ENAMEL STORAGE PIT AND ABANDONED PIPELINE ASSESSMENT REPORT

LEEDS ASSEMBLY PLANT
GENERAL MOTORS CORPORATION
KANSAS CITY, MISSOURI

EMPLOYEE - OWNED
Burns & McDonnell
ENGINEERS - ARCHITECTS - CONSULTANTS
Kansas City, Missouri

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Burns & McDonnell
Waste Consultants, Incorporated
Overland Park, Kansas

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LIST OF ACRONYMS AND ABBREVIATIONS

BMWCI	BURNS & MCDONNELL WASTE CONSULTANTS, INCORPORATED
C	CELSIUS
CERCLA	COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT
CFR	CODE OF FEDERAL REGULATIONS
CLP	CONTRACT LABORATORY PROGRAM
cm	CENTIMETER
CME	CENTRAL MINES AND EQUIPMENT
DOH	DEPARTMENT OF HEALTH
DOT	DEPARTMENT OF TRANSPORTATION
EPA	ENVIRONMENTAL PROTECTION AGENCY
ESP	ENAMEL STORAGE PIT
ft	FEET
g	GRAM
GM	GENERAL MOTORS CORPORATION
HEAST	HEALTH EFFECTS ASSESSMENT SUMMARY TABLES
IRIS	INTEGRATED RISK INFORMATION SYSTEM
kg	KILOGRAM
L	LITER
LEEDS	BUICK-OLDSMOBILE-CADILLAC LEEDS ASSEMBLY PLANT
m	METER
mg	MILLIGRAM
MDNR	MISSOURI DEPARTMENT OF NATURAL RESOURCES
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
OVM	ORGANIC VAPOR MONITOR
PAH	POLYCYCLIC AROMATIC HYDROCARBONS
ppm	PARTS PER MILLION
NAPL	NONAQUEOUS PHASE LIQUID
RfC	REFERENCE CONCENTRATION
RfD	REFERENCE DOSE
SVOCs	SEMIVOLATILE ORGANIC COMPOUNDS
SWLO	SOUTHWEST LABORATORY OF OKLAHOMA
TPH	TOTAL PETROLEUM HYDROCARBONS
USCS	UNIFIED SOIL CLASSIFICATION SYSTEM
USDA	UNITED STATES DEPARTMENT OF AGRICULTURE
UST	UNDERGROUND STORAGE TANK
VOCs	VOLATILE ORGANIC COMPOUNDS
yr	YEAR
μg	MICROGRAMS

EXECUTIVE SUMMARY

GENERAL

Environmental sampling activities were conducted by Burns & McDonnell Waste Consultants, Incorporated (BMWCI) at the General Motors (GM) Leeds Assembly Plant during the late summer and fall of 1991. The purpose of these activities was to characterize potential subsurface contamination related to the abandoned Enamel Storage Pit (ESP) and a related kerosene pipeline (see Figure 2-3). The ESP housed 12 storage tanks containing paint and primer material for automobile parts. The ESP and pipeline were part of the original construction of the plant in 1928, but were abandoned in the 1930s. The former ESP is currently covered with a concrete slab. Obstructions were encountered while drilling in the ESP area and there is no record of the removal of the equipment, therefore the tanks, which are now considered underground storage tanks (USTs), are assumed to be in place.

Subsurface soil samples were collected from five soil borings and two monitoring well borings (see Figure 3-1). Three of the soil borings were drilled in the area thought to comprise the ESP. The remaining borings were drilled along the pipeline. Subsurface soil samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and/or total petroleum hydrocarbons (TPH). Groundwater samples were collected from the two monitoring wells during two separate rounds. These were analyzed for SVOCs and TPH.

RESULTS OF INVESTIGATION

TPH levels exceeding 100 mg/kg were found in subsurface soil samples from three borings along the pipeline. The highest level encountered was 1,840 mg/kg. The highest level of total VOCs was 7,960 μg/kg. This sample was taken within the ESP and contained acetone and 4-methyl-2-pentanone. SVOCs were detected in most of the borings. The SVOC most frequently encountered was 2-methylnaphthalene. The highest level of this SVOC (3,500 μg/kg) was in a sample along the pipeline.

The groundwater samples were analyzed for SVOCs and TPH. TPH was detected at or below 25 mg/L in all groundwater samples. The only SVOCs detected in groundwater was 2-methylnaphthalene (4 μg/L) and pentachlorophenol (1 μg/L).

CONTAMINANT FATE AND TRANSPORT

The potential chemicals of concern consist of 11 polycyclic aromatic hydrocarbons (PAHs), four SVOCs, and eight VOCs. All of the chemicals, with the exception of benzo(a)pyrene (a PAH), are present in soil at levels far below risk-based concentrations based on worker soil ingestion. The roof and concrete floor of the building prevent precipitation from reaching the soil. The floor also prevents migration of soil particles or vapor into the air and retards the aerobic biodegradation of the contaminants.

The PAHs and SVOCs will most likely remain in place in soil and biodegrade slowly.

VOCs typically have a high potential to migrate because of their poor adsorption to soil, relatively high water solubilities, and high vapor pressures. However, upward migration of the VOCs would be limited by the concrete flooring. Movement of VOCs toward groundwater is a potential migration route. Given the slow groundwater velocity and substantial distance to the Blue River, many years would pass before any contaminants reach the river. Complete biodegradation is expected to occur prior to contact with river water.

The relatively low concentrations of the VOCs in soil are considered to preclude the formation of hazardous concentrations in air. If the concrete floor is removed, the possibility would exist that SVOC- and PAH-contaminated soil and/or VOC vapors could be transported to the air.

HEALTH IMPACT ASSESSMENT

According to the Health Impact Assessment, performed as part of the investigation activities, current conditions at the site do not pose any significant risk because of incomplete exposure pathways of the chemicals

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present in the subsurface soil. Health impacts posed by disturbing the concrete flooring and removing the tanks were evaluated. Use of the highest detected concentrations of chemicals and conservative exposure assumptions showed that even in this scenario it would be very unlikely for workers to experience any adverse health effects.

Assumptions made regarding the site, behavior of human populations, values used to calculate model exposure, and toxicity of chemicals to humans may result in uncertainties in the Health Impact Assessment. These uncertainties were evaluated qualitatively and determined to generally influence the Health Impact Assessment in the direction of protectiveness. Each component of the Health Impact Assessment is either neutral or conservative, and therefore protective.

RECOMMENDATIONS

BMWCI recommends that this Assessment Report be considered an "UST Closure Report," as required by the Missouri Department of Natural Resources (MDNR) in the Underground Storage Tank Closure Guidance Document (MDNR 1992) and that no further action be taken.

The recommended course of action is based on several factors. From a risk standpoint, the rate of contaminant migration is very slow, taking over a thousand years to reach the Blue River (the closest body of water). In addition, there should be no significant impact upon human health and the environment from the contamination detected in the vicinity of the ESP and pipeline and contaminant concentrations would be expected to diminish substantially over time. Finally, the site itself also precludes filling the tanks with an inert material as part of closure because the tanks are located in a 24-foot deep pit beneath a building. Excavating tanks which were abandoned more than 50 years ago seems unnecessary and impractical.

* * * * *

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

This document presents the results of environmental investigation activities performed for GM by BMWCI at the Buick-Oldsmobile-Cadillac Leeds Assembly Plant (Leeds) in Kansas City, Missouri. The purpose of the activities was three-fold: (1) to characterize potential subsurface contamination associated with the former Enamel Storage Pit (ESP) and abandoned pipeline located under the slab of the first floor of the Assembly Building; (2) to study the fate and transport of the chemicals encountered; and (3) to assess any potential impacts on human health and the environment related to the contamination at this site.

The environmental investigation activities included sampling and analysis of subsurface soil and groundwater in the vicinity of the ESP and pipeline. United States Environmental Protection Agency (EPA) guidance criteria were followed during sampling and analysis in order to obtain high quality data.

1.2 REPORT ORGANIZATION

In order to present the investigation results most clearly, the remainder of this report is organized in the following manner:

Site Background (Section 2.0)

A brief description of the site location and geology/hydrogeology is presented in this section. The history of the Assembly Plant and, more specifically, the ESP and pipeline is also given.

Investigation Activities (Section 3.0)

This section presents the methods used for drilling, monitoring well installation, and subsurface soil and groundwater sampling.

Results of Investigation (Section 4.0)

Descriptions of the sampling locations and the results obtained from the soil and groundwater samples are given in this section. Summarized data tables are also provided to aid in evaluating the results.

Contaminant Fate and Transport (Section 5.0)

Potential routes of exposure to the chemicals of concern at the site are given in this section. Contaminant persistence and migration are also discussed.

Health Impact Assessment (Section 6.0)

A Health Impact Assessment was performed to evaluate potential danger to human health and the environment.

Summary and Recommendations (Section 7.0)

In addition to summarizing the previous sections, recommendations for remedial action are presented in this section.

* * * * *

2.0 SITE BACKGROUND

2.1 SITE LOCATION

Leeds is located at 6817 Stadium Drive in Kansas City, Missouri, and is shown in Figure 2-1. The facility, situated on an 117-acre site, includes a main manufacturing building of approximately two million square feet. An aerial photograph of the site vicinity, taken in the spring of 1991, is given in Figure 2-2. The ESP and pipeline are located beneath the ground floor in the northwest portion of the Assembly Building as shown in Figure 2-3.

2.2 GEOLOGY AND HYDROGEOLOGY

Leeds is located within the alluvial valley of the Blue River. The alluvial soils are silty clays, clayey silts, and fine sands. These fine-grained soils range in thickness from approximately 26 to 50 feet. The fine-grained soils are underlain by a layer of silty and clayey gravel that varies from approximately 2.5 to 6 feet in thickness. The clayey gravel layer encountered beneath the GM Leeds facility is locally absent elsewhere in the Blue River valley. Underlaying the clayey gravel is the shale bedrock of the Pleasanton Group.

Groundwater was encountered at approximately 7 feet below the surface in the ESP area. Generally, groundwater has been found to flow in a southwesterly direction at the site until it reaches the center of the Blue River alluvial channel. Ultimately, the flow within the alluvium moves to the northwest where the Blue River discharges into the Missouri River alluvium.

2.3 SITE HISTORY AND DESCRIPTION

The original plant building was constructed by GM in 1928. Several additions to the original building have since been made. The last addition was completed in 1981. Automobile assembly and related operations occurred at the plant while it was active. Production ceased on April 19, 1988, and the plant was closed in October of 1990.

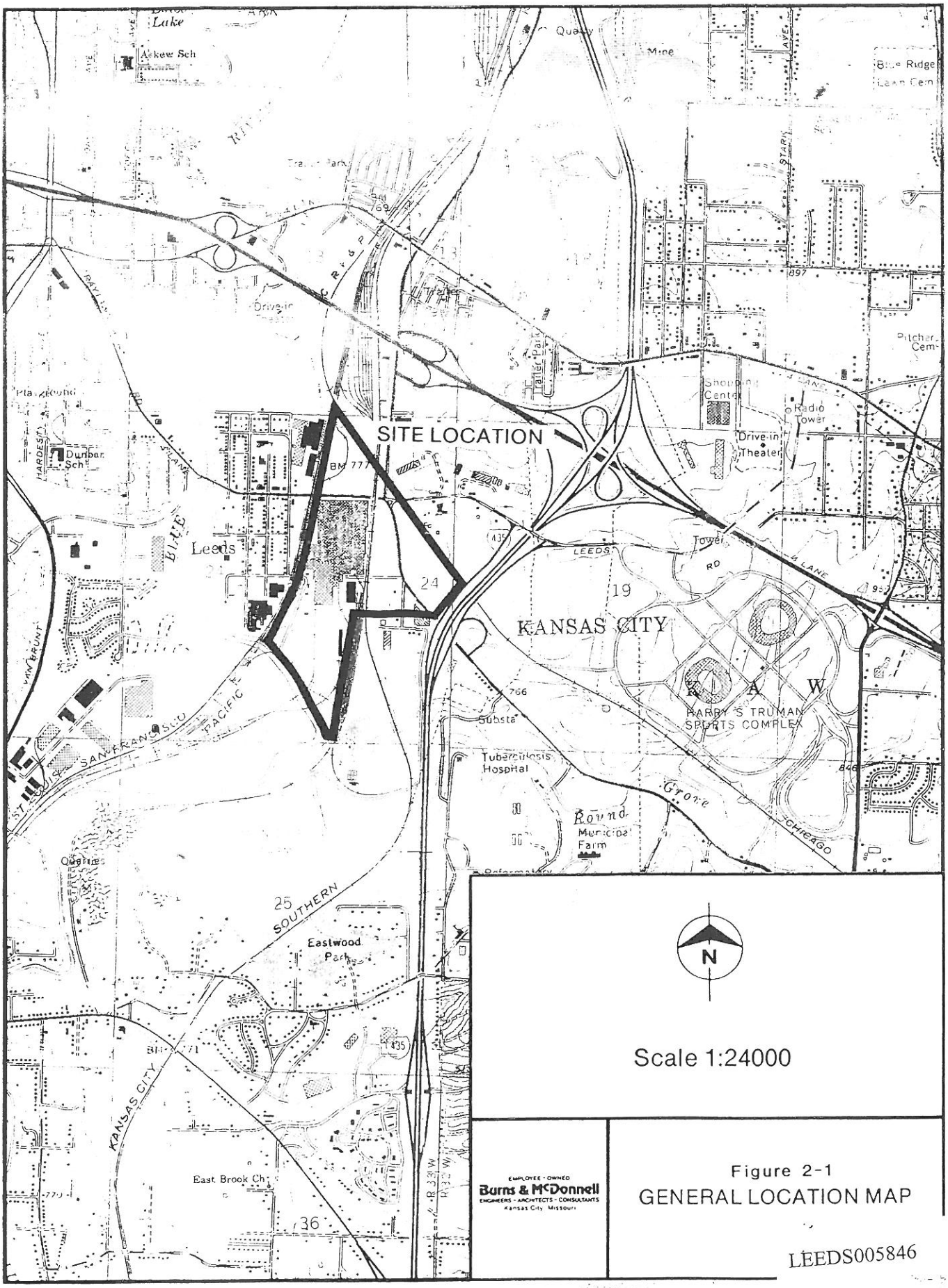

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Figure 2-1
GENERAL LOCATION MAP

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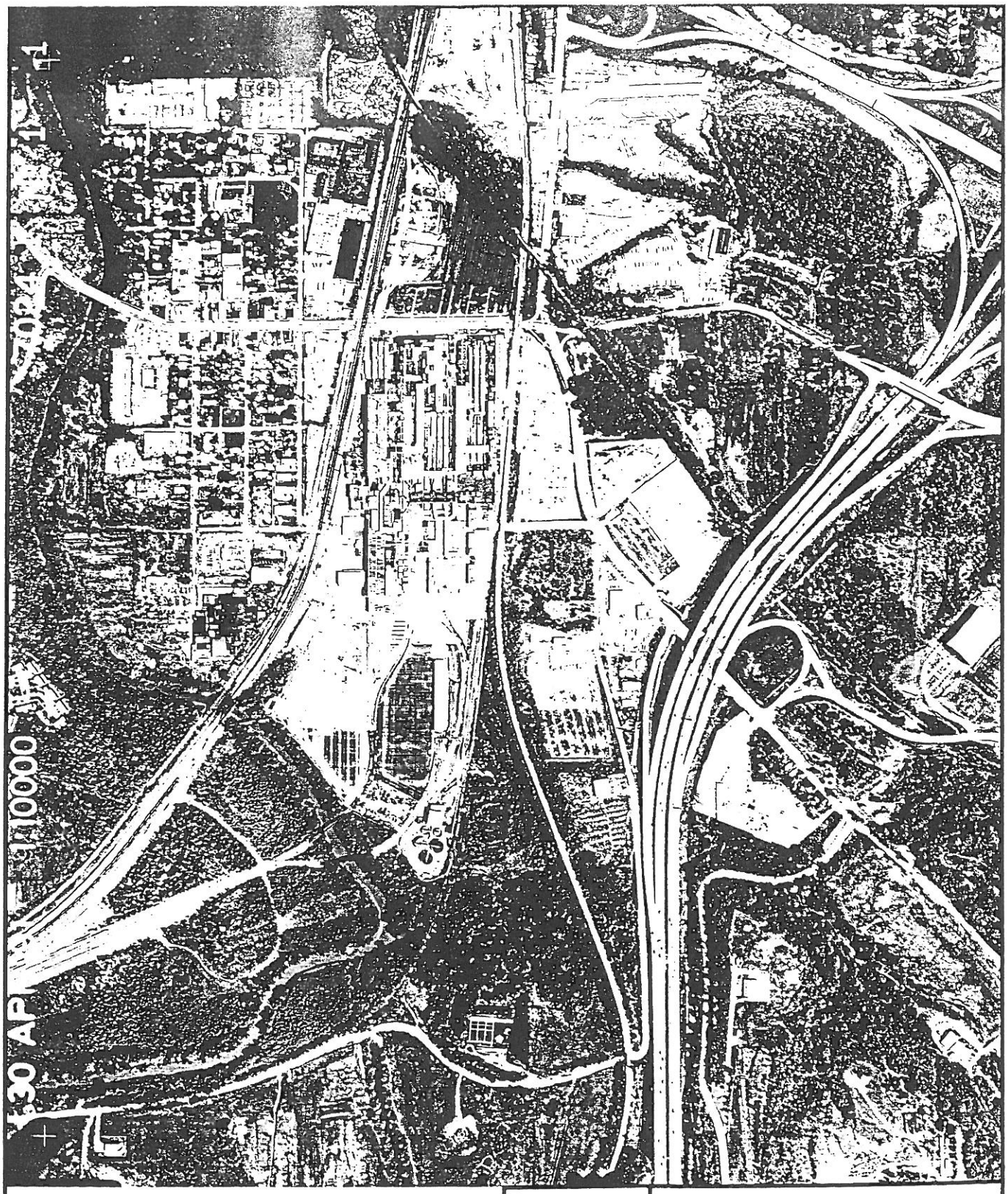

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Figure 2-2
AERIAL PHOTOGRAPH

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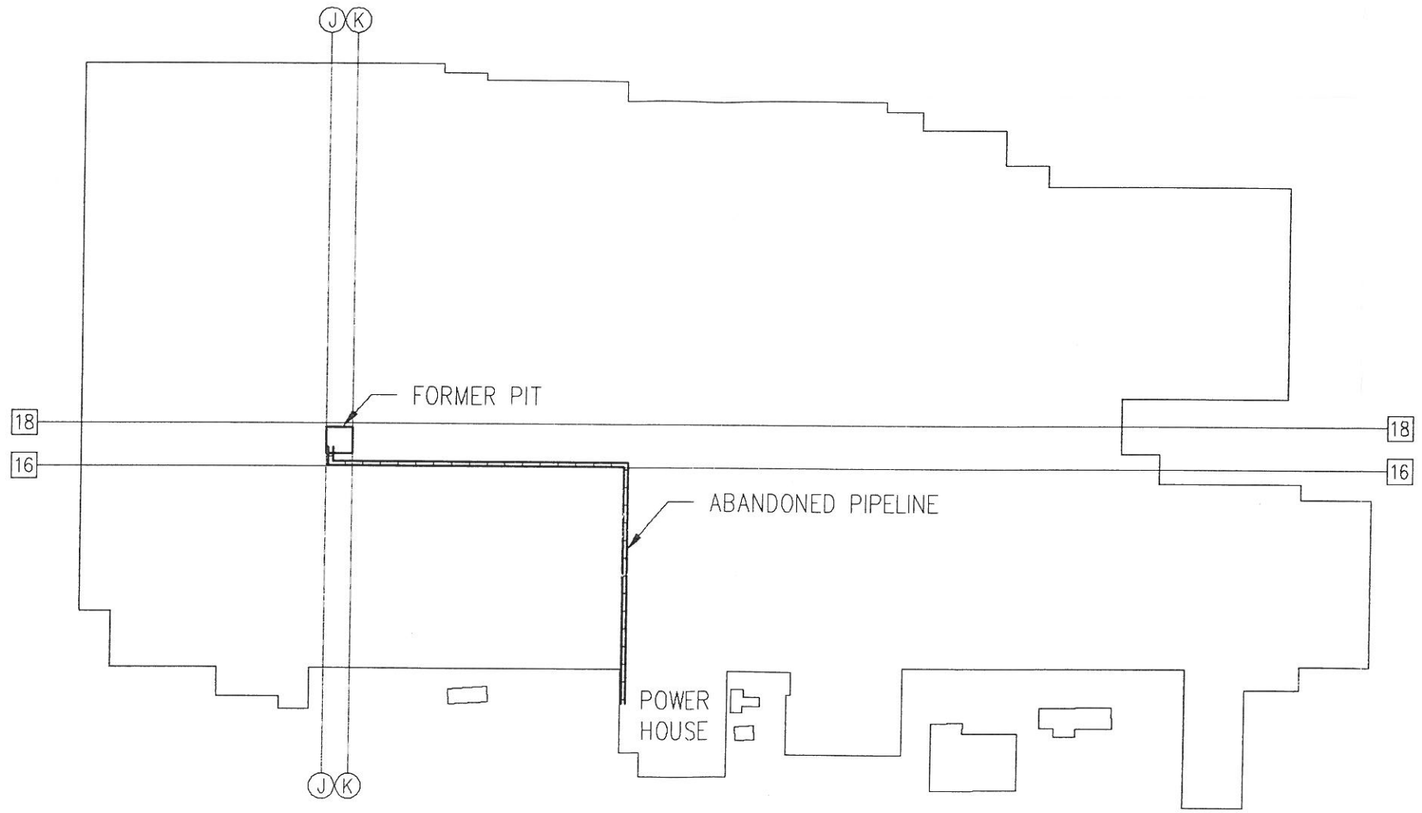

LEGEND

16 COLUMN IDENTIFICATION

(J) ROW IDENTIFICATION

NORTH

200 0 200 400

SCALE IN FEET

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FIGURE 2-3
FACILITY FLOOR PLAN

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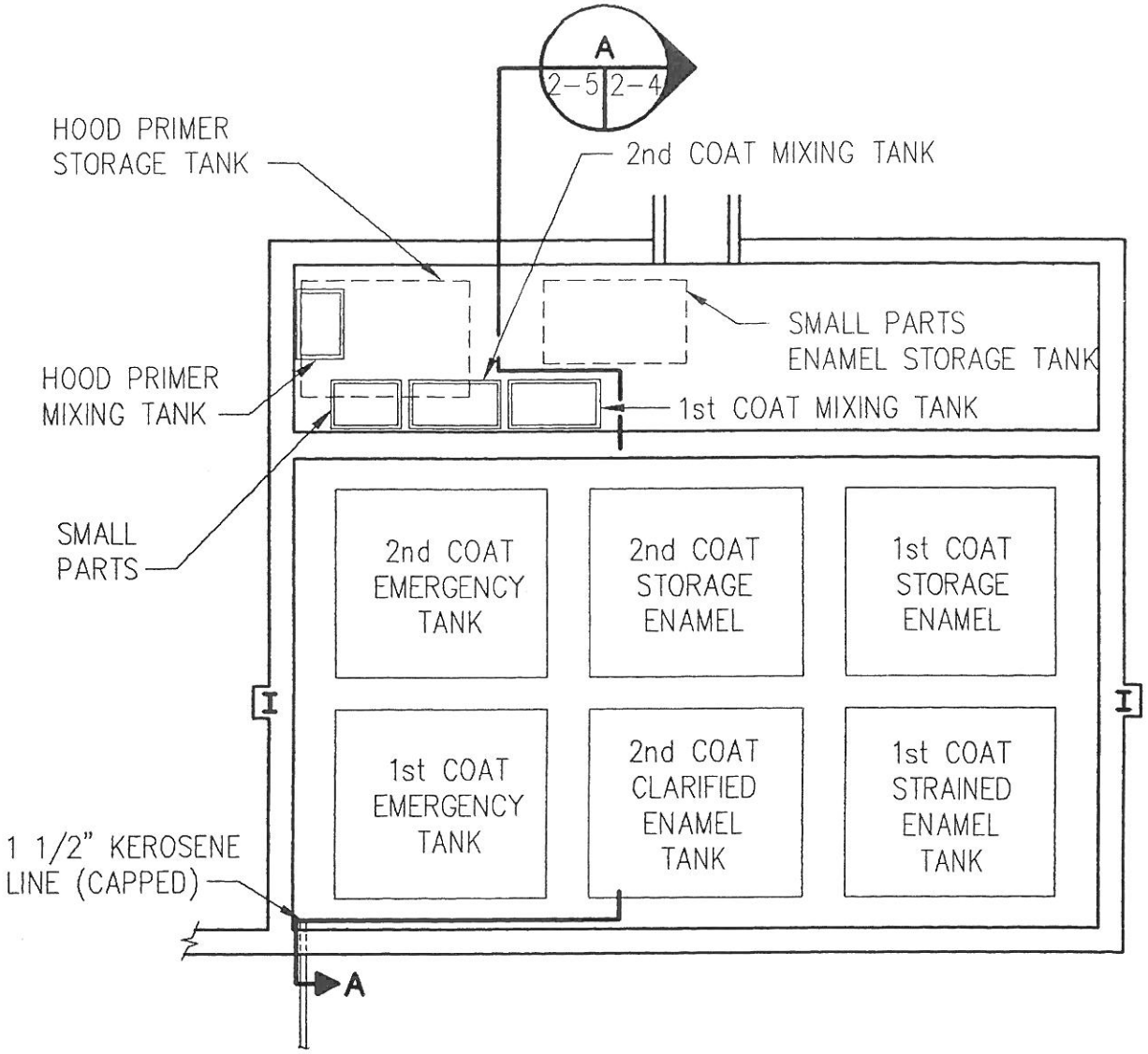
The ESP and pipeline were part of the original construction of the plant. There is no record of the removal of this equipment, therefore it is assumed to be in place. The dimensions of the ESP are 34 feet by 40 feet by 24 feet deep. The ESP was built to house 12 tanks for the storage and mixing of various types of enamel and primer prior to use on automobile parts. Figures 2-4 and 2-5, depicting the ESP, were generated based upon historical drawings. Six large tanks (approximately 5,300 gallons each) and four smaller tanks (less than 200 gallons each) are on the upper level of the ESP. Two tanks (between 1,000 and 2,000 gallons each) are on the level directly below the four smaller tanks. Sometime after it was abandoned, the ESP was covered with a 10-inch concrete floor slab. Due to this slab cover, the tanks in the ESP are viewed as underground storage tanks (USTs). Regulations governing USTs are more conservative than those governing above-ground storage tanks. The tops of the large tanks are about 12 to 14 feet below the ground surface.

A one-and-a-half inch diameter kerosene pipeline enters the ESP at the northwest corner. This pipeline is shown capped in Figures 2-4 and 2-5 and is not connected to the other piping in the ESP. It is assumed that kerosene was used as a solvent in the process. This pipeline appears to run to the Power House as shown in Figure 2-3 (also based upon historical drawings).

* * * * *



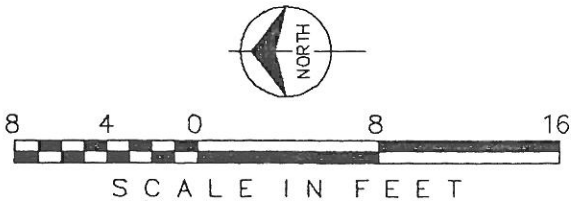


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FIGURE 2-4
ENAMEL STORAGE PIT PLAN

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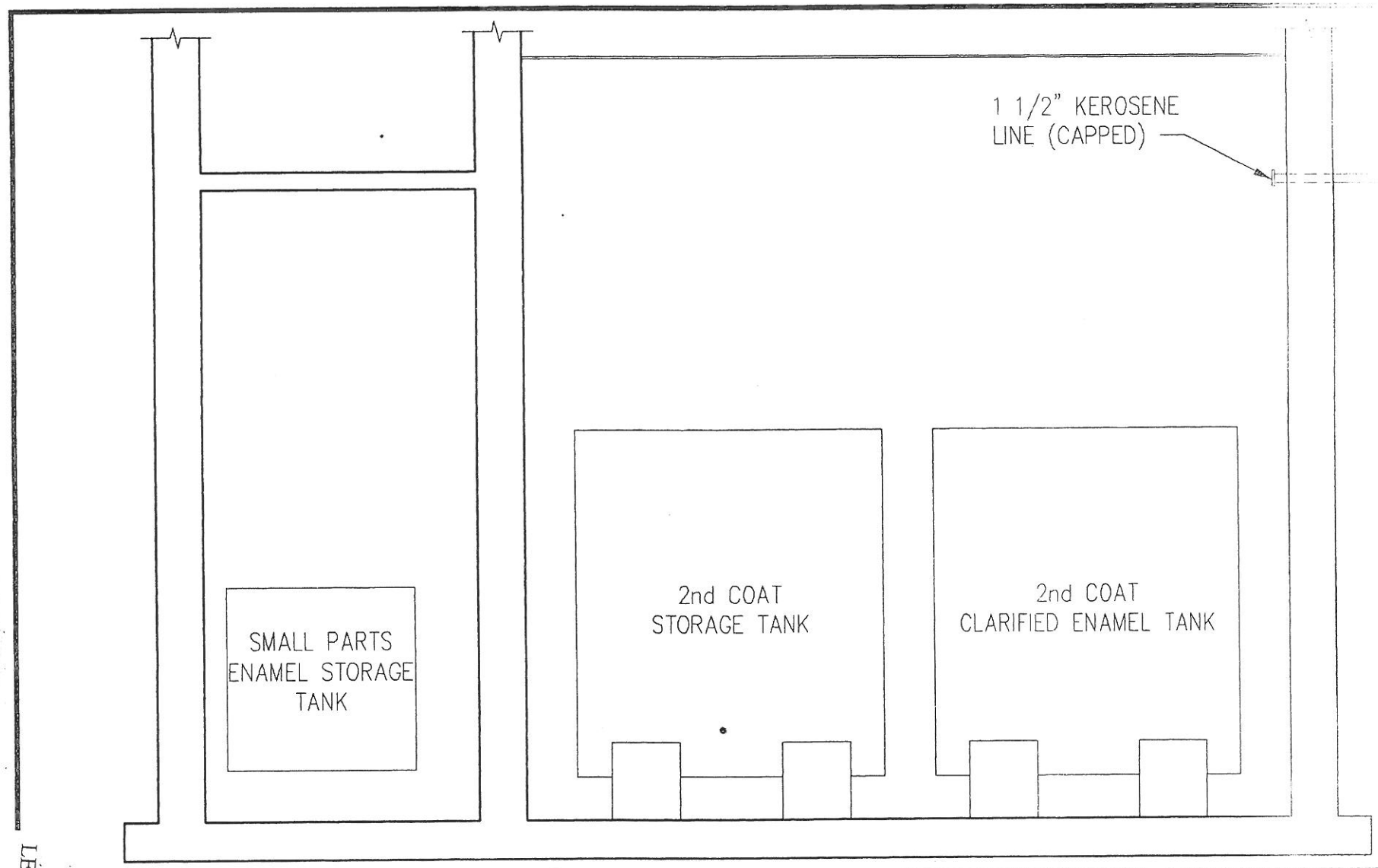

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FIGURE 2-3
ENAMEL STORAGE PIT
PROFILE

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3.0 INVESTIGATION ACTIVITIES

To assist in characterizing subsurface soil and groundwater in the vicinity of the ESP and pipeline, a total of seven boreholes were drilled through the ground floor of the Assembly Building, as shown in Figure 3-1. Five of these were soil borings (SB-201, SB-205, SB-218, SB-219, and SB-122) and two were monitoring well borings (MW-201 and MW-202). Subsurface soil samples were collected from each of these borings for the following analyses as shown in Table 3-1:

- VOCs
- SVOCs
- TPH

Groundwater samples were collected from Monitoring Wells (MW-201 and MW-202) during two separate rounds of sampling which occurred four months apart. These samples were analyzed for SVOCs and TPH (Table 3-1).

All samples were analyzed by a laboratory certified under the Contract Laboratory Program (CLP). Analytical methods, preservation requirements, and holding times are given in Table 3-2 for the analyses specified in Table 3-1.

3.1 DRILLING AND MONITORING WELL INSTALLATION

Concrete coring was required prior to the drilling of boreholes. Ten-inch diameter cores were drilled to a depth of approximately 10 inches at each borehole location. In certain areas, the concrete was covered by asphalt block or wood block flooring material. This flooring material was removed using a pick-axe prior to concrete coring.

All borings were advanced using 7-5/8-inch outer-diameter, hollow-stem augers equipped with decontaminated Central Mines and Equipment (CME) samplers. When the advancement of the CME sampler became impossible due to some obstruction, drilling was attempted without the sampler. Borings were drilled to depths ranging from 4 to 25 feet. An organic vapor monitor (OVM) was used to screen

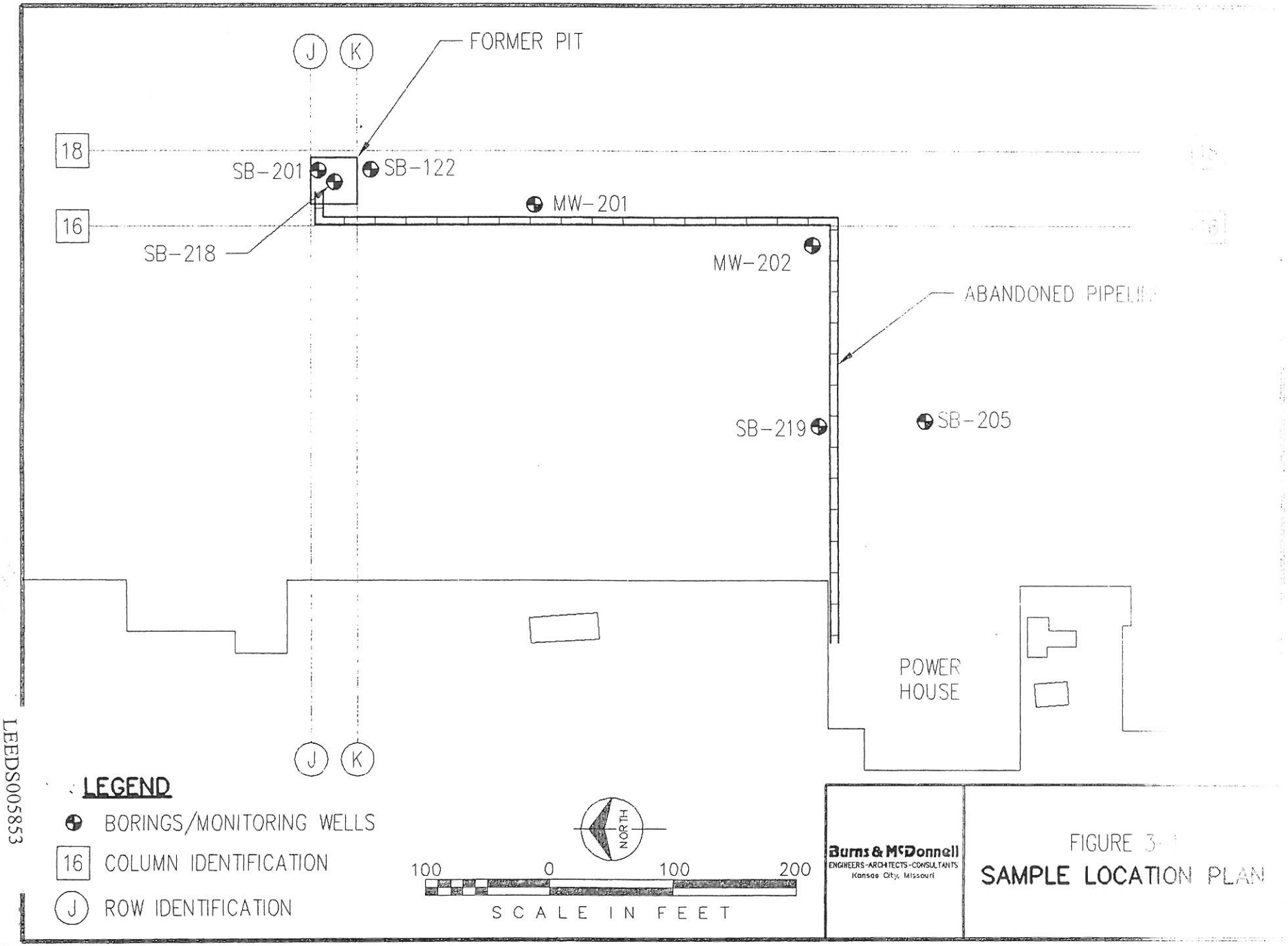

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TABLE 3-1

SUBSURFACE SOIL AND GROUNDWATER SAMPLING STRATEGY

Boring	Sample	Depth (ft)	Parameters		
			VOCs	SVOCs	TPH
MW-201	A	4	X	X	X
	B	8	X	X	X
	C	11	X	X	X
	D (Dup. of C)	11	X	X	X
MW-202	A	5	X	X	X
	B	10	X	X	X
	C	14	X	X	X
SB-201		2			X
SB-205	A	4.5			X
	B	9			X
	C	14			X
	E	24			X
	F (Dup. of C)	14			X
SB-218	A	5			X
	B	8			X
	C	12			X
SB-219	A	3	X	X	X
	B	8	X	X	X
	C	14	X	X	X
SB-122	A	7	X		
	B	12.3	X		
	C	18.2	X		
	D	23.8	X		
Groundwater Sample					
Round 1					
GW-201A	-	15.5 *		X	X
GW-202A	-	15 *		X	X
GW-207A	(Dup. of 202A)	15 *		X	X
Round 2					
GW-201B		15.5 *		X	X
GW-209B	(Dup. of 201B)	15.5 *		X	X
GW-202B		15		X	X

* Total depth of monitoring well.

TABLE 3-2

ANALYTICAL METHODS, PRESERVATION REQUIREMENTS, AND HOLDING TIMES

Parameter	Analytical Method	Sample Preservation	Holding Time
Soil			
VOCs	SW846, 8240	G/4 Deg C	10 Days
SVOCs	SW846, 8270	G/4 Deg C	10/40 Days (*)
TPH	EPA 418.1	G/4 Deg C	26 Days
Water			
SVOCs	EPA 625	G,A/4 Deg C	5/40 Days (*)
TPH	EPA 418.1	G,A/4 Deg C HCl to pH < 2	26 Days

G = Glass
A = Amber
(*) = Extraction/Analysis Limit

soil samples and provide breathing zone and borehole readings of organic vapor concentrations. The sample, ambient air, and breathing zone OVM readings were recorded on the drilling logs as "S", "A", and "B", respectively. Drilling logs (see Appendix A) were prepared for each borehole for field classification purposes. The classification procedure included textural descriptions in accordance with the Unified Soil Classification System (USCS) and the United States Department of Agriculture (USDA). In addition, field classification provided a lithological description of visible soil grains, moist soil color (based on Munsell Soil Color charts), moisture, soil structure, sedimentary features, other visible features, and interpretation of geologic origin.

Upon completion of sampling, the soil borings were grouted shut using a cement/bentonite grout and patched with epoxy grout.

The monitoring wells were constructed of 2-inch diameter, Schedule-40 ends, Schedule-5 Midbody, 316-stainless-steel, flush-threaded riser pipe; and wire-wrapped, Schedule-40, stainless-steel screen (0.010 slot size). Monitoring Wells MW-201 and MW-202 were installed to depths of 15.5 feet and 15 feet, respectively, using a 10-foot long screened interval for the bottom portion. Blank riser pipe was installed from the top of the screen to approximately 2 inches below the concrete floor at each well. Lockable water-tight caps were placed on top the pipes.

A filter pack consisting of clean sand was placed in the annular space surrounding the well pipe to a level approximately 2 feet above the screened interval. A hydrated bentonite seal, consisting of 0.25-inch diameter bentonite pellets, was placed above the filter pack to approximately 1 foot below the concrete floor. The remaining annular space was backfilled using chemically-inert Volclay grout. A flush-mounted protective cover was installed over each monitoring well.

The BMWCI on-site geologist prepared drawings conforming to construction records for each monitoring well. These monitoring well construction diagrams are provided in Appendix B.

3.2 SUBSURFACE SOIL SAMPLING

All seven borings were sampled for chemical analysis as indicated in Table 3-1. Samples were collected in containers and clearly labeled at each sample location. Subsurface soil samples were collected using a CME continuous sampler. The following sampling procedure was used:

1. The breathing space of each borehole was continuously monitored using an OVM. Readings were recorded on the drilling log.

2. The CME sampler was opened and the soil core split down the middle by a field team member wearing clean disposable gloves. A decontaminated, stainless-steel sampling knife was used to expose soil not in contact with the sampler.

3. The portion of the sample that appeared most contaminated was submitted for analysis. This was determined by visual screening and/or by screening with an OVM.

4. Samples that were to be analyzed for VOCs were collected first and quickly placed in the appropriate containers to minimize loss of volatile constituents.

5. All slough portions of the soil sample were removed using the stainless-steel sampling knife and placed in DOT-approved, 55-gallon drums.

Soil samples were shipped to the analytical laboratory as discussed in Section 3.4.

3.3 GROUNDWATER SAMPLING

Two rounds of groundwater samples were collected four months apart from both monitoring wells for SVOCs and TPH analysis as specified in Table 3-1. A minimum of 24 hours prior to collecting these samples, the wells were developed, or purged of at least three well volumes.

Well development was performed on all newly-installed wells to remove residual drilling fluids and fine-grained material near the screen, and to improve the hydraulic connection between the well and the aquifer. This was accomplished by repeatedly removing water from the well and thereby drawing aquifer water through the filterpack and screen. Disposable bailers were used for well development.

The procedure used to collect groundwater samples is described below:

1. A disposable bailer was lowered slowly until it contacted the water surface.

2. The bailer was allowed to sink and fill with minimal surface disturbance and then raised to the surface.

3. The bailer was tipped to allow a slow discharge from the top so that groundwater could gently flow down the side of the sample bottle with minimal entry turbulence.

4. Steps 1 through 3 were repeated, as needed, to acquire sufficient volume to fill all containers specified for the analyses.

Groundwater samples were packed and shipped to the laboratory as discussed in Section 3.4.

3.4 SAMPLE CONTAINER PACKAGING AND SHIPPING

Samples were packed and shipped according to requirements for low-hazard level samples. These requirements are based on EPA specifications, as well as DOT Regulations (49 CFR Parts 172 and 173). Soil and groundwater samples submitted for chemical analysis were placed in sample containers provided by the laboratory. Each container was labeled with the sample number, project number, date, time, and sampler's initials. The containers were wrapped in plastic bubble-wrap and packed in coolers with ice packs. The coolers were

then [illegible] packing tape and shipped overnight to the analytical laboratory.

3.5 DECONTAMINATION

All nondedicated sampling equipment used during investigation activities was properly decontaminated between samples. Using a stiff-bristle brush, sampling equipment (e.g., soil sample knife, scraper, CME continuous sampler, etc.) was thoroughly washed with detergent (Alconox), followed by rinses with tap water, distilled water, and pesticide-grade hexane. Equipment was allowed to dry prior to reuse.

Drilling equipment was cleaned between boreholes with a high-pressure steam cleaner using fresh water from a potable water supply. All of this equipment was steam cleaned until there was no visible soil remaining. This runoff drained into sewers leading to the on-site industrial wastewater treatment plant.

All sampling personnel wore clean disposable latex gloves while sampling. New gloves were put on between samples.

* * * * *

4.0 RESULTS OF INVESTIGATION

Twenty-two subsurface soil and four groundwater samples (not including duplicates) were collected during environmental investigation activities in the vicinity of the ESP and pipeline. The samples were sent to Southwest Laboratory of Oklahoma (SWLO) for analysis. Upon receipt of the analytical results, the laboratory data was validated by BMWCI. The validation process involved confirming the correct analyses and holding times, evaluating field and laboratory quality assurance/quality control (QA/QC) sample results, and qualifying the data based upon the above evaluation. Flags, or "qualifiers" (defined in Table 4-1) were added to the data to denote the level of acceptability. Subsequent to data validation, Tables 4-2 through 4-4 were developed to summarize the subsurface soil and groundwater data. The original laboratory data is provided in Appendices C and D.

4.1 SUBSURFACE SOIL

Subsurface soil samples were collected in the vicinity of the ESP and pipeline from five soil borings (SB-201, SB-205, SB-218, SB-219, and SB-122) and two monitoring well borings (MW-201 and MW-202). These sample locations are shown on Figure 3-1 and the sampling strategy is described in Table 3-1. Subsurface soil sample results are summarized in Tables 4-2 (monitoring well borings) and 4-3 (soil borings).

As previously stated in Section 3.2, subsurface soil sampling locations were partly determined by OVM readings. The deepest sample in a boring does not necessarily correspond with the total depth of that boring. A sharp decrease in sample OVM readings is a good indication that organic contaminant concentrations have decreased at that point, therefore further sampling in that boring may not be necessary. Sample OVM readings are designated by an "S" on the drilling logs (Appendix A).

4.1.1 ESP

Borings SB-201 and SB-218 were drilled into the ESP and SB-122 was installed just south of the ESP. The other four borings were placed along the abandoned

TABLE 4-1
DEFINITIONS FOR DATA QUALIFIERS

ORGANIC COMPOUNDS

LABORATORY QUALIFICATIONS

U - This qualifier indicates a compound was analyzed for but not detected above the minimum detection capabilities of the analytical instrument. The value associated with the "U" qualifier is the sample quantitation limit, which is a reporting limit for a particular analyte and matrix by the EPA, adjusted for sample dilution, level of analysis, percent moisture, and other sample interferences. The sample quantitation limit is greater than the minimum detection limit of the analytical instrument, and is considered to be the lowest concentration that can be quantified precisely and accurately.

J - This qualifier indicates that the associated numerical value is an estimated quantity as qualified by the laboratory. This qualifier is used when the compound is detected in the sample but the detected quantity is less than the sample quantitation limit. The sample quantitation limit is a reporting limit for a particular analyte and matrix by the EPA, adjusted for sample dilution, level of analysis, percent moisture, and other interferences. The same quantitation limit is considered to be the lowest concentration that can be quantified precisely and accurately. This qualifier is also used for estimating a concentration for a tentatively identified compound (TIC) where both the identity and concentration of the compound are uncertain.

B - This qualifier is used when the target compound is detected in the associated laboratory blank as well as in the sample. A laboratory blank is used to define the level of background contamination caused by contaminants in solvents, reagents, glassware, and other sample processing hardware. It is an artificial sample that is carried through the entire analytical procedure. This qualifier indicates possible blank contamination though it does not necessarily render the data unusable. In some circumstances, blank contamination will render the compound"undetected" (See "U'" qualifier).

BMWCI QUALIFICATIONS

J' - This qualifier indicates that the associated numerical value is an estimated quantity as qualified pursuant to a quality control evaluation of the data by BMWCI. In the event of a "UJ'" qualifier, the associated numerical value that is qualified as estimated is the sample quantitation limit and not the detected concentration of the compound. This qualification results from surrogate spike recovery values falling outside specified control limits. The surrogate spike is a quality control sample which indicates recovery capabilities for organic compounds on a per sample basis. The "'" qualifier indicates the source of qualification as BMWCI's quality control evaluation.

U' - This qualifier indicates that the target compound should be considered undetected as qualified pursuant to a quality control evaluation of the data by BMWCI. If the concentration of a particular analyte in a field sample is less than five times (or 10 times for common laboratory contaminants) the concentration in the associated laboratory blank, the EPA guidelines dictate that the field sample concentration can be assumed to come from laboratory contamination. As a result, the value is considered undetected as defined for "U" qualifier. The "'" qualifier indicates the source of qualification as BMWCI's quality control evaluation.

F - This qualifier is used when the target compound is detected in the associated field blank as well as in the sample. A field blank or equipment rinsate blank is collected from High Performance Liquid Chromatography (HPLC) water used to rinse field sampling equipment after decontamination has taken place. Field blanks indicate whether any carryover of contamination is occurring between discrete sample collection events.

R - This qualifier indicates that the data is qualified as unusable pursuant to a quality control evaluation by BMWCI. This qualification results from surrogate spike recoveries falling below 10 percent which indicates significant problems in the detection of organic compounds. Samples are fortified with surrogate spiking compounds before purging and extraction in order to monitor preparation and analysis of samples. Only undetected ("U") values are qualified as unusable and indicate that the parameter may be present but was not detected during the analysis.

TABLE 4-1 (continued)
DEFINITIONS FOR DATA QUALIFIERS

INORGANIC COMPOUNDS

LABORATORY QUALIFICATIONS

U - This qualifier indicates a compound was analyzed for but not detected above the minimum detection capabilities of the analytical instrument. The value associated with the "U" qualifier is the instrument detection limit for inorganics.

BMWCI QUALIFICATIONS

J* - This qualifier indicates that the associated numerical value is an estimated quantity as qualified pursuant to a quality control evaluation of the data by BMWCI. In the event of a "UJ*" qualifier, the associated numerical value that is qualified as estimated is the instrument detection limit for inorganics and not the detected concentration of the compound. The estimated qualification for inorganic data results from matrix spike recoveries or duplicate percent differences falling outside specified control limits. The "*" qualifier indicates the source of qualification as BMWCI's quality control evaluation.

R - This qualifier indicates that the data is qualified as unusable pursuant to a quality control evaluation by BMWCI. The unusable qualification for inorganic data results from matrix spike recoveries falling below 30 percent which indicates significant problems in the detection of inorganic compounds. Only undetected ("U") values are qualified as unusable and indicate that the parameter may be present but was not detected during the analysis.

Note: Some sample entries are qualified with two or more qualifiers, e.g. "BJU*". Each individual qualifier still retains its meaning as defined in Table 4-1.

TABLE 4-2
MONITORING WELL BORING
SUBSURFACE SOIL SAMPLES

Laboratory Number:		8019.16	8019.17	8019.18	8019.19	8046.08	8046.09	8046.10
Sample Number:		MW-201A	MW-201B	MW-201C	MW-201D	MW-202A	MW-202B	MW-202C
Sample Matrix:		Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Depth From:		4.00	8.00	11.00	11.00	5.00	10.00	14.00
Sample Depth To:		4.00	8.00	11.00	11.00	5.00	10.00	14.00
PARAMETER	UNITS				Dup. 201C			
Total Petroleum Hydrocarbons	mg/kg	100	230	620	750	42	1440	1840
VOLATILE ORGANIC COMPOUNDS								
Chloromethane	µg/kg	13.4 U	1620 U	1740 U	14.2 U	12.5 U	60 U	1630 U
Bromomethane	µg/kg	13.4 U	1620 U	1740 U	14.2 U	12.5 U	60 U	1630 U
Vinyl Chloride	µg/kg	13.4 U	1620 U	1740 U	14.2 U	12.5 U	60 U	1630 U
Chloroethane	µg/kg	13.4 U	1620 U	1740 U	14.2 U	12.5 U	60 U	1630 U
Methylene Chloride	µg/kg	6.7 U	810 U	870 U	7	6.25 U	30 U	815 U
Acetone	µg/kg	12 JT	1620 U	1740 U	14.2 U	30	262	1770
Carbon Disulfide	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
1,1-Dichloroethene	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
1,1-Dichloroethane	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
Trans-1,2-Dichloroethene	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
Chloroform	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
1,2-Dichloroethane	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
Methyl Ethyl Ketone	µg/kg	13.4 U	1620 U	1740 U	14.2 U	12.5 U	60 U	1630 U
1,1,1-Trichloroethane	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
Carbon Tetrachloride	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
Vinyl Acetate	µg/kg	13.4 U	1620 U	1740 U	14.2 U	12.5 U	60 U	1630 U
Bromodichloromethane	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
1,1,2,2-Tetrachloroethane	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
1,2-Dichloropropane	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
Trans-1,3-Dichloropropene	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
Trichloroethene	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
Dibromochloromethane	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
1,1,2-Trichloroethane	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
Benzene	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
cis-1,3-Dichloropropene	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
2-Chloroethylvinylether	µg/kg	13.4 U	1620 U	1740 U	14.2 U	12.5 U	60 U	1630 U
Bromoform	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
2-Hexanone	µg/kg	13.4 U	1620 U	1740 U	14.2 U	12.5 U	60 U	1630 U
4-Methyl-2-Pentanone	µg/kg	13.4 U	1620 U	1740 U	14.2 U	12.5 U	60 U	1630 U
Tetrachloroethene	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
Toluene	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
Chlorobenzene	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
Ethylbenzene	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
Styrene	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U
Total Xylenes	µg/kg	6.7 U	810 U	870 U	7.1 U	6.25 U	30 U	815 U

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TABLE 4-2 (continued)
MONITORING WELL BORING
SUBSURFACE SOIL SAMPLES

Laboratory Number:	8019.16	8019.17	8019.18	8019.19	8046.08	8046.09	8046.10
Sample Number:	MW-201A	MW-201B	MW-201C	MW-201D	MW-202A	MW-202B	MW-202C
Sample Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Depth From:	4.00	8.00	11.00	11.00	5.00	10.00	14.00
Sample Depth To:	4.00	8.00	11.00	11.00	5.00	10.00	14.00
PARAMETER UNITS				Dup. 201C			
SEMIVOLATILE ORGANIC COMPOUNDS							
Phenol µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
bis(2-Chloroethyl)Ether µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
2-Chlorophenol µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
1,3-Dichlorobenzene µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
1,4-Dichlorobenzene µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
Benzyl Alcohol µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
1,2-Dichlorobenzene µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
2-Methylphenol µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
bis(2-Chloroisopropyl)Ether µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
4-Methylphenol µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
N-Nitroso-Di-n-Propylamine µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
Hexachloroethane µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
Nitrobenzene µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
Isophorone µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
2-Nitrophenol µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
2,4-Dimethylphenol µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
Benzoic Acid µg/kg	1600 U	1600 U	1600 U	1600 U	2000 U	1970 U	2080 U
bis(2-Chloroethoxy)Methane µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
2,4-Dichlorophenol µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
1,2,4-Trichlorobenzene µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
Naphthalene µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
4-Chloroaniline µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
Hexachlorobutadiene µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
4-Chloro-3-Methylphenol µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
2-Methylnaphthalene µg/kg	95 J	560	340	380	413 U	407	1300
Hexachlorocyclopentadiene µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
2,4,6-Trichlorophenol µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
2,4,5-Trichlorophenol µg/kg	1600 U	1600 U	1600 U	1600 U	2000 U	1970 U	2080 U
2-Chloronaphthalene µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
2-Nitroaniline µg/kg	1600 U	1600 U	1600 U	1600 U	2000 U	1970 U	2080 U
Dimethylphthalate µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
Acenaphthylene µg/kg	90 J	330 U	330 U	330 U	413 U	406 U	429 U

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TABLE 4-2 (continued)
MONITORING WELL BORING
SUBSURFACE SOIL SAMPLES

Laboratory Number:	8019.16	8019.17	8019.18	8019.19	8046.08	8046.09	8046.10
Sample Number:	MW-201A	MW-201B	MW-201C	MW-201D	MW-202A	MW-202B	MW-202C
Sample Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Depth From:	4.00	8.00	11.00	11.00	5.00	10.00	14.00
Sample Depth To:	4.00	8.00	11.00	11.00	5.00	10.00	14.00
PARAMETER UNITS				Dup. 201C			
SEMIVOLATILE ORGANIC COMPOUNDS							
3-Nitroaniline µg/kg	1600 U	1600 U	1600 U	1600 U	2000 U	1970 U	2080 U
Acenaphthene µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
2,4-Dinitrophenol µg/kg	1600 U	1600 U	1600 U	1600 U	2000 U	1970 U	2080 U
4-Nitrophenol µg/kg	1600 U	1600 U	1600 U	1600 U	2000 U	1970 U	2080 U
Dibenzofuran µg/kg	40 J	75 J	330 U	330 U	413 U	406 U	429 U
2,4-Dinitrotoluene µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
2,6-Dinitrotoluene µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
Diethylphthalate µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
4-Chlorophenyl-Phenylether µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
Fluorene µg/kg	330 U	70 J	330 U	170 J	413 U	406 U	429 U
4-Nitroaniline µg/kg	1600 U	1600 U	1600 U	1600 U	2000 U	1970 U	2080 U
4,6-Dinitro-2-Methylphenol µg/kg	1600 U	1600 U	1600 U	1600 U	2000 U	1970 U	2080 U
N-Nitrosodiphenylamine µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
4-Bromophenyl-Phenylether µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
Hexachlorobenzene µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
Pentachlorophenol µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
Phenanthrene µg/kg	130 J	330 U	70 J	80 J	413 U	90 J	429 U
Anthracene µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
Di-N-Butylphthalate µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
Fluoranthene µg/kg	90 J	330 U	130 J	130 J	413 U	406 U	429 U
Pyrene µg/kg	90 J	330 U	110 J	110 J	413 U	406 U	429 U
Butylbenzylphthalate µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
3,3-Dichlorobenzidine µg/kg	660 U	660 U	660 U	660 U	825 U	812 U	858 U
Benzo(a)Anthracene µg/kg	60 J	330 U	50 J	40 J	413 U	406 U	429 U
bis(2-Ethylhexyl)Phthalate µg/kg	330 U	330 U	330 U	330 U	413 U	110 J	429 U
Chrysene µg/kg	80 J	330 U	330 U	330 U	413 U	406 U	429 U
Di-N-Octyl Phthalate µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
Benzo(b)Fluoranthene µg/kg	100 J	330 U	330 U	40 J	413 U	406 U	429 U
Benzo(k)Fluoranthene µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
Benzo(a)Pyrene µg/kg	100 J	330 U	30 J	20 J	413 U	406 U	429 U
Indeno(1,2,3-cd)Pyrene µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
Dibenz(a,h)Anthracene µg/kg	330 U	330 U	330 U	330 U	413 U	406 U	429 U
Benzo(g,h,i)Perylene µg/kg	70 J	330 U	330 U	330 U	413 U	406 U	429 U

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TABLE 4-3
SOIL BORING
SUBSURFACE SOIL SAMPLES

Laboratory Number:		7963.01	7963.02	7963.03	7963.04	7963.05	7963.06	8046.05	8046.06	8046.07
Sample Number:		SB-201	SB-205A	SB-205B	SB-205C	SB-205E	SB-205F	SB-218A	SB-218A	SB-~~218C~~ SB-218C
Sample Matrix:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Depth From:		2.00	4.50	9.00	14.00	24.00	14.00	5.00	8.00	12.00
Sample Depth To:		2.00	4.50	9.00	14.00	24.00	14.00	5.00	8.00	12.00
PARAMETER	UNITS						Dup. 205C			
Total Petroleum Hydrocarbons	mg/kg	28	12	12	10	11	14	42	57	68
Flash Point	deg.F	< 200	-	-	-	-	-	-	-	-

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TABLE 4-3 (continued)
SOIL BORING
SUBSURFACE SOIL SAMPLES

Laboratory Number:		7963.10	7963.11	7963.12	7151.19	7151.20	7151.21	7151.22
Sample Number:		SB-219A	SB-219B	SB-219C	SB-122A	SB-122B	SB-122C	SB-122D
Sample Matrix:		Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Depth From:		3.00	8.00	14.00	7.00	12.30	18.20	23.80
Sample Depth To:		3.00	8.00	14.00	7.00	12.30	18.20	23.80
PARAMETER	UNITS							
Total Petroleum Hydrocarbons	mg/kg	13	350	540	-	-	-	-
VOLATILE ORGANIC COMPOUNDS								
Chloromethane	µg/kg	14.7 U	1540 U	1610 U	1730 U	13.7 U	13.8 U	14.5 U
Bromomethane	µg/kg	14.7 U	1540 U	1610 U	1730 U	13.7 U	13.8 U	14.5 U
Vinyl Chloride	µg/kg	14.7 U	1540 U	1610 U	1730 U	13.7 U	13.8 U	14.5 U
Chloroethane	µg/kg	14.7 U	1540 U	1610 U	1730 U	13.7 U	13.8 U	14.5 U
Methylene Chloride	µg/kg	7.35 U	770 U	805 U	865 U	18 F	13 F	3 FJ
Acetone	µg/kg	55	1760	1610 U	5630	50	39	8 J
Carbon Disulfide	µg/kg	7.35 U	770 U	805 U	865 U	6.85 U	6.9 U	7.25 U
1,1-Dichloroethene	µg/kg	7.35 U	770 U	805 U	865 U	6.85 U	6.9 U	7.25 U
1,1-Dichloroethane	µg/kg	7.35 U	770 U	805 U	865 U	6.85 U	6.9 U	7.25 U
Trans-1,2-Dichloroethene	µg/kg	7.35 U	770 U	805 U	865 U	6.85 U	6.9 U	7.25 U
Chloroform	µg/kg	7.35 U	770 U	805 U	865 U	6.85 U	6.9 U	7.25 U
1,2-Dichloroethane	µg/kg	7.35 U	770 U	805 U	865 U	6.85 U	6.9 U	7.25 U
Methyl Ethyl Ketone	µg/kg	14.7 U	1540 U	1610 U	1730 U	4 J	13.8 U	14.5 U
1,1,1-Trichloroethane	µg/kg	7.35 U	770 U	805 U	865 U	6.85 U	6.9 U	7.25 U
Carbon Tetrachloride	µg/kg	7.35 U	770 U	805 U	865 U	6.85 U	6.9 U	7.25 U
Vinyl Acetate	µg/kg	14.7 U	1540 U	1610 U	1730 U	13.7 U	13.8 U	14.5 U
Bromodichloromethane	µg/kg	7.35 U	770 U	805 U	865 U	6.85 U	6.9 U	7.25 U
1,1,2,2-Tetrachloroethane	µg/kg	7.35 U	770 U	805 U	865 U	6.85 U	6.9 U	7.25 U
1,2-Dichloropropane	µg/kg	7.35 U	770 U	805 U	865 U	6.85 U	6.9 U	7.25 U
Trans-1,3-Dichloropropene	µg/kg	7.35 U	770 U	805 U	865 U	6.85 U	6.9 U	7.25 U
Trichloroethene	µg/kg	7.35 U	770 U	805 U	865 U	6.85 U	6.9 U	7.25 U
Dibromochloromethane	µg/kg	7.35 U	770 U	805 U	865 U	6.85 U	6.9 U	7.25 U
1,1,2-Trichloroethane	µg/kg	7.35 U	770 U	805 U	865 U	6.85 U	6.9 U	7.25 U
Benzene	µg/kg	7.35 U	770 U	805 U	865 U	6.85 U	6.9 U	7.25 U
cis-1,3-Dichloropropene	µg/kg	7.35 U	770 U	805 U	865 U	6.85 U	6.9 U	7.25 U
2-Chloroethylvinylether	µg/kg	14.7 U	1540 U	1610 U	1730 U	13.7 U	13.8 U	14.5 U
Bromoform	µg/kg	7.35 U	770 U	805 U	865 U	6.85 U	6.9 U	7.25 U
2-Hexanone	µg/kg	14.7 U	1540 U	1610 U	1730 U	13.7 U	13.8 U	14.5 U
4-Methyl-2-Pentanone	µg/kg	14.7 U	1540 U	1610 U	2060	13.7 U	13.8 U	14.5 U
Tetrachloroethene	µg/kg	7.35 U	770 U	805 U	865 U	10	4 J	7.25 U
Toluene	µg/kg	7.35 U	770 U	805 U	865 U	6.85 U	6.9 U	7.25 U
Chlorobenzene	µg/kg	7.35 U	770 U	805 U	865 U	6.85 U	6.9 U	7.25 U
Ethylbenzene	µg/kg	7.35 U	770 U	805 U	865 U	6.85 U	6.9 U	7.25 U
Styrene	µg/kg	7.35 U	770 U	805 U	865 U	6.85 U	6.9 U	7.25 U
Total Xylenes	µg/kg	7.35 U	770 U	805 U	865 U	5 J	6.9 U	7.25 U

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TABLE 4-3 (continued)
SOIL BORING
SUBSURFACE SOIL SAMPLES

Laboratory Number:		7963.10	7963.11	7963.12
Sample Number:		SB-219A	SB-219B	SB-219C
Sample Matrix:		Soil	Soil	Soil
Sample Depth From:		3.00	8.00	14.00
Sample Depth From:		3.00	8.00	14.00
PARAMETER	UNITS			
SEMIVOLATILE ORGANIC COMPOUNDS				
Phenol	µg/kg	485 U	406 U	422 U
bis(2-Chloroethyl)Ether	µg/kg	485 U	406 U	422 U
2-Chlorophenol	µg/kg	485 U	406 U	422 U
1,3-Dichlorobenzene	µg/kg	485 U	406 U	422 U
1,4-Dichlorobenzene	µg/kg	485 U	406 U	422 U
Benzyl Alcohol	µg/kg	485 U	406 U	422 U
1,2-Dichlorobenzene	µg/kg	485 U	406 U	422 U
2-Methylphenol	µg/kg	485 U	406 U	422 U
bis(2-Chloroisopropyl)Ether	µg/kg	485 U	406 U	422 U
4-Methylphenol	µg/kg	485 U	406 U	422 U
N-Nitroso-Di-n-Propylamine	µg/kg	485 U	406 U	422 U
Hexachloroethane	µg/kg	485 U	406 U	422 U
Nitrobenzene	µg/kg	485 U	406 U	422 U
Isophorone	µg/kg	485 U	406 U	422 U
2-Nitrophenol	µg/kg	485 U	406 U	422 U
2,4-Dimethylphenol	µg/kg	485 U	406 U	422 U
Benzoic Acid	µg/kg	2350 U	1970 U	2050 U
bis(2-Chloroethoxy)Methane	µg/kg	485 U	406 U	422 U
2,4-Dichlorophenol	µg/kg	485 U	406 U	422 U
1,2,4-Trichlorobenzene	µg/kg	485 U	406 U	422 U
Naphthalene	µg/kg	485 U	406 U	422 U
4-Chloroaniline	µg/kg	485 U	406 U	422 U
Hexachlorobutadiene	µg/kg	485 U	406 U	422 U
4-Chloro-3-Methylphenol	µg/kg	485 U	406 U	422 U
2-Methylnaphthalene	µg/kg	17 J	3500	422 U
Hexachlorocyclopentadiene	µg/kg	485 U	406 U	422 U
2,4,6-Trichlorophenol	µg/kg	485 U	406 U	422 U
2,4,5-Trichlorophenol	µg/kg	2350 U	1970 U	2050 U
2-Chloronaphthalene	µg/kg	485 U	406 U	422 U
2-Nitroaniline	µg/kg	2350 U	1970 U	2050 U
Dimethylphthalate	µg/kg	485 U	406 U	422 U
Acenaphthylene	µg/kg	485 U	406 U	422 U
3-Nitroaniline	µg/kg	2350 U	1970 U	2050 U

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TABLE 4-3 (continued)
SOIL BORING
SUBSURFACE SOIL SAMPLES

Laboratory Number:		7963.10	7963.11	7963.12
Sample Number:		SB-219A	SB-219B	SB-219C
Sample Matrix:		Soil	Soil	Soil
Sample Depth From:		3.00	8.00	14.00
Sample Depth From:		3.00	8.00	14.00
PARAMETER	UNITS			
SEMIVOLATILE ORGANIC COMPOUNDS				
Acenaphthene	µg/kg	485 U	406 U	422 U
2,4-Dinitrophenol	µg/kg	2350 U	1970 U	2050 U
4-Nitrophenol	µg/kg	2350 U	1970 U	2050 U
Dibenzofuran	µg/kg	485 U	110 J	422 U
2,4-Dinitrotoluene	µg/kg	485 U	406 U	422 U
2,6-Dinitrotoluene	µg/kg	485 U	406 U	422 U
Diethylphthalate	µg/kg	485 U	406 U	422 U
4-Chlorophenyl-Phenylether	µg/kg	485 U	406 U	422 U
Fluorene	µg/kg	485 U	54 J	422 U
4-Nitroaniline	µg/kg	2350 U	1970 U	2050 U
4,6-Dinitro-2-Methylphenol	µg/kg	2350 U	1970 U	2050 U
N-Nitrosodiphenylamine	µg/kg	485 U	406 U	422 U
4-Bromophenyl-Phenylether	µg/kg	485 U	406 U	422 U
Hexachlorobenzene	µg/kg	485 U	406 U	422 U
Pentachlorophenol	µg/kg	485 U	406 U	422 U
Phenanthrene	µg/kg	38 J	39 J	21 J
Anthracene	µg/kg	485 U	406 U	422 U
Di-N-Butylphthalate	µg/kg	30 J	33 J	21 J
Fluoranthene	µg/kg	56 J	406 U	422 U
Pyrene	µg/kg	78 J	406 U	422 U
Butylbenzylphthalate	µg/kg	485 U	406 U	422 U
3,3-Dichlorobenzidine	µg/kg	970 U	812 U	845 U
Benzo(a)Anthracene	µg/kg	485 U	406 U	422 U
bis(2-Ethylhexyl)Phthalate	µg/kg	485 U	406 U	422 U
Chrysene	µg/kg	485 U	406 U	422 U
Di-N-Octyl Phthalate	µg/kg	20 J	4 J	4 J
Benzo(b)Fluoranthene	µg/kg	63 J	406 U	422 U
Benzo(k)Fluoranthene	µg/kg	485 U	406 U	422 U
Benzo(a)Pyrene	µg/kg	485 U	406 U	422 U
Indeno(1,2,3-cd)Pyrene	µg/kg	485 U	406 U	422 U
Dibenz(a,h)Anthracene	µg/kg	485 U	406 U	422 U
Benzo(g,h,i)Perylene	µg/kg	485 U	406 U	422 U

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kerosene pipeline. SB-201 was abandoned at 4 feet due to an obstruction. Similarly, SB-218 was abandoned at 12.5 feet due to an obstruction. One sample from SB-201 and three samples from SB-218 were collected for TPH analysis. No significant TPH values (greater than 100 mg/kg) were encountered in SB-201 or SB-218.

SB-122 was drilled to a total depth of 23.8 feet. Samples from this boring were analyzed for VOCs. Elevated levels of VOCs (5,630 µg/kg of acetone and 2,060 µg/kg of 4-methyl-2-pentanone) were detected in the 7 foot sample at SB-122. There was a significant decrease in the concentrations of these compounds in the deeper samples from SB-122. No other VOCs were encountered at significant levels in SB-122.

4.1.2 Pipeline

The highest TPH levels encountered during the investigation activities were from Monitoring Well Boring MW-202 (1,840 mg/kg at 14 feet). TPH levels above 100 mg/kg were also detected in samples from MW-201 and SB-219. The highest TPH levels from these borings occurred at the 11- to 14-feet depth.

Acetone was encountered in two borings along the pipeline. The highest levels were 1,770 µg/kg and 1,760 µg/kg in samples MW-202C and SB-219B, respectively. No other VOCs were detected at significant levels along the pipeline.

The SVOC most often detected in subsurface soil samples was 2-methylnaphthalene. The highest level detected was 3,500 µg/kg in SB-219B. The highest total SVOCs level also occurred in this sample (3,740 µg/kg).

4.2 GROUNDWATER

Two rounds of groundwater samples were collected from MW-201 and MW-202 and analyzed for TPH and SVOCs as indicated in Table 3-1. Samples collected from MW-201 are called GW-201A (Round 1) and GW-201B (Round 2). Samples from MW-202 are similarly named. A duplicate sample was also collected during each round. GW-207A was the duplicate of GW-202A and GW-209B was the duplicate of GW-201B.

There were no significant concentrations of contaminants detected in Round 1 groundwater samples. TPH was encountered at 10 mg/L in GW-201A and 20 mg/L in GW-202A (17 mg/L in GW-207A). None of these values exceed any known regulatory limits. 2-Methylnaphthalene was detected at 4 μg/L in GW-201A. No other SVOCs were detected in any of the Round 1 groundwater samples. Analytical results of Round 1 groundwater sampling are summarized in Table 4-4.

Similarly, Round 2 groundwater sample results did not show significant concentrations of contaminants. TPH was detected at 3 mg/L in GW-201B (1.7 mg/L in GW-209B) and 25 mg/L in GW-202B. Pentachlorophenol was detected at 1 μg/L in GW-201B. No other SVOCs were detected in any of the Round 2 groundwater samples, which are summarized in Table 4-5

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TABLE 4-4
ROUND 1 GROUNDWATER SAMPLES

Laboratory Number:		8083.07	8083.01	8083.02
Sample Number:		GW-201A	GW-202A	GW-207A
Sample Matrix:		Water	Water	Water
PARAMETER	UNITS			Dup. of 202A
Total Petroleum Hydrocarbons	mg/L	10	20	17
SEMIVOLATILE ORGANIC COMPOUNDS				
Phenol	µg/L	10 U	51000 U	52000 U
bis(2-Chloroethyl)Ether	µg/L	10 U	51000 U	52000 U
2-Chlorophenol	µg/L	10 U	51000 U	52000 U
1,3-Dichlorobenzene	µg/L	10 U	51000 U	52000 U
1,4-Dichlorobenzene	µg/L	10 U	51000 U	52000 U
Benzyl Alcohol	µg/L	10 U	51000 U	52000 U
1,2-Dichlorobenzene	µg/L	10 U	51000 U	52000 U
2-Methylphenol	µg/L	10 U	51000 U	52000 U
bis(2-Chloroisopropyl)Ether	µg/L	10 U	51000 U	52000 U
4-Methylphenol	µg/L	10 U	51000 U	52000 U
N-Nitroso-Di-n-Propylamine	µg/L	10 U	51000 U	52000 U
Hexachloroethane	µg/L	10 U	51000 U	52000 U
Nitrobenzene	µg/L	10 U	51000 U	52000 U
Isophorone	µg/L	10 U	51000 U	52000 U
2-Nitrophenol	µg/L	10 U	51000 U	52000 U
2,4-Dimethylphenol	µg/L	10 U	51000 U	52000 U
Benzoic Acid	µg/L	50 U	255000 U	260000 U
bis(2-Chloroethoxy)Methane	µg/L	10 U	51000 U	52000 U
2,4-Dichlorophenol	µg/L	10 U	51000 U	52000 U
1,2,4-Trichlorobenzene	µg/L	10 U	51000 U	52000 U
Naphthalene	µg/L	10 U	51000 U	52000 U
4-Chloroaniline	µg/L	10 U	51000 U	52000 U
Hexachlorobutadiene	µg/L	10 U	51000 U	52000 U
4-Chloro-3-Methylphenol	µg/L	10 U	51000 U	52000 U
2-Methylnaphthalene	µg/L	4 J	51000 U	52000 U
Hexachlorocyclopentadiene	µg/L	10 U	51000 U	52000 U
2,4,6-Trichlorophenol	µg/L	10 U	51000 U	52000 U
2,4,5-Trichlorophenol	µg/L	50 U	255000 U	260000 U
2-Chloronaphthalene	µg/L	10 U	51000 U	52000 U
2-Nitroaniline	µg/L	50 U	255000 U	260000 U
Dimethylphthalate	µg/L	10 U	51000 U	52000 U
Acenaphthylene	µg/L	10 U	51000 U	52000 U
3-Nitroaniline	µg/L	50 U	255000 U	260000 U

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TABLE 4–4 (continued)
ROUND 1 GROUNDWATER SAMPLES

Laboratory Number: / Sample Number: / Sample Matrix:		8083.07 GW-201A Water	8083.01 GW-202A Water	8083.02 GW-207A Water
PARAMETER	UNITS			Dup. of 202A
SEMIVOLATILE ORGANIC COMPOUNDS				
Acenaphthene	µg/L	10 U	51000 U	52000 U
2,4-Dinitrophenol	µg/L	50 U	255000 U	260000 U
4-Nitrophenol	µg/L	50 U	255000 U	260000 U
Dibenzofuran	µg/L	10 U	51000 U	52000 U
2,4-Dinitrotoluene	µg/L	10 U	51000 U	52000 U
2,6-Dinitrotoluene	µg/L	10 U	51000 U	52000 U
Diethylphthalate	µg/L	10 U	51000 U	52000 U
4-Chlorophenyl-Phenylether	µg/L	10 U	51000 U	52000 U
Fluorene	µg/L	10 U	51000 U	52000 U
4-Nitroaniline	µg/L	50 U	255000 U	260000 U
4,6-Dinitro-2-Methylphenol	µg/L	50 U	255000 U	260000 U
N-Nitrosodiphenylamine	µg/L	10 U	51000 U	52000 U
4-Bromophenyl-Phenylether	µg/L	10 U	51000 U	52000 U
Hexachlorobenzene	µg/L	10 U	51000 U	52000 U
Pentachlorophenol	µg/L	10 U	51000 U	52000 U
Phenanthrene	µg/L	10 U	51000 U	52000 U
Anthracene	µg/L	10 U	51000 U	52000 U
Di-N-Butylphthalate	µg/L	10 U	51000 U	52000 U
Fluoranthene	µg/L	10 U	51000 U	52000 U
Pyrene	µg/L	10 U	51000 U	52000 U
Butylbenzylphthalate	µg/L	10 U	51000 U	52000 U
3,3-Dichlorobenzidine	µg/L	20 U	102000 U	104000 U
Benzo(a)Anthracene	µg/L	10 U	51000 U	52000 U
bis(2-Ethylhexyl)Phthalate	µg/L	10 U	51000 U	52000 U
Chrysene	µg/L	10 U	51000 U	52000 U
Di-N-Octyl Phthalate	µg/L	10 U	51000 U	52000 U
Benzo(b)Fluoranthene	µg/L	10 U	51000 U	52000 U
Benzo(k)Fluoranthene	µg/L	10 U	51000 U	52000 U
Benzo(a)Pyrene	µg/L	10 U	51000 U	52000 U
Indeno(1,2,3-cd)Pyrene	µg/L	10 U	51000 U	52000 U
Dibenz(a,h)Anthracene	µg/L	10 U	51000 U	52000 U
Benzo(g,h,i)Perylene	µg/L	10 U	51000 U	52000 U

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TABLE 4-5
ROUND 2 GROUNDWATER SAMPLES

Laboratory Number: / Sample Number: / Sample Matrix:		9099.01 GW-201B Water	9099.04 GW-209B Water	9099.02 GW-202B Water
PARAMETER	UNITS		Dup. of 201B	
Total Petroleum Hydrocarbons	mg/l	3	1.7	25
SEMIVOLATILE ORGANIC COMPOUNDS				
Phenol	µg/L	10 U	10 U	500 U
bis(2-Chloroethyl)Ether	µg/L	10 U	10 U	500 U
2-Chlorophenol	µg/L	10 U	10 U	500 U
1,3-Dichlorobenzene	µg/L	10 U	10 U	500 U
1,4-Dichlorobenzene	µg/L	10 U	10 U	500 U
Benzyl Alcohol	µg/L	10 U	10 U	500 U
1,2-Dichlorobenzene	µg/L	10 U	10 U	500 U
2-Methylphenol	µg/L	10 U	10 U	500 U
bis(2-Chloroisopropyl)Ether	µg/L	10 U	10 U	500 U
4-Methylphenol	µg/L	10 U	10 U	500 U
N-Nitroso-Di-n-Propylamine	µg/L	10 U	10 U	500 U
Hexachloroethane	µg/L	10 U	10 U	500 U
Nitrobenzene	µg/L	10 U	10 U	500 U
Isophorone	µg/L	10 U	10 U	500 U
2-Nitrophenol	µg/L	10 U	10 U	500 U
2,4-Dimethylphenol	µg/L	10 U	10 U	500 U
Benzoic Acid	µg/L	50 U	50 U	2500 U
bis(2-Chloroethoxy)Methane	µg/L	10 U	10 U	500 U
2,4-Dichlorophenol	µg/L	10 U	10 U	500 U
1,2,4-Trichlorobenzene	µg/L	10 U	10 U	500 U
Naphthalene	µg/L	10 U	10 U	500 U
4-Chloroaniline	µg/L	10 U	10 U	500 U
Hexachlorobutadiene	µg/L	10 U	10 U	500 U
4-Chloro-3-Methylphenol	µg/L	10 U	10 U	500 U
2-Methylnaphthalene	µg/L	10 U	10 U	500 U
Hexachlorocyclopentadiene	µg/L	10 U	10 U	500 U
2,4,6-Trichlorophenol	µg/L	10 U	10 U	500 U
2,4,5-Trichlorophenol	µg/L	50 U	50 U	2500 U
2-Chloronaphthalene	µg/L	10 U	10 U	500 U
2-Nitroaniline	µg/L	50 U	50 U	2500 U
Dimethylphthalate	µg/L	10 U	10 U	500 U
Acenaphthylene	µg/L	10 U	10 U	500 U
3-Nitroaniline	µg/L	50 U	50 U	2500 U

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TABLE 4-5 (continued)
ROUND 2 GROUNDWATER SAMPLES

Laboratory Number:		9099.01	9099.04	9099.02
Sample Number:		GW-201B	GW-209B	GW-202B
Sample Matrix:		Water	Water	Water
PARAMETER	UNITS		Dup. of 201B	
SEMIVOLATILE ORGANIC COMPOUNDS				
Acenaphthene	µg/L	10 U	10 U	500 U
2,4-Dinitrophenol	µg/L	50 U	50 U	2500 U
4-Nitrophenol	µg/L	50 U	50 U	2500 U
Dibenzofuran	µg/L	10 U	10 U	500 U
2,4-Dinitrotoluene	µg/L	10 U	10 U	500 U
2,6-Dinitrotoluene	µg/L	10 U	10 U	500 U
Diethylphthalate	µg/L	10 U	10 U	500 U
4-Chlorophenyl-Phenylether	µg/L	10 U	10 U	500 U
Fluorene	µg/L	10 U	10 U	500 U
4-Nitroaniline	µg/L	50 U	50 U	2500 U
4,6-Dinitro-2-Methylphenol	µg/L	50 U	50 U	2500 U
N-Nitrosodiphenylamine	µg/L	10 U	10 U	500 U
4-Bromophenyl-Phenylether	µg/L	10 U	10 U	500 U
Hexachlorobenzene	µg/L	10 U	10 U	500 U
Pentachlorophenol	µg/L	1 J	10 U	500 U
Phenanthrene	µg/L	10 U	10 U	500 U
Anthracene	µg/L	10 U	10 U	500 U
Di-N-Butylphthalate	µg/L	10 U	10 U	500 U
Fluoranthene	µg/L	10 U	10 U	500 U
Pyrene	µg/L	10 U	10 U	500 U
Butylbenzylphthalate	µg/L	10 U	10 U	500 U
3,3-Dichlorobenzidine	µg/L	20 U	20 U	1000 U
Benzo(a)Anthracene	µg/L	10 U	10 U	500 U
bis(2-Ethylhexyl)Phthalate	µg/L	10 U	10 U	500 U
Chrysene	µg/L	10 U	10 U	500 U
Di-N-Octyl Phthalate	µg/L	10 U	10 U	500 U
Benzo(b)Fluoranthene	µg/L	10 U	10 U	500 U
Benzo(k)Fluoranthene	µg/L	10 U	10 U	500 U
Benzo(a)Pyrene	µg/L	10 U	10 U	500 U
Indeno(1,2,3-cd)Pyrene	µg/L	10 U	10 U	500 U
Dibenz(a,h)Anthracene	µg/L	10 U	10 U	500 U
Benzo(g,h,i)Perylene	µg/L	10 U	10 U	500 U

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5.0 CONTAMINANT FATE AND TRANSPORT

5.1 POTENTIAL ROUTES OF MIGRATION

This section examines the potential routes of migration and provides information concerning the pertinent physical and chemical properties of potential chemicals of concern. A summary is provided of specific fate and transport mechanisms for these potential chemicals of concern. Potential routes of contaminant migration beneath the Assembly Building are limited to the subsurface route (contaminated water migration). The surface route (surface water and sediment) and the airborne route (vapor or airborne soil/dust particles) are nonviable because the immediate area of concern (the ESP) is below the concrete flooring of the Assembly Building. Furthermore, most of the plant site not occupied by buildings is covered with asphalt or concrete paving.

5.1.1 Subsurface Migration

Subsurface migration can occur through groundwater and/or soil. These media are considered exposure pathways as well as reservoirs for contamination.

5.1.1.1 Groundwater

Groundwater may become contaminated from the leaching of on-site subsurface soils or by contact with soluble contaminants. The groundwater migration pathway is an important route to consider at this site because it is adjacent to the Blue River. The predominant groundwater flow direction is basically from northeast to southwest, which is toward the Blue River. Hydrogeological studies have indicated that the alluvial soils beneath the Leeds site are 26 to 50 feet thick. In these soils, the groundwater velocity ranges from 0.3 to 1.7 feet/year toward the southwest. Groundwater was encountered beneath the ESP area at approximately 7 feet below the ground surface.

5.1.1.2 Subsurface Soil

The fate of contaminants in the subsurface soil depends primarily upon the rate of leaching into groundwater, the vaporization potential, and the rate of biodegradation. Particulate matter can also be transferred from soil to

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groundwater by subsurface erosion. However, soil basically remains in place and acts more like a reservoir or exposure point than a migrational pathway. Soil excavation could cause contaminant migration via evaporation and the release of contaminated soil particles.

There is little possibility that free liquid contaminants (non-aqueous phase liquids, NAPLs) exist in the subsurface soil because of the relatively low concentrations detected.

5.1.2 Surface Migration

Within the Assembly Building there is practically no chance for contaminant migration via the surface route. Virtually no precipitation would reach the soil since it is covered with a roof and concrete flooring.

5.1.3 Air Migration

The potential for transfer of contaminants under the floor to air is remote, unless the area is excavated. Volatile and semivolatile contaminants are not expected to find a pathway to air. However, if the soil is exposed in any manner, the high vapor pressures of some of the contaminants (e.g., acetone) would allow rapid transfer to air. Nevertheless, the low concentrations of volatile toxicants detected in the soil would probably not result in hazardous vapor concentrations in air.

5.2 CONTAMINANT PERSISTENCE AND MIGRATION

Many factors determine the extent to which contaminants can migrate and the amount of time required to do so. Contaminant persistence is one of the most important factors affecting the extent of migration. Persistence is a chemical's ability to resist degradation by physical, chemical, or biological means. The persistence and migration of potential chemicals of concern are discussed in the following subsections.

The potential chemicals of concern include 12 polycyclic aromatic hydrocarbons (PAHs), three SVOCs, and six VOCs. Table 5-1 presents the frequency of

TABLE 5-1
STATISTICAL INFORMATION ON
POTENTIAL CHEMICALS OF CONCERN

Parameter	Statistical Information	
	Frequency of Detection	High Concentration (µg/kg)
Polycyclic Aromatic Hydrocarbons		
Acenaphthylene	1/11	90J
Benzo(a)anthracene	3/11	60J
Benzo(b)fluoranthene	2/11	100J
Benzo(g,h,i)perylene	1/11	70J
Benzo(a)pyrene	3/11	100J
Chrysene	1/11	80J
Dibenzofuran	3/11	75J
Fluoranthene	4/11	130J
Fluorene	3/11	170J
2-Methylnaphthalene	9/11	3500
Phenanthrene	7/11	130J
Pyrene	4/11	110J
Semivolatile Organic Compounds		
Bis(2-ethylhexyl) Phthalate	1/11	110J
Di-n-butyl Phthalate	3/11	33J
Di-n-octyl Phthalate	3/11	20J
Volatile Organic Compounds		
Acetone	10/13	5630J
Dichloromethane (Methylene Chloride)	4/13	18F
Methyl Ethyl Ketone	1/13	4J
4-Methyl-2-pentanone	1/13	2060
Tetrachloroethene	2/13	10
Xylene (total)	1/13	5J

ND = No Data

[a] The J qualifier following the concentration indicates that the concentration was estimated; The F qualifier indicates that the compound was also detected in the field blank.

[b] This concentration has been established for naphthalene, which would be expected to be similar in toxicity to 2-methylnaphthalene.

detection of potential chemicals of concern and the highest concentrations detected in soil.

5.2.1 Physical Properties and Environmental Characteristics

Table 5-2 provides some relevant physical properties of these chemicals. The environmental characteristics of the chemicals (presented in Table 5-3) are directly related to their physical properties. For example, the higher molecular weight PAHs (Table 5-2) have very low water solubilities, high octanol-water coefficients (K_{ow}), and very low vapor pressures. These properties explain why these compounds are strongly adsorbed on soil and can migrate when the soil erodes, but cannot be easily leached from the soil (Table 5-3). These compounds will not readily evaporate because of their low vapor pressures.

5.2.2 Environmental Half-Lives

Table 5-4 presents half-lives for the potential chemicals of concern in various media. Much of this data is based upon the "scientific judgement" of the authors of the Handbook of Environmental Degradation Rates (Howard et al., 1991), but the data provides important insight on environmental persistence. PAHs have half-lives of 6 to 1,900 days in soil and 24 to 3,800 days in groundwater.

The three SVOCs are fairly rapidly degraded in soil (2-28 days), as are five of the VOCs. Tetrachloroethene has a much longer half-life in soil (540-1,080 days). Tetrachloroethene biodegrades to a number of products including vinyl chloride, which is much more toxic than its predecessor (Davis and Olsen, 1990). However, the generated concentrations of vinyl chloride would be at least one order of magnitude less than its predecessor, and vinyl chloride would itself be subject to biodegradation (Wood et al. 1985). Given the relatively low levels of these tetrachloroethene, no significant hazard increase would be anticipated because of this degradation route.

Biodegradation studies presume that an ample supply of oxygen will be available in the soil to allow aerobic biodegradation to occur. This may not

TABLE 5-2
PHYSICAL PROPERTIES OF
CHEMICALS OF POTENTIAL CONCERN

Parameter	Physical Properties				
	Molecular Weight (g/mol)	Water Solubility (mg/L)	Octanol-Water Coefficient (K_{ow})	Vapor Press (Torr)	Density [a] (g/ml)
Polycyclic Aromatic Hydrocarbons					
Acenaphthylene	152	3.93	8300	2.9×10^{-2}	NA
Benzo(a)anthracene	228	0.014	407000	5×10^{-9}	NA
Benzo(b)fluoranthene	252	0.0012	1100000	5×10^{-7}	NA
Benzo(g,h,i)perylene	276	0.0002	3160000	1.03×10^{-10}	NA
Benzo(a)pyrene	252	0.003	1260000	5.6×10^{-9}	NA
Chrysene	228	0.002	407000	6.3×10^{-7}	NA
Dibenzofuran	168	3.1	13000	1.8×10^{-4}	NA
Fluoranthene	202	0.26	214000	6×10^{-9}	NA
Fluorene	166	1.68-1.98	15000	7.1×10^{-4}	NA
2-Methylnaphthalene	142	25.4	13000	6.8×10^{-2}	NA
Phenanthrene	178	1-1.16	28000	2.5×10^{-6}	NA
Pyrene	202	0.16	76000	2×10^{-6}	NA
Semivolatile Organic Compounds					
Bis(2-ethylhexyl) Phthalate	390	0.285	9500	9.75×10^{-5}	0.98
Di-n-butyl Phthalate	278	400	20500	1×10^{-2}	1.05
Di-n-octyl Phthalate	390	3	1.6×10^{9}	1.4×10^{-4}	0.99
Volatile Organic Compounds					
Acetone	58	Miscible	0.6	230	0.80
Dichloromethane (Methylene Chloride)	85	13000	19	349	1.36
Methyl Ethyl Ketone	100	17000	12.3	100	0.80
4-Methyl-2-pentanone	72	240000	1.9	100	0.80
Tetrachloroethene	166	150-200	758	14	1.6
Xylene (total)	106	150-180 [b]	1000-1500 [b]	10 [b]	0.87 [b]

Sources: Risk Assistant Data Base (1992), Verschueren, (1983), Ney (1990), U.S. Dept. of Health and Human Services, Toxicological Profile for Polycyclic Aromatic Hydrocarbons, 1990

NA = Not Applicable

[a] Densities of solids are not considered applicable to transport phenomena.

[b] Approximate values for ortho, meta and para-xylenes

TABLE 5-3
ENVIRONMENTAL CHARACTERISTICS
OF POTENTIAL CHEMICALS OF CONCERN

Parameter	Environmental Characteristics			
	Absorption On Soil	Bioaccumulation	Volatility	Leaching into water
Polycyclic Aromatic Hydrocarbons				
Acenaphthylene	Yes	Yes	Low	No
Benzo(a)anthracene	Yes	Yes	Very Low	No
Benzo(b)fluoranthene	Yes	Yes	Very Low	No
Benzo(g,h,i)perylene	Yes	Yes	Very Low	No
Benzo(a)pyrene	Yes	Yes	Very Low	No
Chrysene	Yes	Yes	Very Low	No
Dibenzofuran	Yes	Yes	Very Low	No
Fluoranthene	Yes	Yes	Very Low	No
Fluorene	Yes	Yes	Very Low	No
2-Methylnaphthalene	Some	Yes	Low	No
Phenanthrene	Yes	Yes	Very Low	No
Pyrene	Yes	Yes	Very Low	No
Semivolatile Organic Compounds				
Bis(2-ethylhexyl) Phthalate	Yes	Yes	Very Low	No
Di-n-butyl Phthalate	Yes	Yes	Very Low	No
Di-n-octyl Phthalate	Yes	Yes	Very Low	No
Volatile Organic Compounds				
Acetone	No	No	High	Yes
Dichloromethane (Methylene Chloride)	No	No	High	Yes
Methyl Ethyl Ketone	No	No	High	Yes
4-Methyl-2-pentanone	No	No	High	Yes
Tetrachloroethene	Some	Yes	High	Some
Xylene (total)	Some	Yes	High	Some

Sources: Ney, (1990), Nyer et al. (1991)

TABLE 5-4
HALF-LIVES OF POTENTIAL CHEMICALS OF CONCERN

Parameter	Half-Lives			
	Soil [a] (days)	Groundwater [a] (days)	Laboratory [b] Biodegradation	Air [a] (days)
Polycylic Aromatic Hydrocarbons				
Acenaphthylene	12 - 102	24 - 204	96% in 7 d	NA
Benzo(a)anthracene	ND	ND	8% in 7 d 36% in 16 mo	NA
Benzo(b)fluoranthene	360 - 610	720 - 1220	50% in 360 - 610 d	NA
Benzo(g,h,i)perylene	590 - 650	1180 - 1300	50% in 590 - 650 d	NA
Benzo(a)pyrene	57 - 530	114 - 1060	26% in 6 mo 50% in 220 - 530d	NA
Chrysene	370 - 1000	740 - 2000	3% in 7 d 16% in 16 mo	NA
Dibenzofuran	7 - 28	8 - 35	100% in 7 d	NA
Fluoranthene	140 - 440	280 - 886	0% in 7 d 5% in 140 - 440 d	NA
Fluorene	32 - 60	64 - 120	74% in 7 d 50% in 32 - 60 d	NA
2-Methylnapthalene	ND	ND	100% in 9 d	
Phenanthrene	6 - 200	32 - 400	100% in 7 d	NA
Pyrene	210 - 1900	420 - 3800	41% in 7 d 97% in 16 mo	NA
Semivolatile Organic Compounds				
Bis(2-ethylhexyl) Phthalate	5 - 23	10 - 389	0% in 7 d	NA
Di-n-butyl Phthalate	2 - 23	2 - 23	100% in 7 d	NA
Di-n-octyl Phthalate	7 - 28	14 - 365	0% in 7 d	NA
Volatile Organic Compounds				
Acetone	1 - 7	2 - 14	ND	11 - 116
Dichloromethane (Methylene Chloride)	7 - 28	14 - 56	100% in 7 d	19 - 191
Methyl Ethyl Ketone	1 - 7	2 - 14	ND	2.7 - 27
4-Methyl-2-butanone	1 - 7	2 - 14	ND	0.2 - 1.9
Tetrachloroethene	540 - 1080	1080 - 2160	38% in 7 d 50% in 300 d	16 - 160
Xylene (total)	7 - 28	14 - 360	50% in 37 d	0.1 - 1.8

Sources: [(a)]Howard et al. (1991), [(b)]Dragun (1988)
NA = Not applicable
ND = No data

be the case for the chemicals under the Assembly Building because the concrete floor retards the transfer of the oxygen from the air to the soil. Furthermore, much of the remainder of the site is covered with asphalt paving which would also prevent oxygen transfer to the soil.

Biodegradation in the absence of oxygen (anaerobic degradation) is also an important degradation process, but this process has been estimated to be about four times slower then aerobic biodegradation (Howard et al. 1991).

5.3 SUMMARY

Presented below is a summary of the pertinent facts concerning the fate and transport of potential chemicals of concern at the Assembly Building. The most important factor regarding the fate and transport of these contaminants is the concrete floor of the building which (1) prevents precipitation from reaching the soil, (2) prevents migration of soil particles or vapor to the air, and (3) retards aerobic biodegradation of the contaminants.

5.3.1 Polycyclic Aromatic Hydrocarbons

Twelve PAHs (Table 5-1) have been detected in the soil under the Assembly Building. PAHs are strongly adsorbed on soil and not readily leached into groundwater. They will not readily evaporate because of their low vapor pressures. There is little opportunity for transmission of PAH-laden dust particles into the air because of the concrete flooring. Also, there is little chance for erosion of soil particles because precipitation should not directly affect the soil beneath the building.

PAHs have relatively long half-lives in soil, biodegrade slowly (Table 5-4), and will most likely remain in place (adsorbed on soil). However, excavation would expose the soil and possibly allow transport of PAH-contaminated soil into air.

5.3.2 Semivolatile Organic Compounds

SVOCs behave very similarly to PAHs. They are strongly adsorbed on soil, generally remain in place, and biodegrade slowly. Excavation would expose the soil and possibly allow transport of SVOC-contaminated soil into air.

5.3.3 Volatile Organic Compounds

VOCs are the most likely contaminants to migrate because of their poor adsorption to soil, relatively high water solubility, and high vapor pressures. However, their upward migration is limited by the concrete flooring which would retard evaporation.

Transport of VOCs toward groundwater is a potential migration route. Four of the VOCs (acetone, methyl chloride, methylene chloride, methyl ethyl ketone, and 4-methyl-2-butanone) biodegrade fairly rapidly (1-28 days) in soil. However, tetrachloroethene has a long half-life in soil (540-1,080 days) and has the most potential for migrating a significant distance through the soil. However, the approximate distance from the ESP area to the river is 2,500 feet, and the maximum groundwater velocity is 1.7 ft/yr. Total biodegradation of all of the VOCs would be expected to occur prior to reaching the river.

The half-lives of the VOCs in air (as a result of photolysis) range from 0.1 to 613 days (Table 5-4). Methylene chloride is the most stable (19-191 days) and xylenes are the least stable (0.1-0.8 days). The relatively low concentrations of VOCs in soil would probably preclude the build-up of hazardous concentrations in air. This topic is discussed in Section 6.0 of this report.

* * * * *

6.0 HEALTH IMPACT ASSESSMENT

6.1 INTRODUCTION

The purpose of this Health Impact Assessment is to evaluate the risk to human health, if any, posed by the abandoned ESP Area and pipeline at the Leeds Plant. The assessment is based on analytical data collected during the BMWCI Site field investigation activities. The Health Impact Assessment follows the guidelines outlined in the EPA's most current guidance document available for estimating risk (USEPA 1989). It is organized as follows:

- Introduction
- Selection of Chemicals to Be Assessed
- Exposure Assessment
- Toxicity Assessment
- Risk Characterization
- Uncertainties in the Health Impact Assessment.

6.2 SELECTION OF CHEMICALS TO BE ASSESSED

Groundwater samples taken in this area showed very few detections of the analytes. 2-Methylnaphthalene was detected at a low concentration (4 μg/L) in one sample and TPH was detected in samples from two monitoring wells at 20 L and below. Direct human exposure to these chemicals in the groundwater is unlikely since public drinking water is available and the construction of drinking water wells is not anticipated in the ESP area. Since this pathway is considered incomplete, chemicals of potential concern are limited to those found in the subsurface soil samples. All chemicals with a positive laboratory detection were carried through the Health Impact Assessment except TPH.

In order to evaluate human health risk posed by TPH, for which there is no toxicity value available, it is appropriate to look at the toxicity values of specific TPH constituents. Benzene is an example of a likely TPH constituent. It is carcinogenic and considered to pose the highest potential for health risk of typical TPH constituents. Using benzene to represent TPH toxicity in

a health impact assessment is considered a conservative approach. Review of the subsurface soil sampling results, however showed no detection of benzene. TPH was therefore dropped from further consideration in the Health Impact Assessment.

No additional screening of the encountered chemicals was done since there were relatively few chemicals detected in the area of investigation. This allowed a more comprehensive evaluation without making the Health Impact Assessment unwieldy. Table 6-1 lists the chemicals found at the site, and the sample in which the highest concentration was detected.

6.3 EXPOSURE ASSESSMENT

In the exposure assessment, the contaminated media, potential routes of exposure, and potentially exposed populations are identified. Only completed pathways (i.e., a human receptor in contact with the contaminated media) can actually pose a human health risk. The following section discusses both current and future scenarios, and the likelihood for a human receptor population to have direct contact with contaminated media at the ESP Area. Section 6.3.2 discusses how the chemical concentrations for exposure intake were calculated. Section 6.3.3 presents the exposure intake calculations.

6.3.1 Exposure Scenario

As discussed in Section 6.2, subsurface soil is the only media considered in this Health Impact Assessment. Under the current site conditions, with the concrete flooring in place, there is no potential for direct human contact with the subsurface soils, thereby rendering this pathway incomplete. If, in the future, a new work force occupies the facility, there would still be no risk, provided the concrete flooring remains in place. In the event the flooring is disturbed, as would be the case if the USTs were removed, direct contact with the subsurface soils could take place. This exposure pathway would then be completed and may potentially pose a risk. The remainder of the Health Impact Assessment focuses on the future risk, if any, posed to workers from contact with the soils during UST removal.

TABLE 6-1
HIGHEST CONCENTRATION OF CHEMICALS ASSESSED

Chemical	Sample Number	Concentration (mg/kg)
POLYCYCLIC AROMAITC HYDROCARBONS		
Acenaphthalene	MW-201A	90J
Benzo(a)Anthracene	MW-201A	60J
Benzo(b)Fluoranthene	MW-201A	100J
Benzo(a)Pyrene	MW-201A	100J
Benzo(g,h,i)Perylene	MW-201A	70J
Chrysene	MW-201A	80J
Fluoranthene	MW-201C	130J
Fluorene	MW-201D	170J
Phenanthrene	MW-201A	130J
Pyrene	MW-201C	110J
SEMIVOLATILE ORGANIC COMPOUNDS		
Bis(2 ethylhexyl)Phthalate	MW-202B	110J
Di-N-Butylphthalate	SB-219B	33J
Di-N-Octyl Phthalate	SB-219A	20J
2-Methyl-naphthalene	SB-219B	3500
VOLATILE ORGANIC COMPOUNDS		
Acetone	SB-122A	5630
Methylene Chloride	SB-122B	18F
Methyl Ethyl Ketone	SB-122B	4J
4-Methyl-2-Pentanone	SB-122A	2060
Tetrachloroethene	SB-122B	10
Xylenes(Total)	SB-122B	5J

J - This flag indicates that the associated numerical value is an estimated quantity as qualified by the laboratory.

F - This flag is used when the target compound is detected in the field blank as well as the sample.

In establishing a reasonable exposure scenario, it was assumed that removal of the USTs would take approximately 30 days to complete and that a worker would spend 8 hours per day at the site. Other assumptions necessary for the calculations, such as respiration rate, are shown in the intake calculation tables discussed in Section 6.3.3.

The following exposure routes were considered in the Health Impact Assessment:

- Incidental ingestion of contaminants in soil;
- Inhalation of contaminants in fugitive dust;
- Dermal contact with contaminants in the soil; and
- Inhalation of vapor phase chemicals.

Vapor phase chemical concentrations for a future scenario could not be measured. Modeling to predict vapor phase chemical concentrations was considered unnecessary in the Health Impact Assessment. The conservative estimate of exposure concentration for fugitive dust, as discussed in the following section, was thought to overcompensate for the minimal risk posed by vapor phase chemicals.

6.3.2 Exposure Concentrations

The highest concentrations detected for each chemical were used in the exposure section of the Health Impact Assessment. Since a future scenario is being considered, there is obviously no data available regarding fugitive dust concentrations. The Occupational Safety and Health Administration (OSHA) maximum allowable dust level in air, 15 mg/m^3, was used to model the dust level at the site during removal. This level is considered very unlikely, and is therefore a conservative estimate in the evaluation. Fugitive dust particles were assumed to include the maximum chemical concentrations found in the subsurface soils.

6.3.3 Estimation Of Chemical Intakes

Intake rates for all the chemicals of concern were quantified using pathway-specific equations taken from the EPA Risk Assessment Guidance for

Superfund, Volume I: Human Health Evaluation Manual (Part A) (USEPA 1989). These equations and exposure variables are shown in Tables 6-2 through 6-4. Whenever possible, site-specific information was used for variable values in the equations. When not available, default values were taken from EPA guidance documents and referenced. If neither site-specific information nor default values were available, best professional judgment was employed. Chemical intake (or dose) is expressed in milligrams of substance per kilogram of body weight per day (mg/kg/day). This dose is later used, along with toxicity values, during the risk characterization discussed in Section 6.5.

6.4 TOXICITY ASSESSMENT

6.4.1 Noncarcinogenic Effects

The Reference Dose (RfD) and Reference Concentration (RfC) are the toxicity values used in assessing noncarcinogenic effects from oral and inhalation exposure, respectively. Each represents the amount of chemical that can be taken into the body on a daily basis for life without any adverse health consequences.

The EPA Integrated Risk Information System (IRIS) computer database contains chemical-specific RfD and RfC values that have been verified by an intra-agency work group. RfD and RfC values that have not yet been verified may be found in the EPA Health Effects Assessment Summary Tables (HEAST), a quarterly publication.

Most RfDs are expressed as the amount of a chemical administered rather than the amount of a chemical absorbed. In order to assess the toxicity for the dermal route of exposure, it is necessary to adjust RfDs from an administered dose to an absorbed dose. A default value of 50 percent was used to make the adjustment in the Health Impact Assessment.

For some substances there are no toxicity values available in either IRIS or HEAST. These substances are generally excluded from the quantitative estimation of risk. Table 6-5 summarizes the available toxicity values and health effects of concern associated with exposure to specific contaminants.

TABLE 6-2

FORMULA FOR WORKER INGESTION OF CHEMICALS IN SOIL*

Equation:

Intake (mg/kg/day) = CS x CF x SA x AF x ABS x EF x ED / (BW x AT)

Where:

CS = Chemical Concentration in soil (mg/kg)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (kg/mg)
FI = Fraction Ingested from Contaminated Source (unitless)
EF = Exposure Frequency (days/year)
ED = Exposure Duration (years)
BW = Body Weight (kg)
AT = Averaging Time (days)

Variable Values:

CS = highest concentration of chemical in soil samples
IR = 50 mg/day (EPA 1991)
CF = 10^{-6} kg/mg
FI = 1
EF = 30 days/year
ED = 1 year (EPA 1991)
BW = 70 kg (EPA 1989)
AT = 9,125 days for noncarcinogenic effects (ED x 365 days/year). (EPA 1989)
25,550 days for carcinogenic effects (70 years x 365 days/year). (EPA 1990)

**USEPA, 1989*

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TABLE 6-3

FORMULA FOR WORKER INHALATION OF CHEMICALS IN FUGITIVE DUST*

Equation:

Intake (mg/kg/day) = CA x IR x ET x EF x ED / (BW x AT)

Where:

CA = Chemical Concentration in Air (mg/m^3)
where: CA = C_s x D x C_d x R_d x CF
C_s is the chemical concentration in soil (mg/kg)
D is the dust concentration ($\mu g/m^3$)
C_d is the contaminated concentration of dust ($\mu g/\mu g$)
R_d is the respirable fraction
CF is a conversion factor (kg/µg)
IR = Inhalation Rate (m^3/hr)
ET = Exposure Time (hours/day)
EF = Exposure Frequency (days/year)
ED = Exposure Duration (years)
BW = Body Weight (kg)
AT = Averaging Time (days)

Variable Values:

C_s = highest concentration of chemical in soil samples
D = 15,000 $\mu g/m^3$
C_d = 1.0
R_d = 0.73
CF = 10^{-9}
IR = 2.5 m^3/hr (EPA 1991)
ET = 8 hrs/day
EF = 30 days/year (EPA 1991)
ED = 1 year (EPA 1991)
BW = 70 kg (EPA 1989)
AT = 9,125 days for noncarcinogenic effects (ED x 365 days/year). (EPA 1989)
25,550 days for carcinogenic effects (70 years x 365 days/year). (EPA 1990)

*USEPA, 1989

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TABLE 6-4

FORMULA FOR WORKER DERMAL CONTACT WITH CHEMICALS IN SOIL*

Equation:

Absorbed Dose (mg/kg/day) = CS x IR x CF x FI x EF x ED/ (BW x AT)

Where:

CS = Chemical Concentration in soil (mg/kg)
CF = Conversion Factor (kg/mg)
SA = Skin Surface Area Available for Contact (cm^2/event)
AF = Soil to Skin Adherence Factor (mg/cm^2)
ABS = Absorption Factor (unitless)
EF = Exposure Frequency (days/year)
ED = Exposure Duration (years)
BW = Body Weight (kg)
AT = Averaging Time (days)

Variable Values:

CS = highest concentration of chemical in soil samples
CF = 10^{-6} kg/mg
SA = 1,980 cm^2/event (arithmetic mean of body part specific surface area - forearms, hands of male adults). (EPA 1990)
AF = 1.0 mg/cm^2 (EPA 1991)
ABS = chemical specific or a default value of 1 (EPA 1991)
EF = 30 days/year
ED = 1 year (EPA 1991)
BW = 70 kg (EPA 1989)
AT = 9,125 days for noncarcinogenic effects (ED x 365 days/year). (EPA 1989)
25,550 days for carcinogenic effects (70 years x 365 days/year). (EPA 1990)

**USEPA, 1989*

TABLE 6-5
SUMMARY OF NONCARCINOGENIC TOXICITY INFORMATION
FOR CHEMICALS

Chemical	Reference	RfD/RfC (mg/kg/day)	Effect of Concern Oral/Inhalation
POLYCYCLIC AROMATIC HYDROCARBONS			
Flouranthene	IRIS	4.0E-2/ND	Nephropathy, increased liver weights, hematological alterations / NA
Flourene	IRIS	4.0E-2/ND	Decreased red blood count, packed cell volume and hemoglobin / NA
Pyrene	HEAST	3.0E-2/ND	Renal effects / NA
SEMIVOLATILE ORGANIC COMPOUNDS			
Bis(2-ethylhexyl)Phthalate	IRIS	2.0E-2/ND	Increased relative liver weight / NA
Di-N-Butylphthalate	IRIS	1.0E-1/ND	Mortality / NA
Di-N-Octyl Phthalate	HEAST	2.0E-2/ND	NA
VOLATILE ORGANIC COMPOUNDS			
Acetone	IRIS	1.0E-1/ND	Increased kidney and liver weight, nephrotoxicity / NA
Methylene Chloride	IRIS/HEAST	6.0E-2/3.0E+0	NA / Liver toxicity
Methyl Ethyl Ketone	HEAST	5.0E-2/3.0E-1	Fetoxicity / Central nervous system effects
4-Methyl-2-Pentanone	HEAST	5.0E-2/8.0E-2	Liver and kidney effects / Liver and kidney effects
Tetrachloroethene	IRIS	1.0E-2/ND	Hepatotoxicity / NA
Xylenes	IRIS/HEAST	2.0E+0/3.0E-1	Hyperactivity, decreased body weight / Central nervous system effects

IRIS - Integrated Risk Information System. Values from October, 1991.
HEAST - Health Exposure Affects Summary Tables. Values from October, 1991.
NA - Not Available.
ND - Not Determined.

6.4.2 Carcinogenic Effects

The toxicity values used in assessing the risk of cancer resulting from chemical exposure are called slope factors or cancer potency factors. A slope factor is defined as the upper limit on the lifetime probability that a carcinogen will cause cancer at a dose of one mg/kg/day. Slope factors are available in IRIS or HEAST for most substances categorized as A or B carcinogens. Table 6-6 depicts EPA's carcinogen classification system.

For certain substances suspected of being human carcinogens, no slope factors are available. It would be inappropriate to simply exclude them from the assessment, therefore two options were considered: 1) to assess them qualitatively, or 2) to use a surrogate slope factor to calculate a quantitative estimate of cancer risk. The second approach was chosen because several PAHs (a group of similar compounds, some of which have shown carcinogenic activity) encountered at the site did not have available slope factors. Additionally, PAHs are present in complex mixtures of substances, such as cigarette smoke and coal tar that have been strongly associated with an increased risk of cancer in humans. Because humans are typically exposed to PAHs only in mixtures, it has not been possible to establish human carcinogenicity for the individual PAH compounds. Utilizing the experimental evidence regarding single substances in animals and mixtures in humans, it was concluded that a quantitative estimate of risk is both reasonable and appropriate.

The surrogate value used in this assessment is the slope factor for benzo(a)pyrene, a PAH compound extensively studied and thought to be the most potent. The detected concentrations of all PAHs categorized as B2 carcinogens [benzo(a)pyrene, benzo(a)anthracene, benzo(k)fluoranthene and chrysene] were added and used as the exposure concentration for benzo(a)pyrene in the risk calculations. Using the benzo(a)pyrene slope factor for the other (presumably less potent) carcinogenic PAHs most likely results in a conservative overestimate of risk.

TABLE 6-6
EPA CARCINOGEN CLASSIFICATION

CARCINOGEN CATEGORIES

A Human carcinogen

B Probable human carcinogen

C Possible human carcinogen

D Not classifiable

E Evidence of noncarcinogenicity

WEIGHT-OF-EVIDENCE CLASSIFICATION MATRIX

	Animal Evidence				
Human Evidence	Sufficient	Limited	Inadequate	No Data	No Evidence
Sufficient	A	A	A	A	A
Limited	B1	B1	B1	B1	B1
Inadequate	B2	C	D	D	D
No Data	B2	C	D	D	E
No Evidence	B2	D	D	D	E

Note: The B category is subdivided into B1 and B2, with the strength of any available human data being the deciding factor.

As with the noncarcinogenic toxicity values discussed in Section [illegible], it is also necessary to adjust slope factors from an administered dose to an absorbed dose in evaluating dermal exposure. A default value of 50 percent absorption was applied in the Health Impact Assessment.

The carcinogens and suspected carcinogens detected on site are presented in Table 6-7. As indicated, bis(2-ethylhexyl)phthalate, methylene chloride, and tetrachloroethene are B2 carcinogens. Chloromethane is categorized as a C carcinogen.

6.5 RISK CHARACTERIZATION

6.5.1 Noncarcinogenic Risk

In this section, the toxicity values for the chemicals detected are used in conjunction with the dose estimates developed from the exposure scenario to quantitatively estimate potential health risks associated with the excavation of the USTs at the site. The characterization of noncarcinogenic risks utilizes RfDs and/or RfCs as toxicity values. The doses calculated for each exposure pathway are compared with the reference value. By definition, if the dose does not exceed the reference value, no adverse health effects would be expected. The comparison of dose to reference value is expressed mathematically as the hazard quotient, which is simply the dose divided by the reference value:

Hazard Quotient = Dose (mg/kg/day) / RfD (mg/kg/day)

A hazard quotient of one (1) or less indicates that no adverse health effects are expected. Hazard quotients for all chemicals present are summed to arrive at a total hazard index. If all indices are one or less, the site poses essentially no risk of adverse noncarcinogenic human health effects.

The exposure pathways for which hazard indices were calculated include incidental ingestion of soil (due to typical hand to mouth behavior and consequent intake), inhalation of fugitive dust, and dermal contact with soil.

TABLE 6-7
SUMMARY OF CARCINOGENIC TOXICITY INFORMATION
FOR CHEMICALS ASSESSED

Chemical	Weight of Evidence	Reference	Slope Factor Oral/Inhalation (mg/kg/day)	Site of Tumor Oral/Inhalation
POLYCYCLIC AROMATIC HYDROCARBONS				
Benzo(a)Pyrene	B2	HEAST	1.2E+1/1.7E-3	Stomach / Respiratory Tract
SEMIVOLATILE ORGANIC COMPOUNDS				
Bis(2-ethylhexyl)Phthalate	B2	IRIS	1.4E-2/ND	Liver / NA
VOLATILE ORGANIC COMPOUNDS				
Methylene Chloride	B2	IRIS	7.5E-3/4.7E-7	Liver / Liver, lung
Tetrachloroethene	B2	HEAST	5.1E-2/5.2E-7	Liver / Lukemia, liver

IRIS - Integrated Risk Information System. Values from October, 1991.
HEAST - Health Exposure Affects Summary Tables. Values from October, 1991.
NA - Not Available.
ND - Not Determined.

The chemicals evaluated within each pathway included only those for which RfDs and/or RfCs were available in IRIS or HEAST.

Incidental ingestion of soil resulted in a pathway hazard index expressed exponentially as 5E-6, or 0.000005. Inhalation of dust resulted in an index of 3E-4 (0.0003) and dermal contact resulted in an index of 5E-4 (0.0005). The total hazard index for workers was 8E-4 (0.0008). Since this value is less than one, adverse noncarcinogenic health effects on the workers would not be expected as a result of their contact with the site. Table 6-8 depicts the intake, reference, and hazard index values for the worker exposure scenario during UST removal.

6.5.2 Carcinogenic Risk

The characterization of carcinogenic risk utilizes slope factors in conjunction with the estimated doses to quantitatively evaluate the potential risk of cancer posed by site chemicals. The estimated dose for each carcinogenic substance is multiplied by the corresponding slope factor to calculate risk. The simple expression is:

$$\text{Risk} = \text{Dose (mg/kg/day)} \times \text{Slope Factor (mg/kg/day)}^{-1}$$

The calculated risks are summed within each pathway and then for all pathways to yield total excess lifetime cancer risk. Zero risk is never achievable in any practical sense given the current assumption that any exposure to a carcinogen poses some risk. Consequently, ranges of acceptable risk have been developed by EPA for use as remediation goals. The Superfund site goal is to achieve a site-related cancer risk to exposed individuals of no less than 1 in 10,000. Exponentially, this risk is expressed as 1E-4, or 0.0001.

Exposure pathways remain the same as discussed before (Section 6.1). The pathway risks for ingestion of soil, inhalation of dust, and dermal contact with soil were calculated as 3E-9, 7E-9, and 1E-7, respectively. The total cancer risk for the site is 1E-7 (1 in ten million). This is significantly less than the minimum remediation goal of 1E-4 (1 in ten thousand). Table 6-9

TABLE 6-8
HAZARD INDEX ESTIMATES FOR WORKER EXPOSURE

Chemical	Daily Intake (mg/kg/d)	RfD/RfC (mg/kg/day)	Hazard Quotient	Pathway Hazard Index	Total Hazard Index
EXPOSURE PATHWAY: Incidental ingestion of chemicals in soil.					
POLYCYCLIC AROMATIC HYDROCARBONS					
Flouranthene	7.6E-9	4.0E-2	2E-7		
Flourene	1.0E-8	4.0E-2	2E-7		
Pyrene	6.5E-9	3.0E-2	2E-7		
SEMIVOLATILE ORGANIC COMPOUNDS					
Bis(2-ethylhexyl)Phthalate	6.5E-9	2.0E-2	3E-7		
Di-N-Butylphthalate	1.9E-9	1.0E-1	2E-8		
Di-N-Octyl Phthalate	1.2E-9	2.0E-2	6E-8		
VOLATILE ORGANIC COMPOUNDS					
Acetone	3.3E-7	1.0E-1	3E-6		
Methylene Chloride	1.1E-9	6.0E-2	2E-8		
Methyl Ethyl Ketone	2.3E-10	5.0E-2	5E-9		
4-Methyl-2-Pentanone	1.2E-7	5.0E-2	2E-6		
Tetrachloroethene	5.9E-10	1.0E-2	6E-8		
Xylenes	2.9E-10	2.0E+0	1E-10		
PATHWAY HAZARD INDEX:				5E-6	
EXPOSURE PATHWAY: Inhalation of chemicals in fugitive dust.					
VOLATILE ORGANIC COMPOUNDS					
Methylene Chloride	2.0E-7	3.0E+0	7E-8		
Methyl Ethyl Ketone	4.4E-8	3.0E-1	1E-7		
4-Methyl-2-Pentanone	2.3E-5	8.0E-2	3E-4		
Xylenes	5.5E-8	3.0E-1	2E-7		
PATHWAY HAZARD INDEX:				3E-4	
EXPOSURE PATHWAY: Dermal contact with chemicals in soil.					
POLYCYCLIC AROMATIC HYDROCARBONS					
Flouranthene	3.0E-7	4.0E-2	2E-5		
Flourene	3.9E-7	4.0E-2	2E-5		
Pyrene	2.6E-7	3.0E-2	2E-5		
SEMIVOLATILE ORGANIC COMPOUNDS					
Bis(2-ethylhexyl)Phthalate	2.6E-7	2.0E-2	3E-5		
Di-N-Butylphthalate	7.7E-8	1.0E-1	2E-6		
Di-N-Octyl Phthalate	4.7E-8	2.0E-2	5E-6		
VOLATILE ORGANIC COMPOUNDS					
Acetone	1.3E-5	1.0E-1	3E-4		
Methylene Chloride	4.2E-8	6.0E-2	1E-6		
Methyl Ethyl Ketone	9.3E-9	5.0E-2	4E-7		
4-Methyl-2-Pentanone	4.8E-6	5.0E-2	2E-4		
Tetrachloroethene	2.3E-8	1.0E-2	5E-6		
Xylenes	1.2E-8	2.0E+0	1E-8		
PATHWAY HAZARD INDEX:				5E-4	
TOTAL HAZARD INDEX:					8E-4

TABLE 6-9
EXCESS LIFETIME CANCER RISK ESTIMATES
FOR WORKER EXPOSURE

Chemical	Daily Intake (mg/kg/d)	Slope Factor (mg/kg/d)	Excess Cancer Risk	Pathway Cancer Risk	Total Cancer Risk
EXPOSURE PATHWAY: Incidental ingestion of chemicals in soil.					
POLYCYCLIC AROMATIC HYDROCARBONS					
Benzo(a)Pyrene	2.9E-10	1.2E+1	3E-9		
SEMIVOLATILE ORGANIC COMPOUNDS					
Bis(2-ethylhexyl)Phthalate	9.2E-11	1.4E-2	1E-12		
VOLATILE ORGANIC COMPOUNDS					
Methylene Chloride	1.5E-11	7.5E-3	1E-13		
Tetrachloroethene	8.4E-12	5.1E-2	4E-13		
PATHWAY CANCER RISK:				3E-9	
EXPOSURE PATHWAY: Inhalation of chemicals in fugitive dust.					
POLYCYCLIC AROMATIC HYDROCARBONS					
Benzo(a)Pyrene	4.4E-6	1.7E-3	7E-9		
VOLATILE ORGANIC COMPOUNDS					
Methylene Chloride	2.3E-7	4.7E-7	1E-13		
Tetrachloroethene	1.3E-7	4.2E-7	7E-14		
PATHWAY CANCER RISK:				7E-9	
EXPOSURE PATHWAY:Dermal contact with chemicals in soil.					
POLYCYCLIC AROMATIC HYDROCARBONS					
Benzo(a)Pyrene	1.1E-8	1.2E+1	1E-7		
SEMIVOLATILE ORGANIC COMPOUNDS					
Bis(2-ethylhexyl)Phthalate	3.7E-9	1.4E-2	5E-11		
VOLATILE ORGANIC COMPOUNDS					
Methylene Chloride	6.0E-10	7.5E-3	4E-11		
Tetrachloroethene	3.3E-10	5.1E-2	2E-11		
PATHWAY CANCER RISK:				1E-7	
TOTAL CANCER RISK:					1E-7

depicts intake values, slope factors, and cancer risks for the worker exposure scenario during UST removal.

6.6 UNCERTAINTIES IN THE HEALTH IMPACT ASSESSMENT

6.6.1 Uncertainties From Chemical Identification

At any site, it is likely that there are more individual chemical substances present than are identified in the sampling and analytical effort. The selection of media sampled, number of samples, and analyses requested are determined by a review of the history of the site, information on current operations, and an evaluation as to which chemicals of concern could potentially be present. Given the nature of this site, and the level and identity of the chemicals detected in the sampling effort, it is unlikely that significant chemical contamination went undetected. Therefore, the chemical identification phase of the Health Impact Assessment does not appear to have introduced appreciable uncertainty.

6.6.2 Uncertainties from Exposure Assessment

In evaluating exposure, probable scenarios are developed to estimate the conditions and duration of human contact with chemicals associated with the site. The scenarios are based on observations or assumptions about the potential activities of human populations on or near the site. To prevent underestimation of any risks, exposure conditions and duration are typically high estimates of potential exposure.

The exposure concentrations of the chemicals of concern are developed from the analytical results and then calculated or modeled for each applicable exposure route. Default values, such as average respiration rates, are used in these calculations to quantify intake. Although they are based on EPA-validated data, there is uncertainty in the applicability of such values to any particular exposed population or individual. To compensate for this uncertainty, the default values are typically set to the high end (usually the 95th percentile) of the normal range. Therefore, the uncertainty associated with the exposure assessment is appreciable, but tends toward a conservative

overestimation of exposure and is protective of potentially exposed populations.

It should also be noted that the model for inhalation of dust utilized OSHA's maximum allowable dust level as the airborne dust concentration. This should result in a conservative overestimate of the site conditions during UST removal.

While it is recognized that some of the chemicals will volatilize and be present in air as vapor, the dust exposure level used is considered conservative and overcompensates for the potential risk posed by inhalation of volatiles.

6.6.3 Uncertainties From Toxicity Assessment

For some substances present, there is little or no toxicity information available and what is available is typically from animal studies. The relative strength of the available toxicological information generates some uncertainty in the evaluation of possible adverse health effects and the exposure level at which they may occur. To ensure a safe margin of error, if possible, EPA uses two adjustments for toxicity values. For noncarcinogenic substances, the RfD is established only after uncertainty factors are applied. These factors may result in an RfD that is as much as a thousandfold less than the harmful dose level determined through animal testing. For carcinogens, the slope factor presents the 95 percent upper confidence limit the dose response curve, that is a conservative estimate of low dose potency. The actual cancer potency of a substance at low doses is almost certainly less, and may be zero.

In the particular case of PAHs, using the slope factor for what is considered the most potent PAH as a surrogate slope factor for all the carcinogenic PAHs results in a protective overestimate of toxicity. The uncertainty associated with this extrapolation is appreciable.

Some uncertainty may enter the Health Impact Assessment in adjusting the toxicity values for dermal exposure assessment. Although the default value of 50 percent absorption may be reasonable for most chemicals, for other chemicals it may be inappropriately high or low, making the uncertainty appreciable.

* * * * *

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSIONS

Five soil borings (SB-201, SB-205, SB-218, SB-219, and SB-122) and two monitoring well borings (MW-201 and MW-202) were drilled at the GM Leeds Assembly Plant in the vicinity of the ESP and the abandoned kerosene pipeline. Subsurface soil samples were collected from all borings and groundwater samples from both monitoring wells for chemical analysis. The results were used to characterize the nature and extent of potential contamination and effects upon human health and the environment relating to the ESP and pipeline.

7.1.1 Subsurface Soil

Twenty-four subsurface soil samples (including two duplicate samples) were collected at the Leeds Assembly Plant in the vicinity of the ESP and abandoned kerosene pipeline. These samples were analyzed for VOCs, SVOCs, and/or TPH according to Table 3-1.

TPH levels exceeding 100 mg/kg were found in samples from MW-201, MW-202, and SB-219. The highest TPH concentration encountered was 1,840 mg/kg in MW-202C. Elevated levels of VOCs (predominantly acetone) were encountered in Samples MW-202C, SB-219B, and SB-122A. The highest total VOCs detection was 7,960 μg/kg (consisting of acetone and 4-methyl-2-pentanone) in Sample SB-122A. SVOCs were detected in all subsurface soil samples calling for this analysis except MW-202A. The SVOC most often detected was 2-methylnaphthalene. The highest concentration of this compound was 3,500 μg/kg in Sample SB-219B.

7.1.2 Groundwater

Three groundwater samples (including one duplicate) were collected during each of the two sampling rounds from two monitoring wells along the abandoned pipeline. Samples were analyzed for SVOCs and TPH (Table 3-1). The only SVOCs encountered were 2-methylnaphthalene (4 μg/L) in GW-201A and

pentachlorophe[illegible] in GW-201B. TPH was detected at 25 mg/L, or less, in all ground[illegible]s, including the duplicates.

7.1.3 Contaminant Fate and Transport

The fate and transport of 23 potential chemicals of concern were evaluated. These chemicals consisted of 11 PAHs, four SVOCs, and 8 VOCs. With the exception of benzo(a)pyrene, all of the chemicals were detected in soil far below risk-based concentrations.

Migration of soil particles or vapor into the air is hindered by the concrete floor that covers the ESP area and pipeline. The concrete floor also retards aerobic biodegredation of the contaminants. The roof of the building and the concrete floor prevent precipitation from reaching the soil. Unlike PAHs and SVOCs, VOCs typically have a higher potential to migrate. Upward migration of VOCs is also limited by the concrete floor, however VOCs could potentially migrate toward groundwater. The slow velocity of the groundwater and substantial distance to the Blue River would delay the migration of contaminants to the river by many years.

The relatively low concentrations of VOCs in soil should preclude hazardous concentrations from forming in air. However, if the concrete floor is removed, SVOC- and PAH-contaminated soil and/or VOC vapors could be transported to the air.

7.1.4 Health Impact Assessment

The Health Impact Assessment evaluated the potential for risk to human health posed by the ESP Area and the pipeline. The assessment was based on analytical results of the field investigation activities. Current conditions at the site do not pose any significant risk because of incomplete exposure pathways to chemicals in the subsurface soil.

The risk posed by disturbing the concrete flooring, as would be the case in an UST removal, was evaluated. The risk characterization, using the highest detected concentrations of chemicals and conservative exposure assumptions,

showed that it is very unlikely for workers during UST removal to experience any adverse health consequences.

Any uncertainties in this Health Impact Assessment may result from the assumptions made about the site, behavior of human populations, values used to calculate or model exposure, and toxicity of chemicals to humans. At this site, these uncertainties were evaluated qualitatively and determined to generally influence the Health Impact Assessment in the direction of protectiveness. That is, each component of the Health Impact Assessment is either neutral or conservative, and therefore protective.

7.2 RECOMMENDATIONS

According to the Underground Storage Tank Closure Guidance Document (MDNR 1992), the only procedure required for USTs taken out of service prior to January 1, 1974, is: 1) use industry practices to close the USTs, 2) collect and analyze soil samples (as presented in this report) if a release is suspected, and 3) submit an "UST Closure Report."

BMWCI recommends that this Assessment Report be considered an "UST Closure Report" and that no further action be taken for the following reasons:

1. As discussed in Section 5.0, it is unlikely that significant migration of contaminants would occur in this area.

2. According to the Health Impact Assessment (Section 6.0), there is no significant impact upon human health and the environment from the contamination detected in the vicinity of the ESP and pipeline.

3. The above factors show tank excavation to be unnecessary.

4. The suspected quantities, depth to excavate, and date of abandonment of the USTs make filling them with an inert material impractical and unnecessary.

* * * * *

8.0 REFERENCES

1. Davis, A. and R. L. Olsen. "Predicting the Fate and Transport of Organic Compounds in Groundwater, Part 2." Hazardous Materials Control Research Institute. 3(4):18-37. 1990

2. Dragun, J. The Soil Chemistry of Hazardous Materials. Hazardous Materials Control Research Institute. Silver Springs, MD. 1988.

3. Federal Register. "Proposed Rules." P.30865. July 27, 1990.

4. Howard, P. H., R. S. Boethling, W. F. Jarvis, W. M. Meylan, E. M. Michalenko. Handbook of Environmental Degredation Rates. Lewis Publishers. 1991.

5. MDNR. Underground Storage Tank Closure Guidance Document. Division of Environmental Quality, Water Pollution Control Program. Jefferson City, MO. January 1992.

6. Ney, R. E. Where Did That Chemical Go? A Practical Guide to Chemical Fate and Transport in the Environment. Van Nostrand Reinhold. New York. 1990.

7. Nyer, E. et al. Ground Water Monitoring Review. Fall 1991.

8. Risk Assistant Data Base. The Hampshire Research Institute. Alexandria, VA. 1991.

9. Smith, Roy L. Risk Based Concentration Table, First Quarter 1992. USEPA Region III. Philadelphia, PA. December 2, 1991.

10. USDHHS. Toxicological Profile for Polycyclic Aromatic Hydrocarbons. Washinton, D. C. Agency for Toxic Substance and Disease Registry. 1990.

11. USEPA. A Compendium of Superfund Field Operations Method. December 1987.

12. USEPA. Exposures Factors Handbook. Office of Health and Environmental Assessment. EPA/600/8-89/043. 1990.

13. USEPA. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA. Office of Emergency and Remedial Response, and Office of Solid Waste and Emergency Response. October 1988.

14. USEPA. Health Effects Assessment Summary Tables, Annual FY -1991. Office of Emergency and Remedial Response. OERR 9200.6-303 (91-1). 1991a.

15. USEPA. Integrated Risk Information System (IRIS). December 1991.

16. USEPA. Risk Assessment Guidance for Superfund. Volume I: Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response. EPA/540/1-89/002. 1989.

17. USEPA. Supplemental Guidance, Standard Default Exposure Factors. OSWER Directive 99235.6-03. 1991.

18. Verschueren, K. Handbook of Environmental Data on Organic Chemicals. Second Edition. Van Nostrand Reinhold. New York. 1983.

19. Wood, P. R., R. F. Lang, and I. L. Payan. Groundwater Quality. Ward, Figer, and McCarty. Wiley, New York. 1985.

* * * * *

APPENDIX A

DRILLING LOGS

Project Name: GMLEEDS						Boring No.	
Project No.: 91-223-4						Page 1 of 2	
Ground Elevation		Location				Total Footage: 20.0'	
Drilling Type	Hole Size	Overburden Footage	Bedrock Footage	No. of Samples	No. Core Boxes	Depth To Water	Date Measured
HSA	6"	20'	0	4	0	See Remarks	
Drilling Co.: Layne Western						Driller (s): Randy Crowell / Gary McDaniels	
Drilling Rig: [illegible]						Type of Penetration Test: None	
Date: 11-18	To: 11-18-91					Field Observer (s): Kirby Smail / [illegible]	

Depth	Description	Class.	Blow Count	Recov.	Sample or Box No.	Remarks
1	asphalt concrete					began @ 1:47 11-18-91
1	Fill, clay, cinders, wood, olive gray to black, dry	Fill		3.0/5.0	C1	
3					S=1	
5					1:50 C2	
6	CLAY, moist, olive gray (5Y 3/2) medium [illegible], [illegible]			5.0/5.0		2:00 A=20 ppm B=1.1 ppm
7						
8					S=[illegible]	
9						
10					2:05 C3	
11	CLAY, some silt, layer of silty (5Y 3/2), wet, very soft, low plasticity	CL		4.5/5.0		2:15 A=[illegible] ppm B=[illegible] ppm
12					S=4.5/5	
13						
14					C4	

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Drilling Log, continued

Boring No. MW-12

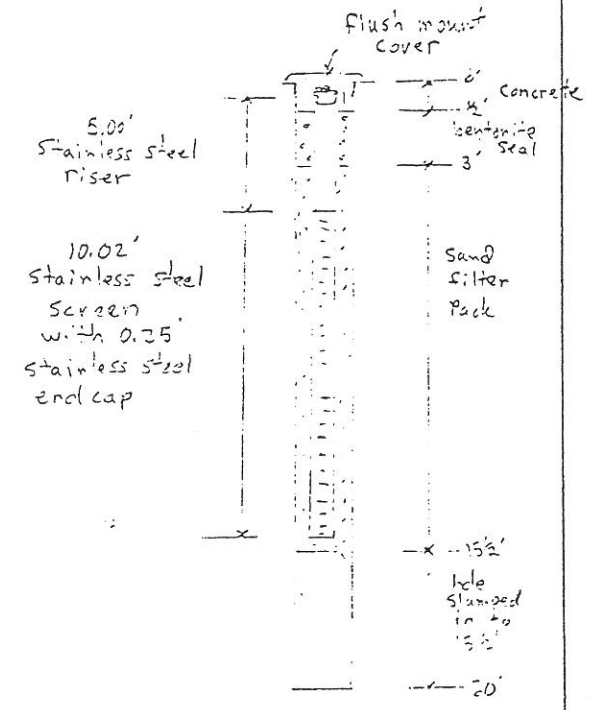
Project Name GMLEEDS

Page 2 of 2

Project No. 91-223-4

Date 11-19

Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks
15	CLAY, moist, grayish green (5G 5/2), stiff, high plast.	CL		3'/3'	C4	
16						
17	CLAY, wet, pale green (5G 7/2), very soft, trace plasticity	CL			S-5	
18	SILT, some clay, light brown (5YR 5/6), soft, non plastic	ML				
19						
20	TD = 20.0'				S-25	TD @ 2:25 hole left open 11-18-91
21						well construction began @ 1:50 on 11-20-91
22	5.00' stainless steel riser					10.02' stainless screen 0.25' stainless end cap 5.00' stainless riser 2½ bgs Sand ½ bg bentonite chip
23	10.02' stainless steel screen with 0.25' stainless steel end cap					well completed @ 2:10 11-20-91
24						
25						
26						
27						
28						
29						
30						
31						



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LEEDS005911

Project Name: GMLEEDS						Boring No.: [illegible]-20-5	
Project No.: 91-223-4						Page: 1 of 2	
Ground Elevation		Location				Total Footage: 20.0'	
Drilling Type	Hole Size	Overburden Footage	Bedrock Footage	No. of Samples	No. Core Boxes	Depth To Water	Date Measured
HSA	6"	20'	0	4	0	See Remarks	
Drilling Co.: Layne Western						Driller (s): [illegible] / Gary D. Conkle	
Drilling Rig.: [illegible]						Type of Penetration Test	
Date: 11-20-9[illegible]		To: 11-20-91				Field Observer (s): Kirby Smail / [illegible]	

Depth	Description	Class.	Blow Count	Recov.	Sample or Box No.	A=auger cuttings B=borehole S=Sample Remarks
1	Concrete					began @ 7:40 11-20-91
2	CLAY, cinders, some sand, olive black, to black, damp	fill			C1 S=0	7:40 A=0ppm B=0ppm
3					745	hit hard object removed sampler to drive through
4	gravel, clay, and cinders	fill			[illegible]	
5					C2	1:50 A=0ppm B=0ppm
6	CLAY, some gravel to ½"; damp to moist, grayish olive (10Y 4/2) soft, medium plasticity	CL				
7					S=5?	
8						8:00 A=0ppm B=0ppm
9						
10	CLAY, trace organics (roots), strong petrol odor, grayish olive to black (5Y 3/2), moist, soft to very soft; high plasticity	CH			T:05 C3	8:05 B=18.2 ppm sweet-acid type smell
11						1 3:50 11-20-91
12					S=540	
13						8:19 A=0ppm B=[illegible]ppm
14					T:20	strong odor

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LEEDS005912

Boring No. [illegible]

Project Name GMLEEDS

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Project No. 91-223-4

Date [illegible]

Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks
15	CLAY				CL	
16	CLAY, wet, grayish green (5GY 5/2), soft, low plasticity, trace fine sand, strong iron staining	CL			S-9	7:30 P=0 ppm B=24.8 ppm
17						
18						
19						7:34 P=0 ppm; 0% B=17%
20					8:30	TD=8:30
21	TD=20'					Well construction began @ 1:30 11-2
22	locking flush mount cover; 2' concrete; ½' bentonite seal; 5.00' stainless steel riser					9.96' stainless scre 5.00' stainless riser Sand pack from 16½' to 3' 4 bgs used Bentonite seal from to ½' ½ bg used
23						
24	9.96' stainless steel screen					
25	Sand filter pack					well left unfinished 1:50 11-20-91 11-21-91 1:30 flush mount set level with finish fl
26						
27						
28	16.5' hole slump to 16½'					
29	20					
30						
31						

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LEEDS005913

Project Name: GM LEEDS						Boring No.: SB-201	
Project No.: 91-223-4						Page: 1 of 1	
Ground Elevation:		Location:				Total Depth: 4.0'	
Drilling Type	Hole Size	Overburden Footage	Bedrock Footage	No. of Samples	No. Core Boxes	Depth To Water	Date Measured
HSA	6"	4.0'	0	0	0	See Remarks	

Drilling Co.: Layne Western — Driller (s): Randy Crowley

Drilling Rig.: Skid rig — Type of Penetration Test: none

Date: 11-11-91 To: 11-11-91 — Field Observer (s): Kirby Smail / Jim Brayfield

Depth	Description	Class.	Blow Count	Recov.	Sample or Box No.	Remarks (A = ambient, B = borehole, S = sample)
1	Concrete					begin @ 11-11-91
	gap (air space)					
2	SAND and gravel fill, some silt and clay, wet, grayish orange 10YR 7/4				<1	2:33 A = 0, 0 B = 0, 0
3				0		Kerosine odor (strong) OVM = 195 ppm off auger
4						2:35 auger refusal on pipe @ 4.0'
	TD = 4.0'					hole left open
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						

LEEDS005914

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Project Name: GMLEEDS			Boring No.: SB-223
Project No.: 91-223-4			Page: 1 of 2
Ground Elevation:	Location:		Total Footage: 25.0

Drilling Type	Hole Size	Overburden Footage	Bedrock Footage	No. of Samples	No. Core Boxes	Depth To Water	Date Measured
HSA	6"	25'	0	5	0	See Remarks	

Drilling Co.: Layne Western		Driller (s): Randy Crawford / Gary	
Drilling Rig.: Chicago		Type of Penetration Test: none	
Date: 11-12-91	To: 11-12-91	Field Observer (s): Kirby Smail / Jim Bowdish	

Depth	Description	Class.	Blow Count	Recov.	Sample or Box No.	Remarks
0	Concrete					began @ 9:00 11-12-91
1	SAND & gravel fill, light brown to olive gray; damp	Fill		4.5 / 4.5	C1	A= 0 ppm, 0 %
2					S=1	9:03 B= 0 ppm, 0 %
3						
4	CLAY, soft, damp, olive gray (5Y 3/2), trace gravel to ½" medium plasticity	CL				
5					9:10 C2	9:11 A= 0 ppm B= 0 ppm
6						
7				5.0 / 5.0	S=0	
8						
9						9:22 A= 0 ppm B= 0 ppm
10	CLAY, trace gravel to ½", damp olive gray (5Y 3/2) with light brown (5YR 5/6) mottling, medium stiffness, medium plasticity	CL			9:22 C3	
11				5.0 / 5.0		
12					S=0	
13						
14					9:35	

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Drilling Log, continued

Boring No. [illegible]
Page 2 of 2
Project Name GMLEEDS
Project No. 91-223-4
Date [illegible]

Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks
15	CLAY, trace gravel to 1" diam, olive gray with light brown mottling, med-stiff, med plasticity;				C4	9:41 A=0 ppm B=0 ppm, 0%
16						
17				3.0/5.0	S=0	
18	saturated layer to 19'					▽ 9:52 11-12-91 free liquid
19						
20	CLAY, damp, olive black (5Y 3/1) soft, high plasticity;	CH			9:46 C5	
21						10:01 A=0 ppm B=0 ppm
22					S=	
23						
24						
25					10:00	TD @ 10:00
26	TD = 25.0' TD @ 10:00					hole was backfilled with bentonite chip hole plug.
27						
28						
29						
30						LEEDS005916
31						

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Project Name: GMLEEDS						Boring No.: SB 218	
Project No.: 91-223-4						Page: 1 of 1	
Ground Elevation		Location				Total Footage: 10'	
Drilling Type	Hole Size	Overburden Footage	Bedrock Footage	No. of Samples	No. Core Boxes	Depth To Water	Date Measured
HSA	6"	10'	0	3	0	See Remarks	

Drilling Co.: Layne Western — Driller (s): Randy Croul / Gary McDaniels

Drilling Rig.: Skid rig — Type of Penetration Test: NONE

Date: 11-20-91 — To: 11-20-91 — Field Observer (s): Kirby Smail / Jim Brodie

Depth	Description	Class.	Blow Count	Recov.	Sample or Box No.	Remarks
	Concrete					began @ 12:10 11-20-91
1	air space				C1	
2	SAND, some silt, yellowish gray (5Y 7/2) wet, poorly graded	Fill		0.5/1.0		
3					S=0	12:15 A=0 ppm B=0 ppm
4						
5					12:14 C2	
6						
7				0.5/1.0		12:25 A=0 ppm B=0 ppm
8					S=4	
9						
10					12:33 C3	pushed sampler to 12.5'
11	TD = 12.0'				S=0	hole 12ft open 11-21-91
12					12:35	drilling w/ Sand
13						
14						

LEEDS005917

Form TS-GT-2-1

090280

Burns & McDonnell

Project Name	Boring No.
GMLEEDS	SB-214 (was SB-203)
Project No. 91-223-4	Page 1 of 2
Ground Elevation	Location	Total Footage 17.0'

Drilling Type	Hole Size	Overburden Footage	Bedrock Footage	No. of Samples	No. Core Boxes	Depth To Water	Date Measured
HSA	6"	17'	0	4	0	See Remarks	

Drilling Co. Layne Western	Driller (s) Randy Crowel / Gary McDaniels
Drilling Rig. CME-75	Type of Penetration Test none
Date 11-12-91 To 11-12-91	Field Observer (s) Kirby Smail / Jim Brayfield

Depth	Description	Class.	Blow Count	Recov.	Sample or Box No.	Remarks
1	asphalt blocks concrete					began @ 10:45 11-12-91
2	gravel, sand, clay, cinders, fill damp	Fill		3.0 3.0	C1 S=0	10:52 A = 0 ppm, 0% B = 0 ppm, 0%
3						
4	CLAY, trace gravel to ½", dark olive gray (5Y 3/2) stiff, med plasticity	CL				
5					10:55 C2	
6				5.0 5.0		
7					S=101	
8						
9						
10					11:10 C3	▽ 11:20 11-12-91 free liquid
11						
12	CLAY, trace silt, olive gray with light brown mottling Medium stiff, moist			5.0 5.0	S=126	
13						
14						

LEEDS005918

090280

Burns & McDonnell

Form TS-GT-2-1

Boring No. SB-214 (was SB-203)

Project Name GMLEEDS

Page 2 of 2

Project No. 91-223-4

Date 11-12-91

Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks
15	CLAY, trace silt, olive gray with light brown mottling, medium stiff, medium plasticity, damp	CL			C4	
16					S=17.7	
17					11:25	TD @ 11:25 hole was backfilled with bentonite chip hole plug on completion. -well is going to be moved to SB-204 location.
17	TD = 17.0' TD @ 11:25					
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						

051281

Burns & McDonnell

Form TS-GT-1

LEEDS005919

Drilling Log

SB-122

Project Name: GMLEEDS						Boring No.: SB22	
Project No.: 91-223-4						Page: 1 of 2	
Ground Elevation: ~765 MSL	Location:			ASSEMBLY PLANT		Total Footage: 24.5'	
Drilling Type	Hole Size	Overburden Footage	Bedrock Footage	No. of Samples	No. Core Boxes	Depth To Water	Date Measu
11 SA	6"	24.5'	-0-	7	0	(SEE REMARKS!)	
Drilling Co.: LAYNE - WESTERN					Driller (s): R. CROLL, K. SANTOYO		
Drilling Rig.: MOBILE - B40 (SKID)					Type of Penetration Test: NA		
Date: 8.29-91	To: 8.29-91				Field Observer (s): TED RIEGEL		

Depth	Description	Class.	Blow Count	Recov.	Sample or Box No.	Remarks
	CONCRETE (PLANT FLOOR)		NA		CME#1	STARTED DRILL @ 11:10 8.29-
1	CLAY, TRACE SILT, DARK YELLOWISH BROWN (10YR4/2), LOOSE, HIGHLY PLASTIC, DRY, (FILL). DAMP.	CH		3.0/4.4		B.H. OVM: 0.0 LEL: 0%
2	CLAY, SILTY, DUSKY YELLOWISH BROWN (10YR2/2), BLACK GRANULES, MED. PLASTICITY, DAMP.	CL				SAMPLE OVM: 0, LEL: 0
3	CLAY, SOME SILT, DARK YELLOWISH BROWN (10YR4/2), LOOSE HIGHLY PLASTIC, DAMP, (FILL)	CH				
4						
5					11:15 CME 2	STRONG GAS-LI ODOR FROM CH
6	CLAY, SOME GRANULAR BLACK DEBRIS, MOTTLED DARK GREENISH GRAY (5GY4/1) WITH GRAYISH BLACK (N2), LOW DENSITY, HIGHLY PLASTIC, WET.	CH		5.0/5.0		B.H. OVM: LEL:
7					(A)	SAMPLE OVM: 1,0% LEL: 0%
8						@ 12:45 SAMPLE TAK FROM HIGH C READING.
9					12:45 CME 3	
10						
11	CLAY, MOTTLED OLIVE GRAY (5Y4/1) WITH MODERATE YELLOWISH ORANGE (10YR5/4), LOW DENSITY, HIGHLY PLASTIC, WET.	CH		3.8/5.0		B.H. OVM: 23 p LEL: 0% SAMPLE: OVM: 0 ppm LEL: 0%
12					(B)	B TAKEN FR HOMO. CME
13						
14					12:52	

Drilling Log, continued

SB-122

Boring No. SB-122

Project Name GILLETT

Page 2 of 2

Project No. 7448-4

Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Type of Sample No.	Remarks
15	(SEE PAGE 1)	CH	NA		CME 4	BH OVM: 0ppm LEL: 0% SAMPLE OVM: 0ppm LEL: 0%
16				2.0 / 5.0		
17	CLAY, DARK GREENISH GRAY (5GY4/1) VERY LOOSE, LOW DENSITY, HIGHLY PLASTIC, WET.	CH				
18					ⓒ	ⓒ TAKEN FROM HOMO. CME
19					1:08	
20					CME 5	BH OVM: 0.3ppm LEL: 0% SAMPLE OVM: 0ppm LEL: 0%
21				2.5 / 5.0		
22						
23						
24					ⓓ	ⓓ TAKEN AT TOP OF PIT BOTTOM.
	CONCRETE (~~PIT~~ BOTTOM)	FILL?			1:1K	
25	AUGER REFUSAL @ 24.5' @ 1:14 8-29-91				CME 6	AUGER REFUSAL BH @ 24.5' OVM: 1:1K 8-29-91 LEL: SAMPLE OVM: LEL:
26						
27						
28						
29						
30						
31						

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Form TS-GT-2

LEEDS005921

APPENDIX B

MONITORING WELL
CONSTRUCTION DIAGRAMS

Drilling Log, continued

Boring No. MW-201

Project Name GMLEEDS

Page of

Project No. 91-223-4

Date 11-20-91

Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks
15	flush mount cover					Boring Well construction 3' @ 2 pm
						10' stainless steel screen
						5.0' stainless steel riser
18						Sand pack from 15.5' to 3'
19	3'					3½ bags used
20						Bentonite seal from 3' to ½'
21						½ bag used
22	Sand filter pack					Well completed except for flush mount cover @ 2:15 pm
23						11-21-91
24	10.02' stainless steel screen and 0.25' stainless steel end cap					flush mount cover and concrete cap installed
25						
26						
27						
28						
29						
30	15.5'					
31						

LEEDS005923

051281

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Form TS GT-2 2

Drilling Log, continued

Boring No. MW-202

Project Name GMLEEDS

Page of

Project No. 91-223-4

Date 11-20-91

Depth	Description	Log or Class	Blow Count	Core Recov. & Loss	Box or Sample No.	Remarks
15						Began well construction @ 1:30 pm
16	flush mount cover					6" Stainless Steel Casing
	Concrete cap					Sand pack from 16½ to 3'
18	3.5'					3½ bags used
19	6.00' stainless steel riser					Bentonite Seal from 3' to ½'
20						½ bag used
21	Sand filter pack					well completed except for flush mount cover @ 1:45 pm 11-20-91
22	9.96' stainless steel Screen and 0.25' stainless steel end cap					11-21-91 Concrete cap and flush mount cover installed.
23						
24						
25						
26						
27						
28	15.0'					
29	TD=16.5'					
30						
31						

LEEDS005924

APPENDIX C

LABORATORY DATA -
SUBSURFACE SOIL

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,MO 64130
Attn: Tom Marsh

Report: 0019.16

Date: 11/27/91

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	1.00	2	mg/kg	11/27/91	11/27/91	EPA-418.1

LEEDS005926

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Tim Tate

Report: 8019.16

Date: 12/11/91

VOLATILE ORGANIC COMPOUNDS (VOA/8)	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Chloromethane	1.34	1 U	ug/kg	11/20/91	SW846-8240
Bromomethane	1.34	1 U	ug/kg	11/20/91	SW846-8240
Vinyl Chloride	1.34	1 U	ug/kg	11/20/91	SW846-8240
Chloroethane	1.34	1 U	ug/kg	11/20/91	SW846-8240
Methylene Chloride	6.70	0 U	ug/kg	11/20/91	SW846-8240
Acetone	1.20	1 J	ug/kg	11/20/91	SW846-8240
Carbon Disulfide	6.70	0 U	ug/kg	11/20/91	SW846-8240
1,1-Dichloroethene	6.70	0 U	ug/kg	11/20/91	SW846-8240
1,1-Dichloroethane	6.70	0 U	ug/kg	11/20/91	SW846-8240
Trans-1,2-Dichloroethene	6.70	0 U	ug/kg	11/20/91	SW846-8240
Chloroform	6.70	0 U	ug/kg	11/20/91	SW846-8240
1,2-Dichloroethane	6.70	0 U	ug/kg	11/20/91	SW846-8240
2-Butanone	1.34	1 U	ug/kg	11/20/91	SW846-8240
1,1,1-Trichloroethane	6.70	0 U	ug/kg	11/20/91	SW846-8240
Carbon Tetrachloride	6.70	0 U	ug/kg	11/20/91	SW846-8240
Vinyl Acetate	1.34	1 U	ug/kg	11/20/91	SW846-8240
Bromodichloromethane	6.70	0 U	ug/kg	11/20/91	SW846-8240
1,1,2,2-Tetrachloroethane	6.70	0 U	ug/kg	11/20/91	SW846-8240
1,2-Dichloropropane	6.70	0 U	ug/kg	11/20/91	SW846-8240
Trans-1,3-Dichloropropene	6.70	0 U	ug/kg	11/20/91	SW846-8240
Trichloroethene	6.70	0 U	ug/kg	11/20/91	SW846-8240
Dibromochloromethane	6.70	0 U	ug/kg	11/20/91	SW846-8240
1,1,2-Trichloroethane	6.70	0 U	ug/kg	11/20/91	SW846-8240
Benzene	6.70	0 U	ug/kg	11/20/91	SW846-8240
cis-1,3-Dichloropropene	6.70	0 U	ug/kg	11/20/91	SW846-8240
2-Chloroethylvinylether	1.34	1 U	ug/kg	11/20/91	SW846-8240
Bromoform	6.70	0 U	ug/kg	11/20/91	SW846-8240
2-Hexanone	1.34	1 U	ug/kg	11/20/91	SW846-8240
4-Methyl-2-Pentanone	1.34	1 U	ug/kg	11/20/91	SW846-8240
Tetrachloroethene	6.70	0 U	ug/kg	11/20/91	SW846-8240
Toluene	6.70	0 U	ug/kg	11/20/91	SW846-8240
Chlorobenzene	6.70	0 U	ug/kg	11/20/91	SW846-8240
Ethylbenzene	6.70	0 U	ug/kg	11/20/91	SW846-8240
Styrene	6.70	0 U	ug/kg	11/20/91	SW846-8240

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 8019.16

Date: 12/11/91

SWL # 4: 8019.16
PROJECT: KC Site II/91-223-4
SAMPLE #: MW201A

Date Submitted 11/19/91
Sample Matrix: Soil
Depth From:

COMMENTS:

VOLATILE ORGANIC COMPOUNDS (VOCS)	RESULT*		UNITS	DATE ANALYZED	METHOD
Total Xylenes	6.70	0 U	ug/kg	11/20/91	SW846-8240

LEEDS005928

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,MO 64130
Attn: Joe Marsh

Report: 8019.16

Date: 12/11/91

SWL #: 8019.16
PROJECT: KC Site II/91-223-4
SAMPLE #: MW201A
[illegible]

Date Submitted 11/19/91
Sample Matrix: Soil
Depth From: 4.00
[illegible]

Collected:

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Phenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
bis(2-Chloroethyl)Ether	3.30	2 U	ug/kg	12/02/91	SW846-8270
2-Chlorophenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
1,3-Dichlorobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
1,4-Dichlorobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Benzyl Alcohol	3.30	2 U	ug/kg	12/02/91	SW846-8270
1,2-Dichlorobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
2-Methylphenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
bis(2-Chloroisopropyl)Ether	3.30	2 U	ug/kg	12/02/91	SW846-8270
4-Methylphenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
N-Nitroso-Di-n-Propylamine	3.30	2 U	ug/kg	12/02/91	SW846-8270
Hexachloroethane	3.30	2 U	ug/kg	12/02/91	SW846-8270
Nitrobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Isophorone	3.30	2 U	ug/kg	12/02/91	SW846-8270
2-Nitrophenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
2,4-Dimethylphenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
Benzoic Acid	1.60	3 U	ug/kg	12/02/91	SW846-8270
bis(2-Chloroethoxy)Methane	3.30	2 U	ug/kg	12/02/91	SW846-8270
2,4-Dichlorophenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
1,2,4-Trichlorobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Naphthalene	3.30	2 U	ug/kg	12/02/91	SW846-8270
4-Chloroaniline	3.30	2 U	ug/kg	12/02/91	SW846-8270
Hexachlorobutadiene	3.30	2 U	ug/kg	12/02/91	SW846-8270
4-Chloro-3-Methylphenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
2-Methylnaphthalene	9.50	1 J	ug/kg	12/02/91	SW846-8270
Hexachlorocyclopentadiene	3.30	2 U	ug/kg	12/02/91	SW846-8270
2,4,6-Trichlorophenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
2,4,5-Trichlorophenol	1.60	3 U	ug/kg	12/02/91	SW846-8270
2-Chloronaphthalene	3.30	2 U	ug/kg	12/02/91	SW846-8270
2-Nitroaniline	1.60	3 U	ug/kg	12/02/91	SW846-8270
Dimethylphthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
Acenaphthylene	9.00	1 J	ug/kg	12/02/91	SW846-8270
3-Nitroaniline	1.60	3 U	ug/kg	12/02/91	SW846-8270
Acenaphthene	3.30	2 U	ug/kg	12/02/91	SW846-8270

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,MO 64130
Attn: Joe Marsh

Report: 8019.16

Date: 12/11/91

SWLO #: 8019.16
PROJECT: KC Site 11/91-223-4
SAMPLE #: MW201A
LOCATION:

COMMENTS:

Date Submitted 11/19/91
Sample Matrix: Soil
Depth From: 4.00
Depth To: 6.00

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
2,4-Dinitrophenol	1.60	3 U	ug/kg	12/02/91	SW846-8270
4-Nitrophenol	1.60	3 U	ug/kg	12/02/91	SW846-8270
Dibenzofuran	4.00	1 J	ug/kg	12/02/91	SW846-8270
2,4-Dinitrotoluene	3.30	2 U	ug/kg	12/02/91	SW846-8270
2,6-Dinitrotoluene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Diethylphthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
4-Chlorophenyl-Phenylether	3.30	2 U	ug/kg	12/02/91	SW846-8270
Fluorene	3.30	2 U	ug/kg	12/02/91	SW846-8270
4-Nitroaniline	1.60	3 U	ug/kg	12/02/91	SW846-8270
4,6-Dinitro-2-Methylphenol	1.60	3 U	ug/kg	12/02/91	SW846-8270
N-Nitrosodiphenylamine	3.30	2 U	ug/kg	12/02/91	SW846-8270
4-Bromophenyl-Phenylether	3.30	2 U	ug/kg	12/02/91	SW846-8270
Hexachlorobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Pentachlorophenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
Phenanthrene	1.30	2 J	ug/kg	12/02/91	SW846-8270
Anthracene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Di-N-Butylphthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
Fluoranthene	9.00	1 J	ug/kg	12/02/91	SW846-8270
Pyrene	9.00	1 J	ug/kg	12/02/91	SW846-8270
Butylbenzylphthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
3,3-Dichlorobenzidine	6.60	2 U	ug/kg	12/02/91	SW846-8270
Benzo(a)Anthracene	6.00	1 J	ug/kg	12/02/91	SW846-8270
bis(2-Ethylhexyl)Phthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
Chrysene	8.00	1 J	ug/kg	12/02/91	SW846-8270
Di-N-Octyl Phthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
Benzo(b)Fluoranthene	1.00	2 J	ug/kg	12/02/91	SW846-8270
Benzo(k)Fluoranthene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Benzo(a)Pyrene	1.00	2 J	ug/kg	12/02/91	SW846-8270
Indeno(1,2,3-cd)Pyrene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Dibenz(a,h)Anthracene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Benzo(g,h,i)Perylene	7.00	1 J	ug/kg	12/02/91	SW846-8270

LEEDS005930

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,MO 64130
Attn: Joe Marsh

Report: 8019.17

Date: 12/11/91

SWL #: 8019.1
Page 4

Date Submitted 11/19/91
Sample Matrix: Soil
Depth From: 0.00
Depth To: 0.00

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	2.30	2	mg/kg	11/27/91	11/27/91	EPA-418.1

LEEDS005931

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,MO 64130
Attn: Joe Marsh

Report: 8019.17

Date: 12/11/91

SWLO #: 8019.17
P.O. #: KC Sole 11/91-223 A
Quote:

Date Received: 11/14/91
Sample Matrix: Soil
Reply Due:

Comments:

VOLATILE ORGANIC COMPOUNDS (VOCS)	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Chloromethane	1.62	3 U	ug/kg	11/20/91	SW846-8240
Bromomethane	1.62	3 U	ug/kg	11/20/91	SW846-8240
Vinyl Chloride	1.62	3 U	ug/kg	11/20/91	SW846-8240
Chloroethane	1.62	3 U	ug/kg	11/20/91	SW846-8240
Methylene Chloride	8.10	2 U	ug/kg	11/20/91	SW846-8240
Acetone	1.62	3 U	ug/kg	11/20/91	SW846-8240
Carbon Disulfide	8.10	2 U	ug/kg	11/20/91	SW846-8240
1,1-Dichloroethene	8.10	2 U	ug/kg	11/20/91	SW846-8240
1,1-Dichloroethane	8.10	2 U	ug/kg	11/20/91	SW846-8240
Trans-1,2-Dichloroethene	8.10	2 U	ug/kg	11/20/91	SW846-8240
Chloroform	8.10	2 U	ug/kg	11/20/91	SW846-8240
1,2-Dichloroethane	8.10	2 U	ug/kg	11/20/91	SW846-8240
2-Butanone	1.62	3 U	ug/kg	11/20/91	SW846-8240
1,1,1-Trichloroethane	8.10	2 U	ug/kg	11/20/91	SW846-8240
Carbon Tetrachloride	8.10	2 U	ug/kg	11/20/91	SW846-8240
Vinyl Acetate	1.62	3 U	ug/kg	11/20/91	SW846-8240
Bromodichloromethane	8.10	2 U	ug/kg	11/20/91	SW846-8240
1,1,2,2-Tetrachloroethane	8.10	2 U	ug/kg	11/20/91	SW846-8240
1,2-Dichloropropane	8.10	2 U	ug/kg	11/20/91	SW846-8240
Trans-1,3-Dichloropropene	8.10	2 U	ug/kg	11/20/91	SW846-8240
Trichloroethene	8.10	2 U	ug/kg	11/20/91	SW846-8240
Dibromochloromethane	8.10	2 U	ug/kg	11/20/91	SW846-8240
1,1,2-Trichloroethane	8.10	2 U	ug/kg	11/20/91	SW846-8240
Benzene	8.10	2 U	ug/kg	11/20/91	SW846-8240
cis-1,3-Dichloropropene	8.10	2 U	ug/kg	11/20/91	SW846-8240
2-Chloroethylvinylether	1.62	3 U	ug/kg	11/20/91	SW846-8240
Bromoform	8.10	2 U	ug/kg	11/20/91	SW846-8240
2-Hexanone	1.62	3 U	ug/kg	11/20/91	SW846-8240
4-Methyl-2-Pentanone	1.62	3 U	ug/kg	11/20/91	SW846-8240
Tetrachloroethene	8.10	2 U	ug/kg	11/20/91	SW846-8240
Toluene	8.10	2 U	ug/kg	11/20/91	SW846-8240
Chlorobenzene	8.10	2 U	ug/kg	11/20/91	SW846-8240
Ethylbenzene	8.10	2 U	ug/kg	11/20/91	SW846-8240
Styrene	8.10	2 U	ug/kg	11/20/91	SW846-8240

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,MO 64130
Attn: Joe Marsh

Report: 8019.17

Date: 12/11/91

SDG #: 8019.17
PROJECT: KC Site II/91-223-4
Sample #: MW2018

Date Submitted 11/19/91
Sample Matrix: Soil
Depth From: 0.00

VOLATILE ORGANIC COMPOUNDS (VOCS)	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Total Xylenes	8.10	2 U	ug/kg	11/20/91	SW846-8240

LEEDS005933

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,MO 64130
Attn: Joe Marsh

Report: 8019.17

Date: 12/11/91

SWLO #: 8019.17
PROJECT: KC Site II/91-223-4
SAMPLE #: MW201R
LOCATION:

Date Submitted 11/19/91
Sample Matrix: Soil
Depth From: 8.00
Depth To: 8.40
Date Extracted: 11/20/91

COMMENTS:

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Phenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
bis(2-Chloroethyl)Ether	3.30	2 U	ug/kg	12/02/91	SW846-8270
2-Chlorophenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
1,3-Dichlorobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
1,4-Dichlorobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Benzyl Alcohol	3.30	2 U	ug/kg	12/02/91	SW846-8270
1,2-Dichlorobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
2-Methylphenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
bis(2-Chloroisopropyl)Ether	3.30	2 U	ug/kg	12/02/91	SW846-8270
4-Methylphenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
N-Nitroso-Di-n-Propylamine	3.30	2 U	ug/kg	12/02/91	SW846-8270
Hexachloroethane	3.30	2 U	ug/kg	12/02/91	SW846-8270
Nitrobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Isophorone	3.30	2 U	ug/kg	12/02/91	SW846-8270
2-Nitrophenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
2,4-Dimethylphenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
Benzoic Acid	1.60	3 U	ug/kg	12/02/91	SW846-8270
bis(2-Chloroethoxy)Methane	3.30	2 U	ug/kg	12/02/91	SW846-8270
2,4-Dichlorophenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
1,2,4-Trichlorobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Naphthalene	3.30	2 U	ug/kg	12/02/91	SW846-8270
4-Chloroaniline	3.30	2 U	ug/kg	12/02/91	SW846-8270
Hexachlorobutadiene	3.30	2 U	ug/kg	12/02/91	SW846-8270
4-Chloro-3-Methylphenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
2-Methylnaphthalene	5.60	2	ug/kg	12/02/91	SW846-8270
Hexachlorocyclopentadiene	3.30	2 U	ug/kg	12/02/91	SW846-8270
2,4,6-Trichlorophenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
2,4,5-Trichlorophenol	1.60	3 U	ug/kg	12/02/91	SW846-8270
2-Chloronaphthalene	3.30	2 U	ug/kg	12/02/91	SW846-8270
2-Nitroaniline	1.60	3 U	ug/kg	12/02/91	SW846-8270
Dimethylphthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
Acenaphthylene	3.30	2 U	ug/kg	12/02/91	SW846-8270
3-Nitroaniline	1.60	3 U	ug/kg	12/02/91	SW846-8270
Acenaphthene	3.30	2 U	ug/kg	12/02/91	SW846-8270

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,MO 64130
Attn: Joe Marsh

Report: 8019.17

Date: 12/11/91

SULI #: 8019.17
PROJECT: KC Site II/91-223-4
[illegible] #: MW201S
[illegible]

Date Submitted 11/[illegible]
Sample Matrix: Soil
Depth From:
Depth To:
Date Extracted [illegible]

COMMENTS:

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
2,4-Dinitrophenol	1.60	3 U	ug/kg	12/02/91	SW846-8270
4-Nitrophenol	1.60	3 U	ug/kg	12/02/91	SW846-8270
Dibenzofuran	7.50	1 J	ug/kg	12/02/91	SW846-8270
2,4-Dinitrotoluene	3.30	2 U	ug/kg	12/02/91	SW846-8270
2,6-Dinitrotoluene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Diethylphthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
4-Chlorophenyl-Phenylether	3.30	2 U	ug/kg	12/02/91	SW846-8270
Fluorene	7.00	1 J	ug/kg	12/02/91	SW846-8270
4-Nitroaniline	1.60	3 U	ug/kg	12/02/91	SW846-8270
4,6-Dinitro-2-Methylphenol	1.60	3 U	ug/kg	12/02/91	SW846-8270
N-Nitrosodiphenylamine	3.30	2 U	ug/kg	12/02/91	SW846-8270
4-Bromophenyl-Phenylether	3.30	2 U	ug/kg	12/02/91	SW846-8270
Hexachlorobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Pentachlorophenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
Phenanthrene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Anthracene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Di-N-Butylphthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
Fluoranthene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Pyrene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Butylbenzylphthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
3,3-Dichlorobenzidine	6.60	2 U	ug/kg	12/02/91	SW846-8270
Benzo(a)Anthracene	3.30	2 U	ug/kg	12/02/91	SW846-8270
bis(2-Ethylhexyl)Phthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
Chrysene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Di-N-Octyl Phthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
Benzo(b)Fluoranthene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Benzo(k)Fluoranthene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Benzo(a)Pyrene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Indeno(1,2,3-cd)Pyrene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Dibenz(a,h)Anthracene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Benzo(g,h,i)Perylene	3.30	2 U	ug/kg	12/02/91	SW846-8270

LEEDS005935

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,MO 64130
Attn: Joe Marsh

Report: 8019.16

Date: 12/11/91

SWLO #: 8019.16

Date Submitted 11/19/91
Sample Matrix: Soil

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	6.20	2	mg/kg	11/27/91	11/27/91	EPA-418.1

LEEDS005936

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,MO 64130
Attn: Joe Marsh

Report: 8019.18

Date: 12/11/91

Date Submitted 11/19/91
Sample Matrix: Soil
Depth From: 11.00

VOLATILE ORGANIC COMPOUNDS (VOCS)	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Chloromethane	1.74	3 U	ug/kg	11/20/91	SW846-8240
Bromomethane	1.74	3 U	ug/kg	11/20/91	SW846-8240
Vinyl Chloride	1.74	3 U	ug/kg	11/20/91	SW846-8240
Chloroethane	1.74	3 U	ug/kg	11/20/91	SW846-8240
Methylene Chloride	8.70	2 U	ug/kg	11/20/91	SW846-8240
Acetone	1.74	3 U	ug/kg	11/20/91	SW846-8240
Carbon Disulfide	8.70	2 U	ug/kg	11/20/91	SW846-8240
1,1-Dichloroethene	8.70	2 U	ug/kg	11/20/91	SW846-8240
1,1-Dichloroethane	8.70	2 U	ug/kg	11/20/91	SW846-8240
Trans-1,2-Dichloroethene	8.70	2 U	ug/kg	11/20/91	SW846-8240
Chloroform	8.70	2 U	ug/kg	11/20/91	SW846-8240
1,2-Dichloroethane	8.70	2 U	ug/kg	11/20/91	SW846-8240
2-Butanone	1.74	3 U	ug/kg	11/20/91	SW846-8240
1,1,1-Trichloroethane	8.70	2 U	ug/kg	11/20/91	SW846-8240
Carbon Tetrachloride	8.70	2 U	ug/kg	11/20/91	SW846-8240
Vinyl Acetate	1.74	3 U	ug/kg	11/20/91	SW846-8240
Bromodichloromethane	8.70	2 U	ug/kg	11/20/91	SW846-8240
1,1,2,2-Tetrachloroethane	8.70	2 U	ug/kg	11/20/91	SW846-8240
1,2-Dichloropropane	8.70	2 U	ug/kg	11/20/91	SW846-8240
Trans-1,3-Dichloropropene	8.70	2 U	ug/kg	11/20/91	SW846-8240
Trichloroethene	8.70	2 U	ug/kg	11/20/91	SW846-8240
Dibromochloromethane	8.70	2 U	ug/kg	11/20/91	SW846-8240
1,1,2-Trichloroethane	8.70	2 U	ug/kg	11/20/91	SW846-8240
Benzene	8.70	2 U	ug/kg	11/20/91	SW846-8240
cis-1,3-Dichloropropene	8.70	2 U	ug/kg	11/20/91	SW846-8240
2-Chloroethylvinylether	1.74	3 U	ug/kg	11/20/91	SW846-8240
Bromoform	8.70	2 U	ug/kg	11/20/91	SW846-8240
2-Hexanone	1.74	3 U	ug/kg	11/20/91	SW846-8240
4-Methyl-2-Pentanone	1.74	3 U	ug/kg	11/20/91	SW846-8240
Tetrachloroethene	8.70	2 U	ug/kg	11/20/91	SW846-8240
Toluene	8.70	2 U	ug/kg	11/20/91	SW846-8240
Chlorobenzene	8.70	2 U	ug/kg	11/20/91	SW846-8240
Ethylbenzene	8.70	2 U	ug/kg	11/20/91	SW846-8240
Styrene	8.70	2 U	ug/kg	11/20/91	SW846-8240

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,MO 64130
Attn: Joe Marsh

Report: 8019.18

Date: 12/11/91

SWLO #: 8019.18
PROJECT: KC Site [illegible]-223-4
SAMPLE #: MW201
LOCATION:

COMMENTS:

Date Submitted 11/19/91
Sample Matrix: Soil
Depth From: 11.00
Depth To: [illegible]
Date Extracted: / /

VOLATILE ORGANIC COMPOUNDS (VOCS)	RESULT*	UNITS	DATE ANALYZED	REFERENCE METHOD
Total Xylenes	8.70 2 U	ug/kg	11/20/91	SW846-8240

LEEDS005938

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,MO 64130
Attn: Joe Marsh

Report: 6014...
Date: 12/1...

S/D #: ...
...
...
...

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Phenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
bis(2-Chloroethyl)Ether	3.30	2 U	ug/kg	12/02/91	SW846-8270
2-Chlorophenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
1,3-Dichlorobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
1,4-Dichlorobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Benzyl Alcohol	3.30	2 U	ug/kg	12/02/91	SW846-8270
1,2-Dichlorobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
2-Methylphenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
bis(2-Chloroisopropyl)Ether	3.30	2 U	ug/kg	12/02/91	SW846-8270
4-Methylphenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
N-Nitroso-Di-n-Propylamine	3.30	2 U	ug/kg	12/02/91	SW846-8270
Hexachloroethane	3.30	2 U	ug/kg	12/02/91	SW846-8270
Nitrobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Isophorone	3.30	2 U	ug/kg	12/02/91	SW846-8270
2-Nitrophenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
2,4-Dimethylphenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
Benzoic Acid	1.60	3 U	ug/kg	12/02/91	SW846-8270
bis(2-Chloroethoxy)Methane	3.30	2 U	ug/kg	12/02/91	SW846-8270
2,4-Dichlorophenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
1,2,4-Trichlorobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Naphthalene	3.30	2 U	ug/kg	12/02/91	SW846-8270
4-Chloroaniline	3.30	2 U	ug/kg	12/02/91	SW846-8270
Hexachlorobutadiene	3.30	2 U	ug/kg	12/02/91	SW846-8270
4-Chloro-3-Methylphenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
2-Methylnaphthalene	3.40	2	ug/kg	12/02/91	SW846-8270
Hexachlorocyclopentadiene	3.30	2 U	ug/kg	12/02/91	SW846-8270
2,4,6-Trichlorophenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
2,4,5-Trichlorophenol	1.60	3 U	ug/kg	12/02/91	SW846-8270
2-Chloronaphthalene	3.30	2 U	ug/kg	12/02/91	SW846-8270
2-Nitroaniline	1.60	3 U	ug/kg	12/02/91	SW846-8270
Dimethylphthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
Acenaphthylene	3.30	2 U	ug/kg	12/02/91	SW846-8270
3-Nitroaniline	1.60	3 U	ug/kg	12/02/91	SW846-8270
Acenaphthene	3.30	2 U	ug/kg	12/02/91	SW846-8270

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,MO 64130
Attn: Joe Marsh

Report: 8019.18

Date: 12/11/91

SWLO #: 8019.18
PROJECT: KC Site [illegible]
[illegible]

Date Submitted 11/19/91
Sample Matrix: Soil
[illegible]

COMMENTS:

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
2,4-Dinitrophenol	1.60	3 U	ug/kg	12/02/91	SW846-8270
4-Nitrophenol	1.60	3 U	ug/kg	12/02/91	SW846-8270
Dibenzofuran	3.30	2 U	ug/kg	12/02/91	SW846-8270
2,4-Dinitrotoluene	3.30	2 U	ug/kg	12/02/91	SW846-8270
2,6-Dinitrotoluene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Diethylphthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
4-Chlorophenyl-Phenylether	3.30	2 U	ug/kg	12/02/91	SW846-8270
Fluorene	3.30	2 U	ug/kg	12/02/91	SW846-8270
4-Nitroaniline	1.60	3 U	ug/kg	12/02/91	SW846-8270
4,6-Dinitro-2-Methylphenol	1.60	3 U	ug/kg	12/02/91	SW846-8270
N-Nitrosodiphenylamine	3.30	2 U	ug/kg	12/02/91	SW846-8270
4-Bromophenyl-Phenylether	3.30	2 U	ug/kg	12/02/91	SW846-8270
Hexachlorobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Pentachlorophenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
Phenanthrene	7.00	1 J	ug/kg	12/02/91	SW846-8270
Anthracene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Di-N-Butylphthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
Fluoranthene	1.30	2 J	ug/kg	12/02/91	SW846-8270
Pyrene	1.10	2 J	ug/kg	12/02/91	SW846-8270
Butylbenzylphthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
3,3-Dichlorobenzidine	6.60	2 U	ug/kg	12/02/91	SW846-8270
Benzo(a)Anthracene	5.00	1 J	ug/kg	12/02/91	SW846-8270
bis(2-Ethylhexyl)Phthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
Chrysene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Di-N-Octyl Phthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
Benzo(b)Fluoranthene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Benzo(k)Fluoranthene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Benzo(a)Pyrene	3.00	1 J	ug/kg	12/02/91	SW846-8270
Indeno(1,2,3-cd)Pyrene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Dibenz(a,h)Anthracene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Benzo(g,h,i)Perylene	3.30	2 U	ug/kg	12/02/91	SW846-8270

LEEDS005940

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,MO 64130
Attn: Joe Marsh

Report: 8019.19

Date: 12/11/91

SWLO #: 8019.19
PROJECT: KC Site II/91-223-4

Date Submitted 11/19/91
Sample Matrix: Soil
Depth From: 26.00
Depth To: 26.00

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	7.50	2	mg/kg	11/27/91	11/27/91	EPA-418.1

LEEDS005941

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,MO 64130
Attn: Joe Marsh

Report: 8019.19

Date: 12/11/91

SWLO #: 8019.19
PROJECT: KC Site 11791-223-4
SAMPLE #: [illegible]
LOCATION:

Date Submitted: 11/19/91
Sample Matrix: Soil
Depth From: [illegible]
[illegible]
Date Extracted: [illegible]

COMMENTS:

VOLATILE ORGANIC COMPOUNDS (VOCS)	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Chloromethane	1.42	1 U	ug/kg	11/21/91	SW846-8240
Bromomethane	1.42	1 U	ug/kg	11/21/91	SW846-8240
Vinyl Chloride	1.42	1 U	ug/kg	11/21/91	SW846-8240
Chloroethane	1.42	1 U	ug/kg	11/21/91	SW846-8240
Methylene Chloride	7.00	0	ug/kg	11/21/91	SW846-8240
Acetone	1.42	1 U	ug/kg	11/21/91	SW846-8240
Carbon Disulfide	7.10	0 U	ug/kg	11/21/91	SW846-8240
1,1-Dichloroethene	7.10	0 U	ug/kg	11/21/91	SW846-8240
1,1-Dichloroethane	7.10	0 U	ug/kg	11/21/91	SW846-8240
Trans-1,2-Dichloroethene	7.10	0 U	ug/kg	11/21/91	SW846-8240
Chloroform	7.10	0 U	ug/kg	11/21/91	SW846-8240
1,2-Dichloroethane	7.10	0 U	ug/kg	11/21/91	SW846-8240
2-Butanone	1.42	1 U	ug/kg	11/21/91	SW846-8240
1,1,1-Trichloroethane	7.10	0 U	ug/kg	11/21/91	SW846-8240
Carbon Tetrachloride	7.10	0 U	ug/kg	11/21/91	SW846-8240
Vinyl Acetate	1.42	1 U	ug/kg	11/21/91	SW846-8240
Bromodichloromethane	7.10	0 U	ug/kg	11/21/91	SW846-8240
1,1,2,2-Tetrachloroethane	7.10	0 U	ug/kg	11/21/91	SW846-8240
1,2-Dichloropropane	7.10	0 U	ug/kg	11/21/91	SW846-8240
Trans-1,3-Dichloropropene	7.10	0 U	ug/kg	11/21/91	SW846-8240
Trichloroethene	7.10	0 U	ug/kg	11/21/91	SW846-8240
Dibromochloromethane	7.10	0 U	ug/kg	11/21/91	SW846-8240
1,1,2-Trichloroethane	7.10	0 U	ug/kg	11/21/91	SW846-8240
Benzene	7.10	0 U	ug/kg	11/21/91	SW846-8240
cis-1,3-Dichloropropene	7.10	0 U	ug/kg	11/21/91	SW846-8240
2-Chloroethylvinylether	1.42	1 U	ug/kg	11/21/91	SW846-8240
Bromoform	7.10	0 U	ug/kg	11/21/91	SW846-8240
2-Hexanone	1.42	1 U	ug/kg	11/21/91	SW846-8240
4-Methyl-2-Pentanone	1.42	1 U	ug/kg	11/21/91	SW846-8240
Tetrachloroethene	7.10	0 U	ug/kg	11/21/91	SW846-8240
Toluene	7.10	0 U	ug/kg	11/21/91	SW846-8240
Chlorobenzene	7.10	0 U	ug/kg	11/21/91	SW846-8240
Ethylbenzene	7.10	0 U	ug/kg	11/21/91	SW846-8240
Styrene	7.10	0 U	ug/kg	11/21/91	SW846-8240

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,MO 64130
Attn: Joe Marsh

Report: 8019.19

Date: 12/11/91

SWLO #: 8019.19
PROJECT: KC Site II/91-223-4
SAMPLE #: MW201D
LOCATION:

Date Submitted 11/19/91
Sample Matrix: Soil
Depth From: 26.00
Depth To: 26.00
Lab Comments: /

COMMENTS:

VOLATILE ORGANIC COMPOUNDS (VOCS)	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Total Xylenes	7.10	0 U	ug/kg	11/21/91	SW846-8240

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,MO 64130
Attn: Joe Marsh

Report: 8019.19

Date: 12/11/91

SOLO #: 8019.19
PROJECT: KC Site II/91-2[illegible]
SAMPLE #: MW201D
LOCATION:

COMMENTS:

Date Submitted: 11/19/91
Sample Matrix: Soil
Depth From: 26.00
Depth To: 26.00
Date Sampled: 11/[illegible]/91

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Phenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
bis(2-Chloroethyl)Ether	3.30	2 U	ug/kg	12/02/91	SW846-8270
2-Chlorophenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
1,3-Dichlorobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
1,4-Dichlorobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Benzyl Alcohol	3.30	2 U	ug/kg	12/02/91	SW846-8270
1,2-Dichlorobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
2-Methylphenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
bis(2-Chloroisopropyl)Ether	3.30	2 U	ug/kg	12/02/91	SW846-8270
4-Methylphenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
N-Nitroso-Di-n-Propylamine	3.30	2 U	ug/kg	12/02/91	SW846-8270
Hexachloroethane	3.30	2 U	ug/kg	12/02/91	SW846-8270
Nitrobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Isophorone	3.30	2 U	ug/kg	12/02/91	SW846-8270
2-Nitrophenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
2,4-Dimethylphenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
Benzoic Acid	1.60	3 U	ug/kg	12/02/91	SW846-8270
bis(2-Chloroethoxy)Methane	3.30	2 U	ug/kg	12/02/91	SW846-8270
2,4-Dichlorophenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
1,2,4-Trichlorobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Naphthalene	3.30	2 U	ug/kg	12/02/91	SW846-8270
4-Chloroaniline	3.30	2 U	ug/kg	12/02/91	SW846-8270
Hexachlorobutadiene	3.30	2 U	ug/kg	12/02/91	SW846-8270
4-Chloro-3-Methylphenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
2-Methylnaphthalene	3.80	2	ug/kg	12/02/91	SW846-8270
Hexachlorocyclopentadiene	3.30	2 U	ug/kg	12/02/91	SW846-8270
2,4,6-Trichlorophenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
2,4,5-Trichlorophenol	1.60	3 U	ug/kg	12/02/91	SW846-8270
2-Chloronaphthalene	3.30	2 U	ug/kg	12/02/91	SW846-8270
2-Nitroaniline	1.60	3 U	ug/kg	12/02/91	SW846-8270
Dimethylphthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
Acenaphthylene	3.30	2 U	ug/kg	12/02/91	SW846-8270
3-Nitroaniline	1.60	3 U	ug/kg	12/02/91	SW846-8270
Acenaphthene	3.30	2 U	ug/kg	12/02/91	SW846-8270

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,MO 64130
Attn: Joe Marsh

Report: 8019.19

Date: 12/11/91

SWLO #: 8019.19
PROJECT: KC Site II/91-223-4
SAMPLE #: MW201D
LOCATION:

Date Submitted 11/19/91
Sample Matrix: Soil
Depth From: 26.00
Depth To: 26.00
Date Extracted: 11/20/91

COMMENTS:

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
2,4-Dinitrophenol	1.60	3 U	ug/kg	12/02/91	SW846-8270
4-Nitrophenol	1.60	3 U	ug/kg	12/02/91	SW846-8270
Dibenzofuran	3.30	2 U	ug/kg	12/02/91	SW846-8270
2,4-Dinitrotoluene	3.30	2 U	ug/kg	12/02/91	SW846-8270
2,6-Dinitrotoluene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Diethylphthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
4-Chlorophenyl-Phenylether	3.30	2 U	ug/kg	12/02/91	SW846-8270
Fluorene	1.70	2 J	ug/kg	12/02/91	SW846-8270
4-Nitroaniline	1.60	3 U	ug/kg	12/02/91	SW846-8270
4,6-Dinitro-2-Methylphenol	1.60	3 U	ug/kg	12/02/91	SW846-8270
N-Nitrosodiphenylamine	3.30	2 U	ug/kg	12/02/91	SW846-8270
4-Bromophenyl-Phenylether	3.30	2 U	ug/kg	12/02/91	SW846-8270
Hexachlorobenzene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Pentachlorophenol	3.30	2 U	ug/kg	12/02/91	SW846-8270
Phenanthrene	8.00	1 J	ug/kg	12/02/91	SW846-8270
Anthracene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Di-N-Butylphthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
Fluoranthene	1.30	2 J	ug/kg	12/02/91	SW846-8270
Pyrene	1.10	2 J	ug/kg	12/02/91	SW846-8270
Butylbenzylphthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
3,3-Dichlorobenzidine	6.60	2 U	ug/kg	12/02/91	SW846-8270
Benzo(a)Anthracene	4.00	1 J	ug/kg	12/02/91	SW846-8270
bis(2-Ethylhexyl)Phthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
Chrysene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Di-N-Octyl Phthalate	3.30	2 U	ug/kg	12/02/91	SW846-8270
Benzo(b)Fluoranthene	4.00	1 J	ug/kg	12/02/91	SW846-8270
Benzo(k)Fluoranthene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Benzo(a)Pyrene	2.00	1 J	ug/kg	12/02/91	SW846-8270
Indeno(1,2,3-cd)Pyrene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Dibenz(a,h)Anthracene	3.30	2 U	ug/kg	12/02/91	SW846-8270
Benzo(g,h,i)Perylene	3.30	2 U	ug/kg	12/02/91	SW846-8270

LEEDS005945

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell
4800 East 63rd Street
Kansas City, MO 64130

Report: 8016.00

Date: 12-13-91

Date Submitted: 11/26/91
Sample Matrix: Soil
Depth From : 5.00
Depth To : 5.00

LOCATION:
COMMENTS:

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	4.20	1	mg/kg	11/27/91	11/27/91	EPA-418.1

LEEDS005946

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2560

CLIENT: Burns & McDonnell
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 8046.08

Date: 12/19/91

SAMPLE ID: [illegible]
LOCATION:

COMMENTS:

Sample Matrix: Soil
Depth From : 5.00
Depth To : 5.00
Date Extracted: / /

VOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Chloromethane	1.25	1 U	ug/kg	11/22/91	SW846-8240
Bromomethane	1.25	1 U	ug/kg	11/22/91	SW846-8240
Vinyl Chloride	1.25	1 U	ug/kg	11/22/91	SW846-8240
Chloroethane	1.25	1 U	ug/kg	11/22/91	SW846-8240
Methylene Chloride	6.25	0 U	ug/kg	11/22/91	SW846-8240
Acetone	3.00	1	ug/kg	11/22/91	SW846-8240
Carbon Disulfide	6.25	0 U	ug/kg	11/22/91	SW846-8240
1,1-Dichloroethene	6.25	0 U	ug/kg	11/22/91	SW846-8240
1,1-Dichloroethane	6.25	0 U	ug/kg	11/22/91	SW846-8240
Trans-1,2-Dichloroethene	6.25	0 U	ug/kg	11/22/91	SW846-8240
Chloroform	6.25	0 U	ug/kg	11/22/91	SW846-8240
1,2-Dichloroethane	6.25	0 U	ug/kg	11/22/91	SW846-8240
2-Butanone	1.25	1 U	ug/kg	11/22/91	SW846-8240
1,1,1-Trichloroethane	6.25	0 U	ug/kg	11/22/91	SW846-8240
Carbon Tetrachloride	6.25	0 U	ug/kg	11/22/91	SW846-8240
Vinyl Acetate	1.25	1 U	ug/kg	11/22/91	SW846-8240
Bromodichloromethane	6.25	0 U	ug/kg	11/22/91	SW846-8240
1,1,2,2-Tetrachloroethane	6.25	0 U	ug/kg	11/22/91	SW846-8240
1,2-Dichloropropane	6.25	0 U	ug/kg	11/22/91	SW846-8240
Trans-1,3-Dichloropropene	6.25	0 U	ug/kg	11/22/91	SW846-8240
Trichloroethene	6.25	0 U	ug/kg	11/22/91	SW846-8240
Dibromochloromethane	6.25	0 U	ug/kg	11/22/91	SW846-8240
1,1,2-Trichloroethane	6.25	0 U	ug/kg	11/22/91	SW846-8240
Benzene	6.25	0 U	ug/kg	11/22/91	SW846-8240
cis-1,3-Dichloropropene	6.25	0 U	ug/kg	11/22/91	SW846-8240
2-Chloroethylvinylether	1.25	1 U	ug/kg	11/22/91	SW846-8240
Bromoform	6.25	0 U	ug/kg	11/22/91	SW846-8240
2-Hexanone	1.25	1 U	ug/kg	11/22/91	SW846-8240
4-Methyl-2-Pentanone	1.25	1 U	ug/kg	11/22/91	SW846-8240
Tetrachloroethene	6.25	0 U	ug/kg	11/22/91	SW846-8240

LEEDS005947

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX 918-251-2599

CLIENT: Burns & McDonnell
4800 East 63rd Street
[illegible]

Report: 8046.08

Date: 12/19/91

[illegible]
SAMPLE #: [illegible]
LOCATION:

COMMENTS:

[illegible]
Sample Matrix: [illegible]
Depth From : 5.00
Depth To : 5.00
Date Extracted: / /

VOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Toluene	6.25	0 U	ug/kg	11/22/91	SW846-8240
Chlorobenzene	6.25	0 U	ug/kg	11/22/91	SW846-8240
Ethylbenzene	6.25	0 U	ug/kg	11/22/91	SW846-8240
Styrene	6.25	0 U	ug/kg	11/22/91	SW846-8240
Total Xylenes	6.25	0 U	ug/kg	11/22/91	SW846-8240

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 6046.08

SWLO #: [illegible]
PROJECT: KC Site 1
SAMPLE #: MW-202R
LOCATION:

Depth To : 5.00
Date Extracted: 11/22/91

COMMENTS:

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Phenol	4.13	2 U	ug/kg	12/05/91	SW846-8270
bis(2-Chloroethyl)Ether	4.13	2 U	ug/kg	12/05/91	SW846-8270
2-Chlorophenol	4.13	2 U	ug/kg	12/05/91	SW846-8270
1,3-Dichlorobenzene	4.13	2 U	ug/kg	12/05/91	SW846-8270
1,4-Dichlorobenzene	4.13	2 U	ug/kg	12/05/91	SW846-8270
Benzyl Alcohol	4.13	2 U	ug/kg	12/05/91	SW846-8270
1,2-Dichlorobenzene	4.13	2 U	ug/kg	12/05/91	SW846-8270
2-Methylphenol	4.13	2 U	ug/kg	12/05/91	SW846-8270
bis(2-Chloroisopropyl)Ether	4.13	2 U	ug/kg	12/05/91	SW846-8270
4-Methylphenol	4.13	2 U	ug/kg	12/05/91	SW846-8270
N-Nitroso-Di-n-Propylamine	4.13	2 U	ug/kg	12/05/91	SW846-8270
Hexachloroethane	4.13	2 U	ug/kg	12/05/91	SW846-8270
Nitrobenzene	4.13	2 U	ug/kg	12/05/91	SW846-8270
Isophorone	4.13	2 U	ug/kg	12/05/91	SW846-8270
2-Nitrophenol	4.13	2 U	ug/kg	12/05/91	SW846-8270
2,4-Dimethylphenol	4.13	2 U	ug/kg	12/05/91	SW846-8270
Benzoic Acid	2.00	3 U	ug/kg	12/05/91	SW846-8270
bis(2-Chloroethoxy)Methane	4.13	2 U	ug/kg	12/05/91	SW846-8270
2,4-Dichlorophenol	4.13	2 U	ug/kg	12/05/91	SW846-8270
1,2,4-Trichlorobenzene	4.13	2 U	ug/kg	12/05/91	SW846-8270
Naphthalene	4.13	2 U	ug/kg	12/05/91	SW846-8270
4-Chloroaniline	4.13	2 U	ug/kg	12/05/91	SW846-8270
Hexachlorobutadiene	4.13	2 U	ug/kg	12/05/91	SW846-8270
4-Chloro-3-Methylphenol	4.13	2 U	ug/kg	12/05/91	SW846-8270
2-Methylnaphthalene	4.13	2 U	ug/kg	12/05/91	SW846-8270
Hexachlorocyclopentadiene	4.13	2 U	ug/kg	12/05/91	SW846-8270
2,4,6-Trichlorophenol	4.13	2 U	ug/kg	12/05/91	SW846-8270
2,4,5-Trichlorophenol	2.00	3 U	ug/kg	12/05/91	SW846-8270
2-Chloronaphthalene	4.13	2 U	ug/kg	12/05/91	SW846-8270
2-Nitroaniline	2.00	3 U	ug/kg	12/05/91	SW846-8270

LEEDS005949

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 8045.02

Date: 12/13/91

PROJECT: KC Site II
SAMPLE #: MW-202A
LOCATION:

Date Sampled :
Sample Matrix: Water
Depth From : Surface
Depth To : 5.00'
Date Extracted: 11/21/91

COMMENTS:

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Dimethylphthalate	4.13	2 U	ug/kg	12/05/91	SW846-8270
Acenaphthylene	4.13	2 U	ug/kg	12/05/91	SW846-8270
3-Nitroaniline	2.00	3 U	ug/kg	12/05/91	SW846-8270
Acenaphthene	4.13	2 U	ug/kg	12/05/91	SW846-8270
2,4-Dinitrophenol	2.00	3 U	ug/kg	12/05/91	SW846-8270
4-Nitrophenol	2.00	3 U	ug/kg	12/05/91	SW846-8270
Dibenzofuran	4.13	2 U	ug/kg	12/05/91	SW846-8270
2,4-Dinitrotoluene	4.13	2 U	ug/kg	12/05/91	SW846-8270
2,6-Dinitrotoluene	4.13	2 U	ug/kg	12/05/91	SW846-8270
Diethylphthalate	4.13	2 U	ug/kg	12/05/91	SW846-8270
4-Chlorophenyl-Phenylether	4.13	2 U	ug/kg	12/05/91	SW846-8270
Fluorene	4.13	2 U	ug/kg	12/05/91	SW846-8270
4-Nitroaniline	2.00	3 U	ug/kg	12/05/91	SW846-8270
4,6-Dinitro-2-Methylphenol	2.00	3 U	ug/kg	12/05/91	SW846-8270
N-Nitrosodiphenylamine	4.13	2 U	ug/kg	12/05/91	SW846-8270
4-Bromophenyl-Phenylether	4.13	2 U	ug/kg	12/05/91	SW846-8270
Hexachlorobenzene	4.13	2 U	ug/kg	12/05/91	SW846-8270
Pentachlorophenol	4.13	2 U	ug/kg	12/05/91	SW846-8270
Phenanthrene	4.13	2 U	ug/kg	12/05/91	SW846-8270
Anthracene	4.13	2 U	ug/kg	12/05/91	SW846-8270
Di-N-Butylphthalate	4.13	2 U	ug/kg	12/05/91	SW846-8270
Fluoranthene	4.13	2 U	ug/kg	12/05/91	SW846-8270
Pyrene	4.13	2 U	ug/kg	12/05/91	SW846-8270
Butylbenzylphthalate	4.13	2 U	ug/kg	12/05/91	SW846-8270
3,3-Dichlorobenzidine	8.25	2 U	ug/kg	12/05/91	SW846-8270
Benzo(a)Anthracene	4.13	2 U	ug/kg	12/05/91	SW846-8270
bis(2-Ethylhexyl)Phthalate	4.13	2 U	ug/kg	12/05/91	SW846-8270
Chrysene	4.13	2 U	ug/kg	12/05/91	SW846-8270
Di-N-Octyl Phthalate	4.13	2 U	ug/kg	12/05/91	SW846-8270
Benzo(b)Fluoranthene	4.13	2 U	ug/kg	12/05/91	SW846-8270

LEEDS005950

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell
4800 East 63rd
Kansas City, MO
Attn: Sue Hayes

Report: 8046.00

Date: 12/19/91

Sample ID: SB-16
LOCATION:

Depth From : .00
Depth To : 5.00
Date Extracted: 11/22/91

COMMENTS:

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Benzo(k)Fluoranthene	4.13	2 U	ug/kg	12/05/91	SW846-8270
Benzo(a)Pyrene	4.13	2 U	ug/kg	12/05/91	SW846-8270
Indeno(1,2,3-cd)Pyrene	4.13	2 U	ug/kg	12/05/91	SW846-8270
Dibenz(a,h)Anthracene	4.13	2 U	ug/kg	12/05/91	SW846-8270
Benzo(g,h,i)Perylene	4.13	2 U	ug/kg	12/05/91	SW846-8270

LEEDS005951

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

[illegible] Burns & McDonnell
[illegible] East [illegible]
[illegible]

[illegible]
[illegible] Sheet 1
SAMPLE #: AW-20SB
LOCATION:
COMMENTS:

[illegible]
Sample Matrix: Soil
Depth From : 10.00
Depth To : 10.00

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	1.44	J	mg/kg	11/27/91	11/27/91	EPA-418.1

LEEDS005952

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell
4600 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 9046.00

PROJECT: KC Site II
SAMPLE #: MW-202B
LOCATION:

Depth To : 0.00
Date Extracted: / /

COMMENTS:

VOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Chloromethane	6.00	1 U	ug/kg	11/25/91	SW846-8240
Bromomethane	6.00	1 U	ug/kg	11/25/91	SW846-8240
Vinyl Chloride	6.00	1 U	ug/kg	11/25/91	SW846-8240
Chloroethane	6.00	1 U	ug/kg	11/25/91	SW846-8240
Methylene Chloride	3.00	1 U	ug/kg	11/25/91	SW846-8240
Acetone	2.62	2	ug/kg	11/25/91	SW846-8240
Carbon Disulfide	3.00	1 U	ug/kg	11/25/91	SW846-8240
1,1-Dichloroethene	3.00	1 U	ug/kg	11/25/91	SW846-8240
1,1-Dichloroethane	3.00	1 U	ug/kg	11/25/91	SW846-8240
Trans-1,2-Dichloroethene	3.00	1 U	ug/kg	11/25/91	SW846-8240
Chloroform	3.00	1 U	ug/kg	11/25/91	SW846-8240
1,2-Dichloroethane	3.00	1 U	ug/kg	11/25/91	SW846-8240
2-Butanone	6.00	1 U	ug/kg	11/25/91	SW846-8240
1,1,1-Trichloroethane	3.00	1 U	ug/kg	11/25/91	SW846-8240
Carbon Tetrachloride	3.00	1 U	ug/kg	11/25/91	SW846-8240
Vinyl Acetate	6.00	1 U	ug/kg	11/25/91	SW846-8240
Bromodichloromethane	3.00	1 U	ug/kg	11/25/91	SW846-8240
1,1,2,2-Tetrachloroethane	3.00	1 U	ug/kg	11/25/91	SW846-8240
1,2-Dichloropropane	3.00	1 U	ug/kg	11/25/91	SW846-8240
Trans-1,3-Dichloropropene	3.00	1 U	ug/kg	11/25/91	SW846-8240
Trichloroethene	3.00	1 U	ug/kg	11/25/91	SW846-8240
Dibromochloromethane	3.00	1 U	ug/kg	11/25/91	SW846-8240
1,1,2-Trichloroethane	3.00	1 U	ug/kg	11/25/91	SW846-8240
Benzene	3.00	1 U	ug/kg	11/25/91	SW846-8240
cis-1,3-Dichloropropene	3.00	1 U	ug/kg	11/25/91	SW846-8240
2-Chloroethylvinylether	6.00	1 U	ug/kg	11/25/91	SW846-8240
Bromoform	3.00	1 U	ug/kg	11/25/91	SW846-8240
2-Hexanone	6.00	1 U	ug/kg	11/25/91	SW846-8240
4-Methyl-2-Pentanone	6.00	1 U	ug/kg	11/25/91	SW846-8240
Tetrachloroethene	3.00	1 U	ug/kg	11/25/91	SW846-8240

LEEDS005953

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell
4600 East 63rd Street
Kansas City, Mo 64130
Attn: Joe Green

Report: 8046.09

Date: 12/19/91

SWLO #: [illegible]
PROJECT: KC Site II
SAMPLE #: MW-202B
LOCATION:

COMMENTS:

Date Submitted: 11/21/91
Sample Matrix: Soil
Depth From : 10.00
Depth To : 10.00
Date Extracted: / /

VOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Toluene	3.00	1 U	ug/kg	11/25/91	SW846-8240
Chlorobenzene	3.00	1 U	ug/kg	11/25/91	SW846-8240
Ethylbenzene	3.00	1 U	ug/kg	11/25/91	SW846-8240
Styrene	3.00	1 U	ug/kg	11/25/91	SW846-8240
Total Xylenes	3.00	1 U	ug/kg	11/25/91	SW846-8240

LEEDS005954

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell
4800 East 63rd Street
Kansas City, MO 64130
Attn: Tom Marsh

Report: 8046.09

Date: 12/20/91

Work #: 8046.09
PROJECT: KC Site II
SAMPLE #: MW-202B
LOCATION:

COMMENTS:

Date Submitted: 11/21/91
Sample Matrix: Soil
Depth From : 10.00
Depth To : 10.00
Date Extracted: 11/22/91

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Phenol	4.06	2 U	ug/kg	12/05/91	SW846-8270
bis(2-Chloroethyl)Ether	4.06	2 U	ug/kg	12/05/91	SW846-8270
2-Chlorophenol	4.06	2 U	ug/kg	12/05/91	SW846-8270
1,3-Dichlorobenzene	4.06	2 U	ug/kg	12/05/91	SW846-8270
1,4-Dichlorobenzene	4.06	2 U	ug/kg	12/05/91	SW846-8270
Benzyl Alcohol	4.06	2 U	ug/kg	12/05/91	SW846-8270
1,2-Dichlorobenzene	4.06	2 U	ug/kg	12/05/91	SW846-8270
2-Methylphenol	4.06	2 U	ug/kg	12/05/91	SW846-8270
bis(2-Chloroisopropyl)Ether	4.06	2 U	ug/kg	12/05/91	SW846-8270
4-Methylphenol	4.06	2 U	ug/kg	12/05/91	SW846-8270
N-Nitroso-Di-n-Propylamine	4.06	2 U	ug/kg	12/05/91	SW846-8270
Hexachloroethane	4.06	2 U	ug/kg	12/05/91	SW846-8270
Nitrobenzene	4.06	2 U	ug/kg	12/05/91	SW846-8270
Isophorone	4.06	2 U	ug/kg	12/05/91	SW846-8270
2-Nitrophenol	4.06	2 U	ug/kg	12/05/91	SW846-8270
2,4-Dimethylphenol	4.06	2 U	ug/kg	12/05/91	SW846-8270
Benzoic Acid	1.97	3 U	ug/kg	12/05/91	SW846-8270
bis(2-Chloroethoxy)Methane	4.06	2 U	ug/kg	12/05/91	SW846-8270
2,4-Dichlorophenol	4.06	2 U	ug/kg	12/05/91	SW846-8270
1,2,4-Trichlorobenzene	4.06	2 U	ug/kg	12/05/91	SW846-8270
Naphthalene	4.06	2 U	ug/kg	12/05/91	SW846-8270
4-Chloroaniline	4.06	2 U	ug/kg	12/05/91	SW846-8270
Hexachlorobutadiene	4.06	2 U	ug/kg	12/05/91	SW846-8270
4-Chloro-3-Methylphenol	4.06	2 U	ug/kg	12/05/91	SW846-8270
2-Methylnaphthalene	4.07	2	ug/kg	12/05/91	SW846-8270
Hexachlorocyclopentadiene	4.06	2 U	ug/kg	12/05/91	SW846-8270
2,4,6-Trichlorophenol	4.06	2 U	ug/kg	12/05/91	SW846-8270
2,4,5-Trichlorophenol	1.97	3 U	ug/kg	12/05/91	SW846-8270
2-Chloronaphthalene	4.06	2 U	ug/kg	12/05/91	SW846-8270
2-Nitroaniline	1.97	3 U	ug/kg	12/05/91	SW846-8270

LEEDS005955

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell
4800 East 63rd Street
Kansas City, MO 74130
Attn: Joe Marsh

Report: 8046.09

Date: 12/10/91

Work #: 8046.09
PROJECT: KC Site II
SAMPLE #: MW-202S
LOCATION:

COMMENTS:

Date Submitted: 11/21/91
Sample Matrix: Soil
Depth From : 10.00
Depth To : 10.00
Date Extracted: 11/22/91

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Dimethylphthalate	4.06	2 U	ug/kg	12/05/91	SW846-8270
Acenaphthylene	4.06	2 U	ug/kg	12/05/91	SW846-8270
3-Nitroaniline	1.97	3 U	ug/kg	12/05/91	SW846-8270
Acenaphthene	4.06	2 U	ug/kg	12/05/91	SW846-8270
2,4-Dinitrophenol	1.97	3 U	ug/kg	12/05/91	SW846-8270
4-Nitrophenol	1.97	3 U	ug/kg	12/05/91	SW846-8270
Dibenzofuran	4.06	2 U	ug/kg	12/05/91	SW846-8270
2,4-Dinitrotoluene	4.06	2 U	ug/kg	12/05/91	SW846-8270
2,6-Dinitrotoluene	4.06	2 U	ug/kg	12/05/91	SW846-8270
Diethylphthalate	4.06	2 U	ug/kg	12/05/91	SW846-8270
4-Chlorophenyl-Phenylether	4.06	2 U	ug/kg	12/05/91	SW846-8270
Fluorene	4.06	2 U	ug/kg	12/05/91	SW846-8270
4-Nitroaniline	1.97	3 U	ug/kg	12/05/91	SW846-8270
4,6-Dinitro-2-Methylphenol	1.97	3 U	ug/kg	12/05/91	SW846-8270
N-Nitrosodiphenylamine	4.06	2 U	ug/kg	12/05/91	SW846-8270
4-Bromophenyl-Phenylether	4.06	2 U	ug/kg	12/05/91	SW846-8270
Hexachlorobenzene	4.06	2 U	ug/kg	12/05/91	SW846-8270
Pentachlorophenol	4.06	2 U	ug/kg	12/05/91	SW846-8270
Phenanthrene	9.00	1 J	ug/kg	12/05/91	SW846-8270
Anthracene	4.06	2 U	ug/kg	12/05/91	SW846-8270
Di-N-Butylphthalate	4.06	2 U	ug/kg	12/05/91	SW846-8270
Fluoranthene	4.06	2 U	ug/kg	12/05/91	SW846-8270
Pyrene	4.06	2 U	ug/kg	12/05/91	SW846-8270
Butylbenzylphthalate	4.06	2 U	ug/kg	12/05/91	SW846-8270
3,3-Dichlorobenzidine	8.12	2 U	ug/kg	12/05/91	SW846-8270
Benzo(a)Anthracene	4.06	2 U	ug/kg	12/05/91	SW846-8270
bis(2-Ethylhexyl)Phthalate	1.10	2 J	ug/kg	12/05/91	SW846-8270
Chrysene	4.06	2 U	ug/kg	12/05/91	SW846-8270
Di-N-Octyl Phthalate	4.06	2 U	ug/kg	12/05/91	SW846-8270
Benzo(b)Fluoranthene	4.06	2 U	ug/kg	12/05/91	SW846-8270

LEEDS005956

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell
4800 East 63rd Street
Kansas City, MO 74130
Attn: Joe Marsh

Report: 8046.09

Date: 12/19/91

SWLO #: 8046.09
PROJECT: KC Site II
SAMPLE #: MW-202B
LOCATION:

COMMENTS:

Date Submitted:
Sample Matrix: Soil
Depth From :
Depth To :
Date Extracted: 11/22/91

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Benzo(k)Fluoranthene	4.06	2 U	ug/kg	12/05/91	SW846-8270
Benzo(a)Pyrene	4.06	2 U	ug/kg	12/05/91	SW846-8270
Indeno(1,2,3-cd)Pyrene	4.06	2 U	ug/kg	12/05/91	SW846-8270
Dibenz(a,h)Anthracene	4.06	2 U	ug/kg	12/05/91	SW846-8270
Benzo(g,h,i)Perylene	4.06	2 U	ug/kg	12/05/91	SW846-8270

LEEDS005957

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Parks

Report: 8046.10

Date: 12/10/91

Work #: 8046.10
PROJECT: KC Site 11
SAMPLE #: MW-202C
LOCATION:
COMMENTS:

Date Submitted: 11/26/91
Sample Matrix: Soil
Depth From : 14.00
Depth To : 14.00

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	1.84	3	mg/kg	11/27/91	11/27/91	EPA-418.1

LEEDS005958

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

SWLO #:
PROJECT: KC Solv. #1
SAMPLE #: MW-22R
LOCATION:

COMMENTS:

Report: 8046.10

Date: 12/19/91

Date Submitted: 11/21/91
Sample Matrix: Soil
Depth From : 14.00
Depth To : 14.00
Date Extracted: / /

VOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Chloromethane	1.63	3 U	ug/kg	11/22/91	SW846-8240
Bromomethane	1.63	3 U	ug/kg	11/22/91	SW846-8240
Vinyl Chloride	1.63	3 U	ug/kg	11/22/91	SW846-8240
Chloroethane	1.63	3 U	ug/kg	11/22/91	SW846-8240
Methylene Chloride	8.15	2 U	ug/kg	11/22/91	SW846-8240
Acetone	1.77	3	ug/kg	11/22/91	SW846-8240
Carbon Disulfide	8.15	2 U	ug/kg	11/22/91	SW846-8240
1,1-Dichloroethene	8.15	2 U	ug/kg	11/22/91	SW846-8240
1,1-Dichloroethane	8.15	2 U	ug/kg	11/22/91	SW846-8240
Trans-1,2-Dichloroethene	8.15	2 U	ug/kg	11/22/91	SW846-8240
Chloroform	8.15	2 U	ug/kg	11/22/91	SW846-8240
1,2-Dichloroethane	8.15	2 U	ug/kg	11/22/91	SW846-8240
2-Butanone	1.63	3 U	ug/kg	11/22/91	SW846-8240
1,1,1-Trichloroethane	8.15	2 U	ug/kg	11/22/91	SW846-8240
Carbon Tetrachloride	8.15	2 U	ug/kg	11/22/91	SW846-8240
Vinyl Acetate	1.63	3 U	ug/kg	11/22/91	SW846-8240
Bromodichloromethane	8.15	2 U	ug/kg	11/22/91	SW846-8240
1,1,2,2-Tetrachloroethane	8.15	2 U	ug/kg	11/22/91	SW846-8240
1,2-Dichloropropane	8.15	2 U	ug/kg	11/22/91	SW846-8240
Trans-1,3-Dichloropropene	8.15	2 U	ug/kg	11/22/91	SW846-8240
Trichloroethene	8.15	2 U	ug/kg	11/22/91	SW846-8240
Dibromochloromethane	8.15	2 U	ug/kg	11/22/91	SW846-8240
1,1,2-Trichloroethane	8.15	2 U	ug/kg	11/22/91	SW846-8240
Benzene	8.15	2 U	ug/kg	11/22/91	SW846-8240
cis-1,3-Dichloropropene	8.15	2 U	ug/kg	11/22/91	SW846-8240
2-Chloroethylvinylether	1.63	3 U	ug/kg	11/22/91	SW846-8240
Bromoform	8.15	2 U	ug/kg	11/22/91	SW846-8240
2-Hexanone	1.63	3 U	ug/kg	11/22/91	SW846-8240
4-Methyl-2-Pentanone	1.63	3 U	ug/kg	11/22/91	SW846-8240
Tetrachloroethene	8.15	2 U	ug/kg	11/22/91	SW846-8240

LEEDS005959

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell
4800 East 63rd Street
Kansas City, MO 74130
Attn: Joe Marsh

Report: 8046.10

Date: 12/19/91

SWLO #: 8046.10
PROJECT: KC Site II
SAMPLE #: MW-202C
LOCATION:

COMMENTS:

Date Submitted:
Sample Matrix: Soil
Depth From : 14.00
Depth To : 14.00
Date Extracted: / /

VOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Toluene	8.15	2 U	ug/kg	11/22/91	SW846-8240
Chlorobenzene	8.15	2 U	ug/kg	11/22/91	SW846-8240
Ethylbenzene	8.15	2 U	ug/kg	11/22/91	SW846-8240
Styrene	8.15	2 U	ug/kg	11/22/91	SW846-8240
Total Xylenes	8.15	2 U	ug/kg	11/22/91	SW846-8240

LEEDS005960

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell
4800 East 63rd Street
Kansas City, MO 74130
Attn: Joe Marsh

Report: 8046.10

Date: 12/19/91

SWLO #: 8046.10
PROJECT: KC Site II
SAMPLE #: MW-202C
LOCATION:

COMMENTS:

Date Submitted: 11/21/91
Sample Matrix: Soil
Depth From : 14.00
Depth To : 14.00
Date Extracted: 11/22/91

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Phenol	4.29	2 U	ug/kg	12/09/91	SW846-8270
bis(2-Chloroethyl)Ether	4.29	2 U	ug/kg	12/09/91	SW846-8270
2-Chlorophenol	4.29	2 U	ug/kg	12/09/91	SW846-8270
1,3-Dichlorobenzene	4.29	2 U	ug/kg	12/09/91	SW846-8270
1,4-Dichlorobenzene	4.29	2 U	ug/kg	12/09/91	SW846-8270
Benzyl Alcohol	4.29	2 U	ug/kg	12/09/91	SW846-8270
1,2-Dichlorobenzene	4.29	2 U	ug/kg	12/09/91	SW846-8270
2-Methylphenol	4.29	2 U	ug/kg	12/09/91	SW846-8270
bis(2-Chloroisopropyl)Ether	4.29	2 U	ug/kg	12/09/91	SW846-8270
4-Methylphenol	4.29	2 U	ug/kg	12/09/91	SW846-8270
N-Nitroso-Di-n-Propylamine	4.29	2 U	ug/kg	12/09/91	SW846-8270
Hexachloroethane	4.29	2 U	ug/kg	12/09/91	SW846-8270
Nitrobenzene	4.29	2 U	ug/kg	12/09/91	SW846-8270
Isophorone	4.29	2 U	ug/kg	12/09/91	SW846-8270
2-Nitrophenol	4.29	2 U	ug/kg	12/09/91	SW846-8270
2,4-Dimethylphenol	4.29	2 U	ug/kg	12/09/91	SW846-8270
Benzoic Acid	2.08	3 U	ug/kg	12/09/91	SW846-8270
bis(2-Chloroethoxy)Methane	4.29	2 U	ug/kg	12/09/91	SW846-8270
2,4-Dichlorophenol	4.29	2 U	ug/kg	12/09/91	SW846-8270
1,2,4-Trichlorobenzene	4.29	2 U	ug/kg	12/09/91	SW846-8270
Naphthalene	4.29	2 U	ug/kg	12/09/91	SW846-8270
4-Chloroaniline	4.29	2 U	ug/kg	12/09/91	SW846-8270
Hexachlorobutadiene	4.29	2 U	ug/kg	12/09/91	SW846-8270
4-Chloro-3-Methylphenol	4.29	2 U	ug/kg	12/09/91	SW846-8270
2-Methylnaphthalene	1.30	3	ug/kg	12/09/91	SW846-8270
Hexachlorocyclopentadiene	4.29	2 U	ug/kg	12/09/91	SW846-8270
2,4,6-Trichlorophenol	4.29	2 U	ug/kg	12/09/91	SW846-8270
2,4,5-Trichlorophenol	2.08	3 U	ug/kg	12/09/91	SW846-8270
2-Chloronaphthalene	4.29	2 U	ug/kg	12/09/91	SW846-8270
2-Nitroaniline	2.08	3 U	ug/kg	12/09/91	SW846-8270

LEEDS005961

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 8046.10

Date: 12/19/91

COMMENTS:

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Dimethylphthalate	4.29	2 U	ug/kg	12/09/91	SW846-8270
Acenaphthylene	4.29	2 U	ug/kg	12/09/91	SW846-8270
3-Nitroaniline	2.08	3 U	ug/kg	12/09/91	SW846-8270
Acenaphthene	4.29	2 U	ug/kg	12/09/91	SW846-8270
2,4-Dinitrophenol	2.08	3 U	ug/kg	12/09/91	SW846-8270
4-Nitrophenol	2.08	3 U	ug/kg	12/09/91	SW846-8270
Dibenzofuran	4.29	2 U	ug/kg	12/09/91	SW846-8270
2,4-Dinitrotoluene	4.29	2 U	ug/kg	12/09/91	SW846-8270
2,6-Dinitrotoluene	4.29	2 U	ug/kg	12/09/91	SW846-8270
Diethylphthalate	4.29	2 U	ug/kg	12/09/91	SW846-8270
4-Chlorophenyl-Phenylether	4.29	2 U	ug/kg	12/09/91	SW846-8270
Fluorene	4.29	2 U	ug/kg	12/09/91	SW846-8270
4-Nitroaniline	2.08	3 U	ug/kg	12/09/91	SW846-8270
4,6-Dinitro-2-Methylphenol	2.08	3 U	ug/kg	12/09/91	SW846-8270
N-Nitrosodiphenylamine	4.29	2 U	ug/kg	12/09/91	SW846-8270
4-Bromophenyl-Phenylether	4.29	2 U	ug/kg	12/09/91	SW846-8270
Hexachlorobenzene	4.29	2 U	ug/kg	12/09/91	SW846-8270
Pentachlorophenol	4.29	2 U	ug/kg	12/09/91	SW846-8270
Phenanthrene	4.29	2 U	ug/kg	12/09/91	SW846-8270
Anthracene	4.29	2 U	ug/kg	12/09/91	SW846-8270
Di-N-Butylphthalate	4.29	2 U	ug/kg	12/09/91	SW846-8270
Fluoranthene	4.29	2 U	ug/kg	12/09/91	SW846-8270
Pyrene	4.29	2 U	ug/kg	12/09/91	SW846-8270
Butylbenzylphthalate	4.29	2 U	ug/kg	12/09/91	SW846-8270
3,3-Dichlorobenzidine	8.58	2 U	ug/kg	12/09/91	SW846-8270
Benzo(a)Anthracene	4.29	2 U	ug/kg	12/09/91	SW846-8270
bis(2-Ethylhexyl)Phthalate	4.29	2 U	ug/kg	12/09/91	SW846-8270
Chrysene	4.29	2 U	ug/kg	12/09/91	SW846-8270
Di-N-Octyl Phthalate	4.29	2 U	ug/kg	12/09/91	SW846-8270
Benzo(b)Fluoranthene	4.29	2 U	ug/kg	12/09/91	SW846-8270

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell
4800 East 63rd Street
Kansas City, MO 74130
Attn: Joe Marsh

Report: 8046.10

Date: 12/19/91

SWLO #: 8046.10
PROJECT: KC Site II
SAMPLE #: MW-202C
LOCATION:

COMMENTS:

Date Submitted: 11/21/91
Sample Matrix: Soil
Depth From : 14.00
Depth To : 14.00
Date Extracted: 11/22/91

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Benzo(k)Fluoranthene	4.29	2 U	ug/kg	12/09/91	SW846-8270
Benzo(a)Pyrene	4.29	2 U	ug/kg	12/09/91	SW846-8270
Indeno(1,2,3-cd)Pyrene	4.29	2 U	ug/kg	12/09/91	SW846-8270
Dibenz(a,h)Anthracene	4.29	2 U	ug/kg	12/09/91	SW846-8270
Benzo(g,h,i)Perylene	4.29	2 U	ug/kg	12/09/91	SW846-8270

LEEDS005963

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
[illegible] West Albany • Broken Arrow, Oklahoma [illegible] • Office (918) 251-[illegible] • Fax (918) 251-[illegible]

CLIENT: Burns & McDonnell Engineering Co.
3800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 7963.01
Date: [illegible]

PWSID #: 7963.01
PROJECT: KC Site II
SAMPLE #: SB-201
LOCATION:
COMMENTS:

Date Collected: 11/13/91
Sample Matrix: Soil
Depth From : 0.00
Depth To : 0.00

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	2.80	1	mg/kg	11/15/91	11/15/91	EPA-418.1

LEEDS005964

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

[redacted] • Office [redacted] • Fax [redacted]

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 7963.01

Date: 12/11/91

SWLO #: [redacted]
PROJ. #: [redacted]
SAMPLE #: [redacted]
LOCATION:
COMMENTS:

Depth From : 0.00
Depth To : 0.00

FLASH POINT	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Flash Point	2.00	2 >	deg.f	/ /	12/02/91	ASTMD-93

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

LEEDS005965

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West A ... • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 7963.02

Date: 12/11/91

SWLO #: 7963.02
PROJECT: KC Site II
SAMPLE #: SB-205A
LOCATION:
COMMENTS:

Date Submitted: 11/13/91
Sample Matrix: Soil
Depth From : 4.50
Depth To : 4.50

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	1.20	1	mg/kg	11/15/91	11/15/91	EPA-418.1

LEEDS005966

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 7963.03
Date: 12/11/91

SWLO #: 7963.03
PROJECT: KC Site 1J
SAMPLE #: SB-205B
LOCATION:
COMMENTS:

Date Submitted: 11/13/91
Sample Matrix: Soil
Depth From : 9.00
Depth To : 9.00

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	1.20	1	mg/kg	11/15/91	11/15/91	EPA-418.1

LEEDS005967

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

[illegible] • Broken Arrow, Oklahoma [illegible] • Office (918) 251-[illegible] • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 7963.04

Date: 12/11/91

SWLO #: 7963.04
PROJECT: KC Site II
SAMPLE #: SB-205C
LOCATION:
COMMENTS:

Date Submitted: 11/13/91
Sample Matrix: Soil
Depth From : 14.00
Depth To : 14.00

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	1.00	1	mg/kg	11/15/91	11/15/91	EPA-418.1

LEEDS005968

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 7963.05

Date: 12/31/91

SWLO #: 7963...
PROJECT: KC Site 11
SAMPLE #: SB-205E
LOCATION:
COMMENTS:

Sample Matrix: Soil
Depth From : 24.00
Depth To : 24.00

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	1.10	1	mg/kg	11/15/91	11/15/91	EPA-418.1

LEEDS005969

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 7963.06

Date: 12/11/91

SWLO #: 7963.06
PROJECT: KC Site II
SAMPLE #: SB-205F
LOCATION:
COMMENTS:

Date Submitted: 11/13/91
Sample Matrix: Soil
Depth From : 29.00
Depth To : 29.00

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	1.40	1	mg/kg	11/15/91	11/15/91	EPA-418.1

LEEDS005970

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-[illegible] • FAX: 918-251-2509

CLIENT: [illegible]

Date Submitted: [illegible]
Sample Matrix: Soil
Depth From : 5.00
Depth To : 5.00

PROJECT: [illegible]
SAMPLE #: SB-218A
LOCATION:
COMMENTS:

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	4.20	1	mg/kg	11/27/91	11/27/91	EPA-418.1

LEEDS005971

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: Burns & McDonnell
4400 East 63rd Street
Kansas City, MO 64130
Attn: Tom Grimm

Report: 8094..06

Date: 12/19/91

SWLO #: 8094-1.0e
PROJECT: KC Site II
SAMPLE #: SB-218B
LOCATION:
COMMENTS:

Date Submitted: 11/21/91
Sample Matrix: Soil
Depth From : 8.00
Depth To : 8.00

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	5.70	1	mg/kg	11/27/91	11/27/91	EPA-418.1

LEEDS005972

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 W. Albany • Broken Arrow, Oklahoma 74012 • 918-251-2858 • FAX: 918-251-2599

CLIENT: [illegible]

Report: 6046.07

Date: 12/19/91

[illegible]

Project: KC Site 11

SAMPLE #: SB-C10C

LOCATION:

COMMENTS:

[illegible]

Sample Matrix: Soil

Depth From : 12.00

Depth To : 12.00

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	6.80	1	mg/kg	11/27/91	11/27/91	EPA-418.1

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

Broken Arrow, Oklahoma • (918) 251-8858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, Missouri
Attn: Joe Marr

SWLO #: 7961.10
PROJECT: KC Site 11
SAMPLE #: MW-203A
LOCATION: SB-21
COMMENTS:

Sample Matrix: Soil
Depth From : 3.00
Depth To : 3.00

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	1.30	1	mg/kg	11/15/91	11/15/91	EPA-418.1

LEEDS005974

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 7963.10

Date: 12/11/91

SWLO #: 7963.1
PROJECT: 50-591
SAMPLE #: MW-20A
LOCATION: 50-591
COMMENTS:

Date Submitted: 11/13/91
Sample Matrix: Soil
Depth From : 3.00
Depth To : 3.00
Date Extracted: / /

VOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Chloromethane	1.47	1 U	ug/kg	11/14/91	SW846-8240
Bromomethane	1.47	1 U	ug/kg	11/14/91	SW846-8240
Vinyl Chloride	1.47	1 U	ug/kg	11/14/91	SW846-8240
Chloroethane	1.47	1 U	ug/kg	11/14/91	SW846-8240
Methylene Chloride	7.35	0 U	ug/kg	11/14/91	SW846-8240
Acetone	5.50	1	ug/kg	11/14/91	SW846-8240
Carbon Disulfide	7.35	0 U	ug/kg	11/14/91	SW846-8240
1,1-Dichloroethene	7.35	0 U	ug/kg	11/14/91	SW846-8240
1,1-Dichloroethane	7.35	0 U	ug/kg	11/14/91	SW846-8240
Trans-1,2-Dichloroethene	7.35	0 U	ug/kg	11/14/91	SW846-8240
Chloroform	7.35	0 U	ug/kg	11/14/91	SW846-8240
1,2-Dichloroethane	7.35	0 U	ug/kg	11/14/91	SW846-8240
2-Butanone	1.47	1 U	ug/kg	11/14/91	SW846-8240
1,1,1-Trichloroethane	7.35	0 U	ug/kg	11/14/91	SW846-8240
Carbon Tetrachloride	7.35	0 U	ug/kg	11/14/91	SW846-8240
Vinyl Acetate	1.47	1 U	ug/kg	11/14/91	SW846-8240
Bromodichloromethane	7.35	0 U	ug/kg	11/14/91	SW846-8240
1,1,2,2-Tetrachloroethane	7.35	0 U	ug/kg	11/14/91	SW846-8240
1,2-Dichloropropane	7.35	0 U	ug/kg	11/14/91	SW846-8240
Trans-1,3-Dichloropropene	7.35	0 U	ug/kg	11/14/91	SW846-8240
Trichloroethene	7.35	0 U	ug/kg	11/14/91	SW846-8240
Dibromochloromethane	7.35	0 U	ug/kg	11/14/91	SW846-8240
1,1,2-Trichloroethane	7.35	0 U	ug/kg	11/14/91	SW846-8240
Benzene	7.35	0 U	ug/kg	11/14/91	SW846-8240
cis-1,3-Dichloropropene	7.35	0 U	ug/kg	11/14/91	SW846-8240
2-Chloroethylvinylether	1.47	1 U	ug/kg	11/14/91	SW846-8240
Bromoform	7.35	0 U	ug/kg	11/14/91	SW846-8240
2-Hexanone	1.47	1 U	ug/kg	11/14/91	SW846-8240
4-Methyl-2-Pentanone	1.47	1 U	ug/kg	11/14/91	SW846-8240
Tetrachloroethene	7.35	0 U	ug/kg	11/14/91	SW846-8240

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2857

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 7963.10

Date: 12/11/91

SWLO #: 7963.10
PROJECT: KC Site II
SAMPLE #: ~~MW-203A~~ SB-219
LOCATION:

COMMENTS:

Date Submitted: [illegible]
Sample Matrix: Soil
Depth From : 3.00
Depth To : 3.00
Date Extracted: / /

VOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Toluene	7.35	0 U	ug/kg	11/14/91	SW846-8240
Chlorobenzene	7.35	0 U	ug/kg	11/14/91	SW846-8240
Ethylbenzene	7.35	0 U	ug/kg	11/14/91	SW846-8240
Styrene	7.35	0 U	ug/kg	11/14/91	SW846-8240
Total Xylenes	7.35	0 U	ug/kg	11/14/91	SW846-8240

LEEDS005976

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 7963.10

Date: 12/11/91

SWLO #: 7963.10
PROJECT: KC Site II
SAMPLE #: MW-203A
LOCATION: SB-219

COMMENTS:

Date Submitted: 11/13/91
Sample Matrix: Soil
Depth From : 3.00
Depth To : 3.00
Date Extracted: 11/13/91

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Phenol	4.85	2 U	ug/kg	11/26/91	SW846-8270
bis(2-Chloroethyl)Ether	4.85	2 U	ug/kg	11/26/91	SW846-8270
2-Chlorophenol	4.85	2 U	ug/kg	11/26/91	SW846-8270
1,3-Dichlorobenzene	4.85	2 U	ug/kg	11/26/91	SW846-8270
1,4-Dichlorobenzene	4.85	2 U	ug/kg	11/26/91	SW846-8270
Benzyl Alcohol	4.85	2 U	ug/kg	11/26/91	SW846-8270
1,2-Dichlorobenzene	4.85	2 U	ug/kg	11/26/91	SW846-8270
2-Methylphenol	4.85	2 U	ug/kg	11/26/91	SW846-8270
bis(2-Chloroisopropyl)Ether	4.85	2 U	ug/kg	11/26/91	SW846-8270
4-Methylphenol	4.85	2 U	ug/kg	11/26/91	SW846-8270
N-Nitroso-Di-n-Propylamine	4.85	2 U	ug/kg	11/26/91	SW846-8270
Hexachloroethane	4.85	2 U	ug/kg	11/26/91	SW846-8270
Nitrobenzene	4.85	2 U	ug/kg	11/26/91	SW846-8270
Isophorone	4.85	2 U	ug/kg	11/26/91	SW846-8270
2-Nitrophenol	4.85	2 U	ug/kg	11/26/91	SW846-8270
2,4-Dimethylphenol	4.85	2 U	ug/kg	11/26/91	SW846-8270
Benzoic Acid	2.35	3 U	ug/kg	11/26/91	SW846-8270
bis(2-Chloroethoxy)Methane	4.85	2 U	ug/kg	11/26/91	SW846-8270
2,4-Dichlorophenol	4.85	2 U	ug/kg	11/26/91	SW846-8270
1,2,4-Trichlorobenzene	4.85	2 U	ug/kg	11/26/91	SW846-8270
Naphthalene	4.85	2 U	ug/kg	11/26/91	SW846-8270
4-Chloroaniline	4.85	2 U	ug/kg	11/26/91	SW846-8270
Hexachlorobutadiene	4.85	2 U	ug/kg	11/26/91	SW846-8270
4-Chloro-3-Methylphenol	4.85	2 U	ug/kg	11/26/91	SW846-8270
2-Methylnaphthalene	1.70	1 J	ug/kg	11/26/91	SW846-8270
Hexachlorocyclopentadiene	4.85	2 U	ug/kg	11/26/91	SW846-8270
2,4,6-Trichlorophenol	4.85	2 U	ug/kg	11/26/91	SW846-8270
2,4,5-Trichlorophenol	2.35	3 U	ug/kg	11/26/91	SW846-8270
2-Chloronaphthalene	4.85	2 U	ug/kg	11/26/91	SW846-8270
2-Nitroaniline	2.35	3 U	ug/kg	11/26/91	SW846-8270

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 7963.10

Date: 12/11/91

SYLO #: 7963
PROJECT: SI
SAMPLE #: MW-20SA
LOCATION: SD-21

Date Submitted: 11/7/91
Sample Matrix: Soil
Depth From : 3.00
Depth To : 3.00
Date Extracted: 11/13/91

COMMENTS:

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Dimethylphthalate	4.85	2 U	ug/kg	11/26/91	SW846-8270
Acenaphthylene	4.85	2 U	ug/kg	11/26/91	SW846-8270
3-Nitroaniline	2.35	3 U	ug/kg	11/26/91	SW846-8270
Acenaphthene	4.85	2 U	ug/kg	11/26/91	SW846-8270
2,4-Dinitrophenol	2.35	3 U	ug/kg	11/26/91	SW846-8270
4-Nitrophenol	2.35	3 U	ug/kg	11/26/91	SW846-8270
Dibenzofuran	4.85	2 U	ug/kg	11/26/91	SW846-8270
2,4-Dinitrotoluene	4.85	2 U	ug/kg	11/26/91	SW846-8270
2,6-Dinitrotoluene	4.85	2 U	ug/kg	11/26/91	SW846-8270
Diethylphthalate	4.85	2 U	ug/kg	11/26/91	SW846-8270
4-Chlorophenyl-Phenylether	4.85	2 U	ug/kg	11/26/91	SW846-8270
Fluorene	4.85	2 U	ug/kg	11/26/91	SW846-8270
4-Nitroaniline	2.35	3 U	ug/kg	11/26/91	SW846-8270
4,6-Dinitro-2-Methylphenol	2.35	3 U	ug/kg	11/26/91	SW846-8270
N-Nitrosodiphenylamine	4.85	2 U	ug/kg	11/26/91	SW846-8270
4-Bromophenyl-Phenylether	4.85	2 U	ug/kg	11/26/91	SW846-8270
Hexachlorobenzene	4.85	2 U	ug/kg	11/26/91	SW846-8270
Pentachlorophenol	4.85	2 U	ug/kg	11/26/91	SW846-8270
Phenanthrene	3.80	1 J	ug/kg	11/26/91	SW846-8270
Anthracene	4.85	2 U	ug/kg	11/26/91	SW846-8270
Di-N-Butylphthalate	3.00	1 J	ug/kg	11/26/91	SW846-8270
Fluoranthene	5.60	1 J	ug/kg	11/26/91	SW846-8270
Pyrene	7.80	1 J	ug/kg	11/26/91	SW846-8270
Butylbenzylphthalate	4.85	2 U	ug/kg	11/26/91	SW846-8270
3,3-Dichlorobenzidine	9.70	2 U	ug/kg	11/26/91	SW846-8270
Benzo(a)Anthracene	4.85	2 U	ug/kg	11/26/91	SW846-8270
bis(2-Ethylhexyl)Phthalate	4.85	2 U	ug/kg	11/26/91	SW846-8270
Chrysene	4.85	2 U	ug/kg	11/26/91	SW846-8270
Di-N-Octyl Phthalate	2.00	1 J	ug/kg	11/26/91	SW846-8270
Benzo(b)Fluoranthene	6.30	1 J	ug/kg	11/26/91	SW846-8270

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-3858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Jim Marsh

Report: 7963.10

Date: 12/11/91

Date Submitted: 11/13/91
PROJECT: KC Site II
SAMPLE #: MW-203A
LOCATION: SB-29
COMMENTS:

Sample Matrix: Soil
Depth From : 3.00
Depth To : 3.00
Date Extracted: 11/13/91

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Benzo(k)Fluoranthene	4.85	2 U	ug/kg	11/26/91	SW846-8270
Benzo(a)Pyrene	4.85	2 U	ug/kg	11/26/91	SW846-8270
Indeno(1,2,3-cd)Pyrene	4.85	2 U	ug/kg	11/26/91	SW846-8270
Dibenz(a,h)Anthracene	4.85	2 U	ug/kg	11/26/91	SW846-8270
Benzo(g,h,i)Perylene	4.85	2 U	ug/kg	11/26/91	SW846-8270

LEEDS005979

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
[illegible] • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East [illegible]
Kansas City, MO [illegible]
Attn: Joe Marsh

Report: 7963.11

Date: 12/11/91

SWLO #: 7963.11
PROJECT: KC Site II
SAMPLE #: ~~MW-203B~~ SB 24
LOCATION:
COMMENTS:

Date Submitted: 11/13/91
Sample Matrix: Soil
Depth From : 8.00
Depth To : 8.00

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	3.50	2	mg/kg	11/15/91	11/15/91	EPA-418.1

LEEDS005980

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
[illegible] Broken Arrow, Oklahoma [illegible] (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 7963.11

Date: 12/11/91

Project: NE Site
SAMPLE #: MW-203B
LOCATION: SB-219

Depth From : 6.00
Depth To : 8.00
Date Extracted: / /

COMMENTS:

VOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Chloromethane	1.54	3 U	ug/kg	11/19/91	SW846-8240
Bromomethane	1.54	3 U	ug/kg	11/19/91	SW846-8240
Vinyl Chloride	1.54	3 U	ug/kg	11/19/91	SW846-8240
Chloroethane	1.54	3 U	ug/kg	11/19/91	SW846-8240
Methylene Chloride	7.70	2 U	ug/kg	11/19/91	SW846-8240
Acetone	1.76	3	ug/kg	11/19/91	SW846-8240
Carbon Disulfide	7.70	2 U	ug/kg	11/19/91	SW846-8240
1,1-Dichloroethene	7.70	2 U	ug/kg	11/19/91	SW846-8240
1,1-Dichloroethane	7.70	2 U	ug/kg	11/19/91	SW846-8240
Trans-1,2-Dichloroethene	7.70	2 U	ug/kg	11/19/91	SW846-8240
Chloroform	7.70	2 U	ug/kg	11/19/91	SW846-8240
1,2-Dichloroethane	7.70	2 U	ug/kg	11/19/91	SW846-8240
2-Butanone	1.54	3 U	ug/kg	11/19/91	SW846-8240
1,1,1-Trichloroethane	7.70	2 U	ug/kg	11/19/91	SW846-8240
Carbon Tetrachloride	7.70	2 U	ug/kg	11/19/91	SW846-8240
Vinyl Acetate	1.54	3 U	ug/kg	11/19/91	SW846-8240
Bromodichloromethane	7.70	2 U	ug/kg	11/19/91	SW846-8240
1,1,2,2-Tetrachloroethane	7.70	2 U	ug/kg	11/19/91	SW846-8240
1,2-Dichloropropane	7.70	2 U	ug/kg	11/19/91	SW846-8240
Trans-1,3-Dichloropropene	7.70	2 U	ug/kg	11/19/91	SW846-8240
Trichloroethene	7.70	2 U	ug/kg	11/19/91	SW846-8240
Dibromochloromethane	7.70	2 U	ug/kg	11/19/91	SW846-8240
1,1,2-Trichloroethane	7.70	2 U	ug/kg	11/19/91	SW846-8240
Benzene	7.70	2 U	ug/kg	11/19/91	SW846-8240
cis-1,3-Dichloropropene	7.70	2 U	ug/kg	11/19/91	SW846-8240
2-Chloroethylvinylether	1.54	3 U	ug/kg	11/19/91	SW846-8240
Bromoform	7.70	2 U	ug/kg	11/19/91	SW846-8240
2-Hexanone	1.54	3 U	ug/kg	11/19/91	SW846-8240
4-Methyl-2-Pentanone	1.54	3 U	ug/kg	11/19/91	SW846-8240
Tetrachloroethene	7.70	2 U	ug/kg	11/19/91	SW846-8240

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • (918) 251-2858 • Fax (918) 251-3858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 7963.11

Date: 12/1[illegible]

SWLO #: 7963.11
PROJECT: KC Site II
SAMPLE #: ~~MW-203B~~
LOCATION: SB-219
COMMENTS:

Date Submitted: [illegible]
Sample Matrix: Soil
Depth From : 8.00
Depth To : 8.00
Date Extracted: / /

VOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Toluene	7.70	2 U	ug/kg	11/19/91	SW846-8240
Chlorobenzene	7.70	2 U	ug/kg	11/19/91	SW846-8240
Ethylbenzene	7.70	2 U	ug/kg	11/19/91	SW846-8240
Styrene	7.70	2 U	ug/kg	11/19/91	SW846-8240
Total Xylenes	7.70	2 U	ug/kg	11/19/91	SW846-8240

LEEDS005982

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1760 West [illegible] • Broken Arrow, Oklahoma 74012 • Office (918) 251-[illegible] • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 7953.[illegible]

Date: 12/[illegible]/9[illegible]

[illegible]
PROJECT: [illegible]
SAMPLE #: MW-[illegible]
LOCATION: SB 20

Sample Matrix: [illegible]
Depth From : 6.00
Depth To : 8.00
Date Extracted: 11/13/91

COMMENTS:

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Phenol	4.06	2 U	ug/kg	11/26/91	SW846-8270
bis(2-Chloroethyl)Ether	4.06	2 U	ug/kg	11/26/91	SW846-8270
2-Chlorophenol	4.06	2 U	ug/kg	11/26/91	SW846-8270
1,3-Dichlorobenzene	4.06	2 U	ug/kg	11/26/91	SW846-8270
1,4-Dichlorobenzene	4.06	2 U	ug/kg	11/26/91	SW846-8270
Benzyl Alcohol	4.06	2 U	ug/kg	11/26/91	SW846-8270
1,2-Dichlorobenzene	4.06	2 U	ug/kg	11/26/91	SW846-8270
2-Methylphenol	4.06	2 U	ug/kg	11/26/91	SW846-8270
bis(2-Chloroisopropyl)Ether	4.06	2 U	ug/kg	11/26/91	SW846-8270
4-Methylphenol	4.06	2 U	ug/kg	11/26/91	SW846-8270
N-Nitroso-Di-n-Propylamine	4.06	2 U	ug/kg	11/26/91	SW846-8270
Hexachloroethane	4.06	2 U	ug/kg	11/26/91	SW846-8270
Nitrobenzene	4.06	2 U	ug/kg	11/26/91	SW846-8270
Isophorone	4.06	2 U	ug/kg	11/26/91	SW846-8270
2-Nitrophenol	4.06	2 U	ug/kg	11/26/91	SW846-8270
2,4-Dimethylphenol	4.06	2 U	ug/kg	11/26/91	SW846-8270
Benzoic Acid	1.97	3 U	ug/kg	11/26/91	SW846-8270
bis(2-Chloroethoxy)Methane	4.06	2 U	ug/kg	11/26/91	SW846-8270
2,4-Dichlorophenol	4.06	2 U	ug/kg	11/26/91	SW846-8270
1,2,4-Trichlorobenzene	4.06	2 U	ug/kg	11/26/91	SW846-8270
Naphthalene	4.06	2 U	ug/kg	11/26/91	SW846-8270
4-Chloroaniline	4.06	2 U	ug/kg	11/26/91	SW846-8270
Hexachlorobutadiene	4.06	2 U	ug/kg	11/26/91	SW846-8270
4-Chloro-3-Methylphenol	4.06	2 U	ug/kg	11/26/91	SW846-8270
2-Methylnaphthalene	3.50	3	ug/kg	11/26/91	SW846-8270
Hexachlorocyclopentadiene	4.06	2 U	ug/kg	11/26/91	SW846-8270
2,4,6-Trichlorophenol	4.06	2 U	ug/kg	11/26/91	SW846-8270
2,4,5-Trichlorophenol	1.97	3 U	ug/kg	11/26/91	SW846-8270
2-Chloronaphthalene	4.06	2 U	ug/kg	11/26/91	SW846-8270
2-Nitroaniline	1.97	3 U	ug/kg	11/26/91	SW846-8270

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 7963.11

SDG #: 7963.11
PROJECT: KC Site 1
SAMPLE #: MW-203B
LOCATION: SB-214

Depth From : 4.00
Depth To : 6.00
Date Extracted: 11/13/91

COMMENTS:

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Dimethylphthalate	4.06	2 U	ug/kg	11/26/91	SW846-8270
Acenaphthylene	4.06	2 U	ug/kg	11/26/91	SW846-8270
3-Nitroaniline	1.97	3 U	ug/kg	11/26/91	SW846-8270
Acenaphthene	4.06	2 U	ug/kg	11/26/91	SW846-8270
2,4-Dinitrophenol	1.97	3 U	ug/kg	11/26/91	SW846-8270
4-Nitrophenol	1.97	3 U	ug/kg	11/26/91	SW846-8270
Dibenzofuran	1.10	2 J	ug/kg	11/26/91	SW846-8270
2,4-Dinitrotoluene	4.06	2 U	ug/kg	11/26/91	SW846-8270
2,6-Dinitrotoluene	4.06	2 U	ug/kg	11/26/91	SW846-8270
Diethylphthalate	4.06	2 U	ug/kg	11/26/91	SW846-8270
4-Chlorophenyl-Phenylether	4.06	2 U	ug/kg	11/26/91	SW846-8270
Fluorene	5.40	1 J	ug/kg	11/26/91	SW846-8270
4-Nitroaniline	1.97	3 U	ug/kg	11/26/91	SW846-8270
4,6-Dinitro-2-Methylphenol	1.97	3 U	ug/kg	11/26/91	SW846-8270
N-Nitrosodiphenylamine	4.06	2 U	ug/kg	11/26/91	SW846-8270
4-Bromophenyl-Phenylether	4.06	2 U	ug/kg	11/26/91	SW846-8270
Hexachlorobenzene	4.06	2 U	ug/kg	11/26/91	SW846-8270
Pentachlorophenol	4.06	2 U	ug/kg	11/26/91	SW846-8270
Phenanthrene	3.90	1 J	ug/kg	11/26/91	SW846-8270
Anthracene	4.06	2 U	ug/kg	11/26/91	SW846-8270
Di-N-Butylphthalate	3.30	1 J	ug/kg	11/26/91	SW846-8270
Fluoranthene	4.06	2 U	ug/kg	11/26/91	SW846-8270
Pyrene	4.06	2 U	ug/kg	11/26/91	SW846-8270
Butylbenzylphthalate	4.06	2 U	ug/kg	11/26/91	SW846-8270
3,3-Dichlorobenzidine	8.12	2 U	ug/kg	11/26/91	SW846-8270
Benzo(a)Anthracene	4.06	2 U	ug/kg	11/26/91	SW846-8270
bis(2-Ethylhexyl)Phthalate	4.06	2 U	ug/kg	11/26/91	SW846-8270
Chrysene	4.06	2 U	ug/kg	11/26/91	SW846-8270
Di-N-Octyl Phthalate	4.00	0 J	ug/kg	11/26/91	SW846-8270
Benzo(b)Fluoranthene	4.06	2 U	ug/kg	11/26/91	SW846-8270

LEEDS005984

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

[illegible] Broken Arrow, Oklahoma 74012 • [illegible] (918) 251-2858 • [illegible]

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 7963.11

Date: 12/[illegible]/91

S*LO #: 7963.11
[illegible]: [illegible] Site 2
SAMPLE #: MW-203B
LOCATION: SB 29

COMMENTS:

[illegible] Depth From : 8.00
[illegible] Depth To : 8.00
Date Extracted: 11/13/91

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Benzo(k)Fluoranthene	4.06	2 U	ug/kg	11/26/91	SW846-8270
Benzo(a)Pyrene	4.06	2 U	ug/kg	11/26/91	SW846-8270
Indeno(1,2,3-cd)Pyrene	4.06	2 U	ug/kg	11/26/91	SW846-8270
Dibenz(a,h)Anthracene	4.06	2 U	ug/kg	11/26/91	SW846-8270
Benzo(g,h,i)Perylene	4.06	2 U	ug/kg	11/26/91	SW846-8270

LEEDS005985

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East [illegible]
Kansas City, MO [illegible]
Attn: Joe M[illegible]

Report: 7963.12

Date: 12/11/91

SWLO #: 79[illegible].12
PROJECT: KC Site 11
SAMPLE #: MW-203C
LOCATION: SB-2M
COMMENTS:

Date Submitted: 11/13/91
Sample Matrix: Soil
Depth From : 14.00
Depth To : 14.00

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	5.40	2	mg/kg	11/15/91	11/15/91	EPA-418.1

LEEDS005986

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 7963.12

Date: 12/11/91

SWLO #:
PROJECT:
SAMPLE #: MW-203
LOCATION:

Date Submitted: /91
Sample Matrix: Soil
Depth From : 14.00
Depth To : 14.00
Date Extracted: / /

COMMENTS:

VOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Chloromethane	1.61	3 U	ug/kg	11/15/91	SW846-8240
Bromomethane	1.61	3 U	ug/kg	11/15/91	SW846-8240
Vinyl Chloride	1.61	3 U	ug/kg	11/15/91	SW846-8240
Chloroethane	1.61	3 U	ug/kg	11/15/91	SW846-8240
Methylene Chloride	8.05	2 U	ug/kg	11/15/91	SW846-8240
Acetone	1.61	3 U	ug/kg	11/15/91	SW846-8240
Carbon Disulfide	8.05	2 U	ug/kg	11/15/91	SW846-8240
1,1-Dichloroethene	8.05	2 U	ug/kg	11/15/91	SW846-8240
1,1-Dichloroethane	8.05	2 U	ug/kg	11/15/91	SW846-8240
Trans-1,2-Dichloroethene	8.05	2 U	ug/kg	11/15/91	SW846-8240
Chloroform	8.05	2 U	ug/kg	11/15/91	SW846-8240
1,2-Dichloroethane	8.05	2 U	ug/kg	11/15/91	SW846-8240
2-Butanone	1.61	3 U	ug/kg	11/15/91	SW846-8240
1,1,1-Trichloroethane	8.05	2 U	ug/kg	11/15/91	SW846-8240
Carbon Tetrachloride	8.05	2 U	ug/kg	11/15/91	SW846-8240
Vinyl Acetate	1.61	3 U	ug/kg	11/15/91	SW846-8240
Bromodichloromethane	8.05	2 U	ug/kg	11/15/91	SW846-8240
1,1,2,2-Tetrachloroethane	8.05	2 U	ug/kg	11/15/91	SW846-8240
1,2-Dichloropropane	8.05	2 U	ug/kg	11/15/91	SW846-8240
Trans-1,3-Dichloropropene	8.05	2 U	ug/kg	11/15/91	SW846-8240
Trichloroethene	8.05	2 U	ug/kg	11/15/91	SW846-8240
Dibromochloromethane	8.05	2 U	ug/kg	11/15/91	SW846-8240
1,1,2-Trichloroethane	8.05	2 U	ug/kg	11/15/91	SW846-8240
Benzene	8.05	2 U	ug/kg	11/15/91	SW846-8240
cis-1,3-Dichloropropene	8.05	2 U	ug/kg	11/15/91	SW846-8240
2-Chloroethylvinylether	1.61	3 U	ug/kg	11/15/91	SW846-8240
Bromoform	8.05	2 U	ug/kg	11/15/91	SW846-8240
2-Hexanone	1.61	3 U	ug/kg	11/15/91	SW846-8240
4-Methyl-2-Pentanone	1.61	3 U	ug/kg	11/15/91	SW846-8240
Tetrachloroethene	8.05	2 U	ug/kg	11/15/91	SW846-8240

LEEDS005987

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1730 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax [illegible]

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 7963.12

Dated: 12/11/91

Sample Matrix: Soil
Depth From : 14.00
Depth To : 14.00
Date Extracted: / /

COMMENTS:

VOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Toluene	8.05	2 U	ug/kg	11/15/91	SW846-8240
Chlorobenzene	8.05	2 U	ug/kg	11/15/91	SW846-8240
Ethylbenzene	8.05	2 U	ug/kg	11/15/91	SW846-8240
Styrene	8.05	2 U	ug/kg	11/15/91	SW846-8240
Total Xylenes	8.05	2 U	ug/kg	11/15/91	SW846-8240

LEEDS005988

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 7963.11

Date: 12/11/91

SWLO #: 7963.12
PROJECT: KC Site II
SAMPLE #: MW-203C
LOCATION: 5829
COMMENTS:

Sample Matrix : Soil
Depth From : 12.00
Depth To : 14.00
Date Extracted: 11/13/91

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Phenol	4.22	2 U	ug/kg	12/02/91	SW846-8270
bis(2-Chloroethyl)Ether	4.22	2 U	ug/kg	12/02/91	SW846-8270
2-Chlorophenol	4.22	2 U	ug/kg	12/02/91	SW846-8270
1,3-Dichlorobenzene	4.22	2 U	ug/kg	12/02/91	SW846-8270
1,4-Dichlorobenzene	4.22	2 U	ug/kg	12/02/91	SW846-8270
Benzyl Alcohol	4.22	2 U	ug/kg	12/02/91	SW846-8270
1,2-Dichlorobenzene	4.22	2 U	ug/kg	12/02/91	SW846-8270
2-Methylphenol	4.22	2 U	ug/kg	12/02/91	SW846-8270
bis(2-Chloroisopropyl)Ether	4.22	2 U	ug/kg	12/02/91	SW846-8270
4-Methylphenol	4.22	2 U	ug/kg	12/02/91	SW846-8270
N-Nitroso-Di-n-Propylamine	4.22	2 U	ug/kg	12/02/91	SW846-8270
Hexachloroethane	4.22	2 U	ug/kg	12/02/91	SW846-8270
Nitrobenzene	4.22	2 U	ug/kg	12/02/91	SW846-8270
Isophorone	4.22	2 U	ug/kg	12/02/91	SW846-8270
2-Nitrophenol	4.22	2 U	ug/kg	12/02/91	SW846-8270
2,4-Dimethylphenol	4.22	2 U	ug/kg	12/02/91	SW846-8270
Benzoic Acid	2.05	3 U	ug/kg	12/02/91	SW846-8270
bis(2-Chloroethoxy)Methane	4.22	2 U	ug/kg	12/02/91	SW846-8270
2,4-Dichlorophenol	4.22	2 U	ug/kg	12/02/91	SW846-8270
1,2,4-Trichlorobenzene	4.22	2 U	ug/kg	12/02/91	SW846-8270
Naphthalene	4.22	2 U	ug/kg	12/02/91	SW846-8270
4-Chloroaniline	4.22	2 U	ug/kg	12/02/91	SW846-8270
Hexachlorobutadiene	4.22	2 U	ug/kg	12/02/91	SW846-8270
4-Chloro-3-Methylphenol	4.22	2 U	ug/kg	12/02/91	SW846-8270
2-Methylnaphthalene	4.22	2 U	ug/kg	12/02/91	SW846-8270
Hexachlorocyclopentadiene	4.22	2 U	ug/kg	12/02/91	SW846-8270
2,4,6-Trichlorophenol	4.22	2 U	ug/kg	12/02/91	SW846-8270
2,4,5-Trichlorophenol	2.05	3 U	ug/kg	12/02/91	SW846-8270
2-Chloronaphthalene	4.22	2 U	ug/kg	12/02/91	SW846-8270
2-Nitroaniline	2.05	3 U	ug/kg	12/02/91	SW846-8270

LEEDS005989

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 7963.12

Date: 12/11/91

SWLO #: 7963.12
PROJECT: KC Site II
SAMPLE #: MW-203C
LOCATION: SB-29

COMMENTS:

Date Submitted: 11/13/91
Sample Matrix: Soil
Depth From : 14.00
Depth To : 14.00
Date Extracted: 11/13/91

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Dimethylphthalate	4.22	2 U	ug/kg	12/02/91	SW846-8270
Acenaphthylene	4.22	2 U	ug/kg	12/02/91	SW846-8270
3-Nitroaniline	2.05	3 U	ug/kg	12/02/91	SW846-8270
Acenaphthene	4.22	2 U	ug/kg	12/02/91	SW846-8270
2,4-Dinitrophenol	2.05	3 U	ug/kg	12/02/91	SW846-8270
4-Nitrophenol	2.05	3 U	ug/kg	12/02/91	SW846-8270
Dibenzofuran	4.22	2 U	ug/kg	12/02/91	SW846-8270
2,4-Dinitrotoluene	4.22	2 U	ug/kg	12/02/91	SW846-8270
2,6-Dinitrotoluene	4.22	2 U	ug/kg	12/02/91	SW846-8270
Diethylphthalate	4.22	2 U	ug/kg	12/02/91	SW846-8270
4-Chlorophenyl-Phenylether	4.22	2 U	ug/kg	12/02/91	SW846-8270
Fluorene	4.22	2 U	ug/kg	12/02/91	SW846-8270
4-Nitroaniline	2.05	3 U	ug/kg	12/02/91	SW846-8270
4,6-Dinitro-2-Methylphenol	2.05	3 U	ug/kg	12/02/91	SW846-8270
N-Nitrosodiphenylamine	4.22	2 U	ug/kg	12/02/91	SW846-8270
4-Bromophenyl-Phenylether	4.22	2 U	ug/kg	12/02/91	SW846-8270
Hexachlorobenzene	4.22	2 U	ug/kg	12/02/91	SW846-8270
Pentachlorophenol	4.22	2 U	ug/kg	12/02/91	SW846-8270
Phenanthrene	2.10	1 J	ug/kg	12/02/91	SW846-8270
Anthracene	4.22	2 U	ug/kg	12/02/91	SW846-8270
Di-N-Butylphthalate	2.10	1 J	ug/kg	12/02/91	SW846-8270
Fluoranthene	4.22	2 U	ug/kg	12/02/91	SW846-8270
Pyrene	4.22	2 U	ug/kg	12/02/91	SW846-8270
Butylbenzylphthalate	4.22	2 U	ug/kg	12/02/91	SW846-8270
3,3-Dichlorobenzidine	8.45	2 U	ug/kg	12/02/91	SW846-8270
Benzo(a)Anthracene	4.22	2 U	ug/kg	12/02/91	SW846-8270
bis(2-Ethylhexyl)Phthalate	4.22	2 U	ug/kg	12/02/91	SW846-8270
Chrysene	4.22	2 U	ug/kg	12/02/91	SW846-8270
Di-N-Octyl Phthalate	4.00	0 J	ug/kg	12/02/91	SW846-8270
Benzo(b)Fluoranthene	4.22	2 U	ug/kg	12/02/91	SW846-8270

LEEDS005990

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma [illegible] • (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City [illegible]
Attn: Jon Ma[illegible]

Report: 7963.12

Date: 12/11/91

[illegible]
[illegible]
SAMPLE #: MW-[illegible]
LOCATION: [illegible]

COMMENTS:

[illegible]
Sample Matrix: Soil
Depth From : 14.00
Depth To : 14.00
Date Extracted: 11/13/91

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Benzo(k)Fluoranthene	4.22	2 U	ug/kg	12/02/91	SW846-8270
Benzo(a)Pyrene	4.22	2 U	ug/kg	12/02/91	SW846-8270
Indeno(1,2,3-cd)Pyrene	4.22	2 U	ug/kg	12/02/91	SW846-8270
Dibenz(a,h)Anthracene	4.22	2 U	ug/kg	12/02/91	SW846-8270
Benzo(g,h,i)Perylene	4.22	2 U	ug/kg	12/02/91	SW846-8270

LEEDS005991

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,,MO 64130
Attn: Joe Marsh

Report: 7151.19

Date: 09/30/91

SWLO #: 7151.19
PROJECT: KC Site II/91-223-4
SAMPLE #: SB22-A SB22-A
LOCATION: SB22

Date Submitted 08/30/91
Sample Matrix: Soil
Depth From: 7.00
Depth To: 7.00
Date Extracted: / /

COMMENTS:

VOLATILE ORGANIC COMPOUNDS (VOCS)	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Chloromethane	1.73	3 U	ug/kg	09/04/91	SW846-8240
Bromomethane	1.73	3 U	ug/kg	09/04/91	SW846-8240
Vinyl Chloride	1.73	3 U	ug/kg	09/04/91	SW846-8240
Chloroethane	1.73	3 U	ug/kg	09/04/91	SW846-8240
Methylene Chloride	8.65	2 U	ug/kg	09/04/91	SW846-8240
Acetone	5.63	3	ug/kg	09/04/91	SW846-8240
Carbon Disulfide	8.65	2 U	ug/kg	09/04/91	SW846-8240
1,1-Dichloroethene	8.65	2 U	ug/kg	09/04/91	SW846-8240
1,1-Dichloroethane	8.65	2 U	ug/kg	09/04/91	SW846-8240
trans-1,2-Dichloroethene	8.65	2 U	ug/kg	09/04/91	SW846-8240
Chloroform	8.65	2 U	ug/kg	09/04/91	SW846-8240
1,2-Dichloroethane	8.65	2 U	ug/kg	09/04/91	SW846-8240
2-Butanone	1.73	3 U	ug/kg	09/04/91	SW846-8240
1,1,1-Trichloroethane	8.65	2 U	ug/kg	09/04/91	SW846-8240
Carbon Tetrachloride	8.65	2 U	ug/kg	09/04/91	SW846-8240
Vinyl Acetate	1.73	3 U	ug/kg	09/04/91	SW846-8240
Bromodichloromethane	8.65	2 U	ug/kg	09/04/91	SW846-8240
1,1,2,2-Tetrachloroethane	8.65	2 U	ug/kg	09/04/91	SW846-8240
1,2-Dichloropropane	8.65	2 U	ug/kg	09/04/91	SW846-8240
trans-1,3-Dichloropropene	8.65	2 U	ug/kg	09/04/91	SW846-8240
Trichloroethene	8.65	2 U	ug/kg	09/04/91	SW846-8240
Dibromochloromethane	8.65	2 U	ug/kg	09/04/91	SW846-8240
1,1,2-Trichloroethane	8.65	2 U	ug/kg	09/04/91	SW846-8240
Benzene	8.65	2 U	ug/kg	09/04/91	SW846-8240
cis-1,3-Dichloropropene	8.65	2 U	ug/kg	09/04/91	SW846-8240
2-Chloroethylvinylether	1.73	3 U	ug/kg	09/04/91	SW846-8240
Bromoform	8.65	2 U	ug/kg	09/04/91	SW846-8240
2-Hexanone	1.73	3 U	ug/kg	09/04/91	SW846-8240
4-Methyl-2-Pentanone	2.06	3	ug/kg	09/04/91	SW846-8240
Tetrachloroethene	8.65	2 U	ug/kg	09/04/91	SW846-8240
Toluene	8.65	2 U	ug/kg	09/04/91	SW846-8240
Chlorobenzene	8.65	2 U	ug/kg	09/04/91	SW846-8240
Ethylbenzene	8.65	2 U	ug/kg	09/04/91	SW846-8240
Styrene	8.65	2 U	ug/kg	09/04/91	SW846-8240

LEEDS005992

RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,,MO 64130
Attn: Joe Marsh

Report: 7151.19

Date: 09/30/91

SWLO #: 7151.19
PROJECT: KC Site II/91-223-4
SAMPLE #: SB22-A 581[illegible]-A
LOCATION: SB22

Date Submitted 08/30/91
Sample Matrix: Soil
Depth From: 7.00
Depth To: 7.00
Date Extracted: / /

COMMENTS:

VOLATILE ORGANIC COMPOUNDS (VOCS)	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Total Xylenes	8.65	2 U	ug/kg	09/04/91	SW846-8240

LEEDS005993

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • [illegible] • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 7151.20
[illegible]

SWLO #: 7151.20
PROJECT: KC Site II/91-223-4
SAMPLE #: SB22-B SB22-B
LOCATION: SB22

Date Submitted 08/30/91
Sample Matrix: Soil
Depth From: 12.30
Depth To: 12.30
Date Extracted: / /

COMMENTS:

VOLATILE ORGANIC COMPOUNDS (VOCS)	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Chloromethane	1.37	1 U	ug/kg	09/04/91	SW846-8240
Bromomethane	1.37	1 U	ug/kg	09/04/91	SW846-8240
Vinyl Chloride	1.37	1 U	ug/kg	09/04/91	SW846-8240
Chloroethane	1.37	1 U	ug/kg	09/04/91	SW846-8240
Methylene Chloride	1.80	1	ug/kg	09/04/91	SW846-8240
Acetone	5.00	1	ug/kg	09/04/91	SW846-8240
Carbon Disulfide	6.85	0 U	ug/kg	09/04/91	SW846-8240
1,1-Dichloroethene	6.85	0 U	ug/kg	09/04/91	SW846-8240
1,1-Dichloroethane	6.85	0 U	ug/kg	09/04/91	SW846-8240
Trans-1,2-Dichloroethene	6.85	0 U	ug/kg	09/04/91	SW846-8240
Chloroform	6.85	0 U	ug/kg	09/04/91	SW846-8240
1,2-Dichloroethane	6.85	0 U	ug/kg	09/04/91	SW846-8240
2-Butanone	4.00	0 J	ug/kg	09/04/91	SW846-8240
1,1,1-Trichloroethane	6.85	0 U	ug/kg	09/04/91	SW846-8240
Carbon Tetrachloride	6.85	0 U	ug/kg	09/04/91	SW846-8240
Vinyl Acetate	1.37	1 U	ug/kg	09/04/91	SW846-8240
Bromodichloromethane	6.85	0 U	ug/kg	09/04/91	SW846-8240
1,1,2,2-Tetrachloroethane	6.85	0 U	ug/kg	09/04/91	SW846-8240
1,2-Dichloropropane	6.85	0 U	ug/kg	09/04/91	SW846-8240
Trans-1,3-Dichloropropene	6.85	0 U	ug/kg	09/04/91	SW846-8240
Trichloroethene	6.85	0 U	ug/kg	09/04/91	SW846-8240
Dibromochloromethane	6.85	0 U	ug/kg	09/04/91	SW846-8240
1,1,2-Trichloroethane	6.85	0 U	ug/kg	09/04/91	SW846-8240
Benzene	6.85	0 U	ug/kg	09/04/91	SW846-8240
cis-1,3-Dichloropropene	6.85	0 U	ug/kg	09/04/91	SW846-8240
2-Chloroethylvinylether	1.37	1 U	ug/kg	09/04/91	SW846-8240
Bromoform	6.85	0 U	ug/kg	09/04/91	SW846-8240
2-Hexanone	1.37	1 U	ug/kg	09/04/91	SW846-8240
4-Methyl-2-Pentanone	1.37	1 U	ug/kg	09/04/91	SW846-8240
Tetrachloroethene	1.00	1	ug/kg	09/04/91	SW846-8240
Toluene	6.85	0 U	ug/kg	09/04/91	SW846-8240
Chlorobenzene	6.85	0 U	ug/kg	09/04/91	SW846-8240
Ethylbenzene	6.85	0 U	ug/kg	09/04/91	SW846-8240
Styrene	6.85	0 U	ug/kg	09/04/91	SW846-8240

LEEDS005994

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,,MO 64130
Attn: Joe Marsh

Report: 7151.20

Date: 09/30/91

SWLO #: 7151.20
PROJECT: KC [illegible]-4
SITE: SB2
LOCATION: SB2

Date Submitted 08/30/91
Sample Matrix: Soil
Depth From: 10.50
Depth To: 12.50
Date Extracted: / /

COMMENTS:

VOLATILE ORGANIC COMPOUNDS (VOCS)	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Total Xylenes	5.00	0 J	ug/kg	09/04/91	SW846-8240

LEEDS005995

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,,MO 64130
Attn: Joe Marsh

Report: 7151.21

Date: 09/30/91

SWLO #: 7151.21
PROJECT: KC Site II/91-223-4
SAMPLE #: SB22-C SB22-C
LOCATION: SB22

Date Submitted 08/30/91
Sample Matrix: Soil
Depth From: 18.20
Depth To: 18.20
Date Extracted: / /

COMMENTS:

VOLATILE ORGANIC COMPOUNDS (VOCS)	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Chloromethane	1.38	1 U	ug/kg	09/04/91	SW846-8240
Bromomethane	1.38	1 U	ug/kg	09/04/91	SW846-8240
Vinyl Chloride	1.38	1 U	ug/kg	09/04/91	SW846-8240
Chloroethane	1.38	1 U	ug/kg	09/04/91	SW846-8240
Methylene Chloride	1.30	1	ug/kg	09/04/91	SW846-8240
Acetone	3.90	1	ug/kg	09/04/91	SW846-8240
Carbon Disulfide	6.90	0 U	ug/kg	09/04/91	SW846-8240
1,1-Dichloroethene	6.90	0 U	ug/kg	09/04/91	SW846-8240
1,1-Dichloroethane	6.90	0 U	ug/kg	09/04/91	SW846-8240
trans-1,2-Dichloroethene	6.90	0 U	ug/kg	09/04/91	SW846-8240
Chloroform	6.90	0 U	ug/kg	09/04/91	SW846-8240
1,2-Dichloroethane	6.90	0 U	ug/kg	09/04/91	SW846-8240
2-Butanone	1.38	1 U	ug/kg	09/04/91	SW846-8240
1,1,1-Trichloroethane	6.90	0 U	ug/kg	09/04/91	SW846-8240
Carbon Tetrachloride	6.90	0 U	ug/kg	09/04/91	SW846-8240
Vinyl Acetate	1.38	1 U	ug/kg	09/04/91	SW846-8240
Bromodichloromethane	6.90	0 U	ug/kg	09/04/91	SW846-8240
1,1,2,2-Tetrachloroethane	6.90	0 U	ug/kg	09/04/91	SW846-8240
1,2-Dichloropropane	6.90	0 U	ug/kg	09/04/91	SW846-8240
trans-1,3-Dichloropropene	6.90	0 U	ug/kg	09/04/91	SW846-8240
Trichloroethene	6.90	0 U	ug/kg	09/04/91	SW846-8240
Dibromochloromethane	6.90	0 U	ug/kg	09/04/91	SW846-8240
1,1,2-Trichloroethane	6.90	0 U	ug/kg	09/04/91	SW846-8240
Benzene	6.90	0 U	ug/kg	09/04/91	SW846-8240
cis-1,3-Dichloropropene	6.90	0 U	ug/kg	09/04/91	SW846-8240
2-Chloroethylvinylether	1.38	1 U	ug/kg	09/04/91	SW846-8240
Bromoform	6.90	0 U	ug/kg	09/04/91	SW846-8240
2-Hexanone	1.38	1 U	ug/kg	09/04/91	SW846-8240
4-Methyl-2-Pentanone	1.38	1 U	ug/kg	09/04/91	SW846-8240
Tetrachloroethene	4.00	0 J	ug/kg	09/04/91	SW846-8240
Toluene	6.90	0 U	ug/kg	09/04/91	SW846-8240
Chlorobenzene	6.90	0 U	ug/kg	09/04/91	SW846-8240
Ethylbenzene	6.90	0 U	ug/kg	09/04/91	SW846-8240
Styrene	6.90	0 U	ug/kg	09/04/91	SW846-8240

LEEDS005996

RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • [illegible] 251-2858 • [illegible] 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,,MO 64130
Attn: Joe Marsh

Report: 7151.21
Date: [illegible]

SWLO #: 7151.21
PROJECT: KC Site I/91-223-4
SAMPLE #: SB22-C [illegible]
LOCATION: SB22

Date Submitted: [illegible]
Sample Matrix: [illegible]
Depth From: [illegible]
Depth To: [illegible]
Date Extracted: / /

COMMENTS:

VOLATILE ORGANIC COMPOUNDS (VOCS)	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Total Xylenes	6.90	0 U	ug/kg	09/04/91	SW846-8240

LEEDS005997

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
[illegible] West Ada • Broken Arrow, Oklahoma [illegible]12 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,,MO 64[illegible]
Attn: Joe Marsh

Report: 7151.22

Date: 09/30/91

SWLO #: 7151.22
PROJECT: KC Site II/91-223-4
SAMPLE #: SB22-D SB22-D
LOCATION: SB22

COMMENTS:

Date Submitted 08/30/91
Sample Matrix: Soil
Depth From: 23.60
Depth To: 23.80
Date Extracted: / /

VOLATILE ORGANIC COMPOUNDS (VOCS)	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
hloromethane	1.45	1 U	ug/kg	09/04/91	SW846-8240
Bromomethane	1.45	1 U	ug/kg	09/04/91	SW846-8240
inyl Chloride	1.45	1 U	ug/kg	09/04/91	SW846-8240
hloroethane	1.45	1 U	ug/kg	09/04/91	SW846-8240
Methylene Chloride	3.00	0 J	ug/kg	09/04/91	SW846-8240
Acetone	8.00	0 J	ug/kg	09/04/91	SW846-8240
arbon Disulfide	7.25	0 U	ug/kg	09/04/91	SW846-8240
,1-Dichloroethene	7.25	0 U	ug/kg	09/04/91	SW846-8240
1,1-Dichloroethane	7.25	0 U	ug/kg	09/04/91	SW846-8240
rans-1,2-Dichloroethene	7.25	0 U	ug/kg	09/04/91	SW846-8240
hloroform	7.25	0 U	ug/kg	09/04/91	SW846-8240
1,2-Dichloroethane	7.25	0 U	ug/kg	09/04/91	SW846-8240
-Butanone	1.45	1 U	ug/kg	09/04/91	SW846-8240
,1,1-Trichloroethane	7.25	0 U	ug/kg	09/04/91	SW846-8240
Carbon Tetrachloride	7.25	0 U	ug/kg	09/04/91	SW846-8240
Vinyl Acetate	1.45	1 U	ug/kg	09/04/91	SW846-8240
romodichloromethane	7.25	0 U	ug/kg	09/04/91	SW846-8240
,1,2,2-Tetrachloroethane	7.25	0 U	ug/kg	09/04/91	SW846-8240
1,2-Dichloropropane	7.25	0 U	ug/kg	09/04/91	SW846-8240
rans-1,3-Dichloropropene	7.25	0 U	ug/kg	09/04/91	SW846-8240
richloroethene	7.25	0 U	ug/kg	09/04/91	SW846-8240
Dibromochloromethane	7.25	0 U	ug/kg	09/04/91	SW846-8240
,1,2-Trichloroethane	7.25	0 U	ug/kg	09/04/91	SW846-8240
enzene	7.25	0 U	ug/kg	09/04/91	SW846-8240
cis-1,3-Dichloropropene	7.25	0 U	ug/kg	09/04/91	SW846-8240
2-Chloroethylvinylether	1.45	1 U	ug/kg	09/04/91	SW846-8240
romoform	7.25	0 U	ug/kg	09/04/91	SW846-8240
-Hexanone	1.45	1 U	ug/kg	09/04/91	SW846-8240
4-Methyl-2-Pentanone	1.45	1 U	ug/kg	09/04/91	SW846-8240
etrachloroethene	7.25	0 U	ug/kg	09/04/91	SW846-8240
oluene	7.25	0 U	ug/kg	09/04/91	SW846-8240
Chlorobenzene	7.25	0 U	ug/kg	09/04/91	SW846-8240
Ethylbenzene	7.25	0 U	ug/kg	09/04/91	SW846-8240
tyrene	7.25	0 U	ug/kg	09/04/91	SW846-8240

LEEDS005998

RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City,,MO 64130
Attn: Joe Marsh

Report: 7151.22

Date: 09/30/91

SWLO #: 7151.22
PROJECT: KC Site [illegible]
SAMPLE #: SB22-D [illegible]
[illegible]

Date Submitted 08/30/91
Sample Matrix: Soil
Depth From: 23.80
Depth To: 23.80
Date Extracted: / /

COMMENTS:

VOLATILE ORGANIC COMPOUNDS (VOCS)	RESULT*	UNITS	DATE ANALYZED	REFERENCE METHOD
Total Xylenes	7.25 0 U	ug/kg	09/04/91	SW846-8240

LEEDS005999

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, ,MO 64130
Attn: Joe Marsh

Report: 7151.23

Date: 09/30/91

SWLO #: 7151.23
PROJECT: KC Site II/91-223-4
SAMPLE #: SB22-ERB
LOCATION: SB22

Date Submitted 08/30/91
Sample Matrix: Water
Depth From: 0.00
Depth To: 0.00
Date Extracted: / /

COMMENTS: Rinsate Blank

VOLATILE ORGANIC COMPOUNDS (VOCS)	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
ıloromethane	1.00	1 U	ug/l	09/04/91	SW846-8240
romomethane	1.00	1 U	ug/l	09/04/91	SW846-8240
Vinyl Chloride	1.00	1 U	ug/l	09/04/91	SW846-8240
hloroethane	1.00	1 U	ug/l	09/04/91	SW846-8240
ethylene Chloride	1.40	1	ug/l	09/04/91	SW846-8240
Acetone	1.00	1 U	ug/l	09/04/91	SW846-8240
Carbon Disulfide	5.00	0 U	ug/l	09/04/91	SW846-8240
,1-Dichloroethene	5.00	0 U	ug/l	09/04/91	SW846-8240
,1-Dichloroethane	5.00	0 U	ug/l	09/04/91	SW846-8240
Trans-1,2-Dichloroethene	5.00	0 U	ug/l	09/04/91	SW846-8240
ıloroform	2.00	0 J	ug/l	09/04/91	SW846-8240
,2-Dichloroethane	5.00	0 U	ug/l	09/04/91	SW846-8240
2-Butanone	1.00	1 U	ug/l	09/04/91	SW846-8240
,1,1-Trichloroethane	5.00	0 U	ug/l	09/04/91	SW846-8240
arbon Tetrachloride	5.00	0 U	ug/l	09/04/91	SW846-8240
vinyl Acetate	1.00	1 U	ug/l	09/04/91	SW846-8240
Bromodichloromethane	5.00	0 U	ug/l	09/04/91	SW846-8240
,1,2,2-Tetrachloroethane	5.00	0 U	ug/l	09/04/91	SW846-8240
,2-Dichloropropane	5.00	0 U	ug/l	09/04/91	SW846-8240
Trans-1,3-Dichloropropene	5.00	0 U	ug/l	09/04/91	SW846-8240
richloroethene	5.00	0 U	ug/l	09/04/91	SW846-8240
ibromochloromethane	5.00	0 U	ug/l	09/04/91	SW846-8240
1,1,2-Trichloroethane	5.00	0 U	ug/l	09/04/91	SW846-8240
Benzene	5.00	0 U	ug/l	09/04/91	SW846-8240
is-1,3-Dichloropropene	5.00	0 U	ug/l	09/04/91	SW846-8240
2-Chloroethylvinylether	1.00	1 U	ug/l	09/04/91	SW846-8240
Bromoform	5.00	0 U	ug/l	09/04/91	SW846-8240
-Hexanone	1.00	1 U	ug/l	09/04/91	SW846-8240
-Methyl-2-Pentanone	1.00	1 U	ug/l	09/04/91	SW846-8240
Tetrachloroethene	5.00	0 U	ug/l	09/04/91	SW846-8240
oluene	5.00	0 U	ug/l	09/04/91	SW846-8240
ılorobenzene	5.00	0 U	ug/l	09/04/91	SW846-8240
Ethylbenzene	5.00	0 U	ug/l	09/04/91	SW846-8240
Styrene	5.00	0 U	ug/l	09/04/91	SW846-8240

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

LEEDS006000

APPENDIX D

LABORATORY DATA -
GROUNDWATER

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1709 West All ans • Broken Arrow, [illegible] 74012 • Office (918) [illegible]

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 8083.07

Date: 12/13/91

SWLO #: 8083.07
PROJECT: KC Site II
SAMPLE #: MW-201A
LOCATION:
COMMENTS:

Date Submitted: 11/25/91
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	1.00	1	mg/l	12/05/91	12/05/91	EPA-418.1

LEEDS006002

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 8083.07

Date: 12/13/91

SWLO #: 8083.07
PROJECT: KC Site II
SAMPLE #: MW-201A
LOCATION:

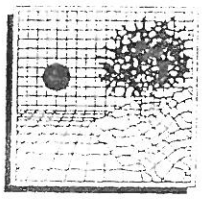
COMMENTS:

Date Submitted: 11/25/91
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00
Date Extracted: 11/25/91

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Phenol	1.00	1 U	ug/l	12/05/91	SW846-8270
bis(2-Chloroethyl)Ether	1.00	1 U	ug/l	12/05/91	SW846-8270
2-Chlorophenol	1.00	1 U	ug/l	12/05/91	SW846-8270
1,3-Dichlorobenzene	1.00	1 U	ug/l	12/05/91	SW846-8270
1,4-Dichlorobenzene	1.00	1 U	ug/l	12/05/91	SW846-8270
Benzyl Alcohol	1.00	1 U	ug/l	12/05/91	SW846-8270
1,2-Dichlorobenzene	1.00	1 U	ug/l	12/05/91	SW846-8270
2-Methylphenol	1.00	1 U	ug/l	12/05/91	SW846-8270
bis(2-Chloroisopropyl)Ether	1.00	1 U	ug/l	12/05/91	SW846-8270
4-Methylphenol	1.00	1 U	ug/l	12/05/91	SW846-8270
N-Nitroso-Di-n-Propylamine	1.00	1 U	ug/l	12/05/91	SW846-8270
Hexachloroethane	1.00	1 U	ug/l	12/05/91	SW846-8270
Nitrobenzene	1.00	1 U	ug/l	12/05/91	SW846-8270
Isophorone	1.00	1 U	ug/l	12/05/91	SW846-8270
2-Nitrophenol	1.00	1 U	ug/l	12/05/91	SW846-8270
2,4-Dimethylphenol	1.00	1 U	ug/l	12/05/91	SW846-8270
Benzoic Acid	5.00	1 U	ug/l	12/05/91	SW846-8270
bis(2-Chloroethoxy)Methane	1.00	1 U	ug/l	12/05/91	SW846-8270
2,4-Dichlorophenol	1.00	1 U	ug/l	12/05/91	SW846-8270
1,2,4-Trichlorobenzene	1.00	1 U	ug/l	12/05/91	SW846-8270
Naphthalene	1.00	1 U	ug/l	12/05/91	SW846-8270
4-Chloroaniline	1.00	1 U	ug/l	12/05/91	SW846-8270
Hexachlorobutadiene	1.00	1 U	ug/l	12/05/91	SW846-8270
4-Chloro-3-Methylphenol	1.00	1 U	ug/l	12/05/91	SW846-8270
2-Methylnaphthalene	4.00	0 J	ug/l	12/05/91	SW846-8270
Hexachlorocyclopentadiene	1.00	1 U	ug/l	12/05/91	SW846-8270
2,4,6-Trichlorophenol	1.00	1 U	ug/l	12/05/91	SW846-8270
2,4,5-Trichlorophenol	5.00	1 U	ug/l	12/05/91	SW846-8270
2-Chloronaphthalene	1.00	1 U	ug/l	12/05/91	SW846-8270
2-Nitroaniline	5.00	1 U	ug/l	12/05/91	SW846-8270

LEEDS006003

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12



SOUTHWEST LABORATORY OF OKLAHOMA, INC.

Broken Arrow, Okla... • ... • FAX (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 8083.07

Date: 12/13/91

SWLO #: 8083.07
PROJECT: KC Site II
SAMPLE #: ~~MW-~~201A
LOCATION: GW

COMMENTS:

Date Submitted: 11/25/91
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00
Date Extracted: 11/25/91

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Dimethylphthalate	1.00	1 U	ug/l	12/05/91	SW846-8270
Acenaphthylene	1.00	1 U	ug/l	12/05/91	SW846-8270
3-Nitroaniline	5.00	1 U	ug/l	12/05/91	SW846-8270
Acenaphthene	1.00	1 U	ug/l	12/05/91	SW846-8270
2,4-Dinitrophenol	5.00	1 U	ug/l	12/05/91	SW846-8270
4-Nitrophenol	5.00	1 U	ug/l	12/05/91	SW846-8270
Dibenzofuran	1.00	1 U	ug/l	12/05/91	SW846-8270
2,4-Dinitrotoluene	1.00	1 U	ug/l	12/05/91	SW846-8270
2,6-Dinitrotoluene	1.00	1 U	ug/l	12/05/91	SW846-8270
Diethylphthalate	1.00	1 U	ug/l	12/05/91	SW846-8270
4-Chlorophenyl-Phenylether	1.00	1 U	ug/l	12/05/91	SW846-8270
Fluorene	1.00	1 U	ug/l	12/05/91	SW846-8270
4-Nitroaniline	5.00	1 U	ug/l	12/05/91	SW846-8270
4,6-Dinitro-2-Methylphenol	5.00	1 U	ug/l	12/05/91	SW846-8270
N-Nitrosodiphenylamine	1.00	1 U	ug/l	12/05/91	SW846-8270
4-Bromophenyl-Phenylether	1.00	1 U	ug/l	12/05/91	SW846-8270
Hexachlorobenzene	1.00	1 U	ug/l	12/05/91	SW846-8270
Pentachlorophenol	1.00	1 U	ug/l	12/05/91	SW846-8270
Phenanthrene	1.00	1 U	ug/l	12/05/91	SW846-8270
Anthracene	1.00	1 U	ug/l	12/05/91	SW846-8270
Di-N-Butylphthalate	1.00	1 U	ug/l	12/05/91	SW846-8270
Fluoranthene	1.00	1 U	ug/l	12/05/91	SW846-8270
Pyrene	1.00	1 U	ug/l	12/05/91	SW846-8270
Butylbenzylphthalate	1.00	1 U	ug/l	12/05/91	SW846-8270
3,3-Dichlorobenzidine	2.00	1 U	ug/l	12/05/91	SW846-8270
Benzo(a)Anthracene	1.00	1 U	ug/l	12/05/91	SW846-8270
bis(2-Ethylhexyl)Phthalate	1.00	1 U	ug/l	12/05/91	SW846-8270
Chrysene	1.00	1 U	ug/l	12/05/91	SW846-8270
Di-N-Octyl Phthalate	1.00	1 U	ug/l	12/05/91	SW846-8270
Benzo(b)Fluoranthene	1.00	1 U	ug/l	12/05/91	SW846-8270

LEEDS006004

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
[illegible] • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
9400 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 8083.07

Date: 12/13/91

SWLO #: 8083.07
PROJECT: KC Site II
SAMPLE #: ~~MW-201A~~
LOCATION:

COMMENTS:

Date Submitted: 11/25/91
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00
Date Extracted: 11/25/91

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Benzo(k)Fluoranthene	1.00	1 U	ug/l	12/05/91	SW846-8270
Benzo(a)Pyrene	1.00	1 U	ug/l	12/05/91	SW846-8270
Indeno(1,2,3-cd)Pyrene	1.00	1 U	ug/l	12/05/91	SW846-8270
Dibenz(a,h)Anthracene	1.00	1 U	ug/l	12/05/91	SW846-8270
Benzo(g,h,i)Perylene	1.00	1 U	ug/l	12/05/91	SW846-8270

LEEDS006005

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
[illegible] • [illegible] • Office (918) 25[illegible] • (918) 25[illegible]

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 8083.01

Date: 12/13/91

SWLO #: 8083.01
PROJECT: KC Site II
SAMPLE #: ~~MW~~-202A
LOCATION: BW
COMMENTS:

Date Submitted: 11/25/91
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	2.00	1	mg/l	12/05/91	12/05/91	EPA-418.1

LEEDS006006

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 8083.01

Date: 12/13/91

SWLO #: 8083.01
PROJECT: KC Site II
SAMPLE #: MW-202A
LOCATION: GW

COMMENTS:

Date Submitted: 11/25/91
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00
Date Extracted: 11/25/91

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Phenol	5.10	4 U	ug/l	12/05/91	SW846-8270
bis(2-Chloroethyl)Ether	5.10	4 U	ug/l	12/05/91	SW846-8270
2-Chlorophenol	5.10	4 U	ug/l	12/05/91	SW846-8270
1,3-Dichlorobenzene	5.10	4 U	ug/l	12/05/91	SW846-8270
1,4-Dichlorobenzene	5.10	4 U	ug/l	12/05/91	SW846-8270
Benzyl Alcohol	5.10	4 U	ug/l	12/05/91	SW846-8270
1,2-Dichlorobenzene	5.10	4 U	ug/l	12/05/91	SW846-8270
2-Methylphenol	5.10	4 U	ug/l	12/05/91	SW846-8270
bis(2-Chloroisopropyl)Ether	5.10	4 U	ug/l	12/05/91	SW846-8270
4-Methylphenol	5.10	4 U	ug/l	12/05/91	SW846-8270
N-Nitroso-Di-n-Propylamine	5.10	4 U	ug/l	12/05/91	SW846-8270
Hexachloroethane	5.10	4 U	ug/l	12/05/91	SW846-8270
Nitrobenzene	5.10	4 U	ug/l	12/05/91	SW846-8270
Isophorone	5.10	4 U	ug/l	12/05/91	SW846-8270
2-Nitrophenol	5.10	4 U	ug/l	12/05/91	SW846-8270
2,4-Dimethylphenol	5.10	4 U	ug/l	12/05/91	SW846-8270
Benzoic Acid	2.55	5 U	ug/l	12/05/91	SW846-8270
bis(2-Chloroethoxy)Methane	5.10	4 U	ug/l	12/05/91	SW846-8270
2,4-Dichlorophenol	5.10	4 U	ug/l	12/05/91	SW846-8270
1,2,4-Trichlorobenzene	5.10	4 U	ug/l	12/05/91	SW846-8270
Naphthalene	5.10	4 U	ug/l	12/05/91	SW846-8270
4-Chloroaniline	5.10	4 U	ug/l	12/05/91	SW846-8270
Hexachlorobutadiene	5.10	4 U	ug/l	12/05/91	SW846-8270
4-Chloro-3-Methylphenol	5.10	4 U	ug/l	12/05/91	SW846-8270
2-Methylnaphthalene	5.10	4 U	ug/l	12/05/91	SW846-8270
Hexachlorocyclopentadiene	5.10	4 U	ug/l	12/05/91	SW846-8270
2,4,6-Trichlorophenol	5.10	4 U	ug/l	12/05/91	SW846-8270
2,4,5-Trichlorophenol	2.55	5 U	ug/l	12/05/91	SW846-8270
2-Chloronaphthalene	5.10	4 U	ug/l	12/05/91	SW846-8270
2-Nitroaniline	2.55	5 U	ug/l	12/05/91	SW846-8270

LEEDS006007

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West [illegible] • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 8083.01

Date: 12/13/91

SWLO #: 8083.01
PROJECT: KC Site II
SAMPLE #: ~~MW~~-202A
LOCATION: GW

COMMENTS:

Date Submitted: 11/25/91
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00
Date Extracted: 11/25/91

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Dimethylphthalate	5.10	4 U	ug/l	12/05/91	SW846-8270
Acenaphthylene	5.10	4 U	ug/l	12/05/91	SW846-8270
3-Nitroaniline	2.55	5 U	ug/l	12/05/91	SW846-8270
Acenaphthene	5.10	4 U	ug/l	12/05/91	SW846-8270
2,4-Dinitrophenol	2.55	5 U	ug/l	12/05/91	SW846-8270
4-Nitrophenol	2.55	5 U	ug/l	12/05/91	SW846-8270
Dibenzofuran	5.10	4 U	ug/l	12/05/91	SW846-8270
2,4-Dinitrotoluene	5.10	4 U	ug/l	12/05/91	SW846-8270
2,6-Dinitrotoluene	5.10	4 U	ug/l	12/05/91	SW846-8270
Diethylphthalate	5.10	4 U	ug/l	12/05/91	SW846-8270
4-Chlorophenyl-Phenylether	5.10	4 U	ug/l	12/05/91	SW846-8270
Fluorene	5.10	4 U	ug/l	12/05/91	SW846-8270
4-Nitroaniline	2.55	5 U	ug/l	12/05/91	SW846-8270
4,6-Dinitro-2-Methylphenol	2.55	5 U	ug/l	12/05/91	SW846-8270
N-Nitrosodiphenylamine	5.10	4 U	ug/l	12/05/91	SW846-8270
4-Bromophenyl-Phenylether	5.10	4 U	ug/l	12/05/91	SW846-8270
Hexachlorobenzene	5.10	4 U	ug/l	12/05/91	SW846-8270
Pentachlorophenol	5.10	4 U	ug/l	12/05/91	SW846-8270
Phenanthrene	5.10	4 U	ug/l	12/05/91	SW846-8270
Anthracene	5.10	4 U	ug/l	12/05/91	SW846-8270
Di-N-Butylphthalate	5.10	4 U	ug/l	12/05/91	SW846-8270
Fluoranthene	5.10	4 U	ug/l	12/05/91	SW846-8270
Pyrene	5.10	4 U	ug/l	12/05/91	SW846-8270
Butylbenzylphthalate	5.10	4 U	ug/l	12/05/91	SW846-8270
3,3-Dichlorobenzidine	1.02	5 U	ug/l	12/05/91	SW846-8270
Benzo(a)Anthracene	5.10	4 U	ug/l	12/05/91	SW846-8270
bis(2-Ethylhexyl)Phthalate	5.10	4 U	ug/l	12/05/91	SW846-8270
Chrysene	5.10	4 U	ug/l	12/05/91	SW846-8270
Di-N-Octyl Phthalate	5.10	4 U	ug/l	12/05/91	SW846-8270
Benzo(b)Fluoranthene	5.10	4 U	ug/l	12/05/91	SW846-8270

LEEDS006008

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 8083.01

Date: 12/13/91

SWLO #: 8083.01
PROJECT: KC Site II
SAMPLE #: MW-202A
LOCATION:

COMMENTS:

Date Submitted: 11/25/91
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00
Date Extracted: 11/25/91

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Benzo(k)Fluoranthene	5.10	4 U	ug/l	12/05/91	SW846-8270
Benzo(a)Pyrene	5.10	4 U	ug/l	12/05/91	SW846-8270
Indeno(1,2,3-cd)Pyrene	5.10	4 U	ug/l	12/05/91	SW846-8270
Dibenz(a,h)Anthracene	5.10	4 U	ug/l	12/05/91	SW846-8270
Benzo(g,h,i)Perylene	5.10	4 U	ug/l	12/05/91	SW846-8270

LEEDS006009

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 8083.02

Date: 12/13/91

SWLO #: 8083.02
PROJECT: KC Site II
SAMPLE #: ~~MW-207A~~ GW
LOCATION:
COMMENTS:

Date Submitted: 11/25/91
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	1.70	1	mg/l	12/05/91	12/05/91	EPA-418.1

LEEDS006010

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
[illegible] • Broken Arrow, [illegible] • Office (918) 251-8858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 8083.02
Date: 12/13/91

SWLO #: 8083.02
PROJECT: KC Site II
SAMPLE #: MW-207A
LOCATION: GW

Date Submitted: 11/25/91
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00
Date Extracted: 11/25/91

COMMENTS:

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Phenol	5.20	4 U	ug/l	12/05/91	SW846-8270
bis(2-Chloroethyl)Ether	5.20	4 U	ug/l	12/05/91	SW846-8270
2-Chlorophenol	5.20	4 U	ug/l	12/05/91	SW846-8270
1,3-Dichlorobenzene	5.20	4 U	ug/l	12/05/91	SW846-8270
1,4-Dichlorobenzene	5.20	4 U	ug/l	12/05/91	SW846-8270
Benzyl Alcohol	5.20	4 U	ug/l	12/05/91	SW846-8270
1,2-Dichlorobenzene	5.20	4 U	ug/l	12/05/91	SW846-8270
2-Methylphenol	5.20	4 U	ug/l	12/05/91	SW846-8270
bis(2-Chloroisopropyl)Ether	5.20	4 U	ug/l	12/05/91	SW846-8270
4-Methylphenol	5.20	4 U	ug/l	12/05/91	SW846-8270
N-Nitroso-Di-n-Propylamine	5.20	4 U	ug/l	12/05/91	SW846-8270
Hexachloroethane	5.20	4 U	ug/l	12/05/91	SW846-8270
Nitrobenzene	5.20	4 U	ug/l	12/05/91	SW846-8270
Isophorone	5.20	4 U	ug/l	12/05/91	SW846-8270
2-Nitrophenol	5.20	4 U	ug/l	12/05/91	SW846-8270
2,4-Dimethylphenol	5.20	4 U	ug/l	12/05/91	SW846-8270
Benzoic Acid	2.60	5 U	ug/l	12/05/91	SW846-8270
bis(2-Chloroethoxy)Methane	5.20	4 U	ug/l	12/05/91	SW846-8270
2,4-Dichlorophenol	5.20	4 U	ug/l	12/05/91	SW846-8270
1,2,4-Trichlorobenzene	5.20	4 U	ug/l	12/05/91	SW846-8270
Naphthalene	5.20	4 U	ug/l	12/05/91	SW846-8270
4-Chloroaniline	5.20	4 U	ug/l	12/05/91	SW846-8270
Hexachlorobutadiene	5.20	4 U	ug/l	12/05/91	SW846-8270
4-Chloro-3-Methylphenol	5.20	4 U	ug/l	12/05/91	SW846-8270
2-Methylnaphthalene	5.20	4 U	ug/l	12/05/91	SW846-8270
Hexachlorocyclopentadiene	5.20	4 U	ug/l	12/05/91	SW846-8270
2,4,6-Trichlorophenol	5.20	4 U	ug/l	12/05/91	SW846-8270
2,4,5-Trichlorophenol	2.60	5 U	ug/l	12/05/91	SW846-8270
2-Chloronaphthalene	5.20	4 U	ug/l	12/05/91	SW846-8270
2-Nitroaniline	2.60	5 U	ug/l	12/05/91	SW846-8270

LEEDS006011

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 8083.02

Date: 12/13/91

SWLO #: 8083.02
PROJECT: KC Site II
SAMPLE #: ~~MW-207~~ A
LOCATION: GW

COMMENTS:

Date Submitted: 11/25/91
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00
Date Extracted: 11/25/91

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Dimethylphthalate	5.20	4 U	ug/l	12/05/91	SW846-8270
Acenaphthylene	5.20	4 U	ug/l	12/05/91	SW846-8270
3-Nitroaniline	2.60	5 U	ug/l	12/05/91	SW846-8270
Acenaphthene	5.20	4 U	ug/l	12/05/91	SW846-8270
2,4-Dinitrophenol	2.60	5 U	ug/l	12/05/91	SW846-8270
4-Nitrophenol	2.60	5 U	ug/l	12/05/91	SW846-8270
Dibenzofuran	5.20	4 U	ug/l	12/05/91	SW846-8270
2,4-Dinitrotoluene	5.20	4 U	ug/l	12/05/91	SW846-8270
2,6-Dinitrotoluene	5.20	4 U	ug/l	12/05/91	SW846-8270
Diethylphthalate	5.20	4 U	ug/l	12/05/91	SW846-8270
4-Chlorophenyl-Phenylether	5.20	4 U	ug/l	12/05/91	SW846-8270
Fluorene	5.20	4 U	ug/l	12/05/91	SW846-8270
4-Nitroaniline	2.60	5 U	ug/l	12/05/91	SW846-8270
4,6-Dinitro-2-Methylphenol	2.60	5 U	ug/l	12/05/91	SW846-8270
N-Nitrosodiphenylamine	5.20	4 U	ug/l	12/05/91	SW846-8270
4-Bromophenyl-Phenylether	5.20	4 U	ug/l	12/05/91	SW846-8270
Hexachlorobenzene	5.20	4 U	ug/l	12/05/91	SW846-8270
Pentachlorophenol	5.20	4 U	ug/l	12/05/91	SW846-8270
Phenanthrene	5.20	4 U	ug/l	12/05/91	SW846-8270
Anthracene	5.20	4 U	ug/l	12/05/91	SW846-8270
Di-N-Butylphthalate	5.20	4 U	ug/l	12/05/91	SW846-8270
Fluoranthene	5.20	4 U	ug/l	12/05/91	SW846-8270
Pyrene	5.20	4 U	ug/l	12/05/91	SW846-8270
Butylbenzylphthalate	5.20	4 U	ug/l	12/05/91	SW846-8270
3,3-Dichlorobenzidine	1.04	5 U	ug/l	12/05/91	SW846-8270
Benzo(a)Anthracene	5.20	4 U	ug/l	12/05/91	SW846-8270
bis(2-Ethylhexyl)Phthalate	5.20	4 U	ug/l	12/05/91	SW846-8270
Chrysene	5.20	4 U	ug/l	12/05/91	SW846-8270
Di-N-Octyl Phthalate	5.20	4 U	ug/l	12/05/91	SW846-8270
Benzo(b)Fluoranthene	5.20	4 U	ug/l	12/05/91	SW846-8270

LEEDS006012

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 =, 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Engineering Co.
4800 East 63rd Street
Kansas City, MO 64130
Attn: Joe Marsh

Report: 8083.02

Date: 12/13/91

SWLO #: 8083.02
PROJECT: KC Site II
SAMPLE #: MW-207A
LOCATION: GW

COMMENTS:

Date Submitted: 11/25/91
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00
Date Extracted: 11/25/91

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Benzo(k)Fluoranthene	5.20	4 U	ug/l	12/05/91	SW846-8270
Benzo(a)Pyrene	5.20	4 U	ug/l	12/05/91	SW846-8270
Indeno(1,2,3-cd)Pyrene	5.20	4 U	ug/l	12/05/91	SW846-8270
Dibenz(a,h)Anthracene	5.20	4 U	ug/l	12/05/91	SW846-8270
Benzo(g,h,i)Perylene	5.20	4 U	ug/l	12/05/91	SW846-8270

LEEDS006013

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany - Broken Arrow, Oklahoma 74012 - Office (918) 251-2858 - Fax (918) 251-2599

CLIENT: Burns & McDonnell Waste Con., Inc.
10881 Lowell Avenue
Overland Park, KS 66210
Attn: Joe Marsh

Report: 9099.01

Date: 04/07/92

SWLO #: 9099.01
PROJECT: KC Site II
SAMPLE #: GW-201B
LOCATION:

COMMENTS:

Date Submitted: 03/24/92
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00
Date Extracted: 03/24/92

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Phenol	1.00	1 U	ug/l	03/27/92	SW846-8270
bis(2-Chloroethyl)Ether	1.00	1 U	ug/l	03/27/92	SW846-8270
2-Chlorophenol	1.00	1 U	ug/l	03/27/92	SW846-8270
1,3-Dichlorobenzene	1.00	1 U	ug/l	03/27/92	SW846-8270
1,4-Dichlorobenzene	1.00	1 U	ug/l	03/27/92	SW846-8270
Benzyl Alcohol	1.00	1 U	ug/l	03/27/92	SW846-8270
1,2-Dichlorobenzene	1.00	1 U	ug/l	03/27/92	SW846-8270
2-Methylphenol	1.00	1 U	ug/l	03/27/92	SW846-8270
bis(2-Chloroisopropyl)Ether	1.00	1 U	ug/l	03/27/92	SW846-8270
4-Methylphenol	1.00	1 U	ug/l	03/27/92	SW846-8270
N-Nitroso-Di-n-Propylamine	1.00	1 U	ug/l	03/27/92	SW846-8270
Hexachloroethane	1.00	1 U	ug/l	03/27/92	SW846-8270
Nitrobenzene	1.00	1 U	ug/l	03/27/92	SW846-8270
Isophorone	1.00	1 U	ug/l	03/27/92	SW846-8270
2-Nitrophenol	1.00	1 U	ug/l	03/27/92	SW846-8270
2,4-Dimethylphenol	1.00	1 U	ug/l	03/27/92	SW846-8270
Benzoic Acid	5.00	1 U	ug/l	03/27/92	SW846-8270
bis(2-Chloroethoxy)Methane	1.00	1 U	ug/l	03/27/92	SW846-8270
2,4-Dichlorophenol	1.00	1 U	ug/l	03/27/92	SW846-8270
1,2,4-Trichlorobenzene	1.00	1 U	ug/l	03/27/92	SW846-8270
Naphthalene	1.00	1 U	ug/l	03/27/92	SW846-8270
4-Chloroaniline	1.00	1 U	ug/l	03/27/92	SW846-8270
Hexachlorobutadiene	1.00	1 U	ug/l	03/27/92	SW846-8270
4-Chloro-3-Methylphenol	1.00	1 U	ug/l	03/27/92	SW846-8270
2-Methylnaphthalene	1.00	1 U	ug/l	03/27/92	SW846-8270
Hexachlorocyclopentadiene	1.00	1 U	ug/l	03/27/92	SW846-8270
2,4,6-Trichlorophenol	1.00	1 U	ug/l	03/27/92	SW846-8270
2,4,5-Trichlorophenol	5.00	1 U	ug/l	03/27/92	SW846-8270
2-Chloronaphthalene	1.00	1 U	ug/l	03/27/92	SW846-8270
2-Nitroaniline	5.00	1 U	ug/l	03/27/92	SW846-8270

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
[illegible] West [illegible] • Broken Arrow, Oklahoma [illegible] • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Waste Con., Inc
10881 Lowell Avenue
Overland Park, KS 66210
Attn: Joe Marsh

Report: 9099.01

Date: 04/06/92

SWLO #: 9099.01
PROJECT: KC Site II
SAMPLE #: GW-201B
LOCATION:

COMMENTS:

Date Submitted: 03/24/92
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00
Date Extracted: 03/24/92

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Dimethylphthalate	1.00	1 U	ug/l	03/27/92	SW846-8270
Acenaphthylene	1.00	1 U	ug/l	03/27/92	SW846-8270
3-Nitroaniline	5.00	1 U	ug/l	03/27/92	SW846-8270
Acenaphthene	1.00	1 U	ug/l	03/27/92	SW846-8270
2,4-Dinitrophenol	5.00	1 U	ug/l	03/27/92	SW846-8270
4-Nitrophenol	5.00	1 U	ug/l	03/27/92	SW846-8270
Dibenzofuran	1.00	1 U	ug/l	03/27/92	SW846-8270
2,4-Dinitrotoluene	1.00	1 U	ug/l	03/27/92	SW846-8270
2,6-Dinitrotoluene	1.00	1 U	ug/l	03/27/92	SW846-8270
Diethylphthalate	1.00	1 U	ug/l	03/27/92	SW846-8270
4-Chlorophenyl-Phenylether	1.00	1 U	ug/l	03/27/92	SW846-8270
Fluorene	1.00	1 U	ug/l	03/27/92	SW846-8270
4-Nitroaniline	5.00	1 U	ug/l	03/27/92	SW846-8270
4,6-Dinitro-2-Methylphenol	5.00	1 U	ug/l	03/27/92	SW846-8270
N-Nitrosodiphenylamine	1.00	1 U	ug/l	03/27/92	SW846-8270
4-Bromophenyl-Phenylether	1.00	1 U	ug/l	03/27/92	SW846-8270
Hexachlorobenzene	1.00	1 U	ug/l	03/27/92	SW846-8270
Pentachlorophenol	1.00	0 J	ug/l	03/27/92	SW846-8270
Phenanthrene	1.00	1 U	ug/l	03/27/92	SW846-8270
Anthracene	1.00	1 U	ug/l	03/27/92	SW846-8270
Di-N-Butylphthalate	1.00	1 U	ug/l	03/27/92	SW846-8270
Fluoranthene	1.00	1 U	ug/l	03/27/92	SW846-8270
Pyrene	1.00	1 U	ug/l	03/27/92	SW846-8270
Butylbenzylphthalate	1.00	1 U	ug/l	03/27/92	SW846-8270
3,3-Dichlorobenzidine	2.00	1 U	ug/l	03/27/92	SW846-8270
Benzo(a)Anthracene	1.00	1 U	ug/l	03/27/92	SW846-8270
bis(2-Ethylhexyl)Phthalate	1.00	1 U	ug/l	03/27/92	SW846-8270
Chrysene	1.00	1 U	ug/l	03/27/92	SW846-8270
Di-N-Octyl Phthalate	1.00	1 U	ug/l	03/27/92	SW846-8270
Benzo(b)Fluoranthene	1.00	1 U	ug/l	03/27/92	SW846-8270

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2558 • Fax (918) 251-2558

CLIENT: Burns & McDonnell Waste Con., Inc
10881 Lowell Avenue
Overland Park, KS 66210
Attn: Joe Marsh

Report: 9099.01

Date: 04/06/92

SWLO #: 9099.01
PROJECT: KC Site II
SAMPLE #: GW-201B
LOCATION:

COMMENTS:

Date Submitted: 03/24/92
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00
Date Extracted: 03/24/92

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Benzo(k)Fluoranthene	1.00	1 U	ug/l	03/27/92	SW846-8270
Benzo(a)Pyrene	1.00	1 U	ug/l	03/27/92	SW846-8270
Indeno(1,2,3-cd)Pyrene	1.00	1 U	ug/l	03/27/92	SW846-8270
Dibenz(a,h)Anthracene	1.00	1 U	ug/l	03/27/92	SW846-8270
Benzo(g,h,i)Perylene	1.00	1 U	ug/l	03/27/92	SW846-8270

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-8551 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Waste Con., Inc.
10881 Lowell Avenue
Overland Park, KS 66210
Attn: Joe Marsh

Report: 9099.01

Date: EST. 04/06/92

SWLO #: 9099.01
PROJECT: KC Site II
SAMPLE #: GW-201B
LOCATION:
COMMENTS:

Date Submitted: 03/24/92
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	3.00	0	mg/l	03/25/92	03/25/92	EPA 418.1

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Waste Con., Inc.
10881 Lowell Avenue
Overland Park, KS 66210
Attn: Joe Marsh

Report: 9099.02

Date: 04/06/92

SWLO #: 9099.02
PROJECT: KC Site II
SAMPLE #: GW-202B
LOCATION:

COMMENTS:

Date Submitted: 03/24/92
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00
Date Extracted: 03/24/92

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Phenol	5.00	2 U	ug/l	03/31/92	SW846-8270
bis(2-Chloroethyl)Ether	5.00	2 U	ug/l	03/31/92	SW846-8270
2-Chlorophenol	5.00	2 U	ug/l	03/31/92	SW846-8270
1,3-Dichlorobenzene	5.00	2 U	ug/l	03/31/92	SW846-8270
1,4-Dichlorobenzene	5.00	2 U	ug/l	03/31/92	SW846-8270
Benzyl Alcohol	5.00	2 U	ug/l	03/31/92	SW846-8270
1,2-Dichlorobenzene	5.00	2 U	ug/l	03/31/92	SW846-8270
2-Methylphenol	5.00	2 U	ug/l	03/31/92	SW846-8270
bis(2-Chloroisopropyl)Ether	5.00	2 U	ug/l	03/31/92	SW846-8270
4-Methylphenol	5.00	2 U	ug/l	03/31/92	SW846-8270
N-Nitroso-Di-n-Propylamine	5.00	2 U	ug/l	03/31/92	SW846-8270
Hexachloroethane	5.00	2 U	ug/l	03/31/92	SW846-8270
Nitrobenzene	5.00	2 U	ug/l	03/31/92	SW846-8270
Isophorone	5.00	2 U	ug/l	03/31/92	SW846-8270
2-Nitrophenol	5.00	2 U	ug/l	03/31/92	SW846-8270
2,4-Dimethylphenol	5.00	2 U	ug/l	03/31/92	SW846-8270
Benzoic Acid	2.50	3 U	ug/l	03/31/92	SW846-8270
bis(2-Chloroethoxy)Methane	5.00	2 U	ug/l	03/31/92	SW846-8270
2,4-Dichlorophenol	5.00	2 U	ug/l	03/31/92	SW846-8270
1,2,4-Trichlorobenzene	5.00	2 U	ug/l	03/31/92	SW846-8270
Naphthalene	5.00	2 U	ug/l	03/31/92	SW846-8270
4-Chloroaniline	5.00	2 U	ug/l	03/31/92	SW846-8270
Hexachlorobutadiene	5.00	2 U	ug/l	03/31/92	SW846-8270
4-Chloro-3-Methylphenol	5.00	2 U	ug/l	03/31/92	SW846-8270
2-Methylnaphthalene	5.00	2 U	ug/l	03/31/92	SW846-8270
Hexachlorocyclopentadiene	5.00	2 U	ug/l	03/31/92	SW846-8270
2,4,6-Trichlorophenol	5.00	2 U	ug/l	03/31/92	SW846-8270
2,4,5-Trichlorophenol	2.50	3 U	ug/l	03/31/92	SW846-8270
2-Chloronaphthalene	5.00	2 U	ug/l	03/31/92	SW846-8270
2-Nitroaniline	2.50	3 U	ug/l	03/31/92	SW846-8270

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1709 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Waste Con., Inc.
10881 Lowell Avenue
Overland Park, KS 66210
Attn: Joe Marsh

Report: 9099.02

Date: 04/06/92

SWLO #: 9099.02
PROJECT: KC Site II
SAMPLE #: GW-202B
LOCATION:

COMMENTS:

Date Submitted: 03/24/92
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00
Date Extracted: 03/24/92

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Dimethylphthalate	5.00	2 U	ug/l	03/31/92	SW846-8270
Acenaphthylene	5.00	2 U	ug/l	03/31/92	SW846-8270
3-Nitroaniline	2.50	3 U	ug/l	03/31/92	SW846-8270
Acenaphthene	5.00	2 U	ug/l	03/31/92	SW846-8270
2,4-Dinitrophenol	2.50	3 U	ug/l	03/31/92	SW846-8270
4-Nitrophenol	2.50	3 U	ug/l	03/31/92	SW846-8270
Dibenzofuran	5.00	2 U	ug/l	03/31/92	SW846-8270
2,4-Dinitrotoluene	5.00	2 U	ug/l	03/31/92	SW846-8270
2,6-Dinitrotoluene	5.00	2 U	ug/l	03/31/92	SW846-8270
Diethylphthalate	5.00	2 U	ug/l	03/31/92	SW846-8270
4-Chlorophenyl-Phenylether	5.00	2 U	ug/l	03/31/92	SW846-8270
Fluorene	5.00	2 U	ug/l	03/31/92	SW846-8270
4-Nitroaniline	2.50	3 U	ug/l	03/31/92	SW846-8270
4,6-Dinitro-2-Methylphenol	2.50	3 U	ug/l	03/31/92	SW846-8270
N-Nitrosodiphenylamine	5.00	2 U	ug/l	03/31/92	SW846-8270
4-Bromophenyl-Phenylether	5.00	2 U	ug/l	03/31/92	SW846-8270
Hexachlorobenzene	5.00	2 U	ug/l	03/31/92	SW846-8270
Pentachlorophenol	5.00	2 U	ug/l	03/31/92	SW846-8270
Phenanthrene	5.00	2 U	ug/l	03/31/92	SW846-8270
Anthracene	5.00	2 U	ug/l	03/31/92	SW846-8270
Di-N-Butylphthalate	5.00	2 U	ug/l	03/31/92	SW846-8270
Fluoranthene	5.00	2 U	ug/l	03/31/92	SW846-8270
Pyrene	5.00	2 U	ug/l	03/31/92	SW846-8270
Butylbenzylphthalate	5.00	2 U	ug/l	03/31/92	SW846-8270
3,3-Dichlorobenzidine	1.00	3 U	ug/l	03/31/92	SW846-8270
Benzo(a)Anthracene	5.00	2 U	ug/l	03/31/92	SW846-8270
bis(2-Ethylhexyl)Phthalate	5.00	2 U	ug/l	03/31/92	SW846-8270
Chrysene	5.00	2 U	ug/l	03/31/92	SW846-8270
Di-N-Octyl Phthalate	5.00	2 U	ug/l	03/31/92	SW846-8270
Benzo(b)Fluoranthene	5.00	2 U	ug/l	03/31/92	SW846-8270

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Waste Con., Inc.
10881 Lowell Avenue
Overland Park, KS 66210
Attn: Joe Marsh

Report: 9099.02
Date: 04/06/92

SWLO #: 9099.02
PROJECT: KC Site II
SAMPLE #: GW-202B
LOCATION:

COMMENTS:

Date Submitted: 03/24/92
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00
Date Extracted: 03/24/92

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Benzo(k)Fluoranthene	5.00	2 U	ug/l	03/31/92	SW846-8270
Benzo(a)Pyrene	5.00	2 U	ug/l	03/31/92	SW846-8270
Indeno(1,2,3-cd)Pyrene	5.00	2 U	ug/l	03/31/92	SW846-8270
Dibenz(a,h)Anthracene	5.00	2 U	ug/l	03/31/92	SW846-8270
Benzo(g,h,i)Perylene	5.00	2 U	ug/l	03/31/92	SW846-8270

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West [illegible] • Broken Arrow, Oklahoma 74012 • [illegible] • Fax (918) 251-2858

CLIENT: Burns & McDonnell Waste Con., Inc.
10881 Lowell Avenue
Overland Park, KS 66210
Attn: Joe Marsh

Report: 9099.02

Date: 04/06/92

SWLO #: 9099.02
PROJECT: KC Site II
SAMPLE #: GW-202B
LOCATION:
COMMENTS:

Date Submitted: 03/24/92
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	2.50	1	mg/l	03/25/92	03/25/92	EPA 418.1

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Waste Con., Inc.
10881 Lowell Avenue
Overland Park, KS 66210
Attn: Joe Marsh

Report: 9099.04

Date: 04/06/92

SWLO #: 9099.04
PROJECT: KC Site II
SAMPLE #: GW-209B
LOCATION:

COMMENTS:

Date Submitted: 03/24/92
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00
Date Extracted: 03/24/92

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Phenol	1.00	1 U	ug/l	03/27/92	SW846-8270
bis(2-Chloroethyl)Ether	1.00	1 U	ug/l	03/27/92	SW846-8270
2-Chlorophenol	1.00	1 U	ug/l	03/27/92	SW846-8270
1,3-Dichlorobenzene	1.00	1 U	ug/l	03/27/92	SW846-8270
1,4-Dichlorobenzene	1.00	1 U	ug/l	03/27/92	SW846-8270
Benzyl Alcohol	1.00	1 U	ug/l	03/27/92	SW846-8270
1,2-Dichlorobenzene	1.00	1 U	ug/l	03/27/92	SW846-8270
2-Methylphenol	1.00	1 U	ug/l	03/27/92	SW846-8270
bis(2-Chloroisopropyl)Ether	1.00	1 U	ug/l	03/27/92	SW846-8270
4-Methylphenol	1.00	1 U	ug/l	03/27/92	SW846-8270
N-Nitroso-Di-n-Propylamine	1.00	1 U	ug/l	03/27/92	SW846-8270
Hexachloroethane	1.00	1 U	ug/l	03/27/92	SW846-8270
Nitrobenzene	1.00	1 U	ug/l	03/27/92	SW846-8270
Isophorone	1.00	1 U	ug/l	03/27/92	SW846-8270
2-Nitrophenol	1.00	1 U	ug/l	03/27/92	SW846-8270
2,4-Dimethylphenol	1.00	1 U	ug/l	03/27/92	SW846-8270
Benzoic Acid	5.00	1 U	ug/l	03/27/92	SW846-8270
bis(2-Chloroethoxy)Methane	1.00	1 U	ug/l	03/27/92	SW846-8270
2,4-Dichlorophenol	1.00	1 U	ug/l	03/27/92	SW846-8270
1,2,4-Trichlorobenzene	1.00	1 U	ug/l	03/27/92	SW846-8270
Naphthalene	1.00	1 U	ug/l	03/27/92	SW846-8270
4-Chloroaniline	1.00	1 U	ug/l	03/27/92	SW846-8270
Hexachlorobutadiene	1.00	1 U	ug/l	03/27/92	SW846-8270
4-Chloro-3-Methylphenol	1.00	1 U	ug/l	03/27/92	SW846-8270
2-Methylnaphthalene	1.00	1 U	ug/l	03/27/92	SW846-8270
Hexachlorocyclopentadiene	1.00	1 U	ug/l	03/27/92	SW846-8270
2,4,6-Trichlorophenol	1.00	1 U	ug/l	03/27/92	SW846-8270
2,4,5-Trichlorophenol	5.00	1 U	ug/l	03/27/92	SW846-8270
2-Chloronaphthalene	1.00	1 U	ug/l	03/27/92	SW846-8270
2-Nitroaniline	5.00	1 U	ug/l	03/27/92	SW846-8270

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Waste Con., Inc.
10881 Lowell Avenue
Overland Park, KS 66210
Attn: Joe Marsh

Report: 9099.04

Date: 04/06/92

SWLO #: 9099.04
PROJECT: KC Site II
SAMPLE #: GW-209B
LOCATION:

COMMENTS:

Date Submitted: 03/24/92
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00
Date Extracted: 03/24/92

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Dimethylphthalate	1.00	1 U	ug/l	03/27/92	SW846-8270
Acenaphthylene	1.00	1 U	ug/l	03/27/92	SW846-8270
3-Nitroaniline	5.00	1 U	ug/l	03/27/92	SW846-8270
Acenaphthene	1.00	1 U	ug/l	03/27/92	SW846-8270
2,4-Dinitrophenol	5.00	1 U	ug/l	03/27/92	SW846-8270
4-Nitrophenol	5.00	1 U	ug/l	03/27/92	SW846-8270
Dibenzofuran	1.00	1 U	ug/l	03/27/92	SW846-8270
2,4-Dinitrotoluene	1.00	1 U	ug/l	03/27/92	SW846-8270
2,6-Dinitrotoluene	1.00	1 U	ug/l	03/27/92	SW846-8270
Diethylphthalate	1.00	1 U	ug/l	03/27/92	SW846-8270
4-Chlorophenyl-Phenylether	1.00	1 U	ug/l	03/27/92	SW846-8270
Fluorene	1.00	1 U	ug/l	03/27/92	SW846-8270
4-Nitroaniline	5.00	1 U	ug/l	03/27/92	SW846-8270
4,6-Dinitro-2-Methylphenol	5.00	1 U	ug/l	03/27/92	SW846-8270
N-Nitrosodiphenylamine	1.00	1 U	ug/l	03/27/92	SW846-8270
4-Bromophenyl-Phenylether	1.00	1 U	ug/l	03/27/92	SW846-8270
Hexachlorobenzene	1.00	1 U	ug/l	03/27/92	SW846-8270
Pentachlorophenol	1.00	1 U	ug/l	03/27/92	SW846-8270
Phenanthrene	1.00	1 U	ug/l	03/27/92	SW846-8270
Anthracene	1.00	1 U	ug/l	03/27/92	SW846-8270
Di-N-Butylphthalate	1.00	1 U	ug/l	03/27/92	SW846-8270
Fluoranthene	1.00	1 U	ug/l	03/27/92	SW846-8270
Pyrene	1.00	1 U	ug/l	03/27/92	SW846-8270
Butylbenzylphthalate	1.00	1 U	ug/l	03/27/92	SW846-8270
3,3-Dichlorobenzidine	2.00	1 U	ug/l	03/27/92	SW846-8270
Benzo(a)Anthracene	1.00	1 U	ug/l	03/27/92	SW846-8270
bis(2-Ethylhexyl)Phthalate	1.00	1 U	ug/l	03/27/92	SW846-8270
Chrysene	1.00	1 U	ug/l	03/27/92	SW846-8270
Di-N-Octyl Phthalate	1.00	1 U	ug/l	03/27/92	SW846-8270
Benzo(b)Fluoranthene	1.00	1 U	ug/l	03/27/92	SW846-8270

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Waste Con., Inc.
10881 Lowell Avenue
Overland Park, KS 66210
Attn: Joe Marsh

Report: 9099.04

Date: 04/06/92

SWLO #: 9099.04
PROJECT: KC Site II
SAMPLE #: GW-209B
LOCATION:

COMMENTS:

Date Submitted: 03/24/92
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00
Date Extracted: 03/24/92

SEMIVOLATILE ORGANIC COMPOUNDS	RESULT*		UNITS	DATE ANALYZED	REFERENCE METHOD
Benzo(k)Fluoranthene	1.00	1 U	ug/l	03/27/92	SW846-8270
Benzo(a)Pyrene	1.00	1 U	ug/l	03/27/92	SW846-8270
Indeno(1,2,3-cd)Pyrene	1.00	1 U	ug/l	03/27/92	SW846-8270
Dibenz(a,h)Anthracene	1.00	1 U	ug/l	03/27/92	SW846-8270
Benzo(g,h,i)Perylene	1.00	1 U	ug/l	03/27/92	SW846-8270

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

SOUTHWEST LABORATORY OF OKLAHOMA, INC.
1700 West Albany • Broken Arrow, Oklahoma 74012 • Office (918) 251-2858 • Fax (918) 251-2858

CLIENT: Burns & McDonnell Waste Con., Inc.
10881 Lowell Avenue
Overland Park, KS 66210
Attn: Joe Marsh

Report: 9099.04

Date: 04/06/92

SWLO #: 9099.04
PROJECT: KC Site II
SAMPLE #: GW-209B
LOCATION:
COMMENTS:

Date Submitted: 03/24/92
Sample Matrix: Water
Depth From : 0.00
Depth To : 0.00

PARAMETER	RESULT*		UNITS	DATE PREPARED	DATE ANALYZED	REFERENCE METHOD
Total Petroleum Hydrocarbons	1.70	0	mg/l	03/25/92	03/25/92	EPA 418.1

*RESULTS REPORTED IN SCIENTIFIC NOTATION: Ex.: 1.20 1 is 1.20 x 10 to the 1 = 12

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