FINAL

1999 NAPL FIELD INVESTIGATION REPORT

McCormick and Baxter Superfund Site
Stockton, California

Volume 1 of 2

June 2, 2000

Prepared for

EPA
REGION 9

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EXECUTIVE SUMMARY

Soil, groundwater, and nonaqueous-phase liquid (NAPL) samples were collected and analyzed during a 4-month field investigation conducted in 1999 at the McCormick and Baxter Superfund site, located in Stockton, California. The purpose of this investigation was to support selection of a final groundwater remedy, including an evaluation of in situ thermal remediation technologies. The 1999 NAPL field investigation was conducted by the U.S. Army Corps of Engineers (USACE) for the U.S. Environmental Protection Agency (EPA) Region 9. The investigation activities, as well as the findings and recommendations based on the data interpretation, are presented below.

1999 NAPL Investigation Activities

Specific tasks conducted during the 1999 field investigation included the following activities:

- Site survey
- Surface geophysical survey
- Soil sample collection and subsurface characterization using the site characterization and analysis penetrometer system (SCAPS), cone penetrometer (CPT), and laser-induced fluorescence (LIF) sensor
- Rotosonic soil borings and soil sample collection and analysis
- Groundwater monitoring well installation
- Groundwater and NAPL sample collection and analysis
- Laboratory treatability study soil sample collection and analysis

1999 NAPL Investigation Findings

Based on the data collected, the primary findings of the 1999 NAPL investigation are listed below.

- NAPL occurs in the A-zone through the D-zone and is strongly suspected to have contaminated the E-zone, based on data collected from two wells southeast of the property boundary. NAPL has migrated laterally and downward from the Main Processing Area towards the south and southeast as far as the Union Pacific Rail

Road (UPRR) property and the southern McCormick and Baxter property boundary near the stormwater retention ponds and the main gate. NAPL is present at shallow depths along Old Mormon Slough and as deep as 160 feet below ground surface (bgs) near the Main Processing Area.

- The volume of NAPL in the subsurface is estimated at between 160,000 and 1,600,000 gallons.

- The volume of NAPL-contaminated soil is estimated at 220,000 cubic yards.

- Naphthalene was detected in the A- through E-zone groundwater, and generally not detected or detected at low concentrations outside the main NAPL plume. PCP and dioxin are dissolved in high concentrations in the A-zone groundwater outside, and downgradient of, the boundaries estimated for the main creosote NAPL plume. Crystalline PCP was observed on the ground surface near soil sample SE-08. Di-isopropyl ether was detected in the surface soil collected at EP-01 in the Cellon Process Area.

- An unknown subsurface obstruction was encountered at approximately 16 feet below ground surface (bgs), which prevented SCAPS sample collection in the area near SE-03, SE-52, and SE-95.

1999 NAPL Investigation Recommendations

Based on the findings presented above and the postinvestigation data gaps and uncertainties discussed in Section 6.0, the recommendations for additional data collection are presented below.

- Conduct subsurface investigation north of (i.e., on the Dutra and Stockton Cold Storage properties) and/or beneath Old Mormon Slough

- Conduct subsurface investigation on the Union Pacific Railroad property

- Conduct further subsurface investigation south of the stormwater retention ponds and the main gate area

- Investigate the PCP source area

- Develop a groundwater strategy and implement a groundwater monitoring program
- Investigate the subsurface obstruction at SE-03, SE-52, and SE-95.

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ABBREVIATIONS AND ACRONYMS

API	American Petroleum Institute
ASTM	American Society for Testing and Materials
bgs	below ground surface
CADD	computer-aided drafting and design
CEC	cation exchange capacity
CLP	Contract Laboratory Program
COC	chain of custody
cPAH	carcinogenic polycyclic aromatic hydrocarbon
CPT	cone penetrometry
CSM	conceptual site model
DCQAR	Daily Chemical Quality Control Report
DNAPL	dense nonaqueous-phase liquid
DO	dissolved oxygen
DQO	data quality objective
DWR	State of California Department of Water Resources
Eh	oxidation reduction potential
EM	electromagnetic
EMLL	electromagnetic line locating
EPA	U.S. Environmental Protection Agency
FASP	Field Analytical Support Program
FID	flame ionization detector
FSP	field sampling plan
GC	gas chromatograph
GMS	Groundwater Monitoring System
HCl	hydrochloric acid
IDW	investigation-derived waste
IPC	in-phase component
IS	internal standard
LCS	laboratory control samples
LIF	laser-induced fluorescence
LNAPL	light nonaqueous-phase liquid
LOD	level of detection
MCL	maximum contaminant level
MS	mass spectrometry
MS/MSD	matrix spike/matrix spike duplicates
msl	mean sea level
NAD83	horizontal measurement referent, California State Coordinate System Zone 3

ABBREVIATIONS AND ACRONYMS (Continued)

NAPL	nonaqueous-phase liquid
NSPC	Newark-Sierra Paper Company
NVD88	vertical measurement referent, California State Coordinate System Zone 3
PAH	polycyclic aromatic hydrocarbon
PARCC	precision, accuracy, representativeness, comparability, and completeness
PCB	polychlorinated biphenyl
PCP	pentachlorophenol
PDS	postdigestion spike
PE	performance evaluation
PID	photoionization detector
POL	petroleum, oil, and lubricants
PPE	personal protective equipment
QAPP	Quality Assurance Project Plan
QC	quality control
redox	oxidation reduction
RI	Remedial Investigation
ROD	Record of Decision
RPD	relative percent difference
rpm	revolutions per minute
SAP	sampling and analysis plan
SCAPS	site characterization and penetrometer system
SDG	sample delivery group
SOP	standard operating procedure
SVOC	semivolatile organic compound
TAL	target analyte list
TC	terrain conductivity
TCDD	tetrachlorodibenzo-p-dioxin
TCDF	tetrachlorinated dibenzofuran
TEC	toxicity equivalent concentration
TFM	total field magnetrometry
TIC	tentatively identified compound
TOC	total organic carbon
TPAH	total polycyclic aromatic hydrocarbons
TPH	total petroleum hydrocarbon
TPH-Dx	total petroleum hydrocarbons–diesel range (extended)
TRPH	total recoverable petroleum hydrocarbons
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers

UNITS OF MEASURE

°C	degrees Celsius
°F	degrees Fahrenheit
cm	centimeter
cm/s	centimeters per second
cP	centipoise
cst	centistoke
ft/day	feet per day
ft/ft	feet per foot
ft^3	cubic foot
g	gram
g/mL	grams per milliliter
g/cc	grams per cubic centimeter
gpm	gallons per minute
L	liter
µg/L	micrograms per liter
meq/g	milliequivalents per gram
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mL	milliliter
mm	millimeters
m/min	meters per minute
mS/cm	milliSiemens per centimeter
mV	millivolt
ng/kg	nanograms per kilogram
pg/L	picograms per liter
ppm	part per million
rpm	revolutions per minute
yd^3	cubic yard

1.0 INTRODUCTION

This report presents the results of the soil and groundwater investigation that was conducted by the U.S. Army Corps of Engineers (USACE) Seattle District for the U.S. Environmental Protection Agency (EPA) at the McCormick and Baxter Superfund Site in Stockton, California, from July to September 1999. This investigation report primarily addresses the nature and extent of the subsurface nonaqueous-phase liquid (NAPL) contamination at the site and presents technical conclusions and recommendations based on those results.

Specific tasks conducted during the 1999 field investigation included the following activities:

- Site survey
- Surface geophysical survey
- Soil sample collection and subsurface characterization using the site characterization and analysis penetrometer system (SCAPS) cone penetrometer (CPT) and laser-induced fluorescence (LIF) sensor
- Rotosonic soil borings and soil sample collection and analysis
- Groundwater monitoring well installation
- Groundwater and nonaqueous-phase liquid (NAPL) sample collection and analysis
- Treatability study soil sample collection and analysis

1.1 SITE DESCRIPTION AND HISTORY

The McCormick and Baxter Superfund site occupies approximately 32 acres in a predominantly industrial area near the Port of Stockton and the junction of Interstate 5 and State Highway 4 (Figure 1-1). Old Mormon Slough forms the boundary to the north and connects to the Stockton Deepwater Channel on the San Joaquin River. Site boundaries include Washington Street to the south, the Interstate 5 freeway to the east, and an industrial facility, which is located at the Port of Stockton Turning Basin, to the west. An 8-acre parcel in the southeastern portion of the site is owned by the Union Pacific Railroad (UPRR). The UPRR property boundaries shown in Figure 1-1 have been approximated from parcel maps.

The former processing areas and tank farm at the site are paved. The rest of the site surface is unpaved, with limited vegetative cover. A layer of gravel between 1 and 3 feet thick is found across most of the site. Railroad tracks are located on many areas of the site. Most of the former structures have been removed. The office building, two storage sheds, a stormwater collection system lift station, remnants of an old gas station, wooden tower, building near the tower, and an asphalt pad are the only remaining aboveground structures. Underground sump-like basement foundations and associated piping for the former pressure treatment units remain in the central portion of the site. Entry to the site is controlled by a perimeter fence and 24-hour security service.

The site is located on the margin of the Sacramento River–San Joaquin River Delta in the Great Valley geomorphic province of California. The site terrain is relatively flat and near sea level, ranging from 8 to 15 feet above mean sea level (msl). Surface water bodies in the vicinity of the site include Old Mormon Slough, New Mormon Slough, the Stockton Deepwater Channel, and the San Joaquin River. Old Mormon Slough is approximately 2,500 feet long and 180 feet wide. Most of the slough is approximately 10 feet deep, although the western portion near its mouth has historically been dredged for barge access. Old and New Mormon Sloughs are tidally influenced, with a maximum tidal range of approximately 3 feet. Stockton Channel, the Port of Stockton Turning Basin, and Old Mormon Slough are areas of net sediment deposition, and all but the inner portion of Old Mormon Slough are periodically dredged to maintain depths appropriate for ship traffic.

The McCormick and Baxter Creosoting Company operated at 1214 West Washington Street in Stockton, California, from 1942 until 1991. Various wood preservation processes were used at the site during its operational history. The treated wood products were used primarily by power utilities, railroads, and in construction. The preservatives included creosote, pentachlorophenol (PCP), arsenic, copper, chromium, and zinc. Solvents or carriers for these preservatives included petroleum-based fuels, such as kerosene and diesel, butane, and ether. A list of wood-preserving chemicals used at the site is shown in Table 1-1.

Most treatment processes consisted of pressure impregnation of the preservative solutions in retorts. Pressure-treated wood was removed from the retorts and allowed to dry in various wood storage areas throughout the site. The primary facility areas identified as the probable sources of contamination at the site include the Main Processing Area, Oily Waste Ponds Area, Cellon Process Area, and Treated Wood Storage Area. Figure 1-2 presents the potential source areas defined at the site.

1.2 PURPOSE OF FIELD INVESTIGATION

Soil and groundwater at the McCormick and Baxter Superfund Site are contaminated primarily with creosote, dioxins, PCP, and metals that were used as wood preservatives. Free-phase product is known to exist in the subsurface, as are dissolved contaminants in groundwater and adsorbed contaminants on the solid phase. The primary objective of the field investigation was to collect the data required to better define the type and extent of NAPL contamination and refine the conceptual site model (CSM). These data were collected to support selection of a final groundwater remedy, including an evaluation of in situ thermal treatment technologies that potentially could enhance the removal of contaminants from the subsurface. Site-specific factors that may impact the effectiveness/deployment of in situ thermal technologies include vertical and horizontal distribution of NAPL of varying compositions; physical and chemical characteristics of the NAPL; depth of NAPL penetration; type, thickness, and heterogeneity of subsurface geologic material; and the presence of manmade subsurface structures or materials. Thermal treatment methods under consideration include steam injection/stripping and electrical heating.

Secondary objectives of this project were to document the extent of groundwater contamination, investigate the possibility of polychlorinated biphenyl (PCB) contamination in the Cellon Process Area, and evaluate the potential for sidewall soils along the slough to contaminate the proposed sediment cap. Results of the slough sidewall sample collection effort are presented in a separate technical memorandum and will not be discussed further in this report.

1.3 FIELD INVESTIGATION REPORT CONTENTS AND ORGANIZATION

The purpose of this report is to present the 1999 groundwater and subsurface soil investigation results and the technical recommendations based on those results. To support the report objectives, this field investigation report contains:

- A detailed description of the subsurface soil and groundwater investigation
- Presentation and interpretation of analytical results
- Analysis of contamination source areas
- Estimates of the extent of lateral and vertical contamination
- Calculations of NAPL volume
- Calculations of contaminant plume migration
- Data gap identification
- Conclusions and recommendations

Tables and figures are presented at the end of the section in which they are first cited. Oversized plates are inserted in plastic sleeves at the end of the document.

Table 1-1
Wood-Preserving Chemicals Used at McCormick and Baxter

Common Name	Chemical Components	Period of Use
Creosote	Creosote and fuel oil	1942 to 1990
Pentachlorophenol	Pentachlorophenol and oil	1946 to 1990
Bouliden salts	Chromium, copper, and arsenic	1949 to 1952
CCA	Chromated copper and arsenic	1952 to 1970
Cellon	Pentachlorophenol, butane, and ether	1965 to 1988
ACA	Ammoniacal copper arsenate	1970 to 1986
Flamescape	Diammonium phosphate, ammonium sulfate, and boric acid	1976 to 1988
ACZA	Ammoniacal copper-zinc aresenate	1986 to 1990

REVISIONS				
SYMBOL	ZONE	DESCRIPTION	DATE	BY

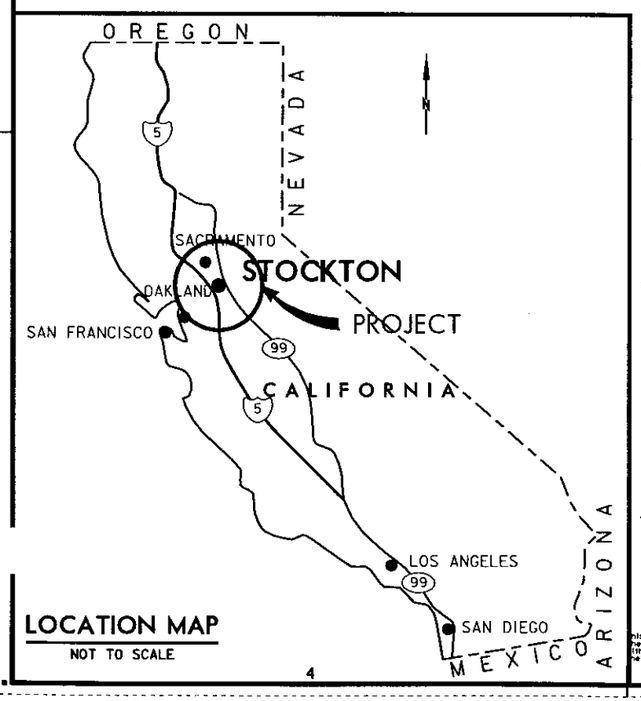
LEGEND

WATER FEATURE

BOUNDARIES

OS-3E SOIL BORING LOCATION

1" = 400' 0 400'



LOCATION MAP
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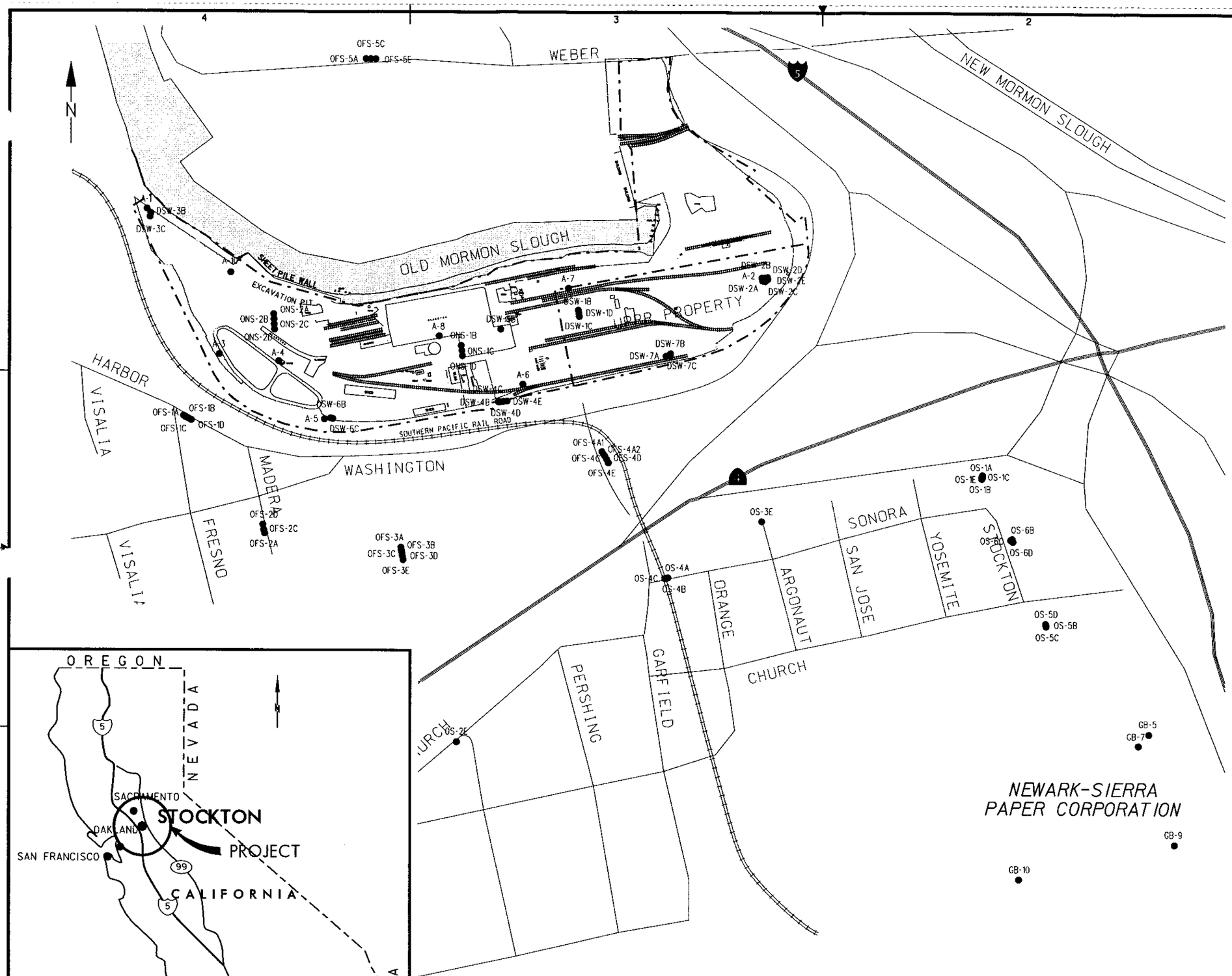

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U.S. ARMY ENGINEER DISTRICT, SEATTLE
CORPS OF ENGINEERS
SEATTLE, WASHINGTON

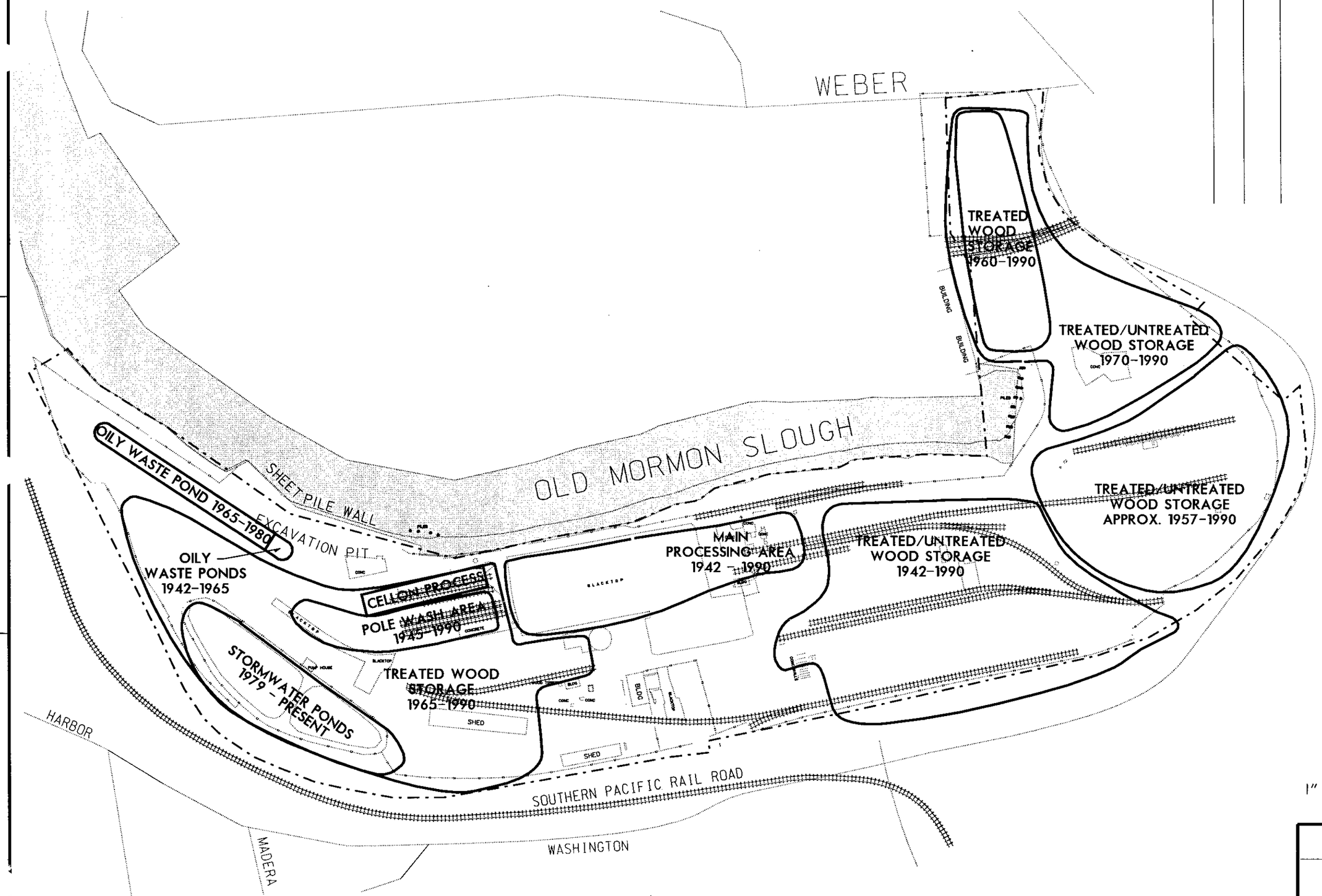
MC CORMICK & BAXTER SUPERFUND SITE
SITE INVESTIGATION

SITE LOCATION

STOCKTON CALIFORNIA

SIZE	INVITATION NO.	FILE NO.	DATE:	FIGURE
D				1-1
DSGN. SMITH		CHK. LYNCH	SHEET	

REVISIONS				
SYMBOL	ZONE	DESCRIPTION	DATE	BY



U.S. ARMY ENGINEER DISTRICT, SEATTLE
CORPS OF ENGINEERS
SEATTLE, WASHINGTON

MC CORMICK & BAXTER SUPERFUND SITE
SITE INVESTIGATION

PROCESS/SOURCE AREAS
IDENTIFIED IN THE RI

STOCKTON CALIFORNIA

SIZE	INVITATION NO.	FILE NO.	DATE:	PLATE
D				1-2
DSGN. SMITH		CHK. LYNCH	SHEET	

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Computer Aided Design & Drafting

2.0 INVESTIGATION ACTIVITIES SUMMARY

2.1 OVERVIEW OF INVESTIGATION OBJECTIVES

Soil and groundwater at the McCormick and Baxter Superfund Site are contaminated primarily with creosote, PCP, dioxin/furans, and metals that were used as wood preservatives. Free-phase product is known to exist in the subsurface. Dissolved contaminants are in groundwater and adsorbed contaminants are on the solid phase. The primary objectives of this field exploration were to:

- Collect data to better define the type and extent of NAPL contamination
- Evaluate the geologic conditions to support selection of a final groundwater remedy, including an evaluation of in situ thermal remediation technologies

These objectives are detailed in the field investigation's data quality objectives (DQO) process, summarized in Table 2-1. The activities associated with this investigation are detailed in the management plan (USACE 1999a).

2.2 SUMMARY OF FIELD AND LABORATORY ACTIVITIES

2.2.1 Site Survey

The survey crew surveyed the site in May 1999 and a topographic map was produced using Intergraph Microstation v.5. The components of the general survey included the following:

- Horizontal and vertical controls were established for the survey. The horizontal controls were in NAD83 and NVD88 state plane coordinates.
- Ten monuments were placed and surveyed on site.
- The survey was performed on a scale of 1 inch = 20 feet. Readings were taken on a 50-foot grid.
- The survey crew surveyed all pertinent site features, including all existing aboveground structures, the lined repository pit, the sheetpile wall along the slough, the perimeter security fence, the two stormwater holding ponds, the corners of the asphalt cap, buildings, paved areas, and the well pumphouse.

- Existing wells, new wells, and rotosonic boring locations were surveyed, with wells surveyed to a vertical control of 0.01 foot.

In addition, the banks along Old Mormon Slough were surveyed.

The topographic map that was generated from this survey included contours to an accuracy of 0.5 foot. These maps were used as the basis for documenting field activities.

2.2.2 Geophysical Investigation

A geophysical survey was performed to delineate the location and shape of subsurface features and metal debris. The project team used the data obtained by the geophysical survey when they selected sampling locations for the SCAPS investigation. The survey covered approximately 16 acres in the western portion of the site, where the presence of subsurface features and metal debris may affect the selection and design of the final groundwater remedy. Geophysical equipment was used to detect both ferrous and nonferrous material to a depth of 15 feet, the depth at which subsurface structures and metal debris were expected. Equipment used included the following:

- Electromagnetic line locating (EMLL) to determine the location of near-surface metal objects like utilities, railroad spurs, and near-surface buried metallic debris during the reconnaissance survey

- Electromagnetic (EM) with terrain conductivity (TC) and in-phase component (IPC) to determine shallow (10 to 15 feet below ground surface [bgs] maximum depth) conductivity variations possibly due to buried foreign objects or changes in subsurface materials

- Total field magnetrometry (TFM) to determine the presence of buried ferrous objects

A geophysical investigation report (Norcal 1999), including maps showing subsurface anomalies and interpretations of what those anomalies might be, was prepared and is available as a stand-alone report.

2.2.3 Groundwater Sampling

Groundwater samples were collected from 15 of the existing monitoring wells. The objectives of the groundwater sampling were threefold:

- To monitor the boundary of the naphthalene plume

- To collect data to aid with future evaluation of the natural attenuation potential and capacity of the system

- To evaluate the groundwater quality in six monitoring wells that have shown historical upward trends in PCP and/or tetrachlorodibenzo-p-dioxin (TCDD) toxicity equivalent concentration (TEC)

This was a limited groundwater sampling event to collect data specific to the NAPL field investigation. A summary of the rationale for why each well was sampled can be found in Table 2-2.

All but one of the 15 groundwater samples were collected using a low-flow purging technique. The one exception (from well DSW-4B) was collected using a higher-flow sampling technique, which involves purging three well volumes of water. This higher-flow sampling technique was used during previous groundwater monitoring events. A low-flow sampling technique was used for this sampling event because it provides data that is more reproducible and more representative than a higher-flow method and also generates less investigation-derived waste (IDW) than the higher-flow method. All existing pumps in these wells were removed, wrapped in plastic, and put into storage. Nondedicated Grundfos Rediflo 2 pumps were used for the low-flow sampling, and the Grundfos pump that used to be in well A-5 was used for the sampling of well DSW-4B to avoid contaminating a rented Rediflo 2 pump with NAPL. Purge water generated during groundwater sampling was contained in 55-gallon drums approved by the U.S. Department of Transportation or was allowed to evaporate on site. Groundwater sampling procedures are described in detail in the Field Sampling Plan (FSP), which is included in the Management Plan (USACE 1999a).

Samples were also collected from all 15 wells for groundwater density analyses at the EPA Kerr Research Laboratory in Ada, Oklahoma.

Additional details from the groundwater sampling event can be found in Appendix B.

2.2.4 NAPL Sampling

The previous data on NAPL composition from recovered product were not sufficient for groundwater remedy design purposes. Additional information was needed to determine whether NAPL composition and NAPL phase (dense NAPL [DNAPL] or light NAPL [LNAPL]) varied across the site. NAPL sampling was attempted at 18 existing monitoring wells, which included all wells with a previous record of LNAPL or DNAPL or wells where concentrations of dissolved phase contaminants were near their respective solubility limits. NAPL sampling was attempted at representative locations across the site (e.g., wells where NAPL was observed in the

past, locations that may have NAPL that represents different sources and contaminant characteristics).

Following the removal of dedicated pumps, wells were checked for the presence of NAPL using an interface probe and other techniques to determine whether there was sufficient NAPL within the wells for sampling. Bailers were used to collect NAPL from the wells. Analyses, with the exception of boiling point distribution, were conducted by the EPA Kerr Laboratory. In addition, semivolatile organic compound (SVOC) and hydrocarbon analyses were conducted by Columbia Analytical Services and the EPA Kerr Laboratory.

A summary of the wells sampled and the analyses performed on those samples is shown in Table 2-3. Additional details from the NAPL sampling event can be found in the Daily Chemical Quality Assurance Reports for July 26, 27, and 28 in Appendix B.

2.2.5 SCAPS LIF and CPT

The SCAPS fluorescence intensity is generally proportional to in situ concentration of contaminants. The proportional feature of the SCAPS LIF can be used to pinpoint the zones of highest contaminant concentration and screen the variation in concentration across the site. The vertical and horizontal extent of the petroleum hydrocarbon plume was characterized using the SCAPS, equipped with an LIF sensor. Continuous fluorescence measurements and cone penetrometry (CPT) measurements were collected for the entire length of each of the SCAPS borings to provide an indication of relative concentrations of suspected contaminants. SCAPS LIF and cone penetrometry measurements started on July 12, 1999, and ended on September 5, 1999.

A total of 106 SCAPS pushes were placed at the site. SCAPS LIF and CPT locations were denoted with “SE” and a number (e.g., SE-01). The maximum depth of each push varied from 11.5 to 155.8 feet bgs, with an average push depth of 92.2 feet bgs. SCAPS penetrations were limited to on-site locations, except for two (SE-82 and SE-83) that were located on the California Cedar Products property south of the site. A summary of the SCAPS LIF and CPT activities is presented below. Further details can be found in the SCAPS field investigation report (USACE 1999b).

Details regarding the SCAPS LIF/CPT push locations can be found in Plate 1, as well as in Appendix B. The SCAPS penetration locations were measured daily with a cloth tape to the nearest 1 foot from a minimum of two directional orientations from already-surveyed site features. Salient information regarding the SCAPS penetrations, including location, dates, wavelength signature depth, and comments, was recorded on a push-probe penetration log form.

The initial 10 penetration locations were preselected based on known or suspected high levels of contamination or known data gaps. The remaining locations for SCAPS borings were selected in the field and were based on the following:

- SCAPS LIF borings were spaced to provide area-wide information on NAPL occurrence and stratigraphy. Data on extent of NAPL contamination were used to identify the area of interest for potential thermal treatment.

- Areas of highest contamination and different petroleum, oil, and lubricant (POL) contaminant types were further defined to evaluate whether more than one contaminant type might require treatment.

- The depth of POL contamination above the LIF threshold concentration was defined.

- The volume and location of free-phase product were evaluated. In addition, an evaluation of the vertical and horizontal extent of dissolved and free-phase contamination was conducted.

- Data were collected to fill in gaps for the conceptual site model.

During installation of the SCAPS probes, continuous geotechnical and stratigraphic data were collected to help interpret contaminant distribution and to delineate the continuity of subsurface materials that may influence contaminant movement, such as clay, silt, and cobble zones. The SCAPS data were also used to optimize the placement of rotosonic soil borings and monitoring wells. All SCAPS penetrations were grouted to ground surface with a silica flour and cement mixture.

2.2.6 SCAPS Soil Sampling

SCAPS soil sampling was conducted in three events: July 15, August 8 to 10, and September 6 to 10, 1999. The SCAPS LIF data were used to determine the SCAPS soil sampling locations for the field investigation. Soil samples were collected from the SCAPS push locations indicated in Table 2-4.

The primary objectives of the SCAPS soil sampling event were as follows:

- Obtain SCAPS LIF calibration and verification samples representative of different soil types, different emission spectra, and different emission intensities throughout the site within SCAPS depth limitations.

- Obtain soil samples to verify anomalous LIF sensor responses.
- Confirm the true bottom of POL, polycyclic aromatic hydrocarbon (PAH), and PCP contamination.
- Collect samples for physical analyses (i.e., permeability, density, porosity, grain size, cation exchange capacity [CEC], and total organic carbon [TOC]).

SCAPS soil sampling locations were selected in the field using the process described below.

1. Selected intervals to confirm threshold limit of SCAPS LIF. Push location intervals where contamination was suspected but not found were targeted to confirm low LIF response (i.e., 50- to 60-foot-thick sand zone).
2. Selected soil samples to evaluate intervals with different wavelength signatures.
3. Collected soil samples to determine the LIF response threshold above which NAPL may be present.
4. Collected samples in locations where nontarget fluorescence is suspected.

Details regarding how each sampling location was selected can be found in Appendix B. SCAPS soil sampling locations were denoted with “SS” and a number (e.g., SS-01).

One SCAPS penetration was placed in the Cellon Process Area (SS-08) to collect soil samples for PCB analysis. In addition, several penetrations were located in areas determined to be free of contamination to collect samples for TOC and permeability analyses. Details regarding the sample collection locations and what the samples were analyzed for can be found in Appendixes A and B.

SCAPS soil sampling locations were generally offset 1 to 2 feet from the initial LIF/CPT push location. The SCAPS truck pushed a hollow core to the desired sample collection depths and pulled out an approximately 2-foot-long by 1.5-inch-diameter soil sample. The soil core was then placed on a table in the field, where the sampling crew examined the core, performed a visual soil classification, and collected the subsequent soil samples in sample jars with Teflon-coated lids (samples for chemical and TOC analyses) or in plastic sleeves (samples for permeability and other physical properties) with caps over the ends of the sleeves.

Occasionally a 2-foot soil sample interval was split into more than one sample if there were two unique geologic zones or if NAPL contamination appeared to be isolated to a particular area of

the 2-foot interval. Soil sample depths are included in the soil sample identification number for easy tracking (e.g., SS008-10-12 was collected from 10 to 12 feet bgs at SE-008).

After sampling was complete, the SCAPS borings were grouted to the ground surface with a silica flour and cement mixture.

2.2.7 Rotosonic Drilling, Soil Sampling, and Monitoring Well Installation

The rotosonic drilling commenced on August 3, 1999, and continued until November 9, 1999. During the field season, 18 borings were logged, as well as sampled and analyzed for total recoverable petroleum hydrocabons (TRPH), TPH-Dx, PCP, PAHs, heavy metals, and physical properties. Soil samples were also collected for use in treatability testing at the EPA Kerr Laboratory. Two monitoring wells were also installed. A total of 4,030 feet were drilled, with 3,045 feet logged and sampled.

The objectives of the contingency borings were twofold:

1. Determine the extent and composition of contamination and evaluate geology at depths where SCAPS penetrations are not possible

2. Determine downward migration potential for groundwater and NAPL

Contingency rotosonic boring locations were selected in the field using the process described below. Details regarding how each contingency boring location was selected can be found in Appendix B. Summary boring logs and well construction details can be found in Appendix D. Rotosonic boring locations were denoted with “SB” and a number (e.g., SB-01).

Most of the drilling locations were placed near SCAPS boreholes. The rotosonic explorations were used to confirm SCAPS LIF data as well as to collect soil samples and provide stratigraphic data at intervals deeper than SCAPS was able to penetrate. Of the 18 borings completed, 16 were collocated with SCAPS borings. Boring SB-99 was not collocated. It was placed to determine the extent of contamination originally found at depth at SB-06. This boring was completed as a continuous boring beginning at the ground surface. Two monitoring wells were installed on site (MW2E, a deep well located near SE-04, and MW1A, a shallow well located near SE-57). Rotosonic boring locations are shown in Plate 1.

The shallow well (MW1A) was placed in an area of known NAPL contamination (near the southern extent of the Cellon Process Area near SE-57) and was screened from 39.8 to 49.8 feet bgs. While drilling the boring for this well, it was noted that product seeped out of the ground in several places approximately 20 feet from the well. The deep E-zone well (MW2E) was placed in the E-zone gravel unit near the southern boundary of the site (SE-04) and screened from 245.5

to 255.5 feet bgs. The purpose of this well is to allow for sampling the E-zone near the southern boundary of the site to help determine whether contaminants are migrating from the site. Wells were completed using stainless steel prepacked well screens and were installed using a dielectric couple between the stainless steel and the mild steel casing.

Samples were collected from all borings and were analyzed for TPH-Dx, PCP, and PAHs. Samples were collected from a select set of borings and were analyzed for TRPH and using the bench (ex situ) LIF. Samples were also collected from another set of borings and used by the EPA Kerr Laboratory during treatability testing. In addition, other samples were collected and analyzed for heavy metals and physical properties. Details regarding the sample depth intervals and which analyses were performed for each sample can be found in Appendix D. Chemical analyses performed on each sample can be found in Appendix A.

2.3 DEVIATIONS FROM THE MANAGEMENT PLAN

It is common for field conditions to cause investigators to make changes from their plans to ensure that they can meet their investigation objectives. A number of changes from the management plan were made by investigation personnel. These changes are summarized below.

- Survey. No changes were made.
- Geophysical. No changes were made.
- Groundwater Sampling. Wells A-5, DSW-4B, DSW-4C, DSW-4D, DSW-6B, and DSW-6C were also analyzed for SVOCs using EPA Method 8270C. The groundwater sampling summary table in the management plan indicated that samples from these wells would not be analyzed for SVOCs. Three purge volumes were used during the sampling of well DSW-4B. The Management Plan called for low-flow sampling for all wells. However, the LNAPL present in DSW-4B did not allow for proper purging with the low-flow equipment. The Grundfos pump from well A-5 was used for sampling DSW-4B. In all other wells, nondedicated low-flow Grundfos Rediflo 2 pumps were used instead of the dedicated bladder pump system specified in the management plan. Microwells were not installed since the locations determined to be the most desirable for microwell placement were outside the property line and the Corps could not secure access agreements. Alkalinity was not measured during well sampling, although the Management Plan called for it, since it could be calculated using other measured parameters.
- NAPL Sampling. No changes were made.

- SCAPS LIF/CPT. Several different SCAPS probes and umbilical cords were used because of equipment failures and availability of a longer probe from the U.S. Navy. The SCAPS production rate was faster than projected, so 104 locations were investigated compared with the 40 estimated in the management plan. The maximum depth pushed using SCAPS was 155.8 feet bgs, although the objective was to push to 200 feet bgs if possible. The actual maximum depth was not longer than 155.8 feet bgs due to several factors (e.g., length of the SCAPS umbilical, encountering refusal, cone and sleeve CPT readings indicating possible probe breakage).

- SCAPS Soil. Permeability testing was performed by PTS Laboratories, Inc., not the EPA Kerr Laboratory. No microwells were installed. The physical testing methods cited in the Management Plan were clarified by PTS. The physical testing methods used were as follows:

  - American Society for Testing and Materials (ASTM) D2216 – Moisture Content

  - ASTM D2937 – Bulk Density

  - American Petroleum Institute (API) RP40 – Effective Porosity and NAPL Saturation

  - Walkley-Black – Total Organic Carbon

  - EPA 9081 – Cation Exchange Capacity

  - EPA 9100/ASTM 5084 – Permeability to Water

  - ASTM D4464 – Grain Size

  - ASTM D422 – Mechanical Sieve

  - ASTM 2887 – Boiling Point Distribution

- Rotosonic Drilling. Two additional borings were installed due to faster production rates than were estimated during project planning. Cores were collected continuously as needed. The Management Plan called for the two 250-foot continuous borings to be archived. Field personnel decided to archive individual samples from those borings instead of the entire borings. One shallow boring (SB-86) was drilled to collect treatability samples. The physical testing

methods cited in the Management Plan were clarified by the laboratory, PTS. The physical testing methods used were the same as those described above for the SCAPS soil sampling.

- Additional Sampling. Surface samples of what turned out to be PCP crystals were collected near SE-08 and analyzed for PAHs and dioxins/furans. Sampling of these crystals was not included in the Management Plan because the crystals were not discovered until the field investigation.

- Performance Evaluation (PE) Sampling. Several PE samples were submitted to the SCAPS laboratory, the EPA Region 9 laboratory, and the FASP laboratory for analysis of TRPH, PAHs, and TPH-Dx. Some samples were mislabeled, incorrectly identified as site samples. This discrepancy was discovered during the quality assurance assessment of the data, and the sample IDs were corrected. In addition, there was a labeling mistake made in the field on samples SS079-80-81 and SS079-62-64. The sample labeled SS079-80-81 was actually a PE sample, which should have been identified as SS979-62-64. The sample labeled SS079-62-64 was the investigative sample collected from 80 to 81 feet bgs, and should have been labeled SS079-80-81. These sample numbers have been corrected in the database. Sample IDs that were corrected are summarized in Table 2-5.

2.4 DISPOSITION OF INVESTIGATION-DERIVED WASTE

Waste generated during the field investigation was collected and disposed of consistent with applicable regulations. Approximately 77 55-gallon drums of waste were generated during the field investigation (60 drums of soil cuttings and excess samples, 4 drums of water, 12 drums of personal protective equipment [PPE] and solid waste, and 1 drum of waste oil). All drums were labeled in accordance with the procedures described in the Management Plan. A summary of the investigation-derived waste (IDW) generated (and its current disposition) for each field activity is presented below.

- Survey. No waste was generated.

- Geophysical Investigation. No waste was generated.

- Groundwater Sampling. All purge water was placed in 55-gallon drums. Water that was contaminated with NAPL was stored on site for future disposal. All other water was allowed to evaporate in the drums on site. PPE that came into physical contact with NAPL was packaged in 55-gallon drums and stored on site

for future disposal. All other PPE was packaged in plastic garbage bags and disposed of in the site's solid waste bin.

- NAPL Sampling. Spent plastic bailers and PPE that came into physical contact with NAPL were packaged in 55-gallon drums and stored on site for future disposal. All other PPE was packaged in plastic garbage bags and disposed of in the site's solid waste bin.

- EPA FASP Laboratory. Spent aqueous samples with hexane—about 0.5 liter (L)—were containerized in amber glass jars and given to USACE for disposal in the hazardous waste laboratory pack (55-gallon drum). Waste organic solvents (primarily hexane, about 1.2 L) were containerized in amber glass jars and given to USACE for disposal in the hazardous waste laboratory pack. An additional 6 L of aqueous waste was containerized in amber glass jars and given to USACE for on-site storage in the hazardous waste laboratory pack and was stored for future disposal. Solid laboratory waste (PPE, soil samples, and glassware) was containerized in a 55-gallon drum for disposal.

- SCAPS Laboratory. Water and acetone (contaminated rinse waste from the SCAPS laboratory) were collected in two 5-gallon buckets (approximately 8 gallons total). Freon waste (analytical calibration standards, extracted Freon from the SCAPS laboratory) was collected in three 4-liter glass bottles (approximately 10 L total) and was disposed of in a hazardous waste laboratory pack (55-gallon drum) stored for future disposal. Glassware (such as contaminated pipettes, soil jars, and vials from the SCAPS laboratory) was collected in plastic garbage bags. PPE (such as contaminated gloves, paper towels, and facial wipes from the SCAPS laboratory) was collected in one plastic garbage bag. These wastes were placed in the hazardous waste laboratory pack (55-gallon drum) and were stored for future disposal.

- SCAPS LIF/CPT and Soil Sampling. Soil cores that were not collected as samples were placed in 55-gallon drums and were stored on site for future disposal. One 55-gallon drum (approximately one-third full) contained hydraulic oil (i.e., less than 1 gallon of oil, plus soil) from an oil leak. Equipment decontamination rinsewater (water and laboratory-grade detergent) was collected in 55-gallon drums and was allowed to evaporate on site. PPE that came into physical contact with NAPL was packaged in 55-gallon drums and stored on site for future disposal. All other PPE was packaged in plastic garbage bags and disposed of in the site's solid waste bin.

- Rotosonic Drilling. Drill cuttings were collected in 55-gallon drums and were stored on site for future disposal. Soil cores that were not collected as samples were placed in 55-gallon drums and stored on site for future disposal. Equipment decontamination rinsewater (water and laboratory-grade detergent) was collected in 55-gallon drums and was allowed to evaporate on site. PPE that came into physical contact with NAPL was packaged in 55-gallon drums and stored on site for future disposal. All other PPE was packaged in plastic garbage bags and disposed of in the site's solid waste bin.

Table 2-1
McCormick and Baxter Data Quality Objectives Process

Problem Statement

Subsurface NAPL cannot be efficiently removed without thermally enhanced extraction methods. Sufficient data are not available to characterize contaminant extent and select a treatment technology.

Investigation Objectives	Data Requirements	Investigation Strategy	Field Decision Criteria/ Performance Specifications
SURFACE GEOPHYSICS			
Identify subsurface structures or debris present that might hinder exploratory work or impact the treatment system.	Delineate location and shape of subsurface structures and metal debris that will assist in: locating areas for SCAPS work; developing conceptual design for thermal treatment system	Perform over 16 acre area west of UPRR. Survey to depth of 15 feet on a series of profiles.	Detect ferrous and nonferrous material to a depth of 15 feet.
SCAPS CPT and LIF			
Determine where NAPL exists and the approximate extent (vertical and horizontal).	Horizontal and vertical extent of NAPL. Measure concentration of primarily 3 or more ring aromatic compounds (and some 2-ring compounds) using LIF.	LIF detection threshold: 100 to 500 mg/kg TPH. 40 LIF penetrations estimated; 10 preselected and 30 decided in field. Initial locations will be selected based on current hypothesis regarding NAPL locations. Spacing of penetrations will be determined in the field and will be evaluated against estimated 100-foot treatment unit size. Continuous readings to depth of 200 feet, if possible, final decisions regarding depth of penetration will be made in the field.	Threshold TPH value (reporting limit) determined in field. Approximately 100 to 500 mg/kg. Spatial resolution of 4 cm (0.13 foot) when driven at 1 m/min. LIF penetration locations will be determined on a daily basis by Kira Lynch (team leader/chemist), Richard Smith (hydrogeologist), Fred Hart (geologist), Randy Olsen (environmental engineer), and Steve Brewer (SCAPS team leader). SCAPS penetration locations will be selected to maximize understanding of the site conceptual site model and extent of NAPL contamination.
Identify if there are more than one unit (as defined by contaminant type) requiring treatment.	Spatial distribution of TPH contamination based on soil fluorescence emission spectra. These intervals will be targeted for collection of soil samples with SCAPS and analysis of soil samples for TPH, PAH, and PCP. Chemical data will assist with interpretation of LIF wavelength signature.	Non-target fluorescence will be evaluated by SCAPS soil sampling and analysis for TRPH. Soil samples TRPH and TPH-Dx results will be used in the field to verify apparent anomalous LIF sensor responses and assist with interpretation of wavelength signature.	Linear range of LIF is estimated to be 100 to 50,000 mg/kg for POL.
Determine how the hydrogeologic conceptual site model can be improved. Determine what natural subsurface features impact movement of NAPL.	Geotechnical and stratigraphic data from cone pressure and sleeve friction sensors. Aquitard topography and continuity.	Soil classification using SCAPS sensors according to ASTM Method D3441.	Soil classification compared to existing soil boring logs. Spatial resolution of 4 cm for soil classification at a rate of 1 m/min.

Table 2-1 (Continued)
McCormick and Baxter Data Quality Objectives Process

Investigation Objectives	Data Requirements	Investigation Strategy	Field Decision Criteria/ Performance Specifications
Determine where soil and groundwater samples will be collected.	Estimated contaminant concentrations in soil across site from LIF.	Select sampling locations where contamination is high and reflects a range of contaminant compositions as defined by wavelength signature.	Locations for SCAPS soil and groundwater samples will be determined in the field by Kira Lynch (team leader/chemist), Richard Smith (hydrogeologist), Fred Hart (geologist), Randy Olsen (environmental engineer), and Steve Brewer (SCAPS team leader). SCAPS soil and groundwater sample locations will be selected by evaluating existing data and SCAPS LIF data.
SCAPS SOIL and GROUNDWATER SAMPLING			
Determine accuracy of the SCAPS LIF data. Verify apparent anomalous LIF readings.	Collocated soil samples with SCAPS LIF penetrations.	Visual evaluation of soil cores for NAPL compared with LIF data. Collect soil samples at approximately 20 penetration locations for on-site analysis of TRPH by 418.1. Approximately 3 locations per penetration. Depths decided in field.	Sensitivity for TRPH must be at least as good as LIF threshold. LIF and confirmation TRPH should be in agreement on detect versus nondetect for 80% of the samples; false negative less than 5%.
Determine variability of contamination composition. Determine if contaminant extent can be better estimated. Confirm the bottom of POL, PAH, and PCP contamination. Develop the conceptual design of an in situ thermal treatment system.	Soil and groundwater data for TPH-Dx, PAH, and PCP. Compare soil chemical analysis with LIF results representative of different soil types, emission spectra and emission intensity. Chemical makeup, magnitude, and variability of contamination.	Soil samples analyzed by the following methods: SCAPS TRPH by 418.1, FASP TPH fingerprinting by GC/FID, limited SVOC TAL by GC/MS to be run by Region 9 Lab. Groundwater samples analyzed by the following methods: FASP TPH fingerprinting by GC/FID, limited SVOC TAL by GC/MS to be run by Region 9 Lab.	Sensitivity for TRPH, TPH, and SVOC analyses must be at least as good as LIF threshold. Sensitivity for SVOCs and TPH determined based on limitations of analytical instrumentation.
Determine how much NAPL is present. Evaluation of NAPL percent saturation is required to assist with evaluation of areas of mobile NAPL.	Percent saturation of NAPL contamination in soil.	Soil samples analyzed for TRPH. Data will be used to calculate percent saturation.	Sensitivity for TRPH analyses must be at least as good as LIF threshold.
Determine if PCB contamination of soil is encountered in Cellon Process area. This area of the site was targeted because evaluation of TPH GC chromatograms from soil samples previously collected indicate that hydraulic fluid was potentially used as the creosote carrier fluid in this process area.	Biased soil PCB data for locations in cellon process area.	Off-site analysis of soil samples for PCBs by EPA CLP SOW. Sample locations to be selected in the field to be representative of areas suspected to have the highest potential contamination. Samples will be collected from soil zones with higher relative clay content.	
Determine if the movement of dissolved organic contaminants is affected by adsorption onto naturally occurring organic matter.	Soil TOC concentrations in unimpacted areas and representative of soil conditions across the site.	9 to 12 soil samples analyzed for TOC using the Walkley-Black method. Samples will be selected to obtain TOC information representative of different aquifer and aquitard zones.	Detection limit of 1,000 mg C/kg to allow for K_d calculation.

Table 2-1 (Continued)
McCormick and Baxter Data Quality Objectives Process

Investigation Objectives	Data Requirements	Investigation Strategy	Field Decision Criteria/ Performance Specifications
Determine downward migration potential for groundwater and NAPL. Provide input for model.	Permeability (hydraulic conductivity) data on aquitard and aquifer materials. Need site-wide data to evaluate variability.	Collect soil samples from aquitard and aquifer materials for hydraulic conductivity measurements. Locations to be determined in the field.	Permeability measurements will be made on soil cores that may have to be repacked. The purpose of the permeability data is to estimate average permeability so this method should provide adequate permeability data quality.
Identify optimum locations for collecting continuous soil cores.	Soil contaminant concentrations.	Select boring locations in areas of highest contamination based on SCAPS results. In addition borings will be located in areas with different contaminant signatures if possible.	Selection of locations for continuous borings will be made in the field by Kira Lynch, Richard Smith, and Fred Hart. Decisions regarding well construction and design will be made in the field by Richard Smith and Fred Hart.
SCAPS MICROWELL INSTALLATION			
Determine the direction of groundwater flow across the site.	Water level data to establish flow conditions at corners of property.	Install two microwells at extreme NW and NE corners of project. Measure water levels to 0.01 feet.	Decisions regarding installation of microwells for water level measurements will be made in the field by Kira Lynch, Richard Smith, Fred Hart, and Randy Olsen.
Determine the extent and composition of NAPL.	Obtain NAPL samples from areas where no monitoring wells are located.	Install and sample up to ten microwells with hydrophobic screens. If NAPL samples are collected they will be analyzed as described for under NAPL samples.	Decisions regarding installation of microwells for NAPL sample collection will be made in the field by Kira Lynch, Richard Smith, Fred Hart, and Randy Olsen.
CONTINGENCY SOIL BORINGS			
Determine the extent/composition of contamination at depths where SCAPS penetrations are not possible.	Soil characterization where SCAPS met refusal before contamination was fully characterized.	Continuous sampling with a 10 ft core barrel with 5 ft split spoon to below SCAPS refusal to a depth of 200 to 250 feet at 15 locations. Selection of soil samples in field for analysis by: 1) SVOC limited TAL by GC/MS by Region 9 Lab. 2) TPH-Dx by GC/FID by FASP. All soil samples archived for additional chemical or physical testing.	Sensitivity for TRPH, TPH, and SVOC analyses must be at least as good as LIF threshold. Sensitivity for SVOCs and TPH based on limitations of analytical instrumentation.
Determine downward migration potential for groundwater and NAPL. Provide input for model.	Permeability (hydraulic conductivity) data on aquitard and aquifer materials. Need site-wide data to evaluate variability.	10 soil samples collected from locations selected in the field and analyzed for permeability by Kerr Lab. These samples will be collected if intervals of unique stratigraphy are encountered that were not sampled for permeability during SCAPS soil sampling.	Permeability measurements will be made on soil cores that may have to be repacked. The purpose of the permeability data is to estimate average permeability so this method should provide adequate permeability data quality.

Table 2-1 (Continued)
McCormick and Baxter Data Quality Objectives Process

Investigation Objectives	Data Requirements	Investigation Strategy	Field Decision Criteria/ Performance Specifications
SOIL BORINGS/MONITORING WELLS			
Determine how amenable the site and contamination are to treatment by thermal methods.	Soil samples collected for physical and chemical characterization of areas of heavy NAPL contamination and differing contaminant signatures.	2 soil borings to 250 feet bgs. Continuous soil cores will be obtained and archived. The cores will be visually evaluated to estimate NAPL saturation. Soil coring by split spoon or core barrel. Completed as monitoring wells. Soil samples for analysis collected from each of 5 aquifer zones and 5 aquitard zones (10 samples per boring for a total of 20 samples).	Samples will be selected from borings in the field. Selection criteria will be based on identifying unique geologic intervals and visible contamination.
	Chemical characteristics of NAPL contamination.	10 soil samples analyzed for dioxin/furans (1613B) and metals (arsenic, copper, chromium, and zinc by CLP RAS) at the Region 9 Lab.	Samples selected only from most contaminated areas of site to evaluate worst-case scenarios.
	Chemical characteristics of NAPL contamination.	20 soil samples for SVOCs full TAL with TICs (GC/MS) by Kerr Lab.	Sensitivity based on soil cleanup levels established in the site ROD (EPA Region 9, March 31, 1999). These samples will be split and also run by the FASP (TPH) and Region 9 (PAH and PCP, Modified 8270) labs to provide data for comparability analysis.
	Geochemistry comparison between zones to provide information to design extraction and treatment system.	20 soil samples for cation exchange capacity by PTS Laboratories.	Sensitivity based on limitations of analytical instrumentation. Samples selected from most sand-rich and clay-rich soils in clean zones.
	Physical characteristics of soil to determine downward migration potential for groundwater and NAPL. Provide input for model.	Soil classification during drilling. 20 soil samples analyzed for grain size (ASTM D422), density (ASTM D2937) and porosity (API RP40) by PTS Laboratories. 20 samples analyzed for permeability (Kerr Lab SOP) by Kerr Lab.	Soil classification compared to existing soil boring logs. Sensitivity based on limitations of analytical instrumentation. The purpose of the permeability data is to estimate average permeability so this method should provide adequate permeability data quality. Samples collected for physical testing will be from soil zones that appear to have relatively low levels of contamination, using visual inspection, and be representative of different stratigraphic horizons.
	Chemical and physical characteristics of NAPL contamination to provide information to design extraction and treatment system.	Up to 10 samples analyzed for oil and grease (9071A) by PTS Laboratories used with moisture content to calculate NAPL saturation.	Sensitivity based on limitations of analytical instrumentation. Samples selected from visibly contaminated zones.

Table 2-1 (Continued)
McCormick and Baxter Data Quality Objectives Process

Investigation Objectives	Data Requirements	Investigation Strategy	Field Decision Criteria/ Performance Specifications
Determine effect of heat on metals fate and transport.	Natural soil metals speciation data for comparison to treatability study results.	Up to 20 soil samples analyzed for metals speciation by Kerr Lab.	Sensitivity based on limitations of analytical instrumentation.
Determine the rate of creosote (PAH) recovery as a function of pore volumes of (condensed) steam injected, and determine the amount of residual creosote remaining after approximately eight pore volumes of steam have been injected. Determine effect of heat on metals fate and transport.	For feasibility and determination of design parameters of thermal treatment.	Up to 20 steam treatability tests, including steam column tests and leaching tests prior to and following steam treatment, by Kerr Lab. Study will focus on PAHs, but will include metals speciation information as well.	Focus on creosote and PAHs only. Samples for treatability testing will be selected in the field with input from Eva Davis. They will bracket the concentration range and be representative of varying contaminant signatures.
LNAPL and DNAPL TESTING			
Determine if NAPL composition varies across the site and if this will impact thermal treatment.	Chemical characteristics of NAPL across site and in different product phases to provide information for design of thermal treatment system.	10 to 20 NAPL samples will be collected from: 1) SCAPS penetrations, 2) existing monitoring wells, and/or 3) microwells. Chemical analysis for SVOCs (full TAL with TICs) and TPH-Dx (GC/FID) by Kerr Lab and Columbia.	Sensitivity based on limitations of analytical instrumentation. Samples will represent both DNAPL and LNAPL, and different contaminated areas.
Determine: 1) the tendency of NAPL to move downward when mobilized, 2) the ability of NAPL to flow to a recovery point, 3) the tendency of NAPL to dissolve in site groundwater, 4) if interfacial tension will effect the amount of residual creosote that will remain in soil, and 5) the potential for fractionation during thermal treatment.	Physical characteristics of NAPL to provide information for design of thermal treatment system.	Physical analyses performed by Kerr Lab for: 1) density from 10 to 90C each 10C, 2) viscosity from 10 to 90C each 10C, 3) solubility of NAPL in site groundwater at 10C and 90C, 4) oil-water interfacial tension from 10 to 90C each 10C using site groundwater, 5) wettability using a bottle test procedure, physical analyses by PTS Laboratories for: 6) boiling point distribution/distillation by ASTM D86.	Sensitivity based on limitations of analytical instrumentation. Density precision is approximately 0.001 gm/cm3.
MONITORING WELL GROUNDWATER SAMPLING AND ANALYSIS			
Determine dissolved naphthalene concentration and extent.	Measure PAHs and PCP in groundwater at perimeter well locations.	Collect samples from eight wells (A-8, DSW-7A, DSW-7B, DSW-7C, OS-3E, OS-4A, OS-4B, and OS-4C) and analyze for SVOCs full TAL with TICs by Region 9 Lab. Use low-flow sampling technique.	Sensitivity based on MCLs and PRG for naphthalene. Groundwater cleanup numbers have not been established for the site (EPA Region 9 ROD, March 31, 1999)
Determine if the historic upward trends in PCP and TCDD concentrations are continuing	Measure PCP or TCDD in groundwater from wells that have shown upward trend in dioxin or SVOC data.	Collect samples from seven wells (A-5, DSW-4B, DSW-4C, DSW-4D, DSW-6B, DSW-6C, and OFS-3B) and analyze for dioxin/furans by CLP lab and SVOCs full TAL with TICs by Region 9 Lab. Use low-flow sampling technique.	Sensitivity based on MCLs and PRG for naphthalene. Groundwater cleanup numbers have not been established for the site (EPA Region 9 ROD, March 31, 1999)

Table 2-1 (Continued)
McCormick and Baxter Data Quality Objectives Process

Investigation Objectives	Data Requirements	Investigation Strategy	Field Decision Criteria/ Performance Specifications
Determine if natural attenuation has the potential to impact contaminant migration.	Measure natural attenuation (NA) potential and capacity in groundwater samples.	Measure following parameters in 15 wells listed above: total and dissolved Mn (200), sulfate (300 Series), chloride (300 Series), nitrate/nitrite (300 Series), TOC (9060), Eh, pH, temperature, specific conductance, DO, turbidity and Hach field analysis of DO, dissolved CO2, total alkalinity, total hardness, total iron. Off-site analyses conducted by Region 9 Lab.	Sensitivity based on limitations of analytical instrumentation.
Determine the tendency of NAPL to move downward when mobilized.	Groundwater density measurements.	Measure density at 10 to 90C (Kerr Lab SOP) in 15 wells listed above.	Sensitivity based on limitations of analytical instrumentation. Precision is approximately 0.001 gm/cm3. Will provide data representative of density across site and in different zones.

Table 2-2
Monitoring Well Groundwater Sampling and Analysis

Monitoring Well ID	Rationale	Analyses to Be Performed
A-5	Dioxin upward trend	1613B/8270/NA parameters/RF parameters
A-8	PCP upward trend	8270/NA parameters/RF parameters
DSW-4B	Dioxin upward trend	1613B/8270/NA parameters/RF parameters
DSW-4C	Dioxin upward trend	1613B/8270/NA parameters/RF parameters
DSW-4D	Dioxin upward trend	1613B/8270/NA parameters/RF parameters
DSW-6B	Dioxin upward trend	1613B/8270/NA parameters/RF parameters
DSW-6C	Dioxin upward trend	1613B/8270/NA parameters/RF parameters
DSW-7A	Naphthalene migration well	8270/NA parameters/RF parameters
DSW-7B	Naphthalene migration well	8270/NA parameters/RF parameters
DSW-7C	Naphthalene migration well	8270/NA parameters
OFS-3B	Dioxin upward trend	1613B/8270/NA parameters/RF parameters
OS-3E	Naphthalene migration well	8270/NA parameters/RF parameters
OS-4A	Naphthalene migration well	8270/NA parameters/RF parameters
OS-4B	Naphthalene migration well	8270/NA parameters/RF parameters
OS-4C	Naphthalene migration well	8270/NA parameters/RF parameters

Notes:
NA - natural attenuation parameters (e.g., total and dissolved manganese, sulfate, chloride, nitrate, nitrite, TOC, dissolved oxygen, dissolved carbon dioxide, total hardness, total iron)
RF - routine field parameters (e.g., redox potential, pH, temperature, specific conductivity, turbidity, and dissolved oxygen)

Table 2-3
NAPL Monitoring Wells

Well			
ID	Total Depth (feet)	NAPL Sampled	Analyses Performed/Comments
A-4	37.05		No NAPL encountered
A-5	35.44		No NAPL encountered
A-6	(27.45)		No NAPL encountered
A-8	37.88		LNAPL encountered; however, insufficient volume to sample
A-10	34.58	X	8270/Hydrocarbon Fingerprinting/Physical Properties [1]
DSW-1D	(58.5)		No NAPL encountered
DSW-4B	74.38		LNAPL encountered; however, insufficient volume to sample
DSW-4C	129.61		No NAPL encountered
DSW-4D	179.58		No NAPL encountered
DSW-4E	266.39		No NAPL encountered
DSW-5B	78.25		No NAPL encountered
DSW-6B	90.37	X	8270/Hydrocarbon Fingerprinting/Physical Properties
DSW-6C	141.26		No NAPL encountered
OFS-4D	197.66		No NAPL encountered
OFS-4E	255.65		No NAPL encountered
ONS-1B	86.15	X	8270/Hydrocarbon Fingerprinting/Physical Properties
ONS-1C	144.58		LNAPL encountered; however, insufficient volume to sample
ONS-2A	59.71		No NAPL encountered

[1] Physical properties for NAPL samples only = density, viscosity, oil-water interfacial tension (all three using 10°C increments from 10 to 90°C), solubility at two different temperatures between 10 and 90°C, wettability, and boiling point distribution (by ASTM D86).

Table 2-4
SCAPS Soil Sampling Locations

Sample Location	Intervals Sampled (feet bgs)
SE-002	14.3-15.1, 15.1-16.0, 24.5-25.6, 25.6-26.5, 84-86
SE-005	29.5-30.5, 30.5-31.6, 43-45, 67-69, 86-87.5
SE-008	10.5-11.7, 19-21, 40-41.5, 42-44, 45-45.9, 48-50
SE-009	21-23, 55-57, 69-70
SE-010	12-14, 30-31.2, 59-59.8, 61.5-63
SE-020	29-31, 47-49, 51-51.8, 56-58, 60-62
SE-028	9.0-10.1, 10.1-11
SE-035	50-52, 54-54.4, 58-59.2
SE-037	31-32.6, 56-57, 93-95
SE-039	10-12, 19-20.6, 22-22.4, 40-42
SE-043	7-8.6, 13-15, 23-25, 27-29
SE-047	10-12, 12-14, 14-15, 21.6-22
SE-064	31-33, 34-36, 41-43, 50-51, 62-63.3, 67-69
SE-079	48.7-48.9, 51-52, 54.2-55, 54-54.2, 58-60, 63-63.9, 80-81
SE-081	50-50.6, 50-52
SE-088	5.4-5.8, 9-10.3, 10.3-11, 14-15.4, 20-21, 24-25.8, 36-38
SE-093	26.7-27, 45-46, 63-65, 66-67, 67-68
SE-096	63-65, 66-67.6, 73-74.2, 78-78.7, 81-82.4, 84.5-84.8, 94-96
SE-097	76.2-76.6, 87-89, 90-92, 92.6-94, 100-102
SE-097A	90-90.1, 90-92

Table 2-5
Performance Evaluation Sample IDs

Revised Sample ID	Sample Date	Sample ID Given in Field	TPH-Dx	PAH/PCP
SB901001	8/4/99		X	
SB906-144.0-144.4	8/5/99			X
SB925-140.0-140.2	8/27/99	SB025-140.0-140.2		X
SB930-204.0-204.3	8/25/99		X	
SB961-110.2-110.6	8/31/99	SB061-110.2-110.6	X	
SB961-138.2-138.6	9/1/99	SB061-138.2-138.6		X
SS908-10-12	8/8/99		X	
SS928-10.1-11	8/8/99			X
SS979-62-64	9/8/99	SS079-80-81		X
SS997-105-106	9/7/99		X	

3.0 DATA SUMMARY

3.1 SITE SURVEY

The Sacramento District U.S. Army Corps of Engineers Survey Branch conducted a detailed site survey of the approximately 32 acres of the McCormick and Baxter site during May through November of 1999. The survey work consisted of the following tasks:

- Placing 10 survey control monuments on site
- Surveying the uplands ground surface elevation on approximately 50-foot centers
- Surveying the locations of all pertinent aboveground site features
- Surveying the coordinates of all existing and new project monitoring wells
- Surveying a select set of borings and SCAPS push locations
- Surveying the bank of Old Mormon Slough from the east end of the sheet pile wall to the edge of the Union Ice property line on the north side of the slough
- Producing a CADD base map of the site

The slough bank survey consisted of 32 cross sections from the low tide line up to a minimum of 100 feet onto the upland. The survey cross sections were spaced at 50-foot intervals. Detailed surveying of the slough bank was conducted to support bank stabilization work to curtail the slumping of contaminated soils into the slough and onto a proposed sediment cap.

The horizontal coordinates and vertical elevations of all existing and new monitoring wells associated with the McCormick and Baxter site were surveyed. A select set of soil boring and SCAPS push locations were also surveyed by the Sacramento District USACE when the surveyors were on site to survey the new monitoring wells, MW1A and MW2E. Horizontal coordinates for soil borings and SCAPS push locations that were not surveyed were estimated by measuring each location's distance and bearing from surveyed features on the site map. The elevation of each nonsurveyed location was estimated from nearby surveyed ground surface elevations shown on the detailed site map.

All horizontal survey coordinates were measured using the California State Coordinate System Zone 3 (NAD83). All vertical elevations were measured using NVD88. Coordinate and

elevation data measured for monitoring wells, SCAPS push locations, and soil boring locations are listed in Table 3-1.

3.2 GEOPHYSICAL SURVEY

A geophysical survey was conducted by Norcal Geophysical Consultants, Inc. The survey area included about 16 acres of the site, predominantly in the Main Processing Area, Cellon Process Area, Oily Waste Ponds Area, and the areas south and west of these areas. The results of the survey are shown in Figure 3-1. The results indicate subsurface anomalies in the anticipated locations (e.g., beneath the asphalt cap in the Main Processing Area, the Cellon Process Area, and former railroad track locations).

Since the results of any geophysical investigation indicate only the different types of subsurface anomalies (electromagnetic and magnetic for the McCormick and Baxter site) and not actual "pictures" of subsurface objects, interpretation of the survey data was necessary. Using the subsurface anomalies data, Norcal mapped their interpretations of the subsurface objects at the site (Figure 3-1). Anomalies were interpreted as follows:

- Concrete Pads and Foundations. These were found along the north central boundary of the geophysical investigation area, and in the center and southeast corner of the geophysical investigation area.

- Footings. The footings were suspected to be supports for a former aboveground storage tank that was located in the southeast corner of the geophysical investigation area.

- Railroad Spurs. These were found throughout the site, including several main lines that trend through the site as well as individual spurs related to specific former operations. Small sections of some of the spurs appear to have been removed.

- Utilities. The subsurface utilities were found generally in the center of the survey area. The utilities probably represent water, electric, and natural gas lines. There may be deeper utilities (e.g., stormdrain lines) that were not detected during the survey.

- Buried Debris and Non-Interpreted Anomalies. These items were found generally beneath the asphalt cap and are believed to represent buried debris, former facility subsurface floors and structures, imported soils, and the fill material used in the cap construction.

Additional details can be found in the geophysical survey report (Norcal 1999).

3.3 SCAPS GEOTECHNICAL AND STRATIGRAPHIC DATA

The SCAPS CPT unit consists of strain gauges that measure cone pressure and sleeve friction in accordance with ASTM Standard D3441. The electromechanical responses of the strain gauges are translated into a soil classification number. A complete description of the SCAPS CPT system and results are given in the SCAPS field investigation report (USACE 1999b). The soil classification numbers and associated material descriptions produced by the SCAPS CPT unit are as follows:

- 0: Peats
- 0-1: Clays
- 1-2: Silt mixtures
- 2-3: Sand mixtures
- 3-4: Sands
- 4-5: Sands and gravels

A soil classification number is assigned every 0.1 foot to the material penetrated.

3.3.1 SCAPS Soil Classification and Visual Observation Comparability

Confirmation soil samples were collected using the SCAPS rig adjacent to CPT/LIF push locations, typically within 2 feet of the original push location. Contingency soil borings using the Resonant Sonic rig were typically drilled within 10 feet of the associated SCAPS CPT/LIF push. The CPT results, SCAPS confirmation soil sampling results, and laboratory grain size analyses from SCAPS and rotosonic borings are compared in Table 3-2. The SCAPS soil classification agrees with the visual soil sample descriptions and grain size analyses with only a few exceptions. Contradictory soil descriptions between the CPT results and visual descriptions are most likely due to the natural spatial variability of subsurface materials. The material reported by the lab to be a clayey silt was visually identified as clay in the field due to the high clay content of the silt. The visual and laboratory descriptions for the silt material are not considered contradictory since the clay content of the silt was generally high and estimating percentages of clays versus silts is extremely difficult using visual/manual procedures.

Soil descriptions for the portions of rotosonic borings that were coincident with SCAPS CPT data are not included in Table 3-2 because the length of SCAPS CPT push and rotosonic boring soil description overlap is too large to present in a table. The results of the two methods were compared when geologic cross sections were developed. Agreement between the two methods is excellent.

The SCAPS CPT and soil classification interpretation provides an accurate measurement of grain size distribution at the McCormick and Baxter site.

3.4 SCAPS LIF DATA

The in situ laser-induced fluorescence system collected peak intensity and peak wavelength for each LIF spectrum. The intensity of the return signal is related to the magnitude of the PAH compounds that are components of the petroleum hydrocarbon contamination. Data were collected continuously at each of the 104 push locations, with a total of 9,600 feet of depth pushed. LIF data for all the SCAPS CPT pushes are presented in the SCAPS field investigation report (USACE 1999b).

The in situ LIF data were used to identify contaminated areas at the site and to refine the NAPL CSM. In situ LIF data were also compared with ex situ LIF (as defined in 3.5.5) and on-site laboratory TRPH analyses of soil samples collected by the SCAPS from locations adjacent to the LIF push locations. This evaluation concluded that the intensity limit of detection for the in situ SCAPS LIF at the McCormick and Baxter site was approximately 300 counts, which was determined to be equivalent to 450 mg/kg of TRPH.

Additional details on the SCAPS LIF effort, including Groundwater Monitoring System (GMS) figures that display the LIF data, can be found in the SCAPS field investigation report (USACE 1999b).

3.5 SCAPS SOIL SAMPLING DATA

3.5.1 FASP TPH Data

TPH was detected above the method detection limit of 100 mg/kg (wet weight) in 42 of 74 SCAPS soil samples. All TPH data is summarized in Table A-2 of Appendix A. The TPH detections in the SCAPS soil samples are presented in Table A-4 of Appendix A. The SCAPS soil sample results are discussed in more detail in Section 5.0.

3.5.2 PAH/PCP Data

Naphthalene was detected above the method detection limit of 100 mg/kg (dry weight) in 17 of 74 SCAPS soil samples. PCP was detected above the method detection limit of 50 mg/kg (dry weight) in 10 of 74 SCAPS soil samples. All PAH/PCP data are summarized in Table A-2 of Appendix A. The SVOC detections in the SCAPS soil samples are presented in Table A-4 of Appendix A. The SCAPS soil sample results are discussed in more detail in Section 5.0.

3.5.3 SCAPS TRPH Data

TRPH was detected above the method detection limit of 50 mg/kg (wet weight) in 40 of 74 SCAPS soil samples. All TRPH data are summarized in Table A-2 of Appendix A. The TRPH detections in the SCAPS soil samples are presented in Table A-4 of Appendix A. The SCAPS soil sample results are discussed in more detail in Section 5.0.

3.5.4 Cellon Process Area PCB Soil Data

A total of six soil samples, plus one blind quality control (QC) duplicate, were collected from the Cellon Process Area for PCB analysis by EPA Method 8082. PCBs were not detected in any of these samples. The results are given in Table 3-3.

3.5.5 LIF Measurement and Soil Chemical Data Comparability

Soil samples were collected using the SCAPS to accomplish the following objectives:

- Obtain LIF verification samples representative of different soil types, different emission spectra, and different emission intensities throughout the site within SCAPS depth limitations.
- Obtain soil samples to verify apparent anomalous LIF sensor responses.
- Identify locations for continuous rotosonic soil borings.
- Confirm the maximum depth of POL and PAH/PCP contamination.
- Assess the percent saturation of NAPL contamination.

Soil sampling sites for verification were chosen in the field based on the following decision criteria:

- Select intervals to confirm threshold limit of SCAPS LIF. Push location intervals where contamination is suspected but not found should be targeted to confirm low LIF response.
- Select soil samples to evaluate intervals with different wavelength signatures.
- Select soil samples to assist with evaluating the LIF response threshold above which NAPL may be present.

- Select soil samples in locations where non-target fluorescence is suspected.

After the soil sample target intervals were selected, the SCAPS unit was positioned near a previous LIF/CPT location—usually within 1 to 2 feet of the original probe location. This procedure was followed to obtain representative samples from depths of interest corresponding to the adjacent LIF/CPT location. A closer location was not desired since the original sensor push-point hole had been grouted, and samples influenced by the grout material were not desired.

Fluorescence emission spectra of the homogenized soil samples were obtained in the field by pressing the soil against the sapphire window of the SCAPS LIF/CPT probe and collecting three or four replicate emission spectra. The replicate measurements were averaged for each sample. This procedure was used to obtain the ex situ LIF response for the interval of interest. The in situ LIF response at the depth of interest was determined by estimating the peak response from the LIF panel plots. To enhance quality control, the LIF/CPT in situ and bench (ex situ) LIF responses were compared to the SCAPS TRPH analytical results.

Seventy-four soil samples were collected and analyzed by the field-modified TRPH method. Interpretation of the associated in situ LIF response for each soil sample was made by obtaining the highest count from the ".gos" file generated by the SCAPS data acquisition software. The ".gos" file is one of five data files generated by the SCAPS LIF/CPT computer software that contains depth-discrete intensities and corresponding wavelengths to the nearest 0.01 ft. Sixty of the 74 measurements reported in situ values above the LIF detection threshold of 300 counts. Results were evaluated regarding the frequency of LIF sensor false positive and false negative responses based on the TRPH analyses (USACE 1995). A false positive response designation was assigned to a sample that yielded an LIF response greater than the level of detection (LOD) (300 counts), while the TRPH analysis reported values less than the calculated TRPH LOD (15 mg/kg). A false negative response was assigned for samples with TRPH above 450 mg/kg, while the LIF analysis reported responses less than 300 counts. It is assumed that the TRPH method expresses greater linearity than the SCAPS LIF sensor.

A summary of the in situ LIF responses and the TRPH results is tabulated in Table 3-4.

An evaluation of the data indicates that 20 of the 60 reported in situ LIF detects were noted as being false positives. Many factors affect the high bias of the SCAPS LIF sensor. For example, naturally occurring materials, such as calcium carbonate (calcite), and wood fragments tend to give a false positive response to the LIF sensor. The presence of calcite was confirmed in the field by performing the reactive HCl test on several samples collected. The LIF in situ data used in this comparison are considered to be biased high due to the method of obtaining the "high count" from the in situ data acquisition files. In addition, the soil samples collected were homogenized prior to containerization, and NAPL contamination traveling in veins and stringers may have been diluted below detection levels in the soil samples.

The false negative result identified in Table 3-4 occurred in sample SS008-48-50. It is believed that there was an error in determining the sample interval, because the ex situ LIF response (2,349 counts) was much greater than the in situ LIF response (37 counts). This field sampling error explains the one false negative response.

The false positive and false negative results are attributed to anomalies inherent in the sample collection and handling technique as well as to the inherent statistical probability of such events occurring.

A similar evaluation was performed with regard to the bench LIF responses (ex situ) and related TRPH results. A total of 74 SCAPS and 12 rotosonic soil samples were collected and analyzed by both the field TRPH and bench ex situ LIF methods. Interpretation of the associated bench ex situ LIF response for each soil sample was made by scanning spectrum wavelengths 440 through 674 and noting the highest LIF count. Thirty-four of the 86 measurements reported ex situ values above the LIF detection threshold of 300 counts. The bench ex situ LIF responses and the TRPH results are summarized in Table 3-5.

No false positive ex situ LIF signals were observed, and only two false negative results were reported. The false negatives were seen in samples SS002 (14.3- to 15.1-foot interval) and SS047 (10- to 12-foot interval), both of which contained moderate levels of TRPH and in situ LIF responses near the LIF threshold detection limit of 300 counts. Given that both samples are from shallow depth intervals, it is suspected that the contamination may be that of a fuel product not detectable by LIF.

It is important to point out that the in situ LIF response was consistently greater than the ex situ LIF response. Correspondingly, one would expect the soil chemical data to be biased low when compared to actual in situ soil chemical concentrations. The low bias in the ex situ soil data set is believed to be influenced by three primary factors:

1. NAPL at the site travels in veins and residual NAPL is in the form of globules. The LIF can measure these directly in situ, but the soil sample collection procedure can result in dilution to the point that individual chemical constituents are below detection levels.

2. When some soil cores were collected, mobile NAPL was lost from the core during the sampling process.

3. Evaluation of field duplicate results for samples that contained NAPL indicates that the precision for these results is very poor. The way in which the laboratory subsamples the soil and how much product is included in the aliquot used for extraction and analysis have a significant influence on the end result.

3.5.6 Interpretation of LIF Data

The SCAPS LIF data were evaluated to identify zones of probable high concentrations of contaminants and likely pathways of NAPL transport. The following criteria were used as lines of evidence to identify intervals of probable NAPL contamination within each SCAPS push.

- LIF counts above 500 were considered an indication of NAPL presence. Intervals with LIF counts between 300 and 500 were considered questionable and may be considered, with other lines of evidence, as an indication of NAPL presence.

- Spectral profiles across the site, which were associated with confirmed creosote NAPL observations during soil sampling, were common at peak wavelengths between 467 and 476 nanometers. LIF spectral profiles for pushes located within and near the Main Processing Area, which were associated with confirmed creosote NAPL observations during soil sampling, were common at peak wavelengths between 480 and 499 nanometers. This information was used to screen the LIF data set and identify intervals associated with creosote contamination.

- Collocated SCAPS soil sampling results were evaluated to determine whether NAPL was reported in the interval of interest as odor, visible, or mobile NAPL.

- The location of each LIF push and its proximity to confirmed NAPL presence was considered.

Table 3-6 summarizes the SCAPS LIF data analysis and identifies intervals of significant creosote contamination or other unique petroleum hydrocarbon contamination within each SCAPS push.

3.6 ROTOSONIC BORINGS SOIL SAMPLING DATA

All rotosonic soil boring soil data are identified on the report tables located in this section and in Appendix A using the “SB” prefix.

3.6.1 FASP TPH Data

A total of 395 soil samples were collected from 18 locations (Figure 3-2) using rotosonic drilling methods and analyzed for TPH by the EPA FASP laboratory in accordance with the EPA Region 9 FASP standard operating procedure (SOP) for modified SW846 Method 8015. Rotosonic boreholes were drilled at locations where the SCAPS unit was refused before

contamination was completely defined. The initial sample collection depth was located at or below the SCAPS refusal depth. At four locations, TPH was not detected at any depth: SB-007, SB-018 (TPH was detected at one depth at 1 mg/kg), SB-025, and SB-047; however, the LIF indicated contamination at shallower depths in the same push/borehole locations. TPH was not detected at the end depth of any soil borings. Concentrations were not corrected for soil moisture (i.e., reported as wet weight).

TPH was detected at the highest concentration at the greatest depth in SB-099 (212.6 feet bgs [1,500 mg/kg]). TPH was detected in concentrations greater than 1,000 mg/kg at seven locations: SB-006 (162 to 162.3 feet bgs [6,900 mg/kg]); SB-027 (69 to 69.3 feet bgs [1,300 mg/kg], 115.9 to 116.3 feet bgs [5,100 mg/kg], and 122.8 to 123.1 feet bgs [15,000 mg/kg]; SB-028 (28.3 to 29.4 feet bgs [2,600 mg/kg], 31 to 33 feet bgs [1,300 mg/kg], and 53.5 to 55 feet bgs [6,500 mg/kg]); SB-057 (eight depth intervals [2,100 to 30,000 mg/kg]); SB-086 (seven depth intervals [1,900 to 11,000 mg/kg]); SB-092 (139.5 to 139.8 feet bgs [1,100 mg/kg]); and SB-099 (nine depth intervals [1,200 to 18,000 mg/kg]). TPH was detected at the greatest concentration on the site in SB-057 at 30,000 mg/kg at 36 to 38 feet bgs.

All TPH detections in the soil boring samples collected are presented in Table A-3 of Appendix A.

3.6.2 PAH/PCP Data

A total of 221 soil samples were collected from 18 locations using rotosonic drilling methods and analyzed by the EPA Region 9 laboratory in accordance with the EPA Region 9 SOP 315 for analysis of SVOCs by EPA SW846 Method 8270. Rotosonic boreholes were drilled at locations where the SCAPS unit was refused before contamination was completely defined. The initial sample collection depths were located at or below the SCAPS refusal depth or at selected depth intervals to confirm the SCAPS LIF responses. At six locations, SVOCs were not detected at any depth: SB-007, SB-018, SB-019, SB-030, SB-047, and SB-052. SVOCs were not detected at the end depth of any soil boring. All PAH/PCP concentrations were corrected for soil moisture (i.e., reported as dry weight).

Pentachlorophenol was detected in the shallow (i.e., less than 20 feet bgs) soil column at seven locations: SB-027 (13.3 to 13.7 feet bgs [530 mg/kg] and 19.7 to 20.0 feet bgs [230 mg/kg]); SB-028 (8.0 to 8.4 feet bgs [140 mg/kg]); SB-047 (12 to 14 feet bgs [140 mg/kg] and 14 to 15 feet bgs [330 mg/kg]); SB-057 (2.7 to 3.0 feet bgs [200 mg/kg]); SB-084 (11.0 to 11.4 feet bgs [120 mg/kg]); SB-086 (17 to 17.3 feet bgs [2,100 mg/kg]); and SB-099 (3.1 to 4.6 feet bgs [100 and 200 mg/kg]). PCP was detected at the deepest depth in SB-061 at 100 mg/kg at 138.2 to 138.6 feet bgs and at the greatest concentration in SB-086 at 2,100 mg/kg at 17 to 17.3 feet bgs. All PCP detections in the soil boring samples collected during the 1999 NAPL investigation are presented in Table A-3 of Appendix A.

Naphthalene was detected at concentrations greater than 1,000 mg/kg at six locations: SB-006 (162 to 162.3 feet bgs [4,100 mg/kg]); SB-027 (122.8 to 123.1 feet bgs [2,700 mg/kg]); SB-028 (53.5 to 55 feet bgs and the field duplicate at the same depth [1,200 and 1,900 mg/kg, respectively]); SB-029 (53.5 to 55 feet bgs [2,000 mg/kg]; SB-057 (36 to 38 feet bgs and the field duplicate at the same depth [3,100 and 5,400 mg/kg, respectively]); SB-057 (40 to 50 feet bgs [5,800 mg/kg]); SB-086 (21.6 to 23.3, 27 to 28.5, and 36.3 to 38 feet bgs [3,500, 1,200, and 1,800 mg/kg, respectively]); and SB-099 at 27.5 to 29.5, the field duplicate at the same depth, and 41 to 42.5 feet bgs [2,000, 1,900, and 1,200 mg/kg, respectively]). All naphthalene detections in the soil boring samples collected during the investigation are presented in Table A-3 of Appendix A.

3.6.3 Dioxins and Furans Data

Twenty-three soil samples were collected from September 29 through October 9, 1999, and analyzed for dioxins and furans using EPA Method 1613B. Appendix A presents the chlorinated furan and dioxin data. All values are reported as dry weight. The calculated toxicity equivalent concentrations (TECs, also known as toxicity equivalents [TEQs]) were greater than 50 nanograms per kilogram (ng/kg) 2,3,7,8-TCDD (U/2) in 13 soil samples, including SB-028 (12 to 12.5 feet bgs [264 ng/kg]), SB-028 (28.3 to 29.4 feet bgs [192 ng/kg]), SB-028 (31 to 33 feet bgs [93 ng/kg]), SB-028 (53.5 to 55 feet bgs [109 ng/kg]), SB-057 (2.7 to 3 feet bgs [25,207 ng/kg]), SB-057 (18 to 19.8 [173 ng/kg]), SB-057 (28 to 29.8 feet bgs [505 ng/kg]), SB-057 (51 to 52 feet bgs [131 ng/kg]), SB-057 (65 to 66 feet bgs [58 ng/kg]), SB-099 (13.4 to 14.7 feet bgs [191 ng/kg]), SB-099 (31 to 33 feet bgs [381 ng/kg]), SB-099 (41 to 42.5 feet bgs [194 ng/kg]), and SE-008 (0.0 to 0.2 feet bgs [923,750 ng/kg]).

Chlorinated dioxin and furan congeners were detected at concentrations greater than 1,000 ng/kg in four borehole/push locations: SB-028, SB-057, SB-099, and SE-008. 2,3,7,8-Tetrachlorinated dibenzofurans (TCDFs) were detected at concentrations greater than 1,000 ng/kg in SE-008 (0.0 to 0.2 feet bgs [1,500 ng/kg]).

1,2,3,7,8-Pentachlorodibenzofuran was detected at concentrations greater than 1,000 ng/kg in SE-008 (0.0 to 0.2 feet bgs [11,000 ng/kg]).

2,3,4,7,8-Pentachlorodibenzofuran was detected at concentrations greater than 1,000 ng/kg in SB-057 (2.7 to 3 feet bgs [2,400 ng/kg]) and SE-008 (0.0 to 0.2 feet bgs [8,400 ng/kg]).

1,2,3,4,7,8-Hexachlorodibenzofuran was detected in concentrations greater than 1,000 ng/kg in SB-057 (2.7 to 3 feet bgs [8,900 ng/kg]) and SE-008 (0.0 to 0.2 feet bgs [300,000 ng/kg]).

1,2,3,6,7,8-Hexachlorodibenzofuran was detected at concentrations greater than 1,000 ng/kg in SB-057 (2.7 to 3 feet bgs [6,200 ng/kg]) and SE-008 (0.0 to 0.2 feet bgs [220,000 ng/kg]).

1,2,3,7,8,9-Hexachlorodibenzofuran was detected in concentrations greater than 1,000 ng/kg in SB-057 (2.7 to 3.0 feet bgs [3,600 ng/kg]) and in SB-008 (0.00 to 0.2 feet bgs [5,000 ng/kg]).

1,2,3,4,6,7,8-Heptachlorodibenzofuran was detected in concentrations greater than 1,000 ng/kg in SB-028 (12 to 12.5 feet bgs [1,200 ng/kg]), SB-028 (28.3 to 29.4 feet bgs [1,000 ng/kg]), SB-28 (53.5 to 55 feet bgs [1,600 ng/kg]), SB-057 (2.7 to 3 feet bgs [170,000 ng/kg]), SB-057 (28 to 29.8 feet bgs [5,700 ng/kg]), SB-057 (51 to 52 feet bgs [1,500 ng/kg]), SB-099 (13.4 to 14.7 feet bgs [1,400 ng/kg]), SB-099 (31 to 33 feet bgs [2,600 ng/kg]), SB-099 (41 to 42.5 feet bgs [1,200 ng/kg]), and SE-008 (0.00 to 0.2 feet bgs [9,200,000 ng/kg]).

1,2,3,4,7,8,9-Heptachlorodibenzofuran was detected at concentrations greater than 1,000 ng/kg in SB-057 (2.7 to 3.0 feet bgs [10,000 ng/kg]) and SE-008 (0.00 to 0.2 feet bgs [670,000 ng/kg]).

Octachlorodibenzofuran was detected in concentrations greater than 1,000 ng/kg in SB-028 (12 to 12.5 feet bgs [2,300 ng/kg]), SB-028 (28.3 to 29.4 feet bgs [6,200 ng/kg]), SB-028 (31 to 33 feet bgs [3,000 ng/kg]), SB-028 (48 to 49.7 feet bgs [2,000 ng/kg]), SB-28 (53.5 to 55 feet bgs [3,800 ng/kg]), SB-057 (2.7 to 3 feet bgs [3,100 ng/kg]), SB-057 (18 to 19.8 feet bgs [5,500 ng/kg]), SB-057 (28 to 29.8 feet bgs [42,000 ng/kg]), SB-057 (51 to 52 feet bgs [3,700 ng/kg]), SB-057 (65 to 66 feet bgs [1,100 ng/kg]), SB-099 (13.4 to 14.7 feet bgs [3,700 ng/kg]), SB-099 (31 to 33 feet bgs [9,000 ng/kg]), SB-099 (41 to 42.5 feet bgs [4,800 ng/kg]), and SE-008 (0.00 to 0.2 feet bgs [17,000,000 ng/kg]).

2,3,7,8-Tetrachlorodibenzodioxin was detected in concentrations greater than 1,000 ng/kg in SE-008 (0.0 to 0.2 feet bgs [2,400 ng/kg]). 1,2,3,7,8-Pentachlorodibenzodioxin was detected in concentrations greater than 1,000 ng/kg in SB-057 (2.7 to 3.0 feet bgs [3,500 ng/kg]) and SE-008 (0.00 to 0.2 feet bgs [56,000 ng/kg]). 1,2,3,4,7,8-Hexachlorodibenzodioxin was detected in concentrations greater than 1,000 ng/kg in SB-057 (2.7 to 3.0 feet bgs [8,300 ng/kg]). 1,2,3,6,7,8-Hexachlorodibenzodioxin was detected in concentrations greater than 1,000 ng/kg in SB-057 (2.7 to 3.0 feet bgs [43,000 ng/kg]) and SE-008 (0.00 to 0.2 feet bgs [2,600,000 ng/kg]). 1,2,3,,7,8,9-Hexachlorodibenzodioxin was detected in concentrations greater than 1,000 ng/kg in SB-057 (2.7 to 3.0 feet bgs [11,000 ng/kg]) and SE-008 (0.00 to 0.2 feet bgs [370,000 ng/kg]).

1,2,3,4,6,7,8-Heptachlorodibenzodioxin was detected in concentrations greater than 1,000 ng/kg in SB-028 (12 to 12.5 feet bgs [7,500 ng/kg]), SB-028 (28.3 to 29.4 feet bgs [5,900 ng/kg]), SB-028 (31 to 33 feet bgs [2,500 ng/kg]), SB-028 (48 to 49.7 feet bgs [1,200 ng/kg]), SB-28 (53.5 to 55 feet bgs [3,000 ng/kg]), SB-057 (2.7 to 3 feet bgs [630,000 ng/kg]), SB-057 (18 to 19.8 feet bgs [9,400 ng/kg]), SB-057 (28 to 29.8 feet bgs [14,000 ng/kg]), SB-057 (51 to 52 feet bgs [4,100 ng/kg]), SB-057 (65 to 66 feet bgs [1,200 ng/kg]), SB-099 (13.4 to 14.7 feet bgs [6,300 ng/kg]), SB-099 (31 to 33 feet bgs [14,000 ng/kg]), SB-099 (41 to 42.5 feet bgs [7,100 ng/kg]), and SE-008 (0.00 to 0.2 feet bgs [40,000,000 ng/kg]).

Octachlorodibenzodioxin was detected in concentrations greater than 1,000 ng/kg in SB-028 (12 to 12.5 feet bgs [56,000 ng/kg]), SB-028 (28.3 to 29.4 feet bgs [70,000 ng/kg]), SB-028 (31 to 33 feet bgs [33,000 ng/kg]), SB-028 (48 to 49.7 feet bgs [7,000 ng/kg]), SB-28 (53.5 to 55 feet bgs [27,000 ng/kg]), SB-028 (55 to 56 feet bgs [2,200 ng/kg]), SB-028 (100.6 to 101.5 feet bgs [2,600 ng/kg]), SB-057 (2.7 to 3 feet bgs [5,900,000 ng/kg]), SB-057 (18 to 19.8 feet bgs [40,000 ng/kg]), SB-057 (28 to 29.8 feet bgs [130,000 ng/kg]), SB-057 (51 to 52 feet bgs [38,000 ng/kg]), SB-057 (65 to 66 feet bgs [12,000 ng/kg]), SB-099 (13.4 to 14.7 feet bgs [70,000 ng/kg]), SB-099 (31 to 33 feet bgs [76,000 ng/kg]), SB-099 (41 to 42.5 feet bgs [74,000 ng/kg]), and SE-008 (0.00 to 0.2 feet bgs [23,000,000 ng/kg]).

3.6.4 Metals Data

A total of 21 soil samples were collected from 3 locations and analyzed for arsenic, chromium, copper, and zinc by the EPA Region 9 laboratory using the Contract Laboratory Program (CLP) RAS SOW. These soil samples were collected at the same locations where laboratory treatability samples were collected (i.e., at location where significant contamination was strongly suspected) , and analyzed to potentially assess the potential impact of thermal treatment on metals mobility. All detected concentrations were corrected for soil moisture (i.e., dry weight). Arsenic, copper, chromium, and zinc were detected at each location and at each depth. Arsenic was detected at concentrations greater than the 16 to 100 mg/kg background arsenic concentrations (ICF Kaiser 1998) in SB-057 (2.7 to 3.0 feet bgs [290 mg/kg]) and SB-099 (13.4 to 14.7 feet bgs [77 mg/kg]). The highest chromium, copper, and zinc concentrations were also detected in SB-057 (2.7 to 3.0 feet bgs). Chromium concentrations ranged from 9.3 mg/kg in SB-028 (55 to 56 feet bgs) to 88 mg/kg in SB-057 (2.7 to 3.0 feet bgs). Copper concentrations ranged from 5.5 mg/kg in SB-028 (53.5 to 55 feet bgs) to 420 mg/kg in SB-057 (2.7 to 3.0 feet bgs). Zinc concentrations ranged from 21 mg/kg in SB-028 (55 to 56 feet bgs) to 120 mg/kg in SB-057 (2.7 to 3.0 feet bgs).

Within the SB-057 borehole from beginning depth at 2.7 to 3.0 feet bgs to final depth at 65 to 66 feet bgs, arsenic concentrations decreased from 290 to 3.2 mg/kg, chromium decreased from 88 to 31 mg/kg, copper decreased from 420 to 17 mg/kg, and zinc decreased from 120 to 38 mg/kg.

Within the SB-028 borehole from the beginning depth at 12 to 12.5 feet bgs to the final depth at 141 to 142 feet bgs, arsenic ranged from 8.3 to 5.1 mg/kg. Chromium decreased from 48 mg/kg at the beginning depth to 9.3 mg/kg at 55 to 56 feet bgs, increased to 49 mg/kg at 100.6 to 101.5 feet bgs, and then decreased to 18 mg/kg at the end depth. Copper decreased from 48 mg/kg at the beginning depth to 5.5 mg/kg at 55 to 56 feet bgs, increased to 45 mg/kg at 100.6 to 101.5 feet bgs, and then decreased to 12 mg/kg at the end depth. Zinc decreased from 62 mg/kg at the beginning depth to 21 mg/kg at 55 to 56 feet bgs, increased to 58 mg/kg at 100.6 to 101.5 feet bgs, and then decreased to 29 mg/kg at 141 to 142 feet bgs.

Within the SB-099 borehole from the beginning 13.4 to 14.7 feet bgs depth to the final 41 to 42.5 feet bgs depth, arsenic decreased from 77 to 4.6 mg/kg, chromium decreased from 75 to 40 mg/kg, copper decreased from 35 to 23 mg/kg, and zinc decreased from 66 to 43 mg/kg.

All metals detected in the soil boring samples collected are presented in Table 3-7.

3.7 PHYSICAL SOIL SAMPLING DATA

3.7.1 Permeability and Hydraulic Conductivity Data

Permeability was calculated from the hydraulic conductivity measured in 31 soil samples collected from 15 locations (SS-010, SS-064, SS-088, SS-093, SB-047, SS-079, SS-035, SS-096, SS-097, SB-099, SB-052, SB-027, SB-025, SB-019, and SB-030) by PTS Laboratories, Inc. Native state hydraulic conductivity was measured at ambient temperatures (i.e., between 68°F and 76°F) using a soil core that had neither been dried nor extruded. Native-state hydraulic conductivity ranged from 5.000E-08 cm/s or (or 0.0001 ft/day) in SS-064 (67 to 69 feet bgs) to 3.083E-03 cm/s (or 8.73 ft/day) in SB-030 (161.7 to 162.2 feet bgs). In sands, hydraulic conductivity ranged from 6.065E-06 cm/s (0.0172 ft/day) in SB-052 (204 to 205 feet bgs) to 3.083E-03 cm/s (8.7390 ft/day) in SB-030 (161.7 to 162.2 feet bgs). In clays, hydraulic conductivity ranged from 5.00E-08 cm/s (0.0001 ft/day) in SS-064 (67 to 69 feet bgs) to 1.38E-04 cm/s (0.3912 ft/day) in SS-079 (63.9 to 65 feet bgs).

Calculated permeability ranged from 0.0490 millidarcy in SS-064 (67 to 69 feet bgs) to 3,015 millidarcies in SB-030 (161.7 to 162.2 feet bgs). In sands, permeability ranged from 5.937 millidarcies in SB-052 from 204 to 205 feet bgs to 3,015 millidarcies in SB-030 from 161.7 to 162.2 feet bgs. In clays, permeability ranged from 0.0490 millidarcy in SB-064 from 67 to 69 feet bgs to 135 millidarcies in SS-079 at 63.9 to 65 feet bgs.

Table 3-8 gives results for both permeability and hydraulic conductivity.

3.7.2 Grain Size, Density, and Porosity Data

A total of 20 soil samples were collected from 10 locations (SS-010, SB-030, SB-047, SB-052, SS-064, SS-079, SS-088, SS-096, SS-097, and SB-099) and analyzed for grain size by PTS Laboratories, Inc., using ASTM D4464M (i.e., hydrodynamic sieve) for fine-grained sediments and ASTM D422 (i.e., mechanical sieve) for coarser sediments. Grain size of collected samples ranged from coarse sand in SB-047 (244.0 to 245.0 feet bgs [1.202 mm median grain size]) to silt in SB-052 (156.0 to 156.6 feet bgs [0.007 mm median grain size]). Grain size results are presented in Table 3-9.

Eighteen soil samples were collected from nine locations (SB-030, SB-047, SB-099, SS-010, SS-064, SS-079, SS-088, SS-096, and SS-097) and analyzed for bulk density by PTS Laboratories, Inc., using ASTM D2937/API RP40. Bulk density ranged from 1.46 g/cc in SB-047 (209.1 to 209.6 feet bgs) to 1.94 g/cc in SB-047 (244.0 to 245.0 feet bgs). In sands, density ranged from 1.4 g/cc in SB-010 (30 to 31.2 feet bgs) to 1.75 g/cc in SB-099 (193 to 194 feet bgs). In clays, density ranged from 1.46 g/cc in SB-047 (209.1 to 209.6 feet bgs) to 1.79 g/cc in SB-047 (117.2 to 117.9 feet bgs).

Effective porosity was calculated for 30 soil samples collected from 12 locations (SB-028, SB-030, SB-047, SB-052, SB-086, SB-099, SS-010, SS-064, SS-079, SS-088, SS-096, and SS-097). All sand samples were repacked and reformed before porosity measurements were conducted. Effective porosity ranged from 25.9 percent in SB-052 (156 to 156.6 feet bgs) to 48.6 percent in SS-010 (30 to 31.2 feet bgs). In sands, porosity ranged from 29.6 percent in SB-052 (122 to 123 feet bgs) to 48.6 percent in SS-010 (30 to 31.2 feet bgs). In clays, porosity ranged from 25.9 percent in SB-052 (156 to 156.6 feet bgs) to 48.4 percent in SB-028 (100.6 to 101.5 feet bgs). Density and porosity results are presented in Table 3-10.

3.7.3 TOC Data

A total of 29 soil samples were collected from 11 locations (SS-010, SS-064, SS-088, SS-093, SB-047, SS-079, SS-035, SS-096, SS-097, SS-018, and SB-099) and analyzed for TOC by PTS Laboratories, Inc., using the Walkley-Black Method. These samples were collected at locations where TPH was not detected at concentrations greater than the method detection limit. TOC ranged from 170 mg/kg in SS-079 (48.7 to 48.9 feet bgs) and SS-096 (78 to 78.7 feet bgs) to 1,900 mg/kg in SB-099 (172.5 to 172.6 feet bgs). In sands, TOC ranged from 170 mg/kg in SS-079 (48.7 to 48.9 feet bgs) and SS-096 (78 to 78.7 feet bgs) to 1,900 mg/kg in SB-099 (172.5 to 172.6 feet bgs). In clays, TOC ranged from 210 mg/kg in SB-018 (183.4 to 183.7 feet bgs) to 1,400 mg/kg in SB-099 (118.8 to 119.8 feet bgs). Table 3-11 presents the TOC results.

3.7.4 Cation Exchange Capacity Data

A total of 20 soil samples from 10 locations (SS-010, SB-030, SB-047, SB-052, SS-064, SS-079, SS-096, SS-088, SS-097, and SB-099) were collected and analyzed for cation exchange capacity (CEC) by PTS Laboratories, Inc., using SW846 Method 9081. CEC ranged from 1.0 milliequivalents (meq) per 100 grams in SB-047 (244 to 245 feet bgs) to 35 meq/100 grams in SB-047 (209.1 to 209.6 feet bgs). In sands, CEC ranged from 4.9 meq/100 grams in SB-030 (161.7 to 162.2 feet bgs) to 14.4 meq/100 grams in SB-096 (78.7 to 79.5 feet bgs). In clays, CEC ranged from 16 meq/100 grams in SB-052 (156 to 156.6 feet bgs) to 35 meq/100 grams in SB-047 (209.1 to 209.6 feet bgs). Cation exchange capacity results are given in Table 3-12.

3.8 GROUNDWATER SAMPLING DATA

3.8.1 Groundwater Elevations

The depths to groundwater at monitoring wells associated with the site were measured during 1999 on April 5 and 6 and on July 22 and 28. Groundwater depths were converted to NVD88 elevations using the most recent survey elevation data collected as a part of this investigation. The groundwater elevations for the April and July 1999 measurement events are listed in Table 3-13. Groundwater elevations were contoured by aquifer zone (A, B, C, D, and E) for each measurement event. Vertical hydraulic gradients were calculated where wells screened at different depths in the aquifer were clustered closely together. Vertical hydraulic gradient data are listed in Table 3-14. Horizontal and vertical gradients were similar for the April and July measurement events. The July 1999 water level elevations were on average approximately 2 feet lower than the April 1999 elevations.

3.8.1.1 April 1999 Data

Groundwater elevation contours for the April 1999 measurement event are shown in Figures 3-3 through 3-7. The horizontal component of groundwater flow in the A-zone was to the southeast, with a gradient of 0.0035 ft/ft. The vertical gradient between the A- and B-zones was downward and averaged –0.075 and –0.036 ft/ft for shallow and deep A-zone wells, respectively. The horizontal component of groundwater flow in the B-zone was to the east-southeast for the central and eastern portions of the study area, with a gradient of 0.0016 ft/ft. The horizontal gradient was reversed in the northwestern portion of the site so that horizontal flow was toward the northwest. The vertical gradient between the B- and C-zones was generally downward, with an average gradient of –0.0056 ft/ft. However, an upward vertical gradient between the B- and C-zones occurs at well clusters OS-1, OS-6, and OS-5 approximately 1,000 feet southeast of the site and at well cluster DSW-3 in the northwest corner of the site.

The horizontal component of groundwater flow in the C-zone was eastward with a slight southeastern component and a gradient that varied from 0.0033 to 0.00083 ft/ft. The vertical gradient between the C- and D-zones was downward, with an average gradient of –0.0078 ft/ft. The horizontal component of groundwater flow in the D-zone was east-southeast, with a gradient of 0.0013 ft/ft. The vertical gradient between the D- and E-zones was downward, with an average gradient of –0.017 ft/ft. The horizontal component of groundwater flow in the E-zone was east-northeast, with a gradient of 0.0011 ft/ft.

3.8.1.2 July 1999 Data

Groundwater elevation contours for the July 1999 measurement event are shown in Figures 3-8 through 3-12. The horizontal component of groundwater flow in the A-zone was to the

southeast, with a gradient of 0.0037 ft/ft. The vertical gradient between the A- and B-zones was downward and averaged –0.086 and –0.042 ft/ft for shallow and deep A-zone wells, respectively. The horizontal component of groundwater flow in the B-zone was to the east-southeast, with a gradient of 0.0012 ft/ft. The horizontal gradient was reversed in the northwestern portion of the site so that horizontal flow was toward the northwest. The vertical gradient between the B- and C-zones was generally downward, with an average gradient of –0.0056 ft/ft. However, an upward vertical gradient between the B- and C-zones occurs at well clusters OS-1 and OS-5 approximately 1,000 feet southeast of the site and at well cluster DSW-3 in the northwest corner of the site.

The horizontal component of groundwater flow in the C-zone was eastward with a slight southeastern component and a gradient that varied from 0.0030 to 0.0009 ft/ft. The vertical gradient between the C- and D-zones was downward, with an average gradient of –0.012 ft/ft.

The horizontal component of groundwater flow in the D-zone was east-southeast, with a gradient of 0.001 ft/ft. The vertical gradient between the D- and E-zones was downward, with an average gradient of –0.025 ft/ft. The horizontal component of groundwater flow in the E-zone was eastward, with a gradient of 0.00059 ft/ft.

3.8.1.3 Comparison With Previous Water Level Measurements

Groundwater elevation data from August 1993 through August 1997 were presented in the Remedial Investigation (RI) report (ICF Kaiser 1998). The horizontal and vertical gradients and flow directions presented in the RI report are qualitatively similar to the April and July 1999 measurement events. The direction and gradient of groundwater flow within and between the aquifer zones do not appear to change significantly with time or season.

Groundwater elevations have been rising with time since August 1993. Between August 1993 and July 1999, water levels observed in monitoring wells have increased on average 12, 17, 16, 20, and 22 feet for the A-, B-, C-, D-, and E-zones, respectively.

3.8.2 Analytical Data Summary

Groundwater was collected from 15 well locations: A-8, A-5, DSW-7A, and OS-4A completed in the A-zone of the aquifer; DSW-4B, DSW-6B, DSW-7B, OFS-3B, and OS-4B completed in the B-zone of the aquifer; DSW-4C, DSW-6C, DSW-7C, and OS-4C completed in the C-zone of the aquifer; DSW-4D completed in the D-zone of the aquifer; and OS-4E completed in the E-zone of the aquifer. Sampling locations are shown in Figure 3-13.

3.8.2.1 Groundwater Density

Fifteen groundwater samples were collected and five (i.e., DSW-7A, ONS-1B, A-8, ONS-4A, and DSW-6C) were analyzed for density by the EPA Kerr Laboratory in Ada, Oklahoma. Three replicate groundwater density measurements were made at 10 degree intervals over the 10°C to 90°C range. As the data in Table 3-15 show, good reproducibility was demonstrated over the entire temperature range. Density values decreased in each sample: from 1.0 to 0.9676 g/mL in DSW-7A (i.e., 3.2 percent change), from 0.9996 to 0.9656 g/mL in ONS-4B (i.e., 3.4 percent change), from 1.0 to 0.9664 g/mL in A-8 (i.e., 3.4 percent change), from 1.0 to 0.9648 g/mL in ONS-4A (i.e., 3.5 percent change), and from 0.9996 to 0.9668 in DSW-6C (i.e., 3.28 percent change). Groundwater density results are shown in Figure 3-14.

3.8.2.2 Naphthalene

Fifteen groundwater samples were collected from July 12 through 15, 1999, and analyzed for SVOCs using the EPA Region 9 laboratory SOP 315 for analysis of SVOCs by SW846 Method 8270. Naphthalene was detected in five groundwater monitoring wells: A-8 (4,000 µg/L), DSW-4B (11,000 µg/L), DSW-4C (10,000 µg/L), DSW-6B (14,000 µg/L), and DSW-6C (800 µg/L). Naphthalene concentrations detected in these groundwater samples are presented in Table 3-16.

3.8.2.3 Pentachlorophenol

Fifteen groundwater samples were collected from July 12 through 15, 1999, and analyzed for SVOCs using the EPA Region 9 laboratory SOP 315 for analysis of SVOCs by SW846 Method 8270. Pentachlorophenol was detected in three groundwater monitoring wells: A-5 (30 µg/L), A-8 (40,000 µg/L), and DSW-4B (110 µg/L). Pentachlorophenol concentrations detected in these groundwater samples are presented in Table 3-16.

3.8.2.4 Carcinogenic PAHs

Fifteen groundwater samples were collected from July 12 through 15, 1999. Chrysene was the only carcinogenic PAH (cPAH) detected. The cPAHs include benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, dibenz(a,h)anthracene, chrysene, and indeno(1,2,3-c,d)pyrene). All detected PAH concentrations are presented in Table 3-16.

3.8.2.5 Dioxins and Furans

Seven groundwater samples were collected from July 12 through 15, 1999, and analyzed for dioxins and furans using EPA Method 1613B. Because dioxin and furan congeners were detected in every groundwater sample at concentrations greater than 1.0 pg/L, 1,000 pg/L was selected as an indication of significant contamination. Chlorinated dioxin and furan congeners

were detected at concentrations greater than 1,000 pg/L in two groundwater monitoring wells: DSW-4B (i.e., 1,2,3,4,6,7,8-HpCDD [8,500 pg/L] and 1,2,3,4,6,7,8-HpCDF [3,200 pg/L]) and DSW-6B (i.e., 1,2,3,4,6,7,8-HpCDD [23,000 pg/L], 1,2,3,4,6,7,8-HpCDF [8,900 pg/L], and 1,2,3,6,7,8-HxCDD [1,500 pg/L]). Dioxin 2,3,7,8-TCDD TEC was greater than 30 ng/L, which is the current groundwater maximum contaminant level (MCL), in the groundwater samples collected from DSW-4B, DSW-4C, and DSW-6B. All chlorinated dioxin and furan congener concentrations detected in these groundwater samples are presented in Table 3-17.

3.8.2.6 Water Quality and Natural Attenuation Properties

Fifteen groundwater samples plus two field duplicates were collected and analyzed for water quality and natural attenuation properties, including trace metals (total and dissolved manganese), miscellaneous inorganics (common anions and total organic carbon), and micropurging stability indicators. Water quality and natural attenuation data are presented in Table 3-18.

Dissolved manganese was detected at concentrations that ranged from 20 to 4,900 mg/L in A-5 and A-8, respectively. Chloride concentrations ranged from 110 mg/L in OFS-3B to 550 mg/L in OS-3E. Total manganese was detected at concentrations that ranged from 20 to 5,500 mg/L in A-5 and A-8, respectively. Nitrate was detected at concentrations that ranged from 0.06 to 19 mg/L in DSW-4B and A-5, respectively. Nitrate also was detected in A-8 (at 16 mg/L). Nitrate was not detected in the remaining groundwater samples. Nitrite was not detected in the groundwater samples. Sulfate was detected at concentrations that ranged from 0.5 mg/L in OS-4C and DSW-6B to 510 mg/L in A-8. Sulfate was not detected in the remaining groundwater wells. TOC concentrations ranged from 2 mg/L in OS-4E to 140 mg/L in A-8.

Measurements made in the field included alkalinity (Hach® test kit), conductivity (YSI® 3560 meter), dissolved oxygen (Chemettes® test kit and YSI 3560 meter), hardness (Hach® test kit), total iron (Hach® test kit), oxygen reduction potential (YSI® 3560 meter), pH (YSI® 3560 meter), and temperature (YSI® 3560 meter). Turbidity was noted by visual observation. Natural attenuation data are presented in Table 3-18.

Alkalinity of groundwater is the measure of the acid-neutralizing capacity and is the sum of all the titratable bases. Alkalinity ranged from 144 mg/L $CaCO_3$ in OS-3E to 769 mg/L $CaCO_3$ in A-8.

Conductivity is a numerical expression of the ability of an aqueous solution to carry an electric current, which is dependent on temperature, ion concentration, and the mobility, valence, and relative concentration of those ions. Conductivity in the groundwater collected at the McCormick and Baxter site ranged from 968 mS/cm in OS-4B to 2,510 mS/cm in A-8.

Dissolved oxygen was measured in the groundwater collected at the site with a portable meter and with the Chemettes® test kit. Dissolved oxygen measured in the field ranged from 0.36 mg/L in DSW-7B to 2.71 mg/L in OS-4A. Dissolved oxygen measured in the laboratory ranged from 0.1 mg/L in A-5 to 3.5 mg/L in OS-4A.

Hardness is a measure of the capacity of a water to precipitate soap. Hardness concentration in the groundwater collected at the site ranged from 146 mg/L $CaCO_3$ in DSW-4D to 632 mg/L $CaCO_3$ in A-8.

Iron was measured in the field using a Hach® test kit. Total iron in the groundwater collected at the site ranged from 0.6 mg/L in OS-4C to 2.1 mg/L in DSW-7B.

Groundwater pH is the measure of the hydrogen ion concentration. At the McCormick and Baxter site, groundwater pH ranged from 6.88 (slightly acidic) in A-5 to 8.46 (basic) in DSW-4D.

Groundwater temperature was measured at each wellhead and was used to indicate well stability for groundwater sample collection. Temperature values ranged from 68.2^{o}F in OS-3E to 76.6^{o}F in A-8.

Groundwater turbidity was measured by visual observation. Seven groundwater samples were clear: DSW-4B, DSW-4C, DSW-6B, DSW-7A, OFS-3B, OFS-3E, and OFS-4C. Color was observed in five groundwater samples, specifically A-8 (rusty orange), DSW-7B (rusty particles), DSW-7C (blackish cloudy), OS-4A (rust color), and OS-4B (black particles).

3.8.3 Groundwater Contamination Trends

Data from the 1999 sampling event were assembled along with data from groundwater sampling events dating back to 1992. This larger data set was used to develop trend plots for three indicator contaminants: naphthalene, pentachlorophenol, and TCDD TEC. (Note that TCDD TEC is presented using one half the detection limit for congeners that were reported as nondetected.) The following discussion of the trend analysis results is limited to the 15 wells that were sampled in 1999.

Trend plots were not prepared for contaminants and wells when there were primarily nondetected levels for that particular indicator contaminant at that well.

3.8.3.1 Naphthalene Trends

Trend plots for naphthalene were prepared for wells A-8, DSW-4B, DSW-4C, DSW-6B, and DSW-6C. These trend plots are shown in Figures 3-15 through 3-19.

3.8.3.2 Pentachlorophenol Trends

Trend plots for pentachlorophenol were prepared for wells A-8, DSW-4B, DSW-4C, and DSW-6B. These trend plots are shown in Figures 3-20 through 3-23.

3.8.3.3 TCDD TEC Trends

Trend plots for TCDD TEC were prepared for wells DSW-4B, DSW-4C, DSW-6B, and DSW-6C. These trend plots are shown in Figures 3-24 through 3-27.

3.9 NAPL SAMPLING DATA

3.9.1 Chemical Composition Data

NAPL was collected from ONS-1B, A-10, and DSW-6B and analyzed for petroleum hydrocarbons and SVOCs. Petroleum hydrocarbons were identified in these samples as diesel-range organics, which ranged from 92 percent in ONS-1B to 13 percent in DSW-6B. SVOCs were detected in percent levels at each sampling location. Naphthalene was detected at concentrations that ranged from 3.2 to 13 percent in DSW-6B and ONS-1B, respectively. Pentachlorophenol was detected (at 0.18 percent) in A-10 only. Samples collected from DSW-6B and A-10 were not pure product and contained a significant amount of water, which could not be separated in the field. All NAPL chemistry results are presented in Table 3-19.

3.9.2 Physical Properties Summary

Samples were analyzed for density, viscosity, boiling point distribution/distillation, NAPL saturation, wettability, solubility, and oil-water interfacial tension. The analysis of these samples is not yet complete, so only partial results are presented in this report. In addition, the results presented here should be considered preliminary since the data quality review has not been completed. All analyses were performed at the EPA Kerr Environmental Laboratory, with the exception of boiling point distribution/distillation and NAPL saturation, which were performed at PTS Laboratories, Inc.

3.9.2.1 Density

Density as a function of temperature for groundwater and NAPL was measured using 25-mL volumetric flasks suspended in a water bath using the Kerr Laboratory SOP. Density measurements were made in triplicate. Measurements were started by determining the empty weight of the flask to the nearest 0.01 gram. The flasks were then filled to below the volumetric line with the fluid and were suspended in the water bath. The fluids were allowed to equilibrate to the highest temperature at which density measurements were to be made (in this case, 90°C).

After the fluids equilibrated to temperature, the volume was adjusted to approximately the volumetric line with additional fluid that also was at the measurement temperature, and the flasks were resuspended in the water bath to ensure that they remained at the desired temperature. After this second equilibration period, the volume in the flasks was double checked; if needed, volume adjustments were again made. If the volume was correct, the flasks were thoroughly dried on the outside, and on the inside of the flask above the volumetric line, then weighed to the nearest 0.01 gram. The weight of fluid in the flask and the volume (25 mL) was used to calculate the density in grams per milliliter. The temperature in the water bath was adjusted for the next measurement, and the flasks were resuspended in the water bath. By working from the highest to the lowest temperature for which measurements were made, fluid was always added to the flasks, and volumes were easily adjusted. Standard deviation of the three replicate measurements was expected to generally be about 0.001 g/mL.

NAPL samples were collected from three locations and analyzed for density at the EPA Robert S. Kerr Laboratory in Ada, Oklahoma. NAPL samples were analyzed for density using the Kerr Laboratory SOP. Density was measured in triplicate at nine 10ºC temperature intervals beginning at 10°C and ending at 90°C. The density of each sample decreased as temperature was increased. Density measurements in A-10 and DSW-6B decreased to less than 1.0 g/mL at the 90°C endpoint. Density in DSW-6B decreased to less than 1.0 g/mL at 20°C. Field duplicate samples were collected from locations A-10 and ONS-1B. The ONS-1B triplicate density measurement demonstrated expected reproducibility. Sample A-10 and the field duplicate sample were reanalyzed due to unexpectedly poor reproducibility. The resulting density data were in good agreement, and were closer to that of the A-10 sample than the field duplicate sample. Table 3-20 presents the density measurement results for all sample analyses.

3.9.2.2 Viscosity

NAPL samples were analyzed for viscosity using the Kerr Laboratory SOP based on ASTM D1296. Viscosity was measured with a Brookfield viscometer with a small sample adapter and water jacket. The water jacket was hooked up to a water bath so that the temperature could be adjusted in the range of 10ºC to 90°C. Triplicate viscosity measurements were taken at 60, 30, and 12 rpm in 10ºC increments beginning at 10°C. Triplicate measurements were made to demonstrate reproducibility. Viscosity decreased as the temperature was increased in each sample and at all viscometer speeds, and viscosity decreased regardless of viscometer speed. Table 3-21 presents the viscosity data for all samples.

Viscosities less than 5 centipoise (cP) should be considered approximate as 5 cP is the practical lower limit of measurement for the equipment used. However, the reproducibility of the measurements indicates that these estimates are reasonable.

3.9.2.3 Boiling Point Distribution/Distillation

Three NAPL samples (from ONS-1B, A-10, and DSW-6B) were collected and analyzed by PTS Laboratories, Inc., for percent distillation fractions using ASTM 2887. The NAPL recovered from ONS-1B boiled at the lowest temperature (322ºF), whereas the NAPL recovered from A-10 and DSW-6B initially boiled at 334°F and 331°F, respectively. The final fraction of NAPL recovered from A-10 boiled at the highest temperature (1058°F). Fifty percent of each sample volume was distilled at 494°F in DSW-6B, 527°F in ONS-1B, and 562°F in A-10.

Table 3-22 presents the boiling point ranges for each NAPL sample.

3.9.2.4 NAPL Saturation

Ten soil samples were collected from three locations (SB-099, SB-086, and SB-028) and analyzed for hydrocarbon saturation by PTS Laboratories, Inc., using API RP 40. Hydrocarbon saturation was calculated as a function of percent volume of water and hydrocarbon in the soil sample as measured from the extracted and dried sample core and the total available pore space in the soil core. Hydrocarbon saturation ranged from less than 0.1 percent in SB-028 (48 to 49.7 feet bgs) and SB-099 (13.4 to 14.7 feet bgs) to 77.0 percent in SB-099 (31 to 33 feet bgs). NAPL saturation results are presented in Table 3-23.

3.9.2.5 Wettability

Wettability data will be reported in the Treatability Study Report.

3.9.2.6 Solubility

Solubility data will be reported in the Treatability Study Report..

3.9.2.7 Oil-Water Interfacial Tension

The surface and interfacial tension of NAPL samples and groundwater from the site were measured using a Fisher surface tensiometer, Model 20. The procedure used basically follows ASTM Method D971. The samples were set into a jacketed beaker that was connected to a water bath to bring the fluid(s) to the desired temperature. Surface and interfacial tension measurements were collected at 10°C intervals in the range of 10ºC to 90°C.

These data will be reported in the Treatability Study Report.

Table 3-1
Summary of Survey Data

Location ID	Northing (feet NAD83)	Easting (feet NAD83)	Elevation (feet NVD88)				Surveyed Location?	Surveyed Elevation?
			Ground Surface	Inner Casing	Outer Casing	Monument		
A-1	2169318.40	6327088.59		12.01	12.15		Yes	Yes
A-2	2169042.40	6329505.65		10.58	10.86		Yes	Yes
A-3	2168753.37	6327372.41		15.37	15.41		Yes	Yes
A-4	2168724.96	6327604.80		12.45	12.95		Yes	Yes
A-5	2168498.44	6327782.39		11.19	11.65		Yes	Yes
A-6	2168637.23	6328558.96		10.63	11.01		Yes	Yes
A-7	2169012.65	6328736.77		10.83	11.43		Yes	Yes
A-8	2168825.45	6328233.52		13.51			Yes	Yes
A-10	2169070.92	6327416.75		12.32	12.96		Yes	Yes
DSW-1B	2168927.26	6328774.42		10.49	10.87		Yes	Yes
DSW-1C	2168903.31	6328778.58		10.12	10.54		Yes	Yes
DSW-1D	2168915.88	6328776.60		10.98	11.07		Yes	Yes
DSW-2A	2169044.56	6329494.83		10.79	10.90		Yes	Yes
DSW-2B	2169056.61	6329504.72		10.80	10.86		Yes	Yes
DSW-2C	2169055.65	6329492.03		10.41	10.56		Yes	Yes
DSW-2D	2169057.89	6329513.84		10.65	10.99		Yes	Yes
DSW-2E	2169049.45	6329514.40		10.61	11.03		Yes	Yes
DSW-3B	2169301.11	6327103.23		11.43	11.83		Yes	Yes
DSW-3C	2169287.20	6327100.85		12.66	13.12		Yes	Yes
DSW-4B	2168567.25	6328462.94		9.97		10.25	Yes	Yes
DSW-4C	2168567.39	6328469.05		9.75		10.08	Yes	Yes
DSW-4D	2168569.43	6328483.13		13.15	13.11		Yes	Yes
DSW-4E	2168571.06	6328496.87		11.01	11.11		Yes	Yes
DSW-5B	2168852.87	6328471.67		11.19	11.49		Yes	Yes
DSW-6B	2168534.00	6327805.10		13.05	13.52		Yes	Yes
DSW-6C	2168500.00	6327907.60		13.40	13.68		Yes	Yes
DSW-7A	2168749.39	6329119.81		9.43		9.753	Yes	Yes

Table 3-1 (Continued)
Summary of Survey Data

Location ID	Northing (feet NAD83)	Easting (feet NAD83)	Elevation (feet NVD88)				Surveyed Location?	Surveyed Elevation?
			Ground Surface	Inner Casing	Outer Casing	Monument		
DSW-7B	2168758.43	6329136.26		9.35		9.77	Yes	Yes
DSW-7C	2168749.75	6329134.11		9.15		9.768	Yes	Yes
MW-1A	2168857.78	6327864.36		11.44	15.23	11.888	Yes	Yes
MW-2E	2168532.12	6327812.34		11.02	14.65	11.5	Yes	Yes
OFS-1A	2168509.87	6327233.96				7.435	Yes	Yes
OFS-1B	2168504.92	6327242.88				7.397	Yes	Yes
OFS-1C	2168499.36	6327252.54				7.386	Yes	Yes
OFS-1D	2168493.45	6327264.32				7.446	Yes	Yes
OFS-2A	2168048.44	6327551.81				7.645	Yes	Yes
OFS-2C	2168062.35	6327548.48				7.666	Yes	Yes
OFS-2D	2168082.57	6327545.26				7.477	Yes	Yes
OFS-3A	2167994.11	6328084.09				8.137	Yes	Yes
OFS-3B	2167984.29	6328085.91				8.15	Yes	Yes
OFS-3C	2167973.02	6328088.06				8.18	Yes	Yes
OFS-3D	2167959.33	6328090.57				8.221	Yes	Yes
OFS-3E	2167945.60	6328092.90				8.282	Yes	Yes
OFS-4A1	2168373.50	6328867.20				7.854	Yes	Yes
OFS-4A2	2168364.72	6328872.76				7.698	Yes	Yes
OFS-4C	2168355.02	6328878.29				7.715	Yes	Yes
OFS-4D	2168342.33	6328885.80				7.573	Yes	Yes
OFS-4E	2168329.33	6328893.17				7.713	Yes	Yes
OFS-5A	2169903.74	6327941.65				12.633	Yes	Yes
OFS-5C	2169904.00	6327960.24				12.602	Yes	Yes
OFS-5E	2169903.89	6327980.99				12.559	Yes	Yes
ONS-1B	2168787.85	6328317.77		10.84		11.198	Yes	Yes
ONS-1C	2168768.06	6328320.30		10.58		11.109	Yes	Yes
ONS-1D	2168748.08	6328322.50		10.72		11.032	Yes	Yes

Table 3-1 (Continued)
Summary of Survey Data

Location ID	Northing (feet NAD83)	Easting (feet NAD83)	Elevation (feet NVD88)				Surveyed Location?	Surveyed Elevation?
			Ground Surface	Inner Casing	Outer Casing	Monument		
ONS-2A	2168909.03	6327584.89		12.71		12.957	Yes	Yes
ONS-2B	2168888.48	6327586.02		12.76		13.086	Yes	Yes
ONS-2C	2168868.65	6327586.77		12.44		12.804	Yes	Yes
ONS-2D	2168849.55	6327588.08		12.65		12.914	Yes	Yes
OS-1A	2168285.78	6330356.25				9.512	Yes	Yes
OS-1B	2168278.99	6330357.12				9.52	Yes	Yes
OS-1C	2168272.20	6330353.44				9.20	Yes	Yes
OS-1E	2168276.51	6330352.24				8.87	Yes	Yes
OS-2E	2167231.59	6328302.82				7.954	Yes	Yes
OS-3E	2168101.58	6329492.62				6.427	Yes	Yes
OS-4A	2167878.28	6329127.54				8.209	Yes	Yes
OS-4B	2167876.44	6329121.01				8.263	Yes	Yes
OS-4C	2167875.43	6329115.33				8.084	Yes	Yes
OS-5B	2167697.99	6330604.48				11.695	Yes	Yes
OS-5C	2167692.85	6330605.69				11.704	Yes	Yes
OS-5D	2167702.42	6330603.61				11.556	Yes	Yes
OS-6B	2168035.80	6330471.70				9.756	Yes	Yes
OS-6C	2168030.88	6330466.78				9.692	Yes	Yes
OS-6D	2168025.06	6330475.34				9.84	Yes	Yes
SB-004	2168530.00	6327814.00	11				No	No
SB-006	2169011.96	6328377.65	14.166				Yes	Yes
SB-007	2169073.72	6328649.30	10.728				Yes	Yes
SB-018	2168790.07	6327641.54	11.79				Yes	Yes
SB-019	2168770.14	6328253.20	11.408				Yes	Yes
SB-025	2168934.16	6327760.78	11.972				Yes	Yes
SB-027	2168923.73	6328116.43	15.439				Yes	Yes
SB-028	2168832.28	6328158.98	13.965				Yes	Yes
SB-030	2168594.50	6328483.28	9.315				Yes	Yes

Table 3-1 (Continued)
Summary of Survey Data

Location ID	Northing (feet NAD83)	Easting (feet NAD83)	Elevation (feet NVD88)				Surveyed Location?	Surveyed Elevation?
			Ground Surface	Inner Casing	Outer Casing	Monument		
SB-047	2168536.11	6328360.48	8.599				Yes	Yes
SB-051	2168616.19	6327801.41	11.238				Yes	Yes
SB-052	2168497.80	6327907.56	9.765				Yes	Yes
SB-057	2168863.69	6327880.42	11.483				Yes	Yes
SB-061	2168677.21	6328074.10	10.695				Yes	Yes
SB-084	2169059.97	6327407.89	12.591				Yes	Yes
SB-086	2168998.18	6327539.97	12.345				Yes	Yes
SB-092	2168822.59	6328562.41	10.223				Yes	Yes
SB-099	2168958.55	6328347.32	15.023				Yes	Yes
SE-001	2169104.00	6327335.00	11.9				No	No
SE-001A	2169104.00	6327333.00	11.9				No	No
SE-002	2168955.23	6327617.18	12.222				Yes	Yes
SE-002A	2168958.37	6327615.65	12.277				Yes	Yes
SE-002B	2168957.95	6327616.88	12.363				Yes	Yes
SE-003	2168514.00	6327854.00	10.5				No	No
SE-003A	2168516.00	6327854.00	10.5				No	No
SE-005	2168896.87	6328152.49	14.842				Yes	Yes
SE-008	2168911.44	6327851.57	13.697				Yes	Yes
SE-009	2168857.19	6327995.79	11.322				Yes	Yes
SE-010	2168941.79	6328036.85	13.358				Yes	Yes
SE-011	2168927.96	6327936.39	14.051				Yes	Yes
SE-012	2168714.00	6328408.00	11				No	No
SE-013	2168722.99	6327782.53	11.48				Yes	Yes
SE-014	2168590.57	6328133.40	9.961				Yes	Yes
SE-015	2168647.66	6328235.42	10.653				Yes	Yes
SE-016	2168705.00	6327950.00	11.2				No	No
SE-017	2168916.87	6328514.94	11.425				Yes	Yes
SE-020	2168812.00	6327854.00	11.3				No	No

Table 3-1 (Continued)
Summary of Survey Data

Location ID	Northing (feet NAD83)	Easting (feet NAD83)	Elevation (feet NVD88)				Surveyed Location?	Surveyed Elevation?
			Ground Surface	Inner Casing	Outer Casing	Monument		
SE-021	2168970.00	6327392.00	12.3				No	No
SE-022	2168827.51	6327506.27	12.473				Yes	Yes
SE-023	2168808.56	6327733.62	12.028				Yes	Yes
SE-024	2169030.00	6327475.00	12.2				No	No
SE-026	2168667.52	6327862.24	11.037				Yes	Yes
SE-029	2168678.85	6328491.20	9.845				Yes	Yes
SE-031	2168632.93	6328663.07	9.782				Yes	Yes
SE-032	2168934.30	6327486.85	12.66				Yes	Yes
SE-033	2168854.34	6327326.83	13.192				Yes	Yes
SE-034	2168631.00	6327454.00	14.2				No	No
SE-035	2168729.81	6327380.27	14.311				Yes	Yes
SE-036	2168542.00	6327969.00	10.6				No	No
SE-037	2168680.72	6328281.65	10.546				Yes	Yes
SE-038	2168594.54	6328406.53	9.297				Yes	Yes
SE-039	2169174.00	6327250.00	11.2				No	No
SE-040	2169260.00	6327108.00	127.2				No	No
SE-041	2168740.82	6327610.22	12.435				Yes	Yes
SE-042	2169106.00	6328818.00	11.5				No	No
SE-043	2168547.69	6328304.42	9.839				Yes	Yes
SE-044	2168728.00	6328111.00	11.4				No	No
SE-045	2168625.25	6327743.05	11.634				Yes	Yes
SE-046	2168494.00	6327820.00	10				No	No
SE-048	2169080.00	6327188.00	12.2				No	No
SE-049	2168508.19	6328038.64	9.979				Yes	Yes
SE-050	2168859.01	6327827.34	12.08				Yes	Yes
SE-053	2169218.00	6327158.00	11.8				No	No
SE-054	2169202.00	6329122.00	10				No	No
SE-054A	2169198.00	6329122.00	10				No	No

Table 3-1 (Continued)
Summary of Survey Data

Location ID	Northing (feet NAD83)	Easting (feet NAD83)	Elevation (feet NVD88)				Surveyed Location?	Surveyed Elevation?
			Ground Surface	Inner Casing	Outer Casing	Monument		
SE-055	2169356.00	6329072.00	10.5				No	No
SE-056	2168785.48	6327934.34	11.36				Yes	Yes
SE-058	2168813.62	6328016.72	11.461				Yes	Yes
SE-059	2168806.84	6327567.63	12.76				Yes	Yes
SE-060	2168900.29	6327537.30	12.282				Yes	Yes
SE-062	2168934.77	6327990.17	13.959				Yes	Yes
SE-063	2168927.44	6327883.28	14.113				Yes	Yes
SE-064	2168928.51	6327857.23	14.016				Yes	Yes
SE-064A	2168928.23	6327859.39	13.99				Yes	Yes
SE-065	2169082.00	6328900.00	11.1				No	No
SE-066	2169075.00	6328718.00	11.5				No	No
SE-067	2169054.67	6328500.60	12.202				Yes	Yes
SE-068	2168722.54	6328231.39	11.462				Yes	Yes
SE-069	2168734.33	6328301.78	10.946				Yes	Yes
SE-070	2168776.48	6328556.34	11.203				Yes	Yes
SE-071	2168873.20	6328476.03	10.991				Yes	Yes
SE-072	2168944.83	6328453.94	11.722				Yes	Yes
SE-073	2168865.24	6328637.21	10.41				Yes	Yes
SE-074	2168900.45	6327664.80	12.692				Yes	Yes
SE-075	2168896.30	6327415.09	12.452				Yes	Yes
SE-076	2169004.88	6327296.21	12.426				Yes	Yes
SE-077	2169126.00	6327213.00	12.2				No	No
SE-078	2168916.46	6327337.17	12.945				Yes	Yes
SE-079	2168788.69	6328643.96	10.169				Yes	Yes
SE-080	2168719.84	6328616.33	10.079				Yes	Yes
SE-081	2168764.87	6328687.23	9.611				Yes	Yes
SE-082	2168301.00	6327696.00	8.5				No	No
SE-083	2168290.00	6327736.00	8.5				No	No

Table 3-1 (Continued)
Summary of Survey Data

Location ID	Northing (feet NAD83)	Easting (feet NAD83)	Elevation (feet NVD88)				Surveyed Location?	Surveyed Elevation?
			Ground Surface	Inner Casing	Outer Casing	Monument		
SE-085	2169144.00	6327150.00	12.3				No	No
SE-087	2169169.00	6327266.00	12.1				No	No
SE-088	2169137.00	6327350.00	12.1				No	No
SE-089	2169061.55	6327490.59	12.499				Yes	Yes
SE-089A	2169061.21	6327493.28	12.63				Yes	Yes
SE-089B	2169049.80	6327512.22	12.531				Yes	Yes
SE-090	2168951.92	6327700.58	12.168				Yes	Yes
SE-091	2168978.00	6328633.00	11.1				No	No
SE-093	2168693.48	6328686.73	9.652				Yes	Yes
SE-094	2168655.29	6328444.56	9.685				Yes	Yes
SE-095	2168547.23	6327878.62	10.937				Yes	Yes
SE-096	2168624.22	6327961.35	10.637				Yes	Yes
SE-097	2168506.38	6327802.38	10.893				Yes	Yes
SE-097A							No	No
SE-098	2168567.13	6328454.03	9.927				Yes	Yes

Table 3-2
Comparison of SCAPS CPT Soil Classification to Visual Soil Descriptions and Laboratory Grain Size Analysis

Location ID	Sample ID[1]	Soil Description					
		SCAPS CPT				Visual	Grain Size Analysis Description[3]
		Soil Classification Number			Equivalent Grain Size[2]		
		Average	Min	Max			
SB-030	SB030-161.7-162.2	NA	NA	NA	NA	Sand	Sand with silt
SB-047	SB047-117.2-117.9	NA	NA	NA	NA	Clay	Silt
SB-047	SB047-141.3-142.1	NA	NA	NA	NA	Sand	Sand with silt
SB-047	SB047-167.5-168.4	NA	NA	NA	NA	Clay	Silt
SB-047	SB047-209.1-209.6	NA	NA	NA	NA	Clay	Silt
SB-047	SB047-244.0-245.0	NA	NA	NA	NA	Sand and gravel	Sand with silt and gravel
SB-052	SB052-122-123	NA	NA	NA	NA	Sand	Sand with silt
SB-052	SB052-156-156.6	NA	NA	NA	NA	Clay	Silt
SB-099	SB099-111.5-112.5	NA	NA	NA	NA	Sand	Sandy silt
SB-099	SB099-118.8-119.8	NA	NA	NA	NA	Clay	Silt
SB-099	SB099-176.9-177.6	NA	NA	NA	NA	Clay	Silt
SB-099	SB099-193-194	NA	NA	NA	NA	Sand	Silty sand
SE-002	SS002-14.3-15.1	0.93	0.65	1.41	Clays	Silty/clay	
SE-002	SS002-15.1-16.0	0.61	0.35	0.90	Clays	Silty/clay	
SE-002	SS002-24.5-25.6	2.10	1.23	3.07	Sand mixtures	Clay	
SE-002	SS002-25.6-26.5	2.89	2.31	3.11	Sand mixtures	Sand	
SE-002	SS002-84-86	1.98	0.30	3.07	Silt mixtures	Sand	
SE-005	SS005-29.5-30.5	2.68	1.79	3.25	Sand mixtures	Sand	
SE-005	SS005-30.5-31.6	2.41	1.87	3.08	Sand mixtures	Clay	
SE-005	SS005-43-45	3.62	3.18	3.85	Sands	Sand	
SE-005	SS005-67-69	3.75	3.07	3.92	Sands	Clay/sand	
SE-005	SS005-86-87.5	3.65	2.76	4.00	Sands	Sand	
SE-008	SS008-10.5-11.7	1.75	1.37	2.58	Silt mixtures	Clay	
SE-008	SS008-19-21	1.82	1.62	2.32	Silt mixtures	Clay	
SE-008	SS008-40-41.5	4.20	4.10	4.24	Sands & gravels	Sand	
SE-008	SS008-42-44	3.84	3.43	4.11	Sands	Sand	
SE-008	SS008-45-45.9	2.15	1.17	2.43	Sand mixtures	Sand	
SE-008	SS008-48-50	3.94	3.68	4.06	Sands	Sand	
SE-009	SS009-21-23	1.97	0.55	2.52	Silt mixtures	Silty/sand	
SE-009	SS009-55-57	4.14	3.99	4.26	Sands & gravels	Sand	
SE-009	SS009-69-70	2.85	2.52	3.24	Sand mixtures	Sand	
SE-010	SS010-12-14	1.62	1.03	2.22	Silt mixtures	Clay	
SE-010	SS010-30-31.2	3.71	3.19	4.21	Sands	Sand	Silty sand
SE-010	SS010-59-59.8	3.35	3.17	3.56	Sands	Sand and gravel	
SE-010	SS010-61.5-63	1.81	0.75	2.51	Silt mixtures	Silt	
SE-010	SS010-61-61.5	1.78	1.62	2.10	Silt mixtures	Sandy/clay	
SE-020	SS020-29-31	ND	ND	ND	ND	Sandy/clay	
SE-020	SS020-47-49	1.62	0.00	2.73	Silt mixtures	Silty/sand	
SE-020	SS020-51-51.8	3.06	2.78	3.38	Sands	Sand	
SE-020	SS020-56-58	3.87	3.63	4.03	Sands	Sand	
SE-020	SS020-60-62	3.82	2.81	4.21	Sands	Sand	
SE-028	SS028-10.1-11	0.65	0.44	0.80	Clays	Clay	

Table 3-2 (Continued)
Comparison of SCAPS CPT Soil Classification to Visual Soil Descriptions and Laboratory Grain Size Analysis

Location ID	Sample ID[1]	Soil Description					
		SCAPS CPT				Visual	Grain Size Analysis Description[3]
		Soil Classification Number			Equivalent Grain Size[2]		
		Average	Min	Max			
SE-028	SS028-9.0-10.1	0.36	0.20	0.47	Clays	Clay	
SE-035	SS035-50-52	0.81	0.44	1.45	Clays	Clay	
SE-035	SS035-54.4-55.2	2.55	2.08	3.03	Sand mixtures	Sand	
SE-035	SS035-54-54.4	2.26	2.02	2.54	Sand mixtures	Sand	
SE-035	SS035-58-59.2	1.26	0.70	2.24	Silt mixtures	Clay	
SE-035	SS035-59.2-60	0.91	0.75	1.56	Clays	Clay	
SE-037	SS037-31-32.6	2.17	0.84	3.80	Sand mixtures	Sand	
SE-037	SS037-56-57	3.46	2.66	3.68	Sands	Sand	
SE-037	SS037-93-95	1.21	0.53	2.89	Silt mixtures	Silt	
SE-039	SS039-10-12	0.93	0.45	1.27	Clays	Clay	
SE-039	SS039-19-20.6	3.26	1.90	3.83	Sands	Sand	
SE-039	SS039-22-22.4	4.33	4.31	4.34	Sands & gravels	Sand	
SE-039	SS039-40-42	0.89	0.36	1.81	Clays	Silty/clay	
SE-043	SS043-13-15	1.18	0.64	1.73	Silt mixtures	Silty/sand	
SE-043	SS043-23-25	1.44	0.68	2.08	Silt mixtures	Silty/sand	
SE-043	SS043-27-29	2.07	0.96	2.91	Sand mixtures	Silt	
SE-043	SS043-7-8.6	0.80	0.53	1.25	Clays	Clay	
SE-047	SS047-10-12	1.50	1.25	1.70	Silt mixtures	Silt	
SE-047	SS047-12-14	1.70	1.14	2.68	Silt mixtures	Silt	
SE-047	SS047-14-15	2.52	2.01	2.84	Sand mixtures	Sand/silt	
SE-047	SS047-20-22	1.13	0.90	1.40	Silt mixtures	Silt/sand	
SE-047	SS047-21.6-22	1.23	1.15	1.34	Silt mixtures	Silt/sand	
SE-064	SS064-31-33	3.30	3.07	3.51	Sands	Sand/silt	
SE-064	SS064-34-36	3.19	2.27	3.63	Sands	Sand	
SE-064	SS064-41-43	1.26	0.35	2.16	Silt mixtures	Clay	Sandy silt
SE-064	SS064-50-51	2.03	0.43	3.17	Sand mixtures	Sand	
SE-064	SS064-62-63.3	3.20	2.13	3.72	Sands	Sand	
SE-064	SS064-67-69	0.51	0.41	0.69	Clays	Clay	
SE-079	SS079-48.7-48.9	3.55	3.50	3.62	Sands	Sand	
SE-079	SS079-48-48.7	3.64	3.55	3.67	Sands	Sand	
SE-079	SS079-51-52	3.63	3.22	3.85	Sands	Sand	
SE-079	SS079-54.2-55	1.43	0.80	1.82	Silt mixtures	Clay	
SE-079	SS079-54-54.2	1.12	1.02	1.23	Silt mixtures	Sand	
SE-079	SS079-58-60	1.15	0.44	2.93	Silt mixtures	Clay/silt	
SE-079	SS079-63.9-65	0.72	0.47	1.00	Clays	Clay	Sandy silt
SE-079	SS079-63-63.9	0.52	0.23	1.00	Clays	Clay	
SE-079	SS079-80-81	2.90	2.46	3.51	Sand mixtures	Sand	
SE-081	SS081-50-50.6	4.02	3.92	4.11	Sands & gravels	Clay/gravel	
SE-081	SS081-50-52	3.01	0.47	4.11	Sands	Clay/gravel	
SE-088	SS088-10.3-11	0.63	0.49	0.69	Clays	Clay	
SE-088	SS088-14-15.4	1.26	1.05	1.35	Silt mixtures	Clay	
SE-088	SS088-20-21	2.32	0.70	3.39	Sand mixtures	Clay/sand/silt	

Table 3-2 (Continued)
Comparison of SCAPS CPT Soil Classification to Visual Soil Descriptions and Laboratory Grain Size Analysis

Location ID	Sample ID[1]	Soil Description					
		SCAPS CPT				Visual	Grain Size Analysis Description[3]
		Soil Classification Number			Equivalent Grain Size[2]		
		Average	Min	Max			
SE-088	SS088-24-25.8	3.47	1.27	4.24	Sands	Sand/clay	
SE-088	SS088-30-31.3	3.55	3.23	3.88	Sands	Sand	Silty sand
SE-088	SS088-36-38	0.65	0.50	0.88	Clays	Clay/silt	Silt
SE-088	SS088-5.4-5.8	ND	ND	ND	ND	Silty/sand	
SE-088	SS088-9-10.3	0.75	0.37	1.20	Clays	Clay	
SE-093	SS093-25-26.7	0.78	0.43	1.67	Clays	Clay	
SE-093	SS093-26.7-27	0.68	0.55	0.79	Clays	Clay	
SE-093	SS093-45-46	2.89	0.58	3.79	Sand mixtures	Sand	
SE-093	SS093-63-65	3.79	3.58	3.94	Sands	Sand	
SE-093	SS093-66-67	3.21	2.06	3.53	Sands	Clay/sand	
SE-093	SS093-67-68	2.48	1.78	3.52	Sand mixtures	Sandy/clay	
SE-096	SS096-63-65	1.64	0.32	3.49	Silt mixtures	Sand/silt/clay	
SE-096	SS096-66-67.6	3.51	3.38	3.62	Sands	Sand	
SE-096	SS096-73-74.2	0.46	0.39	0.53	Clays	Clay	
SE-096	SS096-74.2-75	0.57	0.47	0.73	Clays	Clay	Sandy silt
SE-096	SS096-78.7-79.5	3.17	3.03	3.25	Sands	Sand	Silty sand
SE-096	SS096-78-78.7	3.00	2.91	3.11	Sand mixtures	Sand	
SE-096	SS096-81-82.4	2.79	1.53	3.16	Sand mixtures	Sand	
SE-096	SS096-84.5-84.8	3.93	3.76	4.04	Sands	Sand/gravel	
SE-096	SS096-94-96	0.84	0.49	1.75	Clays	Silty/clay	
SE-097	SS097-100-102	1.06	0.26	2.07	Silt mixtures	Silty/clay	
SE-097	SS097-75.0-76.2	3.46	2.80	3.68	Sands	Sand/silt/clay	Sandy silt
SE-097	SS097-76.2-76.6	3.50	3.46	3.56	Sands	Sand	
SE-097	SS097-87-89	0.29	0.06	0.64	Clays	Silty/clay	
SE-097	SS097-90-92	0.48	0.22	0.73	Clays	Clay/silt	
SE-097	SS097-92.6-94	0.79	0.28	1.26	Clays	Silty/sand	

[1]Sample ID shows depth interval of soil sample.
[2]Based on the average soil classification number for the sampled interval.
[3]Abbreviated description using ASTM D2487. Plasticity data are not available for classification of fines.

Notes:
NA - SCAPS CPT data not available for this depth interval (greater than SCAPS total depth) or no associated SCAPS push (i.e., SB099)
ND - not detected. SCAPS CPT malfunction and no soil classification number available.

Table 3-3
PCB Soil Sampling Results From the Cellon Process Area

Location ID	SE-008	SE-008	SE-008	SE-008	SE-008	SE-008	SE-008
Sample ID	SS008-10.5-11.7	SS508-10.5-11.7	SS008-19-21	SS008-40-41.5	SS008-42-44	SS008-45-45.9	SS008-48-50
Sample Date	8/8/99	8/8/99	8/8/99	8/8/99	8/8/99	8/8/99	8/8/99
Field QC		Field Duplicate					
Soil Description	Clay	Clay	Clay	Sand	Sand	Sand	Sand
NAPL Description	Odor	Odor	Nothing	Visible	Mobile	Nothing	Mobile
PCBs (µg/kg)							
Aroclor 1016	300 U	300 U	300 U	300 U	300 U	300 U	300 U
Aroclor 1221	600 U	600 U	600 U	600 U	600 U	600 U	600 U
Aroclor 1232	300 U	300 U	300 U	300 U	300 U	300 U	300 U
Aroclor 1242	300 U	300 U	300 U	300 U	300 U	300 U	300 U
Aroclor 1248	300 U	300 U	300 U	300 U	300 U	300 U	300 U
Aroclor 1254	300 U	300 U	300 U	300 U	300 U	300 U	300 U
Aroclor 1260	300 U	300 U	300 U	300 U	300 U	300 U	300 U

Notes:
Results are dry weight.
U - undetected

Table 3-4
In Situ LIF/TRPH Evaluation of False Positive/False Negative Responses

Method	False Positive	False Negative
In situ LIF	20	1

Table 3-5
Ex Situ LIF/TRPH Evaluation of False Positive/False Negative Responses

Method	False Positive	False Negative
Bench LIF	0	2

Table 3-6
Identification of Soil Intervals Containing NAPL

Push Location	Depth Interval (feet bgs)	In Situ Wavelength (nanometers)	Comments
SE-1 and SE-1a	10-13	470	NAPL suspected based on LIF wavelength and response.
	50-60	470	NAPL suspected based on LIF wavelength and response.
SE-2 and SE-2a	23-50	471	NAPL confirmed with soil sample.
	64-66	471	NAPL confirmed with soil sample.
	84-86		Sheen and odor noted in soil sample no significant LIF response.
SE-3			No data.
SE-4	100-104	470	Sheen confirmed in SB04.
SE-5	8-12	494-499	Unique peak shape with two humps. NAPL confirmed with soil sample.
	15-20	494-499	Unique peak shape with two humps. NAPL confirmed with soil sample.
	22-28	494-499	Unique peak shape with two humps. NAPL confirmed with soil sample.
	30-35	494-499	Unique peak shape with two humps. NAPL confirmed with soil sample.
	54-60	494-499	Unique peak shape with two humps. NAPL confirmed with soil sample.
	66-70	494-499	Unique peak shape with two humps. NAPL confirmed with soil sample.
SE-6	44	410	Spike at 44 feet bgs had wavelength of 410 nanometers; not target contamination.
	53-60	468	NAPL suspected based on LIF wavelength and response. Odor noted in SB06-54.
	75-80	468	NAPL suspected based on LIF wavelength and response.
SE-7	30-37	466	NAPL suspected based on LIF wavelength and response.
	42-44	470	NAPL suspected based on LIF wavelength and response.
	47-50	470	NAPL suspected based on LIF wavelength and response.
	61-68	468	NAPL suspected based on LIF wavelength and response.
SE-8	24-26	454	NAPL suspected based on LIF wavelength and response.
	40-42	468	NAPL suspected based on LIF wavelength and response.
	42-44	468	NAPL suspected based on LIF wavelength and response.
	44-45	468	NAPL suspected based on LIF wavelength and response.
	45-47	404	Low wavelength for site target contamination.

Table 3-6 (Continued)
Identification of Soil Intervals Containing NAPL

Push Location	Depth Interval (feet bgs)	In Situ Wavelength (nanometers)	Comments
SE-8 (Continued)	48-50	468 (ex situ)	Low LIF in situ response; however, mobile NAPL present in soil sample. Ex situ LIF was 2,349 counts at 469 nanometers. The difference in these results may be due to heterogeneity of soil contamination or mistake on sample interval. NAPL should be considered to be present from 40-50 feet bgs.
SE-9			Clean push that was confirmed with soil sampling.
SE-10	59-65	473-480	Confirmed visible NAPL. Slightly higher wavelength similar to other samples collected near asphalt cap area.
SE-11	50-52	468	NAPL suspected based on LIF wavelength and response.
SE-12			Clean push.
SE-13	60-68	468	NAPL suspected based on LIF wavelength and response.
SE-14			Clean push. Peak at 20.2 feet bgs had a wavelength of 420 nanometers and unlikely to be site contamination of concern.
SE-15	35-37	464	Barely above 300 count threshold; however, SE-15 is located west of the office building near SE-37. NAPL was confirmed in soil sample collected from SE-37.
	47-50		Irregular peak shape and low wavelength unlikely to be site target contamination.
	65-66	467	Barely above 300 count threshold; however, SE-15 is located west of the office building near SE-37. NAPL was confirmed in soil sample collected from SE-37.
SE-16	43-44	460	NAPL suspected based on LIF wavelength and response.
SE-17			Clean push.
SE-18	50-52	472	NAPL suspected based on LIF wavelength and response.
	60-63	468	NAPL suspected based on LIF wavelength and response.
SE-19	7-11	473	NAPL suspected based on LIF wavelength and response.
	33-40	435	Odor noted in SB019 from 37-54 feet bgs. Soil samples collected from SB019 were ND for PAH and PCP; however, TPH was above detection level. Contamination in this interval is questionable due to low wavelength.
	50-60	476	NAPL suspected based on LIF wavelength and response.
SE-20	29-32	467-476	Sheen confirmed 29-31 feet bgs. Low level response; however, curve has correct shape and wavelength.

Table 3-6 (Continued)
Identification of Soil Intervals Containing NAPL

Push Location	Depth Interval (feet bgs)	In Situ Wavelength (nanometers)	Comments
SE-20 (Continued)	40-47	467-476	Low level response; however, curve has correct shape and wavelength.
	47-50	471	Mobile NAPL confirmed in soil sample.
	51-63	470	Mobile NAPL confirmed in soil sample.
SE-21	50-57	468	NAPL suspected based on LIF wavelength and response.
	64-66	468	NAPL suspected based on LIF wavelength and response.
SE-22	30-37	470	This push is located just north of stormwater ponds. The LIF counts in all intervals are just barely above the 300 count threshold limit. NAPL presence at this location is questionable.
	39-41	471	NAPL suspected based on LIF wavelength and response.
	76-80	469	NAPL suspected based on LIF wavelength and response.
SE-23	28-30	448	NAPL suspected based on LIF wavelength and response.
	52-56	470	NAPL suspected based on LIF wavelength and response.
	80-83	469	NAPL suspected based on LIF wavelength and response.
SE-24	6-11	467	All LIF results for this push location are just above threshold; however, located in main OWP Area, and peak shape and wavelength are consistent with site target contamination, so NAPL presence is likely.
	22-30	467	NAPL suspected based on LIF wavelength and response.
	42-54	467	NAPL suspected based on LIF wavelength and response.
	70-73	468	NAPL suspected based on LIF wavelength and response.
SE-25	18-26	448-468	Unique peak shape with broad two-hump peak.
	42-43	403	Single 436 count peak; should not be considered site target contamination due to low wavelength.
	59-70	466	NAPL suspected based on LIF wavelength and response.
	77-83	469	NAPL suspected based on LIF wavelength and response.
SE-26	37-38	471	NAPL suspected based on LIF wavelength and response.
	60-67	470	NAPL suspected based on LIF wavelength and response.
	71-76	467	NAPL suspected based on LIF wavelength and response.

Table 3-6 (Continued)
Identification of Soil Intervals Containing NAPL

Push Location	Depth Interval (feet bgs)	In Situ Wavelength (nanometers)	Comments
SE-27	35-37	481	This push is located under asphalt cap and wavelength is slightly higher, similar to other pushes in this area.
	50-57	476-487	NAPL suspected based on LIF wavelength and response.
	98.6	434	428 count spike at this depth is not likely to be site target contamination due to low wavelength.
SE-28	6-11	487	This push is located under asphalt cap and wavelength is slightly higher, similar to other pushes in this area.
	26-32	476	NAPL suspected based on LIF wavelength and response.
	36-38	487	NAPL suspected based on LIF wavelength and response.
	50-60	487-491	NAPL suspected based on LIF wavelength and response.
SE-29			Clean push.
SE-30			Clean push.
SE-31			Clean push.
SE-32	40-50	473	NAPL suspected based on LIF wavelength and response.
SE-33			Clean push.
SE-34			Clean push.
SE-35			Clean push. Single peak at 51.5 feet bgs of 471 nanometers; however, soil sample collected at 50-52 feet bgs was ND for both PAH/PCP and TPH. No contamination or odor noted in soil sample. It is possible that the LIF picked up a NAPL stringer that was diluted out during soil sampling. Soil discoloration was noted in a sample collected from 58-60 feet bgs; however, no LIF response was recorded in this interval.
SE-36			Clean push. Some minor background peaks did not match target contamination wavelength.
SE-37	32-33	446	Soil sample collected 31-32.6 feet was ND for PAH/PCP and TPH. Interval did have odor and it is possible that soil contamination was diluted during soil homogenization. The wavelength is outside the target spectral profile.
	56-60	484	Mobile NAPL confirmed in soil sample.
	90-100		Confirmed to be non-target contamination; fluorescence likely due to calcite.

Table 3-6 (Continued)
Identification of Soil Intervals Containing NAPL

Push Location	Depth Interval (feet bgs)	In Situ Wavelength (nanometers)	Comments
SE-38			Clean push.
SE-39	10-11	470	NAPL suspected based on LIF wavelength and response.
	18-25	468	NAPL suspected based on LIF wavelength and response.
SE-40			Clean push.
SE-41			Clean push.
SE-42			Clean push.
SE-43	0-10	477	Note lower wavelength in this boring. Soil sampling results indicate that LIF response at this location is due to a unique petroleum hydrocarbon type not creosote. All PAHs were below detection level. Soil sample had fuel odor but no visible NAPL. SE-43 has unique peak shape.
	10-20	455	Note lower wavelength in this boring. Soil sampling results indicate that LIF response at this location is due to a unique petroleum hydrocarbon type not creosote. All PAHs were below detection level. Soil sample had fuel odor but no visible NAPL. SE-43 has unique peak shape.
	20-30	454	Note lower wavelength in this boring. Soil sampling results indicate that LIF response at this location is due to a unique petroleum hydrocarbon type not creosote. All PAHs were below detection level. Soil sample had fuel odor but no visible NAPL. SE-43 has unique peak shape.
SE-44			Clean push with minor exception. Very low level response between 90-102 feet bgs at 470 nanometers may be picking up a stringer. Some contamination detected at a similar depth in SB-61, which is very close.
SE-45			Clean push.
SE-46			Clean push.
SE-47	7-18	437-447	Note lower wavelength. Soil sample results indicate LIF response at this push location is due to a unique petroleum hydrocarbon product type not creosote. PCP was detected at two depths: 12-14 and 14-15 feet bgs. The only PAH reported was phenanthrene at very low levels. Total TPH reported as diesel was very high, up to 9,200 ppm.
SE-48			Clean push.

Table 3-6 (Continued)
Identification of Soil Intervals Containing NAPL

Push Location	Depth Interval (feet bgs)	In Situ Wavelength (nanometers)	Comments
SE-49			Clean push.
SE-50	4-10	468-479	Push located in Main Processing Area, mobile NAPL confirmed nearby.
	20-61	468-479	NAPL suspected based on LIF wavelength and response.
SE-51	50-57	468	Sheen and visible NAPL confirmed in SB051 at 52.4-52.9 and 56-56.3 feet.
	65-70	469	NAPL suspected based on LIF wavelength and response.
	79-83	468	NAPL suspected based on LIF wavelength and response.
SE-52			Refusal hit at 16 feet bgs.
SE-53			Clean push.
SE-54 and 54a			Refusal hit at 16 feet bgs.
SE-55			Clean push.
SE-56	26-31	468	NAPL suspected based on LIF wavelength and response.
	40-48	468	NAPL suspected based on LIF wavelength and response.
	59-61	472	NAPL suspected based on LIF wavelength and response.
SE-57	10-14	430	This may not be target contamination; questionable because of low wavelength.
	25-60	468-475	NAPL suspected based on LIF wavelength and response.
SE-58	35-38	468	NAPL suspected based on LIF wavelength and response.
	84-88	470	NAPL suspected based on LIF wavelength and response.
SE-59			Clean push. Spike at 118.6 feet bgs is at 497 nanometers and is probably not due to site target contamination. Most target contamination in the OWP Area is probably in the 477 nanometers range.
SE-60	36-40		Nontarget contamination.
	45-50	471	NAPL suspected based on LIF wavelength and response.
	54-66	470	NAPL suspected based on LIF wavelength and response.
	92-94		Wavelength of 403-404 nanometers indicates that this is nontarget contamination.
SE-61	124-125	468	Odor and low level of PAHs and TPH reported in SB061 at 126-126.3 feet bgs. Deep contamination (90-102 feet bgs) was also reported in SE-44, which is less than 100 feet northeast of SE-61.

Table 3-6 (Continued)
Identification of Soil Intervals Containing NAPL

Push Location	Depth Interval (feet bgs)	In Situ Wavelength (nanometers)	Comments
SE-62			Clean push.
SE-63	26-30	476	NAPL suspected based on LIF wavelength and response.
	35-37	479	NAPL suspected based on LIF wavelength and response.
	40-50	468-471	NAPL suspected based on LIF wavelength and response.
SE-64	30-38	468	Odor confirmed 31-33 feet bgs, and mobile NAPL confirmed 34-36 feet bgs
	50-52	412	Wavelength of 412 nanometers indicates that this is nontarget contamination. Soil sample collected at 50-51 feet bgs, which had a slight odor but all PAHs and TPH were ND.
	60-62	471	Visible NAPL at 62 feet bgs confirmed in soil sample.
	108	432	Wavelength of 432 nanometers indicates that this is nontarget contamination.
SE-65			Clean push.
SE-66			Clean push.
SE-67	25.5-26.5	487	Wavelength pattern similar to SE-05 and other samples under asphalt cap.
SE-68			Clean push.
SE-69	4-12	414	NAPL suspected based on LIF wavelength and response.
	15-41	412-419	The wavelength signature in this area is unusually low; however, because of high counts and proximity to other confirmed contamination source areas, this interval should be considered a NAPL interval. No soil samples were collected for confirmation; however, the contaminant makeup in this area may be different.
	57-58	482	Contaminant wavelength signature is similar to other samples within asphalt cap area.
SE-70	53-63	497	Similar wavelength pattern to SE-05 and other samples under asphalt cap.
SE-71			Clean push.
SE-72			Clean push.
SE-73			Clean push

Table 3-6 (Continued)
Identification of Soil Intervals Containing NAPL

Push Location	Depth Interval (feet bgs)	In Situ Wavelength (nanometers)	Comments
SE-74	12-16	446	Contamination in this depth interval questionable due to low wavelength.
	23-30	466-470	NAPL suspected based on LIF wavelength and response.
	32-35	471	NAPL suspected based on LIF wavelength and response.
	38-39	472	NAPL suspected based on LIF wavelength and response.
	43-43.2	475	NAPL suspected based on LIF wavelength and response.
	58-64	469-476	NAPL suspected based on LIF wavelength and response.
	65-67	469-473	NAPL suspected based on LIF wavelength and response.
SE-75			Clean push.
SE-76			Clean push. Spike at 61.5-62 feet bgs was at 55 nanometers, which is not a target wavelength signature.
SE-77	25-27	471	NAPL suspected based on LIF wavelength and response.
SE-78			Clean push.
SE-79	50-60	488	NAPL confirmed in soil sample.
	80-80.5	497	NAPL confirmed in soil sample.
SE-80			Clean push.
SE-81	50-52	494	This is a questionable result. Soil sample collected 50-50.6 feet bgs had odor, but all analyses were ND. The ex situ soil sample had a much lower wavelength and may be different then what was measured in situ.
SE-82			Clean push.
SE-83			Clean push.
SE-84	10-16	468	NAPL suspected based on LIF wavelength and response.
	43-53	477	NAPL suspected based on LIF wavelength and response.
SE-85			Clean push.
SE-86	9-20	476	NAPL suspected based on LIF wavelength and response.
	21-37	477	NAPL suspected based on LIF wavelength and response.
	42-49	476	NAPL suspected based on LIF wavelength and response.

Table 3-6 (Continued)
Identification of Soil Intervals Containing NAPL

Push Location	Depth Interval (feet bgs)	In Situ Wavelength (nanometers)	Comments
SE-87	4-10	475	NAPL suspected based on LIF wavelength and response.
	10-20	476	NAPL suspected based on LIF wavelength and response.
	20-28	475	NAPL suspected based on LIF wavelength and response.
SE-88	4-8	467	Visible NAPL confirmed in soil sample 5.4-5.8 feet bgs.
	9-12	468	Visible NAPL confirmed in soil sample 10.3-11 feet bgs.
	13-18	470	Visible NAPL confirmed in soil sample 14-14.5 feet bgs.
	20-28	478	Visible NAPL confirmed in soil sample 20-21 and 24-25.8 feet bgs.
SE-89 and 89a			Clean push with refusal at 12 feet bgs.
SE-89b	14-20	475	NAPL suspected based on LIF wavelength and response.
	20-32	468-473	NAPL suspected based on LIF wavelength and response.
SE-90	22-25	477	NAPL suspected based on LIF wavelength and response.
	29.5-30.5	477	NAPL suspected based on LIF wavelength and response.
	44-49	477	NAPL suspected based on LIF wavelength and response.
	50-60	476	NAPL suspected based on LIF wavelength and response.
SE-91			Clean push. Spike at 13 feet bgs is not real due to irregular peak shape.
SE-92	50-54	489	NAPL suspected based on LIF wavelength and response.
	78-80	489	NAPL suspected based on LIF wavelength and response.
	88-90	486	NAPL suspected based on LIF wavelength and response.
SE-93	62-70	410	Visible NAPL seen is soil core from 66-68 feet bgs. Wavelength is unusually low and all TPH and PAH results were ND; stringers could have been diluted below detection level prior to analysis.
SE-94	8-10	487	NAPL suspected based on LIF wavelength and response.
	12-17	476-488	NAPL suspected based on LIF wavelength and response.
SE-95			Clean push with refusal at 16 feet bgs.
SE-96	63-68	473	Mobile NAPL confirmed in soil sample at 63-65 and 66-67.6 feet bgs.
	82-88	475	Odor confirmed in soil sample at 84.5-84.8 and 94-96 feet bgs.
	92-97	466	NAPL suspected based on LIF wavelength and response.

Table 3-6 (Continued)
Identification of Soil Intervals Containing NAPL

Push Location	Depth Interval (feet bgs)	In Situ Wavelength (nanometers)	Comments
SE-97	87-90	471	NAPL suspected based on LIF wavelength and response.
	90-95	477	NAPL confirmed in soil sample at 90-92 and 92.6-94 feet bgs.
	100-102	468	NAPL confirmed in soil sample at 100-102 feet bgs.
SE-98			Clean push.

Notes:
OWP - Oily Waste Ponds
ND - not detected

Table 3-7
Summary of Metals in Soil

Location ID	Quadrant	Sample ID	Date	Field QC	Soil Description	NAPL Description	Concentration (mg/kg)			
							Arsenic	Chromium	Copper	Zinc
SB-028	C2	SB028-12-12.5	9/29/99		Clay	Odor	8.3	48	48	62
SB-028	C2	SB028-28.3-29.4	9/29/99		Sand & gravel	Sheen	12	27	33	45
SB-028	C2	SB028-31-33	9/29/99		Sand	Sheen	6.2	25	23	38
SB-028	C2	SB028-48-49.7	9/29/99		Sand	Sheen	4.1	25	13	22
SB-028	C2	SB028-53.5-55	9/29/99		Sand	Sheen	12	13	11	31
SB-028	C2	SB528-53.5-55	9/29/99	Field dup	Sand	Sheen	7.8	12	8.3	29
SB-028	C2	SB028-55-56	9/29/99		Sand	Nothing	5.6	9.3	5.5 J	21
SB-028	C2	SB028-79.5-79.8	9/29/99		Clay	Odor	1.1 J	18	14	29
SB-028	C2	SB028-82.2-83.7	9/29/99		Sand	Odor	2.5	20	14	30
SB-028	C2	SB028-100.6-101.5	9/29/99		Clay	Sheen	5.7	49	45	58
SB-028	C2	SB028-141-142	9/30/99		Sand	Odor	5.1	18	12	29
SB-057	C2	SB057-2.7-3	10/9/99		Sand and gravel	Nothing	290	88	420	120
SB-057	C2	SB057-18-19.8	10/9/99		Clay	Odor	9.8	43	28	49
SB-057	C2	SB057-28-29.8	10/9/99		Clay	Odor	8.1	57	39	66
SB-057	C2	SB057-36-38	10/9/99		Sand	Sheen	3.3	55	23	43
SB-057	C2	SB057-51-52	10/9/99		Sand	Sheen	6.2	40	16	33
SB-057	C2	SB057-65-66	10/9/99		Sand	Odor	3.8	31	17	38
SB-057	C2	SB557-65-66	10/9/99	Field dup	Sand	Odor	3.2	27	13	32
SB-099	C3	SB099-13.4-14.7	9/30/99		Clay	Odor	77	75	35	66
SB-099	C3	SB099-31-33	9/30/99		Sand	Visible	5.9	20	12	30
SB-099	C3	SB099-41-42.5	10/6/99		Silt/sand	Sheen	4.6	40	23	43

Note:
J - estimated

Table 3-8
Permeability and Hydraulic Conductivity Results

Location ID	Sample Interval (feet bgs)	Permeability (millidarcy)	Hydraulic Conductivity (cm/s)	Hydraulic Conductivity (ft/day)	Visual Soil Description
SS-010	12-14	6.300E-02	6.450E-08	0.0002	Clay
SS-010	30-31.2	1.681E+03	1.720E-03	4.8756	Sand
SB-019	93.4	9.896E+00	1.013E-05	0.0287	Sand
SB-025	92-92.5	1.454E+01	1.479E-05	0.0419	Sand
SB-027	93-93.5	4.827E+02	4.942E-04	1.4008	Sand
SB-030	161.7-162.2	3.015E+03	3.083E-03	8.7390	Sand
SS-035	54.4-55.2	6.190E+02	6.280E-04	1.7802	Sand
SS-035	59.2-60	2.340E-01	2.380E-07	0.0007	Clay
SB-047	20-22	8.340E-01	8.430E-07	0.0024	Silt/sand
SB-047	117.2-117.9	1.445E-01	1.477E-07	0.0004	Clay
SB-047	141.3-142.1	9.020E+01	9.230E-05	0.2616	Sand
SB047	167.5-168.4	2.780E-01	2.846E-07	0.0008	Clay
SB-047	244.0-245.0	2.846E+01	2.920E-05	0.0828	Sand and gravel
SB-052	122-123	2.737E+01	2.809E-05	0.0796	Sand
SB-052	156-156.6	3.587E-01	3.681E-07	0.0010	Clay
SB-052	164-165	1.108E+02	1.136E-04	0.3219	Sand
SB-052	204-205	5.937E+00	6.065E-06	0.0172	Sand
SS-064	41-43	2.080E-01	2.100E-07	0.0006	Clay
SS-064	67-69	4.900E-02	5.000E-08	0.0001	Clay
SS-079	48-48.7	1.190E+02	1.210E-04	0.3430	Sand
SS-079	63.9-65	1.350E+02	1.380E-04	0.3912	Clay
SS-088	30-31.3	1.390E+02	1.420E-04	0.4025	Sand
SS-088	36-38	1.050E-01	1.070E-07	0.0003	Clay/silt
SS-093	25-26.7	7.870E+00	8.060E-06	0.0228	Clay
SS-096	74.2-75	4.920E+00	5.030E-06	0.0143	Clay
SS-096	78.7-79.5	4.120E+01	4.200E-05	0.1191	Sand
SS-097	75-76.2	9.120E+00	9.280E-06	0.0263	Sand/silt/clay
SB-099	111.5-112.5	1.024E+02	1.042E-04	0.2954	Sand
SB-099	176.9-177.6	8.488E-01	8.688E-07	0.0025	Clay
SB-099	193-194	2.158E+01	2.193E-05	0.0622	Sand
SB-099	247-248	2.360E+02	2.421E-04	0.6862	Silt/sand/gravel

Table 3-9
Grain Size Distribution

Sample ID	Depth (feet bgs)	Median Grain Size (mm)	Particle Size Distribution (weight percent)						
				Sand Size					
			Gravel	Coarse	Medium	Fine	Silt	Clay	Silt & Clay
SS010	30.00-31.20	0.282	0.00	0.00	24.86	57.80	13.20	4.15	17.34
SB-030	161.70-162.20	0.581	0.00	0.00	67.63	23.69	No data	No data	8.68
SB-047	117.2-117.9	0.011	0.00	0.00	0.04	4.15	68.75	27.06	95.81
SB-047	141.30-142.10	0.594	0.00	5.46	59.58	25.15	No data	No data	9.80
SB-047	167.5-168.4	0.010	0.00	0.00	0.00	3.56	68.92	27.52	96.44
SB-047	209.1-209.6	0.012	0.00	0.00	0.00	1.98	71.15	26.87	98.02
SB-047	244.0-245.0	1.202	25.00	17.54	28.85	16.82	No data	No data	11.79
SB-052	122.0-123.0	0.647	0.00	5.43	62.10	22.96	No data	No data	9.50
SB-052	156.0-156.6	0.007	0.00	0.00	0.82	14.02	44.80	40.37	85.16
SS-064	41.00-43.00	0.023	0.00	0.00	9.88	21.96	50.89	17.27	68.16
SS-079	63.90-65.00	0.057	0.00	0.00	0.67	41.98	46.89	10.47	57.36
SS-088	30.00-31.30	0.300	0.00	0.00	30.99	43.11	20.41	5.49	25.90
SS-088	36.00-38.00	0.008	0.00	0.00	0.00	3.41	62.48	34.12	96.59
SS-096	74.20-75.00	0.034	0.00	0.00	3.53	29.55	53.85	13.07	66.92
SS-096	78.70-79.50	0.256	0.00	0.00	24.66	44.43	23.20	7.72	30.92
SS-097	75.00-76.20	0.071	0.00	0.00	3.74	45.50	40.81	9.96	50.76
SB-099	111.5-112.5	0.018	0.00	0.00	5.12	25.27	48.28	21.33	69.61
SB-099	118.8-119.8	0.013	0.00	0.00	0.00	5.11	70.09	24.80	94.89
SB-099	176.9-177.6	0.008	0.00	0.00	0.00	1.10	64.72	34.19	98.90
SB-099	193-194	0.194	0.00	0.00	28.17	36.17	26.74	8.91	35.66

Notes:
ASTM - American Society for Testing and Materials
USCS - Unified Soil Classification System

Table 3-10
Bulk Density and Effective Porosity in Soils

Location ID	Sample ID	Bulk Density (g/cc)	Effective Porosity (percent Vb)	Visual Soil Description
SB-028	SB028-31-33	1.50	44.4	Sand[1]
SB-028	SB028-48-49.7	1.74	35.3	Sand[1]
SB-028	SB028-100.6-101.5	1.40	48.4	Clay
SB-030	SB030-161.7-162.2	1.71	35.8	Sand[1]
SB-047	SB047-117.2-117.9	1.79	32.8	Clay
SB-047	SB047-141.3-142.1	1.73	35.8	Sand[1]
SB-047	SB047-167.5-168.4	1.76	33.8	Clay
SB-047	SB047-209.1-209.6	1.46	45.4	Clay
SB-047	SB047-244.0-245.0	1.94	28.4	Sand/gravel
SB-052	SB052-122-123	1.88	29.6	Sand[1]
SB-052	SB052-156-156.6	1.95	25.9	Clay
SB-086	SB086-33.6-35	1.76	35.6	Sand[1]
SB-086	SB086-36.3-38	1.67	37.8	Sand[1]
SB-099	SB099-13.4-14.7	1.53	41.4	Clay
SB-099	SB099-27.5-29.5	1.49	43.4	Sand[1]
SB-099	SB599-27.5-29.5	1.52	44.2	Sand[1]
SB-099	SB099-31-33	1.66	38.5	Sand[1]
SB-099	SB099-41-42.5	1.64	39.6	Silty/sand
SB-099	SB099-111.5-112.5	1.73	36.1	Sand[1]
SB-099	SB099-118.8-119.8	1.62	39.5	Clay
SB-099	SB099-176.9-177.6	1.67	35.6	Clay
SB-099	SB099-193-194	1.75	35.86	Sand[1]
SE-010	SS010-30-31.2	1.4	48.6	Sand
SE-064	SS064-41-43	1.73	35.7	Clay
SE-079	SS079-63.9-65	1.58	41.6	Clay
SE-088	SS088-30-31.3	1.68	38.8	Sand
SE-088	SS088-36-38	1.82	31.8	Clay/silt
SE-096	SS096-74.2-75	1.59	41.1	Clay
SE-096	SS096-78.7-79.5	1.72	36.3	Sand
SE-097	SS097-75.0-76.2	1.71	36.2	Sand/silt/clay

[1]Sands from rotosonic soil borings were replaced and reformed prior to measurement.

Note:
Vb - bulk volume of the sample

Table 3-11
Total Organic Carbon in Soil

Location ID	Sample ID	Visual Soil Description	NAPL Description	TOC (mg/kg)
SB-018	SB018-80.5-80.8	Sand	Nothing	320 J
SB-018	SB018-91.3-91.6	Sand	Nothing	180 J
SB-018	SB018-109.5-109.8	Sand	Nothing	280 J
SB-018	SB018-183.4-183.7	Clay	Nothing	210 J
SB-047	SS047-21.6-22	Silt/sand	Nothing	330
SB-047	SB047-102.0-103.0	Sand	Nothing	580
SB-047	SB047-117.0-117.2	Clay	Nothing	340
SB-047	SB047-161.0-162.0	Sand	Nothing	630
SB-047	SB047-209.6-209.7	Clay	Nothing	1,300
SB-047	SB047-244.0-245.0	Sand/gravel	Nothing	800
SB-099	SB099-111.5-112.5	Sand	Odor	430
SB-099	SB099-118.8-119.8	Clay	Nothing	1,400
SB-099	SB099-172.5-172.6	Sand	Odor	1,900
SB-099	SB099-193.1-193.3	Sand	Nothing	880
SB-099	SB099-247.8-248.0	Sand	Odor	940
SE-010	SS010-12-14	Clay	Nothing	660
SE-010	SS010-30-31.2	Sand	Nothing	310
SE-035	SS035-54-54.4	Sand	Odor	280 J
SE-035	SS035-58-59.2	Clay	Odor	250 J
SE-064	SS064-41-43	Clay	Odor	450
SE-064	SS064-67-69	Clay	Nothing	390
SE-079	SS079-48.7-48.9	Sand	Odor	170 J
SE-079	SS079-63-63.9	Clay	Odor	330 J
SE-079	SS579-63-63.9	Clay	Odor	640 J
SE-088	SS088-36-38	Clay/silt	Nothing	470
SE-093	SS093-26.7-27	Clay	Odor	240 J
SE-096	SS096-73-74.2	Clay	Odor	250 J
SE-096	SS096-78-78.7	Sand	Nothing	170 J
SE-097	SS097-76.2-76.6	Sand	Nothing	310

Note:
J - estimated

Table 3-12
Cation Exchange Capacity

Sample ID	Depth (feet bgs)	Cation Exchange Capacity (meq/100 grams)	Visual Soil Description
SS-010	30-31.2	9.0	Sand
SB-030	161.7-162.2	4.9	Sand
SB-047	117.2-117.9	18.0	Clay
SB-047	141.3-142.1	7.5	Sand
SB-047	167.5-168.4	23.0	Clay
SB-047	209.1-209.6	35.0	Clay
SB-047	244.0-245.0	1.0	Sand and gravel
SB-052	122-123	12.0	Sand
SB-052	156-156.6	16.0	Clay
SS-064	41-43	20.4	Clay
SS-079	63.9-65.0	22.0	Clay
SS-096	74.2-75.0	31.0	Clay
SS-096	78.7-79.5	14.4	Sand
SS-088	30-31.3	10.0	Sand
SS-088	36-38	17.4	Clay/silt
SS-097	75-76.2	8.4	Sand/silt/clay
SB-099	111.5-112.5	7.0	Sand
SB-099	118.8-119.8	24.0	Clay
SB-099	176.9-177.6	26.0	Clay
SB-099	193-194	11.0	Sand

Table 3-13
Summary of Groundwater Elevations

Well ID	April 1999				July 1999			
	MW Measurement Point Elevation (feet NVD88)	Depth to Water (feet)	GW Elevation (feet NVD88)	GW Measured From:	MW Measurement Point Elevation (feet NVD88)	Depth to Water (feet)	GW Elevation (feet NVD88)	GW Measured From:
A-1	12.15	9.67	2.5	Outer casing	12.15	12.2	!0.049	Outer casing
A-2	10.86	14.95	!4.1	Outer casing	10.86	16.22	!5.4	Outer casing
A-3	—	—	—	—	15.41	16.3	!0.89	Outer casing
A-4	12.95	10.58	2.4	Outer casing	12.95	14.28	!1.3	Outer casing
A-5	11.65	10.56	1.1	Outer casing	11.65	12.07	!0.42	Outer casing
A-6	11.01	12.58	!1.6	Outer casing	11.01	14.75	!3.7	Outer casing
A-7	11.43	13.78	!2.4	Outer casing	11.43	15.38	!4	Outer casing
A-8	—	—	—	—	13.51	16.55	!3	Inner casing
A-10	12.96	10.42	2.5	Outer casing	12.96	13.17	!0.21	Outer casing
DSW-1B	10.87	15.14	!4.3	Outer casing	10.87	17.27	!6.4	Outer casing
DSW-1C	—	—	—	—	10.54	1.16	9.4	Outer casing
DSW-1D	11.07	17	!5.9	Outer casing	11.07	19.53	!8.5	Outer casing
DSW-2A	10.90	15.39	!4.6	Outer casing	10.90	16.22	!5.3	Outer casing
DSW-2B	10.86	15.63	!4.8	Outer casing	10.86	17.45	!6.6	Outer casing
DSW-2C	10.56	15.92	!5.5	Outer casing	10.56	17.89	!7.3	Outer casing
DSW-2D	11.00	16.63	!6	Outer casing	11.00	18.61	!7.6	Outer casing
DSW-2E	11.03	17.85	!7.2	Outer casing	11.03	20.24	!9.2	Outer casing
DSW-3B	11.83	15.55	!3.7	Outer casing	11.83	18.31	!6.5	Outer casing
DSW-3C	13.12	15.01	!1.9	Outer casing	13.12	17.48	!4.4	Outer casing
DSW-4B	9.97	14.35	!4.4	Inner Casing	9.97	16.65	!6.7	Inner casing
DSW-4C	9.75	14.28	!4.5	Inner Casing	9.75	16.36	!6.6	Inner casing
DSW-4D	13.11	18.05	!4.9	Outer casing	13.11	20.48	!7.4	Outer casing
DSW-4E	—	—	—	—	11.11	20.3	!9.2	Outer casing

Table 3-13 (Continued)
Summary of Groundwater Elevations

Well ID	April 1999				July 1999			
	MW Measurement Point Elevation (feet NVD88)	Depth to Water (feet)	GW Elevation (feet NVD88)	GW Measured From:	MW Measurement Point Elevation (feet NVD88)	Depth to Water (feet)	GW Elevation (feet NVD88)	GW Measured From:
DSW-5B	—	—	—	—	11.49	17.79	!6.3	Outer casing
DSW-6B	13.53	16.61	!3.1	Outer casing	13.53	19.05	!5.5	Outer casing
DSW-6C	13.68	18.09	!4.4	Outer casing	13.68	20.52	!6.8	Outer casing
DSW-7A	9.75	13.18	!3.4	Outer casing	9.75	14.86	!5.1	Monument
DSW-7B	9.77	14.78	!5	Outer casing	9.77	16.65	!6.9	Monument
DSW-7C	9.77	15	!5.2	Outer casing	9.77	16.97	!7.2	Monument
OFS-1A	7.44	7.15	0.28	Outer casing	7.44	10.14	!2.7	Monument
OFS-1B	7.40	10.2	!2.8	Outer casing	7.40	12.85	!5.5	Monument
OFS-1C	7.39	11.33	!3.9	Outer casing	7.39	14.1	!6.7	Monument
OFS-1D	7.45	11.68	!4.2	Outer casing	7.45	14.32	!6.9	Monument
OFS-2A	7.65	7.49	0.15	Outer casing	7.65	10.27	!2.6	Monument
OFS-2C	7.67	11.81	!4.1	Outer casing	7.67	14.23	!6.6	Monument
OFS-2D	7.48	11.9	!4.4	Outer casing	7.48	14.6	!7.1	Monument
OFS-3A	8.14	11.98	!3.8	Outer casing	8.14	14.06	!5.9	Monument
OFS-3B	8.15	12.58	!4.4	Outer casing	8.15	15.03	!6.9	Monument
OFS-3C	8.18	12.75	!4.6	Outer casing	8.18	15.22	!7	Monument
OFS-3D	8.22	13.69	!5.5	Outer casing	8.22	16.3	!8.1	Monument
OFS-3E	8.28	13.92	!5.6	Outer casing	8.28	16.66	!8.4	Monument
OFS-4A1	7.85	10.7	!2.8	Outer casing	7.85	12.37	!4.5	Monument
OFS-4A2	7.70	10.95	!3.3	Outer casing	7.70	12.83	!5.1	Monument
OFS-4C	7.72	12.95	!5.2	Outer casing	7.72	15.04	!7.3	Monument
OFS-4D	7.57	13.27	!5.7	Outer casing	7.57	15.6	!8	Monument
OFS-4E	7.71	14.52	!6.8	Outer casing	7.71	16.9	!9.2	Monument

Table 3-13 (Continued)
Summary of Groundwater Elevations

Well ID	April 1999				July 1999			
	MW Measurement Point Elevation (feet NVD88)	Depth to Water (feet)	GW Elevation (feet NVD88)	GW Measured From:	MW Measurement Point Elevation (feet NVD88)	Depth to Water (feet)	GW Elevation (feet NVD88)	GW Measured From:
OFS-5A	12.63	8.54	4.1	Outer casing	12.63	9.42	3.2	Monument
OFS-5C	12.60	17.15	!4.5	Outer casing	12.60	19.47	!6.9	Monument
OFS-5E	12.56	18.82	!6.3	Outer casing	12.56	21.6	!9	Monument
ONS-1B	11.20	15.47	!4.3	Outer casing	11.20	17.8	!6.6	Monument
ONS-1C	11.11	15.81	!4.7	Outer casing	11.11	18.02	!6.9	Monument
ONS-1D	11.03	15.87	!4.8	Outer casing	11.03	18.3	!7.3	Monument
ONS-2A	12.96	11.28	1.7	Outer casing	12.96	13.49	!0.5	Monument
ONS-2B	13.09	15.6	!2.5	Outer casing	13.09	18.21	!5.1	Monument
ONS-2C	12.80	17.01	!4.2	Outer casing	12.80	19.66	!6.9	Monument
ONS-2D	12.65	16.86	!4.2	Inner casing	12.91	19.78	!6.9	Monument
OS-1A	9.51	15.44	!5.9	Outer casing	9.51	16.98	!7.5	Monument
OS-1B	9.52	16.1	!6.6	Outer casing	9.52	17.58	!8.1	Monument
OS-1C	9.20	15.44	!6.2	Outer casing	9.20	16.98	!7.8	Monument
OS-1E	8.87	17.2	!8.3	Outer casing	8.87	19.48	!10.6	Monument
OS-2E	7.95	13.8	!5.8	Outer casing	—	—	—	—
OS-3E	6.43	13.46	!7	Outer casing	6.43	15.77	!9.3	Monument
OS-4A	8.21	11.7	!3.5	Outer casing	8.21	13.36	!5.2	Monument
OS-4B	8.26	13.56	!5.3	Outer casing	8.26	15.5	!7.2	Monument
OS-4C	8.08	13.44	!5.4	Outer casing	8.08	15.38	!7.3	Monument
OS-5B	11.70	19.89	!8.2	Outer casing	11.70	21.29	!9.6	Monument
OS-5C	11.70	19.61	!7.9	Outer casing	11.70	21	!9.3	Monument
OS-5D	11.56	10.65	0.91	Outer casing	11.56	22.16	!10.6	Monument
OS-6B	9.76	16.71	!7	Outer casing	9.76	18.17	!8.4	Monument

Table 3-13 (Continued)
Summary of Groundwater Elevations

Well ID	April 1999				July 1999			
	MW Measurement Point Elevation (feet NVD88)	Depth to Water (feet)	GW Elevation (feet NVD88)	GW Measured From:	MW Measurement Point Elevation (feet NVD88)	Depth to Water (feet)	GW Elevation (feet NVD88)	GW Measured From:
OS-6C	9.69	16.6	!6.9	Outer casing	9.69	18.17	!8.5	Monument
OS-6D	9.84	17.67	!7.8	Outer casing	9.84	18.79	!9	Monument

Notes:
GW - groundwater
MW - monitoring well

Table 3-14
Vertical Gradient Data

Well ID	Vertical Gradients Between Adjacent Aquifer Zones (ft/ft)											
	A_1 to A_2		A_1 to B		A_2 to B		B to C		C to D		D to E	
	Apr-99	Jul-99	Apr-99	Jul-99	Apr-99	Jul-99	Apr-99	Jul-99	Apr-99	Jul-99	Apr-99	Jul-99
A-2 DSW-2A	!0.0105	0.0008										
OFS-4A_1 OFS-4A_2	!0.0084	!0.0128										
A-1 DSW-3B			!0.1289	!0.1337								
A-2 DSW-2B			!0.1005	!0.1370								
A-5 DSW-6B			!0.0868	!0.1062								
A-6 DSW-4B			!0.0618	!0.0645								
A-7 DSW-1B			!0.0399	!0.0509								
A-8 ONS-1B			ND	!0.0741								
DSW-7A DSW-7B			!0.0329	!0.0369								
DSW-2A DSW-2B					!0.0036	!0.0264						
OFS-1A OFS-1B					!0.0642	!0.0572						
OFS-3A OFS-3B					!0.0122	!0.0199						
ONS-2A ONS-2B					!0.0872	!0.0954						
OS-1A OS-1B					!0.0135	!0.0123						
OS-4A OS-4B					!0.0376	!0.0434						
DSW-3B DSW-3C							0.0380	0.0440				
DSW-2B DSW-2C							!0.0124	!0.0155				
DSW-6B DSW-6C							!0.0275	!0.0273				
DSW-4B DSW-4C							!0.0081	!0.0044				
DSW-1B DSW-1C							ND	ND				
ONS-1B ONS-1C							!0.0089	!0.0064				
DSW-7B DSW-7C							!0.0046	!0.0067				
OFS-1B OFS-1C							!0.0237	!0.0262				
OFS-3B OFS-3C							!0.0029	!0.0033				
ONS-2B ONS-2C							!0.0352	!0.0362				

Table 3-14 (Continued)
Vertical Gradient Data

Well ID	Vertical Gradients Between Adjacent Aquifer Zones (ft/ft)											
	A_1 to A_2		A_1 to B		A_2 to B		B to C		C to D		D to E	
	Apr-99	Jul-99	Apr-99	Jul-99	Apr-99	Jul-99	Apr-99	Jul-99	Apr-99	Jul-99	Apr-99	Jul-99
OS-1B OS-1C							0.0070	0.0058				
OS-4B OS-4C							!0.0012	!0.0012				
OS-5B OS-5C							0.0060	0.0062				
OS-6B OS-6C							0.0010	!0.0013				
DSW-2C DSW-2D									!0.0057	!0.0059		
DSW-4C DSW-4D									!0.0002	!0.0067		
DSW-1C DSW-1D									ND	ND		
ONS-1C ONS-1D									!0.0028	!0.0074		
OFS-1C OFS-1D									!0.0060	!0.0033		
OFS-2C OFS-2D									!0.0058	!0.0116		
OFS-3C OFS-3D									!0.0187	!0.0216		
OFS-4C OFS-4D									!0.0096	!0.0146		
ONS-2C ONS-2D									!0.0023	ND		
OS-5C OS-5D									ND	!0.0272		
OS-6C OS-6D									!0.0192	!0.0098		
DSW-2D DSW-2E											!0.0247	!0.0333
DSW-4D DSW-4E											ND	!0.0378
OFS-3D OFS-3E											!0.0035	!0.0062
OFS-4D OFS-4E											!0.0231	!0.0241
Average	**!0.0095**	**!0.0060**	**!0.0751**	**!0.0862**	**!0.0364**	**!0.0424**	**!0.0056**	**!0.0056**	**!0.0078**	**!0.0120**	**!0.0171**	**!0.0254**

Note:
ND - no data available

Table 3-15
Groundwater Density

Well ID	Density (g/mL) at Various Temperatures								
	10°C	20°C	30°C	40°C	50°C	60°C	70°C	80°C	90°C
DSW-7A	1.0000	0.9980	0.9964	0.9916	0.9872	0.9848	0.9776	0.9724	0.9676
	1.0012	0.9996	0.9964	0.9928	0.9888	0.9844	0.9784	0.9724	0.9660
	1.0012	1.0004	0.9968	0.9940	0.9888	0.9848	0.9796	0.9740	0.9672
OS-4B	0.9996	0.9980	0.9960	0.9920	0.9880	0.9832	0.9784	0.9724	0.9656
	0.9992	0.9972	0.9948	0.9908	0.9876	0.9832	0.9784	0.9728	0.9652
	0.9992	0.9980	0.9960	0.9920	0.9884	0.9840	0.9780	0.9728	0.9660
A-8	1.0004	0.9992	0.9972	0.9932	0.9888	0.9840	0.9784	0.9724	0.9664
	0.9996	0.9976	0.9956	0.9916	0.9876	0.9836	0.9776	0.9712	0.9672
	1.0016	0.9996	0.9968	0.9928	0.9888	0.9840	0.9796	0.9740	0.9680
OS-4A	1.0000	0.9988	0.9960	0.9916	0.9884	0.9828	0.9780	0.9716	0.9648
	0.9996	0.9996	0.9964	0.9928	0.9884	0.9836	0.9780	0.9720	0.9664
	1.0004	1.0000	0.9968	0.9940	0.9900	0.9844	0.9788	0.9740	0.9680
DSW-6C	0.9996	0.9980	0.9964	0.9924	0.9892	0.9828	0.9788	0.9724	0.9668
	0.9992	0.9972	0.9944	0.9924	0.9880	0.9832	0.9788	0.9728	0.9652
	0.9984	0.9988	0.9956	0.9932	0.9884	0.9828	0.9788	0.9724	0.9660

Table 3-16
PAHs and PCP Detected in Groundwater

Location ID	A-5		A-8	DSW-4B	DSW-4C		DSW-6B	DSW-6C	DSW-7B	DSW-7C
Date Collected	7/12/99	7/12/99	7/12/99	7/15/99	7/15/99	7/15/99	7/12/99	7/12/99	7/13/99	7/13/99
Field QC		Field Duplicate				Field Duplicate				
SVOCs (mg/L)										
2,4,5-Trichlorophenol	10 U	10 U	500 U	110	10 U	10 U	100 U	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	500 U	70	10 U	10 U	100 U	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	500 U	210	70	60 J	400	10 U	10 U	10 U
2-Methylnaphthalene	10 U	10 U	300 J	1200	1100	1000 J	2000	100	10 U	10 U
2-Methylphenol	10 U	10 U	500 U	70	10 U	10 U	300	10 U	10 U	10 U
4-Methylphenol	10 U	10 U	500 U	20	10 U	10 U	200	10 U	10 U	10 U
Acenaphthene	10 U	10 U	500 U	360	300	300	700	60	40	100
Acenaphthylene	10 U	10 U	500 U	8 J	7 J	7 J	100 U	10 U	10 U	10 U
Anthracene	10 U	10 U	500 U	40	20	20	200	10 U	10 U	10 U
Carbazole	10 U	10 U	700	900	700	700	1000 J	100	10 U	10 U
Chrysene	10 U	10 U	500 U	10	10 U	5 J	100 U	10 U	10 U	10 U
Dibenzofuran	10 U	10 U	500 U	200	160	200	400	30	10 U	7 J
Fluoranthene	10 U	10 U	500 U	60	20	30	200	10 U	10 U	10 U
Fluorene	10 U	10 U	500 U	170	130	100	400	30	10 U	6 J
Naphthalene	10 U	10 U	4,000	11,000	10,000	10,000	14,000	800	10 U	10 U
Pentachlorophenol	30	30	40,000	110	10 U	10 U	100 U	10 U	10 U	10 U
Phenanthrene	10 U	10 U	500 U	220	110	100	600	10	10 U	10 U
Phenol	10 U	10 U	500 U	110	20	20	200	10 U	10 U	10 U
Pyrene	10 U	10 U	500 U	40	10	20	200	10 U	10 U	10 U

Notes:
J - estimated
U - undetected

Table 3-17
Dioxin and Furan Congeners in Groundwater

Location ID	A-5	DSW-4B	DSW-4C		DSW-4D	DSW-6B	DSW-6C	OFS-3B
Date Collected	7/12/99	7/15/99	7/15/99	7/15/99	7/15/99	7/12/99	7/12/99	7/15/99
Field QC				Field Duplicate				
Dioxins/Furans (pg/L)								
1,2,3,4,6,7,8-HpCDD	74	8,500	710	440	65 J	23,000	160	16 J
1,2,3,4,6,7,8-HpCDF	30 J	3,200	190	130	10 U	8,900	27 J	10 U
1,2,3,4,7,8,9-HpCDF	7 J	220	20 J	21 J	10 U	[1]	5 U	10 U
1,2,3,4,7,8-HxCDD	5 U	80 J	10 U	5 U	10 U	53	5 U	10 U
1,2,3,4,7,8-HxCDF	18 J	170 J	35 J	28 J	5 U	420	5 U	5 U
1,2,3,6,7,8-HxCDD	7 J	200 J	25 J	19 J	10 U	1,500	5 U	10 U
1,2,3,6,7,8-HxCDF	5 U	97 J	10 U	8.5 J	5 U	60	5 U	5 U
1,2,3,7,8,9-HxCDD	5 U	120 J	10 U	10 J	10 U	250	5 U	10 U
1,2,3,7,8,9-HxCDF	5 U	32 J	10 U	5 U	5 U	50 U	5 U	5 U
1,2,3,7,8-PeCDD	5 U	140	6 J	9 J	5 U	28 J	5 U	5 U
1,2,3,7,8-PeCDF	10 J	150	5 J	4.8 J	10 U	110	5 U	10 U
2,3,4,6,7,8-HxCDF	5 U	48 J	10 U	5 U	5 U	50 U	5 U	5 U
2,3,4,7,8-PeCDF	6 J	150	7 J	5 U	10 U	96	5 U	10 U
2,3,7,8-TCDD	5 U	29	5 U	5 U	5 U	5 U	5 U	5 U
2,3,7,8-TCDF	5 U	30	5 U	5 U	5 U	42	5 U	5 U
HpCDDs (total)	74	3,800	1,700	1,100	65	23,000	160	50 U
HpCDFs (total)	50 U	650	880	630	50 U	21,000	50 U	50 U
HxCDDs (total)	50 U	600	79	72	50 U	5,200	50 U	50 U
HxCDFs (total)	50 U	4,300	120	200	50 U	13,000	50 U	50 U
OCDD	850	49,000	7,300	4,700	650	230,000	3,000	43 J
OCDF	87 J	8,500	880	570	47 J	17,000	190	9 J
PeCDDs (total)	50 U	150	50 U	50 U	50 U	150	50 U	50 U
PeCDFs (total)	50 U	530	64	50 U	50 U	2,000	50 U	50 U
TCDDs (total)	10 U	29	10 U	10 U	10 U	10 U	10 U	10 U
TCDFs (total)	19	54	11	10 U	10 U	140	10 U	10 U
TEC (U = 1/2)	13	436	35	27	11	874	12	10

[1] 1, 2, 3, 4, 7, 8, 9 - HpCDF was detected, but could not be quantified due to matrix interference.

Notes:
J - estimated
TEC - toxicity equivalent concentration
U - undetected

Table 3-18
Water Quality and Natural Attenuation Parameters in Groundwater

Location ID	A-5		A-8	DSW-4B	DSW-4C		DSW-4D	DSW-6B	DSW-6C	DSW-7A	DSW-7B	DSW-7C	OFS-3B	OS-3E	OS-4A	OS-4B	OS-4C
Date Collected	**7/12/99**	**7/12/99**	**7/12/99**	**7/15/99**	**7/15/99**	**7/15/99**	**7/15/99**	**7/12/99**	**7/12/99**	**7/13/99**	**7/13/99**	**7/13/99**	**7/15/99**	**7/15/99**	**7/14/99**	**7/14/99**	**7/14/99**
Field QC		**Dup.**				**Dup.**											
Metals (µg/L)																	
Manganese (total)	20	20	5,500	270	380	360	160	120	170	1,200	80	150	170	510	340	100	120
Manganese (dissolved)	20	20	4,900	240	300	290	150	110	150	1,100	70	130	160	450	380	80	100
Miscellaneous Analytes (mg/L)																	
Chloride	180	180	220	200	190	190	310	230	280	280	150	310	110	550	250	200	320
Nitrate as N	19	19	16	0.06 J	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	17	0.1 U	0.1
Nitrite as N	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1
Sulfate	270	270	510	1 U	2	2	1 U	0.5	1 U	24	43	3	280	1 U	210	86	0.5
Total organic carbon	18	17	140	36	32	32	4	18	4	9	10	5 J	5	5	6	3	2
Field Data (mg/L)																	
Alkalinity (as $CaCO_3$)	612	--	769	--	436	--	163	368	210	598	330	303	267	144	432	183	158
Conductivity (mS/cm)	1,947	--	2,510	--	1,009	--	990	1,243	1,087	1,917	975	1,236	1,181	1,700	1,787	968	1,009
Dissolved oxygen—field meter	0.82	--	0.7	--	0.72	--	0.53	0.39	1.08	1.2	0.36	0.55	1.63	1.1	2.71	0.4	1.01
Dissolved oxygen—test kit	0.1	--	0.3	--	0.2	--	0.3	0.9	0.4	0.15	1	0.15	0.15	0.25	3.5	0.2	0.3
Hardness (as $CaCO_3$)	366	--	632	--	227	--	146	188	149	554	187	201	225	284	440	166	162
Total iron		--	1.1	--	1.3	--	0.7	0.95	0.85	0.9	2.1	0.85	1	0.8	7	0.9	0.6
Oxygen reduction potential (mV)	331	--	381	--	49.5	--	5	94.3	202	149	59.8	102	53	67	139	2.9	72
pH (std units)	6.88	--	6.91	--	7.89	--	8.46	7.93	8.09	7.03	8.07	7.96	8.12	7.82	7.12	8.3	8.33
Temperature (^oF)	72.9	--	76.6	--	71	--	70.5	70.3	74	74.9	72.3	71.3	68.6	68.2	72.3	71	70.9
Turbidity (visual)[1]	NA	--	Rusty orange	--	Clear	--	Clear	Clear	NA	Clear	Rusty particles	Blackish, cloudy	Clear	Clear	Rust color	Black particles	Clear

[1]Turbidity meter was broken and turbidity was assessed by visual observation.

Notes:
J - estimated
NA - not assessed
U - undetected

Table 3-19
NAPL Chemistry

Analyte	Chemical Concentration (mg/kg)			
	ONS-1B	ONS-1B Field Duplicate	A-10	DSW-6B
TPH				
Diesel	916,000	848,000 J	439,000 J	131,000 J
Lube Oil	ND	ND	ND	ND
SVOCs				
2,4-Dichlorophenol	ND	ND	60 J	ND
Naphthalene	120,000	130,000	39,000	32,000 J
2-Methylnaphthalene	26,000	30,000	14,000	9,100 J
Acenaphthylene	400 J	500	200 J	200 J
Acenaphthene	24,000	25,000	8,500	6,200 J
Dibenzofuran	15,000	16,000	5,200	3,500 J
Fluorene	16,000	18,000	5,900	3,900 J
Pentachlorophenol (PCP)	ND	ND	1,800	ND
Phenanthrene	40,000	40,000	19,000	6,900 J
Anthracene	5,600	7,300	4,100	2,500 J
Fluoranthene	21,000	22,000	5,400	3,000 J
Pyrene	16,000	18,000	5,000	2,700 J
Benzo(a)anthracene	4,500	5,100	1,400	690 J
Chrysene	4,600	5,000	1,600	770 J
bis(2-Ethylhexyl)phthalate	ND	ND	ND	ND
Benzo(b)fluoranthene	2,500	3,000	500 J	200 J
Benzo(k)fluoranthene	2,300	2,300	550	300 J
Benzo(a)pyrene	2,600 B	2,900 B	550 B	200 J, B
Indeno(1,2,3-cd)pyrene	930	1,100	200 J	50 J
Dibenz(a,h)anthracene	300 J	400 J	50 J	20 J
Benzo(g,h,i)perylene	820	970	100 J	50 J

Notes:
B - analyte also detected in associate blank
J - estimated
ND - not detected

Table 3-20
NAPL Density Measurements

Well ID	Density (g/mL) at Various Temperatures								
	10°C	20°C	30°C	40°C	50°C	60°C	70°C	80°C	90°C
A-10	1.0132	1.0044	0.9984	0.9916	0.9844	0.9768	0.9708	0.9616	0.9588
	1.0104	1.004	0.9968	0.9896	0.9828	0.9768	0.9676	0.9624	0.956
	1.01	1.0028	0.9956	0.9888	0.9824	0.9744	0.9688	0.9616	0.956
A-10 (remeasurement)	1.0096	1.0036	0.9952	0.9896	0.9816	0.9748	0.9676	0.96	0.9544
	1.0096	1.0028	0.9952	0.9892	0.9808	0.9744	0.9672	0.96	0.954
	1.0108	1.0036	0.996	0.99	0.9808	0.974	0.968	0.96	0.956
A-10 field duplicate	1.0592	1.052	1.046	1.0376	1.0288	1.0236	1.0156	1.0104	1.0032
	1.06	1.052	1.044	1.038	1.0304	1.0228	1.016	1.0088	1.0024
	1.062	1.0532	1.0468	1.038	1.0328	1.024	1.018	1.0116	1.0036
A-10 (field duplicate remeasurement)	1.0216	1.014	1.0064	0.9996	0.9916	0.9848	0.9788	0.9708	0.964
	1.018	1.0112	1.0024	0.9968	0.9884	0.9832	0.9752	0.9676	0.9608
	1.0196	1.012	1.0056	0.9992	0.9904	0.9832	0.9768	0.97	0.9624
ONS-1B	1.0608	1.054	1.0464	1.0388	1.0308	1.024	1.0176	1.0096	1.0036
	1.062	1.0556	1.0468	1.0396	1.0324	1.0244	1.0164	1.0096	1.0036
	1.0612	1.0536	1.0456	1.0388	1.0304	1.0236	1.0156	1.0096	1.0036
ONS-1B field duplicate	1.06	1.0536	1.0456	1.0376	1.0312	1.0228	1.0164	1.0096	1.0028
	1.0596	1.0524	1.0452	1.0376	1.03	1.0216	1.016	1.0096	1.002
	1.0608	1.0528	1.0452	1.0376	1.0296	1.0228	1.0148	1.008	1.0028
DSW-6B	1.0044	0.9976	0.9892	0.9812	0.9748	0.9684	0.9644	0.9564	0.9484
	1.0044	0.998	0.9896	0.982	0.9744	0.968	0.9632	0.9544	0.946
	1.004	0.9968	0.99	0.9824	0.9752	0.9684	0.9628	0.9524	0.9456

Table 3-21
NAPL Viscosity Measurements

Well ID	Viscosity (cP) at Various Temperatures								
	10°C	20°C	30°C	40°C	50°C	60°C	70°C	80°C	90°C
A-10									
60 rpm		26.25	16.7	11.35	8.4	6.4	5	4.2	3.5
		26.3	16.55	11.4	8.35	6.5	5.1	4.15	3.45
		26.3	16.5	11.35	8.35	6.45	5.05	4.15	3.5
30 rpm	46	26.5	16.6	11.8					
	46	26.4	16.6	11.7					
	46	26.4	16.7	11.9					
12 rpm	45	28.25							
	45.25	28.25							
	45	28.5							
ONS-1B									
60 rpm	21.25	13.5	9.2	6.85	5.35	4.2	3.4	2.95	2.55
	21.2	13.45	9.2	6.85	5.3	4.1	3.45	3	2.65
	21.3	13.5	9.2	6.9	5.35	4.2	3.5	2.95	2.65
30 rpm	21.1	13.6							
	21.2	13.6							
	21.2	13.7							
ONS-1B Field Duplicate									
60 rpm	21.2	13.4	9.2	6.75	5.3	4.15	3.4	2.95	2.6
	21.15	13.45	9.2	6.8	5.2	4.15	3.25	2.9	2.65
	21.15	13.5	9.15	6.8	5.3	4.1	3.45	2.9	2.65
	21.3	13.8							
30 rpm	21.1	13.7							
	21.1	13.8							
A-10									
60 rpm	43.05	24.9	15.7	10.95	7.95	6.05	4.95	4.05	3.4
	43	24.75	15.85	10.85	8	6.15	4.9	4	3.45
	43.05	24.7	15.85	10.9	7.95	6.05	4.9	4	3.4
30 rpm	43.1	24.7	15.9	11.2					
	43.1	24.7	16	11.4					
	43.1	24.6	16	11.1					
12 rpm	44.25								
	44								
	44								

Table 3-21 (Continued)
NAPL Viscosity Measurements

Well ID	Viscosity (cP) at Various Temperatures								
	10°C	20°C	30°C	40°C	50°C	60°C	70°C	80°C	90°C
DSW-6B									
60 rpm	24.9	13.8	7.7	6.45	5.75	5.05	4.2	3.6	3.2
	24.85	13.05	7.65	6.35	5.8	5	4.15	3.55	3.15
	24.85	13.05	7.6	6.2	5.65	5	4.1	3.55	3.1
30 rpm	24.7	14.6							
	24.7	14.6							
	24.6	14.4							

Notes:
Viscosities under 5 cP should be considered approximate as 5 cP is the practical lower limit of measurement for the equipment used. However, the reproducibility of the measurements indicates that these estimates are reasonable.
cP - centipoise

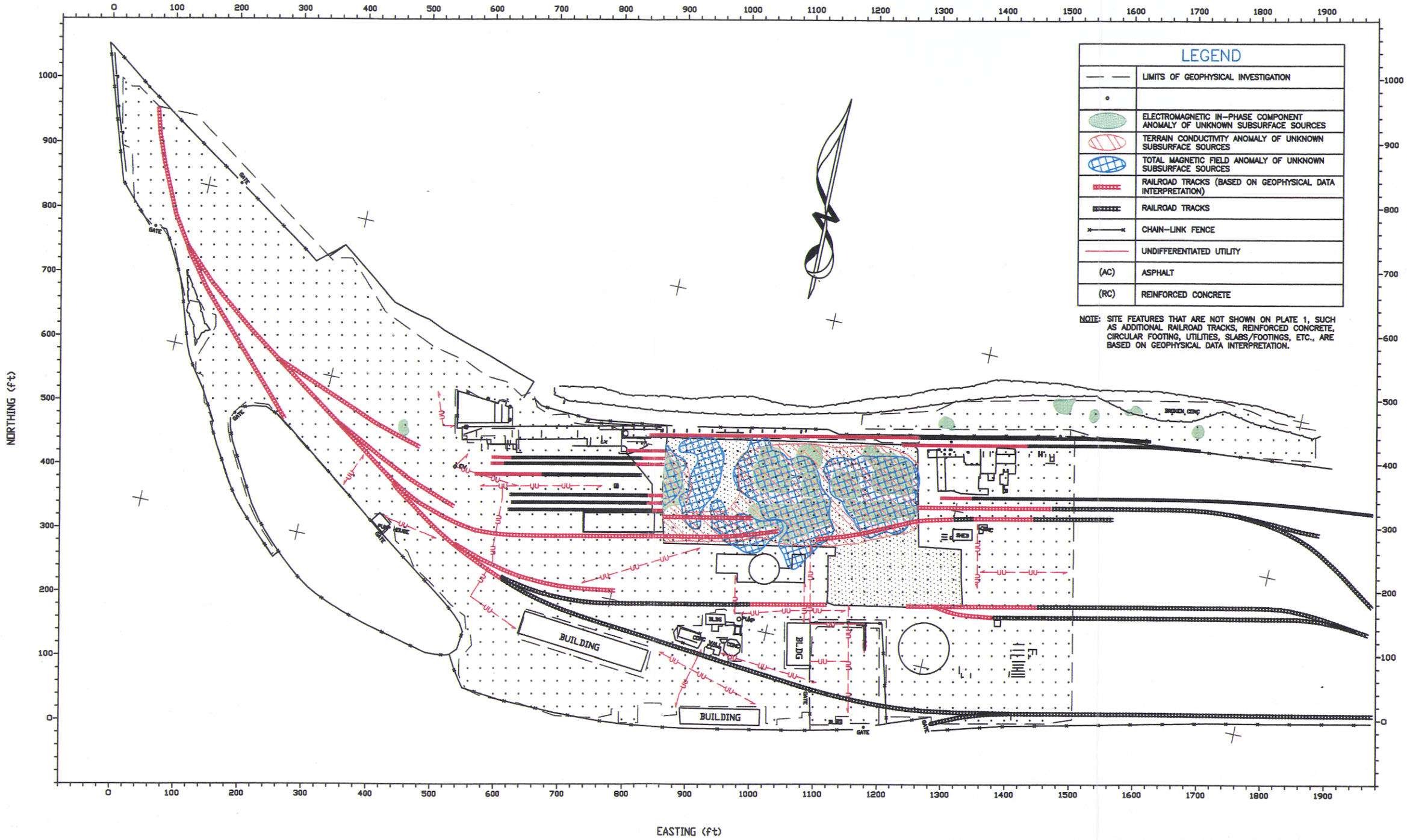
Table 3-22
NAPL Simulated Distillation

Sample Volume Distilled (percent)	Temperature in °F (percent change)		
	ONS-1B	A-10	DSW-6B
Initial boiling point	322	334	331
5	392 (22)	401 (20)	390 (18)
10	403 (3)	404 (0.7)	403 (3.3)
15	406 (0.7)	407 (0.7)	405 (0.4)
20	408 (0.2)	433 (6.4)	407 (0.5)
30	438 (7.3)	475 (10)	425 (4.4)
40	480 (9)	518 (9.1)	447 (5.2)
50	527 (9.7)	562 (8.4)	494 (10)
60	588 (11.5)	596 (5.5)	531 (7.5)
70	623 (5.9)	635 (6.5)	587 (10.5)
80	675 (8.3)	678 (6.6)	629 (7.1)
90	760 (12.6)	766 (13)	702 (12)
95	839 (10.4)	884 (15)	800 (14)
Final boiling point	1023 (21.9)	1058 (20)	1037 (30)

Table 3-23
NAPL Saturation

Location ID	Depth (feet bgs)	Pore Fluid Saturation (percent Pv)		Porosity (percent Vb)		Description	
		Water	Hydrocarbon	Effective Porosity	Air-Filled Porosity	Soil	NAPL
SB-099	13.4-14.7	83.8	Less than 0.1	41.4	7.4	Clay	Odor
SB-599 (field duplicate)	27.5-29.5	60.2	13.0	44.2	13.3	Sand	Sheen
SB-099	27.5-29.5	66.0	13.8	43.4	10.3	Sand	Sheen
SB-099	31-33	28.0	77.0	38.5	5.5	Sand	Mobile
SB-099	41-42.5	88.7	4.2	39.6	3.2	Silt/Sand	Sheen
SB-086	33.6-35	81.3	2.1	35.6	6.1	Sand	Visible
SB-086	36.3-38	69.7	9.2	37.8	8.9	Sand	Visible
SB-028	31-33	93.2	3.7	44.4	1.8	Sand	Sheen
SB-028	100.6-101.5	92.5	1.9	48.4	3.0	Clay	Sheen
SB-028	48-49.7	63.5	Less than 0.1	35.3	13.1	Sand	Sheen

Notes:
All samples were repacked and reformed prior to analysis.
Pv - pore volume
Vb - bulk volume of the sample



LEGEND

— —	LIMITS OF GEOPHYSICAL INVESTIGATION
∘	
	ELECTROMAGNETIC IN-PHASE COMPONENT ANOMALY OF UNKNOWN SUBSURFACE SOURCES
	TERRAIN CONDUCTIVITY ANOMALY OF UNKNOWN SUBSURFACE SOURCES
	TOTAL MAGNETIC FIELD ANOMALY OF UNKNOWN SUBSURFACE SOURCES
	RAILROAD TRACKS (BASED ON GEOPHYSICAL DATA INTERPRETATION)
	RAILROAD TRACKS
	CHAIN-LINK FENCE
	UNDIFFERENTIATED UTILITY
(AC)	ASPHALT
(RC)	REINFORCED CONCRETE

NOTE: SITE FEATURES THAT ARE NOT SHOWN ON PLATE 1, SUCH AS ADDITIONAL RAILROAD TRACKS, REINFORCED CONCRETE, CIRCULAR FOOTING, UTILITIES, SLABS/FOOTINGS, ETC., ARE BASED ON GEOPHYSICAL DATA INTERPRETATION.

NORCA

GEOPHYSICAL SURVEY RESULTS MAP
FIELD INVESTIGATION REPORT

LOCATION: STOCKTON, CALIFORNIA

CLIENT: ARMY CORPS OF ENGINEERS

JOB #: 99-559.01

NORCAL GEOPHYSICAL CONSULTANTS INC.

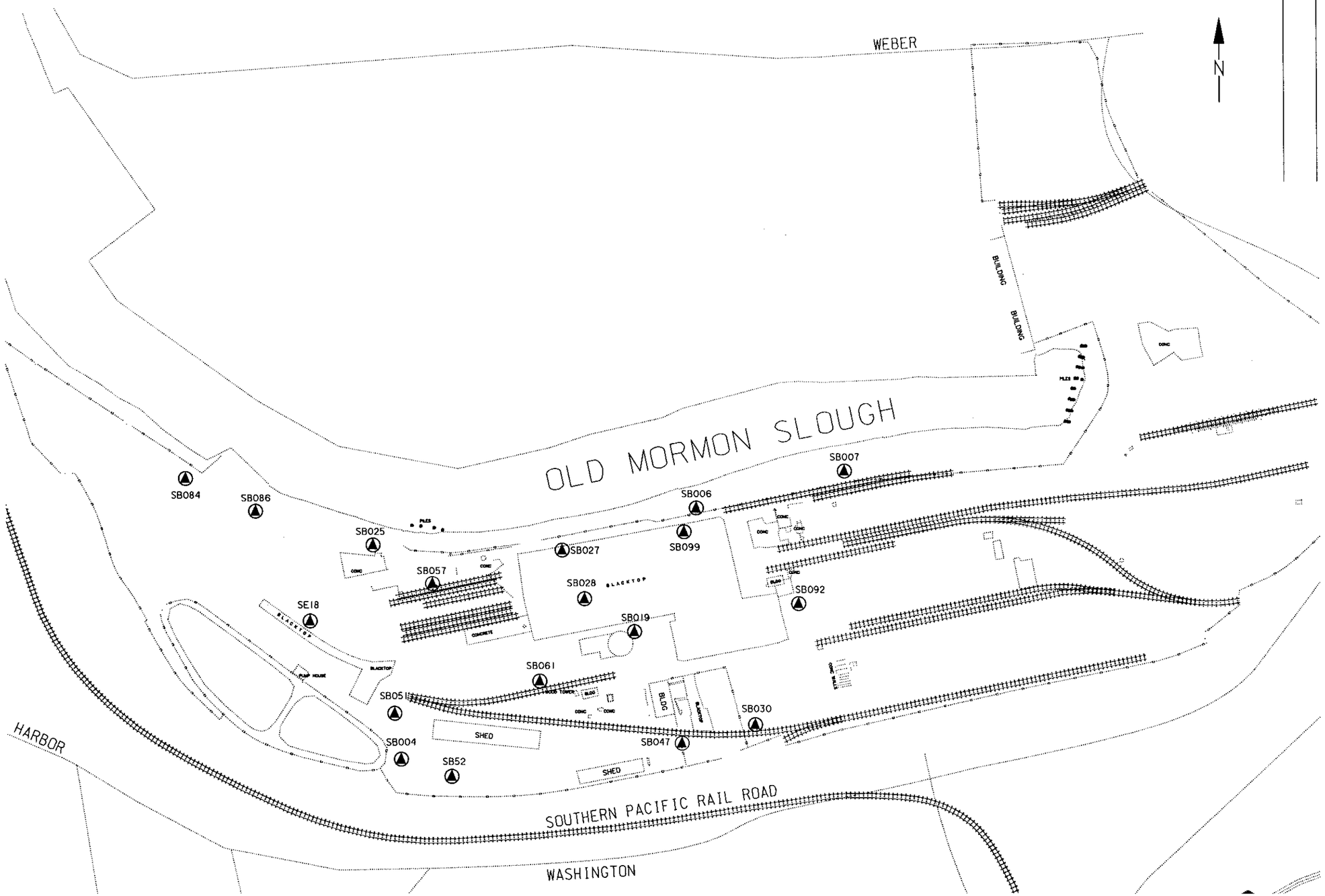
DATE: JUNE 1999

DRAWN BY: G.RANDALL

APPROVED BY: DJK

FIGURE 3-1

REVISIONS				
SYMBOL	ZONE	DESCRIPTION	DATE	BY



1" = 200' 0 100' 200'

U.S. ARMY ENGINEER DISTRICT, SEATTLE
CORPS OF ENGINEERS
SEATTLE, WASHINGTON

MC CORMICK & BAXTER SUPERFUND SITE

ROTOSONIC BORING LOCATIONS

STOCKTON CALIFORNIA

SIZE	INVITATION NO.	FILE NO.	DATE:	FIGURE
D			99DEC22	3-2
DSGN. SMITH		CHK. LYNCH	SHEET	

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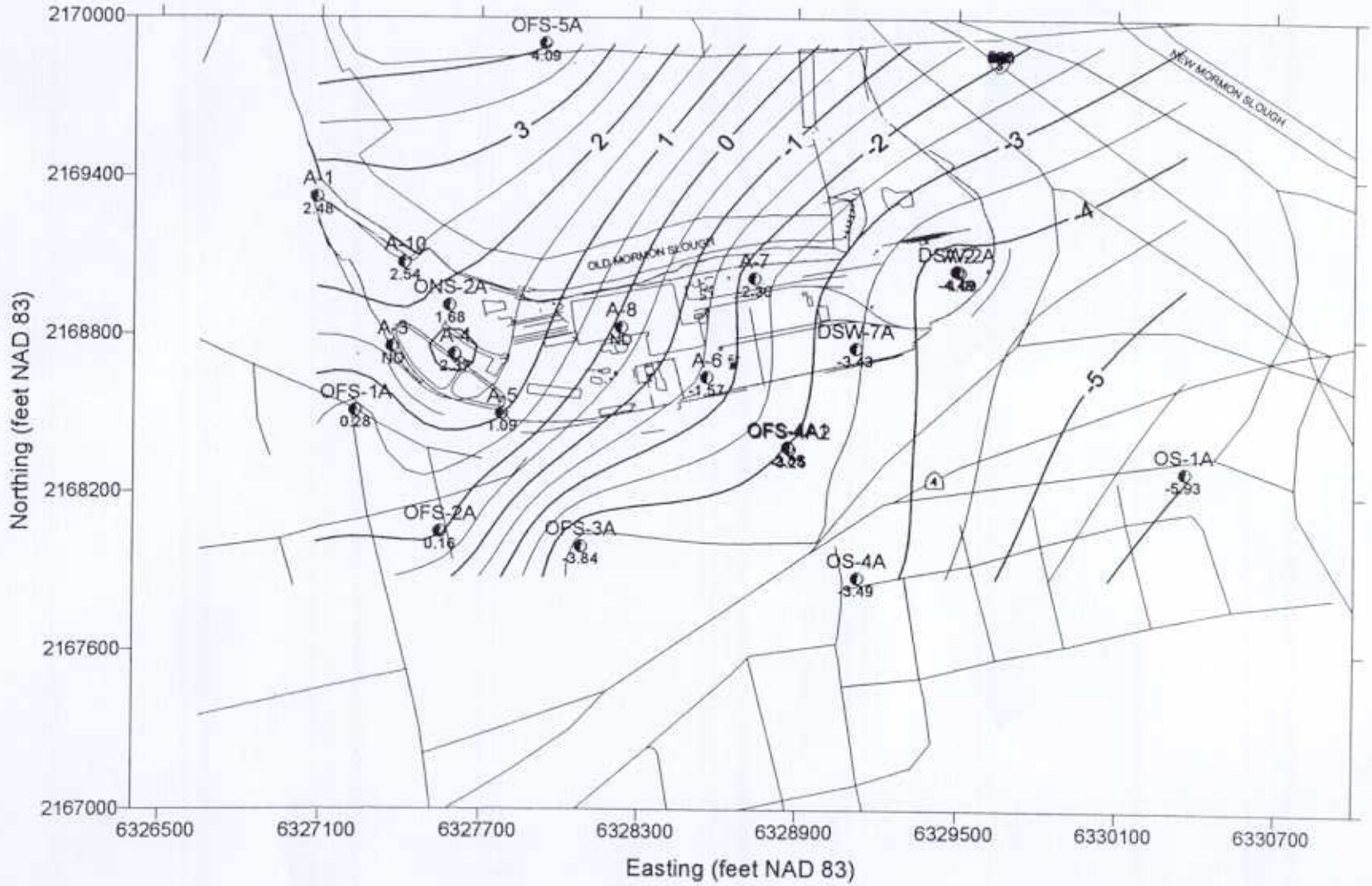
DATE AND TIME PLOTTED: 04-FEB-2000 17:24
DESIGN FILE: i:\htrw\mcbx\smith\mbrscs0y.dgn

Computer Aided Design & Drafting



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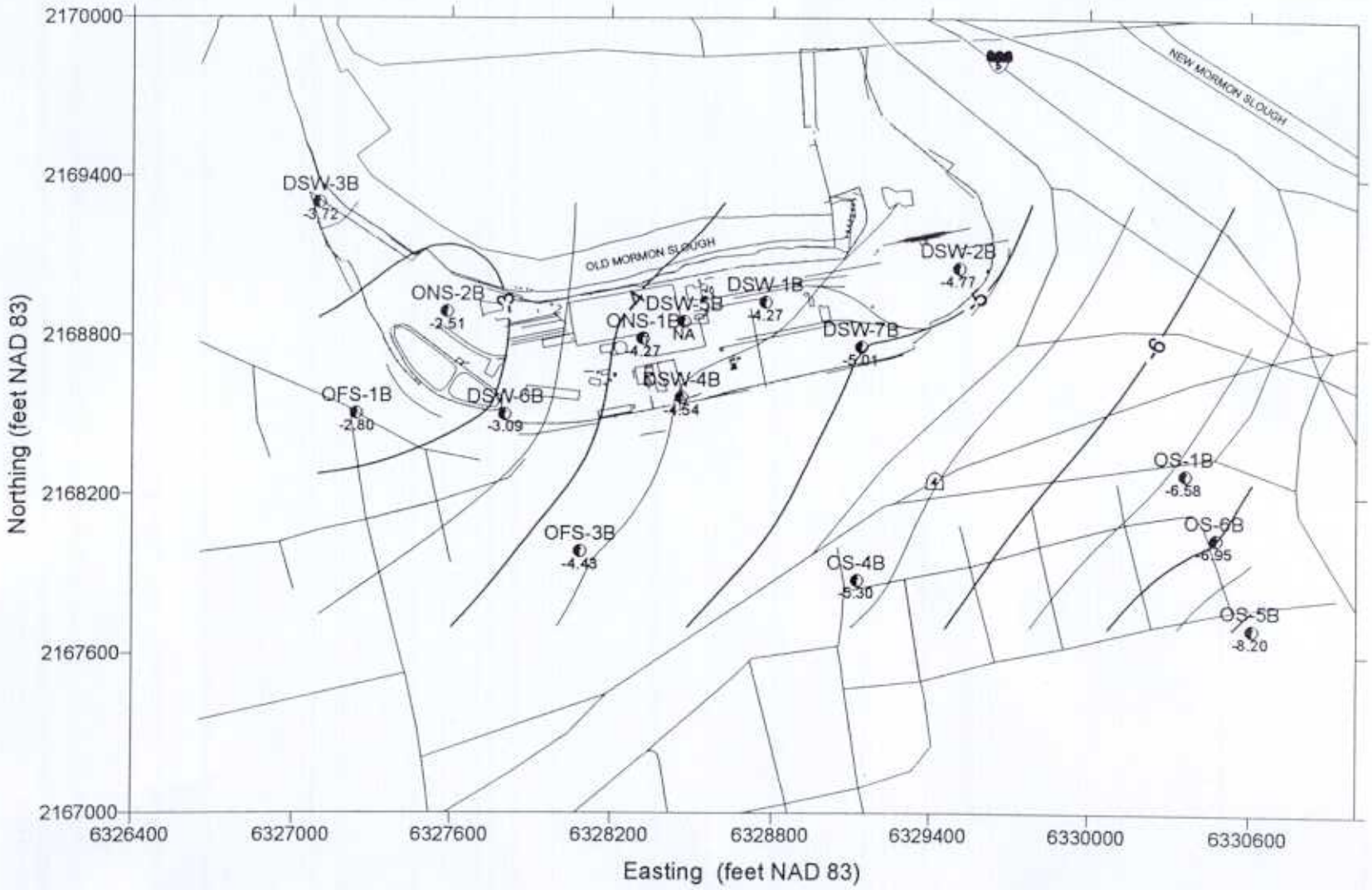
SEATTLE, WASHINGTON

MC CORMICK & BAXTER SUPERFUND SITE
SITE INVESTIGATION

FIGURE 3-3

APRIL 1999 A ZONE GROUNDWATER ELEVATIONS (FEET NVD 88)

STOCKTON CALIFORNIA



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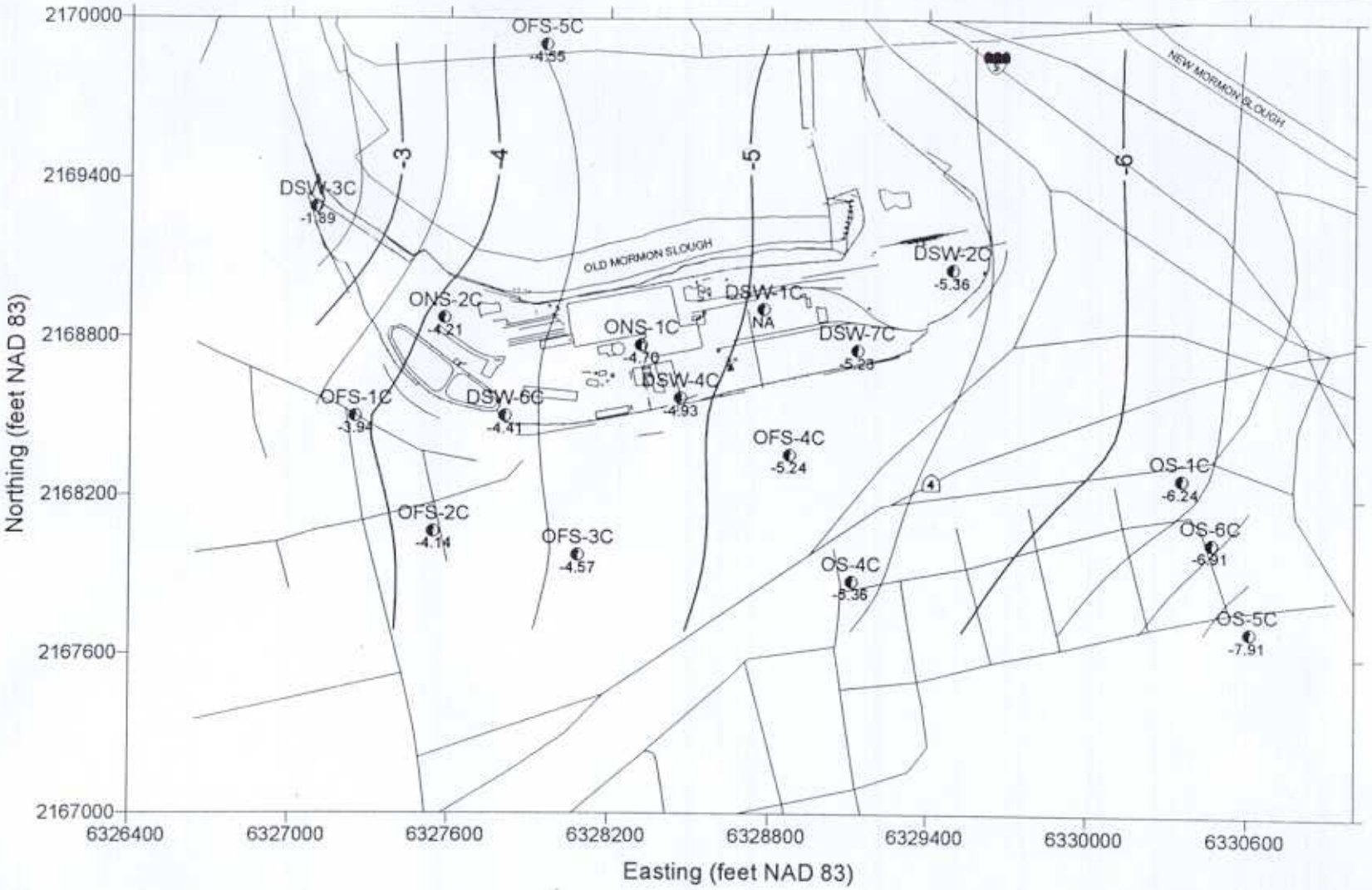
SEATTLE, WASHINGTON

MC CORMICK & BAXTER SUPERFUND SITE
SITE INVESTIGATION

FIGURE 3-4

APRIL 1999 B ZONE GROUNDWATER ELEVATIONS (FEET NVD 88)

STOCKTON CALIFORNIA



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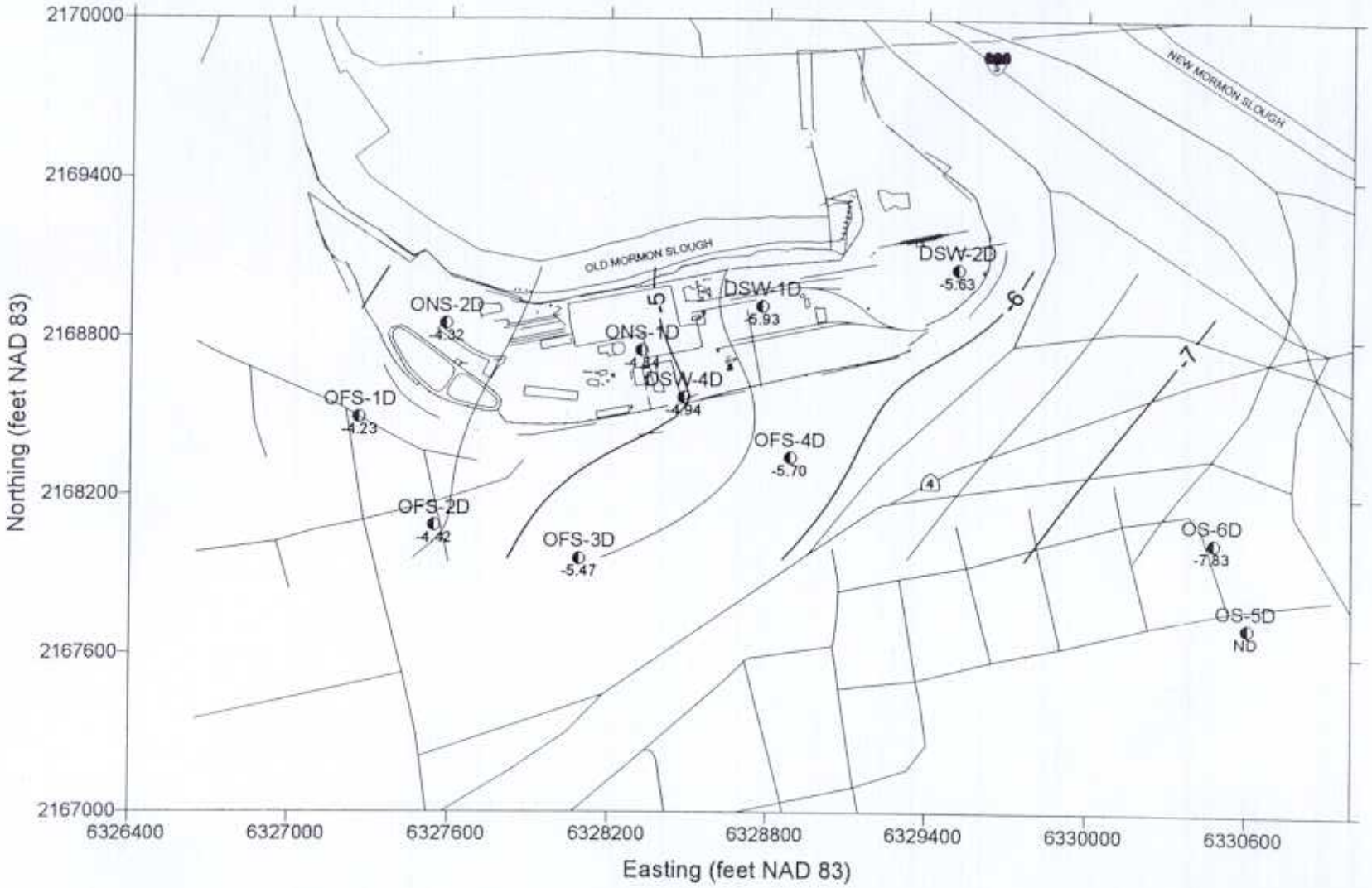
SEATTLE, WASHINGTON

MC CORMICK & BAXTER SUPERFUND SITE
SITE INVESTIGATION

FIGURE 3-5

APRIL 1999 C ZONE GROUNDWATER ELEVATIONS (FEET NVD 88)

STOCKTON CALIFORNIA



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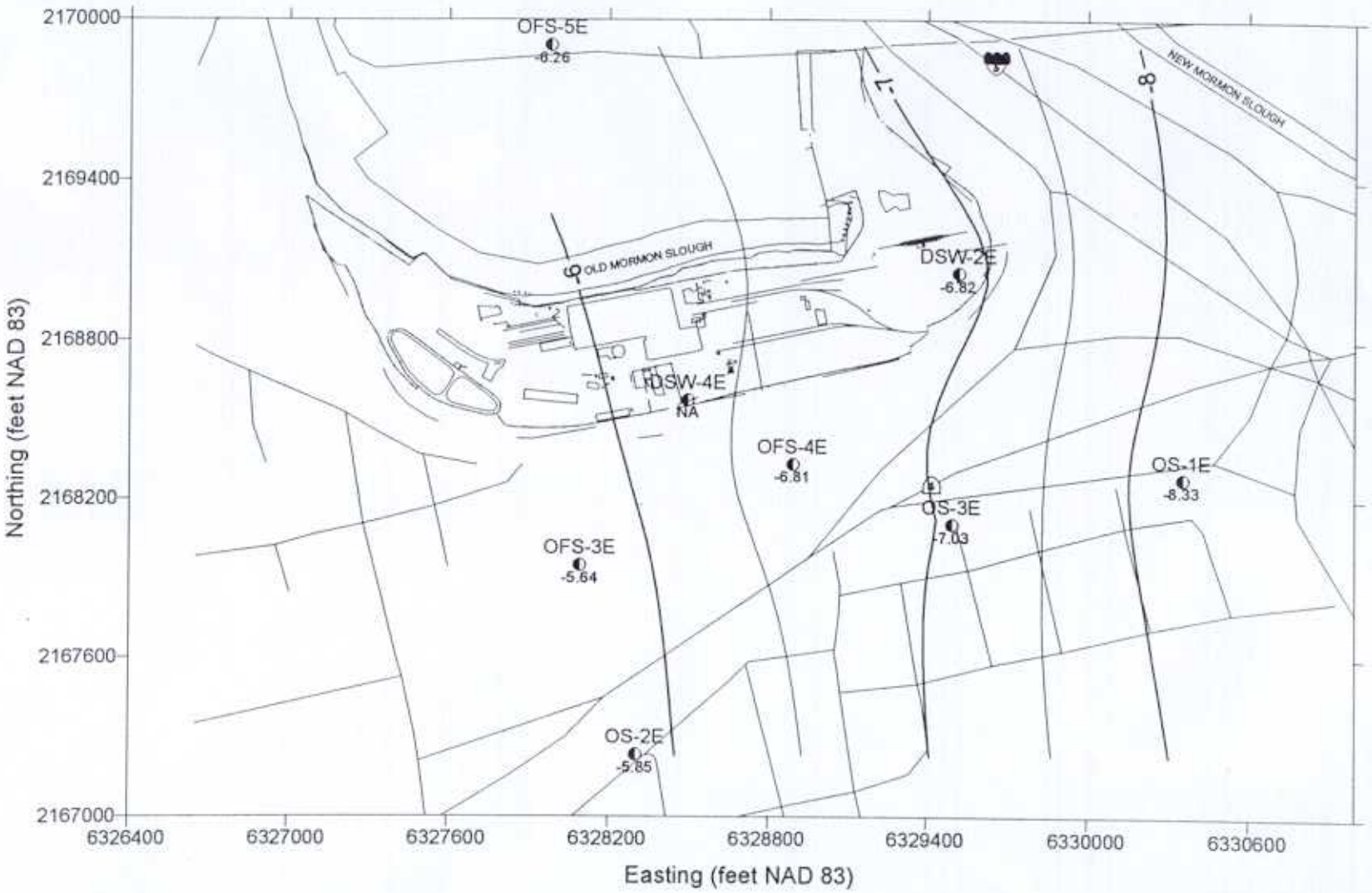
SEATTLE, WASHINGTON

MC CORMICK & BAXTER SUPERFUND SITE
SITE INVESTIGATION

FIGURE 3-6

APRIL 1999 D ZONE GROUNDWATER ELEVATIONS (FEET NVD 88)

STOCKTON CALIFORNIA



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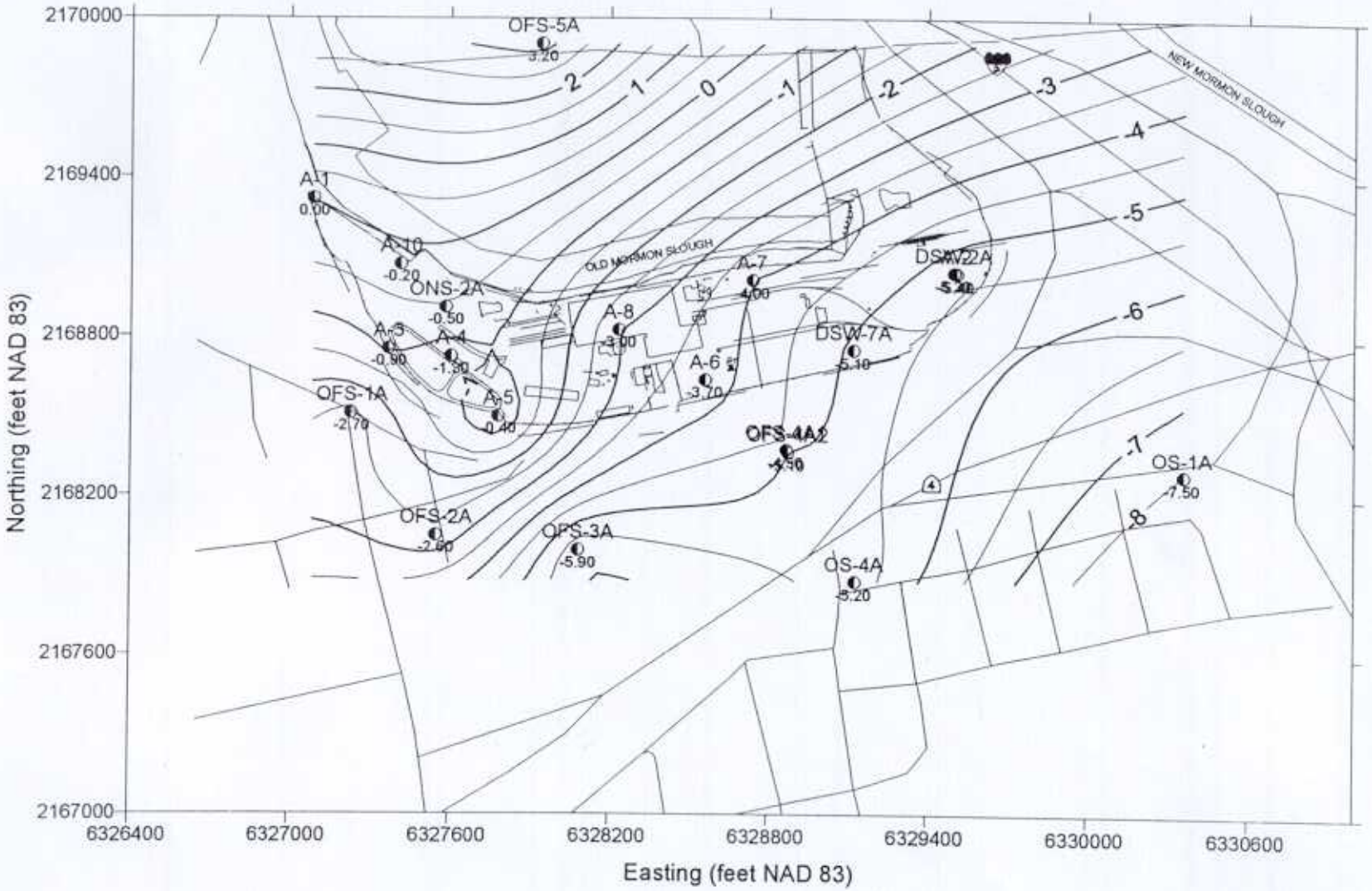
SEATTLE, WASHINGTON

MC CORMICK & BAXTER SUPERFUND SITE
SITE INVESTIGATION

FIGURE 3-7

APRIL 1999 E ZONE GROUNDWATER ELEVATIONS (FEET NVD 88)

STOCKTON CALIFORNIA



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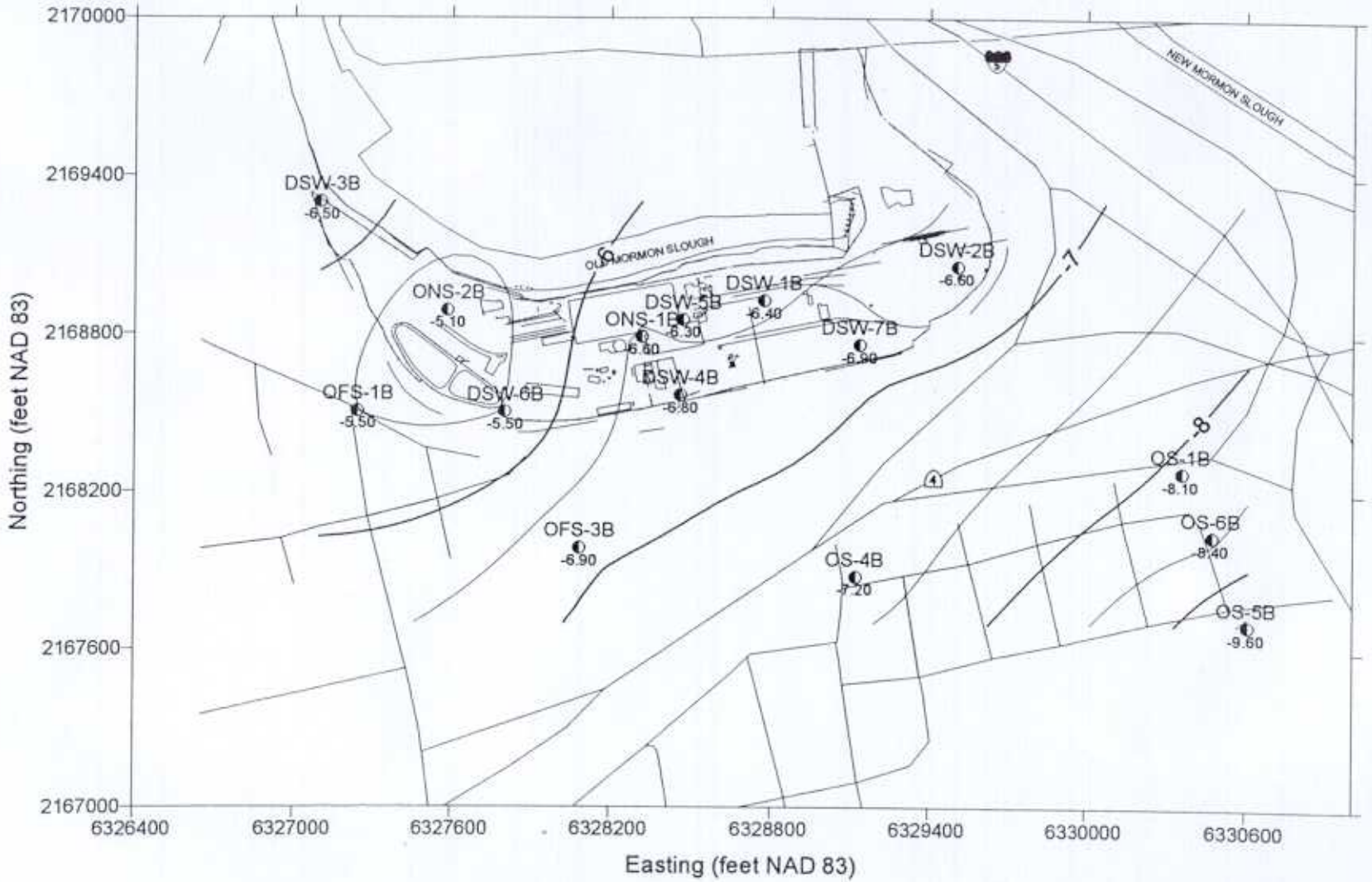
SEATTLE, WASHINGTON

MC CORMICK & BAXTER SUPERFUND SITE
SITE INVESTIGATION

FIGURE 3-8

JULY 1999 A ZONE GROUNDWATER ELEVATIONS (FEET NVD 88)

STOCKTON CALIFORNIA



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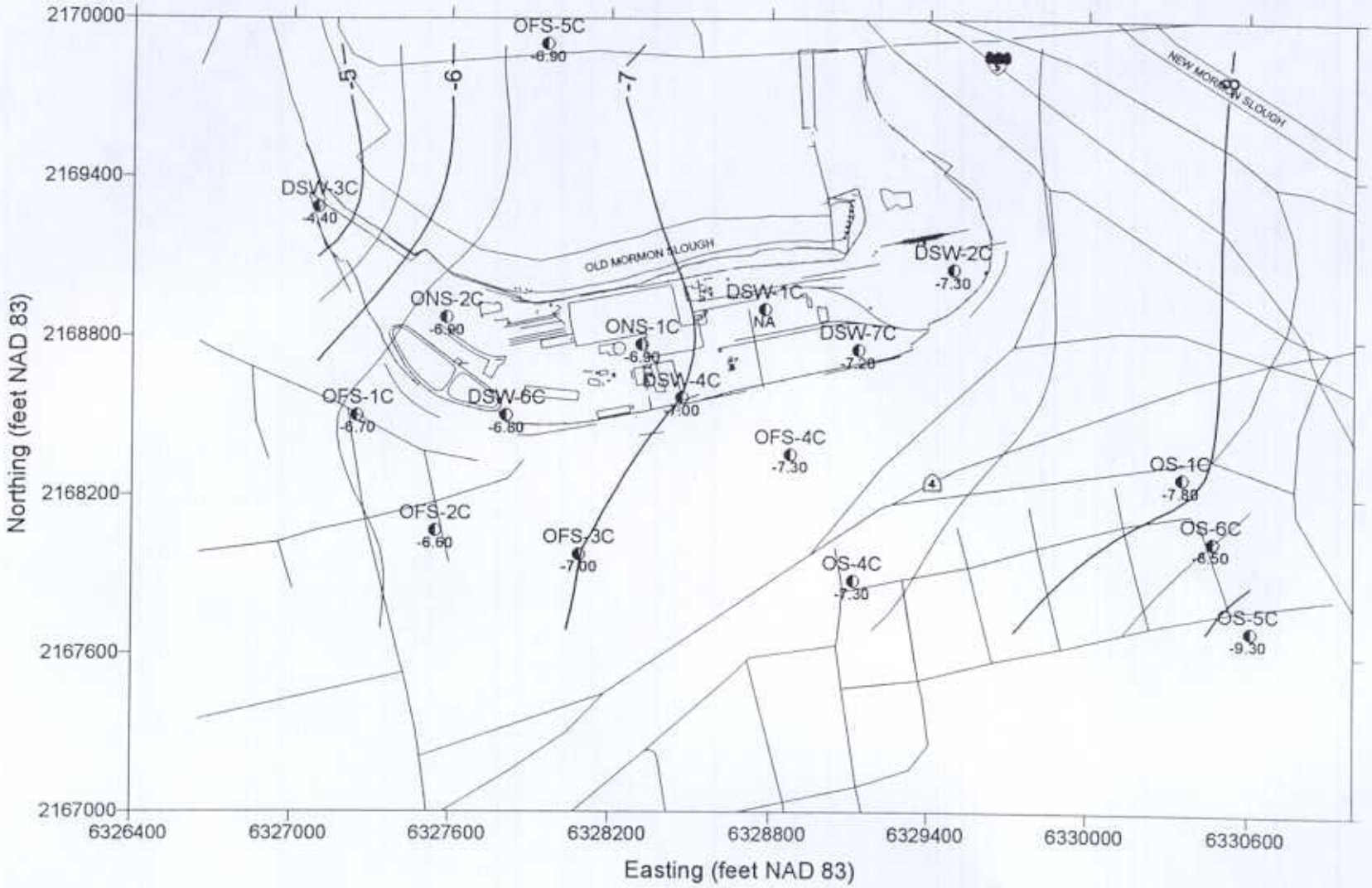
MC CORMICK & BAXTER SUPERFUND SITE
SITE INVESTIGATION

FIGURE 3-9

JULY 1999 B ZONE GROUNDWATER ELEVATIONS (FEET NVD 88)

STOCKTON CALIFORNIA



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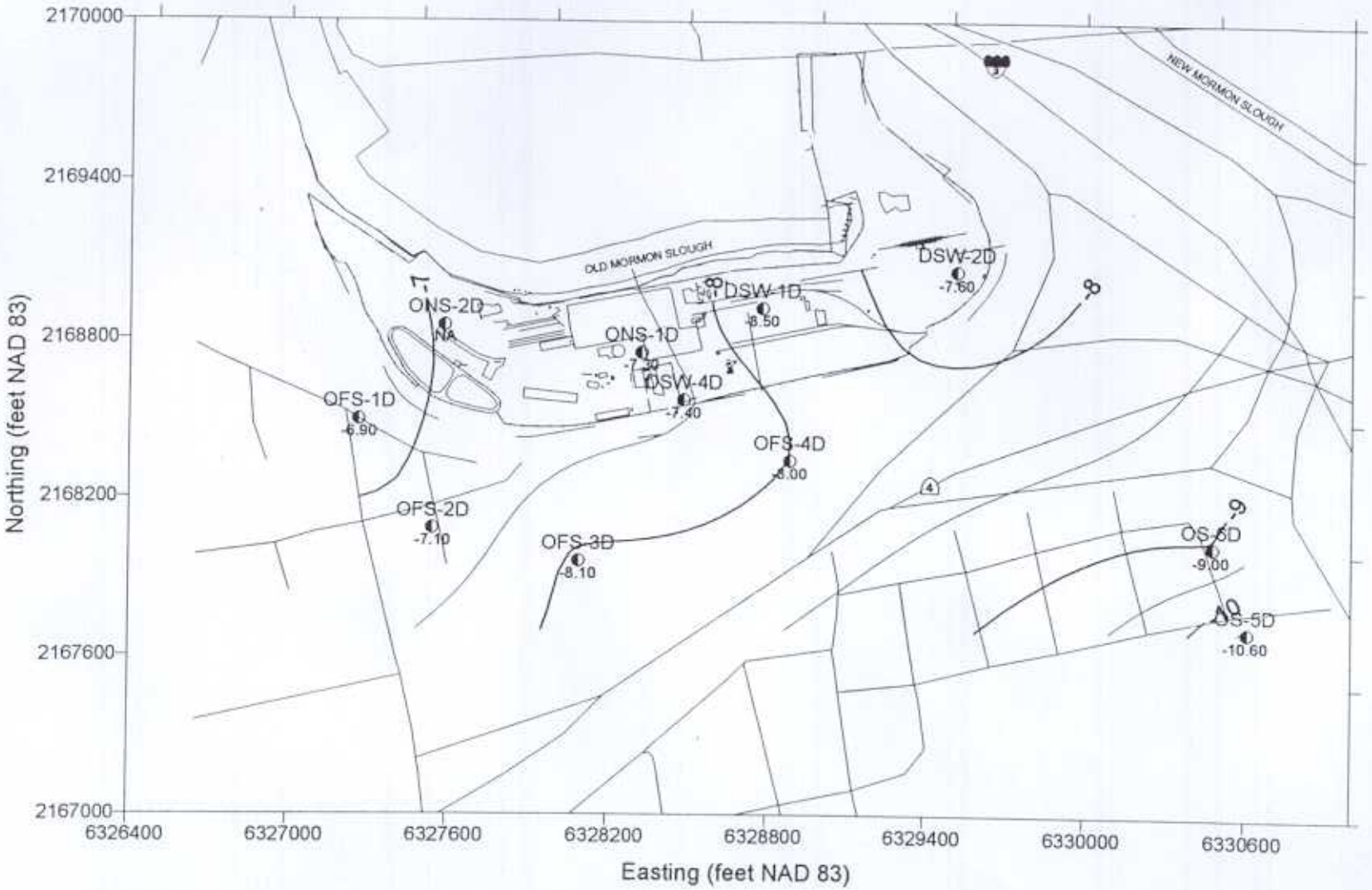
MC CORMICK & BAXTER SUPERFUND SITE
SITE INVESTIGATION

FIGURE 3-10

JULY 1999 C ZONE GROUNDWATER ELEVATIONS (FEET NVD 88)

STOCKTON CALIFORNIA



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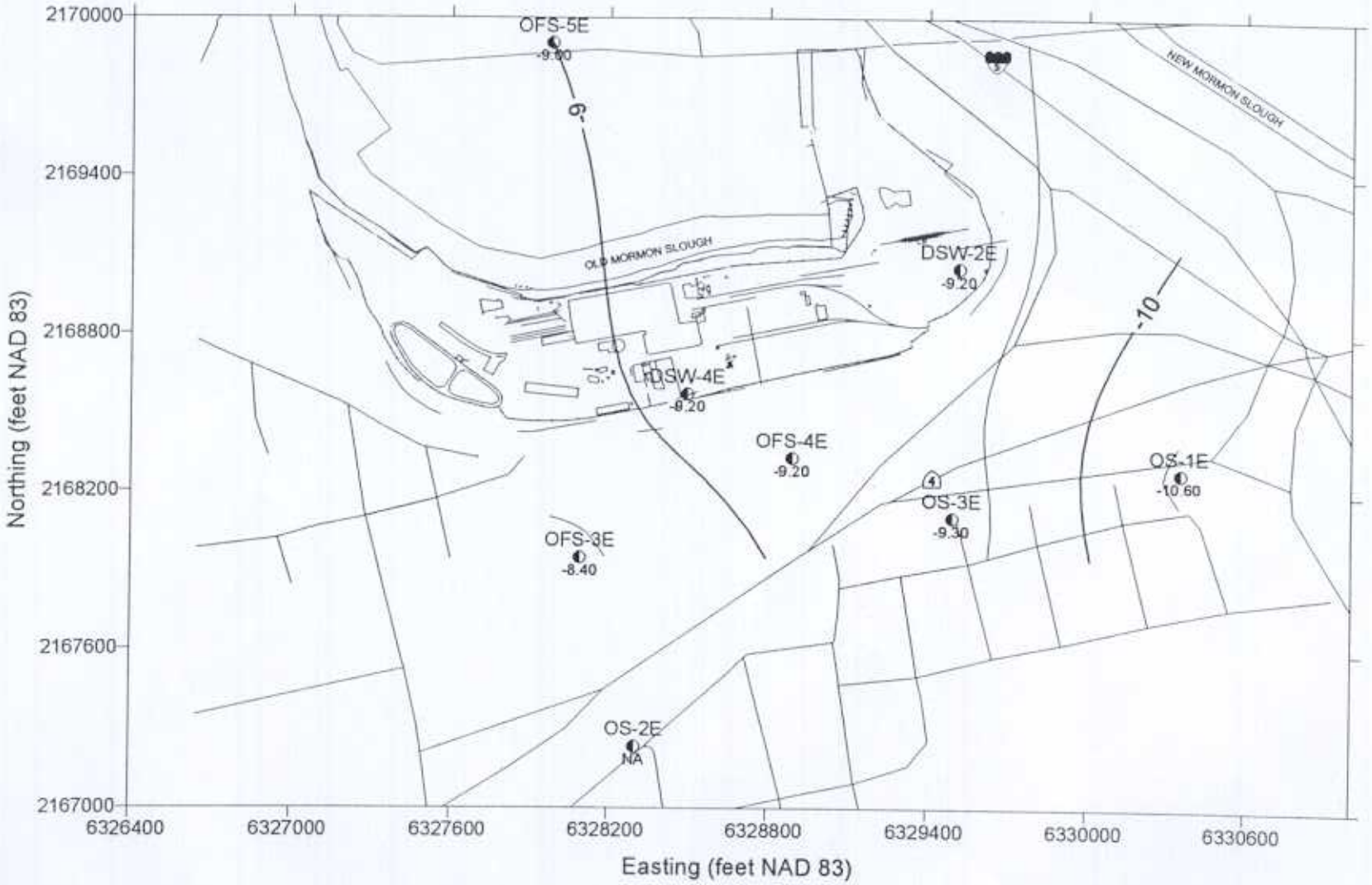
MC CORMICK & BAXTER SUPERFUND SITE
SITE INVESTIGATION

FIGURE 3-11

JULY 1999 D ZONE GROUNDWATER ELEVATIONS (FEET NVD 88)

STOCKTON CALIFORNIA



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CORPS OF ENGINEERS
SEATTLE, WASHINGTON

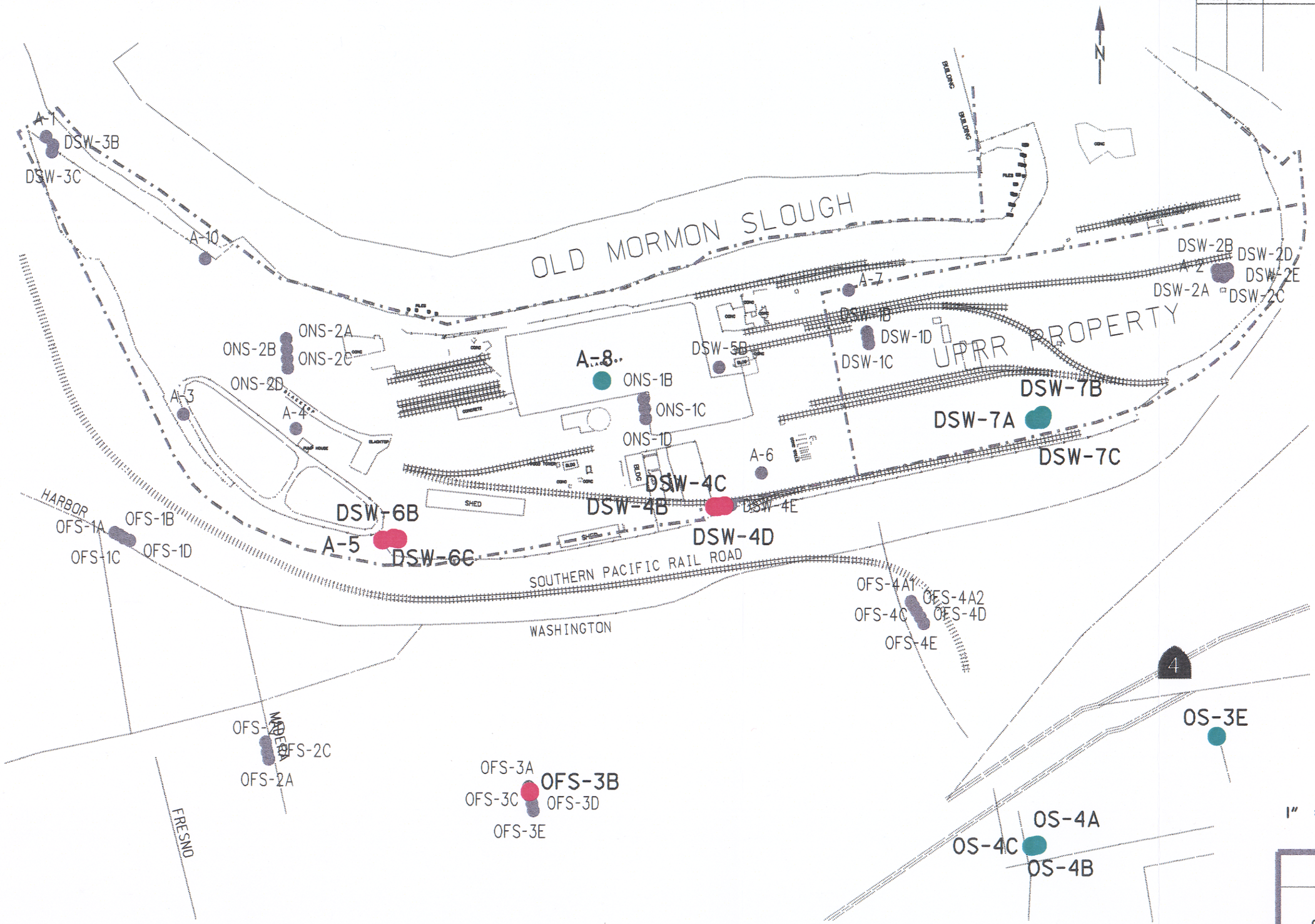
MC CORMICK & BAXTER SUPERFUND SITE
SITE INVESTIGATION

FIGURE 3-12

JULY 1999 E ZONE GROUNDWATER ELEVATIONS (FEET NVD 88)

STOCKTON CALIFORNIA

REVISIONS				
SYMBOL	ZONE	DESCRIPTION	DATE	BY



LEGEND

- BOUNDARIES
- OS-3E — SAMPLE FOR SVOC
- DSW-6B — SAMPLE FOR DIOXIN AND SVOC'S

1" = 200' (0 – 200')

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MC CORMICK & BAXTER SUPERFUND SITE
SITE INVESTIGATION

GROUNDWATER SAMPLING LOCATIONS
OF EXISTING MONITORING WELLS

STOCKTON — CALIFORNIA

SIZE	INVITATION NO.	FILE NO.	DATE:	FIGURE
D				3-13
DSGN. SMITH		CHK. LYNCH		SHEET

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DATE AND TIME PLOTTED: 04-FEB-2000 16:37
DESIGN FILE: I:\htrw\mcbx\smith\mbr\s0m.dgn

Figure 3-14. Groundwater Density

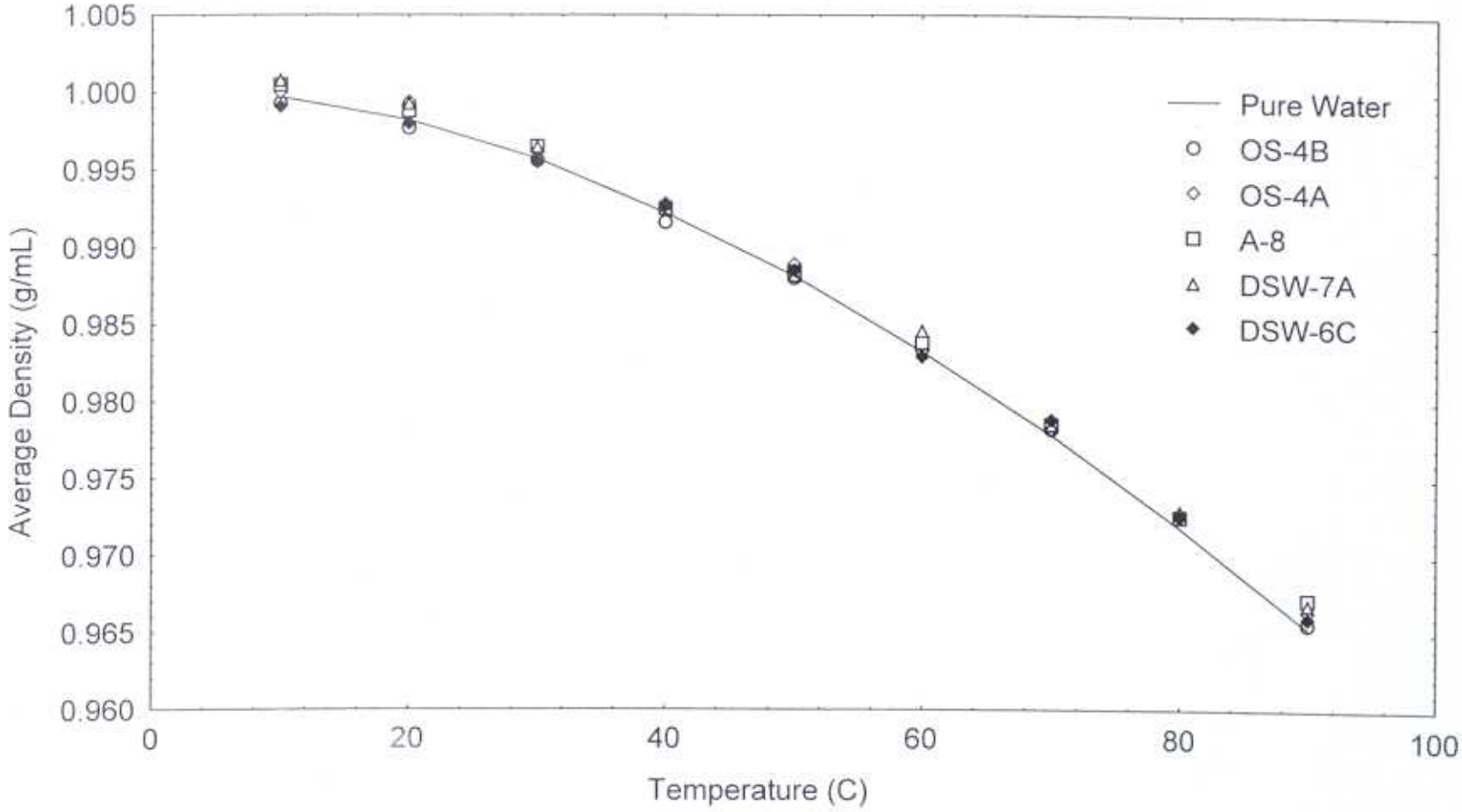


Figure 3-15
Well A-8 Naphthalene Trends

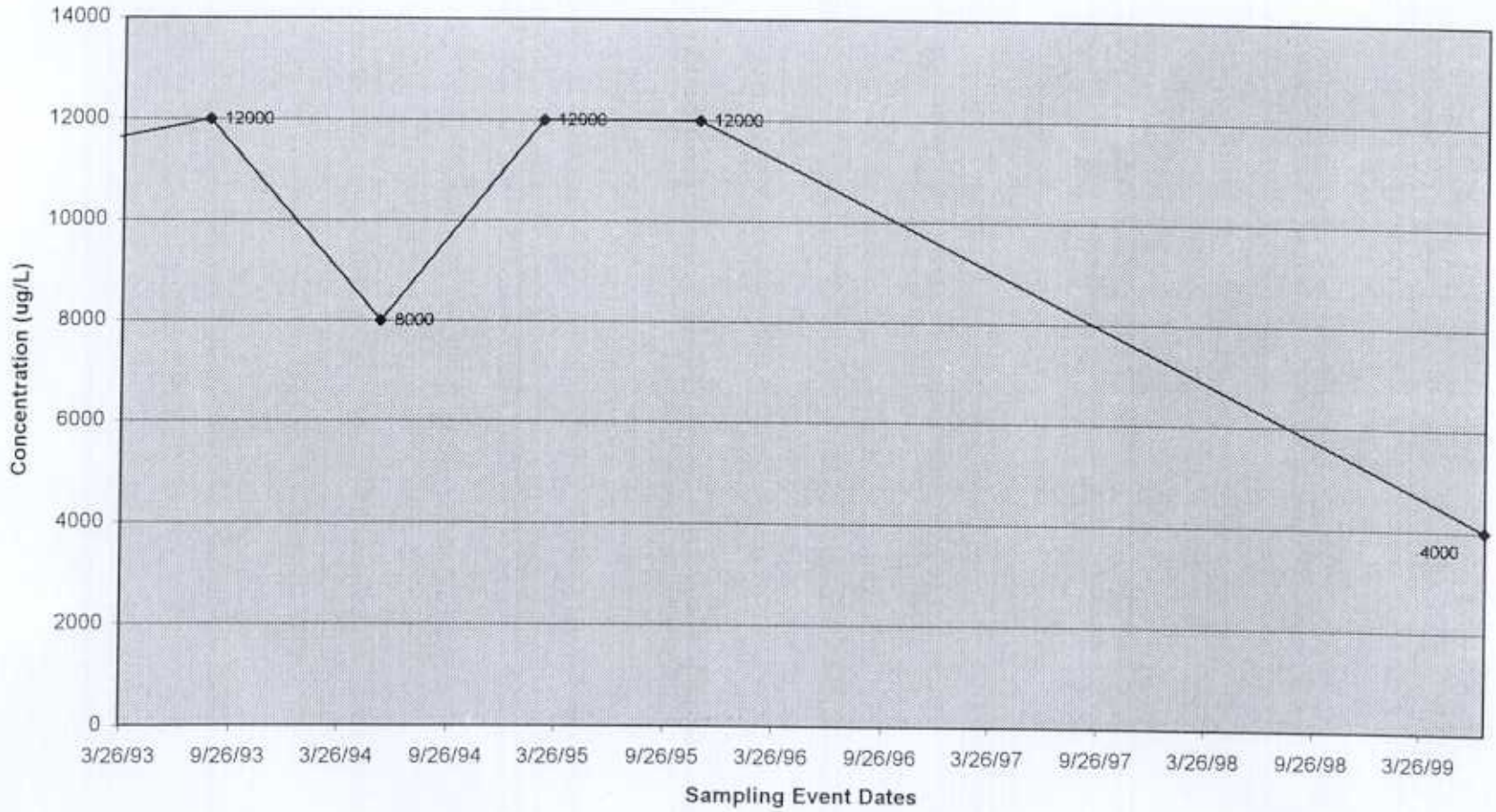


Figure 3-16
Well DSW-4B Naphthalene Trends

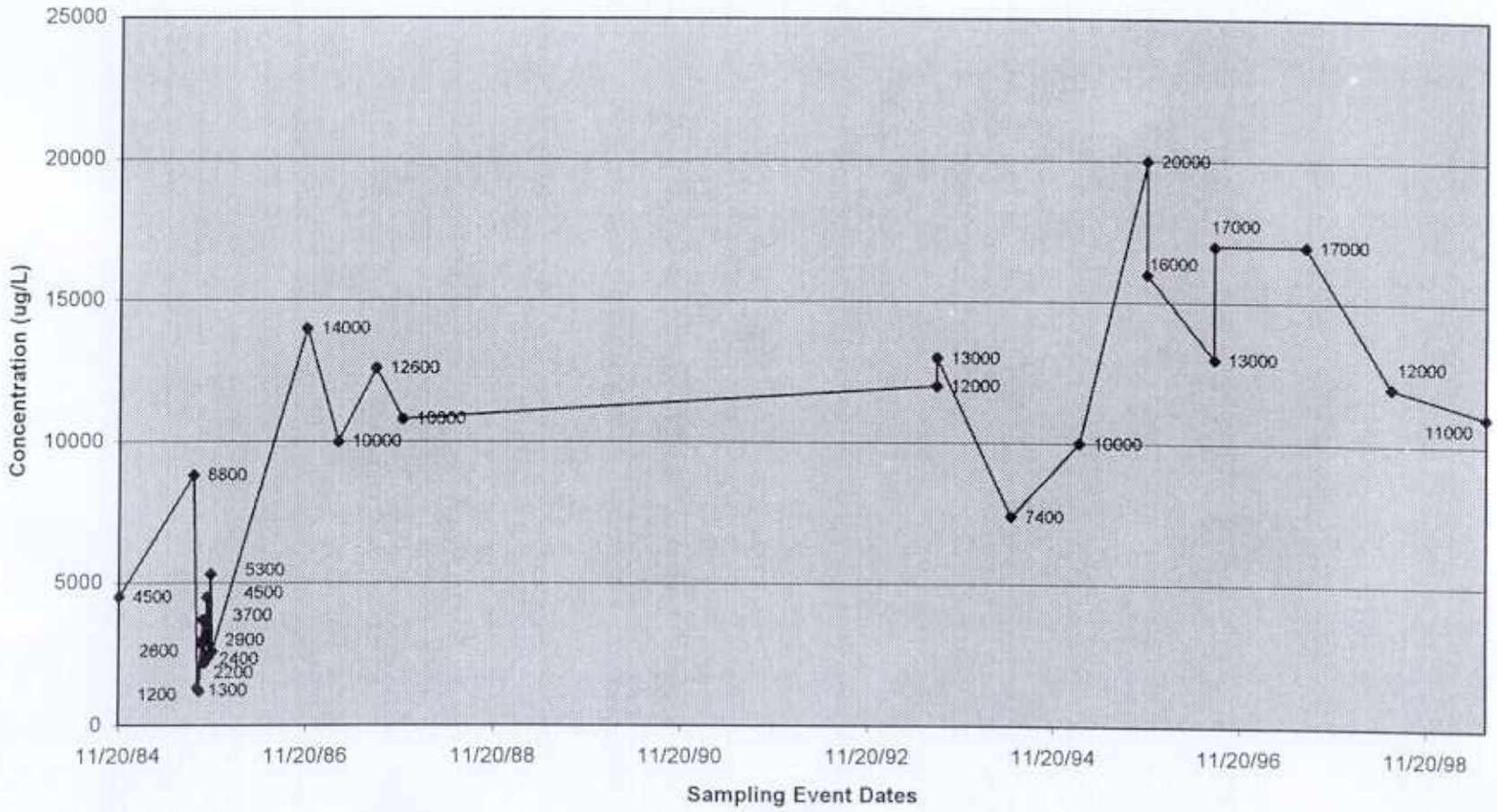


Figure 3-17
Well DSW-4C Naphthalene Trends

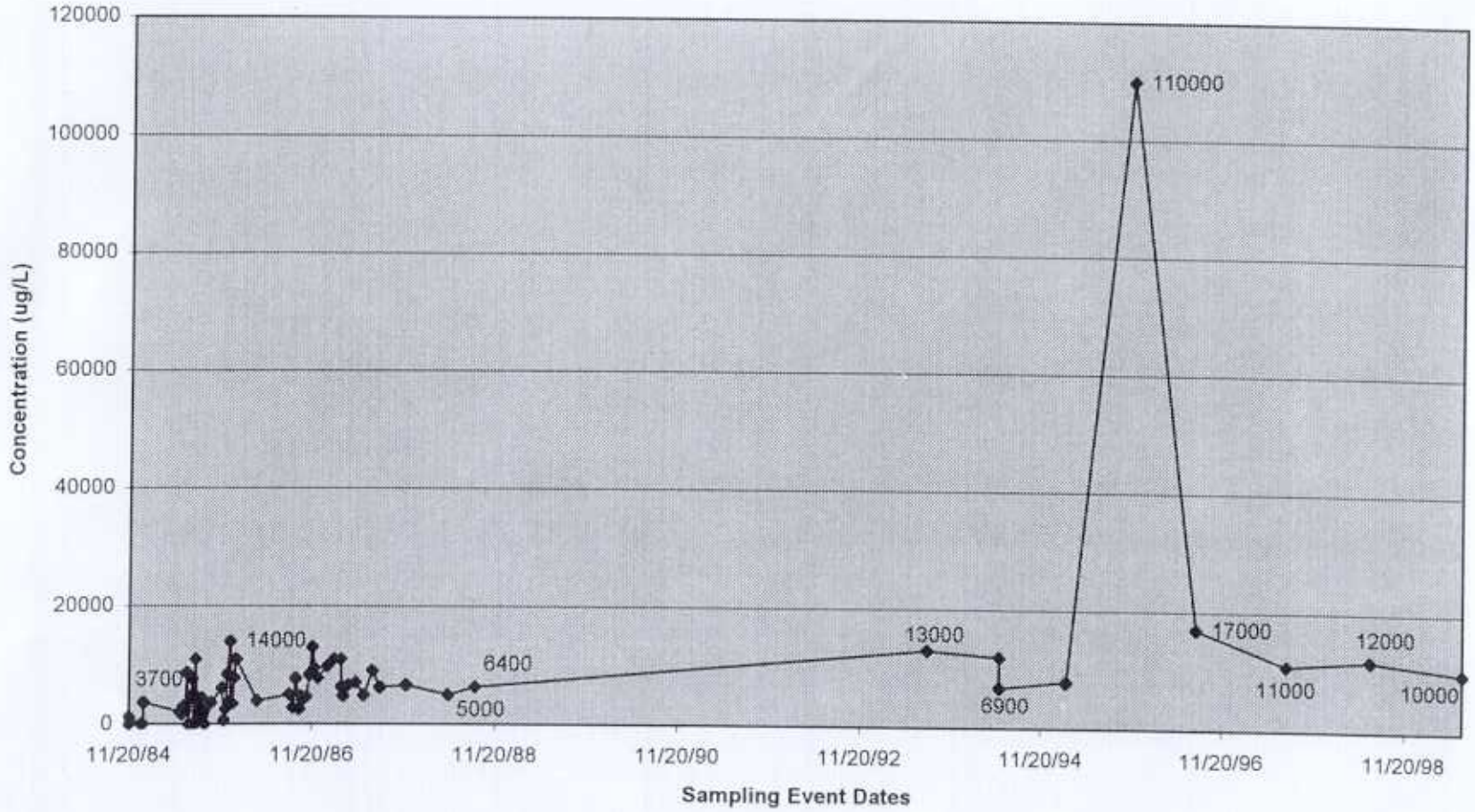


Figure 3-18
Well DSW-6B Naphthalene Trends

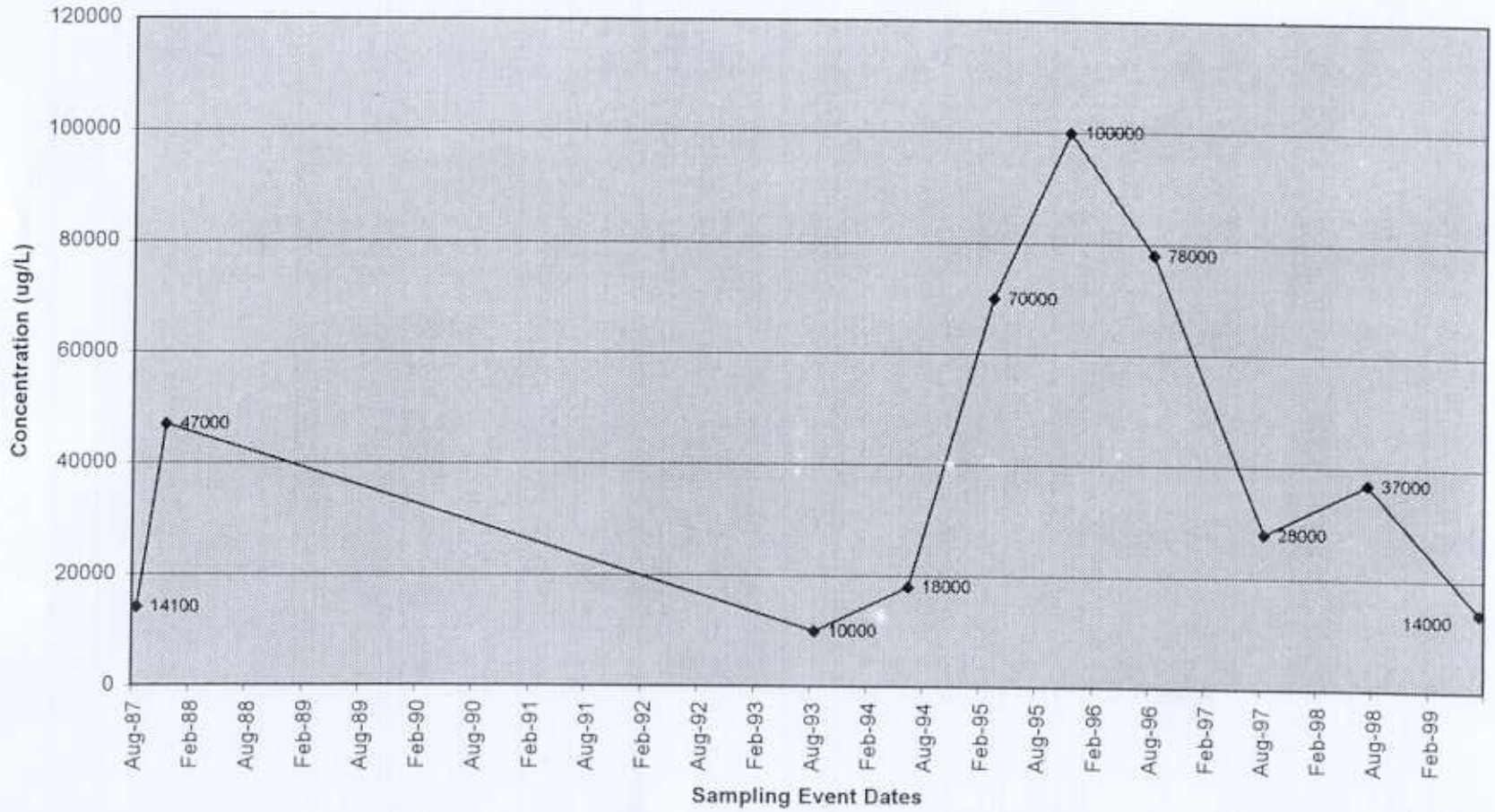


Figure 3-19
Well DSW-6C Naphthalene Trends

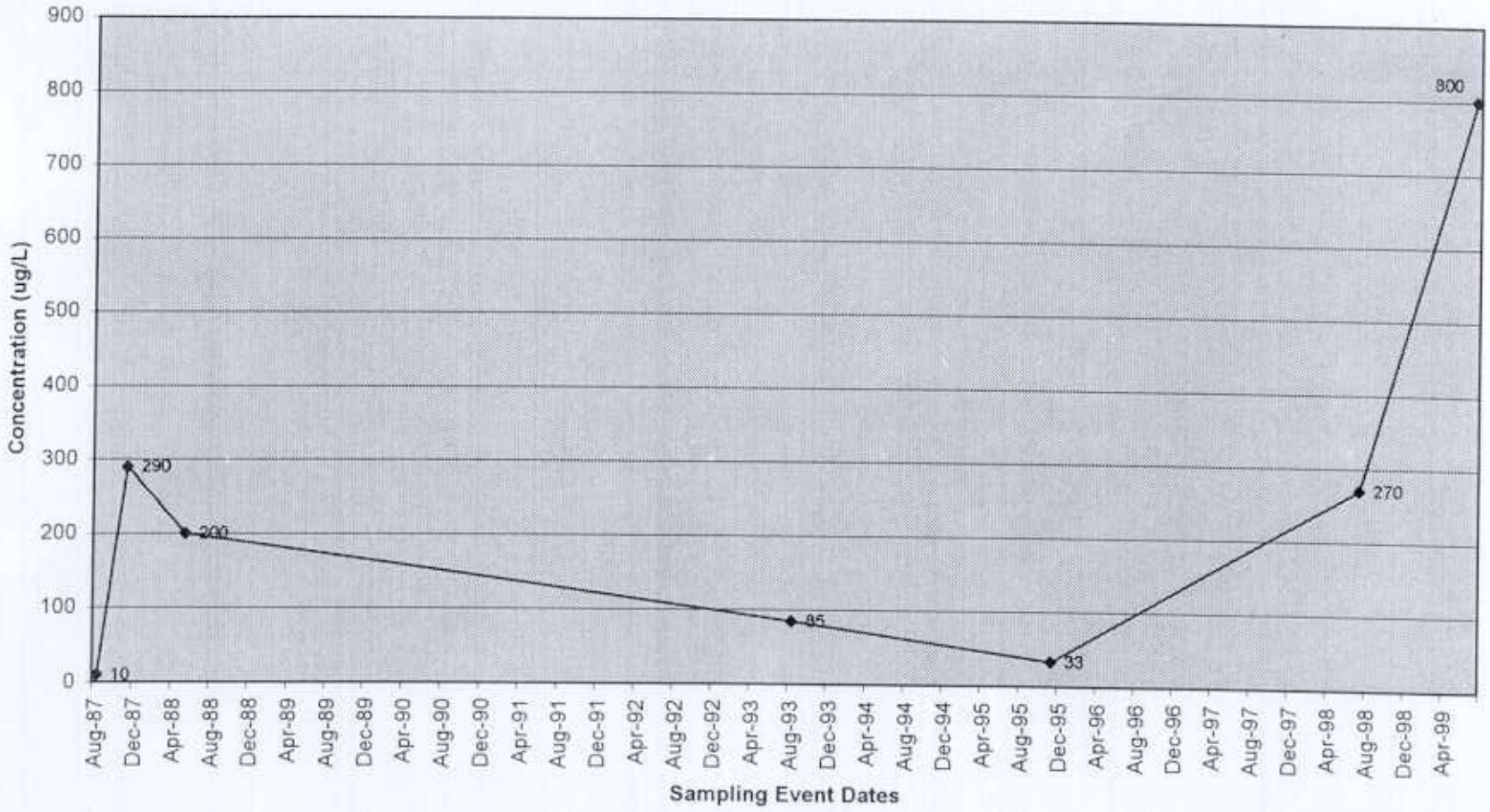


Figure 3-20
Well A-8 PCP Trends

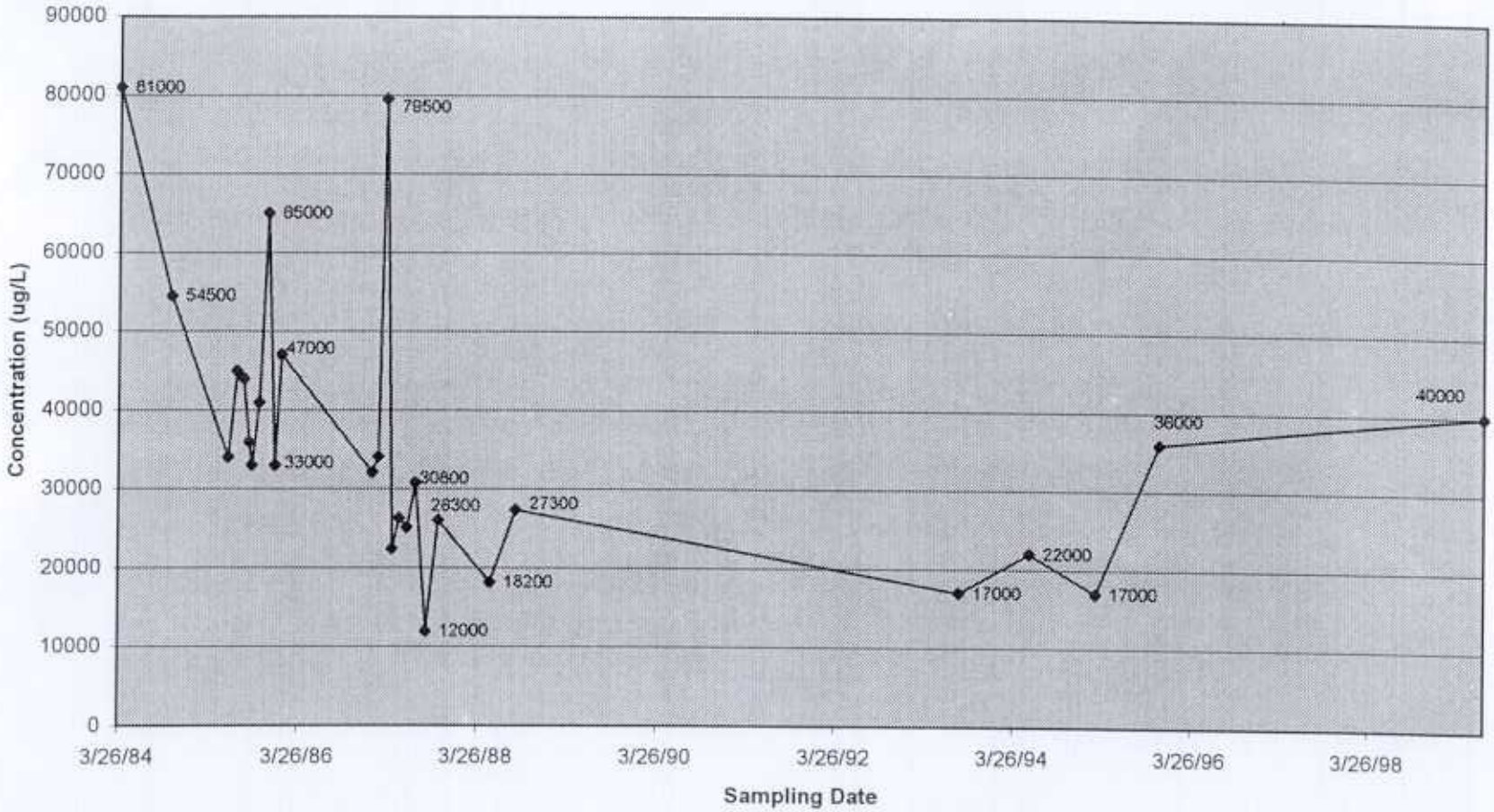


Figure 3-21
Well DSW-4B PCP Trends

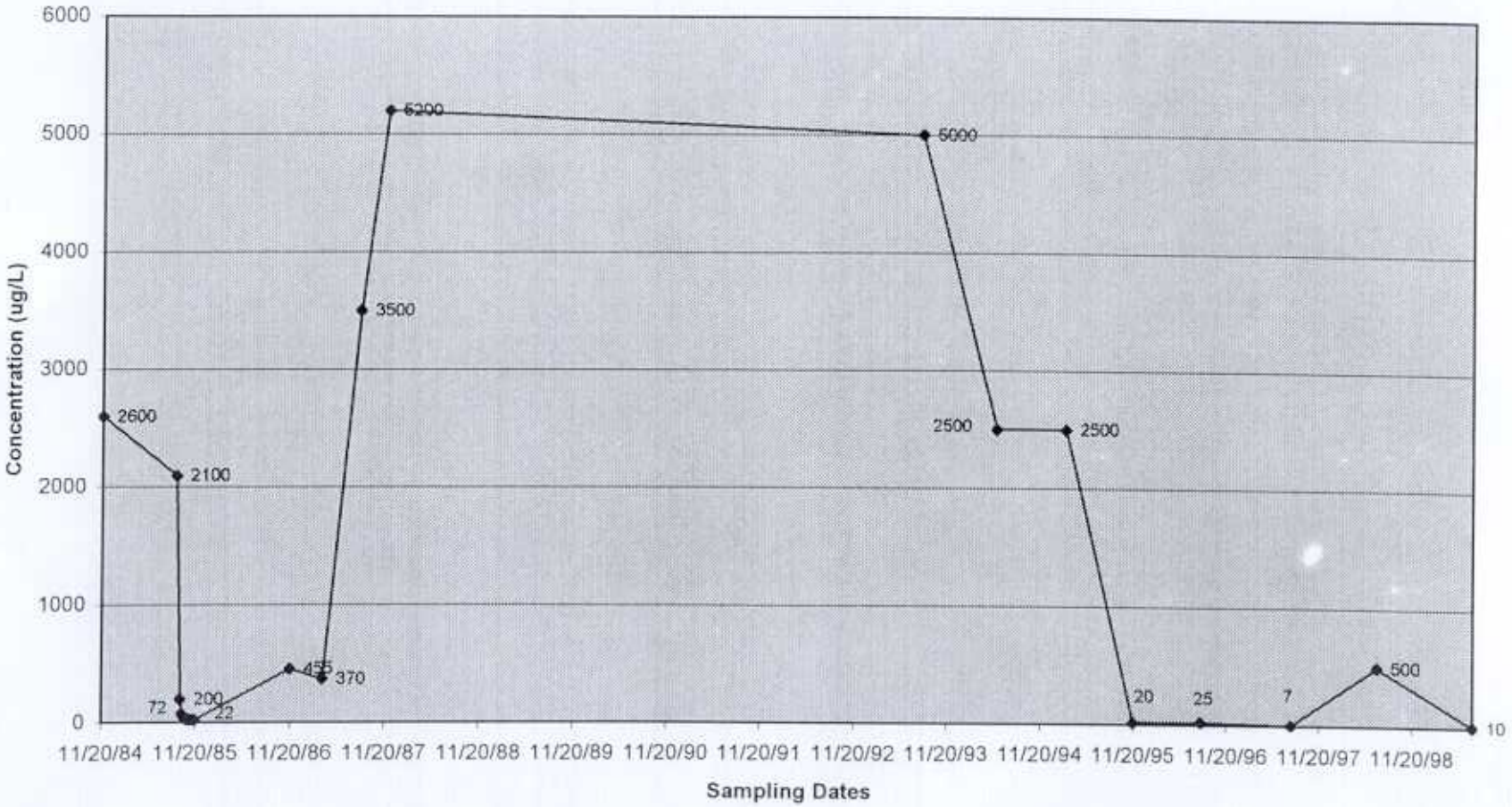


Figure 3-22
Well DSW-4C PCP Trends

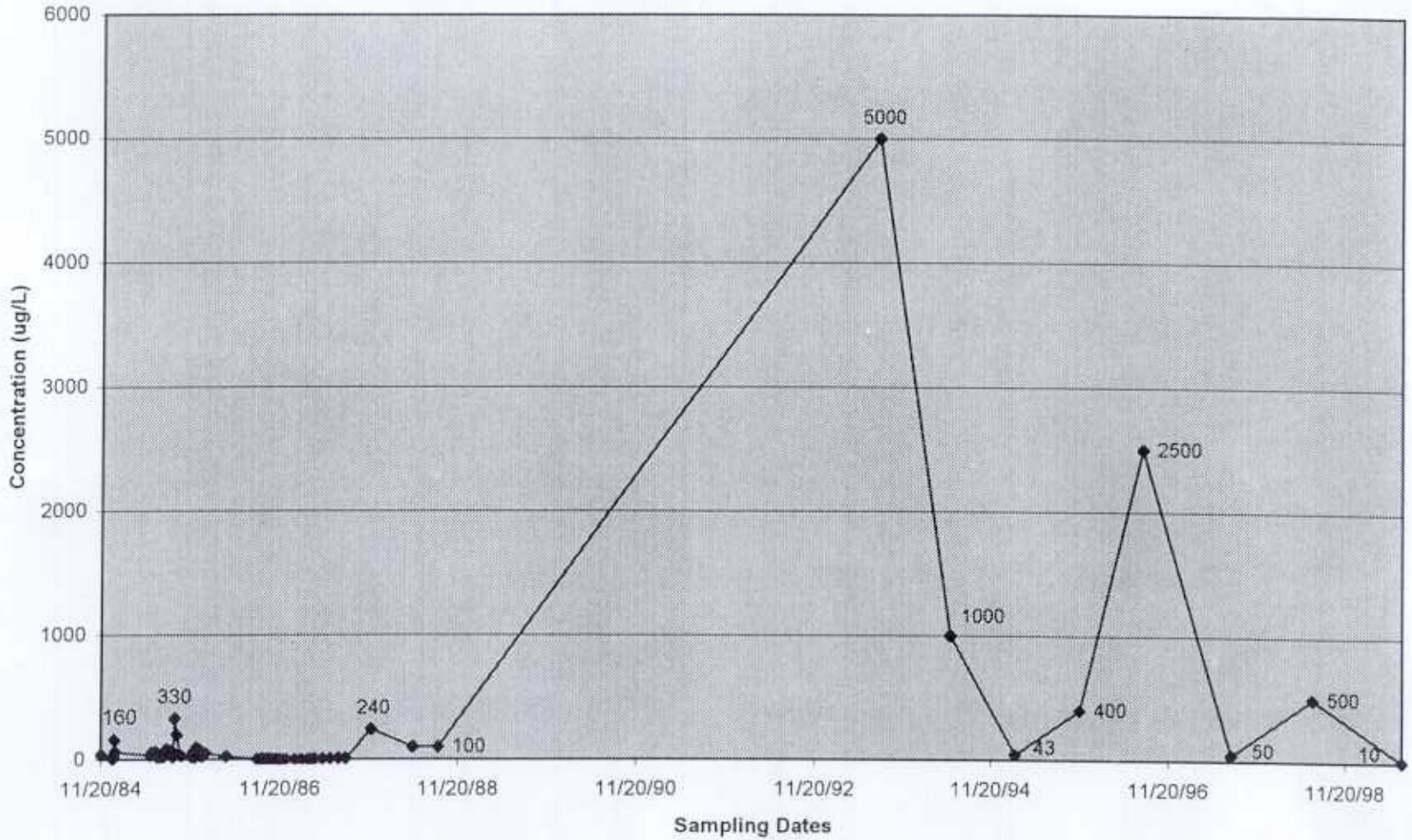


Figure 3-23
Well DSW-6B PCP Trends

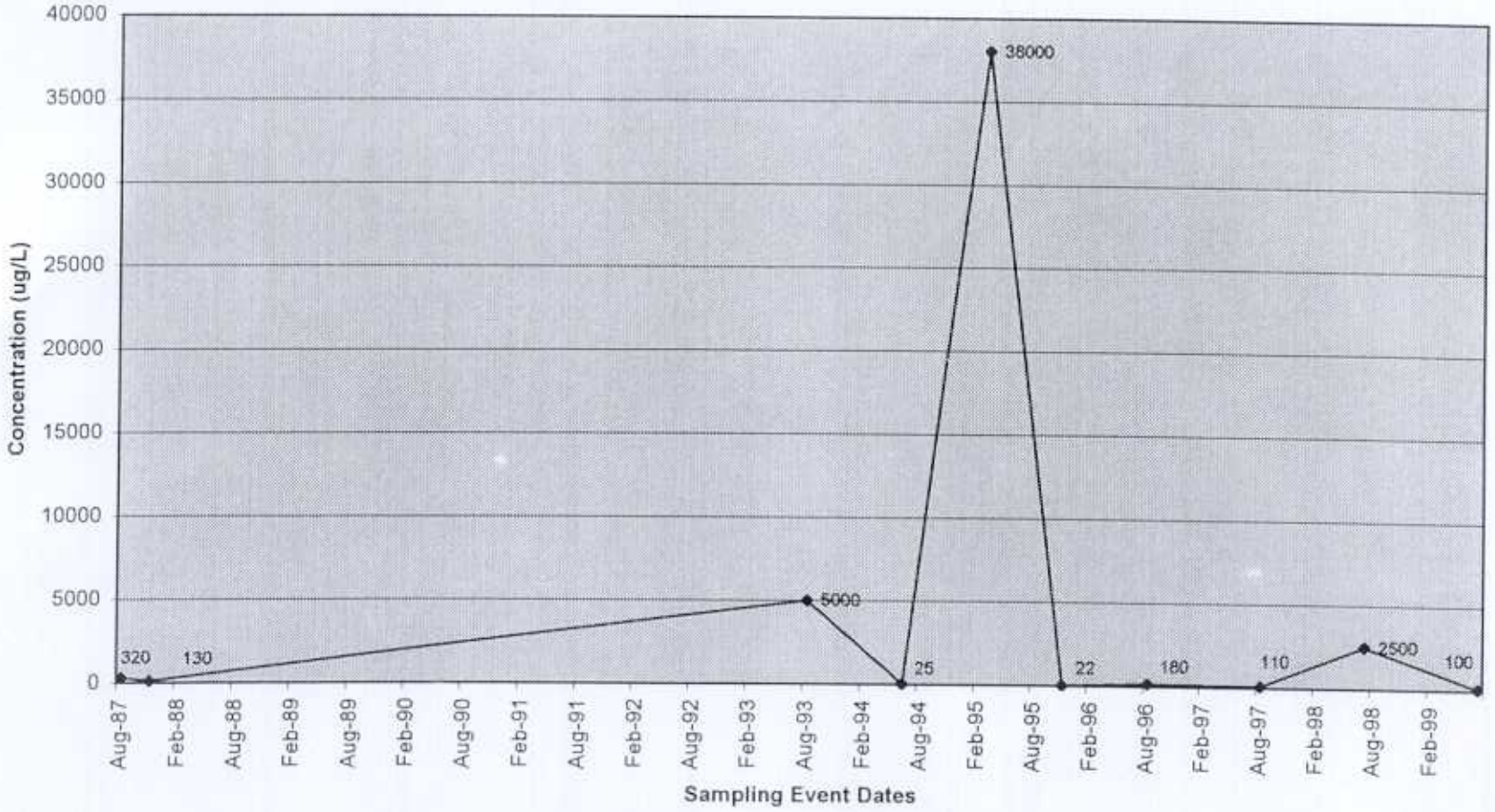


Figure 3-24
Well DSW-4B TCDD TEC Trends

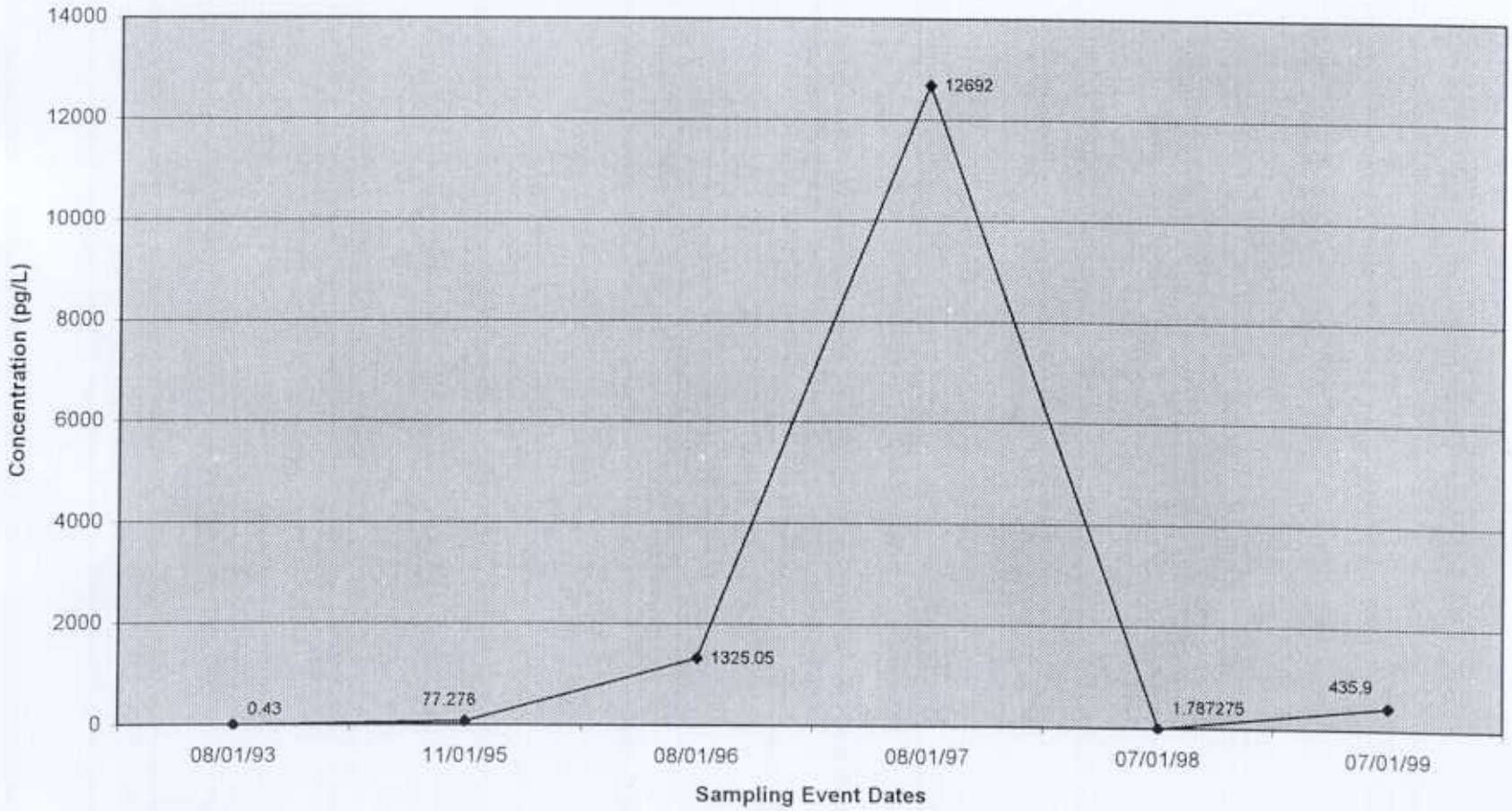


Figure 3-25
Well DSW-4C TCDD TEC Trends

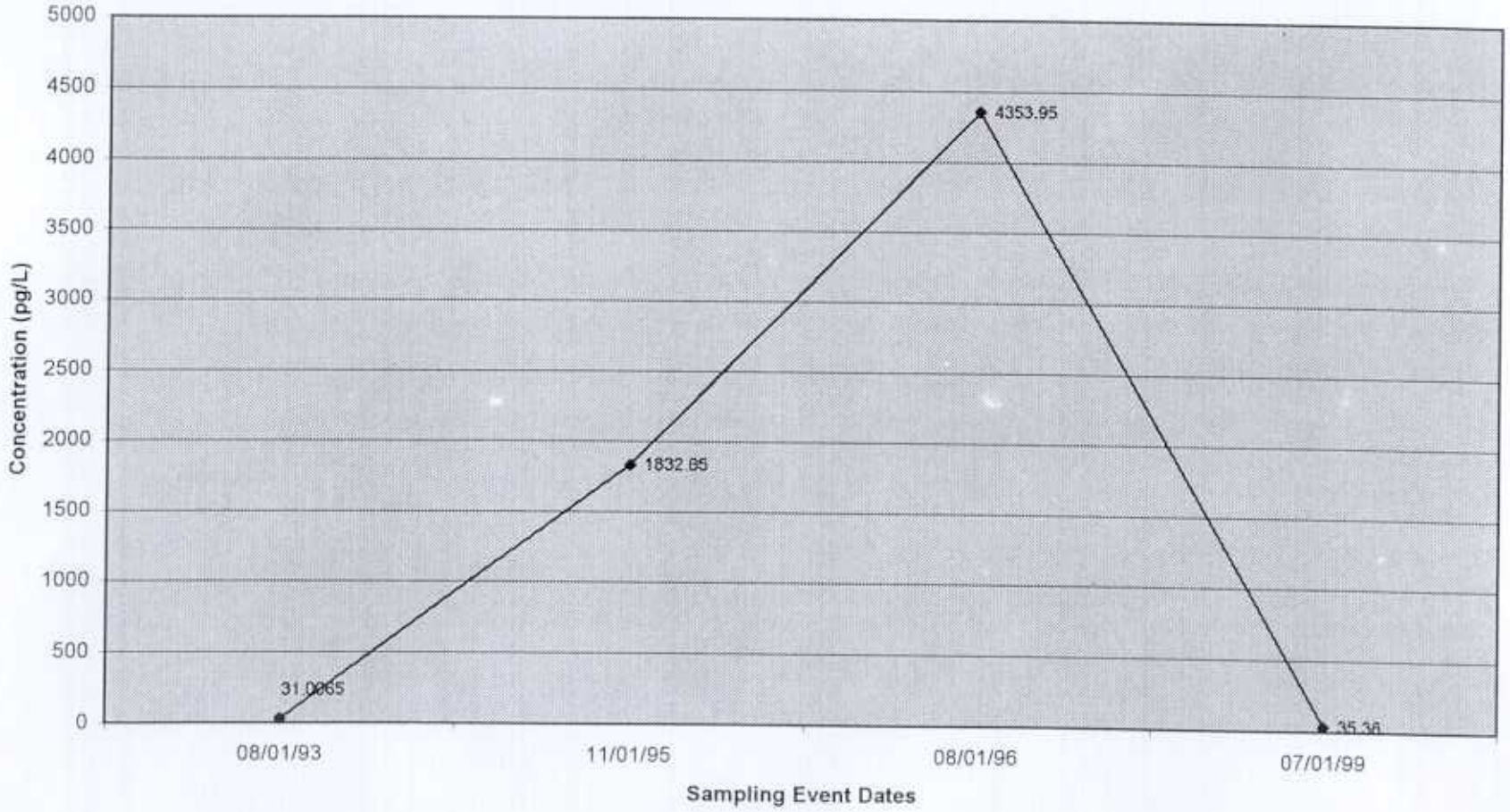


Figure 3-26
Well DSW-6B TCDD TEC

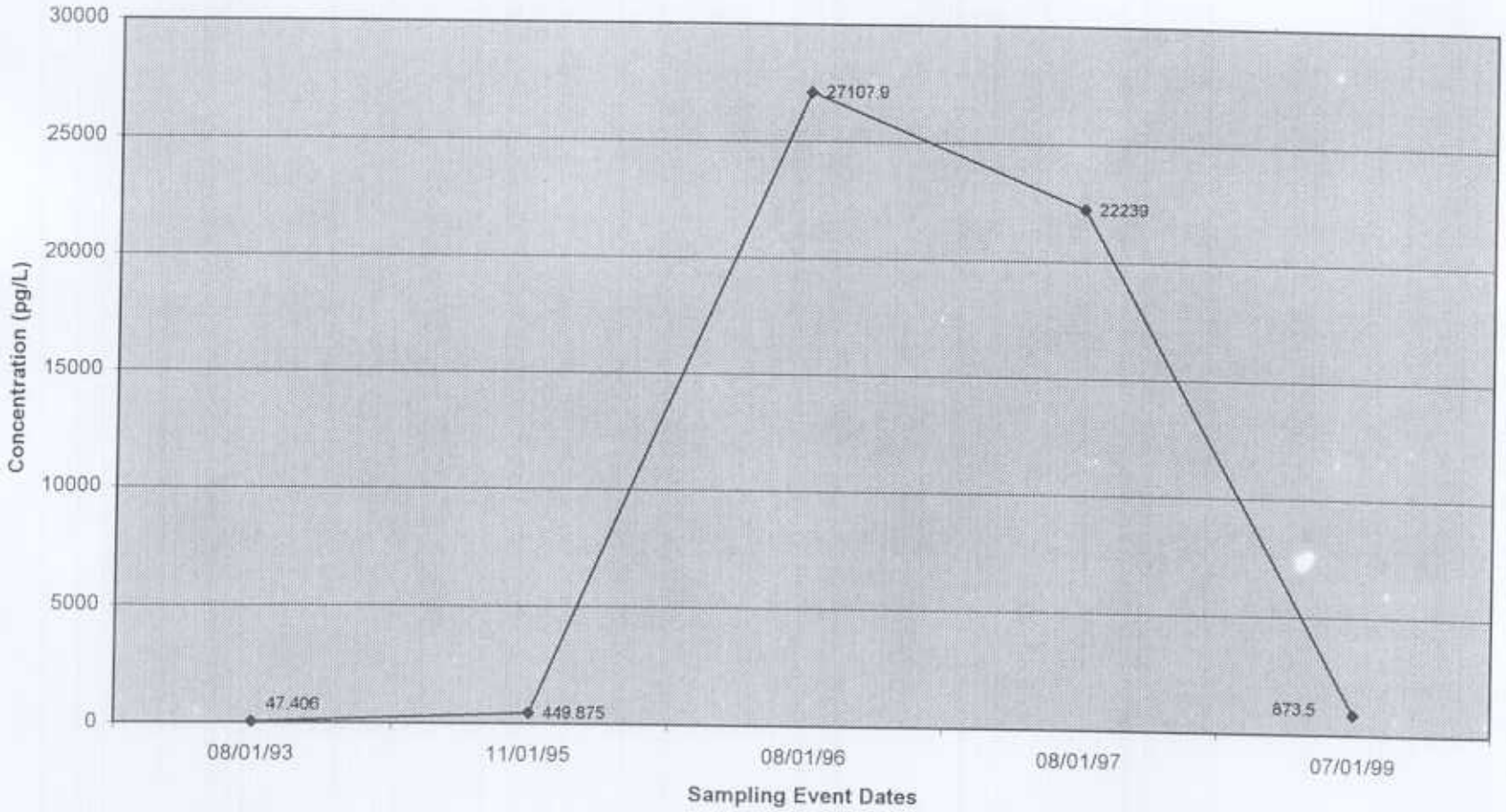
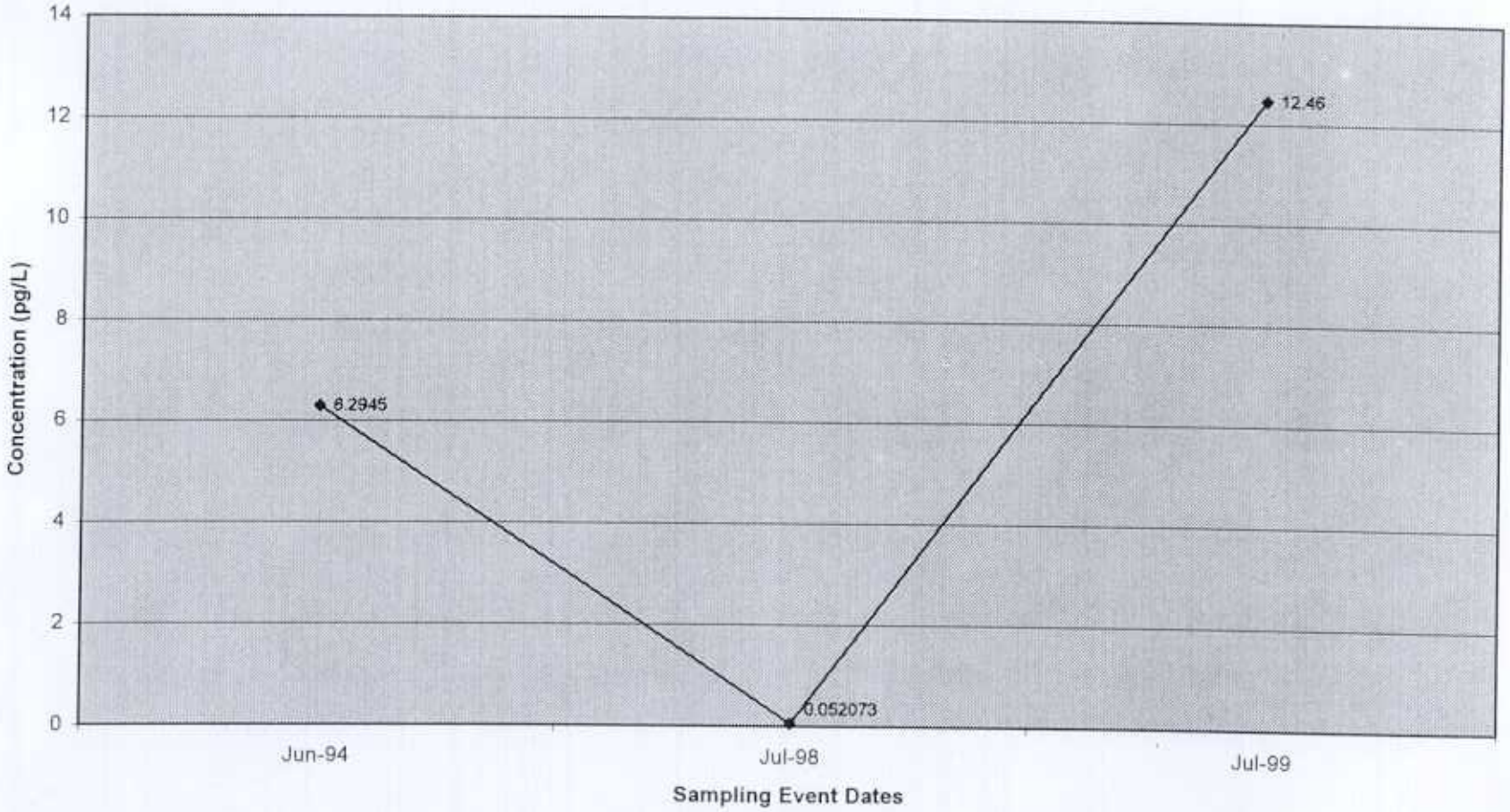


Figure 3-27
Well DSW-6C TCDD TEC



4.0 DATA QUALITY ASSURANCE SUMMARY

After review of the laboratory data deliverables, an evaluation was performed to determine how well the analytical portion of the project was executed and to what extent the chemical data achieved the project-specific data quality objectives. The precision, accuracy, representativeness, comparability, and completeness (PARCC) and the sensitivity were evaluated and are summarized in this section. Overall data quality was high and the data are acceptable for all project-specific purposes. In addition, all sample analyses were compliant with the project's approved sampling and analysis plan (SAP), which was included in the project management plan for the NAPL field exploration (USACE 1999a), except for the items discussed in the following subsections.

4.1 DATA QUALITY REVIEW METHODS

Data were reviewed in accordance with the project-specific criteria established in the SAP for the NAPL field exploration (in USACE 1999a) for the PARCC parameters, and validated in accordance with EPA's *Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA 1999) and *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA 1994). Results for the following laboratory confirmatory quality control (QC) samples were reviewed:

- Field and matrix duplicates
- Matrix spike/matrix spike duplicates (MS/MSD)
- Post-digestion spikes (metals only)
- Laboratory control samples (LCS) and blank spikes
- Performance evaluation (PE) samples (PAH/PCP and TPH-Dx only)
- Rinsate, field, and method blanks
- Surrogates (PAH/PCP, PCB, and TPH-Dx only)
- Internal standards (PAH/PCP and dioxin/furans only)
- Instrument tuning standards (PAH/PCP and dioxin/furans only)
- Initial and continuing calibration standards

Additionally, chain-of-custody (COC) and cooler receipt forms were reviewed, as part of sample representativeness, for evaluation of sample integrity during shipping and handling procedures, and to verify contractual and technical holding times. Laboratory reporting limits (i.e., sensitivity) were reviewed to determine if project-specific detection limits were met. Frequency of collection and analysis of field and laboratory QC samples was reviewed to evaluate completeness and adherence to the SAP.

Data quality review reports for sample delivery groups (SDGs) that were reviewed (i.e., desk-top and full data validation reports) are included in Appendix C. Data were reviewed by URS Greiner Woodward Clyde with the following exceptions:

- Soil TRPH data were reviewed by the USACE. The data quality review is included in the SCAPS report (USACE 1999b).
- Groundwater PAH/PCP data were reviewed by the U. S. EPA Region 9 Quality Assurance Program Office.
- Groundwater and soil dioxin/furans data were reviewed by DMD, Inc. of Vashon Island, Washington. Soil dioxin/furan data were not available for this draft report. Soil dioxin/furan data and validation reports will be included in the final report.

It should be noted that not all sample data associated with this site investigation were subjected to the data review process. Soil samples collected during the rotosonic boring and analyzed for TPH-Dx by the FASP laboratory were not reviewed because complete data reports were not available for review.

4.2 SUMMARY OF PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, AND COMPLETENESS, AND SENSITIVITY REVIEW FOR CHEMICAL ANALYSES

The desk-top and full data validation reports (Appendix C) were reviewed to identify trends in QC parameters that may impact overall data usability. Infrequent and random exceedances of QC limits are expected and do not necessarily limit data usability. General discussion of the QC exceedances and resulting data qualification are discussed in the following sections.

4.2.1 Precision

Precision examines the distribution of the reported values about their mean. The distribution of reported values refers to how different the individual reported values are from the average reported value. Precision may be affected by the natural variation of the matrix or contamination within that matrix, as well as by errors made in the field and/or laboratory handling procedures. Precision is evaluated using analyses of primary and field duplicate samples, laboratory MS/MSDs, and matrix duplicates (inorganics), which not only exhibit sampling and precision, but indicate precision through the reproducibility of the results. Relative percent difference (RPD) is used to evaluate precision. RPD QC limits for primary and field duplicate evaluation are ≤30 percent RPD for aqueous samples and ≤50 percent RPD for soil and NAPL samples. The RPD QC limits for MS/MSDs and matrix duplicates (MD) are those established by the

laboratories, and are referenced in the SAP (in USACE 1999). The data quality indicator "precision" was acceptable for this project.

The required frequency of field duplicate samples and laboratory MS/MSD/MDs are 10 percent and 5 percent, respectively, and were met with the following exception:

- The frequency of field duplicate soil samples for total petroleum hydrocarbon – diesel extended (TPH-Dx) was 9.6 percent.

Field duplicate results are presented in Tables 4-1 through 4-6. Exceedances are highlighted in bold. RPDs were generally within project-specific QC limits. Exceedances are likely due to one or more of the following analytical variances:

- High levels of target analytes in samples, which require secondary dilutions to bring the concentrations within the linear range of calibration (e.g., PAHs/PCP in soils). High dilution factors tend to cause RPD inaccuracies. Also, high levels of target analytes result in diluting out the matrix spike analytes.

- Sample heterogeneity for soil samples.

- Primary and field duplicate results at or near the limit of detection tend to have RPDs outside QC limits.

The analytical results did not require qualification based upon RPD exceedances, per EPA's national functional guidelines for data review (USEPA 1999; USEPA 1994), except for the following incident. The soil samples analyzed for total organic carbon (SDG 99400) were estimated due to an elevated MD RPD.

4.2.2 Accuracy

Accuracy measures the analytical bias in a measurement system. Sources of error are the sampling process, field contamination, preservation, handling, nature of the sample matrix, sample preparation, and analysis techniques. Sampling and laboratory accuracy may be assessed by evaluating the results of equipment rinsate and method blanks, respectively. These data help to assess the potential contamination contribution from various sources. The laboratory objective for accuracy is to equal or exceed the accuracy demonstrated for the applied analytical methods on samples of the same matrix. The percent recovery criterion is used to estimate accuracy based on recovery in MS/MSDs, blank spikes, postdigestion spikes (PDSs), LCSs, PE samples, surrogates, internal standards, and calibration standards. The MS/MSDs, surrogates, and internal standards, which give an indication of matrix effects that may be affecting target

analytes, are also a good gauge of method efficiency. The data quality indicator "accuracy" was acceptable for this project.

The required frequency of these QC samples for collection and analysis were met except for the following exception:

- No equipment rinsate blank results were reported for polychlorinated biphenyls (PCBs). However, PCBs were not detected in the soil samples (SDG Nos. 99218B and 99221B).

The equipment rinsate blanks were free of contamination for all parameters. However, bis(2-ethylhexyl)phthalate (considered a common lab contaminant) and benzo(a)pyrene were detected in the method blank associated with the NAPL samples (SDG K9904956). Also, copper and/or zinc were detected in the method blanks associated with the soil samples (SDG 99273B and 99285D). Only the bis(2-ethylhexyl)phthalate results for the NAPL samples were qualified as nondetect. No further qualifications were required for benzo(a)pyrene, copper, and zinc because the sample results were >5 times the method blank concentrations.

MS/MSDs, blank spikes, PDSs, and LCSs were generally within project-specific QC limits. The only exceedance resulting in data qualification was the arsenic result for sample SB028-79.5-79.8, which was estimated due to an elevated PDS recovery. The organic analytical results did not require further qualification based upon MS/MSD, blank spike, and LCS exceedances, per EPA's national functional guidelines for data review. Exceptions were due to one or more of the following analytical variances:

- Matrix spike analytes being diluted out due to the presence of high levels of target analytes in samples, which are the same analytes used for spiking the QC samples
- Sample heterogeneity for soil samples
- Presence of matrix interference

Ten blind PE samples (soil), five for TPH-Dx and five for polycyclic aromatic hydrocarbons/ pentachlorophenol (PAH/PCP) analyses, were submitted to the EPA Region 9 Laboratories for this site investigation. The PE sample results were within QC limits, except for slightly elevated recoveries of anthracene, fluorene, and pyrene. It should be noted that if the laboratory used the proper number of significant figures (i.e., same as used for the QC limits), then additional results (i.e., benzo(a)pyrene) would be slightly above QC limits. The PE results are presented in Tables 4-7 and 4-8. The PE exceedances indicate that the detected sample results may be biased slightly high. However, it is not expected that the detected sample results would change by an order of magnitude. No qualifiers were recommended based on these PE exceedances.

Elevated surrogate recoveries were reported for several soil analyses (i.e., PCBs, TPH-Dx, and PAHs/PCP) and one NAPL analysis for semivolatiles, indicating high bias in the results. In accordance with the validation guidelines, only the positive results for the affected samples were qualified as estimated. The elevated surrogate recoveries may be due to the presence of matrix interference coeluting with surrogate compounds and/or the high levels of target analytes in the samples, resulting in secondary dilutions to bring the concentrations within the linear range of calibration. High dilution factors tend to cause surrogate recovery inaccuracies.

Surrogate recoveries were outside method QC limits for several water semivolatile analyses. Detected results were qualified as estimated and quantitation limits were qualified as rejected for numerous compounds in 6 of the 18 water samples analyzed.

Internal standards (ISs) were within method QC limits for PAH/PCP and semivolatile analyses, except for isolated instances where low IS recoveries were reported for initial sample analyses, which affect quantitation of naphthalene and 2-methylnaphthalene. Since the affected samples required secondary dilutions for these compounds and the IS recoveries were within QC limits, no qualification of the data were performed.

Due to low internal standard recoveries for semivolatiles analysis of water samples, several detected results were estimated and several quantitation limits were rejected.

Continuing calibrations associated with the PAH/PCP analyses of soils exhibited elevated percent differences for carbazole and/or pentachlorophenol. The affected PAH/PCP results were considered estimated. Instrument calibrations for all other analytes were within QC limits.

Continuing calibrations associated with the PAH/PCP analyses of waters exhibited elevated percent differences for benzyl alcohol, 2-methylphenol, 4-nitroaniline, 3-nitroaniline, carbazole, 3,3'-dichlorobenzidine, 2,2'-oxybis(1-chloropropane), and n-Nitroso-di-n-propylamine. and/or pentachlorophenol. The affected PAH/PCP results were considered estimated. Instrument calibrations for all other analytes were within QC limits.

Instrumental tuning and setup for the dioxin/furans water analyses were generally acceptable and within specification. Occasionally, mass spectral peaks exhibited tailing (less than optimal peak shape), which could indicate dirty optics and/or magnetic field fringe effects associated with less than optimal tuning during analysis of soils extracts. Gas chromatographic (GC) performance during analyses of water extracts showed considerable peak tailing and in the case of at least one sample (Q9602) GC performance was insufficient to permit reporting of some analytes (the reviewer carefully examined the data to provide estimated values). System cleanliness appeared to be responsible for less than optimal GC separation performance during the analysis of water extracts (peak shape degradation was also observed for method blank analyses). Some data were qualified as estimated due to degraded GC performance.

4.2.3 Representativeness

Representativeness expresses the degree to which the sample data accurately and precisely represent the characteristics of a population of samples, parameter variations at a sampling point, or environmental conditions. Representativeness is a qualitative parameter, which is most concerned with the proper design of the sampling program or subsampling of a given sample. Objectives for representativeness are defined for sampling and analysis tasks and are a function of the project-specific data quality objectives (DQOs). Sampling procedures, as described in the SAP have been selected with the goal of obtaining representative samples for the media of concern.

Representativeness is evaluated by examining sample tracking information and COC/cooler receipt documentation. This evaluation allows for contractual and technical holding times to be verified and also verifies that proper documentation was maintained to allow traceability of laboratory analytical results to specific field sample locations. Representativeness can also be assessed by evaluating the precision of matrix and field duplicates, as discussed in Section 1.2.1. The data quality indicator “representativeness” was acceptable for this project.

Sample integrity was generally maintained in accordance with SAP procedures, except for variances specifically referenced in Appendix C. Exceptions include:

- Cooler temperatures outside the QC limits of 4°C ± 2°C
- Sample ID on the COC not in agreement with sample container
- PE samples incorrectly identified on COCs
- Sample not documented on COC, but the sample container was received by the laboratory and the appropriate analysis was performed
- COC not signed and dated by field relinquishing and/or laboratory receipt representatives
- Samples from the same location referenced twice on the same or on different COCs
- COC and cooler receipt form not submitted with analytical results (SDG 29326 and 29492 for geotechnical parameters)

- Sample container received broken at the laboratory; analysis unable to be performed

- Contractual and technical holding time exceedances (SDG 29392 for TOC)

Although all of the above referenced variances could potentially affect representativeness, the only variances which resulted in data qualification were contractual and technical holding time exceedances for soil TOC results for samples SB018-80.5-80.8, SB018-91.3-91.6, SB018-109.5-109.8, and SB018-183.4-183.7.

It is not expected that the cooler temperature exceedances (range from 0°C to 11.4°C) would adversely effect the sample results, because of the chemical nature of the project-specific analytes, i.e., PAHs/PCP, PCBs, and metals, are relatively stable and would not be expected to degrade significantly during sample transport.

Since the sample PE/sample ID discrepancies on the COCs were resolved between the laboratory and project personnel, these documentation discrepancies do not impact the reported analytical results.

4.2.4 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. This goal is achieved through using standard techniques to collect and analyze representative samples, and reporting analytical results in appropriate units. Complete field documentation using standardized data collection forms will support the assessment of comparability. Comparability is limited by other PARCC parameters, because only when precision and accuracy are known can data set comparison be performed with confidence. For data sets to be comparable, it is imperative that the analytical methods and procedures be strictly followed.

Comparability is evaluated by examining the laboratory analytical data and comparing the reported results for compliance with the project-specific approved methods and standard operating procedures (SOPs). The data review determined that the analytical results are acceptable for use, despite minor deviations from the methods and SOPs. The data quality indicator “comparability” was met by the laboratory(s) for this project.

Comparability is also evaluated by comparing inter-laboratory split sample results. However, split samples were not a project-specific requirement.

4.2.5 Completeness

Completeness is defined as a measure of the amount of valid data (usable for project-specific purposes) obtainable from a measurement system compared to the total amount of measurements expected to be obtained under normal conditions. It is important that appropriate QA procedures be maintained to ensure that valid data are obtained and the desired level of completeness meets the project-specific DQOs. For the data generated, the overall project-specific goal of 98 percent is required for completeness (or usability) of the analytical data. The overall completeness for this project is above 98 percent.

4.2.6 Sensitivity

The sensitivity (i.e., reporting limits) of the analytical methods is driven by the project-specific DQOs. All reporting limits met the project-specific requirements, except for some minor variances (i.e., PCBs for soils), as identified in Appendix C. It should be noted that several PAH/PCP soil samples required secondary dilutions, due to the presence of high levels of target analytes, which resulted in elevated reporting limits for nondetect analytes.

For dioxin/furan water concentrations, the laboratory reported lower quantitation limits as specified by both the method and the analytical service request. The reviewer recalculated lower quantitation limits and concentrations (with associated “J” qualifiers) in order to achieve project-specific objectives, which required 5 to 10 pg/L lower reporting limits for waters. The reported detection limits are estimates based on the assumption that linearity is preserved between the lowest calibration point and approximate 2.5 times the signal-to-noise ratio (as an instrumental detection limit). The reported detection and quantitation limits are considered acceptable for distinguishing the site from typical background and for comparison of site conditions to target thresholds.

4.3 OVERALL DATA USABILITY

After review of information contained in the laboratory data deliverables, an evaluation was performed to determine how well the analytical portion of the project was executed and to what extent the chemical data achieved the project-specific DQOs.

The overall DQO for this project was to generate data to support the following uses:

- Identify potential PCB contamination in the Cellon Process Area

- Identify the bottom of petroleum, oil, and lubricant (POL) and PAH/PCP contamination above site-specific threshold concentrations in the vadose zone, capillary fringe, and saturated zone
- Identify the chemical makeup and magnitude of NAPL at the site
- Identify the physical properties of the soils at the site
- Identify TOC levels from areas that have not been impacted by contamination
- Identify the natural attenuation potential and capacity of the groundwater system
- To determine levels of dioxin/furans and metals in soil from areas to be used for thermal treatment lab treatability studies
- Identify the boundary of the naphthalene plume

Data are intended primarily to be used for characterizing the creosote NAPL contamination and updating the site conceptual site model. Despite the minor data QC issues identified above and in Appendix C, the analytical data reported for this project are usable.

Table 4-1
Summary of Field Duplicate Results
PAH/PCP in Soil

Location ID	SB-006	SB-006		SB-007	SB-007		SB-018	SB-018	
Quadrant	C3	C3		C3	C3		C1	C1	
Sample ID	SB006-182.7-183	SB506-182.7-183		SB007-32.3-32.6	SB507-32.3-32.6		SB018-129.5-129.9	SB518-129.5-129.9	
Date Sampled	8/5/99	8/5/99		9/14/99	9/14/99		8/19/99	8/19/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
PAHs (mg/kg)									
2-methylnaphthalene	30 U	30 U	--	20 U	20 U	--	20 U	20 U	--
Acenaphthene	30 U	30 U	--	20 U	20 U	--	20 U	20 U	--
Acenaphthylene	30 U	30 U	--	20 U	20 U	--	20 U	20 U	--
Anthracene	30 U	30 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(a)anthracene	30 U	30 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(a)pyrene	30 U	30 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(b)fluoranthene	30 U	30 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(g,h,i)perylene	30 U	30 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(k)fluoranthene	30 U	30 U	--	20 U	20 U	--	20 U	20 U	--
Carbazole	30 U	30 U	--	20 UJ	20 UJ	--	20 U	20 U	--
Chrysene	30 U	30 U	--	20 U	20 U	--	20 U	20 U	--
Dibenzo(a,h)anthracene	30 U	30 U	--	20 U	20 U	--	20 U	20 U	--
Dibenzofuran	30 U	30 U	--	20 U	20 U	--	20 U	20 U	--
Fluoranthene	30 U	30 U	--	20 U	20 U	--	20 U	20 U	--
Fluorene	30 U	30 U	--	20 U	20 U	--	20 U	20 U	--
Indeno(1,2,3-cd)pyrene	30 U	30 U	--	20 U	20 U	--	20 U	20 U	--
Naphthalene	30 U	30 U	--	20 U	20 U	--	20 U	20 U	--
Pentachlorophenol	60 U	60 U	--	60 U	60 U	--	50 U	50 U	--
Phenanthrene	30 U	30 U	--	20 U	20 U	--	20 U	20 U	--
Pyrene	30 U	30 U	--	20 U	20 U	--	20 U	20 U	--

Table 4-1 (Continued)
Summary of Field Duplicate Results
PAH/PCP in Soil

Location ID	SB-019	SB-019		SB-027	SB-027		SB-027
Quadrant	C2	C2		C2	C2		C2
Sample ID	SB019-37.4-37.7	SB519-37.4-37.7		SB027-61.0-61.4	SB527-61.0-61.4		SB527-142.3-143.0
Date Sampled	8/12/99	8/12/99		9/2/99	9/2/99		9/3/99
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Field Duplicate
PAHs (mg/kg)							
2-methylnaphthalene	20 U	20 U	--	20 U	20 U	--	20 U
Acenaphthene	20 U	20 U	--	20 U	20 U	--	20 U
Acenaphthylene	20 U	20 U	--	20 U	20 U	--	20 U
Anthracene	20 U	20 U	--	20 U	20 U	--	20 U
Benzo(a)anthracene	20 U	20 U	--	20 U	20 U	--	20 U
Benzo(a)pyrene	20 U	20 U	--	20 U	20 U	--	20 U
Benzo(b)fluoranthene	20 U	20 U	--	20 U	20 U	--	20 U
Benzo(g,h,i)perylene	20 U	20 U	--	20 U	20 U	--	20 U
Benzo(k)fluoranthene	20 U	20 U	--	20 U	20 U	--	20 U
Carbazole	20 U	20 U	--	20 U	20 U	--	20 UJ
Chrysene	20 U	20 U	--	20 U	20 U	--	20 U
Dibenzo(a,h)anthracene	20 U	20 U	--	20 U	20 U	--	20 U
Dibenzofuran	20 U	20 U	--	20 U	20 U	--	20 U
Fluoranthene	20 U	20 U	--	20 U	20 U	--	20 U
Fluorene	20 U	20 U	--	20 U	20 U	--	20 U
Indeno(1,2,3-cd)pyrene	20 U	20 U	--	20 U	20 U	--	20 U
Naphthalene	20 U	20 U	--	20 U	20 U	--	20 U
Pentachlorophenol	60 U	60 U	--	60 U	50 U	--	60 U
Phenanthrene	20 U	20 U	--	20 U	20 U	--	20 U
Pyrene	20 U	20 U	--	20 U	20 U	--	20 U

Table 4-1 (Continued)
Summary of Field Duplicate Results
PAH/PCP in Soil

Location ID	SB-027	SB-027		SB-028	SB-028		SB-030	SB-030	
Quadrant	C2	C2		C2	C2		D3	D3	
Sample ID	SB027-214-214.5	SB527-214-214.5		SB028-53.5-55	SB528-53.5-55		SB030-121.4-122.2	SB530-121.4-122.2	
Date Sampled	9/7/99	9/7/99		9/29/99	9/29/99		8/23/99	8/23/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
PAHs (mg/kg)									
2-methylnaphthalene	20 U	20 U	--	420	650	43	30 U	20 U	--
Acenaphthene	20 U	20 U	--	260	450	**54**	30 U	20 U	--
Acenaphthylene	20 U	20 U	--	20 U	20 U	--	30 U	20 U	--
Anthracene	20 U	20 U	--	130	210	47	30 U	20 U	--
Benzo(a)anthracene	20 U	20 U	--	80	120	40	30 U	20 U	--
Benzo(a)pyrene	20 U	20 U	--	30	50	50	30 U	20 U	--
Benzo(b)fluoranthene	20 U	20 U	--	40	60	40	30 U	20 U	--
Benzo(g,h,i)perylene	20 U	20 U	--	10 J	20	**67**	30 U	20 U	--
Benzo(k)fluoranthene	20 U	20 U	--	30	40	29	30 U	20 U	--
Carbazole	20 UJ	20 UJ	--	70 J	100 J	35	30 U	20 U	--
Chrysene	20 U	20 U	--	70	110	44	30 U	20 U	--
Dibenzo(a,h)anthracene	20 U	20 U	--	20 U	20 U	--	30 U	20 U	--
Dibenzofuran	20 U	20 U	--	180	260	36	30 U	20 U	--
Fluoranthene	20 U	20 U	--	300	480	46	30 U	20 U	--
Fluorene	20 U	20 U	--	210	260	21	30 U	20 U	--
Indeno(1,2,3-cd)pyrene	20 U	20 U	--	10 J	20	**67**	30 U	20 U	--
Naphthalene	20 U	20 U	--	1200	1900	45	30 U	20 U	--
Pentachlorophenol	60 U	60 U	--	60 U	60 U	--	60 U	60 U	--
Phenanthrene	20 U	20 U	--	620	980	45	30 U	20 U	--
Pyrene	20 U	20 U	--	220	440	**67**	30 U	20 U	--

Table 4-1 (Continued)
Summary of Field Duplicate Results
PAH/PCP in Soil

Location ID	SB-047	SB-047		SB-051	SB-051		SB-052	SB-052	
Quadrant	D3	D3		D2	D2		D2	D2	
Sample ID	SB047-34.5-35.0	SB547-34.5-35.0		SB051-101.7-102.2	SB551-101.7-102.2		SB052-32.0-32.5	SB552-32.0-32.5	
Date Sampled	10/13/99	10/13/99		9/9/99	9/9/99		10/16/99	10/16/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
PAHs (mg/kg)									
2-methylnaphthalene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Acenaphthene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Acenaphthylene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Anthracene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(a)anthracene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(a)pyrene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(b)fluoranthene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(g,h,i)perylene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(k)fluoranthene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Carbazole	20 UJ	20 UJ	--	20 U	20 U	--	20 UJ	20 UJ	--
Chrysene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Dibenzo(a,h)anthracene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Dibenzofuran	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Fluoranthene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Fluorene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Indeno(1,2,3-cd)pyrene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Naphthalene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Pentachlorophenol	60 U	60 U	--	60 UJ	60 U	--	60 U	60 U	--
Phenanthrene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Pyrene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--

Table 4-1 (Continued)
Summary of Field Duplicate Results
PAH/PCP in Soil

Location ID	SB-052	SB-052		SB-057	SB-057		SB-057	SB-057	
Quadrant	D2	D2		C2	C2		C2	C2	
Sample ID	SB052-118.5-119	SB552-118.5-119		SB057-36-38	SB557-36-38		SB057-51-52	SB557-51-52	
Date Sampled	10/17/99	10/17/99		10/9/99	10/9/99		10/9/99	10/9/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
PAHs (mg/kg)									
2-methylnaphthalene	20 U	20 U	--	1400	2500	**56**	80	100	22
Acenaphthene	20 U	20 U	--	600	900	40	50	60	18
Acenaphthylene	20 U	20 U	--	10 J	20	**67**	20 U	20 U	--
Anthracene	20 U	20 U	--	230	400	**54**	20	30	40
Benzo(a)anthracene	20 U	20 U	--	50	90	**57**	20 U	20 U	--
Benzo(a)pyrene	20 U	20 U	--	20	20	0	20 U	20 U	--
Benzo(b)fluoranthene	20 U	20 U	--	10 J	20	**67**	20 U	20 U	--
Benzo(g,h,i)perylene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(k)fluoranthene	20 U	20 U	--	20	20	0	20 U	20 U	--
Carbazole	20 UJ	20 UJ	--	80 J	130 J	48	20 UJ	20 UJ	--
Chrysene	20 U	20 U	--	50	90	**57**	20 U	20 U	--
Dibenzo(a,h)anthracene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Dibenzofuran	20 U	20 U	--	300	600	**67**	30	40	29
Fluoranthene	20 U	20 U	--	300	500	50	30	40	29
Fluorene	20 U	20 U	--	400	700	**54**	40	40	0
Indeno(1,2,3-cd)pyrene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Naphthalene	20 U	20 U	--	3100	5400	54	110	130	17
Pentachlorophenol	50 U	60 U	--	130	200 J	42	60 U	60 U	-
Phenanthrene	20 U	20 U	--	800	1300	48	80	100	22
Pyrene	20 U	20 U	--	220	400	**58**	30	30	0

Table 4-1 (Continued)
Summary of Field Duplicate Results
PAH/PCP in Soil

Location ID	SB-057	SB-057		SB-061	SB-061		SB-084	SB-084	
Quadrant	C2	C2		D2	D2		C1	C1	
Sample ID	SB057-65-66	SB557-65-66		SB061-154.0-154.4	SB561-154.0-154.4		SB084-135.6-136	SB584-135.6-136	
Date Sampled	10/9/99	10/9/99		8/31/99	8/31/99		9/18/99	9/18/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
PAHs (mg/kg)									
2-methylnaphthalene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Acenaphthene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Acenaphthylene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Anthracene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(a)anthracene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(a)pyrene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(b)fluoranthene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(g,h,i)perylene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(k)fluoranthene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Carbazole	20 UJ	20 UJ	--	20 U	20 U	--	20 UJ	20 UJ	--
Chrysene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Dibenzo(a,h)anthracene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Dibenzofuran	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Fluoranthene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Fluorene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Indeno(1,2,3-cd)pyrene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Naphthalene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Pentachlorophenol	60 U	60 U	--	60 U	60 U	--	60 U	60 U	--
Phenanthrene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Pyrene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--

Table 4-1 (Continued)
Summary of Field Duplicate Results
PAH/PCP in Soil

Location ID	SB-084	SB-084		SB-086	SB-086		SB-092	SB-092	
Quadrant	C1	C1		C1	C1		C3	C3	
Sample ID	SB084-226.0-226.5	SB584-226.0-226.5		SB086-27-28.5	SB586-27-28.5		SB092-86.0-86.5	SB592-86.0-86.5	
Date Sampled	9/19/99	9/19/99		9/28/99	9/28/99		9/20/99	9/20/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
PAHs (mg/kg)									
2-methylnaphthalene	20 U	20 U	--	300	240	22	20 U	20 U	--
Acenaphthene	20 U	20 U	--	190	160	17	20 U	20 U	--
Acenaphthylene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Anthracene	20 U	20 U	--	100	90	11	20 U	20 U	--
Benzo(a)anthracene	20 U	20 U	--	40	30	29	20 U	20 U	--
Benzo(a)pyrene	20 U	20 U	--	10 J	20 U	--	20 U	20 U	--
Benzo(b)fluoranthene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(g,h,i)perylene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(k)fluoranthene	20 U	20 U	--	10 J	10 J	0	20 U	20 U	--
Carbazole	20 UJ	20 UJ	--	50	40	22	20 UJ	20 UJ	--
Chrysene	20 U	20 U	--	40	30	29	20 U	20 U	--
Dibenzo(a,h)anthracene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Dibenzofuran	20 U	20 U	--	110	100	10	20 U	20 U	--
Fluoranthene	20 U	20 U	--	170	140	19	20 U	20 U	--
Fluorene	20 U	20 U	--	150	120	22	20 U	20 U	--
Indeno(1,2,3-cd)pyrene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Naphthalene	20 U	20 U	--	1200	900	29	20 U	20 U	--
Pentachlorophenol	60 U	60 U	--	60 U	60 U	--	60 U	60 U	--
Phenanthrene	20 U	20 U	--	400	300	29	20 U	20 U	--
Pyrene	20 U	20 U	--	140	120	15	20 U	20 U	--

Table 4-1 (Continued)
Summary of Field Duplicate Results
PAH/PCP in Soil

Location ID	SB-092	SB-092		SB-099	SB-099		SB-099	SB-099	
Quadrant	C3	C3		C3	C3		C3	C3	
Sample ID	SB092-131.0-131.5	SB592-131.0-131.5		SB099-3.1-4.6	SB599-3.1-4.6		SB099-27.5-29.5	SB599-27.5-29.5	
Date Sampled	9/21/99	9/21/99		9/30/99	9/30/99		9/30/99	9/30/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
PAHs (mg/kg)									
2-methylnaphthalene	20 U	20 U	--	60	140	**80**	800	700	13
Acenaphthene	20 U	20 U	--	40	80	**67**	1000	1000	0
Acenaphthylene	20 U	20 U	--	40 U	40 U	--	30 J	30 J	0
Anthracene	20 U	20 U	--	110	110	0	350	340	3
Benzo(a)anthracene	20 U	20 U	--	40	40	0	170	150	12
Benzo(a)pyrene	20 U	20 U	--	30 J	30 J	0	50	50	0
Benzo(b)fluoranthene	20 U	20 U	--	40	40	0	40 J	40 J	0
Benzo(g,h,i)perylene	20 U	20 U	--	40 U	40 U	--	50 U	50 U	--
Benzo(k)fluoranthene	20 U	20 U	--	40	20 J	**67**	50	50	0
Carbazole	20 UJ	20 UJ	--	50 J	50 J	0	180 J	180 J	0
Chrysene	20 U	20 U	--	60	60	0	170	160	6
Dibenzo(a,h)anthracene	20 U	20 U	--	40 U	40 U	--	50 U	50 U	--
Dibenzofuran	20 U	20 U	--	20 J	40	**67**	540	500	8
Fluoranthene	20 U	20 U	--	160	170	6	900	900	0
Fluorene	20 U	20 U	--	30 J	60	**67**	800	800	0
Indeno(1,2,3-cd)pyrene	20 U	20 U	--	20 J	40 U	--	50 U	50 U	--
Naphthalene	20 U	20 U	--	200	440	**75**	2,000	1,900	5
Pentachlorophenol	60 U	60 U	--	100	200	**67**	100 U	100 U	--
Phenanthrene	20 U	20 U	--	150	180	18	2,000	2,000	0
Pyrene	20 U	20 U	--	140	160	13	800	700	13

Table 4-1 (Continued)
Summary of Field Duplicate Results
PAH/PCP in Soil

Location ID	SB-099	SB-099		SB-099	SB-099		SE-002	SE-002	
Quadrant	C3	C3		C3	C3		C1	C1	
Sample ID	SB099-127.3-127.5	SB599-127.3-127.5		SB099-160.7-160.9	SB599-160.7-160.9		SS002-84-86	SS502-84-86	
Date Sampled	10/7/99	10/7/99		10/7/99	10/7/99		7/15/99	7/15/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
PAHs (mg/kg)									
2-methylnaphthalene	20 U	20 U	--	200	190	5	20 U	20 U	--
Acenaphthene	20 U	20 U	--	110	120	9	20 U	20 U	--
Acenaphthylene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Anthracene	20 U	20 U	--	40	50	22	20 U	20 U	--
Benzo(a)anthracene	20 U	20 U	--	20	30	40	20 U	20 U	--
Benzo(a)pyrene	20 U	20 U	--	10 J	10 J	0	20 U	20 U	--
Benzo(b)fluoranthene	20 U	20 U	--	10 J	10 J	0	20 U	20 U	--
Benzo(g,h,i)perylene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(k)fluoranthene	20 U	20 U	--	10 J	10 J	0	20 U	20 U	--
Carbazole	20 UJ	20 UJ	--	10 J	10 J	0	20 U	20 U	--
Chrysene	20 U	20 U	--	20	30	40	20 U	20 U	--
Dibenzo(a,h)anthracene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Dibenzofuran	20 U	20 U	--	70	80	13	20 U	20 U	--
Fluoranthene	20 U	20 U	--	100	110	10	20 U	20 U	--
Fluorene	20 U	20 U	--	80	90	12	20 U	20 U	--
Indeno(1,2,3-cd)pyrene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Naphthalene	20 U	20 U	--	380	310	20	20 U	20 U	--
Pentachlorophenol	60 U	60 U	--	60 U	50 U	--	20 U	20 U	--
Phenanthrene	20 U	20 U	--	190	220	15	20 U	20 U	--
Pyrene	20 U	20 U	--	80	90	12	20 U	20 U	--

Table 4-1 (Continued)
Summary of Field Duplicate Results
PAH/PCP in Soil

Location ID	SE-008	SE-008		SE-020	SE-020		SE-020	SE-020	
Quadrant	C2	C2		C2	C2		C2	C2	
Sample ID	SS008-10.5-11.7	SS508-10.5-11.7		SS020-29-31	SS520-29-31		SS020-56-58	SS520-56-58	
Date Sampled	8/8/99	8/8/99		8/8/99	8/8/99		8/8/99	8/8/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
PAHs (mg/kg)									
2-methylnaphthalene	20 U	20 U	--	370	180	**69**	540	600	11
Acenaphthene	20 U	20 U	--	140	80	**55**	240	270	12
Acenaphthylene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Anthracene	20 U	20 U	--	60	40	40	100	110	10
Benzo(a)anthracene	20 U	20 U	--	10 J	20 U	--	20	30	40
Benzo(a)pyrene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(b)fluoranthene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(g,h,i)perylene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(k)fluoranthene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Carbazole	20 U	20 U	--	20	20 U	--	40	40	0
Chrysene	20 U	20 U	--	10 J	20 U	--	30	30	0
Dibenzo(a,h)anthracene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Dibenzofuran	20 U	20 U	--	100	50	**67**	140	160	13
Fluoranthene	20 U	20 U	--	80	50	46	130	140	7
Fluorene	20 U	20 U	--	100	60	50	160	180	12
Indeno(1,2,3-cd)pyrene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Naphthalene	20 J	20 J	--	620	320	**64**	1000	1300	26
Pentachlorophenol	60 J	30 J	--	60 U	60 U	--	60	60	0
Phenanthrene	20 U	20 U	--	200	130	42	380	400	5
Pyrene	20 U	20 U	--	60	40	40	110	120	9

Table 4-1 (Continued)
Summary of Field Duplicate Results
PAH/PCP in Soil

Location ID	SE-043	SE-043		SE-064	SE-064		SE-088	SE-088	
Quadrant	D2	D2		C2	C2		B1	B1	
Sample ID	SS043-23-25	SS543-23-25		SS064-34-36	SS564-34-36		SS088-24-25.8	SS588-24-25.8	
Date Sampled	8/9/99	8/9/99		9/6/99	9/6/99		9/6/99	9/6/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
PAHs (mg/kg)									
2-methylnaphthalene	20 U	20 U	--	210	220	5	250	280	11
Acenaphthene	20 U	20 U	--	130	120	8	170	180	6
Acenaphthylene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Anthracene	20 U	20 U	--	50	40	22	80	80	0
Benzo(a)anthracene	20 U	20 U	--	10 J	20 U	--	20	20	0
Benzo(a)pyrene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(b)fluoranthene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(g,h,i)perylene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Benzo(k)fluoranthene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Carbazole	20 U	20 U	--	20 UJ	20 UJ	--	40 J	40 J	0
Chrysene	20 U	20 U	--	10 J	20 U	--	20	20	0
Dibenzo(a,h)anthracene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Dibenzofuran	20 U	20 U	--	80	70	13	110	120	9
Fluoranthene	20 U	20 U	--	70	60	15	120	120	0
Fluorene	20 U	20 U	--	90	80	12	130	140	7
Indeno(1,2,3-cd)pyrene	20 U	20 U	--	20 U	20 U	--	20 U	20 U	--
Naphthalene	20 U	20 U	--	290	350	19	510 J	550	8
Pentachlorophenol	60 U	60 U	--	60 U	60 U	--	60 U	60 U	--
Phenanthrene	20 U	20 U	--	180	160	12	290	310	7
Pyrene	20 U	20 U	--	60	50	18	90	100	11

Table 4-1 (Continued)
Summary of Field Duplicate Results
PAH/PCP in Soil

Location ID Quadrant Sample ID Date Sampled Field QC	SE-097 D2 SS097-92.6-94 9/7/99 Primary	SE-097 D2 SS597-92.6-94 9/7/99 Field Duplicate	RPD
PAHs (mg/kg)			
2-methylnaphthalene	30 U	10 J	--
Acenaphthene	30 U	30 U	--
Acenaphthylene	30 U	30 U	--
Anthracene	30 U	30 U	--
Benzo(a)anthracene	30 U	30 U	--
Benzo(a)pyrene	30 U	30 U	--
Benzo(b)fluoranthene	30 U	30 U	--
Benzo(g,h,i)perylene	30 U	30 U	--
Benzo(k)fluoranthene	30 U	30 U	--
Carbazole	30 UJ	30 UJ	--
Chrysene	30 U	30 U	--
Dibenzo(a,h)anthracene	30 U	30 U	--
Dibenzofuran	30 U	30 U	--
Fluoranthene	30 U	30 U	--
Fluorene	30 U	30 U	--
Indeno(1,2,3-cd)pyrene	30 U	30 U	--
Naphthalene	30 U	20 J	--
Pentachlorophenol	60 U	60 U	--
Phenanthrene	20 J	20 J	0
Pyrene	30 U	30 U	--
TOTAL HPAH (U=1/2)	150	150	--
TOTAL LPAH (U=1/2)	110	110	--
TOTAL PAH (U=1/2)	260	260	--
LPAH/HPAY (U=1/2)	0.73	0.73	--
Naphthalene/Total PAH (U=1/2)	0.12	0.07 U	--

Notes:
J - estimated value
U - not detected at or above associated value
-- value not calculated

Table 4-2
Summary of Field Duplicate Results
TPH in Soil

Location ID	SB-004	SB-004		SB-006	SB-006		SB-006	SB-006	
Quadrant	D2	D2		C3	C3		C3	C3	
Sample ID	SB004-149.7-150	SB504-149.7-150		SB006-102	SB506-102		SB006-182.7-183	SB506-182.7-183	
Date Sampled	8/10/99	8/10/99		8/4/99	8/4/99		8/5/99	8/5/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
TPH (mg/kg)									
TRPH	--	--	--	--	--	--	--	--	--
Total hydrocarbons, C10-C39	100 U	100 U	--	100 U	100 U	--	100 U	100 U	--
C10-C11	--	--	--	--	--	--	--	--	--
C12-C13	--	--	--	--	--	--	--	--	--
C14-C15	--	--	--	--	--	--	--	--	--
C16-C17	--	--	--	--	--	--	--	--	--
C18-C19	--	--	--	--	--	--	--	--	--
C20-C21	--	--	--	--	--	--	--	--	--
C22-C23	--	--	--	--	--	--	--	--	--
C24-C25	--	--	--	--	--	--	--	--	--
C27-C28	--	--	--	--	--	--	--	--	--
C29-C30	--	--	--	--	--	--	--	--	--
C31-C32	--	--	--	--	--	--	--	--	--
C33-C34	--	--	--	--	--	--	--	--	--
C35-C36	--	--	--	--	--	--	--	--	--
C37-C39	--	--	--	--	--	--	--	--	--

Table 4-2 (Continued)
Summary of Field Duplicate Results
TPH in Soil

Location ID	SB-007	SB-007		SB-007	SB-007		SB-007	SB-007	
Quadrant	C3	C3		C3	C3		C3	C3	
Sample ID	SB007-32.3-32.6	SB507-32.3-32.6		SB007-116.3-116.6	SB507-116.3-117.3		SB007-180.5-181.0	SB507-180.5-181.0	
Date Sampled	9/14/99	9/14/99		9/15/99	9/15/99		9/16/99	9/16/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
TPH (mg/kg)									
TRPH	--	--	--	--	--	--	--	--	--
Total hydrocarbons, C10-C39	100 U	100 U	--	100 U	100 U	--	100 U	100 U	--
C10-C11	--	--	--	--	--	--	--	--	--
C12-C13	--	--	--	--	--	--	--	--	--
C14-C15	--	--	--	--	--	--	--	--	--
C16-C17	--	--	--	--	--	--	--	--	--
C18-C19	--	--	--	--	--	--	--	--	--
C20-C21	--	--	--	--	--	--	--	--	--
C22-C23	--	--	--	--	--	--	--	--	--
C24-C25	--	--	--	--	--	--	--	--	--
C27-C28	--	--	--	--	--	--	--	--	--
C29-C30	--	--	--	--	--	--	--	--	--
C31-C32	--	--	--	--	--	--	--	--	--
C33-C34	--	--	--	--	--	--	--	--	--
C35-C36	--	--	--	--	--	--	--	--	--
C37-C39	--	--	--	--	--	--	--	--	--

Table 4-2 (Continued)
Summary of Field Duplicate Results
TPH in Soil

Location ID	SB-018	SB-018		SB-019	SB-019		SB-019
Quadrant	C1	C1		C2	C2		C2
Sample ID	SB018-129.5-129.9	SB518-129.5-129.9		SB019-37.4-37.7	SB519-37.4-37.7		SB519-137.0-137.3
Date Sampled	8/19/99	8/19/99		8/12/99	8/12/99		8/13/99
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Field Duplicate
TPH (mg/kg)							
TRPH	--	--	--	151	99	42	--
Total hydrocarbons, C10-C39	100 U	100 U	--	88 J	120	31	100 U
C10-C11	--	--	--			--	--
C12-C13	--	--	--	6	12	**67**	--
C14-C15	--	--	--	21	29	32	--
C16-C17	--	--	--	27	28	4	--
C18-C19	--	--	--	13	25	**63**	--
C20-C21	--	--	--	19	26	31	--
C22-C23	--	--	--			--	--
C24-C25	--	--	--			--	--
C27-C28	--	--	--			--	--
C29-C30	--	--	--			--	--
C31-C32	--	--	--			--	--
C33-C34	--	--	--			--	--
C35-C36	--	--	--			--	--
C37-C39	--	--	--			--	--

Table 4-2 (Continued)
Summary of Field Duplicate Results
TPH in Soil

Location ID	SB-025	SB-025		SB-027	SB-027		SB-027	SB-027	
Quadrant	C2	C2		C2	C2		C2	C2	
Sample ID	SB025-163.0-163.4	SB525-163.0-163.4		SB027-61.0-61.4	SB527-61.0-61.4		SB027-142.3-143.0	SB527-142.3-143.0	
Date Sampled	8/27/99	8/27/99		9/2/99	9/2/99		9/3/99	9/3/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
TPH (mg/kg)									
TRPH	--	--	--	--	--	--	--	--	--
Total hydrocarbons, C10-C39	100 U	100 U	--	100 U	100 U	--	100 U	100 U	--
C10-C11	--	--	--	--	--	--	--	--	--
C12-C13	--	--	--	--	--	--	--	--	--
C14-C15	--	--	--	--	--	--	--	--	--
C16-C17	--	--	--	--	--	--	--	--	--
C18-C19	--	--	--	--	--	--	--	--	--
C20-C21	--	--	--	--	--	--	--	--	--
C22-C23	--	--	--	--	--	--	--	--	--
C24-C25	--	--	--	--	--	--	--	--	--
C27-C28	--	--	--	--	--	--	--	--	--
C29-C30	--	--	--	--	--	--	--	--	--
C31-C32	--	--	--	--	--	--	--	--	--
C33-C34	--	--	--	--	--	--	--	--	--
C35-C36	--	--	--	--	--	--	--	--	--
C37-C39	--	--	--	--	--	--	--	--	--

Table 4-2 (Continued)
Summary of Field Duplicate Results
TPH in Soil

Location ID	SB-027	SB-027		SB-028	SB-028		SB-030	SB-030	
Quadrant	C2	C2		C2	C2		D3	D3	
Sample ID	SB027-214-214.5	SB527-214-214.5		SB028-53.5-55	SB528-53.5-55		SB030-121.4-122.2	SB530-121.4-122.2	
Date Sampled	9/7/99	9/7/99		9/29/99	9/29/99		8/23/99	8/23/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
TPH (mg/kg)									
TRPH	--	--	--	--	--	--	--	--	--
Total hydrocarbons, C10-C39	100 U	100 U	--	6000	6500	8	100 U	100 U	--
C10-C11	--	--	--	1700	1800	6	--	--	--
C12-C13	--	--	--	820	900	9	--	--	--
C14-C15	--	--	--	980	1100	12	--	--	--
C16-C17	--	--	--	900	980	9	--	--	--
C18-C19	--	--	--	620	670	8	--	--	--
C20-C21	--	--	--	460	500	8	--	--	--
C22-C23	--	--	--	240	260	8	--	--	--
C24-C25	--	--	--	97	100	3	--	--	--
C27-C28	--	--	--	130	140	7	--	--	--
C29-C30	--	--	--	57	63	10	--	--	--
C31-C32	--	--	--			--	--	--	--
C33-C34	--	--	--			--	--	--	--
C35-C36	--	--	--			--	--	--	--
C37-C39	--	--	--			--	--	--	--

Table 4-2 (Continued)
Summary of Field Duplicate Results
TPH in Soil

Location ID	SB-047	SB-047	SB-047		SB-047	SB-047	
Quadrant	D3	D3	D3		D3	D3	
Sample ID	SB547-28.7-29.0	SB047-34.5-35.0	SB547-34.5-35.0		SB047-129.5-130.0	SB547-129.5-130.0	
Date Sampled	10/13/99	10/13/99	10/13/99		10/14/99	10/14/99	
Field QC	Field Duplicate	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
TPH (mg/kg)							
TRPH	--	--	--	--	--	--	--
Total hydrocarbons, C10-C39	100 U	100 U	100 U	--	100 U	100 U	--
C10-C11	--	--	--	--	--	--	--
C12-C13	--	--	--	--	--	--	--
C14-C15	--	--	--	--	--	--	--
C16-C17	--	--	--	--	--	--	--
C18-C19	--	--	--	--	--	--	--
C20-C21	--	--	--	--	--	--	--
C22-C23	--	--	--	--	--	--	--
C24-C25	--	--	--	--	--	--	--
C27-C28	--	--	--	--	--	--	--
C29-C30	--	--	--	--	--	--	--
C31-C32	--	--	--	--	--	--	--
C33-C34	--	--	--	--	--	--	--
C35-C36	--	--	--	--	--	--	--
C37-C39	--	--	--	--	--	--	--

Table 4-2 (Continued)
Summary of Field Duplicate Results
TPH in Soil

Location ID	SB-047	SB-047		SB-051	SB-051		SB-051	SB-051	
Quadrant	D3	D3		D2	D2		D2	D2	
Sample ID	SB047-188.0-188.5	SB547-188.0-188.5		SB051-101.7-102.2	SB551-101.7-102.2		SB051-152.7-153.0	SB551-152.7-153.0	
Date Sampled	10/15/99	10/15/99		9/9/99	9/9/99		9/13/99	9/13/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
TPH (mg/kg)									
TRPH	--	--	--	--	--	--	--	--	--
Total hydrocarbons, C10-C39	100 U	100 U	--	100 U	100 U	--	100 U	100 U	--
C10-C11	--	--	--	--	--	--	--	--	--
C12-C13	--	--	--	--	--	--	--	--	--
C14-C15	--	--	--	--	--	--	--	--	--
C16-C17	--	--	--	--	--	--	--	--	--
C18-C19	--	--	--	--	--	--	--	--	--
C20-C21	--	--	--	--	--	--	--	--	--
C22-C23	--	--	--	--	--	--	--	--	--
C24-C25	--	--	--	--	--	--	--	--	--
C27-C28	--	--	--	--	--	--	--	--	--
C29-C30	--	--	--	--	--	--	--	--	--
C31-C32	--	--	--	--	--	--	--	--	--
C33-C34	--	--	--	--	--	--	--	--	--
C35-C36	--	--	--	--	--	--	--	--	--
C37-C39	--	--	--	--	--	--	--	--	--

Table 4-2 (Continued)
Summary of Field Duplicate Results
TPH in Soil

Location ID	SB-052	SB-052		SB-052	SB-052		SB-052	SB-052	
Quadrant	D2	D2		D2	D2		D2	D2	
Sample ID	SB052-32.0-32.5	SB552-32.0-32.5		SB052-118.5-119	SB552-118.5-119		SB052-175.5-176.0	SB552-175.5-176	
Date Sampled	10/16/99	10/16/99		10/17/99	10/17/99		10/18/99	10/18/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
TPH (mg/kg)									
TRPH	--	--	--	--	--	--	--	--	--
Total hydrocarbons, C10-C39	100 U	100 U	--	100 U	100 U	--	90 U	100 U	--
C10-C11	--	--	--	--	--	--	--	--	--
C12-C13	--	--	--	--	--	--	--	--	--
C14-C15	--	--	--	--	--	--	--	--	--
C16-C17	--	--	--	--	--	--	--	--	--
C18-C19	--	--	--	--	--	--	--	--	--
C20-C21	--	--	--	--	--	--	--	--	--
C22-C23	--	--	--	--	--	--	--	--	--
C24-C25	--	--	--	--	--	--	--	--	--
C27-C28	--	--	--	--	--	--	--	--	--
C29-C30	--	--	--	--	--	--	--	--	--
C31-C32	--	--	--	--	--	--	--	--	--
C33-C34	--	--	--	--	--	--	--	--	--
C35-C36	--	--	--	--	--	--	--	--	--
C37-C39	--	--	--	--	--	--	--	--	--

Table 4-2 (Continued)
Summary of Field Duplicate Results
TPH in Soil

Location ID	SB-057	SB-057		SB-057	SB-057		SB-061	SB-061	
Quadrant	C2	C2		C2	C2		D2	D2	
Sample ID	SB057-36-38	SB557-36-38		SB057-51-52	SB557-51-52		SB061-154.0-154.4	SB561-154.0-154.4	
Date Sampled	10/9/99	10/9/99		10/9/99	10/9/99		8/31/99	8/31/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
TPH (mg/kg)									
TRPH	--	--	--	--	--	--	--	--	--
Total hydrocarbons, C10-C39	30000	15000	**67**	2000	1500	29	100 U	100 U	--
C10-C11	8000	4100	**64**	490	350	33	--	--	--
C12-C13	6800	3500	**64**	440	340	26	--	--	--
C14-C15	6700	3600	**60**	430	340	23	--	--	--
C16-C17	3900	2000	**64**	290	230	23	--	--	--
C18-C19	2100	980	**73**	200	140	35	--	--	--
C20-C21	1400	1000	33	120	89	30	--	--	--
C22-C23	590		--	49	38	25	--	--	--
C24-C25	270		--	22	18	20	--	--	--
C27-C28	200		--	12		--	--	--	--
C29-C30			--			--	--	--	--
C31-C32			--			--	--	--	--
C33-C34			--			--	--	--	--
C35-C36			--			--	--	--	--
C37-C39			--			--			--

Table 4-2 (Continued)
Summary of Field Duplicate Results
TPH in Soil

Location ID	SB-084	SB-084		SB-084	SB-084		SB-086	SB-086	
Quadrant	C1	C1		C1	C1		C1	C1	
Sample ID	SB084-135.6-136	SB584-135.6-136		SB084-226.0-226.5	SB584-226.0-226.5		SB086-27-28.5	SB586-27-28.5	
Date Sampled	9/18/99	9/18/99		9/19/99	9/19/99		9/28/99	9/28/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
TPH (mg/kg)									
TRPH	--	--	--	--	--	--	--	--	--
Total hydrocarbons, C10-C39	100 U	100 U	--	100 U	100 U	--	4600	7700	50
C10-C11	--	--	--	--	--	--	1500	2200	38
C12-C13	--	--	--	--	--	--	590	1000	**52**
C14-C15	--	--	--	--	--	--	740	1300	**55**
C16-C17	--	--	--	--	--	--	690	1200	**54**
C18-C19	--	--	--	--	--	--	510	920	**57**
C20-C21	--	--	--	--	--	--	320	580	**58**
C22-C23	--	--	--	--	--	--	150	250	50
C24-C25	--	--	--	--	--	--	41	110	**91**
C27-C28	--	--	--	--	--	--	34	63	**60**
C29-C30	--	--	--	--	--	--		27	--
C31-C32	--	--	--	--	--	--			--
C33-C34	--	--	--	--	--	--			--
C35-C36	--	--	--	--	--	--			--
C37-C39	--	--	--	--	--	--			--

Table 4-2 (Continued)
Summary of Field Duplicate Results
TPH in Soil

Location ID	SB-092	SB-092		SB-092	SB-092		SB-099	SB-099	
Quadrant	C3	C3		C3	C3		C3	C3	
Sample ID	SB092-86.0-86.5	SB592-86.0-86.5		SB092-131.0-131.5	SB592-131.0-131.5		SB099-3.1-4.6	SB599-3.1-4.6	
Date Sampled	9/20/99	9/20/99		9/21/99	9/21/99		9/30/99	9/30/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
TPH (mg/kg)									
TRPH	--	--	--	--	--	--	--	--	--
Total hydrocarbons, C10-C39	100 U	100 U	--	100 U	100 U	--	2100	6200	**99**
C10-C11	--	--	--	--	--	--	300	300	0
C12-C13	--	--	--	--	--	--	230	170	30
C14-C15	--	--	--	--	--	--	290	300	3
C16-C17	--	--	--	--	--	--	250	490	**65**
C18-C19	--	--	--	--	--	--	260	880	**109**
C20-C21	--	--	--	--	--	--	200	890	**127**
C22-C23	--	--	--	--	--	--	200	940	**130**
C24-C25	--	--	--	--	--	--	140	680	**132**
C27-C28	--	--	--	--	--	--	130	630	**132**
C29-C30	--	--	--	--	--	--	110	600	**138**
C31-C32	--	--	--	--	--	--		90	--
C33-C34	--	--	--	--	--	--	23	150	**147**
C35-C36	--	--	--	--	--	--		44	--
C37-C39	--	--	--	--	--	--		49	--

Table 4-2 (Continued)
Summary of Field Duplicate Results
TPH in Soil

Location ID	SB-099	SB-099		SB-099	SB-099		SB-099	SB-099	
Quadrant	C3	C3		C3	C3		C3	C3	
Sample ID	SB099-27.5-29.5	SB599-27.5-29.5		SB099-127.3-127.5	SB599-127.3-127.5		SB099-160.7-160.9	SB599-160.7-160.9	
Date Sampled	9/30/99	9/30/99		10/7/99	10/7/99		10/7/99	10/7/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
TPH (mg/kg)									
TRPH	--	--	--	--	--	--	--	--	--
Total hydrocarbons, C10-C39	18000	22000	20	100 U	100 U	--	1200	2200	**59**
C10-C11	2100	2600	21	--	--	--	320	560	**55**
C12-C13	1500	2000	29	--	--	--	210	370	**55**
C14-C15	3400	4300	23	--	--	--	210	370	**55**
C16-C17	3700	4600	22	--	--	--	160	290	**58**
C18-C19	3100	3900	23	--	--	--	110	200	**58**
C20-C21	2100	2600	21	--	--	--	88	160	**58**
C22-C23	720	930	25	--	--	--	47	77	48
C24-C25	620	820	28	--	--	--	13	44	**109**
C27-C28	390	520	29	--	--	--	22	50	**78**
C29-C30			--	--	--	--	6	19	**104**
C31-C32			--	--	--	--			--
C33-C34			--	--	--	--			--
C35-C36			--	--	--	--			--
C37-C39			--	--	--	--			--

Table 4-2 (Continued)
Summary of Field Duplicate Results
TPH in Soil

Location ID	SE-002	SE-002		SE-020	SE-020		SE-020	SE-020	
Quadrant	C1	C1		C2	C2		C2	C2	
Sample ID	SS002-84-86	SS502-84-86		SS020-29-31	SS520-29-31		SS020-56-58	SS520-56-58	
Date Sampled	7/15/99	7/15/99		8/8/99	8/8/99		8/8/99	8/8/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
TPH (mg/kg)									
TRPH	6 J	8 J	29	274	283	3	1456	1458	0.1
Total hydrocarbons, C10-C39	100 U	100 U	--	1100	2600	**81**	6200	6000	3
C10-C11	--	--	--	280	660	**81**	1800	1700	6
C12-C13	--	--	--	290	660	**78**	1100	1000	10
C14-C15	--	--	--	250	550	**75**	1300	1300	0
C16-C17	--	--	--	150	340	**78**	1200	1200	0
C18-C19	--	--	--	85	190	**76**	410	420	2
C20-C21	--	--	--	51	120	**81**	420	420	0
C22-C23	--	--	--	20	60	**100**	67	65	3
C24-C25	--	--	--	7	20	**96**			--
C27-C28	--	--	--		10	-			--
C29-C30	--	--	--			--			--
C31-C32	--	--	--			--			--
C33-C34	--	--	--			--			--
C35-C36	--	--	--			--			--
C37-C39	--	--	--			--			--

Table 4-2 (Continued)
Summary of Field Duplicate Results
TPH in Soil

Location ID	SE-043	SE-043		SE-064	SE-064		SE-088	SE-088	
Quadrant	D2	D2		C2	C2		B1	B1	
Sample ID	SS043-23-25	SS543-23-25		SS064-34-36	SS564-34-36		SS088-24-25.8	SS588-24-25.8	
Date Sampled	8/9/99	8/9/99		9/6/99	9/6/99		9/6/99	9/6/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD
TPH (mg/kg)									
TRPH	363	328	10	1111	1051	6	1507	1080	33
Total hydrocarbons, C10-C39	400	500	22	3700	3800	3	1600	3400	**72**
C10-C11	9	10	11	980	1000	2	330	720	**74**
C12-C13	83	100	19	830	850	2	270	560	**70**
C14-C15	210	250	17	770	790	3	300	630	**71**
C16-C17	63	73	15	480	490	2	270	580	**73**
C18-C19	10	15	40	320	330	3	210	400	**62**
C20-C21	5	6	18	190	190	0	120	300	**86**
C22-C23			--	94	98	4	66	100	41
C24-C25			--	44	44	0	30	30	0
C27-C28			--	22	22	0	14	30	**73**
C29-C30			--			-	6		--
C31-C32			--	9	8	12			--
C33-C34			--			--			--
C35-C36			--			--			--
C37-C39			--			--			--

Table 4-2 (Continued)
Summary of Field Duplicate Results
TPH in Soil

Location ID Quadrant Sample ID Date Sampled Field QC	SE-097 D2 SS097-92.6-94 9/7/99 Primary	SE-097 D2 SS597-92.6-94 9/7/99 Field Duplicate	RPD
TPH (mg/kg)			
TRPH	66	96	37
Total hydrocarbons, C10-C39	140	170	19
C10-C11	27	36	29
C12-C13	26	33	24
C14-C15	30	37	21
C16-C17	24	30	22
C18-C19	15	18	18
C20-C21	11	14	24
C22-C23			--
C24-C25			--
C27-C28			--
C29-C30			--
C31-C32			--
C33-C34			--
C35-C36			--
C37-C39			--

Notes:
J - estimated value
U - not detected at or above associated value
-- no value calculated
If nothing shown, no detection limit available

Table 4-3
Summary of Field Duplicate Results
TOC, PCBs, and Metals in Soil

Location ID	SB-028	SB-028		SB-057	SB-057		SE-008	SE-008		SE-079	SE-079	
Quadrant	C2	C2		C2	C2		C2	C2		C3	C3	
Sample ID	SB028-53.5-55	SB528-53.5-55		SB057-65-66	SB557-65-66		SS008-10.5-11.7	SS508-10.5-11.7		SS079-63-63.9	SS579-63-63.9	
Date Sampled	9/29/99	9/29/99		10/9/99	10/9/99		8/8/99	8/8/99		9/8/99	9/8/99	
Field QC	Primary	Field Duplicate	RPD	Primary	Field Duplicate	RPD	Primary	Field Duplicate		Primary	Field Duplicate	RPD
Conventionals (mg/kg)												
Total organic carbon	--	--	--	--	--	--	--	--	--	330 J	1,000 J	101
PCBs (µg/kg)												
Aroclor 1016	--	--	--	--	--	--	300 U	300 U	--	--	--	--
Aroclor 1221	--	--	--	--	--	--	600 U	600 U	--	--	--	--
Aroclor 1232	--	--	--	--	--	--	300 U	300 U	--	--	--	--
Aroclor 1242	--	--	--	--	--	--	300 U	300 U	--	--	--	--
Aroclor 1248	--	--	--	--	--	--	300 U	300 U	--	--	--	--
Aroclor 1254	--	--	--	--	--	--	300 U	300 U	--	--	--	--
Aroclor 1260	--	--	--	--	--	--	300 U	300 U	--	--	--	--
Metals (mg/kg)												
Arsenic	12	7.8	42	3.8	3.2	17	--	--	--	--	--	--
Chromium	13	12	8	31	27	14	--	--	--	--	--	--
Copper	11	8.3	28	17	13	27	--	--	--	--	--	--
Zinc	31	29	7	38	32	17	--	--	--	--	--	--

J - estimated value
U - not detected at or above associated value
-- no value calculated

Table 4-4
Summary of Duplicate Results
Dioxins/Furans in Groundwater

Location ID Sample ID Date Sampled Field QC	DSW-4C GWDSW4C01 7/15/99 Primary	DSW-4C GW50A1201 7/15/99 Field Duplicate	RPD
Dioxins/Furans (pg/L)			
1,2,3,4,6,7,8-HpCDD	710	440	**47**
1,2,3,4,6,7,8-HpCDF	190	130	**38**
1,2,3,4,7,8,9-HpCDF	20 J	21 J	5
1,2,3,4,7,8-HxCDD	10 U	5 U	--
1,2,3,4,7,8-HxCDF	35 J	28 J	22
1,2,3,6,7,8-HxCDD	25 J	19 J	27
1,2,3,6,7,8-HxCDF	10 U	8.5 J	--
1,2,3,7,8,9-HxCDD	10 U	10 J	--
1,2,3,7,8,9-HxCDF	10 U	5 U	--
1,2,3,7,8-PeCDD	6 J	9 J	**40**
1,2,3,7,8-PeCDF	5 J	4.8 J	4
2,3,4,6,7,8-HxCDF	10 U	5 U	--
2,3,4,7,8-PeCDF	7 J	5 U	--
2,3,7,8-TCDD	5 U	5 U	--
2,3,7,8-TCDF	5 U	5 U	--
HpCDD's (total)	1,700	1,100	**43**
HpCDF's (total)	880	630	**33**
HxCDD's (total)	79	72	9
HxCDF's (total)	120	200	**50**
OCDD	7,300	4,700	**43**
OCDF	880	570	**43**
PeCDD's (total)	50 U	50 U	--
PeCDF's (total)	64	50 U	--
TCDD's (total)	10 U	10 U	--
TCDF's (total)	11	10 U	--
TEC (U/2)	35	27	26
TEC (U=0)	30	22	**31**

Notes:
J - estimated value
U - not detected at or above associated value
Bold values exceed the SAP QA/QC limits.
-- no value calculated

Table 4-5
Summary of Field Duplicate Results
SVOCs in Groundwater

Location ID Sample ID Date Sampled Field QC	A-5 GW000A501 7/12/99 Primary	A-5 GW50A1101 7/12/99 Field Duplicate	RPD	DSW-4C GWDSW4C01 7/15/99 Primary	DSW-4C GW50A1201 7/15/99 Field Duplicate	RPD
SVOC (µg/L)						
1,2,4-trichlorobenzene	10 U	10 U	-	10 U	10 U	-
1,2-dichlorobenzene	10 U	10 U	-	10 U	10 U	-
1,3-dichlorobenzene	10 U	10 U	-	10 U	10 U	-
1,4-dichlorobenzene	10 U	10 U	-	10 U	10 U	-
2,2-oxybis(1-chloropropane)	10 U	10 U	-	10 U	10 U	-
2,4,5-trichlorophenol	10 U	10 U	-	10 U	10 U	-
2,4,6-trichlorophenol	10 U	10 U	-	10 U	10 U	-
2,4-dichlorophenol	10 U	10 U	-	10 U	10 U	-
2,4-dimethylphenol	10 U	10 U	-	70	60 J	15
2,4-dinitrophenol	10 U	10 U	-	10 U	10 U	-
2,4-dinitrotoluene	10 U	10 U	-	10 U	10 U	-
2,6-dinitrotoluene	10 U	10 U	-	10 U	10 U	-
2-chloronaphthalene	10 U	10 U	-	10 U	10 U	-
2-chlorophenol	10 U	10 U	-	10 U	10 U	-
2-methylnaphthalene	10 U	10 U	-	1100	1000 J	10
2-methylphenol	10 U	10 U	-	10 U	10 U	-
2-nitroaniline	10 U	10 U	-	10 U	10 U	-
2-nitrophenol	10 U	10 U	-	10 U	10 U	-
3,3'-dichlorobenzidine	10 U	10 U	-	10 U	10 U	-
3-nitroaniline	10 U	10 U	-	10 U	10 U	-
4,6-dinitro-2-methylphenol	10 U	10 U	-	10 U	10 U	-
4-bromophenyl-phenylether	10 U	10 U	-	10 U	10 U	-
4-chloro-3-methylphenol	10 U	10 U	-	10 U	10 U	-
4-chloroaniline	10 U	10 U	-	10 U	10 U	-
4-chlorophenyl-phenylether	10 U	10 U	-	10 U	10 U	-
4-methylphenol	10 U	10 U	-	10 U	10 U	-
4-nitroaniline	10 U	10 U	-	10 U	10 U	-
4-nitrophenol	10 U	10 U	-	10 U	10 U	-
Acenaphthene	10 U	10 U	-	300	300	0
Acenaphthylene	10 U	10 U	-	7 J	7 J	0
Anthracene	10 U	10 U	-	20	20	0
Benzo(a)anthracene	10 U	10 U	-	10 U	10 U	-
Benzo(a)pyrene	10 U	10 U	-	10 U	10 U	-
Benzo(b)fluoranthene	10 U	10 U	-	10 U	10 U	-
Benzo(g,h,i)perylene	10 U	10 U	-	10 U	10 U	-
Benzo(k)fluoranthene	10 U	10 U	-	10 U	10 U	-
Benzyl alcohol	10 U	10 U	-	10 U	10 U	-
Bis(2-chloroethoxy)methane	10 U	10 U	-	10 U	10 U	-
Bis(2-chloroethyl)ether	10 U	10 U	-	10 U	10 U	-
Bis(2-ethylhexyl)phthalate	10 U	10 U	-	10 U	10 U	-
Butylbenzylphthalate	10 U	10 U	-	10 U	10 U	-
Carbazole	10 U	10 U	-	700	700	0

Table 4-5 (Continued)
Summary of Field Duplicate Results
SVOCs in Groundwater

Location ID Sample ID Date Sampled Field QC	A-5 GW000A501 7/12/99 Primary	A-5 GW50A1101 7/12/99 Field Duplicate	RPD	DSW-4C GWDSW4C01 7/15/99 Primary	DSW-4C GW50A1201 7/15/99 Field Duplicate	RPD
SVOC (µg/L) (Continued)						
Chrysene	10 U	10 U	-	10 U	5 J	-
Di-n-butylphthalate	10 U	10 U	-	10 U	10 U	-
Di-n-octylphthalate	10 U	10 U	-	10 U	10 U	-
Dibenzo(a,h)anthracene	10 U	10 U	-	10 U	10 U	-
Dibenzofuran	10 U	10 U	-	160	200	22
Diethylphthalate	10 U	10 U	-	10 U	10 U	-
Dimethylphthalate	10 U	10 U	-	10 U	10 U	-
Fluoranthene	10 U	10 U	-	20	30	**40**
Fluorene	10 U	10 U	-	130	100	26
Hexachlorobenzene	10 U	10 U	-	10 U	10 U	-
Hexachlorobutadiene	10 U	10 U	-	10 U	10 U	-
Hexachlorocyclopentadiene	10 U	10 U	-	10 U	10 U	-
Hexachloroethane	10 U	10 U	-	10 U	10 U	-
Indeno(1,2,3-cd)pyrene	10 U	10 U	-	10 U	10 U	-
Isophorone	10 U	10 U	-	10 U	10 U	-
N-nitroso-di-n-propylamine	10 U	10 U	-	10 U	10 U	-
N-nitrosodiphenylamine	10 U	10 U	-	10 U	10 U	-
Naphthalene	10 U	10 U	-	10000	10000	0
Nitrobenzene	10 U	10 U	-	10 U	10 U	-
Pentachlorophenol	30	30	0	10 U	10 U	-
Phenanthrene	10 U	10 U	-	110	100	9
Phenol	10 U	10 U	-	20	20	0
Pyrene	10 U	10 U	-	10	20	**67**

Notes:
J - estimated value
U - not detected at or above associated value
Bold values exceed the SAP QA/QC limits.

Table 4-6
Summary of Field Duplicate Results
Conventionals and Metals in Groundwater

Location ID Sample ID Date Sampled Field QC	A-5 GW000A501 7/12/99 Primary	A-5 GW50A1101 7/12/99 Field Duplicate	RPD	DSW-4C GWDSW4C01 7/15/99 Primary	DSW-4C GW50A1201 7/15/99 Field Duplicate	RPD
Conventionals (mg/L)						
Chloride	180	180	0	190	190	0
Nitrate as N	19	19	0	0.1 U	0.1 U	-
Nitrite as N	0.1 U	0.1 U	-	0.1 U	0.1 U	-
Sulfate	270	270	0	2	2	0
Total organic carbon	18	17	6	32	32	0
Metals (µg/L)						
Manganese (total)	20	20	0	380	360	5
Manganese (dissolved)	20	20	0	300	290	3

Note:
U - not detected at or above associated value

Table 4-7
Soil PAH/PCP Performance Evaluation Sample Results (in mg/kg)

Analyte	ERA QC Limits	SB906-144.0-144.4 8/5/99	SB925-140.0-140.2 8/27/99	SB961-138.2-138.6 9/1/99	SS928-10.1-11 8/8/99	SS979-62-64 9/8/99
Acenaphthene	30.2 - 112	110	100	100	110	**120**
Anthracene	9.14 - 53.0	50	**60**	50	**60**	**60**
Benzo(a)pyrene	3.82 - 20.4	20[1]	20[1]	20[1]	20[1]	20[1]
Fluorene	32.0 - 104	**110**	**110**	100	**110**	**120**
Naphthalene	14.3 - 102	100	100	90	80	90
Pentachlorophenol	112[2]	110	110	110	120	120
Pyrene	33.0 - 113	**120**	**120**	**120**	110	**130**

[1]The reported laboratory results are within QC limits; however, if appropriate significant figures were used (i.e., same as used for the QC limits), then the results would be slightly greater than the QC limits.
[2]Certified value. ERA QC limits not available for pentachlorophenol.

Notes:
Bold values exceed the SAP QA/QC limits.
ERA - Environmental Research Associates, Inc.

Table 4-8
Soil TPH-Dx Performance Evaluation Sample Results (in mg/kg)

Analyte	ERA QC Limits	SB901001 8/4/99	SB930-204.0-204.3 8/25/99	SB961-110.2-110.6 8/31/99	SS908-10-12 8/8/99	SS997-105-106 9/7/99
TPH-Dx	838 - 2210	860	**680**	**780**	900	840

Notes:
QC limit exceedances are indicated in **bold**
ERA - Environmental Research Associates, Inc.

5.0 DATA INTERPRETATION/CONCEPTUAL SITE MODEL

5.1 PHYSICAL SYSTEM

5.1.1 Geology

5.1.1.1 Regional Geology

The City of Stockton is located on the margin of the Sacramento-San Joaquin delta near the axis of the Great Valley geomorphic province. The Great Valley is a sedimentary basin consisting of a series of homoclinal beds of clay, silt, sand, and gravel with a gently dipping east flank and more steeply dipping west flank (ICF Kaiser 1998). Stockton is located within the Sacramento sedimentary basin, which is separated from the San Joaquin sedimentary basin by the Stockton fault and the poorly defined Stockton Arch to the south of the project site. Approximately 6,000 feet of Quaternary and Tertiary alluvial deposits and sedimentary rocks overlie approximately 4,000 feet of Tertiary and Jurassic Melanges, which overlie crystalline basement rocks of the southwestward tilted Sierran block.

The California Department of Water Resources (DWR) mapped the surface geology of the McCormick and Baxter site as undifferentiated recent alluvium and Victor Formation. Quaternary flood basin deposits were mapped approximately 1 mile to the east of the site. The mid-Pleistocene to recent alluvium and Victor Formation overlie the Plio-Pleistocene Laguna Formation, which overlies the Mio-Pliocene Mehrten Formation. The flood basin deposits contain delta equivalents of the Victor and Laguna Formations (i.e., the Victor and Laguna Formations interfinger with flood basin deposits).

Flood basin deposits were described as consisting of silty clay, clayey silt, and micaceous silt that represent deposits on the time-transgressive flood plain of the San Joaquin River (Atwater 1982). The flood plain deposits were noted to have common calcium carbonate nodules and locally common black spherules of manganese and/or iron oxides.

The Quaternary Victor Formation is a heterogeneous assemblage of low-sloping alluvial fan and fluvial floodplain deposits derived from the Sierra Nevada (DWR 1967). The deposits consist of a heterogeneous sequence of gravel, sand, and clay. In the vicinity of the site, the thickness of this unit was shown to be approximately 170 feet (DWR 1967). The coarse-grained fluvial deposits of the Victor Formation reportedly grade laterally and vertically into the clays and silts of the flood basin deposits in a manner that “provides little correlation of material between wells” (DWR 1978).

Surface materials have more recently been mapped as Modesto Formation (CDMG 1990) and as fan deposits of the Calaveras River (Atwater 1982). The Modesto Formation represents Pleistocene glacial outwash fans that are approximately 10 to 15 feet thick. The Calaveras fan deposits are described as Quaternary fan deposits consisting of clayey silt, silt, sandy silt, and subordinate sand and gravel. Draining an unglaciated basin, the Calaveras River fan deposits are composed predominantly of lithic rock fragments and contain little mica. Because the Modesto Formation is derived from the Sierra Nevada, it is considered analogous to the Victor Formation for the purposes of this report.

The Plio-Pleistocene Laguna Formation underlies the Victor Formation. The Laguna Formation is interpreted to have been deposited as coalescing alluvial fans from the Sierra Nevada. The Laguna Formation consists of abundant beds of clayey silt and silty sand with some poorly graded sand in relatively thin zones and scarce well-graded gravel beds. It is lithologically similar to the Victor Formation, which makes the contact between the two formations difficult to discern visually. In the vicinity of the site, the Laguna Formation occurs between depths of approximately 170 to 1,000 feet bgs (DWR 1967). The Laguna Formation dips to the southwest and is derived from material eroded from the Sierra Nevada.

The Mehrten Formation lies beneath the Laguna Formation and is composed of moderately indurated andesitic sand and sandstone interbedded with tuffaceous silt and claystones. In the vicinity of Stockton, the Mehrten Formation is approximately 600 feet thick.

5.1.1.2 Site Geology

Prior to the collection of lithological data during this field investigation, the density of lithologic data deeper than 40 feet bgs was low, with data points spaced on average more than 400 feet apart. The new data set contains lithological data to approximately 100 feet bgs, spaced on average 75 to 100 feet apart. Deeper than 100 feet bgs, additional lithologic data are now available but are still relatively sparse. The geologic interpretations presented in this report are based upon all lithologic data collected to date, including the following: Old Mormon Slough sediment cores (SC-OMS series), RI borings (IB series), pre-RI geophysical and boring logs (A, DSW, EB, ONS, OFS, and OS series), SCAPS CPT data, grain size analysis data, SCAPS soil samples, and rotosonic soil borings.

Subsurface materials at the McCormick and Baxter site above 200 feet bgs were interpreted in the RI report (ICF Kaiser 1998) to be the flood basin deposits described by Atwater (1982). Sand and gravel deposits deeper than 200 feet bgs were interpreted in the RI report to be part of the Laguna Formation. Subsurface materials shallower than approximately 240 feet bgs (!230 feet NVD88) encountered during the 1999 investigation summarized in this report consist primarily of two types. A uniform stiff to very stiff gray-green micaceous clayey silt with common calcite nodules and/or veins comprises approximately 60 percent of the subsurface

volume to 240 feet bgs. A gray to gray-green fine- to medium-grained sand and silty sand comprise the remaining 40 percent (Plates 2 through 7). Sedimentary structures such as laminations and cross-bedding are absent in the sands and silts. Contacts between the two materials are generally abrupt but occasionally are gradational. No significant lithological differences were observed in these two material types above and below 200 feet bgs.

The silt material was classified visually as clay in the majority of soil borings based primarily on its plastic nature. However, this material was determined to be silt with a large clay component based upon grain size analyses.

Sand zones exist as laterally continuous horizontal layers and as discontinuous layers and pods within and between the clayey silt material. These sand zones range in thickness from a few feet up to 30 feet thick. Most laterally continuous sand units are approximately 10 feet thick. The observed vertical and lateral relations of the sand and silt materials at the site are consistent with relations described for bedload channel (sand) deposits and flood basin overbank deposits (silt and clay) of a fluvial system, suggesting that the subsurface materials are the flood basin deposits described by Atwater. Bedload channel fluvial deposits typically display the following features, which are well represented in the geologic cross sections (Plates 2 through 7): channel fill is dominantly sand, channels have a high width-to-depth ratio, channels are slightly sinuous, individual channels are of uniform thickness across their width, bed accretion dominates over sediment infill, sands show irregular and poorly developed fining upward sequences, and multilateral sand channel fills commonly volumetrically exceed overbank deposits (Davis 1983). Since sand channel deposits represent a large percentage of the subsurface materials (approximately 40 percent), channels tend to overlap each other, allowing a high degree of horizontal and vertical connectivity of the sand deposits.

Some general trends regarding the occurrence of silts and sands in the subsurface are apparent. The percentage of subsurface volume occupied by sandy material is greater above an elevation of !100 feet (NVD88) than below. The sand units are well connected to !100 feet beneath the former Cellon Process Area extending to the southern boundary of the site. Silt generally predominates the subsurface materials below an elevation of approximately !180 feet and above the gravelly sand/sandy gravel unit at !240 feet elevation.

A sandy gravel/gravelly sand unit was encountered at approximately !240 feet elevation in 7 rotosonic borings and 8 borings completed under previous investigations. This unit is laterally continuous and varies in thickness from 5 to more than 20 feet thick. The gravel and sand consists primarily of quartz/quartzite, volcanic, and metamorphic lithic fragments. These lithologies are similar to those discussed in the RI report (ICF Kaiser 1998). The sandy gravel/gravelly sand was interpreted by the authors of the RI report to be part of the Laguna Formation because the observed gravel lithologies are consistent with deposits from the

Calaveras River whose drainage is composed almost entirely from metamorphic and volcanic rocks.

The bottom of the sandy gravel/gravelly sand unit was penetrated at two locations (SB-004 and SB-052) during the 1999 field work described in this report. The gravelly unit was thinnest (approximately 5 feet) at SB052. Sand and silts encountered below the gravelly unit were similar to those encountered above.

Old Mormon Slough sediments and floodplain deposits below the slough were not investigated as part of the 1999 field work described in this report. However, shallow slough sediment data from the RI of the surface water operable unit (Battelle 1996) were incorporated into the geologic cross sections developed for this report. Sediments in the slough adjacent to the McCormick and Baxter site contain stratified clay, silt, and sand. The uppermost sediments consist of 1.4 to 3.8 feet of very soft, very dark gray to black, homogeneous clayey silt with common gas holes. Battelle interpreted these sediments to have been deposited in a quiescent, stagnant water environment (i.e., the current depositional conditions) after the channel was cut off from its upstream source in 1970 when Mormon Slough was partially filled and Interstate 5 was constructed. From the western edge of the sheet pile wall along the shoreline in front of the former Oily Waste Ponds to the eastern end of the slough, the uppermost sediments in the channel are underlain by a distinctive sticky, very soft, dark-gray clay layer approximately 1.5 to 2 feet thick. This material may have come from a manmade source (e.g., related to the infilling of portions of the slough in 1970 during the construction of Interstate 5) based upon the unusual texture and color of this material. The uppermost clayey silt layer and the gray clay are underlain by a soft to firm, very dark or dark olive-gray silt with plant remains and occasional discontinuous, thin sand layers. A sharp contact with the stiffer flood basin deposits was encountered at two sediment coring locations adjacent to the site uplands. The flood basin deposits were difficult to penetrate with the coring device and may have been the point of refusal at other locations.

5.1.2 Hydrogeology

The upper 200 feet of sediments are collectively referred to as the shallow aquifer. Groundwater in this zone occurs primarily in discontinuous sand layers and lenses of fine- to coarse-grained greenish-gray sand. The sediments from 200 feet bgs to at depth of at least 1,000 feet bgs in the vicinity of Newark-Sierra Paper Corporation (NSPC), located approximately 1,500 feet southeast of the site, have been termed the deep aquifer. The deep aquifer supplies industrial water to NSPC. Before 1993, three NSPC wells pumped 2 to 3 million gallons of water per day. Only two of the wells are still operational and currently pump 400,000 to 500,00 gallons per day. The results of a survey of local supply wells conducted by the USACE Sacramento District are provided in Table 5-1.

The horizontal and vertical overlapping distribution of relatively permeable versus impermeable materials in the subsurface above an elevation of !100 feet prohibits the presence of well-defined aquifers and aquitards. At this site, it is likely that the permeable sands and gravel units above !100 feet are interconnected vertically and horizontally by some pathway. Below !100 feet elevation, sand units may not be as well connected. However, the density of lithologic data below !100 feet elevation is sparse. Additional lithologic information at depth may show connectedness of the sands similar to that observed above !100 feet elevation.

Previous site investigations have divided the subsurface into five hydrogeological sand zones designated A, B, C, D, and E (Table 5-2). At well clusters where nearby wells are screened at different depths, thick clay sequences often separate the screened "aquifer" zones. However, the elevations of these aquifer zones are not consistent across the site and are likely to be connected by overlapping channel deposits elsewhere on the site. Generally, the aquifer zones are horizontally continuous across the site (e.g., the A-zone aquifer is continuous from the Cellon process areas to the southern boundary of the site property.) The sandy zones beneath the former Cellon Process Area (SE-08) extending toward the southeastern end of the stormwater retention ponds are well connected vertically, effectively connecting the A-, B-, and C-zones in this area (Plates 2 and 5). Therefore, the aquifer zone designation applies only locally to areas of the site where the silts are laterally continuous and not vertically bisected by sand channels.

5.1.2.1 Permeability

Laboratory permeability results (Table 3-8 and Figure 5-1) for sand material samples ranged from 6 millidarcies (0.017 ft/day) to 3,000 millidarcies (8.7 ft/day). Sand aquifer hydraulic conductivity values derived from pumping test data (ICF Kaiser 1998) yielded values ranging on average from 16 to 110 feet/day. The laboratory analysis measured vertical conductivity for the samples collected by the SCAPS rig (SS samples) and composite vertical and horizontal conductivity for the rotosonic samples (SB samples). Horizontal hydraulic conductivities were generated from pumping test data. SCAPS sand samples were collected directly into a plastic sleeve that was sent to the laboratory intact. Rotosonic sand samples were disturbed and repacked at the laboratory. Vertical conductivities for geologic materials are often one or more orders of magnitude lower than horizontal conductivities because sediments are typically deposited in horizontal layers. All permeability results reported by the laboratory and calculated for the pumping tests fall within published ranges (Domenico and Schwartz 1990).

Laboratory permeability results for the silt/clay materials ranged from 0.05 millidarcy (0.0001 ft/day) to 140 millidarcies (0.39 ft/day). Clay/silt aquitard hydraulic conductivities derived from pumping test data on average ranged from 0.0053 to 0.060 ft/day. The results of three samples classified as clay/silt have measured permeabilities (Figure 5-1) significantly higher than other measured permeabilities for clay/silt material. All three samples were collected using the SCAPS sampling tool. The SCAPS permeability samples are in a clear plastic sleeve when

brought to the surface, but can be difficult to describe accurately if silts and clays are smeared along the inside of the sleeve. Thus, sandy layers could be concealed and/or unnoticed in the visual soil description. Sample SS079-63.9-65 was described as having sand stringers, which could account for the high measured permeability. Sample SS093-25-26.7 was described as a sandy clay. The sand fraction may account for the higher permeability relative to the majority of clay/silt samples. Fractures were not observed in any of the silt samples collected.

All laboratory permeability results for clay/silt material were measured on intact, vertical samples. Pumping test hydraulic conductivity values were slightly higher than laboratory values. Pumping test vertical hydraulic conductivity calculations incorporate the sandy layers present between main aquifer zones and are thus biased high. All laboratory and pumping test values for hydraulic conductivity were within published ranges for clay and silt.

The E-zone gravel laboratory permeability measurements were 29 millidarcies (0.08 ft/day) and 240 millidarcies (0.70 ft/day). E-zone hydraulic conductivities derived from pumping test data averaged 130 ft/day. The laboratory samples were disturbed and repacked, which may account for part of the significant difference in results between the two methods. Laboratory results are low when compared to published values for gravel.

5.1.2.2 Water Quality

Groundwater beneath the site is generally of poor quality due primarily to high dissolved chloride concentrations (greater than 300 mg/L). From 1953 to 1963, the eastward edge of the 300-mg/L chloride contour migrated from approximately 0.5 mile east of the site to 1.0 mile east of the site (DWR 1967). Measured chloride concentrations in groundwater used by DWR to produce the 300-mg/L contour were mostly from wells deeper than 150 feet bgs. DWR noted that the delta within San Joaquin County generally contains groundwater of undesirable mineral quality throughout its entire surface area and from just below ground surface to the base of unconsolidated sediments. The few exceptions were local lenses of fresh water supplied from seepage from the delta channels and areas in the northwest portion of the county where surplus surface water and groundwater from the Mokelumne River system flushed out poor quality groundwater. The origin of the inferior quality groundwater was unknown but two possible sources were considered to be the most likely. Poor quality water may have accumulated in the trough of the valley and subsequently moved northward or was squeezed out of the trough by higher water levels or pressure from the south. Alternatively, poor quality water could be derived from rising saline connate water deposited with the deltaic sediments.

Chloride concentrations measured in monitoring wells sampled in July 1999 averaged 230, 180, 280, 310, and 550 mg/L in the A-, B-, C-, D- and E-zone wells, respectively. Based on these limited data, chloride concentrations appear to increase with depth at the site. A rapid increase in chloride occurs between the D- and E-zones. The abrupt increase in chloride (based on one data

point in the E-zone) provides evidence that groundwater in the E-zone is derived from a source that is different from that above the E-zone. Hence, the concept of an upper aquifer above !180 feet elevation and a lower aquifer below !180 feet elevation appears to be justified.

5.1.2.3 Tidal Influences

To evaluate the extent to which tidal fluctuations in Old Mormon Slough affect groundwater levels at the site, a tidal influence study was conducted for the A-zone aquifer in 1995. The results of the study concluded that there was insufficient response in water levels to show the effects of tidal ranges, and tidal effects were likely masked by daily changes in barometric pressure.

5.1.2.4 Groundwater Flow

The horizontal component of groundwater flow at the site is southeastward in the A-zone, turning gradually to the east-northeast with depth. An east-northeast E-zone flow direction is consistent with historical regional groundwater data (DWR 1967; ICF Kaiser 1998) that show a large groundwater cone of depression due to groundwater pumping centered over the central portion of the City of Stockton. The calculated horizontal velocities of groundwater in the A-, B-, C-, D- and E-zone sand units are 0.23, 0.20, 0.24, 0.048, and 0.29 ft/day, respectively. The vertical gradient of flow is downward between all aquifer zones, with a few limited exceptions of upward flow from the C- to B-zone. The calculated vertical groundwater flow velocities between aquifer zones A and B, B and C, C and D, and D and E are 0.00011, 0.000026, 0.000023, and 0.000063 ft/day, respectively. Calculated vertical groundwater flow velocities are three to four orders of magnitude less than horizontal groundwater velocities. Therefore, the predominant direction of groundwater flow and dissolved-phase contaminant transport is horizontal within sand zones. Vertical flow velocities were calculated assuming average thicknesses of silt and sand materials observed between clustered well screens. Vertical velocities are likely higher in areas where sand units have a strong vertical connection.

The southeasterly flow of groundwater within the A- through D-zones suggests that groundwater recharge of the upper aquifer is from the northwest and/or local pumping of the upper aquifer is to the southeast. The Stockton deepwater channel is north of the site, and the main channel of the San Joaquin River is west of the site. These are likely groundwater recharge sources for the upper aquifer.

Four lines of evidence suggest that Old Mormon Slough has a poor hydrogeologic connection to the upper aquifer. Groundwater elevations in A-zone wells are typically above water elevations in Old Mormon Slough. The A-zone groundwater gradient does not deflect or alter near the slough. Tidal fluctuations of up to 4 feet induced minimal response in A-zone wells (ICF Kaiser 1998). The bottom of the slough is blanketed with fine sediments that are likely to have low

permeability. Therefore, Old Mormon Slough does not have a strong hydraulic connection to the A-zone aquifer and is likely to contribute little if any water to the upper aquifer. Old Mormon Slough may contribute some water to the upper aquifer at the extreme northwest corner of the site in the vicinity of wells A-1 and A-10. The A-zone gradient near wells A-1 and A-10 is deflected from its average southeast trend and is roughly parallel to the slough (Figures 3-3 and 3-8), indicating that flow is from the north. Dredging of the slough in this area in 1987 may have opened a connection between the slough and the A-zone sands.

There is an apparent mounding of groundwater in the B-zone in the vicinity of wells ONS-2B and OFS-1B (Figures 3-4 and 3-9). Both of these wells are screened within thin sand zones surrounded by a thick continuous sequence of silt. It is possible that ONS-2B and OFS-1B are screened within sand zones that are separated by silt from the sands at the other B-zone wells. Water elevation measurements from ONS-2B and OFS-1B may, therefore, not respond to groundwater pressure changes at the same time as the other B-zone wells. The reason for the upward groundwater flow gradient between the B- and C-zones is not known, but may be related to the apparently poorly connected B-zone sands.

5.1.3 Physical Properties of NAPL

The NAPL density and viscosity data are summarized in Table 5-3. The density and dynamic viscosity results are similar (i.e., less than 10 percent relative percent difference) to measurements that were reported in the RI, as shown in Table 5-4.

5.1.3.1 NAPL Density

NAPL density data are presented in Table 3-20. All product samples were DNAPLs when collected at ambient temperatures, although the measured densities are very similar to water. At each temperature, three measurements were made and good reproducibility of the measurements was demonstrated. Measurements were made of duplicate samples from wells A-10 and ONS-1B. Although the data from the two samples from ONS-1B agreed well, the original set of density measurements made on the sample and duplicate from well A-10 showed significant differences. The density of both samples was remeasured, and the remeasured density for the A-10 sample is in very good agreement. For the duplicate sample, a lower density—closer to that of the A-10 sample—was measured. However, the average density found here is still statistically different from the A-10 sample measurements.

Density as a function of temperature is of interest in thermal remediation evaluations to determine whether further downward migration of DNAPL may be reduced or eliminated by making the DNAPL lighter than water at the same temperature. The data show that the product in DSW-6B may become an LNAPL at temperatures as low as 20°C, whereas the product in

A-10 will become an LNAPL at temperatures around 30°C. However, the product in ONS-1B will not become lighter than water even at temperatures as high as 90°C.

The average density curves for A-10, DSW-6B, and ONS-1B are presented in Figure 5-2.

5.1.3.2 NAPL Viscosity

NAPL viscosity data are presented in Table 3-21. At ambient temperatures, creosote generally has an approximate viscosity of 20 to 45 cP, and thus the product samples collected at the McCormick and Baxter site mostly cover the expected range for creosote. These viscosities mean that the NAPL would flow at rates 10 to 35 times less than the flow of water under the same gradient. However, the viscosity decreases exponentially as the temperature increases, and at temperatures approaching steam temperatures, the mobility of these NAPLs is increased by approximately a factor of 10. This increased mobility will aid NAPL recovery as a liquid during thermal remediation.

The average viscosity curves for A-10, DSW-6B, and ONS-1B are presented in Figure 5-3.

5.1.3.3 NAPL Boiling Point Distribution/Distillation

Based on the boiling point distillation data presented in Table 3-22, the NAPL recovered from A-10 consists of a mixture of hydrocarbons heavier than those from ONS-1B or DSW-6B. A-10 fractions separated at consistently higher temperatures than either ONS-1B or DSW-6B fractions. ONS-1B and DSW-6B distilled at the same temperatures between the zero to 30 percent volume fractions. Between 30 and 95 percent volumes, DSW-6B fractioned at lower temperatures, but was similar to ONS-1B between 95 and 100 percent distillation. The data also suggest that the DSW-6B NAPL contains the lightest molecular weight hydrocarbon mixture.

The boiling point distribution/distillation data are presented in Figure 5-4.

5.1.3.4 NAPL Saturation

NAPL soil saturation results were presented in Table 3-23. Hydrocarbon saturation ranged from less than 0.1 percent in SB-099 (13.4 to 14.7 feet bgs) and SB-028 (48 to 49.7 feet bgs), described at that depth as a clay with odor and a sand with sheen, respectively, to 77.0 percent in SB-099 (31 to 33 feet bgs), described at that depth as a sand with mobile NAPL.

5.1.3.5 NAPL Wettability

These data will be included in the Treatability Study Report.

5.1.3.6 NAPL Solubility

These data will be included in the Treatability Study Report.

5.1.3.7 NAPL Oil-Water Interfacial Tension

These data will be included in the Treatability Study Report.

5.2 CONTAMINATION SOURCE AREAS

5.2.1 Petroleum Hydrocarbon Product Type Identification and Location

The type of petroleum hydrocarbon contamination found in various areas of the site was identified as a factor that would have to be considered during conceptual design of an in situ thermal treatment system. To determine what different petroleum product types are present at the site, EPA Region 9 FASP laboratory TPH-Dx analysis chromatograms were reviewed. The TPH-Dx method is applicable for the identification of semivolatile petroleum products by pattern matching (or "fingerprinting"). Specific petroleum products (e.g., diesel fuel, creosote, hydraulic oil, lube oil) can be identified by comparing chromatograms from site samples to those of "pure" product standards. Often a laboratory will run a series of different "pure" products for this purpose. For this project, the FASP laboratory analyzed three standards:

- Florida TRPH standard (a mixture of even-numbered alkanes from C_6 to C_{40})
- XHc diesel fuel No. 2 composite standard
- Creosote

If specific product types cannot be identified from comparisons to available standard chromatograms, patterns may still be observed that represent other unidentified product types or even naturally occurring organic materials. Unidentified patterns can be compared to each other and grouped to help characterize the site.

Laboratory TPH-Dx chromatograms for the SCAPS soil samples (approximately 80 samples) were reviewed. The TPH-Dx chromatograms for the soil boring samples were not available for review (approximately 400 samples). Five distinct patterns were observed (identified as A through E). Representative chromatograms and locations where these patterns were observed in samples collected from the site are shown in Plate 19. To confirm the results of the chromatogram review, laboratory results for SVOC, TRPH, TPH-Dx, and LIF were also reviewed. Laboratory results are listed in Table 5-5 for five representative samples. Results of this evaluation are summarized below.

Product type A was observed only in samples collected from location SE-43. The same pattern was observed in all samples collected from this location with positive TPH-Dx results. The petroleum pattern did not match that for diesel fuel or creosote and could not be identified. PAHs and PCP were not detected in samples collected from this location.

Product type B was observed only in samples collected from location SE-47. The same pattern was observed in all samples collected from this location with positive TPH-Dx results. The petroleum pattern did not match that for diesel fuel or creosote and could not be identified. PCP and low concentrations of PAHs were detected in samples from this location. Based on review of PAH/PCP chemical analysis results, this product type may be the carrier for PCP. PCP and a mixture of this product type pattern and product type D were observed in samples collected from location SE-88. PCP was also reported for many other samples in association with positive TPH-Dx results; however, without TPH-Dx chromatograms to review, product type identification cannot be confirmed (see Section 5.2.2).

Product types C and D were observed in numerous samples collected from the site. These two petroleum patterns are almost identical except for an unidentified peak (compound) present in product type D and not in product type C. The compound appears near C_{10}. Other than this difference, the patterns are very similar. Both product types contain numerous PAHs, including naphthalene, and closely resemble the pattern of the creosote standard. PCP was detected in approximately 20 percent of these samples.

Product type E was observed only in samples collected from location SE-28. The same pattern was observed in the two samples collected from this location with positive TPH-Dx results. The petroleum pattern did not match that for diesel fuel or creosote and could not be identified. PAHs and PCP were not detected in samples collected from this location.

5.2.2 Comparison of PAH/PCP Chemistry Across the Site

To determine what different petroleum product types are present at the site, an initial review of FASP laboratory TPH-Dx chromatograms was performed as described in Section 5.2.1. Product types A through E were identified. To extend this evaluation, EPA Region 9 laboratory PAH/PCP chemical analysis results were reviewed along with the FASP laboratory TPH-Dx chemical analysis results (including chromatograms) and the SCAPS LIF profiles. Results for approximately 375 soil samples analyzed for PAH/PCP were reviewed. Data for PCP, naphthalene, TPH-Dx, total PAH, and total cPAH were sorted by location and reviewed to identify additional locations across the site where the petroleum product types identified during the TPH-Dx chromatogram review are present. Only samples with positive results were maintained for the evaluation, resulting in a review of 128 samples collected from 26 locations.

During the review, characteristics of the different product types (e.g., distinct chromatographic pattern, presence of PCP, presence of PAH) were identified. Characteristics of the different product types are summarized in Table 5-6.

Using these characteristics as a guide, product types were assigned to sampling results. Samples with TPH-Dx chromatograms available for review have a higher level of confidence than samples without TPH-Dx chromatograms because pattern recognition is a better tool for petroleum product identification than chemistry results alone. Available SCAPS LIF profiles were reviewed as a final check on product type assignments; however, SCAPS profiles are useful only in identifying product types containing PAH. Distinct SCAPS LIF profiles were identified for products with fluorescing compounds (e.g., PAH), including product types A, C, and D. No distinct LIF patterns were evident for product types B and E. Product types B and E may contain PAH but at concentrations less than the sensitivity of the LIF method.

Product type assignments and supporting chemistry results are summarized in Table 5-7 for samples included in this evaluation. Product types assigned from review of TPH-Dx chromatograms are shown in bold.

5.2.3 NAPL Chemical Description

DNAPL was collected from ONS-1B, A-10, and DSW-6B and analyzed for petroleum hydrocarbons and SVOCs. Although LNAPL was measurable in some wells (i.e., A-8, ONS-1C, DSW-4B), the volume was insufficient for sampling. The product samples collected from A-10 and DSW-6B were emulsions that could not be separated in the field. The TPH-Dx analysis includes all organic compounds that fall into the C_{10} to C_{24} molecular weight range. The modified EPA Method 8015 used for the TPH-Dx analysis includes PAHs. The reported TPH concentration ranged from 916,000 ppm in ONS-1B to 131,000 ppm in DSW-6B. Presumably, the balance of these product samples would have been made up of shorter chain (less than C_{10}), lighter weight hydrocarbons and/or water. TPH chromatograms were not reviewed to identify specific product types.

SVOCs were detected in percent levels at each sampling location. Naphthalene was detected in concentrations that ranged from 130,000 ppm to 32,000 ppm in ONS-1B and DSW-6B, respectively. After naphthalene, the most abundant PAH is phenanthrene. Sample ONS-1B contained 33 percent PAHs.

Pentachlorophenol was detected in A-10 only (at 1,800 ppm). This finding is in agreement with the groundwater monitoring results, which indicate that PCP is found primarily in the A-zone.

All SVOCs included in the project target analyte list were detected in samples submitted for analysis. All NAPL samples contained a substantial portion of miscellaneous hydrocarbons that

were not identified. These likely derive from the various fuel oils and other petroleum products used as carriers in the original PCP and creosote mixtures. NAPL sampling results are presented in Section 3.9.1. Results from the 1999 NAPL sampling effort are consistent with NAPL data collected in 1997 (ICF Kaiser 1998).

5.2.4 Dioxin and Metals Extent of Contamination

2,3,7,8-TCDD TECs generally decreased with depth; however, the vertical extent of the dioxin contamination was not defined. Significant TECs were calculated at SB-008 (923,750 ng/kg 2,3,7,8-TCDD), where PCP crystals were detected on the ground surface, and at SB-057 (25, 207 ng/kg 2,3,7,8-TCDD) at 2.7 to 3 feet bgs. SE-008 is also located in an area where Cellon process activities occurred, and SB-057 is located directly in the Cellon process area. This contamination, as well as that at SB-028, likely occurs as a result of the NAPL contamination (as a function of the PCP dissolved in the creosote) detected in these areas; however, NAPL was not analyzed for dioxins and furans.

Chlorinated dioxin and furan congeners were detected at concentrations greater than 1,000 ng/kg in each sample collected. These concentrations were greatest in the shallowest depth interval sampled and generally decreased with depth, except at SB-057 (53.3 to 55 feet bgs) where all congener concentrations increased compared to the previous depth interval. Significant increases in concentration from the 48 to 49.7-foot depth interval to the 53.3- to 55-foot depth interval included 1,2,3,4,7,8-hexachlorodibenzofuran from undetected to 92 ng/kg, respectively; 1,2,3,4,6,7,8-heptachlorodibenzofuran from 450 to 1,600 ng/kg, respectively; octachlorodibenzofuran from 2,000 to 3,800 ng/kg, respectively; 1,2,3,6,7,8-hexachlorodibenzodioxin from 39 to 140 ng/kg, respectively; 1,2,3,4,6,7,8-heptachlorodibenzodioxin from 1,200 to 3,000 ng/kg, respectively; and octachlorodibenzodioxin from 7,000 to 27,000 ng/kg, respectively.

Insufficient data were collected to determine whether the pattern of dioxin/furan contamination occurring in the soil is the same as that detected in the groundwater at DSW-4 and DSW-6.

Metals (i.e., arsenic, chromium, copper, and zinc) were at detected fairly constant concentrations in each depth interval analyzed. The highest concentrations of each metal occurred in SB057 (2.7 to 3 feet bgs) where total PAH (TPAH) was low (i.e., 170) and TPH concentration was 2,200 mg/kg, which was not the highest concentration detected in the borehole.

Trends in metals (i.e., arsenic, chromium, copper, and zinc) concentrations were compared to trends in TPAH and TPH concentrations in each depth interval. Increases and decreases in metals concentrations are not equal to the magnitude of increases and decreases in TPAH and TPH concentrations. Trends (i.e., increases and decreases in concentrations) in arsenic concentrations are less frequently consistent with the trend in TPAH and TPH concentrations

than copper, chromium, and zinc. Chromium concentrations—more frequently than arsenic, copper, and zinc—exhibit the same concentration trend as those in TPAH and TPH concentrations. Further, some concentrations decreased in depth intervals where significant TPAH (i.e., 1,960 mg/kg) and TPH (i.e., 2,600 mg/kg) concentrations were detected. The data set collected is not sufficient to make a statistical determination of the concentration trend correlation between metals and PAH and TPH.

5.2.5 Source Area Description

The SCAPS LIF data were input into GMS to develop a three-dimensional representation of the site's contaminant profile, which can be found in the SCAPS investigation report (USACE 1999b). Since the LIF sampling frequency decreases significantly below depths of 120 feet bgs, the representation of the contaminant profile at depths greater than 120 feet bgs is incomplete. The shallowest zone of contamination was seen at less than 10 feet bgs, beneath the asphalt cap and in the former Oily Waste Pond area near SE-086, SE-087, and SE-088. The deepest zone of contamination was found in SB-06 (160 to 163 feet bgs) and SB-99 (210 to 215 feet bgs). The most widespread contamination was found in the 52.5- to 64.5-foot bgs interval across the site. NAPL contamination is suggested in limited, deep, isolated stringers at locations east of SE-79 (50 to 60 and 80 to 80.5 feet bgs) and in off-site areas southeast of the DSW-4 wells (75 to 140 feet bgs) and south of SE-97 (87 to 90, 90 to 95, and 100 to 102 feet bgs).

The SCAPS LIF data, observations made in the field, and the soil data suggest three primary NAPL source areas: (1) former Oily Waste Ponds Area, (2) Cellon Process Area, and (3) Main Processing Area. The data also suggest that NAPL has and continues to migrate away from these source areas, extending downward as well as outward to the south, west, and east. It also appears that the NAPL may also be migrating north of the property boundary, although no LIF data are available for locations north of the source areas.

PCP was detected in SCAPS soil samples collected at SE-05, SE-02, SE-08, SE-20, SE-88, SE-79, and SE-47. PCP was detected in rotosonic soil boring samples collected from SB-027, SB-028, SB-047, SB-057, SB-084, SB-086, and SB-099. Interestingly, some of the soil samples collected, such as SB-027, had reportable concentrations of PCP while PAHs and TPH-D were not detected. Soil PCP contamination appears to be associated with all three source areas. Crystals of almost pure PCP were found in a surface soil sample (EP-01) collected near SE-08. The Cellon process that took place in this area involved the use of PCP, butane, and ether.

Two unique near-surface (less than 30 feet bgs) source areas were identified near the entrance to the site at SE-43 and SE-47. The petroleum pattern in samples collected at these locations did not match that for diesel fuel or creosote and could not be identified.

5.3 OCCURRENCE OF NAPL

NAPL has been visually observed in soil borings as a brown to black liquid with strong naphthalene odor. NAPL saturation observed in soil cores has ranged from oozing and/or dripping product to brown stains and/or sheen. Dripping/oozing product was most commonly observed in sandy materials but also occurred in silt to a limited extent. The presence of NAPL in the subsurface has also been interpreted from SCAPS LIF data. NAPL is present within both the sand and silt materials identified in the subsurface. However, NAPL was observed more often in sand materials than in silt, and sandy material tended to be uniformly saturated with product in soil cores. NAPL within the clayey silt material was usually observed as discontinuous blobs of NAPL or as thin, vertically oriented NAPL stringers.

The shaded region shown in Plates 2 through 7 represents the subsurface volumes interpreted to contain NAPL. NAPL within the shaded region may occur as mobile NAPL, residual NAPL, pools of DNAPL on low-permeability silt, or thin, vertically discontinuous fingers/stringers. DNAPL may not be present everywhere within the shaded regions. The outer boundary of the shaded region represents the likely maximum extent of NAPL in the subsurface where the vertical and horizontal data density is adequate to define the extent of NAPL. The data density above approximately !100 feet elevation is high and the maximum extent of NAPL above this elevation is well characterized. Below !100 feet elevation, data are relatively sparse. Therefore, NAPL pathways and the maximum horizontal and vertical extent of NAPL below !100 feet elevation are less certain.

The interpreted maximum horizontal extent of NAPL in the subsurface is shown as a solid and dashed line in Figures 5-5 through 5-8. The dashed portion of the boundary indicates areas where NAPL is present but beyond which only limited data are available. Data are insufficient to determine whether NAPL extends beyond the property line at the dashed locations.

5.3.1 Vadose Zone

NAPL, which was presumably released at or near the surface, has moved down through the clayey silt material that comprises the upper 20 to 30 feet of the subsurface. The water table was present within this uppermost clayey silt layer in April and July of 1999. The water table was lower during past measurement events and may have intersected the A-zone sands. The clayey silt layer clearly does not act as an effective barrier to vertical NAPL migration. The dominant direction of NAPL migration within the vadose zone is downward based upon the lack of vadose zone NAPL at locations other than near the suspected source areas.

The majority of NAPL has migrated below the water table as DNAPL. However, NAPL appears to extend along the present water table from the blacktop area southeast to SE-94 (Plate 7). A

large tank was located directly east of SE-94, and it is possible that a spill occurred near or from this tank. NAPL from a spill associated with this tank may not have penetrated deeply.

The shallowest occurrences of NAPL in the vadose zone are beneath the former Oily Waste Ponds Area, the Cellon Process Area, and the asphalt cap that covers the former Main Processing Area (Figure 5-5). The largest net thicknesses of NAPL (Figure 5-8) are also in these three areas. Based upon the presence of vadose zone NAPL and the net thickness of NAPL beneath these areas, these three areas are the most likely source areas of NAPL contamination in the subsurface.

5.3.2 Saturated Zone

DNAPL has migrated from the water table to a maximum observed depth of 212 feet bgs (approximately !200 feet elevation). DNAPL is interpreted as having migrated in the saturated zone by moving vertically through permeable sand units, spreading laterally in sands on top of sloping low-permeability silts, pooling on low-permeability silts, and migrating vertically through silts.

The manner by which DNAPL is able to move through the relatively impermeable silts is not known. DNAPL was observed to be present in the silts as discontinuous blobs of NAPL and as thin vertically oriented stringers. Fractures were looked for, but were not confirmed in any soil cores in any borings. Apparently, the NAPL is able to move through the pore space within the silts.

DNAPL has migrated downward and to the south from the Oily Waste Ponds/Cellon Process Area to a maximum observed depth of 100 feet at the southern boundary of the site and to a depth of 130 feet in the vicinity of SE–61 (Plate 6 and Figures 5-5 and 5-6). The deepest observed occurrence of DNAPL is beneath the Main Processing Area (SB-099) at 212 feet bgs. The Main Processing Area is also a suspected NAPL source area, and vertical migration in this area has been dramatic. DNAPL is interpreted to have moved vertically through multiple low-permeability silt layers (Plates 4 and 7). DNAPL has also migrated laterally and downward from the Main Processing Area toward the southeast (SE-93) and the UPRR property line (as approximated from parcel maps) and toward the south to the southern boundary of the McCormick and Baxter property near the main gate (Plates 4 and 7).
DNAPL may have migrated beyond any or all of the dashed portions of the NAPL boundary shown in Figure 5-5. DNAPL along Old Mormon Slough is present at shallow elevations ranging from 8 feet elevation to !45 feet elevation. Deeper DNAPL is also present adjacent to the slough in the vicinity of the Main Processing Area from elevations as deep as !60 to !160 feet. Thus, DNAPL could have migrated under the slough to the north along a broad margin and at various depths. DNAPL could potentially have migrated onto the UPRR property east of SE-79 and SE-93 at elevations of !40 to !70 feet. DNAPL may also have migrated past

the southern property boundary at the main gate and the southeast corner of the stormwater retention ponds at elevations ranging from !50 to !100 feet and !80 to !90 feet, respectively.

5.3.3 Volume Estimates

NAPL occurrence data, compiled from this investigation and previous subsurface exploration efforts, was used to map product distribution and estimate site-wide NAPL volumes. The elevations at which NAPL was detected in a boring or SCAPS push are listed in Table 5-5. The shallowest depth NAPL was encountered at each location is given in the "top NAPL" column in Table 5-8. These depths were chosen on the basis of significant staining or sheen, free-product visual observation, chemical analyses, and/or LIF response. The deepest point at each location where NAPL was encountered is shown in the "base max NAPL" column. If a particular sampling location did not reach a depth comparable to nearby locations with observed NAPL at that depth or greater, this location was not used for analysis. The total number of feet at each subsurface location interpreted to contain NAPL is shown in the "net NAPL" column. The net thickness of NAPL is not necessarily equal to the distance between the top of NAPL and the bottom of NAPL at any individual location because intervals of non-NAPL contaminated soil were often encountered between the top and bottom of observed NAPL. All NAPL surfaces are truncated where areas of NAPL contamination intersect site boundaries because off-site data are limited to widely spaced monitoring wells.

The data in Table 5-8 were used to create the surface plots shown in Figures 5-5 through 5-8. The top of NAPL contours (Figure 5-5) represent the highest elevations where NAPL was observed in the subsurface across the site. The surface contours in Figure 5-6 represent the deepest on-site elevations of NAPL encountered in the subsurface. The volume of space between the two surfaces is approximately 23,000,000 ft^3 (850,000 yd^3). Therefore, the total volume of space that exists between the shallowest and deepest known occurrences of NAPL is 23,000,000 ft^3.

A third surface (Figure 5-7) was created to represent the base of NAPL at an elevation of !100 feet and above. Data suggest that the bulk of the NAPL is present above !100 feet elevation. NAPL below this elevation is apparently present in small quantities and occurs in thin, hard-to-locate stringers. The volume of space between the surfaces shown in Figures 5-5 and 5-7 is approximately 20,000,000 ft^3 (740,000 yd^3). Therefore, the total volume of space that exists between the shallowest known occurrences of NAPL and an elevation of –100 feet is 20,000,000 ft^3.

The thickness of NAPL-contaminated soil at each boring/push was determined by adding together the intervals of observed and interpreted NAPL at each sampled location to derive a net total thickness at each location. The net thickness, therefore, is not necessarily equal to the distance between the top and bottom of observed NAPL an any particular location. Figure 5-8 is

an interpreted contouring of the net interpreted soil containing NAPL. The net thickness of NAPL is useful in order to estimate the volume of NAPL present in the subsurface because only portions of the subsurface that contain NAPL are used in the calculation. The volume of soil contaminated with NAPL represented by the net thickness map is approximately 6,000,000 ft^3 (220,000 yd^3). Assuming a porosity of 0.35 and values of NAPL saturation in the pore space of 1 percent and 10 percent (the approximate range of NAPL saturation data presented in Table 3-23), yields a volume of NAPL in the subsurface of 160,000 and 1,600,000 gallons, respectively.

5.4 DESCRIPTION OF GROUNDWATER CONTAMINATION

Naphthalene, PAHs, dioxins, PCP, and arsenic were identified as indicator chemicals of the extent of dissolved-phase groundwater contamination in the RI report (ICF Kaiser 1998). Of these chemicals, naphthalene, PCP, and dioxins were targeted for analysis during the July 1999 sampling event.

5.4.1 Changes From 1998 Data

NAPL has been present at some time either as an unmeasurable oily film or as significant DNAPL in five of the wells sampled in July 1999. The presence or absence of NAPL in a well is likely to have a large influence on the concentration of dissolved-phase contaminants in the groundwater. Prior to the July 1999 sampling round, wells were sampled by purging three well volumes at a high rate (approximately 15 gpm). In July 1999, wells were sampled using the low-flow sampling method with flow rates approximately 0.5 gpm. NAPL may be less likely to be entrained with groundwater when the low-flow procedure is used. Therefore, it is possible that previous sampling chemical results may have been biased high when NAPL was present in the well.

5.4.1.1 Naphthalene

Dissolved-phase naphthalene concentration changes were generally insignificant between 1998 and 1999 and between 1999 and earlier dates. Naphthalene concentrations were significantly different in two wells, A-8 and DSW-6C. Naphthalene was much lower in well A-8 than in the recent past but was about equal to the lowest value measured since monitoring began. Because well A-8 is located in a zone known to be contaminated with NAPL, large variations in naphthalene concentrations are expected. Concentrations of naphthalene in well DSW-6C rose sharply from 1998 to 1999. This sharp increase could be due to downward NAPL migration from the B- to the C-zone or lateral migration of NAPL in this area.

5.4.1.2 PCP

Dissolved-phase PCP concentration changes were generally insignificant between 1998 and 1999 and between 1999 and earlier dates. PCP concentrations changed significantly only in well A-5, where PCP concentrations decreased from 1998 levels. PCP concentrations have decreased steadily in this well since monitoring began.

5.4.1.3 TCDD TEC

TCDD TEC concentrations in well A-5 decreased significantly from 1997 to 1999. An oily sheen was noted on the purge water surface during sampling in 1997, and no NAPL was noted in 1999. The TCDD TEC concentration in well DSW-4B increased sharply from 1998 to 1999, but the 1999 value was still well below the peak values of 1996 and 1997. DNAPL and LNAPL were measurable in the well during 1997, and an oily film of LNAPL was noted in July 1999. The TCDD TEC concentration in well DSW-4C has decreased significantly since 1996 when NAPL was present in the well. No NAPL was noted in 1999. TCDD TEC concentrations in well DSW-6B were much lower in 1999 than in 1996 and 1997. Well DSW-6C has had measurable NAPL in all three events. Six well volumes were purged from well DSW-6C during the RI. Excessive pumping may have entrained NAPL with the groundwater sample. The TCDD TEC concentration in wells DSW-6C, OFS-3B and DSW-4D did not change significantly.

5.4.2 Summary of Extent of Groundwater Contamination

The extent of dissolved-phase contamination was investigated and discussed in the RI report (ICF Kaiser 1998). The RI conclusions regarding groundwater contamination are summarized here, and the results of groundwater analyses for naphthalene, PCP, and TCDD TEC are summarized with the interpreted groundwater elevation contours for April 1999 in Plates 8 through 18. The April 1999 groundwater elevation data are presented with groundwater concentration data. Since the groundwater gradients and flow directions have not changed significantly with time or season, the April 1999 groundwater elevation contours are representative of steady-state conditions at the site. Conclusions from the RI were reinterpreted to account for new information regarding the presence of NAPL in the subsurface and new groundwater concentration data.

5.4.2.1 Naphthalene

Naphthalene is present dissolved in groundwater in aquifer zones A through E. In A-zone wells, significant concentrations of naphthalene are only in wells known to contain NAPL (A-8, ONS-2A, and A-10) or in areas where NAPL is interpreted to be present or nearby in the A-zone (ONS-2A) based upon the results of this 1999 investigation (Plate 8). Naphthalene

concentrations at wells located within the interpreted volume of NAPL, or near NAPL-contaminated wells, are within or above the effective solubility concentrations calculated for naphthalene in the RI (6,000 to 15,000 µg/L). One exception to this trend is well A-1, which is upgradient of all known source areas and had high (90 to 170 µg/L) concentrations in the late 1980s, but has otherwise had concentrations that were nondetected or less than 10 µg/L. It is possible that dredging of the slough in 1987 opened a temporary hydraulic connection between the slough and the A-zone sands, allowing a slug of naphthalene-contaminated water to flow through well A-1.

A-zone wells located outside, but immediately downgradient, of the A-zone area containing NAPL have low to nondetected levels of dissolved-phase naphthalene. This suggests that naphthalene has not traveled far ahead of the NAPL plume in the A-zone at significant levels or that A-zone wells downgradient of NAPL are not hydraulically connected to NAPL-contaminated soils. Assuming that hydrophobic sorption of is the primary mechanism controlling the movement of dissolved phase naphthalene in groundwater, a retardation factor relating the velocity of naphthalene transport to the velocity of groundwater flow can be calculated using the following formulae:

$$K_d = K_{oc} \times f_{oc}$$
$$\rho_s = \rho_b/(1-n)$$
$$R_f = 1 + ((1-n)/n) \times \rho_s \times K_d$$

Where K_d is the distribution coefficient, K_{oc} is the partition coefficient of a compound between organic carbon and water, f_{oc} is the weight fraction of organic carbon, ρ_s is the density of the minerals comprising the soil, ρ_b is the bulk density of the soil, n is the soil porosity, and R_f is the retardation factor relating the velocity of the contaminant to the velocity of groundwater. Using a literature-derived value of 933 for K_{oc} (Battelle 1996) and an f_{oc} of 0.001 yields a K_d of 0.93 for naphthalene. Site-specific f_{oc} data were not used because site f_{oc} values were generally less than 0.1 percent. The retardation model used is useful only for values of f_{oc} of 0.1 percent or higher; therefore, 0.l percent was used as the minimum value. Using a ρ_b of 1.71 g/cc (calculated from site specific data) and a porosity of 0.38 yields a R_f of 5.15 for naphthalene. Therefore, naphthalene is anticipated to migrate at one-fifth the velocity of groundwater. Assuming that groundwater velocity in the A-zone sand unit is 0.2 ft/day and that 45 years have elapsed since contamination entered the groundwater, yields a maximum travel distance of 640 feet for naphthalene. However, down-gradient wells that are within 640 feet of known source areas (e.g., A-4, A-5, A-6 and A-7) have measured naphthalene concentrations that are low (less than 30 µg/L or not detected). Dispersion alone is unlikely to account for the low concentrations observed ahead of the NAPL plume. Therefore, some other mechanism (e.g., biodegradation) may be responsible for the lack of significant dissolved-phase contamination ahead of the NAPL plume.

Four B-zone wells (ONS-1B, DSW-4B, DSW-5B, and DSW-6B) have naphthalene concentrations near, within, or above the range of effective solubility for naphthalene calculated in the RI (Plate 9). All four of these wells are screened within the area interpreted to have NAPL in the B-zone and/or NAPL has been detected in the well. As with the A-zone, B-zone dissolved-phase naphthalene concentrations downgradient of interpreted B-zone NAPL contamination are nondetected or are low (less than 10 µg/L). Naphthalene concentrations in well ONS-2B are also low to nondetected suggesting that dissolved-phase naphthalene has not migrated vertically ahead of the DNAPL and/or that the B-zone is not hydraulically connected to the A-zone in the vicinity of the ONS-2 wells.

Three C-zone wells (ONS-1C, DSW-1C, and DSW-4C) have naphthalene concentrations near, within, or above the RI calculated effective solubility range (Plate 10). Wells ONS-1C and DSW-4C are screened within the interpreted NAPL contaminated area of the C-zone. Well DSW-1C is not located within the area interpreted to be contaminated with NAPL. It is possible that NAPL may be present at or near this well. SCAPS information is not available for this depth, but C-zone NAPL contamination is present beneath the asphalt cap. NAPL could have migrated from beneath the asphalt cap to well DSW-1C and would not have been detected by the 1999 NAPL investigation. As with the A- and B-zones, wells downgradient of known C-zone NAPL contamination generally have low or nondetected naphthalene concentrations. Two exceptions are wells DSW-6C and ONS-2C. In well DSW-6C, naphthalene concentrations are now 800 µg/L and have been generally increasing with time. NAPL contamination from the B-zone may be migrating downward to the C-zone. Naphthalene concentrations in well ONS-2C have been moderate (17 to 26 µg/L). No NAPL has been interpreted to be present in the C-zone near this well. However, LIF response was noted at SCAPS locations SE22 and SE60 at depths that fall between the B- and C-zones. The LIF response was at or below the 300 count limit at both locations at the suspect depths, so NAPL was interpreted to not be present. It is possible that a thin stringer of NAPL may have moved down to between the B- and C-zones (80 to 90 feet bgs) in this area.

Two D-zone wells (DSW-1D and OFS-4D) have naphthalene concentrations near, within, or above the RI calculated effective solubility (Plate 11). DSW-1D is outside the current interpreted NAPL-contaminated area, but NAPL could be present at or near this well for the same reasons given for DSW-1C above. Well OFS-4D is located off site approximately 500 feet southeast of the DSW-4 wells. No additional NAPL information is available between OFS-4D and the site boundary. However, the concentrations measured in OFS-4D indicate that NAPL is likely present nearby in the D-zone since naphthalene does not appear to be present dissolved in groundwater very far ahead of the DNAPL source. Naphthalene concentrations in well ONS-1D have risen steadily with time, suggesting that NAPL contamination from the C-zone may be migrating downward to the D-zone at this location. Naphthalene concentrations in well ONS-2D were inconsistent between the two measurement events. The presence of dissolved-phase naphthalene in well ONS-2D is consistent with naphthalene detected in ONS-2C, suggesting a

strong hydraulic connection between the two wells and/or deep NAPL migration. Few D-zone wells are present downgradient of suspected NAPL zones so it is not possible to describe the potential extent of dissolved-phase contamination beyond the suspected NAPL boundaries.

Except for well OFS-4E, all E-zone naphthalene concentrations are nondetected or very low (Plate 12). Naphthalene concentrations in well OFS-4E have declined steadily with time, from 3,600 to 600 µg/L. Initial naphthalene concentrations in this well were high enough to indicate NAPL was nearby.

5.4.2.2 PCP

PCP is generally present in groundwater when naphthalene is present at concentrations high enough to be indicative of NAPL presence (Plates 13 through 17). PCP concentrations are generally lower than naphthalene, presumably due to the lower calculated solubility of PCP (2,000 to 5,000 µg/L). The concentration and extent of dissolved-phase PCP generally decrease with depth in the aquifer until PCP is essentially nondetected within the D- and E-zones.

The distribution of PCP in the A-zone, however, deviates substantially from that of naphthalene (Plate 13). PCP is present in wells at concentrations near, within, or above its calculated effective solubility within the interpreted area of NAPL contamination and known NAPL-contaminated wells (A-10, ONS-2A, and A-8). However, PCP has also been detected near, within, or above its calculated effective solubility levels in A-zone wells downgradient of the NAPL-contaminated wells (A-4, A-5, and A-6) and areas of interpreted NAPL contamination. PCP concentrations (approximately 20 to 120 µg/L) in well A-3 have also been higher than naphthalene concentrations which were generally nondetected.

Based upon partitioning coefficient data, PCP should be approximately 50 to 60 times more retarded in groundwater than naphthalene. The lack of observed PCP contamination beyond interpreted NAPL zones in the B-, C-, D- and E-zones, to the degree that PCP is present ahead of interpreted NAPL-contaminated areas in the A-zone, suggests that a different mechanism is at work for PCP migration in the A-zone. One possibility is a separate, unobserved NAPL carrying the PCP in the A-zone. Alternatively, there may be PCP-contaminated source areas outside of the interpreted creosote NAPL area that are acting as long-term sources to shallow groundwater contamination.

5.4.2.3 Dioxins and Furans

Dioxin is present in dissolved-phase groundwater and shares some of the distribution patterns mentioned in Sections 5.4.2.1 and 5.4.2.2 for naphthalene and PCP (Plate 18). Dioxin data are sparse, but some general trends are evident. Dioxin is present in all aquifer zones and in wells where naphthalene concentrations or other data indicate that NAPL is present or nearby. Dioxin,

like PCP, is also present in A-zone wells (A-3, A-5, and A-6) outside and downgradient of the interpreted NAPL-contaminated area. Dioxin is likely transported as an impurity of the PCP contamination by one of the mechanisms described above.

5.4.3 Natural Attenuation Parameters

A series of water quality and natural attenuation parameters were measured for the monitoring wells sampled during this investigation. The parameters were collected to begin assembling data for a study of natural attenuation at the site. Additional wells and sampling rounds will be required before conclusions can be drawn from the data collected during this investigation.

Table 5-1
Water Supply Well—Interviews and Findings

Agency/Company	Contact	Status
City of Stockton 209-937-7037	Doug Jones 209-937-8782	The water for the City of Stockton is supplied by three sources: 1) City of Stockton - Their wells are over 3 miles away from the McCormick and Baxter Superfund site. 2) California Water Service - Supplies the majority of the drinking water for the City of Stockton. - The majority of their wells are over 2 miles away from the McCormick and Baxter Superfund site (see below). 3) San Joaquin County - Supplies less than 1 percent of Stockton's water. - Their wells are over 3 miles away from the McCormick and Baxter Superfund site.
California Water Service 209-466-8971	Eric Marr 209-464-8311	One supply well in proximity to site; all other wells greater than 2 miles away. The supply well has been inactive for 25 years (it has no pump on it), due to the high salinity of the groundwater. Water levels were measured until 1990.
Department of Water Resources (DWR)	Bob Niblack, Engineering Geologist 916-227-7601	They have well log information but an appointment must be made to research the information (Brian, 255-3076). Bob worked on the McCormick and Baxter site 10 years ago and suggested reviewing the Regional Water Quality Control Board's files for supply well data instead of DWR. Bob also suggested contacting San Joaquin County Flood Control and Water Conservation, located in Stockton.
San Joaquin County Flood Control and Water Conservation	209-468-3000	They claimed no active pumping wells are in the area and referred us to DWR.
Regional Water Quality Control Board (RWQCB)	Pat Leary 916-255-3023	On February 10, 1999, a USACE person went through the RWQCB McCormick and Baxter files. No updated information was found; calls were made from an outdated list of companies that once had wells in the surrounding area. The information gathered from these calls is located in this table.
U.S. Naval Reservation	Jim Pinasco 916-255-3719	No response to phone call.
Newark-Sierra (formerly Gold Bond Wood Products)	Mark Vincent 209-466-5251	Newark-Sierra has four supply wells 0.3 mile from the site but only two wells pump at any one time. The other two wells are used as backup wells. Combined the two wells pump 500,000 gallons of water per day. The wells are deeper than 200 feet and could potentially be pumping from the E zone. The wells have been chemically tested and no contamination has ever been detected in these wells. Up until December 1994, Newark Sierra was pumping 2.3 to 3.0 million gallons of water per day and before that, in the late 1980s Newark was pumping 4.5 million gallons of water per day. Mark Vincent is faxing over

Table 5-1 (Continued)
Water Supply Well—Interviews and Findings

Agency/Company	Contact	Status
Newark-Sierra (Continued)	Mark Vincent 209-466-5251	any well data they have on file including a site map showing the location of the wells. He indicated that there were several other "wet" industries southeast of the McCormick and Baxter site that may have supply wells: H.J. Hines, Valley Tomato, Del Monte, Corn Products, and Campbell Soup. Only two of these "wet industries" appear to be active in the area, Valley Tomato and Del Monte.
Port of Stockton	Jay Jagary 209-946-0246 (ext. 290)	The Port of Stockton has no active supply wells and did not know of any in the area.
Valley Tomato	Tom Halloway 209-982-4586 (ext. 405)	Valley Tomato has two supply wells that pump from July 1 through October 1, during tomato harvest. The wells pump approximately 750,000 gallons per day combined. The wells are located adjacent to the Stockton Metropolitan Airport, which is 2 miles from the site.
Del Monte	John Furr 209-466-9011 (ext. 374)	No response to calls.
City of Stockton Haggin Museum	Todd Ruhstaller 209-462-4116	No response to calls.
Nelson Ready Mix Concrete	Russ Nelson 209-466-2884	The company owns one well, 320 feet deep, with the average pumping rate at 6,000 gallons per day, which can vary depending on business. The well is located 4,500 feet southwest of site on West Charter Way.
Ogden Food Products		No longer in business in the Stockton area.
Union Ice/Storage Co.	Larry Titsworth 209-948-0793	Based on past information from Union Ice, there are 12 shallow monitoring wells on this property, but no extraction wells. Union Ice informed EPA that it has used well water in the past, but discontinued such use in approximately 1986.
Stockton Police Department	Jenny Herder, Public Works Director 209-937-8339	The Police Department owns one well 5,400 feet east of the site. The well has been closed at least 5 years with no pumping taking place.

Source: *Management Plan for NAPL Field Exploration* (USACE 1999a).

Table 5-2
Aquifer Zones and Well Screen Elevations

Aquifer Zone	Elevation of Center of Well Screen (feet NVD88)		
	Minimum	Maximum	Average
A	!48.00	!10.99	!27.04
B	!87.50	!57.64	!68.94
C	!135.00	!108.35	!120.64
D	!190.00	!144.35	!169.50
E	!250.00	!226.97	!241.50

Table 5-3
Physical Characteristics of NAPL (1999)

Well ID	Density (g/mL)[1]	Density (g/mL)[2]	Dynamic Viscosity (cP)[3]	Dynamic Viscosity (cP)[4]
A-10	1.004	0.9569	11.36	3.5
ONS-1B	1.05	1.00	6.86	2.6
DSW-6B	0.9975	0.9467	6.3333	3.2

[1]Density at 20°C
[2]Density at 90°C
[3]Viscosity at 40°C at 60 rpm
[4]Viscosity at 90ºC determined by ASTM Standard Method D445

Note:
cP - centipoise

Table 5-4
Physical Characteristics of NAPL (1998)

Well ID	Density (g/ml)	Kinematic Viscosity[1] (cst)	Dynamic Viscosity (cP)
A-10	1.0120	11.5685	11.7073
DSW-6B	1.0055	6.6914	6.7282

[1]Viscosity at 37.8°C determined by ASTM Standard Method D445

Notes:
cP - centipoise
cst - centistoke

Table 5-5
Laboratory Data Summary for Samples of Representative Product Types

	Product Type	A	B	C	D	E
	Sample ID	SS043-13-15	SS047-12-14	SS096-63-65	SS064-34-36	SS028-9.0-10.1
	Date Sampled	8/9/99	9/7/99	9/9/99	9/6/99	8/8/99
	Field QC					
	Soil Description	Silty/sand	Silt	Sand/silt/clay	Sand	Clay
	NAPL Description	Odor (fuel)	Odor (fuel)	Mobile	Mobile	Nothing
LIF (counts/wavelength)						
Ex situ	Maximum intensity	1,801	399	2,056	1,000	102
	Peak wavelength	454	442	468	452	444
In situ	Maximum intensity	5,669	512.56	3,105.9	1,749	1,929
	Peak wavelength	455	448	471.07	468.98	418.9
SVOC (mg/kg)						
2-Methylnaphthalene		20 U	20 U	2,400 J	210	20 U
Acenaphthene		20 U	20 U	1,100 J	130	20 U
Acenaphthylene		20 U	20 U	20 U	20 U	20 U
Anthracene		20 U	20 U	280	50	20 U
Benzo(a)anthracene		20 U	20 U	60	10 J	20 U
Benzo(a)pyrene		20 U	20 U	20	20 U	20 U
Benzo(b)fluoranthene		20 U	20 U	20	20 U	20 U
Benzo(g,h,i)perylene		20 U	20 U	20 U	20 U	20 U
Benzo(k)fluoranthene		20 U	20 U	10 J	20 U	20 U
Carbazole		20 U	20 UJ	120	20 UJ	20 U
Chrysene		20 U	20 U	60	10 J	20 U
Dibenz(a,h)anthracene		20 U	20 U	20 U	20 U	20 U
Dibenzofuran		20 U	20 U	600 J	80	20 U
Fluoranthene		20 U	20 U	500 J	70	20 U
Fluorene		20 U	20 U	700 J	90	20 U
Indeno(1,2,3-cd)pyrene		20 U	20 U	20 U	20 U	20 U
Naphthalene		20 U	20 U	4,500 J	290	20 U
Pentachlorophenol		60 U	140	60 UJ	60 U	60 U
Phenanthrene		20 U	20	1,400 J	180	20 U
Pyrene		20 U	20 U	260	60	20 U
TPH (mg/kg wet weight)						
TRPH		614	4,088	7,311	1,111	34
TPH-Dx		900	7,700 J	14,000 J	3,700	250
C_{10}-C_{11}		23	280 J	3,500 J	980	5
C_{12}-C_{13}		200	1,200 J	2,900 J	830	10
C_{14}-C_{15}		450	1,700 J	2,700 J	770	30
C_{16}-C_{17}		130	1,600 J	1,800 J	480	180
C_{18}-C_{19}		30	1,400 J	1,300 J	320	10
C_{20}-C_{21}		12	770 J	700 J	190	9
C_{22}-C_{23}		6	460 J	400 J	94	5
C_{24}-C_{25}			220 J	100 J	44	
C_{27}-C_{28}				87 J	22	
C_{29}-C_{30}				34 J	9	
C_{31}-C_{32}						
C_{33}-C_{34}						
C_{35}-C_{36}						
C_{37}-C_{39}						

Notes:
J - estimated value
U - not detected at or above associated value

Table 5-6
Characteristics of Product Types A through E

Product Type	Characteristics
A	Distinct double-humped TPH-Dx chromatographic pattern PCP not detected PAH not detected
B	Distinct TPH-Dx pattern from C_{11} to C_{26} PCP detected Low concentrations of PAH relative to TPH-Dx cPAH not detected
C	Distinct TPH-Dx pattern showing individual PAH peaks but without one compound near C_{10} that appears in type D Closely resembles creosote standard PCP not detected PAH detected cPAH may or may not be detected
D	Distinct TPH-Dx pattern showing individual PAH peaks including the one compound near C_{10} not in product type C Closely resembles creosote standard PCP may or may not be detected PAH detected cPAH may or may not be detected
E	Distinct TPH-Dx pattern between C_{16} and C_{18} PCP not detected PAH may or may not be detected Naphthalene not detected cPAH not detected
PCP	Represented by product sample collected from surface soil at location EP-01

Table 5-7
Product Type Assignments and Supporting Chemistry Results

Location ID	Sample ID	Field QC	Product Type[2]	Chemical Concentration (mg/kg[1])				
				Naphthalene	PCP	TPH-Dx	Total PAH (U=0)	Total cPAH
EP01	EP01-0-0.1		PCP		1,000,000	22,000		
SE-002	SS002-14.3-15.1		**D**	1,400	180	2,200	2,510	80
SE-002	SS002-15.1-16.0		**D**	280		1,000	600	
SE-002	SS002-24.5-25.6		**D**	1,400	30	2,300	2,750	40
SE-002	SS002-25.6-26.5		**D**	2,800	70	7,900	4,530	80
SE-002	SS002-84-86		NE					
SE-002	SS502-84-86	Field duplicate	NE					
SB-004	SB004-101.7-102		C or D	80		320	209.1	
SE-005	SS005-29.5-30.5		**D**	1,200	200	12,000 J	5,050	380
SE-005	SS005-30.5-31.6		**D**	1,200	50	4,000	3,800	220
SE-005	SS005-43-45		NE					
SE-005	SS005-67-69		**D**	150		1,200	560	20
SE-005	SS005-86-87.5		NE					
SB-006	SB006-118.7-119		NE	30			60	
SB-006	SB006-162-162.3		C or D	3,000		6,900	7,860	420
SB-006	SB006-212.5-212.8		C or D	30		700	230	
SE-008	SS008-10.5-11.7		NE	10 J	40 J		10	
SE-008	SS508-10.5-11.7	Field duplicate	NE	10 J	30 J		10	
SE-008	SS008-19-21		NE					
SE-008	SS008-40-41.5		NE			120 J		
SE-008	SS008-42-44		**D**	600		5,300 J	1,750	30
SE-008	SS008-45-45.9		NE	10 J			10	
SE-008	SS008-48-50		**D**	300		3,800 J	890	
SE-009	SS009-21-23		NE					
SE-009	SS009-55-57		NE					
SE-009	SS009-69-70		NE					
SE-010	SS010-59-59.8		NE					
SE-010	SS010-61-61.5		**C**	250		1,500	1,110	80
SE-010	SS010-61.5-63		**C**	380		1,200	1,330	90
SB-019	SB019-37.4-37.7		NE			88 J		
SB-019	SB519-37.4-37.7	Field duplicate	NE			120		
SB-019	SB019-53.6-53.9		NE			160		
SB-019	SB019-182.7-183		NE			3.9		
SE-020	SS020-29-31		**D**	500		1,100	1,360	20
SE-020	SS520-29-31	Field duplicate	**D**	300		2,600	820	

Table 5-7 (Continued)
Product Type Assignments and Supporting Chemistry Results

Location ID	Sample ID	Field QC	Product Type[2]	Chemical Concentration (mg/kg[1])				
				Naphthalene	PCP	TPH-Dx	Total PAH (U=0)	Total cPAH
SE-020	SS020-47-49		**D**	700	40 J	4,800	1,520	30
SE-020	SS020-51-51.8		NE			70 J		
SE-020	SS020-56-58		**D**	800	40 J	6,200	2,110	40
SE-020	SS520-56-58	Field duplicate	**D**	1,000	40 J	6,000	2,410	40
SE-020	SS020-60-62		**D**	400		5,500	1,350	40
SB-027	SB027-13.3-13.7		NE		530			
SB-027	SB027-19.7-20.0		NE		230			
SB-027	SB027-24.0-24.4		NE		200			
SB-027	SB027-63.6-64.0		C or D	40		830	330	20
SB-027	SB027-69.0-69.3		C or D	130		1,300	640	10
SB-027	SB027-73.4-73.9		C or D	210		670	870	50
SB-027	SB027-96.3-96.9		NE			60 J		
SB-027	SB027-113.3-113.7		C or D	20		380	210	10
SB-027	SB027-115.9-116.3		C or D	840		5,100	3,280	210
SB-027	SB027-122.8-123.1		C or D	2,700		15,000	10,010	560
SB-028	SB028-8.0-8.4		D	110	140	880	1,140	70
SB-028	SB028-9.0-10.1		**E**			250		
SB-028	SB028-10.1-11		**E**			440	140	
SB-028	SB028-12-12.5		NE			250	260	
SB-028	SB028-28.3-29.4		C or D	620 J		2,600	1,930	180
SB-028	SB028-31-33		C or D	450		1,300	1,080	40
SB-028	SB028-48-49.7		C or D	20 J		630	130	
SB-028	SB528-48-49.7	Field duplicate	C or D	20		NA	160	
SB-028	SB028-53.5-55		C or D	1,200		6,000	3,630	260
SB-028	SB528-53.5-55	Field duplicate	C or D	1,900		6,500	5,790	400
SB-028	SB028-55-56		C or D	190		490	740	40
SB-028	SB028-79.5-79.8		C or D	20		140	50	
SB-028	SB028-100.6-101.5		C or D	20		830	220	
SB-028	SB028-113-113.2		NE			100	120	
SE-035	SS035-50-52		NE					
SE-037	SS037-31-32.6		NE					
SE-037	SS037-56-57		**D**	3,000		27,000	9,350	650
SE-037	SS037-93-95		NE					
SE-039	SS039-10-12		NE					
SE-039	SS039-19-20.6		**D**	60		940	370	
SE-039	SS039-22-22.4		**D**	40		920	300	
SE-039	SS039-40-42		NE					

Table 5-7 (Continued)
Product Type Assignments and Supporting Chemistry Results

Location ID	Sample ID	Field QC	Product Type[2]	Chemical Concentration (mg/kg[1])				
				Naphthalene	PCP	TPH-Dx	Total PAH (U=0)	Total cPAH
SE-043	SS043-7-8.6		NE					
SE-043	SS043-13-15		**A**			900		
SE-043	SS043-23-25		**A**			400		
SE-043	SS543-23-25	Field duplicate	**A**			500		
SE-043	SS043-27-29		**A**			100		
SB-047	SB047-10-12		**B**			600		
SB-047	SB047-12-14		**B**		140	7,700 J	20	
SB-047	SB047-14-15		**B**		330 J	9,200	70	
SB-051	SB051-52.4-52.9		NE			310	10	
SB-051	SB051-56.0-56.3		C or D	120		720	330	
SB-051	SB051-77.0-77.4		C or D	20		160	20	
SB-051	SB051-80.0-80.3		C or D	20		70 J	20	
SB-051	SB051-124.3-124.6		C or D	30		130	60	
SB-051	SB051-131.8-132.1		NE			120	10	
SB-057	SB057-2.7-3		NE		170	2,200		
SB-057	SB057-28-29.8		C or D	470		2,100	1,150	10
SB-057	SB057-31-32		C or D	430		2,300	1,010	
SB-057	SB057-36-38		BC or BD	3,100	130	30,000	7,210	150
SB-057	SB557-36-38	Field duplicate	BC or BD	5,400	200	15,000	12,360	240
SB-057	SB057-40-50		BC or BD	5,800	200	22,000	12,980	260
SB-057	SB057-51-52		C or D	110		2,000	440	
SB-057	SB557-51-52	Field duplicate	C or D	130		1,500	530	
SB-057	SB057-57.6-57.8		C or D	410		1,600	940	
SB-061	SB061-126.0-126.3		C or D	40		130	100	
SE-064	SS064-31-33		NE					
SE-064	SS064-34-36		**D**	290		3,700	1,100	20
SE-064	SS564-34-36	Field duplicate	**D**	350		3,800	1,080	
SE-064	SS064-50-51		NE					
SE-064	SS064-62-63.3		NE			80 J		
SE-079	SS079-51-52		**C**	460		5,000	2,640	220
SE-079	SS079-54-54.2		**C**	780		4,700	3,490	290
SE-079	SS079-54.2-55		**C**	80		200	480	20
SE-079	SS079-58-60		NE					
SE-079	SS079-80-81		D	90	120	100	540	20
SE-081	SS081-50-50.6		NE					
SB-084	SB084-11.0-11.4		D	100	120	220	370	10

Table 5-7 (Continued)
Product Type Assignments and Supporting Chemistry Results

Location ID	Sample ID	Field QC	Product Type[2]	Chemical Concentration (mg/kg[1])				
				Naphthalene	PCP	TPH-Dx	Total PAH (U=0)	Total cPAH
SB-084	SB084-13.3-13.6		C or D	60			170	
SB-084	SB084-49.3-49.8		C or D	20 J		210	40	
SB-086	SB086-17-17.3		D	700	2,100 J	1,900	1,760	70
SB-086	SB086-21.6-23.3		BD	3,500	30 J	6,600	5,600	140
SB-086	SB086-27-28.5		C or D	1,200		3,000 E	2,750	100
SB-086	SB586-27-28.5	Field duplicate	C or D	900		4,600 E	2,140	70
SB-086	SB086-33.6-35		C or D	600		2,500 E	1,660	40
SB-086	SB086-36.3-38		BC or BD	1,800		11,000	4,320	110
SB-086	SB086-44-45		C or D	380		3,700	1,020	20
SB-086	SB086-49-50		C or D	40		69 J	150	
SE-088	SS088-5.4-5.8		**BD**	11,000	1,200	39,000	29,830	560
SE-088	SS088-9-10.3		C or D	20 J		200	90	
SE-088	SS088-10.3-11		C or D	40		200	230	
SE-088	SS088-14-15.4		NE					
SE-088	SS088-20-21		**C**	420		1,900	1,360	40
SE-088	SS088-24-25.8		**BD**	510 J		1,600	1,680	40
SE-088	SS588-24-25.8	Field duplicate	**BD**	550		3,400	1,800	40
SB-092	SB092-51.5-51.8		C or D	40		480	250	
SB-092	SB092-79.5-79.8		C or D	70		350	460	20
SB-092	SB092-114-114.3		NE			130	60	
SB-092	SB092-139.5-139.8		C or D	190		1,100	870	70
SE-093	SS093-45-46		NE					
SE-093	SS093-63-65		NE					
SE-093	SS093-66-67		NE					
SE-093	SS093-67-68		NE					
SE-096	SS096-63-65		**C**	4,500 J		14,000 J	11,310	170
SE-096	SS096-66-67.6		NE			100		
SE-096	SS096-81-82.4		NE					
SE-096	SS096-84.5-84.8		NE			70 J		
SE-096	SS096-94-96		NE					
SE-097	SS097-87-89		NE					
SE-097	SS097-90-92		NE					
SE-097	SS097-92.6-94		**C**			100	20	
SE-097	SS597-92.6-94	Field duplicate	**C**	20 J		200	50	
SB-099	SB099-3.1-4.6		D	200	100	2,100	1,120	230
SB-099	SB599-3.1-4.6	Field duplicate	D	440	200	6,200	1,530	190

Table 5-7 (Continued)
Product Type Assignments and Supporting Chemistry Results

Location ID	Sample ID	Field QC	Product Type[2]	Chemical Concentration (mg/kg[1])				
				Naphthalene	PCP	TPH-Dx	Total PAH (U=0)	Total cPAH
SB-099	SB099-13.4-14.7		BC or BD	500		6,400	4,870	300
SB-099	SB099-27.5-29.5		BC or BD	2,000		18,000	9,160	480
SB-099	SB599-27.5-29.5	Field duplicate	BC or BD	1,900		22,000	8,820	450
SB-099	SB099-31-33		C or D	320		5,900	1,570	80
SB-099	SB099-41-42.5		BC or BD	1,200		13,000	5,300	300
SB-099	SB099-139.2-139.4		C or D	20		250	150	10
SB-099	SB099-152.6-152.8		C or D	40		70 J	120	
SB-099	SB099-153.8-153.9		C or D	170		410	610	20
SB-099	SB099-160.7-160.9		C or D	380		1,200	1,250	70
SB-099	SB599-160.7-160.9	Field duplicate	C or D	310		2,200	1,270	90
SB-099	SB099-161.8-162		C or D	210		2,100	1,010	50
SB-099	SB099-212.4-212.6		C or D	110		1,500	540	20

[1]Results are reported as dry weight except TPH-Dx which are reported as wet weight.
[2]See Table 5-6

Notes:
Bolddenotes product types assigned from review of TPH-Dx chromatograms
E - result reported was outside of instrument calibration range
J - estimated value
NA - not analyzed
NE - results could not be evaluated due to low concentrations

Table 5-8
Data Used for NAPL Mapping and Volume Estimates

Off-site	Ground Elev.[1] NVD88 (feet)	Top NAPL bgs (feet)	Top NAPL NVD88 (feet)	Base Max NAPL bgs (feet)	Base Max NAPL NVD88 (feet)	Net NAPL (feet)	Comments
A-1		ND	ND	Sh	Sh	NU	
A-2		ND	ND	Sh	Sh	NU	
A-3		ND	ND	Sh	Sh	NU	
A-4		ND	ND	Sh	Sh	NU	
A-5		ND	ND	Sh	Sh	NU	
A-6		ND	ND	Sh	Sh	NU	
A-7		ND	ND	Sh	Sh	NU	
A-8	13.5	ND	ND	Sh	Sh	NU	
A-9		ND	ND	Sh	Sh	NU	
A-10		ND	ND	Sh	Sh	NU	
DSW-1B		ND	ND	ND	Sh	NU	Poor sample descriptions
DSW-1C		ND	ND	ND	ND	NU	Poor sample descriptions
DSW-1D		ND	ND	ND	ND	NU	Poor sample descriptions
DSW-2A		ND	ND	ND	ND	NU	Poor sample descriptions
DSW-2B		ND	ND	ND	ND	NU	Poor sample descriptions
DSW-2C		ND	ND	ND	ND	NU	Poor sample descriptions
DSW-2D		ND	ND	ND	ND	NU	Poor sample descriptions
DSW-2E		ND	ND	ND	ND	NU	Poor sample descriptions
DSW-3B		ND	ND	ND	ND	NU	Poor sample descriptions
DSW-3C		ND	ND	ND	ND	NU	Poor sample descriptions
DSW-4B	10.3	65	!54.7	NU	NU	NU	Grnd surface at top of flush mnt top; NAPL assumed top of screen
DSW-4C	10.1	NU	NU	133	!122.9	NU	Grnd surface at top of flush mnt top; NAPL assumed btm of screen
DSW-4D		NU	NU	NU	NU	NU	Geophysical log only
DSW-4E		NU	NU	NU	NU	NU	Geophysical log only
DSW-5B		NU	NU	NU	NU	NU	Geophysical log only
DSW-6B		NU	NU	NU	NU	NU	Geophysical log only
DSW-6C		NU	NU	NU	NU	NU	Geophysical log only
DSW-7A		NU	NU	NU	NU	NU	Geophysical log only
DSW-7B		NU	NU	NU	NU	NU	Geophysical log only
DSW-7C		NU	NU	NU	NU	NU	Geophysical log only
OFS-1A		NU	NU	NU	NU	NU	Off-site location; not used
OFS-1B		NU	NU	NU	NU	NU	Off-site location; not used
OFS-1C		NU	NU	NU	NU	NU	Off-site location; not used
OFS-1D		NU	NU	NU	NU	NU	Off-site location; not used
OFS-2A		NU	NU	NU	NU	NU	Off-site location; not used
OFS-2C	7.7	NU	NU	NU	NU	NU	Off-site location; not used
OFS-2D		NU	NU	NU	NU	NU	Off-site location; not used
OFS-3A		NU	NU	NU	NU	NU	Off-site location; not used
OFS-3B		NU	NU	NU	NU	NU	Off-site location; not used
OFS-3C		NU	NU	NU	NU	NU	Off-site location; not used
OFS-3D		NU	NU	NU	NU	NU	Off-site location; not used
OFS-3E		NU	NU	NU	NU	NU	Off-site location; not used
OFS-4A1		NU	NU	NU	NU	NU	Off-site location; not used
OFS-4A2		NU	NU	NU	NU	NU	Off-site location; not used
OFS-4C	7.8	NU	NU	NU	NU	NU	Off-site location; not used
OFS-4D		NU	NU	NU	NU	NU	Off-site location; not used
OFS-4E		NU	NU	NU	NU	NU	Off-site location; not used
OFS-5A		NU	NU	NU	NU	NU	Off-site location; not used
OFS-5C	12.7	NU	NU	NU	NU	NU	Off-site location; not used
OFS-5E		NU	NU	NU	NU	NU	Off-site location; not used
ONS-1B		NU	NU	NU	NU	NU	Use ONS-1D only
ONS-1C		NU		NU		NU	Use ONS-1D only
ONS-1D	11.1	6	5.1	142	!130.9	19.7	Grnd elev avg of well top elevations for all ONS-1 wells

Table 5-8 (Continued)
Data Used for NAPL Mapping and Volume Estimates

Off-site	Ground Elev.[1] NVD88 (feet)	Top NAPL bgs (feet)	Top NAPL NVD88 (feet)	Base Max NAPL bgs (feet)	Base Max NAPL NVD88 (feet)	Net NAPL (feet)	Comments
ONS-2A		NU	NU	NU	NU	NU	Use ONS-2D only
ONS-2B		NU	NU	NU	NU	NU	Use ONS-2D only
ONS-2C		NU	NU	NU	NU	NU	Use ONS-2D only
ONS-2D	12.9	62	!49.1	63.5	!50.6	1.5	Grnd elev avg of well top elevations for all ONS-2 wells
OS-1A		NU	NU	NU	NU	NU	Off-site location; not used
OS-1B		NU	NU	NU	NU	NU	Off-site location; not used
OS-1C		NU	NU	NU	NU	NU	Off-site location; not used
OS-1E		NU	NU	NU	NU	NU	Off-site location; not used
OS-2E		NU	NU	NU	NU	NU	Off-site location; not used
OS-3E		NU	NU	NU	NU	NU	Off-site location; not used
OS-4A		NU	NU	NU	NU	NU	Off-site location; not used
OS-4B		NU	NU	NU	NU	NU	Off-site location; not used
OS-4C		NU	NU	NU	NU	NU	Off-site location; not used
OS-5B		NU	NU	NU	NU	NU	Off-site location; not used
OS-5C		NU	NU	NU	NU	NU	Off-site location; not used
OS-5D		NU	NU	NU	NU	NU	Off-site location; not used
OS-6B		NU	NU	NU	NU	NU	Off-site location; not used
OS-6C		NU	NU	NU	NU	NU	Off-site location; not used
OS-6D		NU	NU	NU	NU	NU	Off-site location; not used
GB-5		NU	NU	NU	NU	NU	Off-site location; not used
GB-7		NU	NU	NU	NU	NU	Off-site location; not used
GB-9		NU	NU	NU	NU	NU	Off-site location; not used
GB-10		NU	NU	NU	NU	NU	Off-site location; not used
EB-01	8	ND	ND	Sh	Sh	NU	
EB-02	8.5	24.5	!16	Sh	Sh	NU	Not used; shallow compared to surrounding SCAPS data
EB-03	10.6	Sh	Sh	Sh	Sh	NU	
EB-04	11.2	Sh	Sh	Sh	Sh	NU	
EB-05	11.3	Sh	Sh	Sh	Sh	NU	
EB-06	10.8	Sh	Sh	Sh	Sh	NU	
EB-07	12.1	Sh	Sh	Sh	Sh	NU	
EB-08	11.9	8.5	3.4	Sh	Sh	NU	Not used; shallow compared to surrounding SCAPS data
EB-09	12.4	ND	ND	Sh	Sh	NU	
EB-10	11.7	6.5	5.2	Sh	Sh	NU	Not used; shallow compared to surrounding SCAPS data
EB-11	11.6	6.5	5.1	Sh	Sh	NU	Not used; too shallow for full NAPL extent
EB-12	13.8	ND	ND	Sh	Sh	NU	
EB-13	12.3	6.3	6	Sh	Sh	NU	Not used; shallow compared to surrounding SCAPS data
EB-14	12.1	Sh	Sh	Sh	Sh	NU	
EB-15	11.2	Sh	Sh	Sh	Sh	NU	
EB-16	11.4	Sh	Sh	Sh	Sh	NU	
EB-17	9.4	Sh	Sh	Sh	Sh	NU	
EB-18	11.1	Sh	Sh	Sh	Sh	NU	
EB-19	12.3	Sh	Sh	Sh	Sh	NU	
IB-01A	11.3	Sh	Sh	Sh	Sh	NU	
IB-01B	11	0.5	10.5	Sh	Sh	NU	
IB-02A	11.3	37	!25.7	Sh	Sh	NU	
IB-02B	11.2	33	!21.8	Sh	Sh	NU	
IB-03A	10.8	Sh	Sh	Sh	Sh	NU	
IB-04A	11.8	Sh	Sh	Sh	Sh	NU	
IB-05A	13.7	25	!11.3	Sh	Sh	NU	
IB-06A	13.1	Sh	Sh	Sh	Sh	NU	
IB-07A	14.3	Sh	Sh	Sh	Sh	NU	
IB-07B	14.2	6	8.2	Sh	Sh	NU	
IB-07C	14.2	6	8.2	Sh	Sh	NU	
IB-08A	11.8	Sh	Sh	Sh	Sh	NU	
IB-08B	12	Sh	Sh	Sh	Sh	NU	

Table 5-8 (Continued)
Data Used for NAPL Mapping and Volume Estimates

Off-site	Ground Elev.[1] NVD88 (feet)	Top NAPL bgs (feet)	Top NAPL NVD88 (feet)	Base Max NAPL bgs (feet)	Base Max NAPL NVD88 (feet)	Net NAPL (feet)	Comments
IB-09A	11	7	4	Sh	Sh	NU	
IB-09B	10.9	14	!3.1	Sh	Sh	NU	
IB-09C	11.2	4	7.2	Sh	Sh	NU	
IB-10A	11.3	Sh	Sh	Sh	Sh	NU	
IB-11A	9.9	Sh	Sh	Sh	Sh	NU	
IB-12A	10.8	7	3.8	Sh	Sh	NU	
IB-13A	11.8	ND	ND	Sh	Sh	NU	
IB-13B	10.1	ND	ND	Sh	Sh	NU	
SB004	11	102	!92.5	ND	ND	1.5	Slight sheen
SB006	14.2	52	!39.8	163	!148.8	11	Sheen
SB007	10.7	ND	ND	ND	ND	0	
SB018	11.8	ND	ND	ND	ND	0	
SB019	11.4	NU	NU	128.4	!117	8.4	Missing sample intervals
SB025	12	Sh	Sh	87.9	!75.9	13.5	Boring lacks shallow samples; base main NAPL marginal
SB027	15.4	60	!44.6	123	!107.6	35.5	
SB028	14	27.7	!13.7	126	!112	49.7	
SB030	9.3	ND	ND	ND	ND	0	
SB047	8.9	ND	ND	ND	ND	0	
SB051	11.2	50	!38.8	ND	ND	NU	Conflict with SE51; bottom may be base of sand at 87 feet
SB052	9.8	ND	ND	ND	ND	0	
SB057	11.4	25	!13.6	ND	ND	27.2	Top in 20-30 foot interval; assume 25 feet from SE57
SB061	10.7	125	!114.3	133.5	!122.8	5.5	Minor indication, but agrees with SE61
SB084	12.6	10	2.6	ND	ND	8	First sample, top might be slightly higher, no samples 60-110 feet
SB086	12.3	Sh	Sh	Sh	Sh	NU	NAPL at 17 feet, but no sample 10-17 feet
SB092	10.2	50	!39.8	154	!143.8	34.4	No samples above 50 feet
SB099	15	3	12	214.5	!199.5	32.3	Agrees with IB-9C
SE01	11.9	10	1.9	60	!48.1	13	
SE01A	11.9	NU	NU	NU	NU	NU	Spiky peaks; better results in SE01
SE02	12.2	NU	NU	NU	NU	NU	SE02A deeper with better response
SE02A	12.3	23	!10.7	86	!73.7	31	NAPL at 84-86 feet noted in SS02
SE03	10.5	ND	ND	Sh	Sh	NU	
SE03A	10.5	NU	NU	NU	NU	NU	Response and depth similar to SE03
SE04	11	100	!89	104	!93	4	
SE05	14.8	8	6.8	70	!55.2	30	
SE06	14	53	!39	Sh	Sh	12	
SE07	11.1	ND	ND	ND	ND	0	Intervals with sig. counts, but no contamination in SB007
SE08	13.7	24	!10.3	50	!36.3	12	
SE09	11.3	ND	ND	Sh	Sh	0	
SE10	13.4	59	!45.6	Sh	Sh	6	
SE11	14.1	50	!35.9	52	!37.9	2	
SE12	11	ND	ND	Sh	Sh	0	
SE13	11.5	60	!48.5	68	!56.5	8	
SE14	10	ND	ND	Sh	Sh	0	
SE15	10.7	35	!24.3	66	!55.3	3	
SE16	11.2	43	!31.8	Sh	Sh	1	
SE17	11.4	ND	ND	Sh	Sh	0	Minor spike at 15.5 feet; otherwise counts less than 300
SE18	11.9	50	!38.1	63	!51.1	5	Not sampled until 80 feet
SE19	11.6	7	4.6	Sh	Sh	21	Deep staining only
SE20	11.3	29	!17.7	63	!51.7	25	
SE21	12.3	50	!37.7	Sh	Sh	9	
SE22	12.5	ND	ND	Sh	Sh	0	Counts in 300-500 gray area; adjacent locations show no NAPL
SE23	12	28	!16	83	!71	9	
SE24	12.5	6	6.5	73	!60.5	28	Despite relatively low counts, consider as NAPL due to location
SE25	12.1	18	!5.9	83	!70.9	25	

Table 5-8 (Continued)
Data Used for NAPL Mapping and Volume Estimates

Off-site	Ground Elev.[1] NVD88 (feet)	Top NAPL bgs (feet)	Top NAPL NVD88 (feet)	Base Max NAPL bgs (feet)	Base Max NAPL NVD88 (feet)	Net NAPL (feet)	Comments
SE26	11	37	!26	76	!65	13	
SE27	15	35	!20	57	!42	9	
SE28	14.1	6	8.1	Sh	Sh	23	Shallow NAPL in SB028
SE29	9.8	ND	ND	ND	ND	0	
SE30	9.4	Sh	Sh	ND	ND	0	Trace vague staining in SB030 below 80 feet
SE31	9.8	ND	ND	ND	ND	0	
SE32	12.7	44	!31.3	47	!34.3	3	
SE33	13.2	ND	ND	ND	ND	0	
SE34	14.2	ND	ND	ND	ND	0	
SE35	14.3	ND	ND	ND	ND	0	
SE36	10.6	ND	ND	ND	ND	0	
SE37	10.5	56	!45.5	60	!49.5	2	Peak at 32-33 feet not confirmed with soil sample
SE38	9.3	ND	ND	ND	ND	0	
SE39	11.2	10	1.2	ND	ND	8	
SE40	11.6	ND	ND	ND	ND	0	
SE41	12.4	ND	ND	ND	ND	0	
SE42	11.5	ND	ND	ND	ND	0	
SE43	9.8	NU	NU	NU	NU	NU	Probable diesel contamination; not used for NAPL contours
SE44	11.4	ND	ND	Sh	Sh	0	Very minor response at 100 feet
SE45	11.6	ND	ND	Sh	Sh	0	
SE46	10	ND	ND	Sh	Sh	0	
SE47	8.6	NU	NU	NU	NU	NU	Probable diesel contamination; not used for NAPL contours
SE48	12.2	ND	ND	ND	ND	0	
SE49	10	ND	ND	ND	ND	0	
SE50	12.1	4	8.1	61	!48.9	47	
SE51	11.4	50	!38.6	Sh	Sh	12	Base NAPL may extend below depth of boring?
SE52	10.2	Sh	Sh	Sh	Sh	Sh	
SE53	11.8	ND	ND	ND	ND	0	
SE54	10	Sh	Sh	Sh	Sh	Sh	
SE54A	10	Sh	Sh	Sh	Sh	Sh	
SE55	10.5	ND	ND	ND	ND	0	
SE56	11.4	26	!14.6	61	!49.6	15	
SE57	11.5	10	1.5	60	!48.5	39	
SE58	11.5	35	!23.5	88	!76.5	7	
SE59	12.8	ND	ND	ND	ND	0	
SE60	12.3	45	!32.7	66	!53.7	17	
SE61	11	124	!113	125	!114	1	Deep NAPL at 124 feet supported by SB061 and SE44
SE62	14	ND	ND	ND	ND	0	
SE63	14.1	26	!11.9	50	!35.9	16	
SE64	14	30	!16	62	!48	10	
SE65	11.1	ND	ND	ND	ND	0	
SE66	11.5	ND	ND	ND	ND	0	
SE67	12.2	ND	ND	ND	ND	0	1 spike at 25.69 feet; otherwise counts less than 300
SE68	11.5	ND	ND	ND	ND	0	
SE69	10.9	4	6.9	58	!47.1	35	
SE70	11.2	54	!42.8	63	!51.8	9	Possible spike at base
SE71	11	ND	ND	ND	ND	0	
SE72	11.7	ND	ND	Sh	Sh	0	
SE73	10.4	ND	ND	ND	ND	0	
SE74	12.7	23	!10.3	67	!54.3	19.2	
SE75	12.5	ND	ND	ND	ND	0	
SE76	12.4	ND	ND	ND	ND	0	False spike at 61.5 feet
SE77	12.2	25	!12.8	27	!14.8	2	
SE78	12.9	ND	ND	ND	ND	0	

Table 5-8 (Continued)
Data Used for NAPL Mapping and Volume Estimates

Off-site	Ground Elev.[1] NVD88 (feet)	Top NAPL bgs (feet)	Top NAPL NVD88 (feet)	Base Max NAPL bgs (feet)	Base Max NAPL NVD88 (feet)	Net NAPL (feet)	Comments
SE79	10.2	50	!39.8	Sh	Sh	11	
SE80	10.1	ND	ND	ND	ND	0	
SE81	9.6	ND	ND	ND	ND	0	Dubious spike at 50.4-50.5 feet
SE82	8.5	ND	ND	ND	ND	0	
SE83	8.5	ND	ND	ND	ND	0	
SE84	12.5	10	2.5	Sh	Sh	16	
SE85	12.3	ND	ND	ND	ND	0	
SE86	12.4	9	3.4	48	!35.6	33	
SE87	12.1	4	8.1	Sh	Sh	24	
SE88	12.1	4	8.1	Sh	Sh	20	
SE89	12.5	ND	ND	Sh	Sh	NU	
SE89A	12.6	ND	ND	Sh	Sh	NU	
SE89B	12.5	14	!1.5	Sh	Sh	18	
SE90	12.2	22	!9.8	60	!47.8	19	
SE91	11.1	ND	ND	Sh	Sh	0	Minor spike at 13 feet; otherwise counts less than 300
SE92	9.6	50	!40.4	Sh	Sh	8	NAPL at 90 feet, but could extend deeper
SE93	9.7	62	!52.3	70	!60.3	8	
SE94	9.7	8	1.7	17	!7.3	7	
SE95	10.9	ND	ND	Sh	Sh	NU	
SE96	10.6	63	!52.4	97	!86.4	16	
SE97	10.9	87	!76.1	102	!91.1	10	
SE98	9.9	ND	ND	Sh	Sh	0	

[1]Ground surface elevation for monitoring wells is top of flush-mount casing.

Notes:
ND - not detected; no evidence of NAPL in sample descriptions/analysis or LIF response
NU - not used; indications of NAPL questionable, or data do not agree with other available information
Sh - shallow; boring/push not deep enough to delineate NAPL base, or samples not collected over some upper interval

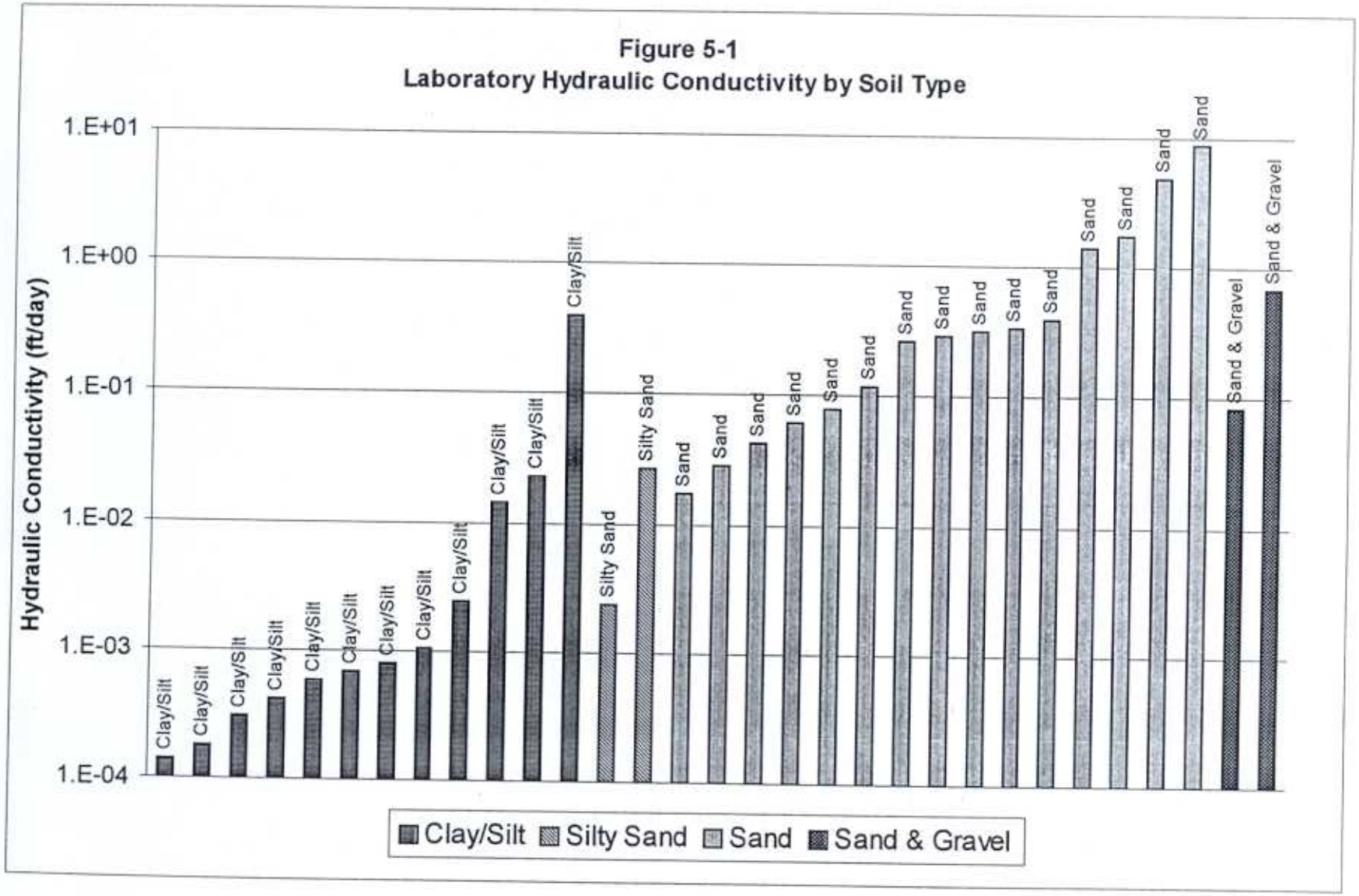


Figure 5-1
Laboratory Hydraulic Conductivity by Soil Type
Hydraulic Conductivity (ft/day)
1.E+01
1.E+00
1.E-01
1.E-02
1.E-03
1.E-04
Clay/Silt
Silty Sand
Sand
Sand & Gravel

Figure 5-2.
Creosote Density

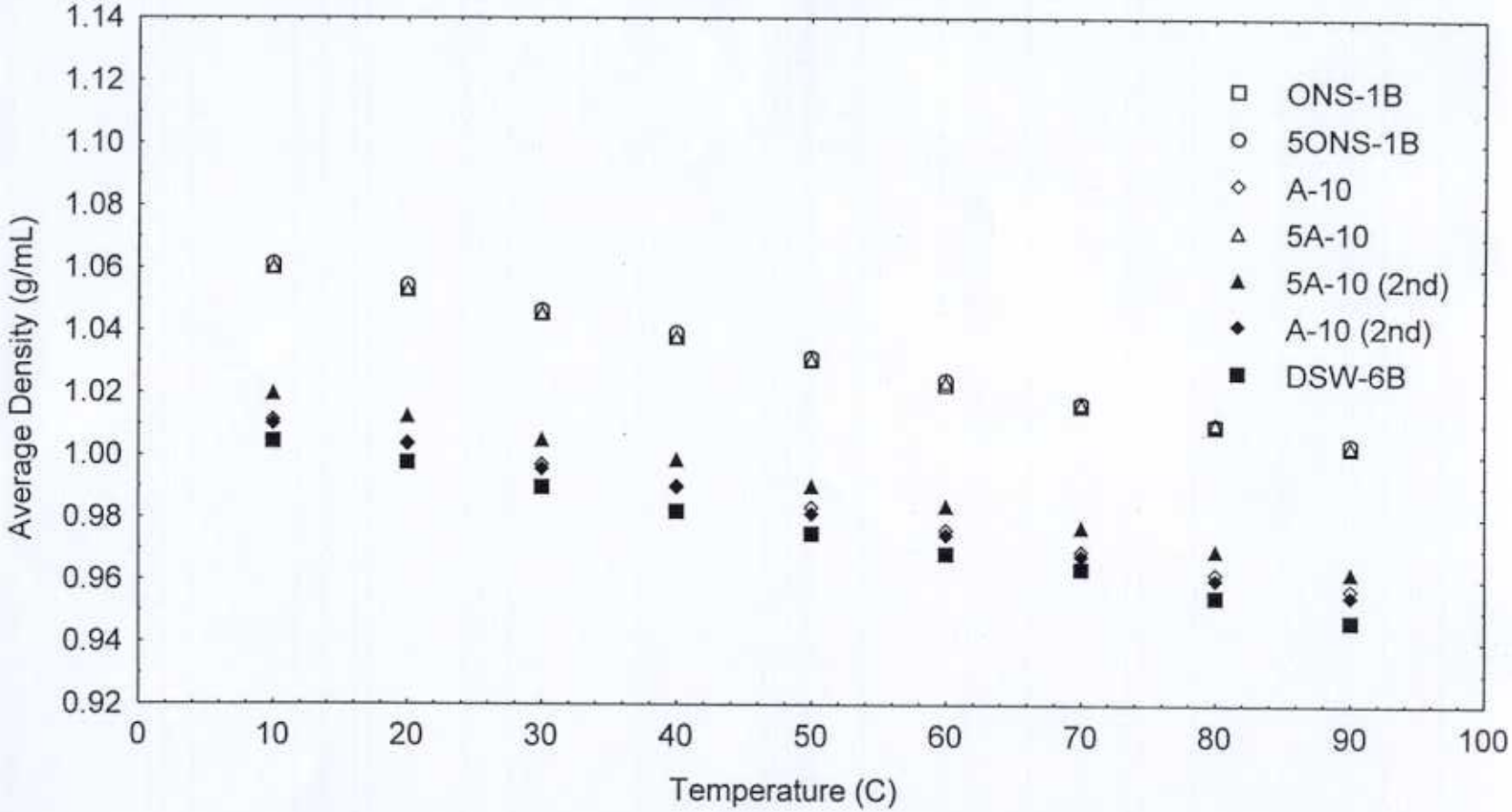
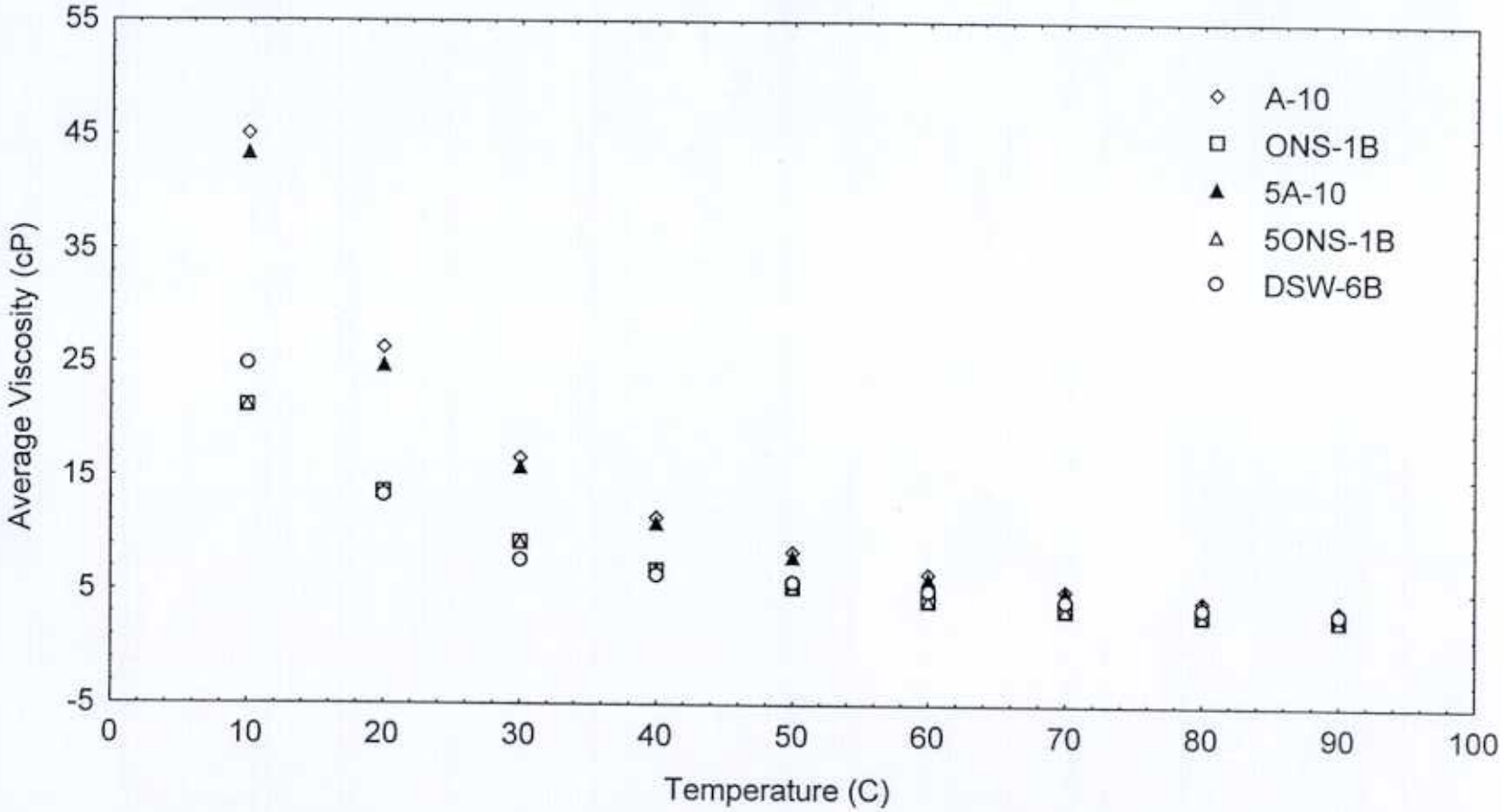


Figure 5-3.
Creosote Viscosity



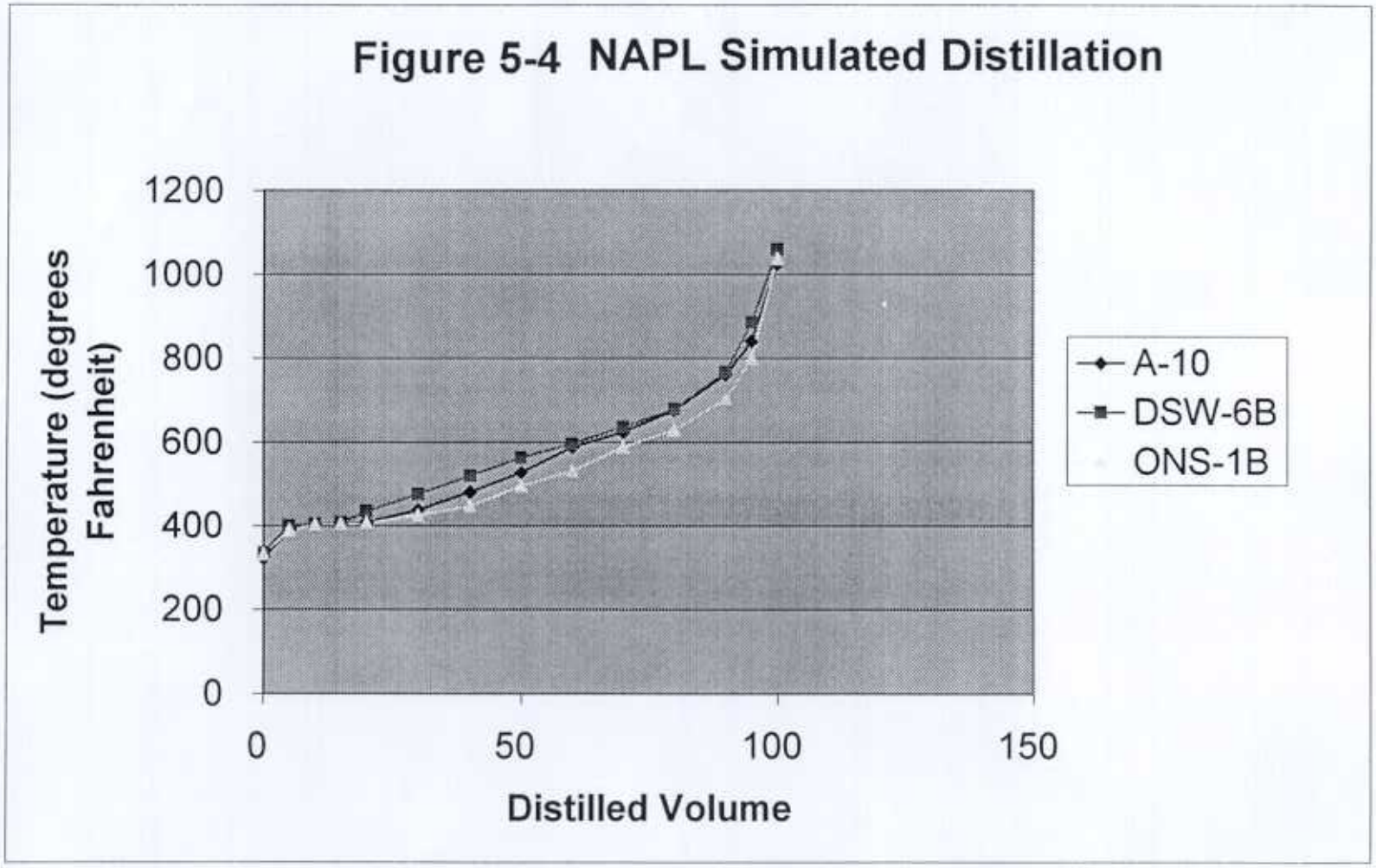
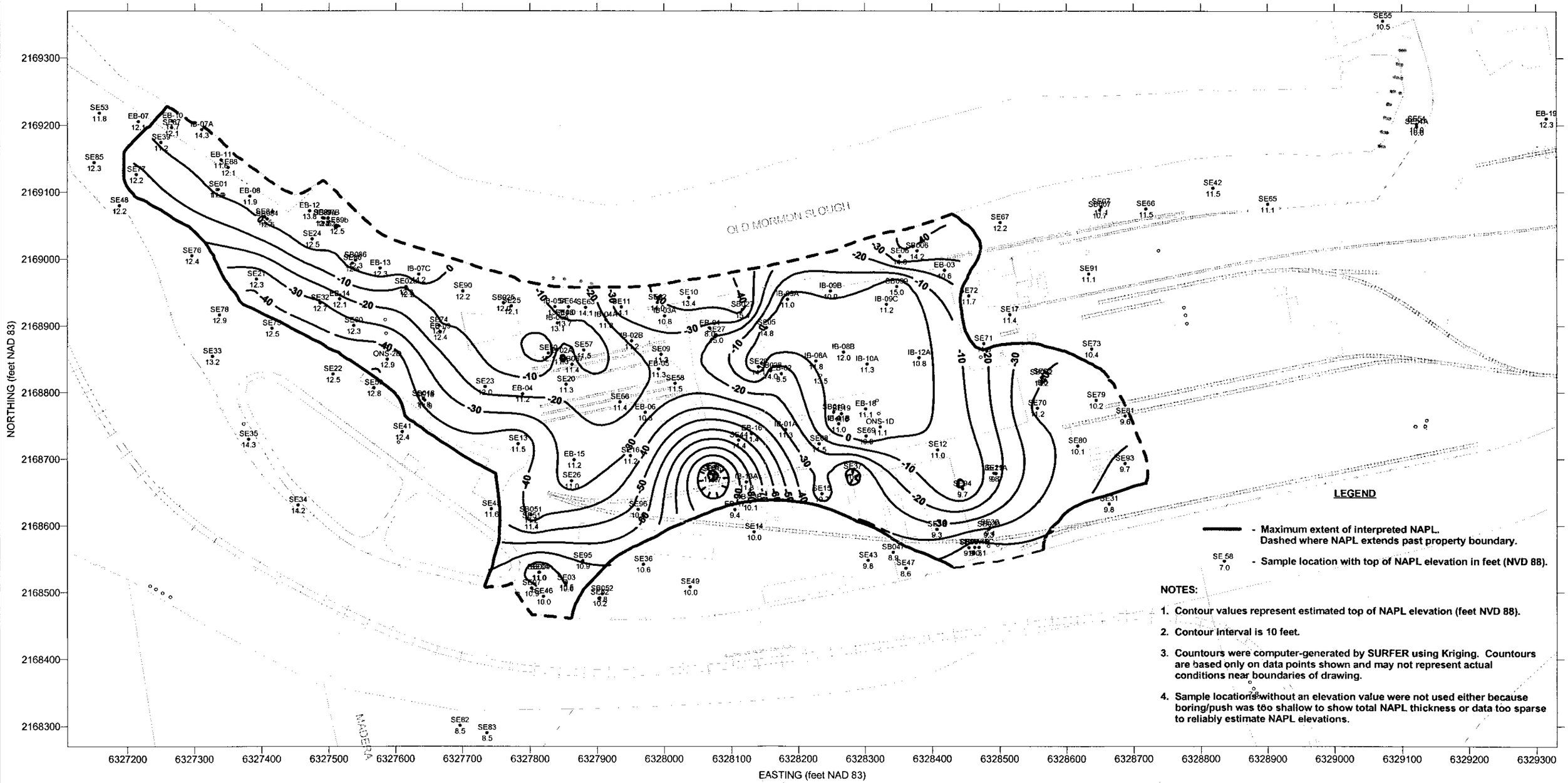


Figure 5-4 NAPL Simulated Distillation
Temperature (degrees Fahrenheit)
1200
1000
800
600
400
200
0
0
50
100
150
Distilled Volume
A-10
DSW-6B
ONS-1B



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MC CORMICK & BAXTER SUPERFUND SITE
SITE INVESTIGATION

Figure 5-5

TOP OF NAPL ELEVATION (feet NVD 88)

STOCKTON CALIFORNIA

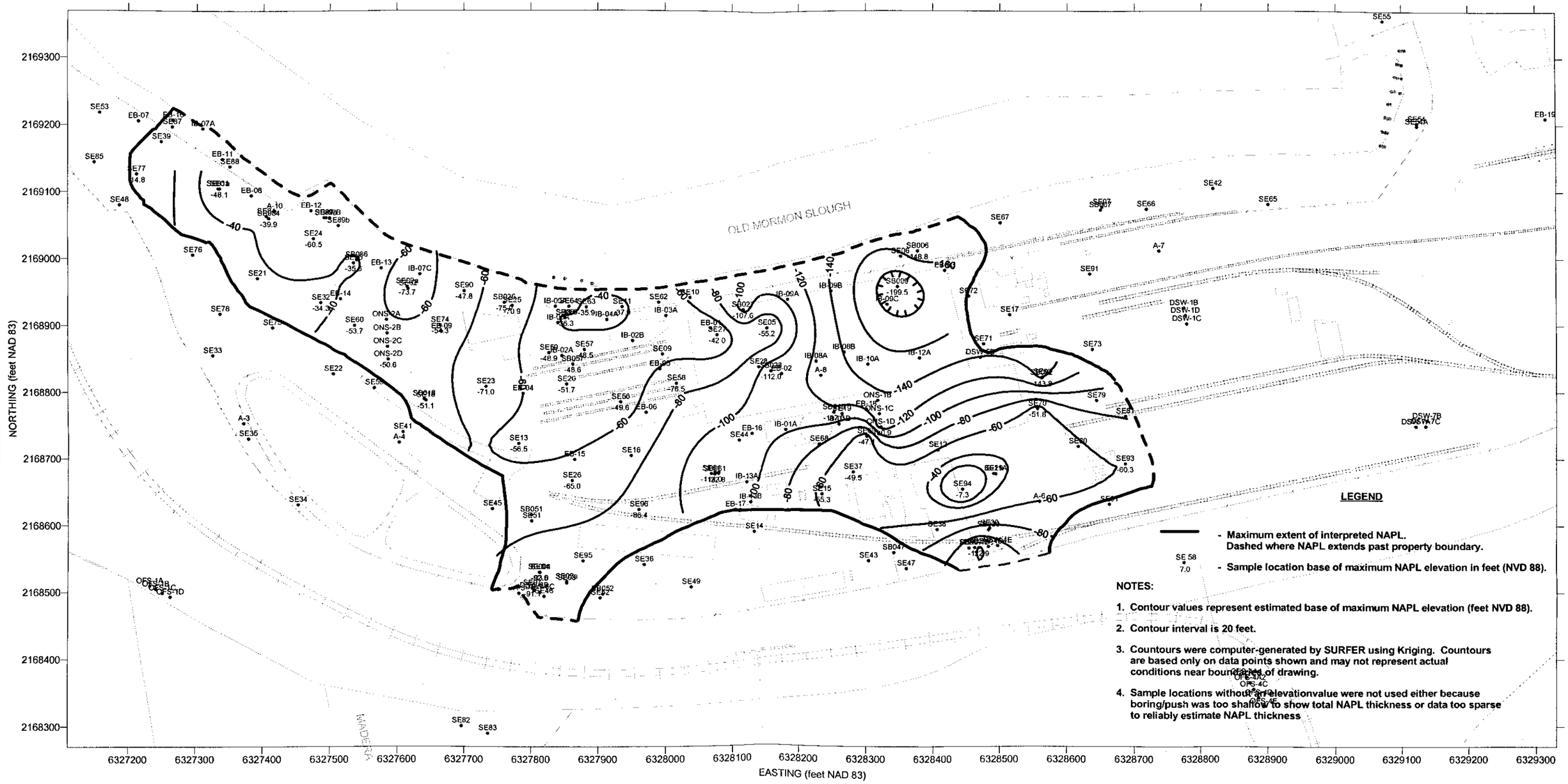

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Figure 5-6

ELEVATION OF BASE OF MAXIMUM NAPL (feet NVD 88)

STOCKTON CALIFORNIA

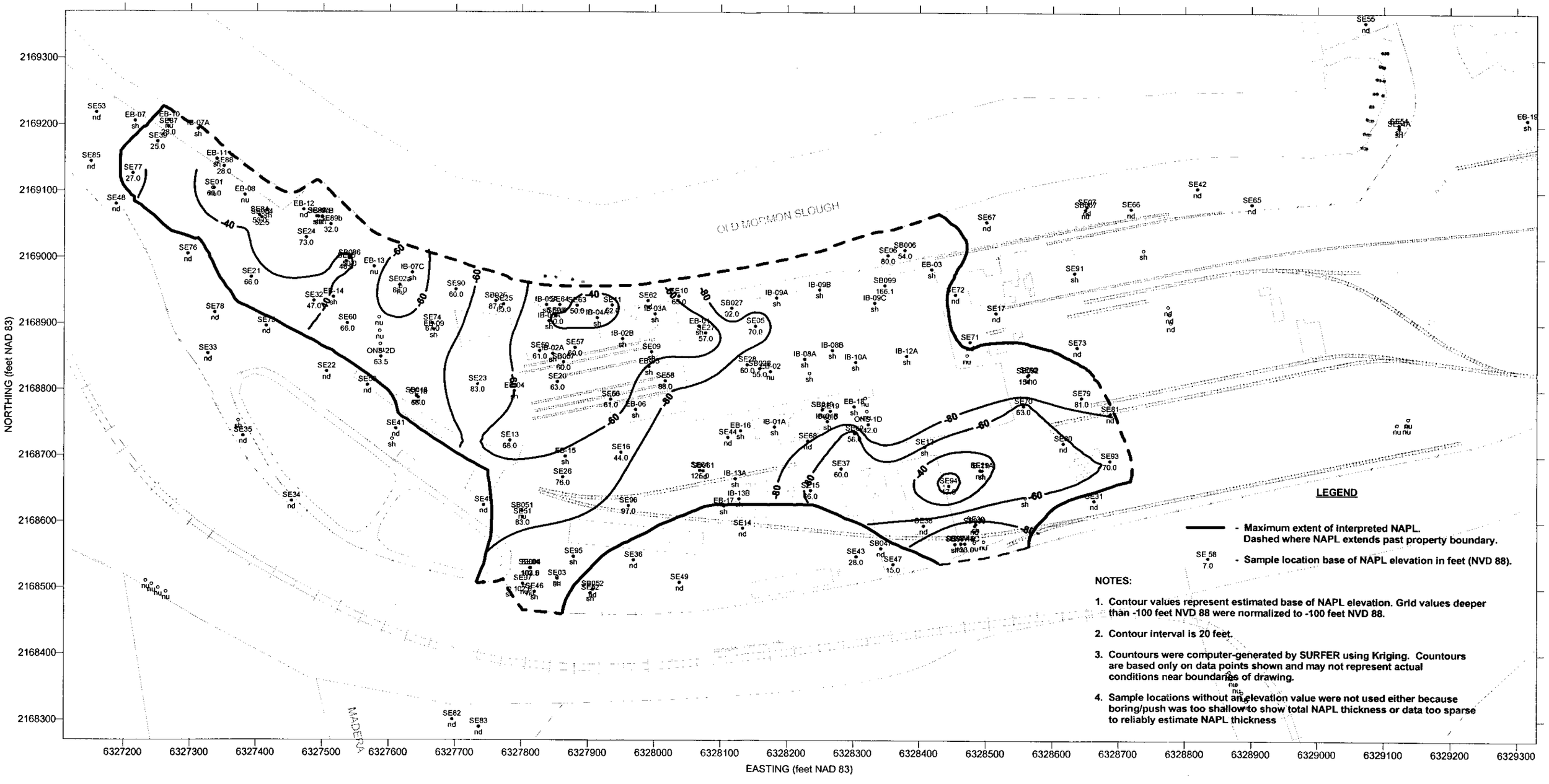

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Figure 5-7

BASE OF NAPL GREATER THAN -100 ELEVATION (feet NVD 88)

STOCKTON CALIFORNIA

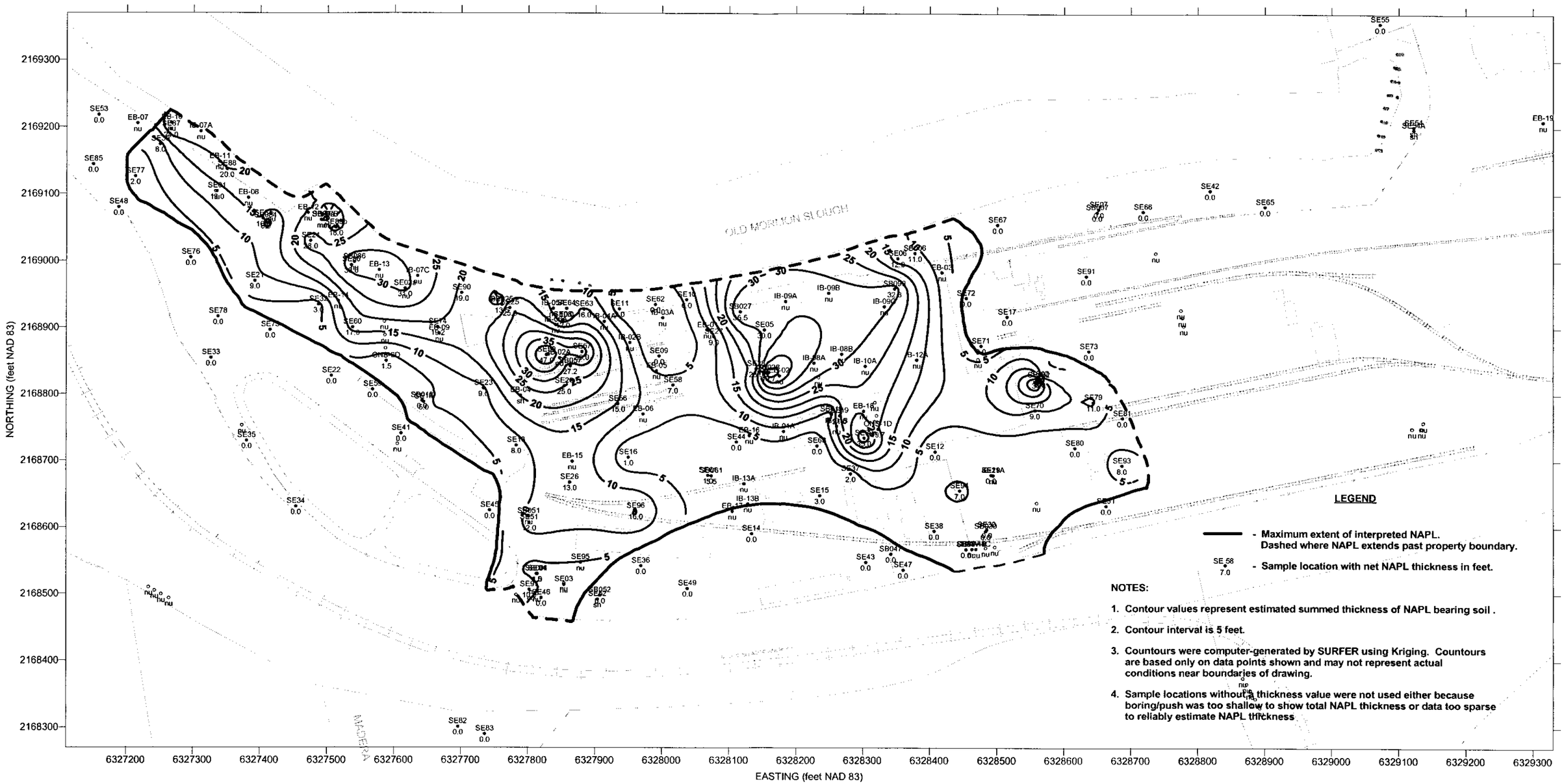

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Figure 5-8

NET THICKNESS OF NAPL BEARING SOIL (feet)

STOCKTON CALIFORNIA

6.0 POST-FIELD INVESTIGATION DATA GAPS AND UNCERTAINTIES

The data quality objective (DQO) process was used to develop the plan for the 1999 NAPL field investigation. However, not all of the existing data gaps were addressed because of access limitations. In addition, more data gaps were identified that need to be addressed before moving forward with selection of a final groundwater remedy. These data gaps are described in this section.

6.1 EXTENT OF NAPL CONTAMINATION AT DSW-4B, DSW-6B, AND OFS-4D

The naphthalene concentrations and trends for these three wells indicate that NAPL contamination has begun to migrate beyond the McCormick and Baxter property. DNAPL may potentially have migrated past the southern property boundary at the main gate and the southeast corner of the stormwater retention ponds at elevations ranging from –50 to –100 feet and –80 to –90 feet, respectively. There are physical accessibility problems related to collecting additional data in these areas (e.g., need for access agreements with other landowners, overhead lines, and current structures). If there is contaminant migration off site in these areas, off-site remediation may have to be considered.

6.2 DENSITY OF SITE DATA

Although a significant amount of data has been collected for the site, there are still areas with uncertainty regarding the presence and amount of NAPL. For example, since the SCAPS was unable to push beyond 152 feet bgs, the amount of data characterizing the deepest portions of the site is sparse. Conditions at the site indicate additional NAPL is likely in the deepest parts of the site. However, the limited amount of data characterizing this part of the site and the nature of NAPL distribution at the site (e.g., thin, vertically discontinuous fingers and stringers) make it difficult to determine the locations and amount of NAPL. An example can be found at SE-35. A potential NAPL stringer identified from 58 to 60 feet bgs during soil sampling was not measured above the detection threshold by LIF. It is possible that a stringer of contamination was found during soil sampling; however, the LIF measurements, collected just a few feet laterally away from the soil sample location, may not measure a nearby NAPL stringer. Below –100 feet elevation, where the density of data drops off dramatically, it is possible that some NAPL was not identified during the characterization process. Additionally, the maximum depth of NAPL at the site is not known.

6.3 POTENTIALLY LOW-BIASED SOIL SAMPLE CHEMICAL RESULTS

Some areas of the site may have significantly higher levels and/or quantities of contamination than have been reported. Several factors may have led to a low bias in the soil contamination analytical results.

- The field sampling team noted that free-phase NAPL was occasionally lost from some of the soil cores before the samples were containerized in jars.

- The field sampling team observed partitioning of NAPL in the sample jars, leading to heterogeneity of the soil samples. In these situations, the way in which the laboratory subsamples can dramatically affect chemical results. Evidence of this problem was documented by the high relative percent differences calculated for duplicate samples of soil samples observed to have mobile NAPL.

- Several of the soil cores were observed to have "veins" of NAPL running through them. In some situations, the field sampling team was forced to homogenize the NAPL veins and globules with the visibly less contaminated soil in the cores, effectively diluting the soil samples, in order to get a sufficient sample volume for analysis.

6.4 NAPL TRANSPORT NORTH OF THE SITE

No investigation work was performed in 1999 north of the McCormick and Baxter property in Old Mormon Slough. Upland DNAPL contamination near the southern edge of the slough is present at shallow elevations ranging from 8 feet elevation to –45 feet elevation. Deeper DNAPL is also present adjacent to the slough near the Main Processing Area from elevations as deep as –60 to –160 feet. Thus, DNAPL could have migrated under the slough to the north along a broad margin and at various depths. If this migration were occurring, the extent of this contamination would need to be determined. The likely source is the upland source areas, the NAPL in the slough sediments, or both.

6.5 NAPL TRANSPORT WITHIN THE EASTERN PORTION OF THE SITE

Access to the Union Pacific property was not available for the 1999 field investigation. Consequently, the potential for NAPL migration eastward from SE-79 and SE-93, through and beyond the UPRR property, is unknown, and there is possible C- and D-zone NAPL contamination near the DSW-1 wells. The size of one of the main NAPL source areas is unclear due to the UPRR property data gap.

6.6 CONTAMINATION ASSOCIATED WITH SE-43 AND SE-47

Two unique near-surface (less than 30 feet bgs) source areas were identified near the entrance to the site at SE-43 and SE-47. The petroleum pattern in samples collected at these locations did not match that for diesel fuel or creosote and could not be identified during the chromatogram review. The contamination found in these areas is not believed to be associated with the main creosote NAPL plume because soil contamination is shallow and is located adjacent to railroad tracks. The contamination in these areas is isolated to less than 30 feet bgs, and is not considered a significant source.

6.7 SUBSURFACE OBSTRUCTION AT SE-03, SE-52, AND SE-97

SCAPS encountered a subsurface obstruction at approximately 16 feet bgs that caused refusal of further penetration at locations SE-03, SE-52, and SE-97. The Resonant Sonic drill rig was able to drill a hole near SE-52; however, this location was collocated approximately 2 feet from the original SCAPS penetration location, SE-52. It is unclear whether a natural or manmade obstruction caused the SCAPS refusal in this area. The type and characteristics of the obstruction are important to know, as they could affect implementation of remedial actions at the site.

6.8 PCP CONTAMINATION IN THE CELLON PROCESS AREA

The Cellon process, which was used by McCormick and Baxter, involved the use of PCP, butane, and ether for wood preservation. Crystals of almost pure PCP were found in a surface soil sample collected at EP-01 in the Cellon Process Area. A screening VOC analysis identified a significant amount of di-isopropyl ether in the surface soil collected at this location. An understanding of the extent of this potential contamination source, as well as any associated contaminant migration, may be required before a final groundwater remedy is selected.

6.9 EXTENT OF PCP AND DIOXIN IN THE A-ZONE AQUIFER

Evaluation of groundwater data shows that PCP and dioxin are extensively found in the A-zone outside of the boundaries identified for the main NAPL plume. One possible explanation for this is a separate, unobserved NAPL carrying the PCP and dioxin in the A-zone, along with an associated PCP and dioxin groundwater plume. Alternatively, there may be undefined vadose zone PCP with dioxin source areas outside of the interpreted NAPL area. These potential source areas would be acting as long-term sources to groundwater contamination in areas outside those affected by the creosote-based NAPL contamination. An understanding of the extent of shallow PCP and dioxin contamination may be required before a final groundwater remedy is selected.

7.0 CONCLUSIONS

The SCAPS LIF data, observations made in the field, and soil data suggest that there are three primary NAPL source areas: (1) Oily Waste Ponds Area, (2) Cellon Process Area, and (3) Main Processing Area. The data also suggest that NAPL has and continues to migrate away from these source areas, extending downward as well as outward to the south, west, and east. There are no LIF data to the north of these source areas, but it is reasonable to assume that the NAPL may also be migrating north of the property boundary.

A review of TPH-Dx analysis chromatograms identified five distinct patterns, which are identified as product types A through E in Table 5-5. A unique PCP source area was identified at location EP-01, where crystals of almost pure PCP and di-isopropyl ether were found in surface soil. Two unique near-surface (less than 30 feet bgs) source areas were identified near the entrance to the site at SE-43 and SE-47. The petroleum patterns in samples collected at these locations did not match those for diesel fuel or creosote and could not be identified.

NAPL has been visually observed in soil borings as a brown to black liquid with strong naphthalene odor. NAPL saturation observed in soil cores has ranged from oozing and/or dripping product to brown stains and/or sheen. Dripping/oozing product was most commonly observed in sandy materials, but also occurred in silt to a limited extent. NAPL is present within both the sand and silt materials identified in the subsurface from at or near ground surface to a maximum observed depth of 212 feet bgs. DNAPL may be as deep as the E-zone of the aquifer (approximately 240 to 250 feet bgs) based on high concentrations of naphthalene in D- and E-zone off-site wells (OFS-4). The bulk of the NAPL appears to be present above an elevation of –100 feet, and deeper NAPL appears to be present in thin, hard to locate stringers. NAPL was observed more often in sand materials than in silt. Sandy material tended to be uniformly saturated with product in soil cores. NAPL within the clayey silt material was usually observed as discontinuous blobs of NAPL or as thin, vertically oriented NAPL stringers. The clayey silt materials are not an effective barrier to vertical DNAPL migration.

The density of stratigraphic and contaminant data above approximately –100 feet elevation is high, and the maximum extent of NAPL above this elevation is well characterized. Below –100 feet elevation, data are relatively sparse. Therefore, NAPL pathways and the maximum horizontal and vertical extent of NAPL below –100 feet elevation are less certain.

The interpreted maximum horizontal extent of NAPL in the subsurface is shown as a solid and dashed line in Figures 5-5 through 5-8. The dashed portion of the boundary indicates areas where NAPL is

present at the property line beyond which no data, or only limited data, are available. Data are insufficient to determine whether NAPL extends beyond the property line at the dashed locations.

The bulk of creosote NAPL is interpreted to be present within the A- and B-zones of the upper aquifer. The volume of space within which NAPL is interpreted to be present at the site is approximately 23,000,000 ft^3 (850,000 yd^3). The volume of space above an elevation of –100 feet within which NAPL is interpreted to be present is approximately 20,000,000 ft^3 (740,000 yd^3). The net thickness of creosote NAPL-contaminated soil at each boring/push was determined by adding together the intervals of observed and interpreted NAPL at each sampled location to derive a net interpreted NAPL thickness for the site (Figure 5-8). The volume of soil containing creosote NAPL is approximately 6,000,000 ft^3 (220,000 yd^3). Assuming a porosity of 0.35 and values of NAPL saturation in the pore space of 1 percent and 10 percent yields a volume of creosote NAPL in the subsurface of 160,000 and 1,600,000 gallons, respectively.

An evaluation of groundwater data indicates that naphthalene may be retarded in the subsurface by a mechanism other than hydrophobic sorption (e.g., biodegradation). Also, PCP and dioxin are dissolved in groundwater at high concentrations in the A-zone outside, and downgradient of, the boundaries identified for the main creosote NAPL plume. Naphthalene is generally at nondetectable or very low levels as a dissolved phase in wells outside of the main creosote NAPL plume, and PCP and dioxin are expected to be less mobile than naphthalene in groundwater. There may be a separate, unobserved NAPL (possibly LNAPL) carrying the PCP and dioxin in the A-zone. Alternatively, there may be PCP-contaminated source areas outside of the interpreted creosote NAPL area that are acting as long-term sources to shallow groundwater contamination.

8.0 RECOMMENDATIONS

Based upon the results, interpretations, data gaps, and conclusions described in this report, the following recommendations are made.

- Further Subsurface Investigations South of the Stormwater Retention Ponds and Main Gate Area. As indicated in Section 6, it is not known to what extent contamination is migrating from the property boundary in these areas. An expedited site characterization approach, using CPT with LIF and rotosonic drilling with soil sampling and analysis, is recommended to evaluate this data gap.

- Subsurface Investigation of the UPRR Property. The presence, extent, and quantity of contamination that has migrated east of SE-79 and SE-93 are not known. An expedited site characterization approach, utilizing CPT with LIF and rotosonic drilling with soil sampling and analysis, is recommended to evaluate this data gap. There may also be C- and D-zone contamination near the DSW-1 wells. Use of rotosonic drilling is recommended to evaluate this data gap.

- Investigation Across and/or Beneath the Old Mormon Slough. The presence, extent, and quantity of contamination that has migrated beneath and north of the slough are not known. An expedited site characterization approach, using CPT with LIF and rotosonic drilling with soil sampling and analysis, and installation of at least two E-zone monitoring wells, is recommended to evaluate this data gap.

- Installation of New Wells. Use of rotosonic drilling to install new wells may be required to fill groundwater plume/contaminant migration data gaps. Further recommendations have been provided in a separate technical memorandum.

- Investigation of the Subsurface Features Near SE-03, SE-52, and SE-95. Exploratory work in this area using an excavator (e.g., backhoe) is recommended to evaluate this data gap.

- Sample Newly-Installed Wells MW2E and MW1A. Collecting a groundwater sample from MW2E and analyzing the sample for TPH, SVOCs, and dioxin/furans are recommended for the next round of groundwater sampling. Collecting a NAPL sample from MW1A and analyzing the sample for TPH and SVOCs is recommended to take place with the next round of groundwater sampling. These wells were installed during the 1999 field investigation and have not been sampled.

- Investigation of the PCP Source Area in the Cellon Process Area and Within the A-Zone Outside of the Main Creosote NAPL Plume. The extent of the shallow PCP source area and whether or not the PCP source near SE-08 is contained within a vault or other structure are important to know as they could affect implementation of remedial actions at the site. An expedited site characterization approach, utilizing a direct-push soil sampling tool and on-site analysis for PCP and SVOCs is recommended to evaluate the presence, extent, and quantity of PCP within the A-zone aquifer and to determine if the source near SE-08 is contained in a vault or other subsurface structure.

- Preparation of a Remedial Design Groundwater Monitoring Strategy. The strategy should meet the following objectives:

  1. Determine the extent (i.e., the down-gradient boundary) of groundwater contamination originating from the site
  2. Determine extent of NAPL in the subsurface and monitor NAPL migration
  3. Determine if dissolved phase contaminant biodegradation is occurring
  4. Monitor groundwater gradients and flow directions
  5. Monitor natural attenuation parameters to evaluate the fate and transport of groundwater contaminants

- Dioxin/Furan Extent of Contamination. Re-evaluate the requirement for collection of additional soil, groundwater, and NAPL samples to determine the extent of subsurface dioxin/furan contamination.

Further recommendations have been provided in a separate technical memorandum.

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APPENDIX A

ROTOSONIC BORING AND SCAPS SOIL DATA – LIF, TRPH, TPH-Dx, PAH/PCP, AND DIOXIN/FURAN RESULTS

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-004	SB-004	SB-004	SB-004
Quadrant	D2	D2	D2	D2
Sample ID	SB004-82.4-82.7	SB004-101.7-102	SB004-109.7-110	SB004-116.8-117.1
Date Sampled	8/10/99	8/10/99	8/10/99	8/10/99
Field QC				
Soil Description	sand	clay	silt	silt
NAPL Description	odor	sheen	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	473	458	--	--
Exsitu peak wavelength	402	402	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	50	--	--
acenaphthene	--	30	--	--
acenaphthylene	--	20 U	--	--
anthracene	--	10 J	--	--
benzo(a)anthracene	--	20 U	--	--
benzo(a)pyrene	--	20 U	--	--
benzo(b)fluoranthene	--	20 U	--	--
benzo(g,h,i)perylene	--	20 U	--	--
benzo(k)fluoranthene	--	20 U	--	--
carbazole	--	20 U	--	--
chrysene	--	20 U	--	--
dibenzo(a,h)anthracene	--	20 U	--	--
dibenzofuran	--	10 J	--	--
fluoranthene	--	20 J	--	--
fluorene	--	20 J	--	--
indeno(1,2,3-cd)pyrene	--	20 U	--	--
naphthalene	--	100	--	--
pentachlorophenol	--	60 U	--	--
phenanthrene	--	40	--	--
pyrene	--	10 J	--	--
Total HPAH (U=1/2)	--	110	--	--
Total LPAH (U=1/2)	--	260	--	--
Total PAH (U=1/2)	--	370	--	--
LPAH/HPAH (U=1/2)	--	2.4	--	--
Naphthalene/Total PAH (U=1/2)	--	0.27	--	--
TPH (mg/kg)				
TRPH	7 J	85	--	--
total hydrocarbons, C10-C39	100 U	320	100 U	100 U
C10-C11	--	93	--	--
C12-C13	--	67	--	--
C14-C15	--	59	--	--
C16-C17	--	45	--	--
C18-C19	--	31	--	--
C20-C21	--	18	--	--
C22-C23	--	7	--	--
C24-C25	--		--	--
C27-C28	--		--	--
C29-C30	--		--	--
C31-C32	--		--	--
C33-C34	--		--	--
C35-C36	--		--	--
C37-C39	--		--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-004	SB-004	SB-004	SB-004
Quadrant	D2	D2	D2	D2
Sample ID	SB004-127.3-127.6	SB004-149.7-150	SB504-149.7-150	SB004-193.0-193.3
Date Sampled	8/10/99	8/10/99	8/10/99	8/11/99
Field QC		Primary	Field Duplicate	
Soil Description	sand	sand	sand	clay
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-004	SB-004	SB-004	SB-006
Quadrant	D2	D2	D2	C3
Sample ID	SB004-203.7-204	SB004-212.6-212.9	SB004-249.7-250	SB006-45
Date Sampled	8/11/99	8/11/99	8/11/99	8/4/99
Field QC				
Soil Description	sand	sand	sand and gravel	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-006	SB-006	SB-006	SB-006
Quadrant	C3	C3	C3	C3
Sample ID	SB006-54	SB006-86	SB006-88	SB006-102
Date Sampled	8/4/99	8/4/99	8/4/99	8/4/99
Field QC				Primary
Soil Description	clay	clay	clay	clay
NAPL Description	odor	nothing	nothing	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-006	SB-006	SB-006	SB-006
Quadrant	C3	C3	C3	C3
Sample ID	SB506-102	SB006-118.7-119	SB006-123.7-124	SB006-128-128.4
Date Sampled	8/4/99	8/5/99	8/5/99	8/5/99
Field QC	Field Duplicate			
Soil Description	clay	sand	sand	sand
NAPL Description	odor	odor	odor	staining
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	10 J	20 U	20 U
acenaphthene	--	20 U	20 U	20 U
acenaphthylene	--	20 U	20 U	20 U
anthracene	--	20 U	20 U	20 U
benzo(a)anthracene	--	20 U	20 U	20 U
benzo(a)pyrene	--	20 U	20 U	20 U
benzo(b)fluoranthene	--	20 U	20 U	20 U
benzo(g,h,i)perylene	--	20 U	20 U	20 U
benzo(k)fluoranthene	--	20 U	20 U	20 U
carbazole	--	20 U	20 U	20 U
chrysene	--	20 U	20 U	20 U
dibenzo(a,h)anthracene	--	20 U	20 U	20 U
dibenzofuran	--	20 U	20 U	20 U
fluoranthene	--	20 U	20 U	20 U
fluorene	--	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	--	20 U	20 U	20 U
naphthalene	--	30	20 U	20 U
pentachlorophenol	--	60 U	60 U	60 U
phenanthrene	--	20 J	20 U	20 U
pyrene	--	20 U	20 U	20 U
Total HPAH (U=1/2)	--	100	100	100
Total LPAH (U=1/2)	--	100	70	70
Total PAH (U=1/2)	--	200	170	170
LPAH/HPAH (U=1/2)	--	1	0.7	0.7
Naphthalene/Total PAH (U=1/2)	--	0.15	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-006	SB-006	SB-006	SB-006
Quadrant	C3	C3	C3	C3
Sample ID	SB006-133-133.4	SB006-139.5-139.8	SB006-144-144.4	SB006-153-153.3
Date Sampled	8/5/99	8/5/99	8/5/99	8/5/99
Field QC				
Soil Description	sand	sand	sand	sand
NAPL Description	odor	odor	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	20 U
acenaphthene	20 U	20 U	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 U	20 U	20 U	20 U
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	20 U	20 U
fluoranthene	20 U	20 U	20 U	20 U
fluorene	20 U	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	20 U	20 U
pentachlorophenol	60 U	60 U	60 U	60 U
phenanthrene	20 U	20 U	20 U	20 U
pyrene	20 U	20 U	20 U	20 U
Total HPAH (U=1/2)	100	100	100	100
Total LPAH (U=1/2)	70	70	70	70
Total PAH (U=1/2)	170	170	170	170
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-006	SB-006	SB-006	SB-006
Quadrant	C3	C3	C3	C3
Sample ID	SB006-162-162.3	SB006-173.6-174	SB006-177.7-178	SB006-182.7-183
Date Sampled	8/5/99	8/5/99	8/5/99	8/5/99
Field QC				Primary
Soil Description	silt	sand	sand	silt
NAPL Description	mobile	odor	nothing	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	1800	20 U	20 U	30 U
acenaphthene	1000	20 U	20 U	30 U
acenaphthylene	300	20 U	20 U	30 U
anthracene	270	20 U	20 U	30 U
benzo(a)anthracene	180	20 U	20 U	30 U
benzo(a)pyrene	90	20 U	20 U	30 U
benzo(b)fluoranthene	110	20 U	20 U	30 U
benzo(g,h,i)perylene	30	20 U	20 U	30 U
benzo(k)fluoranthene	40	20 U	20 U	30 U
carbazole	160	20 U	20 U	30 U
chrysene	170	20 U	20 U	30 U
dibenzo(a,h)anthracene	30 U	20 U	20 U	30 U
dibenzofuran	600	20 U	20 U	30 U
fluoranthene	770	20 U	20 U	30 U
fluorene	660	20 U	20 U	30 U
indeno(1,2,3-cd)pyrene	30	20 U	20 U	30 U
naphthalene	4100	20 U	20 U	30 U
pentachlorophenol	70 U	60 U	60 U	60 U
phenanthrene	1600	20 U	20 U	30 U
pyrene	590	20 U	20 U	30 U
Total HPAH (U=1/2)	2025	100	100	150
Total LPAH (U=1/2)	9730	70	70	105
Total PAH (U=1/2)	11755	170	170	255
LPAH/HPAH (U=1/2)	4.8	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.35	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	6900	100 U	100 U	100 U
C10-C11	1900	--	--	--
C12-C13	1300	--	--	--
C14-C15	1100	--	--	--
C16-C17	900	--	--	--
C18-C19	600	--	--	--
C20-C21	500	--	--	--
C22-C23	300	--	--	--
C24-C25	110	--	--	--
C27-C28	80	--	--	--
C29-C30	70	--	--	--
C31-C32	30	--	--	--
C33-C34		--	--	--
C35-C36		--	--	--
C37-C39		--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-006	SB-006	SB-006	SB-006
Quadrant	C3	C3	C3	C3
Sample ID	SB506-182.7-183	SB006-198.5-198.8	SB006-207-207.3	SB006-212.5-212.8
Date Sampled	8/5/99	8/5/99	8/5/99	8/6/99
Field QC	Field Duplicate			
Soil Description	silt	clay	clay	clay
NAPL Description	odor	odor	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	30 U	30 U	30 U	40
acenaphthene	30 U	30 U	30 U	40
acenaphthylene	30 U	30 U	30 U	20 U
anthracene	30 U	30 U	30 U	10 J
benzo(a)anthracene	30 U	30 U	30 U	20 U
benzo(a)pyrene	30 U	30 U	30 U	20 U
benzo(b)fluoranthene	30 U	30 U	30 U	20 U
benzo(g,h,i)perylene	30 U	30 U	30 U	20 U
benzo(k)fluoranthene	30 U	30 U	30 U	20 U
carbazole	30 U	30 U	30 U	20 U
chrysene	30 U	30 U	30 U	20 U
dibenzo(a,h)anthracene	30 U	30 U	30 U	20 U
dibenzofuran	30 U	30 U	30 U	20
fluoranthene	30 U	30 U	30 U	30
fluorene	30 U	30 U	30 U	30
indeno(1,2,3-cd)pyrene	30 U	30 U	30 U	20 U
naphthalene	30 U	30 U	30 U	40
pentachlorophenol	60 U	70 U	60 U	60 U
phenanthrene	30 U	30 U	30 U	70
pyrene	30 U	30 U	30 U	20
Total HPAH (U=1/2)	150	150	150	130
Total LPAH (U=1/2)	105	105	105	240
Total PAH (U=1/2)	255	255	255	370
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	1.8
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.11
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	700
C10-C11	--	--	--	190
C12-C13	--	--	--	130
C14-C15	--	--	--	110
C16-C17	--	--	--	90
C18-C19	--	--	--	60
C20-C21	--	--	--	50
C22-C23	--	--	--	30
C24-C25	--	--	--	9
C27-C28	--	--	--	11
C29-C30	--	--	--	6
C31-C32	--	--	--	
C33-C34	--	--	--	
C35-C36	--	--	--	
C37-C39	--	--	--	

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-006	SB-006	SB-006	SB-007
Quadrant	C3	C3	C3	C3
Sample ID	SB006-227.2-227.5	SB006-239.7-240	SB006-249.7-250	SB007-32.3-32.6
Date Sampled	8/6/99	8/6/99	8/6/99	9/14/99
Field QC				Primary
Soil Description	clay	sand	sand and gravel	sand
NAPL Description	sheen	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	20 U
acenaphthene	20 U	20 U	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 U	20 U	20 U	20 UJ
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	20 U	20 U
fluoranthene	20 U	20 U	20 U	20 U
fluorene	20 U	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	20 U	20 U
pentachlorophenol	60 U	50 U	50 U	60 U
phenanthrene	20 U	20 U	20 U	20 U
pyrene	20 U	20 U	20 U	20 U
Total HPAH (U=1/2)	100	100	100	100
Total LPAH (U=1/2)	70	70	70	70
Total PAH (U=1/2)	170	170	170	170
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-007	SB-007	SB-007	SB-007
Quadrant	C3	C3	C3	C3
Sample ID	SB507-32.3-32.6	SB007-36.0-36.3	SB007-41.7-42.0	SB007-49.7-50.0
Date Sampled	9/14/99	9/14/99	9/14/99	9/14/99
Field QC	Field Duplicate			
Soil Description	sand	sand	sand	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	20 U
acenaphthene	20 U	20 U	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 UJ	20 UJ	20 UJ	20 UJ
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	20 U	20 U
fluoranthene	20 U	20 U	20 U	20 U
fluorene	20 U	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	20 U	20 U
pentachlorophenol	60 U	60 U	60 U	60 U
phenanthrene	20 U	20 U	20 U	20 U
pyrene	20 U	20 U	20 U	20 U
Total HPAH (U=1/2)	100	100	100	100
Total LPAH (U=1/2)	70	70	70	70
Total PAH (U=1/2)	170	170	170	170
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-007	SB-007	SB-007	SB-007
Quadrant	C3	C3	C3	C3
Sample ID	SB007-54.7-55.0	SB007-57.3-57.6	SB007-63.6-63.9	SB007-66.7-67.0
Date Sampled	9/14/99	9/14/99	9/14/99	9/14/99
Field QC				
Soil Description	sand	clay	clay	sand
NAPL Description	nothing	nothing	nothing	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	20 U
acenaphthene	20 U	20 U	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 UJ	20 UJ	20 UJ	20 UJ
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	20 U	20 U
fluoranthene	20 U	20 U	20 U	20 U
fluorene	20 U	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	20 U	20 U
pentachlorophenol	60 U	60 U	60 U	60 U
phenanthrene	20 U	20 U	20 U	20 U
pyrene	20 U	20 U	20 U	20 U
Total HPAH (U=1/2)	100	100	100	100
Total LPAH (U=1/2)	70	70	70	70
Total PAH (U=1/2)	170	170	170	170
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-007	SB-007	SB-007	SB-007
Quadrant	C3	C3	C3	C3
Sample ID	SB007-74.0-74.3	SB007-79.0-79.3	SB007-83.0-83.3	SB007-90.0-90.5
Date Sampled	9/14/99	9/14/99	9/15/99	9/15/99
Field QC				
Soil Description	sand	sand	clay	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	--	--
acenaphthene	20 U	20 U	--	--
acenaphthylene	20 U	20 U	--	--
anthracene	20 U	20 U	--	--
benzo(a)anthracene	20 U	20 U	--	--
benzo(a)pyrene	20 U	20 U	--	--
benzo(b)fluoranthene	20 U	20 U	--	--
benzo(g,h,i)perylene	20 U	20 U	--	--
benzo(k)fluoranthene	20 U	20 U	--	--
carbazole	20 UJ	20 UJ	--	--
chrysene	20 U	20 U	--	--
dibenzo(a,h)anthracene	20 U	20 U	--	--
dibenzofuran	20 U	20 U	--	--
fluoranthene	20 U	20 U	--	--
fluorene	20 U	20 U	--	--
indeno(1,2,3-cd)pyrene	20 U	20 U	--	--
naphthalene	20 U	20 U	--	--
pentachlorophenol	60 U	60 U	--	--
phenanthrene	20 U	20 U	--	--
pyrene	20 U	20 U	--	--
Total HPAH (U=1/2)	100	100	--	--
Total LPAH (U=1/2)	70	70	--	--
Total PAH (U=1/2)	170	170	--	--
LPAH/HPAH (U=1/2)	0.7	0.7	--	--
Naphthalene/Total PAH (U=1/2)	0.12	0.12	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-007	SB-007	SB-007	SB-007
Quadrant	C3	C3	C3	C3
Sample ID	SB007-97.0-97.5	SB007-102.0-102.3	SB007-106.3-106.6	SB007-116.3-116.6
Date Sampled	9/15/99	9/15/99	9/15/99	9/15/99
Field QC				Primary
Soil Description	clay	clay	clay	silt
NAPL Description	nothing	nothing	nothing	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-007	SB-007	SB-007	SB-007
Quadrant	C3	C3	C3	C3
Sample ID	SB507-116.3-117.3	SB007-122.0-122.3	SB007-126.7-127.3	SB007-134.0-134.3
Date Sampled	9/15/99	9/15/99	9/15/99	9/15/99
Field QC	Field Duplicate			
Soil Description	silt	sand	clay	sand
NAPL Description	odor	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-007	SB-007	SB-007	SB-007
Quadrant	C3	C3	C3	C3
Sample ID	SB007-139.0-139.3	SB007-145.3-145.6	SB007-150.0-150.5	SB007-156.5-156.8
Date Sampled	9/15/99	9/15/99	9/16/99	9/16/99
Field QC				
Soil Description	sand	sand	sand	clay
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-007	SB-007	SB-007	SB-007
Quadrant	C3	C3	C3	C3
Sample ID	SB007-168.3-168.6	SB007-171.5-171.8	SB007-176.3-176.6	SB007-180.5-181.0
Date Sampled	9/16/99	9/16/99	9/16/99	9/16/99
Field QC				Primary
Soil Description	sand	sand	silt	clay
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-007	SB-007	SB-007	SB-007
Quadrant	C3	C3	C3	C3
Sample ID	SB507-180.5-181.0	SB007-184.4-184.7	SB007-197.0-197.3	SB007-209.0-209.3
Date Sampled	9/16/99	9/16/99	9/16/99	9/16/99
Field QC	Field Duplicate			
Soil Description	clay	sand	silt	silt
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-007	SB-018	SB-018	SB-018
Quadrant	C3	C1	C1	C1
Sample ID	SB007-214.0-214.3	SB018-80.5-80.8	SB018-84.7-85.0	SB018-91.3-91.6
Date Sampled	9/16/99	8/19/99	8/19/99	8/19/99
Field QC				
Soil Description	clay	sand	sand	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	358	--	--
Exsitu peak wavelength	--	401	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	20 U	20 U	--
acenaphthene	--	20 U	20 U	--
acenaphthylene	--	20 U	20 U	--
anthracene	--	20 U	20 U	--
benzo(a)anthracene	--	20 U	20 U	--
benzo(a)pyrene	--	20 U	20 U	--
benzo(b)fluoranthene	--	20 U	20 U	--
benzo(g,h,i)perylene	--	20 U	20 U	--
benzo(k)fluoranthene	--	20 U	20 U	--
carbazole	--	20 U	20 U	--
chrysene	--	20 U	20 U	--
dibenzo(a,h)anthracene	--	20 U	20 U	--
dibenzofuran	--	20 U	20 U	--
fluoranthene	--	20 U	20 U	--
fluorene	--	20 U	20 U	--
indeno(1,2,3-cd)pyrene	--	20 U	20 U	--
naphthalene	--	20 U	20 U	--
pentachlorophenol	--	50 U	60 U	--
phenanthrene	--	20 U	20 U	--
pyrene	--	20 U	20 U	--
Total HPAH (U=1/2)	--	100	100	--
Total LPAH (U=1/2)	--	70	70	--
Total PAH (U=1/2)	--	170	170	--
LPAH/HPAH (U=1/2)	--	0.7	0.7	--
Naphthalene/Total PAH (U=1/2)	--	0.12	0.12	--
TPH (mg/kg)				
TRPH	--	1 J	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-018	SB-018	SB-018	SB-018
Quadrant	C1	C1	C1	C1
Sample ID	SB018-109.5-109.8	SB018-113.8-114.1	SB018-129.5-129.9	SB518-129.5-129.9
Date Sampled	8/19/99	8/19/99	8/19/99	8/19/99
Field QC			Primary	Field Duplicate
Soil Description	sand	sand	sand	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	20 U	20 U
acenaphthene	--	--	20 U	20 U
acenaphthylene	--	--	20 U	20 U
anthracene	--	--	20 U	20 U
benzo(a)anthracene	--	--	20 U	20 U
benzo(a)pyrene	--	--	20 U	20 U
benzo(b)fluoranthene	--	--	20 U	20 U
benzo(g,h,i)perylene	--	--	20 U	20 U
benzo(k)fluoranthene	--	--	20 U	20 U
carbazole	--	--	20 U	20 U
chrysene	--	--	20 U	20 U
dibenzo(a,h)anthracene	--	--	20 U	20 U
dibenzofuran	--	--	20 U	20 U
fluoranthene	--	--	20 U	20 U
fluorene	--	--	20 U	20 U
indeno(1,2,3-cd)pyrene	--	--	20 U	20 U
naphthalene	--	--	20 U	20 U
pentachlorophenol	--	--	50 U	50 U
phenanthrene	--	--	20 U	20 U
pyrene	--	--	20 U	20 U
Total HPAH (U=1/2)	--	--	100	100
Total LPAH (U=1/2)	--	--	70	70
Total PAH (U=1/2)	--	--	170	170
LPAH/HPAH (U=1/2)	--	--	0.7	0.7
Naphthalene/Total PAH (U=1/2)	--	--	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-018	SB-018	SB-018	SB-018
Quadrant	C1	C1	C1	C1
Sample ID	SB018-133.9-134.2	SB018-148.0-148.3	SB018-165.1-165.4	SB018-183.4-183.7
Date Sampled	8/19/99	8/19/99	8/19/99	8/19/99
Field QC				
Soil Description	sand	sand	sand	clay
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-019	SB-019	SB-019	SB-019
Quadrant	C2	C2	C2	C2
Sample ID	SB019-37.4-37.7	SB519-37.4-37.7	SB019-53.6-53.9	SB019-82.0-82.3
Date Sampled	8/12/99	8/12/99	8/12/99	8/13/99
Field QC	Primary	Field Duplicate		
Soil Description	sand	sand	sand	clay
NAPL Description	odor	odor	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	324	360	452	--
Exsitu peak wavelength	402	402	402	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	--
acenaphthene	20 U	20 U	20 U	--
acenaphthylene	20 U	20 U	20 U	--
anthracene	20 U	20 U	20 U	--
benzo(a)anthracene	20 U	20 U	20 U	--
benzo(a)pyrene	20 U	20 U	20 U	--
benzo(b)fluoranthene	20 U	20 U	20 U	--
benzo(g,h,i)perylene	20 U	20 U	20 U	--
benzo(k)fluoranthene	20 U	20 U	20 U	--
carbazole	20 U	20 U	20 U	--
chrysene	20 U	20 U	20 U	--
dibenzo(a,h)anthracene	20 U	20 U	20 U	--
dibenzofuran	20 U	20 U	20 U	--
fluoranthene	20 U	20 U	20 U	--
fluorene	20 U	20 U	20 U	--
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	--
naphthalene	20 U	20 U	20 U	--
pentachlorophenol	60 U	60 U	60 U	--
phenanthrene	20 U	20 U	20 U	--
pyrene	20 U	20 U	20 U	--
Total HPAH (U=1/2)	100	100	100	--
Total LPAH (U=1/2)	70	70	70	--
Total PAH (U=1/2)	170	170	170	--
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	--
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	--
TPH (mg/kg)				
TRPH	151	99	142	--
total hydrocarbons, C10-C39	88 J	120	160	100 U
C10-C11			7	--
C12-C13	6	12	10	--
C14-C15	21	29	37	--
C16-C17	27	28	36	--
C18-C19	13	25	36	--
C20-C21	19	26	27	--
C22-C23			5	--
C24-C25				--
C27-C28				--
C29-C30				--
C31-C32				--
C33-C34				--
C35-C36				--
C37-C39				--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-019	SB-019	SB-019	SB-019
Quadrant	C2	C2	C2	C2
Sample ID	SB019-94.0-94.4	SB019-129.6-129.9	SB519-137.0-137.3	SB019-140.9-141.2
Date Sampled	8/13/99	8/13/99	8/13/99	8/13/99
Field QC			Field Duplicate	
Soil Description	sand	sand	sand	sand
NAPL Description	odor	odor	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-019	SB-019	SB-019	SB-025
Quadrant	C2	C2	C2	C2
Sample ID	SB019-162.7-163.0	SB019-174.7-175.0	SB019-182.7-183	SB025-86.4-86.7
Date Sampled	8/16/99	8/16/99	8/16/99	8/26/99
Field QC				
Soil Description	sand	sand	sand	sand
NAPL Description	nothing	nothing	nothing	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	342
Exsitu peak wavelength	--	--	--	402
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	20 U
acenaphthene	--	--	--	20 U
acenaphthylene	--	--	--	20 U
anthracene	--	--	--	20 U
benzo(a)anthracene	--	--	--	20 U
benzo(a)pyrene	--	--	--	20 U
benzo(b)fluoranthene	--	--	--	20 U
benzo(g,h,i)perylene	--	--	--	20 U
benzo(k)fluoranthene	--	--	--	20 U
carbazole	--	--	--	20 U
chrysene	--	--	--	20 U
dibenzo(a,h)anthracene	--	--	--	20 U
dibenzofuran	--	--	--	20 U
fluoranthene	--	--	--	20 U
fluorene	--	--	--	20 U
indeno(1,2,3-cd)pyrene	--	--	--	20 U
naphthalene	--	--	--	20 U
pentachlorophenol	--	--	--	60 U
phenanthrene	--	--	--	20 U
pyrene	--	--	--	20 U
Total HPAH (U=1/2)	--	--	--	100
Total LPAH (U=1/2)	--	--	--	70
Total PAH (U=1/2)	--	--	--	170
LPAH/HPAH (U=1/2)	--	--	--	0.7
Naphthalene/Total PAH (U=1/2)	--	--	--	0.12
TPH (mg/kg)				
TRPH	--	--	--	15 U
total hydrocarbons, C10-C39	100 U	100 U	3.9	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-025	SB-025	SB-025	SB-025
Quadrant	C2	C2	C2	C2
Sample ID	SB025-96.0-96.4	SB025-109.7-110	SB025-129.7-130.0	SB025-132.0-132.4
Date Sampled	8/26/99	8/26/99	8/26/99	8/26/99
Field QC				
Soil Description	sand	silt	sand	sand
NAPL Description	odor	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	--	--	--
acenaphthene	20 U	--	--	--
acenaphthylene	20 U	--	--	--
anthracene	20 U	--	--	--
benzo(a)anthracene	20 U	--	--	--
benzo(a)pyrene	20 U	--	--	--
benzo(b)fluoranthene	20 U	--	--	--
benzo(g,h,i)perylene	20 U	--	--	--
benzo(k)fluoranthene	20 U	--	--	--
carbazole	20 U	--	--	--
chrysene	20 U	--	--	--
dibenzo(a,h)anthracene	20 U	--	--	--
dibenzofuran	20 U	--	--	--
fluoranthene	20 U	--	--	--
fluorene	20 U	--	--	--
indeno(1,2,3-cd)pyrene	20 U	--	--	--
naphthalene	20 U	--	--	--
pentachlorophenol	60 U	--	--	--
phenanthrene	20 U	--	--	--
pyrene	20 U	--	--	--
Total HPAH (U=1/2)	100	--	--	--
Total LPAH (U=1/2)	70	--	--	--
Total PAH (U=1/2)	170	--	--	--
LPAH/HPAH (U=1/2)	0.7	--	--	--
Naphthalene/Total PAH (U=1/2)	0.12	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-025	SB-025	SB-025	SB-025
Quadrant	C2	C2	C2	C2
Sample ID	SB025-137.2-137.5	SB025-145.6-146	SB025-159.7-160.0	SB025-163.0-163.4
Date Sampled	8/26/99	8/26/99	8/27/99	8/27/99
Field QC				Primary
Soil Description	silt	sand	sand	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-025	SB-025	SB-025	SB-025
Quadrant	C2	C2	C2	C2
Sample ID	SB525-163.0-163.4	SB025-179.7-180.0	SB025-193.6-194.3	SB025-202.8-203.1
Date Sampled	8/27/99	8/27/99	8/27/99	8/27/99
Field QC	Field Duplicate			
Soil Description	sand	sand	silt	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-027	SB-027	SB-027	SB-027
Quadrant	C2	C2	C2	C2
Sample ID	SB027-9.4-9.7	SB027-13.3-13.7	SB027-19.7-20.0	SB027-24.0-24.4
Date Sampled	9/2/99	9/2/99	9/2/99	9/2/99
Field QC				
Soil Description	sand	clay	clay	sand
NAPL Description	sheen	odor	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	30 U	20 U	20 U
acenaphthene	20 U	30 U	20 U	20 U
acenaphthylene	20 U	30 U	20 U	20 U
anthracene	20 U	30 U	20 U	20 U
benzo(a)anthracene	20 U	30 U	20 U	20 U
benzo(a)pyrene	20 U	30 U	20 U	20 U
benzo(b)fluoranthene	20 U	30 U	20 U	20 U
benzo(g,h,i)perylene	20 U	30 U	20 U	20 U
benzo(k)fluoranthene	20 U	30 U	20 U	20 U
carbazole	20 UJ	30 UJ	20 U	20 U
chrysene	20 U	30 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	30 U	20 U	20 U
dibenzofuran	20 U	30 U	20 U	20 U
fluoranthene	20 U	30 U	20 U	20 U
fluorene	20 U	30 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	30 U	20 U	20 U
naphthalene	20 U	30 U	20 U	20 U
pentachlorophenol	50 U	530	230	200
phenanthrene	20 U	30 U	20 U	20 U
pyrene	20 U	30 U	20 U	20 U
Total HPAH (U=1/2)	100	150	100	100
Total LPAH (U=1/2)	70	105	70	70
Total PAH (U=1/2)	170	255	170	170
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-027	SB-027	SB-027	SB-027
Quadrant	C2	C2	C2	C2
Sample ID	SB027-33.9-34.2	SB027-46.3-46.7	SB027-59.6-60.0	SB027-61.0-61.4
Date Sampled	9/2/99	9/2/99	9/2/99	9/2/99
Field QC				Primary
Soil Description	sand	sand	sand	sand
NAPL Description	odor	odor	nothing	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	20 U
acenaphthene	20 U	20 U	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 U	20 UJ	20 U	20 U
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	20 U	20 U
fluoranthene	20 U	20 U	20 U	20 U
fluorene	20 U	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	20 U	20 U
pentachlorophenol	60 U	60 U	60 U	60 U
phenanthrene	20 U	20 U	20 U	20 U
pyrene	20 U	20 U	20 U	20 U
Total HPAH (U=1/2)	100	100	100	100
Total LPAH (U=1/2)	70	70	70	70
Total PAH (U=1/2)	170	170	170	170
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-027	SB-027	SB-027	SB-027
Quadrant	C2	C2	C2	C2
Sample ID	SB527-61.0-61.4	SB027-63.6-64.0	SB027-69.0-69.3	SB027-73.4-73.9
Date Sampled	9/2/99	9/2/99	9/2/99	9/2/99
Field QC	Field Duplicate			
Soil Description	sand	sand	sand	sand
NAPL Description	sheen	sheen	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	30	130	180
acenaphthene	20 U	40	80	100
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20	30	30
benzo(a)anthracene	20 U	10 J	20 U	20
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	10 J
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 U	20 U	20 U	10 J
chrysene	20 U	10 J	10 J	20
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20	50	60
fluoranthene	20 U	40	50	60
fluorene	20 U	20	50	60
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	40	130	210
pentachlorophenol	50 U	60 U	60 U	50 U
phenanthrene	20 U	80	120	130
pyrene	20 U	40	40	50
Total HPAH (U=1/2)	100	160	170	210
Total LPAH (U=1/2)	70	240	550	720
Total PAH (U=1/2)	170	400	720	930
LPAH/HPAH (U=1/2)	0.7	1.5	3.2	3.4
Naphthalene/Total PAH (U=1/2)	0.12	0.1	0.18	0.23
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	830	1300	670
C10-C11	--	190	400	240
C12-C13	--	120	320	150
C14-C15	--	130	240	110
C16-C17	--	110	140	58
C18-C19	--	89	89	40
C20-C21	--	74	65	30
C22-C23	--	50	40	20
C24-C25	--	20	20	8
C27-C28	--	20	20	8
C29-C30	--	10	10	5
C31-C32	--			
C33-C34	--			
C35-C36	--			
C37-C39	--			

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-027	SB-027	SB-027	SB-027
Quadrant	C2	C2	C2	C2
Sample ID	SB027-84.2-84.5	SB027-89.2-89.5	SB027-96.3-96.9	SB027-105.6-106.0
Date Sampled	9/2/99	9/2/99	9/2/99	9/2/99
Field QC				
Soil Description	clay	sand	clay	sand
NAPL Description	odor	odor	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	20 U
acenaphthene	20 U	20 U	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 U	20 U	20 U	20 U
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	20 U	20 U
fluoranthene	20 U	20 U	20 U	20 U
fluorene	20 U	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	20 U	20 U
pentachlorophenol	50 U	60 U	60 U	60 U
phenanthrene	20 U	20 U	20 U	20 U
pyrene	20 U	20 U	20 U	20 U
Total HPAH (U=1/2)	100	100	100	100
Total LPAH (U=1/2)	70	70	70	70
Total PAH (U=1/2)	170	170	170	170
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	60 J	100 U
C10-C11	--	--	10	--
C12-C13	--	--	20	--
C14-C15	--	--	10	--
C16-C17	--	--	9	--
C18-C19	--	--	6	--
C20-C21	--	--	5	--
C22-C23	--	--		--
C24-C25	--	--		--
C27-C28	--	--		--
C29-C30	--	--		--
C31-C32	--	--		--
C33-C34	--	--		--
C35-C36	--	--		--
C37-C39	--	--		--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-027	SB-027	SB-027
Quadrant	C2	C2	C2
Sample ID	SB027-113.3-113.7	SB027-115.9-116.3	SB027-122.8-123.1
Date Sampled	9/3/99	9/3/99	9/3/99
Field QC			
Soil Description	sand	sand	sand
NAPL Description	odor	sheen	sheen
LIF (counts/wavelength)			
Exsitu maximum intensity	--	--	--
Exsitu peak wavelength	--	--	--
PAHs (mg/kg)			
2-methylnaphthalene	20	620	1900
acenaphthene	10 J	360	1000
acenaphthylene	20 U	20 U	20
anthracene	10 J	110	400
benzo(a)anthracene	10 J	60	160
benzo(a)pyrene	20 U	30	80
benzo(b)fluoranthene	20 U	40	100
benzo(g,h,i)perylene	20 U	20 U	30
benzo(k)fluoranthene	20 U	10 J	40
carbazole	20 UJ	30 J	100 J
chrysene	20 U	60	150
dibenzo(a,h)anthracene	20 U	20 U	20 U
dibenzofuran	20 U	210	600
fluoranthene	40	240	700
fluorene	10 J	220	700
indeno(1,2,3-cd)pyrene	20 U	10 J	30
naphthalene	20	840	2700
pentachlorophenol	50 U	50 U	60 U
phenanthrene	60	500	1500
pyrene	30	180	500
Total HPAH (U=1/2)	150	650	1800
Total LPAH (U=1/2)	140	2660	8220
Total PAH (U=1/2)	290	3310	10020
LPAH/HPAH (U=1/2)	0.93	4.1	4.6
Naphthalene/Total PAH (U=1/2)	0.06	0.25	0.27
TPH (mg/kg)			
TRPH	--	--	--
total hydrocarbons, C10-C39	380	5100	15000
C10-C11	67	1200	3500
C12-C13	46	1100	3300
C14-C15	51	960	2800
C16-C17	59	630	1900
C18-C19	52	440	1300
C20-C21	40	330	970
C22-C23	30	200	590
C24-C25	10	100	300
C27-C28	10	100	270
C29-C30	9	60	200
C31-C32		20	50
C33-C34		20	50
C35-C36			
C37-C39			

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-027	SB-027	SB-027	SB-027
Quadrant	C2	C2	C2	C2
Sample ID	SB027-129.7-130.0	SB027-142.3-143.0	SB527-142.3-143.0	SB027-152.3-152.7
Date Sampled	9/3/99	9/3/99	9/3/99	9/3/99
Field QC		Primary	Field Duplicate	
Soil Description	sand	sand	sand	sand
NAPL Description	odor	nothing	nothing	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	--	20 U	--
acenaphthene	20 U	--	20 U	--
acenaphthylene	20 U	--	20 U	--
anthracene	20 U	--	20 U	--
benzo(a)anthracene	20 U	--	20 U	--
benzo(a)pyrene	20 U	--	20 U	--
benzo(b)fluoranthene	20 U	--	20 U	--
benzo(g,h,i)perylene	20 U	--	20 U	--
benzo(k)fluoranthene	20 U	--	20 U	--
carbazole	20 UJ	--	20 UJ	--
chrysene	20 U	--	20 U	--
dibenzo(a,h)anthracene	20 U	--	20 U	--
dibenzofuran	20 U	--	20 U	--
fluoranthene	20 U	--	20 U	--
fluorene	20 U	--	20 U	--
indeno(1,2,3-cd)pyrene	20 U	--	20 U	--
naphthalene	20 U	--	20 U	--
pentachlorophenol	50 U	--	60 U	--
phenanthrene	20 U	--	20 U	--
pyrene	20 U	--	20 U	--
Total HPAH (U=1/2)	100	--	100	--
Total LPAH (U=1/2)	70	--	70	--
Total PAH (U=1/2)	170	--	170	--
LPAH/HPAH (U=1/2)	0.7	--	0.7	--
Naphthalene/Total PAH (U=1/2)	0.12	--	0.12	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-027	SB-027	SB-027	SB-027
Quadrant	C2	C2	C2	C2
Sample ID	SB027-166.6-167.0	SB027-172.5-172.8	SB027-183.7-184.0	SB027-193.0-193.4
Date Sampled	9/3/99	9/7/99	9/7/99	9/7/99
Field QC				
Soil Description	sand	sand	sand	sand
NAPL Description	odor	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-027	SB-027	SB-027	SB-027
Quadrant	C2	C2	C2	C2
Sample ID	SB027-201.3-201.7	SB027-214-214.5	SB527-214-214.5	SB027-217.7-218.0
Date Sampled	9/7/99	9/7/99	9/7/99	9/7/99
Field QC		Primary	Field Duplicate	
Soil Description	sand	clay	clay	sand
NAPL Description	odor	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	20 U	20 U	--
acenaphthene	--	20 U	20 U	--
acenaphthylene	--	20 U	20 U	--
anthracene	--	20 U	20 U	--
benzo(a)anthracene	--	20 U	20 U	--
benzo(a)pyrene	--	20 U	20 U	--
benzo(b)fluoranthene	--	20 U	20 U	--
benzo(g,h,i)perylene	--	20 U	20 U	--
benzo(k)fluoranthene	--	20 U	20 U	--
carbazole	--	20 UJ	20 UJ	--
chrysene	--	20 U	20 U	--
dibenzo(a,h)anthracene	--	20 U	20 U	--
dibenzofuran	--	20 U	20 U	--
fluoranthene	--	20 U	20 U	--
fluorene	--	20 U	20 U	--
indeno(1,2,3-cd)pyrene	--	20 U	20 U	--
naphthalene	--	20 U	20 U	--
pentachlorophenol	--	60 U	60 U	--
phenanthrene	--	20 U	20 U	--
pyrene	--	20 U	20 U	--
Total HPAH (U=1/2)	--	100	100	--
Total LPAH (U=1/2)	--	70	70	--
Total PAH (U=1/2)	--	170	170	--
LPAH/HPAH (U=1/2)	--	0.7	0.7	--
Naphthalene/Total PAH (U=1/2)	--	0.12	0.12	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-027	SB-027	SB-028	SB-028
Quadrant	C2	C2	C2	C2
Sample ID	SB027-224.4-224.9	SB027-228.0-228.5	SB028-8.0-8.4	SB028-9.0-10.1
Date Sampled	9/7/99	9/7/99	9/29/99	8/8/99
Field QC				
Soil Description	sand	clay	clay	
NAPL Description	nothing	nothing	odor	
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	120	20 U
acenaphthene	--	--	90	20 U
acenaphthylene	--	--	20 U	20 U
anthracene	--	--	220	20 U
benzo(a)anthracene	--	--	20	20 U
benzo(a)pyrene	--	--	10 J	20 U
benzo(b)fluoranthene	--	--	10 J	20 U
benzo(g,h,i)perylene	--	--	20 U	20 U
benzo(k)fluoranthene	--	--	20 U	20 U
carbazole	--	--	100	20 U
chrysene	--	--	30	20 U
dibenzo(a,h)anthracene	--	--	20 U	20 U
dibenzofuran	--	--	70	20 U
fluoranthene	--	--	110	20 U
fluorene	--	--	90	20 U
indeno(1,2,3-cd)pyrene	--	--	20 U	20 U
naphthalene	--	--	110	20 U
pentachlorophenol	--	--	140	60 U
phenanthrene	--	--	240	20 U
pyrene	--	--	90	20 U
Total HPAH (U=1/2)	--	--	310	100
Total LPAH (U=1/2)	--	--	880	70
Total PAH (U=1/2)	--	--	1190	170
LPAH/HPAH (U=1/2)	--	--	2.8	0.7
Naphthalene/Total PAH (U=1/2)	--	--	0.09	0.12
TPH (mg/kg)				
TRPH	--	--	--	34
total hydrocarbons, C10-C39	100 U	100 U	880	250
C10-C11	--	--	22	5
C12-C13	--	--	51	10
C14-C15	--	--	95	30
C16-C17	--	--	490	180
C18-C19	--	--	83	10
C20-C21	--	--	46	9
C22-C23	--	--	51	5
C24-C25	--	--	23	
C27-C28	--	--	15	
C29-C30	--	--		
C31-C32	--	--		
C33-C34	--	--		
C35-C36	--	--		
C37-C39	--	--		

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-028	SB-028	SB-028	SB-028
Quadrant	C2	C2	C2	C2
Sample ID	SB028-10.1-11	SB028-12-12.5	SB028-28.3-29.4	SB028-31-33
Date Sampled	8/8/99	9/29/99	9/29/99	9/29/99
Field QC				
Soil Description		clay	sand & gravel	sand
NAPL Description		odor	sheen	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20	10 J	180	140
acenaphthene	20	20 U	110	70
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	10 J	180	60	40
benzo(a)anthracene	20 U	20 U	50	20
benzo(a)pyrene	20 U	20 U	20	20 U
benzo(b)fluoranthene	20 U	20 U	30	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20	20 U
carbazole	20 U	70 J	40 J	20 J
chrysene	20 U	20 U	50	20
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	10 J	20 U	100	50
fluoranthene	30	10 J	200	70
fluorene	20	20	80	50
indeno(1,2,3-cd)pyrene	20 U	20 U	10 J	20 U
naphthalene	20 U	20 U	620 J	450
pentachlorophenol	60 U	60 U	60 U	60 U
phenanthrene	60	40	350 J	160
pyrene	20	20 U	150	60
Total HPAH (U=1/2)	130	100	550	230
Total LPAH (U=1/2)	150	280	1410	920
Total PAH (U=1/2)	280	380	1960	1150
LPAH/HPAH (U=1/2)	1.2	2.8	2.6	4
Naphthalene/Total PAH (U=1/2)	0.07	0.05	0.32	0.39
TPH (mg/kg)				
TRPH	353	--	--	--
total hydrocarbons, C10-C39	440	250	2600	1300
C10-C11	10	5	690	420
C12-C13	45	9	330	210
C14-C15	74	22	390	230
C16-C17	84	180	410	180
C18-C19	67	20	300	130
C20-C21	58	19	230	84
C22-C23	50		120	42
C24-C25	20		30	16
C27-C28	20		47	16
C29-C30	10		25	10
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-028	SB-028	SB-028	SB-028
Quadrant	C2	C2	C2	C2
Sample ID	SB028-48-49.7	SB028-53.5-55	SB528-53.5-55	SB028-55-56
Date Sampled	9/29/99	9/29/99	9/29/99	9/29/99
Field QC		Primary	Field Duplicate	
Soil Description	sand	sand	sand	sand
NAPL Description	sheen	sheen	sheen	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	420	650	80
acenaphthene	20	260	450	60
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	10 J	130	210	30
benzo(a)anthracene	20 U	80	120	20
benzo(a)pyrene	20 U	30	50	20 U
benzo(b)fluoranthene	20 U	40	60	20 U
benzo(g,h,i)perylene	20 U	10 J	20	20 U
benzo(k)fluoranthene	20 U	30	40	20 U
carbazole	20 UJ	70 J	100 J	20 J
chrysene	20 U	70	110	20
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	10 J	180	260	40
fluoranthene	20	300	480	80
fluorene	20	210	260	50
indeno(1,2,3-cd)pyrene	20 U	10 J	20	20 U
naphthalene	20	1200	1900	190
pentachlorophenol	50 U	60 U	60 U	60 U
phenanthrene	50	620	980	150
pyrene	20	220	440	60
Total HPAH (U=1/2)	120	800	1350	240
Total LPAH (U=1/2)	140	2850	4460	510
Total PAH (U=1/2)	260	3650	5810	810
LPAH/HPAH (U=1/2)	1.2	3.6	3.3	2.4
Naphthalene/Total PAH (U=1/2)	0.07	0.33	0.33	0.23
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	630	6000	6500	490
C10-C11	55	1700	1800	130
C12-C13	53	820	900	64
C14-C15	130	980	1100	82
C16-C17	160	900	980	79
C18-C19	90	620	670	53
C20-C21	69	460	500	43
C22-C23	35	240	260	21
C24-C25	9.4	97	100	5.9
C27-C28	14	130	140	12
C29-C30	5	57	63	
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-028	SB-028	SB-028	SB-028
Quadrant	C2	C2	C2	C2
Sample ID	SB028-67.7-68	SB028-79.5-79.8	SB028-82.2-83.7	SB028-100.6-101.5
Date Sampled	9/29/99	9/29/99	9/29/99	9/29/99
Field QC				
Soil Description	sand	clay	sand	clay
NAPL Description	odor	odor	odor	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	20
acenaphthene	20 U	20 U	20 U	20
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 U	20 UJ	20 UJ	20 UJ
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	20 U	20 U
fluoranthene	20 U	10 J	20 U	40
fluorene	20 U	20 U	20 U	20
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20	20 U	20
pentachlorophenol	50 U	50 U	60 U	60 U
phenanthrene	20 U	20	20 U	70
pyrene	20 U	20 U	20 U	30
Total HPAH (U=1/2)	100	100	100	150
Total LPAH (U=1/2)	70	90	70	170
Total PAH (U=1/2)	170	190	170	320
LPAH/HPAH (U=1/2)	0.7	0.9	0.7	1.1
Naphthalene/Total PAH (U=1/2)	0.12	0.11	0.12	0.06
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	700 U
C10-C11	--	--	--	92
C12-C13	--	--	--	82
C14-C15	--	--	--	110
C16-C17	--	--	--	150
C18-C19	--	--	--	93
C20-C21	--	--	--	100
C22-C23	--	--	--	33
C24-C25	--	--	--	10
C27-C28	--	--	--	
C29-C30	--	--	--	
C31-C32	--	--	--	
C33-C34	--	--	--	
C35-C36	--	--	--	
C37-C39	--	--	--	

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-028	SB-028	SB-028	SB-028
Quadrant	C2	C2	C2	C2
Sample ID	SB028-113-113.2	SB028-134-134.5	SB028-141-142	SB028-153.3-153.6
Date Sampled	9/29/99	9/30/99	9/30/99	9/30/99
Field QC				
Soil Description	sand	sand	sand	sand
NAPL Description	sheen	nothing	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	20 U
acenaphthene	10 J	20 U	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 U	20 U	20 UJ	20 U
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	20 U	20 U
fluoranthene	30	20 U	20 U	20 U
fluorene	10 J	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	20 U	20 U
pentachlorophenol	60 U	50 UJ	60 U	60 UJ
phenanthrene	50	20 U	20 U	20 U
pyrene	20	20 U	20 U	20 U
Total HPAH (U=1/2)	130	100	100	100
Total LPAH (U=1/2)	110	70	70	70
Total PAH (U=1/2)	240	170	170	170
LPAH/HPAH (U=1/2)	0.85	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.08	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100	100 U	100 U	100 U
C10-C11	21	--	--	--
C12-C13	12	--	--	--
C14-C15	29	--	--	--
C16-C17	20	--	--	--
C18-C19	7	--	--	--
C20-C21	21	--	--	--
C22-C23		--	--	--
C24-C25		--	--	--
C27-C28		--	--	--
C29-C30		--	--	--
C31-C32		--	--	--
C33-C34		--	--	--
C35-C36		--	--	--
C37-C39		--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-030	SB-030	SB-030	SB-030
Quadrant	D3	D3	D3	D3
Sample ID	SB030-69.7-70.0	SB030-76.0-76.3	SB030-82.7-83.2	SB030-110.0-110.3
Date Sampled	8/23/99	8/23/99	8/23/99	8/23/99
Field QC				
Soil Description	sand	sand	sand	clay
NAPL Description	odor	nothing	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	390	--	--	--
Exsitu peak wavelength	402	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	--	--	20 U
acenaphthene	20 U	--	--	20 U
acenaphthylene	20 U	--	--	20 U
anthracene	20 U	--	--	20 U
benzo(a)anthracene	20 U	--	--	20 U
benzo(a)pyrene	20 U	--	--	20 U
benzo(b)fluoranthene	20 U	--	--	20 U
benzo(g,h,i)perylene	20 U	--	--	20 U
benzo(k)fluoranthene	20 U	--	--	20 U
carbazole	20 U	--	--	20 U
chrysene	20 U	--	--	20 U
dibenzo(a,h)anthracene	20 U	--	--	20 U
dibenzofuran	20 U	--	--	20 U
fluoranthene	20 U	--	--	20 U
fluorene	20 U	--	--	20 U
indeno(1,2,3-cd)pyrene	20 U	--	--	20 U
naphthalene	20 U	--	--	20 U
pentachlorophenol	60 U	--	--	60 U
phenanthrene	20 U	--	--	20 U
pyrene	20 U	--	--	20 U
Total HPAH (U=1/2)	100	--	--	100
Total LPAH (U=1/2)	70	--	--	70
Total PAH (U=1/2)	170	--	--	170
LPAH/HPAH (U=1/2)	0.7	--	--	0.7
Naphthalene/Total PAH (U=1/2)	0.12	--	--	0.12
TPH (mg/kg)				
TRPH	8	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-030	SB-030	SB-030	SB-030
Quadrant	D3	D3	D3	D3
Sample ID	SB030-121.4-122.2	SB530-121.4-122.2	SB030-127.3-127.7	SB030-137.3-137.7
Date Sampled	8/23/99	8/23/99	8/23/99	8/23/99
Field QC	Primary	Field Duplicate		
Soil Description	sand	sand	sand	sand
NAPL Description	odor	odor	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	30 U	20 U	--	--
acenaphthene	30 U	20 U	--	--
acenaphthylene	30 U	20 U	--	--
anthracene	30 U	20 U	--	--
benzo(a)anthracene	30 U	20 U	--	--
benzo(a)pyrene	30 U	20 U	--	--
benzo(b)fluoranthene	30 U	20 U	--	--
benzo(g,h,i)perylene	30 U	20 U	--	--
benzo(k)fluoranthene	30 U	20 U	--	--
carbazole	30 U	20 U	--	--
chrysene	30 U	20 U	--	--
dibenzo(a,h)anthracene	30 U	20 U	--	--
dibenzofuran	30 U	20 U	--	--
fluoranthene	30 U	20 U	--	--
fluorene	30 U	20 U	--	--
indeno(1,2,3-cd)pyrene	30 U	20 U	--	--
naphthalene	30 U	20 U	--	--
pentachlorophenol	60 U	60 U	--	--
phenanthrene	30 U	20 U	--	--
pyrene	30 U	20 U	--	--
Total HPAH (U=1/2)	150	100	--	--
Total LPAH (U=1/2)	105	70	--	--
Total PAH (U=1/2)	255	170	--	--
LPAH/HPAH (U=1/2)	0.7	0.7	--	--
Naphthalene/Total PAH (U=1/2)	0.12	0.12	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-030	SB-030	SB-030	SB-030
Quadrant	D3	D3	D3	D3
Sample ID	SB030-143.0-143.5	SB030-152.5-152.8	SB030-166.0-166.3	SB030-174.0-174.3
Date Sampled	8/24/99	8/24/99	8/24/99	8/24/99
Field QC				
Soil Description	sand	sand	sand	sand
NAPL Description	odor	odor	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-030	SB-030	SB-030	SB-047
Quadrant	D3	D3	D3	D3
Sample ID	SB030-188.0-188.3	SB030-194.1-194.4	SB030-204.0-204.3	SB047-8.8-9.2
Date Sampled	8/24/99	8/24/99	8/24/99	10/13/99
Field QC				
Soil Description	sand	silt	sand	clay
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	20 U
acenaphthene	--	--	--	20 U
acenaphthylene	--	--	--	20 U
anthracene	--	--	--	20 U
benzo(a)anthracene	--	--	--	20 U
benzo(a)pyrene	--	--	--	20 U
benzo(b)fluoranthene	--	--	--	20 U
benzo(g,h,i)perylene	--	--	--	20 U
benzo(k)fluoranthene	--	--	--	20 U
carbazole	--	--	--	20 UJ
chrysene	--	--	--	20 U
dibenzo(a,h)anthracene	--	--	--	20 U
dibenzofuran	--	--	--	20 U
fluoranthene	--	--	--	20 U
fluorene	--	--	--	20 U
indeno(1,2,3-cd)pyrene	--	--	--	20 U
naphthalene	--	--	--	20 U
pentachlorophenol	--	--	--	60 U
phenanthrene	--	--	--	20 U
pyrene	--	--	--	20 U
Total HPAH (U=1/2)	--	--	--	100
Total LPAH (U=1/2)	--	--	--	70
Total PAH (U=1/2)	--	--	--	170
LPAH/HPAH (U=1/2)	--	--	--	0.7
Naphthalene/Total PAH (U=1/2)	--	--	--	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-047	SB-047	SB-047	SB-047
Quadrant	D3	D3	D3	D3
Sample ID	SB047-14.6-14.9	SB047-17.7-18.0	SB047-24.2-24.5	SB047-28.7-29.0
Date Sampled	10/13/99	10/13/99	10/13/99	10/13/99
Field QC				Primary
Soil Description	clay	clay	clay	sand
NAPL Description	nothing	nothing	nothing	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	20 U
acenaphthene	20 U	20 U	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 UJ	20 UJ	20 UJ	20 UJ
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	20 U	20 U
fluoranthene	20 U	20 U	20 U	20 U
fluorene	20 U	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	20 U	20 U
pentachlorophenol	60 U	60 U	60 U	60 U
phenanthrene	20 U	20 U	20 U	20 U
pyrene	20 U	20 U	20 U	20 U
Total HPAH (U=1/2)	100	100	100	100
Total LPAH (U=1/2)	70	70	70	70
Total PAH (U=1/2)	170	170	170	170
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	--
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-047	SB-047	SB-047	SB-047
Quadrant	D3	D3	D3	D3
Sample ID	SB547-28.7-29.0	SB047-34.5-35.0	SB547-34.5-35.0	SB047-46.4-46.9
Date Sampled	10/13/99	10/13/99	10/13/99	10/13/99
Field QC	Field Duplicate	Primary	Field Duplicate	
Soil Description	sand	sand	sand	sand
NAPL Description	odor	odor	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	20 U	20 U	20 U
acenaphthene	--	20 U	20 U	20 U
acenaphthylene	--	20 U	20 U	20 U
anthracene	--	20 U	20 U	20 U
benzo(a)anthracene	--	20 U	20 U	20 U
benzo(a)pyrene	--	20 U	20 U	20 U
benzo(b)fluoranthene	--	20 U	20 U	20 U
benzo(g,h,i)perylene	--	20 U	20 U	20 U
benzo(k)fluoranthene	--	20 U	20 U	20 U
carbazole	--	20 UJ	20 UJ	20 UJ
chrysene	--	20 U	20 U	20 U
dibenzo(a,h)anthracene	--	20 U	20 U	20 U
dibenzofuran	--	20 U	20 U	20 U
fluoranthene	--	20 U	20 U	20 U
fluorene	--	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	--	20 U	20 U	20 U
naphthalene	--	20 U	20 U	20 U
pentachlorophenol	--	60 U	60 U	60 U
phenanthrene	--	20 U	20 U	20 U
pyrene	--	20 U	20 U	20 U
Total HPAH (U=1/2)	--	100	100	100
Total LPAH (U=1/2)	--	70	70	70
Total PAH (U=1/2)	--	170	170	170
LPAH/HPAH (U=1/2)	--	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	--	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-047	SB-047	SB-047	SB-047
Quadrant	D3	D3	D3	D3
Sample ID	SB047-54.0-54.3	SB047-61.8-62.1	SB047-69.1-69.4	SB047-73.6-73.9
Date Sampled	10/13/99	10/13/99	10/13/99	10/13/99
Field QC				
Soil Description	sand	sand	sand	sand
NAPL Description	nothing	odor	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	--	20 U	--
acenaphthene	20 U	--	20 U	--
acenaphthylene	20 U	--	20 U	--
anthracene	20 U	--	20 U	--
benzo(a)anthracene	20 U	--	20 U	--
benzo(a)pyrene	20 U	--	20 U	--
benzo(b)fluoranthene	20 U	--	20 U	--
benzo(g,h,i)perylene	20 U	--	20 U	--
benzo(k)fluoranthene	20 U	--	20 U	--
carbazole	20 UJ	--	20 UJ	--
chrysene	20 U	--	20 U	--
dibenzo(a,h)anthracene	20 U	--	20 U	--
dibenzofuran	20 U	--	20 U	--
fluoranthene	20 U	--	20 U	--
fluorene	20 U	--	20 U	--
indeno(1,2,3-cd)pyrene	20 U	--	20 U	--
naphthalene	20 U	--	20 U	--
pentachlorophenol	60 U	--	60 U	--
phenanthrene	20 U	--	20 U	--
pyrene	20 U	--	20 U	--
Total HPAH (U=1/2)	100	--	100	--
Total LPAH (U=1/2)	70	--	70	--
Total PAH (U=1/2)	170	--	170	--
LPAH/HPAH (U=1/2)	0.7	--	0.7	--
Naphthalene/Total PAH (U=1/2)	0.12	--	0.12	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	90 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-047	SB-047	SB-047	SB-047
Quadrant	D3	D3	D3	D3
Sample ID	SB047-82.5-82.8	SB047-86.2-86.4	SB047-97.0-97.3	SB047-103.0-103.3
Date Sampled	10/13/99	10/13/99	10/14/99	10/14/99
Field QC				
Soil Description	clay	sand	sand	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-047	SB-047	SB-047	SB-047
Quadrant	D3	D3	D3	D3
Sample ID	SB047-113.7-114.0	SB047-129.5-130.0	SB547-129.5-130.0	SB047-134.0-134.3
Date Sampled	10/14/99	10/14/99	10/14/99	10/14/99
Field QC		Primary	Field Duplicate	
Soil Description	sand	sand	sand	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	90 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-047	SB-047	SB-047	SB-047
Quadrant	D3	D3	D3	D3
Sample ID	SB047-141.0-141.3	SB047-152.6-152.9	SB047-158.1-158.4	SB047-162.3-162.6
Date Sampled	10/14/99	10/14/99	10/14/99	10/14/99
Field QC				
Soil Description	sand	sand	sand	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	90 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-047	SB-047	SB-047	SB-047
Quadrant	D3	D3	D3	D3
Sample ID	SB047-173.0-173.3	SB047-188.0-188.5	SB547-188.0-188.5	SB047-194.0-194.3
Date Sampled	10/15/99	10/15/99	10/15/99	10/15/99
Field QC		Primary	Field Duplicate	
Soil Description	clay	sand	sand	clay
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	90 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-047	SB-047	SB-047	SB-047
Quadrant	D3	D3	D3	D3
Sample ID	SB047-198.2-198.5	SB047-204.0-204.3	SB047-238.0-238.3	SB047-244.0-245.0
Date Sampled	10/15/99	10/15/99	10/15/99	10/15/99
Field QC				
Soil Description	sand	clay	sand	sand and gravel
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	90 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-051	SB-051	SB-051	SB-051
Quadrant	D2	D2	D2	D2
Sample ID	SB051-52.4-52.9	SB051-56.0-56.3	SB051-77.0-77.4	SB051-80.0-80.3
Date Sampled	9/8/99	9/8/99	9/8/99	9/8/99
Field QC				
Soil Description	sand	sand	clay	sand
NAPL Description	sheen	visible	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	608	819	329	410
Exsitu peak wavelength	402	432	402	402
PAHs (mg/kg)				
2-methylnaphthalene	20 U	60	20 U	20 U
acenaphthene	20 U	40	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	10 J	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 UJ	20 UJ	20 UJ	20 UJ
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20	20 U	20 U
fluoranthene	20 U	20	20 U	20 U
fluorene	20 U	20	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	120	20	20
pentachlorophenol	60 U	60 U	60 U	50 U
phenanthrene	10 J	50	20 U	20 U
pyrene	20 U	10 J	20 U	20 U
Total HPAH (U=1/2)	100	110	100	100
Total LPAH (U=1/2)	70	310	80	80
Total PAH (U=1/2)	170	420	180	180
LPAH/HPAH (U=1/2)	0.7	2.8	0.8	0.8
Naphthalene/Total PAH (U=1/2)	0.12	0.29	0.11	0.11
TPH (mg/kg)				
TRPH	108	296	67	33
total hydrocarbons, C10-C39	310	720	160	70 J
C10-C11	81	190	40	--
C12-C13	60	140	30	--
C14-C15	60	140	30	--
C16-C17	50	100	30	--
C18-C19	30	74	20	--
C20-C21	20	50	10	--
C22-C23	9	20		--
C24-C25		7		--
C27-C28				--
C29-C30				--
C31-C32				--
C33-C34				--
C35-C36				--
C37-C39				--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-051	SB-051	SB-051	SB-051
Quadrant	D2	D2	D2	D2
Sample ID	SB051-86.9-87.2	SB051-92.0-92.5	SB051-98.0-98.4	SB051-101.7-102.2
Date Sampled	9/8/99	9/9/99	9/9/99	9/9/99
Field QC				Primary
Soil Description	sand	sand	silt	sand
NAPL Description	odor	odor	nothing	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	20 U
acenaphthene	20 U	20 U	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 UJ	20 UJ	20 U	20 U
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	20 U	20 U
fluoranthene	20 U	20 U	20 U	20 U
fluorene	20 U	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	20 U	20 U
pentachlorophenol	50 U	60 U	60 U	60 UJ
phenanthrene	20 U	20 U	20 U	20 U
pyrene	20 U	20 U	20 U	20 U
Total HPAH (U=1/2)	100	100	100	100
Total LPAH (U=1/2)	70	70	70	70
Total PAH (U=1/2)	170	170	170	170
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-051	SB-051	SB-051	SB-051
Quadrant	D2	D2	D2	D2
Sample ID	SB551-101.7-102.2	SB051-105.7-106.1	SB051-111.7-112.0	SB051-115.8-116.1
Date Sampled	9/9/99	9/9/99	9/9/99	9/9/99
Field QC	Field Duplicate			
Soil Description	sand	silt	sand	sand
NAPL Description	odor	nothing	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	--	--
acenaphthene	20 U	20 U	--	--
acenaphthylene	20 U	20 U	--	--
anthracene	20 U	20 U	--	--
benzo(a)anthracene	20 U	20 U	--	--
benzo(a)pyrene	20 U	20 U	--	--
benzo(b)fluoranthene	20 U	20 U	--	--
benzo(g,h,i)perylene	20 U	20 U	--	--
benzo(k)fluoranthene	20 U	20 U	--	--
carbazole	20 U	20 U	--	--
chrysene	20 U	20 U	--	--
dibenzo(a,h)anthracene	20 U	20 U	--	--
dibenzofuran	20 U	20 U	--	--
fluoranthene	20 U	20 U	--	--
fluorene	20 U	20 U	--	--
indeno(1,2,3-cd)pyrene	20 U	20 U	--	--
naphthalene	20 U	20 U	--	--
pentachlorophenol	60 U	60 UJ	--	--
phenanthrene	20 U	20 U	--	--
pyrene	20 U	20 U	--	--
Total HPAH (U=1/2)	100	100	--	--
Total LPAH (U=1/2)	70	70	--	--
Total PAH (U=1/2)	170	170	--	--
LPAH/HPAH (U=1/2)	0.7	0.7	--	--
Naphthalene/Total PAH (U=1/2)	0.12	0.12	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-051	SB-051	SB-051	SB-051
Quadrant	D2	D2	D2	D2
Sample ID	SB051-124.3-124.6	SB051-129.0-129.3	SB051-131.8-132.1	SB051-137.9-138.2
Date Sampled	9/9/99	9/9/99	9/9/99	9/9/99
Field QC				
Soil Description	silt	sand	sand	sand
NAPL Description	odor	odor	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	10 J	--	20 U	--
acenaphthene	20 U	--	20 U	--
acenaphthylene	20 U	--	20 U	--
anthracene	20 U	--	20 U	--
benzo(a)anthracene	20 U	--	20 U	--
benzo(a)pyrene	20 U	--	20 U	--
benzo(b)fluoranthene	20 U	--	20 U	--
benzo(g,h,i)perylene	20 U	--	20 U	--
benzo(k)fluoranthene	20 U	--	20 U	--
carbazole	20 UJ	--	20 U	--
chrysene	20 U	--	20 U	--
dibenzo(a,h)anthracene	20 U	--	20 U	--
dibenzofuran	20 U	--	20 U	--
fluoranthene	20 U	--	20 U	--
fluorene	20 U	--	20 U	--
indeno(1,2,3-cd)pyrene	20 U	--	20 U	--
naphthalene	30	--	20 U	--
pentachlorophenol	60 U	--	60 UJ	--
phenanthrene	20	--	10 J	--
pyrene	20 U	--	20 U	--
Total HPAH (U=1/2)	100	--	100	--
Total LPAH (U=1/2)	100	--	70	--
Total PAH (U=1/2)	200	--	170	--
LPAH/HPAH (U=1/2)	1	--	0.7	--
Naphthalene/Total PAH (U=1/2)	0.15	--	0.12	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	130	100 U	120	100 U
C10-C11	30	--	20	--
C12-C13	20	--	20	--
C14-C15	30	--	30	--
C16-C17	20	--	20	--
C18-C19	10	--	20	--
C20-C21	10	--	10	--
C22-C23		--		--
C24-C25		--		--
C27-C28		--		--
C29-C30		--		--
C31-C32		--		--
C33-C34		--		--
C35-C36		--		--
C37-C39		--		--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-051	SB-051	SB-051	SB-051
Quadrant	D2	D2	D2	D2
Sample ID	SB051-145.9-146.2	SB051-149.1-149.4	SB051-152.7-153.0	SB551-152.7-153.0
Date Sampled	9/9/99	9/9/99	9/13/99	9/13/99
Field QC			Primary	Field Duplicate
Soil Description	sand	sand	sand	sand
NAPL Description	odor	nothing	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-051	SB-051	SB-051	SB-051
Quadrant	D2	D2	D2	D2
Sample ID	SB051-155.2-155.5	SB051-160.7-161.0	SB051-165.0-165.3	SB051-173.6-173.9
Date Sampled	9/13/99	9/13/99	9/13/99	9/13/99
Field QC				
Soil Description	silt	sand	sand	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-051	SB-051	SB-051	SB-051
Quadrant	D2	D2	D2	D2
Sample ID	SB051-179.6-179.9	SB051-181.0-181.3	SB051-187.0-187.3	SB051-191.0-191.3
Date Sampled	9/13/99	9/13/99	9/13/99	9/13/99
Field QC				
Soil Description	sand	sand	silt	silt
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-051	SB-051	SB-051	SB-052
Quadrant	D2	D2	D2	D2
Sample ID	SB051-196.6-196.9	SB051-201.0-201.3	SB051-205.7-206.0	SB052-2.0-2.3
Date Sampled	9/13/99	9/13/99	9/13/99	10/16/99
Field QC				
Soil Description	silt	clay	clay	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	20 U
acenaphthene	--	--	--	20 U
acenaphthylene	--	--	--	20 U
anthracene	--	--	--	20 U
benzo(a)anthracene	--	--	--	20 U
benzo(a)pyrene	--	--	--	20 U
benzo(b)fluoranthene	--	--	--	20 U
benzo(g,h,i)perylene	--	--	--	20 U
benzo(k)fluoranthene	--	--	--	20 U
carbazole	--	--	--	20 UJ
chrysene	--	--	--	20 U
dibenzo(a,h)anthracene	--	--	--	20 U
dibenzofuran	--	--	--	20 U
fluoranthene	--	--	--	20 U
fluorene	--	--	--	20 U
indeno(1,2,3-cd)pyrene	--	--	--	20 U
naphthalene	--	--	--	20 U
pentachlorophenol	--	--	--	50 U
phenanthrene	--	--	--	20 U
pyrene	--	--	--	20 U
Total HPAH (U=1/2)	--	--	--	100
Total LPAH (U=1/2)	--	--	--	70
Total PAH (U=1/2)	--	--	--	170
LPAH/HPAH (U=1/2)	--	--	--	0.7
Naphthalene/Total PAH (U=1/2)	--	--	--	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-052	SB-052	SB-052	SB-052
Quadrant	D2	D2	D2	D2
Sample ID	SB052-18.7-19.0	SB052-28.7-29.0	SB052-32.0-32.5	SB552-32.0-32.5
Date Sampled	10/16/99	10/16/99	10/16/99	10/16/99
Field QC			Primary	Field Duplicate
Soil Description	clay	clay	sand	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	20 U
acenaphthene	20 U	20 U	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 UJ	20 UJ	20 UJ	20 UJ
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	20 U	20 U
fluoranthene	20 U	20 U	20 U	20 U
fluorene	20 U	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	20 U	20 U
pentachlorophenol	60 U	60 U	60 U	60 U
phenanthrene	20 U	20 U	20 U	20 U
pyrene	20 U	20 U	20 U	20 U
Total HPAH (U=1/2)	100	100	100	100
Total LPAH (U=1/2)	70	70	70	70
Total PAH (U=1/2)	170	170	170	170
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	90 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-052	SB-052	SB-052	SB-052
Quadrant	D2	D2	D2	D2
Sample ID	SB052-42.0-42.5	SB052-52.3-52.6	SB052-61.0-61.3	SB052-69.0-69.3
Date Sampled	10/16/99	10/16/99	10/16/99	10/16/99
Field QC				
Soil Description	sand	sand	sand	clay
NAPL Description	nothing	nothing	nothing	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	30 U	20 U	20 U
acenaphthene	20 U	30 U	20 U	20 U
acenaphthylene	20 U	30 U	20 U	20 U
anthracene	20 U	30 U	20 U	20 U
benzo(a)anthracene	20 U	30 U	20 U	20 U
benzo(a)pyrene	20 U	30 U	20 U	20 U
benzo(b)fluoranthene	20 U	30 U	20 U	20 U
benzo(g,h,i)perylene	20 U	30 U	20 U	20 U
benzo(k)fluoranthene	20 U	30 U	20 U	20 U
carbazole	20 UJ	30 UJ	20 UJ	20 UJ
chrysene	20 U	30 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	30 U	20 U	20 U
dibenzofuran	20 U	30 U	20 U	20 U
fluoranthene	20 U	30 U	20 U	20 U
fluorene	20 U	30 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	30 U	20 U	20 U
naphthalene	20 U	30 U	20 U	20 U
pentachlorophenol	60 U	70 U	60 U	60 U
phenanthrene	20 U	30 U	20 U	20 U
pyrene	20 U	30 U	20 U	20 U
Total HPAH (U=1/2)	100	150	100	100
Total LPAH (U=1/2)	70	105	70	70
Total PAH (U=1/2)	170	255	170	170
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	90 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-052	SB-052	SB-052	SB-052
Quadrant	D2	D2	D2	D2
Sample ID	SB052-71.5-71.8	SB052-81.0-81.3	SB052-85.7-86.0	SB052-92.3-92.7
Date Sampled	10/16/99	10/16/99	10/16/99	10/17/99
Field QC				
Soil Description	sand	sand	sand	sand
NAPL Description	odor	odor	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	20 U
acenaphthene	20 U	20 U	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 UJ	20 UJ	20 UJ	20 UJ
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	20 U	20 U
fluoranthene	20 U	20 U	20 U	20 U
fluorene	20 U	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	20 U	20 U
pentachlorophenol	60 U	60 U	60 U	60 U
phenanthrene	20 U	20 U	20 U	20 U
pyrene	20 U	20 U	20 U	20 U
Total HPAH (U=1/2)	100	100	100	100
Total LPAH (U=1/2)	70	70	70	70
Total PAH (U=1/2)	170	170	170	170
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-052	SB-052	SB-052	SB-052
Quadrant	D2	D2	D2	D2
Sample ID	SB052-100.7-101.3	SB052-106.2-106.5	SB052-118.5-119	SB552-118.5-119
Date Sampled	10/17/99	10/17/99	10/17/99	10/17/99
Field QC			Primary	Field Duplicate
Soil Description	sand	clay	sand	sand
NAPL Description	odor	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	20 U
acenaphthene	20 U	20 U	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 UJ	20 UJ	20 UJ	20 UJ
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	20 U	20 U
fluoranthene	20 U	20 U	20 U	20 U
fluorene	20 U	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	20 U	20 U
pentachlorophenol	60 U	60 U	50 U	60 U
phenanthrene	20 U	20 U	20 U	20 U
pyrene	20 U	20 U	20 U	20 U
Total HPAH (U=1/2)	100	100	100	100
Total LPAH (U=1/2)	70	70	70	70
Total PAH (U=1/2)	170	170	170	170
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-052	SB-052	SB-052	SB-052
Quadrant	D2	D2	D2	D2
Sample ID	SB052-123.0-123.6	SB052-133.9-134.2	SB052-137.7-138.2	SB052-147.3-147.6
Date Sampled	10/17/99	10/17/99	10/17/99	10/17/99
Field QC				
Soil Description	sand	sand	sand	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	20 U
acenaphthene	20 U	20 U	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 UJ	20 UJ	20 UJ	20 UJ
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	20 U	20 U
fluoranthene	20 U	20 U	20 U	20 U
fluorene	20 U	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	20 U	20 U
pentachlorophenol	50 U	60 U	60 U	60 U
phenanthrene	20 U	20 U	20 U	20 U
pyrene	20 U	20 U	20 U	20 U
Total HPAH (U=1/2)	100	100	100	100
Total LPAH (U=1/2)	70	70	70	70
Total PAH (U=1/2)	170	170	170	170
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-052	SB-052	SB-052	SB-052
Quadrant	D2	D2	D2	D2
Sample ID	SB052-159.0-159.3	SB052-164-165	SB052-175.5-176.0	SB552-175.5-176
Date Sampled	10/17/99	10/17/99	10/18/99	10/18/99
Field QC			Primary	Field Duplicate
Soil Description	sand	sand	sand	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	--	--
acenaphthene	20 U	20 U	--	--
acenaphthylene	20 U	20 U	--	--
anthracene	20 U	20 U	--	--
benzo(a)anthracene	20 U	20 U	--	--
benzo(a)pyrene	20 U	20 U	--	--
benzo(b)fluoranthene	20 U	20 U	--	--
benzo(g,h,i)perylene	20 U	20 U	--	--
benzo(k)fluoranthene	20 U	20 U	--	--
carbazole	20 UJ	20 UJ	--	--
chrysene	20 U	20 U	--	--
dibenzo(a,h)anthracene	20 U	20 U	--	--
dibenzofuran	20 U	20 U	--	--
fluoranthene	20 U	20 U	--	--
fluorene	20 U	20 U	--	--
indeno(1,2,3-cd)pyrene	20 U	20 U	--	--
naphthalene	20 U	20 U	--	--
pentachlorophenol	60 U	50 U	--	--
phenanthrene	20 U	20 U	--	--
pyrene	20 U	20 U	--	--
Total HPAH (U=1/2)	100	100	--	--
Total LPAH (U=1/2)	70	70	--	--
Total PAH (U=1/2)	170	170	--	--
LPAH/HPAH (U=1/2)	0.7	0.7	--	--
Naphthalene/Total PAH (U=1/2)	0.12	0.12	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	90 U	90 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-052	SB-052	SB-052	SB-052
Quadrant	D2	D2	D2	D2
Sample ID	SB052-188.0-188.3	SB052-191.0-191.3	SB052-195.3-195.8	SB052-204.0-205.0
Date Sampled	10/18/99	10/18/99	10/18/99	10/18/99
Field QC				
Soil Description	sand	sand	clay	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-052	SB-052	SB-052	SB-052
Quadrant	D2	D2	D2	D2
Sample ID	SB052-213.0-213.3	SB052-224-224.3	SB052-234.7-235.0	SB052-249.0-249.7
Date Sampled	10/18/99	10/18/99	10/19/99	10/19/99
Field QC				
Soil Description	clay	clay	clay	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	90 U	100 U	90 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-052	SB-052	SB-057	SB-057
Quadrant	D2	D2	C2	C2
Sample ID	SB052-259.1-259.4	SB052-261-262	SB057-2.7-3	SB057-18-19.8
Date Sampled	10/19/99	10/19/99	10/9/99	10/9/99
Field QC				
Soil Description	sand	sand	sand and gravel	clay
NAPL Description	nothing	nothing	nothing	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	20 U	20 U
acenaphthene	--	--	20 U	20 U
acenaphthylene	--	--	20 U	20 U
anthracene	--	--	20 U	20 U
benzo(a)anthracene	--	--	20 U	20 U
benzo(a)pyrene	--	--	20 U	20 U
benzo(b)fluoranthene	--	--	20 U	20 U
benzo(g,h,i)perylene	--	--	20 U	20 U
benzo(k)fluoranthene	--	--	20 U	20 U
carbazole	--	--	20 UJ	20 UJ
chrysene	--	--	20 U	20 U
dibenzo(a,h)anthracene	--	--	20 U	20 U
dibenzofuran	--	--	20 U	20 U
fluoranthene	--	--	20 U	20 U
fluorene	--	--	20 U	20 U
indeno(1,2,3-cd)pyrene	--	--	20 U	20 U
naphthalene	--	--	20 U	20 U
pentachlorophenol	--	--	170	60 U
phenanthrene	--	--	20 U	20 U
pyrene	--	--	20 U	20 U
Total HPAH (U=1/2)	--	--	100	100
Total LPAH (U=1/2)	--	--	70	70
Total PAH (U=1/2)	--	--	170	170
LPAH/HPAH (U=1/2)	--	--	0.7	0.7
Naphthalene/Total PAH (U=1/2)	--	--	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	90 U	2200	100 U
C10-C11	--	--		--
C12-C13	--	--		--
C14-C15	--	--	120	--
C16-C17	--	--	290	--
C18-C19	--	--	470	--
C20-C21	--	--	390	--
C22-C23	--	--	400	--
C24-C25	--	--	170	--
C27-C28	--	--	150	--
C29-C30	--	--	220	--
C31-C32	--	--		--
C33-C34	--	--		--
C35-C36	--	--		--
C37-C39	--	--		--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-057	SB-057	SB-057	SB-057
Quadrant	C2	C2	C2	C2
Sample ID	SB057-28-29.8	SB057-31-32	SB057-36-38	SB557-36-38
Date Sampled	10/9/99	10/9/99	10/9/99	10/9/99
Field QC			Primary	Field Duplicate
Soil Description	clay	clay	sand	sand
NAPL Description	odor	sheen	sheen	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	240	210	1400	2500
acenaphthene	90	80	600	900
acenaphthylene	20 U	20 U	10 J	20
anthracene	40	30	230	400
benzo(a)anthracene	20 U	20 U	50	90
benzo(a)pyrene	20 U	20 U	20	20
benzo(b)fluoranthene	20 U	20 U	10 J	20
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20	20
carbazole	10 J	20 UJ	80 J	130 J
chrysene	10 J	20 U	50	90
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	50	50	300	600
fluoranthene	50	40	300	500
fluorene	70	60	400	700
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	470	430	3100	5400
pentachlorophenol	60 U	60 U	130	200 J
phenanthrene	140	120	800	1300
pyrene	40	40	220	400
Total HPAH (U=1/2)	170	160	700	1170
Total LPAH (U=1/2)	1060	940	6540	11220
Total PAH (U=1/2)	1230	1100	7240	12390
LPAH/HPAH (U=1/2)	6.2	5.9	9.3	9.6
Naphthalene/Total PAH (U=1/2)	0.38	0.39	0.43	0.44
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	2100	2300	30000	15000
C10-C11	570	620	8000	4100
C12-C13	480	520	6800	3500
C14-C15	590	630	6700	3600
C16-C17	230	260	3900	2000
C18-C19	110	130	2100	980
C20-C21	66	76	1400	1000
C22-C23	27	41	590	
C24-C25			270	
C27-C28		16	200	
C29-C30				
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-057	SB-057	SB-057	SB-057
Quadrant	C2	C2	C2	C2
Sample ID	SB057-40-50	SB057-51-52	SB557-51-52	SB057-57.6-57.8
Date Sampled	10/9/99	10/9/99	10/9/99	10/9/99
Field QC		Primary	Field Duplicate	
Soil Description	sand	sand	sand	clay
NAPL Description	mobile	sheen	sheen	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	2600	80	100	190
acenaphthene	1000	50	60	80
acenaphthylene	20	20 U	20 U	20 U
anthracene	400	20	30	30
benzo(a)anthracene	90	20 U	20 U	20 U
benzo(a)pyrene	30	20 U	20 U	20 U
benzo(b)fluoranthene	20	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	30	20 U	20 U	20 U
carbazole	140 J	20 UJ	20 UJ	20 UJ
chrysene	90	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	600	30	40	50
fluoranthene	500	30	40	40
fluorene	700	40	40	50
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	5800	110	130	410
pentachlorophenol	200	60 U	60 U	60 U
phenanthrene	1300	80	100	110
pyrene	400	30	30	30
Total HPAH (U=1/2)	1190	140	150	150
Total LPAH (U=1/2)	11820	390	470	880
Total PAH (U=1/2)	13010	530	620	1030
LPAH/HPAH (U=1/2)	9.9	2.8	3.1	5.9
Naphthalene/Total PAH (U=1/2)	0.45	0.21	0.21	0.4
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	22000	2000	1500	1600
C10-C11	5900	490	350	470
C12-C13	4900	440	340	360
C14-C15	5000	430	340	330
C16-C17	2900	290	230	210
C18-C19	1500	200	140	120
C20-C21	1000	120	89	75
C22-C23	600	49	38	31
C24-C25		22	18	13
C27-C28	130	12		
C29-C30				
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-057	SB-057	SB-057	SB-057
Quadrant	C2	C2	C2	C2
Sample ID	SB057-65-66	SB557-65-66	SB057-74.6-74.8	SB057-81.5-81.7
Date Sampled	10/9/99	10/9/99	10/9/99	10/9/99
Field QC	Primary	Field Duplicate		
Soil Description	sand	sand	sand	sand
NAPL Description	odor	odor	odor	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	20 U
acenaphthene	20 U	20 U	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 UJ	20 UJ	20 UJ	20 UJ
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	20 U	20 U
fluoranthene	20 U	20 U	20 U	20 U
fluorene	20 U	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	20 U	20 U
pentachlorophenol	60 U	60 U	60 U	60 U
phenanthrene	20 U	20 U	20 U	20 U
pyrene	20 U	20 U	20 U	20 U
Total HPAH (U=1/2)	100	100	100	100
Total LPAH (U=1/2)	70	70	70	70
Total PAH (U=1/2)	170	170	170	170
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	--	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-057	SB-057	SB-057	SB-057
Quadrant	C2	C2	C2	C2
Sample ID	SB057-97-97.2	SB057-107.5-107.7	SB057-118-118.2	SB057-123.1-123.4
Date Sampled	10/9/99	10/9/99	10/9/99	10/11/99
Field QC				
Soil Description	clay	sand	sand	sand
NAPL Description	nothing	odor	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	20 U
acenaphthene	20 U	20 U	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 UJ	20 UJ	20 UJ	20 UJ
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	20 U	20 U
fluoranthene	20 U	20 U	20 U	20 U
fluorene	20 U	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	20 U	20 U
pentachlorophenol	60 U	60 U	50 U	60 U
phenanthrene	20 U	20 U	20 U	20 U
pyrene	20 U	20 U	20 U	20 U
Total HPAH (U=1/2)	100	100	100	100
Total LPAH (U=1/2)	70	70	70	70
Total PAH (U=1/2)	170	170	170	170
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-057	SB-057	SB-057	SB-057
Quadrant	C2	C2	C2	C2
Sample ID	SB057-128.3-128.5	SB057-133.5-133.8	SB057-141.8-142.1	SB057-154.0-154.5
Date Sampled	10/9/99	10/10/99	10/10/99	10/10/99
Field QC				
Soil Description	sand	clay	clay	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	20 U
acenaphthene	20 U	20 U	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 UJ	20 UJ	20 UJ	20 UJ
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	20 U	20 U
fluoranthene	20 U	20 U	20 U	20 U
fluorene	20 U	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	20 U	20 U
pentachlorophenol	50 U	60 U	60 U	60 U
phenanthrene	20 U	20 U	20 U	20 U
pyrene	20 U	20 U	20 U	20 U
Total HPAH (U=1/2)	100	100	100	100
Total LPAH (U=1/2)	70	70	70	70
Total PAH (U=1/2)	170	170	170	170
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	90 U	100 U	100 U	90 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-057	SB-057	SB-057	SB-057
Quadrant	C2	C2	C2	C2
Sample ID	SB057-165-165.5	SB057-173.0-173.3	SB057-183.1-183.4	SB057-195.0-195.3
Date Sampled	10/10/99	10/10/99	10/10/99	10/10/99
Field QC				
Soil Description	sand	sand	clay	clay
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	30 U	30 U
acenaphthene	20 U	20 U	30 U	30 U
acenaphthylene	20 U	20 U	30 U	30 U
anthracene	20 U	20 U	30 U	30 U
benzo(a)anthracene	20 U	20 U	30 U	30 U
benzo(a)pyrene	20 U	20 U	30 U	30 U
benzo(b)fluoranthene	20 U	20 U	30 U	30 U
benzo(g,h,i)perylene	20 U	20 U	30 U	30 U
benzo(k)fluoranthene	20 U	20 U	30 U	30 U
carbazole	20 UJ	20 UJ	30 UJ	30 UJ
chrysene	20 U	20 U	30 U	30 U
dibenzo(a,h)anthracene	20 U	20 U	30 U	30 U
dibenzofuran	20 U	20 U	30 U	30 U
fluoranthene	20 U	20 U	30 U	30 U
fluorene	20 U	20 U	30 U	30 U
indeno(1,2,3-cd)pyrene	20 U	20 U	30 U	30 U
naphthalene	20 U	20 U	30 U	30 U
pentachlorophenol	50 U	60 U	60 U	60 U
phenanthrene	20 U	20 U	30 U	30 U
pyrene	20 U	20 U	30 U	30 U
Total HPAH (U=1/2)	100	100	150	150
Total LPAH (U=1/2)	70	70	105	105
Total PAH (U=1/2)	170	170	255	255
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	90 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-057	SB-057	SB-057	SB-057
Quadrant	C2	C2	C2	C2
Sample ID	SB057-204.0-204.3	SB057-216.3-216.6	SB057-231.6-231.9	SB057-242-243
Date Sampled	10/10/99	10/11/99	10/11/99	10/11/99
Field QC				
Soil Description	clay	clay	sand	sand and gravel
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	30 U	20 U	20 U	20 U
acenaphthene	30 U	20 U	20 U	20 U
acenaphthylene	30 U	20 U	20 U	20 U
anthracene	30 U	20 U	20 U	20 U
benzo(a)anthracene	30 U	20 U	20 U	20 U
benzo(a)pyrene	30 U	20 U	20 U	20 U
benzo(b)fluoranthene	30 U	20 U	20 U	20 U
benzo(g,h,i)perylene	30 U	20 U	20 U	20 U
benzo(k)fluoranthene	30 U	20 U	20 U	20 U
carbazole	30 UJ	20 UJ	20 UJ	20 UJ
chrysene	30 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	30 U	20 U	20 U	20 U
dibenzofuran	30 U	20 U	20 U	20 U
fluoranthene	30 U	20 U	20 U	20 U
fluorene	30 U	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	30 U	20 U	20 U	20 U
naphthalene	30 U	20 U	20 U	20 U
pentachlorophenol	60 U	60 U	60 U	50 U
phenanthrene	30 U	20 U	20 U	20 U
pyrene	30 U	20 U	20 U	20 U
Total HPAH (U=1/2)	150	100	100	100
Total LPAH (U=1/2)	105	70	70	70
Total PAH (U=1/2)	255	170	170	170
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	90 U	90 U	90 U	90 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-061	SB-061	SB-061	SB-061
Quadrant	D2	D2	D2	D2
Sample ID	SB061-126.0-126.3	SB061-133.0-133.3	SB061-139.7-140.0	SB061-144.3-144.7
Date Sampled	8/31/99	8/31/99	8/31/99	8/31/99
Field QC				
Soil Description	sand	sand	sand	sand
NAPL Description	odor	odor	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	368	--	--	--
Exsitu peak wavelength	402	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20	20 U	--	--
acenaphthene	10 J	20 U	--	--
acenaphthylene	20 U	20 U	--	--
anthracene	20 U	20 U	--	--
benzo(a)anthracene	20 U	20 U	--	--
benzo(a)pyrene	20 U	20 U	--	--
benzo(b)fluoranthene	20 U	20 U	--	--
benzo(g,h,i)perylene	20 U	20 U	--	--
benzo(k)fluoranthene	20 U	20 U	--	--
carbazole	20 U	20 U	--	--
chrysene	20 U	20 U	--	--
dibenzo(a,h)anthracene	20 U	20 U	--	--
dibenzofuran	20 U	20 U	--	--
fluoranthene	20 U	20 U	--	--
fluorene	10 J	20 U	--	--
indeno(1,2,3-cd)pyrene	20 U	20 U	--	--
naphthalene	40	20 U	--	--
pentachlorophenol	60 U	60 U	--	--
phenanthrene	20	20 U	--	--
pyrene	20 U	20 U	--	--
Total HPAH (U=1/2)	100	100	--	--
Total LPAH (U=1/2)	120	70	--	--
Total PAH (U=1/2)	220	170	--	--
LPAH/HPAH (U=1/2)	1.2	0.7	--	--
Naphthalene/Total PAH (U=1/2)	0.18	0.12	--	--
TPH (mg/kg)				
TRPH	69	--	--	--
total hydrocarbons, C10-C39	130	100 U	100 U	100 U
C10-C11	33	--	--	--
C12-C13	26	--	--	--
C14-C15	27	--	--	--
C16-C17	22	--	--	--
C18-C19	13	--	--	--
C20-C21	8.6	--	--	--
C22-C23		--	--	--
C24-C25		--	--	--
C27-C28		--	--	--
C29-C30		--	--	--
C31-C32		--	--	--
C33-C34		--	--	--
C35-C36		--	--	--
C37-C39		--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-061	SB-061	SB-061	SB-061
Quadrant	D2	D2	D2	D2
Sample ID	SB061-154.0-154.4	SB561-154.0-154.4	SB061-166.5-167.0	SB061-172.7-173.0
Date Sampled	8/31/99	8/31/99	8/31/99	8/31/99
Field QC	Primary	Field Duplicate		
Soil Description	sand	sand	sand	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	--	--
acenaphthene	20 U	20 U	--	--
acenaphthylene	20 U	20 U	--	--
anthracene	20 U	20 U	--	--
benzo(a)anthracene	20 U	20 U	--	--
benzo(a)pyrene	20 U	20 U	--	--
benzo(b)fluoranthene	20 U	20 U	--	--
benzo(g,h,i)perylene	20 U	20 U	--	--
benzo(k)fluoranthene	20 U	20 U	--	--
carbazole	20 U	20 U	--	--
chrysene	20 U	20 U	--	--
dibenzo(a,h)anthracene	20 U	20 U	--	--
dibenzofuran	20 U	20 U	--	--
fluoranthene	20 U	20 U	--	--
fluorene	20 U	20 U	--	--
indeno(1,2,3-cd)pyrene	20 U	20 U	--	--
naphthalene	20 U	20 U	--	--
pentachlorophenol	60 U	60 U	--	--
phenanthrene	20 U	20 U	--	--
pyrene	20 U	20 U	--	--
Total HPAH (U=1/2)	100	100	--	--
Total LPAH (U=1/2)	70	70	--	--
Total PAH (U=1/2)	170	170	--	--
LPAH/HPAH (U=1/2)	0.7	0.7	--	--
Naphthalene/Total PAH (U=1/2)	0.12	0.12	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-061	SB-061	SB-084	SB-084
Quadrant	D2	D2	C1	C1
Sample ID	SB061-184.3-184.7	SB061-192.0-192.4	SB084-11.0-11.4	SB084-13.3-13.6
Date Sampled	8/31/99	9/1/99	9/17/99	9/17/99
Field QC				
Soil Description	sand	sand	clay	clay
NAPL Description	nothing	nothing	sheen	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	20 J	30 U
acenaphthene	--	--	40	20 J
acenaphthylene	--	--	30 U	30 U
anthracene	--	--	20 J	30 U
benzo(a)anthracene	--	--	30 U	30 U
benzo(a)pyrene	--	--	30 U	30 U
benzo(b)fluoranthene	--	--	30 U	30 U
benzo(g,h,i)perylene	--	--	30 U	30 U
benzo(k)fluoranthene	--	--	30 U	30 U
carbazole	--	--	30 UJ	30 UJ
chrysene	--	--	10 J	20 U
dibenzo(a,h)anthracene	--	--	30 U	30 U
dibenzofuran	--	--	20 J	10 J
fluoranthene	--	--	40	20 J
fluorene	--	--	30	20 J
indeno(1,2,3-cd)pyrene	--	--	30 U	30 U
naphthalene	--	--	100	60
pentachlorophenol	--	--	120	70 U
phenanthrene	--	--	80	40
pyrene	--	--	30	10 J
Total HPAH (U=1/2)	--	--	185	145
Total LPAH (U=1/2)	--	--	305	185
Total PAH (U=1/2)	--	--	490	330
LPAH/HPAH (U=1/2)	--	--	1.6	1.3
Naphthalene/Total PAH (U=1/2)	--	--	0.2	0.18
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	220	100 U
C10-C11	--	--	34	--
C12-C13	--	--	25	--
C14-C15	--	--	43	--
C16-C17	--	--	52	--
C18-C19	--	--	30	--
C20-C21	--	--	32	--
C22-C23	--	--		--
C24-C25	--	--		--
C27-C28	--	--		--
C29-C30	--	--		--
C31-C32	--	--		--
C33-C34	--	--		--
C35-C36	--	--		--
C37-C39	--	--		--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-084	SB-084	SB-084	SB-084
Quadrant	C1	C1	C1	C1
Sample ID	SB084-49.3-49.8	SB084-51.0-51.3	SB084-111-111.4	SB084-116.4-116.8
Date Sampled	9/17/99	9/17/99	9/18/99	9/18/99
Field QC				
Soil Description	sand	sand	clay	sand
NAPL Description	sheen	sheen	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	--
acenaphthene	20 U	20 U	20 U	--
acenaphthylene	20 U	20 U	20 U	--
anthracene	20 U	20 U	20 U	--
benzo(a)anthracene	20 U	20 U	20 U	--
benzo(a)pyrene	20 U	20 U	20 U	--
benzo(b)fluoranthene	20 U	20 U	20 U	--
benzo(g,h,i)perylene	20 U	20 U	20 U	--
benzo(k)fluoranthene	20 U	20 U	20 U	--
carbazole	20 UJ	20 UJ	20 UJ	--
chrysene	20 U	20 U	20 U	--
dibenzo(a,h)anthracene	20 U	20 U	20 U	--
dibenzofuran	20 U	20 U	20 U	--
fluoranthene	20 U	20 U	20 U	--
fluorene	20 U	20 U	20 U	--
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	--
naphthalene	20 J	20 U	20 U	--
pentachlorophenol	60 U	60 U	60 U	--
phenanthrene	20 J	20 U	20 U	--
pyrene	20 U	20 U	20 U	--
Total HPAH (U=1/2)	100	100	100	--
Total LPAH (U=1/2)	90	70	70	--
Total PAH (U=1/2)	190	170	170	--
LPAH/HPAH (U=1/2)	0.9	0.7	0.7	--
Naphthalene/Total PAH (U=1/2)	0.11	0.12	0.12	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	210	100 U	100 U	100 U
C10-C11	38	--	--	--
C12-C13	28	--	--	--
C14-C15	38	--	--	--
C16-C17	46	--	--	--
C18-C19	27	--	--	--
C20-C21	29	--	--	--
C22-C23		--	--	--
C24-C25		--	--	--
C27-C28		--	--	--
C29-C30		--	--	--
C31-C32		--	--	--
C33-C34		--	--	--
C35-C36		--	--	--
C37-C39		--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-084	SB-084	SB-084	SB-084
Quadrant	C1	C1	C1	C1
Sample ID	SB084-121-121.5	SB084-129.5-129.8	SB084-135.6-136	SB584-135.6-136
Date Sampled	9/18/99	9/18/99	9/18/99	9/18/99
Field QC			Primary	Field Duplicate
Soil Description	sand	sand	sand	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	--	20 U	20 U
acenaphthene	20 U	--	20 U	20 U
acenaphthylene	20 U	--	20 U	20 U
anthracene	20 U	--	20 U	20 U
benzo(a)anthracene	20 U	--	20 U	20 U
benzo(a)pyrene	20 U	--	20 U	20 U
benzo(b)fluoranthene	20 U	--	20 U	20 U
benzo(g,h,i)perylene	20 U	--	20 U	20 U
benzo(k)fluoranthene	20 U	--	20 U	20 U
carbazole	20 UJ	--	20 UJ	20 UJ
chrysene	20 U	--	20 U	20 U
dibenzo(a,h)anthracene	20 U	--	20 U	20 U
dibenzofuran	20 U	--	20 U	20 U
fluoranthene	20 U	--	20 U	20 U
fluorene	20 U	--	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	--	20 U	20 U
naphthalene	20 U	--	20 U	20 U
pentachlorophenol	60 U	--	60 U	60 U
phenanthrene	20 U	--	20 U	20 U
pyrene	20 U	--	20 U	20 U
Total HPAH (U=1/2)	100	--	100	100
Total LPAH (U=1/2)	70	--	70	70
Total PAH (U=1/2)	170	--	170	170
LPAH/HPAH (U=1/2)	0.7	--	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	--	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-084	SB-084	SB-084	SB-084
Quadrant	C1	C1	C1	C1
Sample ID	SB084-143.0-143.3	SB084-147.5-147.8	SB084-153.5-153.8	SB084-159.7-160.0
Date Sampled	9/18/99	9/18/99	9/18/99	9/18/99
Field QC				
Soil Description	sand	sand	sand	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-084	SB-084	SB-084	SB-084
Quadrant	C1	C1	C1	C1
Sample ID	SB084-164.3-164.6	SB084-168.0-168.3	SB084-171.3-171.6	SB084-176.5-176.8
Date Sampled	9/18/99	9/18/99	9/18/99	9/18/99
Field QC				
Soil Description	sand	sand	sand	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-084	SB-084	SB-084	SB-084
Quadrant	C1	C1	C1	C1
Sample ID	SB084-181.4-181.7	SB084-189.3-189.6	SB084-191.4-191.8	SB084-197.0-197.3
Date Sampled	9/18/99	9/18/99	9/19/99	9/19/99
Field QC				
Soil Description	clay	sand	sand	sand
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-084	SB-084	SB-084	SB-084
Quadrant	C1	C1	C1	C1
Sample ID	SB084-208.5-208.8	SB084-212.0-212.4	SB084-218.0-218.4	SB084-226.0-226.5
Date Sampled	9/19/99	9/19/99	9/19/99	9/19/99
Field QC				Primary
Soil Description	clay	sand	clay	clay
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	20 U
acenaphthene	--	--	--	20 U
acenaphthylene	--	--	--	20 U
anthracene	--	--	--	20 U
benzo(a)anthracene	--	--	--	20 U
benzo(a)pyrene	--	--	--	20 U
benzo(b)fluoranthene	--	--	--	20 U
benzo(g,h,i)perylene	--	--	--	20 U
benzo(k)fluoranthene	--	--	--	20 U
carbazole	--	--	--	20 UJ
chrysene	--	--	--	20 U
dibenzo(a,h)anthracene	--	--	--	20 U
dibenzofuran	--	--	--	20 U
fluoranthene	--	--	--	20 U
fluorene	--	--	--	20 U
indeno(1,2,3-cd)pyrene	--	--	--	20 U
naphthalene	--	--	--	20 U
pentachlorophenol	--	--	--	60 U
phenanthrene	--	--	--	20 U
pyrene	--	--	--	20 U
Total HPAH (U=1/2)	--	--	--	100
Total LPAH (U=1/2)	--	--	--	70
Total PAH (U=1/2)	--	--	--	170
LPAH/HPAH (U=1/2)	--	--	--	0.7
Naphthalene/Total PAH (U=1/2)	--	--	--	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-084	SB-084	SB-086	SB-086
Quadrant	C1	C1	C1	C1
Sample ID	SB584-226.0-226.5	SB084-239.0-239.5	SB086-9.2-9.4	SB086-17-17.3
Date Sampled	9/19/99	9/19/99	9/28/99	9/28/99
Field QC	Field Duplicate			
Soil Description	clay	sand	sand	clay
NAPL Description	nothing	nothing	nothing	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	--	20 U	110
acenaphthene	20 U	--	20 U	90
acenaphthylene	20 U	--	20 U	20 U
anthracene	20 U	--	20 U	240
benzo(a)anthracene	20 U	--	20 U	30
benzo(a)pyrene	20 U	--	20 U	20 U
benzo(b)fluoranthene	20 U	--	20 U	20 U
benzo(g,h,i)perylene	20 U	--	20 U	20 U
benzo(k)fluoranthene	20 U	--	20 U	10 J
carbazole	20 UJ	--	20 U	100
chrysene	20 U	--	20 U	30
dibenzo(a,h)anthracene	20 U	--	20 U	20 U
dibenzofuran	20 U	--	20 U	60
fluoranthene	20 U	--	20 U	120
fluorene	20 U	--	20 U	80
indeno(1,2,3-cd)pyrene	20 U	--	20 U	20 U
naphthalene	20 U	--	20 U	700
pentachlorophenol	60 U	--	60 U	2100 J
phenanthrene	20 U	--	20 U	250
pyrene	20 U	--	20 U	100
Total HPAH (U=1/2)	100	--	100	340
Total LPAH (U=1/2)	70	--	70	1480
Total PAH (U=1/2)	170	--	170	1820
LPAH/HPAH (U=1/2)	0.7	--	0.7	4.4
Naphthalene/Total PAH (U=1/2)	0.12	--	0.12	0.38
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	1900
C10-C11	--	--	--	530
C12-C13	--	--	--	220
C14-C15	--	--	--	240
C16-C17	--	--	--	420
C18-C19	--	--	--	140
C20-C21	--	--	--	180
C22-C23	--	--	--	66
C24-C25	--	--	--	44
C27-C28	--	--	--	16
C29-C30	--	--	--	10
C31-C32	--	--	--	
C33-C34	--	--	--	
C35-C36	--	--	--	
C37-C39	--	--	--	

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-086	SB-086	SB-086	SB-086
Quadrant	C1	C1	C1	C1
Sample ID	SB086-21.6-23.3	SB086-27-28.5	SB586-27-28.5	SB086-33.6-35
Date Sampled	9/28/99	9/28/99	9/28/99	9/28/99
Field QC		Primary	Field Duplicate	
Soil Description	silt	silt	silt	sand
NAPL Description	sheen	sheen	sheen	visible
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	400	300	240	230
acenaphthene	240	190	160	150
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	150	100	90	70
benzo(a)anthracene	40	40	30	20
benzo(a)pyrene	20	10 J	20 U	20 U
benzo(b)fluoranthene	10 J	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20	10 J	10 J	20 U
carbazole	70	50	40	40
chrysene	50	40	30	20
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	140	110	100	80
fluoranthene	220	170	140	110
fluorene	180	150	120	110
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	3500	1200	900	600
pentachlorophenol	30 J	60 U	60 U	60 U
phenanthrene	600	400	300	260
pyrene	170	140	120	90
Total HPAH (U=1/2)	560	450	380	300
Total LPAH (U=1/2)	5080	2350	1820	1430
Total PAH (U=1/2)	5640	2800	2200	1730
LPAH/HPAH (U=1/2)	9.1	5.2	4.8	4.8
Naphthalene/Total PAH (U=1/2)	0.62	0.43	0.41	0.35
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	12000	4600	7700	3600
C10-C11	5200	1500	2200	960
C12-C13	1400	590	1000	540
C14-C15	1600	740	1300	640
C16-C17	1600	690	1200	580
C18-C19	1100	510	920	400
C20-C21	720	320	580	290
C22-C23	380	150	250	130
C24-C25		41	110	
C27-C28	90	34	63	13
C29-C30			27	
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-086	SB-086	SB-086	SB-086
Quadrant	C1	C1	C1	C1
Sample ID	SB086-36.3-38	SB086-44-45	SB086-49-50	SB086-55-56
Date Sampled	9/28/99	9/28/99	9/28/99	9/28/99
Field QC				
Soil Description	sand	sand	clay	sand
NAPL Description	visible	sheen	odor	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	700	160	20	20 U
acenaphthene	400	90	20	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	140	40	20 U	20 U
benzo(a)anthracene	40	10 J	20 U	20 U
benzo(a)pyrene	10 J	20 U	20 U	20 U
benzo(b)fluoranthene	10 J	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	10 J	20 U	20 U	20 U
carbazole	60	20	20 U	20 U
chrysene	40	10 J	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	170	50	20 U	20 U
fluoranthene	200	60	10 J	20 U
fluorene	210	70	10 J	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	1800	380	40	20 U
pentachlorophenol	50 UJ	60 U	60 U	60 U
phenanthrene	600	150	40	20 U
pyrene	160	50	10 J	20 U
Total HPAH (U=1/2)	500	190	100	100
Total LPAH (U=1/2)	3860	900	150	70
Total PAH (U=1/2)	4360	1090	250	170
LPAH/HPAH (U=1/2)	7.7	4.7	1.5	0.7
Naphthalene/Total PAH (U=1/2)	0.41	0.35	0.16	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	11000	3700	69 J	100 U
C10-C11	2900	1000	16	--
C12-C13	1800	640	8	--
C14-C15	1800	650	17	--
C16-C17	1700	600	14	--
C18-C19	1200	410		--
C20-C21	780	300	8	--
C22-C23	470	90		--
C24-C25		47		--
C27-C28	120	16		--
C29-C30				--
C31-C32				--
C33-C34				--
C35-C36				--
C37-C39			7.3	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-092	SB-092	SB-092	SB-092
Quadrant	C3	C3	C3	C3
Sample ID	SB092-51.5-51.8	SB092-57.0-57.3	SB092-79.5-79.8	SB092-82.5-82.8
Date Sampled	9/20/99	9/20/99	9/20/99	9/20/99
Field QC				
Soil Description	clay	clay	sand	sand
NAPL Description	odor	odor	nothing	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	30	20 U	50	20 U
acenaphthene	30	20 U	40	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	10 J	20 U	20	20 U
benzo(a)anthracene	20 U	20 U	10 J	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 UJ	20 UJ	20 UJ	20 UJ
chrysene	20 U	20 U	10 J	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20	20 U	30	20 U
fluoranthene	30	20 U	60	20 U
fluorene	20	20 U	40	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	40	20 U	70	20 U
pentachlorophenol	60 U	60 U	60 U	60 U
phenanthrene	70	20 U	120	20 U
pyrene	20	20 U	40	20 U
Total HPAH (U=1/2)	130	100	180	100
Total LPAH (U=1/2)	210	70	350	70
Total PAH (U=1/2)	340	170	530	170
LPAH/HPAH (U=1/2)	1.6	0.7	1.9	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.13	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	480	100 U	350	100 U
C10-C11	71	--	59	--
C12-C13	72	--	44	--
C14-C15	110	--	67	--
C16-C17	89	--	59	--
C18-C19	60	--	46	--
C20-C21	35	--	28	--
C22-C23	24	--	20	--
C24-C25	5.2	--	5	--
C27-C28	6.6	--	7	--
C29-C30		--		--
C31-C32		--		--
C33-C34		--		--
C35-C36		--		--
C37-C39		--		--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-092	SB-092	SB-092	SB-092
Quadrant	C3	C3	C3	C3
Sample ID	SB092-86.0-86.5	SB592-86.0-86.5	SB092-90.5-90.8	SB092-95.7-96.0
Date Sampled	9/20/99	9/20/99	9/20/99	9/20/99
Field QC	Primary	Field Duplicate		
Soil Description	sand	sand	sand	sand
NAPL Description	odor	odor	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	--	20 U
acenaphthene	20 U	20 U	--	20 U
acenaphthylene	20 U	20 U	--	20 U
anthracene	20 U	20 U	--	20 U
benzo(a)anthracene	20 U	20 U	--	20 U
benzo(a)pyrene	20 U	20 U	--	20 U
benzo(b)fluoranthene	20 U	20 U	--	20 U
benzo(g,h,i)perylene	20 U	20 U	--	20 U
benzo(k)fluoranthene	20 U	20 U	--	20 U
carbazole	20 UJ	20 UJ	--	20 UJ
chrysene	20 U	20 U	--	20 U
dibenzo(a,h)anthracene	20 U	20 U	--	20 U
dibenzofuran	20 U	20 U	--	20 U
fluoranthene	20 U	20 U	--	20 U
fluorene	20 U	20 U	--	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	--	20 U
naphthalene	20 U	20 U	--	20 U
pentachlorophenol	60 U	60 U	--	50 U
phenanthrene	20 U	20 U	--	20 U
pyrene	20 U	20 U	--	20 U
Total HPAH (U=1/2)	100	100	--	100
Total LPAH (U=1/2)	70	70	--	70
Total PAH (U=1/2)	170	170	--	170
LPAH/HPAH (U=1/2)	0.7	0.7	--	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	--	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-092	SB-092	SB-092	SB-092
Quadrant	C3	C3	C3	C3
Sample ID	SB092-104.0-104.3	SB092-106.3-106.6	SB092-114-114.3	SB092-116.5-116.8
Date Sampled	9/20/99	9/20/99	9/21/99	9/21/99
Field QC				
Soil Description	sand	clay	sand	sand
NAPL Description	odor	odor	sheen	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	20 U	--
acenaphthene	--	--	20 U	--
acenaphthylene	--	--	20 U	--
anthracene	--	--	20 U	--
benzo(a)anthracene	--	--	20 U	--
benzo(a)pyrene	--	--	20 U	--
benzo(b)fluoranthene	--	--	20 U	--
benzo(g,h,i)perylene	--	--	20 U	--
benzo(k)fluoranthene	--	--	20 U	--
carbazole	--	--	20 U	--
chrysene	--	--	20 U	--
dibenzo(a,h)anthracene	--	--	20 U	--
dibenzofuran	--	--	20 U	--
fluoranthene	--	--	20	--
fluorene	--	--	20 U	--
indeno(1,2,3-cd)pyrene	--	--	20 U	--
naphthalene	--	--	20 U	--
pentachlorophenol	--	--	60 U	--
phenanthrene	--	--	30	--
pyrene	--	--	10 J	--
Total HPAH (U=1/2)	--	--	110	--
Total LPAH (U=1/2)	--	--	90	--
Total PAH (U=1/2)	--	--	200	--
LPAH/HPAH (U=1/2)	--	--	0.82	--
Naphthalene/Total PAH (U=1/2)	--	--	0.1	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	95 U	130	100 U
C10-C11	--	--	20	--
C12-C13	--	--	14	--
C14-C15	--	--	31	--
C16-C17	--	--	29	--
C18-C19	--	--	16	--
C20-C21	--	--	17	--
C22-C23	--	--		--
C24-C25	--	--		--
C27-C28	--	--		--
C29-C30	--	--		--
C31-C32	--	--		--
C33-C34	--	--		--
C35-C36	--	--		--
C37-C39	--	--		--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-092	SB-092	SB-092	SB-092
Quadrant	C3	C3	C3	C3
Sample ID	SB092-122.5-122.8	SB092-128.1-128.4	SB092-131.0-131.5	SB592-131.0-131.5
Date Sampled	9/21/99	9/21/99	9/21/99	9/21/99
Field QC			Primary	Field Duplicate
Soil Description	clay	sand	sand	sand
NAPL Description	odor	odor	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	20 U	20 U
acenaphthene	--	--	20 U	20 U
acenaphthylene	--	--	20 U	20 U
anthracene	--	--	20 U	20 U
benzo(a)anthracene	--	--	20 U	20 U
benzo(a)pyrene	--	--	20 U	20 U
benzo(b)fluoranthene	--	--	20 U	20 U
benzo(g,h,i)perylene	--	--	20 U	20 U
benzo(k)fluoranthene	--	--	20 U	20 U
carbazole	--	--	20 UJ	20 UJ
chrysene	--	--	20 U	20 U
dibenzo(a,h)anthracene	--	--	20 U	20 U
dibenzofuran	--	--	20 U	20 U
fluoranthene	--	--	20 U	20 U
fluorene	--	--	20 U	20 U
indeno(1,2,3-cd)pyrene	--	--	20 U	20 U
naphthalene	--	--	20 U	20 U
pentachlorophenol	--	--	60 U	60 U
phenanthrene	--	--	20 U	20 U
pyrene	--	--	20 U	20 U
Total HPAH (U=1/2)	--	--	100	100
Total LPAH (U=1/2)	--	--	70	70
Total PAH (U=1/2)	--	--	170	170
LPAH/HPAH (U=1/2)	--	--	0.7	0.7
Naphthalene/Total PAH (U=1/2)	--	--	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-092	SB-092	SB-092
Quadrant	C3	C3	C3
Sample ID	SB092-139.5-139.8	SB092-143.0-143.3	SB092-145.7-146
Date Sampled	9/21/99	9/21/99	9/21/99
Field QC			
Soil Description	sand	sand	sand
NAPL Description	sheen	sheen	sheen
LIF (counts/wavelength)			
Exsitu maximum intensity	--	--	--
Exsitu peak wavelength	--	--	--
PAHs (mg/kg)			
2-methylnaphthalene	100	--	20 U
acenaphthene	80	--	20 U
acenaphthylene	20 U	--	20 U
anthracene	40	--	20 U
benzo(a)anthracene	20	--	20 U
benzo(a)pyrene	10 J	--	20 U
benzo(b)fluoranthene	10 J	--	20 U
benzo(g,h,i)perylene	20 U	--	20 U
benzo(k)fluoranthene	10 J	--	20 U
carbazole	20 J	--	20 U
chrysene	20	--	20 U
dibenzo(a,h)anthracene	20 U	--	20 U
dibenzofuran	50	--	20 U
fluoranthene	90	--	20 U
fluorene	60	--	20 U
indeno(1,2,3-cd)pyrene	20 U	--	20 U
naphthalene	190	--	20 U
pentachlorophenol	60 U	--	60 UJ
phenanthrene	170	--	20 U
pyrene	70	--	20 U
Total HPAH (U=1/2)	260	--	100
Total LPAH (U=1/2)	650	--	70
Total PAH (U=1/2)	910	--	170
LPAH/HPAH (U=1/2)	2.5	--	0.7
Naphthalene/Total PAH (U=1/2)	0.21	--	0.12
TPH (mg/kg)			
TRPH	--	--	--
total hydrocarbons, C10-C39	1100	100 U	100 U
C10-C11	270	--	--
C12-C13	140	--	--
C14-C15	170	--	--
C16-C17	160	--	--
C18-C19	110	--	--
C20-C21	96	--	--
C22-C23	54	--	--
C24-C25	15	--	--
C27-C28	23	--	--
C29-C30	11	--	--
C31-C32		--	--
C33-C34		--	--
C35-C36		--	--
C37-C39		--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-092	SB-092	SB-092	SB-092
Quadrant	C3	C3	C3	C3
Sample ID	SB092-152.5-153.0	SB092-158.0-158.3	SB092-162.0 -162.3	SB092-169.0-169.3
Date Sampled	9/21/99	9/21/99	9/21/99	9/21/99
Field QC				
Soil Description	sand	clay	clay	sand
NAPL Description	odor	nothing	nothing	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	--	--	--
acenaphthene	20 U	--	--	--
acenaphthylene	20 U	--	--	--
anthracene	20 U	--	--	--
benzo(a)anthracene	20 U	--	--	--
benzo(a)pyrene	20 U	--	--	--
benzo(b)fluoranthene	20 U	--	--	--
benzo(g,h,i)perylene	20 U	--	--	--
benzo(k)fluoranthene	20 U	--	--	--
carbazole	20 UJ	--	--	--
chrysene	20 U	--	--	--
dibenzo(a,h)anthracene	20 U	--	--	--
dibenzofuran	20 U	--	--	--
fluoranthene	20 U	--	--	--
fluorene	20 U	--	--	--
indeno(1,2,3-cd)pyrene	20 U	--	--	--
naphthalene	20 U	--	--	--
pentachlorophenol	60 U	--	--	--
phenanthrene	20 U	--	--	--
pyrene	20 U	--	--	--
Total HPAH (U=1/2)	100	--	--	--
Total LPAH (U=1/2)	70	--	--	--
Total PAH (U=1/2)	170	--	--	--
LPAH/HPAH (U=1/2)	0.7	--	--	--
Naphthalene/Total PAH (U=1/2)	0.12	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-092	SB-092	SB-092	SB-092
Quadrant	C3	C3	C3	C3
Sample ID	SB092-172.0-172.3	SB092-176.7-177.0	SB092-181.7-182.0	SB092-187.7-188.0
Date Sampled	9/21/99	9/21/99	9/21/99	9/21/99
Field QC				
Soil Description	sand	sand	clay	sand
NAPL Description	odor	odor	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-092	SB-092	SB-092	SB-092
Quadrant	C3	C3	C3	C3
Sample ID	SB092-192.5-192.8	SB092-202.3-202.6	SB092-209-209.3	SB092-212.0-212.3
Date Sampled	9/22/99	9/22/99	9/22/99	9/22/99
Field QC				
Soil Description	sand	clay	silt	clay
NAPL Description	nothing	nothing	nothing	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	--	--	--
acenaphthene	--	--	--	--
acenaphthylene	--	--	--	--
anthracene	--	--	--	--
benzo(a)anthracene	--	--	--	--
benzo(a)pyrene	--	--	--	--
benzo(b)fluoranthene	--	--	--	--
benzo(g,h,i)perylene	--	--	--	--
benzo(k)fluoranthene	--	--	--	--
carbazole	--	--	--	--
chrysene	--	--	--	--
dibenzo(a,h)anthracene	--	--	--	--
dibenzofuran	--	--	--	--
fluoranthene	--	--	--	--
fluorene	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--
naphthalene	--	--	--	--
pentachlorophenol	--	--	--	--
phenanthrene	--	--	--	--
pyrene	--	--	--	--
Total HPAH (U=1/2)	--	--	--	--
Total LPAH (U=1/2)	--	--	--	--
Total PAH (U=1/2)	--	--	--	--
LPAH/HPAH (U=1/2)	--	--	--	--
Naphthalene/Total PAH (U=1/2)	--	--	--	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-092	SB-099	SB-099	SB-099
Quadrant	C3	C3	C3	C3
Sample ID	SB092-218.0-218.3	SB099-3.1-4.6	SB599-3.1-4.6	SB099-13.4-14.7
Date Sampled	9/22/99	9/30/99	9/30/99	9/30/99
Field QC		Primary	Field Duplicate	
Soil Description	clay	sand	sand	clay
NAPL Description	nothing	sheen	sheen	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	--	60	140	400
acenaphthene	--	40	80	600
acenaphthylene	--	40 U	40 U	30 U
anthracene	--	110	110	270
benzo(a)anthracene	--	40	40	110
benzo(a)pyrene	--	30 J	30 J	30
benzo(b)fluoranthene	--	40	40	30
benzo(g,h,i)perylene	--	40 U	40 U	30 U
benzo(k)fluoranthene	--	40	20 J	30
carbazole	--	50 J	50 J	100 J
chrysene	--	60	60	100
dibenzo(a,h)anthracene	--	40 U	40 U	30 U
dibenzofuran	--	20 J	40	400
fluoranthene	--	160	170	600
fluorene	--	30 J	60	500
indeno(1,2,3-cd)pyrene	--	20 J	40 U	30 U
naphthalene	--	200	440	500
pentachlorophenol	--	100	200	70 U
phenanthrene	--	150	180	1200
pyrene	--	140	160	500
Total HPAH (U=1/2)	--	570	580	1445
Total LPAH (U=1/2)	--	610	1030	3485
Total PAH (U=1/2)	--	1180	1610	4930
LPAH/HPAH (U=1/2)	--	1.1	1.8	2.4
Naphthalene/Total PAH (U=1/2)	--	0.17	0.27	0.1
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	2100	6200	6400
C10-C11	--	300	300	390
C12-C13	--	230	170	540
C14-C15	--	290	300	1300
C16-C17	--	250	490	1400
C18-C19	--	260	880	1100
C20-C21	--	200	890	790
C22-C23	--	200	940	330
C24-C25	--	140	680	210
C27-C28	--	130	630	150
C29-C30	--	110	600	89
C31-C32	--		90	
C33-C34	--	23	150	17
C35-C36	--		44	
C37-C39	--		49	

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-099	SB-099	SB-099	SB-099
Quadrant	C3	C3	C3	C3
Sample ID	SB099-27.5-29.5	SB599-27.5-29.5	SB099-31-33	SB099-41-42.5
Date Sampled	9/30/99	9/30/99	9/30/99	10/6/99
Field QC	Primary	Field Duplicate		
Soil Description	sand	sand	sand	silt/sand
NAPL Description	sheen	sheen	mobile	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	800	700	130	500
acenaphthene	1000	1000	170	500
acenaphthylene	30 J	30 J	20 U	20 U
anthracene	350	340	70	200
benzo(a)anthracene	170	150	30	100
benzo(a)pyrene	50	50	10 J	30
benzo(b)fluoranthene	40 J	40 J	20 U	30
benzo(g,h,i)perylene	50 U	50 U	20 U	20 U
benzo(k)fluoranthene	50	50	10 J	30
carbazole	180 J	180 J	40 J	120 J
chrysene	170	160	30	100
dibenzo(a,h)anthracene	50 U	50 U	20 U	20 U
dibenzofuran	540	500	100	400
fluoranthene	900	900	160	500
fluorene	800	800	140	500
indeno(1,2,3-cd)pyrene	50 U	50 U	20 U	10 J
naphthalene	2000	1900	320	1200
pentachlorophenol	100 U	100 U	60 U	60 U
phenanthrene	2000	2000	360	1200
pyrene	800	700	140	400
Total HPAH (U=1/2)	2255	2125	420	1220
Total LPAH (U=1/2)	6980	6770	1200	4110
Total PAH (U=1/2)	9235	8895	1620	5330
LPAH/HPAH (U=1/2)	3.1	3.2	2.9	3.4
Naphthalene/Total PAH (U=1/2)	0.22	0.21	0.2	0.23
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	18000	22000	5900	13000
C10-C11	2100	2600	600	1700
C12-C13	1500	2000	510	1400
C14-C15	3400	4300	1100	2500
C16-C17	3700	4600	1300	2800
C18-C19	3100	3900	1100	2300
C20-C21	2100	2600	680	1500
C22-C23	720	930	300	540
C24-C25	620	820	210	410
C27-C28	390	520	140	240
C29-C30			37	55
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-099	SB-099	SB-099	SB-099
Quadrant	C3	C3	C3	C3
Sample ID	SB099-53-53.9	SB099-69-69.5	SB099-74-74.2	SB099-84-84.3
Date Sampled	10/6/99	10/6/99	10/6/99	10/6/99
Field QC				
Soil Description	sand	clay	sand	sand
NAPL Description	nothing	nothing	odor	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	--
acenaphthene	20 U	20 U	20 U	--
acenaphthylene	20 U	20 U	20 U	--
anthracene	20 U	20 U	20 U	--
benzo(a)anthracene	20 U	20 U	20 U	--
benzo(a)pyrene	20 U	20 U	20 U	--
benzo(b)fluoranthene	20 U	20 U	20 U	--
benzo(g,h,i)perylene	20 U	20 U	20 U	--
benzo(k)fluoranthene	20 U	20 U	20 U	--
carbazole	20 UJ	20 UJ	20 UJ	--
chrysene	20 U	20 U	20 U	--
dibenzo(a,h)anthracene	20 U	20 U	20 U	--
dibenzofuran	20 U	20 U	20 U	--
fluoranthene	20 U	20 U	20 U	--
fluorene	20 U	20 U	20 U	--
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	--
naphthalene	20 U	20 U	20 U	--
pentachlorophenol	60 U	50 U	60 U	--
phenanthrene	20 U	20 U	20 U	--
pyrene	20 U	20 U	20 U	--
Total HPAH (U=1/2)	100	100	100	--
Total LPAH (U=1/2)	70	70	70	--
Total PAH (U=1/2)	170	170	170	--
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	--
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	--
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-099	SB-099	SB-099	SB-099
Quadrant	C3	C3	C3	C3
Sample ID	SB099-89.5-89.8	SB099-98-98.2	SB099-107.5-107.8	SB099-111-111.2
Date Sampled	10/6/99	10/7/99	10/7/99	10/7/99
Field QC				
Soil Description	sand	clay	clay	sand
NAPL Description	nothing	odor	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	20 U
acenaphthene	20 U	20 U	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 UJ	20 UJ	20 UJ	20 UJ
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	20 U	20 U
fluoranthene	20 U	20 U	20 U	20 U
fluorene	20 U	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	20 U	20 U
pentachlorophenol	60 U	60 U	60 U	60 U
phenanthrene	20 U	20 U	20 U	20 U
pyrene	20 U	20 U	20 U	20 U
Total HPAH (U=1/2)	100	100	100	100
Total LPAH (U=1/2)	70	70	70	70
Total PAH (U=1/2)	170	170	170	170
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	--	100 U	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-099	SB-099	SB-099	SB-099
Quadrant	C3	C3	C3	C3
Sample ID	SB099-127.3-127.5	SB599-127.3-127.5	SB099-139.2-139.4	SB099-141.1-141.3
Date Sampled	10/7/99	10/7/99	10/7/99	10/7/99
Field QC	Primary	Field Duplicate		
Soil Description	clay	clay	clay	sand
NAPL Description	odor	odor	sheen	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20	20 U
acenaphthene	20 U	20 U	20	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	10 J	20 U
carbazole	20 UJ	20 UJ	20 UJ	20 UJ
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	10 J	20 U
fluoranthene	20 U	20 U	20	20 U
fluorene	20 U	20 U	10 J	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	20	20 U
pentachlorophenol	60 U	60 U	50 U	60 U
phenanthrene	20 U	20 U	40	20 U
pyrene	20 U	20 U	10 J	20 U
Total HPAH (U=1/2)	100	100	110	100
Total LPAH (U=1/2)	70	70	130	70
Total PAH (U=1/2)	170	170	240	170
LPAH/HPAH (U=1/2)	0.7	0.7	1.2	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.08	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	250	100 U
C10-C11	--	--	58	--
C12-C13	--	--	52	--
C14-C15	--	--	54	--
C16-C17	--	--	36	--
C18-C19	--	--	19	--
C20-C21	--	--	18	--
C22-C23	--	--	6	--
C24-C25	--	--		--
C27-C28	--	--		--
C29-C30	--	--		--
C31-C32	--	--		--
C33-C34	--	--		--
C35-C36	--	--		--
C37-C39	--	--		--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-099	SB-099	SB-099	SB-099
Quadrant	C3	C3	C3	C3
Sample ID	SB099-152.6-152.8	SB099-153.8-153.9	SB099-160.7-160.9	SB599-160.7-160.9
Date Sampled	10/7/99	10/7/99	10/7/99	10/7/99
Field QC			Primary	Field Duplicate
Soil Description	clay	clay	sand	sand
NAPL Description	odor	odor	sheen	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20	90	200	190
acenaphthene	10 J	50	110	120
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20	40	50
benzo(a)anthracene	20 U	10 J	20	30
benzo(a)pyrene	20 U	20 U	10 J	10 J
benzo(b)fluoranthene	20 U	20 U	10 J	10 J
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	10 J	10 J
carbazole	20 UJ	20 UJ	10 J	10 J
chrysene	20 U	10 J	20	30
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	30	70	80
fluoranthene	10 J	60	100	110
fluorene	20 U	40	80	90
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	40	170	380	310
pentachlorophenol	60 U	60 U	60 U	50 U
phenanthrene	30	110	190	220
pyrene	10 J	50	80	90
Total HPAH (U=1/2)	100	190	280	320
Total LPAH (U=1/2)	130	490	1010	990
Total PAH (U=1/2)	230	680	1290	1310
LPAH/HPAH (U=1/2)	1.3	2.6	3.6	3.1
Naphthalene/Total PAH (U=1/2)	0.17	0.25	0.29	0.24
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	70 J	410	1200	2200
C10-C11	22	120	320	560
C12-C13	10	69	210	370
C14-C15	16	75	210	370
C16-C17	7	60	160	290
C18-C19		35	110	200
C20-C21	7	34	88	160
C22-C23		17	47	77
C24-C25			13	44
C27-C28			22	50
C29-C30			6	19
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-099	SB-099	SB-099	SB-099
Quadrant	C3	C3	C3	C3
Sample ID	SB099-161.8-162	SB099-170-170.2	SB099-184-184.2	SB099-195.1-195.3
Date Sampled	10/7/99	10/7/99	10/7/99	10/8/99
Field QC				
Soil Description	sand	sand	sand	clay
NAPL Description	sheen	odor	nothing	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	160	20 U	20 U	20 U
acenaphthene	100	20 U	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	40	20 U	20 U	20 U
benzo(a)anthracene	20	20 U	20 U	20 U
benzo(a)pyrene	10 J	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	10 J	20 UJ	20 UJ	20 UJ
chrysene	20	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	60	20 U	20 U	20 U
fluoranthene	100	20 U	20 U	20 U
fluorene	80	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	210	20 U	20 U	20 U
pentachlorophenol	60 U	60 U	60 U	60 U
phenanthrene	190	20 U	20 U	20 U
pyrene	80	20 U	20 U	20 U
Total HPAH (U=1/2)	280	100	100	100
Total LPAH (U=1/2)	790	70	70	70
Total PAH (U=1/2)	1070	170	170	170
LPAH/HPAH (U=1/2)	2.8	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.2	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	2100	100 U	100 U	100 U
C10-C11	530	--	--	--
C12-C13	360	--	--	--
C14-C15	370	--	--	--
C16-C17	280	--	--	--
C18-C19	190	--	--	--
C20-C21	170	--	--	--
C22-C23	85	--	--	--
C24-C25	34	--	--	--
C27-C28	50	--	--	--
C29-C30	19	--	--	--
C31-C32		--	--	--
C33-C34		--	--	--
C35-C36		--	--	--
C37-C39		--	--	--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-099	SB-099	SB-099	SB-099
Quadrant	C3	C3	C3	C3
Sample ID	SB099-204.5-204.7	SB099-208-208.2	SB099-212.4-212.6	SB099-221.2-221.4
Date Sampled	10/8/99	10/8/99	10/8/99	10/8/99
Field QC				
Soil Description	clay	clay	clay	silt
NAPL Description	odor	odor	sheen	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	--	--	--	--
Exsitu peak wavelength	--	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	80	20 U
acenaphthene	20 U	20 U	60	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20	20 U
benzo(a)anthracene	20 U	20 U	10 J	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 UJ	20 UJ	20 UJ	20 UJ
chrysene	20 U	20 U	10 J	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	30	20 U
fluoranthene	20 U	20 U	60	20 U
fluorene	20 U	20 U	40	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	110	20 U
pentachlorophenol	60 U	60 U	60 U	60 U
phenanthrene	20 U	20 U	110	20 U
pyrene	20 U	20 U	40	20 U
Total HPAH (U=1/2)	100	100	180	100
Total LPAH (U=1/2)	70	70	430	70
Total PAH (U=1/2)	170	170	610	170
LPAH/HPAH (U=1/2)	0.7	0.7	2.4	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.18	0.12
TPH (mg/kg)				
TRPH	--	--	--	--
total hydrocarbons, C10-C39	100 U	100 U	1500	100 U
C10-C11	--	--	330	--
C12-C13	--	--	270	--
C14-C15	--	--	290	--
C16-C17	--	--	210	--
C18-C19	--	--	140	--
C20-C21	--	--	110	--
C22-C23	--	--	55	--
C24-C25	--	--	25	--
C27-C28	--	--	30	--
C29-C30	--	--	13	--
C31-C32	--	--		--
C33-C34	--	--		--
C35-C36	--	--		--
C37-C39	--	--		--

Table A-1
Rotosonic Boring Soil Data

Location ID	SB-099	SB-099
Quadrant	C3	C3
Sample ID	SB099-234.5-234.7	SB099-249-249.2
Date Sampled	10/8/99	10/8/99
Field QC		
Soil Description	sand	sand
NAPL Description	odor	odor
LIF (counts/wavelength)		
Exsitu maximum intensity	--	--
Exsitu peak wavelength	--	--
PAHs (mg/kg)		
2-methylnaphthalene	20 U	20 U
acenaphthene	20 U	20 U
acenaphthylene	20 U	20 U
anthracene	20 U	20 U
benzo(a)anthracene	20 U	20 U
benzo(a)pyrene	20 U	20 U
benzo(b)fluoranthene	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U
benzo(k)fluoranthene	20 U	20 U
carbazole	20 UJ	20 UJ
chrysene	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U
dibenzofuran	20 U	20 U
fluoranthene	20 U	20 U
fluorene	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U
naphthalene	20 U	20 U
pentachlorophenol	60 U	50 U
phenanthrene	20 U	20 U
pyrene	20 U	20 U
Total HPAH (U=1/2)	100	100
Total LPAH (U=1/2)	70	70
Total PAH (U=1/2)	170	170
LPAH/HPAH (U=1/2)	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12
TPH (mg/kg)		
TRPH	--	--
total hydrocarbons, C10-C39	100 U	100 U
C10-C11	--	--
C12-C13	--	--
C14-C15	--	--
C16-C17	--	--
C18-C19	--	--
C20-C21	--	--
C22-C23	--	--
C24-C25	--	--
C27-C28	--	--
C29-C30	--	--
C31-C32	--	--
C33-C34	--	--
C35-C36	--	--
C37-C39	--	--

Table A-2
SCAPS Soil Data

Location ID	SE-002	SE-002	SE-002	SE-002
Quadrant	C1	C1	C1	C1
Sample ID	SS002-14.3-15.1	SS002-15.1-16.0	SS002-24.5-25.6	SS002-25.6-26.5
Date Sampled	7/15/99	7/15/99	7/15/99	7/15/99
Field QC				
Soil Description	silty/clay	silty/clay	clay	sand
NAPL Description	nothing	nothing	visible	visible
LIF (counts/wavelength)				
Exsitu maximum intensity	192	184	619	810
Exsitu peak wavelength	446	443	466	469
Insitu maximum intensity	424	178	1880	1880
Insitu peak wavelength	471	476	470	470
PAHs (mg/kg)				
2-methylnaphthalene	180	70	500	900 U
acenaphthene	160	40	170	400
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	90	20	70	130
benzo(a)anthracene	30	20 U	20	30
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20	20 U	20 U	10 J
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	110	20 J	50	100
chrysene	30	20 U	20	40
dibenzo(a,h)anthracene	20 U	20 U	30 U	20 U
dibenzofuran	100	30	100	180
fluoranthene	140	40	90	180
fluorene	100	30	110	200
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	1400	280	1400	2800
pentachlorophenol	180	20 U	30	70
phenanthrene	250	90	300	600
pyrene	110	30	70	140
Total HPAH (U=1/2)	380	150	265	450
Total LPAH (U=1/2)	2190	540	2560	4590
Total PAH (U=1/2)	2570	690	2825	5040
LPAH/HPAH (U=1/2)	5.8	3.6	9.7	10
Naphthalene/Total PAH (U=1/2)	0.54	0.41	0.5	0.56
TPH (mg/kg)				
TRPH	1011	341	755	2484
total hydrocarbons, C10-C39	2200	1000	2300	7900
C10-C11	450	260	640	2300
C12-C13	250	110	410	1300
C14-C15	470	190	570	1700
C16-C17	360	150	290	1000
C18-C19	320	120	160	810
C20-C21	170	93	140	420
C22-C23	120	40	52	240
C24-C25	46	26	34	100
C27-C28	19	5	9	
C29-C30	8			
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-2
SCAPS Soil Data

Location ID	SE-002	SE-002	SE-005	SE-005
Quadrant	C1	C1	C2	C2
Sample ID	SS002-84-86	SS502-84-86	SS005-29.5-30.5	SS005-30.5-31.6
Date Sampled	7/15/99	7/15/99	7/15/99	7/15/99
Field QC	Primary	Field Duplicate		
Soil Description	sand	sand	sand	clay
NAPL Description	visible	visible	mobile	visible
LIF (counts/wavelength)				
Exsitu maximum intensity	144	144	766	483
Exsitu peak wavelength	444	444	480	470
Insitu maximum intensity	33	33	794	603
Insitu peak wavelength	426	426	496	492
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	500	400
acenaphthene	20 U	20 U	400	200
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	150	110
benzo(a)anthracene	20 U	20 U	110	70
benzo(a)pyrene	20 U	20 U	50	30
benzo(b)fluoranthene	20 U	20 U	70	40
benzo(g,h,i)perylene	20 U	20 U	20	20 U
benzo(k)fluoranthene	20 U	20 U	20	10 J
carbazole	20 U	20 U	200	170
chrysene	20 U	20 U	110	70
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	300	170
fluoranthene	20 U	20 U	600	400
fluorene	20 U	20 U	300	170
indeno(1,2,3-cd)pyrene	20 U	20 U	20	20 U
naphthalene	20 U	20 U	1200	1200
pentachlorophenol	20 U	20 U	200	50
phenanthrene	20 U	20 U	1100	800
pyrene	20 U	20 U	400	300
Total HPAH (U=1/2)	100	100	1410	950
Total LPAH (U=1/2)	70	70	3660	2890
Total PAH (U=1/2)	170	170	5070	3840
LPAH/HPAH (U=1/2)	0.7	0.7	2.6	3
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.24	0.31
TPH (mg/kg)				
TRPH	6 J	8 J	1504	242
total hydrocarbons, C10-C39	100 U	100 U	12000 J	4000
C10-C11	--	--	2700 J	850
C12-C13	--	--	1200 J	470
C14-C15	--	--	2100 J	770
C16-C17	--	--	1900 J	650
C18-C19	--	--	950 J	490
C20-C21	--	--	1600 J	340
C22-C23	--	--	430 J	220
C24-C25	--	--	620 J	100
C27-C28	--	--	160 J	51
C29-C30	--	--	130 J	42
C31-C32	--	--	30 J	9
C33-C34	--	--	40 J	12
C35-C36	--	--		
C37-C39	--	--		

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-2
SCAPS Soil Data

Location ID	SE-005	SE-005	SE-005	SE-008
Quadrant	C2	C2	C2	C2
Sample ID	SS005-43-45	SS005-67-69	SS005-86-87.5	EP01-0-0.1
Date Sampled	7/15/99	7/15/99	7/15/99	9/30/99
Field QC				
Soil Description	sand	clay/sand	sand	crystals in soil
NAPL Description	odor	mobile	odor	
LIF (counts/wavelength)				
Exsitu maximum intensity	103	418	140	--
Exsitu peak wavelength	445	476	444	--
Insitu maximum intensity	131	1430	70	--
Insitu peak wavelength	497	484	496	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	80	20 U	50000 U
acenaphthene	20 U	50	20 U	50000 U
acenaphthylene	20 U	20 U	20 U	50000 U
anthracene	20 U	20	20 U	50000 U
benzo(a)anthracene	20 U	10 J	20 U	50000 U
benzo(a)pyrene	20 U	20 U	20 U	50000 U
benzo(b)fluoranthene	20 U	20 U	20 U	50000 U
benzo(g,h,i)perylene	20 U	20 U	20 U	50000 U
benzo(k)fluoranthene	20 U	20 U	20 U	50000 U
carbazole	20 U	30	20 U	50000 U
chrysene	20 U	10 J	20 U	50000 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	50000 U
dibenzofuran	20 U	30	20 U	50000 U
fluoranthene	20 U	60	20 U	50000 U
fluorene	20 U	40	20 U	50000 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	50000 U
naphthalene	20 U	150	20 U	50000 U
pentachlorophenol	20 U	20 U	20 U	1000000
phenanthrene	20 U	100	20 U	50000 U
pyrene	20 U	40	20 U	50000 U
Total HPAH (U=1/2)	100	180	100	250000
Total LPAH (U=1/2)	70	450	70	175000
Total PAH (U=1/2)	170	630	170	425000
LPAH/HPAH (U=1/2)	0.7	2.5	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.24	0.12	0.12
TPH (mg/kg)				
TRPH	6 J	113	36	--
total hydrocarbons, C10-C39	100 U	1200	100 U	22000
C10-C11	--	360	--	
C12-C13	--	190	--	
C14-C15	--	220	--	680
C16-C17	--	160	--	10000
C18-C19	--	120	--	800
C20-C21	--	89	--	1100
C22-C23	--	58	--	1200
C24-C25	--	28	--	170
C27-C28	--	14	--	1700
C29-C30	--	13	--	3300
C31-C32	--		--	1600
C33-C34	--		--	530
C35-C36	--		--	230
C37-C39	--		--	120

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-2
SCAPS Soil Data

Location ID	SE-008	SE-008	SE-008	SE-008
Quadrant	C2	C2	C2	C2
Sample ID	SS008-10.5-11.7	SS508-10.5-11.7	SS008-19-21	SS008-40-41.5
Date Sampled	8/8/99	8/8/99	8/8/99	8/8/99
Field QC	Primary	Field Duplicate		
Soil Description	clay	clay	clay	sand
NAPL Description	odor	odor	nothing	visible
LIF (counts/wavelength)				
Exsitu maximum intensity	105	--	86	300
Exsitu peak wavelength	454	--	443	455
Insitu maximum intensity	477	--	63	1601
Insitu peak wavelength	399	--	498	469
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	20 U
acenaphthene	20 U	20 U	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 U	20 U	20 U	20 U
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	20 U	20 U
fluoranthene	20 U	20 U	20 U	20 U
fluorene	20 U	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 J	20 J	20 U	20 U
pentachlorophenol	60 J	30 J	60 U	60 U
phenanthrene	20 U	20 U	20 U	20 U
pyrene	20 U	20 U	20 U	20 U
Total HPAH (U=1/2)	100	100	100	100
Total LPAH (U=1/2)	80	80	70	70
Total PAH (U=1/2)	180	180	170	170
LPAH/HPAH (U=1/2)	0.8	0.8	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.11	0.11	0.12	0.12
TPH (mg/kg)				
TRPH	15 U	--	15 U	28
total hydrocarbons, C10-C39	100 UJ	--	100 UJ	120 J
C10-C11	--	--	--	30
C12-C13	--	--	--	30
C14-C15	--	--	--	30
C16-C17	--	--	--	20
C18-C19	--	--	--	9
C20-C21	--	--	--	6
C22-C23	--	--	--	
C24-C25	--	--	--	
C27-C28	--	--	--	
C29-C30	--	--	--	
C31-C32	--	--	--	
C33-C34	--	--	--	
C35-C36	--	--	--	
C37-C39	--	--	--	

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-2
SCAPS Soil Data

Location ID	SE-008	SE-008	SE-008	SE-009
Quadrant	C2	C2	C2	C2
Sample ID	SS008-42-44	SS008-45-45.9	SS008-48-50	SS009-21-23
Date Sampled	8/8/99	8/8/99	8/8/99	8/10/99
Field QC				
Soil Description	sand	sand	sand	silty/sand
NAPL Description	mobile	nothing	mobile	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	2933	97	2349	94
Exsitu peak wavelength	468	442	469	443
Insitu maximum intensity	927	2107	37	183
Insitu peak wavelength	468	404	405	498
PAHs (mg/kg)				
2-methylnaphthalene	460	20 U	220	20 U
acenaphthene	200	20 U	120	20 U
acenaphthylene	30 U	20 U	20 U	20 U
anthracene	80	20 U	40	20 U
benzo(a)anthracene	20 J	20 U	20 U	20 U
benzo(a)pyrene	30 U	20 U	20 U	20 U
benzo(b)fluoranthene	30 U	20 U	20 U	20 U
benzo(g,h,i)perylene	30 U	20 U	20 U	20 U
benzo(k)fluoranthene	30 U	20 U	20 U	20 U
carbazole	30	20 U	20	20 U
chrysene	20 J	20 U	20 U	20 U
dibenzo(a,h)anthracene	30 U	20 U	20 U	20 U
dibenzofuran	130	20 U	80	20 U
fluoranthene	110	20 U	60	20 U
fluorene	140	20 U	80	20 U
indeno(1,2,3-cd)pyrene	30 U	20 U	20 U	20 U
naphthalene	790	10 J	360	20 U
pentachlorophenol	60 U	60 U	60 U	60 U
phenanthrene	280	20 U	160	20 U
pyrene	90	20 U	40	20 U
Total HPAH (U=1/2)	330	100	180	100
Total LPAH (U=1/2)	1965	70	990	70
Total PAH (U=1/2)	2295	170	1170	170
LPAH/HPAH (U=1/2)	6	0.7	5.5	0.7
Naphthalene/Total PAH (U=1/2)	0.34	0.06	0.31	0.12
TPH (mg/kg)				
TRPH	2591	8 J	1340	15 U
total hydrocarbons, C10-C39	5300 J	100 UJ	3800 J	100 U
C10-C11	1400	--	1100	--
C12-C13	1200	--	970	--
C14-C15	1000	--	750	--
C16-C17	700	--	460	--
C18-C19	440	--	270	--
C20-C21	270	--	160	--
C22-C23	120	--	68	--
C24-C25	50	--	20	--
C27-C28		--	10	--
C29-C30		--		--
C31-C32		--		--
C33-C34		--		--
C35-C36		--		--
C37-C39		--		--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-2
SCAPS Soil Data

Location ID	SE-009	SE-009	SE-010	SE-010
Quadrant	C2	C2	C2	C2
Sample ID	SS009-55-57	SS009-69-70	SS010-59-59.8	SS010-61-61.5
Date Sampled	8/10/99	8/10/99	9/6/99	9/6/99
Field QC				
Soil Description	sand	sand	sand and gravel	sandy/clay
NAPL Description	odor	odor	sheen	visible
LIF (counts/wavelength)				
Exsitu maximum intensity	116	141	117	562
Exsitu peak wavelength	443	442	442	475
Insitu maximum intensity	121	127	1997	578
Insitu peak wavelength	497	401	477	473
PAHs (mg/kg)				
2-methylnaphthalene	20 U	30 U	20 U	200
acenaphthene	20 U	30 U	20 U	110
acenaphthylene	20 U	30 U	20 U	20 U
anthracene	20 U	30 U	20 U	40
benzo(a)anthracene	20 U	30 U	20 U	20
benzo(a)pyrene	20 U	30 U	20 U	10 J
benzo(b)fluoranthene	20 U	30 U	20 U	20
benzo(g,h,i)perylene	20 U	30 U	20 U	20 U
benzo(k)fluoranthene	20 U	30 U	20 U	20 U
carbazole	20 U	30 U	20 UJ	20 J
chrysene	20 U	30 U	20 U	30
dibenzo(a,h)anthracene	20 U	30 U	20 U	20 U
dibenzofuran	20 U	30 U	20 U	70
fluoranthene	20 U	30 U	20 U	100
fluorene	20 U	30 U	20 U	70
indeno(1,2,3-cd)pyrene	20 U	30 U	20 U	20 U
naphthalene	20 U	30 U	20 U	250
pentachlorophenol	60 U	70 U	60 U	60 U
phenanthrene	20 U	30 U	20 U	180
pyrene	20 U	30 U	20 U	80
Total HPAH (U=1/2)	100	150	100	300
Total LPAH (U=1/2)	70	105	70	860
Total PAH (U=1/2)	170	255	170	1160
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	2.9
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.22
TPH (mg/kg)				
TRPH	15 U	15 U	3 J	181
total hydrocarbons, C10-C39	100 U	100 U	100 U	1500
C10-C11	--	--	--	550
C12-C13	--	--	--	320
C14-C15	--	--	--	210
C16-C17	--	--	--	140
C18-C19	--	--	--	94
C20-C21	--	--	--	80
C22-C23	--	--	--	39
C24-C25	--	--	--	19
C27-C28	--	--	--	20
C29-C30	--	--	--	11
C31-C32	--	--	--	
C33-C34	--	--	--	
C35-C36	--	--	--	
C37-C39	--	--	--	

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-2
SCAPS Soil Data

Location ID	SE-010	SE-020	SE-020	SE-020
Quadrant	C2	C2	C2	C2
Sample ID	SS010-61.5-63	SS020-29-31	SS520-29-31	SS020-47-49
Date Sampled	9/6/99	8/8/99	8/8/99	8/8/99
Field QC		Primary	Field Duplicate	
Soil Description	silt	sandy/clay	sandy/clay	silty/sand
NAPL Description	visible	sheen	sheen	mobile
LIF (counts/wavelength)				
Exsitu maximum intensity	637	541	541	1083
Exsitu peak wavelength	487	454	454	476
Insitu maximum intensity	554	362	362	916
Insitu peak wavelength	495	461	461	469
PAHs (mg/kg)				
2-methylnaphthalene	260	370	180	270
acenaphthene	120	140	80	180
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	40	60	40	80
benzo(a)anthracene	30	10 J	20 U	20
benzo(a)pyrene	10 J	20 U	20 U	20 U
benzo(b)fluoranthene	20	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 J	20	20 U	30
chrysene	30	10 J	20 U	20
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	70	100	50	100
fluoranthene	100	80	50	100
fluorene	80	100	60	120
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	380	620	320	850
pentachlorophenol	60 U	60 U	60 U	60
phenanthrene	180	200	130	260
pyrene	80	60	40	80
Total HPAH (U=1/2)	310	220	170	280
Total LPAH (U=1/2)	1070	1500	820	1770
Total PAH (U=1/2)	1380	1720	990	2050
LPAH/HPAH (U=1/2)	3.5	6.8	4.8	6.3
Naphthalene/Total PAH (U=1/2)	0.28	0.36	0.32	0.41
TPH (mg/kg)				
TRPH	162	274	283	717
total hydrocarbons, C10-C39	1200	1100	2600	4800
C10-C11	440	280	660	1400
C12-C13	270	290	660	970
C14-C15	180	250	550	840
C16-C17	120	150	340	690
C18-C19	85	85	190	430
C20-C21	73	51	120	280
C22-C23	36	20	60	130
C24-C25	17	7	20	40
C27-C28	19		10	20
C29-C30	11			6
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-2
SCAPS Soil Data

Location ID	SE-020	SE-020	SE-020	SE-020
Quadrant	C2	C2	C2	C2
Sample ID	SS020-51-51.8	SS020-56-58	SS520-56-58	SS020-60-62
Date Sampled	8/8/99	8/8/99	8/8/99	8/8/99
Field QC		Primary	Field Duplicate	
Soil Description	sand	sand	sand	sand
NAPL Description	visible	mobile	mobile	mobile
LIF (counts/wavelength)				
Exsitu maximum intensity	113	1396	1396	1994
Exsitu peak wavelength	441	471	471	471
Insitu maximum intensity	1627	3067	3067	3316
Insitu peak wavelength	470	472	472	469
PAHs (mg/kg)				
2-methylnaphthalene	20 U	540	600	380
acenaphthene	20 U	240	270	190
acenaphthylene	20 U	20 U	20 U	30 U
anthracene	20 U	100	110	90
benzo(a)anthracene	20 U	20	30	20 J
benzo(a)pyrene	20 U	20 U	20 U	30 U
benzo(b)fluoranthene	20 U	20 U	20 U	30 U
benzo(g,h,i)perylene	20 U	20 U	20 U	30 U
benzo(k)fluoranthene	20 U	20 U	20 U	30 U
carbazole	20 U	40	40	30
chrysene	20 U	30	30	20 J
dibenzo(a,h)anthracene	20 U	20 U	20 U	30 U
dibenzofuran	20 U	140	160	110
fluoranthene	20 U	130	140	110
fluorene	20 U	160	180	140
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	30 U
naphthalene	20 U	1000	1300	610
pentachlorophenol	60 U	60	60	70 U
phenanthrene	20 U	380	400	290
pyrene	20 U	110	120	100
Total HPAH (U=1/2)	100	350	380	340
Total LPAH (U=1/2)	70	2430	2870	1715
Total PAH (U=1/2)	170	2780	3250	2055
LPAH/HPAH (U=1/2)	0.7	6.9	7.6	5
Naphthalene/Total PAH (U=1/2)	0.12	0.36	0.4	0.3
TPH (mg/kg)				
TRPH	15	1456	1458	2899
total hydrocarbons, C10-C39	70 J	6200	6000	5500
C10-C11	--	1800	1700	1600
C12-C13	--	1100	1000	920
C14-C15	--	1300	1300	1200
C16-C17	--	1200	1200	1100
C18-C19	--	410	420	350
C20-C21	--	420	420	370
C22-C23	--	67	65	59
C24-C25	--			
C27-C28	--			
C29-C30	--			
C31-C32	--			
C33-C34	--			
C35-C36	--			
C37-C39	--			

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-2
SCAPS Soil Data

Location ID	SE-035	SE-037	SE-037	SE-037
Quadrant	C1	D2	D2	D2
Sample ID	SS035-50-52	SS037-31-32.6	SS037-56-57	SS037-93-95
Date Sampled	9/9/99	8/9/99	8/9/99	8/9/99
Field QC				
Soil Description	clay	sand	sand	silt
NAPL Description	nothing	odor	mobile	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	75	103	1319	116
Exsitu peak wavelength	454	444	486	442
Insitu maximum intensity	472	640	2054	292
Insitu peak wavelength	471	446	487	443
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	1000	20 U
acenaphthene	20 U	20 U	800	20 U
acenaphthylene	20 U	20 U	100 U	20 U
anthracene	20 U	20 U	400	20 U
benzo(a)anthracene	20 U	20 U	200	20 U
benzo(a)pyrene	20 U	20 U	100 J	20 U
benzo(b)fluoranthene	20 U	20 U	100 J	20 U
benzo(g,h,i)perylene	20 U	20 U	100 U	20 U
benzo(k)fluoranthene	20 U	20 U	100 J	20 U
carbazole	20 U	20 U	200	20 U
chrysene	20 U	20 U	200	20 U
dibenzo(a,h)anthracene	20 U	20 U	100 U	20 U
dibenzofuran	20 U	20 U	500	20 U
fluoranthene	20 U	20 U	900	20 U
fluorene	20 U	20 U	600	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	100 U	20 U
naphthalene	20 U	20 U	4000	20 U
pentachlorophenol	60 UJ	60 U	300 U	60 U
phenanthrene	20 U	20 U	2000	20 U
pyrene	20 U	20 U	700	20 U
Total HPAH (U=1/2)	100	100	2450	100
Total LPAH (U=1/2)	70	70	8850	70
Total PAH (U=1/2)	170	170	11300	170
LPAH/HPAH (U=1/2)	0.7	0.7	3.6	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.35	0.12
TPH (mg/kg)				
TRPH	4 J	15 U	6836	15 U
total hydrocarbons, C10-C39	100 U	100 U	27000	100 U
C10-C11	--	--	7500	--
C12-C13	--	--	2800	--
C14-C15	--	--	4300	--
C16-C17	--	--	5900	--
C18-C19	--	--	1800	--
C20-C21	--	--	3700	--
C22-C23	--	--	1200	--
C24-C25	--	--	50	--
C27-C28	--	--	70	--
C29-C30	--	--		--
C31-C32	--	--		--
C33-C34	--	--		--
C35-C36	--	--		--
C37-C39	--	--		--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-2
SCAPS Soil Data

Location ID	SE-039	SE-039	SE-039	SE-039
Quadrant	B1	B1	B1	B1
Sample ID	SS039-10-12	SS039-19-20.6	SS039-22-22.4	SS039-40-42
Date Sampled	8/9/99	8/9/99	8/9/99	8/9/99
Field QC				
Soil Description	clay	sand	sand	silty/clay
NAPL Description	nothing	mobile	mobile	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	102	449	477	101
Exsitu peak wavelength	444	454	545	443
Insitu maximum intensity	592	1251	460	194
Insitu peak wavelength	471	470	468	436
PAHs (mg/kg)				
2-methylnaphthalene	20 U	50	40	20 U
acenaphthene	20 U	70	60	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	30	20	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 U	20 U	20 U	20 U
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	40	30	20 U
fluoranthene	20 U	50	30	20 U
fluorene	20 U	50	40	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	80	50	20 U
pentachlorophenol	20 U	60 U	60 U	60 U
phenanthrene	20 U	120	90	20 U
pyrene	20 U	40	30	20 U
Total HPAH (U=1/2)	100	170	140	100
Total LPAH (U=1/2)	70	410	310	70
Total PAH (U=1/2)	170	580	450	170
LPAH/HPAH (U=1/2)	0.7	2.4	2.2	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.14	0.11	0.12
TPH (mg/kg)				
TRPH	15 U	804	543	15 U
total hydrocarbons, C10-C39	100 U	940	920	100 U
C10-C11	--	200	190	--
C12-C13	--	97	120	--
C14-C15	--	190	210	--
C16-C17	--	240	220	--
C18-C19	--	98	83	--
C20-C21	--	110	94	--
C22-C23	--	20	7	--
C24-C25	--			--
C27-C28	--			--
C29-C30	--			--
C31-C32	--			--
C33-C34	--			--
C35-C36	--			--
C37-C39	--			--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-2
SCAPS Soil Data

Location ID	SE-043	SE-043	SE-043	SE-043
Quadrant	D2	D2	D2	D2
Sample ID	SS043-7-8.6	SS043-13-15	SS043-23-25	SS543-23-25
Date Sampled	8/9/99	8/9/99	8/9/99	8/9/99
Field QC			Primary	Field Duplicate
Soil Description	clay	silty/sand	silty/sand	silty/sand
NAPL Description	nothing	odor (fuel)	odor (fuel)	odor (fuel)
LIF (counts/wavelength)				
Exsitu maximum intensity	134	1801	592	592
Exsitu peak wavelength	453	454	454	454
Insitu maximum intensity	1009	5669	7094	7094
Insitu peak wavelength	477	455	454	454
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	20 U
acenaphthene	20 U	20 U	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 U	20 U	20 U	20 U
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	20 U	20 U
fluoranthene	20 U	20 U	20 U	20 U
fluorene	20 U	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	20 U	20 U
pentachlorophenol	60 U	60 U	60 U	60 U
phenanthrene	20 U	20 U	20 U	20 U
pyrene	20 U	20 U	20 U	20 U
Total HPAH (U=1/2)	100	100	100	100
Total LPAH (U=1/2)	70	70	70	70
Total PAH (U=1/2)	170	170	170	170
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	9 J	614	363	328
total hydrocarbons, C10-C39	100 U	900	400	500
C10-C11	--	23	9	10
C12-C13	--	200	83	100
C14-C15	--	450	210	250
C16-C17	--	130	63	73
C18-C19	--	30	10	15
C20-C21	--	12	5	6
C22-C23	--	6		
C24-C25	--			
C27-C28	--			
C29-C30	--			
C31-C32	--			
C33-C34	--			
C35-C36	--			
C37-C39	--			

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-2
SCAPS Soil Data

Location ID	SE-043	SE-047	SE-047	SE-047
Quadrant	D2	D3	D3	D3
Sample ID	SS043-27-29	SS047-10-12	SS047-12-14	SS047-14-15
Date Sampled	8/9/99	9/7/99	9/7/99	9/7/99
Field QC				
Soil Description	silt			
NAPL Description	nothing			
LIF (counts/wavelength)				
Exsitu maximum intensity	624	--	--	--
Exsitu peak wavelength	454	--	--	--
Insitu maximum intensity	3837	--	--	--
Insitu peak wavelength	454	--	--	--
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	10 J
acenaphthene	20 U	20 U	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 U	20 UJ	20 UJ	20 UJ
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	20 U	20 U
fluoranthene	20 U	20 U	20 U	20 U
fluorene	20 U	20 U	20 U	20
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	20 U	20 U
pentachlorophenol	60 U	60 U	140	330 J
phenanthrene	20 U	20 U	20	40
pyrene	20 U	20 U	20 U	20 U
Total HPAH (U=1/2)	100	100	100	100
Total LPAH (U=1/2)	70	70	80	110
Total PAH (U=1/2)	170	170	180	210
LPAH/HPAH (U=1/2)	0.7	0.7	0.8	1.1
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.11	0.1
TPH (mg/kg)				
TRPH	38	750	4088	7724
total hydrocarbons, C10-C39	100	600	7700 J	9200 J
C10-C11		16	280 J	300 J
C12-C13	23	97	1200 J	1500 J
C14-C15	53	140	1700 J	2000 J
C16-C17	15	140	1600 J	1900 J
C18-C19		130	1400 J	1600 J
C20-C21		71	770 J	1100 J
C22-C23		19	460 J	630 J
C24-C25		14	220 J	
C27-C28				
C29-C30				
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-2
SCAPS Soil Data

Location ID	SE-064	SE-064	SE-064	SE-064
Quadrant	C2	C2	C2	C2
Sample ID	SS064-31-33	SS064-34-36	SS564-34-36	SS064-50-51
Date Sampled	9/6/99	9/6/99	9/6/99	9/6/99
Field QC		Primary	Field Duplicate	
Soil Description	sand/silt	sand	sand	sand
NAPL Description	odor	mobile	mobile	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	83	1000	1212	83
Exsitu peak wavelength	444	452	447	443
Insitu maximum intensity	799	1749	1749	2661
Insitu peak wavelength	470	469	469	413
PAHs (mg/kg)				
2-methylnaphthalene	30 U	210	220	20 U
acenaphthene	30 U	130	120	20 U
acenaphthylene	30 U	20 U	20 U	20 U
anthracene	30 U	50	40	20 U
benzo(a)anthracene	30 U	10 J	20 U	20 U
benzo(a)pyrene	30 U	20 U	20 U	20 U
benzo(b)fluoranthene	30 U	20 U	20 U	20 U
benzo(g,h,i)perylene	30 U	20 U	20 U	20 U
benzo(k)fluoranthene	30 U	20 U	20 U	20 U
carbazole	30 UJ	20 UJ	20 UJ	20 UJ
chrysene	30 U	10 J	20 U	20 U
dibenzo(a,h)anthracene	30 U	20 U	20 U	20 U
dibenzofuran	30 U	80	70	20 U
fluoranthene	30 U	70	60	20 U
fluorene	30 U	90	80	20 U
indeno(1,2,3-cd)pyrene	30 U	20 U	20 U	20 U
naphthalene	30 U	290	350	20 U
pentachlorophenol	60 U	60 U	60 U	60 U
phenanthrene	30 U	180	160	20 U
pyrene	30 U	60	50	20 U
Total HPAH (U=1/2)	150	210	190	100
Total LPAH (U=1/2)	105	960	980	70
Total PAH (U=1/2)	255	1170	1170	170
LPAH/HPAH (U=1/2)	0.7	4.6	5.2	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.25	0.3	0.12
TPH (mg/kg)				
TRPH	15 U	1111	1051	1 J
total hydrocarbons, C10-C39	100 U	3700	3800	100 U
C10-C11	--	980	1000	--
C12-C13	--	830	850	--
C14-C15	--	770	790	--
C16-C17	--	480	490	--
C18-C19	--	320	330	--
C20-C21	--	190	190	--
C22-C23	--	94	98	--
C24-C25	--	44	44	--
C27-C28	--	22	22	--
C29-C30	--			--
C31-C32	--	9	8	--
C33-C34	--			--
C35-C36	--			--
C37-C39	--			--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-2
SCAPS Soil Data

Location ID	SE-064	SE-079	SE-079	SE-079
Quadrant	C2	C3	C3	C3
Sample ID	SS064-62-63.3	SS079-51-52	SS079-54-54.2	SS079-54.2-55
Date Sampled	9/6/99	9/8/99	9/8/99	9/8/99
Field QC				
Soil Description	sand	sand	sand	clay
NAPL Description	sheen/visible	sheen	visible	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	162	739	1034	176
Exsitu peak wavelength	454	476	486	454
Insitu maximum intensity	54	1468	541	325
Insitu peak wavelength	405	489	493	486
PAHs (mg/kg)				
2-methylnaphthalene	30 U	280	390	50
acenaphthene	30 U	260	320	50
acenaphthylene	30 U	20 U	20 U	20 U
anthracene	30 U	100	130	20
benzo(a)anthracene	30 U	70	90	10 J
benzo(a)pyrene	30 U	30	40	20 U
benzo(b)fluoranthene	30 U	40	50	20 U
benzo(g,h,i)perylene	30 U	20 U	10 J	20 U
benzo(k)fluoranthene	30 U	20 J	20	20 U
carbazole	30 UJ	60 J	80 J	30 UJ
chrysene	30 U	60	80	10 J
dibenzo(a,h)anthracene	30 U	20 U	20 U	20 U
dibenzofuran	30 U	180	220	40
fluoranthene	30 U	300	360	60
fluorene	30 U	210	260	40
indeno(1,2,3-cd)pyrene	30 U	20 U	10 J	20 U
naphthalene	30 U	460	780	80
pentachlorophenol	70 U	60 U	60 U	60 U
phenanthrene	30 U	600	690	120
pyrene	30 U	210	260	40
Total HPAH (U=1/2)	150	760	930	180
Total LPAH (U=1/2)	105	1920	2580	370
Total PAH (U=1/2)	255	2680	3510	550
LPAH/HPAH (U=1/2)	0.7	2.5	2.8	2.1
Naphthalene/Total PAH (U=1/2)	0.12	0.17	0.22	0.15
TPH (mg/kg)				
TRPH	38	1550	1607	76
total hydrocarbons, C10-C39	80 J	5000	4700 J	200
C10-C11	9	790	870 J	43
C12-C13	14	640	570 J	25
C14-C15	23	1000	910 J	39
C16-C17	18	890	810 J	32
C18-C19	9	650	590 J	21
C20-C21	6	490	420 J	15
C22-C23		220	230 J	6
C24-C25		120	110 J	
C27-C28		97	100 J	
C29-C30		48	66 J	
C31-C32				
C33-C34			16 J	
C35-C36				
C37-C39				

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-2
SCAPS Soil Data

Location ID	SE-079	SE-079	SE-081	SE-088
Quadrant	C3	C3	C3	B1
Sample ID	SS079-58-60	SS079-80-81	SS081-50-50.6	SS088-5.4-5.8
Date Sampled	9/8/99	9/8/99	9/8/99	9/6/99
Field QC				
Soil Description	clay/silt	sand	clay/gravel	silty/sand
NAPL Description	odor	visible	odor	visible
LIF (counts/wavelength)				
Exsitu maximum intensity	78	228	99	1350
Exsitu peak wavelength	442	452	442	448
Insitu maximum intensity	701	689	522	1724
Insitu peak wavelength	488	498	494	468
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	6000
acenaphthene	20 U	20 U	20 U	3000
acenaphthylene	20 U	20 U	20 U	70 J
anthracene	20 U	20 U	20 U	900 J
benzo(a)anthracene	20 U	20 U	20 U	200 J
benzo(a)pyrene	20 U	20 U	20 U	70 J
benzo(b)fluoranthene	20 U	20 U	20 U	90 J
benzo(g,h,i)perylene	20 U	20 U	20 U	100 U
benzo(k)fluoranthene	20 U	20 U	20 U	100 U
carbazole	20 UJ	20 UJ	20 U	400 J
chrysene	20 U	20 U	20 U	200 J
dibenzo(a,h)anthracene	20 U	20 U	20 U	100 U
dibenzofuran	20 U	20 U	20 U	1500 J
fluoranthene	20 U	20 U	20 U	1300 J
fluorene	20 U	20 U	20 U	2000
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	100 U
naphthalene	20 U	20 U	20 U	11000
pentachlorophenol	60 U	50 U	50 UJ	1200 J
phenanthrene	20 U	20	20 U	4000
pyrene	20 U	20 U	20 U	1000 J
Total HPAH (U=1/2)	100	100	100	3060
Total LPAH (U=1/2)	70	70	70	26970
Total PAH (U=1/2)	170	170	170	30030
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	8.8
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.37
TPH (mg/kg)				
TRPH	3 J	27	5 J	35104
total hydrocarbons, C10-C39	100 U	100	100 U	39000 J
C10-C11	--	6	--	7700 J
C12-C13	--	9	--	7400 J
C14-C15	--	24	--	7700 J
C16-C17	--	22	--	6400 J
C18-C19	--	17	--	4900 J
C20-C21	--	12	--	2800 J
C22-C23	--	5	--	1500 J
C24-C25	--		--	770 J
C27-C28	--		--	280 J
C29-C30	--		--	120 J
C31-C32	--		--	
C33-C34	--		--	8 J
C35-C36	--		--	
C37-C39	--		--	

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-2
SCAPS Soil Data

Location ID	SE-088	SE-088	SE-088	SE-088
Quadrant	B1	B1	B1	B1
Sample ID	SS088-9-10.3	SS088-10.3-11	SS088-14-15.4	SS088-20-21
Date Sampled	9/6/99	9/6/99	9/6/99	9/6/99
Field QC				
Soil Description	clay	clay	clay	clay/sand/silt
NAPL Description	sheen	visible	visible	visible
LIF (counts/wavelength)				
Exsitu maximum intensity	124	147	77	507
Exsitu peak wavelength	454	443	442	452
Insitu maximum intensity	2821	1310	3088	2938
Insitu peak wavelength	469	471	470	478
PAHs (mg/kg)				
2-methylnaphthalene	30	30	30 U	170
acenaphthene	20 J	30	30 U	140
acenaphthylene	30 U	30 U	30 U	20 U
anthracene	30 U	20 J	30 U	70
benzo(a)anthracene	30 U	30 U	30 U	20
benzo(a)pyrene	30 U	30 U	30 U	20 U
benzo(b)fluoranthene	30 U	30 U	30 U	20 U
benzo(g,h,i)perylene	30 U	30 U	30 U	20 U
benzo(k)fluoranthene	30 U	30 U	30 U	20 U
carbazole	30 UJ	30 U	30 UJ	30 J
chrysene	30 U	30 U	30 U	20
dibenzo(a,h)anthracene	30 U	30 U	30 U	20 U
dibenzofuran	30 U	20 J	30 U	90
fluoranthene	30 U	20 J	30 U	100
fluorene	30 U	20 J	30 U	100
indeno(1,2,3-cd)pyrene	30 U	30 U	30 U	20 U
naphthalene	20 J	40	30 U	420
pentachlorophenol	70 U	60 U	70 U	60 U
phenanthrene	20 J	50	30 U	240
pyrene	30 U	20 J	30 U	80
Total HPAH (U=1/2)	150	160	150	280
Total LPAH (U=1/2)	135	205	105	1150
Total PAH (U=1/2)	285	365	255	1430
LPAH/HPAH (U=1/2)	0.9	1.3	0.7	4.1
Naphthalene/Total PAH (U=1/2)	0.07	0.11	0.12	0.29
TPH (mg/kg)				
TRPH	41	127	8 J	903
total hydrocarbons, C10-C39	200	200	100 U	1900
C10-C11	10	23	--	350
C12-C13	36	31	--	270
C14-C15	46	45	--	340
C16-C17	40	41	--	330
C18-C19	23	31	--	270
C20-C21	15	20	--	160
C22-C23		9	--	90
C24-C25			--	46
C27-C28			--	
C29-C30			--	
C31-C32			--	
C33-C34			--	
C35-C36			--	
C37-C39			--	

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-2
SCAPS Soil Data

Location ID	SE-088	SE-088	SE-093	SE-093
Quadrant	B1	B1	D3	D3
Sample ID	SS088-24-25.8	SS588-24-25.8	SS093-45-46	SS093-63-65
Date Sampled	9/6/99	9/6/99	9/8/99	9/8/99
Field QC	Primary	Field Duplicate		
Soil Description	sand/clay	sand/clay	sand	sand
NAPL Description	visible	visible	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	850	830	93	119
Exsitu peak wavelength	454	466	443	441
Insitu maximum intensity	1989	1989	64	426
Insitu peak wavelength	475	475	447	411
PAHs (mg/kg)				
2-methylnaphthalene	250	280	20 U	20 U
acenaphthene	170	180	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	80	80	20 U	20 U
benzo(a)anthracene	20	20	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	40 J	40 J	20 U	20 U
chrysene	20	20	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	110	120	20 U	20 U
fluoranthene	120	120	20 U	20 U
fluorene	130	140	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	510 J	550	20 U	20 U
pentachlorophenol	60 U	60 U	60 UJ	60 UJ
phenanthrene	290	310	20 U	20 U
pyrene	90	100	20 U	20 U
Total HPAH (U=1/2)	310	320	100	100
Total LPAH (U=1/2)	1440	1550	70	70
Total PAH (U=1/2)	1750	1870	170	170
LPAH/HPAH (U=1/2)	4.6	4.8	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.29	0.29	0.12	0.12
TPH (mg/kg)				
TRPH	1507	1080	15 U	15 U
total hydrocarbons, C10-C39	1600	3400	100 U	100 U
C10-C11	330	720	--	--
C12-C13	270	560	--	--
C14-C15	300	630	--	--
C16-C17	270	580	--	--
C18-C19	210	400	--	--
C20-C21	120	300	--	--
C22-C23	66	100	--	--
C24-C25	30	30	--	--
C27-C28	14	30	--	--
C29-C30	6		--	--
C31-C32			--	--
C33-C34			--	--
C35-C36			--	--
C37-C39			--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-2
SCAPS Soil Data

Location ID	SE-093	SE-093	SE-096	SE-096
Quadrant	D3	D3	D2	D2
Sample ID	SS093-66-67	SS093-67-68	SS096-63-65	SS096-66-67.6
Date Sampled	9/8/99	9/8/99	9/9/99	9/9/99
Field QC				
Soil Description	clay/sand	sandy/clay	sand/silt/cl	sand
NAPL Description	visible	sheen	mobile	mobile
LIF (counts/wavelength)				
Exsitu maximum intensity	93	88	2056	309
Exsitu peak wavelength	443	443	468	442
Insitu maximum intensity	540	929	3106	2602
Insitu peak wavelength	411	476	471	471
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	2400 J	20 U
acenaphthene	20 U	20 U	1100 J	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	280	20 U
benzo(a)anthracene	20 U	20 U	60	20 U
benzo(a)pyrene	20 U	20 U	20	20 U
benzo(b)fluoranthene	20 U	20 U	20	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	10 J	20 U
carbazole	20 U	20 U	120	20 U
chrysene	20 U	20 U	60	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	600 J	20 U
fluoranthene	20 U	20 U	500 J	20 U
fluorene	20 U	20 U	700 J	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	4500 J	20 U
pentachlorophenol	60 UJ	60 UJ	60 UJ	60 UJ
phenanthrene	20 U	20 U	1400 J	20 U
pyrene	20 U	20 U	260	20 U
Total HPAH (U=1/2)	100	100	960	100
Total LPAH (U=1/2)	70	70	10390	70
Total PAH (U=1/2)	170	170	11350	170
LPAH/HPAH (U=1/2)	0.7	0.7	11	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.4	0.12
TPH (mg/kg)				
TRPH	15 U	5 J	7311	83
total hydrocarbons, C10-C39	100 U	100 U	14000 J	140
C10-C11	--	--	3500 J	15
C12-C13	--	--	2900 J	24
C14-C15	--	--	2700 J	34
C16-C17	--	--	1800 J	31
C18-C19	--	--	1300 J	18
C20-C21	--	--	700 J	14
C22-C23	--	--	400 J	
C24-C25	--	--	100 J	
C27-C28	--	--	87 J	
C29-C30	--	--	34 J	
C31-C32	--	--		
C33-C34	--	--		
C35-C36	--	--		
C37-C39	--	--		

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-2
SCAPS Soil Data

Location ID	SE-096	SE-096	SE-096	SE-097
Quadrant	D2	D2	D2	D2
Sample ID	SS096-81-82.4	SS096-84.5-84.8	SS096-94-96	SS097-87-89
Date Sampled	9/9/99	9/9/99	9/9/99	9/7/99
Field QC				
Soil Description	sand	sand/gravel	silty/clay	silty/clay
NAPL Description	nothing	odor	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	115	315	89	78
Exsitu peak wavelength	443	442	442	443
Insitu maximum intensity	48	2117	833	849
Insitu peak wavelength	428	475	467	471
PAHs (mg/kg)				
2-methylnaphthalene	20 U	20 U	20 U	20 U
acenaphthene	20 U	20 U	20 U	20 U
acenaphthylene	20 U	20 U	20 U	20 U
anthracene	20 U	20 U	20 U	20 U
benzo(a)anthracene	20 U	20 U	20 U	20 U
benzo(a)pyrene	20 U	20 U	20 U	20 U
benzo(b)fluoranthene	20 U	20 U	20 U	20 U
benzo(g,h,i)perylene	20 U	20 U	20 U	20 U
benzo(k)fluoranthene	20 U	20 U	20 U	20 U
carbazole	20 U	20 U	20 U	20 UJ
chrysene	20 U	20 U	20 U	20 U
dibenzo(a,h)anthracene	20 U	20 U	20 U	20 U
dibenzofuran	20 U	20 U	20 U	20 U
fluoranthene	20 U	20 U	20 U	20 U
fluorene	20 U	20 U	20 U	20 U
indeno(1,2,3-cd)pyrene	20 U	20 U	20 U	20 U
naphthalene	20 U	20 U	20 U	20 U
pentachlorophenol	60 UJ	50 UJ	60 UJ	60 U
phenanthrene	20 U	20 U	20 U	20 U
pyrene	20 U	20 U	20 U	20 U
Total HPAH (U=1/2)	100	100	100	100
Total LPAH (U=1/2)	70	70	70	70
Total PAH (U=1/2)	170	170	170	170
LPAH/HPAH (U=1/2)	0.7	0.7	0.7	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.12	0.12
TPH (mg/kg)				
TRPH	6 J	99	6 J	1 J
total hydrocarbons, C10-C39	100 U	70 J	100 U	100 U
C10-C11	--	--	--	--
C12-C13	--	--	--	--
C14-C15	--	--	--	--
C16-C17	--	--	--	--
C18-C19	--	--	--	--
C20-C21	--	--	--	--
C22-C23	--	--	--	--
C24-C25	--	--	--	--
C27-C28	--	--	--	--
C29-C30	--	--	--	--
C31-C32	--	--	--	--
C33-C34	--	--	--	--
C35-C36	--	--	--	--
C37-C39	--	--	--	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-2
SCAPS Soil Data

Location ID	SE-097	SE-097	SE-097	SE-097
Quadrant	D2	D2	D2	D2
Sample ID	SS097-90-92	SS097-92.6-94	SS597-92.6-94	SS097-100-102
Date Sampled	9/7/99	9/7/99	9/7/99	9/7/99
Field QC		Primary	Field Duplicate	
Soil Description	clay/silt	silty/sand	silty/sand	silty/clay
NAPL Description	odor	visible	visible	visible
LIF (counts/wavelength)				
Exsitu maximum intensity	79	152	140	103
Exsitu peak wavelength	442	443	444	452
Insitu maximum intensity	7362	980	980	663
Insitu peak wavelength	477	474	474	469
PAHs (mg/kg)				
2-methylnaphthalene	20 U	30 U	10 J	20 U
acenaphthene	20 U	30 U	30 U	20 U
acenaphthylene	20 U	30 U	30 U	20 U
anthracene	20 U	30 U	30 U	20 U
benzo(a)anthracene	20 U	30 U	30 U	20 U
benzo(a)pyrene	20 U	30 U	30 U	20 U
benzo(b)fluoranthene	20 U	30 U	30 U	20 U
benzo(g,h,i)perylene	20 U	30 U	30 U	20 U
benzo(k)fluoranthene	20 U	30 U	30 U	20 U
carbazole	20 UJ	30 UJ	30 UJ	20 UJ
chrysene	20 U	30 U	30 U	20 U
dibenzo(a,h)anthracene	20 U	30 U	30 U	20 U
dibenzofuran	20 U	30 U	30 U	20 U
fluoranthene	20 U	30 U	30 U	20 U
fluorene	20 U	30 U	30 U	20 U
indeno(1,2,3-cd)pyrene	20 U	30 U	30 U	20 U
naphthalene	20 U	30 U	20 J	20 U
pentachlorophenol	60 U	60 U	60 U	60 U
phenanthrene	20 U	20 J	20 J	20 U
pyrene	20 U	30 U	30 U	20 U
Total HPAH (U=1/2)	100	150	150	100
Total LPAH (U=1/2)	70	110	110	70
Total PAH (U=1/2)	170	260	260	170
LPAH/HPAH (U=1/2)	0.7	0.73	0.73	0.7
Naphthalene/Total PAH (U=1/2)	0.12	0.12	0.07	0.12
TPH (mg/kg)				
TRPH	3 J	66	96	3 J
total hydrocarbons, C10-C39	100 U	140	170	100 U
C10-C11	--	27	36	--
C12-C13	--	26	33	--
C14-C15	--	30	37	--
C16-C17	--	24	30	--
C18-C19	--	15	18	--
C20-C21	--	11	14	--
C22-C23	--			--
C24-C25	--			--
C27-C28	--			--
C29-C30	--			--
C31-C32	--			--
C33-C34	--			--
C35-C36	--			--
C37-C39	--			--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-2
SCAPS Soil Data

Location ID	SE-097A
Quadrant	D2
Sample ID	SS097A-90-92
Date Sampled	9/7/99
Field QC	
Soil Description	silty/clay
NAPL Description	odor
LIF (counts/wavelength)	
Exsitu maximum intensity	107
Exsitu peak wavelength	443
Insitu maximum intensity	7362
Insitu peak wavelength	477
PAHs (mg/kg)	
2-methylnaphthalene	--
acenaphthene	--
acenaphthylene	--
anthracene	--
benzo(a)anthracene	--
benzo(a)pyrene	--
benzo(b)fluoranthene	--
benzo(g,h,i)perylene	--
benzo(k)fluoranthene	--
carbazole	--
chrysene	--
dibenzo(a,h)anthracene	--
dibenzofuran	--
fluoranthene	--
fluorene	--
indeno(1,2,3-cd)pyrene	--
naphthalene	--
pentachlorophenol	--
phenanthrene	--
pyrene	--
Total HPAH (U=1/2)	--
Total LPAH (U=1/2)	--
Total PAH (U=1/2)	--
LPAH/HPAH (U=1/2)	--
Naphthalene/Total PAH (U=1/2)	--
TPH (mg/kg)	
TRPH	7 J
total hydrocarbons, C10-C39	--
C10-C11	--
C12-C13	--
C14-C15	--
C16-C17	--
C18-C19	--
C20-C21	--
C22-C23	--
C24-C25	--
C27-C28	--
C29-C30	--
C31-C32	--
C33-C34	--
C35-C36	--
C37-C39	--

Notes:

--: Not analyzed.

blank: analyte not detected at unknown detection limit.

Table A-3
Rotosonic Boring Soil Data - Detections Only

Location ID	SB-004	SB-004	SB-006	SB-006
Quadrant	D2	D2	C3	C3
Sample ID	SB004-82.4-82.7	SB004-101.7-102	SB006-118.7-119	SB006-162-162.3
Date Sampled	8/10/99	8/10/99	8/5/99	8/5/99
Field QC				
Soil Description	sand	clay	sand	silt
NAPL Description	odor	sheen	odor	mobile
LIF (counts/wavelength)				
Exsitu maximum intensity	473	458		
Exsitu peak wavelength	402	402		
Insitu maximum intensity	170	507		
Insitu peak wavelength	473	479		
PAHs (mg/kg)				
2-methylnaphthalene		50	10 J	1800
acenaphthene		30		1000
acenaphthylene				300
anthracene		10 J		270
benzo(a)anthracene				180
benzo(a)pyrene				90
benzo(b)fluoranthene				110
benzo(g,h,i)perylene				30
benzo(k)fluoranthene				40
carbazole				160
chrysene				170
dibenzofuran		10 J		600
fluoranthene		20 J		770
fluorene		20 J		660
indeno(1,2,3-cd)pyrene				30
naphthalene		100	30	4100
pentachlorophenol				
phenanthrene		40	20 J	1600
pyrene		10 J		590
Total HPAH (U=1/2)		110	100	2025
Total LPAH (U=1/2)		260	100	9730
Total PAH (U=1/2)		370	200	11755
LPAH/HPAH (U=1/2)		2.4	1	4.8
Naphthalene/Total PAH (U=1/2)		0.27	0.15	0.35
TPH (mg/kg)				
TRPH	7 J	85		
total hydrocarbons, C10-C39		320		6900
C10-C11		93		1900
C12-C13		67		1300
C14-C15		59		1100
C16-C17		45		900
C18-C19		31		600
C20-C21		18		500
C22-C23		7		300
C24-C25				110
C27-C28				80
C29-C30				70
C31-C32				30
C33-C34				
C35-C36				
C37-C39				

Table A-3
Rotosonic Boring Soil Data - Detections Only

Location ID	SB-006	SB-018	SB-019	SB-019
Quadrant	C3	C1	C2	C2
Sample ID	SB006-212.5-212.8	SB018-80.5-80.8	SB019-37.4-37.7	SB519-37.4-37.7
Date Sampled	8/6/99	8/19/99	8/12/99	8/12/99
Field QC			Primary	Field Duplicate
Soil Description	clay	sand	sand	sand
NAPL Description	odor	nothing	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity		358	324	360
Exsitu peak wavelength		401	402	402
Insitu maximum intensity			556	556
Insitu peak wavelength			435	435
PAHs (mg/kg)				
2-methylnaphthalene	40			
acenaphthene	40			
acenaphthylene				
anthracene	10 J			
benzo(a)anthracene				
benzo(a)pyrene				
benzo(b)fluoranthene				
benzo(g,h,i)perylene				
benzo(k)fluoranthene				
carbazole				
chrysene				
dibenzofuran	20			
fluoranthene	30			
fluorene	30			
indeno(1,2,3-cd)pyrene				
naphthalene	40			
pentachlorophenol				
phenanthrene	70			
pyrene	20			
Total HPAH (U=1/2)	130			
Total LPAH (U=1/2)	240			
Total PAH (U=1/2)	370			
LPAH/HPAH (U=1/2)	1.8			
Naphthalene/Total PAH (U=1/2)	0.11			
TPH (mg/kg)				
TRPH		1 J	151	99
total hydrocarbons, C10-C39	700		88 J	120
C10-C11	190			
C12-C13	130		6	12
C14-C15	110		21	29
C16-C17	90		27	28
C18-C19	60		13	25
C20-C21	50		19	26
C22-C23	30			
C24-C25	9			
C27-C28	11			
C29-C30	6			
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-3
Rotosonic Boring Soil Data - Detections Only

Location ID	SB-019	SB-019	SB-027	SB-027
Quadrant	C2	C2	C2	C2
Sample ID	SB019-53.6-53.9	SB019-182.7-183	SB027-13.3-13.7	SB027-19.7-20.0
Date Sampled	8/12/99	8/16/99	9/2/99	9/2/99
Field QC				
Soil Description	sand	sand	clay	clay
NAPL Description	odor	nothing	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	452			
Exsitu peak wavelength	402			
Insitu maximum intensity	77			
Insitu peak wavelength	401			
PAHs (mg/kg)				
2-methylnaphthalene				
acenaphthene				
acenaphthylene				
anthracene				
benzo(a)anthracene				
benzo(a)pyrene				
benzo(b)fluoranthene				
benzo(g,h,i)perylene				
benzo(k)fluoranthene				
carbazole				
chrysene				
dibenzofuran				
fluoranthene				
fluorene				
indeno(1,2,3-cd)pyrene				
naphthalene				
pentachlorophenol			530	230
phenanthrene				
pyrene				
Total HPAH (U=1/2)			150	100
Total LPAH (U=1/2)			105	70
Total PAH (U=1/2)			255	170
LPAH/HPAH (U=1/2)			0.7	0.7
Naphthalene/Total PAH (U=1/2)			0.12	0.12
TPH (mg/kg)				
TRPH	142			
total hydrocarbons, C10-C39	160	3.9		
C10-C11	7			
C12-C13	10			
C14-C15	37			
C16-C17	36			
C18-C19	36			
C20-C21	27			
C22-C23	5			
C24-C25				
C27-C28				
C29-C30				
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-3
Rotosonic Boring Soil Data - Detections Only

Location ID	SB-027	SB-027	SB-027	SB-027
Quadrant	C2	C2	C2	C2
Sample ID	SB027-24.0-24.4	SB027-63.6-64.0	SB027-69.0-69.3	SB027-73.4-73.9
Date Sampled	9/2/99	9/2/99	9/2/99	9/2/99
Field QC				
Soil Description	sand	sand	sand	sand
NAPL Description	odor	sheen	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity				
Exsitu peak wavelength				
Insitu maximum intensity				
Insitu peak wavelength				
PAHs (mg/kg)				
2-methylnaphthalene		30	130	180
acenaphthene		40	80	100
acenaphthylene				
anthracene		20	30	30
benzo(a)anthracene		10 J		20
benzo(a)pyrene				
benzo(b)fluoranthene				10 J
benzo(g,h,i)perylene				
benzo(k)fluoranthene				
carbazole				10 J
chrysene		10 J	10 J	20
dibenzofuran		20	50	60
fluoranthene		40	50	60
fluorene		20	50	60
indeno(1,2,3-cd)pyrene				
naphthalene		40	130	210
pentachlorophenol	200			
phenanthrene		80	120	130
pyrene		40	40	50
Total HPAH (U=1/2)	100	160	170	210
Total LPAH (U=1/2)	70	240	550	720
Total PAH (U=1/2)	170	400	720	930
LPAH/HPAH (U=1/2)	0.7	1.5	3.2	3.4
Naphthalene/Total PAH (U=1/2)	0.12	0.1	0.18	0.23
TPH (mg/kg)				
TRPH				
total hydrocarbons, C10-C39		830	1300	670
C10-C11		190	400	240
C12-C13		120	320	150
C14-C15		130	240	110
C16-C17		110	140	58
C18-C19		89	89	40
C20-C21		74	65	30
C22-C23		50	40	20
C24-C25		20	20	8
C27-C28		20	20	8
C29-C30		10	10	5
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-3
Rotosonic Boring Soil Data - Detections Only

Location ID	SB-027	SB-027	SB-027	SB-027
Quadrant	C2	C2	C2	C2
Sample ID	SB027-96.3-96.9	SB027-113.3-113.7	SB027-115.9-116.3	SB027-122.8-123.1
Date Sampled	9/2/99	9/3/99	9/3/99	9/3/99
Field QC				
Soil Description	clay	sand	sand	sand
NAPL Description	odor	odor	sheen	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity				
Exsitu peak wavelength				
Insitu maximum intensity				
Insitu peak wavelength				
PAHs (mg/kg)				
2-methylnaphthalene		20	620	1900
acenaphthene		10 J	360	1000
acenaphthylene				20
anthracene		10 J	110	400
benzo(a)anthracene		10 J	60	160
benzo(a)pyrene			30	80
benzo(b)fluoranthene			40	100
benzo(g,h,i)perylene				30
benzo(k)fluoranthene			10 J	40
carbazole			30 J	100 J
chrysene			60	150
dibenzofuran			210	600
fluoranthene		40	240	700
fluorene		10 J	220	700
indeno(1,2,3-cd)pyrene			10 J	30
naphthalene		20	840	2700
pentachlorophenol				
phenanthrene		60	500	1500
pyrene		30	180	500
Total HPAH (U=1/2)		150	650	1800
Total LPAH (U=1/2)		140	2660	8220
Total PAH (U=1/2)		290	3310	10020
LPAH/HPAH (U=1/2)		0.93	4.1	4.6
Naphthalene/Total PAH (U=1/2)		0.06	0.25	0.27
TPH (mg/kg)				
TRPH				
total hydrocarbons, C10-C39	60 J	380	5100	15000
C10-C11	10	67	1200	3500
C12-C13	20	46	1100	3300
C14-C15	10	51	960	2800
C16-C17	9	59	630	1900
C18-C19	6	52	440	1300
C20-C21	5	40	330	970
C22-C23		30	200	590
C24-C25		10	100	300
C27-C28		10	100	270
C29-C30		9	60	200
C31-C32			20	50
C33-C34			20	50
C35-C36				
C37-C39				

Table A-3
Rotosonic Boring Soil Data - Detections Only

Location ID	SB-028	SB-028	SB-028	SB-028
Quadrant	C2	C2	C2	C2
Sample ID	SB028-8.0-8.4	SB028-9.0-10.1	SB028-10.1-11	SB028-12-12.5
Date Sampled	9/29/99	8/8/99	8/8/99	9/29/99
Field QC				
Soil Description	clay			clay
NAPL Description	odor			odor
LIF (counts/wavelength)				
Exsitu maximum intensity				
Exsitu peak wavelength				
Insitu maximum intensity				
Insitu peak wavelength				
PAHs (mg/kg)				
2-methylnaphthalene	120		20	10 J
acenaphthene	90		20	
acenaphthylene				
anthracene	220		10 J	180
benzo(a)anthracene	20			
benzo(a)pyrene	10 J			
benzo(b)fluoranthene	10 J			
benzo(g,h,i)perylene				
benzo(k)fluoranthene				
carbazole	100			70 J
chrysene	30			
dibenzofuran	70		10 J	
fluoranthene	110		30	10 J
fluorene	90		20	20
indeno(1,2,3-cd)pyrene				
naphthalene	110			
pentachlorophenol	140			
phenanthrene	240		60	40
pyrene	90		20	
Total HPAH (U=1/2)	310		130	100
Total LPAH (U=1/2)	880		150	280
Total PAH (U=1/2)	1190		280	380
LPAH/HPAH (U=1/2)	2.8		1.2	2.8
Naphthalene/Total PAH (U=1/2)	0.09		0.07	0.05
TPH (mg/kg)				
TRPH		34	353	
total hydrocarbons, C10-C39	880	250	440	250
C10-C11	22	5	10	5
C12-C13	51	10	45	9
C14-C15	95	30	74	22
C16-C17	490	180	84	180
C18-C19	83	10	67	20
C20-C21	46	9	58	19
C22-C23	51	5	50	
C24-C25	23		20	
C27-C28	15		20	
C29-C30			10	
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-3
Rotosonic Boring Soil Data - Detections Only

Location ID	SB-028	SB-028	SB-028	SB-028
Quadrant	C2	C2	C2	C2
Sample ID	SB028-28.3-29.4	SB028-31-33	SB028-48-49.7	SB028-53.5-55
Date Sampled	9/29/99	9/29/99	9/29/99	9/29/99
Field QC				Primary
Soil Description	sand & gravel	sand	sand	sand
NAPL Description	sheen	sheen	sheen	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity				
Exsitu peak wavelength				
Insitu maximum intensity				
Insitu peak wavelength				
PAHs (mg/kg)				
2-methylnaphthalene	180	140		420
acenaphthene	110	70	20	260
acenaphthylene				
anthracene	60	40	10 J	130
benzo(a)anthracene	50	20		80
benzo(a)pyrene	20			30
benzo(b)fluoranthene	30			40
benzo(g,h,i)perylene				10 J
benzo(k)fluoranthene	20			30
carbazole	40 J	20 J		70 J
chrysene	50	20		70
dibenzofuran	100	50	10 J	180
fluoranthene	200	70	20	300
fluorene	80	50	20	210
indeno(1,2,3-cd)pyrene	10 J			10 J
naphthalene	620 J	450	20	1200
pentachlorophenol				
phenanthrene	350 J	160	50	620
pyrene	150	60	20	220
Total HPAH (U=1/2)	550	230	120	800
Total LPAH (U=1/2)	1410	920	140	2850
Total PAH (U=1/2)	1960	1150	260	3650
LPAH/HPAH (U=1/2)	2.6	4	1.2	3.6
Naphthalene/Total PAH (U=1/2)	0.32	0.39	0.07	0.33
TPH (mg/kg)				
TRPH				
total hydrocarbons, C10-C39	2600	1300	630	6000
C10-C11	690	420	55	1700
C12-C13	330	210	53	820
C14-C15	390	230	130	980
C16-C17	410	180	160	900
C18-C19	300	130	90	620
C20-C21	230	84	69	460
C22-C23	120	42	35	240
C24-C25	30	16	9.4	97
C27-C28	47	16	14	130
C29-C30	25	10	5	57
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-3
Rotosonic Boring Soil Data - Detections Only

Location ID	SB-028	SB-028	SB-028	SB-028
Quadrant	C2	C2	C2	C2
Sample ID	SB528-53.5-55	SB028-55-56	SB028-79.5-79.8	SB028-100.6-101.5
Date Sampled	9/29/99	9/29/99	9/29/99	9/29/99
Field QC	Field Duplicate			
Soil Description	sand	sand	clay	clay
NAPL Description	sheen	nothing	odor	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity				
Exsitu peak wavelength				
Insitu maximum intensity				
Insitu peak wavelength				
PAHs (mg/kg)				
2-methylnaphthalene	650	80		20
acenaphthene	450	60		20
acenaphthylene				
anthracene	210	30		
benzo(a)anthracene	120	20		
benzo(a)pyrene	50			
benzo(b)fluoranthene	60			
benzo(g,h,i)perylene	20			
benzo(k)fluoranthene	40			
carbazole	100 J	20 J		
chrysene	110	20		
dibenzofuran	260	40		
fluoranthene	480	80	10 J	40
fluorene	260	50		20
indeno(1,2,3-cd)pyrene	20			
naphthalene	1900	190	20	20
pentachlorophenol				
phenanthrene	980	150	20	70
pyrene	440	60		30
Total HPAH (U=1/2)	1350	240	100	150
Total LPAH (U=1/2)	4460	510	90	170
Total PAH (U=1/2)	5810	810	190	320
LPAH/HPAH (U=1/2)	3.3	2.4	0.9	1.1
Naphthalene/Total PAH (U=1/2)	0.33	0.23	0.11	0.06
TPH (mg/kg)				
TRPH				
total hydrocarbons, C10-C39	6500	490		
C10-C11	1800	130		92
C12-C13	900	64		82
C14-C15	1100	82		110
C16-C17	980	79		150
C18-C19	670	53		93
C20-C21	500	43		100
C22-C23	260	21		33
C24-C25	100	5.9		10
C27-C28	140	12		
C29-C30	63			
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-3
Rotosonic Boring Soil Data - Detections Only

Location ID	SB-028	SB-030	SB-051	SB-051
Quadrant	C2	D3	D2	D2
Sample ID	SB028-113-113.2	SB030-69.7-70.0	SB051-52.4-52.9	SB051-56.0-56.3
Date Sampled	9/29/99	8/23/99	9/8/99	9/8/99
Field QC				
Soil Description	sand	sand	sand	sand
NAPL Description	sheen	odor	sheen	visible
LIF (counts/wavelength)				
Exsitu maximum intensity		390.3	608	819
Exsitu peak wavelength		402	402	432
Insitu maximum intensity			3807	91.8
Insitu peak wavelength			469	442
PAHs (mg/kg)				
2-methylnaphthalene				60
acenaphthene	10 J			40
acenaphthylene				
anthracene				10 J
benzo(a)anthracene				
benzo(a)pyrene				
benzo(b)fluoranthene				
benzo(g,h,i)perylene				
benzo(k)fluoranthene				
carbazole				
chrysene				
dibenzofuran				20
fluoranthene	30			20
fluorene	10 J			20
indeno(1,2,3-cd)pyrene				
naphthalene				120
pentachlorophenol				
phenanthrene	50		10 J	50
pyrene	20			10 J
Total HPAH (U=1/2)	130		100	110
Total LPAH (U=1/2)	110		70	310
Total PAH (U=1/2)	240		170	420
LPAH/HPAH (U=1/2)	0.85		0.7	2.8
Naphthalene/Total PAH (U=1/2)	0.08		0.12	0.29
TPH (mg/kg)				
TRPH		8	108	296
total hydrocarbons, C10-C39	100		310	720
C10-C11	21		81	190
C12-C13	12		60	140
C14-C15	29		60	140
C16-C17	20		50	100
C18-C19	7		30	74
C20-C21	21		20	50
C22-C23			9	20
C24-C25				7
C27-C28				
C29-C30				
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-3
Rotosonic Boring Soil Data - Detections Only

Location ID	SB-051	SB-051	SB-051	SB-051
Quadrant	D2	D2	D2	D2
Sample ID	SB051-77.0-77.4	SB051-80.0-80.3	SB051-124.3-124.6	SB051-131.8-132.1
Date Sampled	9/8/99	9/8/99	9/9/99	9/9/99
Field QC				
Soil Description	clay	sand	silt	sand
NAPL Description	odor	odor	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	329	410		
Exsitu peak wavelength	402	402		
Insitu maximum intensity	9601	67.3		
Insitu peak wavelength	458	422		
PAHs (mg/kg)				
2-methylnaphthalene			10 J	
acenaphthene				
acenaphthylene				
anthracene				
benzo(a)anthracene				
benzo(a)pyrene				
benzo(b)fluoranthene				
benzo(g,h,i)perylene				
benzo(k)fluoranthene				
carbazole				
chrysene				
dibenzofuran				
fluoranthene				
fluorene				
indeno(1,2,3-cd)pyrene				
naphthalene	20	20	30	
pentachlorophenol				
phenanthrene			20	10 J
pyrene				
Total HPAH (U=1/2)	100	100	100	100
Total LPAH (U=1/2)	80	80	100	70
Total PAH (U=1/2)	180	180	200	170
LPAH/HPAH (U=1/2)	0.8	0.8	1	0.7
Naphthalene/Total PAH (U=1/2)	0.11	0.11	0.15	0.12
TPH (mg/kg)				
TRPH	67	33		
total hydrocarbons, C10-C39	160	70 J	130	120
C10-C11	40		30	20
C12-C13	30		20	20
C14-C15	30		30	30
C16-C17	30		20	20
C18-C19	20		10	20
C20-C21	10		10	10
C22-C23				
C24-C25				
C27-C28				
C29-C30				
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-3
Rotosonic Boring Soil Data - Detections Only

Location ID	SB-057	SB-057	SB-057	SB-057
Quadrant	C2	C2	C2	C2
Sample ID	SB057-2.7-3	SB057-28-29.8	SB057-31-32	SB057-36-38
Date Sampled	10/9/99	10/9/99	10/9/99	10/9/99
Field QC				Primary
Soil Description	sand and gravel	clay	clay	sand
NAPL Description	nothing	odor	sheen	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity				
Exsitu peak wavelength				
Insitu maximum intensity				
Insitu peak wavelength				
PAHs (mg/kg)				
2-methylnaphthalene		240	210	1400
acenaphthene		90	80	600
acenaphthylene				10 J
anthracene		40	30	230
benzo(a)anthracene				50
benzo(a)pyrene				20
benzo(b)fluoranthene				10 J
benzo(g,h,i)perylene				
benzo(k)fluoranthene				20
carbazole		10 J		80 J
chrysene		10 J		50
dibenzofuran		50	50	300
fluoranthene		50	40	300
fluorene		70	60	400
indeno(1,2,3-cd)pyrene				
naphthalene		470	430	3100
pentachlorophenol	170			130
phenanthrene		140	120	800
pyrene		40	40	220
Total HPAH (U=1/2)	100	170	160	700
Total LPAH (U=1/2)	70	1060	940	6540
Total PAH (U=1/2)	170	1230	1100	7240
LPAH/HPAH (U=1/2)	0.7	6.2	5.9	9.3
Naphthalene/Total PAH (U=1/2)	0.12	0.38	0.39	0.43
TPH (mg/kg)				
TRPH				
total hydrocarbons, C10-C39	2200	2100	2300	30000
C10-C11		570	620	8000
C12-C13		480	520	6800
C14-C15	120	590	630	6700
C16-C17	290	230	260	3900
C18-C19	470	110	130	2100
C20-C21	390	66	76	1400
C22-C23	400	27	41	590
C24-C25	170			270
C27-C28	150		16	200
C29-C30	220			
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-3
Rotosonic Boring Soil Data - Detections Only

Location ID	SB-057	SB-057	SB-057	SB-057
Quadrant	C2	C2	C2	C2
Sample ID	SB557-36-38	SB057-40-50	SB057-51-52	SB557-51-52
Date Sampled	10/9/99	10/9/99	10/9/99	10/9/99
Field QC	Field Duplicate		Primary	Field Duplicate
Soil Description	sand	sand	sand	sand
NAPL Description	sheen	mobile	sheen	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity				
Exsitu peak wavelength				
Insitu maximum intensity				
Insitu peak wavelength				
PAHs (mg/kg)				
2-methylnaphthalene	2500	2600	80	100
acenaphthene	900	1000	50	60
acenaphthylene	20	20		
anthracene	400	400	20	30
benzo(a)anthracene	90	90		
benzo(a)pyrene	20	30		
benzo(b)fluoranthene	20	20		
benzo(g,h,i)perylene				
benzo(k)fluoranthene	20	30		
carbazole	130 J	140 J		
chrysene	90	90		
dibenzofuran	600	600	30	40
fluoranthene	500	500	30	40
fluorene	700	700	40	40
indeno(1,2,3-cd)pyrene				
naphthalene	5400	5800	110	130
pentachlorophenol	200 J	200		
phenanthrene	1300	1300	80	100
pyrene	400	400	30	30
Total HPAH (U=1/2)	1170	1190	140	150
Total LPAH (U=1/2)	11220	11820	390	470
Total PAH (U=1/2)	12390	13010	530	620
LPAH/HPAH (U=1/2)	9.6	9.9	2.8	3.1
Naphthalene/Total PAH (U=1/2)	0.44	0.45	0.21	0.21
TPH (mg/kg)				
TRPH				
total hydrocarbons, C10-C39	15000	22000	2000	1500
C10-C11	4100	5900	490	350
C12-C13	3500	4900	440	340
C14-C15	3600	5000	430	340
C16-C17	2000	2900	290	230
C18-C19	980	1500	200	140
C20-C21	1000	1000	120	89
C22-C23		600	49	38
C24-C25			22	18
C27-C28		130	12	
C29-C30				
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-3
Rotosonic Boring Soil Data - Detections Only

Location ID	SB-057	SB-061	SB-084	SB-084
Quadrant	C2	D2	C1	C1
Sample ID	SB057-57.6-57.8	SB061-126.0-126.3	SB084-11.0-11.4	SB084-13.3-13.6
Date Sampled	10/9/99	8/31/99	9/17/99	9/17/99
Field QC				
Soil Description	clay	sand	clay	clay
NAPL Description	sheen	odor	sheen	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity		367.7		
Exsitu peak wavelength		402		
Insitu maximum intensity				
Insitu peak wavelength				
PAHs (mg/kg)				
2-methylnaphthalene	190	20	20 J	
acenaphthene	80	10 J	40	20 J
acenaphthylene				
anthracene	30		20 J	
benzo(a)anthracene				
benzo(a)pyrene				
benzo(b)fluoranthene				
benzo(g,h,i)perylene				
benzo(k)fluoranthene				
carbazole				
chrysene			10 J	
dibenzofuran	50		20 J	10 J
fluoranthene	40		40	20 J
fluorene	50	10 J	30	20 J
indeno(1,2,3-cd)pyrene				
naphthalene	410	40	100	60
pentachlorophenol			120	
phenanthrene	110	20	80	40
pyrene	30		30	10 J
Total HPAH (U=1/2)	150	100	185	145
Total LPAH (U=1/2)	880	120	305	185
Total PAH (U=1/2)	1030	220	490	330
LPAH/HPAH (U=1/2)	5.9	1.2	1.6	1.3
Naphthalene/Total PAH (U=1/2)	0.4	0.18	0.2	0.18
TPH (mg/kg)				
TRPH		69		
total hydrocarbons, C10-C39	1600	130	220	
C10-C11	470	33	34	
C12-C13	360	26	25	
C14-C15	330	27	43	
C16-C17	210	22	52	
C18-C19	120	13	30	
C20-C21	75	8.6	32	
C22-C23	31			
C24-C25	13			
C27-C28				
C29-C30				
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-3
Rotosonic Boring Soil Data - Detections Only

Location ID	SB-084	SB-086	SB-086	SB-086
Quadrant	C1	C1	C1	C1
Sample ID	SB084-49.3-49.8	SB086-17-17.3	SB086-21.6-23.3	SB086-27-28.5
Date Sampled	9/17/99	9/28/99	9/28/99	9/28/99
Field QC				Primary
Soil Description	sand	clay	silt	silt
NAPL Description	sheen	sheen	sheen	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity				
Exsitu peak wavelength				
Insitu maximum intensity				
Insitu peak wavelength				
PAHs (mg/kg)				
2-methylnaphthalene		110	400	300
acenaphthene		90	240	190
acenaphthylene				
anthracene		240	150	100
benzo(a)anthracene		30	40	40
benzo(a)pyrene			20	10 J
benzo(b)fluoranthene			10 J	
benzo(g,h,i)perylene				
benzo(k)fluoranthene		10 J	20	10 J
carbazole		100	70	50
chrysene		30	50	40
dibenzofuran		60	140	110
fluoranthene		120	220	170
fluorene		80	180	150
indeno(1,2,3-cd)pyrene				
naphthalene	20 J	700	3500	1200
pentachlorophenol		2100 J	30 J	
phenanthrene	20 J	250	600	400
pyrene		100	170	140
Total HPAH (U=1/2)	100	340	560	450
Total LPAH (U=1/2)	90	1480	5080	2350
Total PAH (U=1/2)	190	1820	5640	2800
LPAH/HPAH (U=1/2)	0.9	4.4	9.1	5.2
Naphthalene/Total PAH (U=1/2)	0.11	0.38	0.62	0.43
TPH (mg/kg)				
TRPH				
total hydrocarbons, C10-C39	210	1900	12000	4600
C10-C11	38	530	5200	1500
C12-C13	28	220	1400	590
C14-C15	38	240	1600	740
C16-C17	46	420	1600	690
C18-C19	27	140	1100	510
C20-C21	29	180	720	320
C22-C23		66	380	150
C24-C25		44		41
C27-C28		16	90	34
C29-C30		10		
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-3
Rotosonic Boring Soil Data - Detections Only

Location ID	SB-086	SB-086	SB-086	SB-086
Quadrant	C1	C1	C1	C1
Sample ID	SB586-27-28.5	SB086-33.6-35	SB086-36.3-38	SB086-44-45
Date Sampled	9/28/99	9/28/99	9/28/99	9/28/99
Field QC	Field Duplicate			
Soil Description	silt	sand	sand	sand
NAPL Description	sheen	visible	visible	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity				
Exsitu peak wavelength				
Insitu maximum intensity				
Insitu peak wavelength				
PAHs (mg/kg)				
2-methylnaphthalene	240	230	700	160
acenaphthene	160	150	400	90
acenaphthylene				
anthracene	90	70	140	40
benzo(a)anthracene	30	20	40	10 J
benzo(a)pyrene			10 J	
benzo(b)fluoranthene			10 J	
benzo(g,h,i)perylene				
benzo(k)fluoranthene	10 J		10 J	
carbazole	40	40	60	20
chrysene	30	20	40	10 J
dibenzofuran	100	80	170	50
fluoranthene	140	110	200	60
fluorene	120	110	210	70
indeno(1,2,3-cd)pyrene				
naphthalene	900	600	1800	380
pentachlorophenol				
phenanthrene	300	260	600	150
pyrene	120	90	160	50
Total HPAH (U=1/2)	380	300	500	190
Total LPAH (U=1/2)	1820	1430	3860	900
Total PAH (U=1/2)	2200	1730	4360	1090
LPAH/HPAH (U=1/2)	4.8	4.8	7.7	4.7
Naphthalene/Total PAH (U=1/2)	0.41	0.35	0.41	0.35
TPH (mg/kg)				
TRPH				
total hydrocarbons, C10-C39	7700	3600	11000	3700
C10-C11	2200	960	2900	1000
C12-C13	1000	540	1800	640
C14-C15	1300	640	1800	650
C16-C17	1200	580	1700	600
C18-C19	920	400	1200	410
C20-C21	580	290	780	300
C22-C23	250	130	470	90
C24-C25	110			47
C27-C28	63	13	120	16
C29-C30	27			
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-3
Rotosonic Boring Soil Data - Detections Only

Location ID	SB-086	SB-092	SB-092	SB-092
Quadrant	C1	C3	C3	C3
Sample ID	SB086-49-50	SB092-51.5-51.8	SB092-79.5-79.8	SB092-114-114.3
Date Sampled	9/28/99	9/20/99	9/20/99	9/21/99
Field QC				
Soil Description	clay	clay	sand	sand
NAPL Description	odor	odor	nothing	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity				
Exsitu peak wavelength				
Insitu maximum intensity				
Insitu peak wavelength				
PAHs (mg/kg)				
2-methylnaphthalene	20	30	50	
acenaphthene	20	30	40	
acenaphthylene				
anthracene		10 J	20	
benzo(a)anthracene			10 J	
benzo(a)pyrene				
benzo(b)fluoranthene				
benzo(g,h,i)perylene				
benzo(k)fluoranthene				
carbazole				
chrysene			10 J	
dibenzofuran		20	30	
fluoranthene	10 J	30	60	20
fluorene	10 J	20	40	
indeno(1,2,3-cd)pyrene				
naphthalene	40	40	70	
pentachlorophenol				
phenanthrene	40	70	120	30
pyrene	10 J	20	40	10 J
Total HPAH (U=1/2)	100	130	180	110
Total LPAH (U=1/2)	150	210	350	90
Total PAH (U=1/2)	250	340	530	200
LPAH/HPAH (U=1/2)	1.5	1.6	1.9	0.82
Naphthalene/Total PAH (U=1/2)	0.16	0.12	0.13	0.1
TPH (mg/kg)				
TRPH				
total hydrocarbons, C10-C39	69 J	480	350	130
C10-C11	16	71	59	20
C12-C13	8	72	44	14
C14-C15	17	110	67	31
C16-C17	14	89	59	29
C18-C19		60	46	16
C20-C21	8	35	28	17
C22-C23		24	20	
C24-C25		5.2	5	
C27-C28		6.6	7	
C29-C30				
C31-C32				
C33-C34				
C35-C36				
C37-C39	7.3			

Table A-3
Rotosonic Boring Soil Data - Detections Only

Location ID	SB-092	SB-099	SB-099	SB-099
Quadrant	C3	C3	C3	C3
Sample ID	SB092-139.5-139.8	SB099-3.1-4.6	SB599-3.1-4.6	SB099-13.4-14.7
Date Sampled	9/21/99	9/30/99	9/30/99	9/30/99
Field QC		Primary	Field Duplicate	
Soil Description	sand	sand	sand	clay
NAPL Description	sheen	sheen	sheen	odor
LIF (counts/wavelength)				
Exsitu maximum intensity				
Exsitu peak wavelength				
Insitu maximum intensity				
Insitu peak wavelength				
PAHs (mg/kg)				
2-methylnaphthalene	100	60	140	400
acenaphthene	80	40	80	600
acenaphthylene				
anthracene	40	110	110	270
benzo(a)anthracene	20	40	40	110
benzo(a)pyrene	10 J	30 J	30 J	30
benzo(b)fluoranthene	10 J	40	40	30
benzo(g,h,i)perylene				
benzo(k)fluoranthene	10 J	40	20 J	30
carbazole	20 J	50 J	50 J	100 J
chrysene	20	60	60	100
dibenzofuran	50	20 J	40	400
fluoranthene	90	160	170	600
fluorene	60	30 J	60	500
indeno(1,2,3-cd)pyrene		20 J		
naphthalene	190	200	440	500
pentachlorophenol		100	200	
phenanthrene	170	150	180	1200
pyrene	70	140	160	500
Total HPAH (U=1/2)	260	570	580	1445
Total LPAH (U=1/2)	650	610	1030	3485
Total PAH (U=1/2)	910	1180	1610	4930
LPAH/HPAH (U=1/2)	2.5	1.1	1.8	2.4
Naphthalene/Total PAH (U=1/2)	0.21	0.17	0.27	0.1
TPH (mg/kg)				
TRPH				
total hydrocarbons, C10-C39	1100	2100	6200	6400
C10-C11	270	300	300	390
C12-C13	140	230	170	540
C14-C15	170	290	300	1300
C16-C17	160	250	490	1400
C18-C19	110	260	880	1100
C20-C21	96	200	890	790
C22-C23	54	200	940	330
C24-C25	15	140	680	210
C27-C28	23	130	630	150
C29-C30	11	110	600	89
C31-C32			90	
C33-C34		23	150	17
C35-C36			44	
C37-C39			49	

Table A-3
Rotosonic Boring Soil Data - Detections Only

Location ID	SB-099	SB-099	SB-099	SB-099
Quadrant	C3	C3	C3	C3
Sample ID	SB099-27.5-29.5	SB599-27.5-29.5	SB099-31-33	SB099-41-42.5
Date Sampled	9/30/99	9/30/99	9/30/99	10/6/99
Field QC	Primary	Field Duplicate		
Soil Description	sand	sand	sand	silt/sand
NAPL Description	sheen	sheen	mobile	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity				
Exsitu peak wavelength				
Insitu maximum intensity				
Insitu peak wavelength				
PAHs (mg/kg)				
2-methylnaphthalene	800	700	130	500
acenaphthene	1000	1000	170	500
acenaphthylene	30 J	30 J		
anthracene	350	340	70	200
benzo(a)anthracene	170	150	30	100
benzo(a)pyrene	50	50	10 J	30
benzo(b)fluoranthene	40 J	40 J		30
benzo(g,h,i)perylene				
benzo(k)fluoranthene	50	50	10 J	30
carbazole	180 J	180 J	40 J	120 J
chrysene	170	160	30	100
dibenzofuran	540	500	100	400
fluoranthene	900	900	160	500
fluorene	800	800	140	500
indeno(1,2,3-cd)pyrene				10 J
naphthalene	2000	1900	320	1200
pentachlorophenol				
phenanthrene	2000	2000	360	1200
pyrene	800	700	140	400
Total HPAH (U=1/2)	2255	2125	420	1220
Total LPAH (U=1/2)	6980	6770	1200	4110
Total PAH (U=1/2)	9235	8895	1620	5330
LPAH/HPAH (U=1/2)	3.1	3.2	2.9	3.4
Naphthalene/Total PAH (U=1/2)	0.22	0.21	0.2	0.23
TPH (mg/kg)				
TRPH				
total hydrocarbons, C10-C39	18000	22000	5900	13000
C10-C11	2100	2600	600	1700
C12-C13	1500	2000	510	1400
C14-C15	3400	4300	1100	2500
C16-C17	3700	4600	1300	2800
C18-C19	3100	3900	1100	2300
C20-C21	2100	2600	680	1500
C22-C23	720	930	300	540
C24-C25	620	820	210	410
C27-C28	390	520	140	240
C29-C30			37	55
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-3
Rotosonic Boring Soil Data - Detections Only

Location ID	SB-099	SB-099	SB-099	SB-099
Quadrant	C3	C3	C3	C3
Sample ID	SB099-139.2-139.4	SB099-152.6-152.8	SB099-153.8-153.9	SB099-160.7-160.9
Date Sampled	10/7/99	10/7/99	10/7/99	10/7/99
Field QC				Primary
Soil Description	clay	clay	clay	sand
NAPL Description	sheen	odor	odor	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity				
Exsitu peak wavelength				
Insitu maximum intensity				
Insitu peak wavelength				
PAHs (mg/kg)				
2-methylnaphthalene	20	20	90	200
acenaphthene	20	10 J	50	110
acenaphthylene				
anthracene			20	40
benzo(a)anthracene			10 J	20
benzo(a)pyrene				10 J
benzo(b)fluoranthene				10 J
benzo(g,h,i)perylene				
benzo(k)fluoranthene	10 J			10 J
carbazole				10 J
chrysene			10 J	20
dibenzofuran	10 J		30	70
fluoranthene	20	10 J	60	100
fluorene	10 J		40	80
indeno(1,2,3-cd)pyrene				
naphthalene	20	40	170	380
pentachlorophenol				
phenanthrene	40	30	110	190
pyrene	10 J	10 J	50	80
Total HPAH (U=1/2)	110	100	190	280
Total LPAH (U=1/2)	130	130	490	1010
Total PAH (U=1/2)	240	230	680	1290
LPAH/HPAH (U=1/2)	1.2	1.3	2.6	3.6
Naphthalene/Total PAH (U=1/2)	0.08	0.17	0.25	0.29
TPH (mg/kg)				
TRPH				
total hydrocarbons, C10-C39	250	70 J	410	1200
C10-C11	58	22	120	320
C12-C13	52	10	69	210
C14-C15	54	16	75	210
C16-C17	36	7	60	160
C18-C19	19		35	110
C20-C21	18	7	34	88
C22-C23	6		17	47
C24-C25				13
C27-C28				22
C29-C30				6
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-3
Rotosonic Boring Soil Data - Detections Only

Location ID	SB-099	SB-099	SB-099
Quadrant	C3	C3	C3
Sample ID	SB599-160.7-160.9	SB099-161.8-162	SB099-212.4-212.6
Date Sampled	10/7/99	10/7/99	10/8/99
Field QC	Field Duplicate		
Soil Description	sand	sand	clay
NAPL Description	sheen	sheen	sheen
LIF (counts/wavelength)			
Exsitu maximum intensity			
Exsitu peak wavelength			
Insitu maximum intensity			
Insitu peak wavelength			
PAHs (mg/kg)			
2-methylnaphthalene	190	160	80
acenaphthene	120	100	60
acenaphthylene			
anthracene	50	40	20
benzo(a)anthracene	30	20	10 J
benzo(a)pyrene	10 J	10 J	
benzo(b)fluoranthene	10 J		
benzo(g,h,i)perylene			
benzo(k)fluoranthene	10 J		
carbazole	10 J	10 J	
chrysene	30	20	10 J
dibenzofuran	80	60	30
fluoranthene	110	100	60
fluorene	90	80	40
indeno(1,2,3-cd)pyrene			
naphthalene	310	210	110
pentachlorophenol			
phenanthrene	220	190	110
pyrene	90	80	40
Total HPAH (U=1/2)	320	280	180
Total LPAH (U=1/2)	990	790	430
Total PAH (U=1/2)	1310	1070	610
LPAH/HPAH (U=1/2)	3.1	2.8	2.4
Naphthalene/Total PAH (U=1/2)	0.24	0.2	0.18
TPH (mg/kg)			
TRPH			
total hydrocarbons, C10-C39	2200	2100	1500
C10-C11	560	530	330
C12-C13	370	360	270
C14-C15	370	370	290
C16-C17	290	280	210
C18-C19	200	190	140
C20-C21	160	170	110
C22-C23	77	85	55
C24-C25	44	34	25
C27-C28	50	50	30
C29-C30	19	19	13
C31-C32			
C33-C34			
C35-C36			
C37-C39			

Table A-4
SCAPS Soil Data - Detections Only

Location ID	SE-002	SE-002	SE-002	SE-002
Quadrant	C1	C1	C1	C1
Sample ID	SS002-14.3-15.1	SS002-15.1-16.0	SS002-24.5-25.6	SS002-25.6-26.5
Date Sampled	7/15/99	7/15/99	7/15/99	7/15/99
Field QC				
Soil Description	silty/clay	silty/clay	clay	sand
NAPL Description	nothing	nothing	visible	visible
LIF (counts/wavelength)				
Exsitu maximum intensity	192	184	619	810
Exsitu peak wavelength	446	443	466	469
Insitu maximum intensity	424	178	1880	1880
Insitu peak wavelength	471	476	470	470
PAHs (mg/kg)				
2-methylnaphthalene	180	70	500	
acenaphthene	160	40	170	400
acenaphthylene				
anthracene	90	20	70	130
benzo(a)anthracene	30		20	30
benzo(a)pyrene				
benzo(b)fluoranthene	20			10 J
benzo(g,h,i)perylene				
benzo(k)fluoranthene				
carbazole	110	20 J	50	100
chrysene	30		20	40
dibenzofuran	100	30	100	180
fluoranthene	140	40	90	180
fluorene	100	30	110	200
indeno(1,2,3-cd)pyrene				
naphthalene	1400	280	1400	2800
pentachlorophenol	180		30	70
phenanthrene	250	90	300	600
pyrene	110	30	70	140
Total HPAH (U=1/2)	380	150	265	450
Total LPAH (U=1/2)	2190	540	2560	4590
Total PAH (U=1/2)	2570	690	2825	5040
LPAH/HPAH (U=1/2)	5.8	3.6	9.7	10
Naphthalene/Total PAH (U=1/2)	0.54	0.41	0.5	0.56
TPH (mg/kg)				
TRPH	1011	341	755	2484
total hydrocarbons, C10-C39	2200	1000	2300	7900
C10-C11	450	260	640	2300
C12-C13	250	110	410	1300
C14-C15	470	190	570	1700
C16-C17	360	150	290	1000
C18-C19	320	120	160	810
C20-C21	170	93	140	420
C22-C23	120	40	52	240
C24-C25	46	26	34	100
C27-C28	19	5	9	
C29-C30	8			
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-4
SCAPS Soil Data - Detections Only

Location ID	SE-002	SE-002	SE-005	SE-005
Quadrant	C1	C1	C2	C2
Sample ID	SS002-84-86	SS502-84-86	SS005-29.5-30.5	SS005-30.5-31.6
Date Sampled	7/15/99	7/15/99	7/15/99	7/15/99
Field QC	Primary	Field Duplicate		
Soil Description	sand	sand	sand	clay
NAPL Description	visible	visible	mobile	visible
LIF (counts/wavelength)				
Exsitu maximum intensity	144	144	766	483
Exsitu peak wavelength	444	444	480	470
Insitu maximum intensity	33	33	794	603
Insitu peak wavelength	426	426	496	492
PAHs (mg/kg)				
2-methylnaphthalene			500	400
acenaphthene			400	200
acenaphthylene				
anthracene			150	110
benzo(a)anthracene			110	70
benzo(a)pyrene			50	30
benzo(b)fluoranthene			70	40
benzo(g,h,i)perylene			20	
benzo(k)fluoranthene			20	10 J
carbazole			200	170
chrysene			110	70
dibenzofuran			300	170
fluoranthene			600	400
fluorene			300	170
indeno(1,2,3-cd)pyrene			20	
naphthalene			1200	1200
pentachlorophenol			200	50
phenanthrene			1100	800
pyrene			400	300
Total HPAH (U=1/2)			1410	950
Total LPAH (U=1/2)			3660	2890
Total PAH (U=1/2)			5070	3840
LPAH/HPAH (U=1/2)			2.6	3
Naphthalene/Total PAH (U=1/2)			0.24	0.31
TPH (mg/kg)				
TRPH	6 J	8 J	1504	242
total hydrocarbons, C10-C39			12000 J	4000
C10-C11			2700 J	850
C12-C13			1200 J	470
C14-C15			2100 J	770
C16-C17			1900 J	650
C18-C19			950 J	490
C20-C21			1600 J	340
C22-C23			430 J	220
C24-C25			620 J	100
C27-C28			160 J	51
C29-C30			130 J	42
C31-C32			30 J	9
C33-C34			40 J	12
C35-C36				
C37-C39				

Table A-4
SCAPS Soil Data - Detections Only

Location ID	SE-005	SE-005	SE-005	SE-008
Quadrant	C2	C2	C2	C2
Sample ID	SS005-43-45	SS005-67-69	SS005-86-87.5	SS008-10.5-11.7
Date Sampled	7/15/99	7/15/99	7/15/99	8/8/99
Field QC				Primary
Soil Description	sand	clay/sand	sand	clay
NAPL Description	odor	mobile	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	103	418	140	105
Exsitu peak wavelength	445	476	444	454
Insitu maximum intensity	131	1430	70	477
Insitu peak wavelength	497	484	496	399
PAHs (mg/kg)				
2-methylnaphthalene		80		
acenaphthene		50		
acenaphthylene				
anthracene		20		
benzo(a)anthracene		10 J		
benzo(a)pyrene				
benzo(b)fluoranthene				
benzo(g,h,i)perylene				
benzo(k)fluoranthene				
carbazole		30		
chrysene		10 J		
dibenzofuran		30		
fluoranthene		60		
fluorene		40		
indeno(1,2,3-cd)pyrene				
naphthalene		150		20 J
pentachlorophenol				60 J
phenanthrene		100		
pyrene		40		
Total HPAH (U=1/2)		180		100
Total LPAH (U=1/2)		450		80
Total PAH (U=1/2)		630		180
LPAH/HPAH (U=1/2)		2.5		0.8
Naphthalene/Total PAH (U=1/2)		0.24		0.11
TPH (mg/kg)				
TRPH	6 J	113	36	
total hydrocarbons, C10-C39		1200		
C10-C11		360		
C12-C13		190		
C14-C15		220		
C16-C17		160		
C18-C19		120		
C20-C21		89		
C22-C23		58		
C24-C25		28		
C27-C28		14		
C29-C30		13		
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-4
SCAPS Soil Data - Detections Only

Location ID	SE-008	SE-008	SE-008	SE-008
Quadrant	C2	C2	C2	C2
Sample ID	SS508-10.5-11.7	SS008-40-41.5	SS008-42-44	SS008-45-45.9
Date Sampled	8/8/99	8/8/99	8/8/99	8/8/99
Field QC	Field Duplicate			
Soil Description	clay	sand	sand	sand
NAPL Description	odor	visible	mobile	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity		300	2933	97
Exsitu peak wavelength		455	468	442
Insitu maximum intensity		1601	927	2107
Insitu peak wavelength		469	468	404
PAHs (mg/kg)				
2-methylnaphthalene			460	
acenaphthene			200	
acenaphthylene				
anthracene			80	
benzo(a)anthracene			20 J	
benzo(a)pyrene				
benzo(b)fluoranthene				
benzo(g,h,i)perylene				
benzo(k)fluoranthene				
carbazole			30	
chrysene			20 J	
dibenzofuran			130	
fluoranthene			110	
fluorene			140	
indeno(1,2,3-cd)pyrene				
naphthalene	20 J		790	10 J
pentachlorophenol	30 J			
phenanthrene			280	
pyrene			90	
Total HPAH (U=1/2)	100		330	100
Total LPAH (U=1/2)	80		1965	70
Total PAH (U=1/2)	180		2295	170
LPAH/HPAH (U=1/2)	0.8		6	0.7
Naphthalene/Total PAH (U=1/2)	0.11		0.34	0.06
TPH (mg/kg)				
TRPH		28	2591	8 J
total hydrocarbons, C10-C39		120 J	5300 J	
C10-C11		30	1400	
C12-C13		30	1200	
C14-C15		30	1000	
C16-C17		20	700	
C18-C19		9	440	
C20-C21		6	270	
C22-C23			120	
C24-C25			50	
C27-C28				
C29-C30				
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-4
SCAPS Soil Data - Detections Only

Location ID	SE-008	SE-010	SE-010	SE-010
Quadrant	C2	C2	C2	C2
Sample ID	SS008-48-50	SS010-59-59.8	SS010-61-61.5	SS010-61.5-63
Date Sampled	8/8/99	9/6/99	9/6/99	9/6/99
Field QC				
Soil Description	sand	sand and gravel	sandy/clay	silt
NAPL Description	mobile	sheen	visible	visible
LIF (counts/wavelength)				
Exsitu maximum intensity	2349	117	562	637
Exsitu peak wavelength	469	442	475	487
Insitu maximum intensity	37	1997	578	554
Insitu peak wavelength	405	477	473	495
PAHs (mg/kg)				
2-methylnaphthalene	220		200	260
acenaphthene	120		110	120
acenaphthylene				
anthracene	40		40	40
benzo(a)anthracene			20	30
benzo(a)pyrene			10 J	10 J
benzo(b)fluoranthene			20	20
benzo(g,h,i)perylene				
benzo(k)fluoranthene				
carbazole	20		20 J	20 J
chrysene			30	30
dibenzofuran	80		70	70
fluoranthene	60		100	100
fluorene	80		70	80
indeno(1,2,3-cd)pyrene				
naphthalene	360		250	380
pentachlorophenol				
phenanthrene	160		180	180
pyrene	40		80	80
Total HPAH (U=1/2)	180		300	310
Total LPAH (U=1/2)	990		860	1070
Total PAH (U=1/2)	1170		1160	1380
LPAH/HPAH (U=1/2)	5.5		2.9	3.5
Naphthalene/Total PAH (U=1/2)	0.31		0.22	0.28
TPH (mg/kg)				
TRPH	1340	3 J	181	162
total hydrocarbons, C10-C39	3800 J		1500	1200
C10-C11	1100		550	440
C12-C13	970		320	270
C14-C15	750		210	180
C16-C17	460		140	120
C18-C19	270		94	85
C20-C21	160		80	73
C22-C23	68		39	36
C24-C25	20		19	17
C27-C28	10		20	19
C29-C30			11	11
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-4
SCAPS Soil Data - Detections Only

Location ID	SE-020	SE-020	SE-020	SE-020
Quadrant	C2	C2	C2	C2
Sample ID	SS020-29-31	SS520-29-31	SS020-47-49	SS020-51-51.8
Date Sampled	8/8/99	8/8/99	8/8/99	8/8/99
Field QC	Primary	Field Duplicate		
Soil Description	sandy/clay	sandy/clay	silty/sand	sand
NAPL Description	sheen	sheen	mobile	visible
LIF (counts/wavelength)				
Exsitu maximum intensity	541	541	1083	113
Exsitu peak wavelength	454	454	476	441
Insitu maximum intensity	362	362	916	1627
Insitu peak wavelength	461	461	469	470
PAHs (mg/kg)				
2-methylnaphthalene	370	180	270	
acenaphthene	140	80	180	
acenaphthylene				
anthracene	60	40	80	
benzo(a)anthracene	10 J		20	
benzo(a)pyrene				
benzo(b)fluoranthene				
benzo(g,h,i)perylene				
benzo(k)fluoranthene				
carbazole	20		30	
chrysene	10 J		20	
dibenzofuran	100	50	100	
fluoranthene	80	50	100	
fluorene	100	60	120	
indeno(1,2,3-cd)pyrene				
naphthalene	620	320	850	
pentachlorophenol			60	
phenanthrene	200	130	260	
pyrene	60	40	80	
Total HPAH (U=1/2)	220	170	280	
Total LPAH (U=1/2)	1500	820	1770	
Total PAH (U=1/2)	1720	990	2050	
LPAH/HPAH (U=1/2)	6.8	4.8	6.3	
Naphthalene/Total PAH (U=1/2)	0.36	0.32	0.41	
TPH (mg/kg)				
TRPH	274	283	717	15
total hydrocarbons, C10-C39	1100	2600	4800	70 J
C10-C11	280	660	1400	
C12-C13	290	660	970	
C14-C15	250	550	840	
C16-C17	150	340	690	
C18-C19	85	190	430	
C20-C21	51	120	280	
C22-C23	20	60	130	
C24-C25	7	20	40	
C27-C28		10	20	
C29-C30			6	
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-4
SCAPS Soil Data - Detections Only

Location ID	SE-020	SE-020	SE-020	SE-035
Quadrant	C2	C2	C2	C1
Sample ID	SS020-56-58	SS520-56-58	SS020-60-62	SS035-50-52
Date Sampled	8/8/99	8/8/99	8/8/99	9/9/99
Field QC	Primary	Field Duplicate		
Soil Description	sand	sand	sand	clay
NAPL Description	mobile	mobile	mobile	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	1396	1396	1994	75
Exsitu peak wavelength	471	471	471	454
Insitu maximum intensity	3067	3067	3316	472
Insitu peak wavelength	472	472	469	471
PAHs (mg/kg)				
2-methylnaphthalene	540	600	380	
acenaphthene	240	270	190	
acenaphthylene				
anthracene	100	110	90	
benzo(a)anthracene	20	30	20 J	
benzo(a)pyrene				
benzo(b)fluoranthene				
benzo(g,h,i)perylene				
benzo(k)fluoranthene				
carbazole	40	40	30	
chrysene	30	30	20 J	
dibenzofuran	140	160	110	
fluoranthene	130	140	110	
fluorene	160	180	140	
indeno(1,2,3-cd)pyrene				
naphthalene	1000	1300	610	
pentachlorophenol	60	60		
phenanthrene	380	400	290	
pyrene	110	120	100	
Total HPAH (U=1/2)	350	380	340	
Total LPAH (U=1/2)	2430	2870	1715	
Total PAH (U=1/2)	2780	3250	2055	
LPAH/HPAH (U=1/2)	6.9	7.6	5	
Naphthalene/Total PAH (U=1/2)	0.36	0.4	0.3	
TPH (mg/kg)				
TRPH	1456	1458	2899	4 J
total hydrocarbons, C10-C39	6200	6000	5500	
C10-C11	1800	1700	1600	
C12-C13	1100	1000	920	
C14-C15	1300	1300	1200	
C16-C17	1200	1200	1100	
C18-C19	410	420	350	
C20-C21	420	420	370	
C22-C23	67	65	59	
C24-C25				
C27-C28				
C29-C30				
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-4
SCAPS Soil Data - Detections Only

Location ID	SE-037	SE-039	SE-039	SE-043
Quadrant	D2	B1	B1	D2
Sample ID	SS037-56-57	SS039-19-20.6	SS039-22-22.4	SS043-7-8.6
Date Sampled	8/9/99	8/9/99	8/9/99	8/9/99
Field QC				
Soil Description	sand	sand	sand	clay
NAPL Description	mobile	mobile	mobile	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	1319	449	477	134
Exsitu peak wavelength	486	454	545	453
Insitu maximum intensity	2054	1251	460	1009
Insitu peak wavelength	487	470	468	477
PAHs (mg/kg)				
2-methylnaphthalene	1000	50	40	
acenaphthene	800	70	60	
acenaphthylene				
anthracene	400	30	20	
benzo(a)anthracene	200			
benzo(a)pyrene	100 J			
benzo(b)fluoranthene	100 J			
benzo(g,h,i)perylene				
benzo(k)fluoranthene	100 J			
carbazole	200			
chrysene	200			
dibenzofuran	500	40	30	
fluoranthene	900	50	30	
fluorene	600	50	40	
indeno(1,2,3-cd)pyrene				
naphthalene	4000	80	50	
pentachlorophenol				
phenanthrene	2000	120	90	
pyrene	700	40	30	
Total HPAH (U=1/2)	2450	170	140	
Total LPAH (U=1/2)	8850	410	310	
Total PAH (U=1/2)	11300	580	450	
LPAH/HPAH (U=1/2)	3.6	2.4	2.2	
Naphthalene/Total PAH (U=1/2)	0.35	0.14	0.11	
TPH (mg/kg)				
TRPH	6836	804	543	9 J
total hydrocarbons, C10-C39	27000	940	920	
C10-C11	7500	200	190	
C12-C13	2800	97	120	
C14-C15	4300	190	210	
C16-C17	5900	240	220	
C18-C19	1800	98	83	
C20-C21	3700	110	94	
C22-C23	1200	20	7	
C24-C25	50			
C27-C28	70			
C29-C30				
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-4
SCAPS Soil Data - Detections Only

Location ID	SE-043	SE-043	SE-043	SE-043
Quadrant	D2	D2	D2	D2
Sample ID	SS043-13-15	SS043-23-25	SS543-23-25	SS043-27-29
Date Sampled	8/9/99	8/9/99	8/9/99	8/9/99
Field QC		Primary	Field Duplicate	
Soil Description	silty/sand	silty/sand	silty/sand	silt
NAPL Description	odor (fuel)	odor (fuel)	odor (fuel)	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	1801	592	592	624
Exsitu peak wavelength	454	454	454	454
Insitu maximum intensity	5669	7094	7094	3837
Insitu peak wavelength	455	454	454	454
PAHs (mg/kg)				
2-methylnaphthalene				
acenaphthene				
acenaphthylene				
anthracene				
benzo(a)anthracene				
benzo(a)pyrene				
benzo(b)fluoranthene				
benzo(g,h,i)perylene				
benzo(k)fluoranthene				
carbazole				
chrysene				
dibenzofuran				
fluoranthene				
fluorene				
indeno(1,2,3-cd)pyrene				
naphthalene				
pentachlorophenol				
phenanthrene				
pyrene				
Total HPAH (U=1/2)				
Total LPAH (U=1/2)				
Total PAH (U=1/2)				
LPAH/HPAH (U=1/2)				
Naphthalene/Total PAH (U=1/2)				
TPH (mg/kg)				
TRPH	614	363	328	38
total hydrocarbons, C10-C39	900	400	500	100
C10-C11	23	9	10	
C12-C13	200	83	100	23
C14-C15	450	210	250	53
C16-C17	130	63	73	15
C18-C19	30	10	15	
C20-C21	12	5	6	
C22-C23	6			
C24-C25				
C27-C28				
C29-C30				
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-4
SCAPS Soil Data - Detections Only

Location ID	SE-047	SE-047	SE-047	SE-064
Quadrant	D3	D3	D3	C2
Sample ID	SS047-10-12	SS047-12-14	SS047-14-15	SS064-34-36
Date Sampled	9/7/99	9/7/99	9/7/99	9/6/99
Field QC				Primary
Soil Description				sand
NAPL Description				mobile
LIF (counts/wavelength)				
Exsitu maximum intensity				1000
Exsitu peak wavelength				452
Insitu maximum intensity				1749
Insitu peak wavelength				469
PAHs (mg/kg)				
2-methylnaphthalene			10 J	210
acenaphthene				130
acenaphthylene				
anthracene				50
benzo(a)anthracene				10 J
benzo(a)pyrene				
benzo(b)fluoranthene				
benzo(g,h,i)perylene				
benzo(k)fluoranthene				
carbazole				
chrysene				10 J
dibenzofuran				80
fluoranthene				70
fluorene			20	90
indeno(1,2,3-cd)pyrene				
naphthalene				290
pentachlorophenol		140	330 J	
phenanthrene		20	40	180
pyrene				60
Total HPAH (U=1/2)		100	100	210
Total LPAH (U=1/2)		80	110	960
Total PAH (U=1/2)		180	210	1170
LPAH/HPAH (U=1/2)		0.8	1.1	4.6
Naphthalene/Total PAH (U=1/2)		0.11	0.1	0.25
TPH (mg/kg)				
TRPH	750	4088	7724	1111
total hydrocarbons, C10-C39	600	7700 J	9200 J	3700
C10-C11	16	280 J	300 J	980
C12-C13	97	1200 J	1500 J	830
C14-C15	140	1700 J	2000 J	770
C16-C17	140	1600 J	1900 J	480
C18-C19	130	1400 J	1600 J	320
C20-C21	71	770 J	1100 J	190
C22-C23	19	460 J	630 J	94
C24-C25	14	220 J		44
C27-C28				22
C29-C30				
C31-C32				9
C33-C34				
C35-C36				
C37-C39				

Table A-4
SCAPS Soil Data - Detections Only

Location ID	SE-064	SE-064	SE-064	SE-079
Quadrant	C2	C2	C2	C3
Sample ID	SS564-34-36	SS064-50-51	SS064-62-63.3	SS079-51-52
Date Sampled	9/6/99	9/6/99	9/6/99	9/8/99
Field QC	Field Duplicate			
Soil Description	sand	sand	sand	sand
NAPL Description	mobile	odor	sheen/visible	sheen
LIF (counts/wavelength)				
Exsitu maximum intensity	1212	83	162	739
Exsitu peak wavelength	447	443	454	476
Insitu maximum intensity	1749	2661	54	1468
Insitu peak wavelength	469	413	405	489
PAHs (mg/kg)				
2-methylnaphthalene	220			280
acenaphthene	120			260
acenaphthylene				
anthracene	40			100
benzo(a)anthracene				70
benzo(a)pyrene				30
benzo(b)fluoranthene				40
benzo(g,h,i)perylene				
benzo(k)fluoranthene				20 J
carbazole				60 J
chrysene				60
dibenzofuran	70			180
fluoranthene	60			300
fluorene	80			210
indeno(1,2,3-cd)pyrene				
naphthalene	350			460
pentachlorophenol				
phenanthrene	160			600
pyrene	50			210
Total HPAH (U=1/2)	190			760
Total LPAH (U=1/2)	980			1920
Total PAH (U=1/2)	1170			2680
LPAH/HPAH (U=1/2)	5.2			2.5
Naphthalene/Total PAH (U=1/2)	0.3			0.17
TPH (mg/kg)				
TRPH	1051	1 J	38	1550
total hydrocarbons, C10-C39	3800		80 J	5000
C10-C11	1000		9	790
C12-C13	850		14	640
C14-C15	790		23	1000
C16-C17	490		18	890
C18-C19	330		9	650
C20-C21	190		6	490
C22-C23	98			220
C24-C25	44			120
C27-C28	22			97
C29-C30				48
C31-C32	8			
C33-C34				
C35-C36				
C37-C39				

Table A-4
SCAPS Soil Data - Detections Only

Location ID	SE-079	SE-079	SE-079	SE-079
Quadrant	C3	C3	C3	C3
Sample ID	SS079-54-54.2	SS079-54.2-55	SS079-58-60	SS079-80-81
Date Sampled	9/8/99	9/8/99	9/8/99	9/8/99
Field QC				
Soil Description	sand	clay	clay/silt	sand
NAPL Description	visible	odor	odor	visible
LIF (counts/wavelength)				
Exsitu maximum intensity	1034	176	78	228
Exsitu peak wavelength	486	454	442	452
Insitu maximum intensity	541	325	701	689
Insitu peak wavelength	493	486	488	498
PAHs (mg/kg)				
2-methylnaphthalene	390	50		
acenaphthene	320	50		
acenaphthylene				
anthracene	130	20		
benzo(a)anthracene	90	10 J		
benzo(a)pyrene	40			
benzo(b)fluoranthene	50			
benzo(g,h,i)perylene	10 J			
benzo(k)fluoranthene	20			
carbazole	80 J			
chrysene	80	10 J		
dibenzofuran	220	40		
fluoranthene	360	60		
fluorene	260	40		
indeno(1,2,3-cd)pyrene	10 J			
naphthalene	780	80		
pentachlorophenol				
phenanthrene	690	120		20
pyrene	260	40		
Total HPAH (U=1/2)	930	180		100
Total LPAH (U=1/2)	2580	370		70
Total PAH (U=1/2)	3510	550		170
LPAH/HPAH (U=1/2)	2.8	2.1		0.7
Naphthalene/Total PAH (U=1/2)	0.22	0.15		0.12
TPH (mg/kg)				
TRPH	1607	76	3 J	27
total hydrocarbons, C10-C39	4700 J	200		100
C10-C11	870 J	43		6
C12-C13	570 J	25		9
C14-C15	910 J	39		24
C16-C17	810 J	32		22
C18-C19	590 J	21		17
C20-C21	420 J	15		12
C22-C23	230 J	6		5
C24-C25	110 J			
C27-C28	100 J			
C29-C30	66 J			
C31-C32				
C33-C34	16 J			
C35-C36				
C37-C39				

Table A-4
SCAPS Soil Data - Detections Only

Location ID	SE-081	SE-088	SE-088	SE-088
Quadrant	C3	B1	B1	B1
Sample ID	SS081-50-50.6	SS088-5.4-5.8	SS088-9-10.3	SS088-10.3-11
Date Sampled	9/8/99	9/6/99	9/6/99	9/6/99
Field QC				
Soil Description	clay/gravel	silty/sand	clay	clay
NAPL Description	odor	visible	sheen	visible
LIF (counts/wavelength)				
Exsitu maximum intensity	99	1350	124	147
Exsitu peak wavelength	442	448	454	443
Insitu maximum intensity	522	1724	2821	1310
Insitu peak wavelength	494	468	469	471
PAHs (mg/kg)				
2-methylnaphthalene		6000	30	30
acenaphthene		3000	20 J	30
acenaphthylene		70 J		
anthracene		900 J		20 J
benzo(a)anthracene		200 J		
benzo(a)pyrene		70 J		
benzo(b)fluoranthene		90 J		
benzo(g,h,i)perylene				
benzo(k)fluoranthene				
carbazole		400 J		
chrysene		200 J		
dibenzofuran		1500 J		20 J
fluoranthene		1300 J		20 J
fluorene		2000		20 J
indeno(1,2,3-cd)pyrene				
naphthalene		11000	20 J	40
pentachlorophenol		1200 J		
phenanthrene		4000	20 J	50
pyrene		1000 J		20 J
Total HPAH (U=1/2)		3060	150	160
Total LPAH (U=1/2)		26970	135	205
Total PAH (U=1/2)		30030	285	365
LPAH/HPAH (U=1/2)		8.8	0.9	1.3
Naphthalene/Total PAH (U=1/2)		0.37	0.07	0.11
TPH (mg/kg)				
TRPH	5 J	35104	41	127
total hydrocarbons, C10-C39		39000 J	200	200
C10-C11		7700 J	10	23
C12-C13		7400 J	36	31
C14-C15		7700 J	46	45
C16-C17		6400 J	40	41
C18-C19		4900 J	23	31
C20-C21		2800 J	15	20
C22-C23		1500 J		9
C24-C25		770 J		
C27-C28		280 J		
C29-C30		120 J		
C31-C32				
C33-C34		8 J		
C35-C36				
C37-C39				

Table A-4
SCAPS Soil Data - Detections Only

Location ID	SE-088	SE-088	SE-088	SE-088
Quadrant	B1	B1	B1	B1
Sample ID	SS088-14-15.4	SS088-20-21	SS088-24-25.8	SS588-24-25.8
Date Sampled	9/6/99	9/6/99	9/6/99	9/6/99
Field QC			Primary	Field Duplicate
Soil Description	clay	clay/sand/silt	sand/clay	sand/clay
NAPL Description	visible	visible	visible	visible
LIF (counts/wavelength)				
Exsitu maximum intensity	77	507	850	830
Exsitu peak wavelength	442	452	454	466
Insitu maximum intensity	3088	2938	1989	1989
Insitu peak wavelength	470	478	475	475
PAHs (mg/kg)				
2-methylnaphthalene		170	250	280
acenaphthene		140	170	180
acenaphthylene				
anthracene		70	80	80
benzo(a)anthracene		20	20	20
benzo(a)pyrene				
benzo(b)fluoranthene				
benzo(g,h,i)perylene				
benzo(k)fluoranthene				
carbazole		30 J	40 J	40 J
chrysene		20	20	20
dibenzofuran		90	110	120
fluoranthene		100	120	120
fluorene		100	130	140
indeno(1,2,3-cd)pyrene				
naphthalene		420	510 J	550
pentachlorophenol				
phenanthrene		240	290	310
pyrene		80	90	100
Total HPAH (U=1/2)		280	310	320
Total LPAH (U=1/2)		1150	1440	1550
Total PAH (U=1/2)		1430	1750	1870
LPAH/HPAH (U=1/2)		4.1	4.6	4.8
Naphthalene/Total PAH (U=1/2)		0.29	0.29	0.29
TPH (mg/kg)				
TRPH	8 J	903	1507	1080
total hydrocarbons, C10-C39		1900	1600	3400
C10-C11		350	330	720
C12-C13		270	270	560
C14-C15		340	300	630
C16-C17		330	270	580
C18-C19		270	210	400
C20-C21		160	120	300
C22-C23		90	66	100
C24-C25		46	30	30
C27-C28			14	30
C29-C30			6	
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-4
SCAPS Soil Data - Detections Only

Location ID	SE-093	SE-096	SE-096	SE-096
Quadrant	D3	D2	D2	D2
Sample ID	SS093-67-68	SS096-63-65	SS096-66-67.6	SS096-81-82.4
Date Sampled	9/8/99	9/9/99	9/9/99	9/9/99
Field QC				
Soil Description	sandy/clay	sand/silt/cl	sand	sand
NAPL Description	sheen	mobile	mobile	nothing
LIF (counts/wavelength)				
Exsitu maximum intensity	88	2056	309	115
Exsitu peak wavelength	443	468	442	443
Insitu maximum intensity	929	3106	2602	48
Insitu peak wavelength	476	471	471	428
PAHs (mg/kg)				
2-methylnaphthalene		2400 J		
acenaphthene		1100 J		
acenaphthylene				
anthracene		280		
benzo(a)anthracene		60		
benzo(a)pyrene		20		
benzo(b)fluoranthene		20		
benzo(g,h,i)perylene				
benzo(k)fluoranthene		10 J		
carbazole		120		
chrysene		60		
dibenzofuran		600 J		
fluoranthene		500 J		
fluorene		700 J		
indeno(1,2,3-cd)pyrene				
naphthalene		4500 J		
pentachlorophenol				
phenanthrene		1400 J		
pyrene		260		
Total HPAH (U=1/2)		960		
Total LPAH (U=1/2)		10390		
Total PAH (U=1/2)		11350		
LPAH/HPAH (U=1/2)		11		
Naphthalene/Total PAH (U=1/2)		0.4		
TPH (mg/kg)				
TRPH	5 J	7311	83	6 J
total hydrocarbons, C10-C39		14000 J	140	
C10-C11		3500 J	15	
C12-C13		2900 J	24	
C14-C15		2700 J	34	
C16-C17		1800 J	31	
C18-C19		1300 J	18	
C20-C21		700 J	14	
C22-C23		400 J		
C24-C25		100 J		
C27-C28		87 J		
C29-C30		34 J		
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-4
SCAPS Soil Data - Detections Only

Location ID	SE-096	SE-096	SE-097	SE-097
Quadrant	D2	D2	D2	D2
Sample ID	SS096-84.5-84.8	SS096-94-96	SS097-87-89	SS097-90-92
Date Sampled	9/9/99	9/9/99	9/7/99	9/7/99
Field QC				
Soil Description	sand/gravel	silty/clay	silty/clay	clay/silt
NAPL Description	odor	odor	odor	odor
LIF (counts/wavelength)				
Exsitu maximum intensity	315	89	78	79
Exsitu peak wavelength	442	442	443	442
Insitu maximum intensity	2117	833	849	7362
Insitu peak wavelength	475	467	471	477
PAHs (mg/kg)				
2-methylnaphthalene				
acenaphthene				
acenaphthylene				
anthracene				
benzo(a)anthracene				
benzo(a)pyrene				
benzo(b)fluoranthene				
benzo(g,h,i)perylene				
benzo(k)fluoranthene				
carbazole				
chrysene				
dibenzofuran				
fluoranthene				
fluorene				
indeno(1,2,3-cd)pyrene				
naphthalene				
pentachlorophenol				
phenanthrene				
pyrene				
Total HPAH (U=1/2)				
Total LPAH (U=1/2)				
Total PAH (U=1/2)				
LPAH/HPAH (U=1/2)				
Naphthalene/Total PAH (U=1/2)				
TPH (mg/kg)				
TRPH	99	6 J	1 J	3 J
total hydrocarbons, C10-C39	70 J			
C10-C11				
C12-C13				
C14-C15				
C16-C17				
C18-C19				
C20-C21				
C22-C23				
C24-C25				
C27-C28				
C29-C30				
C31-C32				
C33-C34				
C35-C36				
C37-C39				

Table A-4
SCAPS Soil Data - Detections Only

Location ID	SE-097	SE-097	SE-097
Quadrant	D2	D2	D2
Sample ID	SS097-92.6-94	SS597-92.6-94	SS097-100-102
Date Sampled	9/7/99	9/7/99	9/7/99
Field QC	Primary	Field Duplicate	
Soil Description	silty/sand	silty/sand	silty/clay
NAPL Description	visible	visible	visible
LIF (counts/wavelength)			
Exsitu maximum intensity	152	140	103
Exsitu peak wavelength	443	444	452
Insitu maximum intensity	980	980	663
Insitu peak wavelength	474	474	469
PAHs (mg/kg)			
2-methylnaphthalene		10 J	
acenaphthene			
acenaphthylene			
anthracene			
benzo(a)anthracene			
benzo(a)pyrene			
benzo(b)fluoranthene			
benzo(g,h,i)perylene			
benzo(k)fluoranthene			
carbazole			
chrysene			
dibenzofuran			
fluoranthene			
fluorene			
indeno(1,2,3-cd)pyrene			
naphthalene		20 J	
pentachlorophenol			
phenanthrene	20 J	20 J	
pyrene			
Total HPAH (U=1/2)	150	150	
Total LPAH (U=1/2)	110	110	
Total PAH (U=1/2)	260	260	
LPAH/HPAH (U=1/2)	0.73	0.73	
Naphthalene/Total PAH (U=1/2)	0.12	0.07	
TPH (mg/kg)			
TRPH	66	96	3 J
total hydrocarbons, C10-C39	140	170	
C10-C11	27	36	
C12-C13	26	33	
C14-C15	30	37	
C16-C17	24	30	
C18-C19	15	18	
C20-C21	11	14	
C22-C23			
C24-C25			
C27-C28			
C29-C30			
C31-C32			
C33-C34			
C35-C36			
C37-C39			

Table A-5
Dioxins and Furans in Soil - Detected Congeners Only

Location ID	SB-028	SB-028	SB-028	SB-028	SB-028	SB-
Sample ID	SB028-12-12.5	SB028-28.3-29.4	SB028-31-33	SB028-48-49.7	SB028-53.5-55	SB528-
Sample Date	9/29/99	9/29/99	9/29/99	9/29/99	9/29/99	9/29
Field QC					Primary	Field Du
Dioxins/Furans (ng/kg)						
1,2,3,4,6,7,8-HpCDD	7500	5900	2500	1200	1600	3000
1,2,3,4,6,7,8-HpCDF	1200	1000	830	450	1100	1600
1,2,3,4,7,8,9-HpCDF	100	250	5 U	5 U	93	110
1,2,3,4,7,8-HxCDD	5 U	10	5 U	5 U	5 U	5
1,2,3,4,7,8-HxCDF	82	5 U	62	5 U	79	92
1,2,3,6,7,8-HxCDD	640	230	87	39	100	140
1,2,3,6,7,8-HxCDF	44	5 U	5 U	5 U	5 U	5
1,2,3,7,8,9-HxCDD	140	65	20	5 U	17	5
1,2,3,7,8,9-HxCDF	38	5 U	5 U	5 U	5 U	5
1,2,3,7,8-PeCDD	29	5 U	5 U	5 U	5 U	5
1,2,3,7,8-PeCDF	9	8	5 U	5 U	5 U	5
2,3,4,6,7,8-HxCDF	21	21	5 U	5 U	5 U	5
2,3,4,7,8-PeCDF	15	17	8	5 U	6	9
2,3,7,8-TCDD	1 U	1 U	1 U	1 U	1 U	1
2,3,7,8-TCDF	3	2	1 U	1 U	1 U	1
HpCDD's (total)	15000	15000	6300	2400	3200	6600
HpCDF's (total)	4000	6200	5400	2400	5800	9100
HxCDD's (total)	2100	950	330	120	320	140
HxCDF's (total)	3000	2300	930	310	930	1500
OCDD	56000	70000	33000	7000	16000	27000
OCDF	2300	6200	3000	2000	2200	3800
PeCDD's (total)	150	27	6	5	5	5
PeCDF's (total)	920	140	46	8	61	100
TCDD's (total)	13	4	1	1	1	1
TCDF's (total)	100	13	3	1	1	4
TEC (U/2)	264	192.4	93.13	34.2	71.65	108.77
TEC (U=0)	263.25	189.4	90.2	29.4	68.73	105.6

Table A-5
Dioxins and Furans in Soil - Detected Congeners Only

Location ID Sample ID Sample Date Field QC	028 53.5-55 9/99 uplicate	SB-028 SB028-55-56 9/29/99	SB-028 SB028-79.5-79.8 9/29/99	SB-028 SB028-82.2-83.7 9/29/99	SB-028 SB028-100.6-101.5 9/29/99	SB-028 SB028-141-142 9/30/99
Dioxins/Furans (ng/kg)						
1,2,3,4,6,7,8-HpCDD		230	25	310	230	20
1,2,3,4,6,7,8-HpCDF		75	9	40 U	94	5 U
1,2,3,4,7,8,9-HpCDF		9	5 U	40 U	5 U	5 U
1,2,3,4,7,8-HxCDD	U	5 U	5 U	40 U	5 U	5 U
1,2,3,4,7,8-HxCDF		6	5 U	40 U	6	5 U
1,2,3,6,7,8-HxCDD		8	5 U	40 U	6	5 U
1,2,3,6,7,8-HxCDF	U	5 U	5 U	40 U	5 U	5 U
1,2,3,7,8,9-HxCDD	U	5 U	5 U	40 U	5 U	5 U
1,2,3,7,8,9-HxCDF	U	5 U	5 U	40 U	5 U	5 U
1,2,3,7,8-PeCDD	U	5 U	5 U	5 U	5 U	5 U
1,2,3,7,8-PeCDF	U	5 U	5 U	5 U	5 U	5 U
2,3,4,6,7,8-HxCDF	U	5 U	5 U	40 U	5 U	5 U
2,3,4,7,8-PeCDF		5 U	5 U	5 U	5 U	5 U
2,3,7,8-TCDD	U	1 U	1 U	1 U	1 U	1 U
2,3,7,8-TCDF	U	1 U	1 U	1 U	1 U	1 U
HpCDD's (total)		460	50	700	670	20
HpCDF's (total)		360	44	40	450	5
HxCDD's (total)		22	5 U	40	7	5
HxCDF's (total)		54	8	40	59	5
OCDD		2200	290	34	2600	140
OCDF		350	42	40 U	360	10
PeCDD's (total)		5 U	5	5	5	5
PeCDF's (total)		5 U	5 U	5	5	5
TCDD's (total)		1 U	1	1	1	1
TCDF's (total)		1 U	1 U	1	1	1
TEC (U/2)		11.51	5.62	20.72	11.85	5.22
TEC (U=0)		7.09	0.67	3.13	7.4	0.14

Table A-5
Dioxins and Furans in Soil - Detected Congeners Only

Location ID	SB-057	SB-057	SB-057	SB-057	SB-057	SB-
Sample ID	SB057-2.7-3	SB057-18-19.8	SB057-28-29.8	SB057-36-38	SB057-51-52	SB057
Sample Date	10/9/99	10/9/99	10/9/99	10/9/99	10/9/99	10/9
Field QC						Prin
Dioxins/Furans (ng/kg)						
1,2,3,4,6,7,8-HpCDD	630000 J	9400 J	14000 J	72000	4100 J	1200
1,2,3,4,6,7,8-HpCDF	170000 J	480 J	5700 J	20000	1500 J	190
1,2,3,4,7,8,9-HpCDF	10000 J	23 J	590 J	1900	53 J	8
1,2,3,4,7,8-HxCDD	8300 J	19 J	5 U	120	5 U	5
1,2,3,4,7,8-HxCDF	8900 J	16 J	370 J	1600	43 J	5
1,2,3,6,7,8-HxCDD	43000 J	130 J	650 J	1900	180 J	28
1,2,3,6,7,8-HxCDF	6200 J	7 J	5 U	200 U	9 J	5
1,2,3,7,8,9-HxCDD	11000 J	45 J	110 J	610	39 J	9
1,2,3,7,8,9-HxCDF	3600 J	13 J	5 U	200 U	5 U	5
1,2,3,7,8-PeCDD	3500 J	6 J	5 U	23	5 U	5
1,2,3,7,8-PeCDF	50 U	5 U	5 U	52	8 J	5
2,3,4,6,7,8-HxCDF	50 U	5 U	5 U	200 U	13 J	5
2,3,4,7,8-PeCDF	2400 J	5 U	27	160	5 U	5
2,3,7,8-TCDD	130 J	1 U	1 U	1 U	1 U	1
2,3,7,8-TCDF	200 J	1 U	1 U	12	3 J	1
HpCDD's (total)	1100000	14000	28000	160000	5000	2000
HpCDF's (total)	470000	1700	28000	120000	6700	770
HxCDD's (total)	130000	480	2700	6100	700	81
HxCDF's (total)	250000	410	4700	35000	1300	140
OCDD	5900000 J	40000 J	130000 J	530000	38000 J	12000
OCDF	3100 J	5500 J	42000 J	130000	3700 J	1100
PeCDD's (total)	6900	15	36	180	9	5
PeCDF's (total)	26000	120	350	1900	190	15
TCDD's (total)	510	3	2	10	1 U	1
TCDF's (total)	5000	10	12	53	6	1
TEC (U/2)	25206.85	172.95	504.5	2148	130.83	35.2
TEC (U=0)	25203.1	171.03	501.75	2117	127.33	30.78

Table A-5
Dioxins and Furans in Soil - Detected Congeners Only

Location ID	057	SB-057	SB-099	SB-099	SB-099	SE-008
Sample ID	-65-66	SB557-65-66	SB099-13.4-14.7	SB099-31-33	SB099-41-42.5	SE008-0.0-0.2
Sample Date	9/99	10/9/99	9/30/99	9/30/99	10/6/99	10/10/99
Field QC	nary	Field Duplicate				
Dioxins/Furans (ng/kg)						
1,2,3,4,6,7,8-HpCDD	J	1100 J	6300 J	14000 J	7100 J	40000000 J
1,2,3,4,6,7,8-HpCDF	J	200 J	1400 J	2600 J	1200 J	9200000 J
1,2,3,4,7,8,9-HpCDF	J	50 U	72 J	240 J	56 J	670000 J
1,2,3,4,7,8-HxCDD	U	50 U	5 U	5 U	5 U	5000 U
1,2,3,4,7,8-HxCDF	U	200 U	27 J	87 J	21 J	300000 J
1,2,3,6,7,8-HxCDD	J	50 U	230 J	880 J	210 J	2600000 J
1,2,3,6,7,8-HxCDF	U	200 U	5 U	42 J	5 U	220000 J
1,2,3,7,8,9-HxCDD	J	50 U	81 J	110 J	48 J	370000 J
1,2,3,7,8,9-HxCDF	U	200 U	5 U	47 J	5 U	5000 U
1,2,3,7,8-PeCDD	U	50 U	5 U	15 J	5 U	56000 J
1,2,3,7,8-PeCDF	U	5 U	5 U	6 J	5 U	11000 J
2,3,4,6,7,8-HxCDF	U	200 U	5 U	5 U	5 U	5000 U
2,3,4,7,8-PeCDF	U	5 U	5 U	5 U	5 U	8400 J
2,3,7,8-TCDD	U	1 U	1 U	1 U	1 U	2400 J
2,3,7,8-TCDF	U	1 U	1 U	1 U	1 U	1500 J
HpCDD's (total)		1600	17000	31000	22000	52000000
HpCDF's (total)		1000	6700	13000	6800	40000000
HxCDD's (total)		50 U	1700	2000	1400	6300000
HxCDF's (total)		2000	1900	4900	1000	9600000
OCDD	J	2200 J	70000 J	76000 J	74000 J	23000000 J
OCDF	J	340 J	3700 J	9000 J	4800 J	17000000 J
PeCDD's (total)	U	50 U	23	39	14	76000
PeCDF's (total)		31	100	250	55	140000
TCDD's (total)	U	1 U	2	6	6	4900
TCDF's (total)	U	1 U	4	11	4	30000
TEC (U/2)		57.71	190.64	381.35	194.43	923750
TEC (U=0)		15.54	187.72	380.3	190.26	923000

Table A-5
Dioxins and Furans in Water - Detected Congeners Only

Location ID	A-5	DSW-4B	DSW-4C	DSW-4C	DSW-4D	DSW
Sample ID	GW000A501	GWDSW4B01	GWDSW4C01	GW50A1201	GWDSW4D01	GWDSV
Sample Date	7/12/99	7/15/99	7/15/99	7/15/99	7/15/99	7/12
Field QC			Primary	Field Duplicate		
Dioxins/Furans (pg/L)						
1,2,3,4,6,7,8-HpCDD	74	8500	710	440	65 J	23000
1,2,3,4,6,7,8-HpCDF	30 J	3200	190	130		8900
1,2,3,4,7,8,9-HpCDF	7 J	220	20 J	21 J		
1,2,3,4,7,8-HxCDD		80 J				53
1,2,3,4,7,8-HxCDF	18 J	170 J	35 J	28 J		420
1,2,3,6,7,8-HxCDD	7 J	200 J	25 J	19 J		1500
1,2,3,6,7,8-HxCDF		97 J		8.5 J		60
1,2,3,7,8,9-HxCDD		120 J		10 J		250
1,2,3,7,8,9-HxCDF		32 J				
1,2,3,7,8-PeCDD		140	6 J	9 J		28
1,2,3,7,8-PeCDF	10 J	150	5 J	5 J		110
2,3,4,6,7,8-HxCDF		48 J				
2,3,4,7,8-PeCDF	6 J	150	7 J			96
2,3,7,8-TCDD		29				
2,3,7,8-TCDF		30				42
HpCDD's (total)	74	3800	1700	1100	65	23000
HpCDF's (total)		650	880	630		21000
HxCDD's (total)		600	79	72		5200
HxCDF's (total)		4300	120	200		13000
OCDD	850	49000	7300	4700	650	230000
OCDF	87 J	8500	880	570	47 J	17000
PeCDD's (total)		150				150
PeCDF's (total)		530	64			2000
TCDD's (total)		29				
TCDF's (total)	19	54	11			140
TEC (U/2)	13	436	35	27	11	874
TEC (U=0)	8	436	30	22	1.3	866

Table A-5
Dioxins and Furans in Water - Detected Congeners Only

Location ID Sample ID Sample Date Field QC	V-6B W6B01 2/99	DSW-6C GWDSW6C01 7/12/99	OFS-3B GW0FS3B01 7/15/99
Dioxins/Furans (pg/L)			
1,2,3,4,6,7,8-HpCDD		160	16 J
1,2,3,4,6,7,8-HpCDF		27 J	
1,2,3,4,7,8,9-HpCDF			
1,2,3,4,7,8-HxCDD			
1,2,3,4,7,8-HxCDF			
1,2,3,6,7,8-HxCDD			
1,2,3,6,7,8-HxCDF			
1,2,3,7,8,9-HxCDD			
1,2,3,7,8,9-HxCDF			
1,2,3,7,8-PeCDD	J		
1,2,3,7,8-PeCDF			
2,3,4,6,7,8-HxCDF			
2,3,4,7,8-PeCDF			
2,3,7,8-TCDD			
2,3,7,8-TCDF			
HpCDD's (total)		160	
HpCDF's (total)			
HxCDD's (total)			
HxCDF's (total)			
OCDD		3000	43 J
OCDF		190	9 J
PeCDD's (total)			
PeCDF's (total)			
TCDD's (total)			
TCDF's (total)			
TEC (U/2)		12	10
TEC (U=0)		5.1	0.2

APPENDIX B

Field Notes and DCQCRs

DATA NOT AVAILABLE ELECTRONICALLY

APPENDIX C

Data Quality Summary Reports

DATA NOT AVAILABLE ELECTRONICALLY

APPENDIX D

Summary Boring Logs

DATA NOT AVAILABLE ELECTRONICALLY