against human health-based screening values to help decide whether there are risk concerns that warrant further action. As part of this process, data were compared with Tier 1 values published in the IEPA's *Tiered Approach to Corrective Action Objectives* (TACO) rules[4]. Under TACO, no further action is warranted for chemicals that are below the Tier 1 soil objectives. As part of this process, SWMU metals data were compared with background concentrations. SWMU data exceeding background were then compared with available health-based screening levels.

TACO USE

Data of acceptable quality were compiled for surface and shallow subsurface soils (0 to 5 ft). Constituents present in soil samples collected within the 0 to 1 ft depth are available for incidental dermal contact, resulting in soil ingestion, and/or transfer to air via diffusion or wind-blown action and subsequent inhalation. Data from soil samples collected from the 0 to 1 and >1 to 5 ft depth intervals were combined and placed in the shallow soil group under the assumption that excavation activities could cause soil within this depth range to be commingled or exposed, thus making the soil available for incidental dermal contact with and inhalation of constituents. It is unlikely that soils greater than 5 ft would be excavated.

In general, the data were compared with the most conservative (i.e., lowest) Tier 1 soil objectives for commercial/industrial properties for a given exposure pathway (i.e., general site worker and construction worker ingestion, inhalation, and the soil component of groundwater ingestion).

The following guidelines were used as part of the screening process:

- The soil to groundwater pathway was not considered for SWMU S for the following reasons: 1) In the work plan request letter, USEPA commented that sufficient groundwater monitoring exists to conclude there is no significant groundwater impact; and 2) The groundwater beneath the eastern portion of SWMU S is influenced by the Corrective Action Program (CAP), and as such, is controlled.

- To be conservative, the soil to groundwater pathway was considered for SWMU T even though groundwater monitoring conducted during the Phase II RFI indicates there are no significant groundwater impacts.

- The soil to groundwater pathway was not considered for SWMU V for the following reasons: 1) Leaching results via Toxicity Characteristics Leaching Procedure (TCLP) indicate that the metals in soils have low mobility; and 2) The groundwater beneath the SWMU is captured, similar to the CAP, by groundwater production at the Riverfront. IS THIS TRUE?

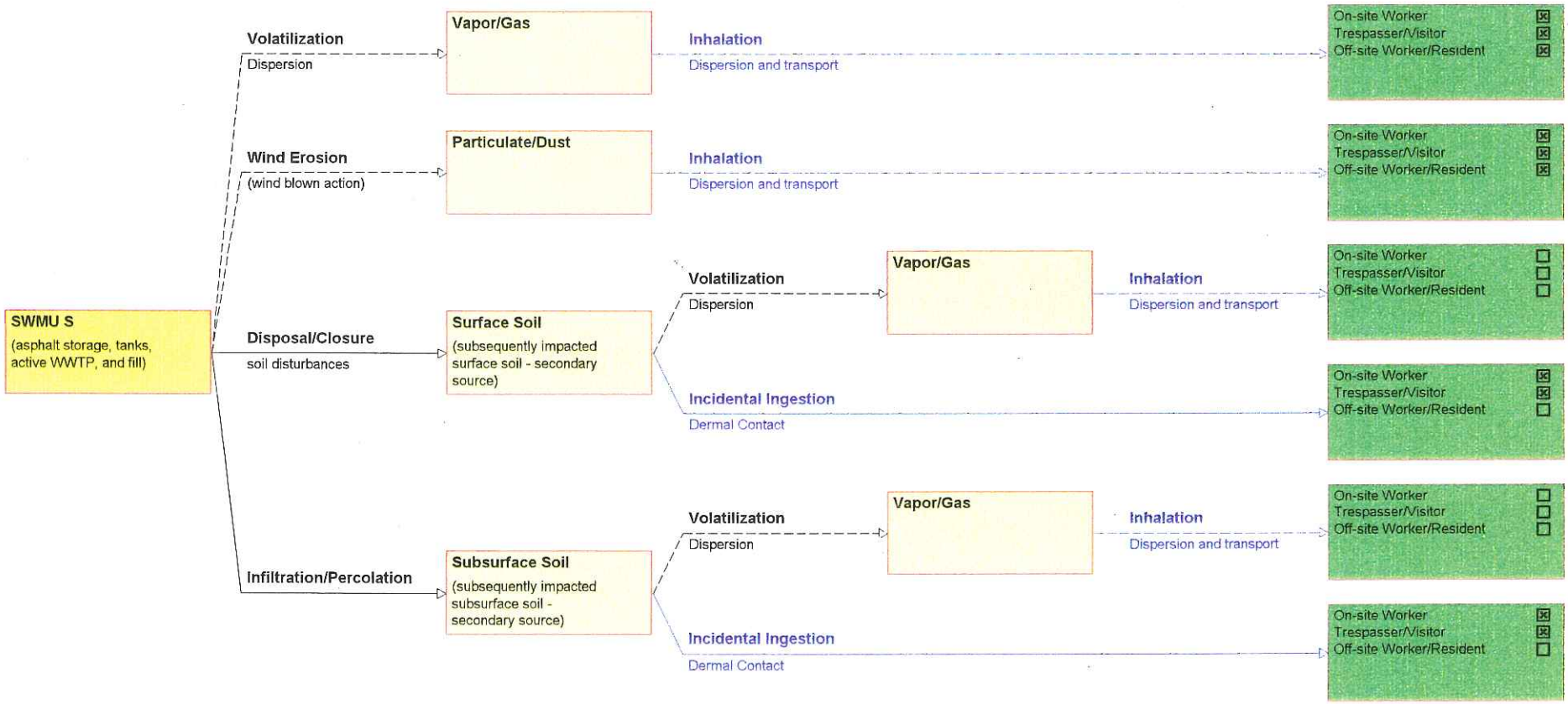
- For SWMUs S, T, and V, data from soils below a depth of 5 ft were also compared to the Tier 1 criteria even though the likelihood of uncontrolled excavations is negligible.

[4] Tiered Approach to Corrective Action Objectives (TACO), 35 IAC Part 742, June 5, 1997.

- Sediment samples collected and analyzed from the active polishing lagoons were not compared with Tier 1 criteria. Lagoon sediments are not available for human exposure in the same way that soils could be. More importantly, the lagoons constitute an active part of the wastewater treatment process and the accumulation of sediment is by design. The focus of the screening evaluation for the lagoons is on releases from the lagoons (i.e., comparison of soils beneath the lagoons to Tier 1 values). ok

Figures

FIGURE 2-1
SITE CONCEPTUAL EXPOSURE MODEL (SCEM)
SWMU S
WOOD RIVER REFINING COMPANY

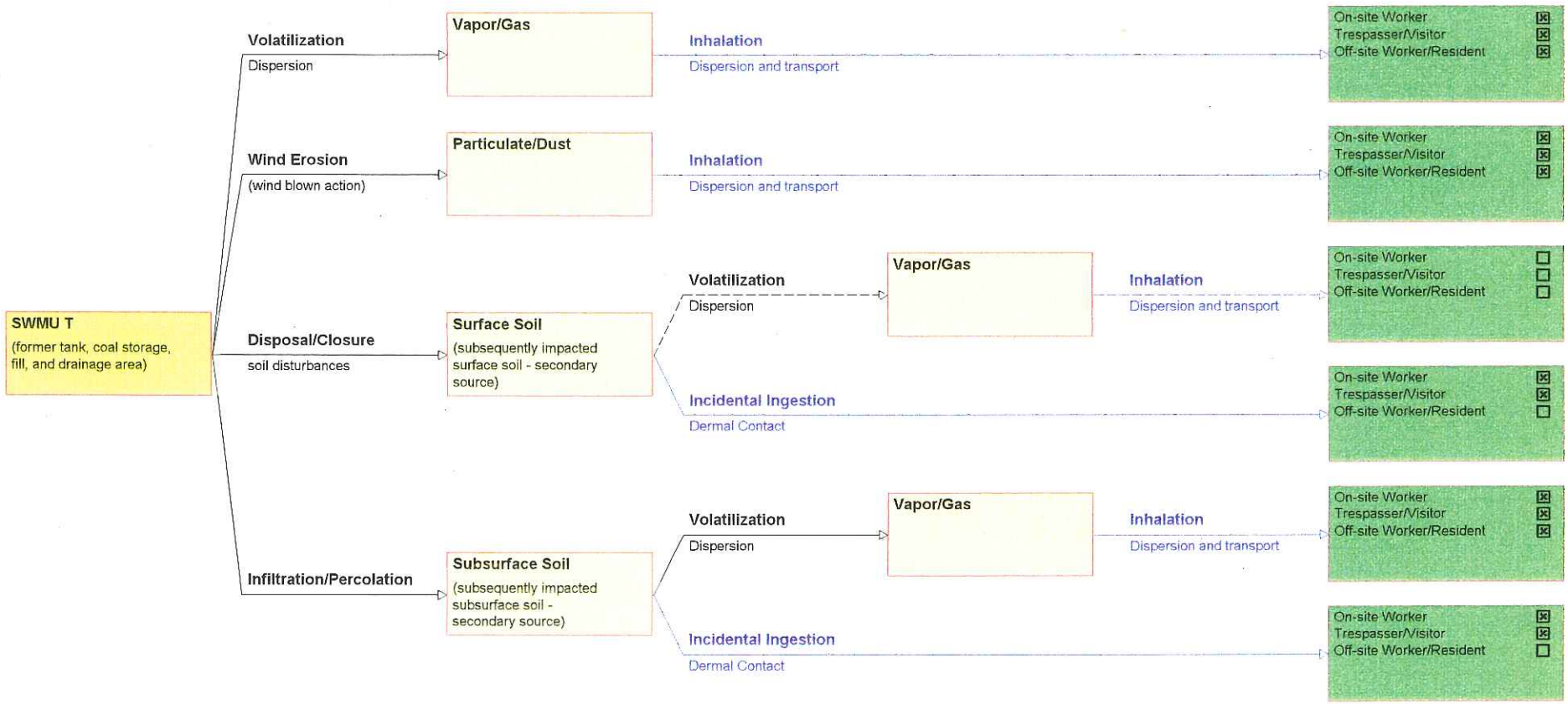


Line Styles

——————— Significant Pathway

- - - - - - - - Insignificant Pathway

FIGURE 2-2
SITE CONCEPTUAL EXPOSURE MODEL (SCEM)
SWMU T
WOOD RIVER REFINING COMPANY

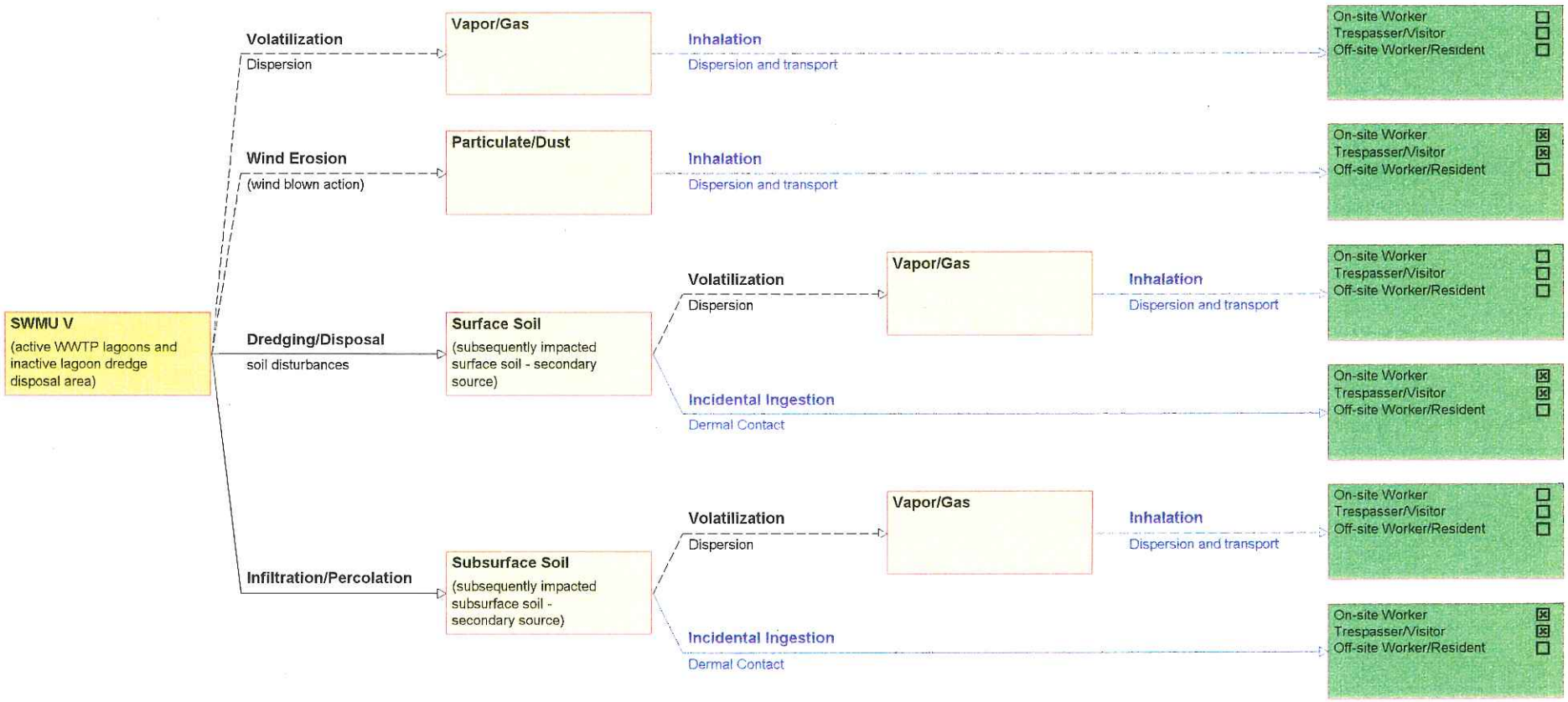


Line Styles

Significant Pathway

Insignificant Pathway

FIGURE 2-3
SITE CONCEPTUAL EXPOSURE MODEL (SCEM)
SWMU V
WOOD RIVER REFINING COMPANY



Line Styles

Significant Pathway

Insignificant Pathway

SECTIONTHREE Investigation Program

This section describes the procedures used to collect, track, analyze and present the Phase III RFI data for SWMUs S, T and V. Detailed information on the Phase I and II sampling programs is presented in the RFI Final Report (WRRC, 1995).

3.1 FIELD SAMPLING AND ANALYTICAL PROGRAM

The objective of the Phase III sampling program was to collect samples to provide area-wide representativeness of SWMUs S, T and V and to enable a conservative assessment of risk for specific exposure pathways (e.g., surface soil samples to assess wind borne dispersal). Other selected locations characterize the nature and extent of releases to soils.

Phase III boring locations are shown in **Figures 1-2, 1-3,** and **1-4.** The locations were selected to supplement existing information and to respond to USEPA's concerns. Soil samples were collected continuously from the borings using hand sampling methods (e.g., liner-tube sampler, bucket auger, shovel) or with direct push techniques (i.e., Geoprobe™). General sampling depth intervals were predetermined based on the SCEM and DQOs. In some cases, specific sample depth intervals were selected based on field observations and VOC screening using a photoionization detector (PID). Soil boring logs were completed based on visual observations and drilling characteristics and are contained in **Appendix A.**

SAMPLING DEPTH Determined

Soil samples for analytical testing were collected from borings according to the following general rationale, depending on whether the sample was identified for nature and extent purposes or for risk screening purposes:

Nature and Extent Characterization

- One sample from within the SWMU (generally expected to be within the upper 10 ft)
- One sample from the interval of greatest apparent impact (based on field observations), if present
- One sample from beneath the impacted zone (but not beneath the water table).

ok

Risk Screening

- One surface soil sample from a depth between 0 and 1 ft
- One shallow soil sample from a depth between approximately 1 and 5 ft.

As described in the SCEM, the surface and shallow subsurface soil samples were used for the screening risk evaluation. Although exposure to deeper soils (>5 ft) is unlikely, these samples were also compared against the screening criteria to be conservative. All samples were used for nature and extent characterization. **Table 3-1** summarizes the types and quantities of samples collected under the Phase III program. The table below summarizes the number and type of samples collected for analysis.

ALL DEPTHS USED IN EVALUATING RISK.

	SWMU S	SWMU T	SWMU V
Investigative Samples	19	33	31
QA/QC Samples	8	16	10
Totals	27	49	41

Field Quality Assurance and Quality Control (QA/QC) samples included trip blanks, equipment or rinsate blanks, duplicates, and matrix spike (MS) and matrix spike duplicate (MSD) samples. A detailed description of the field activities and the soil boring logs are presented in **Appendix A**.

Investigative samples collected for laboratory analysis were analyzed by STL-Savannah Laboratories (Savannah) of Savannah, Georgia. In general, samples from SWMU S were analyzed for Refinery Hazardous Constituents List (RHCL) parameters, and samples from SWMUs T and V were analyzed for subsets of 40 CFR 264 Appendix IX. Selected samples from SWMU T were also analyzed for total petroleum hydrocarbons (TPH). Selected samples from SWMU V were additionally analyzed using the TCLP for metals. Samples were analyzed in accordance with the work plan and DQAP using USEPA SW-846 methodology. The constituents and test methods are listed in **Tables 3-2** and **3-3.** PAH compounds were reported by method 8310 rather than method 8270 to obtain lower reporting limits. In addition, selected representative samples were tested for moisture content and total organic carbon (TOC). These samples were collected from areas which, based on field observations, did not appear to be impacted.

3.2 DATA MANAGEMENT AND PRESENTATION

Data management methods and procedures were used to document, track, store and retrieve data collected during the RFI. These methods and procedures are described in the data management portion of the Phase III work plan.

Field activities were documented through the use of the following:

- Soil boring logs
- Chain of custody forms
- Field log books
- Photographs.

A sample numbering system was used to track samples for positive identification of sample results. Each sample number consists of a variable code which identifies the sample matrix, sample location, sample depth, sample date, and sample type. For example, the sample identification: SS30001811039900D would indicate a duplicate subsurface soil sample collected from boring number 300 from a depth of 18 ft on November 3, 1999. SAMPLE CODE

A Microsoft Excel®-based sample tracking system was utilized to track analytical samples from the time of collection until receipt by the laboratory. Information available from this system includes sample collection information (sample ID, date, time, etc.) and analytical requirements.

Analytical data were validated by URSGWC and entered into a Microsoft Access® database. The analytical data were electronically loaded into the database from floppy disks received from Savannah. Revisions to the database were made after URSGWC completed data validation. Data qualifiers were written on the hard copy of the data and were manually-entered into the database. Historical data (i.e., Phase I and II) were also loaded in the database and combined with the Phase III data. For quality assurance, approximately ten percent of the data in the database were compared with the hard copy results.

In general, data to be presented in tabular form were downloaded from Access® into Excel® for sorting, filtering and presentation purposes. Data presented in graphical formats were depicted using AutoCAD® and Environmental Visualization System™ (EVS) software. EVS is used to develop and display 2- and 3-dimensional models of environmental conditions. Specifically for this project, EVS was used to develop figures that illustrate the horizontal and

vertical extent of releases for SWMU V. The depiction of SWMU S and T through EVS was judged to be less useful and, as such, was not performed.

3.3 PROJECT MANAGEMENT

PLAYERS

Project management during the RFI was completed as identified in the work plan. In general, the project work was performed by URSGWC under the direction of the WRRC Management Representative, Joseph Brewster, and WRRC Project Coordinator, Mike Armour. The primary URSGWC contact was the Project Manager, Bob Billman. Contacts with the USEPA Region 5 Project Coordinator, Gale Hruska, were made by WRRC. Other firms utilized to complete the RFI included: STL-Savannah Laboratories - sample testing, under contract to WRRC; and Roberts Environmental Drilling, Inc. – soil drilling, under contract to URSGWC.

3.4 HEALTH AND SAFETY

The field activities previously described were conducted in accordance with the project Health and Safety Plan (HSP) prepared for the work at SWMUs S, T, and V. The field work was conducted in USEPA Modified Level D personal protective equipment (PPE). Non-intrusive work such as staking of boring locations and field measurements were conducted in Level D PPE. Reusable flame-retardant Nomex coveralls were worn in accordance with WRRC safety policies. Work was also conducted in conformance with other WRRC procedures such as obtaining daily work permits for operation of the drilling equipment.

The following instruments were used as indicators of air quality during the field activities:

- Organic Vapor Meter OVM-580B photoionization detector with 10.2 electron volt (eV) probe
- Gastech combustible gas indicator
- Dräger colorimetric tubes for detecting benzene.

Health and safety related information was recorded in field log books or on soil boring logs.

3.5 QUALITY ASSURANCE

The data from the RFI field activities were collected in accordance with procedures described in the DQAP and revisions as described in Section 1.2. A Quality Assurance Report for the RFI is

included in **Appendix B**. The report presents a description of the overall project QA results including data quality objectives, data validation, audits, and corrective action. These quality areas are summarized below.

3.5.1 Data Quality Objectives

The project data quality objectives established for accuracy, precision, completeness, representativeness and comparability were met. The QA report provides descriptions and the results achieved for each of the data quality objectives.

3.5.2 Data Quality Review, Validation and Overall Assessment

The initial validation of laboratory data was performed by Savannah. URSGWC conducted an independent review of each data report and further validated a minimum of 10 percent of the data. Seven packages of data (sample delivery groups [SDGs]) were provided to URSGWC from Savannah. Data were contract laboratory program (CLP)-like deliverables, as specified in the work plan. The validation procedure used was consistent with the work plan and USEPA guidelines for the validation of laboratory data (USEPA, 1993 and 1994). The following items were reviewed in the validation process:

- Transcription error check
- Results reported from secondary dilutions
- Analyte identification and quantitation
- Holding times
- Blanks
- Surrogate recoveries
- Laboratory control sample results
- Matrix spike and matrix spike duplicate results
- Inductively Coupled Plasma (ICP) interference check sample recoveries (full data validation only)
- ICP serial dilution results (metals only) (full data validation only)
- Field duplicate results
- Instrument performance and calibration.
- Overall assessment of data.

Qualifiers were assigned to data when results from the above items were outside control limits. These qualifiers are included in the data summary tables presented in Section 4 and the analytical results in **Appendix C**. Results were acceptable for 100 percent of the data (no qualifications or only J or UJ qualifiers). A summary of the results of the independent validation is provided in **Appendix B.**

Data were collected according to the work plan, and the DQO and SCEM procedures, and were representative of the nature and extent of site conditions. In general, the analytical data provided by Savannah was acceptable in quality for characterizing the nature and extent of contamination and for the screening risk evaluation.

3.5.3 Corrective Action

NO NON-COMPLIANCE

No non-compliance incidents occurred which would have triggered the corrective action process as defined in the DQAP.

3.5.4 Laboratory Comparability

Phase I and II samples were analyzed by Enseco - Rocky Mountain Analytical Laboratory (now part of STL Laboratories). The Phase III data were analyzed by Savannah. Analyses for all investigation phases were conducted using SW-846 methodologies under approved quality assurance plans.

Overall, the data are considered comparable, however there are a few important differences between the historical and Phase III data. For the historical data, Method 8240 was used for the VOC analysis while Method 8260 was used for the Phase III VOC analysis. The detection and quantifying capabilities are highly similar. Also, for selected samples at SWMU T associated with petroleum tanks, historical samples were analyzed for benzene, toluene, ethylbenzene and xylenes (BTEX) via Method 8020. For Phase III, BTEX was reported via Method 8260 to provide better quantification capabilities. Phase III samples for VOC analysis were collected using Encore® sample vials and prepared for analysis using Method 5035. Based on USEPA's directive for this method, the results are expected to be more accurate than traditional methods.

For semivolatile organics, historical samples were analyzed by Method 8270. For Phase III, several of these semivolatile organic compounds (i.e., PAHs) were analyzed by Method 8310 to obtain lower detection limits.

Most metals for historical samples were analyzed by Method 6010 except for arsenic and selenium which were analyzed by Methods 7060 and 7740, respectively to obtain lower detection limits. These metals were analyzed by Method 6010 for Phase III samples. Due to advances in Method 6010, detection limits are comparable with Methods 7060 and 7740.

The methodology used for total petroleum hydrocarbons (TPH) differed between Phase II and Phase III. For Phase II, the methods used were Total Chromatographable Organics (TCO) via Method GC/FID and TPH via Method 418.1. Phase III utilized Method 8015 and reported the results as Gasoline Range Organics and Diesel Range Organics. While these three methods are not directly comparable, they satisfy their intended use for the RFI. They are used as a measure of hydrocarbon content to evaluate potential releases.

Overall, the data among Phases I, II and III are comparable.

Tables

TABLE 3-1
SAMPLE TRACKING SUMMARY

SDG #	SWMU	Sample ID	Date	Time	Depth (ft)	SAMPLE ANALYSIS												Field Screenings (ppm)
						RHCL				Appendix IX							TOC, Moist/pH	
						VOC	SVOC	PAH	Metals	VOC	BTEX	SVOC	PAH	Metals	Metals	TPH[2]		
1	S	SS300001110399 00S	11/03/99	1030	1	1	1	1	1									*
1	S	SS300006110399 00S	11/03/99	1046	6	1	1	1	1									*
1	S	SS300018110399 00S	11/03/99	1140	18	1	1	1	1								1	35
1	S	SS301008110399 00S	11/03/99	1420	8	1	1	1	1									*
1	S	SS301020110399 00S	11/03/99	1450	20	1	1	1	1								1	10
1	S	SS302001110499 00S	11/04/99	920	1	1	1	1	1								1	4.5
7	S	SS302004112399 00S	11/23/99	1230	4												1	*
1	S	SS302014110499 00S	11/04/99	955	14	1	1	1	1									*
1	S	SS302024110499 00S	11/04/99	1030	24	1	1	1	1									41
1	S	SS303001110499 00S	11/04/99	1330	1	1	1	1	1								1	22.5
1	S	SS303004110499 00S	11/04/99	1345	4	1	1	1	1								1	70
1	S	SS303008110499 00S	11/04/99	1400	8	1	1	1	1									255
1	S	SS303012110499 00S	11/04/99	1410	12												1	16
1	S	SS303022110499 00S	11/04/99	1430	22	1	1	1	1								1	27
1	S	SS304001110459 900S	11/05/99	1035	1	1	1	1	1									*
1	S	SS304004110599 00S	11/05/99	1100	4	1	1	1	1									*
1	S	SS304020110599 00S	11/05/99	1125	20	1	1	1	1									798
4	S	SS305001111599 00S	11/15/99	900	1	1	1	1	1									1
4	S	SS305004111599 00S	11/15/99	905	4	1	1	1	1								1	20
4	S	SS305014111599 00S	11/15/99	920	14	1	1	1	1								1	114
1	S	SS306001110599 00S	11/05/99	1200	1	1	1	1	1								1	54
4	T	SS319012111599 00S	11/15/99	1150	12						1					1		5
4	T	SS320012111599 00S	11/15/99	1410	12						1					1		3
2	T	SS321001110599 00S	11/05/99	1500	1					1		1	1	1			1	*
2	T	SS321004110599 00S	11/05/99	1510	4					1		1	1	1				*
7	T	SS322001112399 00S	11/23/99	1115	1					1		1	1	1				1
7	T	SS322003112399 00S	11/23/99	1145	3					1		1	1	1				0
4	T	SS323004111599 00S	11/15/99	1530	4									1				3
4	T	SS323012111599 00S	11/15/99	1540	12									1				7
5	T	SS324004111699 00S	11/16/99	925	4									1				3
5	T	SS324012111699 00S	11/16/99	935	12									1			1	2
6	T	SS325008111899 00S	11/18/99	920	8					1		1	1	1		1	1	2
6	T	SS325016111899 00S	11/18/99	930	16					1		1	1	1			1	3
5	T	SS326010111699 00S	11/16/99	1020	10						1					1		5
5	T	SS327010111699 00S	11/16/99	1050	10						1					1		5
5	T	SS328001111699 00S	11/16/99	1105	1					1		1	1	1		1		1
5	T	SS328016111699 00S	11/16/99	1120	16					1		1	1	1		1	1	5
5	T	SS329001111699 00S	11/16/99	1250	1					1		1	1	1		1		2
5	T	SS329016111699 00S	11/16/99	1310	16					1		1	1	1		1	1	5
6	T	SS330001111999 00S	11/19/99	850	1					1		1	1	1		1		1
6	T	SS330010111999 00S	11/19/99	905	10					1		1	1	1		1	1	2
6	T	SS331001111899 00S	11/18/99	1335	1					1		1	1	1			1	1
6	T	SS331005111899 00S	11/18/99	1340	5					1		1	1	1			1	18
6	T	SS332001111899 00S	11/18/99	1020	1						1		1			1		2
6	T	SS332014111899 00S	11/18/99	1040	14						1		1			1		7
6	T	SS333001111899 00S	11/18/99	1225	1						1		1			1		5
6	T	SS333014111899 00S	11/18/99	1245	14						1		1			1		3

TABLE 3-1
SAMPLE TRACKING SUMMARY

SDG #	SWMU	Sample ID	Date	Time	Depth (ft)	SAMPLE ANALYSIS: RHCL VOC	RHCL SVOC	RHCL PAH	RHCL Metals	Appendix IX VOC	Appendix IX BTEX	Appendix IX SVOC	Appendix IX PAH	Appendix IX Metals	Metals[1]	TPH[2]	TOC, Moist/pH	Field Screenings (ppm)
5	T	SS335001111169900S	11/16/99	845	1					1		1	1	1			1	2
5	T	SS335005111169900S	11/16/99	850	5					1		1	1	1			1	1
6	T	SS336001111199900S	11/19/99	935	1					1		1	1	1				1
6	T	SS336010111199900S	11/19/99	950	10					1		1	1	1				1
6	T	SS337001111199900S	11/19/99	1000	1					1		1	1	1				3
6	T	SS337010111199900S	11/19/99	1015	10					1		1	1	1				7
2	V	SS358001111089900S	11/08/99	920	1										1		1	0
2	V	SS358004111089900S	11/08/99	940	4										1		1	0
2	V	SS358012111089900S	11/08/99	955	12										1		1	2
3	V	SS359004111109900S	11/11/99	1115	4										1		1	2
3	V	SS359012111119900S	11/11/99	1125	12										1		1	1
3	V	SS360004111119900S	11/11/99	1400	4					1		1	1	1				3
3	V	SS360012111119900S	11/11/99	1410	12					1		1	1	1				0
3	V	SS361004111129900S	11/12/99	1420	4										1			5
3	V	SS361012111129900S	11/12/99	1430	12										1			3
3	V	SS362004111129900S	11/12/99	1045	4										1			0
3	V	SS362012111129900S	11/12/99	1055	12										1			0
3	V	SS363001111129900S	11/12/99	1325	1												1	6
3	V	SS363004111129900S	11/12/99	1325	4										1			7
3	V	SS363012111129900S	11/12/99	1335	12										1			1
2	V	SS364004111099900S	11/09/99	1600	4					1		1	1	1				2
2	V	SS364014111109900S	11/10/99	1515	14					1		1	1	1			1	2
3	V	SS365004111129900S	11/12/99	855	4										1			1
3	V	SS365012111129900S	11/12/99	905	12										1			1
3	V	SS366001111129900S	11/12/99	940	1												1	6
3	V	SS366004111129900S	11/12/99	940	4										1		1	0
3	V	SS366012111129900S	11/12/99	950	12										1			0
2	V	SS367008111109900S	11/10/99	1015	8					1		1	1	1				84
2	V	SS367009111109900S	11/10/99	1015	9					1		1	1	1				71
2	V	SS367011111109900S	11/10/99	1015	11					1		1	1	1				10
2	V	SS368006111109900S	11/10/99	1130	6					1		1	1	1				205
2	V	SS368009111109900S	11/10/99	1130	9					1		1	1	1			1	2
2	V	SS368011111109900S	11/10/99	1130	11					1		1	1	1			1	5
2	V	SS369005111099900S	11/09/99	1045	5					1		1	1	1				89
2	V	SS369008111099900S	11/09/99	1115	8					1		1	1	1			1	2
2	V	SS369011111099900S	11/09/99	1330	11					1		1	1	1			1	22
2	V	SS370005111089900S	11/08/99	1330	5					1		1	1	1				167
2	V	SS370008111089900S	11/08/99	1430	8					1		1	1	1				38
2	V	SS370011111089900S	11/08/99	1430	11					1		1	1	1				85
7	T	SSP-1341123990GW	11/23/99	1330							1		1			1		*
83		**TOTAL INVESTIGATIVE SAMPLES**				19	19	19	19	45		36	41	55		16	35	
69 to 87		***SAMPLING PLAN TOTALS***																

Metals[1] = Selected App. IX metals: Sb, As, Ba, Be, Cd, Cr, Pb, Hg, Se, V & Zn

[2] = TPH has been broken down into Hydrocarbons as DRO (deisel) and GRO (gasoline)

* = PID System Malfunction

Note: Metal analysis often includes Cyanide and Sulfide

TABLE 3-1
SAMPLE TRACKING SUMMARY

SDG #	SWMU	Sample ID	Date	Time	Depth (ft)	SAMPLE ANALYSIS: RHCL VOC	RHCL SVOC	RHCL PAH	RHCL Metals	Appendix IX VOC	Appendix IX BTEX	Appendix IX SVOC	Appendix IX PAH	Appendix IX Metals	Appendix IX Metals	TPH	TOC, Moist/pH	Field Screenings (ppm)
		DUPLICATES																
1	S	SS30300811049900D	11/04/99	1400	8	1	1	1	1									
4	S	SS30501411159900D	11/15/99	920	14	1	1	1	1									
5	T	SS32400411169900D	11/16/99	925	4									1				
5	T	SS32900111169900D	11/16/99	1250	1					1		1	1	1		1		
6	T	SS33001011199900D	11/19/99	905	10					1		1	1	1		1		
6	T	SS33100511189900D	11/18/99	1340	5					1		1	1	1			1	
3	V	SS36001211119900D	11/11/99	1410	12					1		1	1	1				
3	V	SS36600411129900D	11/12/99	940	4										1			
2	V	SS36900511099900D	11/09/99	1045	5					1		1	1	1				
		TOTALS				2	2	2	2	5		5	5	7		2		
		PERCENT				11%	11%	11%	11%	11%		14%	12%	13%		13%		
		SAMPLING PLAN PERCENT				*10%*	*10%*	*10%*	*10%*	*10%*		*10%*	*10%*	*10%*		*10%*		
		MS/MSD																
4	S	SS3050041115990MS	11/15/99	905	4	1	1	1	1									
4	S	SS305004111599MSD	11/15/99	905	4	1	1	1	1									
1	S	SS3060011105990MS	11/05/99	1200	1	1	1	1	1									
1	S	SS306001110599MSD	11/05/99	1200	1	1	1	1	1									
4	T	SS3200121115990MS	11/15/99	1410	12						1					1		
4	T	SS320012111599MSD	11/15/99	1410	12						1					1		
7	T	SS3220011123990MS	11/23/99	1115	1					1								
7	T	SS322001112399MSD	11/23/99	1115	1					1								
5	T	SS3280011116990MS	11/16/99	1105	1					1		1	1	1		1		
5	T	SS328001111699MSD	11/16/99	1105	1					1		1	1	1		1		
6	T	SS3310011118990MS	11/18/99	1335	1					1		1	1	1				
6	T	SS331001111899MSD	11/18/99	1335	1					1		1	1	1				
3	V	SS3600041111990MS	11/11/99	1400	4					1		1	1	1				
3	V	SS360004111199MSD	11/11/99	1400	4					1		1	1	1				
2	V	SS3640041109990MS	11/09/99	1600	4					1		1	1	1				
2	V	SS364004110999MSD	11/09/99	1600	4					1		1	1	1				
		TOTAL				2	2	2	2	5		3	3	3		2		
		PERCENT				11%	11%	11%	11%	11%		8%	7%	5%		13%		
		SAMPLING PLAN PERCENT				*5%*	*5%*	*5%*	*5%*	*5%*		*5%*	*5%*	*5%*		*5%*		
		EQUIPMENT BLANKS																
1	S	W3050011105990EB	11/05/99	1000		1	1	1	1									
2	V	W3690021109990EB	11/09/99	1500						1		1	1	1				
3	V	W3600031111990EB	11/11/99	1500						1		1	1	1				
3	V	W3660041112990EB	11/12/99	1030											1			
4	S	W3050051115990EB	11/15/99	1000		1	1	1	1									
4	T	W3200061115990EB	11/15/99	1500							1						1	
5	T	W3290071116990EB	11/16/99	1330						1		1	1	1		1		
6	T	W3310081118990EB	11/18/99	1400						1		1	1	1				
6	T	W3300091119990EB	11/19/99	1045						1		1	1	1		1		
		TOTAL				2	2	2	2	5		5	5	6		2		
		PERCENT				11%	11%	11%	11%	11%		14%	12%	11%		13%		
		SAMPLING PLAN PERCENT				*10%*	*10%*	*10%*	*10%*	*10%*		*10%*	*10%*	*10%*		*10%*		

TABLE 3-1
SAMPLE TRACKING SUMMARY

SDG #	SWMU	Sample ID	Date	Time	Depth (ft)	SAMPLE ANALYSIS RHCL VOC	RHCL SVOC	RHCL PAH	RHCL Metals	Appendix IX VOC	Appendix IX BTEX	Appendix IX SVOC	Appendix IX PAH	Appendix IX Metals	Metals	TPH	TOC Moist/pH	Field Screenings (ppm)
		TRIP BLANKS																
1		TRIP BLANK #1	11/03/99			1												
1		TRIP BLANK #2	11/04/99			1												
1		TRIP BLANK #3	11/05/99			1												
2		TRIP BLANK #4	11/05/99							1								
2		TRIP BLANK #5	11/08/99							1								
2		TRIP BLANK #6	11/09/99							1								
2		TRIP BLANK #7	11/09/99							1								
3		TRIP BLANK #8	11/10/99							1								
3		TRIP BLANK #9	11/11/99							1								
4		TRIP BLANK #10	11/15/99			1												
4		TRIP BLANK #11	11/15/99			1												
4		TRIP BLANK #12	11/16/99							1								
4		TRIP BLANK #13	11/16/99							1								
4		TRIP BLANK #14	11/16/99							1								
4		TRIP BLANK #15	11/18/99							1								
4		TRIP BLANK #16	11/18/99							1								
5		TRIP BLANK #17	11/19/99							1								
5		TRIP BLANK #18	11/19/99							1								
6		TRIP BLANK #19	11/23/99							1								

109 = TOTAL INVESTIGATIVE & QA/QC SAMPLES
128 = TOTAL INVESTIGATIVE & QA/QC (INCLUDING TRIP BLANK) SAMPLES

TABLE 3-2
LABORATORY REPORTING LIMITS AND REFINERY HAZARDOUS CONSTITUENTS LIST

REFINERY HAZARDOUS CONSTITUENT LIST *	USEPA Region 5 Data Quality Limit (DQL) [1] Soil (ug/kg)	Required Reporting Limit [2] Soil (ug/kg)	method	Is Reporting Limit Below Region 5 DQL ?
VOLATILE ORGANIC COMPOUNDS				
benzene	1,400 ca	5	8260	YES
carbon disulfide	16,000 nc	5	8260	YES
chlorobenzene	160,000 nc	5	8260	YES
chloroform	530 ca	5	8260	YES
1,2-dibromoethane	5.1 ca	5	8260	YES
1,2-dichloroethane	440 ca	5	8260	YES
ethylbenzene	2,900,000 sat	5	8260	YES
methyl ethyl ketone	8,700,000 nc	100	8260	YES
styrene	2,200,000 sat	5	8260	YES
toluene	1,900,000 nc	5	8260	YES
xylenes (total)	980,000 sat	5	8260	YES
SEMI-VOLATILE ORGANIC COMPOUNDS				
benzenethiol	780	660	8270	YES
bis-(2-ethylhexyl) phthalate	61,000	660	8270	YES
butylbenzyl phthalate	13,000,000 nc	660	8270	YES
o-cresol	3,300,000 nc	660	8270	YES
m-cresol	3,300,000 nc	660	8270	YES
p-cresol	330,000 nc	660	8270	YES
1-2 dichlorobenzene	2,300,000 nc	660	8270	YES
1-3 dichlorobenzene	280,000 nc	660	8270	YES
1-4 dichlorobenzene	17,000 nc	660	8270	YES
2,4-dimethylphenol	1,300,000 nc	660	8270	YES
2,4-dinitrophenol	130,000 nc	3,300	8270	YES
diethylphthalate	52,000,000 nc	660	8270	YES
7,12-dimethyl-benz(a)anthracene	NA	660	8270	
dimethyl phthalate	$> 1 \times 10^8$	660	8270	YES
di-n-butyl phthalate	NA	660	8270	
1,4-dioxane	14,000 ca	500	8270	YES
1-methylnaphthalene	NA	660	8270	
phenol	39,000,000 nc	660	8270	YES
pyridine	65,000 nc	660	8270	YES
Quinoline	NA	660	8270	YES
POLYNUCLEAR AROMATIC HYDROCARBONS[3]				
acenaphthene	360,000 sat	1,200	8310	YES
anthracene	19,000 sat	450	8310	YES
benzo(a)anthracene	610 ca	9	8310	YES
benzo(a)pyrene	61 ca	15	8310	YES
benzo(b)fluoranthene	610 ca	12	8310	YES
benzo(g h i) perylene	NA	40	8310	
benzo(k)fluoranthene	6,100 ca	11	8310	YES
chrysene	24,000 sat	100	8310	YES
dibenz(a,h)anthracene	61 ca	20	8310	YES
fluoranthene	2,600,000 nc	140	8310	YES
fluorene	300,000 sat	140	8310	YES
indeno (1,2,3-cd) pyrene	610 ca	29	8310	YES

TABLE 3-2
LABORATORY REPORTING LIMITS AND REFINERY HAZARDOUS CONSTITUENTS LIST

REFINERY HAZARDOUS CONSTITUENT LIST *	USEPA Region 5 Data Quality Limit (DQL) (1) Soil (ug/kg)	Required Reporting Limit (2) Soil (ug/kg)	method	Is Reporting Limit Below Region 5 DQL ?
naphthalene	800,000 sat	1,200	8310	YES
phenanthrene	NA	120	8310	
pyrene	2,000,000 nc	200	8310	YES
METALS/WET CHEMISTRY				
antimony	31,000 nc	12,000	6010B	YES
arsenic (3)	320 ca	300	6010B	YES
barium	5,300,000 nc	40,000	6010B	YES
beryllium (3)	140 ca	60	6010B	YES
cadmium	38,000 nc	400	6010B	YES
chromium (5)	210,000 ca	2,000	6010B	YES
cobalt	NA	10,000	6010B	
lead	400,000 nc	1,000	6010B	YES
mercury	23,000 nc	400	7471	YES
nickel	1,500,000 nc	8,000	6010B	YES
selenium	380,000 nc	1,000	6010B	YES
vanadium	540,000 nc	10,000	6010B	YES
cyanide	1,600,000	2,000	9010B	YES

Notes:

* Appendix VIII Hazardous Constintuent Subset for Petroleum Insudtyr Studies, from "Petition to Delist Hazardous Waste, A Guidance Manual, "(EPA/530-SW-85-003)

(1) RCRA Data Quality Levels Memorandum-Update 1, U.S. EPA - Region 5, Dec. 14, 1995.

(2) The laboratory must be able to demonstrate that their experimentally determined Method Detection Limit (MDL) is less than their repo (the numeric value associated with non-detectable results, generally 3 to 5 times higher than the MDL) and that their reporting limit is equal to the Required Reporting Limit specified in this table. The Required Reporting Limits are based on an evaluation of project req combined with an evaluation of the value anticipated to be achievable by a good laboratory for the specified analytical method. The Re Reporting Limits are generally at least 3 to 5 times higher than the estimated detection limits contained in USEPA SW-846, Third Edit Updates I, II, and IIA, September 1994. Reporting limits listed may not always be attainable with site samples due to potential matrix i

(3) Required reporting limits for arsenic and beryllium are based on estimated detection limits from U.S. EPA SW-846, Third Edition, incl 1, 2, and 2A, September 1994, and an evaluation of method detections limits provided by analytical laboratories. These values assume solution value adjusted to 1 gram of solid sample and 200 mL of final digestate volume. It is acceptable for the laboratory to adjust the digestate volume to 100 mL in order to meet the Required Reporting Limit.

(4) This list of PAHs do not have toxicity values, or Region 5 data quality limits for benzo(g,h,i)perylene, and phenanthrene.

(5) Data quality objective for chromium is based on 1/6 ratio of chromium VI to chromium III.

NA = not available

TABLE 3-3
LABORATORY REPORTING LIMITS AND APPENDIX IX CONSTITUENTS LIST

40 CFR 264 APPENDIX IX HAZARDOUS CONSTITUENT	USEPA Region 5 Data Quality Limit (DQL) [1] Soil (ug/kg)	Savannah's Reporting Limit [2,3] Soil (ug/kg)	method	Is Reporting Limit Below Region 5 DQL ?
VOLATILE ORGANIC COMPOUNDS				
acetone	2,000,000 nc	50	8260	YES
acetonitrile	390,000 nc	200	8260	YES
acrolein	1,300,000 nc	100	8260	YES
acrylonitrile	130 ca	100	8260	YES
allyl chloride	3,300,000 nc	5	8260	YES
benzene	1,400 ca	5	8260	YES
bromodichloromethane	1,400 ca	5	8260	YES
bromoform	56,000 ca	5	8260	YES
carbon disulfide	16,000 nc	5	8260	YES
carbon tetrachloride	470 ca	5	8260	YES
chlorobenzene	160,000 nc	5	8260	YES
chloroethane	1,100,000 nc	10	8260	YES
chloroform	530 ca	5	8260	YES
chloroprene	NA	5	8260	
dibromochloromethane	5,300 ca	5	8260	YES
1,2-dibromo-3-chloropropane	320 ca	10	8260	YES
1,2-dibromoethane	5.1 ca	5	8260	YES
1,2 dichlorobenzene	2,300,000 nc	330	8270	YES
1,3 dichlorobenzene	280,000 nc	330	8270	YES
1,4 dichlorobenzene	17,000 nc	330	8270	YES
1,2-dichloroethane	440 ca	5	8260	YES
1,2-dichloropropane	680 ca	5	8260	YES
dichlorodifluoromethane	110,000 nc	5	8260	YES
1,1-dichloroethane	840,000 nc	5	8260	YES
1,1-dichloroethylene	38 ca	5	8260	YES
trans-1,2-dichloroethylene	170,000 nc	5	8260	YES
1,3-dichloropropene	510 ca	5	8260	YES
ethylbenzene	2,900,000 sat	5	8260	YES
ethyl methacrylate	340,000 sat	5	8260	YES
2-hexanone	NA	25	8260	
isobutyl alcohol	20,000,000 nc	200	8260	YES
4-methyl-2-pentanone (MIBK)	5,200,000 nc	25	8260	YES
methacrylonitrile	1,300 nc	100	8260	YES
methyl bromide	15,000 nc	10	8260	YES
methyl chloride	2,000 ca	10	8260	YES
methyl ethyl ketone	8,700,000 nc	25	8260	YES
methyl iodide	NA	5	8260	
methyl methacrylate	5,200,000 nc	5	8260	YES
methylene bromide	650,000 nc	5	8260	YES
methylene chloride	11,000 ca	5	8260	YES
pentachloroethane	NA	25	8260	
propionitrile	NA	100	8260	
styrene	2,200,000 sat	5	8260	YES
trans-1,4-dichloro-2-butene	7.6 ca	5[7]	8260	NO
1,1,1-trichloroethane	3,200,000 nc	5	8260	YES
1,1,2-trichloroethane	1,400 ca	5	8260	YES
1,2,3-trichloropropane	6.6 ca	5	8260	YES
1,1,1,2-tetrachloroethane	4,800 ca	5	8260	YES
1,1,2,2-tetrachloroethane	900 ca	5	8260	YES
tetrachloroethene (PCE)	7,000 ca	5	8260	YES
trichloroethene (TCE)	7,100 ca	5	8260	YES
trichlorofluoromethane	710,000 nc	5	8260	YES
toluene	1,900,000 nc	5	8260	YES

TABLE 3-3
LABORATORY REPORTING LIMITS AND APPENDIX IX CONSTITUENTS LIST

40 CFR 264 APPENDIX IX HAZARDOUS CONSTITUENT	USEPA Region 5 Data Quality Limit (DQL) [1] Soil (ug/kg)	Savannah's Reporting Limit [2,3] Soil (ug/kg)	method	Is Reporting Limit Below Region 5 DQL ?
vinyl chloride	5.2 ca	10	8260	NO ← NOT SIGNIFICANT
vinyl acetate	65,000,000 nc	10	8260	YES
xylenes (total)	980,000 sat	10	8260	YES
SEMI-VOLATILE COMPOUNDS				
4-aminobiphenyl	NA	330	8270	
acetophenone	5,600,000 nc	330	8270	YES
2-acetylaminofluorene (2-AAF)	NA	330	8270	
a,a-dimethylphenethylamine	NA	330	8270	
aniline	19,000 nc	330	8270	YES
aramite	18,000 ca	330	8270	YES
benzenethiol	780	660	8270	YES
benzyl alcohol	20,000,000 nc	330	8270	YES
bis (2-chloroethyl) ether	74 ca	330	8270	NO
bis (2-ethylhexyl) phthalate	32,000 ca	330	8270	YES
bis (2-chloro-1-methylethyl) ether	6,300 ca	330	8270	YES
bis (2-chloroethoxy) methane	NA	330	8270	
4-bromophenyl phenyl ether	NA	330	8270	
butylbenzyl phthalate	13,000,000 nc	330	8270	YES
p-chloroaniline	260,000 nc	660	8270	YES
2-chloronaphthalene	5,200,000 nc	330	8270	YES
2-chlorophenol	330,000 nc	330	8270	YES
4-chlorophenyl phenyl ether	NA	330	8270	
p-chloro-m-cresol	NA	330	8270	
o-cresol	3,300,000 nc	330	8270	YES
m-cresol	3,300,000 nc	330	8270	YES
p-cresol	330,000 nc	330	8270	YES
diallate	NA	330	8270	
dibenzofuran	260,000 nc	330	8270	YES
2,4-dichlorophenol	200,000 nc	330	8270	YES
2,4-dimethylphenol	1,300,000 nc	330	8270	YES
2,4-dinitrophenol	130,000 nc	1,700	8270	YES
2,6-dichlorophenol	NA	330	8270	
diethyl phthalate	52,000,000 nc	330	8270	YES
dimethoate	NA	330	8270	
7,12-dimethyl-benz(a)anthracene	NA	330	8270	
dimethyl phthalate	$> 1 \times 10^8$	330	8270	YES
p-(dimethylamino)-azobenzene	NA	330	8270	
diphenylamine	1,600,000 nc	330	8270	YES
2,4-dinitrotoluene	130,000 nc	330	8270	YES
2,6-dinitrotoluene	65,000 ca	330	8270	YES
di-n-butyl phthalate	NA	330	8270	
di-n-octyl-phthalate	1,300,000 nc	330	8270	YES
3,3'-dichlorobenzidine	990 ca	660	8270	YES
m-dinitrobenzene (1,3-DNB)	6,500 nc	330	8270	YES
3,3'-dimethylbenzidine	48 ca	660[7]	8270	NO
4,6-dinitro-o-cresol	NA	1,700	8270	
1,4-dioxane	14,000 ca	330	8270	YES
ethyl methane sulfonate	NA	330	8270	
famphur	NA	330	8270	
hexachlorobenzene	280 ca	330	8270	NO ← NOT SIGNIFICANT
hexachlorobutadiene	5,700 ca	330	8270	YES
hexachlorocyclopentadiene	450,000 nc	330	8270	YES
hexachloroethane	32,000 nc	330	8270	YES
hexachloropropene	NA	330	8270	

TABLE 3-3
LABORATORY REPORTING LIMITS AND APPENDIX IX CONSTITUENTS LIST

40 CFR 264 APPENDIX IX HAZARDOUS CONSTITUENT	USEPA Region 5 Data Quality Limit (DQL) [1] Soil (ug/kg)	Savannah's Reporting Limit [2,3] Soil (ug/kg)	method	Is Reporting Limit Below Region 5 DQL ?
hexachlorophene	20,000 nc	20,000[7,8]	8270	NO
isophorone	470,000 ca	330	8270	YES
isosafrole	NA	330	8270	
kepone	NA	330	8270	
3-methylcholanthrene	NA	330	8270	
1-methylnaphthalene	NA	330	8270	
2-methylnaphthalene	NA	330	8270	
methapyrilene	NA	6600[7]	8270	
methyl methanesulfonate	NA	330	8270	
1,4-naphthoquinone	NA	330	8270	
1-naphthylamine	NA	330	8270	
SEMI-VOLATILE COMPOUNDS				
2-naphthylamine	NA	330	8270	
4-nitroquinoline-1-oxide	NA	3,300	8270	
5-nitro-o-toluidine	NA	330	8270	
N-nitrosodi-n-butylamine	82 ca	330	8270	NO
N-nitrosodi-n-propylamine	63 ca	330	8270	NO
N-nitrosodiethylamine	3 ca	330	8270	NO
N-nitrosodimethylamine	8.7 ca	330	8270	NO
N-nitroso-n-methylethylamine	20 ca	330	8270	NO
N-nitrosodiphenylamine	91,000 ca	330	8270	YES
N-nitrosomorpholine	NA	330	8270	
N-nitrosopiperidine	NA	330	8270	
N-nitrosopyrrolidine	210 ca	330	8270	NO
nitrobenzene	33,000 nc	330	8270	YES
o-nitroaniline	3,900 nc	1,700	8270	YES
m-nitroaniline	NA	1,700	8270	
p-nitroaniline	NA	1,700	8270	
o-nitrophenol	NA	330	8270	
p-nitrophenol	NA	1,700	8270	
pentachlorobenzene	52,000 nc	330	8270	YES
pentachlorophenol	2,500 ca	1,700	8270	YES
p-phenylenediamine	12,000,000 nc	1,700	8270	YES
pentachloronitrobenzene	1,700 ca	330	8270	YES
phenacetin	NA	330	8270	
phenol	39,000,000 nc	330	8270	YES
2-picoline	NA	330	8270	
pronamide	NA	330	8270	
pyridine	65,000 nc	330	8270	YES
quinoline	NA	660	8270	
safrole	NA	330	8270	
1,2,4-trichlorobenzene	620,000 nc	330	8270	YES
2,4,5-trichlorophenol	6,500,000 nc	330	8270	YES
2,4,6-trichlorophenol	40,000 ca	330	8270	YES
1,2,4,5-tetrachlobenzene	20,000 nc	330	8270	YES
2,3,4,6-tetrachlorophenol	2,000,000 ca	330	8270	YES
o-toluidine	NA	330	8270	
o,o,o-triethyl phosphorothioate	NA	330	8270	
sym-trinitrobenzene	NA	330	8270	
POLYNUCLEAR AROMATIC HYDROCARBONS[4]				
acenaphthene	360,000 sat	50	8310	YES
acenaphthylene	NA	20	8310	
anthracene	19,000 sat	4	8310	YES

TABLE 3-3
LABORATORY REPORTING LIMITS AND APPENDIX IX CONSTITUENTS LIST

40 CFR 264 APPENDIX IX HAZARDOUS CONSTITUENT	USEPA Region 5 Data Quality Limit (DQL) [1] Soil (ug/kg)	Savannah's Reporting Limit [2,3] Soil (ug/kg)	method	Is Reporting Limit Below Region 5 DQL ?
benzo(a)anthracene	610 ca	4	8310	YES
benzo(a)pyrene	61 ca	4	8310	YES
benzo(b)fluoranthene	610 ca	4	8310	YES
benzo(k)fluoranthene	6,100 ca	4	8310	YES
benzo(g,h,i)perylene	NA	10	8310	
chrysene	24,000 sat	4	8310	YES
dibenz(a,h)anthracene	61 ca	10	8310	YES
fluoranthene	2,600,000 nc	10	8310	YES
fluorene	300,000 sat	10	8310	YES
indeno (1,2,3-cd) pyrene	610 ca	10	8310	YES
naphthalene	800,000 sat	20	8310	YES
phenanthrene	NA	4	8310	
pyrene	2,000,000 nc	10	8310	YES
METALS/WET CHEMISTRY				
* **antimony**	31,000 nc	2,000	6010B	YES
* **arsenic** [5]	320 ca	1,000	6010B	NO
* **barium**	5,300,000 nc	1,000	6010B	YES
* **beryllium** [5]	140 ca	400	6010B	NO
* **cadmium**	38,000 nc	500	6010B	YES
* **chromium** [6]	210,000 ca	1,000	6010B	YES
cobalt	NA	1,000	6010B	
copper	2,800,000 nc	2,000	6010B	YES
* **lead**	400,000 nc	500	6010B	YES
* **mercury**	23,000 nc	20	7471	YES
nickel	1,500,000 nc	4,000	6010B	YES
* **selenium**	380,000 nc	1,000	6010B	YES
silver	380,000 nc	1,000	6010B	YES
thallium	6,100 nc	1,000	6010B	YES
tin	46,000,000 nc	5,000	6010B	YES
* **vanadium**	540,000 nc	1,000	6010B	YES
* **zinc**	23,000,000 nc	2,000	6010B	YES
cyanide	1,600,000 nc	1,000	9010B	YES
sulfide	NA	10,000[7]	9030B(9034)	

*** Metals to be tested at SWMU V**

Notes:

(1) RCRA Data Quality Levels Memorandum-Update 1, U.S. EPA - Region 5, Dec. 14, 1995.

ca = carcinogenic effects

nc = noncarcinogenic effects

sat = chemical saturation concentration

(2) The laboratory must be able to demonstrate that their experimentally determined Method Detection Limit (MDL) is less than their reporting limit (the numeric value associated with non-detectable results, generally 3 to 5 times higher than the MDL). Reporting Limits are generally at least 3 to 5 times higher than the estimated detection limits contained in USEPA SW-846, Third Edition, including Updates I, II, and IIA, January 1998. Reporting limits listed may not always be attainable with site samples due to potential matrix interferences.

(3) See **Attachment 1 - Table 5.2** for Savannah's "MDLs and PQLs for Solids and Semisolids".

(4) This list of PAHs do not have toxicity values, or Region 5 data quality limits for benzo(g,h,i)perylene, and phenanthrene.

(5) Required reporting limits for arsenic and beryllium are based on estimated detection limits from U.S. EPA SW-846, Third Edition, including Updates 1, 2, and 2A, September 1994, and an evaluation of method detections limits provided by analytical laboratories. These values assume a solution value adjusted to 1 gram of solid sample and 200 mL of final digestate volume. It is acceptable for the laboratory to adjust their final digestate volume to 100 mL in order to meet the Required Reporting Limit.

(6) Data quality objective for chromium is based on 1/6 ratio of chromium VI to chromium III.

(7) Project specific reporting limits were developed for certain compounds in order to achieve a more desirable limit: Trans-1,4-dichloro-2-butene, 3,3'-Dimethylbenzidine, Hexachlorophene, Methapyrilene, Sulfide, and Total Organic Carbon, all of which satisfy the requirement in footnote (2).

(8) Exhibits non-reproducible chromatographic behavior.

NA = not available

SECTIONFOUR Field Investigation Results, Laboratory Analysis and Screening Risk Evaluation

4.1 OVERVIEW OF INVESTIGATION AND EVALUATION METHODOLOGY

4.1.1 General Physical Characterization

The objectives of the Phase I and II investigations (1990 - 1992) were to obtain data concerning potential releases from SWMUs S, T and V for characterization purposes, and to provide data for a health and environmental assessment, as needed. A total of 23 test pits and 29 soil borings and groundwater wells were drilled/excavated and sampled for SWMUs S, T, and V.

The Phase III sampling program was performed in 1999 to further characterize the nature and extent of releases from SWMUs S, T, and V based on USEPA comments. Seven soil borings (300 through 306) at SWMU S, 14 borings (319 through 337) at SWMU T, and 8 borings (358 through 370) at SWMU V were drilled and soil samples were collected. One groundwater sample was collected from an existing monitoring well at SWMU T. The sampling rationale was in accordance with the work plan and DQOs. Refer to **Appendix A** for a summary of the Phase III sampling program.

Soil samples were field screened for VOCs to help characterize soils and help make sample selections for analysis. Samples were screened using a photoionization detector (PID) with a 10.2 Electron Volt (eV) lamp. Soil samples were placed inside plastic Ziploc®-type bags. After approximately 10 to 15 minutes, the tip of the meter was placed inside the bag and the VOC concentration in the headspace was measured. PID results ranged from 0 part per million (ppm) (non-detect) to 4,518 ppm and were recorded on the boring logs. Refer to **Table 3-1** for a summary of the sample PID results and the boring logs in **Appendix A** for all other PID results[1].

Soil samples for background purposes were collected during the Corrective Measures Study (CMS) for SWMU U/AB and analyzed for metals and PAHs. The metals results were used for comparison to the SWMUs S and T sand samples. Background soil samples were also collected as part of the Phase I and II RFI investigations. Both sets of data were compiled using the upper tolerance level (UTL) method (IEPA, 1997). The UTL or the maximum concentration for each metal was considered the background level, as appropriate. See the table below for a brief summary of background results. Refer to **Appendix A, Table A-1**, for a more detailed summary of background data and methodology.

[1] Based on analytical results, some peak readings (*) were determined to be anomalous, and the result of a malfunctioning PID.

BACKGROUND CONCENTRATIONS

	UNITS	SWMU V	SWMUs S & T	
		CLAY	CLAY	SAND
Antimony, Total	mg/kg	6.0	6.0	1.3
Arsenic, Total	mg/kg	4.9	7.0	4.2
Barium, Total	mg/kg	115.0	438.0	126.9
Beryllium, Total	mg/kg	0.5	0.7	1.1
Cadmium, Total	mg/kg	0.5	1.9	3.4
Chromium, Total	mg/kg	20.9	15.3	14.2
Cobalt, Total	mg/kg	6.6	13.2	34.3
Copper, Total	mg/kg	NA	NA	17.1
Lead, Total	mg/kg	17.6	6.8	45.6
Mercury, Total	mg/kg	0.1	0.2	0.4
Nickel, Total	mg/kg	15.6	53.5	19.3
Selenium, Total	mg/kg	1.0	2.0	0.4
Vanadium, Total	mg/kg	22.4	31.5	31.0
Silver, Total	mg/kg	1.0	NA	0.3
Zinc, Total	mg/kg	66.2	NA	83.7
Cyanide	mg/kg	0.5	0.5	NA
Sulfide, Total	mg/kg	0.5	NA	NA

APPEARS NORMAL

4.1.2 Chemical Characterization

This section presents the results of the laboratory testing of samples. Data were validated in accordance with USEPA guidelines and the DQAP. The data qualifiers used in the tables discussed in this section are defined below.

J The associated value is an estimated quantity.

UJ The parameter was analyzed for, but was not detected. The sample reporting limit is an estimated quantity.

Phase III and historical data are combined for the data presentation in this section. In a few cases, soil samples were collected from monitoring wells installed during the Phase II RFI. These data were reported in the Phase II RFI Report (WRRC, 1995) but were not shown in the summary tables in this report. These data were, however, considered when evaluating the data for this report and the "Nature and Extent of Releases and Risk Screening" sections contain references to these samples, as warranted. The results are presented for three depths intervals: surface (0 to 1 ft); shallow subsurface (>1 to 5 ft);

and deep subsurface (>5 ft to water table). The discussion in the sections below contains the findings for each depth interval (constituents detected) for VOCs, SVOCs, PAHs, TPH, and inorganics.

4.1.3 Nature and Extent of Releases and Risk Screenings

After the Phase III data were reviewed for quality, they were combined with the historical data. Detected analytes within each group were compared with background values and conservative soil health-based screening levels. The screening levels used were IEPA's TACO Tier 1 soil remediation objectives for the industrial/commercial land use scenario. For SWMUs S and V, the screening levels used were the lower of the soil ingestion and soil inhalation values (for the general site or construction workers). For SWMU T, screening levels were the lower of the above soil values or the soil component of the groundwater ingestion pathway. The basis for this approach was described in Section 2.3. The screening levels used for this evaluation are presented in **Table 4-1.** Selected samples at SWMU V were additionally analyzed via TCLP for select analytes/metals. The results from these samples were compared directly to the relevant Class I groundwater standards. ok

Of the 61 analytes detected in SWMUs S, T, and V, 19 do not have TACO values. These 19 constituents were addressed as follows: for 8 analytes, screening values were obtained from USEPA Region 9's Preliminary Remediation Goals (PRGs) (USEPA, 1999); for 3 analytes, the screening values were obtained from USEPA Region 3's Risk-Based Concentrations (RBCs) (USEPA, 1999); four analyte screening values were verbally obtained from IEPA (IEPA, 2000); and four did not have screening values from these sources. In the screening process, these analytes were retained to be conservative. In addition, cobalt, lead and tin do not have screening values for the pH dependent soil to groundwater pathway (based on Class I water supply). At the Tannery, these constituents were retained to be conservative for that pathway. Table 4-1 includes references for these analytes. The results of the screening are summarized with each SWMU section.

4.2 SWMU S – FORMER WHITE STAR REFINERY

4.2.1 Site and Subsurface Conditions

SWMU S is located in the eastern portion of the West Property (**Figure 1-2**). The former White Star refinery covered an area of approximately 53 acres. The locations of the refinery units and surface impoundments were derived from archive USGS and USDA aerial photos taken shortly after demolition of the refinery, the earliest being 1937. Currently, a large portion of SWMU S is covered

with structures, or is paved with asphalt or gravel. The property is generally flat lying with ground surface elevations roughly at 430 ft, NGVD, with the exception of the tank yard dikes in the southern portions of the SWMU.

The subsurface conditions beneath SWMU S generally consist of the following materials, in descending order: man-placed sandy to gravelly clay fill, alluvial silty clay with local silt zones, and glacial outwash sands. **Figures 4-1** and **4-2** illustrate the generalized subsurface conditions. The surficial fill materials vary in thickness from 1 to 5 ft, generally consisting of gravelly clay, gravel or sand fill with occasional rubble. Beneath the fill is a variable low to medium plastic, soft to stiff alluvial clay unit. The thickness of this unit varies from approximately 10 to 15 ft. In the area of Tanks A-144 and A-148 (southeast portion of SWMU) a 3 to 5 ft thick interval of sand was present beneath the surficial fill and above the clay unit. The sands were stained black and hydrocarbon odors were observed. This area represents a filled impoundment. Wastes from the impoundment were reportedly moved to the SWMU CFG area when the current tanks were constructed (mid 1970s). The outwash unit below the clay extends from a depth of roughly 15 ft to bedrock, estimated in excess of 100 ft. These materials were deposited by meltwater streams emerging from beneath the leading edge of a glacier and, because of this, tend to be well stratified. The upper approximately 20 ft of this unit has been characterized under the RFI. It generally consists of fine to medium grain, poorly graded sand with fine contents generally less than 10 percent. This unit represents the Main aquifer underlying the WRRC and represents the uppermost aquifer beneath SWMU S. The depth to groundwater beneath SWMU S is approximately 30 to 35 ft. Refer to **Appendix A** for a detailed description of the subsurface conditions encountered during Phase III borings.

4.2.2 Chemical Characterization

Phase III work at SWMU S focused on providing additional data in two areas based on USEPA comments: the wastewater treatment plant area; and asphalt storage tank area. Because of the similar nature of the constituents detected in these areas, the chemical characterization presents both areas together. However, the areas are separated for discussion of the nature and extent of releases and screening assessment. In addition, data from the 1993 Alternate Source Demonstration (ASD) (Shell, 1993) were used to supplement Phase III data in the wastewater treatment plant area. Soil samples from the ASD were analyzed for RHCL and Appendix IX organics.

Surface Soil Samples (0 to 1 ft)

A total of 9 surface samples (6 Phase III and 3 historical) were collected from various locations from the 0 to 1 ft depth. **Table 4-2a** summarizes the constituents detected in this interval (samples with detections only). **Table 4-3** summarizes the frequency and range of concentrations for the constituents detected. **Table C-1A** in **Appendix A** summarizes the analytical results for this depth interval and includes sample detection limits.

VOCs were detected in 1 of the 9 samples. Ethylbenzene, methyl ethyl ketone (2-butanone), toluene, and xylenes were detected in one sample at concentrations of 82 μg/kg, 37 μg/kg, 23μg/kg, and 66 μg/kg, respectively.

No SVOCs were detected in any of the 9 samples.

PAHs were detected in 7 of the 9 samples. Detected constituents include anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene. The concentrations of detected constituents ranged from 14.2 μg/kg (benzo(a)anthracene) to 21,000 μg/kg (phenanthrene). Not all 12 constituents were detected in each of the 9 samples.

All of the samples contained metals with concentrations ranging from 0.1 mg/kg (beryllium) to 230 mg/kg (barium). Constituents identified include arsenic, barium, beryllium, cadmium, chromium, cobalt, lead, mercury, nickel, vanadium and zinc. Not all 11 constituents were detected in each of the 9 samples.

Shallow Subsurface Soil Samples (>1 to 5 ft)

A total of 16 (3 Phase III, 6 Alternate Source Demonstration, and 7 historical) samples were collected from various locations from this depth interval. **Tables 4-2a and 4-2b** summarize the constituents detected in this interval (samples with detections only). **Table 4-3** summarizes the frequency and range of concentrations for detections. **Table C-1A** in **Appendix A** summarizes the analytical results for this depth interval and includes sample detection limits.

VOCs were detected in 10 of the 16 samples. Detected constituents include 1,1,1-trichloroethane, 1,2-dichloropropane, 2-hexanone, benzene, carbon disulfide, ethylbenzene, methyl ethyl ketone (2-butanone), methyl isobutyl ketone (4-methyl-2-pentanone), methylene chloride (dichloromethene), toluene and xylenes. Some of these may be laboratory related. Not all twelve constituents were detected in each of the 16 samples. The concentrations ranged from 1.0 μg/kg (benzene) to 4,400 μg/kg (xylenes).

SVOCs were detected in 7 of the 16 samples. Detected constituents include 1-methylnaphthalene, 2-methylnaphthalene, acetophenone, benzenethiol, bis(2-ethylhexyl)phthalate, dibenzofuran, di-n-octyl-phthalate, n-nitrosodiphenylamine, and phenol. Not all nine constituents were detected in each of the sixteen samples. The concentrations ranged from 110 μg/kg (di-n-octyl-phthalate) to 13,000 μg/kg (1-methylnaphthalene).

Thirteen of the 16 samples tested contained PAHs, with concentrations ranging from 9.6 μg/kg (anthracene) to 20,000 μg/kg (pyrene). Compounds detected include acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene. Not all fifteen constituents were detected in each of the sixteen samples.

All historical and Phase III samples tested identified metals/inorganics (Alternate Source Demonstration samples were not tested for inorganics), with concentrations ranging from 0.28 mg/kg (mercury) to 263 mg/kg (barium). Constituents detected include arsenic, barium, beryllium, cadmium, chromium, cobalt, lead, mercury, nickel, vanadium, and zinc. Not all eleven constituents were detected in each of the ten samples.

Deep Subsurface Soil Samples (>5 ft)

Thirty-three samples (12 Phase III, 12 Alternate Source Demonstration, and 9 historical) were collected from various locations from the >5 ft depth interval. **Tables 4-2a and 4-2b** summarize the constituents detected in this depth interval (samples with detections only). **Table 4-3** summarizes the frequency and range of concentrations for detections. **Table C-1A** in **Appendix A** summarizes the analytical results for this depth interval and includes sample detection limits.

Fifteen of the 33 samples tested contained VOCs, with concentrations ranging from 1.1 µg/kg (carbon disulfide) to 1,700 µg/kg (methylene chloride). Constituents identified include 1,2,3-trichloropropane, 2-hexanone, benzene, carbon disulfide, ethylbenzene, methyl ethyl ketone (2-butanone), methyl isobutyl ketone (4-methyl-2-pentanone), methylene chloride (dichloromethene), toluene and xylenes. Some of these may be laboratory related. Not all ten constituents were detected in each of the thirty-three samples.

Twelve of the 33 samples tested contained SVOCs, with concentrations ranging from 54 µg/kg (1-methylnaphthalene) to 76,000 µg/kg (2-methylnaphthalene). Compounds identified include 1-methylnaphthalene, 2-methylnaphthalene, 4-methylphenol (p-cresol), dibenzofuran, di-n-octyl-phthalate, and phenol. Not all six constituents were detected in each of the thirty-three samples.

Fourteen of the 33 samples tested contained PAHs, with concentrations ranging from 4.2 µg/kg to 26,000 µg/kg (both phenanthrene). Compounds identified include acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene. Not all fourteen constituents were detected in each of the 33 samples.

All 21 historical and Phase III samples tested identified metals/inorganics (Alternate Source Demonstration samples were not tested for inorganics), with concentrations ranging from 0.039 mg/kg (mercury) to 290 mg/kg (barium). Constituents detected include arsenic, barium, beryllium, cadmium, chromium, cobalt, lead, mercury, nickel, vanadium, and zinc. Not all eleven constituents were detected in each of the 21 samples.

4.2.3 Nature and Extent of Releases and Risk Screening

Wastewater Treatment Plant Area

The photo below depicts the general wastewater treatment plant area looking south across Ponds 1 and 2 toward the asphalt storage tank area.

In August 1993, soil samples were collected and analyzed as part of the ASD. These soil samples were collected in the vicinity of Ponds 1 and 2. The ASD and Phase III borings judged to be within the WWTP area include: 1, 2, 3, 4, 5, 6, 304, 305, and 306. There was also one soil sample collected from monitoring well P-118 from a depth of 12 ft. Analytical results identified primarily PAHs, with fewer numbers (and concentrations) of VOCs, SVOCs and inorganics.

The characteristics of the far eastern portion of the SWMU (represented by Borings 304 and 305), and the far western portion (represented by monitoring well P-118) are somewhat different from the central portion and are discussed separately.

The central portion is the area around Pond 1 and Pond 2, and is primarily represented by results from the ASD borings. The highest detections were generally found in the sample from Boring 2 at a depth of 8 ft. A few VOCs and various PAHs were detected, including (but not limited to): xylenes (98 μg/kg); benzo(a)pyrene (2,200 μg/kg); chrysene (6,500 μg/kg); 1-methylnaphthalene (49,000 μg/kg); and phenanthrene (26,000 μg/kg). A deeper sample from this boring, at a depth of 32 ft, included detections of 1-methylnaphthalene (54 μg/kg) and phenanthrene (65 μg/kg). Samples

below depths of approximately 12 ft are infrequent, but the available data indicate that concentrations decrease to low part per billion (ppb) levels for constituents of concern. Samples from borings in this area had four exceedances of the Tier 1 soil objectives for benzo(a)pyrene and one exceedance of 1,2,3-trichloropropane (**Table 4-4**) out of 19 samples. Each of the exceedances occurred within the upper 8 ft. These exceedances are not significant given that the degree of exceedances was low (i.e., less than five times the screening level), the screening levels are based on a highly conservative 10^{-6} risk, and the potential for routine exposure is low.

The far western portion of the area is represented by one sample from well P-118. The sample was collected at a depth of 12 ft, which represents the base of the clay interval in that area. The sample contained one VOC, toluene, at 5.9 μg/kg and various PAHs, such as chrysene (1,300 μg/kg), phenanthrene (3,700 μg/kg), and pyrene (1,700 μg/kg). These detections were all well below the corresponding Tier 1 objectives.

The far eastern portion of the SWMU is represented by Borings 304 and 305. In Boring 304, samples were collected from depths of 1, 4, and 20 ft. PAHs were detected in each sample, with the highest concentration being detected in the sample from 4 ft. Detections included benzo(a)anthracene (280 μg/kg) and chrysene (400 μg/kg). In the sample from a depth of 20 ft, concentrations ranged from 6.9 μg/kg (benzo(a)pyrene) to 150 μg/kg (phenanthrene). In Boring 305, samples were collected from depths of 1, 4, and 14 ft. Several PAHs were detected in each sample. In the sample from 1 ft, concentrations ranged from 6.8 μg/kg (benzo(k)fluoranthene) to 73 μg/kg (pyrene). Lead was detected in this sample at a concentration of 40 mg/kg. Concentrations in the sample from 4 ft ranged from 9.6 μg/kg (anthracene) to 93 μg/kg (pyrene). Lead was also detected in this sample at a concentration of 160 mg/kg. The sample from a depth of 14 ft contained PAHs ranging from 56 μg/kg (benzo(b)fluoranthene) to 2,000 μg/kg (pyrene). This sample also contained BTEX at concentrations of 20 μg/kg, 18 μg/kg, 160 μg/kg and 310 μg/kg, respectively. Borings 304 and 305 did not extend past a depth of 20 ft because water entered the borings. This is interpreted to be a localized condition, as the regional groundwater surface is located at a depth of 30 to 35 ft in this area. The residual hydrocarbons (e.g., PAHs) present in these soils are likely attributable to operations of the former White Star refinery. There were no Tier 1 exceedances for organics from these borings. Samples from Boring 305 had exceedances for arsenic and beryllium only (4 and 14 ft) (**Table 4-4**). The arsenic results were less than two times the background concentration. Beryllium results exceeded Tier 1 value in two of the six samples.

In summary, the results from the comparison of the wastewater treatment plant area samples to the conservative screening values indicate that the area does not pose a human health concern.

Asphalt Storage Tank Area

The photo below depicts the eastern portion of the asphalt storage tank area.

The asphalt storage tank area historical and Phase III borings include: 9, 10, 11, 12, 13, 14, 15, 16, 300, 301, 302, and 303. Historical constituents of concern included mostly PAHs and a few VOCs and SVOCs. This is consistent with the known use of the area (e.g., asphalt product storage). USEPA's main recommendation for this area was to supplement previously collected data by obtaining additional samples within the clay layer (approximately 5 to 15 ft below ground surface). Some Phase III borings were located in the vicinity of historical locations to obtain deeper samples.

Samples from borings in tank areas A-44 and A-152 were non-detect for organics (sample depths 3 and 23 ft, and 1 and 15 ft, respectively). Inorganics were generally within the background range. As such, no further action is warranted for these areas.

In the Tank A-50 area, various PAHs and one VOC were detected, primarily in the upper approximately 6 ft, but also in samples to a depth of 18 ft (deepest sample collected). Inorganics were generally within the background range. The highest concentrations occurred in a sample from Boring 14 from a depth of 4 ft (1-methylnaphthalene [13,000 μg/kg], naphthalene [5,100 μg/kg], phenanthrene [3,500 μg/kg], xylenes [6 μg/kg]). A sample from a depth of 6 ft contained various PAHs at concentrations ranging from 11 to 110 μg/kg. A sample from Boring 14 at a depth of 15 ft was non-detect for organics. A sample from a depth of 18 ft (Boring 300) contained two PAHs, anthracene (11μg/kg) and phenanthrene (4.2 μg/kg). The organics detected were all below the applicable Tier 1 soil screening levels. The concentrations of arsenic and beryllium are close to or just above background/TACO values (i.e., within approximately two times) and do not pose a concern (**Table 4-4**). These screening results indicate that no further action is warranted in this tank area.

One boring was drilled and sampled in the Tank A-146 yard (Boring 10). The results indicated detections of chrysene and pyrene at a depth of 3 ft (4,600 μg/kg and 5,900 μg/kg, respectively). A sample from a depth of 20 ft was non-detect for organics. Inorganics were generally within the background range for both samples. Based on a review of the soil boring log for Boring 10 and the analytical results from Boring 301 (located to the east in the adjacent tank yard), it is expected that the concentrations would decrease to the low ppb range within the upper 10 ft. None of the detected concentrations exceed the Tier 1 screening levels, therefore no further action is warranted for this tank area.

Historically, the area occupied by tank yards A-148, A-144 and A-147 contained several relatively small impoundments. As indicated previously, wastes from these areas were removed when the current tanks were constructed in the 1970s. Sample results from soil borings in these areas are indicative of residuals from the past uses. In the Tank A-148 yard, the highest organic concentrations are within the upper 5 ft (e.g., chrysene, 15,000 μg/kg; phenanthrene, 21,000 μg/kg; ethylbenzene, 730 μg/kg; and xylenes, 4,400 μg/kg). Concentrations in a sample from a depth of 8 ft were significantly lower (e.g., anthracene 6.8 μg/kg , chrysene 12 μg/kg). A few PAHs were detected in samples from depths of 20 and 21 ft, at concentrations similar to those in the sample from 8 ft. Samples from the Tank A-147 yard were similar to those from the A-148 yard in that PAHs, primarily, were detected to the depths explored (samples from 22 and 24 ft in two borings). The highest concentration was chrysene from a depth of 4 ft in Boring 303 (410 μg/kg). The results

of samples from below this depth were near or below 100 µg/kg. In general, constituent concentrations decrease with depth. One soil boring was drilled in the Tank A-144 yard. The results of samples from depths of 3 and 23 ft only detected xylenes at concentrations of 28 and 6.2 µg/kg. One soil sample was collected from a depth of 6 ft during the drilling of monitoring well P-119. No organics were detected, however, the reporting limits were elevated (e.g., 14,000 µg/kg for SVOCs and PAHs). Lead was detected in this sample at a concentration of 848 mg/kg. Aside from this result, inorganics results were generally within the background range. None of the organics were detected at concentrations exceeding the Tier 1 values. As with the other areas, arsenic and beryllium were only slightly above the background/Tier 1 (**Table 4-4**) values. These results support a no further action determination for this area.

In summary, there were very few exceedances of the Tier 1 screening levels, only arsenic, beryllium and lead. The degree of exceedances for arsenic and beryllium were low and could be considered background. The lead result is anomalous with respect to other samples from the area. Overall, this area does not pose a significant threat to human health. Agree

4.3 SWMU T - FORMER INTERNATIONAL SHOE COMPANY TANNERY

4.3.1 Area-Wide Overview

4.3.1.1 Overview of Physical Characterization

SWMU T is located in the western portion of the West Property (**Figure 1-3**). The Tannery generally consisted of numerous single and multi-story process buildings and storage facilities. A schematic of the former facility is shown in **Figure 4-3**. This figure was compiled from fire insurance maps drafted in 1920, 1928, 1947, 1953, and 1958.

The subsurface conditions beneath the Tannery are substantially different from those beneath other portions of the WRRC. The deposits beneath the Tannery area appear to represent a meander cutoff of the ancestral Mississippi River. A meander cutoff is a portion of a floodplain which was previously occupied by the river channel. As the channel migrates, the meander portion is cut leaving an abandoned channel. The resulting abandoned channel is slowly filled with sediment during flood events. Sand-size materials are deposited near the channel; grain size decreases away from the channel. As floodwaters recede, suspended silt and clay particles settle above and beyond

the sand size material. The meander valley itself was carved through the valley fill materials, a uniform glacial outwash sand deposit, which underlies the Wood River area.

The deposits beneath the tannery generally consist of approximately 15 to 45 ft of complex, interbedded fine-grain silt and clay soils overlying the main sands. The upper sequence is typically composed of approximately 10 ft of silty clay overlying approximately 10 ft of variable clay, silt and fine sand. The fine sand and silt intervals yield water to monitoring wells and have been designated informally as the Rand Sand aquifer (ES, 1990). The Rand is underlain by a 3 to 6 ft thick silty clay. A second waterbearing zone occurs beneath the clay unit. This fine-grain silty sand is informally named the EPA sand for an EPA well which is reportedly screened across a sandy zone between the Rand and the Main regional aquifer. The thickness of the EPA is not well defined but is believed to be on the order of 5 to 10 ft. Underlying the EPA is a 2 to 3 ft thick clay unit which separates the EPA from the underlying outwash sand. The outwash sand extends from a depth of approximately 40 ft to bedrock. This unit is characterized by fine to medium-grain, well sorted sands with very little fines. Within this unit is the Main regional groundwater aquifer, informally named the Main aquifer. **Figures 4-4** and **4-5** illustrate the general subsurface conditions beneath the SWMU. Refer to **Appendix A** for a detailed description of subsurface conditions encountered in Phase III borings. Additional information on the subsurface conditions is contained in the Phase II RFI Final Report (WRRC, 1995).

4.3.1.2 Overview of Chemical Characterization

This section provides a tannery-wide overview of the analytical results for Phase I, II and III samples. Subsequent sections focus on the specific sub-areas of concern.

Surface Soil Samples (0 to 1 ft)

A total of 24 surface samples (19 Phase III and 5 historical) were collected from various locations from the 0 to 1 ft depth. Samples were analyzed for parameters based on the Phase II results, and included a combination of Appendix IX parameters and TPH. **Table 4-5** summarizes the constituents detected in this interval (samples with detections only). **Table 4-6** summarizes the frequency and range of concentrations for the constituents detected. **Table 4-7** summarizes the results of the comparison of site data to Tier 1 screening values. **Table C-2A** in **Appendix C** summarizes the analytical results for this depth interval and includes sample detection limits.

Appendix IX Parameters & TPH.

Five VOCs were detected, including acetone, dichloromethane, methyl ethyl ketone, toluene and trichloroethene. The concentrations of detected constituents ranged from 6.6 µg/kg (toluene) to 190 µg/kg (acetone). These chemicals are commonly used in the analytical process and, as such may be artifacts.

2-Methylnaphthalene was the only SVOC detected, and concentrations ranged between 390 µg/kg and 1,300 µg/kg.

Fourteen PAHs were detected. Detected constituents include acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene and pyrene. The concentrations of detected constituents ranged from 6.6 µg/kg (benzo(a)anthracene) to 22,000 µg/kg (fluoranthene).

Fifteen metals were detected. Detected constituents include arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, sulfide, tin, vanadium, zinc. The concentrations of detected constituents ranged from 0.25 mg/kg (beryllium) to 2,830 mg/kg (zinc).

Hydrocarbons as diesel range organics (DRO) and gasoline range organics (GRO) were detected, at concentrations ranging from 320 to 750 mg/kg (DRO) and 340 to 920 µg/kg for (GRO), respectively.

Shallow Subsurface Soil Samples (>1 to 5ft)

A total of 35 samples (11 Phase III and 24 historical) were collected from various locations from the 1 to 5 ft depth interval. Samples were analyzed for varying combinations of Appendix IX constituents and TPH. **Table 4-5** summarizes the constituents detected in this interval (samples with detections only). **Table 4-6** summarizes the frequency and range of concentrations for the constituents detected. **Table C-2A** in **Appendix C** summarizes the analytical results for this depth interval and includes sample detection limits.

Eight VOCs were detected. Detected constituents include acetone, carbon disulfide, dichloromethane, ethylbenzene, methyl ethyl ketone, toluene, trichloroethene and xylenes. The

concentrations of detected constituents ranged from 5.4 µg/kg (toluene) to 920 µg/kg (ethylbenzene). Some of these may be laboratory related.

No SVOCs were detected at this depth interval.

Sixteen PAHs were detected. Detected constituents include acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene and pyrene. The concentrations of detected constituents ranged from 120 µg/kg (benzo (k) fluoranthene) to 20,000 µg/kg (acenaphthene).

Sixteen inorganics were detected. Detected constituents include antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, cyanide, lead, mercury, nickel, sulfide, tin, vanadium, zinc. The concentrations of detected constituents ranged from 0.031mg/kg (mercury) to 2,270 mg/kg (lead).

Hydrocarbons as TPH (Total Petroleum Hydrocarbons) were detected, ranging in concentration from 76.9 mg/kg to 31,100 mg/kg.

Deep Subsurface Soil Samples (> 5 ft)

A total of 30 samples (19 Phase III and 11 historical) were collected from various locations from the >5 depth interval. **Table 4-5** summarizes the constituents detected in this interval (samples with detections only). **Table 4-6** summarizes the frequency and range of concentrations for the constituents detected. **Table C-2A** in **Appendix C** summarizes the analytical results for this depth interval and includes sample detection limits.

Two VOCs were detected, including acetone and methyl ethyl ketone. The concentrations of detected constituents ranged from 10 µg/kg (methyl ethyl ketone) to 330 µg/kg (acetone). These may be laboratory related.

Three SVOCs were detected. Detected constituents include 2-methylnaphthalene, bis(2-ethylhexyl)phthalate and n-nitrosodimethylamine. The concentrations of detected constituents ranged between 440 µg/kg (2-methylnaphthalene) and 1,300 µg/kg (n-nitrosodimethylamine).

Fourteen PAHs were detected. Detected constituents include anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene and pyrene. The concentrations of detected constituents ranged from 5.4 μg/kg (chrysene) to 14,000 μg/kg (fluoranthene).

Thirteen metals were detected. Detected constituents include arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, sulfide, vanadium, zinc. The concentrations of detected constituents ranged from 0.037 mg/kg (mercury) to 1,100 mg/kg (barium).

Hydrocarbons as TPH, DRO and GRO were detected, ranging in concentration from 76.9 mg/kg to 31,100 mg/kg for TPH, 4.5 mg/kg to 650 mg/kg for DRO and 310 μg/kg (one detection for GRO).

The balance of the section on the Tannery is structured somewhat differently than that for the other SWMUs because the Tannery includes several different areas of potential concern. The section is generally structured based on USEPA comments that broadly addressed "tank" areas and "fill" areas. Within the specific tank or fill areas, the text generally follows the same format as the other SWMUs, i.e., physical characterization, chemical characterization, and nature and extent of releases and risk screening. A few borings were located for risk screening purposes, and were not located in a tank or fill area. The results of samples from these borings were included in the previous section (Overview of Chemical Characterization).

4.3.2 Fill Areas

No further action is necessary in the North Fill area based on comments from USEPA in the work plan request letter dated May 20, 1999. The Phase II RFI Report (WRRC, 1995) includes data associated with this fill area.

4.3.2.1 South Fill Area

The South Fill Area contains Borings 214, 219, 217, 215, 216, 218, 336 and 337. The picture below shows this area, looking south from the main portion of the Tannery.

Borings 336 and 337 were located to be paired with the Phase II Borings 215 and 217, respectively in order to obtain deeper samples.

Two VOCs, acetone and toluene, were detected in the > 1 to 5 ft interval with concentrations ranging from 5.8 µg/kg (toluene) to 13 µg/kg (acetone). Two (2) SVOCs were detected, 2-methylnaphthalene and n-nitrosodimethylamine, in the > 5 ft interval with concentrations ranging from 440 µg/kg (2-methylnaphthalene) to 1,600 µg/kg (n-nitrosodimethylamine). Twelve PAHs were detected in all of the depth intervals (0 to 1 ft, >1 to 5 ft and >5 ft). Detected constituents include anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene and pyrene. The concentrations of detected constituents ranged from 210 µg/kg (anthracene) at 1 ft to 14,000 µg/kg (fluoranthene) at 10 ft. Sixteen metals were detected in all of the depth intervals (0 to 1 ft, >1 to 5 ft and >5 ft). Detected constituents include antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, cyanide, lead,

mercury, nickel, sulfide, tin, vanadium, zinc. The concentrations of detected constituents ranged from 0.037 mg/kg (mercury) to 1,390 mg/kg (zinc).

The constituents that exceed the Tier 1 screening levels for the South Fill area are mostly metals and PAHs (**Table 4-7**). Nearly half of these detections exceed the objectives for the soil component of groundwater ingestion pathway, and would otherwise not exceed if compared to direct contact objectives.

Boring 336 has the only SVOC exceedence, n-nitrosodimethylamine, with a concentration of 1,600 μg/kg at 10 ft. Boring 337 has certain PAHs exceeding the Tier 1 objectives at 10 ft (benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, dibenzo(a,h)anthracene). The PAH detections in the sample from 10 ft appear anomalous. The soil boring log does not reveal any indications of impact or fill placed to this depth. The sample tracking process was reviewed and there are no indications of errors, e.g., switching of samples from 1 and 10 ft. Most samples collected from depths of 1 and 4 ft exceeded the screening level for one or more metals (antimony, arsenic, chromium, cobalt, lead). However, the samples from a depth of 10 ft were at concentrations very close to background (i.e., within two times).

4.3.2.2 East Fill Area

The East Fill Area contains Borings 220, 221, 222, 330 and 331. The picture below shows this area.

Seven VOCs were detected in the >1 to 5 ft and >5 ft intervals. Detected constituents include acetone, carbon disulfide, dichloromethane, methyl ethyl ketone, toluene, trichloroethene, and xylenes. The concentrations of detected constituents ranged from 5.4 µg/kg (xylene) to 170 µg/kg (acetone). No SVOCs were detected. Fourteen PAHs were detected in all of the depth intervals (0- to 1 ft, >1 to 5 ft and >5 ft). Detected constituents include anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene and pyrene. The concentrations of detected constituents ranged from 38 µg/kg (naphthalene) at 10 ft to 1,900 µg/kg (pyrene) at 5 ft. Thirteen metals were detected in all of the depth intervals (0 to 1 ft, >1 to 5 ft and >5 ft). Detected constituents include arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, sulfide, vanadium, and zinc. The concentrations of detected constituents ranged from 0.16 mg/kg (mercury) at 1 ft to 1,100 mg/kg (barium) at 10 ft. Hydrocarbons as DRO and GRO were detected, at concentrations ranging from 920 µg/kg (GRO) at 1 ft to 690 mg/kg (DRO) in the same sample.

The detections associated with Boring 330 may represent fill material to a depth of approximately 10 ft, since this is the general location of the New Split Tannery building (**Figure 4-3**). Samples from

this boring were collected at depths of 1 and 10 ft. Sample results generally included PAHs, TPH and metals. There is no clear pattern to the detections that would suggest a shallow or deep source. This is reasonable if the source is commingled fill placed in the area.

Tier 1 screening levels for the East Fill area samples were exceeded for certain metals (e.g., arsenic, chromium and lead) based principally on the soil to groundwater pathway (**Table 4-7**).

Reservoir Area

The reservoir area is represented by Borings 2, 325, and 325A. Borings 325 and 325A were located to address a possible water reservoir in the East Fill Area. On Figure 4-3, this area is referred to as a *one million gallon reservoir* underneath the Old Split Tannery building. Additional information on the historic Sanborn Fire Insurance maps used to create **Figure 4-3** identifies groundwater production wells supplying this reservoir. Boring 325 encountered refusal at a depth of 11 ft on concrete; this is interpreted to be a basement or rubble at the base of the building. No water was encountered at this depth. No impacts were observed. Boring 325A was offset approximately 25 ft east and drilled to completion at a depth of 18 ft.

No VOCs or SVOCs were detected in soil samples from these borings. Ten PAHs were detected in the 0 to 1 ft depth interval. Detected constituents include anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, phenanthrene and pyrene. The concentrations of detected constituents ranged from 3,300 μg/kg (anthracene) at 1 ft to 22,000 μg/kg (fluoranthene). Fourteen metals were detected in all of the depth intervals (0 to 1 ft, >1 to 5 ft and >5 ft). Detected constituents include arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, sulfide, vanadium, zinc. The concentrations of detected constituents ranged from 0.037 mg/kg (mercury) at 8 ft to 250 mg/kg (barium) at 8 ft. Hydrocarbons as DRO were detected with a concentration of 4.8 mg/kg at a depth of 8 ft. These materials represent fill placed when the structure was demolished.

Tier 1 screening levels were exceeded for a few PAHs (benzo(a)anthracene, benzo(a)pyrene and benzo(b)fluoranthene) and metals (arsenic, cobalt, and lead) (**Table 4-7**). Sulfide and hydrocarbons (DRO) do not have screening values. The PAHs were in a sample from 1 ft and the others were from samples at depths of 8 and 16 ft. Fifty percent of the exceedances were associated with the soil to groundwater pathway. These concentrations are well below the associated direct contact

standards (i.e., ingestion, inhalation), and in some cases may represent background conditions. As such, these results do not pose a significant threat.

4.3.3 Tank Areas

4.3.3.1 Tank 1

An underground storage tank (UST) for gasoline was reportedly located in this area (**Figure 4-3**). Borings 319 and 320 were drilled near Tank 1 (depicted above). Samples were collected from a depth of 12 ft and analyzed for BTEX and TPH. No constituents were detected in the samples. No additional information was obtained to indicate whether a tank in fact was located there. Regardless, the results do not reveal any indications of a release. As such, no further action is needed in this area.

4.3.3.2 Tanks 2 and 3

Tanks 2 and 3 were reportedly a 225 gallon gasoline UST and 4,100 gallon fuel oil UST, respectively (**Figure 4-6**). The top of Tank 3 is visible at the ground surface. Tank 3 was sounded with a probe rod through an open port (white PVC pipe shown in photo above). The tank was nearly full of water and there were no observable indications of impact (e.g., no sheen, etc.). There appeared to be a few inches of sediment accumulation at the bottom, but there were no indications of impact.

Borings 226, 225, 227, 224, 234, 3, 326 and 327 were drilled around Tanks 2 and 3 (**Figure 4-6**). Samples were collected from depths of 10 ft for Borings 326 and 327 and were analyzed for BTEX and TPH. Samples from Boring 3 were collected from depths of 1 and 15 ft and analyzed for VOCs, SVOCs, metals and PAHs. Samples from Boring 234 were collected from depths of 3 and 16 ft and analyzed for VOCs, SVOCs, metals, PAHs, BTEX and TPH. No analytical samples were collected from Borings 226, 225, 224 and 227. Constituents were detected in samples from borings 3 and 234. Detected constituents include metals and TPH. Nine metals were detected in the depth intervals (0 to 1 ft and >5 ft). Detected constituents include arsenic, barium, beryllium, cadmium, chromium, cobalt, nickel, vanadium, and zinc. The concentrations of metals ranged from 0.45 mg/kg (beryllium) at 15 ft to 228 mg/kg (barium) also at 15 ft. These results are within the background range. TPH was detected with a concentration of 4,930 mg/kg at 3 ft in Boring 234. Phase III samples were collected from a depth of 10 ft in this area and were non-detect for TPH. As such, the TPH result from Boring 234 appears to be a local effect of limited extent. There were no significant exceedances of the Tier 1 screening levels for samples from the Tank 2 and Tank 3 area (**Table 4-7**).

4.3.3.3 Tank 4

Based on historic maps, a 500 gallon gasoline UST was located in this area (**Figure 4-3**). Borings 8, 228, 233, 328 and 329 were drilled in the Tank 4 area (depicted above) (**Figure 4-6**). A sample was collected from Boring 228 from a depth of 4 ft and sampled for BTEX and TPH. Samples were collected from Boring 8 from a depth of 2 and 12 ft and sampled for VOCs, SVOCs, and metals. Samples were collected from Borings 328 and 329 from depths of 1 and 16 ft and sampled for VOCs, SVOCs, PAHs, metals and TPH. No analytical samples were taken from Boring 233.

Two VOCs, acetone and ethylbenzene, were detected in the >1 to 5 ft and >5 ft depth intervals with concentrations of 37 μg/kg (acetone) at 12 ft and 140 μg/kg (ethylbenzene) at 4ft. Two SVOCs, 2-methylnaphthalene and bis(2-ethylhexyl)phthalate, were detected in the 0 to 1 ft and >5 ft depth intervals with concentrations of 390 μg/kg (2-methylnaphthalene), 460 and 470 μg/kg (bis(2-ethylhexyl)phthalate). Ten PAHs were detected in the 0 to 1 ft, >1 to 5 ft, and >5 ft depth intervals. Detected constituents include anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, phenanthrene and pyrene. The concentrations of detected constituents ranged from 5.4 μg/kg (chrysene) at 16 ft to 1,100 μg/kg (pyrene) at 1 ft. Twelve metals were detected in all of the depth intervals (0-1ft, >1-5ft and >5ft). Detected constituents include arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, vanadium, and zinc. The concentrations of detected constituents ranged from 0.04 mg/kg (mercury) at 16 ft to 270 mg/kg (barium) at 1 ft. Hydrocarbons as TPH, DRO and GRO were detected. The concentrations of detected constituents ranged from 320 mg/kg (DRO) at 1 ft to 31,100 mg/kg (TPH) at 4 ft.

No additional information was obtained to indicate whether in fact a UST was located in this area. However, the TPH results suggest that petroleum releases have occurred in this area. The two Phase III borings were drilled to a depth of 16 ft, which is the approximate depth of the Rand waterbearing zone. One of the two samples from these borings was non-detect for petroleum constituents (Boring 329). The other sample contained hydrocarbons as DRO (650 mg/kg) and chrysene (5.4 μg/kg). Most of the Tier 1 exceedances from this area (**Table 4-7**) are metals (arsenic, chromium and lead) and are similar to other samples of the fill in this area (East Fill area). There were no exceedances of organic constituents that would be associated with petroleum releases (e.g., PAHs). Overall, the constituents and concentrations detected do not appear to pose a significant concern based on the current site model.

4.3.3.4 Tanks 5 and 6

Tanks 5 and 6 are each located in the same general area (**Figure 4-6**). Tank 6 is an aboveground tank that is approximately 2,000 gallons in capacity. There is no information regarding its former contents. The Tank 6 area was not sampled during Phase III based on comments from USEPA in the work plan request letter. The Phase II RFI Report (WRRC, 1995) includes data associated with this tank area.

Tank 5 is the area represented by two Stanisol (similar to mineral spirits) tanks (**Figure 4-6**). One of the tanks was reportedly a UST (1,000 gallon). No additional information was obtained regarding this tank. The other tank (1,400 gallon) is an aboveground tank which is still present. The tank is located beneath an open-side dock-high floor and the tank rests on the ground. The tank is visible from the side of the building (depicted above).

Borings 6, 231, 332, 333 and 229 were drilled in the Tank 5 area (**Figure 4-6**). One groundwater monitoring well was installed during Phase II (P-134) and was resampled. Soil samples were collected from Borings 231 and 229 from a depth of 5 ft and analyzed for BTEX and TPH. Samples

were collected from Boring 6 from a depth of 1 and 25 ft and analyzed for VOCs, SVOCs, and metals. Samples were collected from Borings 332 and 333 from depths of 1 and 14 ft and sampled for BTEX, PAHs and TPH.

Three VOCs, acetone, ethylbenzene and methyl ethyl ketone, were detected in the 0 to 1 ft, >1 to 5 ft and >5 ft depth intervals with concentrations of 10 μg/kg (methyl ethyl ketone) at 25 ft and 920 μg/kg (ethylbenzene) at 5 ft. Nine PAHs were detected in the 0 to 1 ft and >5 ft depth intervals. Detected constituents include anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, phenanthrene and pyrene. The concentrations of detected constituents ranged from 7.3 μg/kg (phenanthrene) at 14 ft to 780 μg/kg (pyrene) at 1 ft. Eleven inorganics were detected in all of the depth intervals (0 to 1 ft, >1 to 5 ft and >5 ft). Detected constituents include arsenic, barium, beryllium, cadmium, chromium, cobalt, lead, nickel, sulfide, vanadium, and zinc. The concentrations of detected constituents ranged from 0.38 mg/kg (beryllium) at 16 ft to 184 mg/kg (barium) at 1 ft. Hydrocarbons as TPH, DRO and GRO were detected, at concentrations ranging from 310 μg /kg (GRO) at 14 ft to 510 mg/kg (DRO) at 1 ft.

One groundwater sample was collected and tested for BTEX, PAHs and hydrocarbons as DRO and GRO. No BTEX or PAHs were detected. Hydrocarbons as GRO and DRO were detected with concentrations of 0.056 mg/l and 0.61 mg/l, respectively. These results are comparable with the TPH results obtained during the Phase II RFI (e.g., less than 0.5 mg/l).

The soil analytical results from Borings 332 and 333 indicate releases extend from the Tank 5 area to a depth of approximately 14 ft, which is the depth to groundwater. The concentrations at this depth however are relatively low (i.e., less than 5 mg/kg). These concentrations alone should not pose a concern for this area as no significant levels of hazardous constituents were identified (**Table 4-7**).

4.3.3.5 Tank 7

Tank 7 is an area where three 10,000 gallon aboveground chromate storage tanks were located (remnants of tank cradles depicted above). Borings 4, 323, and 324 were drilled in the Tank 7 area (**Figure 4-6**). One sample was collected from Boring 4 from a depth of 1 ft and analyzed for VOCs, SVOCs, and metals. Samples from Borings 323 and 324 were collected from depths of 4 and 12 ft and analyzed for metals.

Two VOCs, dichloromethane and toluene, were detected in the 0 to 1 ft depth interval with concentrations of 6.6 µg/kg (toluene) and 18 µg/kg (dichloromethane). One SVOC, 2-methylnaphthalene, was detected in the 0 to 1 ft depth interval with a concentration of 560 µg/kg. Seven PAHs were detected in the 0 to 1 ft depth interval. Detected constituents include benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene and pyrene. The concentrations of detected constituents ranged from 430 µg/kg (benzo(a)anthracene) to 1,700 µg/kg (phenanthrene). Twelve metals were detected in all of the depth intervals (0 to 1 ft, >1 to 5 ft and >5 ft). Detected constituents include arsenic, barium,

beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, vanadium, and zinc. The concentrations of detected constituents ranged from 0.031 mg/kg (mercury) at 4 ft to 704 mg/kg (chromium) at 1 ft.

The results from the two Phase III borings in this area show dissimilar results. In Boring 323, chromium was detected in samples from depths of 4 and 12 ft at concentrations of 26 and 400 mg/kg, respectively. In Boring 324 however, chromium was detected in the sample from the 4 ft depth at a concentration of 120 mg/kg, and a concentration of 20 mg/kg in the sample from the 12 ft depth.

Detections of arsenic, beryllium, chromium and lead exceeded the Tier 1 screening levels for this area (**Table 4-7**). The detections of arsenic, beryllium and lead are close to background levels (e.g., within approximately two times). Chromium exceeded the screening level in samples from depths of 1, 4, and 12 ft, each from different borings. However, the samples from the 4 and 12 ft depths only exceeded as a result of the soil to groundwater pathway.

4.4 SWMU V - ACTIVE POLISHING LAGOONS AND DREDGED MATERIAL AREA

This SWMU currently consists of two sub-areas which are related by past waste management practices but are separate in terms of current regulatory status. The Polishing Lagoons are part of the wastewater treatment system; treated water discharges are regulated under WRRC's National Permit Discharge Elimination System (NPDES) permit. The areas north and west of the lagoons contain material from past dredging of the lagoons and also represent the location of a former lagoon. The following sections contain separate discussions for each of these two areas.

What about the history of the lagoons? This would help determine the source of the chromium in the sediments.

4.4.1 Active Polishing Lagoons

4.4.1.1 Physical Characterization

The Polishing Lagoons (depicted above) are tertiary wastewater treatment units. Treated water from the wastewater treatment plant flows by gravity to the Polishing Lagoons prior to discharge to the Mississippi River.

The Polishing Lagoons are located between the Mississippi River and Illinois Route 3 (**Figure 2-1**). The lagoons are on the west side of the flood protection levee, which is adjacent to Route 3. The lagoons are accessed from Route 3 by a private service road which parallels the south side of the lagoons. The lagoons occupy an area of approximately 10 acres. The lagoons consist of two main parallel east-west trending lagoons, approximately 1,000-ft long by 180-ft wide. North-south elongated lagoons, approximately 400-ft long by 30- to 80-ft wide are at either end of the main lagoons. Water enters the north lagoon through influent pipes which connect the lagoon inlet area with the main lagoon. The south lagoon has been blocked and does not receive inflow. At the west

Polishing Lagoons

SOUTH LAGOON NOT IN USE.

end of the main lagoons, water flows through the small western lagoon prior to discharge to the river.

The natural ground surface in the lagoon area is approximate at an elevation of 423 to 425 ft. The top of the dikes surrounding the lagoons is approximate at an elevation of 430 to 435 ft. The water level in the lagoons is at an approximate elevation of 428. The water depth in the north lagoon ranges from approximately 4 to 7.5 ft, (as measured in November 1999) and is deepest toward the western (downstream) end. The sediment thickness varies from approximately 4 ft (east end) to 0.5 ft (west end). The water depth in the south lagoon is approximately 2 ft. The thickness of sediment at the bottom of the south lagoon is approximately 4.5 ft based on measurements from the Phase III borings. **Figure 4-7** depicts the subsurface conditions in the lagoon area.

4.4.1.2 Chemical Characterization

Samples from the lagoons (historical and Phase III) were analyzed for Appendix IX parameters.

Sediment Samples

A total of 11 sediment samples were collected from the north and south lagoons (7 Phase III and 4 historical). **Table 4-8** summarizes the constituents detected (samples with detections only). **Table 4-9a** summarizes the frequency and range of concentrations for the constituents detected. **Table C-3A** in **Appendix C** summarizes the analytical results for the sediment samples and includes sample detection limits.

Seven VOCs were detected. Detected constituents include acetone, benzene, carbon disulfide, ethylbenzene, methyl ethyl ketone, toluene, and xylenes. The concentrations of detected constituents ranged from 38 µg/kg (benzene) to 6,000 µg/kg (acetone). Some of these may analytes be laboratory related.

Two SVOCs, 1-Methylnaphthalene and dibenzofuran, were detected with concentrations of 38,000 µg/kg and 6,400 µg/kg, respectively.

Fifteen PAHs were detected. Detected constituents include acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, dibenzofuran, fluoranthene, fluorene,

phenanthrene and pyrene. The concentrations of detected constituents ranged from 140 µg/kg (benzo(k)fluoranthene) to 15,000 µg/kg (pyrene).

Sixteen metals were detected. Detected constituents include antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, cyanide, lead, mercury, nickel, selenium, sulfide, vanadium and zinc. The concentrations of detected constituents ranged from 0.46 mg/kg (beryllium) to 15,000 mg/kg (chromium).

Soil Samples

A total of 8 soil samples were collected from beneath the active lagoons (all Phase III). **Table 4-8** summarizes the constituents detected (samples with detections only). **Table 4-9a** summarizes the frequency and range of concentrations for the constituents detected. **Table C-3A** in Appendix C summarizes the analytical results for the soil samples and includes sample detection limits.

Two VOCs, acetone and carbon disulfide, were detected with concentrations ranging from 9.1 µg/kg (carbon disulfide) to 94 µg/kg (acetone). These may be laboratory related.

One SVOC, bis(2-ethylhexyl)phthalate, was detected with a concentration of 1,000 µg/kg.

Eleven PAHs were detected. Detected constituents include acenaphthene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, fluoranthene, naphthalene, phenanthrene and pyrene. The concentrations of detected constituents ranged from 5.3 µg/kg (benzo(a)pyrene) to 520 µg/kg (acenaphthene).

Fifteen metals were detected. Detected constituents include antimony, arsenic, barium, beryllium, chromium, cobalt, copper, lead, mercury, nickel, selenium, sulfide, vanadium, and zinc. The concentrations of detected constituents ranged from 0.036 mg/kg (mercury) to 1,100 mg/kg (sulfide).

4.4.1.3 Nature and Extent of Releases and Risk Screening

The data obtained from the active lagoons indicate that the constituents of concern in the sediment have not migrated down into the underlying soil to any significant degree. The sediment thickness in the north lagoon varies from approximately 0.5 ft near the west (influent) end to approximately 4 ft near the east end. In the south lagoon, which currently receives no inflow and received dredged material from the north lagoon in 1997, the sediment thickness is approximately 4.5 ft. The lower

Check THIS!

contact between the sediment and the underlying soils occurs at a depth of approximately 8 ft beneath the water surface in the north lagoon and about 6.5 ft below the water surface in the south lagoon. Since the water surface is lower in the south lagoon, it is believed that the base of the lagoons is at a consistent elevation.

Sediment Depth end

Chromium is the primary chemical of concern in the lagoon sediment, from a concentration standpoint. Chromium concentrations in sediment generally ranged from 3,100 to 4,300 mg/kg. The concentration in the boring from the western end of the north lagoon (367) was relatively higher, 15,000 mg/kg, and appears anomalous relative to the other sediment samples. Aside from the concentration in the sample from Boring 367, there did not appear to be an appreciable difference between the north and south lagoons.

The chromium concentrations decrease distinctly with depth, to near background levels in the native soils beneath the lagoons. For example, in Boring 369, the sediment concentration was 4,200 (at 5 ft). The underlying soil sample from 8 ft yielded 36 mg/kg and the sample from 11 ft, 22 mg/kg. The results from the other locations were similar. These data suggest that the chromium is relatively immobile. Data from leachability testing also support this conclusion. Samples from Borings 367 and 369, which had sediment concentrations of 15,000 and 4,200 mg/kg, respectively, were analyzed for TCLP in the underlying soils from the 11 ft depth and the results for both samples were non-detect (<0.01 mg/l) for chromium (**Table 4-11**). **Figure 4-8** contains a diagram that visually depicts the generalized concentration distribution in a section through the north lagoon.

Don't know about state of Chromium
If hexavalent → human health problems.

As described in Section 2.3, analytical results for soils beneath the lagoons were compared against the Tier 1 screening levels. Significantly, chromium results did not exceed the screening values. The only exceedances were for arsenic and beryllium. In both cases, the detected values were within approximately two times background and the screening values, and these concentrations should not pose a concern. No screening level was available for sulfide. **Table 4-10** contains the screening levels and exceedance information for the detected analytes.

4.4.2 Dredged Spoil and Former Lagoon Areas

4.4.2.1 Physical Characterization

The dredged spoil and former lagoon areas (depicted above) are located north and west of the current lagoons. The configuration of the former lagoon is shown on (**Figures 1-4**). Relics of the northern and western dikes of the former unit are evident in the current site topography. Historic aerial photographs provide a rough measure to estimate the duration the lagoon appeared to be active. The lagoon is believed to have been constructed after 1945 and before 1955 and appears to have become inactive in the mid 1960s. Information on the use of this unit was not readily available.

The ground surface is hummocky over much of the area north and west of the current lagoons. There is no uniform surface water drainage pattern and standing water is common. Debris such as tree branches from past flooding of the river is common. The hummocky topography represents dredged material from the lagoons. The last dredging of the lagoons occurred in 1997 when material

from the north lagoon was placed in the south lagoon. Much of the area is now covered with low-lying vegetation. Small trees are present on the western dike of the former lagoon.

4.4.2.2 Chemical Characterization

Historically, samples from this area were analyzed for a broad suite of parameters (i.e., Appendix IX). Phase III samples were generally analyzed only for metals.

Surface Soil Samples (0 to 1 ft)

A total of 10 samples were collected from the 0 to 1 ft depth (1 Phase III and 9 historical). **Table 4-8** summarizes the constituents detected in this interval (samples with detections only). **Table 4-9b** summarizes the frequency and range of concentrations for the constituents detected. **Table C-3A** in Appendix C summarizes the analytical results for this depth interval (samples with and without detections).

One VOC, toluene, was detected with a concentration ranging from 5 μg/kg to 9.2 μg/kg.

No SVOCs or PAHs were detected.

Fourteen metals were detected. Detected constituents include antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, cyanide, lead, mercury, nickel, selenium, vanadium and zinc. The concentrations of detected constituents ranged from 0.17 mg/kg (mercury) to 13,000 (chromium).

Shallow Subsurface Soil Samples (>1 to 5ft)

A total of 11 samples (all Phase III) were collected from the 1 to 5 ft depth interval. **Table 4-8** summarizes the constituents detected in this interval (samples with detections only). **Table 4-9b** summarizes the frequency and range of concentrations for the constituents detected. **Table C-3A** in **Appendix C** summarizes the analytical results for this depth interval (samples with and without detections).

No VOCs or SVOCs were detected at this depth interval.

Three PAHs were detected. Detected constituents include acenaphthene, benzo(b)fluoranthene, and benzo(g,h,i)perylene. The concentrations of detected constituents ranged from 8.6 µg/kg (benzo(b)fluoranthene) to 1,100 µg/kg (acenaphthene).

Fifteen metals were detected. Detected constituents include antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, cyanide, lead, mercury, nickel, selenium, vanadium and zinc. The concentrations of detected constituents ranged from 0.069 mg/kg (mercury) to 21,000 mg/kg (chromium).

Deep Subsurface Soil Samples (> 5 ft)

A total of 12 samples were collected from various locations from the >5 ft depth interval (all Phase III). **Table 4-8** summarizes the constituents detected in this interval (samples with detections only). **Table 4-9** summarizes the frequency and range of concentrations for the constituents detected. **Table C-3A** in Appendix C summarizes the analytical results for this depth interval (samples with and without detections).

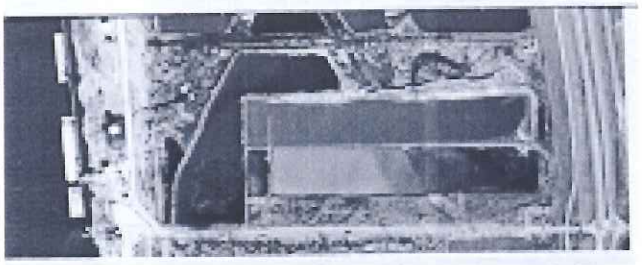
Two VOCs, acetone and methyl ethyl ketone, were detected with concentrations of detected constituents ranging from 45 µg/kg (methyl ethyl ketone) to 150 µg/kg (acetone). These may be laboratory related.

No SVOCs or PAHs were detected at this depth interval.

Fourteen metals were detected. Detected constituents include antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, vanadium, zinc. The concentrations of detected constituents ranged from 0.036 mg/kg (mercury) to 6,400 mg/kg (chromium).

4.4.2.3 Nature and Extent of Releases and Risk Screening

The areas around the active lagoons represent a former lagoon and areas where dredged material were placed. The photo below is from 1964 and shows the former lagoon area. **Figure 1-4** illustrates the approximate boundaries of the former lagoon, based on an aerial photograph.



Phase III borings judged to be within the former lagoon area include: 358, 359, 360, 361, 363 and 364. Construction information on this lagoon is not available. Based on a review of the boring logs, the bottom of the unit appears to be at a depth of approximately 6 to 10 ft below ground surface, which is approximately at an elevation of 417 to 415 ft. This is similar to (i.e., within a few feet) the elevation estimated for the active lagoons. Chromium concentrations in surface and shallow soils (0 to 5 ft) within the former lagoon area ranged from approximately 331 to 21,000 mg/kg. Chromium concentrations for samples collected from a depth of 12 ft, which is below the interpreted base of the former lagoon (from native soil), were near background (21 to 51 mg/kg), with two exceptions. At Boring 359 the lower sample, at 12 ft, contained chromium at 3,100 mg/kg. In Boring 363, the sample at 12 ft contained chromium at 6,400 mg/kg. These areas may represent localized depressions in the lagoon bottom. **Figure 4-8** depicts this area.

OLD LAGOON

Chromium

As with the active lagoon area, data from leachability testing demonstrates that the chromium is not readily leachable. Samples from Borings 360 (12 ft), 363 (4 ft) and 364 (14 ft) were analyzed for selected TCLP metals. The results for chromium in these samples were 0.048 mg/l, 0.017 mg/l, and <0.01 mg/l, respectively (**Table 4-11**).

Samples from two borings, 360 and 364 (within the former lagoon area) were additionally analyzed for organics (VOCs, SVOCs, PAHs) based on USEPA comments. The samples from Boring 360 at the 4 and 12 ft depths were non-detect for these parameters. The sample from Boring 364 at 4 ft contained low ppb levels for three PAHs; the sample from the 14 ft depth contained low ppb levels of acetone and methyl ethyl ketone, which are judged to be laboratory related.

Chromium concentrations in the area north of the active lagoon but outside the former lagoon (dredged material area) tended to follow the same general pattern as in the other areas.

Concentrations in the 0 to 4 ft depth ranged from 1,470 to 5,540 mg/kg. Concentrations at a depth of 12 ft ranged from 22 to 49 mg/kg.

Based on USEPA's request for additional information concerning the nature and extent of mercury in soils (letter dated September 1, 1999), supplemental samples were taken in the northern portion of the SWMU, specifically borings 361 and 362. These two borings showed results at the 4 ft and 12 ft depths, with mercury not exceeding 0.14 mg/kg, which is less than background (0.2 mg/kg). Mercury results outside the lagoons are below 1 mg/kg for 88 percent of the 26 samples. Mercury results did not exceed 6.9 mg/kg, which is well below the Construction-Ingestion (lowest) Tier I screening value (61 mg/kg). The highest concentrations are at depths greater than 5 ft and, and such are believed to be related to tannery activities. Mercury is not currently detected in the refinery wastewater stream (less than 0.0002 mg/l). MERCURY

Analytical data from the former lagoon and dredged material area were compared with Tier 1 screening levels. Refer to Section 2.3 and 4.1.3 for a discussion of the approach used to make the comparison. **Table 4-10** contains the screening levels and exceedance information for the detected analytes. The screening levels were exceeded for antimony, arsenic, beryllium, chromium and lead. The arsenic, antimony and beryllium results are within approximately two times background and should not pose a concern. The lead detections are within two times the screening value, and the frequency of exceedance is low. As such, there does not appear to be a concern with lead. Chromium is the primary constituent of concern. As described earlier, the analytical results indicate that most of the chromium is contained in the waste material (e.g., dredged material, former lagoon sediment) and has not leached into the underlying native soil. The results from two locations (359 and 363) from a depth of 12 ft exceeded the screening level, however it is not clear whether these samples were within or below the former lagoon. OTHER METALS

The nature and distribution of chromium in soils in the areas outside the active lagoons suggests that the primary exposure potential is related to near-surface soils. The results from deep soil samples and TCLP data demonstrate that the chromium is not very leachable, and as such does not represent a concern to groundwater. In summary, the potential migration of chromium to groundwater is an unlikely scenario.

Tables

TABLE 4-1
TIER I SOIL SCREENING LEVELS

Footnote	CHEMICAL	UNITS	INDUST/INGEST	INDUST/INHAL	CONST/INGEST	CONST/INHAL	SOIL/GRDWTR-I & pH
	Volatile Organic Compounds						
	1,1,1-Trichloroethane	ug/kg		1200000		1200000	2000
1	1,2,3-Trichloropropane	ug/kg	3.1				
	1,2-Dichloropropane	ug/kg	84000	23000	1800000	500	30
2	2-Hexanone	ug/kg	82000000				
	Acetone	ug/kg	200000000	100000000	200000000	100000000	
	Benzene	ug/kg	200000	1500	4300000	2100	30
	Carbon disulfide	ug/kg	200000000	720000	20000000	9000	
	dichloromethane (methylene chloride)	ug/kg	760000	24000	12000000	34000	20
	Ethylbenzene	ug/kg	200000000	400000	20000000	58000	13000
1	Methyl ethyl ketone (2-Butanone)	ug/kg	2900000				
1	Methyl isobutyl ketone (4-Methyl-2-penta	ug/kg	28000000				
	Toluene	ug/kg	410000000	650000	410000000	42000	12000
	Trichloroethene	ug/kg	520000	8900	1200000	12000	60
	Xylenes, Total	ug/kg	1000000000	410000	410000000	410000	150000
	Semivolatile Organic Compounds						
3	1-Methylnaphthalene	ug/kg	61000				
2	2-Methylnaphthalene	ug/kg	41000000				16000
1	4-Methylphenol (p-Cresol)	ug/kg	4400000				
1	Acetophenone	ug/kg	1600				
2	Benzenethiol	ug/kg	20000				
	bis(2-Ethylhexyl)phthalate	ug/kg	410000	31000000	4100000	31000000	3600000
1	Dibenzofuran	ug/kg	5100000				
	Di-n-octyl phthalate	ug/kg	41000000	10000000	4100000	10000000	10000000
1	N-Nitrosodimethylamine	ug/kg	48				
	N-Nitrosodiphenylamine	ug/kg	1200000		25000000		1000
	Phenol	ug/kg	1000000000		120000000		100000
	Polynuclear Aromatic Compounds						
	Acenaphthene	ug/kg	120000000		120000000		570000
3	Acenaphthylene	ug/kg	61000				15000
	Anthracene	ug/kg	610000000		610000000		12000000
	Benzo(a)anthracene	ug/kg	8000		170000		2000
	Benzo(a)pyrene	ug/kg	800		17000		8000
	Benzo(b)fluoranthene	ug/kg	8000		170000		5000
3	Benzo(g,h,i)perylene	ug/kg	61000				29000
	Benzo(k)fluoranthene	ug/kg	78000		1700000		49000
	Chrysene	ug/kg	780000		17000000		160000
	Dibenzo(a,h)anthracene	ug/kg	800		17000		2000
	Fluoranthene	ug/kg	82000000		82000000		4300000
	Fluorene	ug/kg	82000000		82000000		560000
	Indene	ug/kg					
	Indeno(1,2,3-cd)pyrene	ug/kg	8000		170000		14000
	Naphthalene	ug/kg	82000000		8200000		84000
3	Phenanthrene	ug/kg	61000				140000
	Pyrene	ug/kg	61000000		61000000		4200000
	Hydrocarbon Compounds						
	Hydrocarbons as DRO	mg/kg					
	Hydrocarbons as GRO	ug/kg					
	Total Petroleum Hydrocarbons (TPH)	mg/kg					

TABLE 4-1
TIER I SOIL SCREENING LEVELS

Footnote	CHEMICAL	UNITS	INDUST/INGEST	INDUST/INHAL	CONST/INGEST	CONST/INHAL	SOIL/GRDWTR-I & pH	BACKGROUND LEVELS		
								SWMU V	SWMUs S & T	
	Inorganic Compounds							CLAY	CLAY	SAND
	Antimony	mg/kg	820		82		5	6.00	6.00	1.33
	Arsenic	mg/kg	3	1200	61	25000	30	4.90	7.00	4.16
	Barium	mg/kg	140000	910000	14000	870000	1800	115.00	438.00	126.91
	Beryllium	mg/kg	1	2100	29	44000	1000	0.50	0.73	1.08
	Cadmium	mg/kg	2000	2800	200	59000	59	0.50	1.90	3.36
	Chromium	mg/kg	10000	420	4100	8800	28	20.90	15.30	14.16
	Cobalt	mg/kg	120000		12000		1	6.60	13.20	34.30
	Copper	mg/kg	82000		8200		330000			17.06
	Cyanide, Total	mg/kg	41000		4100		40	0.50	0.50	NA
	Lead	mg/kg	400		400		0.0075	17.60	6.80	45.63
	Mercury	mg/kg	610	540000	61	52000	6.4	0.10	0.20	0.41
	Nickel	mg/kg	41000	21000	41000	440000	700	15.60	53.50	19.31
	Selenium	mg/kg	10000		1000		2.4	1.00	2.00	0.37
	Sulfide	mg/kg						0.50		
1	Tin	mg/kg	100000							
	Vanadium	mg/kg	14000		1400		980	22.40	31.50	31.04
	Zinc	mg/kg	610000		61000		16000	66.20		83.71

All screening values were obtained from TACO unless noted below:

1 = Value obtained from Region 9 Preliminary Remediation Goals

2 = Value Obtained from Region 3 Risk Based Screening Levels

3 = Value Obtained from Illinois Environmental Protection Agency (Tom Hornshaw, 3-20-00)

[ ] = Value not available

TABLE 4-2a
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU S
(0 TO 1 FT, >1 FT, >5FT)

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
9	1	1990	ENSECO		SOIL	7060	Arsenic, Total	7.2	(mg/kg)			
9	1	1990	ENSECO		SOIL	6010	Barium, Total	119	(mg/kg)			
9	1	1990	ENSECO		SOIL	6010	Beryllium, Total	0.29	(mg/kg)			
9	1	1990	ENSECO		SOIL	6010	Cadmium, Total	0.6	(mg/kg)			
9	1	1990	ENSECO		SOIL	6010	Chromium, Total	9.7	(mg/kg)			
9	1	1990	ENSECO		SOIL	6010	Cobalt, Total	4.4	(mg/kg)			
9	1	1990	ENSECO		SOIL	6010	Nickel, Total	10.4	(mg/kg)			
9	1	1990	ENSECO		SOIL	6010	Vanadium, Total	16.9	(mg/kg)			
11	1	1990	ENSECO		SOIL	7060	Arsenic, Total	4.6	(mg/kg)			
11	1	1990	ENSECO		SOIL	6010	Barium, Total	64.1	(mg/kg)			
11	1	1990	ENSECO		SOIL	6010	Beryllium, Total	0.29	(mg/kg)			
11	1	1990	ENSECO		SOIL	6010	Chromium, Total	10.4	(mg/kg)			
11	1	1990	ENSECO		SOIL	6010	Cobalt, Total	4.7	(mg/kg)			
11	1	1990	ENSECO		SOIL	7421	Lead, Total	10.7	(mg/kg)			
11	1	1990	ENSECO		SOIL	6010	Nickel, Total	11.2	(mg/kg)			
11	1	1990	ENSECO		SOIL	6010	Vanadium, Total	16.4	(mg/kg)			
13	1	1990	ENSECO		SOIL	8240	2-Butanone	82	(ug/kg)			
13	1	1990	ENSECO		SOIL	7060	Arsenic, Total	1.6	(mg/kg)			
13	1	1990	ENSECO		SOIL	6010	Barium, Total	188	(mg/kg)			
13	1	1990	ENSECO		SOIL	6010	Beryllium, Total	0.62	(mg/kg)			
13	1	1990	ENSECO		SOIL	6010	Chromium, Total	10.3	(mg/kg)			
13	1	1990	ENSECO		SOIL	8270	Chrysene	15000	(ug/kg)	← SLIGHTLY ABOVE SSL; BELOW TACO		
13	1	1990	ENSECO		SOIL	6010	Cobalt, Total	3.1	(mg/kg)			
13	1	1990	ENSECO		SOIL	8240	Ethylbenzene	37	(ug/kg)			
13	1	1990	ENSECO		SOIL	6010	Nickel, Total	8.3	(mg/kg)			
13	1	1990	ENSECO		SOIL	8270	Phenanthrene	21000	(ug/kg)	← NO VALUES		
13	1	1990	ENSECO		SOIL	8240	Toluene	23	(ug/kg)			
13	1	1990	ENSECO		SOIL	6010	Vanadium, Total	16.3	(mg/kg)			
13	1	1990	ENSECO		SOIL	8240	Xylenes (Total)	66	(ug/kg)			
300	1	1999	SAVANNAH		SOIL	8310	Anthracene	220	ug/kg dw	22		
300	1	1999	SAVANNAH		SOIL	6010	Arsenic	6	mg/kg dw	6		
300	1	1999	SAVANNAH		SOIL	6010	Barium	230	mg/kg dw	230		
300	1	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	29	ug/kg dw	22		
300	1	1999	SAVANNAH		SOIL	6010	Beryllium	1.1	mg/kg dw	0.2		
300	1	1999	SAVANNAH		SOIL	6010	Chromium	25	mg/kg dw	2.8		
300	1	1999	SAVANNAH		SOIL	8310	Chrysene	26	ug/kg dw	22		
300	1	1999	SAVANNAH		SOIL	6010	Lead	25	mg/kg dw	1.4		
300	1	1999	SAVANNAH		SOIL	6010	Nickel	22	mg/kg dw	11		
300	1	1999	SAVANNAH		SOIL	8310	Phenanthrene	43	ug/kg dw	43		
300	1	1999	SAVANNAH		SOIL	6010	Vanadium	44	mg/kg dw	14		
302	1	1999	SAVANNAH		SOIL	8310	Anthracene	9.8	ug/kg dw	4.5		
302	1	1999	SAVANNAH		SOIL	6010	Arsenic	7.2	mg/kg dw	1.2		
302	1	1999	SAVANNAH		SOIL	6010	Barium	170	mg/kg dw	1.2		
302	1	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	28	ug/kg dw	4.5	P	
302	1	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	20	ug/kg dw	4.5		

TABLE 4-2a
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU S
(0 TO 1 FT, >1 FT, >5FT)

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
302	1	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	12	ug/kg dw	4.5	P	
302	1	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	50	ug/kg dw	11	P	
302	1	1999	SAVANNAH		SOIL	6010	Beryllium	0.65	mg/kg dw	0.46		
302	1	1999	SAVANNAH		SOIL	6010	Chromium	17	mg/kg dw	1.2		
302	1	1999	SAVANNAH		SOIL	8310	Chrysene	36	ug/kg dw	4.5	P	
302	1	1999	SAVANNAH		SOIL	8310	Dibenzo(a,h)anthracene	22	ug/kg dw	11		
302	1	1999	SAVANNAH		SOIL	8310	Fluoranthene	61	ug/kg dw	11		
302	1	1999	SAVANNAH		SOIL	8310	Indeno(1,2,3-cd)pyrene	14	ug/kg dw	11	P	
302	1	1999	SAVANNAH		SOIL	6010	Lead	25	mg/kg dw	0.58		
302	1	1999	SAVANNAH		SOIL	6010	Nickel	21	mg/kg dw	4.6		
302	1	1999	SAVANNAH		SOIL	8310	Phenanthrene	27	ug/kg dw	4.5	P	
302	1	1999	SAVANNAH		SOIL	8310	Pyrene	54	ug/kg dw	11	P	
302	1	1999	SAVANNAH		SOIL	6010	Vanadium	35	mg/kg dw	1.2		
302	1	1999	SAVANNAH		SOIL	8310	Anthracene	15	ug/kg dw	4.8		
303	1	1999	SAVANNAH		SOIL	6010	Arsenic	7	mg/kg dw	1.2		
303	1	1999	SAVANNAH		SOIL	6010	Barium	99	mg/kg dw	1.2		
303	1	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	19	ug/kg dw	4.8		
303	1	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	32	ug/kg dw	4.8		
303	1	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	23	ug/kg dw	4.8	P	
303	1	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	44	ug/kg dw	12		
303	1	1999	SAVANNAH		SOIL	8310	Benzo(k)fluoranthene	14	ug/kg dw	4.8	P	
303	1	1999	SAVANNAH		SOIL	6010	Beryllium	0.37	mg/kg dw	0.34		
303	1	1999	SAVANNAH		SOIL	6010	Chromium	11	mg/kg dw	1.2		
303	1	1999	SAVANNAH		SOIL	8310	Chrysene	35	ug/kg dw	4.8		
303	1	1999	SAVANNAH		SOIL	8310	Dibenzo(a,h)anthracene	21	ug/kg dw	12	P	
303	1	1999	SAVANNAH		SOIL	8310	Fluoranthene	36	ug/kg dw	12		
303	1	1999	SAVANNAH		SOIL	8310	Indeno(1,2,3-cd)pyrene	15	ug/kg dw	12		
303	1	1999	SAVANNAH		SOIL	6010	Lead	42	mg/kg dw	0.59		
303	1	1999	SAVANNAH		SOIL	6010	Nickel	15	mg/kg dw	4.7		
303	1	1999	SAVANNAH		SOIL	8310	Phenanthrene	19	ug/kg dw	4.8	P	
303	1	1999	SAVANNAH		SOIL	8310	Pyrene	25	ug/kg dw	12	P	
303	1	1999	SAVANNAH		SOIL	6010	Vanadium	24	mg/kg dw	1.2		
304	1	1999	SAVANNAH		SOIL	8310	Anthracene	9.5	ug/kg dw	4.4		
304	1	1999	SAVANNAH		SOIL	6010	Arsenic	3.5	mg/kg dw	1.1		
304	1	1999	SAVANNAH		SOIL	6010	Barium	74	mg/kg dw	11		
304	1	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	28	ug/kg dw	4.4		
304	1	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	21	ug/kg dw	4.4	P	
304	1	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	27	ug/kg dw	4.4		
304	1	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	43	ug/kg dw	11		
304	1	1999	SAVANNAH		SOIL	8310	Benzo(k)fluoranthene	6.6	ug/kg dw	4.4	P	
304	1	1999	SAVANNAH		SOIL	6010	Beryllium	0.32	mg/kg dw	0.3		
304	1	1999	SAVANNAH		SOIL	6010	Chromium	20	mg/kg dw	1.1		
304	1	1999	SAVANNAH		SOIL	8310	Chrysene	42	ug/kg dw	11		
304	1	1999	SAVANNAH		SOIL	8310	Dibenzo(a,h)anthracene	30	ug/kg dw	11	P	
304	1	1999	SAVANNAH		SOIL	8310	Fluoranthene	32	ug/kg dw	11	P	

TABLE 4-2a
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU S
(0 TO 1 FT, >1 FT, >5FT)

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
304	1	1999	SAVANNAH		SOIL	6010	Lead	13	mg/kg dw	0.45		
304	1	1999	SAVANNAH		SOIL	6010	Nickel	13	mg/kg dw	4.4		
304	1	1999	SAVANNAH		SOIL	8310	Phenanthrene	62	ug/kg dw	4.4		
304	1	1999	SAVANNAH		SOIL	8310	Pyrene	34	ug/kg dw	11	P	
304	1	1999	SAVANNAH		SOIL	6010	Vanadium	21	mg/kg dw	1.1		
305	1	1999	SAVANNAH		SOIL	8310	Anthracene	8.1	ug/kg dw	4.8		
305	1	1999	SAVANNAH		SOIL	6010	Arsenic	6.2	mg/kg dw	1.2		
305	1	1999	SAVANNAH		SOIL	6010	Barium	170	mg/kg dw	12		
305	1	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	22	ug/kg dw	4.8		
305	1	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	27	ug/kg dw	4.8		
305	1	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	24	ug/kg dw	4.8	P	
305	1	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	65	ug/kg dw	12		
305	1	1999	SAVANNAH		SOIL	8310	Benzo(k)fluoranthene	6.8	ug/kg dw	4.8	P	
305	1	1999	SAVANNAH		SOIL	6010	Beryllium	0.85	mg/kg dw	0.48		
305	1	1999	SAVANNAH		SOIL	6010	Cadmium	0.64	mg/kg dw	0.6	E	
305	1	1999	SAVANNAH		SOIL	6010	Chromium	22	mg/kg dw	1.2		
305	1	1999	SAVANNAH		SOIL	8310	Chrysene	51	ug/kg dw	12		
305	1	1999	SAVANNAH		SOIL	6010	Cobalt	7.9	mg/kg dw	7.9		
305	1	1999	SAVANNAH		SOIL	8310	Fluoranthene	34	ug/kg dw	12	P	
305	1	1999	SAVANNAH		SOIL	8310	Indeno(1,2,3-cd)pyrene	17	ug/kg dw	12	P	
305	1	1999	SAVANNAH		SOIL	6010	Lead	40	mg/kg dw	0.6		
305	1	1999	SAVANNAH		SOIL	7471	Mercury	0.26	mg/kg dw	0.24		
305	1	1999	SAVANNAH		SOIL	6010	Nickel	24	mg/kg dw	4.8	E	
305	1	1999	SAVANNAH		SOIL	8310	Phenanthrene	57	ug/kg dw	4.8		
305	1	1999	SAVANNAH		SOIL	8310	Pyrene	73	ug/kg dw	12	P	
305	1	1999	SAVANNAH		SOIL	6010	Vanadium	41	mg/kg dw	1.2		
305	1	1999	SAVANNAH		SOIL	6010	Zinc	130	mg/kg dw	2.4	E*	J
306	1	1999	SAVANNAH		SOIL	8310	Anthracene	15	ug/kg dw	4		
306	1	1999	SAVANNAH		SOIL	6010	Arsenic	2	mg/kg dw	1		
306	1	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	4.2	ug/kg dw	4	P	
306	1	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	11	ug/kg dw	10		
306	1	1999	SAVANNAH		SOIL	6010	Beryllium	0.1	mg/kg dw	0.06		
306	1	1999	SAVANNAH		SOIL	6010	Chromium	12	mg/kg dw	1		
306	1	1999	SAVANNAH		SOIL	8310	Chrysene	7.4	ug/kg dw	4	P	
306	1	1999	SAVANNAH		SOIL	6010	Lead	4.2	mg/kg dw	0.42		
306	1	1999	SAVANNAH		SOIL	6010	Nickel	10	mg/kg dw	4		
306	1	1999	SAVANNAH		SOIL	8310	Phenanthrene	13	ug/kg dw	4		
306	1	1999	SAVANNAH		SOIL	8310	Pyrene	13	ug/kg dw	10	P	

TABLE 4-2a
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU S
(0 TO 1 FT, >1 FT, >5FT)

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
10	3	1990	ENSECO		SOIL	7060	Arsenic, Total	1.4	(mg/kg)			
10	3	1990	ENSECO		SOIL	6010	Barium, Total	71	(mg/kg)			
10	3	1990	ENSECO		SOIL	6010	Cadmium, Total	1.4	(mg/kg)			
10	3	1990	ENSECO		SOIL	6010	Chromium, Total	17.9	(mg/kg)			
10	3	1990	ENSECO		SOIL	8270	Chrysene	4600	(ug/kg)	← Below SSL		
10	3	1990	ENSECO		SOIL	6010	Cobalt, Total	3.3	(mg/kg)			
10	3	1990	ENSECO		SOIL	7421	Lead, Total	189	(mg/kg)			
10	3	1990	ENSECO		SOIL	6010	Nickel, Total	12.2	(mg/kg)			
10	3	1990	ENSECO		SOIL	8270	Pyrene	5900	(ug/kg)	← Below SSL		
10	3	1990	ENSECO		SOIL	6010	Vanadium, Total	21.1	(mg/kg)			
11	5	1990	ENSECO		SOIL	7060	Arsenic, Total	1.8	(mg/kg)			
11	5	1990	ENSECO		SOIL	6010	Barium, Total	103	(mg/kg)			
11	5	1990	ENSECO		SOIL	6010	Beryllium, Total	0.5	(mg/kg)			
11	5	1990	ENSECO		SOIL	6010	Cadmium, Total	2	(mg/kg)			
11	5	1990	ENSECO		SOIL	6010	Chromium, Total	21.1	(mg/kg)			
11	5	1990	ENSECO		SOIL	6010	Cobalt, Total	4.2	(mg/kg)			
11	5	1990	ENSECO		SOIL	8240	Ethylbenzene	730	(ug/kg)			
11	5	1990	ENSECO		SOIL	6010	Nickel, Total	9.9	(mg/kg)			
11	5	1990	ENSECO		SOIL	8270	Phenanthrene	11000	(ug/kg)	← NO SSL	J	
11	5	1990	ENSECO		SOIL	8240	Toluene	1600	(ug/kg)			
11	5	1990	ENSECO		SOIL	6010	Vanadium, Total	27.6	(mg/kg)			
11	5	1990	ENSECO		SOIL	8240	Xylenes (Total)	4400	(ug/kg)			
12	3	1990	ENSECO		SOIL	7060	Arsenic, Total	2.4	(mg/kg)			
12	3	1990	ENSECO		SOIL	6010	Barium, Total	114	(mg/kg)			
12	3	1990	ENSECO		SOIL	6010	Beryllium, Total	0.75	(mg/kg)			
12	3	1990	ENSECO		SOIL	6010	Chromium, Total	12.5	(mg/kg)			
12	3	1990	ENSECO		SOIL	6010	Cobalt, Total	9.5	(mg/kg)			
12	3	1990	ENSECO		SOIL	6010	Nickel, Total	17.3	(mg/kg)			
12	3	1990	ENSECO		SOIL	6010	Vanadium, Total	13.5	(mg/kg)			
14	4	1990	ENSECO		SOIL	8270	1-Methylnaphthalene	13000	(ug/kg)	← NO SSL		
14	4	1990	ENSECO		SOIL	7060	Arsenic, Total	3.4	(mg/kg)			
14	4	1990	ENSECO	DUPLICATE	SOIL	7060	Arsenic, Total	4.9	(mg/kg)			
14	4	1990	ENSECO	DUPLICATE	SOIL	6010	Barium, Total	180	(mg/kg)			
14	4	1990	ENSECO		SOIL	6010	Barium, Total	198	(mg/kg)			
14	4	1990	ENSECO		SOIL	6010	Beryllium, Total	0.63	(mg/kg)			
14	4	1990	ENSECO	DUPLICATE	SOIL	6010	Beryllium, Total	0.74	(mg/kg)			
14	4	1990	ENSECO		SOIL	6010	Cadmium, Total	0.59	(mg/kg)			
14	4	1990	ENSECO	DUPLICATE	SOIL	6010	Chromium, Total	11.2	(mg/kg)			
14	4	1990	ENSECO		SOIL	6010	Chromium, Total	11.6	(mg/kg)			
14	4	1990	ENSECO		SOIL	6010	Cobalt, Total	3.5	(mg/kg)			
14	4	1990	ENSECO	DUPLICATE	SOIL	6010	Cobalt, Total	5.3	(mg/kg)			
14	4	1990	ENSECO	DUPLICATE	SOIL	7421	Lead, Total	5.5	(mg/kg)			
14	4	1990	ENSECO		SOIL	7421	Lead, Total	17.5	(mg/kg)			
14	4	1990	ENSECO		SOIL	8270	Naphthalene	5100	(ug/kg)	← Below SSL		
14	4	1990	ENSECO		SOIL	6010	Nickel, Total	11.1	(mg/kg)			

TABLE 4-2a
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU S
(0 TO 1 FT, >1 FT, >5FT)

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
14	4	1990	ENSECO	DUPLICATE	SOIL	6010	Nickel, Total	13.1	(mg/kg)			
14	4	1990	ENSECO		SOIL	8270	Phenanthrene	3500	(ug/kg)	← NO SSL		
14	4	1990	ENSECO	DUPLICATE	SOIL	6010	Vanadium, Total	17.4	(mg/kg)			
14	4	1990	ENSECO		SOIL	6010	Vanadium, Total	24.8	(mg/kg)			
14	4	1990	ENSECO	DUPLICATE	SOIL	8240	Xylenes (Total)	6	(ug/kg)			
15	3	1990	ENSECO		SOIL	8240	2-Butanone	140	(ug/kg)			
15	3	1990	ENSECO		SOIL	7060	Arsenic, Total	2.2	(mg/kg)			
15	3	1990	ENSECO		SOIL	6010	Barium, Total	70.6	(mg/kg)			
15	3	1990	ENSECO		SOIL	6010	Beryllium, Total	0.4	(mg/kg)			
15	3	1990	ENSECO		SOIL	6010	Vanadium, Total	10.8	(mg/kg)			
15	3	1990	ENSECO		SOIL	8240	Xylenes (Total)	28	(ug/kg)			
16	3	1990	ENSECO		SOIL	8240	2-Butanone	95	(ug/kg)			
16	3	1990	ENSECO		SOIL	7060	Arsenic, Total	1.5	(mg/kg)			
16	3	1990	ENSECO		SOIL	6010	Barium, Total	263	(mg/kg)			
16	3	1990	ENSECO		SOIL	8270	Benzenethiol	890	(ug/kg)			
16	3	1990	ENSECO		SOIL	6010	Beryllium, Total	0.37	(mg/kg)			
16	3	1990	ENSECO		SOIL	6010	Cadmium, Total	1	(mg/kg)			
16	3	1990	ENSECO		SOIL	6010	Chromium, Total	14.5	(mg/kg)			
16	3	1990	ENSECO		SOIL	6010	Cobalt, Total	2.4	(mg/kg)			
16	3	1990	ENSECO		SOIL	8240	Ethylbenzene	10	(ug/kg)			
16	3	1990	ENSECO		SOIL	7421	Lead, Total	31.8	(mg/kg)			
16	3	1990	ENSECO		SOIL	6010	Nickel, Total	7.7	(mg/kg)			
16	3	1990	ENSECO		SOIL	8270	Phenanthrene	1000	(ug/kg)	← NO SSL		
16	3	1990	ENSECO		SOIL	6010	Vanadium, Total	16.6	(mg/kg)			
16	3	1990	ENSECO		SOIL	8240	Xylenes (Total)	19	(ug/kg)			
303	4	1999	SAVANNAH		SOIL	8310	Anthracene	130	ug/kg dw	44		
303	4	1999	SAVANNAH		SOIL	6010	Arsenic	4.6	mg/kg dw	1.1		
303	4	1999	SAVANNAH		SOIL	6010	Barium	79	mg/kg dw	1.1		
303	4	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	350	ug/kg dw	44	P	
303	4	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	190	ug/kg dw	44		
303	4	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	140	ug/kg dw	44		
303	4	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	210	ug/kg dw	110		
303	4	1999	SAVANNAH		SOIL	6010	Beryllium	0.35	mg/kg dw	0.45		
303	4	1999	SAVANNAH		SOIL	6010	Chromium	11	mg/kg dw	1.1		
303	4	1999	SAVANNAH		SOIL	8310	Chrysene	410	ug/kg dw	44		
303	4	1999	SAVANNAH		SOIL	8310	Fluoranthene	230	ug/kg dw	110	P	
303	4	1999	SAVANNAH		SOIL	6010	Lead	15	mg/kg dw	0.56		
303	4	1999	SAVANNAH		SOIL	6010	Nickel	13	mg/kg dw	4.4		
303	4	1999	SAVANNAH		SOIL	8310	Phenanthrene	190	ug/kg dw	44		
303	4	1999	SAVANNAH		SOIL	8310	Pyrene	370	ug/kg dw	110	P	
303	4	1999	SAVANNAH		SOIL	6010	Vanadium	23	mg/kg dw	1.1		
304	4	1999	SAVANNAH		SOIL	6010	Arsenic	3.6	mg/kg dw	1.1		
304	4	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	280	ug/kg dw	44	P	
304	4	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	54	ug/kg dw	44	P	
304	4	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	62	ug/kg dw	44	P	

TABLE 4-2a

SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU S

(0 TO 1 FT, >1 FT, >5FT)

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
304	4	1999	SAVANNAH		SOIL	6010	Beryllium	0.34	mg/kg dw	0.3		
304	4	1999	SAVANNAH		SOIL	6010	Chromium	14	mg/kg dw	1.1		
304	4	1999	SAVANNAH		SOIL	8310	Chrysene	400	ug/kg dw	44	P	
304	4	1999	SAVANNAH		SOIL	6010	Lead	11	mg/kg dw	0.45		
304	4	1999	SAVANNAH		SOIL	6010	Vanadium	17	mg/kg dw	1.1		
305	4	1999	SAVANNAH		SOIL	8310	Anthracene	9.6	ug/kg dw	4.8		
305	4	1999	SAVANNAH		SOIL	6010	Arsenic	8.2	mg/kg dw	1.2		
305	4	1999	SAVANNAH		SOIL	6010	Barium	140	mg/kg dw	12		
305	4	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	24	ug/kg dw	4.8	P	
305	4	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	23	ug/kg dw	4.8		
305	4	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	11	ug/kg dw	4.8		
305	4	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	31	ug/kg dw	12		
305	4	1999	SAVANNAH		SOIL	6010	Beryllium	1.3	mg/kg dw	0.48		
305	4	1999	SAVANNAH		SOIL	6010	Cadmium	1.3	mg/kg dw	0.6	E	
305	4	1999	SAVANNAH		SOIL	6010	Chromium	20	mg/kg dw	1.2		
305	4	1999	SAVANNAH		SOIL	8310	Chrysene	45	ug/kg dw	4.8	P	
305	4	1999	SAVANNAH		SOIL	6010	Cobalt	7.3	mg/kg dw	1.2		
305	4	1999	SAVANNAH		SOIL	8310	Fluoranthene	49	ug/kg dw	12	P	
305	4	1999	SAVANNAH		SOIL	6010	Lead	160	mg/kg dw	0.6		
305	4	1999	SAVANNAH		SOIL	7471	Mercury	0.28	mg/kg dw	0.24		
305	4	1999	SAVANNAH		SOIL	6010	Nickel	31	mg/kg dw	4.8	E	
305	4	1999	SAVANNAH		SOIL	8310	Phenanthrene	54	ug/kg dw	4.8		
305	4	1999	SAVANNAH		SOIL	8310	Pyrene	93	ug/kg dw	12	P	
305	4	1999	SAVANNAH		SOIL	6010	Vanadium	34	mg/kg dw	1.2		
305	4	1999	SAVANNAH		SOIL	6010	Zinc	180	mg/kg dw	2.4	E*	J

TABLE 4-2a
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU S
(0 TO 1 FT, >1 FT, >5FT)

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
9	15	1990	ENSECO		SOIL	8240	2-Butanone	23	(ug/kg)			
9	15	1990	ENSECO		SOIL	7060	Arsenic, Total	6.6	(mg/kg)			
9	15	1990	ENSECO		SOIL	6010	Barium, Total	56.5	(mg/kg)			
9	15	1990	ENSECO		SOIL	6010	Beryllium, Total	0.22	(mg/kg)			
9	15	1990	ENSECO		SOIL	6010	Chromium, Total	10.4	(mg/kg)			
9	15	1990	ENSECO		SOIL	6010	Cobalt, Total	2.8	(mg/kg)			
9	15	1990	ENSECO		SOIL	6010	Nickel, Total	9.7	(mg/kg)			
9	15	1990	ENSECO		SOIL	6010	Vanadium, Total	13.3	(mg/kg)			
10	20	1990	ENSECO		SOIL	7060	Arsenic, Total	1.8	(mg/kg)			
10	20	1990	ENSECO		SOIL	6010	Barium, Total	17.3	(mg/kg)			
10	20	1990	ENSECO		SOIL	6010	Chromium, Total	6.8	(mg/kg)			
10	20	1990	ENSECO		SOIL	6010	Cobalt, Total	3.7	(mg/kg)			
10	20	1990	ENSECO		SOIL	6010	Nickel, Total	8.1	(mg/kg)			
10	20	1990	ENSECO		SOIL	6010	Vanadium, Total	12.8	(mg/kg)			
11	25	1990	ENSECO		SOIL	6010	Barium, Total	11.4	(mg/kg)			
11	25	1990	ENSECO		SOIL	6010	Chromium, Total	7.4	(mg/kg)			
11	25	1990	ENSECO		SOIL	6010	Cobalt, Total	3.5	(mg/kg)			
11	25	1990	ENSECO		SOIL	6010	Nickel, Total	6	(mg/kg)			
11	25	1990	ENSECO		SOIL	6010	Vanadium, Total	5.1	(mg/kg)			
12	23	1990	ENSECO		SOIL	6010	Barium, Total	9.6	(mg/kg)			
12	23	1990	ENSECO		SOIL	6010	Cobalt, Total	3.6	(mg/kg)			
12	23	1990	ENSECO		SOIL	6010	Nickel, Total	11.2	(mg/kg)			
12	23	1990	ENSECO		SOIL	6010	Vanadium, Total	4.9	(mg/kg)			
13	21	1990	ENSECO		SOIL	6010	Barium, Total	12.9	(mg/kg)		J	
13	21	1990	ENSECO		SOIL	6010	Chromium, Total	6.5	(mg/kg)		J	
13	21	1990	ENSECO		SOIL	6010	Cobalt, Total	4	(mg/kg)			
13	21	1990	ENSECO		SOIL	6010	Nickel, Total	9.5	(mg/kg)			
13	21	1990	ENSECO		SOIL	8270	Phenanthrene	510	(ug/kg)			
13	21	1990	ENSECO		SOIL	6010	Vanadium, Total	10	(mg/kg)		J	
14	15	1990	ENSECO		SOIL	7060	Arsenic, Total	1.2	(mg/kg)			
14	15	1990	ENSECO		SOIL	6010	Barium, Total	22.4	(mg/kg)			
14	15	1990	ENSECO		SOIL	6010	Chromium, Total	3.8	(mg/kg)			
14	15	1990	ENSECO		SOIL	6010	Cobalt, Total	2.5	(mg/kg)			
14	15	1990	ENSECO		SOIL	6010	Nickel, Total	7.4	(mg/kg)			
14	15	1990	ENSECO		SOIL	6010	Vanadium, Total	6.8	(mg/kg)			
15	23	1990	ENSECO		SOIL	6010	Barium, Total	19.5	(mg/kg)			
15	23	1990	ENSECO		SOIL	6010	Cobalt, Total	3.4	(mg/kg)			
15	23	1990	ENSECO		SOIL	6010	Nickel, Total	7.9	(mg/kg)			
15	23	1990	ENSECO		SOIL	6010	Vanadium, Total	7.7	(mg/kg)			
15	23	1990	ENSECO		SOIL	8240	Xylenes (Total)	6.2	(ug/kg)			
16	23	1990	ENSECO	DUPLICATE	SOIL	8240	2-Butanone	16	(ug/kg)			
16	23	1990	ENSECO		SOIL	7060	Arsenic, Total	0.74	(mg/kg)			
16	23	1990	ENSECO	DUPLICATE	SOIL	7060	Arsenic, Total	0.82	(mg/kg)			
16	23	1990	ENSECO	DUPLICATE	SOIL	6010	Barium, Total	12.8	(mg/kg)			
16	23	1990	ENSECO		SOIL	6010	Barium, Total	19.9	(mg/kg)			

TABLE 4-2a
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU S
(0 TO 1 FT, >1 FT, >5FT)

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
16	23	1990	ENSECO	DUPLICATE	SOIL	6010	Cadmium, Total	0.99	(mg/kg)			
16	23	1990	ENSECO	DUPLICATE	SOIL	6010	Cobalt, Total	4.7	(mg/kg)			
16	23	1990	ENSECO		SOIL	6010	Cobalt, Total	11.3	(mg/kg)			
16	23	1990	ENSECO	DUPLICATE	SOIL	6010	Nickel, Total	12.6	(mg/kg)			
16	23	1990	ENSECO		SOIL	6010	Nickel, Total	29.7	(mg/kg)			
16	23	1990	ENSECO	DUPLICATE	SOIL	6010	Vanadium, Total	7.7	(mg/kg)			
16	23	1990	ENSECO		SOIL	6010	Vanadium, Total	9.9	(mg/kg)			
300	6	1999	SAVANNAH		SOIL	6010	Arsenic	5.8	mg/kg dw	0.4		
300	6	1999	SAVANNAH		SOIL	6010	Barium	120	mg/kg dw	53		
300	6	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	13	ug/kg dw	5.2		
300	6	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	11	ug/kg dw	5.2	P	
300	6	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	24	ug/kg dw	5.2	P	
300	6	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	48	ug/kg dw	13	P	
300	6	1999	SAVANNAH		SOIL	6010	Beryllium	0.86	mg/kg dw	0.19		
300	6	1999	SAVANNAH		SOIL	6010	Chromium	21	mg/kg dw	2.7		
300	6	1999	SAVANNAH		SOIL	8310	Chrysene	45	ug/kg dw	5.2	P	
300	6	1999	SAVANNAH		SOIL	8310	Dibenzo(a,h)anthracene	110	ug/kg dw	13		
300	6	1999	SAVANNAH		SOIL	8310	Fluoranthene	20	ug/kg dw	13	P	
300	6	1999	SAVANNAH		SOIL	8310	Indeno(1,2,3-cd)pyrene	19	ug/kg dw	13		
300	6	1999	SAVANNAH		SOIL	6010	Lead	13	mg/kg dw	1.3		
300	6	1999	SAVANNAH		SOIL	6010	Nickel	20	mg/kg dw	11		
300	6	1999	SAVANNAH		SOIL	8310	Phenanthrene	13	ug/kg dw	5.2		
300	6	1999	SAVANNAH		SOIL	8310	Pyrene	37	ug/kg dw	13		
300	6	1999	SAVANNAH		SOIL	6010	Vanadium	28	mg/kg dw	13		
300	18	1999	SAVANNAH		SOIL	8310	Anthracene	11	ug/kg dw	4.2		
300	18	1999	SAVANNAH		SOIL	6010	Arsenic	0.94	mg/kg dw	0.32		
300	18	1999	SAVANNAH		SOIL	6010	Beryllium	0.11	mg/kg dw	0.065		
300	18	1999	SAVANNAH		SOIL	6010	Chromium	9.6	mg/kg dw	2.2		
300	18	1999	SAVANNAH		SOIL	6010	Lead	2.1	mg/kg dw	1.1		
300	18	1999	SAVANNAH		SOIL	6010	Nickel	11	mg/kg dw	8.6		
300	18	1999	SAVANNAH		SOIL	8310	Phenanthrene	4.2	ug/kg dw	4.2		
300	18	1999	SAVANNAH		SOIL	6010	Vanadium	11	mg/kg dw	11		
300	18	1999	SAVANNAH		SOIL	8260	Xylenes, Total	20	ug/kg dw	5.8		
300	6	1999	SAVANNAH		SOIL	8310	Anthracene	15	ug/kg dw	5.2		
301	8	1999	SAVANNAH		SOIL	8310	Anthracene	6.8	ug/kg dw	6		
301	8	1999	SAVANNAH		SOIL	6010	Arsenic	4.3	mg/kg dw	0.45		
301	8	1999	SAVANNAH		SOIL	6010	Barium	250	mg/kg dw	60		
301	8	1999	SAVANNAH		SOIL	6010	Beryllium	1.2	mg/kg dw	0.09		
301	8	1999	SAVANNAH		SOIL	6010	Chromium	27	mg/kg dw	3		
301	8	1999	SAVANNAH		SOIL	8310	Chrysene	12	ug/kg dw	6		
301	8	1999	SAVANNAH		SOIL	6010	Lead	15	mg/kg dw	1.5		
301	8	1999	SAVANNAH		SOIL	6010	Nickel	26	mg/kg dw	12		
301	8	1999	SAVANNAH		SOIL	6010	Vanadium	46	mg/kg dw	15		
301	20	1999	SAVANNAH		SOIL	8310	Anthracene	13	ug/kg dw	4.2		
301	20	1999	SAVANNAH		SOIL	6010	Arsenic	1	mg/kg dw	0.32		

TABLE 4-2a
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU S
(0 TO 1 FT, >1 FT, >5FT)

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
301	20	1999	SAVANNAH		SOIL	6010	Beryllium	0.13	mg/kg dw	0.065		
301	20	1999	SAVANNAH		SOIL	6010	Chromium	5.4	mg/kg dw	2.2		
301	20	1999	SAVANNAH		SOIL	8310	Fluorene	21	ug/kg dw	11		
301	20	1999	SAVANNAH		SOIL	6010	Lead	2.3	mg/kg dw	1.1		
301	20	1999	SAVANNAH		SOIL	6010	Nickel	12	mg/kg dw	8.6		
301	20	1999	SAVANNAH		SOIL	8310	Phenanthrene	7.1	ug/kg dw	4.2		
301	20	1999	SAVANNAH		SOIL	6010	Vanadium	13	mg/kg dw	11		
302	14	1999	SAVANNAH		SOIL	8310	Anthracene	27	ug/kg dw	10		
302	14	1999	SAVANNAH		SOIL	6010	Arsenic	9.5	mg/kg dw	1.1		
302	14	1999	SAVANNAH		SOIL	6010	Barium	220	mg/kg dw	1.1		
302	14	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	23	ug/kg dw	10	P	
302	14	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	14	ug/kg dw	10		
302	14	1999	SAVANNAH		SOIL	6010	Beryllium	1.2	mg/kg dw	0.43		
302	14	1999	SAVANNAH		SOIL	6010	Chromium	30	mg/kg dw	1.1		
302	14	1999	SAVANNAH		SOIL	8310	Chrysene	45	ug/kg dw	10		
302	14	1999	SAVANNAH		SOIL	6010	Lead	19	mg/kg dw	0.54		
302	14	1999	SAVANNAH		SOIL	6010	Nickel	31	mg/kg dw	4.3		
302	14	1999	SAVANNAH		SOIL	8310	Phenanthrene	30	ug/kg dw	10		
302	14	1999	SAVANNAH		SOIL	8310	Pyrene	53	ug/kg dw	26		
302	14	1999	SAVANNAH		SOIL	6010	Vanadium	59	mg/kg dw	1.1		
302	24	1999	SAVANNAH		SOIL	8310	Anthracene	16	ug/kg dw	4.2		
302	24	1999	SAVANNAH		SOIL	6010	Arsenic	1.2	mg/kg dw	0.86		
302	24	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	7.3	ug/kg dw	4.2	P	
302	24	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	5.2	ug/kg dw	4.2		
302	24	1999	SAVANNAH		SOIL	6010	Beryllium	0.19	mg/kg dw	0.34		
302	24	1999	SAVANNAH		SOIL	6010	Chromium	7.4	mg/kg dw	0.86		
302	24	1999	SAVANNAH		SOIL	8310	Chrysene	11	ug/kg dw	4.2		
302	24	1999	SAVANNAH		SOIL	8310	Fluoranthene	24	ug/kg dw	10		
302	24	1999	SAVANNAH		SOIL	6010	Lead	3.4	mg/kg dw	0.43		
302	24	1999	SAVANNAH		SOIL	8310	Phenanthrene	12	ug/kg dw	4.2		
302	24	1999	SAVANNAH		SOIL	8310	Pyrene	13	ug/kg dw	10	P	
302	24	1999	SAVANNAH		SOIL	6010	Vanadium	13	mg/kg dw	0.86		
303	8	1999	SAVANNAH		SOIL	8310	Anthracene	120	ug/kg dw	26		J
303	8	1999	SAVANNAH	DUPLICATE	SOIL	8310	Anthracene	20	ug/kg dw	4.8		J
303	8	1999	SAVANNAH		SOIL	6010	Arsenic	2.1	mg/kg dw	1.3		
303	8	1999	SAVANNAH	DUPLICATE	SOIL	6010	Arsenic	2.3	mg/kg dw	1.2		
303	8	1999	SAVANNAH	DUPLICATE	SOIL	6010	Barium	150	mg/kg dw	12		
303	8	1999	SAVANNAH	DUPLICATE	SOIL	8310	Benzo(a)anthracene	28	ug/kg dw	4.8		
303	8	1999	SAVANNAH	DUPLICATE	SOIL	8310	Benzo(a)pyrene	8.2	ug/kg dw	4.8		
303	8	1999	SAVANNAH		SOIL	6010	Beryllium	0.47	mg/kg dw	0.42		
303	8	1999	SAVANNAH	DUPLICATE	SOIL	6010	Beryllium	0.63	mg/kg dw	0.49		
303	8	1999	SAVANNAH		SOIL	6010	Chromium	13	mg/kg dw	1.3		
303	8	1999	SAVANNAH	DUPLICATE	SOIL	6010	Chromium	22	mg/kg dw	1.2		
303	8	1999	SAVANNAH	DUPLICATE	SOIL	8310	Chrysene	22	ug/kg dw	4.8	P	
303	8	1999	SAVANNAH	DUPLICATE	SOIL	8310	Fluoranthene	38	ug/kg dw	12	P	

TABLE 4-2a

SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU S

(0 TO 1 FT, >1 FT, >5FT)

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
303	8	1999	SAVANNAH	DUPLICATE	SOIL	6010	Lead	12	mg/kg dw	0.49		
303	8	1999	SAVANNAH		SOIL	6010	Lead	8.4	mg/kg dw	0.52		
303	8	1999	SAVANNAH		SOIL	6010	Nickel	15	mg/kg dw	4.2		
303	8	1999	SAVANNAH	DUPLICATE	SOIL	6010	Nickel	19	mg/kg dw	4.8		
303	8	1999	SAVANNAH	DUPLICATE	SOIL	8310	Phenanthrene	24	ug/kg dw	12		
303	8	1999	SAVANNAH		SOIL	8310	Phenanthrene	32	ug/kg dw	26		
303	8	1999	SAVANNAH	DUPLICATE	SOIL	8310	Pyrene	33	ug/kg dw	4.8	P	
303	8	1999	SAVANNAH		SOIL	6010	Vanadium	21	mg/kg dw	1.3		
303	8	1999	SAVANNAH	DUPLICATE	SOIL	6010	Vanadium	32	mg/kg dw	1.2		
303	22	1999	SAVANNAH		SOIL	8310	Anthracene	27	ug/kg dw	9.6		
303	22	1999	SAVANNAH		SOIL	6010	Arsenic	3.4	mg/kg dw	1.2		
303	22	1999	SAVANNAH		SOIL	6010	Barium	91	mg/kg dw	1.2		
303	22	1999	SAVANNAH		SOIL	6010	Beryllium	0.58	mg/kg dw	0.49		
303	22	1999	SAVANNAH		SOIL	6010	Chromium	22	mg/kg dw	1.2		
303	22	1999	SAVANNAH		SOIL	6010	Lead	9.5	mg/kg dw	0.61		
303	22	1999	SAVANNAH		SOIL	6010	Nickel	24	mg/kg dw	4.8		
303	22	1999	SAVANNAH		SOIL	8310	Phenanthrene	16	ug/kg dw	9.6		
303	22	1999	SAVANNAH		SOIL	6010	Vanadium	29	mg/kg dw	1.2		
304	20	1999	SAVANNAH		SOIL	8310	Anthracene	82	ug/kg dw	4.7		
304	20	1999	SAVANNAH		SOIL	6010	Arsenic	2.8	mg/kg dw	1.2		
304	20	1999	SAVANNAH		SOIL	6010	Barium	85	mg/kg dw	11		
304	20	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	53	ug/kg dw	4.7	P	
304	20	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	6.9	ug/kg dw	4.7	P	
304	20	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	12	ug/kg dw	4.7	P	
304	20	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	21	ug/kg dw	12	P	
304	20	1999	SAVANNAH		SOIL	6010	Beryllium	0.43	mg/kg dw	0.42		
304	20	1999	SAVANNAH		SOIL	6010	Chromium	16	mg/kg dw	1.2		
304	20	1999	SAVANNAH		SOIL	8310	Chrysene	54	ug/kg dw	4.7		
304	20	1999	SAVANNAH		SOIL	8310	Fluoranthene	32	ug/kg dw	12	P	
304	20	1999	SAVANNAH		SOIL	8310	Fluorene	22	ug/kg dw	12		
304	20	1999	SAVANNAH		SOIL	6010	Lead	6.2	mg/kg dw	0.47		
304	20	1999	SAVANNAH		SOIL	6010	Nickel	14	mg/kg dw	4.8		
304	20	1999	SAVANNAH		SOIL	8310	Phenanthrene	150	ug/kg dw	4.7		
304	20	1999	SAVANNAH		SOIL	8310	Pyrene	73	ug/kg dw	12	P	
304	20	1999	SAVANNAH		SOIL	6010	Vanadium	26	mg/kg dw	1.2		
305	14	1999	SAVANNAH	DUPLICATE	SOIL	8270	1-Methylnaphthalene	1000	ug/kg dw	1000		
305	14	1999	SAVANNAH		SOIL	8310	Anthracene	170	ug/kg dw	52		J
305	14	1999	SAVANNAH	DUPLICATE	SOIL	8310	Anthracene	520	ug/kg dw	220		J
305	14	1999	SAVANNAH		SOIL	6010	Arsenic	6.3	mg/kg dw	1.3		
305	14	1999	SAVANNAH	DUPLICATE	SOIL	6010	Arsenic	8.1	mg/kg dw	1.4		
305	14	1999	SAVANNAH	DUPLICATE	SOIL	6010	Barium	260	mg/kg dw	14		
305	14	1999	SAVANNAH		SOIL	6010	Barium	290	mg/kg dw	13		
305	14	1999	SAVANNAH		SOIL	8260	Benzene	20	ug/kg dw	6.4		
305	14	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	110	ug/kg dw	52		J
305	14	1999	SAVANNAH	DUPLICATE	SOIL	8310	Benzo(a)anthracene	530	ug/kg dw	220		J

TABLE 4-2a
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU S
(0 TO 1 FT, >1 FT, >5FT)

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
305	14	1999	SAVANNAH	DUPLICATE	SOIL	8310	Benzo(a)pyrene	270	ug/kg dw	220		
305	14	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	56	ug/kg dw	52	P	J
305	14	1999	SAVANNAH		SOIL	6010	Beryllium	1	mg/kg dw	0.52		
305	14	1999	SAVANNAH	DUPLICATE	SOIL	6010	Beryllium	1.1	mg/kg dw	0.56		
305	14	1999	SAVANNAH		SOIL	6010	Cadmium	0.66	mg/kg dw	0.65	E	
305	14	1999	SAVANNAH	DUPLICATE	SOIL	6010	Cadmium	1.2	mg/kg dw	0.7	E	
305	14	1999	SAVANNAH		SOIL	6010	Chromium	20	mg/kg dw	1.3		
305	14	1999	SAVANNAH	DUPLICATE	SOIL	6010	Chromium	20	mg/kg dw	1.4		
305	14	1999	SAVANNAH		SOIL	8310	Chrysene	200	ug/kg dw	52		J
305	14	1999	SAVANNAH	DUPLICATE	SOIL	8310	Chrysene	730	ug/kg dw	220	P	J
305	14	1999	SAVANNAH	DUPLICATE	SOIL	6010	Cobalt	11	mg/kg dw	1.4		
305	14	1999	SAVANNAH		SOIL	6010	Cobalt	9.1	mg/kg dw	1.3		
305	14	1999	SAVANNAH		SOIL	8260	Ethylbenzene	160	ug/kg dw	6.4		J
305	14	1999	SAVANNAH	DUPLICATE	SOIL	8310	Fluoranthene	1400	ug/kg dw	550	P	J
305	14	1999	SAVANNAH		SOIL	8310	Fluoranthene	400	ug/kg dw	130	P	J
305	14	1999	SAVANNAH		SOIL	6010	Lead	15	mg/kg dw	0.65		
305	14	1999	SAVANNAH	DUPLICATE	SOIL	6010	Lead	22	mg/kg dw	0.7		
305	14	1999	SAVANNAH		SOIL	7471	Mercury	0.039	mg/kg dw	0.026		
305	14	1999	SAVANNAH	DUPLICATE	SOIL	7471	Mercury	0.056	mg/kg dw	0.28		
305	14	1999	SAVANNAH		SOIL	6010	Nickel	24	mg/kg dw	5.2	E	
305	14	1999	SAVANNAH	DUPLICATE	SOIL	6010	Nickel	26	mg/kg dw	5.6	E	
305	14	1999	SAVANNAH	DUPLICATE	SOIL	8310	Phenanthrene	1800	ug/kg dw	220		J
305	14	1999	SAVANNAH		SOIL	8310	Phenanthrene	550	ug/kg dw	52		J
305	14	1999	SAVANNAH	DUPLICATE	SOIL	8310	Pyrene	2000	ug/kg dw	550	P	
305	14	1999	SAVANNAH		SOIL	8310	Pyrene	840	ug/kg dw	130	P	
305	14	1999	SAVANNAH		SOIL	8260	Toluene	18	ug/kg dw	6.4		
305	14	1999	SAVANNAH	DUPLICATE	SOIL	6010	Vanadium	34	mg/kg dw	1.4		
305	14	1999	SAVANNAH		SOIL	6010	Vanadium	35	mg/kg dw	1.3		
305	14	1999	SAVANNAH		SOIL	8260	Xylenes, Total	310	ug/kg dw	6.4		J
305	14	1999	SAVANNAH		SOIL	6010	Zinc	79	mg/kg dw	2.6	E*	J
305	14	1999	SAVANNAH	DUPLICATE	SOIL	6010	Zinc	86	mg/kg dw	2.8	E*	J
301	20	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	1400	mg/kg dw	540		
302	1	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	16000	mg/kg dw	580		
302	4	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	9800	mg/kg dw	550		
303	1	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	4600	mg/kg dw	590		
303	4	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	8200	mg/kg dw	560		
303	12	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	3800	mg/kg dw	600		
303	22	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	5200	mg/kg dw	600		
305	4	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	23000	mg/kg dw	600		
305	14	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	2400	mg/kg dw	720		
306	1	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	1100	mg/kg dw	500		
300	18	1999	SAVANNAH		SOIL	9045	pH	6.43	units	1		
301	20	1999	SAVANNAH		SOIL	9045	pH	6.82	units	1		
302	1	1999	SAVANNAH		SOIL	9045	pH	7.37	units	1		
302	4	1999	SAVANNAH		SOIL	9045	pH	7.18	units	1		

TABLE 4-2a
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU S
(0 TO 1 FT, >1 FT, >5FT)

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
303	1	1999	SAVANNAH		SOIL	9045	pH	7.75	units	1		
303	4	1999	SAVANNAH		SOIL	9045	pH	7.91	units	1		
303	12	1999	SAVANNAH		SOIL	9045	pH	7.19	units	1		
303	22	1999	SAVANNAH		SOIL	9045	pH	6.93	units	1		
305	4	1999	SAVANNAH		SOIL	9045	pH	7.75	units	1		
305	14	1999	SAVANNAH		SOIL	9045	pH	7.84	units	1		
306	1	1999	SAVANNAH		SOIL	9045	pH	8.52	units	1		

* = Detection Limits are not displayed for historical samples. Refer to laboratory data sets (previously submitted to USEPA) for detection limits.

Note: Qualifier descriptions are explained in Appendix B, Tables B-1a and B-1b.

TABLE 4-2b

SUMMARY OF DETECTIONS FOR THE ALTERNATE SOURCE DEMONSTRATION SOIL SAMPLES FOR SWMU S (>1 FT, >5FT)

		BORING 1			BORING 2			BORING 3		
Parameter	Units	2 – 4 ft	4 – 6 ft	28 – 30 ft	4 – 6 ft	6 – 8 ft	30 – 32 ft	2 – 4 ft	6 – 8 ft	30 – 32 ft
Appendix IX Volatile Organics										
Benzene	ug/kg				50	22		1.0 J	3.0 J	
Methyl ethyl ketone (2-Butanone)	ug/kg				18			36		
Carbon Disulfide	ug/kg	9.7 J			3.6 J			2.4 J	1.1 J	
1,2-Dichloropropane	ug/kg									
Ethylbenzene	ug/kg		460 J		20	19			2.2 J	
2-Hexanone	ug/kg								86	
Methylene Chloride	ug/kg		1700 J	340 J						
4-Methyl-2-pentanone (MIBK)	ug/kg								7.8 J	
Toluene	ug/kg	3.6 J			25	5.6 J		1.2 J	7	
1,1,1-Trichloroethane	ug/kg									
1,2,3-Trichloropropane	ug/kg									2.6 J
Xylenes (total)	ug/kg	11 J	1400 J		110	98			20	
Appendix IX/RHCL Semi-volatile Organics										
Acenaphthene	ug/kg				360 J	1800 J				
Acenaphthylene	ug/kg									
Acetophenone	ug/kg									
Anthracene	ug/kg				1200 J	5000 J				
Benzo(a)anthracene	ug/kg				1800 J	5300 J		510 J		
Benzo(b)fluoranthene	ug/kg				550 J					
Benzo(g,h,i)perylene	ug/kg				670 J	1800 J				
Benzo(a)pyrene	ug/kg				830 J	2200 J				
Chrysene	ug/kg				2200 J	6500 J		520 J		
Dibenz(a,h)anthracene	ug/kg									
Dibenzofuran	ug/kg				340 J					
Di-n-octyl phthalate	ug/kg						140 J			64 J
bis(2-Ethylhexyl)phthalate	ug/kg	2300 J	3800 J	1500 J	580 J		570	500 J	100 J	280 J
Fluoranthene	ug/kg				890 J	1700 J		430 J		
Fluorene	ug/kg		3400 J		1100 J	4700 J				
Indene	ug/kg									
Indeno(1,2,3-cd)pyrene	ug/kg									
1-Methylnaphthalene	ug/kg	2000 J	57000		3000 J	49000	54 J	2000 J		
2- Methylnaphthalene	ug/kg	1700 J	76000			3800 J		2100 J		
4-Methylphenol	ug/kg								210 J	
Naphthalene	ug/kg		14000 J					770 J		
N-Nitrosodiphenylamine	ug/kg									
Phenanthrene	ug/kg	2800 J	5900 J		1100 J	26000	65 J			
Phenol	ug/kg							1700 J		
Pyrene	ug/kg				3700	10000 J		560 J		

NOTE:

B Compound is also detected in the blank.
J Result is detected below the reporting limit or is an estimated concentration.
ND Not detected.
NA Not applicable.

TABLE 4-2b
SUMMARY OF DETECTIONS FOR THE ALTERNATE SOURCE DEMONSTRATION SOIL SAMPLES FOR SWMU S
(>1 FT, >5FT)

		BORING 4		BORING 5				BORING 6		
Parameter	Units	2 – 4 ft	30 – 32 ft	0 – 2 ft	2 – 4 ft	12 – 14 ft	30 – 32 ft	2 – 4 ft	20 – 22 ft	28 – 30 ft
Appendix IX Volatile Organics										
Benzene	ug/kg			2.9 J						
Methyl ethyl ketone (2-Butanone)	ug/kg		1.6 J							
Carbon Disulfide	ug/kg			2.6 J		1.4 J		5.6 J		
1,2-Dichloropropane	ug/kg				1.8 J					
Ethylbenzene	ug/kg									
2-Hexanone	ug/kg									
Methylene Chloride	ug/kg									
4-Methyl-2-pentanone (MIBK)	ug/kg					2.7 J	1.7 J			
Toluene	ug/kg	2.3 J		18	3.3 J			20		12
1,1,1-Trichloroethane	ug/kg			20	2.2 J					
1,2,3-Trichloropropane	ug/kg			9.3	2.7 J	2.2 J	2.3 J			1.4 J
Xylenes (total)	ug/kg			4.4 BJ				19		
Appendix IX/RHCL Semi-volatile Organics										
Acenaphthene	ug/kg									
Acenaphthylene	ug/kg			320 J						
Acetophenone	ug/kg			120 J	180 J					
Anthracene	ug/kg	69 J		550	77 J					
Benzo(a)anthracene	ug/kg	180 J		1800	340					
Benzo(b)fluoranthene	ug/kg	120 J		3600	300 J					
Benzo(g,h,i)perylene	ug/kg			780	220 J			4800 J	150 J	
Benzo(a)pyrene	ug/kg	99 J		1200	260 J			3400 J		
Chrysene	ug/kg	120 J		2100	300 J			8700 J		
Dibenz(a,h)anthracene	ug/kg				140 J					
Dibenzofuran	ug/kg	570		400	360					
Di-n-octyl phthalate	ug/kg	110 J								
bis(2-Ethylhexyl)phthalate	ug/kg	380	62 J	390	130 J	450	91 J			150 J
Fluoranthene	ug/kg	170 J		1400	300 J					
Fluorene	ug/kg			56						
Indene	ug/kg				76					
Indeno(1,2,3-cd)pyrene	ug/kg			780	120 J					
1-Methylnaphthalene	ug/kg	1700		670	930					
2- Methylnaphthalene	ug/kg	1600		970	1100					
4-Methylphenol	ug/kg									
Naphthalene	ug/kg	550		380	340					
N-Nitrosodiphenylamine	ug/kg	200 J								
Phenanthrene	ug/kg	1100		2900						
Phenol	ug/kg				1200					
Pyrene	ug/kg	490		2300	520			20000 J		

NOTE:

B Compound is also detected in the blank.
J Result is detected below the reporting limit or is an estimated concentration.
ND Not detected.
NA Not applicable.

TABLE 4-3
FREQUENCY AND RANGE OF DETECTED ANALYTES FOR SWMU S

Compound	0 – 1 ft		1 – 5 ft		> 5 ft	
	Detection Frequency	Concentration Range	Detection Frequency	Concentration Range	Detection Frequency	Concentration Range
VOCs (µg/kg)						
1,1,1-Trichloroethane	--	--	2 / 6	2.2 – 20	0 / 12	--
1,2-Dichloropropane	--	--	1 / 6	1.8	0 / 12	--
1,2,3-Trichloropropane	--	--	2 / 6	2.7 – 9.3	4 / 12	1.4 – 2.6
2-Hexanone	--	--	0 / 6	--	1 / 12	86
4-Methyl-2-pentanone	--	--	0 / 6	--	3 / 12	1.7 – 7.8
Benzene	0 / 9	--	2 / 16	1 – 2.9	4 / 33	3 – 50
Carbon Disulfide	0 / 9	--	4 / 7	2.4 – 9.7	3 / 33	1.1 – 3.6
Ethylbenzene	1 / 9	37	2 / 16	10 – 730	5 / 33	2.2 – 460
Methylene Chlroide	--	--	0 / 6	--	2 / 12	340 – 1,700
Methyl Ethyl Ketone (2-Butanone)	1 / 9	82	3 / 16	36 - 140	4 / 33	1.6 – 23
Toluene	1 / 9	23	7 / 16	1.2 – 1,600	5 / 33	5.6 – 18
Xylenes, Total	1 / 9	66	7 / 16	4.4 – 4,400	7 / 33	6.2 – 1,400
SVOCs (µg/kg)						
1-Methylnaphthalene	0 / 9	--	6 / 16	670 – 13,000	5 / 33	54 – 57,000
2-Methylnaphthalene	--	--	5 / 6	970 – 2,100	2 / 12	3,800 – 76,000
4-Methylphenol	--	--	0 / 6	--	1 / 12	210
Acetophenone	--	--	2 / 6	120 – 180	0 / 12	--
Benzenethiol	0 / 9	--	1 / 10	890	0 / 8	--
Bis(2-ethylhexyl)phthalate	0 / 9	--	5 / 16	130 – 2,300	10 / 33	62 – 3,800
Dibenzofuran	--	--	3 / 6	360 - 570	1 / 12	340
Di-n-octyl phthalate	0 / 9	--	1 / 13	110	2 / 31	64 - 140
N-Nitrosodiphenylamine	--	--	1 / 6	200	0 / 12	--
Phenol	0 / 9	--	2 / 16	1,200 – 1,700	0 / 33	--

TABLE 4-3
FREQUENCY AND RANGE OF DETECTED ANALYTES FOR SWMU S

Compound	0 – 1 ft		1 – 5 ft		> 5 ft	
	Detection Frequency	Concentration Range	Detection Frequency	Concentration Range	Detection Frequency	Concentration Range
PAHs (µg/kg)						
Acenaphthene	0 / 6	--	0 / 9	--	2 / 24	360 – 1,800
Acenaphthylene	--	--	1 / 6	320	0 / 12	--
Anthracene	6 / 9	8.1 – 220	5 / 16	9.6 – 550	14 / 33	6.8 – 5,000
Benzo(a)anthracene	5 / 9	4.2 – 28	7 / 16	24 – 1,800	9 / 33	7.3 – 5,300
Benzo(a)pyrene	4 / 9	20 – 32	7 / 16	23 – 3,400	8 / 33	5.2 – 2,200
Benzo(b)fluoranthene	5 / 9	12 – 29	6 / 16	11 - 3,600	4 / 33	12 – 550
Benzo(g,h,i)perylene	5 / 6	11 – 65	5 / 9	31 – 4,800	5 / 24	21 – 1,800
Benzo(k)fluoranthene	3 / 9	6.6 – 14	0 / 9	--	0 / 21	--
Chrysene	7 / 9	7.4 – 15,000	9 / 16	45 – 8,700	10 / 33	11 – 6,500
Dibenzo(a,h)anthracene	3 / 9	21 – 30	1 / 16	140	1 / 33	110
Fluoranthene	4 / 9	32 – 61	6 / 16	49 – 1,400	8 / 33	20 – 1,700
Fluorene	0 / 6	--	1 / 9	56	5 / 24	21 – 4,700
Indene	--	--	1 / 6	76	0 / 12	--
Indeno(1,2,3-cd)pyrene	3 / 6	14 – 17	2 / 9	120 – 780	1 / 24	19
Naphthalene	0 / 9	--	5 / 16	340 - 5,100	1 / 33	14,000
Phenanthrene	7 / 9	13 – 21,000	8 / 16	54 – 11,000	16 / 33	4.2 – 26,000
Pyrene	5 / 9	13 – 73	8 / 16	93 – 20,000	9 / 33	13 – 10,000
Metals (mg/kg)						
Arsenic	9 / 9	1.6 – 7.2	10 / 10	1.4 – 8.2	17 / 21	0.74 – 9.5
Barium	8 / 9	64.1 – 230	9 / 10	70.6 – 263	17 / 21	9.6 - 290
Beryllium	9 / 9	0.1 – 1.1	9 / 10	0.34 – 1.3	13 / 21	0.11 – 1.2
Cadmium	2 / 9	0.6 – 0.64	5 / 10	0.59 – 2	3 / 21	0.66 – 1.2
Chromium	9 / 9	9.7 – 25	9 / 10	11 – 21.1	17 / 21	3.8 – 30
Cobalt	4 / 9	3.1 – 7.9	7 / 10	2.4 – 9.5	11 / 21	2.5 – 11.3

TABLE 4-3
FREQUENCY AND RANGE OF DETECTED ANALYTES FOR SWMU S

Compound	0 – 1 ft		1 – 5 ft		> 5 ft	
	Detection Frequency	Concentration Range	Detection Frequency	Concentration Range	Detection Frequency	Concentration Range
Metals (mg/kg)						
Lead	7 / 9	4.2 – 42	7 / 10	5.5 – 189	12 / 21	2.1 – 22
Mercury	1 / 9	0.26	1 / 10	0.28	2 / 21	.039 - .056
Nickel	9 / 9	8.3 – 24	8 / 10	7.7 – 31	20 / 21	6 – 31
Vanadium	8 / 9	16.3 – 44	10 / 10	10.8 – 34	`21 /21	4.9 – 59
Zinc	1 / 6	130	1 / 3	180	2 / 12	79 - 86

TABLE 4-4
EXCEEDENCES OF TIER I SCREENING LEVELS FOR SWMU S

LOCATION	DEPTH	QAQCTYPE	MATRIX	ANALYTE	RESULT	UNITS	DETECTLIMIT	LAB Q.	URS Q.	BACKGROUND	INDUST/INGEST	INDUST/INHAL	CONST/INGEST	CONST/INHAL
9	1		SOIL	Arsenic, Total	7.2	(mg/kg)				7	3	1200	61	25000
300	1		SOIL	Beryllium	1.1	mg/kg dw	0.2			0.73	1	2100	29	44000
302	1		SOIL	Arsenic	7.2	mg/kg dw	1.2			7	3	1200	61	25000
5	2		SOIL	1,2,3-Trichloropropane	9.3	(ug/kg)				--	3.1			
5	2		SOIL	Benzo(a)pyrene	1200	(ug/kg)				--	800		17000	
5	4		SOIL	Indene	76	(ug/kg)				--				
6	4		SOIL	Benzo(a)pyrene	3400	(ug/kg)		J		--	800		17000	
305	4		SOIL	Arsenic	8.2	mg/kg dw	1.2			7	3	1200	61	25000
305	4		SOIL	Beryllium	1.3	mg/kg dw	0.48			0.73	1	2100	29	44000
2	6		SOIL	Benzo(a)pyrene	830	(ug/kg)				--	800		17000	
2	8		SOIL	Benzo(a)pyrene	2200	(ug/kg)				--	800		17000	
301	8		SOIL	Beryllium	1.2	mg/kg dw	0.09			0.73	1	2100	29	44000
302	14		SOIL	Arsenic	9.5	mg/kg dw	1.1			7	3	1200	61	25000
302	14		SOIL	Beryllium	1.2	mg/kg dw	0.43			0.73	1	2100	29	44000
305	14	DUPLICATE	SOIL	Arsenic	8.1	mg/kg dw	1.4			7	3	1200	61	25000
305	14	DUPLICATE	SOIL	Beryllium	1.1	mg/kg dw	0.56			0.73	1	2100	29	44000

Arsenic above SSLs, but not above background

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
South Fill Area	214	4	1992	ENSECO		SOIL	7060	Arsenic, Total	5.4	(mg/kg)			
	214	4	1992	ENSECO		SOIL	6010	Barium, Total	132	(mg/kg)			
	214	4	1992	ENSECO		SOIL	6010	Beryllium, Total	0.83	(mg/kg)			
	214	4	1992	ENSECO		SOIL	6010	Cadmium, Total	1.5	(mg/kg)			
	214	4	1992	ENSECO		SOIL	6010	Chromium, Total	14.8	(mg/kg)			
	214	4	1992	ENSECO		SOIL	6010	Cobalt, Total	10.4	(mg/kg)			
	214	4	1992	ENSECO		SOIL	7421	Lead, Total	53	(mg/kg)			
	214	4	1992	ENSECO		SOIL	7470	Mercury, Total	0.1	(mg/kg)			
	214	4	1992	ENSECO		SOIL	6010	Nickel, Total	21.6	(mg/kg)			
	214	4	1992	ENSECO		SOIL	8240	Toluene	9.6	(ug/kg)			
	214	4	1992	ENSECO		SOIL	6010	Vanadium, Total	19.7	(mg/kg)			
	214	4	1992	ENSECO		SOIL	6010	Zinc, Total	116	(mg/kg)		J	
	215	4	1992	ENSECO		SOIL	8270	Anthracene	1300	(ug/kg)			
	215	4	1992	ENSECO		SOIL	7060	Arsenic, Total	3	(mg/kg)			
	215	4	1992	ENSECO		SOIL	6010	Barium, Total	193	(mg/kg)			
	215	4	1992	ENSECO		SOIL	8270	Benzo(a)anthracene	1300	(ug/kg)			
	215	4	1992	ENSECO		SOIL	8270	Benzo(a)pyrene	1100	(ug/kg)	← AT TACO	Limit range	
	215	4	1992	ENSECO		SOIL	8270	Benzo(b)fluoranthene	1300	(ug/kg)			
	215	4	1992	ENSECO		SOIL	8270	Benzo(g,h,i)perylene	640	(ug/kg)			
	215	4	1992	ENSECO		SOIL	8270	Benzo(K)fluoranthene	470	(ug/kg)			
	215	4	1992	ENSECO		SOIL	6010	Beryllium, Total	0.5	(mg/kg)			
	215	4	1992	ENSECO		SOIL	6010	Chromium, Total	17.3	(mg/kg)			
	215	4	1992	ENSECO		SOIL	8270	Chrysene	1100	(ug/kg)			
	215	4	1992	ENSECO		SOIL	6010	Cobalt, Total	2.8	(mg/kg)			
	215	4	1992	ENSECO		SOIL	8270	Fluoranthene	4200	(ug/kg)			
	215	4	1992	ENSECO		SOIL	8270	Indeno(1,2,3-C,D)pyrene	550	(ug/kg)			
	215	4	1992	ENSECO		SOIL	7421	Lead, Total	75.1	(mg/kg)			
	215	4	1992	ENSECO		SOIL	6010	Nickel, Total	10.3	(mg/kg)			
	215	4	1992	ENSECO		SOIL	8270	Phenanthrene	3800	(ug/kg)			
	215	4	1992	ENSECO		SOIL	8270	Pyrene	2800	(ug/kg)			
	215	4	1992	ENSECO		SOIL	6010	Vanadium, Total	17.7	(mg/kg)			
	215	4	1992	ENSECO		SOIL	6010	Zinc, Total	54.5	(mg/kg)		J	
	216	4	1992	ENSECO		SOIL	8240	Acetone	13	(ug/kg)			
	216	4	1992	ENSECO		SOIL	7060	Arsenic, Total	4.6	(mg/kg)			
	216	4	1992	ENSECO		SOIL	6010	Barium, Total	133	(mg/kg)			
	216	4	1992	ENSECO		SOIL	6010	Beryllium, Total	0.77	(mg/kg)			
	216	4	1992	ENSECO		SOIL	6010	Cadmium, Total	0.73	(mg/kg)			
	216	4	1992	ENSECO		SOIL	6010	Chromium, Total	10.3	(mg/kg)			
	216	4	1992	ENSECO		SOIL	6010	Cobalt, Total	12	(mg/kg)			
	216	4	1992	ENSECO		SOIL	7421	Lead, Total	14	(mg/kg)			
	216	4	1992	ENSECO		SOIL	6010	Nickel, Total	24.5	(mg/kg)			
	216	4	1992	ENSECO		SOIL	6010	Vanadium, Total	13.1	(mg/kg)			
	216	4	1992	ENSECO		SOIL	6010	Zinc, Total	58	(mg/kg)		J	
	217	4	1992	ENSECO		SOIL	6010	Antimony, Total	9.2	(mg/kg)			
	217	4	1992	ENSECO		SOIL	7060	Arsenic, Total	6.8	(mg/kg)			
	217	4	1992	ENSECO		SOIL	6010	Barium, Total	527	(mg/kg)			
	217	4	1992	ENSECO		SOIL	6010	Beryllium, Total	0.56	(mg/kg)			
	217	4	1992	ENSECO		SOIL	6010	Cadmium, Total	9.1	(mg/kg)			

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
South Fill Area	217	4	1992	ENSECO		SOIL	6010	Chromium, Total	1190	(mg/kg)	← Above SSL		
	217	4	1992	ENSECO		SOIL	6010	Cobalt, Total	2.3	(mg/kg)			
	217	4	1992	ENSECO		SOIL	9010	Cyanide	0.98	(mg/kg)			
	217	4	1992	ENSECO		SOIL	7421	Lead, Total	815	(mg/kg)	← Above SSL		
	217	4	1992	ENSECO		SOIL	7470	Mercury, Total	1	(mg/kg)			
	217	4	1992	ENSECO		SOIL	6010	Nickel, Total	34.5	(mg/kg)			
	217	4	1992	ENSECO		SOIL	8240	Toluene	5.8	(ug/kg)			
	217	4	1992	ENSECO		SOIL	6010	Vanadium, Total	24	(mg/kg)			
	217	4	1992	ENSECO		SOIL	6010	Zinc, Total	1390	(mg/kg)		J	
	218	4	1992	ENSECO		SOIL	7060	Arsenic, Total	3.4	(mg/kg)			
	218	4	1992	ENSECO		SOIL	6010	Barium, Total	181	(mg/kg)			
	218	4	1992	ENSECO		SOIL	6010	Beryllium, Total	0.94	(mg/kg)			
	218	4	1992	ENSECO		SOIL	6010	Cadmium, Total	1.2	(mg/kg)			
	218	4	1992	ENSECO		SOIL	6010	Chromium, Total	9.4	(mg/kg)			
	218	4	1992	ENSECO		SOIL	6010	Cobalt, Total	15.5	(mg/kg)			
	218	4	1992	ENSECO		SOIL	7421	Lead, Total	21.7	(mg/kg)			
	218	4	1992	ENSECO		SOIL	6010	Nickel, Total	35.3	(mg/kg)			
	218	4	1992	ENSECO		SOIL	376.2	Sulfide, Total	1.1	(mg/kg)			
	218	4	1992	ENSECO		SOIL	6010	Vanadium, Total	15.2	(mg/kg)			
	218	4	1992	ENSECO		SOIL	6010	Zinc, Total	58.3	(mg/kg)		J	
	219	4	1992	ENSECO		SOIL	7060	Arsenic, Total	8.7	(mg/kg)			
	219	4	1992	ENSECO		SOIL	6010	Barium, Total	112	(mg/kg)			
	219	4	1992	ENSECO		SOIL	6010	Beryllium, Total	0.92	(mg/kg)			
	219	4	1992	ENSECO		SOIL	6010	Cadmium, Total	2	(mg/kg)			
	219	4	1992	ENSECO		SOIL	6010	Chromium, Total	39.9	(mg/kg)			
	219	4	1992	ENSECO		SOIL	6010	Cobalt, Total	3	(mg/kg)			
	219	4	1992	ENSECO		SOIL	7421	Lead, Total	80.1	(mg/kg)			
	219	4	1992	ENSECO		SOIL	7470	Mercury, Total	0.18	(mg/kg)			
	219	4	1992	ENSECO		SOIL	6010	Nickel, Total	13.4	(mg/kg)			
	219	4	1992	ENSECO		SOIL	6010	Vanadium, Total	18.2	(mg/kg)			
	219	4	1992	ENSECO		SOIL	6010	Zinc, Total	280	(mg/kg)		J	
	336	1	1999	SAVANNAH		SOIL	8310	Anthracene	210	ug/kg dw	44		
	336	1	1999	SAVANNAH		SOIL	6010	Arsenic	3.8	mg/kg d	1.1		
	336	1	1999	SAVANNAH		SOIL	6010	Barium	130	mg/kg d	1.1	N	
	336	1	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	420	ug/kg dw	44		
	336	1	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	440	ug/kg dw	44	← ABOVE SSL	
	336	1	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	500	ug/kg dw	44		
	336	1	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	490	ug/kg dw	110		
	336	1	1999	SAVANNAH		SOIL	8310	Benzo(k)fluoranthene	250	ug/kg dw	44		
	336	1	1999	SAVANNAH		SOIL	6010	Beryllium	0.98	mg/kg d	0.44		
	336	1	1999	SAVANNAH		SOIL	6010	Chromium	100	mg/kg d	1.1		
	336	1	1999	SAVANNAH		SOIL	8310	Chrysene	440	ug/kg dw	44		
	336	1	1999	SAVANNAH		SOIL	6010	Cobalt	5.3	mg/kg d	1.1		
	336	1	1999	SAVANNAH		SOIL	6010	Copper	47	mg/kg d	2.2		
	336	1	1999	SAVANNAH		SOIL	8310	Fluoranthene	1300	ug/kg dw	110		
	336	1	1999	SAVANNAH		SOIL	8310	Indeno(1,2,3-cd)pyrene	300	ug/kg dw	110		
	336	1	1999	SAVANNAH		SOIL	6010	Lead	74	mg/kg d	0.57	N	
	336	1	1999	SAVANNAH		SOIL	7471	Mercury	0.18	mg/kg d	0.022		

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
South Fill Area	336	1	1999	SAVANNAH		SOIL	6010	Nickel	17	mg/kg d	4.4		
	336	1	1999	SAVANNAH		SOIL	8310	Phenanthrene	810	ug/kg dw	44		
	336	1	1999	SAVANNAH		SOIL	8310	Pyrene	960	ug/kg dw	110		
	336	1	1999	SAVANNAH		SOIL	6010	Tin	45	mg/kg d	5.5		
	336	1	1999	SAVANNAH		SOIL	6010	Vanadium	26	mg/kg d	1.1		
	336	1	1999	SAVANNAH		SOIL	6010	Zinc	110	mg/kg d	2.2	E*	
	336	10	1999	SAVANNAH		SOIL	6010	Arsenic	7.8	mg/kg d	1.3		
	336	10	1999	SAVANNAH		SOIL	6010	Barium	150	mg/kg d	1.3	N	
	336	10	1999	SAVANNAH		SOIL	6010	Beryllium	0.6	mg/kg d	0.52		
	336	10	1999	SAVANNAH		SOIL	6010	Chromium	15	mg/kg d	1.3		
	336	10	1999	SAVANNAH		SOIL	6010	Cobalt	4.3	mg/kg d	1.3		
	336	10	1999	SAVANNAH		SOIL	6010	Copper	15	mg/kg d	2.6		
	336	10	1999	SAVANNAH		SOIL	6010	Lead	9.7	mg/kg d	0.63	N	
	336	10	1999	SAVANNAH		SOIL	7471	Mercury	0.042	mg/kg d	0.026		
	336	10	1999	SAVANNAH		SOIL	6010	Nickel	17	mg/kg d	5.2		
	336	10	1999	SAVANNAH		SOIL	8270	N-Nitrosodimethylamine	1600	ug/kg dw	1600		
	336	10	1999	SAVANNAH		SOIL	6010	Vanadium	26	mg/kg d	1.3		
	336	10	1999	SAVANNAH		SOIL	6010	Zinc	47	mg/kg d	2.6	E*	
	337	1	1999	SAVANNAH		SOIL	6010	Arsenic	10	mg/kg d	1.4		
	337	1	1999	SAVANNAH		SOIL	6010	Barium	56	mg/kg d	1.4	N	
	337	1	1999	SAVANNAH		SOIL	6010	Beryllium	0.73	mg/kg d	0.56		
	337	1	1999	SAVANNAH		SOIL	6010	Chromium	32	mg/kg d	1.4		
	337	1	1999	SAVANNAH		SOIL	6010	Cobalt	4.4	mg/kg d	1.4		
	337	1	1999	SAVANNAH		SOIL	6010	Copper	74	mg/kg d	2.8		
	337	1	1999	SAVANNAH		SOIL	6010	Lead	89	mg/kg d	0.7	N	
	337	1	1999	SAVANNAH		SOIL	7471	Mercury	0.21	mg/kg d	0.028		
	337	1	1999	SAVANNAH		SOIL	6010	Nickel	17	mg/kg d	5.6		
	337	1	1999	SAVANNAH		SOIL	6010	Vanadium	18	mg/kg d	1.4		
	337	1	1999	SAVANNAH		SOIL	6010	Zinc	120	mg/kg d	2.8	E*	
	337	10	1999	SAVANNAH		SOIL	8270	2-Methylnaphthalene	440	ug/kg dw			
	337	10	1999	SAVANNAH		SOIL	8310	Anthracene	460	ug/kg dw			
	337	10	1999	SAVANNAH		SOIL	6010	Arsenic	8.5	mg/kg dw			
	337	10	1999	SAVANNAH		SOIL	6010	Barium	180	mg/kg dw		N	
	337	10	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	5800	ug/kg dw	← ABOVE SSL		
	337	10	1999	SAVANNAH	DILUTED	SOIL	8310	Benzo(a)anthracene	6400	ug/kg dw	←	D	
	337	10	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	8600	ug/kg dw	← ABOVE SSL		
	337	10	1999	SAVANNAH	DILUTED	SOIL	8310	Benzo(a)pyrene	8800	ug/kg dw	←	D	
	337	10	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	13000	ug/kg dw	← ABOVE SSL	E	
	337	10	1999	SAVANNAH	DILUTED	SOIL	8310	Benzo(b)fluoranthene	12000	ug/kg dw	← " "	D	
	337	10	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	12000	ug/kg dw			
	337	10	1999	SAVANNAH	DILUTED	SOIL	8310	Benzo(g,h,i)perylene	9700	ug/kg dw		DP	
	337	10	1999	SAVANNAH		SOIL	8310	Benzo(k)fluoranthene	4800	ug/kg dw			
	337	10	1999	SAVANNAH	DILUTED	SOIL	8310	Benzo(k)fluoranthene	4800	ug/kg dw		D	
	337	10	1999	SAVANNAH		SOIL	6010	Beryllium	0.59	mg/kg dw			
	337	10	1999	SAVANNAH		SOIL	6010	Chromium	15	mg/kg dw			
	337	10	1999	SAVANNAH		SOIL	8310	Chrysene	5800	ug/kg dw			
	337	10	1999	SAVANNAH	DILUTED	SOIL	8310	Chrysene	5700	ug/kg dw		D	
	337	10	1999	SAVANNAH		SOIL	6010	Cobalt	14	mg/kg dw			

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
South Fill Area	337	10	1999	SAVANNAH		SOIL	6010	Copper	16	mg/kg dw			
	337	10	1999	SAVANNAH		SOIL	8310	Dibenzo(a,h)anthracene	4100	ug/kg dw	← Above SSL	P	
	337	10	1999	SAVANNAH	DILUTED	SOIL	8310	Dibenzo(a,h)anthracene	4500	ug/kg dw		DP	
	337	10	1999	SAVANNAH		SOIL	8310	Fluoranthene	14000	ug/kg dw			
	337	10	1999	SAVANNAH	DILUTED	SOIL	8310	Fluoranthene	14000	ug/kg dw		D	
	337	10	1999	SAVANNAH		SOIL	8310	Indeno(1,2,3-cd)pyrene	6600	ug/kg dw	← Above SSL	E	
	337	10	1999	SAVANNAH	DILUTED	SOIL	8310	Indeno(1,2,3-cd)pyrene	7100	ug/kg dw		D	
	337	10	1999	SAVANNAH		SOIL	6010	Lead	12	mg/kg dw		N	
	337	10	1999	SAVANNAH		SOIL	7471	Mercury	0.037	mg/kg dw			
	337	10	1999	SAVANNAH		SOIL	6010	Nickel	32	mg/kg dw			
	337	10	1999	SAVANNAH		SOIL	8310	Phenanthrene	2400	ug/kg dw			
	337	10	1999	SAVANNAH	DILUTED	SOIL	8310	Phenanthrene	2400	ug/kg dw		D	
	337	10	1999	SAVANNAH		SOIL	8310	Pyrene	10000	ug/kg dw			
	337	10	1999	SAVANNAH	DILUTED	SOIL	8310	Pyrene	10000	ug/kg dw		D	
	337	10	1999	SAVANNAH		SOIL	6010	Vanadium	28	mg/kg dw			
	337	10	1999	SAVANNAH		SOIL	6010	Zinc	48	mg/kg dw		E*	
East Fill Area	220	4	1992	ENSECO		SOIL	8240	2-Butanone	31	(ug/kg)		J	
	220	4	1992	ENSECO		SOIL	7060	Arsenic, Total	4.1	(mg/kg)			
	220	4	1992	ENSECO		SOIL	6010	Barium, Total	263	(mg/kg)			
	220	4	1992	ENSECO		SOIL	6010	Beryllium, Total	0.4	(mg/kg)			
	220	4	1992	ENSECO		SOIL	6010	Chromium, Total	79.2	(mg/kg)			
	220	4	1992	ENSECO		SOIL	8240	Dichloromethane	9.4	(ug/kg)		J	
	220	4	1992	ENSECO		SOIL	7421	Lead, Total	51.2	(mg/kg)			
	220	4	1992	ENSECO		SOIL	7470	Mercury, Total	0.25	(mg/kg)			
	220	4	1992	ENSECO		SOIL	6010	Nickel, Total	12.6	(mg/kg)			
	220	4	1992	ENSECO		SOIL	8240	Toluene	16	(ug/kg)		J	
	220	4	1992	ENSECO		SOIL	8240	Trichloroethene	7.9	(ug/kg)		J	
	220	4	1992	ENSECO		SOIL	6010	Vanadium, Total	14.4	(mg/kg)			
	220	4	1992	ENSECO		SOIL	8240	Xylenes (Total)	5.4	(ug/kg)		J	
	220	4	1992	ENSECO		SOIL	6010	Zinc, Total	161	(mg/kg)		J	
	221	4	1992	ENSECO		SOIL	7060	Arsenic, Total	2.7	(mg/kg)			
	221	4	1992	ENSECO	DUPLICATE	SOIL	6010	Barium, Total	130	(mg/kg)			
	221	4	1992	ENSECO		SOIL	6010	Barium, Total	133	(mg/kg)			
	221	4	1992	ENSECO	DUPLICATE	SOIL	6010	Beryllium, Total	0.59	(mg/kg)			
	221	4	1992	ENSECO		SOIL	6010	Beryllium, Total	0.64	(mg/kg)			
	221	4	1992	ENSECO		SOIL	6010	Cadmium, Total	0.53	(mg/kg)			
	221	4	1992	ENSECO	DUPLICATE	SOIL	6010	Cadmium, Total	0.55	(mg/kg)			
	221	4	1992	ENSECO	DUPLICATE	SOIL	6010	Chromium, Total	9.9	(mg/kg)			
	221	4	1992	ENSECO		SOIL	6010	Chromium, Total	13.4	(mg/kg)			
	221	4	1992	ENSECO		SOIL	6010	Cobalt, Total	3.5	(mg/kg)			
	221	4	1992	ENSECO	DUPLICATE	SOIL	6010	Cobalt, Total	5.1	(mg/kg)			
	221	4	1992	ENSECO	DUPLICATE	SOIL	8240	Dichloromethane	6.8	(ug/kg)		J	
	221	4	1992	ENSECO		SOIL	8240	Dichloromethane	12	(ug/kg)		J	
	221	4	1992	ENSECO	DUPLICATE	SOIL	7421	Lead, Total	14.1	(mg/kg)			
	221	4	1992	ENSECO		SOIL	7421	Lead, Total	16.6	(mg/kg)			
	221	4	1992	ENSECO		SOIL	6010	Nickel, Total	10.4	(mg/kg)			
	221	4	1992	ENSECO	DUPLICATE	SOIL	6010	Nickel, Total	13.8	(mg/kg)			

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
East Fill Area	221	4	1992	ENSECO		SOIL	8240	Toluene	7.5	(ug/kg)		J	
	221	4	1992	ENSECO	DUPLICATE	SOIL	6010	Vanadium, Total	14	(mg/kg)			
	221	4	1992	ENSECO		SOIL	6010	Vanadium, Total	23.8	(mg/kg)			
	221	4	1992	ENSECO	DUPLICATE	SOIL	6010	Zinc, Total	41.3	(mg/kg)		J	
	221	4	1992	ENSECO		SOIL	6010	Zinc, Total	49.2	(mg/kg)		J	
	222	5	1992	ENSECO		SOIL	8240	Acetone	32	(ug/kg)		J	
	222	5	1992	ENSECO		SOIL	7060	Arsenic, Total	4.4	(mg/kg)			
	222	5	1992	ENSECO		SOIL	6010	Barium, Total	284	(mg/kg)			
	222	5	1992	ENSECO		SOIL	6010	Beryllium, Total	0.65	(mg/kg)			
	222	5	1992	ENSECO		SOIL	6010	Cadmium, Total	0.86	(mg/kg)			
	222	5	1992	ENSECO		SOIL	6010	Chromium, Total	85.9	(mg/kg)			
	222	5	1992	ENSECO		SOIL	6010	Cobalt, Total	3.3	(mg/kg)			
	222	5	1992	ENSECO		SOIL	7421	Lead, Total	28.3	(mg/kg)			
	222	5	1992	ENSECO		SOIL	7470	Mercury, Total	0.21	(mg/kg)			
	222	5	1992	ENSECO		SOIL	6010	Nickel, Total	12.5	(mg/kg)			
	222	5	1992	ENSECO		SOIL	376.2	Sulfide, Total	4.7	(mg/kg)			
	222	5	1992	ENSECO		SOIL	6010	Vanadium, Total	22.4	(mg/kg)			
	222	5	1992	ENSECO		SOIL	6010	Zinc, Total	120	(mg/kg)		J	
	330	1	1999	SAVANNAH		SOIL	8310	Anthracene	56	ug/kg dw	51		
	330	1	1999	SAVANNAH		SOIL	6010	Arsenic	4.7	mg/kg d	1.3		
	330	1	1999	SAVANNAH		SOIL	6010	Barium	100	mg/kg d	1.3	N	
	330	1	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	260	ug/kg dw	51		
	330	1	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	170	ug/kg dw	51	P	
	330	1	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	79	ug/kg dw	51	P	J
	330	1	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	130	ug/kg dw	130	P	
	330	1	1999	SAVANNAH		SOIL	6010	Beryllium	0.43	mg/kg d	0.4		
	330	1	1999	SAVANNAH		SOIL	6010	Chromium	15	mg/kg d	1.3		J
	330	1	1999	SAVANNAH		SOIL	8310	Chrysene	280	ug/kg dw	51		
	330	1	1999	SAVANNAH		SOIL	6010	Cobalt	4.2	mg/kg d	1.3		
	330	1	1999	SAVANNAH		SOIL	6010	Copper	17	mg/kg d	2.6		
	330	1	1999	SAVANNAH		SOIL	8310	Fluoranthene	240	ug/kg dw	130	P	
	330	1	1999	SAVANNAH		SOIL	8015	Hydrocarbons as DRO	690	mg/kg d	43	E	J
	330	1	1999	SAVANNAH	DILUTED	SOIL	8015M	Hydrocarbons as GRO	920	ug/kg dw	86	D	
	330	1	1999	SAVANNAH		SOIL	6010	Lead	25	mg/kg d	0.63	N	J
	330	1	1999	SAVANNAH		SOIL	7471	Mercury	0.16	mg/kg d	0.026		
	330	1	1999	SAVANNAH		SOIL	6010	Nickel	16	mg/kg d	5.2		
	330	1	1999	SAVANNAH		SOIL	8310	Phenanthrene	360	ug/kg dw	51	P	
	330	1	1999	SAVANNAH		SOIL	8310	Pyrene	280	ug/kg dw	130	P	
	330	1	1999	SAVANNAH		SOIL	6010	Vanadium	24	mg/kg d	1.3		J
	330	1	1999	SAVANNAH		SOIL	6010	Zinc	60	mg/kg d	2.6	E*	J
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	8260	Acetone	110	ug/kg dw	65		
	330	10	1999	SAVANNAH		SOIL	8260	Acetone	110	ug/kg dw	62		
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	8310	Anthracene	120	ug/kg dw	5.2		
	330	10	1999	SAVANNAH	DUP/DILUTD	SOIL	8310	Anthracene	150	ug/kg dw	52	D	
	330	10	1999	SAVANNAH		SOIL	8310	Anthracene	330	ug/kg dw	330		
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	6010	Arsenic	8.7	mg/kg d	1.3		
	330	10	1999	SAVANNAH		SOIL	6010	Arsenic	8.1	mg/kg d	1.3		
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	6010	Barium	1100	mg/kg d	130	N	

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
East Fill Area	330	10	1999	SAVANNAH		SOIL	6010	Barium	850	mg/kg d	1.3	N	
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	8310	Benzo(a)anthracene	210	ug/kg dw	5.2		
	330	10	1999	SAVANNAH	DUP/DILUTD	SOIL	8310	Benzo(a)anthracene	230	ug/kg dw	52	D	
	330	10	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	490	ug/kg dw	490		
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	8310	Benzo(a)pyrene	230	ug/kg dw	5.2	E	
	330	10	1999	SAVANNAH	DUP/DILUTD	SOIL	8310	Benzo(a)pyrene	260	ug/kg dw	52	D	
	330	10	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	560	ug/kg dw	560		
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	8310	Benzo(b)fluoranthene	240	ug/kg dw	5.2	E	J
	330	10	1999	SAVANNAH	DUP/DILUTD	SOIL	8310	Benzo(b)fluoranthene	280	ug/kg dw	52	D	
	330	10	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	510	ug/kg dw	510		
	330	10	1999	SAVANNAH	DUP/DILUTD	SOIL	8310	Benzo(g,h,i)perylene	220	ug/kg dw	130	D	
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	8310	Benzo(g,h,i)perylene	340	ug/kg dw	13		
	330	10	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	660	ug/kg dw	660P	P	
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	8310	Benzo(k)fluoranthene	110	ug/kg dw	5.2		
	330	10	1999	SAVANNAH	DUP/DILUTD	SOIL	8310	Benzo(k)fluoranthene	150	ug/kg dw	52	D	
	330	10	1999	SAVANNAH		SOIL	8310	Benzo(k)fluoranthene	240	ug/kg dw	240		
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	6010	Beryllium	0.84	mg/kg d	0.52		
	330	10	1999	SAVANNAH		SOIL	6010	Beryllium	0.83	mg/kg d	0.52		
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	6010	Cadmium	0.8	mg/kg d	0.65		
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	6010	Chromium	420	mg/kg d	1.3		J
	330	10	1999	SAVANNAH		SOIL	6010	Chromium	420	mg/kg d	1.3		
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	8310	Chrysene	220	ug/kg dw	5.2	E	
	330	10	1999	SAVANNAH	DUP/DILUTD	SOIL	8310	Chrysene	230	ug/kg dw	52	D	
	330	10	1999	SAVANNAH		SOIL	8310	Chrysene	460	ug/kg dw	460		
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	6010	Cobalt	6.6	mg/kg d	1.3		
	330	10	1999	SAVANNAH		SOIL	6010	Cobalt	6.7	mg/kg d	1.3		
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	6010	Copper	44	mg/kg d	2.6		
	330	10	1999	SAVANNAH		SOIL	6010	Copper	45	mg/kg d	2.6		
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	8310	Dibenzo(a,h)anthracene	110	ug/kg dw	13	P	
	330	10	1999	SAVANNAH		SOIL	8310	Dibenzo(a,h)anthracene	430	ug/kg dw	430P	P	
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	8310	Fluoranthene	700	ug/kg dw	13	E	
	330	10	1999	SAVANNAH	DUP/DILUTD	SOIL	8310	Fluoranthene	740	ug/kg dw	130	D	
	330	10	1999	SAVANNAH		SOIL	8310	Fluoranthene	1400	ug/kg dw	1400		
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	8310	Fluorene	39	ug/kg dw	13		
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	8015	Hydrocarbons as DRO	43	mg/kg d	4.3		J
	330	10	1999	SAVANNAH		SOIL	8015	Hydrocarbons as DRO	93	mg/kg d	4.3		
	330	10	1999	SAVANNAH	DUP/DILUTD	SOIL	8310	Indeno(1,2,3-cd)pyrene	140	ug/kg dw	130	D	
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	8310	Indeno(1,2,3-cd)pyrene	140	ug/kg dw	13	E	
	330	10	1999	SAVANNAH		SOIL	8310	Indeno(1,2,3-cd)pyrene	400	ug/kg dw	400		
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	6010	Lead	100	mg/kg d	0.65	N	J
	330	10	1999	SAVANNAH		SOIL	6010	Lead	90	mg/kg d	0.65	N	
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	7471	Mercury	0.27	mg/kg d	0.026		
	330	10	1999	SAVANNAH		SOIL	7471	Mercury	0.25	mg/kg d	0.026		
	330	10	1999	SAVANNAH		SOIL		Moisture (% Loss on drying @ 105 C)	26	%		%	
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	8310	Naphthalene	38	ug/kg dw	26	P	
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	6010	Nickel	41	mg/kg d	5.2		
	330	10	1999	SAVANNAH		SOIL	6010	Nickel	19	mg/kg d	5.2		
	330	10	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	1300	mg/kg d	650		

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
East Fill Area	330	10	1999	SAVANNAH		SOIL	9045	pH	7.49	units	1		
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	8310	Phenanthrene	430	ug/kg dw	5.2	E	
	330	10	1999	SAVANNAH	DUP/DILUTD	SOIL	8310	Phenanthrene	480	ug/kg dw	52	D	
	330	10	1999	SAVANNAH		SOIL	8310	Phenanthrene	1100	ug/kg dw	1100		
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	8310	Pyrene	460	ug/kg dw	13		
	330	10	1999	SAVANNAH	DUP/DILUTD	SOIL	8310	Pyrene	510	ug/kg dw	130	D	
	330	10	1999	SAVANNAH		SOIL	8310	Pyrene	1100	ug/kg dw	1100		
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	6010	Vanadium	170	mg/kg d	1.3		J
	330	10	1999	SAVANNAH		SOIL	6010	Vanadium	390	mg/kg d	1.3		
	330	10	1999	SAVANNAH	DUPLICATE	SOIL	6010	Zinc	610	mg/kg d	2.6	E*	J
	330	10	1999	SAVANNAH		SOIL	6010	Zinc	480	mg/kg d	2.6	E*	
	331	1	1999	SAVANNAH		SOIL	8310	Anthracene	180	ug/kg dw	48		
	331	1	1999	SAVANNAH		SOIL	6010	Arsenic	7.2	mg/kg d	1.2		
	331	1	1999	SAVANNAH		SOIL	6010	Barium	270	mg/kg d	1.2	N	J
	331	1	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	470	ug/kg dw	48		
	331	1	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	280	ug/kg dw	48	P	
	331	1	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	130	ug/kg dw	48	P	
	331	1	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	590	ug/kg dw	120	P	
	331	1	1999	SAVANNAH		SOIL	6010	Beryllium	0.78	mg/kg d	0.48		
	331	1	1999	SAVANNAH		SOIL	6010	Chromium	130	mg/kg d	1.2		
	331	1	1999	SAVANNAH		SOIL	8310	Chrysene	840	ug/kg dw	48		
	331	1	1999	SAVANNAH		SOIL	6010	Cobalt	6.7	mg/kg d	1.2		
	331	1	1999	SAVANNAH		SOIL	6010	Copper	30	mg/kg d	2.4		
	331	1	1999	SAVANNAH		SOIL	8310	Dibenzo(a,h)anthracene	160	ug/kg dw	120	P	
	331	1	1999	SAVANNAH		SOIL	8310	Fluoranthene	940	ug/kg dw	120	P	
	331	1	1999	SAVANNAH		SOIL	6010	Lead	68	mg/kg d	0.6	N	J
	331	1	1999	SAVANNAH		SOIL	7471	Mercury	0.41	mg/kg d	0.024		
	331	1	1999	SAVANNAH		SOIL		Moisture (% Loss on drying @ 105 C)	15	%		%	
	331	1	1999	SAVANNAH		SOIL	6010	Nickel	23	mg/kg d	4.8		
	331	1	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	15000	mg/kg d	600		
	331	1	1999	SAVANNAH		SOIL	9045	pH	7.32	units	1		
	331	1	1999	SAVANNAH		SOIL	8310	Phenanthrene	1100	ug/kg dw	48	P	
	331	1	1999	SAVANNAH		SOIL	8310	Pyrene	490	ug/kg dw	120	P	
	331	1	1999	SAVANNAH		SOIL	6010	Vanadium	32	mg/kg d	1.2		
	331	1	1999	SAVANNAH		SOIL	6010	Zinc	130	mg/kg d	2.4	E*	J
	331	5	1999	SAVANNAH	DUPLICATE	SOIL	8260	Acetone	76	ug/kg dw	56		
	331	5	1999	SAVANNAH		SOIL	8260	Acetone	170	ug/kg dw	57		
	331	5	1999	SAVANNAH	DUPLICATE	SOIL	8310	Anthracene	420	ug/kg dw	150		
	331	5	1999	SAVANNAH		SOIL	8310	Anthracene	570	ug/kg dw	150		
	331	5	1999	SAVANNAH	DUPLICATE	SOIL	6010	Arsenic	7.4	mg/kg d	1.2		
	331	5	1999	SAVANNAH		SOIL	6010	Arsenic	7.3	mg/kg d	1.3		
	331	5	1999	SAVANNAH	DUPLICATE	SOIL	6010	Barium	220	mg/kg d	1.2	N	
	331	5	1999	SAVANNAH		SOIL	6010	Barium	250	mg/kg d	1.3	N	
	331	5	1999	SAVANNAH	DUPLICATE	SOIL	8310	Benzo(a)anthracene	1200	ug/kg dw	150		
	331	5	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	1500	ug/kg dw	150	P	
	331	5	1999	SAVANNAH	DUPLICATE	SOIL	8310	Benzo(a)pyrene	420	ug/kg dw	150		
	331	5	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	600	ug/kg dw	150		
	331	5	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	260	ug/kg dw	150	P	

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
East Fill Area	331	5	1999	SAVANNAH	DUPLICATE	SOIL	8310	Benzo(g,h,i)perylene	540	ug/kg dw	380		
	331	5	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	920	ug/kg dw	380	P	
	331	5	1999	SAVANNAH	DUPLICATE	SOIL	6010	Beryllium	0.85	mg/kg d	0.48		
	331	5	1999	SAVANNAH		SOIL	6010	Beryllium	0.86	mg/kg d	0.52		
	331	5	1999	SAVANNAH		SOIL	8260	Carbon disulfide	12	ug/kg dw	5.7		
	331	5	1999	SAVANNAH	DUPLICATE	SOIL	6010	Chromium	20	mg/kg d	1.2		J
	331	5	1999	SAVANNAH		SOIL	6010	Chromium	65	mg/kg d	1.2		J
	331	5	1999	SAVANNAH	DUPLICATE	SOIL	8310	Chrysene	1000	ug/kg dw	150		
	331	5	1999	SAVANNAH		SOIL	8310	Chrysene	1400	ug/kg dw	150		
	331	5	1999	SAVANNAH	DUPLICATE	SOIL	6010	Cobalt	15	mg/kg d	1.2		
	331	5	1999	SAVANNAH		SOIL	6010	Cobalt	7.2	mg/kg d	1.2		
	331	5	1999	SAVANNAH	DUPLICATE	SOIL	6010	Copper	24	mg/kg d	2.4		
	331	5	1999	SAVANNAH		SOIL	6010	Copper	29	mg/kg d	2.6		
	331	5	1999	SAVANNAH		SOIL	8310	Dibenzo(a,h)anthracene	460	ug/kg dw	380		
	331	5	1999	SAVANNAH	DUPLICATE	SOIL	8310	Fluoranthene	610	ug/kg dw	380	P	
	331	5	1999	SAVANNAH		SOIL	8310	Fluoranthene	620	ug/kg dw	380	P	
	331	5	1999	SAVANNAH	DUPLICATE	SOIL	6010	Lead	53	mg/kg d	0.62	N	
	331	5	1999	SAVANNAH		SOIL	6010	Lead	58	mg/kg d	0.64	N	
	331	5	1999	SAVANNAH	DUPLICATE	SOIL	7471	Mercury	0.26	mg/kg d	0.024		
	331	5	1999	SAVANNAH		SOIL	7471	Mercury	0.3	mg/kg d	0.026		
	331	5	1999	SAVANNAH		SOIL	8260	Methyl ethyl ketone (2-Butanone)	45	ug/kg dw	29		
	331	5	1999	SAVANNAH	DUPLICATE	SOIL		Moisture (% Loss on drying @ 105 C)	24	%		%	
	331	5	1999	SAVANNAH		SOIL		Moisture (% Loss on drying @ 105 C)	23	%		%	
	331	5	1999	SAVANNAH	DUPLICATE	SOIL	6010	Nickel	25	mg/kg d	4.8		
	331	5	1999	SAVANNAH		SOIL	6010	Nickel	23	mg/kg d	5.2		
	331	5	1999	SAVANNAH	DUPLICATE	SOIL	Walkley-Black	Organic Carbon	28000	mg/kg d	600		
	331	5	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	15000	mg/kg d	650		
	331	5	1999	SAVANNAH	DUPLICATE	SOIL	9045	pH	7.42	units	1		
	331	5	1999	SAVANNAH		SOIL	9045	pH	7.18	units	1		
	331	5	1999	SAVANNAH	DUPLICATE	SOIL	8310	Phenanthrene	1100	ug/kg dw	150	P	
	331	5	1999	SAVANNAH		SOIL	8310	Phenanthrene	1500	ug/kg dw	150	P	
	331	5	1999	SAVANNAH	DUPLICATE	SOIL	8310	Pyrene	1600	ug/kg dw	380	P	
	331	5	1999	SAVANNAH		SOIL	8310	Pyrene	1900	ug/kg dw	380	P	
	331	5	1999	SAVANNAH	DUPLICATE	SOIL	9030	Sulfide	35	mg/kg d	30		
	331	5	1999	SAVANNAH	DUPLICATE	SOIL	6010	Vanadium	27	mg/kg d	1.2		
	331	5	1999	SAVANNAH		SOIL	6010	Vanadium	38	mg/kg d	1.3		
	331	5	1999	SAVANNAH	DUPLICATE	SOIL	6010	Zinc	90	mg/kg d	2.4	E*	
	331	5	1999	SAVANNAH		SOIL	6010	Zinc	140	mg/kg d	2.6	E*	
Reservoir	2	1	1990	ENSECO		SOIL	8270	Anthracene	3300	(ug/kg)			
	2	1	1990	ENSECO		SOIL	7060	Arsenic, Total	3.8	(mg/kg)			
	2	1	1990	ENSECO		SOIL	6010	Barium, Total	186	(mg/kg)			
	2	1	1990	ENSECO		SOIL	8270	Benzo(a)anthracene	7400	(ug/kg)			
	2	1	1990	ENSECO		SOIL	8270	Benzo(a)pyrene	5800	(ug/kg)			
	2	1	1990	ENSECO		SOIL	8270	Benzo(b)fluoranthene	8700	(ug/kg)			
	2	1	1990	ENSECO		SOIL	8270	Benzo(g,h,i)perylene	4000	(ug/kg)			
	2	1	1990	ENSECO		SOIL	8270	Benzo(K)fluoranthene	3800	(ug/kg)			
	2	1	1990	ENSECO		SOIL	6010	Beryllium, Total	0.59	(mg/kg)			

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
Reservoir	2	1	1990	ENSECO		SOIL	6010	Cadmium, Total	0.62	(mg/kg)			
	2	1	1990	ENSECO		SOIL	6010	Chromium, Total	11.8	(mg/kg)			
	2	1	1990	ENSECO		SOIL	8270	Chrysene	6100	(ug/kg)			
	2	1	1990	ENSECO		SOIL	6010	Cobalt, Total	4.8	(mg/kg)			
	2	1	1990	ENSECO		SOIL	8270	Fluoranthene	22000	(ug/kg)			
	2	1	1990	ENSECO		SOIL	7421	Lead, Total	9.4	(mg/kg)			
	2	1	1990	ENSECO		SOIL	6010	Nickel, Total	11.1	(mg/kg)			
	2	1	1990	ENSECO		SOIL	8270	Phenanthrene	17000	(ug/kg)			
	2	1	1990	ENSECO		SOIL	8270	Pyrene	16000	(ug/kg)			
	2	1	1990	ENSECO		SOIL	7740	Selenium, Total	0.57	(mg/kg)			
	2	1	1990	ENSECO		SOIL	6010	Vanadium, Total	22.1	(mg/kg)			
	2	1	1990	ENSECO		SOIL	6010	Zinc, Total	67.3	(mg/kg)			
	2	15	1990	ENSECO		SOIL	7060	Arsenic, Total	4.6	(mg/kg)			
	2	15	1990	ENSECO		SOIL	6010	Barium, Total	148	(mg/kg)			
	2	15	1990	ENSECO		SOIL	6010	Beryllium, Total	0.4	(mg/kg)			
	2	15	1990	ENSECO		SOIL	6010	Cadmium, Total	0.59	(mg/kg)			
	2	15	1990	ENSECO		SOIL	6010	Chromium, Total	10.3	(mg/kg)			
	2	15	1990	ENSECO		SOIL	6010	Cobalt, Total	7.9	(mg/kg)			
	2	15	1990	ENSECO		SOIL	6010	Nickel, Total	17.2	(mg/kg)			
	2	15	1990	ENSECO		SOIL	6010	Vanadium, Total	18	(mg/kg)			
	2	15	1990	ENSECO		SOIL	6010	Zinc, Total	46.1	(mg/kg)			
	325	8	1999	SAVANNAH		SOIL	6010	Arsenic	7.9	mg/kg d	1.4		
	325	8	1999	SAVANNAH		SOIL	6010	Barium	250	mg/kg d	1.4	N	
	325	8	1999	SAVANNAH		SOIL	6010	Beryllium	0.93	mg/kg d	0.56		
	325	8	1999	SAVANNAH		SOIL	6010	Chromium	21	mg/kg d	1.4		
	325	8	1999	SAVANNAH		SOIL	6010	Cobalt	7.4	mg/kg d	1.4		
	325	8	1999	SAVANNAH		SOIL	6010	Copper	21	mg/kg d	2.8		
	325	8	1999	SAVANNAH		SOIL	8015	Hydrocarbons as DRO	4.8	mg/kg d	4.6		
	325	8	1999	SAVANNAH		SOIL	6010	Lead	13	mg/kg d	0.68	N	
	325	8	1999	SAVANNAH		SOIL	7471	Mercury	0.037	mg/kg d	0.028		
	325	8	1999	SAVANNAH		SOIL		Moisture (% Loss on drying @ 105 C)	32	%		%	
	325	8	1999	SAVANNAH		SOIL	6010	Nickel	20	mg/kg d	5.6		
	325	8	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	1900	mg/kg d	700		
	325	8	1999	SAVANNAH		SOIL	9045	pH	6.75	units	1		
	325	8	1999	SAVANNAH		SOIL	9030	Sulfide	43	mg/kg d	35		
	325	8	1999	SAVANNAH		SOIL	6010	Vanadium	37	mg/kg d	1.4		
	325	8	1999	SAVANNAH		SOIL	6010	Zinc	67	mg/kg d	2.8	E*	
	325	16	1999	SAVANNAH		SOIL	6010	Arsenic	6.8	mg/kg d	1.2		
	325	16	1999	SAVANNAH		SOIL	6010	Barium	130	mg/kg d	1.2	N	
	325	16	1999	SAVANNAH		SOIL	6010	Beryllium	0.56	mg/kg d	0.48		
	325	16	1999	SAVANNAH		SOIL	6010	Chromium	15	mg/kg d	1.2		
	325	16	1999	SAVANNAH		SOIL	6010	Cobalt	5.3	mg/kg d	1.2		
	325	16	1999	SAVANNAH		SOIL	6010	Copper	13	mg/kg d	2.4		
	325	16	1999	SAVANNAH		SOIL	6010	Lead	8.5	mg/kg d	0.62	N	
	325	16	1999	SAVANNAH		SOIL		Moisture (% Loss on drying @ 105 C)	22	%		%	
	325	16	1999	SAVANNAH		SOIL	6010	Nickel	16	mg/kg d	4.8		
	325	16	1999	SAVANNAH		SOIL	9045	pH	6.99	units	1		
	325	16	1999	SAVANNAH		SOIL	6010	Vanadium	27	mg/kg d	1.2		

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
	325	16	1999	SAVANNAH		SOIL	6010	Zinc	48	mg/kg d	2.4	E*	
Tank 2	3	1	1990	ENSECO		SOIL	7060	Arsenic, Total	3.9	(mg/kg)			
	3	1	1990	ENSECO		SOIL	6010	Barium, Total	119	(mg/kg)			
	3	1	1990	ENSECO		SOIL	6010	Beryllium, Total	0.61	(mg/kg)			
	3	1	1990	ENSECO		SOIL	6010	Cadmium, Total	0.64	(mg/kg)			
	3	1	1990	ENSECO		SOIL	6010	Chromium, Total	12.1	(mg/kg)			
	3	1	1990	ENSECO		SOIL	6010	Cobalt, Total	4.9	(mg/kg)			
	3	1	1990	ENSECO		SOIL	6010	Nickel, Total	15.9	(mg/kg)			
	3	1	1990	ENSECO		SOIL	6010	Vanadium, Total	17.3	(mg/kg)			
	3	1	1990	ENSECO		SOIL	6010	Zinc, Total	48.9	(mg/kg)			
	3	15	1990	ENSECO		SOIL	7060	Arsenic, Total	4.9	(mg/kg)			
	3	15	1990	ENSECO		SOIL	6010	Barium, Total	228	(mg/kg)			
	3	15	1990	ENSECO		SOIL	6010	Beryllium, Total	0.45	(mg/kg)			
	3	15	1990	ENSECO		SOIL	6010	Cadmium, Total	0.55	(mg/kg)			
	3	15	1990	ENSECO		SOIL	6010	Chromium, Total	10.8	(mg/kg)			
	3	15	1990	ENSECO		SOIL	6010	Cobalt, Total	4.9	(mg/kg)			
	3	15	1990	ENSECO		SOIL	6010	Nickel, Total	15.1	(mg/kg)			
	3	15	1990	ENSECO		SOIL	6010	Vanadium, Total	16.7	(mg/kg)			
	3	15	1990	ENSECO		SOIL	6010	Zinc, Total	45.9	(mg/kg)			
Tank 3	234	3	1992	ENSECO		SOIL	418.1	TPH	4930	(mg/kg)			
Tank 4	8	2	1990	ENSECO		SOIL	7060	Arsenic, Total	2.5	(mg/kg)			
	8	2	1990	ENSECO		SOIL	6010	Barium, Total	112	(mg/kg)			
	8	2	1990	ENSECO		SOIL	6010	Chromium, Total	23.1	(mg/kg)			
	8	2	1990	ENSECO		SOIL	6010	Cobalt, Total	5.1	(mg/kg)			
	8	2	1990	ENSECO		SOIL	7421	Lead, Total	52.4	(mg/kg)			
	8	2	1990	ENSECO		SOIL	8270	Pyrene	820	(ug/kg)			
	8	2	1990	ENSECO		SOIL	6010	Vanadium, Total	14.6	(mg/kg)			
	8	2	1990	ENSECO		SOIL	6010	Zinc, Total	21.6	(mg/kg)			
	8	12	1990	ENSECO		SOIL	8240	Acetone	37	(ug/kg)			
	8	12	1990	ENSECO		SOIL	7060	Arsenic, Total	2.4	(mg/kg)			
	8	12	1990	ENSECO		SOIL	6010	Barium, Total	186	(mg/kg)			
	8	12	1990	ENSECO		SOIL	6010	Beryllium, Total	0.65	(mg/kg)			
	8	12	1990	ENSECO		SOIL	6010	Cadmium, Total	0.9	(mg/kg)			
	8	12	1990	ENSECO		SOIL	6010	Chromium, Total	9.3	(mg/kg)			
	8	12	1990	ENSECO		SOIL	6010	Cobalt, Total	10.7	(mg/kg)			
	8	12	1990	ENSECO		SOIL	7421	Lead, Total	9.4	(mg/kg)			
	8	12	1990	ENSECO		SOIL	6010	Nickel, Total	24.1	(mg/kg)			
	8	12	1990	ENSECO		SOIL	6010	Vanadium, Total	18	(mg/kg)			
	8	12	1990	ENSECO		SOIL	6010	Zinc, Total	28.4	(mg/kg)			
	228	4	1992	ENSECO		SOIL	8240	Ethylbenzene	140	(ug/kg)			
	228	4	1992	ENSECO		SOIL	418.1	TPH	31100	(mg/kg)			
	228	11	1992	ENSECO		SOIL	418.1	TPH	632	(mg/kg)			
	328	1	1999	SAVANNAH		SOIL	8310	Anthracene	55	ug/kg dw	43		
	328	1	1999	SAVANNAH		SOIL	6010	Arsenic	5.4	mg/kg d	1.1		
	328	1	1999	SAVANNAH		SOIL	6010	Barium	210	mg/kg d	1.1		
	328	1	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	150	ug/kg dw	43		
	328	1	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	220	ug/kg dw	43		

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
Tank 4	328	1	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	94	ug/kg dw	43	P	
	328	1	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	180	ug/kg dw	110	P	
	328	1	1999	SAVANNAH		SOIL	6010	Beryllium	0.71	mg/kg d	0.44	E	
	328	1	1999	SAVANNAH		SOIL	6010	Cadmium	0.88	mg/kg d	0.55	E	
	328	1	1999	SAVANNAH		SOIL	6010	Chromium	77	mg/kg d	1.1		
	328	1	1999	SAVANNAH		SOIL	8310	Chrysene	320	ug/kg dw	43	P	
	328	1	1999	SAVANNAH		SOIL	6010	Cobalt	5.8	mg/kg d	1.1	E	
	328	1	1999	SAVANNAH		SOIL	6010	Copper	29	mg/kg d	2.2		
	328	1	1999	SAVANNAH		SOIL	8310	Fluoranthene	190	ug/kg dw	110	P	
	328	1	1999	SAVANNAH	DILUTED	SOIL	8015	Hydrocarbons as DRO	520	mg/kg d	66	D	
	328	1	1999	SAVANNAH		SOIL	8015	Hydrocarbons as DRO	750	mg/kg d	3.6	E	
	328	1	1999	SAVANNAH		SOIL	6010	Lead	81	mg/kg d	0.55		
	328	1	1999	SAVANNAH		SOIL	7471	Mercury	0.42	mg/kg d	0.22	N	
	328	1	1999	SAVANNAH		SOIL	6010	Nickel	19	mg/kg d	4.4		
	328	1	1999	SAVANNAH		SOIL	8310	Phenanthrene	290	ug/kg dw	43	P	
	328	1	1999	SAVANNAH		SOIL	8310	Pyrene	410	ug/kg dw	110	P	
	328	1	1999	SAVANNAH		SOIL	6010	Vanadium	30	mg/kg d	1.1		
	328	1	1999	SAVANNAH		SOIL	6010	Zinc	130	mg/kg d	2.2		
	328	16	1999	SAVANNAH		SOIL	6010	Arsenic	5	mg/kg d	1.3		
	328	16	1999	SAVANNAH		SOIL	6010	Barium	200	mg/kg d	1.3		
	328	16	1999	SAVANNAH		SOIL	6010	Beryllium	0.79	mg/kg d	0.52	E	
	328	16	1999	SAVANNAH		SOIL	8270	bis(2-Ethylhexyl)phthalate	460	ug/kg dw	420	B	
	328	16	1999	SAVANNAH		SOIL	6010	Chromium	26	mg/kg d	1.3		
	328	16	1999	SAVANNAH		SOIL	8310	Chrysene	5.4	ug/kg dw	5.1	P	
	328	16	1999	SAVANNAH		SOIL	6010	Cobalt	4.9	mg/kg d	1.3	E	
	328	16	1999	SAVANNAH		SOIL	6010	Copper	18	mg/kg d	2.6		
	328	16	1999	SAVANNAH	DILUTED	SOIL	8015	Hydrocarbons as DRO	360	mg/kg d	86	D	
	328	16	1999	SAVANNAH		SOIL	8015	Hydrocarbons as DRO	650	mg/kg d	4.3	E	
	328	16	1999	SAVANNAH		SOIL	6010	Lead	11	mg/kg d	0.64		
	328	16	1999	SAVANNAH		SOIL	7471	Mercury	0.041	mg/kg d	0.026	N	
	328	16	1999	SAVANNAH		SOIL		Moisture (% Loss on drying @ 105 C)	27	%			
	328	16	1999	SAVANNAH		SOIL	6010	Nickel	18	mg/kg d	5.2		
	328	16	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	5900	mg/kg d	650		
	328	16	1999	SAVANNAH		SOIL	9045	pH	7.68	units	1		
	328	16	1999	SAVANNAH		SOIL	6010	Vanadium	32	mg/kg d	1.3		
	328	16	1999	SAVANNAH		SOIL	6010	Zinc	74	mg/kg d	2.6		
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	8270	2-Methylnaphthalene	390	ug/kg dw	360		
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	8310	Anthracene	67	ug/kg dw	44		
	329	1	1999	SAVANNAH		SOIL	8310	Anthracene	110	ug/kg dw	44		
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	6010	Arsenic	6	mg/kg d	1.1		
	329	1	1999	SAVANNAH		SOIL	6010	Arsenic	6.5	mg/kg d	1.1		
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	6010	Barium	270	mg/kg d	1.1		
	329	1	1999	SAVANNAH		SOIL	6010	Barium	260	mg/kg d	1.1		
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	8310	Benzo(a)anthracene	140	ug/kg dw	44		
	329	1	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	190	ug/kg dw	44		
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	8310	Benzo(a)pyrene	180	ug/kg dw	44		
	329	1	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	290	ug/kg dw	44		
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	8310	Benzo(b)fluoranthene	94	ug/kg dw	44		

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
	329	1	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	130	ug/kg dw	44		
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	8310	Benzo(g,h,i)perylene	210	ug/kg dw	110	P	
	329	1	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	480	ug/kg dw	110		
	329	1	1999	SAVANNAH		SOIL	8310	Benzo(k)fluoranthene	53	ug/kg dw	44	P	
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	6010	Beryllium	0.76	mg/kg d	0.44	E	
	329	1	1999	SAVANNAH		SOIL	6010	Beryllium	0.75	mg/kg d	0.44	E	
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	6010	Cadmium	1.0	mg/kg d	0.55	E	
	329	1	1999	SAVANNAH		SOIL	6010	Cadmium	0.99	mg/kg d	0.55	E	
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	6010	Chromium	87	mg/kg d	1.1		
	329	1	1999	SAVANNAH		SOIL	6010	Chromium	94	mg/kg d	1.1		
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	8310	Chrysene	290	ug/kg dw	44	P	
	329	1	1999	SAVANNAH		SOIL	8310	Chrysene	400	ug/kg dw	44	P	
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	6010	Cobalt	6.3	mg/kg d	1.1	E	
	329	1	1999	SAVANNAH		SOIL	6010	Cobalt	6.5	mg/kg d	1.1	E	
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	6010	Copper	28	mg/kg d	2.2		
	329	1	1999	SAVANNAH		SOIL	6010	Copper	30	mg/kg d	2.2		
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	8310	Fluoranthene	430	ug/kg dw	110		
	329	1	1999	SAVANNAH		SOIL	8310	Fluoranthene	700	ug/kg dw	110		
	329	1	1999	SAVANNAH	DUP/DILUTD	SOIL	8015	Hydrocarbons as DRO	320	mg/kg d	73	D	
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	8015	Hydrocarbons as DRO	630	mg/kg d	3.7	E	
	329	1	1999	SAVANNAH	DILUTED	SOIL	8015	Hydrocarbons as DRO	360	mg/kg d	72	D	
	329	1	1999	SAVANNAH		SOIL	8015	Hydrocarbons as DRO	590	mg/kg d	3.6	E	
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	6010	Lead	90	mg/kg d	0.55		
	329	1	1999	SAVANNAH		SOIL	6010	Lead	91	mg/kg d	0.55		
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	7471	Mercury	0.39	mg/kg d	0.022	N	
Tank 4	329	1	1999	SAVANNAH		SOIL	7471	Mercury	0.27	mg/kg d	0.22	N	
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	6010	Nickel	21	mg/kg d	4.4		
	329	1	1999	SAVANNAH		SOIL	6010	Nickel	21	mg/kg d	4.4		
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	8310	Phenanthrene	370	ug/kg dw	44		
	329	1	1999	SAVANNAH		SOIL	8310	Phenanthrene	490	ug/kg dw	44		
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	8310	Pyrene	200	ug/kg dw	110	P	J
	329	1	1999	SAVANNAH		SOIL	8310	Pyrene	1100	ug/kg dw	110		J
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	6010	Vanadium	32	mg/kg d	1.1		
	329	1	1999	SAVANNAH		SOIL	6010	Vanadium	35	mg/kg d	1.1		
	329	1	1999	SAVANNAH	DUPLICATE	SOIL	6010	Zinc	150	mg/kg d	2.2		
	329	1	1999	SAVANNAH		SOIL	6010	Zinc	150	mg/kg d	2.2		
	329	16	1999	SAVANNAH		SOIL	6010	Arsenic	7.3	mg/kg d	1.3		
	329	16	1999	SAVANNAH		SOIL	6010	Barium	190	mg/kg d	1.3		
	329	16	1999	SAVANNAH		SOIL	6010	Beryllium	0.57	mg/kg d	0.52	E	
	329	16	1999	SAVANNAH		SOIL	8270	bis(2-Ethylhexyl)phthalate	470	ug/kg dw	410	B	
	329	16	1999	SAVANNAH		SOIL	6010	Chromium	13	mg/kg d	1.3		
	329	16	1999	SAVANNAH		SOIL	6010	Cobalt	9.6	mg/kg d	1.3	E	
	329	16	1999	SAVANNAH		SOIL	6010	Copper	16	mg/kg d	2.6		
	329	16	1999	SAVANNAH		SOIL	6010	Lead	10	mg/kg d	0.63		
	329	16	1999	SAVANNAH		SOIL	7471	Mercury	0.040	mg/kg d	0.026	N	
	329	16	1999	SAVANNAH		SOIL		Moisture (% Loss on drying @ 105 C)	27	%			
	329	16	1999	SAVANNAH		SOIL	6010	Nickel	24	mg/kg d	5.2		
	329	16	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	11000	mg/kg d	650		

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
	329	16	1999	SAVANNAH		SOIL	9045	pH	7.92	units	1		
	329	16	1999	SAVANNAH		SOIL	6010	Vanadium	23	mg/kg d	1.3		
	329	16	1999	SAVANNAH		SOIL	6010	Zinc	50	mg/kg d	2.6		
Tank 5	6	1	1990	ENSECO		SOIL	8240	2-Butanone	30	(ug/kg)			
	6	1	1990	ENSECO		SOIL	8240	Acetone	190	(ug/kg)			
	6	1	1990	ENSECO		SOIL	7060	Arsenic, Total	2	(mg/kg)			
	6	1	1990	ENSECO		SOIL	6010	Barium, Total	184	(mg/kg)			
	6	1	1990	ENSECO		SOIL	6010	Beryllium, Total	0.45	(mg/kg)			
	6	1	1990	ENSECO		SOIL	6010	Cadmium, Total	0.67	(mg/kg)			
	6	1	1990	ENSECO		SOIL	6010	Chromium, Total	8.6	(mg/kg)			
	6	1	1990	ENSECO		SOIL	8270	Chrysene	400	(ug/kg)			
	6	1	1990	ENSECO		SOIL	6010	Cobalt, Total	2.7	(mg/kg)			
	6	1	1990	ENSECO		SOIL	8270	Fluoranthene	410	(ug/kg)			
	6	1	1990	ENSECO		SOIL	7421	Lead, Total	9.8	(mg/kg)			
	6	1	1990	ENSECO		SOIL	6010	Nickel, Total	9.1	(mg/kg)			
	6	1	1990	ENSECO		SOIL	8270	Phenanthrene	500	(ug/kg)			
	6	1	1990	ENSECO		SOIL	8270	Pyrene	620	(ug/kg)			
	6	1	1990	ENSECO		SOIL	376.2	Sulfide, Total	11.6	(mg/kg)			
	6	1	1990	ENSECO		SOIL	6010	Vanadium, Total	18.3	(mg/kg)			
	6	1	1990	ENSECO		SOIL	6010	Zinc, Total	38.6	(mg/kg)			
	6	16	1990	ENSECO		SOIL	7060	Arsenic, Total	4	(mg/kg)			
	6	16	1990	ENSECO		SOIL	6010	Barium, Total	117	(mg/kg)			
	6	16	1990	ENSECO		SOIL	6010	Beryllium, Total	0.38	(mg/kg)			
	6	16	1990	ENSECO		SOIL	6010	Chromium, Total	9.1	(mg/kg)			
	6	16	1990	ENSECO		SOIL	6010	Cobalt, Total	4.5	(mg/kg)			
	6	16	1990	ENSECO		SOIL	7421	Lead, Total	7.4	(mg/kg)			
	6	16	1990	ENSECO		SOIL	6010	Nickel, Total	15.2	(mg/kg)			
Tank 5	6	16	1990	ENSECO		SOIL	6010	Vanadium, Total	14	(mg/kg)			
	6	16	1990	ENSECO		SOIL	6010	Zinc, Total	39.2	(mg/kg)			
	6	25	1990	ENSECO		SOIL	8240	2-Butanone	10	(ug/kg)			
	6	25	1990	ENSECO		SOIL	8240	Acetone	76	(ug/kg)			
	6	25	1990	ENSECO		SOIL	7060	Arsenic, Total	0.85	(mg/kg)			
	6	25	1990	ENSECO		SOIL	6010	Barium, Total	96.4	(mg/kg)			
	6	25	1990	ENSECO		SOIL	6010	Beryllium, Total	0.45	(mg/kg)			
	6	25	1990	ENSECO		SOIL	6010	Cadmium, Total	1.3	(mg/kg)			
	6	25	1990	ENSECO		SOIL	6010	Chromium, Total	10	(mg/kg)			
	6	25	1990	ENSECO		SOIL	6010	Cobalt, Total	6	(mg/kg)			
	6	25	1990	ENSECO		SOIL	6010	Nickel, Total	14.6	(mg/kg)			
	6	25	1990	ENSECO		SOIL	376.2	Sulfide, Total	6.6	(mg/kg)			
	6	25	1990	ENSECO		SOIL	6010	Vanadium, Total	15.1	(mg/kg)			
	6	25	1990	ENSECO		SOIL	6010	Zinc, Total	36.2	(mg/kg)			
	229	5	1992	ENSECO		SOIL	8240	Ethylbenzene	880	(ug/kg)			
	229	5	1992	ENSECO	DUPLICATE	SOIL	8240	Ethylbenzene	920	(ug/kg)			
	229	5	1992	ENSECO		SOIL	418.1	TPH	76.9	(mg/kg)			
	134		1992	SAVANNAH	GW	WATER	8015	Hydrocarbons as DRO	0.61	mg/l	0.1		
	134		1992	SAVANNAH	GW	WATER	8015M	Hydrocarbons as GRO	0.056	mg/l	0.01		

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
	332	1	1999	SAVANNAH		SOIL	8310	Anthracene	83	ug/kg dw	44	P	
	332	1	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	140	ug/kg dw	44		
	332	1	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	200	ug/kg dw	44		
	332	1	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	67	ug/kg dw	44	P	
	332	1	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	200	ug/kg dw	110	P	
	332	1	1999	SAVANNAH		SOIL	8310	Chrysene	320	ug/kg dw	44		
	332	1	1999	SAVANNAH		SOIL	8310	Fluoranthene	350	ug/kg dw	110	P	
	332	1	1999	SAVANNAH		SOIL	8015	Hydrocarbons as DRO	510	mg/kg d	3.8	E	J
	332	1	1999	SAVANNAH		SOIL	8310	Phenanthrene	380	ug/kg dw	44		
	332	1	1999	SAVANNAH		SOIL	8310	Pyrene	780	ug/kg dw	110	P	
	332	14	1999	SAVANNAH		SOIL	8015	Hydrocarbons as DRO	4.5	mg/kg d	3.6		
	332	14	1999	SAVANNAH		SOIL	8015M	Hydrocarbons as GRO	310	ug/kg dw	100		
	332	14	1999	SAVANNAH		SOIL	8310	Phenanthrene	7.3	ug/kg dw	5.1		
	332	14	1999	SAVANNAH		SOIL	8310	Pyrene	19	ug/kg dw	13		
	333	1	1999	SAVANNAH		SOIL	8310	Anthracene	100	ug/kg dw	44		
	333	1	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	160	ug/kg dw	44		
	333	1	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	190	ug/kg dw	44	P	
	333	1	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	100	ug/kg dw	44	P	
	333	1	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	280	ug/kg dw	110		
	333	1	1999	SAVANNAH		SOIL	8310	Chrysene	380	ug/kg dw	44		
	333	1	1999	SAVANNAH		SOIL	8310	Fluoranthene	240	ug/kg dw	110	P	
	333	1	1999	SAVANNAH		SOIL	8015	Hydrocarbons as DRO	370	mg/kg d	11	E	J
	333	1	1999	SAVANNAH	DILUTED	SOIL	8015M	Hydrocarbons as GRO	340	ug/kg dw	110	D	
	333	1	1999	SAVANNAH		SOIL	8310	Phenanthrene	620	ug/kg dw	44		
	333	1	1999	SAVANNAH		SOIL	8310	Pyrene	270	ug/kg dw	110	P	
	333	14	1999	SAVANNAH		SOIL	8015	Hydrocarbons as DRO	4.7	mg/kg d	2.7		

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
Tank 6	5	1	1990	ENSECO		SOIL	8270	2-Methylnaphthalene	1300	(ug/kg)			
	5	1	1990	ENSECO		SOIL	8270	Anthracene	870	(ug/kg)			
	5	1	1990	ENSECO		SOIL	7060	Arsenic, Total	4.1	(mg/kg)			
	5	1	1990	ENSECO		SOIL	6010	Barium, Total	119	(mg/kg)			
	5	1	1990	ENSECO		SOIL	8270	Benzo(a)anthracene	1300	(ug/kg)			
	5	1	1990	ENSECO		SOIL	8270	Benzo(b)fluoranthene	1200	(ug/kg)			
	5	1	1990	ENSECO		SOIL	6010	Beryllium, Total	1.2	(mg/kg)			
	5	1	1990	ENSECO		SOIL	6010	Cadmium, Total	17.1	(mg/kg)			
	5	1	1990	ENSECO		SOIL	6010	Chromium, Total	19.8	(mg/kg)			
	5	1	1990	ENSECO		SOIL	8270	Chrysene	1700	(ug/kg)			
	5	1	1990	ENSECO		SOIL	6010	Cobalt, Total	6.1	(mg/kg)			
	5	1	1990	ENSECO		SOIL	8270	Dibenz(a,h)anthracene	880	(ug/kg)			
	5	1	1990	ENSECO		SOIL	8270	Fluoranthene	1300	(ug/kg)			
	5	1	1990	ENSECO		SOIL	7421	Lead, Total	694	(mg/kg)	* Above SSL & TACO		
	5	1	1990	ENSECO		SOIL	6010	Nickel, Total	20.7	(mg/kg)			
	5	1	1990	ENSECO		SOIL	8270	Phenanthrene	9200	(ug/kg)			
	5	1	1990	ENSECO		SOIL	8270	Pyrene	3500	(ug/kg)			
	5	1	1990	ENSECO		SOIL	376.2	Sulfide, Total	0.64	(mg/kg)			
	5	1	1990	ENSECO		SOIL	6010	Vanadium, Total	18.3	(mg/kg)			
	5	1	1990	ENSECO		SOIL	6010	Zinc, Total	2830	(mg/kg)			
	5	25	1990	ENSECO		SOIL	8240	Acetone	19	(ug/kg)			
	5	25	1990	ENSECO		SOIL	6010	Barium, Total	133	(mg/kg)			
	5	25	1990	ENSECO		SOIL	6010	Beryllium, Total	0.46	(mg/kg)			
	5	25	1990	ENSECO		SOIL	6010	Cadmium, Total	0.63	(mg/kg)			
	5	25	1990	ENSECO		SOIL	6010	Chromium, Total	10.3	(mg/kg)			
	5	25	1990	ENSECO		SOIL	6010	Cobalt, Total	4.8	(mg/kg)			
	5	25	1990	ENSECO		SOIL	7421	Lead, Total	6.5	(mg/kg)			
	5	25	1990	ENSECO		SOIL	6010	Nickel, Total	17.7	(mg/kg)			
	5	25	1990	ENSECO		SOIL	6010	Vanadium, Total	13.5	(mg/kg)			
	5	25	1990	ENSECO		SOIL	6010	Zinc, Total	64.9	(mg/kg)			
	230	4	1992	ENSECO		SOIL	8240	2-Butanone	16	(ug/kg)			
	230	4	1992	ENSECO		SOIL	8240	Acetone	43	(ug/kg)			
	230	4	1992	ENSECO		SOIL	7060	Arsenic, Total	2.9	(mg/kg)			
	230	4	1992	ENSECO		SOIL	6010	Barium, Total	140	(mg/kg)			
	230	4	1992	ENSECO		SOIL	6010	Beryllium, Total	0.55	(mg/kg)			
	230	4	1992	ENSECO		SOIL	6010	Cadmium, Total	0.92	(mg/kg)			
	230	4	1992	ENSECO		SOIL	8240	Carbon Disulfide	9.6	(ug/kg)			
	230	4	1992	ENSECO		SOIL	6010	Chromium, Total	14.1	(mg/kg)			
	230	4	1992	ENSECO		SOIL	6010	Cobalt, Total	6.2	(mg/kg)			
	230	4	1992	ENSECO		SOIL	7421	Lead, Total	11.3	(mg/kg)			
	230	4	1992	ENSECO		SOIL	8270	Naphthalene	3600	(ug/kg)			
	230	4	1992	ENSECO		SOIL	6010	Nickel, Total	14.9	(mg/kg)			
	230	4	1992	ENSECO		SOIL	376.2	Sulfide, Total	0.7	(mg/kg)			
	230	4	1992	ENSECO		SOIL	6010	Vanadium, Total	29.5	(mg/kg)			
	230	4	1992	ENSECO		SOIL	8240	Xylenes (Total)	7.8	(ug/kg)			
	230	4	1992	ENSECO		SOIL	6010	Zinc, Total	104	(mg/kg)		J	

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
Tank 7	4	1	1990	ENSECO		SOIL	8270	2-Methylnaphthalene	560	(ug/kg)			
	4	1	1990	ENSECO		SOIL	7060	Arsenic, Total	4.4	(mg/kg)			
	4	1	1990	ENSECO		SOIL	6010	Barium, Total	125	(mg/kg)			
	4	1	1990	ENSECO		SOIL	8270	Benzo(a)anthracene	430	(ug/kg)			
	4	1	1990	ENSECO		SOIL	8270	Benzo(a)pyrene	440	(ug/kg)			
	4	1	1990	ENSECO		SOIL	8270	Benzo(b)fluoranthene	560	(ug/kg)			
	4	1	1990	ENSECO		SOIL	6010	Beryllium, Total	1.1	(mg/kg)			
	4	1	1990	ENSECO		SOIL	6010	Cadmium, Total	2	(mg/kg)			
	4	1	1990	ENSECO		SOIL	6010	Chromium, Total	704	(mg/kg)			
	4	1	1990	ENSECO		SOIL	8270	Chrysene	490	(ug/kg)			
	4	1	1990	ENSECO		SOIL	6010	Cobalt, Total	4.6	(mg/kg)			
	4	1	1990	ENSECO		SOIL	8240	Dichloromethane	18	(ug/kg)			
	4	1	1990	ENSECO		SOIL	8270	Fluoranthene	800	(ug/kg)			
	4	1	1990	ENSECO		SOIL	7421	Lead, Total	8.7	(mg/kg)			
	4	1	1990	ENSECO		SOIL	6010	Nickel, Total	21.3	(mg/kg)			
	4	1	1990	ENSECO		SOIL	8270	Phenanthrene	1700	(ug/kg)			
	4	1	1990	ENSECO		SOIL	8270	Pyrene	1000	(ug/kg)			
	4	1	1990	ENSECO		SOIL	8240	Toluene	6.6	(ug/kg)			
	4	1	1990	ENSECO		SOIL	6010	Vanadium, Total	23.6	(mg/kg)			
	4	1	1990	ENSECO		SOIL	6010	Zinc, Total	268	(mg/kg)			
	323	4	1999	SAVANNAH		SOIL	6010	Arsenic	4.9	ng/kg d	1.3		
	323	4	1999	SAVANNAH		SOIL	6010	Barium	260	ng/kg d	1.3		
	323	4	1999	SAVANNAH		SOIL	6010	Beryllium	1.1	ng/kg d	0.52		
	323	4	1999	SAVANNAH		SOIL	6010	Chromium	26	ng/kg d	1.3		
	323	4	1999	SAVANNAH		SOIL	6010	Cobalt	9.2	ng/kg d	1.3		
	323	4	1999	SAVANNAH		SOIL	6010	Copper	26	ng/kg d	2.6	N	
	323	4	1999	SAVANNAH		SOIL	6010	Lead	19	ng/kg d	0.66		
	323	4	1999	SAVANNAH		SOIL	7471	Mercury	0.04	ng/kg d	0.026		
	323	4	1999	SAVANNAH		SOIL	6010	Nickel	34	ng/kg d	5.2	E	
	323	4	1999	SAVANNAH		SOIL	6010	Vanadium	36	ng/kg d	1.3		
	323	4	1999	SAVANNAH		SOIL	6010	Zinc	77	ng/kg d	2.6	E*	J
	323	12	1999	SAVANNAH		SOIL	6010	Arsenic	15	ng/kg d	1.4		
	323	12	1999	SAVANNAH		SOIL	6010	Barium	290	ng/kg d	1.4		
	323	12	1999	SAVANNAH		SOIL	6010	Beryllium	0.46	ng/kg d	0.56		
	323	12	1999	SAVANNAH		SOIL	6010	Chromium	400	ng/kg d	1.4		
	323	12	1999	SAVANNAH		SOIL	6010	Cobalt	5.5	ng/kg d	1.4		
	323	12	1999	SAVANNAH		SOIL	6010	Copper	21	ng/kg d	2.8	N	
	323	12	1999	SAVANNAH		SOIL	6010	Lead	14	ng/kg d	0.68		
	323	12	1999	SAVANNAH		SOIL	7471	Mercury	0.048	ng/kg d	0.28		
	323	12	1999	SAVANNAH		SOIL	6010	Nickel	14	ng/kg d	5.6	E	
	323	12	1999	SAVANNAH		SOIL	6010	Vanadium	37	ng/kg d	1.4		
	323	12	1999	SAVANNAH		SOIL	6010	Zinc	66	ng/kg d	2.8	E*	J
	324	4	1999	SAVANNAH	DUPLICATE	SOIL	6010	Arsenic	6.1	ng/kg d	1.2		
	324	4	1999	SAVANNAH		SOIL	6010	Arsenic	6.4	ng/kg d	1.2		
	324	4	1999	SAVANNAH	DUPLICATE	SOIL	6010	Barium	210	ng/kg d	1.2		
	324	4	1999	SAVANNAH		SOIL	6010	Barium	230	ng/kg d	1.2		
	324	4	1999	SAVANNAH	DUPLICATE	SOIL	6010	Beryllium	0.84	ng/kg d	0.48	E	
	324	4	1999	SAVANNAH		SOIL	6010	Beryllium	0.92	ng/kg d	0.48	E	

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
Tank 7	324	4	1999	SAVANNAH	DUPLICATE	SOIL	6010	Chromium	120	mg/kg d	1.2		J
	324	4	1999	SAVANNAH		SOIL	6010	Chromium	28	mg/kg d	1.2		J
	324	4	1999	SAVANNAH	DUPLICATE	SOIL	6010	Cobalt	6.5	mg/kg d	1.2	E	
	324	4	1999	SAVANNAH		SOIL	6010	Cobalt	8.1	mg/kg d	1.2	E	
	324	4	1999	SAVANNAH	DUPLICATE	SOIL	6010	Copper	31	mg/kg d	2.4		
	324	4	1999	SAVANNAH		SOIL	6010	Copper	21	mg/kg d	2.4		
	324	4	1999	SAVANNAH	DUPLICATE	SOIL	6010	Lead	25	mg/kg d	0.61		
	324	4	1999	SAVANNAH		SOIL	6010	Lead	15	mg/kg d	0.62		
	324	4	1999	SAVANNAH	DUPLICATE	SOIL	7471	Mercury	0.070	mg/kg d	0.24	N	
	324	4	1999	SAVANNAH		SOIL	7471	Mercury	0.031	mg/kg d	0.024	N	
	324	4	1999	SAVANNAH	DUPLICATE	SOIL	6010	Nickel	19	mg/kg d	4.8		
	324	4	1999	SAVANNAH		SOIL	6010	Nickel	19	mg/kg d	4.8		
	324	4	1999	SAVANNAH	DUPLICATE	SOIL	6010	Vanadium	35	mg/kg d	1.2		
	324	4	1999	SAVANNAH		SOIL	6010	Vanadium	44	mg/kg d	1.2		
	324	4	1999	SAVANNAH	DUPLICATE	SOIL	6010	Zinc	83	mg/kg d	2.4		
	324	4	1999	SAVANNAH		SOIL	6010	Zinc	78	mg/kg d	2.4		
	324	12	1999	SAVANNAH		SOIL	6010	Arsenic	9	mg/kg d	1.3		
	324	12	1999	SAVANNAH		SOIL	6010	Barium	200	mg/kg d	1.3		
	324	12	1999	SAVANNAH		SOIL	6010	Beryllium	0.71	mg/kg d	0.52	E	
	324	12	1999	SAVANNAH		SOIL	6010	Chromium	20	mg/kg d	1.3		
	324	12	1999	SAVANNAH		SOIL	6010	Cobalt	7.1	mg/kg d	1.3	E	
	324	12	1999	SAVANNAH		SOIL	6010	Copper	20	mg/kg d	2.6		
	324	12	1999	SAVANNAH		SOIL	6010	Lead	11	mg/kg d	0.65		
	324	12	1999	SAVANNAH		SOIL	7471	Mercury	0.044	mg/kg d	0.026	N	
	324	12	1999	SAVANNAH		SOIL		Moisture (% Loss on drying @ 105 C)	29	%			
	324	12	1999	SAVANNAH		SOIL	6010	Nickel	23	mg/kg d	5.2		
	324	12	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	2300	mg/kg d	720		
	324	12	1999	SAVANNAH		SOIL	9045	pH	6.54	units	1		
	324	12	1999	SAVANNAH		SOIL	6010	Vanadium	34	mg/kg d	1.3		
	324	12	1999	SAVANNAH		SOIL	6010	Zinc	64	mg/kg d	2.6		
General	1	2	1990	ENSECO		SOIL	8270	Anthracene	720	(ug/kg)			
	1	2	1990	ENSECO		SOIL	7060	Arsenic, Total	4.5	(mg/kg)			
	1	2	1990	ENSECO		SOIL	6010	Barium, Total	337	(mg/kg)			
	1	2	1990	ENSECO		SOIL	8270	Benzo(a)anthracene	1700	(ug/kg)			
	1	2	1990	ENSECO		SOIL	8270	Benzo(a)pyrene	1400	(ug/kg)			
	1	2	1990	ENSECO		SOIL	8270	Benzo(b)fluoranthene	2900	(ug/kg)			
	1	2	1990	ENSECO		SOIL	8270	Benzo(g,h,i)perylene	890	(ug/kg)			
	1	2	1990	ENSECO		SOIL	6010	Beryllium, Total	0.41	(mg/kg)			
	1	2	1990	ENSECO		SOIL	6010	Cadmium, Total	1.3	(mg/kg)			
	1	2	1990	ENSECO		SOIL	6010	Chromium, Total	1030	(mg/kg)	← ABOVE SSL		
	1	2	1990	ENSECO		SOIL	8270	Chrysene	2000	(ug/kg)			
	1	2	1990	ENSECO		SOIL	6010	Cobalt, Total	2.7	(mg/kg)			
	1	2	1990	ENSECO		SOIL	8270	Fluoranthene	3900	(ug/kg)			
	1	2	1990	ENSECO		SOIL	8270	Fluorene	370	(ug/kg)			
	1	2	1990	ENSECO		SOIL	8270	Indeno(1,2,3-C,D)pyrene	570	(ug/kg)			
	1	2	1990	ENSECO		SOIL	7421	Lead, Total	2270	(mg/kg)	← ABOVE SSL & TACO		
	1	2	1990	ENSECO		SOIL	7470	Mercury, Total	0.87	(mg/kg)			

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
General	1	2	1990	ENSECO		SOIL	6010	Nickel, Total	16.2	(mg/kg)			
	1	2	1990	ENSECO		SOIL	8270	Phenanthrene	3700	(ug/kg)			
	1	2	1990	ENSECO		SOIL	8270	Pyrene	4700	(ug/kg)			
	1	2	1990	ENSECO		SOIL	6010	Vanadium, Total	18.1	(mg/kg)			
	1	2	1990	ENSECO		SOIL	6010	Zinc, Total	256	(mg/kg)			
	1	10	1990	ENSECO		SOIL	6010	Barium, Total	157	(mg/kg)			
	1	10	1990	ENSECO		SOIL	6010	Beryllium, Total	0.53	(mg/kg)			
	1	10	1990	ENSECO		SOIL	6010	Cadmium, Total	0.67	(mg/kg)			
	1	10	1990	ENSECO		SOIL	6010	Chromium, Total	20.5	(mg/kg)			
	1	10	1990	ENSECO		SOIL	6010	Cobalt, Total	2.5	(mg/kg)			
	1	10	1990	ENSECO		SOIL	7421	Lead, Total	6.8	(mg/kg)			
	1	10	1990	ENSECO		SOIL	6010	Nickel, Total	12.2	(mg/kg)			
	1	10	1990	ENSECO		SOIL	6010	Vanadium, Total	13.4	(mg/kg)			
	1	10	1990	ENSECO		SOIL	6010	Zinc, Total	54.8	(mg/kg)			
	7	2	1990	ENSECO		SOIL	8240	Acetone	12	(ug/kg)			
	7	2	1990	ENSECO		SOIL	7060	Arsenic, Total	3.4	(mg/kg)			
	7	2	1990	ENSECO		SOIL	6010	Barium, Total	163	(mg/kg)			
	7	2	1990	ENSECO		SOIL	8270	Benzo(a)anthracene	540	(ug/kg)			
	7	2	1990	ENSECO		SOIL	8270	Benzo(a)pyrene	340	(ug/kg)			
	7	2	1990	ENSECO		SOIL	8270	Benzo(b)fluoranthene	580	(ug/kg)			
	7	2	1990	ENSECO		SOIL	6010	Beryllium, Total	0.68	(mg/kg)			
	7	2	1990	ENSECO		SOIL	6010	Cadmium, Total	0.61	(mg/kg)			
	7	2	1990	ENSECO		SOIL	6010	Chromium, Total	9.6	(mg/kg)			
	7	2	1990	ENSECO		SOIL	8270	Chrysene	560	(ug/kg)			
	7	2	1990	ENSECO		SOIL	6010	Cobalt, Total	6.5	(mg/kg)			
	7	2	1990	ENSECO		SOIL	8270	Fluoranthene	890	(ug/kg)			
	7	2	1990	ENSECO		SOIL	7421	Lead, Total	5.8	(mg/kg)			
	7	2	1990	ENSECO		SOIL	7470	Mercury, Total	0.22	(mg/kg)			
	7	2	1990	ENSECO		SOIL	6010	Nickel, Total	17.2	(mg/kg)			
	7	2	1990	ENSECO		SOIL	8270	Phenanthrene	1000	(ug/kg)			
	7	2	1990	ENSECO		SOIL	8270	Pyrene	1000	(ug/kg)			
	7	2	1990	ENSECO		SOIL	6010	Vanadium, Total	14.3	(mg/kg)			
	7	2	1990	ENSECO		SOIL	6010	Zinc, Total	33.1	(mg/kg)			
	7	7	1990	ENSECO		SOIL	8240	2-Butanone	44	(ug/kg)			
	7	7	1990	ENSECO		SOIL	8240	Acetone	330	(ug/kg)			
	7	7	1990	ENSECO		SOIL	7060	Arsenic, Total	1.7	(mg/kg)			
	7	7	1990	ENSECO		SOIL	6010	Barium, Total	166	(mg/kg)			
	7	7	1990	ENSECO		SOIL	6010	Beryllium, Total	0.52	(mg/kg)			
	7	7	1990	ENSECO		SOIL	6010	Chromium, Total	9.6	(mg/kg)			
	7	7	1990	ENSECO		SOIL	6010	Cobalt, Total	4.6	(mg/kg)			
	7	7	1990	ENSECO		SOIL	6010	Nickel, Total	13.1	(mg/kg)			
	7	7	1990	ENSECO		SOIL	6010	Vanadium, Total	16.9	(mg/kg)			
	7	7	1990	ENSECO		SOIL	6010	Zinc, Total	29.7	(mg/kg)			
	7	17	1990	ENSECO		SOIL	7060	Arsenic, Total	3.9	(mg/kg)			
	7	17	1990	ENSECO		SOIL	6010	Barium, Total	108	(mg/kg)			
	7	17	1990	ENSECO		SOIL	6010	Beryllium, Total	0.33	(mg/kg)			
	7	17	1990	ENSECO		SOIL	6010	Chromium, Total	8.1	(mg/kg)			
	7	17	1990	ENSECO		SOIL	6010	Cobalt, Total	5.3	(mg/kg)			

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
General	7	17	1990	ENSECO		SOIL	6010	Nickel, Total	18.4	(mg/kg)			
	7	17	1990	ENSECO		SOIL	6010	Vanadium, Total	12.7	(mg/kg)			
	7	17	1990	ENSECO		SOIL	6010	Zinc, Total	27.5	(mg/kg)			
	321	1	1999	SAVANNAH		SOIL	8310	Acenaphthylene	23	ug/kg dw	4.2		
	321	1	1999	SAVANNAH		SOIL	8310	Anthracene	12	ug/kg dw	4.2		
	321	1	1999	SAVANNAH		SOIL	6010	Arsenic	2.3	mg/kg d	1.1		
	321	1	1999	SAVANNAH		SOIL	6010	Barium	130	mg/kg d	1.1		
	321	1	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	6.6	ug/kg dw	4.2		
	321	1	1999	SAVANNAH		SOIL	6010	Beryllium	0.25	mg/kg d	0.42		
	321	1	1999	SAVANNAH		SOIL	6010	Cadmium	0.59	mg/kg d	0.52		
	321	1	1999	SAVANNAH		SOIL	6010	Chromium	65	mg/kg d	1.1		
	321	1	1999	SAVANNAH		SOIL	8310	Chrysene	11	ug/kg dw	4.2		
	321	1	1999	SAVANNAH		SOIL	6010	Cobalt	2	mg/kg d	1.1		
	321	1	1999	SAVANNAH		SOIL	6010	Copper	23	mg/kg d	2.1		
	321	1	1999	SAVANNAH		SOIL	8310	Fluoranthene	22	ug/kg dw	10		
	321	1	1999	SAVANNAH		SOIL	6010	Lead	32	mg/kg d	0.52		
	321	1	1999	SAVANNAH		SOIL	6010	Nickel	9.3	mg/kg d	4.2		
	321	1	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	34000	mg/kg d	530		
	321	1	1999	SAVANNAH		SOIL	9045	pH	7.95	units	1		
	321	1	1999	SAVANNAH		SOIL	8310	Phenanthrene	24	ug/kg dw	4.2		
	321	1	1999	SAVANNAH		SOIL	8310	Pyrene	38	ug/kg dw	10	P	
	321	1	1999	SAVANNAH	REANALYSIS	SOIL	8260	Trichloroethene	22	ug/kg dw	5.3		
	321	1	1999	SAVANNAH		SOIL	6010	Vanadium	11	mg/kg d	1.1		
	321	1	1999	SAVANNAH		SOIL	6010	Zinc	67	mg/kg d	2.1		
	321	4	1999	SAVANNAH		SOIL	8310	Acenaphthene	13000	ug/kg dw	360	EP	
	321	4	1999	SAVANNAH	DILUTED	SOIL	8310	Acenaphthene	20000	ug/kg dw	3600	DP	
	321	4	1999	SAVANNAH		SOIL	8310	Acenaphthylene	300	ug/kg dw	140		
	321	4	1999	SAVANNAH		SOIL	8310	Anthracene	140	ug/kg dw	28		
	321	4	1999	SAVANNAH		SOIL	6010	Arsenic	6.6	mg/kg d	1.3		
	321	4	1999	SAVANNAH		SOIL	6010	Barium	920	mg/kg d	1.3		
	321	4	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	350	ug/kg dw	28		
	321	4	1999	SAVANNAH	DILUTED	SOIL	8310	Benzo(a)anthracene	460	ug/kg dw	280	D	
	321	4	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	270	ug/kg dw	29		
	321	4	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	270	ug/kg dw	28		
	321	4	1999	SAVANNAH	DILUTED	SOIL	8310	Benzo(b)fluoranthene	320	ug/kg dw	280	D	
	321	4	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	430	ug/kg dw	71	P	
	321	4	1999	SAVANNAH		SOIL	8310	Benzo(k)fluoranthene	120	ug/kg dw	28		
	321	4	1999	SAVANNAH		SOIL	6010	Beryllium	2.3	mg/kg d	0.52		
	321	4	1999	SAVANNAH		SOIL	6010	Cadmium	2.8	mg/kg d	0.65		
	321	4	1999	SAVANNAH		SOIL	6010	Chromium	91	mg/kg d	1.3		
	321	4	1999	SAVANNAH		SOIL	8310	Chrysene	490	ug/kg dw	28		
	321	4	1999	SAVANNAH	DILUTED	SOIL	8310	Chrysene	580	ug/kg dw	280	D	
	321	4	1999	SAVANNAH		SOIL	6010	Cobalt	11	mg/kg d	1.3		
	321	4	1999	SAVANNAH		SOIL	6010	Copper	34	mg/kg d	2.5		
	321	4	1999	SAVANNAH		SOIL	8310	Fluoranthene	630	ug/kg dw	71	P	
	321	4	1999	SAVANNAH	DILUTED	SOIL	8310	Fluoranthene	820	ug/kg dw	710	DP	
	321	4	1999	SAVANNAH		SOIL	8310	Indeno(1,2,3-cd)pyrene	160	ug/kg dw	71	P	
	321	4	1999	SAVANNAH		SOIL	6010	Lead	110	mg/kg d	0.65		

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
General	321	4	1999	SAVANNAH		SOIL	6010	Nickel	45	mg/kg d	5.2		
	321	4	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	38000	mg/kg d	650		
	321	4	1999	SAVANNAH		SOIL	9045	pH	7.52	units	1		
	321	4	1999	SAVANNAH		SOIL	8310	Phenanthrene	640	ug/kg dw	28		
	321	4	1999	SAVANNAH	DILUTED	SOIL	8310	Phenanthrene	730	ug/kg dw	280	D	
	321	4	1999	SAVANNAH		SOIL	8310	Pyrene	670	ug/kg dw	71		
	321	4	1999	SAVANNAH	DILUTED	SOIL	8310	Pyrene	990	ug/kg dw	710	D	
	321	4	1999	SAVANNAH		SOIL	6010	Tin	9.4	mg/kg d	6.5		
	321	4	1999	SAVANNAH		SOIL	8260	Trichloroethene	9.8	ug/kg dw	6.2		
	321	4	1999	SAVANNAH		SOIL	6010	Vanadium	44	mg/kg d	1.3		
	321	4	1999	SAVANNAH		SOIL	6010	Zinc	580	mg/kg d	2.5		
	322	1	1999	SAVANNAH		SOIL	8310	Anthracene	1500	ug/kg dw	240		
	322	1	1999	SAVANNAH		SOIL	6010	Arsenic	7	mg/kg d	1.1		
	322	1	1999	SAVANNAH		SOIL	6010	Barium	370	mg/kg d	1.1		
	322	1	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	2400	ug/kg dw	240		
	322	1	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	1700	ug/kg dw	240		
	322	1	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	2100	ug/kg dw	240		
	322	1	1999	SAVANNAH		SOIL	8310	Benzo(k)fluoranthene	950	ug/kg dw	240		
	322	1	1999	SAVANNAH		SOIL	6010	Beryllium	0.61	mg/kg d	0.44	E	
	322	1	1999	SAVANNAH		SOIL	6010	Cadmium	1.3	mg/kg d	0.55	E	
	322	1	1999	SAVANNAH		SOIL	6010	Chromium	740	mg/kg d	1.1		
	322	1	1999	SAVANNAH		SOIL	8310	Chrysene	2000	ug/kg dw	240		
	322	1	1999	SAVANNAH		SOIL	6010	Cobalt	6.2	mg/kg d	1.1		
	322	1	1999	SAVANNAH		SOIL	6010	Copper	44	mg/kg d	2.2		
	322	1	1999	SAVANNAH		SOIL	8310	Dibenzo(a,h)anthracene	1000	ug/kg dw	590	P	
	322	1	1999	SAVANNAH		SOIL	8310	Fluoranthene	7600	ug/kg dw	590		
	322	1	1999	SAVANNAH		SOIL	8310	Indeno(1,2,3-cd)pyrene	1100	ug/kg dw	590		
	322	1	1999	SAVANNAH		SOIL	6010	Lead	110	mg/kg d	0.55	N	J
	322	1	1999	SAVANNAH		SOIL	7471	Mercury	0.92	mg/kg d	0.24		
	322	1	1999	SAVANNAH		SOIL	6010	Nickel	19	mg/kg d	4.4		
	322	1	1999	SAVANNAH		SOIL	8310	Phenanthrene	4800	ug/kg dw	240		
	322	1	1999	SAVANNAH		SOIL	8310	Pyrene	5100	ug/kg dw	590		
	322	1	1999	SAVANNAH		SOIL	6010	Vanadium	33	mg/kg d	1.1		
	322	1	1999	SAVANNAH		SOIL	6010	Zinc	280	mg/kg d	2.2	E	
	322	3	1999	SAVANNAH	DILUTED	SOIL	8310	Anthracene	510	ug/kg dw	140	D	
	322	3	1999	SAVANNAH		SOIL	8310	Anthracene	630	ug/kg dw	46		
	322	3	1999	SAVANNAH		SOIL	6010	Antimony	14	mg/kg d	2.4		
	322	3	1999	SAVANNAH		SOIL	6010	Arsenic	6.3	mg/kg d	1.2		
	322	3	1999	SAVANNAH		SOIL	6010	Barium	500	mg/kg d	1.2		
	322	3	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	1100	ug/kg dw	46		
	322	3	1999	SAVANNAH	DILUTED	SOIL	8310	Benzo(a)anthracene	850	ug/kg dw	140	D	
	322	3	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	1000	ug/kg dw	46		
	322	3	1999	SAVANNAH	DILUTED	SOIL	8310	Benzo(a)pyrene	820	ug/kg dw	140	D	
	322	3	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	1100	ug/kg dw	46		
	322	3	1999	SAVANNAH	DILUTED	SOIL	8310	Benzo(b)fluoranthene	950	ug/kg dw	140	D	
	322	3	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	1200	ug/kg dw	120	P	
	322	3	1999	SAVANNAH	DILUTED	SOIL	8310	Benzo(g,h,i)perylene	980	ug/kg dw	350	DP	
	322	3	1999	SAVANNAH	DILUTED	SOIL	8310	Benzo(k)fluoranthene	420	ug/kg dw	140	D	

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
General	322	3	1999	SAVANNAH		SOIL	8310	Benzo(k)fluoranthene	520	ug/kg dw	46		
	322	3	1999	SAVANNAH		SOIL	6010	Beryllium	0.64	mg/kg d	0.48	E	
	322	3	1999	SAVANNAH		SOIL	6010	Cadmium	2.6	mg/kg d	0.6	E	
	322	3	1999	SAVANNAH		SOIL	6010	Chromium	470	mg/kg d	1.2		
	322	3	1999	SAVANNAH		SOIL	8310	Chrysene	1000	ug/kg dw	46		
	322	3	1999	SAVANNAH	DILUTED	SOIL	8310	Chrysene	840	ug/kg dw	140	D	
	322	3	1999	SAVANNAH		SOIL	6010	Cobalt	5.9	mg/kg d	1.2		
	322	3	1999	SAVANNAH		SOIL	6010	Copper	98	mg/kg d	2.4		
	322	3	1999	SAVANNAH		SOIL	8310	Dibenzo(a,h)anthracene	460	ug/kg dw	120	P	
	322	3	1999	SAVANNAH	DILUTED	SOIL	8310	Fluoranthene	2800	ug/kg dw	350	D	
	322	3	1999	SAVANNAH		SOIL	8310	Fluoranthene	3500	ug/kg dw	120		
	322	3	1999	SAVANNAH		SOIL	8310	Fluorene	170	ug/kg dw	120		
	322	3	1999	SAVANNAH	DILUTED	SOIL	8310	Indeno(1,2,3-cd)pyrene	510	ug/kg dw	350	D	
	322	3	1999	SAVANNAH		SOIL	8310	Indeno(1,2,3-cd)pyrene	650	ug/kg dw	120		
	322	3	1999	SAVANNAH		SOIL	7471	Mercury	0.37	mg/kg d	0.24		
	322	3	1999	SAVANNAH		SOIL	6010	Nickel	18	mg/kg d	4.8		
	322	3	1999	SAVANNAH	DILUTED	SOIL	8310	Phenanthrene	1700	ug/kg dw	140	D	
	322	3	1999	SAVANNAH		SOIL	8310	Phenanthrene	2100	ug/kg dw	46	E	
	322	3	1999	SAVANNAH	DILUTED	SOIL	8310	Pyrene	1900	ug/kg dw	350	D	
	322	3	1999	SAVANNAH		SOIL	8310	Pyrene	2300	ug/kg dw	120		
	322	3	1999	SAVANNAH		SOIL	6010	Vanadium	25	mg/kg d	1.2		
	322	3	1999	SAVANNAH		SOIL	6010	Zinc	490	mg/kg d	2.4	E	
	335	1	1999	SAVANNAH		SOIL	8310	Acenaphthene	590	ug/kg dw	550		
	335	1	1999	SAVANNAH		SOIL	8310	Anthracene	190	ug/kg dw	43		
	335	1	1999	SAVANNAH		SOIL	6010	Arsenic	13	mg/kg d	1.1		
	335	1	1999	SAVANNAH		SOIL	6010	Barium	140	mg/kg d	1.1		
	335	1	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	270	ug/kg dw	43		
	335	1	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	220	ug/kg dw	43		
	335	1	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	88	ug/kg dw	43	P	
	335	1	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	160	ug/kg dw	110	P	
	335	1	1999	SAVANNAH		SOIL	6010	Beryllium	1.2	mg/kg d	0.44	E	
	335	1	1999	SAVANNAH		SOIL	6010	Cadmium	1.5	mg/kg d	0.55	E	
	335	1	1999	SAVANNAH		SOIL	6010	Chromium	20	mg/kg d	1.1		
	335	1	1999	SAVANNAH		SOIL	8310	Chrysene	530	ug/kg dw	43	P	
	335	1	1999	SAVANNAH		SOIL	6010	Cobalt	7.5	mg/kg d	1.1	E	
	335	1	1999	SAVANNAH		SOIL	6010	Copper	32	mg/kg d	2.2		
	335	1	1999	SAVANNAH		SOIL	8310	Dibenzo(a,h)anthracene	140	ug/kg dw	110	P	
	335	1	1999	SAVANNAH		SOIL	8310	Fluoranthene	490	ug/kg dw	110	P	
	335	1	1999	SAVANNAH		SOIL	6010	Lead	79	mg/kg d	0.55		
	335	1	1999	SAVANNAH		SOIL	7471	Mercury	0.35	mg/kg d	0.022	N	
	335	1	1999	SAVANNAH		SOIL		Moisture (% Loss on drying @ 105 C)	8	%			
	335	1	1999	SAVANNAH		SOIL	6010	Nickel	32	mg/kg d	4.4		
	335	1	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	28000	mg/kg d	550		
	335	1	1999	SAVANNAH		SOIL	9045	pH	7.14	units	1		
	335	1	1999	SAVANNAH		SOIL	8310	Phenanthrene	930	ug/kg dw	43		
	335	1	1999	SAVANNAH		SOIL	8310	Pyrene	1400	ug/kg dw	110	P	
	335	1	1999	SAVANNAH		SOIL	6010	Vanadium	34	mg/kg d	1.1		
	335	1	1999	SAVANNAH		SOIL	6010	Zinc	120	mg/kg d	2.2		

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
General	335	5	1999	SAVANNAH		SOIL	8310	Anthracene	840	ug/kg dw	44		
	335	5	1999	SAVANNAH	DILUTED	SOIL	8310	Anthracene	870	ug/kg dw	180	D	
	335	5	1999	SAVANNAH		SOIL	6010	Arsenic	14	mg/kg d	1.1		
	335	5	1999	SAVANNAH		SOIL	6010	Barium	120	mg/kg d	1.1		
	335	5	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	870	ug/kg dw	44		
	335	5	1999	SAVANNAH	DILUTED	SOIL	8310	Benzo(a)anthracene	900	ug/kg dw	180	D	
	335	5	1999	SAVANNAH	DILUTED	SOIL	8310	Benzo(a)pyrene	580	ug/kg dw	180	D	
	335	5	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	640	ug/kg dw	44		
	335	5	1999	SAVANNAH	DILUTED	SOIL	8310	Benzo(b)fluoranthene	690	ug/kg dw	180	DP	
	335	5	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	710	ug/kg dw	44	P	
	335	5	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	550	ug/kg dw	110		
	335	5	1999	SAVANNAH	DILUTED	SOIL	8310	Benzo(g,h,i)perylene	590	ug/kg dw	440	D	
	335	5	1999	SAVANNAH		SOIL	8310	Benzo(k)fluoranthene	290	ug/kg dw	44	P	
	335	5	1999	SAVANNAH	DILUTED	SOIL	8310	Benzo(k)fluoranthene	320	ug/kg dw	180	D	
	335	5	1999	SAVANNAH		SOIL	6010	Beryllium	0.78	mg/kg d	0.44	E	
	335	5	1999	SAVANNAH		SOIL	6010	Cadmium	1.9	mg/kg d	0.55	E	
	335	5	1999	SAVANNAH		SOIL	6010	Chromium	19	mg/kg d	1.1		
	335	5	1999	SAVANNAH		SOIL	8310	Chrysene	1100	ug/kg dw	44		
	335	5	1999	SAVANNAH	DILUTED	SOIL	8310	Chrysene	1100	ug/kg dw	180	D	
	335	5	1999	SAVANNAH		SOIL	6010	Cobalt	9.6	mg/kg d	1.1	E	
	335	5	1999	SAVANNAH		SOIL	6010	Copper	26	mg/kg d	2.2		
	335	5	1999	SAVANNAH		SOIL	8310	Fluoranthene	3000	ug/kg dw	110		
	335	5	1999	SAVANNAH	DILUTED	SOIL	8310	Fluoranthene	3700	ug/kg dw	440	D	
	335	5	1999	SAVANNAH		SOIL	8310	Fluorene	270	ug/kg dw	110		
	335	5	1999	SAVANNAH		SOIL	8310	Indeno(1,2,3-cd)pyrene	340	ug/kg dw	110		
	335	5	1999	SAVANNAH		SOIL	6010	Lead	60	mg/kg d	0.55		
	335	5	1999	SAVANNAH		SOIL	7471	Mercury	0.37	mg/kg d	0.022	N	
	335	5	1999	SAVANNAH		SOIL		Moisture (% Loss on drying @ 105 C)	15	%			
	335	5	1999	SAVANNAH		SOIL	6010	Nickel	34	mg/kg d	4.4		
	335	5	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	67000	mg/kg d	550		
	335	5	1999	SAVANNAH		SOIL	9045	pH	6.94	units	1		
	335	5	1999	SAVANNAH		SOIL	8310	Phenanthrene	2500	ug/kg dw	44	E	
	335	5	1999	SAVANNAH	DILUTED	SOIL	8310	Phenanthrene	2600	ug/kg dw	180	D	
	335	5	1999	SAVANNAH		SOIL	8310	Pyrene	1900	ug/kg dw	110		
	335	5	1999	SAVANNAH	DILUTED	SOIL	8310	Pyrene	2000	ug/kg dw	440	D	
	335	5	1999	SAVANNAH		SOIL	6010	Vanadium	32	mg/kg d	1.1		
	335	5	1999	SAVANNAH		SOIL	6010	Zinc	100	mg/kg d	2.2		
North	210	2	1992	ENSECO		SOIL	7060	Arsenic, Total	3.3	(mg/kg)			
	210	2	1992	ENSECO		SOIL	6010	Barium, Total	125	(mg/kg)			
	210	2	1992	ENSECO		SOIL	6010	Beryllium, Total	0.57	(mg/kg)			
	210	2	1992	ENSECO		SOIL	6010	Chromium, Total	15.5	(mg/kg)			
	210	2	1992	ENSECO		SOIL	6010	Cobalt, Total	4.6	(mg/kg)			
	210	2	1992	ENSECO		SOIL	7421	Lead, Total	11.4	(mg/kg)			
	210	2	1992	ENSECO		SOIL	6010	Nickel, Total	11.9	(mg/kg)			
	210	2	1992	ENSECO		SOIL	6010	Vanadium, Total	15.8	(mg/kg)			
	210	2	1992	ENSECO		SOIL	6010	Zinc, Total	33.4	(mg/kg)			
	211	4	1992	ENSECO		SOIL	8240	2-Butanone	42	(ug/kg)		J	

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
North	211	4	1992	ENSECO		SOIL	8240	Acetone	310	(ug/kg)		J	
	211	4	1992	ENSECO		SOIL	7060	Arsenic, Total	2.9	(mg/kg)			
	211	4	1992	ENSECO		SOIL	6010	Barium, Total	136	(mg/kg)			
	211	4	1992	ENSECO		SOIL	6010	Beryllium, Total	0.58	(mg/kg)			
	211	4	1992	ENSECO		SOIL	6010	Cadmium, Total	0.6	(mg/kg)			
	211	4	1992	ENSECO		SOIL	6010	Chromium, Total	8.4	(mg/kg)			
	211	4	1992	ENSECO		SOIL	6010	Cobalt, Total	6.8	(mg/kg)			
	211	4	1992	ENSECO		SOIL	7421	Lead, Total	14	(mg/kg)			
	211	4	1992	ENSECO		SOIL	6010	Nickel, Total	14.9	(mg/kg)			
	211	4	1992	ENSECO		SOIL	376.2	Sulfide, Total	0.76	(mg/kg)			
	211	4	1992	ENSECO		SOIL	8240	Toluene	5.4	(ug/kg)		J	
	211	4	1992	ENSECO		SOIL	6010	Vanadium, Total	17.5	(mg/kg)			
	211	4	1992	ENSECO		SOIL	6010	Zinc, Total	33.8	(mg/kg)			
	212	2	1992	ENSECO		SOIL	8240	2-Butanone	42	(ug/kg)		J	
	212	2	1992	ENSECO		SOIL	7060	Arsenic, Total	1.4	(mg/kg)			
	212	2	1992	ENSECO		SOIL	6010	Barium, Total	36.7	(mg/kg)			
	212	2	1992	ENSECO		SOIL	6010	Beryllium, Total	0.66	(mg/kg)			
	212	2	1992	ENSECO		SOIL	6010	Cadmium, Total	0.87	(mg/kg)			
	212	2	1992	ENSECO		SOIL	6010	Chromium, Total	25.2	(mg/kg)			
	212	2	1992	ENSECO		SOIL	6010	Cobalt, Total	2	(mg/kg)			
	212	2	1992	ENSECO		SOIL	8240	Dichloromethane	9.5	(ug/kg)		J	
	212	2	1992	ENSECO		SOIL	7421	Lead, Total	31.2	(mg/kg)			
	212	2	1992	ENSECO		SOIL	6010	Nickel, Total	8.5	(mg/kg)			
	212	2	1992	ENSECO		SOIL	8240	Toluene	24	(ug/kg)		J	
	212	2	1992	ENSECO		SOIL	6010	Vanadium, Total	14.5	(mg/kg)			
	212	2	1992	ENSECO		SOIL	8240	Xylenes (Total)	7.1	(ug/kg)		J	
	212	2	1992	ENSECO		SOIL	6010	Zinc, Total	62.5	(mg/kg)			
	213	3	1992	ENSECO	DUPLICATE	SOIL	7060	Arsenic, Total	1.3	(mg/kg)			
	213	3	1992	ENSECO		SOIL	7060	Arsenic, Total	2	(mg/kg)			
	213	3	1992	ENSECO	DUPLICATE	SOIL	6010	Barium, Total	59.6	(mg/kg)			
	213	3	1992	ENSECO		SOIL	6010	Barium, Total	78.9	(mg/kg)			
	213	3	1992	ENSECO		SOIL	6010	Beryllium, Total	0.65	(mg/kg)			
	213	3	1992	ENSECO	DUPLICATE	SOIL	6010	Beryllium, Total	0.83	(mg/kg)			
	213	3	1992	ENSECO		SOIL	6010	Cadmium, Total	1	(mg/kg)			
	213	3	1992	ENSECO	DUPLICATE	SOIL	6010	Cadmium, Total	1.2	(mg/kg)			
	213	3	1992	ENSECO	DUPLICATE	SOIL	6010	Chromium, Total	33.8	(mg/kg)			
	213	3	1992	ENSECO		SOIL	6010	Chromium, Total	35.7	(mg/kg)			
	213	3	1992	ENSECO		SOIL	6010	Cobalt, Total	1.8	(mg/kg)			
	213	3	1992	ENSECO	DUPLICATE	SOIL	6010	Cobalt, Total	1.9	(mg/kg)			
	213	3	1992	ENSECO	DUPLICATE	SOIL	8240	Dichloromethane	15	(ug/kg)		J	
	213	3	1992	ENSECO		SOIL	8240	Dichloromethane	16	(ug/kg)		J	
	213	3	1992	ENSECO		SOIL	7421	Lead, Total	30.9	(mg/kg)			
	213	3	1992	ENSECO	DUPLICATE	SOIL	7421	Lead, Total	30.9	(mg/kg)			
	213	3	1992	ENSECO		SOIL	6010	Nickel, Total	9.3	(mg/kg)			
	213	3	1992	ENSECO	DUPLICATE	SOIL	6010	Nickel, Total	9.3	(mg/kg)			

TABLE 4-5
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU T
(0 TO 1 FT, >1 FT, >5FT)

SITE	LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
	213	3	1992	ENSECO	DUPLICATE	SOIL	8240	Toluene	31	(ug/kg)		J	
	213	3	1992	ENSECO		SOIL	8240	Toluene	40	(ug/kg)		J	
	213	3	1992	ENSECO	DUPLICATE	SOIL	8240	Trichloroethene	12	(ug/kg)		J	
	213	3	1992	ENSECO		SOIL	8240	Trichloroethene	14	(ug/kg)		J	
	213	3	1992	ENSECO		SOIL	6010	Vanadium, Total	18.8	(mg/kg)			
	213	3	1992	ENSECO	DUPLICATE	SOIL	6010	Vanadium, Total	31.3	(mg/kg)			
	213	3	1992	ENSECO	DUPLICATE	SOIL	8240	Xylenes (Total)	9	(ug/kg)		J	
	213	3	1992	ENSECO		SOIL	8240	Xylenes (Total)	9.7	(ug/kg)		J	
	213	3	1992	ENSECO	DUPLICATE	SOIL	6010	Zinc, Total	66.3	(mg/kg)			
	213	3	1992	ENSECO		SOIL	6010	Zinc, Total	82.3	(mg/kg)			

* = Detection Limits are not displayed for historical samples. Refer to laboratory data sets (previously submitted to USEPA) for detection limits.

Note: Qualifier descriptions are explained in Appendix B, Tables B-1a and B-1b.

TABLE 4-6
FREQUENCY AND RANGE OF DETECTED ANALYTES FOR SWMU T

Compound	0 – 1 ft		1 – 5 ft		> 5 ft	
	Detection Frequency	Concentration Range	Detection Frequency	Concentration Range	Detection Frequency	Concentration Range
VOCs (µg/kg)						
Acetone	1 / 22	190	7 / 32	12 - 310	6 / 22	19 - 330
Carbon Disulfide	0 / 22	--	2 / 32	9.6 – 12	0 / 22	--
Dichloromethane	1 / 22	18	6 / 32	6.8 – 16	0 / 22	--
Ethylbenzene	0 / 24	--	3 / 32	140 / 920	0 / 28	--
Methyl Ethyl Ketone (2-Butanone)	1 / 22	30	5 / 32	16 - 45	2 / 22	10 – 44
Toluene	1 / 24	6.6	8 / 32	5.4 – 40	0 / 28	--
Trichloroethene	1 / 22	22	4 / 32	7.9 – 14	0 / 22	--
Xylenes, Total	0 / 24	--	5 / 32	5.4 – 9.7	0 / 28	--
SVOCs (µg/kg)						
2-Methylnaphthalene	3 / 21	390 – 1,300	0 / 32	--	1 / 22	440
Bis(2-ethylhexyl)phthalate	0 / 21	--	0 / 32	--	2 / 22	460 – 470
N-Nitrosodimethylamine	0 / 21	--	0 / 32	--	1 / 22	1,600
PAHs (µg/kg)						
Acenaphthene	1 / 24	590	2 / 32	13, 000 – 20,000	0 / 24	--
Acenaphthylene	1 / 24	23	1 / 32	300	0 / 24	--
Anthracene	13 / 24	12 – 3,300	9 / 32	140 – 1,300	4 / 24	120 – 330
Benzo(a)anthracene	14 / 24	6.6 – 7,400	11 / 32	350 – 1,700	4 / 24	210 – 6,400
Benzo(a)pyrene	12 / 24	170 – 5,800	10 / 32	270 – 1,400	4 / 24	230 – 8,800
Benzo(b)fluoranthene	13 / 24	67 – 8,700	10 / 32	260 – 2,900	4 / 24	240 – 13,000
Benzo(g,h,i)perylene	10 / 24	130 – 4,000	9 / 32	430 – 1,200	4 / 24	220 – 12,000
Benzo(k)fluoranthene	4 / 24	53 – 3,800	6 / 32	120 – 520	4 / 24	110 – 4,800
Chrysene	15 / 24	11 – 6,100	11 / 32	490 – 2,000	5 / 24	5.4 – 5,800

TABLE 4-6
FREQUENCY AND RANGE OF DETECTED ANALYTES FOR SWMU T

Compound	0 – 1 ft		1 – 5 ft		> 5 ft	
	Detection Frequency	Concentration Range	Detection Frequency	Concentration Range	Detection Frequency	Concentration Range
PAHs (µg/kg)						
Dibenzo(a,h)anthracene	4 / 24	140 – 1,000	2 / 32	460	3 / 24	110 – 4,500
Fluoranthene	15 / 24	22 – 22,000	11 / 32	610 – 4,200	4 / 24	700 – 14,000
Fluorene	0 / 24	--	3 / 32	170 – 370	1 / 24	39
Indeno(1,2,3-cd)pyrene	2 / 18	300 – 1,100	6 / 32	160 – 650	4 / 24	140 – 7,100
Naphthalene	0 / 24	--	1 / 32	3,600	1 / 24	38
Phenanthrene	15 / 24	24 - 17,000	11 / 32	640 – 3,800	5 / 24	7.3 – 2.400
Pyrene	15 / 24	38 - 16,000	12 / 32	670 – 4,700	5 / 24	19 – 10,000
Metals (mg/kg)						
Antimony	0 / 21	--	2 / 35	9.2 – 14	0 / 24	--
Arsenic	15 / 21	2 – 10	26 / 35	1.3 - 14	17 / 24	0.85 – 15
Barium	15 / 21	56 – 370	27 / 35	36.7 – 920	19 / 24	96.4 – 1,100
Beryllium	15 / 22	0.25 – 1.2	26 / 35	0.4 – 2.3	19 / 24	0.4 – 0.93
Cadmium	11 / 21	0.59 – 17.1	18 / 35	0.53 – 9.1	7 / 24	0.55 – 1.3
Chromium	15 / 21	8.6 – 740	27 / 35	8.4 – 1,190	19 / 24	8.1 – 420
Cobalt	15 / 21	2 – 7.5	26 / 35	1.8 – 15.5	19 / 24	2.5 – 14
Copper	10 / 16	17 – 74	8 / 11	21 – 98	10 / 13	13 – 45
Cyanide, Total	0 / 21	--	1 / 35	0.98	0 / 24	--
Lead	14 / 21	8.7 – 694	26 /35	5.8 – 2,270	14 / 24	6.5 – 100
Mercury	9 / 21	0.16 – 0.92	14 / 35	0.031 – 1	9 / 24	0.037 – 0.27
Nickel	15 / 21	9.1 – 32	26 / 35	8.5 – 45	19 / 24	12.2 – 41
Selenium	1 / 21	0.57	0 / 35	--	0 / 24	--
Sulfide	2 / 21	0.64 – 11.6	5 / 35	0.7 – 35	2 / 24	6.6 – 43
Tin	1 / 16	45	1 / 11	9.4	0 / 13	--

TABLE 4-6
FREQUENCY AND RANGE OF DETECTED ANALYTES FOR SWMU T

Compound	0 – 1 ft		1 – 5 ft		> 5 ft	
	Detection Frequency	Concentration Range	Detection Frequency	Concentration Range	Detection Frequency	Concentration Range
Metals (mg/kg)						
Vanadium	15 / 21	11 – 35	27 / 35	13.1 – 44	19 / 24	12.7 – 390
Zinc	15 / 21	38.6 – 2,830	27 / 35	21.6 – 1,390	19 / 24	27.5 – 610
Hydrocarbons						
TPH historical (mg/kg)	0 / 4	--	3 / 7	76.9 – 31,100	1 / 7	632
Hydrocarbons as DRO (mg/kg)	9 / 12	320 – 750	--	--	7 / 13	4.5 - 650
Hydrocarbons as GRO (µg/kg)	2 / 12	340 – 920	--	--	1 / 13	310

TABLE 4-7
EXCEEDENCES OF TIER I SCREENING LEVELS FOR SWMU T

SITE	LOCATION	DEPTH	LABNAME	QAQCTYPE	MATRIX	ANALYTE	RESULT	UNITS	DETECTLIMIT	LAB Q.	URS Q.	BKGRD	IND/ING	IND/INH	CON/ING	CON/INH
South	214	4	ENSECO			Lead, Total	53	(mg/kg)				6.8	400		400	
Fill	215	4	ENSECO			Benzo(a)pyrene	1100	(ug/kg)				--	800		17000	
Area	215	4	ENSECO			Lead, Total	75.1	(mg/kg)				6.8	400		400	
	216	4	ENSECO			Lead, Total	14	(mg/kg)				6.8	400		400	
	217	4	ENSECO			Antimony, Total	9.2	(mg/kg)				6	820		82	
	217	4	ENSECO			Chromium, Total	1190	(mg/kg)				15.3	10000	420	4100	8800
	217	4	ENSECO			Lead, Total	815	(mg/kg)				6.8	400		400	
	218	4	ENSECO			Cobalt, Total	15.5	(mg/kg)				13.2	120000		12000	
	218	4	ENSECO			Lead, Total	21.7	(mg/kg)				6.8	400		400	
	218	4	ENSECO			Sulfide	1.1	(mg/kg)				--				
	219	4	ENSECO			Arsenic, Total	8.7	(mg/kg)				7	3	1200	61	25000
	219	4	ENSECO			Chromium, Total	39.9	(mg/kg)				15.3	10000	420	4100	8800
	219	4	ENSECO			Lead, Total	80.1	(mg/kg)				6.8	400		400	
	336	1	SAVANNAH			Lead	74	mg/kg dw	0.57	N		6.8	400		400	
	336	1	SAVANNAH			Chromium	100	mg/kg dw	1.1			15.3	10000	420	4100	8800
	336	10	SAVANNAH			Arsenic	7.8	mg/kg dw	1.3			5.14	3	1200	61	25000
	336	10	SAVANNAH			N-Nitrosodimethylamine	1600	ug/kg dw	1600			--	48			
	337	1	SAVANNAH			Arsenic	10	mg/kg dw	1.4			7	3	1200	61	25000
	337	1	SAVANNAH			Chromium	32	mg/kg dw	1.4			15.3	10000	420	4100	8800
	337	1	SAVANNAH			Lead	89	mg/kg dw	0.7	N		6.8	400		400	
	337	10	SAVANNAH			Benzo(a)anthracene	5800	ug/kg dw				--	8000		170000	
	337	10	SAVANNAH			Benzo(a)pyrene	8600	ug/kg dw				--	800		17000	
	337	10	SAVANNAH			Benzo(b)fluoranthene	13000	ug/kg dw		E		--	8000		170000	
	337	10	SAVANNAH			Dibenzo(a,h)anthracene	4100	ug/kg dw		P		--	800		17000	
	337	10	SAVANNAH			Arsenic	8.5	mg/kg dw				5.14	3	1200	61	25000
	337	10	SAVANNAH			Cobalt	14	mg/kg dw				34.3	120000		12000	
	337	10	SAVANNAH			Lead	12	mg/kg dw		N		51.1	400		400	
	337	10	SAVANNAH	DIL		Benzo(a)anthracene	6400	ug/kg dw		D		--	8000		170000	
	337	10	SAVANNAH	DIL		Benzo(a)pyrene	8800	ug/kg dw		D		--	800		17000	
	337	10	SAVANNAH	DIL		Benzo(b)fluoranthene	12000	ug/kg dw		D		--	8000		170000	
	337	10	SAVANNAH	DIL		Dibenzo(a,h)anthracene	4500	ug/kg dw		DP		--	800		17000	
East	220	4	ENSECO			Chromium, Total	79.2	(mg/kg)				15.3	10000	420	4100	8800
Fill	220	4	ENSECO			Lead, Total	51.2	(mg/kg)				6.8	400		400	
Area	221	4	ENSECO	DUP		Lead, Total	14.1	(mg/kg)				6.8	400		400	
	221	4	ENSECO			Lead, Total	16.6	(mg/kg)				6.8	400		400	
	222	5	ENSECO			Chromium, Total	85.9	(mg/kg)				15.3	10000	420	4100	8800
	222	5	ENSECO			Lead, Total	28.3	(mg/kg)				6.8	400		400	
	222	5	ENSECO			Sulfide	4.7	(mg/kg)				--				
	330	1	SAVANNAH			Lead	25	mg/kg dw	0.63	N	J	6.8	400		400	
	330	1	SAVANNAH			Hydrocarbons as DRO	690	mg/kg dw	43	E	J	--				
	330	1	SAVANNAH	DIL		Hydrocarbons as GRO	920	ug/kg dw	86	D		--				
	330	10	SAVANNAH			Arsenic	8.1	mg/kg dw	1.3			5.14	3	1200	61	25000
	330	10	SAVANNAH	DUP		Arsenic	8.7	mg/kg dw	1.3			5.14	3	1200	61	25000
	330	10	SAVANNAH	DUP		Hydrocarbons as DRO	43	mg/kg dw	4.3		J	--				
	330	10	SAVANNAH			Lead	90	mg/kg dw	0.65	N		51.1	400		400	
	330	10	SAVANNAH			Hydrocarbons as DRO	93	mg/kg dw	4.3			--				
	330	10	SAVANNAH	DUP		Lead	100	mg/kg dw	0.65	N	J	51.1	400		400	

Note: Some analytes do not have screening values for comparison. The postive results were retained on this table, even though they may not be in exceedence.

= Exceeds the Soil-to-Groundwater Pathway only.

East	330	10	SAVANNAH			Chromium	420	mg/kg dw	1.3			16.5	10000	420	4100	8800
Fill	330	10	SAVANNAH	DUP		Chromium	420	mg/kg dw	1.3		J	16.5	10000	420	4100	8800
Area	331	1	SAVANNAH			Arsenic	7.2	mg/kg dw	1.2			7	3	1200	61	25000
	331	1	SAVANNAH			Lead	68	mg/kg dw	0.6	N	J	6.8	400		400	
	331	1	SAVANNAH			Chromium	130	mg/kg dw	1.2			15.3	10000	420	4100	8800
	331	5	SAVANNAH			Arsenic	7.3	mg/kg dw	1.3			7	3	1200	61	25000
	331	5	SAVANNAH	DUP		Arsenic	7.4	mg/kg dw	1.2			7	3	1200	61	25000
	331	5	SAVANNAH	DUP		Cobalt	15	mg/kg dw	1.2			13.2	120000		12000	
	331	5	SAVANNAH	DUP		Sulfide	35	mg/kg dw	30			--				

TABLE 4-7
EXCEEDENCES OF TIER I SCREENING LEVELS FOR SWMU T

SITE	LOCATION	DEPTH	LABNAME	QAQCTYPE	MATRIX	ANALYTE	RESULT	UNITS	DETECTLIMIT	LAB Q.	URS Q.	BKGRD	IND/ING	IND/INH	CON/ING	CON/INH
	331	5	SAVANNAH	DUP		Lead	53	mg/kg dw	0.62	N		6.8	400		400	
	331	5	SAVANNAH			Lead	58	mg/kg dw	0.64	N		6.8	400		400	
	331	5	SAVANNAH			Chromium	65	mg/kg dw	1.2		J	15.3	10000	420	4100	8800
Reservoir	2	1	ENSECO			Benzo(a)anthracene	7400	(ug/kg)				--	8000		170000	
	2	1	ENSECO			Benzo(a)pyrene	5800	(ug/kg)				--	800		17000	
	2	1	ENSECO			Benzo(b)fluoranthene	8700	(ug/kg)				--	8000		170000	
	2	1	ENSECO			Lead, Total	9.4	(mg/kg)				6.8	400		400	
	325	8	SAVANNAH			Hydrocarbons as DRO	4.8	mg/kg dw	4.6			--				
	325	8	SAVANNAH			Arsenic	7.9	mg/kg dw	1.4			7	3	1200	61	25000
	325	8	SAVANNAH			Lead	13	mg/kg dw	0.68	N		6.8	400		400	
	325	8	SAVANNAH			Sulfide	43	mg/kg dw	35			--				
	325	16	SAVANNAH			Cobalt	5.3	mg/kg dw	1.2			13.2	120000		12000	
	325	16	SAVANNAH			Lead	8.5	mg/kg dw	0.62	N		6.8	400		400	
Tank 2	3	15	ENSECO			Arsenic, Total	4.9	(mg/kg)				5.14	3	1200	61	25000
Tank 3	234	3	ENSECO			TPH	4930	(mg/kg)				--				
Tank 4	8	2	ENSECO			Lead, Total	52.4	(mg/kg)				6.8	400		400	
	8	12	ENSECO			Lead, Total	9.4	(mg/kg)				6.8	400		400	
	228	4	ENSECO			TPH	31100	(mg/kg)				--				
	228	11	ENSECO			TPH	632	(mg/kg)				--				
	328	1	SAVANNAH			Chromium	77	mg/kg dw	1.1			15.3	10000	420	4100	8800
	328	1	SAVANNAH			Lead	81	mg/kg dw	0.55			15.3	400		400	
	328	1	SAVANNAH	DIL		Hydrocarbons as DRO	520	mg/kg dw	66	D		--				
	328	1	SAVANNAH			Hydrocarbons as DRO	750	mg/kg dw	3.6	E		--				
	328	16	SAVANNAH			Lead	11	mg/kg dw	0.64			51.1	400		400	
	328	16	SAVANNAH	DIL		Hydrocarbons as DRO	360	mg/kg dw	86	D		--				
	328	16	SAVANNAH			Hydrocarbons as DRO	650	mg/kg dw	4.3	E		--				
	329	1	SAVANNAH	DUP		Chromium	87	mg/kg dw	1.1			15.3	10000	420	4100	8800
	329	1	SAVANNAH	DUP		Lead	90	mg/kg dw	0.55			6.8	400		400	
	329	1	SAVANNAH			Lead	91	mg/kg dw	0.55			6.8	400		400	
	329	1	SAVANNAH			Chromium	94	mg/kg dw	1.1			15.3	10000	420	4100	8800
	329	1	SAVANNAH	DUP/DIL		Hydrocarbons as DRO	320	mg/kg dw	73	D		--				
	329	1	SAVANNAH	DIL		Hydrocarbons as DRO	360	mg/kg dw	72	D		--				
	329	1	SAVANNAH			Hydrocarbons as DRO	590	mg/kg dw	3.6	E		--				
	329	1	SAVANNAH	DUP		Hydrocarbons as DRO	630	mg/kg dw	3.7	E		--				
	329	16	SAVANNAH			Arsenic	7.3	mg/kg dw	1.3			5.14	3	1200	61	25000

Note: Some analytes do not have screening values for comparison. The postive results were retained on this table, even though they may not be in exceedence.

= Exceeds the Soil-to-Groundwater Pathway only.

TABLE 4-7
EXCEEDENCES OF TIER I SCREENING LEVELS FOR SWMU T

SITE	LOCATION	DEPTH	LABNAME	QAQCTYPE	MATRIX	ANALYTE	RESULT	UNITS	DETECTLIMIT	LAB Q.	URS Q.	BKGRD	IND/ING	IND/INH	CON/ING	CON/INH
Tank 5	6	1	ENSECO			Lead, Total	9.8	(mg/kg)				6.8	400		400	
	6	1	ENSECO			Sulfide	11.6	(mg/kg)								
	6	25	ENSECO			Sulfide	6.6	(mg/kg)								
	229	5	ENSECO			TPH	76.9	(mg/kg)								
	134		SAVANNAH	GW		Hydrocarbons as GRO	0.056	mg/l	0.01							
	134		SAVANNAH	GW		Hydrocarbons as DRO	0.61	mg/l	0.1							
	332	1	SAVANNAH			Hydrocarbons as DRO	510	mg/kg dw	3.8	E						
	333	1	SAVANNAH	DIL		Hydrocarbons as GRO	340	ug/kg dw	110	D						
	333	1	SAVANNAH			Hydrocarbons as DRO	370	mg/kg dw	11	E						
	333	14	SAVANNAH			Hydrocarbons as DRO	4.5	mg/kg dw	3.6							
	333	14	SAVANNAH			Hydrocarbons as DRO	4.7	mg/kg dw	2.7							
	333	14	SAVANNAH			Hydrocarbons as GRO	310	ug/kg dw	100							
Tank 7	4	1	ENSECO			Beryllium, Total	1.1	(mg/kg)					1	2100	29	44000
	4	1	ENSECO			Chromium, Total	704	(mg/kg)					10000	420	4100	8800
	4	1	ENSECO			Lead, Total	8.7	(mg/kg)				6.8	400		400	
	323	4	SAVANNAH			Beryllium	1.1	mg/kg dw	0.52				1	2100	29	44000
	323	4	SAVANNAH			Lead	19	mg/kg dw	0.66			6.8	400		400	
	323	12	SAVANNAH			Lead	14	mg/kg dw	0.68			6.8	400		400	
	323	12	SAVANNAH			Arsenic	15	mg/kg dw	1.4				3	1200	61	25000
	323	12	SAVANNAH			Chromium	400	mg/kg dw	1.4				10000	420	4100	8800
	324	4	SAVANNAH			Lead	15	mg/kg dw	0.62			6.8	400		400	
	324	4	SAVANNAH			Lead	25	mg/kg dw	0.61			6.8	400		400	
	324	4	SAVANNAH			Chromium	120	mg/kg dw	1.2		J		10000	420	4100	8800
	324	12	SAVANNAH			Arsenic	9	mg/kg dw	1.3				3	1200	61	25000
General	1	2	ENSECO			Benzo(a)pyrene	1400	(ug/kg)					800		17000	
	1	2	ENSECO			Chromium, Total	1030	(mg/kg)					10000	420	4100	8800
	1	2	ENSECO			Lead, Total	2270	(mg/kg)					400		400	
	321	1	SAVANNAH			Lead	32	mg/kg dw	0.52			6.8	400		400	
	321	1	SAVANNAH			Chromium	65	mg/kg dw	1.1				10000	420	4100	8800
	321	4	SAVANNAH			Beryllium	2.3	mg/kg dw	0.52				1	2100	29	44000
	321	4	SAVANNAH			Chromium	91	mg/kg dw	1.3				10000	420	4100	8800
	321	4	SAVANNAH			Lead	110	mg/kg dw	0.65			6.8	400		400	
	322	1	SAVANNAH			Lead	110	mg/kg dw	0.55	N	J	6.8	400		400	
	322	1	SAVANNAH			Chromium	740	mg/kg dw	1.1				10000	420	4100	8800
	322	1	SAVANNAH			Dibenzo(a,h)anthracene	1000	ug/kg dw	590	P			800		17000	
	322	1	SAVANNAH			Benzo(a)pyrene	1700	ug/kg dw	240				800		17000	
	322	1	SAVANNAH			Benzo(a)anthracene	2400	ug/kg dw	240				8000		170000	
	322	3	SAVANNAH			Antimony	14	mg/kg dw	2.4				820		82	
	322	3	SAVANNAH			Chromium	470	mg/kg dw	1.2				10000	420	4100	8800
	322	3	SAVANNAH	DIL		Benzo(a)pyrene	820	ug/kg dw	140	D			800		17000	
	322	3	SAVANNAH			Benzo(a)pyrene	1000	ug/kg dw	46				800		17000	
	335	1	SAVANNAH			Beryllium	1.2	mg/kg dw	0.44	E			1	2100	29	44000
	335	1	SAVANNAH			Arsenic	13	mg/kg dw	1.1				3	1200	61	25000
	335	1	SAVANNAH			Lead	79	mg/kg dw	0.55			6.8	400		400	
	335	5	SAVANNAH			Arsenic	14	mg/kg dw	1.1				3	1200	61	25000
	335	5	SAVANNAH			Lead	60	mg/kg dw	0.55			6.8	400		400	

Note: Some analytes do not have screening values for comparison. The postive results were retained on this table, even though they may not be in exceedence.
= Exceeds the Soil-to-Groundwater Pathway only.

TABLE 4-8
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU V
(0 TO 1 FT, >1 FT, >5FT)
LAGOON AREA

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
1		1990	ENSECO		SEDIMENT	6010	Antimony, Total	12.1	(mg/kg)			
1		1990	ENSECO		SEDIMENT	7060	Arsenic, Total	11.6	(mg/kg)			
1		1990	ENSECO		SEDIMENT	6010	Barium, Total	94.2	(mg/kg)			
1		1990	ENSECO		SEDIMENT	8240	Benzene	38	(ug/kg)			
1		1990	ENSECO		SEDIMENT	6010	Chromium, Total	1460	(mg/kg)			
1		1990	ENSECO		SEDIMENT	6010	Cobalt, Total	1.5	(mg/kg)			
1		1990	ENSECO		SEDIMENT	9010	Cyanide	0.65	(mg/kg)			
1		1990	ENSECO		SEDIMENT	8240	Ethylbenzene	54	(ug/kg)			
1		1990	ENSECO		SEDIMENT	7421	Lead, Total	35.3	(mg/kg)			
1		1990	ENSECO		SEDIMENT	6010	Nickel, Total	8.6	(mg/kg)			
1		1990	ENSECO		SEDIMENT	7740	Selenium, Total	10.9	(mg/kg)			
1		1990	ENSECO		SEDIMENT	376.2	Sulfide, Total	65.2	(mg/kg)			
1		1990	ENSECO		SEDIMENT	8240	Toluene	68	(ug/kg)			
1		1990	ENSECO		SEDIMENT	6010	Vanadium, Total	8.5	(mg/kg)			
1		1990	ENSECO		SEDIMENT	8240	Xylenes (Total)	230	(ug/kg)			
1		1990	ENSECO		SEDIMENT	6010	Zinc, Total	94.9	(mg/kg)			
2		1990	ENSECO		SEDIMENT	6010	Antimony, Total	7.8	(mg/kg)			
2		1990	ENSECO		SEDIMENT	7060	Arsenic, Total	1.4	(mg/kg)			
2		1990	ENSECO		SEDIMENT	6010	Barium, Total	88	(mg/kg)			
2		1990	ENSECO		SEDIMENT	6010	Chromium, Total	642	(mg/kg)			
2		1990	ENSECO		SEDIMENT	9010	Cyanide	2	(mg/kg)			
2		1990	ENSECO		SEDIMENT	7421	Lead, Total	14.4	(mg/kg)			
2		1990	ENSECO		SEDIMENT	6010	Nickel, Total	9.6	(mg/kg)			
2		1990	ENSECO		SEDIMENT	7740	Selenium, Total	9.3	(mg/kg)			
2		1990	ENSECO		SEDIMENT	376.2	Sulfide, Total	4.2	(mg/kg)			
2		1990	ENSECO		SEDIMENT	6010	Vanadium, Total	12.7	(mg/kg)			
2		1990	ENSECO		SEDIMENT	8240	Xylenes (Total)	1500	(ug/kg)			
2		1990	ENSECO		SEDIMENT	6010	Zinc, Total	191	(mg/kg)			
3		1990	ENSECO		SEDIMENT	7060	Arsenic, Total	1.1	(mg/kg)			
3		1990	ENSECO		SEDIMENT	6010	Barium, Total	56.6	(mg/kg)			
3		1990	ENSECO		SEDIMENT	6010	Chromium, Total	373	(mg/kg)			
3		1990	ENSECO		SEDIMENT	8240	Ethylbenzene	110	(ug/kg)			
3		1990	ENSECO		SEDIMENT	7421	Lead, Total	8	(mg/kg)			
3		1990	ENSECO		SEDIMENT	6010	Nickel, Total	7.4	(mg/kg)			
3		1990	ENSECO		SEDIMENT	7740	Selenium, Total	6.3	(mg/kg)			
3		1990	ENSECO		SEDIMENT	376.2	Sulfide, Total	27.8	(mg/kg)			
3		1990	ENSECO		SEDIMENT	8240	Toluene	110	(ug/kg)			
3		1990	ENSECO		SEDIMENT	6010	Vanadium, Total	9.4	(mg/kg)			
3		1990	ENSECO		SEDIMENT	8240	Xylenes (Total)	780	(ug/kg)			
3		1990	ENSECO		SEDIMENT	6010	Zinc, Total	102	(mg/kg)			
4		1990	ENSECO		SEDIMENT	7060	Arsenic, Total	1.3	(mg/kg)			
4		1990	ENSECO		SEDIMENT	6010	Barium, Total	72.3	(mg/kg)			
4		1990	ENSECO		SEDIMENT	6010	Chromium, Total	532	(mg/kg)			
4		1990	ENSECO		SEDIMENT	9010	Cyanide	0.55	(mg/kg)			
4		1990	ENSECO		SEDIMENT	7421	Lead, Total	8.2	(mg/kg)			

TABLE 4-8
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU V
(0 TO 1 FT, >1 FT, >5FT)
LAGOON AREA

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
4		1990	ENSECO		SEDIMENT	6010	Nickel, Total	7.6	(mg/kg)			
4		1990	ENSECO		SEDIMENT	7740	Selenium, Total	8.5	(mg/kg)			
4		1990	ENSECO		SEDIMENT	376.2	Sulfide, Total	43.1	(mg/kg)			
4		1990	ENSECO		SEDIMENT	6010	Vanadium, Total	9.3	(mg/kg)			
4		1990	ENSECO		SEDIMENT	6010	Zinc, Total	207	(mg/kg)			
367	8	1999	SAVANNAH		SEDIMENT	8270	1-Methylnaphthalene	38000	ug/kg dw	38000		
367	8	1999	SAVANNAH		SEDIMENT	8310	Acenaphthene	4500	ug/kg dw	800	P	
367	8	1999	SAVANNAH		SEDIMENT	8310	Anthracene	640	ug/kg dw	66	P	
367	8	1999	SAVANNAH	DILUTION	SEDIMENT	8310	Anthracene	700	ug/kg dw	670	DP	
367	8	1999	SAVANNAH		SEDIMENT	6010	Antimony	150	mg/kg dw	6.2	N	
367	8	1999	SAVANNAH		SEDIMENT	6010	Barium	560	mg/kg dw	14		
367	8	1999	SAVANNAH	DILUTION	SEDIMENT	8310	Benzo(a)anthracene	730	ug/kg dw	670	DP	
367	8	1999	SAVANNAH		SEDIMENT	8310	Benzo(a)anthracene	770	ug/kg dw	66		
367	8	1999	SAVANNAH		SEDIMENT	8310	Benzo(a)pyrene	400	ug/kg dw	66		
367	8	1999	SAVANNAH		SEDIMENT	8310	Benzo(b)fluoranthene	300	ug/kg dw	66	P	
367	8	1999	SAVANNAH		SEDIMENT	8310	Benzo(g,h,i)perylene	740	ug/kg dw	740		
367	8	1999	SAVANNAH		SEDIMENT	6010	Beryllium	0.46	mg/kg dw	0.44		
367	8	1999	SAVANNAH		SEDIMENT	6010	Cadmium	1.6	mg/kg dw	0.7		
367	8	1999	SAVANNAH		SEDIMENT	6010	Chromium	15000	mg/kg dw	14		
367	8	1999	SAVANNAH		SEDIMENT	8310	Chrysene	840	ug/kg dw	66	P	
367	8	1999	SAVANNAH	DILUTION	SEDIMENT	8310	Chrysene	950	ug/kg dw	670	DP	
367	8	1999	SAVANNAH		SEDIMENT	6010	Copper	71	mg/kg dw	14		
367	8	1999	SAVANNAH		SEDIMENT	8310	Dibenzo(a,h)anthracene	280	ug/kg dw	160		
367	8	1999	SAVANNAH		SEDIMENT	8270	Dibenzofuran	6400	ug/kg dw	6400		
367	8	1999	SAVANNAH		SEDIMENT	8310	Fluoranthene	1200	ug/kg dw	160	P	
367	8	1999	SAVANNAH		SEDIMENT	8310	Fluorene	3200	ug/kg dw	160		
367	8	1999	SAVANNAH	DILUTION	SEDIMENT	8310	Fluorene	4000	ug/kg dw	1700	D	
367	8	1999	SAVANNAH		SEDIMENT	6010	Lead	380	mg/kg dw	7		
367	8	1999	SAVANNAH		SEDIMENT	8310	Phenanthrene	7700	ug/kg dw	66	E	
367	8	1999	SAVANNAH	DILUTION	SEDIMENT	8310	Phenanthrene	8900	ug/kg dw	670	D	
367	8	1999	SAVANNAH		SEDIMENT	8310	Pyrene	960	ug/kg dw	160	P	
367	8	1999	SAVANNAH		SEDIMENT	9030	Sulfide	5400	mg/kg dw	350		
367	8	1999	SAVANNAH		SEDIMENT	6010	Vanadium	46	mg/kg dw	14		
367	8	1999	SAVANNAH		SEDIMENT	6010	Zinc	350	mg/kg dw	28		
367	9	1999	SAVANNAH		SOIL	6010	Arsenic	12	mg/kg dw	1.4		
367	9	1999	SAVANNAH		SOIL	6010	Barium	270	mg/kg dw	1.4		
367	9	1999	SAVANNAH		SOIL	6010	Beryllium	1	mg/kg dw	0.56		
367	9	1999	SAVANNAH		SOIL	6010	Chromium	39	mg/kg dw	1.4		
367	9	1999	SAVANNAH		SOIL	6010	Cobalt	10	mg/kg dw	1.4		
367	9	1999	SAVANNAH		SOIL	6010	Copper	26	mg/kg dw	2.8		
367	9	1999	SAVANNAH		SOIL	6010	Lead	17	mg/kg dw	0.71		
367	9	1999	SAVANNAH		SOIL	7471	Mercury	0.036	mg/kg dw	0.028		
367	9	1999	SAVANNAH		SOIL	6010	Nickel	30	mg/kg dw	5.6		
367	9	1999	SAVANNAH		SOIL	6010	Vanadium	53	mg/kg dw	1.4		
367	9	1999	SAVANNAH		SOIL	6010	Zinc	92	mg/kg dw	2.8		

TABLE 4-8
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU V
(0 TO 1 FT, >1 FT, >5FT)
LAGOON AREA

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
367	11	1999	SAVANNAH		SOIL	6010	Arsenic	15	mg/kg dw	1.4		
367	11	1999	SAVANNAH		SOIL	6010	Barium	260	mg/kg dw	1.4		
367	11	1999	SAVANNAH		SOIL	6010	Beryllium	1.2	mg/kg dw	0.56		
367	11	1999	SAVANNAH		SOIL	6010	Chromium	30	mg/kg dw	1.4		
367	11	1999	SAVANNAH		SOIL	6010	Cobalt	12	mg/kg dw	1.4		
367	11	1999	SAVANNAH		SOIL	6010	Copper	28	mg/kg dw	2.8		
367	11	1999	SAVANNAH		SOIL	6010	Lead	18	mg/kg dw	0.7		
367	11	1999	SAVANNAH		SOIL	7471	Mercury	0.04	mg/kg dw	0.028		
367	11	1999	SAVANNAH		SOIL	6010	Nickel	28	mg/kg dw	5.6		
367	11	1999	SAVANNAH		SOIL	6010	Vanadium	56	mg/kg dw	1.4		
367	11	1999	SAVANNAH		SOIL	6010	Zinc	94	mg/kg dw	2.8		
368	6	1999	SAVANNAH		SEDIMENT	8260	Acetone	3200	ug/kg dw	1000		
368	6	1999	SAVANNAH	REANALYSIS	SEDIMENT	8260	Acetone	6000	ug/kg dw	1100		
368	6	1999	SAVANNAH		SEDIMENT	8310	Anthracene	1500	ug/kg dw	1200	P	
368	6	1999	SAVANNAH		SEDIMENT	6010	Antimony	24	mg/kg dw	20	N	
368	6	1999	SAVANNAH		SEDIMENT	6010	Arsenic	16	mg/kg dw	10		
368	6	1999	SAVANNAH		SEDIMENT	6010	Barium	580	mg/kg dw	10		
368	6	1999	SAVANNAH		SEDIMENT	8260	Benzene	160	ug/kg dw	100		
368	6	1999	SAVANNAH	REANALYSIS	SEDIMENT	8260	Benzene	280	ug/kg dw	110		
368	6	1999	SAVANNAH		SEDIMENT	8310	Benzo(a)anthracene	11000	ug/kg dw	1200		
368	6	1999	SAVANNAH		SEDIMENT	8310	Benzo(a)pyrene	3700	ug/kg dw	1200		
368	6	1999	SAVANNAH		SEDIMENT	8310	Benzo(b)fluoranthene	3900	ug/kg dw	1200	P	
368	6	1999	SAVANNAH		SEDIMENT	8310	Benzo(g,h,i)perylene	9200	ug/kg dw	2900		
368	6	1999	SAVANNAH		SEDIMENT	8260	Carbon disulfide	1200	ug/kg dw	1200		
368	6	1999	SAVANNAH	REANALYSIS	SEDIMENT	8260	Carbon disulfide	250	ug/kg dw	110		
368	6	1999	SAVANNAH		SEDIMENT	6010	Chromium	3100	mg/kg dw	10		
368	6	1999	SAVANNAH		SEDIMENT	8310	Chrysene	6400	ug/kg dw	1200	P	
368	6	1999	SAVANNAH		SEDIMENT	6010	Copper	100	mg/kg dw	20		
368	6	1999	SAVANNAH		SEDIMENT	8260	Ethylbenzene	400	ug/kg dw	100		
368	6	1999	SAVANNAH	REANALYSIS	SEDIMENT	8260	Ethylbenzene	800	ug/kg dw	110		
368	6	1999	SAVANNAH		SEDIMENT	8310	Fluoranthene	5000	ug/kg dw	2900	P	
368	6	1999	SAVANNAH		SEDIMENT	8310	Fluorene	5800	ug/kg dw	2900		
368	6	1999	SAVANNAH		SEDIMENT	6010	Lead	77	mg/kg dw	5		
368	6	1999	SAVANNAH		SEDIMENT	7471	Mercury	2.1	mg/kg dw	0.2		
368	6	1999	SAVANNAH	REANALYSIS	SEDIMENT	8260	Methyl ethyl Ketone (2-Butanone)	1800	ug/kg dw	540		
368	6	1999	SAVANNAH		SEDIMENT	8260	Methyl ethyl Ketone (2-Butanone)	720	ug/kg dw	500		
368	6	1999	SAVANNAH		SEDIMENT	6010	Nickel	49	mg/kg dw	40		
368	6	1999	SAVANNAH		SEDIMENT	8310	Phenanthrene	14000	ug/kg dw	1200		
368	6	1999	SAVANNAH		SEDIMENT	8310	Pyrene	15000	ug/kg dw	2900	P	
368	6	1999	SAVANNAH		SEDIMENT	6010	Selenium	59	mg/kg dw	10		
368	6	1999	SAVANNAH		SEDIMENT	9030	Sulfide	7400	mg/kg dw	250		
368	6	1999	SAVANNAH		SEDIMENT	8260	Toluene	530	ug/kg dw	100		
368	6	1999	SAVANNAH	REANALYSIS	SEDIMENT	8260	Toluene	970	ug/kg dw	110		
368	6	1999	SAVANNAH		SEDIMENT	6010	Vanadium	63	mg/kg dw	10		
368	6	1999	SAVANNAH		SEDIMENT	8260	Xylenes, Total	1500	ug/kg dw	210		

TABLE 4-8
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU V
(0 TO 1 FT, >1 FT, >5FT)
LAGOON AREA

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
368	6	1999	SAVANNAH	REANALYSIS	SEDIMENT	8260	Xylenes, Total	2800	ug/kg dw	220		
368	6	1999	SAVANNAH		SEDIMENT	6010	Zinc	1200	mg/kg dw	20		
368	9	1999	SAVANNAH		SOIL	8260	Acetone	94	ug/kg dw	75		
368	9	1999	SAVANNAH		SOIL	6010	Arsenic	3.3	mg/kg dw	1.3		
368	9	1999	SAVANNAH		SOIL	6010	Barium	180	mg/kg dw	1.3		
368	9	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	5.5	ug/kg dw	5.2	P	
368	9	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	6.2	ug/kg dw	5.2	P	
368	9	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	7.6	ug/kg dw	5.2	P	
368	9	1999	SAVANNAH		SOIL	6010	Beryllium	0.51	mg/kg dw	0.4		
368	9	1999	SAVANNAH		SOIL	8260	Carbon disulfide	9.1	ug/kg dw	7.5		
368	9	1999	SAVANNAH		SOIL	6010	Chromium	24	mg/kg dw	1.3		
368	9	1999	SAVANNAH		SOIL	8310	Chrysene	7.9	ug/kg dw	5.2	P	
368	9	1999	SAVANNAH		SOIL	6010	Cobalt	9.9	mg/kg dw	1.3		
368	9	1999	SAVANNAH		SOIL	6010	Copper	15	mg/kg dw	2.6		
368	9	1999	SAVANNAH		SOIL	8310	Fluoranthene	27	ug/kg dw	13	P	
368	9	1999	SAVANNAH		SOIL	6010	Lead	9.7	mg/kg dw	0.66		J
368	9	1999	SAVANNAH		SOIL	6010	Nickel	25	mg/kg dw	5.2		
368	9	1999	SAVANNAH		SOIL	8310	Phenanthrene	16	ug/kg dw	5.2		
368	9	1999	SAVANNAH		SOIL	8310	Pyrene	36	ug/kg dw	13	P	
368	9	1999	SAVANNAH		SOIL	9030	Sulfide	190	mg/kg dw	32		
368	9	1999	SAVANNAH		SOIL	6010	Vanadium	27	mg/kg dw	1.3		
368	9	1999	SAVANNAH		SOIL	6010	Zinc	57	mg/kg dw	2.6		
368	11	1999	SAVANNAH		SOIL	8260	Acetone	68	ug/kg dw	61		
368	11	1999	SAVANNAH		SOIL	6010	Arsenic	2.8	mg/kg dw	1.3		
368	11	1999	SAVANNAH		SOIL	6010	Barium	140	mg/kg dw	1.3		
368	11	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	17	ug/kg dw	5.2		
368	11	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	5.3	ug/kg dw	5.2	P	
368	11	1999	SAVANNAH		SOIL	6010	Beryllium	0.46	mg/kg dw	0.4		
368	11	1999	SAVANNAH		SOIL	6010	Chromium	19	mg/kg dw	1.3		
368	11	1999	SAVANNAH		SOIL	8310	Chrysene	5.8	ug/kg dw	5.2	P	
368	11	1999	SAVANNAH		SOIL	6010	Cobalt	7.8	mg/kg dw	1.3		
368	11	1999	SAVANNAH		SOIL	6010	Copper	13	mg/kg dw	2.6		
368	11	1999	SAVANNAH		SOIL	8310	Fluoranthene	13	ug/kg dw	13	P	
368	11	1999	SAVANNAH		SOIL	6010	Lead	9.5	mg/kg dw	0.65		J
368	11	1999	SAVANNAH		SOIL	6010	Nickel	17	mg/kg dw	5.2		
368	11	1999	SAVANNAH		SOIL	8310	Phenanthrene	16	ug/kg dw	5.2		
368	11	1999	SAVANNAH		SOIL	8310	Pyrene	28	ug/kg dw	13	P	
368	11	1999	SAVANNAH		SOIL	9030	Sulfide	160	mg/kg dw	32		
368	11	1999	SAVANNAH		SOIL	6010	Vanadium	26	mg/kg dw	1.3		
368	11	1999	SAVANNAH		SOIL	6010	Zinc	51	mg/kg dw	2.6		
369	5	1999	SAVANNAH		SEDIMENT	8310	Acenaphthene	1500	ug/kg dw	1200	P	
369	5	1999	SAVANNAH		SEDIMENT	8310	Acenaphthylene	920	ug/kg dw	460		
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	8260	Acetone	1100	ug/kg dw	390		
369	5	1999	SAVANNAH		SEDIMENT	8260	Acetone	1200	ug/kg dw	1200		
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	8310	Anthracene	1500	ug/kg dw	1000		

TABLE 4-8
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU V
(0 TO 1 FT, >1 FT, >5FT)
LAGOON AREA

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
369	5	1999	SAVANNAH		SEDIMENT	8310	Anthracene	710	ug/kg dw	92		
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	6010	Antimony	39	mg/kg dw	17	N	
369	5	1999	SAVANNAH		SEDIMENT	6010	Antimony	41	mg/kg dw	16	N	
369	5	1999	SAVANNAH		SEDIMENT	6010	Arsenic	10	mg/kg dw	4		
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	6010	Arsenic	11	mg/kg dw	4.3		
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	6010	Barium	560	mg/kg dw	4.3		
369	5	1999	SAVANNAH		SEDIMENT	6010	Barium	570	mg/kg dw	4		
369	5	1999	SAVANNAH		SEDIMENT	8260	Benzene	60	ug/kg dw	40		
369	5	1999	SAVANNAH		SEDIMENT	8310	Benzo(a)anthracene	1700	ug/kg dw	92	P	
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	8310	Benzo(a)anthracene	5100	ug/kg dw	1000		
369	5	1999	SAVANNAH		SEDIMENT	8310	Benzo(a)pyrene	1000	ug/kg dw	92	P	
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	8310	Benzo(a)pyrene	2400	ug/kg dw	1000		
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	8310	Benzo(b)fluoranthene	1900	ug/kg dw	1000	P	
369	5	1999	SAVANNAH		SEDIMENT	8310	Benzo(b)fluoranthene	850	ug/kg dw	92	P	
369	5	1999	SAVANNAH		SEDIMENT	8310	Benzo(g,h,i)perylene	3000	ug/kg dw	230		
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	8310	Benzo(g,h,i)perylene	6300	ug/kg dw	2500		
369	5	1999	SAVANNAH		SEDIMENT	8310	Benzo(k)fluoranthene	140	ug/kg dw	92	P	
369	5	1999	SAVANNAH		SEDIMENT	8260	Carbon disulfide	240	ug/kg dw	40		
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	8260	Carbon disulfide	480	ug/kg dw	480		
369	5	1999	SAVANNAH		SEDIMENT	6010	Chromium	3800	mg/kg dw	4		
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	6010	Chromium	4200	mg/kg dw	4.3		
369	5	1999	SAVANNAH		SEDIMENT	8310	Chrysene	1400	ug/kg dw	92	P	
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	8310	Chrysene	3700	ug/kg dw	1000	P	
369	5	1999	SAVANNAH		SEDIMENT	6010	Cobalt	8	mg/kg dw	4		
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	6010	Cobalt	8.2	mg/kg dw	4.3		
369	5	1999	SAVANNAH		SEDIMENT	6010	Copper	100	mg/kg dw	8		
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	6010	Copper	100	mg/kg dw	8.6		
369	5	1999	SAVANNAH		SEDIMENT	8310	Dibenzo(a,h)anthracene	850	ug/kg dw	230		
369	5	1999	SAVANNAH		SEDIMENT	8260	Ethylbenzene	130	ug/kg dw	40		
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	8260	Ethylbenzene	52	ug/kg dw	39		
369	5	1999	SAVANNAH		SEDIMENT	8310	Fluoranthene	980	ug/kg dw	230	P	J
369	5	1999	SAVANNAH		SEDIMENT	8310	Fluorene	1400	ug/kg dw	230		J
369	5	1999	SAVANNAH		SEDIMENT	6010	Lead	130	mg/kg dw	2		
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	6010	Lead	130	mg/kg dw	2.2		
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	7471	Mercury	0.87	mg/kg dw	0.86		
369	5	1999	SAVANNAH		SEDIMENT	7471	Mercury	1.5	mg/kg dw	0.04		
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	8260	Methyl ethyl Ketone (2-Butanone)	280	ug/kg dw	190		
369	5	1999	SAVANNAH		SEDIMENT	8260	Methyl ethyl Ketone (2-Butanone)	330	ug/kg dw	200		
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	6010	Nickel	45	mg/kg dw	17		
369	5	1999	SAVANNAH		SEDIMENT	6010	Nickel	46	mg/kg dw	16		
369	5	1999	SAVANNAH		SEDIMENT	8310	Phenanthrene	3300	ug/kg dw	92		
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	8310	Phenanthrene	5600	ug/kg dw	1000		
369	5	1999	SAVANNAH		SEDIMENT	8310	Pyrene	3300	ug/kg dw	230	P	
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	8310	Pyrene	9600	ug/kg dw	2500	P	
369	5	1999	SAVANNAH		SEDIMENT	6010	Selenium	50	mg/kg dw	4		

TABLE 4-8
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU V
(0 TO 1 FT, >1 FT, >5FT)
LAGOON AREA

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	6010	Selenium	51	mg/kg dw	4.3		
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	9030	Sulfide	3300	mg/kg dw	110		
369	5	1999	SAVANNAH		SEDIMENT	9030	Sulfide	4300	mg/kg dw	500		
369	5	1999	SAVANNAH		SEDIMENT	8260	Toluene	140	ug/kg dw	40		
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	8260	Toluene	78	ug/kg dw	39		
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	6010	Vanadium	66	mg/kg dw	4.3		
369	5	1999	SAVANNAH		SEDIMENT	6010	Vanadium	69	mg/kg dw	4		
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	8260	Xylenes, Total	300	ug/kg dw	300		
369	5	1999	SAVANNAH		SEDIMENT	8260	Xylenes, Total	880	ug/kg dw	200		
369	5	1999	SAVANNAH	DUPLICATE	SEDIMENT	6010	Zinc	800	mg/kg dw	8.6		
369	5	1999	SAVANNAH		SEDIMENT	6010	Zinc	810	mg/kg dw	8		
369	8	1999	SAVANNAH		SOIL	6010	Arsenic	8.3	mg/kg dw	1.4		
369	8	1999	SAVANNAH		SOIL	6010	Barium	240	mg/kg dw	1.4		
369	8	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	12	ug/kg dw	5.7	P	
369	8	1999	SAVANNAH		SOIL	6010	Beryllium	1	mg/kg dw	0.56		
369	8	1999	SAVANNAH		SOIL	8270	bis(2-Ethylhexyl)phthalate	1000	ug/kg dw	1000		
369	8	1999	SAVANNAH		SOIL	6010	Chromium	36	mg/kg dw	1.4		
369	8	1999	SAVANNAH		SOIL	8310	Chrysene	8.2	ug/kg dw	5.7		
369	8	1999	SAVANNAH		SOIL	6010	Cobalt	9.9	mg/kg dw	1.4		
369	8	1999	SAVANNAH		SOIL	6010	Copper	27	mg/kg dw	2.8		
369	8	1999	SAVANNAH		SOIL	6010	Lead	16	mg/kg dw	0.71		
369	8	1999	SAVANNAH		SOIL	7471	Mercury	0.049	mg/kg dw	0.028		
369	8	1999	SAVANNAH		SOIL	6010	Nickel	24	mg/kg dw	5.6		
369	8	1999	SAVANNAH		SOIL	9030	Sulfide	120	mg/kg dw	35		
369	8	1999	SAVANNAH		SOIL	6010	Vanadium	45	mg/kg dw	1.4		
369	8	1999	SAVANNAH		SOIL	6010	Zinc	92	mg/kg dw	2.8		
369	11	1999	SAVANNAH		SOIL	8310	Acenaphthene	520	ug/kg dw	520P	P	
369	11	1999	SAVANNAH		SOIL	6010	Arsenic	5.6	mg/kg dw	1.4		
369	11	1999	SAVANNAH		SOIL	6010	Barium	250	mg/kg dw	1.4		
369	11	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	6.3	ug/kg dw	5.2		
369	11	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	9.8	ug/kg dw	5.2	P	
369	11	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	16	ug/kg dw	13		
369	11	1999	SAVANNAH		SOIL	6010	Beryllium	0.93	mg/kg dw	0.56		
369	11	1999	SAVANNAH		SOIL	6010	Chromium	22	mg/kg dw	1.4		
369	11	1999	SAVANNAH		SOIL	8310	Chrysene	12	ug/kg dw	5.2		
369	11	1999	SAVANNAH		SOIL	6010	Cobalt	9.1	mg/kg dw	1.4		
369	11	1999	SAVANNAH		SOIL	6010	Copper	23	mg/kg dw	2.8		
369	11	1999	SAVANNAH		SOIL	8310	Dibenzo(a,h)anthracene	17	ug/kg dw	13		
369	11	1999	SAVANNAH		SOIL	6010	Lead	15	mg/kg dw	0.68		
369	11	1999	SAVANNAH		SOIL	8310	Naphthalene	29	ug/kg dw	26		
369	11	1999	SAVANNAH		SOIL	6010	Nickel	23	mg/kg dw	5.6		
369	11	1999	SAVANNAH		SOIL	8310	Phenanthrene	9.4	ug/kg dw	5.2		
369	11	1999	SAVANNAH		SOIL	6010	Vanadium	38	mg/kg dw	1.4		
369	11	1999	SAVANNAH		SOIL	6010	Zinc	74	mg/kg dw	2.8		
370	5	1999	SAVANNAH		SEDIMENT	8310	Acenaphthylene	1000	ug/kg dw	720		

TABLE 4-8
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU V
(0 TO 1 FT, >1 FT, >5FT)
LAGOON AREA

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
370	5	1999	SAVANNAH		SEDIMENT	8260	Acetone	1600	ug/kg dw	580		
370	5	1999	SAVANNAH		SEDIMENT	8310	Anthracene	290	ug/kg dw	140		
370	5	1999	SAVANNAH		SEDIMENT	6010	Antimony	18	mg/kg dw	13	N	
370	5	1999	SAVANNAH		SEDIMENT	6010	Arsenic	18	mg/kg dw	6.3		
370	5	1999	SAVANNAH		SEDIMENT	6010	Barium	760	mg/kg dw	6.3		
370	5	1999	SAVANNAH		SEDIMENT	8260	Benzene	81	ug/kg dw	58		
370	5	1999	SAVANNAH		SEDIMENT	8310	Benzo(a)anthracene	650	ug/kg dw	140		
370	5	1999	SAVANNAH		SEDIMENT	8310	Benzo(a)pyrene	380	ug/kg dw	140		
370	5	1999	SAVANNAH		SEDIMENT	8310	Benzo(b)fluoranthene	430	ug/kg dw	140	P	
370	5	1999	SAVANNAH		SEDIMENT	8260	Carbon disulfide	74	ug/kg dw	58		
370	5	1999	SAVANNAH		SEDIMENT	6010	Chromium	4300	mg/kg dw	6.3		
370	5	1999	SAVANNAH		SEDIMENT	8310	Chrysene	1400	ug/kg dw	140	P	
370	5	1999	SAVANNAH		SEDIMENT	6010	Copper	150	mg/kg dw	13		
370	5	1999	SAVANNAH		SEDIMENT	8310	Dibenzo(a,h)anthracene	430	ug/kg dw	360		
370	5	1999	SAVANNAH		SEDIMENT	8260	Ethylbenzene	150	ug/kg dw	58		
370	5	1999	SAVANNAH		SEDIMENT	6010	Lead	160	mg/kg dw	3.1		
370	5	1999	SAVANNAH		SEDIMENT	7471	Mercury	3.1	mg/kg dw	0.13		
370	5	1999	SAVANNAH		SEDIMENT	8260	Methyl ethyl Ketone (2-Butanone)	510	ug/kg dw	290		
370	5	1999	SAVANNAH		SEDIMENT	6010	Nickel	55	mg/kg dw	24		
370	5	1999	SAVANNAH		SEDIMENT	8310	Phenanthrene	670	ug/kg dw	140	P	
370	5	1999	SAVANNAH		SEDIMENT	8310	Pyrene	910	ug/kg dw	360	P	
370	5	1999	SAVANNAH		SEDIMENT	6010	Selenium	84	mg/kg dw	6.3		
370	5	1999	SAVANNAH		SEDIMENT	9030	Sulfide	1800	mg/kg dw	160		
370	5	1999	SAVANNAH		SEDIMENT	8260	Toluene	94	ug/kg dw	58		
370	5	1999	SAVANNAH		SEDIMENT	6010	Vanadium	69	mg/kg dw	6.3		
370	5	1999	SAVANNAH		SEDIMENT	8260	Xylenes, Total	460	ug/kg dw	120		
370	5	1999	SAVANNAH		SEDIMENT	6010	Zinc	1700	mg/kg dw	13		
370	8	1999	SAVANNAH		SOIL	6010	Antimony	29	mg/kg dw	6.4	N	
370	8	1999	SAVANNAH		SOIL	6010	Arsenic	5.5	mg/kg dw	1.6		
370	8	1999	SAVANNAH		SOIL	6010	Barium	230	mg/kg dw	1.6		
370	8	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	7.9	ug/kg dw	6.4	P	
370	8	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	13	ug/kg dw	6.4	P	
370	8	1999	SAVANNAH		SOIL	6010	Beryllium	0.99	mg/kg dw	0.64		
370	8	1999	SAVANNAH		SOIL	6010	Chromium	310	mg/kg dw	1.6		
370	8	1999	SAVANNAH		SOIL	8310	Chrysene	7.6	ug/kg dw	6.4		
370	8	1999	SAVANNAH		SOIL	6010	Cobalt	9.7	mg/kg dw	1.6		
370	8	1999	SAVANNAH		SOIL	6010	Copper	28	mg/kg dw	3.2		
370	8	1999	SAVANNAH		SOIL	6010	Lead	21	mg/kg dw	0.81		
370	8	1999	SAVANNAH		SOIL	7471	Mercury	2.6	mg/kg dw	0.032		
370	8	1999	SAVANNAH		SOIL	6010	Nickel	27	mg/kg dw	6.4		
370	8	1999	SAVANNAH		SOIL	8310	Phenanthrene	15	ug/kg dw	6.4		
370	8	1999	SAVANNAH		SOIL	8310	Pyrene	19	ug/kg dw	16	P	
370	8	1999	SAVANNAH		SOIL	6010	Selenium	2.2	mg/kg dw	1.6		
370	8	1999	SAVANNAH		SOIL	9030	Sulfide	1100	mg/kg dw	40		
370	8	1999	SAVANNAH		SOIL	6010	Vanadium	52	mg/kg dw	1.6		

TABLE 4-8
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU V
(0 TO 1 FT, >1 FT, >5FT)
LAGOON AREA

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LABQUALIFIER	URSQUALIFIER
370	8	1999	SAVANNAH		SOIL	6010	Zinc	130	mg/kg dw	3.2		
370	11	1999	SAVANNAH		SOIL	6010	Antimony	6.3	mg/kg dw	5.6	N	
370	11	1999	SAVANNAH		SOIL	6010	Arsenic	2.6	mg/kg dw	1.4		
370	11	1999	SAVANNAH		SOIL	6010	Barium	270	mg/kg dw	1.4		
370	11	1999	SAVANNAH		SOIL	8310	Benzo(a)anthracene	14	ug/kg dw	5.4	P	
370	11	1999	SAVANNAH		SOIL	8310	Benzo(a)pyrene	9.2	ug/kg dw	5.4		
370	11	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	10	ug/kg dw	5.4	P	
370	11	1999	SAVANNAH		SOIL	6010	Beryllium	0.67	mg/kg dw	0.56		
370	11	1999	SAVANNAH		SOIL	6010	Chromium	23	mg/kg dw	1.4		
370	11	1999	SAVANNAH		SOIL	8310	Chrysene	13	ug/kg dw	5.4		
370	11	1999	SAVANNAH		SOIL	6010	Cobalt	7.4	mg/kg dw	1.4		
370	11	1999	SAVANNAH		SOIL	6010	Copper	18	mg/kg dw	2.8		
370	11	1999	SAVANNAH		SOIL	6010	Lead	12	mg/kg dw	0.68		
370	11	1999	SAVANNAH		SOIL	7471	Mercury	0.049	mg/kg dw	0.028		
370	11	1999	SAVANNAH		SOIL	6010	Nickel	17	mg/kg dw	5.6		
370	11	1999	SAVANNAH		SOIL	8310	Phenanthrene	19	ug/kg dw	5.4		
370	11	1999	SAVANNAH		SOIL	8310	Pyrene	27	ug/kg dw	13	P	
370	11	1999	SAVANNAH		SOIL	9030	Sulfide	420	mg/kg dw	35		
370	11	1999	SAVANNAH		SOIL	6010	Vanadium	34	mg/kg dw	1.4		
370	11	1999	SAVANNAH		SOIL	6010	Zinc	57	mg/kg dw	2.8		
368	9	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	5800	mg/kg dw	650		
368	11	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	3700	mg/kg dw	650		
369	8	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	4700	mg/kg dw	700		
369	11	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	5300	mg/kg dw	700		
368	9	1999	SAVANNAH		SOIL	9045	pH	8.86	units	1		
368	11	1999	SAVANNAH		SOIL	9045	pH	8.87	units	1		
369	8	1999	SAVANNAH		SOIL	9045	pH	8.13	units	1		
369	11	1999	SAVANNAH		SOIL	9045	pH	8.4	units	1		

* = Detection Limits are not displayed for historical samples. Refer to laboratory data sets (previously submitted to USEPA) for detection limits.

Note: Qualifier descriptions are explained in Appendix B, Tables B-1a and B-1b.

TABLE 4-8
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU V
(0 TO 1 FT, >1 FT, >5FT)
DREDGED AREA

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LAB Q.	URS Q.
240	1	1992	ENSECO			7060	Arsenic, Total	4.4	(mg/kg)			
240	1	1992	ENSECO			6010	Barium, Total	141	(mg/kg)			
240	1	1992	ENSECO			6010	Beryllium, Total	0.62	(mg/kg)			
240	1	1992	ENSECO			6010	Cadmium, Total	1	(mg/kg)			
240	1	1992	ENSECO			6010	Chromium, Total	1360	(mg/kg)			
240	1	1992	ENSECO			6010	Cobalt, Total	5	(mg/kg)			
240	1	1992	ENSECO			7421	Lead, Total	59.9	(mg/kg)			
240	1	1992	ENSECO			7470	Mercury, Total	0.17	(mg/kg)			
240	1	1992	ENSECO			6010	Nickel, Total	15.5	(mg/kg)			
240	1	1992	ENSECO			6010	Vanadium, Total	22.7	(mg/kg)			
240	1	1992	ENSECO			6010	Zinc, Total	117	(mg/kg)			
241	1	1992	ENSECO	DUPLICATE		6010	Antimony, Total	8.1	(mg/kg)			
241	1	1992	ENSECO			6010	Antimony, Total	9.4	(mg/kg)			
241	1	1992	ENSECO	DUPLICATE		7060	Arsenic, Total	2.8	(mg/kg)			
241	1	1992	ENSECO			7060	Arsenic, Total	6.2	(mg/kg)			
241	1	1992	ENSECO	DUPLICATE		6010	Barium, Total	93.5	(mg/kg)			
241	1	1992	ENSECO			6010	Barium, Total	96.8	(mg/kg)			
241	1	1992	ENSECO	DUPLICATE		6010	Beryllium, Total	0.54	(mg/kg)			
241	1	1992	ENSECO			6010	Beryllium, Total	0.56	(mg/kg)			
241	1	1992	ENSECO	DUPLICATE		6010	Cadmium, Total	0.92	(mg/kg)			
241	1	1992	ENSECO			6010	Cadmium, Total	1.4	(mg/kg)			
241	1	1992	ENSECO	DUPLICATE		6010	Chromium, Total	331	(mg/kg)			
241	1	1992	ENSECO			6010	Chromium, Total	142	(mg/kg)			
241	1	1992	ENSECO	DUPLICATE		6010	Cobalt, Total	4.7	(mg/kg)			
241	1	1992	ENSECO			6010	Cobalt, Total	5.1	(mg/kg)			
241	1	1992	ENSECO	DUPLICATE		7421	Lead, Total	25.5	(mg/kg)			
241	1	1992	ENSECO			7421	Lead, Total	26.5	(mg/kg)			
241	1	1992	ENSECO	DUPLICATE		6010	Nickel, Total	13.4	(mg/kg)			
241	1	1992	ENSECO			6010	Nickel, Total	15	(mg/kg)			
241	1	1992	ENSECO	DUPLICATE		7740	Selenium, Total	0.5	(mg/kg)			
241	1	1992	ENSECO			7740	Selenium, Total	3.6	(mg/kg)			
241	1	1992	ENSECO			8240	Toluene	5	(ug/kg)			
241	1	1992	ENSECO	DUPLICATE		6010	Vanadium, Total	17.2	(mg/kg)			
241	1	1992	ENSECO			6010	Vanadium, Total	20.9	(mg/kg)			
241	1	1992	ENSECO	DUPLICATE		6010	Zinc, Total	69.3	(mg/kg)			
241	1	1992	ENSECO			6010	Zinc, Total	103	(mg/kg)			
242	1	1992	ENSECO			6010	Antimony, Total	17.5	(mg/kg)			
242	1	1992	ENSECO			7060	Arsenic, Total	2.8	(mg/kg)			
242	1	1992	ENSECO			6010	Barium, Total	98.8	(mg/kg)			
242	1	1992	ENSECO			6010	Beryllium, Total	0.44	(mg/kg)			
242	1	1992	ENSECO			6010	Cadmium, Total	0.56	(mg/kg)			
242	1	1992	ENSECO			6010	Chromium, Total	135	(mg/kg)			
242	1	1992	ENSECO			6010	Cobalt, Total	3.8	(mg/kg)			
242	1	1992	ENSECO			7421	Lead, Total	18.7	(mg/kg)			
242	1	1992	ENSECO			6010	Nickel, Total	11.1	(mg/kg)			

TABLE 4-8
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU V
(0 TO 1 FT, >1 FT, >5FT)
DREDGED AREA

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LAB Q.	URS Q.
242	1	1992	ENSECO			6010	Vanadium, Total	14.7	(mg/kg)			
242	1	1992	ENSECO			6010	Zinc, Total	55.1	(mg/kg)			
243	1	1992	ENSECO			7060	Arsenic, Total	4.4	(mg/kg)			
243	1	1992	ENSECO			6010	Barium, Total	111	(mg/kg)			
243	1	1992	ENSECO			6010	Beryllium, Total	0.56	(mg/kg)			
243	1	1992	ENSECO			6010	Cadmium, Total	0.88	(mg/kg)			
243	1	1992	ENSECO			6010	Chromium, Total	67.6	(mg/kg)			
243	1	1992	ENSECO			6010	Cobalt, Total	5.2	(mg/kg)			
243	1	1992	ENSECO			7421	Lead, Total	19.5	(mg/kg)			
243	1	1992	ENSECO			6010	Nickel, Total	13.7	(mg/kg)			
243	1	1992	ENSECO			6010	Vanadium, Total	24.3	(mg/kg)			
243	1	1992	ENSECO			6010	Zinc, Total	68.9	(mg/kg)			
244	1	1992	ENSECO			6010	Antimony, Total	7.5	(mg/kg)			
244	1	1992	ENSECO			7060	Arsenic, Total	3.9	(mg/kg)			
244	1	1992	ENSECO			6010	Barium, Total	119	(mg/kg)			
244	1	1992	ENSECO			6010	Beryllium, Total	0.45	(mg/kg)			
244	1	1992	ENSECO			6010	Cadmium, Total	1.4	(mg/kg)			
244	1	1992	ENSECO			6010	Chromium, Total	2630	(mg/kg)			
244	1	1992	ENSECO			6010	Cobalt, Total	3.2	(mg/kg)			
244	1	1992	ENSECO			9010	Cyanide	0.67	(mg/kg)			
244	1	1992	ENSECO			7421	Lead, Total	53.7	(mg/kg)			
244	1	1992	ENSECO			7470	Mercury, Total	0.89	(mg/kg)			
244	1	1992	ENSECO			6010	Nickel, Total	10.9	(mg/kg)			
244	1	1992	ENSECO			6010	Vanadium, Total	22.4	(mg/kg)			
244	1	1992	ENSECO			6010	Zinc, Total	88.1	(mg/kg)			
245	1	1992	ENSECO			6010	Antimony, Total	118	(mg/kg)			
245	1	1992	ENSECO			7060	Arsenic, Total	3.2	(mg/kg)			
245	1	1992	ENSECO			6010	Barium, Total	296	(mg/kg)			
245	1	1992	ENSECO			6010	Chromium, Total	13000	(mg/kg)			
245	1	1992	ENSECO			9010	Cyanide	2.9	(mg/kg)			
245	1	1992	ENSECO			7421	Lead, Total	371	(mg/kg)			
245	1	1992	ENSECO			7470	Mercury, Total	0.52	(mg/kg)			
245	1	1992	ENSECO			8240	Toluene	9.2	(ug/kg)		J	
245	1	1992	ENSECO			6010	Vanadium, Total	34.8	(mg/kg)			
245	1	1992	ENSECO			6010	Zinc, Total	229	(mg/kg)			
246	1	1992	ENSECO			6010	Antimony, Total	102	(mg/kg)			
246	1	1992	ENSECO			7060	Arsenic, Total	2.6	(mg/kg)			
246	1	1992	ENSECO			6010	Barium, Total	174	(mg/kg)			
246	1	1992	ENSECO			6010	Chromium, Total	1470	(mg/kg)			
246	1	1992	ENSECO			6010	Cobalt, Total	2.6	(mg/kg)			
246	1	1992	ENSECO			9010	Cyanide	0.89	(mg/kg)			
246	1	1992	ENSECO			7421	Lead, Total	48.6	(mg/kg)			
246	1	1992	ENSECO			7470	Mercury, Total	0.35	(mg/kg)			
246	1	1992	ENSECO			6010	Nickel, Total	12.2	(mg/kg)			
246	1	1992	ENSECO			7740	Selenium, Total	3.1	(mg/kg)			

TABLE 4-8
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU V
(0 TO 1 FT, >1 FT, >5FT)

DREDGED AREA

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LAB Q.	URS Q.
246	1	1992	ENSECO			6010	Vanadium, Total	16.7	(mg/kg)			
246	1	1992	ENSECO			6010	Zinc, Total	104	(mg/kg)			
247	1	1992	ENSECO			7060	Arsenic, Total	2.8	(mg/kg)			
247	1	1992	ENSECO			6010	Barium, Total	653	(mg/kg)			
247	1	1992	ENSECO			6010	Chromium, Total	5540	(mg/kg)			
247	1	1992	ENSECO			9010	Cyanide	1.3	(mg/kg)			
247	1	1992	ENSECO			7421	Lead, Total	175	(mg/kg)			
247	1	1992	ENSECO			7470	Mercury, Total	0.72	(mg/kg)			
247	1	1992	ENSECO			6010	Vanadium, Total	17.4	(mg/kg)			
247	1	1992	ENSECO			6010	Zinc, Total	329	(mg/kg)			
358	1	1999	SAVANNAH		SOIL	6010	Antimony	4.2	mg/kg dw	2.4	N	
358	1	1999	SAVANNAH		SOIL	6010	Arsenic	6.2	mg/kg dw	1.2		
358	1	1999	SAVANNAH		SOIL	6010	Barium	190	mg/kg dw	1.2		
358	1	1999	SAVANNAH		SOIL	6010	Beryllium	0.64	mg/kg dw	0.48		
358	1	1999	SAVANNAH		SOIL	6010	Cadmium	0.71	mg/kg dw	0.6		
358	1	1999	SAVANNAH		SOIL	6010	Chromium	1200	mg/kg dw	1.2		
358	1	1999	SAVANNAH		SOIL	6010	Lead	58	mg/kg dw	0.6		
358	1	1999	SAVANNAH		SOIL	7471	Mercury	0.18	mg/kg dw	0.024		
358	1	1999	SAVANNAH		SOIL	6010	Vanadium	33	mg/kg dw	1.2		
358	1	1999	SAVANNAH		SOIL	6010	Zinc	120	mg/kg dw	2.4		
358	4	1999	SAVANNAH		SOIL	6010	Barium	560	mg/kg dw	8.2		
358	4	1999	SAVANNAH		SOIL	6010	Beryllium	0.52	mg/kg dw	0.44		
358	4	1999	SAVANNAH		SOIL	6010	Cadmium	1.1	mg/kg dw	1		
358	4	1999	SAVANNAH		SOIL	6010	Chromium	13000	mg/kg dw	8.2		
358	4	1999	SAVANNAH		SOIL	6010	Lead	770	mg/kg dw	4.1		
358	4	1999	SAVANNAH		SOIL	7471	Mercury	0.34	mg/kg dw	0.21		
358	4	1999	SAVANNAH		SOIL	6010	Vanadium	31	mg/kg dw	8.2		
358	4	1999	SAVANNAH		SOIL	6010	Zinc	470	mg/kg dw	16		
358	12	1999	SAVANNAH		SOIL	6010	Arsenic	2.3	mg/kg dw	1.3		
358	12	1999	SAVANNAH		SOIL	6010	Barium	120	mg/kg dw	1.3		
358	12	1999	SAVANNAH		SOIL	6010	Beryllium	0.58	mg/kg dw	0.052		
358	12	1999	SAVANNAH		SOIL	6010	Chromium	23	mg/kg dw	1.3		
358	12	1999	SAVANNAH		SOIL	6010	Lead	11	mg/kg dw	0.65		
358	12	1999	SAVANNAH		SOIL	6010	Vanadium	29	mg/kg dw	1.3		
358	12	1999	SAVANNAH		SOIL	6010	Zinc	57	mg/kg dw	2.6		
359	4	1999	SAVANNAH		SOIL	6010	Antimony	29	mg/kg dw	2.4		
359	4	1999	SAVANNAH		SOIL	6010	Arsenic	11	mg/kg dw	1.1		
359	4	1999	SAVANNAH		SOIL	6010	Barium	160	mg/kg dw	1.1	E	
359	4	1999	SAVANNAH		SOIL	6010	Beryllium	0.48	mg/kg dw	0.44	E	
359	4	1999	SAVANNAH		SOIL	6010	Cadmium	4.8	mg/kg dw	0.55		
359	4	1999	SAVANNAH		SOIL	6010	Chromium	860	mg/kg dw	1.1		
359	4	1999	SAVANNAH		SOIL	6010	Lead	160	mg/kg dw	0.55		
359	4	1999	SAVANNAH		SOIL	7471	Mercury	0.12	mg/kg dw	0.022		
359	4	1999	SAVANNAH		SOIL	6010	Vanadium	28	mg/kg dw	1.1		
359	4	1999	SAVANNAH		SOIL	6010	Zinc	380	mg/kg dw	2.2		

TABLE 4-8

SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU V

(0 TO 1 FT, >1 FT, >5FT)

DREDGED AREA

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LAB Q.	URS Q.
359	12	1999	SAVANNAH		SOIL	6010	Arsenic	3.3	mg/kg dw	1.4		
359	12	1999	SAVANNAH		SOIL	6010	Barium	340	mg/kg dw	1.4	E	
359	12	1999	SAVANNAH		SOIL	6010	Beryllium	0.57	mg/kg dw	0.52	E	
359	12	1999	SAVANNAH		SOIL	6010	Chromium	3100	mg/kg dw	1.4		
359	12	1999	SAVANNAH		SOIL	6010	Lead	130	mg/kg dw	0.7		
359	12	1999	SAVANNAH		SOIL	7471	Mercury	6.9	mg/kg dw	0.028		
359	12	1999	SAVANNAH		SOIL	6010	Vanadium	37	mg/kg dw	1.4		
359	12	1999	SAVANNAH		SOIL	6010	Zinc	160	mg/kg dw	2.8		
360	4	1999	SAVANNAH		SOIL	8310	Acenaphthene	1100	ug/kg dw	1100P	P	
360	4	1999	SAVANNAH		SOIL	6010	Antimony	32	mg/kg dw	3.4		
360	4	1999	SAVANNAH		SOIL	6010	Arsenic	4.8	mg/kg dw	1.7		
360	4	1999	SAVANNAH		SOIL	6010	Barium	320	mg/kg dw	1.7	E	
360	4	1999	SAVANNAH		SOIL	6010	Beryllium	0.92	mg/kg dw	0.68	E	
360	4	1999	SAVANNAH		SOIL	6010	Cadmium	3.7	mg/kg dw	0.85		
360	4	1999	SAVANNAH		SOIL	6010	Chromium	9100	mg/kg dw	1.7		
360	4	1999	SAVANNAH		SOIL	6010	Cobalt	12	mg/kg dw	1.7	E	
360	4	1999	SAVANNAH		SOIL	6010	Copper	61	mg/kg dw	3.4		
360	4	1999	SAVANNAH		SOIL	9010	Cyanide, Total	2	mg/kg dw	1.7		
360	4	1999	SAVANNAH		SOIL	6010	Lead	190	mg/kg dw	0.85		
360	4	1999	SAVANNAH		SOIL	7471	Mercury	0.88	mg/kg dw	0.034		
360	4	1999	SAVANNAH		SOIL	6010	Nickel	29	mg/kg dw	6.8	E	
360	4	1999	SAVANNAH		SOIL	6010	Selenium	4.3	mg/kg dw	1.7		
360	4	1999	SAVANNAH		SOIL	6010	Vanadium	40	mg/kg dw	1.7		
360	4	1999	SAVANNAH		SOIL	6010	Zinc	270	mg/kg dw	3.4		
360	12	1999	SAVANNAH		SOIL	6010	Arsenic	6.7	mg/kg dw	1.4		
360	12	1999	SAVANNAH	DUPLICATE	SOIL	6010	Arsenic	9	mg/kg dw	1.4		
360	12	1999	SAVANNAH	DUPLICATE	SOIL	6010	Barium	200	mg/kg dw	1.4	E	
360	12	1999	SAVANNAH		SOIL	6010	Barium	450	mg/kg dw	1.4	E	
360	12	1999	SAVANNAH		SOIL	6010	Beryllium	1.0	mg/kg dw	0.56	E	
360	12	1999	SAVANNAH	DUPLICATE	SOIL	6010	Beryllium	1.1	mg/kg dw	0.56	E	
360	12	1999	SAVANNAH		SOIL	6010	Chromium	30	mg/kg dw	1.4		
360	12	1999	SAVANNAH	DUPLICATE	SOIL	6010	Chromium	51	mg/kg dw	1.4		
360	12	1999	SAVANNAH		SOIL	6010	Cobalt	9.2	mg/kg dw	1.4	E	
360	12	1999	SAVANNAH	DUPLICATE	SOIL	6010	Cobalt	9.6	mg/kg dw	1.4	E	
360	12	1999	SAVANNAH		SOIL	6010	Copper	24	mg/kg dw	2.8		
360	12	1999	SAVANNAH	DUPLICATE	SOIL	6010	Copper	24	mg/kg dw	2.8		
360	12	1999	SAVANNAH		SOIL	6010	Lead	15	mg/kg dw	0.69		
360	12	1999	SAVANNAH	DUPLICATE	SOIL	6010	Lead	16	mg/kg dw	0.68		
360	12	1999	SAVANNAH	DUPLICATE	SOIL	7471	Mercury	0.046	mg/kg dw	0.028		
360	12	1999	SAVANNAH		SOIL	6010	Nickel	24	mg/kg dw	5.2	E	
360	12	1999	SAVANNAH	DUPLICATE	SOIL	6010	Nickel	24	mg/kg dw	5.6	E	
360	12	1999	SAVANNAH		SOIL	6010	Vanadium	42	mg/kg dw	1.4		
360	12	1999	SAVANNAH	DUPLICATE	SOIL	6010	Vanadium	53	mg/kg dw	1.4		
360	12	1999	SAVANNAH		SOIL	6010	Zinc	76	mg/kg dw	2.8		
360	12	1999	SAVANNAH	DUPLICATE	SOIL	6010	Zinc	78	mg/kg dw	2.8		

TABLE 4-8
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU V
(0 TO 1 FT, >1 FT, >5FT)
DREDGED AREA

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LAB Q.	URS Q.
361	4	1999	SAVANNAH		SOIL	6010	Arsenic	6.8	mg/kg dw	1.4		
361	4	1999	SAVANNAH		SOIL	6010	Barium	220	mg/kg dw	1.4	E	
361	4	1999	SAVANNAH		SOIL	6010	Beryllium	0.93	mg/kg dw	0.56	E	
361	4	1999	SAVANNAH		SOIL	6010	Chromium	580	mg/kg dw	1.4		
361	4	1999	SAVANNAH		SOIL	6010	Lead	35	mg/kg dw	0.69		
361	4	1999	SAVANNAH		SOIL	7471	Mercury	0.069	mg/kg dw	0.028		
361	4	1999	SAVANNAH		SOIL	6010	Vanadium	47	mg/kg dw	1.4		
361	4	1999	SAVANNAH		SOIL	6010	Zinc	100	mg/kg dw	2.8		
361	12	1999	SAVANNAH		SOIL	6010	Arsenic	11	mg/kg dw	1.4		
361	12	1999	SAVANNAH		SOIL	6010	Barium	230	mg/kg dw	1.4	E	
361	12	1999	SAVANNAH		SOIL	6010	Beryllium	1.2	mg/kg dw	0.56	E	
361	12	1999	SAVANNAH		SOIL	6010	Chromium	26	mg/kg dw	1.4		
361	12	1999	SAVANNAH		SOIL	6010	Lead	17	mg/kg dw	0.69		
361	12	1999	SAVANNAH		SOIL	7471	Mercury	0.036	mg/kg dw	0.028		
361	12	1999	SAVANNAH		SOIL	6010	Vanadium	45	mg/kg dw	1.4		
361	12	1999	SAVANNAH		SOIL	6010	Zinc	77	mg/kg dw	2.8		
362	4	1999	SAVANNAH		SOIL	6010	Arsenic	6.9	mg/kg dw	1.1		
362	4	1999	SAVANNAH		SOIL	6010	Barium	160	mg/kg dw	1.1	E	
362	4	1999	SAVANNAH		SOIL	6010	Beryllium	0.78	mg/kg dw	0.44	E	
362	4	1999	SAVANNAH		SOIL	6010	Cadmium	0.63	mg/kg dw	0.55		
362	4	1999	SAVANNAH		SOIL	6010	Chromium	23	mg/kg dw	1.1		
362	4	1999	SAVANNAH		SOIL	6010	Lead	26	mg/kg dw	0.55		
362	4	1999	SAVANNAH		SOIL	7471	Mercury	0.14	mg/kg dw	0.022		
362	4	1999	SAVANNAH		SOIL	6010	Vanadium	35	mg/kg dw	1.1		
362	4	1999	SAVANNAH		SOIL	6010	Zinc	79	mg/kg dw	2.2		
362	12	1999	SAVANNAH		SOIL	6010	Arsenic	3	mg/kg dw	1.4		
362	12	1999	SAVANNAH		SOIL	6010	Barium	240	mg/kg dw	1.4	E	
362	12	1999	SAVANNAH		SOIL	6010	Beryllium	0.82	mg/kg dw	0.56	E	
362	12	1999	SAVANNAH		SOIL	6010	Chromium	21	mg/kg dw	1.4		
362	12	1999	SAVANNAH		SOIL	6010	Lead	12	mg/kg dw	0.72		
362	12	1999	SAVANNAH		SOIL	6010	Vanadium	33	mg/kg dw	1.4		
362	12	1999	SAVANNAH		SOIL	6010	Zinc	62	mg/kg dw	2.8		
363	4	1999	SAVANNAH		SOIL	6010	Barium	250	mg/kg dw	1.2	E	
363	4	1999	SAVANNAH		SOIL	6010	Beryllium	0.22	mg/kg dw	0.48	E	
363	4	1999	SAVANNAH		SOIL	6010	Cadmium	7.5	mg/kg dw	0.6		
363	4	1999	SAVANNAH		SOIL	6010	Chromium	12000	mg/kg dw	1.2		
363	4	1999	SAVANNAH		SOIL	6010	Lead	160	mg/kg dw	0.6		
363	4	1999	SAVANNAH		SOIL	7471	Mercury	0.64	mg/kg dw	0.024		
363	4	1999	SAVANNAH		SOIL	6010	Vanadium	28	mg/kg dw	1.2		
363	4	1999	SAVANNAH		SOIL	6010	Zinc	150	mg/kg dw	2.4		
363	12	1999	SAVANNAH		SOIL	6010	Antimony	47	mg/kg dw	4.2		
363	12	1999	SAVANNAH		SOIL	6010	Barium	200	mg/kg dw	1.8	E	
363	12	1999	SAVANNAH		SOIL	6010	Beryllium	0.55	mg/kg dw	0.44	E	
363	12	1999	SAVANNAH		SOIL	6010	Cadmium	2.1	mg/kg dw	0.9		
363	12	1999	SAVANNAH		SOIL	6010	Chromium	6400	mg/kg dw	1.8		

TABLE 4-8
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU V
(0 TO 1 FT, >1 FT, >5FT)

DREDGED AREA

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LAB Q.	URS Q.
363	12	1999	SAVANNAH		SOIL	6010	Lead	140	mg/kg dw	0.9		
363	12	1999	SAVANNAH		SOIL	7471	Mercury	0.71	mg/kg dw	0.036		
363	12	1999	SAVANNAH		SOIL	6010	Selenium	1.8	mg/kg dw	1.8		
363	12	1999	SAVANNAH		SOIL	6010	Vanadium	33	mg/kg dw	1.8		
363	12	1999	SAVANNAH		SOIL	6010	Zinc	140	mg/kg dw	3.6		
364	4	1999	SAVANNAH		SOIL	8310	Acenaphthene	370	ug/kg dw	370P	P	
364	4	1999	SAVANNAH		SOIL	6010	Antimony	130	mg/kg dw	22	N	
364	4	1999	SAVANNAH		SOIL	6010	Barium	490	mg/kg dw	1.7		
364	4	1999	SAVANNAH		SOIL	8310	Benzo(b)fluoranthene	8.6	ug/kg dw	6.8		
364	4	1999	SAVANNAH		SOIL	8310	Benzo(g,h,i)perylene	18	ug/kg dw	17	P	
364	4	1999	SAVANNAH		SOIL	6010	Beryllium	0.28	mg/kg dw	0.28		
364	4	1999	SAVANNAH		SOIL	6010	Cadmium	5	mg/kg dw	0.85		
364	4	1999	SAVANNAH		SOIL	6010	Chromium	21000	mg/kg dw	1.7		
364	4	1999	SAVANNAH		SOIL	6010	Lead	500	mg/kg dw	0.85		
364	4	1999	SAVANNAH		SOIL	7471	Mercury	1.7	mg/kg dw	0.034		
364	4	1999	SAVANNAH		SOIL	6010	Vanadium	55	mg/kg dw	1.7		
364	4	1999	SAVANNAH		SOIL	6010	Zinc	320	mg/kg dw	3.4		
364	14	1999	SAVANNAH		SOIL	8260	Acetone	150	ug/kg dw	84		
364	14	1999	SAVANNAH		SOIL	6010	Arsenic	8.4	mg/kg dw	1.4		
364	14	1999	SAVANNAH		SOIL	6010	Barium	290	mg/kg dw	1.4		
364	14	1999	SAVANNAH		SOIL	6010	Beryllium	0.73	mg/kg dw	0.6		
364	14	1999	SAVANNAH		SOIL	6010	Chromium	31	mg/kg dw	1.5		
364	14	1999	SAVANNAH		SOIL	6010	Cobalt	8.6	mg/kg dw	1.5		
364	14	1999	SAVANNAH		SOIL	6010	Copper	23	mg/kg dw	3		
364	14	1999	SAVANNAH		SOIL	6010	Lead	14	mg/kg dw	0.74		
364	14	1999	SAVANNAH		SOIL	7471	Mercury	0.054	mg/kg dw	0.03		
364	14	1999	SAVANNAH		SOIL	8260	Methyl ethyl Ketone (2-Butanone)	45	ug/kg dw	45		
364	14	1999	SAVANNAH		SOIL	6010	Nickel	23	mg/kg dw	6		
364	14	1999	SAVANNAH		SOIL	6010	Vanadium	44	mg/kg dw	1.5		
364	14	1999	SAVANNAH		SOIL	6010	Zinc	70	mg/kg dw	3		
365	4	1999	SAVANNAH		SOIL	6010	Antimony	9.4	mg/kg dw	6		
365	4	1999	SAVANNAH		SOIL	6010	Arsenic	8.1	mg/kg dw	1.5		
365	4	1999	SAVANNAH		SOIL	6010	Barium	240	mg/kg dw	1.5	E	
365	4	1999	SAVANNAH		SOIL	6010	Beryllium	0.96	mg/kg dw	0.6	E	
365	4	1999	SAVANNAH		SOIL	6010	Cadmium	1.7	mg/kg dw	0.75		
365	4	1999	SAVANNAH		SOIL	6010	Chromium	1900	mg/kg dw	1.5		
365	4	1999	SAVANNAH		SOIL	6010	Lead	78	mg/kg dw	0.75		
365	4	1999	SAVANNAH		SOIL	7471	Mercury	0.31	mg/kg dw	0.03		
365	4	1999	SAVANNAH		SOIL	6010	Vanadium	44	mg/kg dw	1.5		
365	4	1999	SAVANNAH		SOIL	6010	Zinc	140	mg/kg dw	3		
365	12	1999	SAVANNAH		SOIL	6010	Arsenic	5.2	mg/kg dw	1.3		
365	12	1999	SAVANNAH		SOIL	6010	Barium	230	mg/kg dw	1.3	E	
365	12	1999	SAVANNAH		SOIL	6010	Beryllium	0.77	mg/kg dw	0.52	E	
365	12	1999	SAVANNAH		SOIL	6010	Chromium	22	mg/kg dw	1.3		
365	12	1999	SAVANNAH		SOIL	6010	Lead	12	mg/kg dw	0.65		

TABLE 4-8
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU V
(0 TO 1 FT, >1 FT, >5FT)
DREDGED AREA

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LAB Q.	URS Q.
365	12	1999	SAVANNAH		SOIL	6010	Vanadium	34	mg/kg dw	1.3		
365	12	1999	SAVANNAH		SOIL	6010	Zinc	60	mg/kg dw	2.6		
366	4	1999	SAVANNAH	DUPLICATE	SOIL	6010	Antimony	120	mg/kg dw	4.8		
366	4	1999	SAVANNAH		SOIL	6010	Antimony	89	mg/kg dw	6.7		
366	4	1999	SAVANNAH	DUPLICATE	SOIL	6010	Arsenic	5.2	mg/kg dw	1.2		
366	4	1999	SAVANNAH		SOIL	6010	Arsenic	6.5	mg/kg dw	1.7		
366	4	1999	SAVANNAH	DUPLICATE	SOIL	6010	Barium	280	mg/kg dw	1.2	E	
366	4	1999	SAVANNAH		SOIL	6010	Barium	400	mg/kg dw	1.7	E	
366	4	1999	SAVANNAH	DUPLICATE	SOIL	6010	Beryllium	0.62	mg/kg dw	0.48	E	
366	4	1999	SAVANNAH		SOIL	6010	Beryllium	0.90	mg/kg dw	0.67	E	
366	4	1999	SAVANNAH	DUPLICATE	SOIL	6010	Cadmium	0.94	mg/kg dw	0.6		
366	4	1999	SAVANNAH		SOIL	6010	Cadmium	1.2	mg/kg dw	0.83		
366	4	1999	SAVANNAH	DUPLICATE	SOIL	6010	Chromium	2000	mg/kg dw	1.2		
366	4	1999	SAVANNAH		SOIL	6010	Chromium	3100	mg/kg dw	1.7		
366	4	1999	SAVANNAH	DUPLICATE	SOIL	6010	Lead	58	mg/kg dw	0.6		
366	4	1999	SAVANNAH		SOIL	6010	Lead	83	mg/kg dw	0.83		
366	4	1999	SAVANNAH	DUPLICATE	SOIL	7471	Mercury	0.59	mg/kg dw	0.024		
366	4	1999	SAVANNAH		SOIL	7471	Mercury	1.9	mg/kg dw	0.033		
366	4	1999	SAVANNAH	DUPLICATE	SOIL	6010	Selenium	2.6	mg/kg dw	2.4		
366	4	1999	SAVANNAH		SOIL	6010	Selenium	3.7	mg/kg dw	6.7		
366	4	1999	SAVANNAH	DUPLICATE	SOIL	6010	Vanadium	31	mg/kg dw	1.2		
366	4	1999	SAVANNAH		SOIL	6010	Vanadium	47	mg/kg dw	1.7		
366	4	1999	SAVANNAH	DUPLICATE	SOIL	6010	Zinc	120	mg/kg dw	2.4		
366	4	1999	SAVANNAH		SOIL	6010	Zinc	190	mg/kg dw	3.3		
366	12	1999	SAVANNAH		SOIL	6010	Arsenic	1.8	mg/kg dw	1.3		
366	12	1999	SAVANNAH		SOIL	6010	Barium	110	mg/kg dw	1.3	E	
366	12	1999	SAVANNAH		SOIL	6010	Beryllium	0.66	mg/kg dw	0.52	E	
366	12	1999	SAVANNAH		SOIL	6010	Chromium	49	mg/kg dw	1.3		
366	12	1999	SAVANNAH		SOIL	6010	Lead	11	mg/kg dw	0.63		
366	12	1999	SAVANNAH		SOIL	6010	Vanadium	19	mg/kg dw	1.3		
366	12	1999	SAVANNAH		SOIL	6010	Zinc	57	mg/kg dw	2.6		
358	1	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	17000	mg/kg dw	600		
358	4	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	25000	mg/kg dw	4000		
358	12	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	3900	mg/kg dw	650		
359	4	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	9700	mg/kg dw	550		
359	12	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	54000	mg/kg dw	700		
363	1	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	8700	mg/kg dw	700		
364	14	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	6200	mg/kg dw	750		
366	1	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	6700	mg/kg dw	650		
366	4	1999	SAVANNAH		SOIL	Walkley-Black	Organic Carbon	18000	mg/kg dw	830		
358	1	1999	SAVANNAH		SOIL	9045	pH	7.17	units	1		
358	4	1999	SAVANNAH		SOIL	9045	pH	7.47	units	1		
358	12	1999	SAVANNAH		SOIL	9045	pH	7.63	units	1		
359	4	1999	SAVANNAH		SOIL	9045	pH	7.51	units	1		
359	12	1999	SAVANNAH		SOIL	9045	pH	7.52	units	1		

TABLE 4-8
SUMMARY OF DETECTIONS FOR HISTORICAL AND PHASE III SOIL SAMPLES FOR SWMU V
(0 TO 1 FT, >1 FT, >5FT)

DREDGED AREA

LOCATION	DEPTH	DATE	LABNAME	QAQCTYPE	MATRIX	METHOD	ANALYTE	RESULT	UNITS	DETECTLIMIT*	LAB Q.	URS Q.
363	1	1999	SAVANNAH		SOIL	9045	pH	7.63	units	1		
364	14	1999	SAVANNAH		SOIL	9045	pH	8.42	units	1		
366	1	1999	SAVANNAH		SOIL	9045	pH	7.77	units	1		
366	4	1999	SAVANNAH		SOIL	9045	pH	7.82	units	1		

* = Detection Limits are not displayed for historical samples. Refer to laboratory data sets (previously submitted to USEPA) for Detection limits.

Note: Qualifier descriptions are explained in Appendix B, Tables B-1a and B-1b.

TABLE 4-9a
FREQUENCY AND RANGE OF DETECTED ANALYTES FOR THE ACTIVE LAGOON AREA FOR SWMU V

Compound	Sediment		Soil	
	Detection Frequency	Concentration Range	Detection Frequency	Concentration Range
VOCs (µg/kg)				
Acetone	5 / 10	1,100 – 6,000	2 / 9	68 – 94
Benzene	5 / 10	38 – 280	--	--
Carbon Disulfide	5 / 10	74 – 1,200	1 / 9	9.1
Ethylbenzene	7 / 10	52 – 800	--	--
Methyl Ethyl Ketone (2-Butanone)	5 / 10	280 – 1,800	--	--
Toluene	7 / 10	68 – 970	--	--
Xylenes, Total	8 / 10	230 – 2,800	--	--
SVOCs (µg/kg)				
1-Methylnaphthalene	1 / 10	38,000	--	--
Bis(2-ethylhexyl)phthalate	--	--	1 / 9	1,000
Dibenzofuran	1 / 10	6,400	--	--
PAHs (µg/kg)				
Anthracene	6 / 10	290 – 1,500	--	--
Acenaphthene	2 / 10	1,500 – 4,500	1 / 9	520
Acenaphthylene	2 / 10	920 – 1,000	--	--
Benzo(a)anthracene	6 / 10	650 – 11,000	5 / 9	5.5 – 17
Benzo(a)pyrene	5 / 10	380 – 3,700	4 / 9	5.3 – 9.2
Benzo(b)fluoranthene	5 / 10	300 – 3,900	4 / 9	7.6 – 13
Benzo(g,h,i)perylene	4 / 10	740 – 9,200	1 / 9	16
Benzo(k)fluoranthene	1 / 10	140	--	--
Chrysene	6 / 10	840 – 6,400	6 / 9	5.8 – 13
Dibenzo(a,h)anthracene	3 / 10	280 – 430	1 / 9	17
Fluoranthene	3 / 10	980 – 5,000	2 / 9	13 – 27
Fluorene	4 / 10	1,400 – 5,800	--	--
Naphthalene	--	--	1 / 9	29
Phenanthrene	6 / 10	670 – 14,000	5 / 9	9.4 – 19
Pyrene	5 / 10	910 – 15,000	4 / 9	19 – 36
Metals (mg/kg)				
Antimony	7 / 10	7.8 – 150	2 / 9	6.3 – 29
Arsenic	8 / 10	1.1 – 18	8 / 9	2.6 – 15
Barium	9 / 10	56.6 – 760	8 / 9	140 – 270
Beryllium	1 / 10	0.46	8 / 9	0.46 – 1.2

TABLE 4-9a
FREQUENCY AND RANGE OF DETECTED ANALYTES FOR THE ACTIVE LAGOON AREA FOR SWMU V

Compound	Sediment		Soil	
	Detection Frequency	Concentration Range	Detection Frequency	Concentration Range
Metals (mg/kg)				
Cadmium	1 / 10	1.6	--	--
Chromium	9 / 10	373 – 15,000	8 / 9	19 – 310
Cobalt	3 / 10	1.5 – 8.2	8 / 9	7.4 – 12
Copper	5 / 6	71 – 150	8 / 9	13 – 28
Cyanide, Total	3 / 10	0.55 – 2	--	--
Lead	9 / 10	8 – 380	8 / 9	9.5 – 21
Mercury	4 / 10	0.87 – 3.1	5 / 9	0.036 – 2.6
Nickel	8 / 10	7.4 – 55	8 / 9	17 – 30
Selenium	8 / 10	6.3 – 84	1 / 9	2.2
Sulfide	9 / 10	4.2 – 7,400	5 / 9	120 – 1,100
Vanadium	9 / 10	8.5 – 69	8 / 9	26 – 56
Zinc	9 / 10	94.9 – 1,700	8 / 9	51 - 130

TABLE 4-9b
FREQUENCY AND RANGE OF DETECTED ANALYTES FOR THE FORMER LAGOON AND DREDGED MATERIAL AREA FOR SWMU V

Compound	0 – 1 ft		1 – 5 ft		> 5 ft	
	Detection Frequency	Concentration Range	Detection Frequency	Concentration Range	Detection Frequency	Concentration Range
VOCs (µg/kg)						
Acetone	0 / 9	--	0 / 3	--	1 / 5	150
Methyl Ethyl Ketone (2-Butanone)	0 / 9	--	0 / 3	--	1 / 5	45
Toluene	2 / 9	5 – 9.2	0 / 3	--	0 / 5	--
SVOCs (µg/kg)						
None detected						
PAHs (µg/kg)						
Acenaphthene	0 / 9	--	2 / 3	370 – 1,100	0 / 5	--
Benzo(b)fluoranthene	0 / 9	--	1 / 3	8.6	0 / 5	--
Benzo(g,h,i)perylene	0 / 9	--	1 / 3	18	0 / 5	--
Metals (mg/kg)						
Antimony	7 / 10	4.2 - 118	6 / 11	9.4 – 130	1 / 12	47
Arsenic	10 / 10	2.6 – 6.2	7 / 11	4.8 – 11	9 / 12	1.8 - 11
Barium	10 / 10	93.5 – 653	10 / 11	160 – 560	10 / 12	110 - 450
Beryllium	7 / 10	0.44 - 0.64	10 / 11	0.22 - 0.96	10 / 12	0.55 – 1.2
Cadmium	7 / 10	0.56 – 1.4	9 / 11	0.63 – 7.5	1 / 12	2.1
Chromium	10 / 10	67.6 – 13,000	10 /11	23 – 21,000	10 / 12	21 – 6,400
Cobalt	7 / 10	2.6 – 5.2	1 / 11	12	3 / 12	8.6 – 9.6

TABLE 4-9b
FREQUENCY AND RANGE OF DETECTED ANALYTES FOR THE FORMER LAGOON AND DREDGED MATERIAL AREA FOR SWMU V

Compound	0 – 1 ft		1 – 5 ft		> 5 ft	
	Detection Frequency	Concentration Range	Detection Frequency	Concentration Range	Detection Frequency	Concentration Range
Metals (mg/kg)						
Copper	0 / 1	--	1 / 11	61	3 / 12	23 - 24
Cyanide, Total	4 / 10	0.67 – 2.9	1 / 11	2	0 / 12	--
Lead	10 / 10	18.7 – 371	10 / 11	26 – 770	10 / 12	11 - 140
Mercury	6 / 10	0.17 – 0.89	10 / 11	0.069 – 1.9	5 / 12	0.036 – 6.9
Nickel	7 / 10	10.9 – 15.5	1 / 11	29	3 / 12	23 – 24
Selenium	3 / 10	0.5 – 3.6	3 / 11	2.6 – 4.3	1 / 12	1.8
Vanadium	10 / 10	14.7 – 34.8	10 / 11	28 – 55	10 / 12	19 – 53
Zinc	10 / 10	55.1 – 329	10 / 11	79 – 470	10 / 12	57 - 160

TABLE 4-10
EXCEEDENCES OF TIER I SCREENING LEVELS FOR SWMU V

LAGOON AREA

LOCATION	DEPTH	QAQCTYPE	MATRIX	ANALYTE	RESULT	UNITS	DETECTLIMIT	LAB Q.	URS Q.	BACKGROUND	INDUST/INGEST	INDUST/INHAL	CONST/INGEST	CONST/INHAL
367	9		SOIL	Arsenic	12	mg/kg dw	1.4			4.9	3	1200	61	25000
367	11		SOIL	Arsenic	15	mg/kg dw	1.4			4.9	3	1200	61	25000
367	11		SOIL	Beryllium	1.2	mg/kg dw	0.56			0.5	1	2100	29	44000
368	9		SOIL	Sulfide	190	mg/kg dw	32			0.5				
368	11		SOIL	Sulfide	160	mg/kg dw	32			0.5				
369	8		SOIL	Arsenic	8.3	mg/kg dw	1.4			4.9	3	1200	61	25000
369	8		SOIL	Sulfide	120	mg/kg dw	35			0.5				
369	11		SOIL	Arsenic	5.6	mg/kg dw	1.4			4.9	3	1200	61	25000
370	8		SOIL	Arsenic	5.5	mg/kg dw	1.6			4.9	3	1200	61	25000
370	8		SOIL	Sulfide	1100	mg/kg dw	40			0.5				
370	11		SOIL	Sulfide	420	mg/kg dw	35			0.5				

Note: Some analytes do not have screening values for comparison. The postive results were retained on this table, even though they may not be in exceedence.

TABLE 4-10
EXCEEDENCES OF TIER I SCREENING LEVELS FOR SWMU V

DREDGED AREA

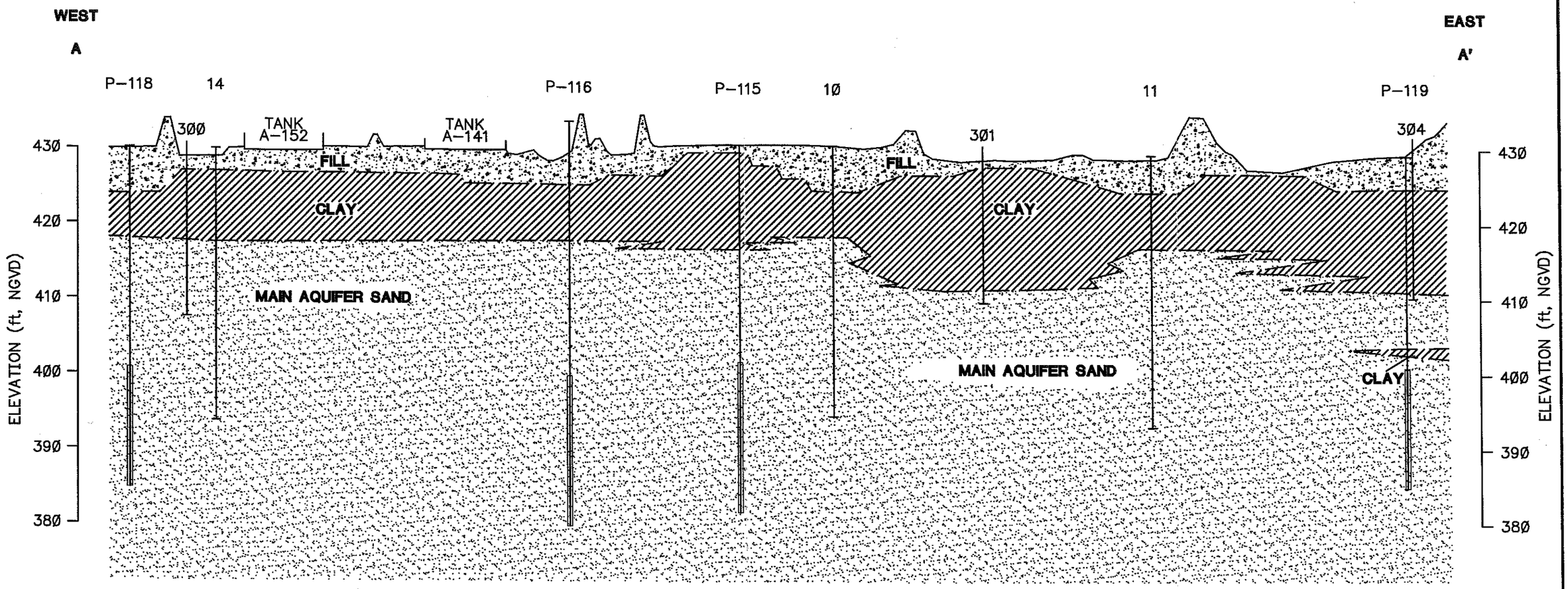
LOCATION	DEPTH	QAQCTYPE	MATRIX	ANALYTE	RESULT	UNITS	DETECTLIMIT	LAB Q.	URS Q.	BACKGROUND	INDUST/INGEST	INDUST/INHAL	CONST/INGEST	CONST/INHAL
240	1		SOIL	Chromium, Tota	1360	(mg/kg)				20.9	10000	420	4100	8800
241	1		SOIL	Arsenic, Total	6.2	(mg/kg)				4.9	3	1200	61	25000
244	1		SOIL	Chromium, Tota	2630	(mg/kg)				20.9	10000	420	4100	8800
245	1		SOIL	Antimony, Total	118	(mg/kg)				6	820		82	
245	1		SOIL	Chromium, Tota	13000	(mg/kg)				20.9	10000	420	4100	8800
246	1		SOIL	Antimony, Total	102	(mg/kg)				6	820		82	
246	1		SOIL	Chromium, Tota	1470	(mg/kg)				20.9	10000	420	4100	8800
247	1		SOIL	Chromium, Tota	5540	(mg/kg)				20.9	10000	420	4100	8800
358	1		SOIL	Arsenic	6.2	mg/kg dw	1.2			4.9	3	1200	61	25000
358	1		SOIL	Chromium	1200	mg/kg dw	1.2			20.9	10000	420	4100	8800
358	4		SOIL	Chromium	13000	mg/kg dw	8.2			20.9	10000	420	4100	8800
358	4		SOIL	Lead	770	mg/kg dw	4.1			17.6	400		400	
359	4		SOIL	Arsenic	11	mg/kg dw	1.1			4.9	3	1200	61	25000
359	4		SOIL	Chromium	860	mg/kg dw	1.1			20.9	10000	420	4100	8800
360	4		SOIL	Chromium	9100	mg/kg dw	1.7			20.9	10000	420	4100	8800
361	4		SOIL	Arsenic	6.8	mg/kg dw	1.4			4.9	3	1200	61	25000
361	4		SOIL	Chromium	580	mg/kg dw	1.4			20.9	10000	420	4100	8800
362	4		SOIL	Arsenic	6.9	mg/kg dw	1.1			4.9	3	1200	61	25000
363	4		SOIL	Chromium	12000	mg/kg dw	1.2			20.9	10000	420	4100	8800
364	4		SOIL	Antimony	130	mg/kg dw	22	N		6	820		82	
364	4		SOIL	Chromium	21000	mg/kg dw	1.7			20.9	10000	420	4100	8800
364	4		SOIL	Lead	500	mg/kg dw	0.85			17.6	400		400	
365	4		SOIL	Arsenic	8.1	mg/kg dw	1.5			4.9	3	1200	61	25000
365	4		SOIL	Chromium	1900	mg/kg dw	1.5			20.9	10000	420	4100	8800
366	4	DUPLICATE	SOIL	Antimony	120	mg/kg dw	4.8			6	820		82	
366	4		SOIL	Antimony	89	mg/kg dw	6.7			6	820		82	
366	4	DUPLICATE	SOIL	Arsenic	5.2	mg/kg dw	1.2			4.9	3	1200	61	25000
366	4		SOIL	Arsenic	6.5	mg/kg dw	1.7			4.9	3	1200	61	25000
366	4	DUPLICATE	SOIL	Chromium	2000	mg/kg dw	1.2			20.9	10000	420	4100	8800
366	4		SOIL	Chromium	3100	mg/kg dw	1.7			20.9	10000	420	4100	8800
359	12		SOIL	Chromium	3100	mg/kg dw	1.4			20.9	10000	420	4100	8800
360	12		SOIL	Arsenic	6.7	mg/kg dw	1.4			4.9	3	1200	61	25000
360	12	DUPLICATE	SOIL	Arsenic	9	mg/kg dw	1.4			4.9	3	1200	61	25000
360	12	DUPLICATE	SOIL	Beryllium	1.1	mg/kg dw	0.56	E		0.5	1	2100	29	44000
361	12		SOIL	Arsenic	11	mg/kg dw	1.4			4.9	3	1200	61	25000
361	12		SOIL	Beryllium	1.2	mg/kg dw	0.56	E		0.5	1	2100	29	44000
363	12		SOIL	Chromium	6400	mg/kg dw	1.8			20.9	10000	420	4100	8800
365	12		SOIL	Arsenic	5.2	mg/kg dw	1.3			4.9	3	1200	61	25000
364	14		SOIL	Arsenic	8.4	mg/kg dw	1.4			4.9	3	1200	61	25000

Note: Some analytes do not have screening values for comparison. The postive results were retained on this table, even though they may not be in exceedence.

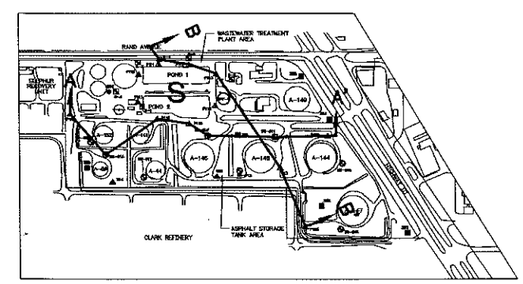
TABLE 4-11
SWMU V TCLP ANALYSIS

SAMPLE ID		SS360012111119900S		SS363004111129900S		SS364014111109900S			SS366012111129900S		SS367011111109900S			SS369011111109900S		
SL LOG NUMBER		S917660A-2		S917697A-3		S917621A-1			S917697A-2		S917621A-2			S917577A-1		
SAMPLE DATE		11/11/1999		11/12/1999		11/10/1999			11/12/1999		11/10/1999			11/10/1999		
MATRIX		SOIL		SOIL		SOIL			SOIL		SOIL			SOIL		
	UNITS															
TCLP METALS (6010)																
Arsenic, (TCLP)	(mg/l)	0.01	U	0.01	U	0.01	U		0.01	U	0.01	U		0.01	U	
Chromium, (TCLP)	(mg/l)	0.048		0.017		0.01	U		0.01	U	0.01	U		0.011		
Lead, (TCLP)	(mg/l)	0.005	U	0.005	U	0.005	U	*	0.005	U	0.005	U	*	0.012		*

Figures



KEY MAP



NOTE: SUBSURFACE PROFILE MODIFIED FROM 1992 PHASE II RFI REPORT

LEGEND

0 150 300
HORIZONTAL SCALE, FEET

WELL RISER
WELL SCREEN
EXTENT OF WELL BORING

P-130 MONITORING WELL
10 SOIL BORING
MAIN AQUIFER SAND
CLAY
FILL

EQUILON WOOD RIVER REFINING COMPANY
PHASE III RFI, SWMUs S, T AND V

PROJECT NO. 2389C8602F.01

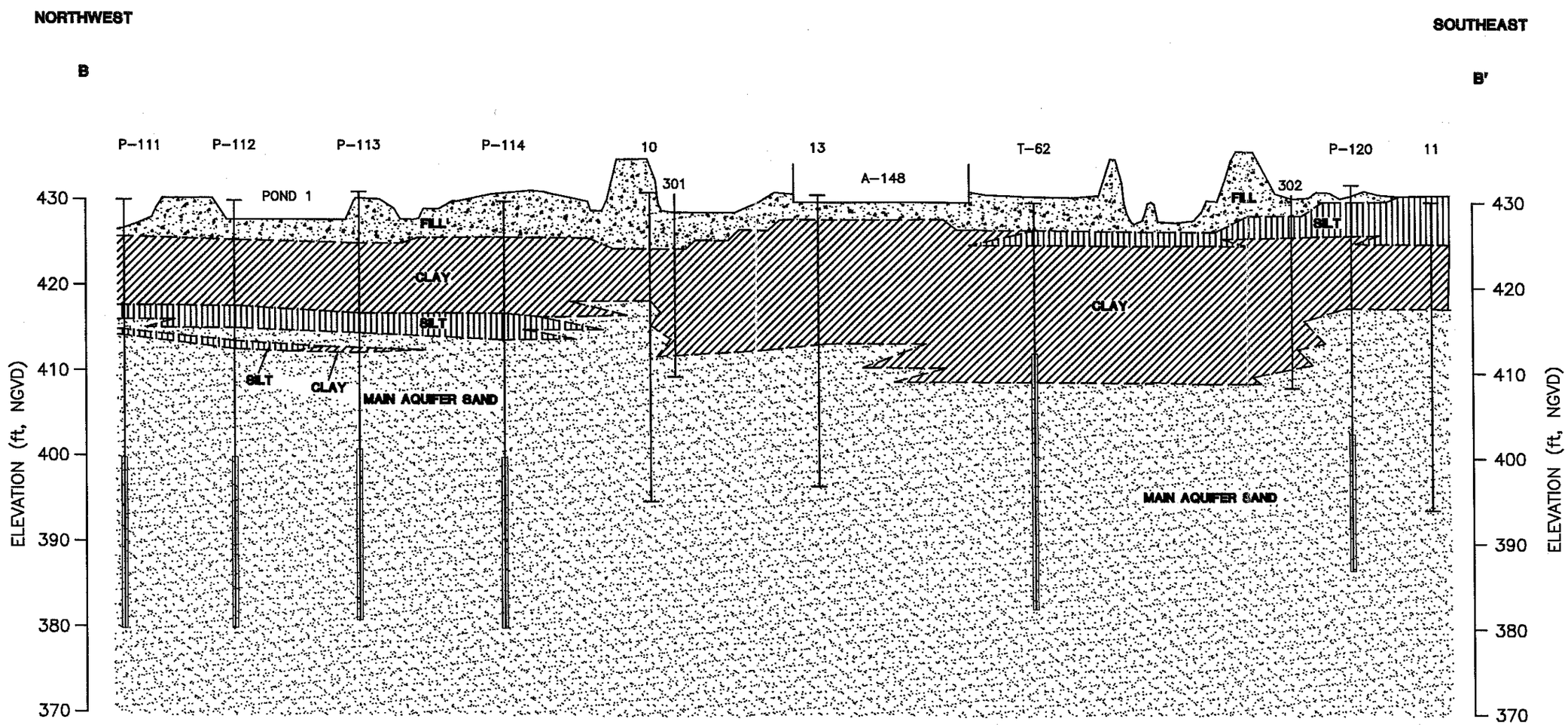
URS Greiner Woodward Clyde
A Division of URS Corporation

DRN. BY: cu 8/3/92
DSGN. BY: tph
CHKD. BY: 4/25

SWMU S West-East Subsurface Profile

FIG. NO. 4-1

File: E:\SHELL2F\WESTPROP\FIG4-1.DWG Last edited: APR. 24, 00 @ 1:09 p.m. URS Corp.



LEGEND

WELL RISER
WELL SCREEN
EXTENT OF WELL BORING

P-111 MONITORING WELL
10 SOIL BORING

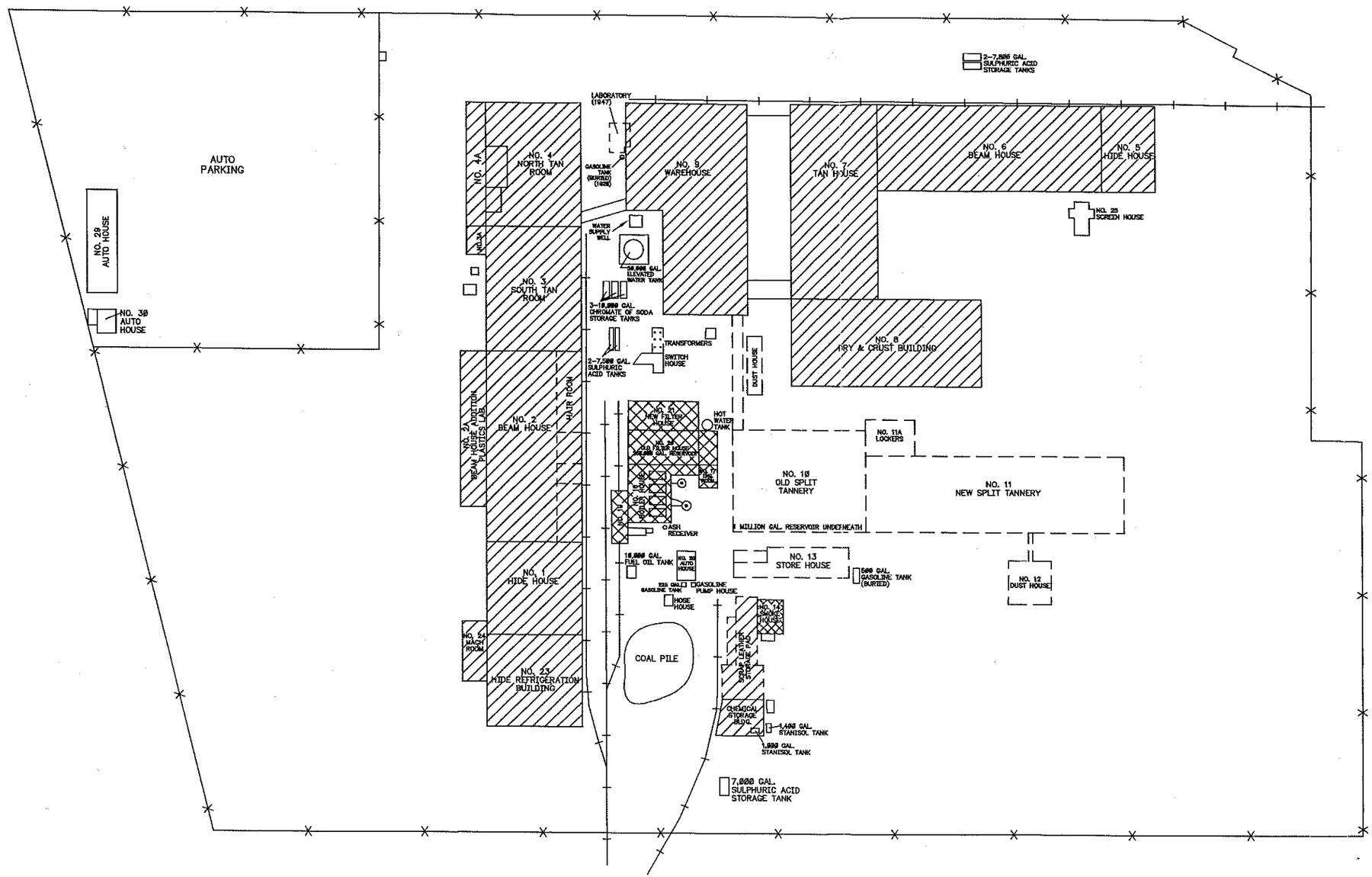
MAIN AQUIFER SAND
CLAY
SILT
FILL

NOTES: 1.) SUBSURFACE PROFILE MODIFIED FROM 1992 PHASE II RFI REPORT
2.) REFER TO FIGURE 4-1 FOR SECTION LOCATION

0 150 300
HORIZONTAL SCALE, FEET

EQUILON WOOD RIVER REFINING COMPANY PHASE III RFI, SWMUs S, T AND V	PROJECT NO. 2389C8602F.01
URS Greiner Woodward Clyde A Division of URS Corporation	
DRN. BY: cu 8/3/92 DSGN. BY: tph CHKD. BY: RBG 4/25	SWMU S Northwest-Southeast Subsurface Profile
	FIG. NO. 4-2

File: E:\SHELL2F\WESTPROP\FIG4-2.DWG Last edited: APR. 24, 00 @ 11:27 a.m. URS Corp.



LEGEND

- Denotes Existing Foundations
- Concrete Slab and Partial Footings
- Denotes Buried Building Foundation

0 120 240
SCALE FEET

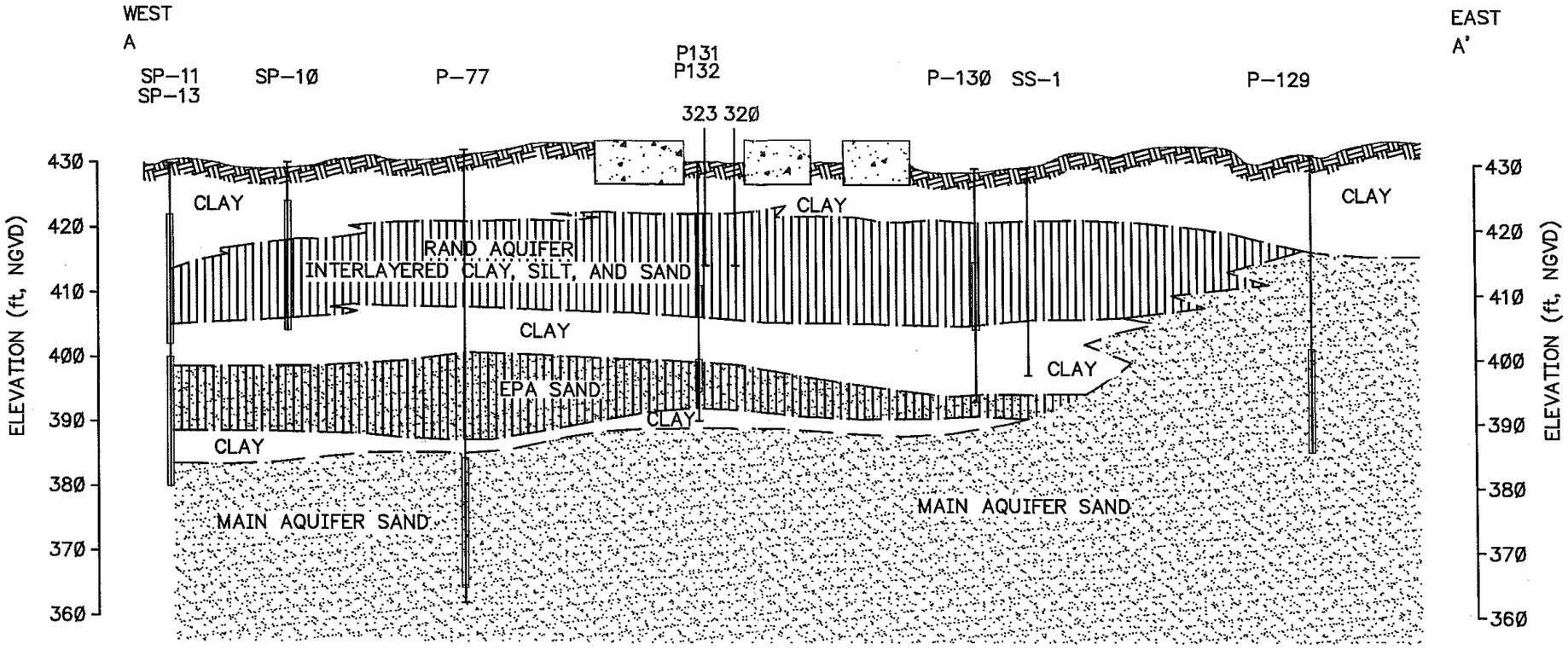
N

NOTE: 1. FIGURE ORIGINALLY PRESENTED IN 1992 PHASE II RFI REPORT

2. THIS MAP REPRESENTS A COMPILATION OF SANBORN MAP COMPANY FIRE INSURANCE MAPS DATED 1920, 1928, 1947, 1953 AND 1958

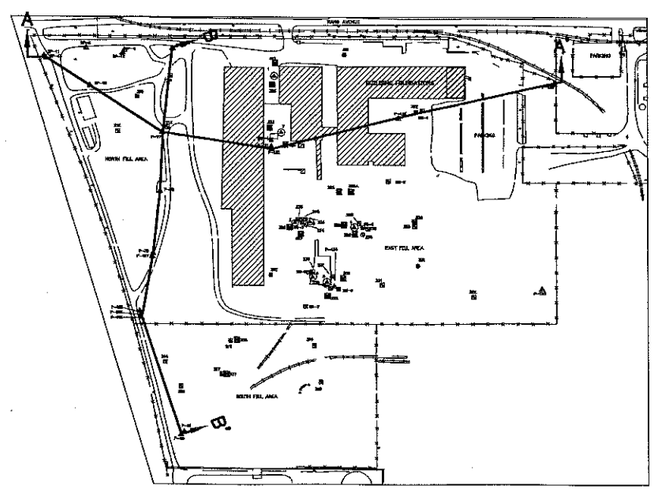
EQUILON WOOD RIVER REFINING COMPANY PHASE III RFI, SWMUs S, T AND V	PROJECT NO. 2389C8602F.01
URS Greiner Woodward Clyde A Division of URS Corporation	
DRN. BY: djd 4/18/00 DSGN. BY: CHKD. BY: RBB 4/25	Former Tannery Facility Layout — FIG. NO. 4-3

File: E:\89C8602F\TASK13-1\TANNERY.DWG Last edited: APR. 18, 00 @ 2:46 p.m. URS Corp.



NOTE: SUBSURFACE PROFILE MODIFIED FROM 1992 PHASE II RFI REPORT

KEY MAP



LEGEND

- WELL RISER
- WELL SCREEN
- EXTENT OF WELL BORING

SP-10 / P-130 — MONITORING WELL

SS-1 — SOIL BORING

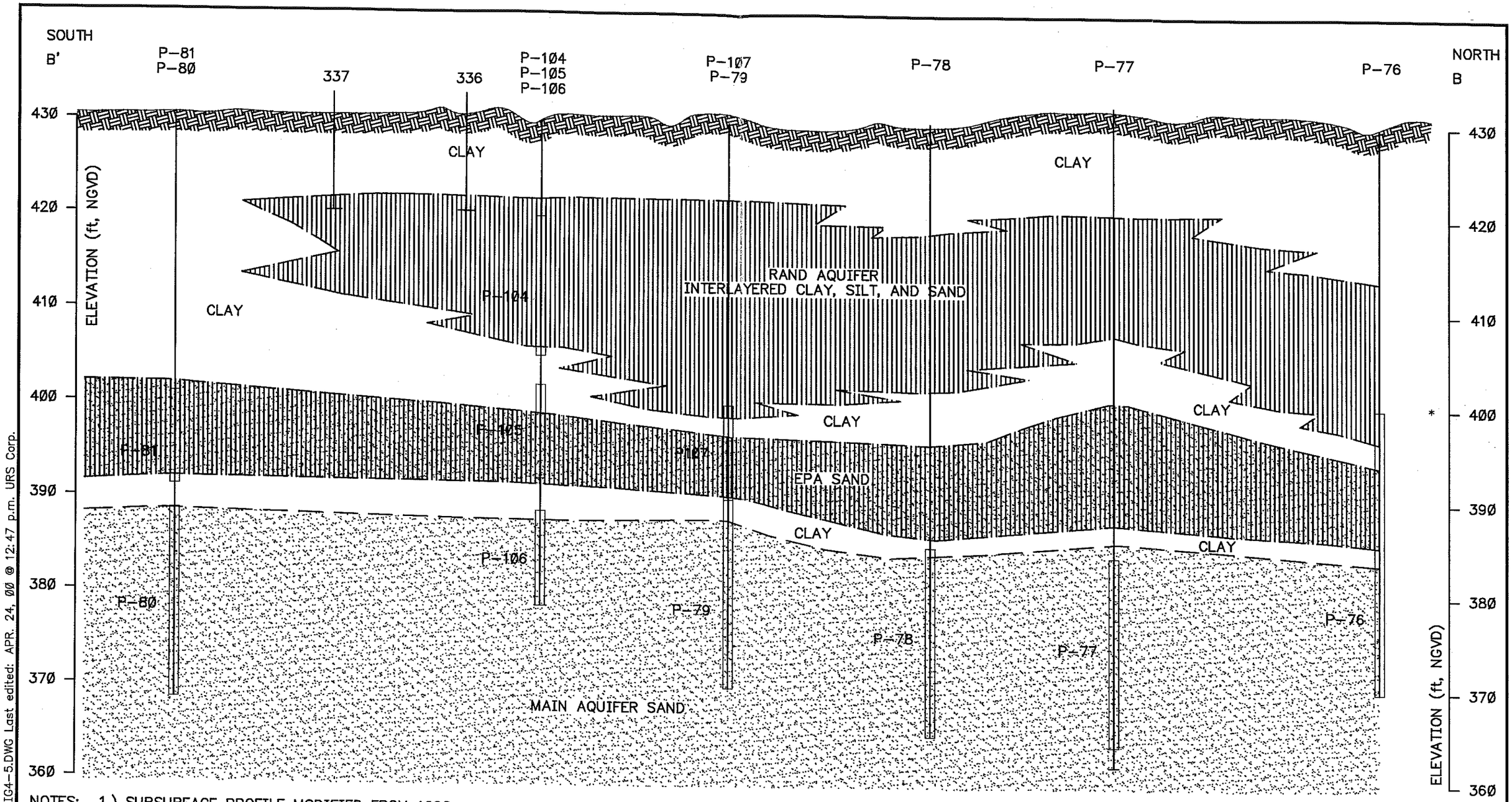
- RAND AQUIFER
- EPA SAND
- MAIN AQUIFER SAND
- CONCRETE FOUNDATION

0 200 400

HORIZONTAL SCALE, FEET

EQUILON WOOD RIVER REFINING COMPANY PHASE III RFI, SWMUs S, T AND V	PROJECT NO. 2389C8602F.01
URS Greiner Woodward Clyde A Division of URS Corporation	
DRN. BY: djd 4/18/00 DSGN. BY: tph CHKD. BY: RCB 4/25	Tannery East-West Subsurface Profile
	FIG. NO. 4-4

File: E:\SHELL2F\TASK9\FIG4-4.DWG Last edited: APR. 25, 00 @ 09:25 a.m. URS Corp.



NOTES:
1.) SUBSURFACE PROFILE MODIFIED FROM 1992 PHASE II RFI REPORT
2.) REFER TO FIGURE 4-4 FOR SECTION LOCATION

0 100 200
HORIZONTAL SCALE, FEET

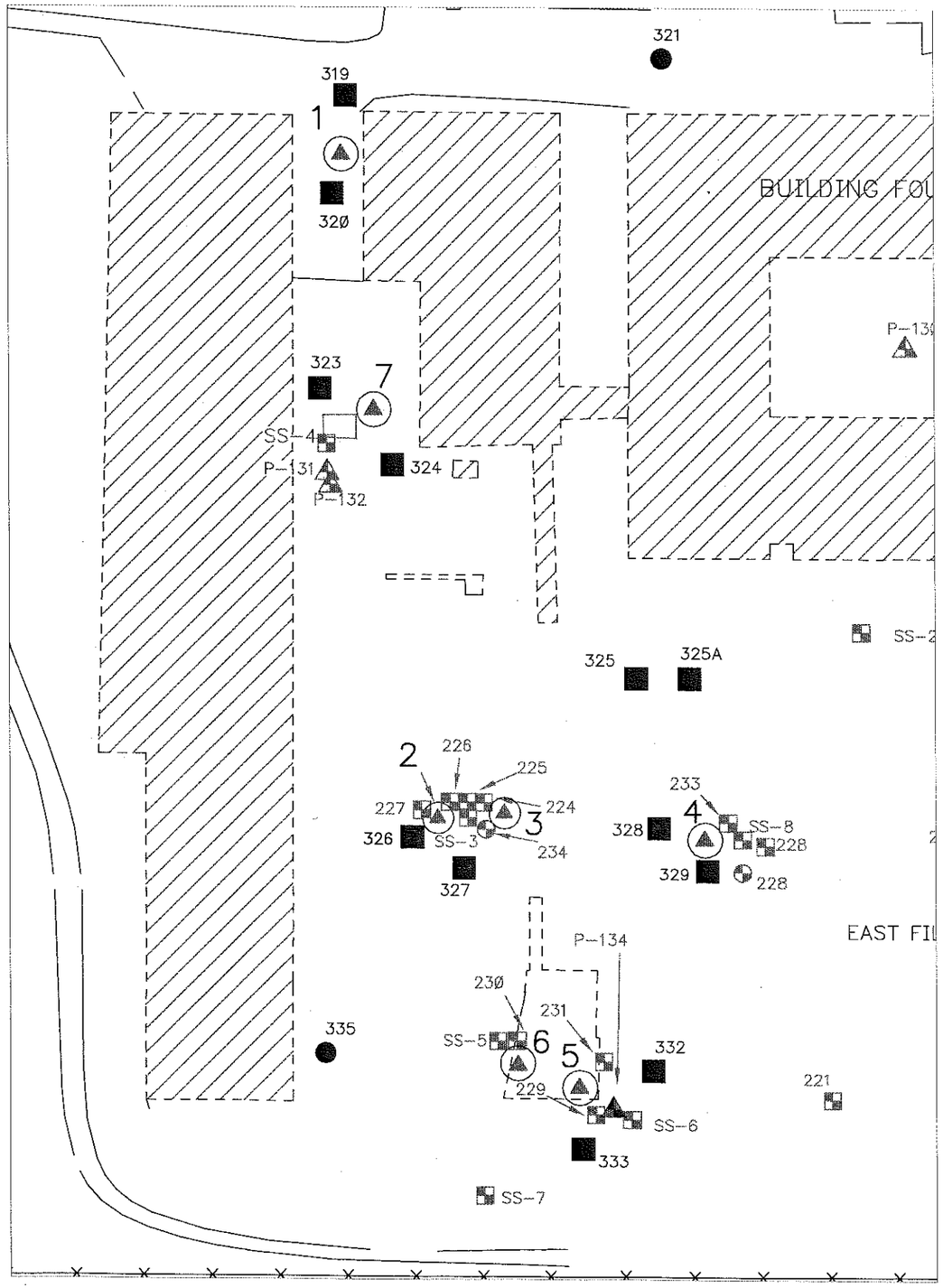
LEGEND

WELL RISER
WELL SCREEN
EXTENT OF WELL BORING
P-130 MONITORING WELL

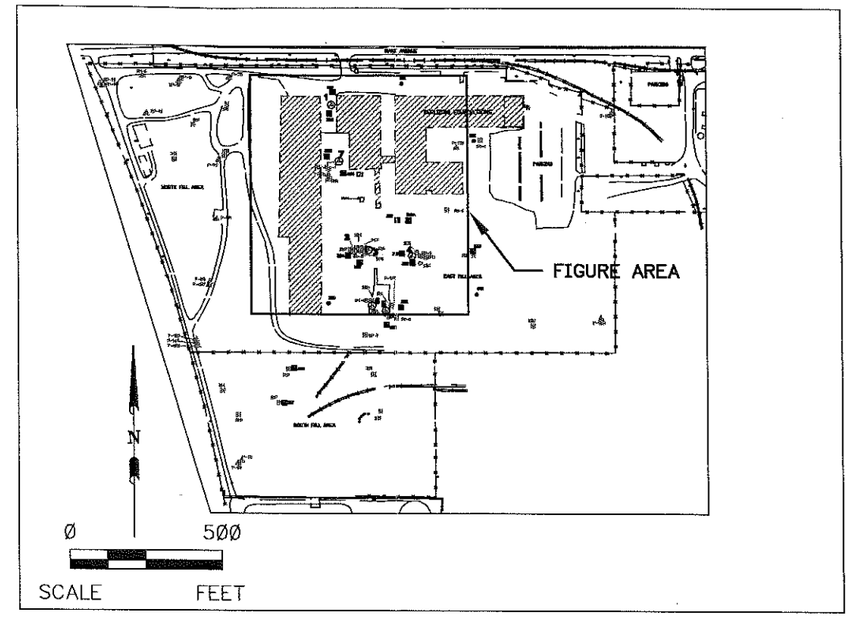
RAND AQUIFER
EPA SAND AQUIFER
MAIN AQUIFER SAND

EQUILON WOOD RIVER REFINING COMPANY PHASE III RFI, SWMUs S, T AND V	PROJECT NO. 2389C8602F.01
URS Greiner Woodward Clyde A Division of URS Corporation	
DRN. BY: djd 4/18/00 DSGN. BY: tph CHKD. BY: RB 4/25	Tannery North-South Subsurface Profile
	FIG. NO. 4-5

File: E:\SHELL2F\TASK9\FIG4-5.DWG Last edited: APR. 24, 00 @ 12:47 p.m. URS Corp.



KEY MAP



LEGEND

- EXISTING MONITORING WELL LOCATION
- PHASE II TEST PIT LOCATION
- TANK LOCATION
- PHASE I OR II BORING LOCATION
- PHASE III SURFACE AND SHALLOW SUBSURFACE SOIL BORING LOCATION
- PHASE III SOIL BORING LOCATION

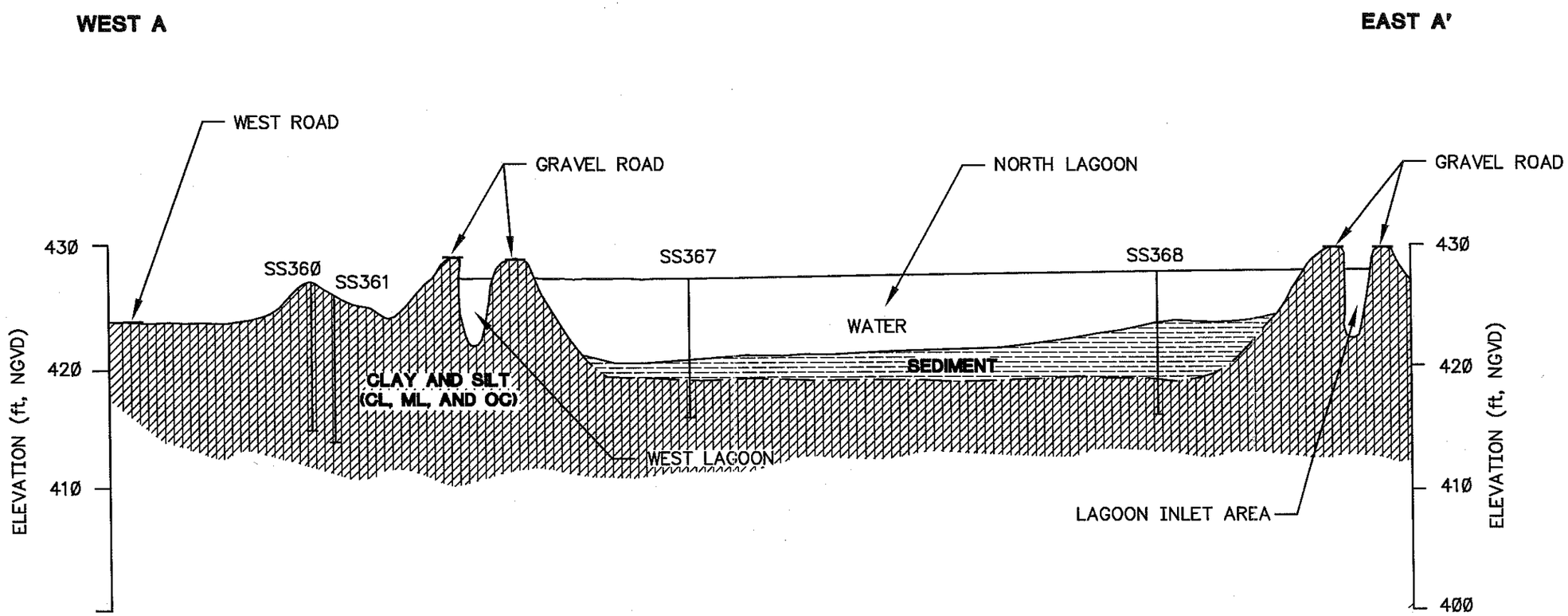
N

100 0 100

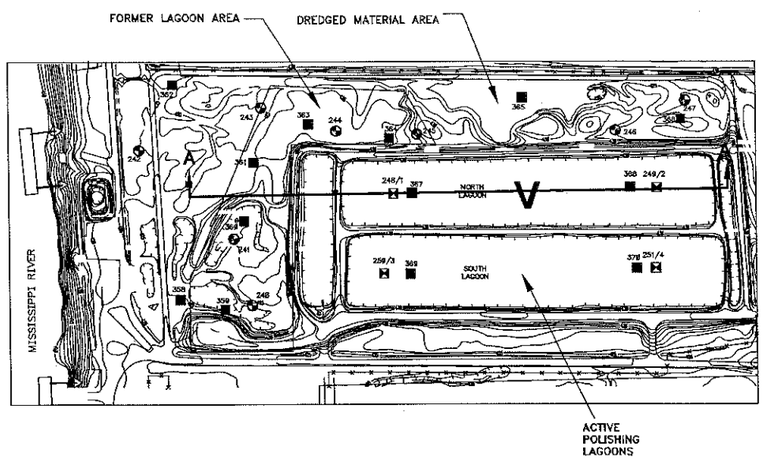
SCALE FEET

EQUILON WOOD RIVER REFINING COMPANY PHASE III RFI, SWMUs S, T, AND V	PROJECT NO. 2389C8602F.01
URS Greiner Woodward Clyde A Division of URS Corporation	
DRN. BY: djd 8/19/99 DSGN. BY: at CHKD. BY: RB	Sample Locations SWMUT Tanks 2,3,4,5,6, and 7
	FIG. NO. 4-6

File: K:\ENVIRON\2389C8602F.01 (WRRC STV)\FIG4-6.DWG Last edited: 05/22/00 @ 1:42 p.m. @ WCC-ST.LOUIS



KEY MAP



LEGEND

10	SOIL BORING
	CLAY AND SILT
	SEDIMENT

0 150 300

HORIZONTAL SCALE, FEET

EQUILON WOOD RIVER REFINING COMPANY PHASE III RFI, SWMUs S, T AND V	PROJECT NO. 2389C8602F.01
URS Greiner Woodward Clyde A Division of URS Corporation	
DRN. BY: djd 4/17/00 DSGN. BY: mmf CHKD. BY:	SWMU V East–West Subsurface Profile
	FIG. NO. 4–7

File: E:\SHELL2F\FIG4-7.DWG Last edited: MAY 22, 00 @ 1:42 p.m. URS Corp.

5.1 SUMMARY OF PHASE III RFI

The Phase III investigation of SWMUs S, T and V has been conducted in accordance with the USEPA-approved work plan. The sampling program was based on a SCEM and DQOs to provide efficient data collection to characterize source areas and releases and to provide data to support risk based decision-making. Data collected were representative of the nature and extent of source materials and releases. The Phase II RFI data for these SWMUs were combined with the Phase III data for site characterization and a screening risk evaluation.

5.1.1 Nature and Extent of Source Materials and Releases

A total of 157 investigative soil samples were collected, analyzed and evaluated as part of the Phase I, II and III RFI.

SWMU S

Samples were analyzed for a combination of RHCL and Appendix IX VOCs, SVOCs, PAHs and metals/inorganics. The constituents detected most often are summarized below.

Wastewater Treatment Plant

VOCs were detected at frequencies ranging from 6 percent (1,2-dichloropropane, 2-hexanone) to 42 percent (toluene) of the samples. SVOCs were detected at frequencies ranging from 6 percent (4-methylphenol, n-nitrosodiphenylamine) to 58 percent (bis-(2-ethylhexyl)phthalate) of the samples. PAHs were detected at frequencies ranging from 6 percent (acenaphthylene) to 58 percent (chrysene) of the samples. Metals/inorganics were detected in all of the samples analyzed.

Asphalt Storage Tank Area

VOCs were detected at frequencies ranging from 3 percent (ethylbenzene) to 22 percent (toluene, xylenes) of the samples. SVOCs were detected at frequencies ranging from 3 percent (1-methylnaphthalene) to 4 percent (benzenethiol) of the samples. PAHs were detected at frequencies ranging from 3 percent (dibenzo(a,h)anthracene, naphthalene) to 53 percent (phenanthrene) of the samples. Metals/inorganics were detected in all of the samples analyzed.

The distribution of constituents tends to be similar throughout the upper approximately 14 ft (i.e., the fill and clay interval). Except in isolated areas, soils below this tend to be relatively unimpacted.

SWMU T

Samples were analyzed for a combination of Appendix IX VOCs, SVOCs, PAHs, hydrocarbons and metals/inorganics. The constituents detected most often are summarized below.

South Fill Area

VOCs were detected at frequencies ranging from 9 percent (acetone) to 36 percent (dichloromethane) of the samples, some of these may be laboratory related. SVOCs were detected at a frequency of 10 percent (2-methylnaphthalene, bis-(2-ethylhexyl)phthalate, n-nitrosodiphenylamine) of the samples. PAHs were detected at frequencies ranging from 18 percent (dibenzo(a,h)anthracene) to 36 percent (most PAHs) of the samples. Samples were not analyzed for TPH in this area. Metals/inorganics were detected in all of the samples analyzed.

East Fill Area

VOCs were detected at frequencies ranging from 10 percent (carbon disulfide, trichloroethene, xylenes) to 50 percent (acetone) of the samples. Some of these may be laboratory related. Samples analyzed for SVOCs resulted in no detections. PAHs were detected at frequencies ranging from 9 percent (naphthalene) to 64 percent (most PAHs) of the samples. TPH (GRO, DRO) was detected 2 to 3 times, respectively, in the four samples analyzed. Metals/inorganics were detected in all of the samples analyzed.

Reservoir

Samples analyzed for VOCs and SVOCs resulted in no detections. PAHs were detected at a frequency of 25 percent (all compounds detected) of the samples. TPH (DRO) was detected in the 1 sample analyzed. Metals/inorganics were detected in all of the samples analyzed.

Tank 1 Area

Samples in this area were analyzed for BTEX and TPH (GRO, DRO). There were no detections for any of the four samples analyzed.

Tank 2 Area

Samples analyzed for VOCs, SVOCs and PAHs resulted in no detections. Samples were not analyzed for TPH in this area. Metals/inorganics were detected in all of the samples analyzed.

Tank 3 Area

Samples in this area were analyzed for BTEX and TPH. TPH was detected in one of the two samples analyzed.

Tank 4 Area

VOCs were detected at frequencies ranging from 11 percent (ethylbenzene) to 14 percent (acetone) of the samples. Some of these may be laboratory related. SVOCs were detected at frequencies ranging from 14 percent (2-methylnaphthalene) to 29 percent (bis-(2-ethylhexyl)phthalate) of the samples. PAHs were detected at frequencies ranging from 14 percent (benzo(k)fluoranthene) to 57 percent (pyrene) of the samples collected. TPH (TPH, DRO) was detected 2 to 8 times , in the 9 to 11 samples analyzed. Metals/inorganics were detected in all of the samples analyzed.

Tank 5 Area

VOCs were detected at frequencies ranging from 20 percent (ethylbenzene) to 67 percent (acetone, methyl ethyl ketone) of the samples. Some of these may be laboratory related. SVOCs were not detected in any of the samples analyzed. PAHs were detected at frequencies ranging from 20 percent (most compounds detected) to 40 percent (phenanthrene, pyrene) of the samples. TPH (TPH, GRO, DRO) was detected 1 to 5 times, in the 6 to 8 samples analyzed. Metals/inorganics were detected in all of the samples analyzed.

Tank 7 Area

VOCs SVOCs and PAHs were only analyzed in one sample from this area. There were two detections of VOCs (ethylbenzene, toluene), one SVOC (2-methylnaphthalene) and limited PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, fluoranthene, phenanthrene, pyrene). Samples were not analyzed for TPH in this area. Metals/inorganics were detected in all of the samples analyzed.

SWMU V

Samples were analyzed for a combination of Appendix IX VOCs, SVOCs, PAHs and metals/inorganics, however, most were only analyzed for metals. The constituents detected most often are summarized below.

Active Lagoons

Within the sediment, VOCs were detected at frequencies ranging from 50 (acetone, benzene, carbon disulfide, methyl ethyl ketone) to 80 percent (xylenes) of the samples. Some of these may be laboratory related. Two SVOCs (1-methylnaphthalene, dibenzofuran) were detected at a frequency of 10 percent of the samples collected. PAHs were detected at frequencies ranging from 10 percent (benzo(k)fluoranthene) to 60 percent (benzo(a)anthracene, phenanthrene) of the samples. Metals/inorganics were detected in all of the samples analyzed.

In the soil beneath the lagoons, VOCs were detected at frequencies ranging from 11 (carbon disulfide) to 22 percent (acetone) of the samples. These may be laboratory related. One SVOC (bis-(2-ethylhexyl)phthalate) was detected at a frequency of 11 percent of the samples. PAHs were detected at frequencies ranging from 11 percent (acenaphthene, benzo(g,h,i)perylene, dibenzo(a,h)anthracene, naphthalene) to 67 percent (chrysene) of the samples. Metals/inorganics were detected in all of the samples analyzed.

The concentrations of detected analytes within the sediment tend to be similar throughout the lagoons. Soils beneath the lagoons appear to be relatively unimpacted.

Former Lagoon and Dredged Material Area

VOCs were detected at frequencies ranging from 6 (acetone, methyl ethyl ketone) to 12 percent (toluene) of the samples. Some of these may be laboratory related. SVOCs were not detected in any of the samples analyzed. PAHs were detected at frequencies ranging from 6 percent (benzo(b)fluoranthene, benzo(g,h,i)perylene) to 12 percent (acenaphthene) of the samples. Metals/inorganics were detected in all of the samples analyzed.

Soils within this area are generally impacted with chromium, primarily to a depth between 4 and 12 ft, based on relatively high concentrations (e.g., >1,000 mg/kg) in the samples from 4 ft and concentrations close to background in the samples from 12 ft. There were two locations where the

samples from 12 ft were comparable to the samples from 4 ft. These locations are within the former lagoon area and may represent source material. The results of TCLP analyses demonstrate that chromium is not readily leachable.

5.1.2 Risk-Based Evaluation

The results of the risk based evaluation of source and release areas are summarized below. The data were compared with IEPA Tier I screening levels for industrial/commercial properties on a sample-specific basis, i.e., analyte results for individual samples were compared with the screening levels, rather than comparing statistical representations of the data (e.g., mean, upper confidence limit, etc.). Further, samples from all depths were compared even though the most likely exposure scenario involves only the interval from 0 to 5 ft. Sample data were compared with the most conservative (i.e., lowest) screening levels corresponding to the relevant pathways for individual analytes. For SWMU S and V, the relevant pathways were ingestion and inhalation only. For SWMU T, the soil to groundwater pathway was also considered.

SWMU S

The results of the comparison for the wastewater treatment plant area identified one exceedance for VOCs (1,2,3 trichloropropane), no exceedances for SVOCs, and a limited set of PAHs (benzo(a)pyrene [4 times], indene [1]) and metals (arsenic [2], beryllium [2]). The comparison results for the asphalt storage tank area identified no exceedances for VOCs, SVOCs, or PAHs only and a limited set of metals (arsenic [3], beryllium [3]).

Overall, these results indicate the areas pose a low concern for human health. For organics, the magnitude and degree of exceedance was low and the potential for exposure is low. The exceedances for arsenic and beryllium were most often close to either the background or the Tier 1 screening levels.

SWMU T

The results of the comparison for the South Fill area identified no exceedances for VOCs, 1 exceedance for SVOCs (n-nitrosodiphenylamine), and a limited set of PAHs (benzo(a)pyrene [3], benzo(a)anthracene [2], benzo(b)fluoranthene [2], dibenzo(a,h)anthracene [2]) and metals (antimony [1], arsenic [4], chromium [4], cobalt [2], lead [9]) within the south areas. In the East Fill area, only a limited set metals (arsenic [5], chromium [6], lead [10]) were identified as exceedances. The

reservoir area identified limited exceedances of PAHs (benzo(a)pyrene [2], benzo(a)anthracene [1], benzo(b)fluoranthene [1]), and metals (arsenic [1], cobalt [1], lead [2]). The Tank 2 area had only 1 exceedance of arsenic, and the Tank 3 area did not have any exceedances. In the Tank 4 area, only a limited set of metals (arsenic [1], chromium [3], lead [6]) were identified as exceedances. The Tank 5 area is limited to 1 lead exceedance. Finally, in the Tank 7 area, only a limited set of metals (arsenic [2], beryllium [2], chromium [3], lead [5]) were identified as exceedances. Some of these samples also contained hydrocarbons and sulfide. These constituents did not have screening values for comparison.

Overall, these results indicate the areas do not pose a significant concern based on the current site model.

SWMU V

The results of the comparison for soils beneath the lagoons identified no exceedances for VOCs, SVOCs or PAHs and a limited set of metals/inorganics (arsenic, beryllium) in exceedance. The comparison results for the former lagoon and dredged material area identified no exceedances for VOCs, SVOCs or PAHs, and only exceedances for a limited set of metals (antimony, arsenic, beryllium, chromium, lead). In both areas, the exceedances of arsenic and beryllium were most often close to either the background or the soil screening levels and should not pose a concern. The magnitude and degree of exceedance for lead was low and as such is not expected to pose a concern. The chromium detections in the former lagoon and dredged material area represent a potential direct-contact concern. As in SWMU T, some samples contained sulfide which has been retained as an exceedance for conservatism, even though there were no comparison criteria.

There are many uncertainties associated with this screening evaluation that result in additional conservatism. They include selecting the lowest or most conservative screening levels, using the highest detected value for screening, and not using site-specific exposure factors to derive the screening levels. The net result of this conservativeness is that human health risk is overstated for most if not all of the analytes.

5.2 CONCLUSIONS

The following significant points are concluded based on the cumulative results of the RFI for SWMUs S, T and V:

- The nature and extent of source areas and releases have been adequately characterized for SWMUs S, T and V. The predominance of relatively lower mobility constituents (e.g., PAHs, metals) is favorable for the retardation of constituents. The data supports this in that very little evidence of downward migration was observed even in areas where source materials have been in place for several decades.

- The results of a highly conservative (e.g., Tier 1) risk-based evaluation of the data indicate that screening levels are only exceeded for a focused set of analytes. The potential human health risks for most constituents are expected to be within the acceptable risk and hazard ranges, as defined by USEPA, if site-specific baseline risk assessment methodology (e.g., TACO Tier 3) were used.

- Both areas within SWMU S (wastewater treatment plant and asphalt storage tank) have few exceedances. Therefore, on a risk basis alone no further action is warranted at SWMU S. OK

- Releases have been identified and characterized for the East and South Fill areas, and Tanks 1, 2, 3, 4, 5, and 7. Tier 1 exceedances were identified for only a few constituents. The magnitude and degree of exceedances were generally low. This, coupled with a low potential for exposure indicates that these areas do not pose a significant concern. ok

- The soil beneath the active lagoons at SWMU V is relatively unimpacted and the lagoons should be removed from further evaluation. The soil in the surrounding area represents a potential direct-contact concern. Further evaluation may be needed to quantify this concern and determine whether risk reduction measures are warranted. However, given its current use, the area does not appear to pose a threat to human health.

Illinois Environmental Protection Agency, 1997, Tiered Approach To Corrective Action Objectives, 35 IAC Part 742.

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USEPA, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication No. SW-846 (Third Edition, 1986, as amended by Revision I).

U.S. Environmental Protection Agency, 1993, Evidence for Data Collection in Support of Environmental Decision Making Using the Data Quality Objectives Process for Superfund, Interim Final Guidance, Publication EPA QA/G-4, August, 1993.

U.S. Environmental Protection Agency, 1994. Contract Laboratory Program, National Functional Guidelines for Organic Data Review, February.

U.S. Environmental Protection Agency, 1994. Contract Laboratory Program, National Functional Guidelines for Inorganic Data Review, February.

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U.S. Environmental Protection Agency, 1999. Risk-Based Concentrations, U.S. EPA Region III, October, 1999.

Wood River Refining Company, 1999, Phase III RCRA Facility Investigation Work Plan, SWMUs S, T and V, August 1999. Prepared by URS Greiner Woodward Clyde.

Appendix A
Field Data

FIELD SAMPLING ACTIVITIES

The RFI Phase III field activities consisted of advancing investigative soil borings using a Geoprobe® to further assess the nature and extent of impacts to soil identified during Phase I and Phase II investigations (1990 to 1992) at SWMUs S, T and V.

General Procedures

Standard operating procedures (SOPs) contained in the approved Phase III work plan and Data Quality Assurance Plan (DQAP) were followed for soil sampling, chain-of-custody documentation, calibration and maintenance of field equipment, quality assurance/quality control sampling, and decontamination.

PHASE III SAMPLING ACTIVITIES

Roberts Environmental Drilling Services (Roberts) of Millstadt, Illinois performed the soil sampling under the direction of a URS Greiner Woodward Clyde geological engineer. The sampling event took place from November 3, 1999 until December 2, 1999 (November 23 last analytical sampling day). Thirty-two soil borings were advanced using a Geoprobe® sampling system mounted on a Bobcat. In addition, four borings were advanced using a Geoprobe® mounted on a pontoon boat. The Geoprobe® uses a hydraulically powered percussion hammer for pushing steel sampling probes. The Bobcat-mounted Geoprobe® collected soil samples using a 2-in. ID Macro™ sampler with acetate liners, while pontoon boat-mounted Geoprobe® collected soil samples using a 4 in. ID Macro™ sampler with acetate liners. Two borings were advanced using a hand auger. The boring locations were selected in order to adequately assess the extent of previously identified releases from SWMUs S, T & V and to supplement existing information collected during Phase I and Phase II investigations. Boring locations are shown in **Figures 1-2, 1-3** and **1-4** of the report. The rationale and general Phase III sampling strategy segregated the borings into each individual SWMU as follows:

- SWMU S: Seven borings were advanced and sampled as specified in the work plan. One boring (SS-306) was hand-augered and sampled to a depth of 6 inches for exposure-based parameters. Six borings (300, 301, 302, 303, 304, and 305) were drilled to depths of 20

to 24 ft across the SWMU S area to assess the nature and extent of potential releases from the area.

- SWMU T: Nineteen borings were advanced and sampled as specified in the work plan. Four borings (321, 322, 331, and 335) were drilled or hand augered and sampled to a depth less than 5 ft for exposure-based sample collection. Fifteen borings (319, 320, 323, 324, 325, 325A, 326, 327, 328, 329, 330, 332, 333, 336, and 337) were advanced to depths of 10 to 18 ft across SWMU T to assess nature and extent of potential releases from the area. Boring 325A was offset and drilled at a location approximately 25 ft to the east of boring 325 due to refusal on concrete at a depth of 11 ft. One groundwater sample was taken from an existing monitoring well (P-134) to assess the nature and extent of potential releases from the area.

- SWMU V: Thirteen borings were advanced and sampled as specified in the work plan. The borings (358 through 370) were drilled to depths of 11 to 24 ft across the SWMU V area, including two borings each in the north and south lagoons, to assess nature and extent potential releases from the area.

Sampling Protocol

The investigation was performed using the Geoprobe® sampling system to reduce the amount of soil cuttings which would be generated and to minimize the amount of organic vapors which would be generated during the investigation. Shallow soil samples were typically collected continuously using a 2 in. ID by 4-ft long Macro™-core soil sampler, clear acetate liners and 1-in. diameter by 3-ft long steel probe rods. Operating Procedure No. OP-2A in the work plan describes sampling procedures and diagrams of the soil sampler.

Prior to initiating sampling activities, boring locations were located in the field by measuring from existing features. The borings were staked and labeled with an indelible marker and orange flagging. Elevations were estimated to the foot based on the site topographic map.

Generally, one to three soil samples were collected from each boring for laboratory analysis. The sampling intervals were identified as follows:

1. Surficial soils - samples from 0 to 1 ft were collected using hand sampling methods (e.g., liner-tube sampler, bucket auger, shovel) according to operating procedure OP-1;

2. Shallow subsurface soils - samples from 0 to 5 ft. were collected using the Geoprobe® system. Operating Procedure No. OP-2A describes the procedures for Geoprobe® sampling and decontamination

3. Deep subsurface soils - samples from between 5 and 24 ft were collected using the Geoprobe®.

The intent of the sampling program was to collect samples from areas of SWMUs S, T and V where impacts had previously been identified and from areas assumed to be beyond the limits of the impacts.

The stratigraphy was logged from the recovered soil samples. Soil samples were field screened for organic vapors using an organic vapor meter (OVM) according to Operating Procedure No. OP-3. Upon retrieval, the liners were cut open and the soil sample collected samples for VOC analysis were collected with an EnCore™ sampler (inert composite polymer) and a stainless steel T-handle. The procedure for collecting samples with the EnCore™ sampler is included is Operating Procedure No. OP-3A.

Upon completion, the borings were backfilled with granular bentonite.

SWMU S Borings

A total of seven borings ranging in depth from 6 inches to 24 ft were drilled and sampled at the SWMU.

Subsurface conditions in the upper 5 ft over the majority of the SWMU consisted of fill material. This material consisted predominantly of moist, brown, tan, and black mottled silts and clays with some sand and gravel. OVM readings for the SWMU ranged from 1 to 70 ppm.

Below 5 ft, the subsurface soils consisted of approximately 7 to 17 ft of moist, brown, black, and gray mottled silts and clays. OVM readings ranged from 13 to 4,518 ppm. Soils underlying this

material consisted of a gray to tan, medium to coarse grained sand. OVM readings in the sand unit ranged from 10 to 2,938 ppm. The sand unit thickness exceeded the depth of the borings.

Borings 301 through 305 contained 0.5 to 9.5 ft thick sections containing trace slag, sludge, and/or oil with some hydrocarbon odor; OVM readings ranged from 17 to 3,807 ppm.

SWMU T Borings

A total of 19 borings ranging in depth from 3 to 18 ft were drilled and sampled at the SWMU location.

Subsurface conditions in the upper 5 ft consisted of fill material. This material consisted of predominantly dark brown sandy, gravelly silt. OVM readings ranged from 0 to 18 ppm. Below 5 ft, the soils consisted of approximately 2 to 12 ft of moist, brown to gray, orangish-brown, and black silty clay. OVM readings ranged from 1 to 18 ppm. Soils underlying this material consisted of a orangish-brown and gray mottled, fine-grained clayey sand to fine to medium-grained sand. OVM readings in the sand unit ranged from 1 to 11 ppm. The sand unit thickness exceeded the depth of the borings.

A black sludge-like material with a hydrocarbon odor was noted between 4 and 5 ft in boring 331. The OVM reading was 18 ppm.

SWMU V Borings

A total of 13 borings ranging in depth from 11 to 24 ft were drilled and sampled at the SWMU.

Subsurface conditions in the upper 5 ft over the majority of the SWMU consisted of moist, dark brown clayey silts/silty clays with trace gravel. OVM readings for the SWMU ranged from 0 to 7 ppm.

Below 5 ft, the soils consisted of approximately 7 to 11 ft of moist, brown, black, gray, olive, and orangish-brown mottled clays, silty clays, and organic clays. OVM readings ranged from 0 to 7 ppm. The clay unit thickness exceeded the depth of the borings.

Borings in the lagoons (367 through 370) contained sediments ranging from 0.5 to 4.5 ft in thickness. OVM readings ranged from 2 to 205 ppm.

Analysis

Soil samples at SWMU S were analyzed for compounds on the Refinery Hazardous Constituent List (RHCL) (Modified Skinner List). Soil samples at SWMUs T and V were analyzed parameters on the Appendix IX list. The methods included were: volatile organic compounds (VOCs) by Method 8260 and extraction Method 5035; semivolatile organic compounds (SVOCs) by Method 8270, polynuclear aromatic hydrocarbons (PAHs) by Method 8310, total petroleum hydrocarbons (TPH) by Methods 8015 and 8015M, and inorganics (including cyanide and sulfide) by Methods 6010, 7471, 9010 and 9030. These constituents are listed in **Tables 3-2** and **3-3** of the report. Polynuclear aromatic hydrocarbons compounds were not reported as part of the semivolatiles list (as they were historically), instead they were reported by Method 8310 in order to obtain lower reporting limits.

Samples from twelve borings (321, 324, 325A, 328, 329, 330, 331, 335, 358, 359, 363, and 365) were collected for total organic carbon (TOC) analysis, by the Walkley-Black method, and moisture and pH analysis.

Quality assurance/quality control (QA/QC) samples included trip blanks, equipment blanks, duplicates, and matrix spike (MS) and matrix spike duplicate (MSD) samples. Refer to **Table 3-1** of the report for a summary of the number of QA/QC samples collected.

HEALTH AND SAFETY

All intrusive work at the site was performed in level D personal protective equipment (PPE) in accordance with the site specific health and safety plan (HSP) prepared by URS Greiner Woodward Clyde prior to beginning the field effort. In addition, WRRC requires that all personnel working at the facility wear flame retardant coveralls (FRCs). Ambient air monitoring for VOCs was performed at the site using a RAE Systems Mini RAE 2000 organic vapor monitor (OVM) and a Industrial Scientific MX-251 combustible gas indicator (CGI). Background and borehole readings were measured with each instrument and recorded in the field logbook and on the boring logs.

DECONTAMINATION

Decontamination of sampling equipment was performed to limit the potential migration of site related constituents. Reusable probing and sampling equipment was decontaminated between borings using a high pressure wash and potable water rinse. A portable decontamination station was established at each SWMU. Fluids generated from small equipment decontamination were collected and transferred to WRRC's wastewater treatment plant (WWTP).

Reusable hand tools such as drive shoes or sample spoons were decontaminated at the boring locations using an Alconox soap wash and a distilled water rinse. Used acetate sample liners were placed into drums for disposal. All expendable materials having a low probability of contamination (i.e., used gloves, Tyvek) were collected and placed into trash bags and placed into plant trash dumpsters

DOCUMENTATION

Boring Logs

Boring logs are included in Appendix A of the report. Each boring was logged by the URS Greiner Woodward Clyde geological engineer on a field boring log using the Unified Soil Classification (USC) system. Each boring log identifies the project name and number, location, date, Geoprobe contractor and operator. The body of the log contains spaces to describe the soils encountered during drilling, sample recovery in percent, water level information, OVM readings, if any, and the disposition of the borehole. A separate column is used for other field notes related to the sampling.

Field Notebook

A field logbook was kept by the field team. Entries into the field logbook included, but were not necessarily limited to, the following information:

- Project name
- Names of personnel on site
- Weather conditions

- Date and time of sampling
- Sample location and number
- Field screening results
- Other project specific information.

Chain-Of-Custody Record

A chain-of-custody record (COC) was maintained for all analytical samples collected. The COC contained the following information:

- Sample number
- Sample date and time
- Analysis requested
- Airbill Tracking ID for sample shipping
- Signatures of the persons who obtained custody of the samples and for the receiving laboratory.

Custody seals were placed on each cooler whenever the cooler was not in direct possession of the sampler. The custody seal provided space for the samplers name and the sample date. A copy of the COC is included with the analytical data in **Appendix C** of the report.

TABLE A-1
SUMMARY OF BACKGROUND ANALYTE CONCENTRATIONS
(SWMUs S and T SAND)

Parameter	Units	G/SS200A(0-.5'	G/SS200B(.5'-4	BG/SS201(0-.5')	G/SS201(.5'-4'	BG/SS202(0-.5')	G/SS202(.5'-4'	BG/SS203(0-.5')	G/SS203(.5'-4'	BG/SS204(0-.5')
Metals (6010/7000)										
Antimony, Total (Sb)	mg/kg	0.6100	1.3600	0.4040	0.2940	0.6210	0.4860	0.1790	0.2960	0.3210
Arsenic, Total (As)	mg/kg	0.9790	1.7600	2.0300	0.6650	5.1400	2.6900	1.7700	1.4100	1.9200
Barium, Total (Ba)	mg/kg	45.8000	158.0000	56.3000	30.3000	46.1000	115.0000	25.1000	31.6000	28.5000
Beryllium, Low Level (Be)	mg/kg	0.2650	0.4430	0.5100	0.2750	1.0700	1.1600	0.4830	0.4260	0.4570
Cadmium, Low Level (Cd)	mg/kg	0.9960	4.8100	0.7990	0.6070	1.3600	1.8600	0.5600	1.1800	0.8810
Chromium, Total (Cr)	mg/kg	6.2600	9.5300	5.9600	5.6400	6.3100	11.6000	3.2100	6.5800	5.0500
Cobalt	mg/kg	3.0900	34.3000	1.9100	2.2000	3.1100	5.5900	1.8500	3.4900	2.3700
Copper, Total (Cu)	mg/kg	7.3800	9.7100	6.6900	3.0700	7.8900	11.5000	3.3700	4.4300	5.3400
Lead, Low Level (Pb)	mg/kg	13.5000	7.1300	1.2600	1.0400	34.0000	13.9000	16.6000	5.9800	20.6000
Mercury, Total (Hg)	mg/kg	0.0540	0.0420	0.0510	0.0300	0.0670	0.0500	0.0500	0.0350	0.0470
Nickel, Total (Ni)	mg/kg	5.7300	26.7000	7.9800	5.1500	7.6900	14.0000	2.7500	6.5300	4.9500
Selenium	mg/kg			0.1070	0.0450	0.1270	0.0430	0.0840		0.0710
Silver	mg/kg	0.3230	0.0550	0.0670	0.0850	0.0150		0.0000	0.0150	0.0200
Vanadium, Total (V)	mg/kg	11.6000	36.3000	9.5900	8.1000	11.7000	20.1000	6.7700	16.6000	9.7700
Zinc, Total (Zn)	mg/kg	36.3000	18.6000	28.3000	9.6700	33.5000	29.6000	14.9000	12.1000	23.8000

TABLE A-1
SUMMARY OF BACKGROUND ANALYTE CONCENTRATIONS
(SWMUs S and T SAND)

Parameter	Units	G/SS204(.5'-4'	BG/SS205(0-.5')	G/SS205(.5'-4'	BG/SS206(0-.5')	G/SS206(.5'-4'	BG/SS207(0-.5')	G/SS207(.5'-4'	BG/SS208(0-.5')	G/SS208(.5'-4'	BG/SS209(0-.5')	G/SS209(.5'-4'	BG/SS210(0-.5')	G/SS210(.5'-4'
Metals (6010/7000)														
Antimony, Total (Sb)	mg/kg	0.3830	1.1600	0.1550	1.4400	0.7110	0.2600	0.2280	0.1780	0.2160	0.2360	0.3220	0.3490	0.1600
Arsenic, Total (As)	mg/kg	2.2000	1.7700	0.3760	3.5600	2.3500	1.0200	0.3330	0.9630	0.1520	1.1700	1.0900	0.8250	0.8760
Barium, Total (Ba)	mg/kg	41.2000	44.2000	10.9000	57.3000	49.9000	14.9000	13.9000	12.0000	14.7000	25.8000	33.4000	30.8000	35.8000
Beryllium, Low Level (Be)	mg/kg	0.5560	0.3980	0.1860	0.5360	0.3670	0.2030	0.2340	0.1680	0.1910	0.2670	0.3250	0.2530	0.3210
Cadmium, Low Level (Cd)	mg/kg	1.3400	1.4000	0.2380	1.2500	0.8440	0.4910	0.4160	0.3900	0.3860	0.5860	0.5900	0.6570	0.5320
Chromium, Total (Cr)	mg/kg	9.0400	10.6000	3.1700	10.1000	5.8800	2.8700	3.7100	2.5700	3.2600	3.4400	3.4600	4.0400	2.9900
Cobalt	mg/kg	3.7000	2.6400	0.9150	3.4800	2.2500	0.9630	1.5900	0.6070	1.1400	2.8100	3.4900	2.9500	3.6400
Copper, Total (Cu)	mg/kg	5.0900	18.2000	1.7000	17.7000	6.9900	5.1400	2.3000	3.3900	1.2400	3.7100	2.6800	3.8800	2.2300
Lead, Low Level (Pb)	mg/kg	3.8600	41.1000	4.3000	51.1000	35.4000	18.5000	3.4100	14.2000	2.1700	14.3000	3.5300	11.0000	2.8800
Mercury, Total (Hg)	mg/kg	0.0360	0.2330	0.0580	0.4050	0.1400	0.0640	0.0360	0.0650	0.0540	0.0550	0.0430	0.0600	0.0310
Nickel, Total (Ni)	mg/kg	9.2800	10.9000	2.1200	10.8000	6.0500	2.5800	3.2800	2.0800	3.6100	3.7600	4.4100	4.9100	4.5000
Selenium	mg/kg	0.0330	0.0250		0.1020	0.3670	0.0360	0.0020	0.0160		0.0290		0.0590	
Silver	mg/kg													
Vanadium, Total (V)	mg/kg	16.0000	18.1000	4.1900	15.4000	9.9500	6.9700	8.9100	5.5600	4.3300	6.8300	7.8600	7.7100	6.3300
Zinc, Total (Zn)	mg/kg	15.1000	105.0000	8.7500	99.9000	25.5000	16.2000	7.4900	14.3000	8.3600	17.7000	9.8400	18.0000	9.7900

TABLE A-1
SUMMARY OF BACKGROUND ANALYTE CONCENTRATIONS
(SWMUs S and T SAND)

Parameter	Units	BG/SS211(0-.5')	G/SS211(.5'-4'	Can the Prescriptive Approach be used?(1)	Mean	Standard Deviation	K Value (4)	Upper Tolerance Limit (UTL)	Maximum Background Concentration
Metals (6010/7000)									
Antimony, Total (Sb)	mg/kg	0.4170	0.7660	Yes	0.4813	0.3681	2.3090	**1.3313**	1.44
Arsenic, Total (As)	mg/kg	2.0000	1.7400	Yes	1.6162	1.1001	2.3090	**4.1564**	5.14
Barium, Total (Ba)	mg/kg	31.8000	111.0000	Yes	44.3458	35.7561	2.3090	**126.9066**	158.00
Beryllium, Low Level (Be)	mg/kg	0.5070	1.0300	Yes	0.4430	0.2761	2.3090	**1.0806**	1.16
Cadmium, Low Level (Cd)	mg/kg	0.8240	2.9300	Yes	1.0803	0.9866	2.3090	**3.3585**	4.81
Chromium, Total (Cr)	mg/kg	4.9000	16.5000		6.1113	3.4876	2.3090	**14.1641**	16.50
Cobalt	mg/kg	2.3200	5.1000	No - Not normal distribution				Not Applicable	**34.30**
Copper, Total (Cu)	mg/kg	5.8900	12.7000	Yes	6.3425	4.6408	2.3090	**17.0582**	18.20
Lead, Low Level (Pb)	mg/kg	17.1000	10.4000	Yes	14.4692	13.4973	2.3090	**45.6345**	51.10
Mercury, Total (Hg)	mg/kg	0.0600	0.0490	No - Not normal distribution				Not Applicable	**0.41**
Nickel, Total (Ni)	mg/kg	4.6200	12.5000	Yes	6.9533	5.3502	2.3090	**19.3070**	26.70
Selenium	mg/kg	0.1810	0.0760	no - >15% nondetects				Not Applicable	**0.37**
Silver	mg/kg			no - >15% nondetects				Not Applicable	**0.32**
Vanadium, Total (V)	mg/kg	9.6000	33.1000	Yes	12.1404	8.1851	2.3090	31.0397	36.30
Zinc, Total (Zn)	mg/kg	25.3000	29.7000	Yes	25.7375	25.1069	2.3090	83.7093	105.00

(1) The Prescriptive Approach (IEPA, 1997 - Rules for Part 742) includes calculation of the Upper Tolerance Limit (UTL) for background data for comparison with site data. This approach cannot be used if the constituent has greater than 15% nondetects, or if the data do not exhibit normality. The data were tested for normality by using the Shapiro-Wilk Test of Normality.

(2) If UTLs could be calculated for the analyte, then the UTL value was considered to be background. If UTLs could not be calculated, then the maximum value for that analyte was considered to be background.

(3) Values in bold are the background values used for comparison with site data.

TABLE A-1
SUMMARY OF BACKGROUND ANALYTE CONCENTRATIONS
(SWMUs S and T CLAY)

Parameter	Units	SS18400100S	SS18400900S	SS18500100S	SS18500900S	SS18600100S	SS18600900S	Mean	Standard Deviation	K Value (4)	Upper Tolerance Limit (UTL) (5)	Maximum Background Concentration	Can the Prescriptive Approach be used?(1)
Metals (6010/7000)													
Antimony, Total	(mg/kg)	<6	<6	<6	<6	<6	<6				Not Applicable	6	no - >15% nondetects
Arsenic, Total	(mg/kg)	2.70	6.50	7.00	5.10	3.20	1.90	4.4000	2.1090	3.707	12.2182	**7.00**	
Barium, Total	(mg/kg)	438.00	277.00	106.00	335.00	147.00	53.50	226.0833	148.2047	3.707	775.4783	**438**	
Beryllium, Total	(mg/kg)	0.60	0.68	0.73	0.61	0.69	0.22	0.5883	0.1871	3.707	1.2820	**0.73**	No - Not normal distribution
Cadmium, Total	(mg/kg)	<.5	0.85	1.40	1.90	<.5	0.81				Not Applicable	**1.9**	no - >15% nondetects
Chromium, Total	(mg/kg)	11.20	15.30	12.20	11.90	12.70	10.40	12.2833	1.6822	3.707	18.5191	**15.3**	
Cobalt, Total	(mg/kg)	2.00	13.20	9.60	8.60	3.40	3.10	6.6500	4.4765	3.707	23.2444	**13.20**	
Lead, Total	(mg/kg)	<5	5.80	<5	6.80	<5	<5					**6.8**	no - >15% nondetects
Mercury, Total	(mg/kg)	<.2	<.2	<.2	<.2	<.2	<.2					**0.2**	no - >15% nondetects
Nickel, Total	(mg/kg)	13.00	35.40	15.60	53.50	12.10	8.90	23.0833	17.6428	6.707	141.4138	**53.5**	
Selenium, Total	(mg/kg)	<1	<1	<1	<2	<1	<1				Not Applicable	**2**	no - >15% nondetects
Vanadium, Total	(mg/kg)	18.60	31.50	22.00	24.30	17.90	15.30	21.6000	5.7938	3.707	43.0776	**31.50**	
Cyanide	(mg/kg)	<.5	<.5	<.5	<.5	<.5	<.5				Not Applicable	**0.5**	no - >15% nondetects

(1) The Prescriptive Approach (IEPA, 1997 - Rules for Part 742) includes calculation of the Upper Tolerance Limit (UTL) for background data for comparison with site data. This approach cannot be used if the constituent has greater than 15% nondetects, or if the data do not exhibit normality. The data were tested for normality by using the Shapiro-Wilk Test of Normality.

(2) If UTLs could be calculated for the analyte, then the UTL value was considered to be background. If UTLs could not be calculated, then the maximum value for that analyte was considered to be background.

(3) Values in bold are the background values used for comparison with site data.

(4) Values for K shall be determined using Apendix A, Table B from IEPA Part 742.

(5) If the sample set contains at least ten sample results the UTL shall be the upper limit of the area background concentration for the site. It the sample set contains fewer than ten sample results, the maiximum value of the sample set shall be the upper limit of the area background concentration for the site.

TABLE A-1
SUMMARY OF BACKGROUND ANALYTE CONCENTRATIONS
(SWMU V CLAY)

Parameter	Units	SS25200100S	SS25300100S	SS25400100S	SS25500100S	SS25600100S	SS25700100S	Mean	Standard Deviation	K Value (4)	Upper Tolerance Limit (UTL) (5)	Maximum Background Concentration	Can the Prescriptive Approach be used?(1)
Metals (6010/7000)													
Antimony, Total	(mg/kg)	<6	<6	<6	<6	<6	<6				Not Applicable	6	no - >15% nondetects
Arsenic, Total	(mg/kg)	3.4	2.5	3.5	4.9	4.6	4.4	3.9800	0.9783	3.707	7.6064	**4.90**	
Barium, Total	(mg/kg)	77.6	90.9	97.6	115	105	101	101.9000	8.9655	3.707	135.1351	**115.00**	
Beryllium, Total	(mg/kg)	0.46	0.5	0.47	0.46	0.47	0.47	0.4740	0.0152	3.707	0.5302	**0.50**	No - Not normal distribution
Cadmium, Total	(mg/kg)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5				Not Applicable	0.5	no - >15% nondetects
Chromium, Total	(mg/kg)	10.5	12.8	13.9	20.9	13	12.7	14.6600	3.5204	3.707	27.7100	**20.90**	
Cobalt, Total	(mg/kg)	5.4	5.8	5.7	6.6	6.2	6.1	6.0800	0.3564	3.707	7.4011	**6.60**	
Lead, Total	(mg/kg)	13.7	15.9	14.6	17.6	15.5	15.2	15.7600	1.1327	3.707	19.9589	**17.60**	
Mercury, Total	(mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				Not Applicable	0.1	no - >15% nondetects
Nickel, Total	(mg/kg)	12.2	13.8	14	15.6	14.5	14.7	14.5200	0.7050	3.707	17.1334	**15.60**	
Selenium, Total	(mg/kg)	<1	<1	<1	<1	<1	<1				Not Applicable	1	no - >15% nondetects
Vanadium, Total	(mg/kg)	17.1	19.5	21.1	22.4	21.1	20.6	20.9400	1.0455	3.707	24.8155	**22.40**	
Silver, Total	(mg/kg)	<1	<1	<1	<1	<1	<1				Not Applicable	1	no - >15% nondetects
Zinc, Total	(mg/kg)	48.2	57	59.4	66.2	60.3	59	60.3800	3.4702	3.707	73.2439	**66.20**	
Cyanide	(mg/kg)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5				Not Applicable	0.5	no - >15% nondetects
Sulfide, Total	(mg/kg)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5				Not Applicable	0.5	no - >15% nondetects

(1) The Prescriptive Approach (IEPA, 1997 - Rules for Part 742) includes calculation of the Upper Tolerance Limit (UTL) for background data for comparison with site data. This approach cannot be used if the constituent has greater than 15% nondetects, or if the data do not exhibit normality. The data were tested for normality by using the Shapiro-Wilk Test of Normality.

(2) If UTLs could be calculated for the analyte, then the UTL value was considered to be background. If UTLs could not be calculated, then the maximum value for that analyte was considered to be background.

(3) Values in bold are the background values used for comparison with site data.

(4) Values for K shall be determined using Apendix A, Table B from IEPA Part 742.

(5) If the sample set contains at least ten sample results the UTL shall be the upper limit of the area background concentration for the site. It the sample set contains fewer than ten sample results, the maiximum value of the sample set shall be the upper limit of the area background concentration for the site.

KEY TO BORING LOGS

	Graphic Symbol	Description	USC Class.
GRAVEL		GRAVEL with little or no fines	GP or GW
		Silty GRAVEL	GM
		Clayey GRAVEL	GC
SAND		SAND with little or no fines	SP or SW
		Silty SAND	SM
		Clayey SAND	SC
LOW PLASTIC SILTS AND CLAYS		Inorganic low plastic SILT	ML
		Inorganic low plastic CLAY	CL
		Silty	CL
		Sandy	CL
		Gravelly	CL
		Organic low plastic SILT or CLAY	OL
HIGH PLASTIC SILTS AND CLAYS		Inorganic high plastic SILT	MH
		Inorganic high plastic CLAY	CH
		Organic high plastic SILT or CLAY	OH
		Peat and other highly organic soils	PT
ROCKS		LIMESTONE	
		SHALE	
		SANDSTONE	
		SILTSTONE	
SURFACE MATERIALS		Topsoil or pavement	
		FILL	

TERMS DESCRIBING CONSISTENCY OR CONDITION

Coarse grained soils (major portion retained on No. 200 sieve): Includes gravels and sands. Condition is rated according to the Standard Penetration Resistance, as shown below.

Descriptive Term	Blows per Foot
Very loose	0 - 5
Loose	5 - 10
Medium dense	10 - 30
Dense	30 - 50
Very dense	Greater than 50

Fine grained soils (major portion passing No. 200 sieve): Includes clays and silts. Consistency is rated according to shearing strength, as indicated by penetrometer readings or by unconfined compression tests.

Descriptive Term	Unconfined Compressive Strength, tons/sq.ft	Hand Test
Very soft	less than 0.25	Extrudes between fingers
Soft	0.25 - 0.50	Molded by slight pressure
Firm	0.50 - 1.00	Molded by strong pressure
Stiff	1.00 - 2.00	Indented by thumb
Very stiff	2.00 - 4.00	Indented by thumbnail
Hard	4.00 and higher	Difficult to indent

LEGEND AND NOMENCLATURE

	Standard Penetration Sample
	Liner-tube sample, obtained by penetration of thick wall sampler containing 2 in. diameter liner-tubes (California sampler).
	Undisturbed sample, obtained by penetration of minimal 3 in. diameter, thin wall tube or, where indicated, fixed-piston sampling head.
	NX core.
PP,tsf	Unconfined compressive strength in tsf estimated with pocket penetrometer.
TV,tsf	Undrained shear strength in tsf estimated with torvane.
NMC,%	Natural Moisture Content, %
LL	Liquid Limit
PI	Plasticity Index
Qu, ksf	Unconfined Compressive Strength (Laboratory), ksf
RQD=80%	Percentage (80) of Rock Quality Designation
▽	Depth Groundwater enters at time of drilling.
▼	Groundwater Level at some specified time after drilling.

SAMPLING RESISTANCE

P	Sample pushed by hydraulic rig action.
3 6 9	Numbers indicate blows per 6 in. of sampler penetration when driven by a 140 lb hammer falling freely 30 in. The Standard Penetration Resistance is the number of blows for the last 12 in. of penetration of the Standard Penetration sampler, e.g. 15.
15	Standard Penetration Resistance
50/2	Number of blows (50) used to drive the Standard Penetration Sampler a certain number of inches (2).

ABBREVIATIONS USED UNDER "FIELD NOTES"

HSA = Hollow Stem Auger
CFA = Continuous Flight Auger
ATD = At Time of Drilling
AD = After Drilling
DWL = Drill Water Loss
DWR = Drill Water Return

URS Greiner Woodward Clyde

LOG OF BORING SS 300

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/3/1999	DATE COMPLETED: 11/3/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 427.5	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 24.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU S - Inactive White Star Refinery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Firm, moist, dark brown CLAY (CL); roots present		0		12/12		CL	*	Sample SS30000111039900S; VOCs, SVOCs, PAHs, and Metals (RHCL)
		1						
		2		36/36			*	
Becomes gray		3						Hydrocarbon odor (1.0 - 24.0 ft)
		4						
Firm, moist, gray and brown mottled SILT (ML)		5		48/48		ML	*	Sample SS30000611039900S; VOCs, SVOCs, PAHs, and Metals (RHCL)
		6						
Trace sand		7					2764.0	
		8						
		9		48/48			1260.0	Water @ 9.0 ft (perched)
Soft, wet, gray and brown mottled sandy SILT (ML) with trace orangish-brown clay flecks		10						
Firm, moist, gray and brown mottled CLAY (CL)		11				CL	88.0	
Loose, moist, gray, coarse-grained SAND (SP)		12				SP		
Becomes tan		13		36/48			136.0	
		14						
		15					202.0	
		16						
		17		36/48			35.0	Sample SS30001811039900S; VOCs, SVOCs, PAHs, and Metals (RHCL)
		18						
		19					254.0	
		20						

* PID Malfunction

URS Greiner Woodward Clyde

LOG OF BORING SS 300

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/3/1999	DATE COMPLETED: 11/3/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 427.5	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 24.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU S - Inactive White Star Refinery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
		20						
		21					755.0	
		22		48/48		SP		
Becomes wet		23					2938.0	Water @ 23.0 ft
		24						
Bottom of Boring at 24.0 ft								Backfilled with granular bentonite
		25						
		26						
		27						
		28						
		29						
		30						
		31						
		32						
		33						
		34						
		35						
		36						
		37						
		38						
		39						
		40						

* PID Malfunction

URS Greiner Woodward Clyde

LOG OF BORING SS 301

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/3/1999	DATE COMPLETED: 11/3/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 428.5	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 20.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU S - Inactive White Star Refinery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Soft, moist, brown, tan and black mottled CLAY (CL) with trace sand, gravel and slag		0						
		1						
Becomes gray, brown and black mottled		2		36/48			*	Sludge and soil mixture, hydrocarbon odor (1.0 - 2.0 ft)
		3						
		4						
		5					*	Sludge and soil mixture, hydrocarbon odor (5.0 - 7.0 ft)
Becomes very soft and wet		6		42/48				Water @ 6.0 ft (perched)
Firm, moist, gray and brown mottled CLAY (CL)		7					*	Sample SS30100811039900S; VOCs, SVOCs, PAHs, and Metals (RHCL)
		8						
Very soft, wet, dark brown CLAY (CL) with trace slag		9				CL	822.0	Water @ 9.0 ft (perched)
Firm, moist, gray and olive mottled CLAY (CL)								Sludge and soil mixture, hydrocarbon odor (9.0 - 9.5 ft)
		10		36/48				
Becomes gray and orangish-brown mottled		11					2386.0	
		12						
		13					706.0	
Becomes very soft and wet								Water @ 13.5 ft (perched)
Firm, moist, gray, brown and orangish-brown mottled CLAY (CL)		14		48/48				Oil and soil mixture, hydrocarbon odor (13.5 - 15.5 ft)
		15					343.0	
Soft, moist, brown sandy CLAY (CL) with trace silt		16						
Becomes very soft and wet		17					36.0	Water @ 17.0 ft
		18		36/48				
Loose, wet, tan coarse-grained SAND (SP)		19				SP	10.0	Hydrocarbon odor (17.0 - 20.0 ft)
		20						Sample SS30102011039900S; VOCs, SVOCs, PAHs, and Metals (RHCL)
Bottom of Boring at 20.0 ft								Backfilled with granular bentonite

* PID Malfunction

URS Greiner Woodward Clyde

LOG OF BORING SS 302

PROJECT NAME/NUMBER	Phase III RFI - SWMUs S, T, V 23-89C8602F.01	DATE STARTED 11/4/1999	DATE COMPLETED 11/4/1999
LOCATION	Equilon Wood River Refining Company Roxana, IL		
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL) 431.0	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS) 24.0	ROCK DEPTH (FT BGS) na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU S - Inactive White Star Refinery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Soft, moist, tan SILT (ML) with trace clay; roots present		0		12/12		ML	5.0	Sample SS30200111049900S; VOCs, SVOCs, PAHs and Metals (RHCL)
Firm, moist, dark brown SILT (ML); roots present		1						
		2		36/36			27.0	
		3						
Soft, moist, black and gray mottled CLAY (CL)		4				CL		Soil and sludge mixture, hydrocarbon odor (3.0 - 10.0 ft)
		5					NR	
		6		24/48				
		7					1622.0	
		8						
Becomes firm		9					70.0	
Firm, moist, gray and brown mottled CLAY (CL)		10		48/48				
		11					319.0	Oil and soil mixture (10.0 - 12.5 ft)
		12						
		13					*	Oil, soil and sludge mixture, hydrocarbon odor (12.5 - 13.0 ft)
		14		48/48				Sample SS30201411049900S; VOCs, SVOCs, PAHs and Metals (RHCL)
		15					*	Oil and soil mixture (13.0 - 16.0 ft)
Soft, moist, greenish-gray and gray mottled CLAY (CL)		16						
		17					*	
Firm, moist, gray and brown mottled CLAY (CL)		18		48/48				
		19					382.0	Soil and sludge mixture (19.0 - 19.5 ft)
Loose, moist, black coarse-grained clayey SAND (SC)						SC		
Firm, moist, gray and olive mottled sandy CLAY (CL)		20				CL		

* PID Malfunction

URS Greiner Woodward Clyde

LOG OF BORING SS 302

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/4/1999	DATE COMPLETED: 11/4/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 431.0	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 24.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU S - Inactive White Star Refinery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Firm, moist, gray and olive mottled sandy CLAY (CL)		20						
		21				CL	3469.0	
		22		48/48				
Loose, moist, light gray, black, brown and olive layered coarse-grained SAND (SP) Becomes wet		23				SP	41.0	Sample SS30202411049900S; VOCs, SVOCs, PAHs and Metals (RHCL) Water @ 23.5 ft
		24						
Bottom of Boring at 24.0 ft		25						Backfilled with granular bentonite
		26						
		27						
		28						
		29						
		30						
		31						
		32						
		33						
		34						
		35						
		36						
		37						
		38						
		39						
		40						

* PID Malfunction

URS Greiner Woodward Clyde

LOG OF BORING SS 303

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/4/1999	DATE COMPLETED: 11/4/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 430.5	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 24.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU S - Inactive White Star Refinery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Soft, moist, tan SILT (ML); roots present		0		12/12		ML	23.0	Sample SS303001110499 00S; VOCs, SVOCs, PAHs and Metals (RCHL)
		1						
Soft, moist, black, tan and gray sandy SILT (ML) with trace clay		2		48/48			70.0	Sample SS303004110499 00S; VOCs, SVOCs, PAHs and Metals (RCHL)
		3						
Soft, moist, brown, tan, orangish-brown and gray sandy CLAY (CL)		4				CL		
Becomes sandy SILT (ML)		5		48/48		ML	223.0	
Firm, moist, gray, dark gray and orangish-brown mottled sandy CLAY (CL)		6				CL		
Becomes CLAY (CL)		7					255.0	
Firm, moist, black CLAY (CL) w/ trace sand		8						Soil and sludge mixture (7.0 - 9.0 ft)
Becomes black, tan and gray mottled		9					17.0	
		10		48/48				
		11					16.0	
		12						
		13						
Firm, moist, dark gray sandy CLAY (CL)		14		48/48			13.0	
		15						
Loose, moist, dark gray coarse-grained clayey SAND (SC)		16				SC		
Loose, moist, light brown coarse-grained SAND (SP)		17				SP		
Becomes yellowish-brown		18		48/48			20.0	
Soft, moist, gray and orangish-brown mottled silty CLAY (CL)		19				CL		
Becomes sandy, silty CLAY (CL)								
Loose, moist, gray coarse-grained SAND (SP)		20				SP		

URS Greiner Woodward Clyde

LOG OF BORING SS 303

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/4/1999	DATE COMPLETED: 11/4/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 430.5	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 24.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU S - Inactive White Star Refinery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Loose, moist, gray coarse-grained SAND (SP)		20						
		21					27.0	
Becomes light gray		22		48/48		SP		
Becomes wet		23					38.0	Water @ 23.0 ft
		24						
Bottom of Boring at 24.0 ft								Backfilled with granular bentonite
		25						
		26						
		27						
		28						
		29						
		30						
		31						
		32						
		33						
		34						
		35						
		36						
		37						
		38						
		39						
		40						

URS Greiner Woodward Clyde

LOG OF BORING SS 304

PROJECT NAME/NUMBER	Phase III RFI - SWMUs S, T, V 23-89C8602F.01	DATE STARTED	11/5/1999
LOCATION	Equilon Wood River Refining Company Roxana, IL	DATE COMPLETED	11/5/1999
DRILLING CONTRACTOR	Roberts Environmental	FOREMAN	Joe Cox
GROUND ELEVATION (FT. MSL)	435.5	WATER DEPTH (FT BGS):	na
DRILLING EQUIPMENT	Geoprobe (2" x 4' macrosampler)	COMPLETION DEPTH (FT BGS)	20.0
ROCK DEPTH (FT BGS)	na	GEOLOGIST/ENGINEER	Matthew R. Foresman
BORING LOCATION	SWMU S - Inactive White Star Refinery		

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Loose, dry, gray GRAVEL (GW) w/ fines		0				GW		
Soft, moist, black clayey, gravely, SILT (ML) with trace sand				12/12		ML	*	Hydrocarbon odor
Soft, moist, tan silty SAND (SM) with trace clay		1				SM		Sample SS30400111059900S; VOCs, SVOCs, PAHs and Metals (RCHL)
Loose, moist, gray GRAVEL (GW) with fines		2		36/36		GW	*	
		3						Soil and sludge mixture, hydrocarbon odor (3.0 - 4.5 ft)
Soft, moist, black clayey SILT (ML) with trace gravel, brick								
Soft, moist, brown and black mottled SILT (ML)		4						Sample SS30400411059900S; VOCs, SVOCs, PAHs and Metals (RCHL)
Firm, moist, brown clayey SILT (ML)		5				ML	NA	
		6		42/48				
Soft, moist, black organic CLAY (OC)		7				OC	4518.0	
		8						
Firm, moist, gray and olive mottled CLAY (CL)		9					NR	
		10		24/48				
		11					8.0	Soil and sludge mixture, hydrocarbon odor (8.5 - 18.0 ft)
		12						
		13					3807.0	
		14		48/48		CL		
		15		*			NA	
		16						
Becomes gray, olive and dark gray mottled		17					8.0	
Soft, moist, gray, olive and dark gray mottled silty CLAY (CL) with trace sand and gravel		18		48/48				
		19					798.0	Sample SS30402011059900S; VOCs, SVOCs, PAHs and Metals (RCHL) Water @ 19.5 ft
Loose, wet, light brown coarse-grained SAND (SP)		20				SP		
Bottom of Boring at 20.0 ft								Backfilled with granular bentonite

* PID Malfunction

URS Greiner Woodward Clyde

LOG OF BORING SS 305

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/15/1999	DATE COMPLETED: 11/15/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 432.0	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 20.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU S - Inactive White Star Refinery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Soft, moist, brown sandy CLAY (CL) with trace gravel and debris; organics present		0, 1		12/12		CL	1.0	Sample SS30500111159900S; VOCs, SVOCs, PAHs and Metals (RCHL)
		2, 3, 4		36/36		CL	20.0	Samples SS30500411159900S, SS3050041115990MS, and SS305004111599MSD; VOCs, SVOCs, PAHs and Metals (RCHL)
Soft, moist, black sandy SILT (ML) with trace gravel and slag		5, 6		48/48		ML	153.0	Soil and sludge mixture, hydrocarbon odor (4.5 - 7.0 ft)
		7				ML	144.0	Oil and soil mixture, hydrocarbon odor (7.0 - 10.5 ft)
Soft, moist, gray CLAY (CL)		8, 9				CL	57.0	
		10, 11, 12		48/48		CL	86.0	
Firm, moist, gray and brown mottled CLAY (CL)		13, 14		30/48		CL	114.0	Samples SS30501411159900S and SS30501411159900D; VOCs, SVOCs, PAHs and Metals (RCHL)
		15, 16				CL	96.0	
Loose, moist, gray and brown mottled clayey SAND (SC)		17, 18		48/48		SC	241.0	Hydrocarbon odor (16.5 - 20.0 ft)
Loose, moist, gray and tan banded medium to coarse-grained SAND (SP) Becomes wet		19, 20				SP	114.0	Water @ 19.5
Bottom of Boring at 20.0 ft								Backfilled with granular bentonite

URS Greiner Woodward Clyde

LOG OF BORING SS 306

PROJECT NAME/NUMBER	Phase III RFI - SWMUs S, T, V 23-89C8602F.01	DATE STARTED	11/5/1999
LOCATION	Equilon Wood River Refining Company Roxana, IL	DATE COMPLETED	11/5/1999
DRILLING CONTRACTOR	Roberts Environmental	FOREMAN	Joe Cox
GROUND ELEVATION (FT. MSL)	430.5	WATER DEPTH (FT BGS):	na
DRILLING EQUIPMENT	Geoprobe (2" x 4' macrosampler)	COMPLETION DEPTH (FT BGS)	24.0
ROCK DEPTH (FT BGS)	na		
GEOLOGIST/ENGINEER	Matthew R. Foresman	BORING LOCATION	SWMU S - Inactive White Star Refinery

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Loose, moist, gray GRAVEL (GW) w/ fines		- 0 -		6/6		GW	54.0	Sample SS306001110599 00S; VOCs, SVOCs, PAHs and Metals (RCHL)*
Loose, moist, brown coarse-grained SAND (SP)						SP		
Bottom of Boring at 0.5 ft		- 1 -						Backfilled with granular bentonite
		- 2 -						* Also took Samples SS3060011105990MS and SS306001110599MSD
		- 3 -						
		- 4 -						
		- 5 -						
		- 6 -						
		- 7 -						
		- 8 -						
		- 9 -						
		- 10 -						
		- 11 -						
		- 12 -						
		- 13 -						
		- 14 -						
		- 15 -						
		- 16 -						
		- 17 -						
		- 18 -						
		- 19 -						
		- 20 -						

URS Greiner Woodward Clyde

LOG OF BORING SS 319

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/15/1999	DATE COMPLETED: 11/15/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 430.0	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 16.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU T - Inactive International Shoe Tannery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Concrete		0				CR	NA	
		1						
Loose, moist, light gray Gravel (GW) with fines (2 in. minus)						GW		
Loose, moist, black coarse-grained gravelly SAND (SP) with slag		2		48/48		SP		
Soft, moist, brown CLAY (CL) with trace silt		3				CL	4.0	
		4						
Firm, moist, gray and black mottled CLAY (CL)		5					3.0	
Becomes gray and orangish-brown mottled		6		48/48				
		7					3.0	
Soft, moist, gray and orangish-brown mottled sandy CLAY (CL)		8						
		9					7.0	
		10		48/48				
Loose, moist, orangish-brown and gray mottled, fine to medium-grained clayey SAND (SC)		11					5.0	
		12						Sample SS31901211159900S; BTEX and TPH
		13				SC	5.0	
Becomes wet		14		48/48				Water @ 13.5 ft
		15					4.0	
		16						
Bottom of Boring at 16.0 ft		17						Backfilled with granular bentonite
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 320

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/ /1999	DATE COMPLETED: 11/ /1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 430.0	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 16.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU T - Inactive International Shoe Tannery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Concrete		0						
		1				CR	NR	
		2		24/48				
Firm, moist, black CLAY (CL)		3					5.0	
		4						
		5					7.0	
Firm, moist, gray and orangish-brown mottled CLAY (CL)		6		48/48		CL		
Becomes brown and orangish-brown mottled		7					3.0	
		8						
Soft, moist, brown and orangish-brown mottled silty CLAY (CL)		9					5.0	
		10		48/48				
Loose, moist, brown and orangish-brown mottled, fine to medium-grained clayey SAND (SP)		11					3.0	Samples SS32001211159900S, SS3200121115990MS, and SS320012111599MSD; BTEX and TPH
		12						
Becomes wet		13				SP	5.0	Water @ 12.5 ft
		14		48/48				
		15					6.0	
		16						
Bottom of Boring at 16.0 ft		17						Backfilled with granular bentonite
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 321

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/5/1999	DATE COMPLETED: 11/5/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 430.0	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 4.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU T - Inactive International Shoe Tannery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Loose, dry, gray GRAVEL (GW)		0		12/12		GW	NA	Sample SS32100111059900S; VOCs, SVOCs & Metals (Appendix IX), and PAHs
		1						
Loose, moist, black sandy, silty, clayey GRAVEL (GW) with cinders		2		36/36			NA	
		3						Sample SS32100411059900S; VOCs, SVOCs & Metals (Appendix IX), and PAHs, TOC, moisture & ph
Soft, moist, black silty CLAY (CL)		4				CL		
Bottom of Boring at 4.0 ft		5						Backfilled with granular bentonite
		6						
		7						
		8						
		9						
		10						
		11						
		12						
		13						
		14						
		15						
		16						
		17						
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 322

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/23/1999	DATE COMPLETED: 11/23/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: na	FOREMAN: na	GROUND ELEVATION (FT. MSL): 429.0	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: hand auger		COMPLETION DEPTH (FT BGS): 3.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU T - Inactive International Shoe Tannery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Soft, moist, dark brown sandy, gravelly SILT (ML); roots present		0		12/12		ML	1.0	Sample SS322001112399 00S; VOCs, SVOCs & Metals (Appendix IX), and PAHs
		1						
		2		24/24			0.0	
Firm, moist, brown gravelly SILT (ML)		3						Sample SS322003112399 00S; VOCs, SVOCs & Metals (Appendix IX), and PAHs
Bottom of Boring at 4.0 ft		4						Backfilled with granular bentonite
		5						
		6						
		7						
		8						
		9						
		10						
		11						
		12						
		13						
		14						
		15						
		16						
		17						
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 323

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/15/1999	DATE COMPLETED: 11/15/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 428.5	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 16.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU T - Inactive International Shoe Tannery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Soft, dry, dark brown sandy, gravelly SILT (ML) with debris; roots present		0						
		1					3.0	
Firm, moist, dark brown SILT (ML) with trace sand						ML		
		2		48/48				
		3					3.0	
Firm, moist, gray and orangish-brown mottled CLAY (CL)								Sample SS32300411159900S; Metals (Appendix IX)
		4						
		5				CL	5.0	
Becomes sandy CLAY (CL)								
		6		48/48				
		7					5.0	
Loose, moist, gray and orangish-brown mottled fine-grained clayey SAND (SC)								
		8						
		9					4.0	
						SC		
		10		48/48				
		11					7.0	
		12						Sample SS32301211159900S; Metals (Appendix IX)
Soft, moist, tan, brown and gray mottled sandy CLAY (CL)						CL		
		13					7.0	
Loose, moist, tan and gray mottled fine-grained clayey SAND (SC)								
		14		48/48				
Becomes wet						SC		Water @ 14.0 ft
		15					6.0	
		16						
Bottom of Boring at 16.0 ft								Backfilled with granular bentonite
		17						
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 323

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/15/1999	DATE COMPLETED: 11/15/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 428.5	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 16.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU T - Inactive International Shoe Tannery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Soft, dry, dark brown sandy, gravelly SILT (ML) with debris; roots present		0, 1				ML	3.0	
Firm, moist, dark brown SILT (ML) with trace sand		2		48/48				
		3					3.0	
Firm, moist, gray and orangish-brown mottled CLAY (CL)		4				CL		Sample SS323004111159900S; Metals (Appendix IX)
		5					5.0	
Becomes sandy CLAY (CL)		6		48/48				
		7					5.0	
Loose, moist, gray and orangish-brown mottled fine-grained clayey SAND (SC)		8				SC		
		9					4.0	
		10		48/48				
		11					7.0	
		12						Sample SS323012111159900S; Metals (Appendix IX)
Soft, moist, tan, brown and gray mottled sandy CLAY (CL)		13				CL	7.0	
Loose, moist, tan and gray mottled fine-grained clayey SAND (SC)		14		48/48		SC		
Becomes wet		15					6.0	Water @ 14.0 ft
		16						
Bottom of Boring at 16.0 ft		17, 18, 19, 20						Backfilled with granular bentonite

URS Greiner Woodward Clyde

LOG OF BORING SS 324

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/16/1999	DATE COMPLETED: 11/16/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 430.0	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 16.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU T - Inactive International Shoe Tannery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Firm, moist, dark brown sandy SILT (ML); roots present		0						
		1						
		2		48/48		ML	3.0	
Firm, moist, dark gray and orangish-brown mottled SILT (ML) with trace sand; roots present		3						
		4						Samples SS32400411169900S and SS32400411169900D; Metals (Appendix IX)
Firm, moist gray CLAY (CL) with trace organics		5					1.0	
		6		48/48				
Firm, moist, light gray and orangish-brown mottled CLAY (CL) with trace sand		7					3.0	
		8				CL		
		9					1.0	
		10		48/48				
Becomes a sandy CLAY (CL)		11					2.0	
Loose, moist, light gray and orangish-brown banded fine-grained SAND (SP)		12				SP		Sample SS32401211169900S; Metals (Appendix IX), TOC, moisture, and ph
Loose, moist, light gray and orangish-brown mottled clayey SAND (SC)		13				SC	4.0	
Becomes wet		14		48/48				Water @ 13.5 ft
Soft, wet, light gray and orangish-brown mottled sandy CLAY (CL)		15				CL	5.0	
Becomes moist								
Becomes a CLAY (CL) with trace sand		16						
Bottom of Boring at 16.0 ft		17						Backfilled with granular bentonite
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 325

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/ /1999	DATE COMPLETED: 11/ /1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 432.0	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 11.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU T - Inactive International Shoe Tannery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Soft, moist, dark brown sandy, gravelly SILT (ML); roots present		0						*Note: Boring was abandoned and offset approximately 25.0 ft E due to refusal @ 11.0 ft
		1				ML		
		2		48/48				
Becomes brown and orangish-brown mottled		3						
Loose, dry, light gray GRAVEL (GP)		4				GP		
		5					NA	
Loose, dry, red brick fragments (BR)		6		24/48				
		7						
		8				BR		
		9		24/48				
		10						
Firm, moist, black sandy, gravelly SILT (ML)		11				ML		
Bottom of boring at 11.0 ft due to refusal (concrete)		12						Backfilled with granular bentonite
		13						
		14						
		15						
		16						
		17						
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 325A

PROJECT NAME/NUMBER	Phase III RFI - SWMUs S, T, V 23-89C8602F.01	DATE STARTED	DATE COMPLETED
LOCATION	Equilon Wood River Refining Company Roxana, IL	11/18/1999	11/18/1999
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL)	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 18.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU T - Inactive International Shoe Tannery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Firm, moist, brown, dark brown, tan, orangish-brown, and reddish-brown mottled sandy, gravelly SILT (ML); roots present		0, 1, 2, 3, 4				ML	1.0, 2.0	*Note: Boring was offset approximately 25.0 ft E from boring SS 325, and was drilled due to refusal at and subsequent abandonment of Boring SS 325.
Loose, dry, light gray GRAVEL (GW)						GW		
Loose, moist, black gravelly SLAG (SL)		5				SL	3.0	
Soft, moist, tan, dark brown and orangish-brown mottled sandy CLAY (CL)		6				CL		
Firm, moist, dark gray CLAY (CL)		7				CL	2.0	Sample SS32500811189900S; VOCs, SVOCs & Metals (Appendix IX), and PAHs & TPH
Becomes gray		8, 9, 10				CL	2.0	
Becomes gray and orangish-brown mottled		11, 12				CL	3.0	
Firm, moist, gray and orangish-brown mottled sandy CLAY (CL)		13, 14				CL	4.0	
		15				CL	3.0	Sample SS32501611189900S; VOCs, SVOCs & Metals (Appendix IX), and PAHs, TPH, TOC, moisture & ph
Firm, moist, dark brown CLAY (CL)		16				CL		Water @ 16.5 ft
		17				CL	3.0	
Loose, moist, gray and orangish-brown mottled clayey SAND (SC)		18				SC		
Bottom of Boring at 18.0 ft		19, 20						Backfilled with granular bentonite

URS Greiner Woodward Clyde

LOG OF BORING SS 326

PROJECT NAME/NUMBER	Phase III RFI - SWMUs S, T, V 23-89C8602F.01	DATE STARTED	DATE COMPLETED
LOCATION	Equilon Wood River Refining Company Roxana, IL	11/16/1999	11/16/1999
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 429.0	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 16.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU T - Inactive International Shoe Tannery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Stiff, dry, dark brown, sandy, gravelly SILT (ML); roots present		0						
Becomes moist		1					6.0	
Stiff, moist, dark brown, orangish-brown, reddish-brown and tan mottled clayey SILT (ML)		2		48/48				
Becomes dark brown and reddish-brown mottled		3				ML	5.0	
		4						
		5					7.0	
		6		48/48				
Stiff, moist, gray and orangish-brown mottled silty CLAY (CL)		7				CL	5.0	
		8						
Loose, moist, gray and orangish-brown mottled fine-grained clayey SAND (SC)		9					5.0	Sample SS32601011169900S; BTEX and TPH
		10		48/48				
		11					3.0	
Becomes wet		12				SC		Water @ 11.5 ft
Becomes brown and gray mottled		13					11.0	
Becomes gray and orangish-brown mottled		14		48/48				
		15					6.0	
		16						
Bottom of Boring at 16.0 ft		17						Backfilled with granular bentonite
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 327

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01 LOCATION: Equilon Wood River Refining Company Roxana, IL		DATE STARTED: 11/16/1999	DATE COMPLETED: 11/16/1999
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 430.5	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 16.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU T - Inactive International Shoe Tannery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Stiff, dry, dark brown, sandy, gravelly SILT (ML); roots present		0						
Becomes moist		1					3.0	
		2		48/48				
Stiff, moist, dark brown and reddish-brown mottled clayey SILT (ML)		3				ML	7.0	
		4						
		5					3.0	
		6		48/48				
Stiff, moist, gray and orangish-brown mottled silty CLAY (CL)		7				CL	5.0	
Becomes firm		8						
Loose, moist, gray and orangish-brown mottled fine-grained clayey SAND (SC)		9					5.0	Sample SS32701011169900S; BTEX and TPH
		10		48/48		SC		
		11					6.0	
		12						
Loose, moist, gray and orangish-brown layered fine to medium-grained SAND (SP)		13				SP	7.0	
		14		48/48				
Loose, moist, gray and orangish-brown mottled fine-grained clayey SAND (SC) Becomes wet		15				SC	7.0	Water @ 15.0 ft
		16						
Bottom of Boring at 16.0 ft		17						Backfilled with granular bentonite
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 328

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/16/1999	DATE COMPLETED: 11/16/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 435.0	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 18.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU T - Inactive International Shoe Tannery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Firm, moist, dark brown sandy, gravelly SILT (ML); roots present		0		12/12		ML	1.0	Samples SS32800111169900S, SS3280011116990MS, and SS328001111699MSD; VOCs, SVOCs & Metals (Appendix IX), and PAHs & TPH
		1						
		2		24/24				
Soft, moist, tannish-brown sandy SILT (ML)		3					4.0	
Soft, moist, black silty CLAY (CL)		4				CL		
Loose, dry, light gray GRAVEL (GW)				48/48		GW	7.0	
Soft, moist, gray and dark brown mottled organic CLAY (OC)		5				OC		
Soft, moist, black sandy, gravelly SILT (ML)						ML		
		6						
Soft, moist, gray and orangish-brown CLAY (CL) with trace sand		7				CL	4.0	
		8						
		9		48/48			4.0	
		10						
		11					4.0	
		12						
Firm, moist, brown CLAY (CL) with trace sand		13		48/48			4.0	
Becomes gray and orangish-brown mottled		14						
		15					5.0	
Loose, moist, gray to orangish-brown layered fine-grained SAND (SP) with trace clay		16				SP		Sample SS328016111169900S; VOCs, SVOCs & Metals (Appendix IX), and PAHs, TPH, TOC, moisture & ph
Loose, wet, gray and orangish-brown mottled fine-grained clayey SAND (SC)		17		24/24		SC	5.0	Water @ 16.0 ft
		18						
Bottom of Boring at 18.0 ft		19						Backfilled with granular bentonite
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 329

PROJECT NAME/NUMBER	Phase III RFI - SWMUs S, T, V 23-89C8602F.01	DATE STARTED	11/16/1999
LOCATION	Equilon Wood River Refining Company Roxana, IL	DATE COMPLETED	11/16/1999
DRILLING CONTRACTOR	Roberts Environmental	FOREMAN	Joe Cox
GROUND ELEVATION (FT. MSL)	434.0	WATER DEPTH (FT BGS):	na
DRILLING EQUIPMENT	Geoprobe (2" x 4' macrosampler)	COMPLETION DEPTH (FT BGS)	18.0
ROCK DEPTH (FT BGS)	na	GEOLOGIST/ENGINEER	Matthew R. Foresman
BORING LOCATION	SWMU T - Inactive International Shoe Tannery		

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Firm, moist, dark brown sandy, gravelly SILT (ML); roots present		0		12/12		ML	2.0	Samples 32900111169900S and 32900111169900D; VOCs, SVOCs & Metals (Appendix IX), and PAHs & TPH
		1						
		2		36/36				
Soft, moist, tannish-brown sandy, gravelly SILT (ML)		3					3.0	
Becomes black		4						
Firm, moist, gray, tan, dark brown and black mottled clayey SILT (ML)		5		48/48			5.0	
Becomes dark brown and reddish-brown mottled		6						
		7					6.0	
		8						
Firm, dark brown silty CLAY (CL)		9		48/48		CL	5.0	
Becomes gray and orangish-brown		10						
		11					5.0	
Loose, moist, gray and orangish-brown, fine-grained clayey SAND (SC)		12				SC	5.0	
		13						
Loose, moist, gray and orangish-brown, fine-grained SAND (SP) with trace clay		14		48/48		SP	5.0	Sample SS32901611169900S; VOCs, SVOCs & Metals (Appendix IX), and PAHs, TPH, TOC, moisture & ph
		15						
Soft, moist, gray and orangish-brown mottled sandy CLAY (CL)		16				CL		
Firm, moist, brown CLAY (CL) with trace sandy								
Loose, wet, gray and orangish-brown mottled clayey SAND (SC)		17		24/24		SC	6.0	Water @ 16.5 ft
		18						
Bottom of Boring at 18.0 ft		19						Backfilled with granular bentonite
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 330

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/17/1999	DATE COMPLETED: 11/17/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 438.5	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 10.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU T - Inactive International Shoe Tannery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Soft, moist, tan sandy, gravelly SILT (ML); roots present		0		12/12		ML	1.0	Sample SS33000111199900S; VOCs, SVOCs & Metals (Appendix IX), and PAHs & TPH
		1						
		2		36/36			12.0	
Firm, moist, gray, brown and dark brown mottled CLAY (CL) with trace sand and organics		3				CL		
Firm, moist, gray CLAY (CL) with trace sand		4						
Firm, moist, gray and brown mottled organic CLAY (OC)		5		48/48		OC	5.0	
Soft, moist, tan, gray, brown, and dark brown mottled sandy, gravelly SILT (ML) with brick fragments		6				ML		
		7					4.0	
Firm, moist, black asphaltic concrete material (AC)		8				AC		
Firm, moist, dark brown and organish-brown mottled CLAY (CL)		9		24/24		CL	2.0	Samples SS33001011199900S and SS 33001011199900D; VOCs, SVOCs & Metals (Appendix IX), and PAHs, TPH, TOC, moisture & ph
		10						
Bottom of Boring at 10.0 ft		11						Backfilled with granular bentonite
		12						
		13						
		14						
		15						
		16						
		17						
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 331

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/18/1999	DATE COMPLETED: 11/18/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 430.5	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 5.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU T - Inactive International Shoe Tannery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Firm, moist, dark brown sandy, gravelly SILT (ML); roots present		0		12/12		ML	1.0	Samples SS33100111189900S, SS3310011118990MS, and SS331001111899MSD; VOCs, SVOCs & Metals (Appendix IX), and PAHs, moisture & ph
		1						
With slag		2		48/48			18.0	
Becomes gray, brown, dark brown and organish-brown mottled		3						Sludge and soil mixture, hydrocarbon odor (4.0 - 5.0 ft)
Soft, moist, gray and orangish-brown mottled sandy CLAY (CL) with organics and slag		4				CL		
Soft, moist, black sandy, gravelly CLAY (CL) with slag		5						Samples SS33100511189900S, SS33100511189900D; VOCs, SVOCs & Metals (Appendix IX), and PAHs, moisture & ph
Bottom of Boring at 5.0 ft		6						Backfilled with granular bentonite
		7						
		8						
		9						
		10						
		11						
		12						
		13						
		14						
		15						
		16						
		17						
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 332

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/ /1999	DATE COMPLETED: 11/ /1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 431.0	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 16.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU T - Inactive International Shoe Tannery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Firm, moist, dark brown sandy, gravelly SILT (ML); roots present		0		12/12		ML	2.0	Sample SS332001111189900S; BTEX, TPH, and PAHs
		1						
Becomes brown, dark brown, gray and orangish-brown mottled		2		36/36			6.0	
		3						
Soft, moist, gray and orangish-brown mottled sandy, gravelly CLAY (CL) with organics		4				CL		
Firm, moist, black silty CLAY (CL)		5					4.0	
Firm, moist, gray CLAY (CL)		6		48/48				
		7					8.0	
		8						
Becomes gray and orangish-brown mottled		9					5.0	
		10		48/48				
		11					7.0	
		12						
Soft, moist, gray and orangish-brown mottled clayey SAND (SC)		13					7.0	
		14		48/48		SC		Sample SS332014111189900S; BTEX, TPH, and PAHs
Becomes wet		15					8.0	Water at 15.0 ft
		16						
Bottom of Boring at 16.0 ft		17						Backfilled with granular bentonite
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 333

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/18/1999	DATE COMPLETED: 11/18/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 433.0	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 16.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU T - Inactive International Shoe Tannery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Firm, moist, dark brown sandy, gravelly SILT (ML)		0		12/12		ML	5.0	Sample SS333001111189900S; BTEX, TPH, and PAHs
		1						
Becomes brown, dark brown, gray and orangish-brown		2		36/36			5.0	
Dry BRICK fragments (BR)		3				BR		
Loose, moist, sandy, gravelly SLAG (SL)						SL		
		4						
Soft, moist, gray and orangish-brown sandy, gravelly CLAY (CL) with organics								
Firm, moist, black silty CLAY (CL)		5				CL	3.0	
Becomes gray and orangish-brown mottled silty CLAY (CL)		6		48/48				
Becomes CLAY (CL)		7					3.0	
		8						
Becomes sandy CLAY (CL)		9					3.0	
		10		48/48				
Loose, moist, gray and orangish-brown mottled fine-grained clayey SAND (SC)		11				SC	3.0	
		12						
		13					3.0	Sample SS333014111189900S; BTEX, TPH, and PAHs
		14		48/48				
Becomes wet		15					2.0	Water @ 15.0 ft
		16						
Bottom of Boring at 16.0 ft		17						Backfilled with granular bentonite
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 335

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01 LOCATION: Equilon Wood River Refining Company Roxana, IL		DATE STARTED: 11/16/1999	DATE COMPLETED: 11/ 161999
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 432.5	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 5.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU T - Inactive International Shoe Tannery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Soft, moist, dark brown, gray and orangish-brown mottled sandy, gravelly organic CLAY (OC)		0		12/12		OC	2.0	Sample SS335001111169900S; VOCs, SVOCs & Metals (Appendix IX), and PAH, TOC, moisture & ph
		1						
		2						
		3		48/48			1.0	
Soft, moist, brown sandy, gravelly CLAY (CL); roots present		4				CL		Sample SS335005111169900S; VOCs, SVOCs & Metals (Appendix IX), and PAH, TOC, moisture, & ph
		5						
Bottom of Boring at 5.0 ft		6						Backfilled with granular bentonite
		7						
		8						
		9						
		10						
		11						
		12						
		13						
		14						
		15						
		16						
		17						
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 336

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01 LOCATION: Equilon Wood River Refining Company Roxana, IL		DATE STARTED: 11/19/1999	DATE COMPLETED: 11/ /1999
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 431.0	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 10.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU T - Inactive International Shoe Tannery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Loose, dry, black and reddish-brown gravelly, silty SAND (SM) with slag		0		12/12		SM	1.0	Sample SS336001111199900S; VOCs, SVOCs & Metals (Appendix IX), and PAHs
		1						
		2		36/36			1.0	
Soft, moist, dark brown CLAY (CL) with trace sand		3				CL		
Becomes brown and orangish-brown mottled								
Becomes firm		4						
Becomes brown, orangish-brown and tan mottled		5					2.0	
		6		48/48				
Firm, moist, gray and orangish-brown mottled silty CLAY (CL)		7					2.0	
Loose, moist, gray and orangish-brown mottled fine-grained clayey SAND (SC)		8				SC		
		9		24/24			1.0	
		10						Sample SS336010111199900S; VOCs, SVOCs & Metals (Appendix IX), and PAHs
Bottom of Boring at 10.0 ft		11						Backfilled with granular bentonite
		12						
		13						
		14						
		15						
		16						
		17						
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 337

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/19/1999	DATE COMPLETED: 11/19/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 432.0	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 10.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU T - Inactive International Shoe Tannery	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Loose, dry, black and reddish-brown gravelly, silty SAND (SM) with slag		0		12/12		SM	3.0	Sample SS337001111199900S; VOCs, SVOCs & Metals (Appendix IX), and PAHs
		1						
		2		36/36			5.0	
Soft, moist, dark brown silty CLAY (CL)		3				CL		
Firm, moist, brown and orangish-brown mottled CLAY (CL)								
Becomes dark gray		4						
Becomes brown, dark brown and tan mottled		5		48/48			8.0	
		6						
Firm, moist, gray and orangish-brown mottled silty CLAY (CL)		7					4.0	
Loose, moist, gray and orangish-brown mottled fine-grained clayey SAND (SC)		8				SC	7.0	
		9		24/24				
Loose, moist, gray and orangish-brown mottled fine-grained SAND (SP) with trace clay		10				SP		Sample SS337010111199900S; VOCs, SVOCs & Metals (Appendix IX), and PAHs
Bottom of Boring at 10.0 ft		11						Backfilled with granular bentonite
		12						
		13						
		14						
		15						
		16						
		17						
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 358

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/8/1999	DATE COMPLETED: 11/8/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 425.0	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 24.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU V - Area Around Active Lagoons	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Firm, moist, dark brown silty CLAY (CL); roots present		0		12/12		CL	0.0	Sample SS358800111089900S; Selected Metals (Appendix IX), TOC, moisture & ph
Trace gravel		1						
Firm, moist, dark brown clayey SILT (ML) with trace gravel		2		36/36		ML	0.0	
		3						
		4						Sample SS358004110899 00S; Selected Metals (Appendix IX), TOC, moisture & ph
Firm, moist, dark brown silty CLAY (CL) with trace gravel		5		48/48		CL	0.0	
Soft, moist, gray and brown mottled CLAY (CL)		6						
		7					2.0	
		8						
Becomes firm		9		48/48			2.0	
Becomes soft		10						Sample SS358012110899 00S; Selected Metals (Appendix IX), TOC, moisture & ph
		11					2.0	
		12						Water @ 12.0 ft (perched)
Becomes wet		13		48/48			5.0	
Becomes moist		14						
		15					0.0	
		16						
No recovery		17		NR		NR	NR	
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 358

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/8/1999	DATE COMPLETED: 11/8/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 425.0	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 24.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU V - Area Around Active Lagoons	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
No recovery		20						
		21						
		22		NR		NR	NR	
		23						
		24						
Bottom of Boring at 24.0 ft		25						Backfilled with granular bentonite
		26						
		27						
		28						
		29						
		30						
		31						
		32						
		33						
		34						
		35						
		36						
		37						
		38						
		39						
		40						

URS Greiner Woodward Clyde

LOG OF BORING SS 359

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/11/1999	DATE COMPLETED: 11/11/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 427.0	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 12.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU V - Area Around Active Lagoons	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Loose, moist, light gray Gravel (GW) with fines (2 in. minus)		0				GW		
		1					5.0	
Soft, moist, dark brown and brown mottled silty, gravely CLAY (CL)		2		48/48		CL		
Becomes dark brown, brown and orangish brown with black flecks								
Becomes dark brown, gray and black mottled		3					2.0	
		4						Sample SS35900411119900S; Selected Metals (Appendix IX), TOC, moisture & ph
		5					4.0	
Soft, moist, brown silty CLAY (CL) with occasional tan and dark brown mottling and black flecks, trace gravel		6		48/48				
		7					2.0	
		8						
Soft, moist, brown and black mottled silty CLAY (CL) with trace sand and gravel		9					1.0	
Becomes firm		10		48/48				
		11					1.0	
		12						Sample SS35901211119900S; Selected Metals (Appendix IX), TOC, moisture & ph
Bottom of Boring at 12.0 ft		13						Backfilled with granular bentonite
		14						
		15						
		16						
		17						
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 360

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/11/1999	DATE COMPLETED: 11/11/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 423.0	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 12.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU V - Area Around Active Lagoons	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Soft, moist, brown silty CLAY (CL) with organics		0, 1				CL	3.0	
		2		48/48				
Soft, moist, tan SILT (ML) with organics		3				ML	3.0	Samples 36000411119900S, 3600041111990MS, and 360004111199MSD; VOCs, SVOCs & Metals (Appendix IX), and PAHs, Cyanide & Sulfides
Soft, moist, gray and organish-brown mottled CLAY (CL) with organics and black flecks		4				CL		
		5					0.0	
Soft, moist, gray and black mottled CLAY (CL)								
Becomes firm		6		48/48				
		7					1.0	
Becomes gray, black and brown mottled		8						
		9					NR	
Becomes wet		10		24/48				Water @ 10.0 ft
		11					0.0	Samples 36001211119900S and 36001211119900D; VOCs, SVOCs & Metals (Appendix IX), and PAHs, Cyanide & Sulfides
		12						
Bottom of Boring at 12.0 ft		13, 14, 15, 16, 17, 18, 19, 20						Backfilled with granular bentonite

URS Greiner Woodward Clyde

LOG OF BORING SS 361

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/12/1999	DATE COMPLETED: 11/12/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 425.0	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 12.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU V - Area Around Active Lagoons	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Soft, moist, brown silty CLAY (CL) with organics		0				CL		
		1					7.0	
Soft, moist, tan clayey SILT (ML) with organics								
		2		48/48		ML		
		3					5.0	
Soft, moist, gray, olive and organish-brown mottled CLAY (CL)								Sample SS36100411129900S; Selected Metals (Appendix IX)
		4						Water @ 4.5 ft (perched)
Becomes wet								
		5					7.0	
Becomes moist								
		6		48/48				
		7					5.0	
						CL		
Becomes wet		8						Water @ 8.0 ft (perched)
Becomes moist								
		9					5.0	
Becomes stiff		10		48/48				
		11					3.0	
		12						Sample SS3610121119900S; Selected Metals (Appendix IX)
Bottom of Boring at 12.0 ft								Backfilled with granular bentonite
		13						
		14						
		15						
		16						
		17						
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 362

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/12/1999	DATE COMPLETED: 11/12/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 424.5	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 12.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU V - Area Around Active Lagoons	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Soft, moist, dark brown, brown and tan mottled clayey SILT (ML) with trace gravel; roots present		0						
		1					0.0	
		2		48/48		ML		
		3					0.0	
		4						Sample SS36200411129900S; Selected Metals (Appendix IX)
Soft, moist, gray and brown mottled silty CLAY (CL)		5					0.0	
		6		48/48				
		7					1.0	
Firm, moist, gray and orangish-brown mottled CLAY (CL)		8				CL		
		9					1.0	
		10		48/48				
		11					0.0	Water @ 11.0 ft
Very soft, wet, gray silty CLAY (CL)								Sample SS36201211129900S; Selected Metals (Appendix IX)
Firm, moist, gray and brown mottled CLAY (CL)		12						
Bottom of Boring at 12.0 ft								Backfilled with granular bentonite
		13						
		14						
		15						
		16						
		17						
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 363

PROJECT NAME/NUMBER	Phase III RFI - SWMUs S, T, V 23-89C8602F.01	DATE STARTED	DATE COMPLETED
LOCATION	Equilon Wood River Refining Company Roxana, IL	11/12/1999	11/12/1999
DRILLING CONTRACTOR	FOREMAN	GROUND ELEVATION (FT. MSL)	WATER DEPTH (FT BGS):
Roberts Environmental	Joe Cox	424.5	na
DRILLING EQUIPMENT		COMPLETION DEPTH (FT BGS)	ROCK DEPTH (FT BGS)
Geoprobe (2" x 4' macrosampler)		12.0	na
GEOLOGIST/ENGINEER		BORING LOCATION	
Matthew R. Foresman		SWMU V - Area Around Active Lagoons	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Soft, moist, brown silty CLAY (CL) with organics		0				CL	6.0	Sample SS363001111299 00S; TOC, moisture & ph
		1						
Soft, moist, tan clayey SILT (ML) with organics		2		48/48		ML		
		3					7.0	
Soft, moist, dark gray organic CLAY (OC)		4				OC		Sample SS363004111299 00S; Selected Metals (Appendix IX)
Very soft, wet, black organic CLAY (OC)		5					6.0	Water @ 4.5 ft (perched)
Soft, moist, gray, olive and black mottled CLAY (CL)		6		48/48				
		7				CL	3.0	
Becomes firm		8						Water @ 8.5 ft (perched)
Soft, wet, black organic CLAY (OC) with trace sand		9				OC	5.0	
Firm, moist, gray and olive mottled CLAY (CL)		10		48/48				
Becomes stiff		11				CL	1.0	
		12						Sample SS363012111299 00S; Selected Metals (Appendix IX)
Bottom of Boring at 12.0 ft		13						Backfilled with granular bentonite
		14						
		15						
		16						
		17						
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 364

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01 LOCATION: Equilon Wood River Refining Company Roxana, IL		DATE STARTED: 11/8/1999	DATE COMPLETED: 11/10/1999
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 425.2	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 16.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU V - Area Around Active Lagoons	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Soft, moist, brown clayey SILT (ML); roots present		0				ML		
		1						
		2		48/48			2.0	
		3						Samples SS36400411099900S, SS3640041109990MS, and SS364004110999MSD; VOCs, SVOCs & Metals (Appendix IX), and PAHs, Cyanide & Sulfides
		4						
With trace sand								
Becomes wet		5					1.0	Water at 5.0 ft (perched)
Becomes moist		6		48/48				
		7					1.0	
Soft, moist, black silty CLAY (CL) with trace silt						CL		
Becomes wet		8						Water at 7.5 ft (perched)
Firm, moist, black and gray mottled CLAY (CL) with trace silt		9					1.0	
								Lagoon sediments (0.0 - 14.0 ft)
		10		48/48				
		11					1.0	
		12						
Soft, wet, gray sandy CLAY (CL) with organics								Water @ 12.0 ft (perched)
		13					2.0	Sample SS36401411109900S; VOCs, SVOCs & Metals (Appendix IX), and PAHs, Cyanide & Sulfides
		14		48/48				
Firm, moist, gray CLAY (CL) with trace silt		15					2.0	
		16						
Bottom of Boring at 16.0 ft								Backfilled with granular bentonite
		17						
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 365

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/12/1999	DATE COMPLETED: 11/12/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 425.0	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 12.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU V - Area Around Active Lagoons	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Soft, moist, brown organic CLAY (OC) with trace sand		0						
		1					NR	
		2		24/48		OC		
Soft, moist, gray orgnanic CLAY (OC) with black flecks		3					1.0	Samples SS36500411129900S and SS36500411129900D; Selected Metals (Appendix IX)
		4						
Firm, moist, gray and brown mottled CLAY (CL)		5					1.0	
		6		48/48				
		7					0.0	Water at 7.0 ft (perched)
Soft, wet, gray and brown mottled silty CLAY (CL)		8				CL		
		9					0.0	
		10		48/48				
Firm, moist, gray and brown mottled CLAY (CL)		11					1.0	
		12						Sample SS36501211129900S; Selected Metals (Appendix IX)
Bottom of Boring at 12.0 ft		13						Backfilled with granular bentonite
		14						
		15						
		16						
		17						
		18						
		19						
		20						

URS Greiner Woodward Clyde

LOG OF BORING SS 365

PROJECT NAME/NUMBER: Phase III RFI - SWMUs S, T, V 23-89C8602F.01		DATE STARTED: 11/12/1999	DATE COMPLETED: 11/12/1999
LOCATION: Equilon Wood River Refining Company Roxana, IL			
DRILLING CONTRACTOR: Roberts Environmental	FOREMAN: Joe Cox	GROUND ELEVATION (FT. MSL): 427.0	WATER DEPTH (FT BGS): na
DRILLING EQUIPMENT: Geoprobe (2" x 4' macrosampler)		COMPLETION DEPTH (FT BGS): 12.0	ROCK DEPTH (FT BGS): na
GEOLOGIST/ENGINEER: Matthew R. Foresman		BORING LOCATION: SWMU V - Area Around Active Lagoons	

DESCRIPTION	Sample Run	Depth (FT BGS)	Water Table	SAMPLES Recov. (in)	SAMPLES Time	USC	PID Readings Head Space (ppm)	REMARKS
Soft, moist, brown and orangish-brown mottled silty CLAY (CL) with organics		0, 1, 2		48/48		CL	6.0	Sample SS36600111129900S; TOC, moisture & ph
Soft, moist, gray, tan and orangish-brown mottled clayey SILT (ML) with organics and trace sand Becomes dry		3, 4				ML	0.0	Sample SS36600411129900S; Selected Metals (Appendix IX), TOC, moisture & ph
Becomes moist		5, 6		48/48			0.0	
Firm, moist, gray and orangish-brown mottled silty CLAY (CL) with organics and trace sand		7, 8				CL	0.0	
Firm, moist, gray, brown and black mottled CLAY (CL) Becomes black		9, 10		48/48			1.0	
		11, 12					0.0	Sample SS36501211129900S; Selected Metals (Appendix IX)
Bottom of Boring at 12.0 ft		13, 14, 15, 16, 17, 18, 19, 20						Backfilled with granular bentonite

LOG of BORING No. B-367

DATE 11/10/99 SURFACE ELEVATION, FT _____ DATUM _____ LOCATION SWMU V N. lagoon

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	RECOVERY, %	DESCRIPTION	STRATUM EL / DEPTH	SYMBOL	PP, TSF	FIELD Qu,KSF	NMC, %	LL	PI	Qu, KSF	NOTES
0				Water (lagoon)									Boring advanced with barge mounted Geoprobe, and 4in. diameter x 5ft. Macrosampler
5													
				Very soft, moist, black SLUDGE (S)	7.5								Hydrocarbon odor Sample SS367008111109900S
				Firm, moist, gray, brown and black mottled CLAY (CL)	8.0								
			100	Becomes stiff									Hydrocarbon odor Sample SS367009111109900S
10													
				Bottom of boring at 11ft.	11.0								Sample SS367011111109900S Backfilled with granular bentonite
15													
20													

Completion Depth: 11.0 Ft. Water Depth: NA ft., After _____ hrs.

Project No.: 23-89C8602F.01(D200) _____ ft., After _____ hrs.

Project Name: Equilon WRRC RFI-SWMUs S, T, & V _____ ft., After _____ hrs.

Drilling Contractor: Roberts Env Drilling Logged by: Matt Foresman

3/30/00 WCCXS D200

URS Greiner Woodward-Clyde

LOG of BORING No. B-368

DATE 11/10/99 SURFACE ELEVATION, FT _____ DATUM _____ LOCATION SWMU V-North lagoon

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	RECOVERY, %	DESCRIPTION	STRATUM EL / DEPTH	SYMBOL	PP, TSF	FIELD Qu,KSF	NMC, %	LL	PI	Qu, KSF	NOTES
0				Water (lagoon)									Boring advanced with barge mounted Geoprobe, and 4in. diameter x 5ft. Macrosampler
				Very soft, wet, black SLUDGE (S)	4.0								Hydrocarbon odor
5			100										Sample SS36800611109900S
			100	Firm, moist, gray and black mottled CLAY (CL)	8.0								Hydrocarbon odor Sample SS36800911109900S
10													Sample SS36801111109900S
				Bottom of boring at 11ft.	11.0								Backfilled with granular bentonite
15													
20													

Completion Depth: 11.0 Ft.

Water Depth: NA ft., After _____ hrs.

Project No.: 23-89C8602F.01(D200)

_____ ft., After _____ hrs.

Project Name: Equilon WRRC RFI-SWMUs S, T, & V

_____ ft., After _____ hrs.

Drilling Contractor: Roberts Env Drilling

Logged by: Matt Foresman

3/30/00 WCCXS D200

URS Greiner Woodward-Clyde

LOG of BORING No. B-369

DATE 11/9/99 SURFACE ELEVATION, FT _____ DATUM _____ LOCATION SWMU V-South lagoon

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	RECOVERY, %	DESCRIPTION	STRATUM EL / DEPTH	SYMBOL	PP, TSF	FIELD Qu,KSF	NMC, %	LL	PI	Qu, KSF	NOTES
0				Water (lagoon)									Boring advanced with barge mounted Geoprobe, and 4in. diameter x 5ft. Macrosampler
				Very soft, moist, black SLUDGE (S)	2.0								Hydrocarbon odor Sample SS36900811099900S SS36900S11099900D 5
			100										
5													
				Firm, moist, gray and black mottled CLAY (CL)	6.5								Hydrocarbon odor
			100										
10													Sample SS36901111099900S
				Bottom of boring at 11ft.	11.0								Backfilled with granular bentonite
15													
20													

Completion Depth: 11.0 Ft. Water Depth: NA ft., After _____ hrs.

Project No.: 23-89C8602F.01(D200) _____ ft., After _____ hrs.

Project Name: Equilon WRRC RFI-SWMUs S, T, & V _____ ft., After _____ hrs.

Drilling Contractor: Roberts Env Drilling Logged by: Matt Foresman

3/30/00 WCCXS D200

URS Greiner Woodward-Clyde

LOG of BORING No. B-370

DATE 11/8/99 SURFACE ELEVATION, FT _____ DATUM _____ LOCATION SWMU V-South lagoon

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	RECOVERY, %	DESCRIPTION	STRATUM EL / DEPTH	SYMBOL	PP, TSF	FIELD Qu,KSF	NMC, %	LL	PI	Qu, KSF	NOTES
0				Water (lagoon)									Boring advanced with barge mounted Geoprobe, and 4in. diameter x 5ft. Macrosampler
			100	Very soft, moist, black SLUDGE (S)	2.0								Hydrocarbon odor Sample SS37000511089900S
5			100										
			100	Firm, moist, gray, brown and black mottled CLAY (CL)	6.5								Sample SS37000811089900S
10			100										Sample SS37001111089900S
				Bottom of boring at 11ft.	11.0								Backfilled with granular bentonite
15													
20													

Completion Depth: 11.0 Ft. Water Depth: NA ft., After _____ hrs.

Project No.: 23-89C8602F.01(D200) _____ ft., After _____ hrs.

Project Name: Equilon WRRC RFI-SWMUs S, T, & V _____ ft., After _____ hrs.

Drilling Contractor: Roberts Env Drilling Logged by: Matt Foresman

3/30/00 WCCXS D200

URS Greiner Woodward-Clyde

Appendix B
Quality Assurance Data

INTRODUCTION

This Quality Assurance Report presents the findings of a review/validation of analytical data soil and sediment samples and a groundwater sample collected as part of the Phase III characterization of SWMUs S, T, and V. Samples were collected between November 3 and 23, 1999 from the Equilon Wood River Refining Company (WRRC) site located in Roxana, Illinois. Sampling was conducted by URS Greiner Woodward Clyde (URSGWC). Analytical testing was provided by Severn Trent Laboratories (STL's – Savannah Laboratory). All samples sent to Savannah were analyzed using the USEPA SW-846 methodologies referenced in the Data Quality Assurance Plan (DQAP) for SWMUs S, T, and V and associated addenda DQAP dated October, 1999).

In accordance with the DQAP, 100 percent of the data was subjected to a data quality review. The DQAP also required that 10 percent of the data be fully validated in accordance with the USEPA data validation guidance documents. The validation was performed in order to confirm that the analytical data provided by STL's – Savannah Laboratory was acceptable in quality for characterizing the nature and extent of contamination and for the screening risk evaluation.

A total of seven sample delivery groups (SDGs) were analyzed by STL's – Savannah Laboratory. These SDGs consisted of 128 samples (70 soil, 12 sediment and 1 groundwater, 9 duplicate, 8 MS/MSD, 9 rinsate blanks and 19 trip blanks) from SWMUs S, T, and V. These samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polynuclear aromatic hydrocarbons (PAHs), diesel range organics (DRO), gasoline range organics (GRO), and metals/inorganics (not all the samples were analyzed for all the constituents). VOC, SVOC, PAH, DRO, GRO, TPH, and metals/inorganics results for fourteen samples were fully validated in accordance with the criteria presented in the DQAP, which accounted for 10 percent of the total data (including field QA samples).

The procedures for review and validation of the data followed guidance from the following documents:

1. Phase III Data Quality Assurance Plan. Revision 3 October 1999. Prepared by URS Greiner Woodward Clyde Consultants.
2. U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, February 1994.

3. U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, February 1994.

The above "Guidelines" provided the criteria to review. Additional quantitative criteria are given in the analytical methods. Qualifiers assigned by the data validator have been transcribed onto the laboratory reporting forms. The qualifiers are accompanied by codes which indicate the reason for assignment of the qualifier(s). The various codes are explained in **Table B-1a** and **B-1b**.

OVERALL DATA ASSESSMENT

Based on the criteria outlined, it is recommended that the results reported for these analyses be accepted for their intended use. Acceptable levels of accuracy, precision, and representativeness (based on MS/MSD, LCS, and surrogate data analyses as well as field duplicate results) were achieved for this data set, except where noted in this appendix. In addition, analytical completeness, defined to be the percentage of analytical results which are judged to be valid, including estimated (J or UJ) values, for this data set was over 99 percent, which exceeds the completeness goal of 95 percent

Results. Appropriate qualifiers assigned to the data by URSGWC are summarized in the RFI Report data tables. Qualifiers assigned by the data validator have also been transcribed onto the laboratory reporting forms

The data review included evaluation of the following criteria (full data validation in parenthesis):

Organics

- Transcription error check
- Results reported from secondary dilutions
- Sample holding times
- Instrument performance and calibration (full data validation only)
- Method blank, rinsate blank and trip blank contamination
- Surrogate spike recoveries
- Laboratory control sample recoveries
- MS/MSD recoveries and relative percent difference (RPD) values

- Internal standard areas and retention times (VOCs, SVOCs only) (full data validation)
- Field duplicate results
- Compound identification (full data validation only)
- Overall assessment of data.

Inorganics and Wet Chemistry

- Transcription error check
- Sample holding times
- Instrument performance and calibration (full data validation only)
- Initial and continuing calibration blank (full data validation only), and method blank contamination
- Rinsate blank contamination
- Laboratory control sample recoveries
- Matrix spike recoveries and laboratory duplicate sample RPD values
- ICP interference check sample recoveries (full data validation only)
- ICP serial dilution results (metals only) (full data validation only)
- Field duplicate results
- Analyte identification and quantitation (full data validation only)
- Overall assessment of data.

The following sections present the results of the data review/validation.

TRANSCRIPTION ERROR CHECK

During review, the following transcription errors were noted:

- The water samples in SDG 6 were extracted one day beyond the seven day holding time for SVOCs, but was not noted in the Case Narrative. Since the holding time was exceeded by only one day, no qualification of data was required.

- Dates of sample extraction/analysis and Batch IDs were not provided on the Metals Form-3s. Method blank identification and holding time compliance was achieved through a review of the chain-of-custody, sample preparation logs, analysis run logs, accompanying organic sample extraction logs, and the raw data forms.

RESULTS REPORTED FROM DILUTIONS

Twenty seven samples were analyzed at multiple dilutions for PAHs due to an abundance of target analytes. For samples with concentrations above the instrument linear calibration range, the compound(s) that exceeded the calibration range was flagged by the laboratory with an "E" qualifier. Sample concentrations reported from the diluted analyses were considered to be more representative of the sample's concentration and were transcribed onto the laboratory reporting forms, along with any appropriate qualifier. **Table B-2** presents the samples and associated PAH results that required dilutions due to concentrations above the instruments linear calibration range.

SVOC results for twelve samples were reported at dilution factors greater than 1:1. For these samples, the laboratory only reported the results for one analysis. The samples were screened prior to final analysis to determine the most appropriate dilution factor to minimize the potential for compounds exceeding calibration ranges and to minimize matrix effects. **Table B-3** summarizes the samples that were analyzed at dilutions for SVOCs and the reason for the dilutions.

Additionally, for the DRO analyses, four samples were analyzed at a 1:20 dilution factor. For samples with concentrations above the instrument linear calibration range, the compound(s) that exceeded the calibration range was flagged by the laboratory with an "E" qualifier. Sample concentrations reported from the diluted analyses were considered to be more representative of the sample's concentration and were transcribed onto the laboratory reporting forms, along with any appropriate qualifier. **Table B-4** presents the samples and associated DRO results that required dilutions due to concentrations above the instruments linear calibration range.

SAMPLE HOLDING TIMES

Sample holding time requirements for the analyses performed are presented in the DQAP and/or in the "Guidelines". All extractions and/or analyses for VOCs, SVOCs, PAHs, DROs, GROs, wet

chemistry, and metal parameters were completed within the recommended holding time requirements, except those summarized in **Table B-5**. ONLY 3 samples

In each case (3 samples), the holding time was exceeded by one day. Since the potential loss of analyte due to holding time exceedances is minimal for these situations, no qualification of data was judged to be required.

GC/MS INSTRUMENT PERFORMANCE

GC/MS instrument performance checks were performed to ensure mass resolution, identification, and instrument sensitivity. Criteria for evaluating instrument performance included possible transcription/calculation errors, adherence to instrument tuning frequency requirements, mass assignments, and ion abundance criteria. Instrument performance check samples were evaluated against criteria established in USEPA SW-846 Method 8260B and 8270C. Instrument tune data were validated for 10 percent of the samples. The associated samples for which the instrument tuning data were validated included:

Parameter	Samples
VOCs	SS325008, SS325016, SS330001, SS330010, SS331001, SS331005, SS332001, SS332014, SS333001, SS333014, SS336001, SS336010, SS337001, and SS337010
SVOCs	SS325008, SS325016, SS330001, SS330010, SS331001, SS331005, SS336001, SS336010, SS337001, and SS337010

Based on the raw data, the ion abundance criteria were within evaluation criteria for all masses, and no calculation or transcription errors were noted.

INITIAL AND CONTINUING CALIBRATION ALL MET ACCEPTABILITY CRITERIA

Instrument initial and continuing calibration data relative to the samples listed in the previous section were validated as part of the QA/QC program for this investigation. Initial and continuing calibration criteria are established to assess whether the instruments are capable of producing acceptable qualitative and quantitative data for the subject parameters. All initial and continuing calibrations were performed at the required frequency.

All VOC initial calibration relative response factor (RRF) values and relative standard deviation (RSD) values met the acceptance criteria presented in the "Guidelines" and required no qualification, except acrolein. Acrolein results for all samples affected by the full validation were qualified as J (detects)/UJ (nondetects). It should be noted that acrolein is not a chemical of concern at SWMUs S, T, and V.

All VOC continuing calibration RRF values and percent difference (%D) values met the acceptance criteria presented in the "Guidelines" " and required no qualification, except the RF for acrolein and the %D for acrolein, chloroethane, and vinyl chloride. Acrolein results were previously qualified, therefore only chloroethane and vinyl chloride results, for all samples within the full validation package, were qualified as J (detects)/UJ (nondetects). As with acrolein, chloroethane and vinyl chloride are not chemicals of concern at SWMUs S, T, and V.

All SVOC initial calibration RRF values and RSD values met the acceptance criteria presented in the "Guidelines" and no qualification was required.

All SVOC continuing calibration RRF values and %D values met the acceptance criteria presented in the "Guidelines" and required no qualification, except the %D for n-nitrosodimethylamine and 1,4-dioxane. N-nitrosodimethylamine and 1,4-dioxane results for rinsate blanks W331008 and W330009 (within the full validation) were qualified as UJ. These analytes are not chemicals of concern for SWMUs S, T, and V.

All PAH initial calibration RRF values and RSD values met the acceptance criteria presented in the "Guidelines" and no qualification was required.

All PAH continuing calibration RRF values and %D values met the acceptance criteria presented in the "Guidelines" and required no qualification, except the %D for benzo(a)pyrene, ideno(1,2,3-cd)pyrene, and benzo(g,h,i)perylene. Benzo(a)pyrene, ideno(1,2,3-cd)pyrene, and benzo(g,h,i)perylene results for samples W331008 (rinsate blank), SS331001, SS332001,SS332014, SS333001, SS333014, SS325008, and SS325016 (within the full validation) were qualified as J/UJ.

All DRO and GRO initial calibration RRF values and RSD values met the acceptance criteria presented in the "Guidelines" and no qualification was required.

All DRO and GRO continuing calibration RRF values and %D values met the acceptance criteria presented in the "Guidelines" and no qualification was required.

Remaining instrument calibrations (metals and wet chemistry) were acceptable (only J or UJ qualifiers) or required no qualification of data. Additionally, no errors in calculations or transcriptions were noted during the validation of the calibration data from this data set.

LABORATORY METHOD BLANKS

ok

Laboratory method blanks evaluate the existence and magnitude of contamination problems resulting from laboratory activities. All laboratory method blanks were analyzed at the method prescribed frequencies.

Wet Chemistry method blanks (including calibration blanks) had low level detections (i.e., low ppm) of target compounds/analytes (cyanide and sulfide). Per the "Guidelines", sample results not substantially above the concentration of the associated laboratory blank concentration (5 or 10 times depending on the analyte) required qualification as non-detected (data qualifier U). Samples and appropriate qualifiers due to potential laboratory contamination are presented in **Table B-6**.

RINSATE BLANK SAMPLES

ok

Rinsate blank samples are used to evaluate sampling equipment decontamination procedures. The DQAP required rinsate blank samples be collected at a frequency of one per 10 investigative samples. Nine rinsate blank samples were collected for approximately 83 investigative samples, therefore, the frequency requirements of the DQAP were met.

None of the rinsate blank samples had detections, indicating that the effectiveness of the decontamination process was successful in preventing cross-contamination of the subsequent soil samples.

TRIP BLANK SAMPLES

ok

Trip blank samples are used to assess VOC cross-contamination of soil samples during shipment to the laboratory. One trip blank sample was submitted with each shipment containing soil samples for VOC analyses (for a total of fourteen trip blank samples).

All trip blank samples were VOC-free, indicating the potential for cross contamination of samples during shipping and storage was minimal.

SURROGATE SPIKE RECOVERIES

ONLY 3 recoveries not in specs.-barely out

Surrogate compounds are used to evaluate overall laboratory performance for sample preparation efficiency on a per sample basis. All samples analyzed for VOCs, SVOCs, PAHs, DROs, and GROs are spiked with surrogate compounds prior to sample preparation. The "Guidelines" require that all VOC, PAH, DRO, and GRO surrogate spike recoveries meet acceptance criteria and allow one SVOC surrogate recovery per fraction to be outside acceptance criteria, provided that recoveries are greater than or equal to 10 percent. Surrogate recoveries for PAH analyses were validated using professional judgment.

Two out of 106 VOC analyses had surrogate spike recoveries that did not meet the "Guidelines" acceptance criteria. The outlying VOC surrogate recoveries for samples SS337001 and SS337001-RE indicated a potential low bias. Per the "Guidelines", detected and non-detected VOC sample results for samples that had low surrogate recoveries were qualified as estimated (J for detects and UJ for non-detects). Samples that had surrogate recoveries outside the laboratory's established control limits are summarized in **Table B-7**.

One method blank for SVOCs had a surrogate recovery that was just below the "Guidelines" acceptance criteria. Since one surrogate compound is allowed to be outside criteria for each fraction, no qualifications were made. Samples that had surrogate recoveries outside the laboratory's established control limits are also summarized in **Table B-7**.

Seven out of twenty-two DRO analyses and twenty-eight out of eighty-five PAH analyses yielded surrogate spike recoveries outside the laboratory's established control limits as a result of sample dilution (dilution factors greater than 1:2). Qualification of sample data is not required when outlying surrogate recoveries resulted from sample dilution. Samples that had surrogate recoveries outside the laboratory's established control limits are summarized in **Table B-8**.

For PAH analyses which did not require substantial dilution, the samples that had surrogate recoveries outside the laboratory's established control limits are summarized in **Table B-9**. During the review and validation of the analytical data for samples analyzed for PAHs, it was noted that

several surrogate compound recoveries were reported outside the evaluation criteria. The outlying recoveries were generally attributed to the surrogate recoveries being elevated due to high levels of target analytes or surrogate compounds being "diluted out"(discussed above). The presence of high levels of target analytes resulted in peaks eluting in the retention time window of the surrogate compound, consequently resulting in an artificially high surrogate recovery. Since the continuing calibrations and laboratory control sample (LCS) recoveries for the associated samples were within criteria, indicating the system was operating within acceptable criteria, data were not qualified due to surrogate compounds being elevated due to high concentrations.

One method blank (MB1130A) SVOC analysis yielded surrogate spike recoveries outside the laboratory's established control limits for 2-fluorobiphenyl. Per the "Guidelines", one surrogate compound is allowed to be outside criteria for each fraction before qualification is required, therefore, no qualification of data was required.

Two out of twenty-two GRO analyses had surrogate spike recoveries that did not meet the "Guidelines" acceptance criteria. The outlying GRO surrogate recoveries for samples SS328001 and SS329001 indicated a potential high bias, however, the results for both samples were non-detect. Per the "Guidelines", non-detected sample results for samples that had high surrogate recoveries required no qualification on the basis of the potential high bias. The samples that had surrogate recoveries outside the laboratory's established control limits are also summarized in **Table B-8.**

No other sample results required qualification based on outlying surrogate spike recoveries.

LABORATORY CONTROL SAMPLES OK

Laboratory control samples (LCS) were analyzed for all parameters and serve to monitor the overall performance of the steps in an analysis, including sample preparation.

All LCS recoveries were within analytical accuracy limits. Therefore, no qualifications were necessary on the basis of the LCS data.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) SAMPLES

MS/MSD samples for organics and MS/laboratory duplicates for inorganics are analyzed to assess

potential matrix effects upon the data. MS/MSD and MS/lab duplicates samples were required to be collected at a frequency of one per 20 investigative samples in accordance with the DQAP. URSGWC submitted eight MS/MSD and MS/lab duplicate samples for approximately 83 investigative samples, thereby meeting the DQAP frequency requirement. The MS/MSD samples collected included the following:

Sample	MS/MSD Parameters
SS305004, SS306001, SS328001, SS331001, SS360004, and SS364004	VOCs, SVOCs, PAHs, and Inorganics
SS320012	BTEX, and TPH
SS322001S	VOCs, SVOCs, PAHs, Inorganics, and TPH

Most MS recoveries and RPD values were either within the laboratory's or methods' established control limits, indicating that acceptable analytical accuracy and precision were achieved for these analyses, or were acceptable based on the LCS/LCSD recoveries. Outlying spike recoveries and/or RPD values associated with the samples analyzed for this investigation are summarized as follows. It should be noted that the associated samples were assigned by the URSGWC QA Officer:

Analysis	Analyte	% Recovery		% Control Limits	RPD (1)	RPD Control Limits
		MS	MSD			
SS305004-4						
SVOCs	1,4-dichlorobenzene	61	42	10-105	37	31
	1,2,4-trichlorobenzene	61	48	10-112	24	22
PAHs	All (except acenaphthylene, indeno(1,2,3-cd)pyrene, and dibenzo(a,h)anthracene)	--	--	--	--	--
GRO	gasoline	173	164	10-149	5	40
Inorganics	lead	-202	-209	75-125	3.4	20
	zinc	335	143	75-125	80	20
	Sulfide	*	14	50-150	*	50
SS306001-1						
PAHs	All (except dibenzo(a,h)anthracene)	--	--	--	--	--

Analysis	Analyte	% Recovery MS	% Recovery MSD	% Control Limits	RPD (1)	RPD Control Limits
Metals	antimony	49	47	75-125	4.2	20
SS320012-4						
SVOCs	1,4-dichlorobenzene	61	42	10-105	37	31
	1,2,4-trichlorobenzene	61	48	10-112	24	22
PAHs	All (except acenaphthylene, indeno(1,2,3-cd)pyrene, and dibenzo(a,h)anthracene)	--	--	--	--	--
GRO	gasoline	173	164	10-149	5	40
Inorganics	lead	-202	-209	75-125	3.4	20
	zinc	335	143	75-125	80	20
	Sulfide	*	14	50-150	*	50
SS322001-7						
VOCs	chlorobenzene	65	72	66-135	10	34
SVOCs	pyrene	0	* (-44)	10-133	*	42
	1,2,4-trichlorobenzene	33	44	11-122	28	22
PAHs	All	--	--	--	--	--
Inorganics	lead	197	147	75-125	29	20
	tin	91	74	75-125	21	20
	chromium	247	477	75-125	64	20
	zinc	134	124	75-125	7.8	20
	Sulfide	21	52	50-150	85	50

Analysis	Analyte	% Recovery MS	% Recovery MSD	% Control Limits	RPD (1)	RPD Control Limits
SS328001-5						
VOCs	chlorobenzene	42	74	66-135	55	34
	toluene	53	78	38-158	38	32
SVOCs	pyrene	122	156	10-133	24	42
PAHs	All (except acenaphthylene, indeno(1,2,3-cd)pyrene, and dibenzo(a,h)anthracene)	--	--	--	--	--
DRO	diesel	*	*	40-140	*	40
Inorganics	chromium	22	100	75-125	128	20
	mercury	49	48	80-120	2.1	20
	Sulfide	35	53	50-150	41	50
SS331001-6						
PAHs	All (except naphthalene, acenaphthene, and fluorene)	--	--	--	--	--
DRO	diesel	*	*	40-140	*	40
Inorganics	**barium**	95	74	75-125	25	20
	lead	80	60	75-125	29	20
	Sulfide	53	31	50-150	52	50
SS360004-3						
VOCs	chlorobenzene	113	66	66-135	52	34
	toluene	111	70	38-158	45	32
	trichloroethene	115	73	51-146	45	34
PAHs	acenaphthene	18	164	32-128	160	37
Inorganics	chromium	6149	4457	75-125	32	20
	mercury	21	52	75-125	85	20
	zinc	117	133	75-125	13	20
	Sulfide	*	14	50-150	*	50

Associated Samples:

Analysis	Analyte	% Recovery MS	% Recovery MSD	% Control Limits	RPD (1)	RPD Control Limits
SS364004-2						
VOCs	chlorobenzene	84	64	66-135	27	34
PAHs	naphthalene	25	26	31-159	4	34
Inorganics	antimony	127	120	75-125	5.7	20
	chromium	-2552	2494	75-125	--	20
	zinc	89	79	75-125	17	20

RPD-relative percent difference between MS/MSD or MS/lab duplicate analyses

NA-not applicable

--MS recovery or RPD value within control limits

*-Value outside QC limits (no or negative recovery)

Samples in **bold** were detected for the associated sample and qualified as J

The outlying MS/MSD recoveries and RPD values reported for this investigation indicated both a potential high and low bias. Detected sample results for the associated sample were qualified as estimated (J) when spike recoveries exhibited both a high and low bias. Non-detected results for the associated samples were qualified as estimated (UJ) when spike recoveries exhibited a low bias only and the recoveries were equal to or greater than 10 percent for organics and equal to or greater than 30 percent for inorganics.

It should be noted that several other VOC, SVOC, PAH, DRO, GRO, and Inorganic MS/MSD recoveries were outside control limits (non-bolded compounds). However, data qualification of the associated sample results was not considered necessary because: 1) the continuing calibrations and laboratory control sample (LCS) recoveries (and LCSD when applicable) for the associated samples were within criteria, indicating the system was operating within acceptable limits; 2) the outliers were caused by sample dilution, and no qualification is required when MS/MSD recoveries are outside control limits due to the necessity for sample dilution; or 3) the concentration in the sample was greater than four times (4X) the spike concentration, therefore spike recovery limits do not apply.

No other sample results required qualification based on the results of the MS/MSD analyses.

ICP INTERFERENCE CHECK SAMPLES (ICS)

The interference check sample (ICS) is analyzed for metals and is used to verify the laboratory's interelement and background correction factors and to confirm that the laboratory properly calibrated their instruments to account for potential interference problems.

A review of the provided data for 10 percent of the samples (see GC/MS instrument performance section for associated samples) showed that all recoveries were within accuracy limits, and no qualifications were necessary.

ICP SERIAL DILUTION

Metals detected at concentrations 50 times (or greater) than the instrument detection limit in an undiluted extract are required to have an ICP serial dilution performed. Savannah performed an ICP serial dilution with each data package (seven total). One sample (within the full validation) had an outlying % difference for the select analyte as shown below:

Sample	Analyte	% Difference
SS331001	zinc	12.5
Associated Samples: SS331001		

Since the results indicated poor precision (>10%) between the dilution analyses, the result for the associated analyte in sample SS331001 was qualified as estimated (J).

INTERNAL STANDARDS (VOCs and SVOCs)

Internal standards (IS) performance criteria ensure that the gas chromatograph/mass spectrometer (GC/MS) sensitivity and response are stable during each analytical run. All IS retention times and area responses for the samples in data package #6 were reviewed in accordance with validation protocols presented in the "Guidelines". All VOC and SVOC retention times were within the established IS retention time windows.

Two VOC and one SVOC sample analyses had internal standard area responses outside control limits as summarized in the following table:

Sample	Fraction	IS Compound	Area Response	Control Limits
SS337001	VOC	1,4-dichlorobenzene-d4	108129	186788-747154
SS337001-RE	VOC	1,4-dichlorobenzene-d4	124919	186788-747154
SS337010	SVOC	perylene-d12	1088	130099-520396

Per the "Guidelines", compounds associated with an internal standard having area responses below control limits, but above 50 percent of the lower control limit, required qualification as estimated (J for detects, UJ for non-detects). Compounds associated with an internal standard having area responses below 50 percent of the lower control limit required qualification of detects as estimated (J) and non-detects were rejected as unusable (R).

Validation of the IS data also included verification of retention times and areas summarized on Form-8 to those of the instrument chromatograms on a 10 percent basis; no anomalies were noted.

FIELD DUPLICATES

Field duplicate results were used to evaluate representativeness. When results for both duplicate and sample values are greater than five times the quantitation limit (QL), satisfactory representativeness is indicated by an RPD less than or equal to 100 percent for soil samples. Where one or both of the results of a field duplicate pair are reported at less than five times the QL, satisfactory representativeness is indicated if the field duplicate results agree within 3.5 times the quantitation limit for soil samples. Field duplicate results that do not meet these criteria may indicate unsatisfactory representativeness of the results.

Nine field duplicate samples were collected for approximately 83 investigative samples, which satisfies the required quantity the DQAP (1 per 10 investigative samples or 10 percent). The field duplicate sample pairs are summarized as follows:

Sample	Field Duplicate
SS303008- VOCs, SVOCs, PAHs, Inorganics	SS303008D- VOCs, SVOCs, PAHs, Inorganics
SS305014- VOCs, SVOCs, PAHs, Inorganics, TOC, Moisture/pH	SS305014D- VOCs, SVOCs, PAHs, Inorganics

Sample	Field Duplicate
SS324004- Inorganics	SS324004D- Inorganics
SS329001- VOCs, SVOCs, PAHs, Inorganics, TPH	SS329001D- VOCs, SVOCs, PAHs, Inorganics, TPH
SS330010- VOCs, SVOCs, PAHs, Inorganics, TPH, TOC, Moisture/pH	SS330010D- VOCs, SVOCs, PAHs, Inorganics, TPH
SS331005- VOCs, SVOCs, PAHs, Inorganics, TOC, Moisture/pH	SS331005D- VOCs, SVOCs, PAHs, Inorganics, TOC, Moisture/pH
SS360012- VOCs, SVOCs, PAHs, Inorganics	SS360012D- VOCs, SVOCs, PAHs, Inorganics
SS366004- Inorganics, TOC, Moisture/pH	SS366004D- Inorganics
SS369005- VOCs, SVOCs, PAHs, Inorganics	SS369005D- VOCs, SVOCs, PAHs, Inorganics

With the following exceptions, the reported results for field duplicate sample pairs were generally in agreement with the above acceptance criteria:

Analyte	SS303008	SS303008D	Difference
PAHs (µg/kg)			
anthracene	120	20	143% RPD

Analyte	SS305014	SS305014D	Difference
VOCs (µg/kg)			
ethylbenzene	160	ND @6.6	23 times QL
xylenes (total)	310	ND @6.6	46 times QL
Analyte	**SS305014**	**SS305014D**	**Difference**
PAHs (µg/kg)			
anthracene	170	520	6.7 times QL
benzo(a)anthracene	110	530	8.1 times QL
chrysene	200	730	10.2 times QL

Analyte	SS305014	SS305014D	Difference
fluoranthene	400	1400	7.7 times QL
phenanthrene	550	1800	106% RPD

Analyte	SS329001	SS329001D	Difference
PAHs (mg/kg)			
pyrene	1100	200	8.2 times QL

Analyte	SS324004	SS324004D	Difference
Metals (mg/kg)			
chromium	28	120	124% RPD

Analyte	SS331005	SS331005D	Difference
Metals (mg/kg)			
chromium	20	65	106% RPD

Analyte	SS330001	SS330001D	Difference
PAHs (μg/kg)			
benzo(b)fluoranthene	79	240	38.7 times QL
DRO (mg/kg)			
diesel	690	43	176.5% RPD
Metals (mg/kg)			
chromium	15	420	186.2% RPD
lead	25	100	120% RPD
vanadium	24	170	150.5% RPD
zinc	60	610	164.2% RPD

The observed discrepancies between field duplicate sample results may have been caused by sample heterogeneity. Slight differences in the sample matrix can have a substantial affect on the reproducibility of the data. Based on the differences between the above field duplicate sample results, the associated data were qualified as estimated (J).

Laboratory duplicate results are also used to evaluate representativeness. With the exception of the two samples below, the reported results for laboratory duplicate sample pairs were generally in agreement with the acceptance criteria previously stated for field duplicate samples.

Analyte	SS331001-MS	SS331001-MSD	Difference
Metals (mg/kg)			
zinc	188.1	148.3	23.7% RPD

Analyte	SS305004	Duplicate	Difference
Metals (mg/kg)			
zinc	290.1	224.6	25.5% RPD

Based on the differences between the above laboratory duplicate sample results, the associated data were qualified as estimated (J).

COMPOUND IDENTIFICATION AND QUANTITATION

Data for one or more compounds and analytes for 10 percent of the samples (see GC/MS Instrument Performance section for associated samples) were checked for potential identification errors and were recalculated from the raw data. No anomalies were noted for the target compound and target analyte identifications and quantitations.

TABLE B-1a
SUMMARY OF URSGWC DATA QUALIFIERS

During the validation process, a limited set of qualifiers may be issued to individual results to indicate the data quality suggested by the review process. Any one qualifier may be assigned for a number of different reasons. All qualifiers are accompanied by codes that indicate the reasons the qualifier(s) have been assigned. This table lists the codes used for the qualifiers.

CODE	QUALITY CONTROL PROBLEM REQUIRING QUALIFICATION
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

TABLE B-1b
SUMMARY OF SAVANNAH DATA QUALIFIERS

During the validation process, a limited set of qualifiers may be issued to individual results to indicate the data quality suggested by the review process. Any one qualifier may be assigned for a number of different reasons. All qualifiers are accompanied by codes that indicate the reasons the qualifier(s) have been assigned. This table lists the codes used for the qualifiers.

CODE	INORGANIC QUALITY CONTROL PROBLEM REQUIRING QUALIFICATION
B	This flag indicates the reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL).
E	This flag indicates the reported value is estimated because of the presence of interference.
M	This flag indicates that duplicate injection precision was not met.
N	This flag indicates that spiked sample recovery is not within control limits.
S	This flag indicates that the reported value was determined by the Method of Standard Additions (MSA).
U	This flag indicates the analyte was analyzed for but was not detected.
W	This flag indicates the post-digestion spike for Furnace AA analysis is out of control limits (85-115%), while sample absorbence is less than 50% of spike absorbence.
*	This flag indicates that duplicate analysis is not within control limits.
+	This flag indicates the correlation coefficient for the MSA is less than 0.995.

CODE	ORGANIC QUALITY CONTROL PROBLEM REQUIRING QUALIFICATION
A	This flag indicates that a tentatively identified compound is a suspected aldol-condensation product.
B	This flag is used when the analyte if found in the associated method blank as well as in the sample.
C	This flag applies to pesticide results where the identification has been confirmed by GC/MS.
D	If a sample or extract is reanalyzed at a higher dilution factor, the DL suffix is appended to the sample number of the Form I for the more diluted sample, and all reported concentrations on that Form I are flagged with the D flag.
E	This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.
J	This flag indicates an estimated value. This flag is used (1) when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, (2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the results is less than the CRQL but greater than zero, and (3) when the retention time data indicate the presence of a compound that meets the pesticide/Aroclor identification criteria, and the result is less than the CRQL but greater than zero.
N	This flag indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search.
P	This flag is used for pesticide/Aroclor target analyte when there is greater than 25% difference for detected concentrations between the two GC columns.
U	This flag indicates the compound was analyzed for but not detected.
X	Laboratory defined flag.

TABLE B-2

PAH RESULTS REPORTED FROM DILUTIONS

Sample	Parameter	Appropriate Dilution Factor	Reason for Dilution
SS303004	PAHs	1:10	Abundance of target analyte
SS304004	PAHs	1:10	Abundance of target analyte
SS305014	PAHs	1:10	Abundance of target analyte
SS305014D	PAHs	1:40	Abundance of target analyte
SS321004	PAHs	1:10	Abundance of target analyte
SS322001	PAHs	1:50	Abundance of target analyte
SS322001(MS)	PAHs	1:50	Abundance of target analyte
SS322001(MSD)	PAHs	1:50	Abundance of target analyte
SS322003	PAHs	1:10	Abundance of target analyte
SS322003	PAHs	1:30	Abundance of phenanthrene
SS328001	PAHs	1:10	Abundance of target analyte
SS329001	PAHs	1:10	Abundance of target analyte
SS329001D	PAHs	1:10	Abundance of target analyte
SS330001	PAHs	1:10	Abundance of target analyte
SS330010(DL)	PAHs	1:10	Abundance of target analyte
SS30010D	PAHs	1:10	Abundance of target analyte
SS331001	PAHs	1:10	Abundance of target analyte
SS331005	PAHs	1:30	Abundance of target analyte
SS331005D	PAHs	1:30	Abundance of target analyte
SS332001	PAHs	1:10	Abundance of target analyte
SS333001	PAHs	1:10	Abundance of target analyte
SS335001	PAHs	1:10	Abundance of target analyte
SS335005	PAHs	1:10	Abundance of target analyte
SS335005	PAHs	1:40	Abundance of phenanthrene
SS336001	PAHs	1:10	Abundance of target analyte
SS337010	PAHs	1:50	Abundance of target analyte
SS337010	PAHs	1:100	Abundance of benzo(b)fluoranthene & indeno(1,2,3-cd)pyrene
SS367008	PAHs	1:10	Abundance of target analyte
SS367008D	PAHs	1:10	Abundance of target analyte
SS368006	PAHs	1:10	Abundance of target analyte

TABLE B-3

SVOC RESULTS REPORTED AT DILUTIONS

Sample	Parameter	Dilution Factor	Reason for Dilution
SS303004	SVOCs	1:2	matrix intereference
SS303008	SVOCs	1:6	matrix intereference
SS303008D	SVOCs	1:2	matrix intereference
SS303022	SVOCs	1:6	matrix intereference
SS304004	SVOCs	1:10	matrix intereference
SS305004	SVOCs	1:6	detections
SS321004	SVOCs	1:6	matrix intereference
SS335001	SVOCs	1:5	detections
SS367008	SVOCs	1:6	detections
SS368006	SVOCs	1:6	detections
SS369005	SVOCs	1:6	detections
SS369005D	SVOCs	1:6	detections

TABLE B-4

DRO RESULTS REPORTED FROM DILUTIONS

Sample	Parameter	Compound	Appropriate Dilution Factor
SS328001	DROs	Analyte abundance	1:20
SS328016	DROs	Analyte abundance	1:10
SS329001	DROs	Analyte abundance	1:10
SS329001D	DROs	Analyte abundance	1:5

TABLE B-5

HOLDING TIME EXCEEDANCES

Sample	SDG	Analyte	Reported Holding Time Days	Required Holding Time Days
SS360004 (MS/MSD only)	3	VOCs	15(1)	14(1)
W331008	6	SVOCs	8(2)	7(2)
W331008	6	PAHs	8(2)	7(2)

(1) Number of days from collection to analysis.

(2) Number of days from collection to extraction.

TABLE B-6

QUALIFED DATA DUE TO METHOD BLANK CONTAMINATION

Fraction	Analyte	Conc.	Qualified Conc.
Wet Chemistry (mg/kg)			
1. 1119T MB	cyanide	2.5916	
2. 1123S MB	cyanide	1.0975	
4. 1123U MB	cyanide	1.9413	
5. 1125S MB	cyanide	1.6905	
6. 1206S MB	cyanide	3.3777	
7. MB (PBS-1)	sulfide	27	
Associated Samples:			
SS369005	cyanide	4.9	1.2U
SS364004	cyanide	3.3	1.2U
SS368006	cyanide	5.1	1.2U
SS360012D	sulfide	36	36U
SS3230012	sulfide	50	33U

TABLE B-7

VOC & SVOC ANALYSES WITH OUTLYING SURROGATE SPIKE RECOVERIES

Sample	Fraction	Surrogate Compound	Recovery	Limits
SS337001 undiluted	VOC	BFB	62	63-135
SS337001(RE) undiluted	VOC	BFB	62	63-135

BFB-bromofluorobenzene

Sample	Fraction	Surrogate Compound	Recovery	Limits
1130A-EMB (method blank)	SVOC	FBP	26	30-120

FBP-fluorobiphenyl

TABLE B-8

DRO & GRO ANALYSES WITH OUTLYING SURROGATE SPIKE RECOVERIES

Sample	Fraction	Surrogate Compound	Recovery	Limits
SS328001 diluted	DRO	o-terphenyl	0	15-154
SS328001(MS) diluted	DRO	o-terphenyl	0	15-154
SS328001(MSD) diluted	DRO	o-terphenyl	0	15-154
SS328016 diluted	DRO	o-terphenyl	0	15-154
SS329001 diluted	DRO	o-terphenyl	0	15-154
SS329001D diluted	DRO	o-terphenyl	0	15-154
SS330001 undiluted	DRO	o-terphenyl	0	15-154
SS332001 undiluted	DRO	o-terphenyl	0	15-154
SS333001 undiluted	DRO	o-terphenyl	0	15-154
SS333001(MS) undiluted	DRO	o-terphenyl	0	15-154
SS333001(MSD) undiluted	DRO	o-terphenyl	0	15-154

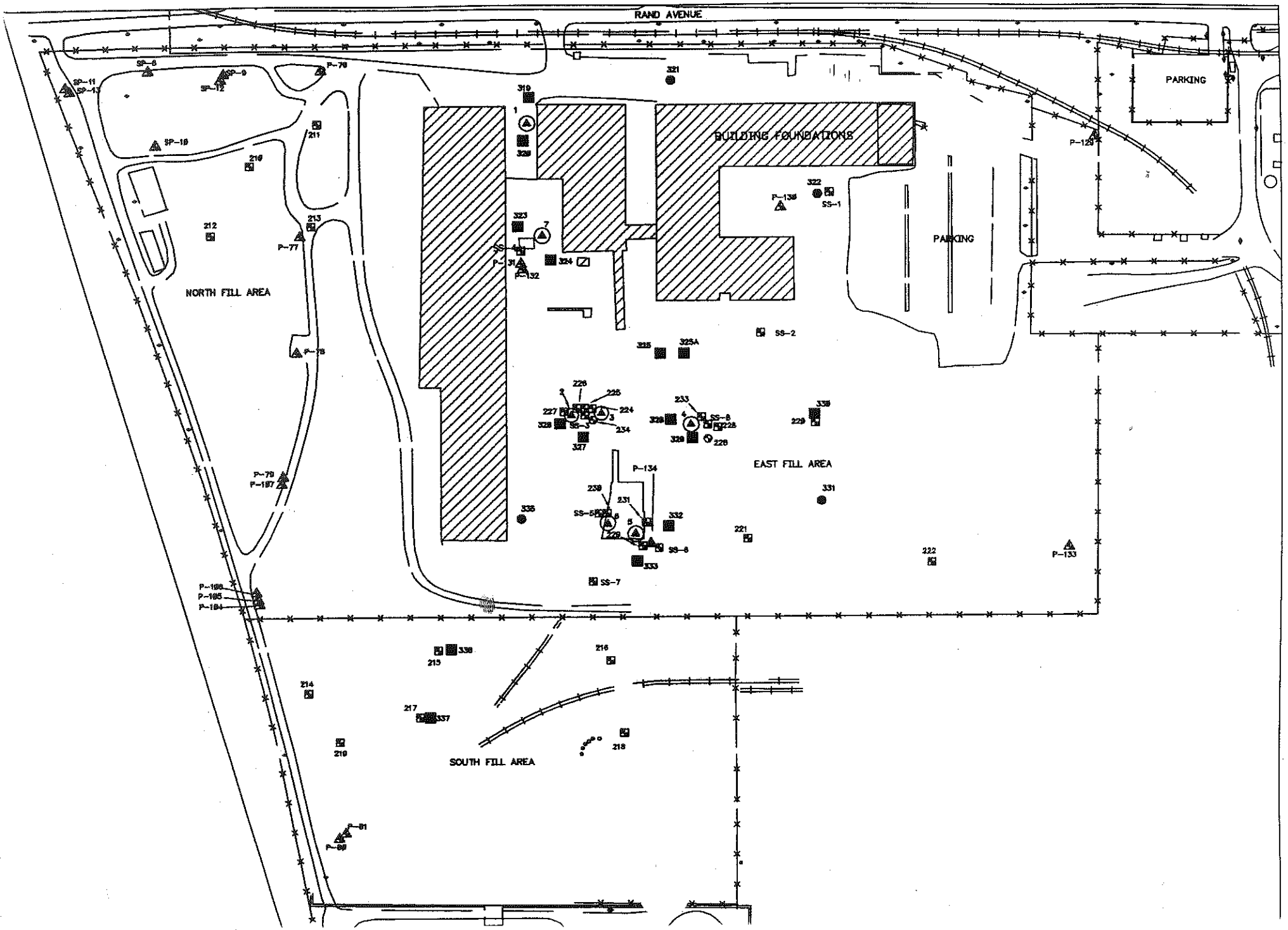
Sample	Fraction	Surrogate Compound	Recovery	Limits
SS328001 diluted	GRO	f3-toluene	171	41-156
SS329001 diluted	GRO	f3-toluene	235	41-156

TABLE B-9

PAH ANALYSES WITH OUTLYING SURROGATE SPIKE RECOVERIES

		Surrogate % Recoveries (1)
Sample	Dilution Factor	Terphenyl-d14 UV/FL (32-141)
SS303004	10.0	0/0
SS304004	10.0	0/0
SS304020	1.0	268/206
SS305004(MSD)	1.0	540/97
SS305014	10.0	0/0
SS305014D	40.0	0/0
SS306001(MSD)	1.0	232/174
SS321004(DL)	10.0	0/0
SS322001	50.0	0/0
SS322001(MS)	1.0	0/0
SS322001(MSD)	1.0	0/0
SS322003	1.0	0/0
SS322003(DL)	10.0 30.0	0/0
SS328001	1.0	0/0
SS329001	10.0	0/0
SS329001D	10.0	0/0
SS330001	10.0	0/0
SS330010	10.0	0/0
SS330010D	1.0	400/273
SS330010D(DL)	10.0	0/0
SS331001	10.0	0/0
SS331001(MS)	1.0	0/0
SS331001(MSD)	1.0	0/0
SS331005	30.0	0/0
SS331005D	30.0	0/0
SS332001	10.0	0/0
SS333001	10.0	0/0
SS335001	10.0	0/0
SS335005	1.0	0/0
SS335005(DL)	10.0 40.0	0/0
SS336001	10.0	0/0
SS337010	50.0	0/0
SS337010(DL)	100.0	0/0
SS367008	1.0	0/357
SS367008(DL)	10.0	0/0
SS368006	5.0	0/0
SS369005	1.0	0/0
SS369005D	10.0	0/0

(1) Control limits noted in parentheses
UV-surrogate recovery reported from the UV detector
FL-surrogate recovery reported from the fluorescence detector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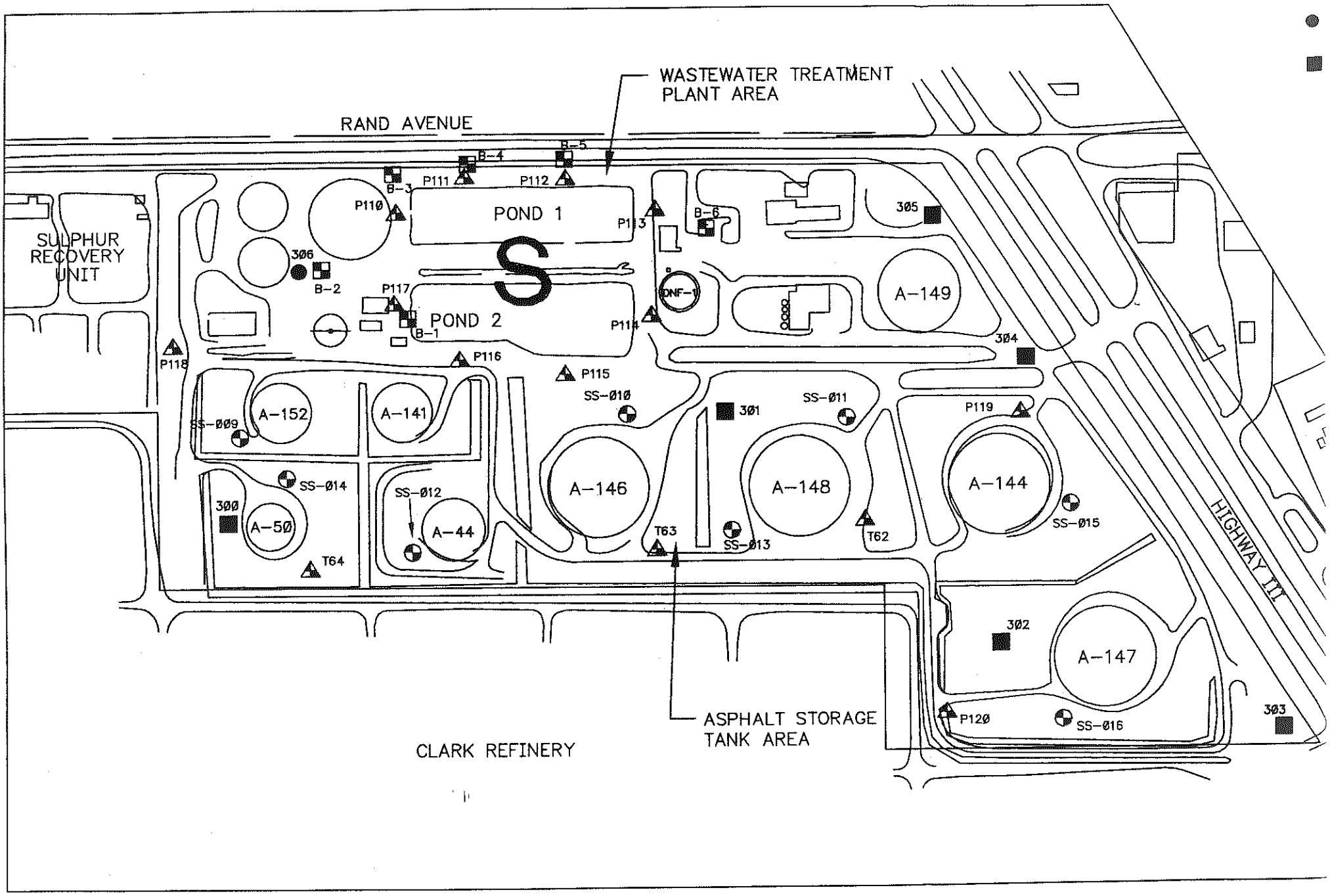
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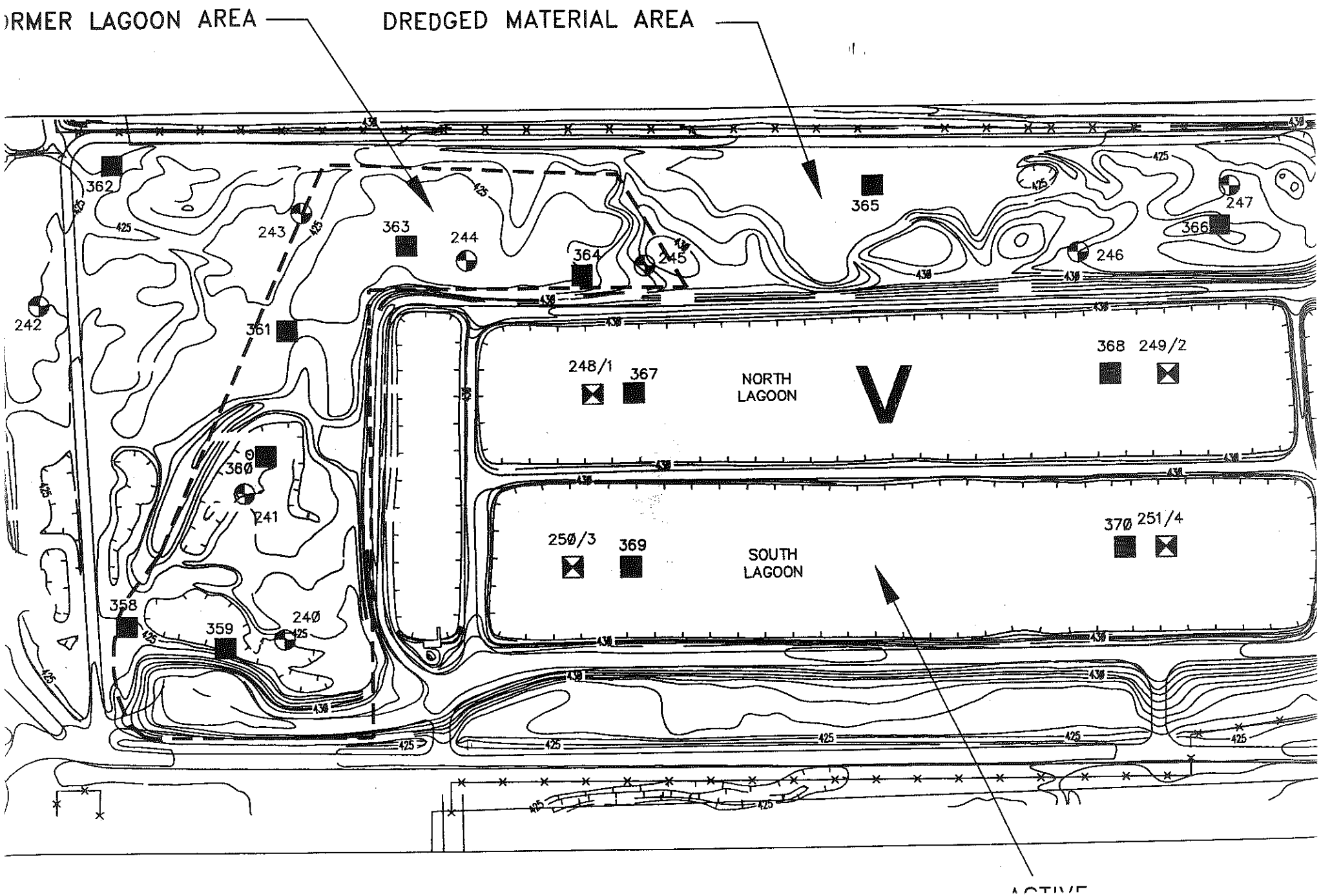
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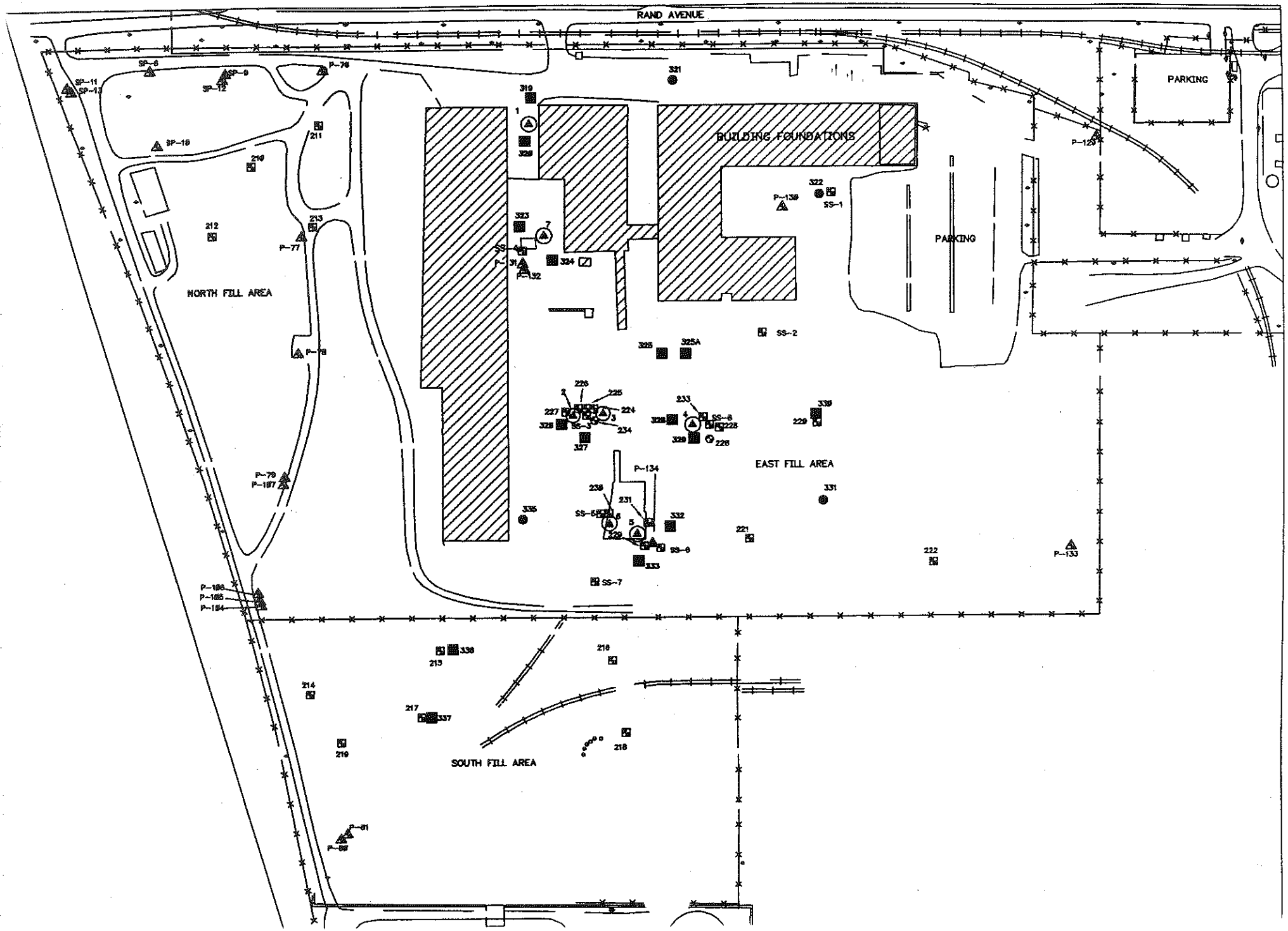
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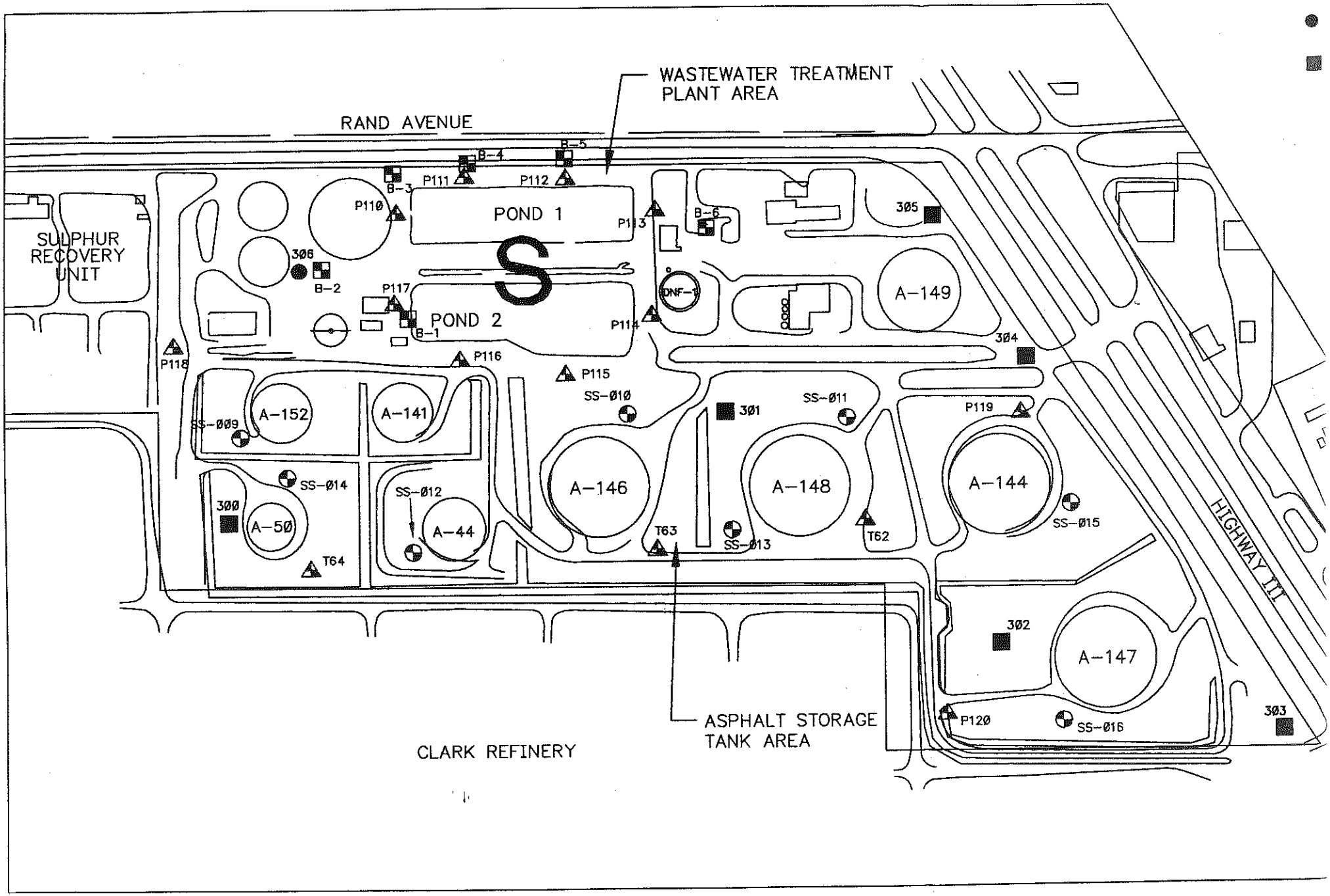
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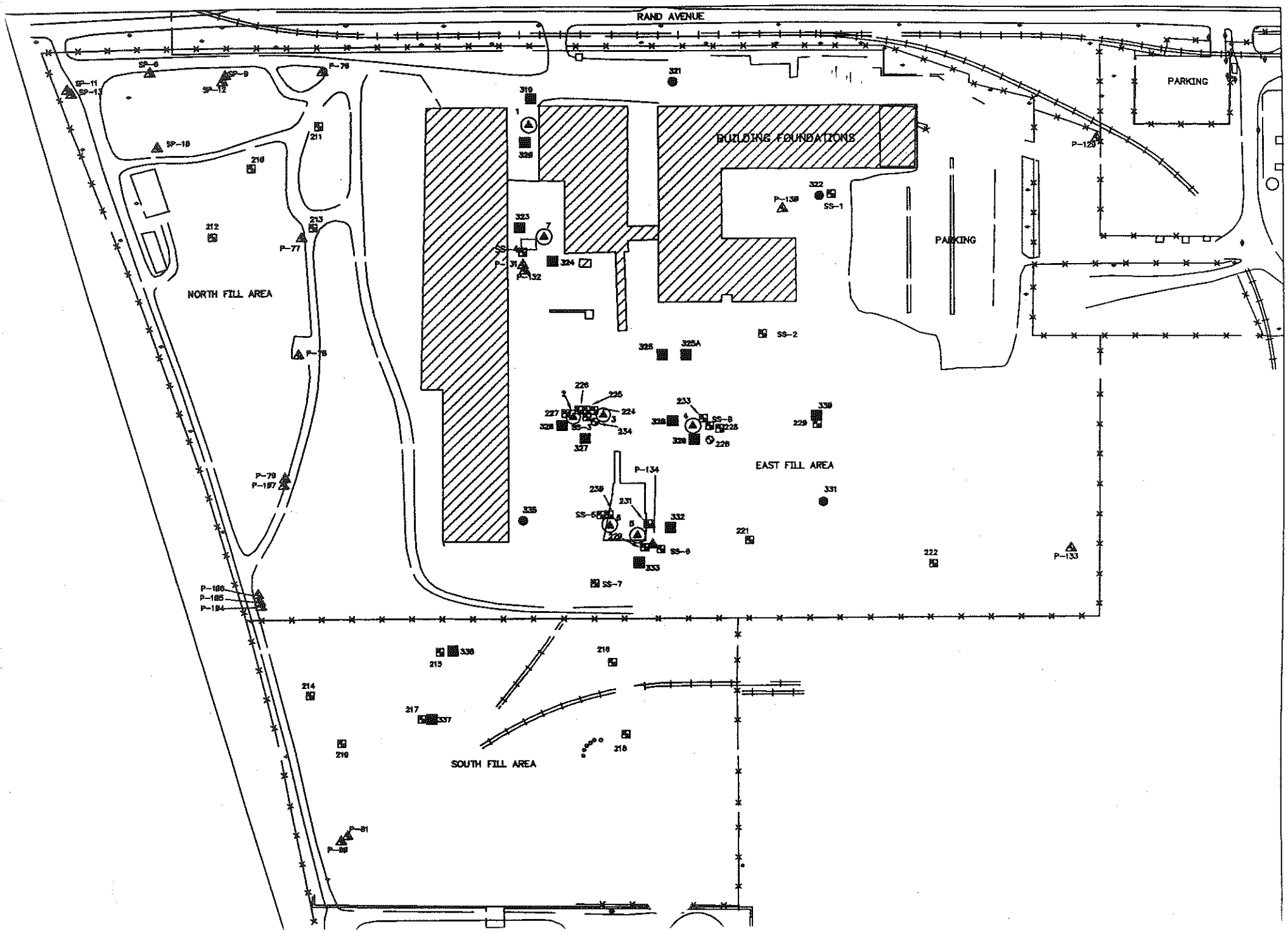
CLARK REFINERY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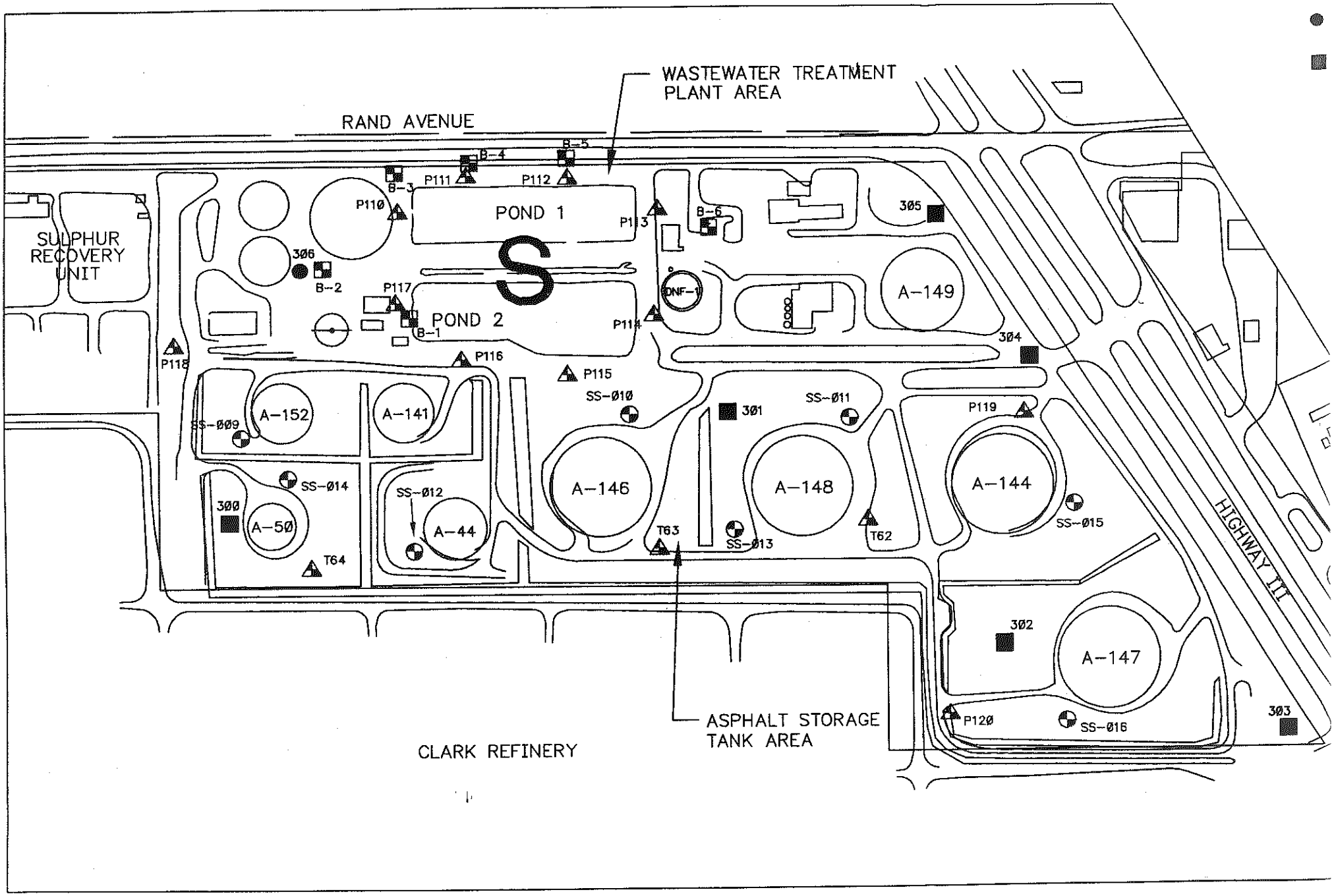
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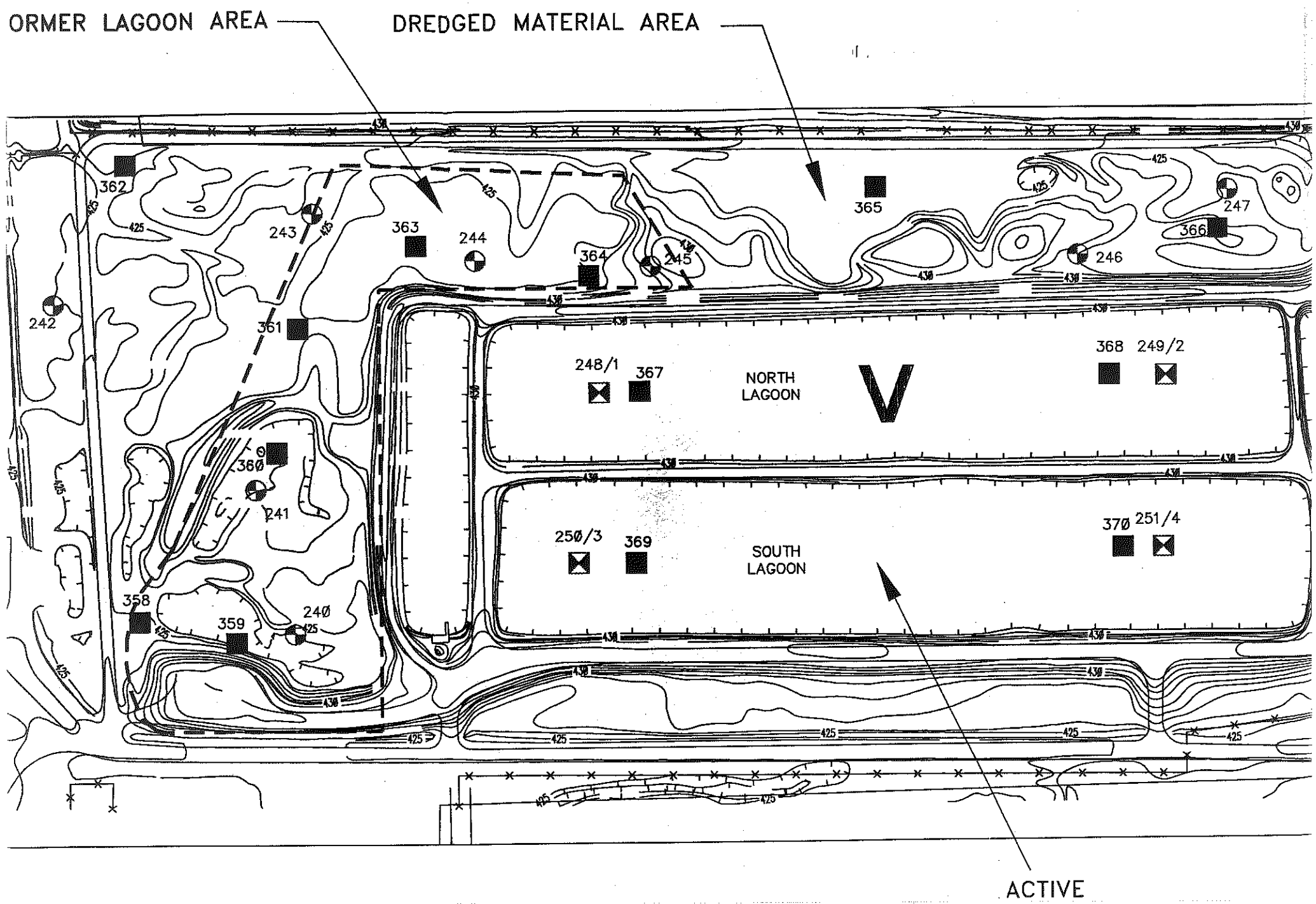
CLARK REFINERY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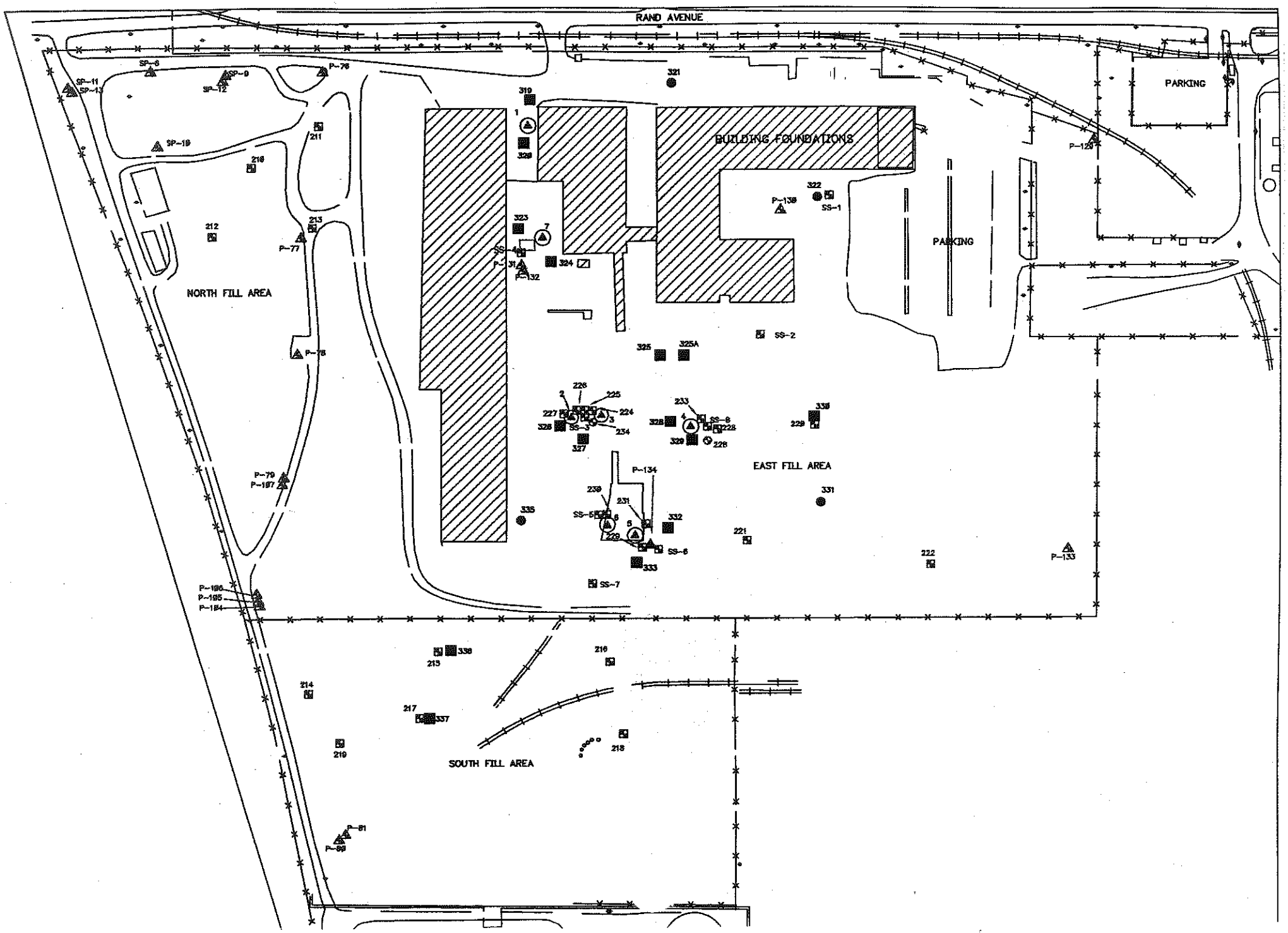
RAND AVENUE
PARKING
BUILDING FOUNDATIONS
PARKING
NORTH FILL AREA
EAST FILL AREA
SOUTH FILL AREA
SP-6
SP-9
SP-12
SP-11
SP-13
SP-10
P-76
P-77
P-78
P-79
P-107
P-106
P-105
P-104
P-81
P-80
P-120
P-130
P-131
P-132
P-134
P-133
SS-1
SS-2
SS-3
SS-4
SS-5
SS-6
SS-7
SS-8
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325A
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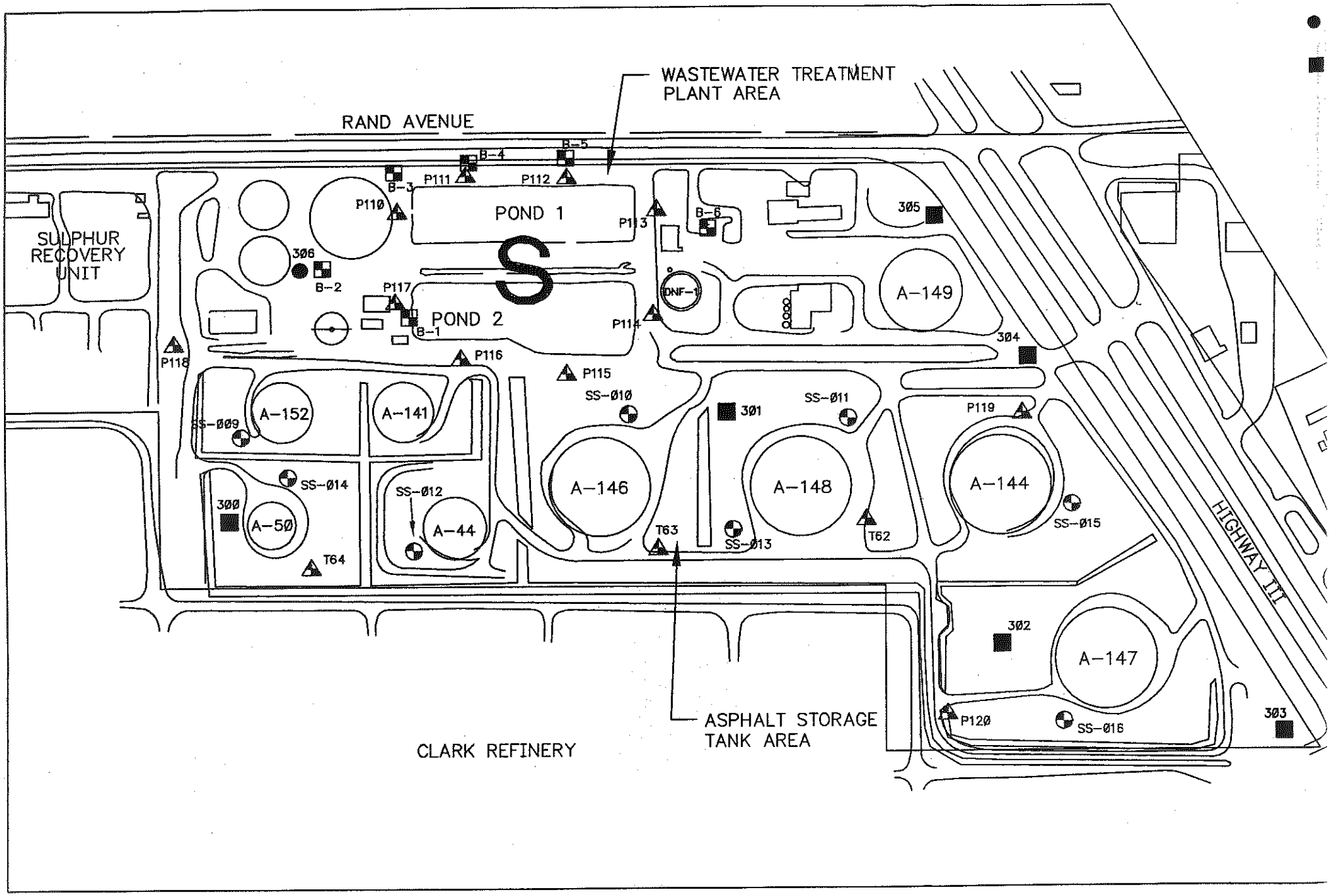
WASTEWATER TREATMENT PLANT AREA
RAND AVENUE
SULPHUR RECOVERY UNIT
POND 1
POND 2
S
B-1
B-2
B-3
B-4
B-5
B-6
P110
P111
P112
P113
P114
P115
P116
P117
P118
P119
P120
306
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302
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DNF-1
A-149
A-152
A-141
A-146
A-148
A-144
A-147
A-50
A-44
SS-009
SS-010
SS-011
SS-012
SS-013
SS-014
SS-015
SS-016
T62
T63
T64
HIGHWAY III
ASPHALT STORAGE TANK AREA
CLARK REFINERY