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REPORTS

DATE:

2000

HSI GEOTRANS
A TETRA TECH COMPANY

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October 6, 2000
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IR0295

Mr. William Olson
New Mexico Oil Conservation District
2040 South Pacheco
Santa Fe, NM 87505

RE: Site Assessment Workplan
Former Axelson Facility
Hobbs, New Mexico

Dear Mr. Olson:

On behalf of Beazer East, Inc., please find enclosed one copy of the Site Assessment Workplan for the former Axelson Facility, located at 2703 West Marland Boulevard, Hobbs, New Mexico (site). This workplan is submitted to begin the process of site closure through the New Mexico Oil and Conservation Division (OCD). The workplan has been prepared in accordance with OCD guidelines. The workplan summarizes previous site activities and recommends additional activities to characterize the site soil and groundwater impacts.

Please contact me at (916) 853-1800 if you have any questions regarding this transmittal.

Sincerely,

HSI GEOTRANS

Jennifer A. Abrahams, R.G.
Senior Hydrogeologist

Enclosure

cc: Mitchell Brourman, Beazer East, Inc.
Jim McGinty, Halliburton
Bill Skaggs

Site Assessment Workplan
Former Axelson Facility
2703 W. Marland Boulevard
Hobbs, New Mexico

October 6, 2000

Prepared for:

Beazer East, Inc.
One Oxford Centre, Suite 3000
Pittsburgh, Pennsylvania 15219

Prepared by:

HSI GEOTRANS
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3035 Prospect Park Drive, Suite 40
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1.0 INTRODUCTION

This report presents the Site Assessment Workplan (Workplan) to characterize the extent of subsurface impacts at the former Axelson, Inc. facility located at 2703 West Marland Boulevard, Hobbs, New Mexico (Site). A Site location map is presented on Figure 1 and a Site facility layout map is presented on Figure 2.

The Site is privately owned and currently leased to Performance Lift, Inc., however, the Site environmental liability is retained by Beazer East, Inc., on behalf of Carisbrook Industries.

This Workplan is prepared in accordance with the New Mexico Oil and Conservation Division (OCD) guidelines, since site activities formerly supported the oil field service industry. This Workplan briefly presents the Site's operational background and physical characteristics, defines the current Site conditions, evaluates the remaining data needs and presents a proposed scope of work to fulfill the data needs.

2.0 SITE BACKGROUND

The Site is owned by Mr. Bill Staggs and was leased to Axelson, Inc. (Axelson) from 1980 to approximately 1997. Axelson repaired submersible rod sucker oil pumps and rods at the Site. The Site was unoccupied from 1997 until mid-1999, when the Site was leased by Performance Lift, Inc., an equipment distribution company. Currently, Performance Lift sells new equipment; any spent or excess fluids generated during nominal cleaning or repairing is contained and disposed by an outside vendor (Safety Kleen).

The Site occupies approximately 1.2 acres, with approximately 6,7000 square feet of covered area (primarily occupied by the office/shop building). The shop portion of the building contains two concrete catch basins, that are connected to an exterior septic tank and associated leach line(s). The site septic tank (Figure 2) is reportedly still used and has not been pumped out since at least 1990. The location, configuration and condition of the leach line(s) are not known. A water well is located in the northwestern corner of the Site, as shown on Figure 2. A metal plate has been welded on top of the water well and the well has not been used since at least 1993. The well construction details, including total depth and well screen, are unknown.

A small, storage building was formerly located west of the office portion of the main building, as shown on Figure 2. This storage building was reportedly removed in 1997. A shack located south of the building was reportedly removed in 1999.

The Axelson operations consisted of cleaning and repairing pumps and rods. Equipment received at the Site for servicing was initially screened for Naturally Occurring Radioactive Materials (NORM) using a portable Geiger counter. Scale material on the equipment occasionally contained NORM. The scale material was cleaned off the equipment and stored in 55-gallon drums along the fenced area at the southeastern corner of the Site, as shown on Figure 2. The NORM impacted material

was returned to the oil company that generated the NORM for appropriate disposal. Pumps and miscellaneous parts were stored along the western angled portion of the Site, as shown on Figure 2.

Prior to repair, rod sucker oil pumps and rods were cleaned at an outdoor staging area where they were returned from the production fields. The wash water and sludge generated during the cleaning operations was contained in an above ground 7,000-gallon wash vat tank from 1994 through 1997 (Figure 2). The wash vat tank was self-contained and not connected to the septic tank. Wash water and sludge material was reportedly directed to the septic tank prior to installation of the wash vat tank.

A 500-gallon gasoline underground storage tank (UST) was formerly located south of the septic tank. The UST reportedly was removed by the Site owner in 1993; Axelson did not use the UST. Additional information regarding the former gasoline tank is unknown.

3.0 SITE SETTING

The Site is located within the Southern Plains physiographic district. The Site soils consist of 17 to 19 feet of gray to brown silty sand and sandy silt. This is underlain by 3 to 6.5 feet of hard, brown, indurated sandstone, which is underlain by a brown, silty sand material. The Site is underlain by Pliocene Series of the Tertiary Ogallala Formation. The Ogallala Formation is a thick sequence of interbedded sand, silt and clay overlain by a well indurated calcareous sandstone.

The Ogallala Aquifer, identified within the Ogallala Formation, is a drinking water supply aquifer. Groundwater is located approximately 80 feet below ground surface (bgs) within the Ogallala Aquifer in the vicinity of the Site. There are no groundwater supply wells with a one mile radius of the facility. As mentioned in Section 2.0, a water well is located in the northwestern portion of the site, however, this is not a water supply well.

A 1995 soil and groundwater investigation at the Site, identified perched groundwater approximately 30 to 32 feet bgs (see Section 4.0 for further information).

4.0 SITE CONDITIONS

Environmental Management and Engineering, Inc. (EME) performed a subsurface investigation at the Site in February 1995 and identified Site soil and groundwater impacts. Soil and groundwater samples were collected at the Site to assess the nature and extent impacts associated with the septic tank and associated leach field and the concrete catch basins, as shown on Figure 2. Soil and groundwater analyses included total petroleum hydrocarbons (TPH) and volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and RCRA 8 Metals (including arsenic, barium, cadmium, total chromium, lead, mercury, selenium and silver). Surface soil samples were collected and analyzed for NORM. In addition, sludge samples were collected from each of the concrete catch basins, the septic tank and the wash vat tank for NORM, TPH, and RCRA 8 Metals analyses.

The soil analytical results are presented in Tables 1 through 5 and the groundwater analytical results are presented in Tables 6 through 8. The 1995 laboratory analytical data sheets are included in Appendix A

The 1995 EME analytical results are compared to applicable regulatory action levels. The OCD recommended remediation action level for TPH in soil is 100 milligrams per kilogram (mg/kg). Other soil analytical results are compared to EPA Region 6 Human Health Medium-Specific Screening Levels (HHSLs) for industrial soils. The groundwater analytical results are compared to New Mexico Water Quality Control Commission Ground Water Standards (WQCCs) and/or the U.S. EPA Drinking Water Maximum Contaminant Levels (MCLs). When both a WQCC and MCL value were listed for a contaminant, the more stringent value was used for comparison.

4.1 Results of Soil Investigation

Soil samples were collected from eight soil borings, one background boring, four sludge sample locations, and eleven surface soil sample locations to characterize the nature

and extent of potential impacts to Site soils. The areas investigated include: the septic tank and associate leach line(s); the catch basins; one background location; and areas with historic NORM use. Boring logs created by EME during their soil investigation are presented in Appendix B.

4.1.1 Septic Tank and Associated Leach Line(s)

Eight borings were drilled and sampled in the vicinity of the septic tank and associated leach line(s), as presented on Figure 2. Borings H1-2, H1-4, H1-5, and H1-6 were drilled until refusal was encountered at depths of 20, 18, 14, and 17 feet bgs, respectively. Borings H1-1, H1-3, H1-7, and H1-8 were drilled to a depth of 37 feet bgs. Perched groundwater was encountered in borings H1-1, H1-3, H1-7 and H1-8 at approximately 30 to 32 feet bgs. Soil borings H1-1, H1-3, and H1-7 were converted to two-inch diameter groundwater monitoring wells and labeled as MW-1, MW-2, and MW-3, respectively.

Visual petroleum impacts and odors were reported in boring H1-1 from 7 to 32 feet bgs; perched groundwater was present at 32 feet bgs. Visual petroleum impacts and odors were also noted in boring H1-2 from 9 to 18 feet bgs. A "solvent" odor was noted at approximately 15 feet bgs in boring H1-2. Visual impact and odors were not observed in borings H1-3 through H1-8.

Selected soil samples from borings H1-1 through H1-8 were analyzed for TPH, VOCs, SVOCs, and RCRA 8 Metals, as shown in Tables 1 through 4. Six of the eleven soil samples contained TPH at concentrations greater than the OCD action level. These TPH concentrations were detected at depths of up to 29 feet bgs. The soil VOC, SVOC, and RCRA 8 Metal analytical results were below the EPA HHSLs for industrial soils.

One sludge sample was collected from the septic tank and one sludge sample was collected from the former wash vat tank. These samples were analyzed for TPH and

RCRA 8 Metals. Both sludge samples contained TPH concentrations that exceeded the OCD action level, however, the metal results were below the EPA HHSLs for industrial soils.

4.1.2 Catch Basins

Two sludge samples were collected from the concrete catch basins. The sludge samples were analyzed for TPH, VOCs, and RCRA 8 Metals. Both sludge samples contained TPH concentrations that exceeded the OCD action level. The sludge samples did not contain detectable concentrations of VOCs. RCRA 8 metal results for the sludge samples were below the EPA HHSLs for industrial soils.

4.1.3 Background Sample

One surface soil background sample (HBG-1) was collected along the northeast boundary of the Site, as shown on Figure 2. The background area was considered to be unimpacted by normal facility operations. The background soil sample was analyzed for TPH and RCRA 8 Metals. The TPH and RCRA 8 metals concentrations were below the corresponding regulatory action levels.

4.1.4 NORM Sampling

EME conducted a Site survey of radiation levels using a 2.0-inch thin window GM detector. The survey map was used to identify areas potentially impacted by NORM. Fourteen surface soil samples, collected from 0 to 0.5 feet bgs, and four sludge samples were collected and analyzed for NORM (specifically radium 226 and 228). Analytical NORM results are presented in Table 5 and sample locations are identified in Figure 2.

Six surface soil samples contained radium 226 at concentrations above the proposed State of New Mexico NORM regulatory action level for Radium 226 of 30 pico Curies per gram (pCi/gm). One sludge sample from the concrete catch basins contained radium 226 at concentrations above the proposed regulatory action level.

4.2 Groundwater Impacts

Three borings were completed as monitoring wells at the Site to help characterize the potential Site impacts to groundwater. All three groundwater monitoring wells were completed as two-inch diameter wells and are screened from 25 to 35 feet bgs. In addition, a grab groundwater sample was collected from a boring and a water sample was collected from the water well located in the northwest corner of the Site. The water samples were analyzed for TPH, VOCs, and RCRA 8 Metals. The water analytical results are summarized in Tables 6 through 8.

The groundwater flow direction and gradient have not been established at the Site since the elevations of the monitoring wells have not been surveyed. A review of the 7.5 Minute Series Hobbs West Quadrangle, New Mexico topographic map, indicates the regional groundwater flow direction in the vicinity of the Site is likely to be toward the south-southeast.

The TPH concentrations detected in groundwater samples ranged from less than 1 milligram per liter (mg/L) in the water well sample located in the northwest corner of the Site up to 680 mg/L in monitor well MW-1, located adjacent to the septic tank. The EPA has published Suggested No-Adverse Response Level (SNARL) concentrations for gasoline, diesel and kerosene of 5, 100 and 100 micrograms per liter (µg/L), respectively. The TPH analyses performed by EME in 1995 did not speciate the hydrocarbons, therefore, a comparison of the 1995 EME data to the SNARLs is not possible.

Groundwater samples collected from the monitoring wells and the grab groundwater sample collected from the boring contained concentrations of VOCs that exceeded some of the WQCCs or MCLs. The sample from the existing water well did not contain VOCs at concentrations that exceeded regulatory action levels.

Arsenic and barium were the only RCRA 8 Metals detected in the Site groundwater and grab water sample. The arsenic concentrations slightly exceeded the MCL. The barium concentrations were all below the MCL. It is unknown whether the 1995 water samples were field filtered, therefore, it is unknown whether the metal results are representative of dissolved or total metal concentrations.

5.0 IDENTIFICATION OF REMAINING DATA NEEDS

This section outlines recommended sampling to further delineate the extent of previously identified soil impacts and assess the vertical and horizontal extent of groundwater impacts at the Site. All investigative work will be performed in accordance with OCD requirements, HSI GeoTrans' Standard Operating Procedures (SOPs), presented in Appendix C, and in accordance with a site specific Health and Safety Plan (HASP), presented in Appendix D. Prior to beginning the proposed field work activities, a utility clearance will be conducted at each of the proposed boring locations.

5.1 Delineation of Soil Impacts

TPH soil concentrations in the vicinity of the septic tank and associated leach line(s) exceed the OCD action level. NORM concentrations in surface soils in the vicinity of the septic tank and associated leach line(s) exceed the OCD proposed action level. Additional soil sampling is recommended to characterize the vertical and horizontal extent of TPH and NORM impacts to soil at the Site. The proposed soil sample locations are shown on Figure 3, and described below.

5.1.1 TPH Sampling

Six soil boring locations are proposed to assess the vertical and horizontal extent of TPH impacts. The borings will be sampled at five foot intervals and drilled to the perched water level, anticipated to be approximately 35 feet bgs, or until refusal is encountered. The soil samples will be collected for lithology, field screening and potential laboratory analysis. An HSI GeoTrans geologist will log the soil lithology, color, moisture, and monitor the soil samples with an organic vapor analyzer (OVA) for hydrocarbon vapors.

The 5, 10 and 15 foot soil samples from the four borings in the immediate vicinity of the septic tank and leach line(s) (SB-1 through SB-4) will be analyzed for TPH using EPA Method 8015 Modified. The deeper soil samples from these borings will be archived at

the laboratory, pending the analytical results of the shallower soil samples. Archived samples will be analyzed, as necessary, to define the vertical extent of TPH impacts to the OCD action level. That is, deeper samples will be analyzed until the TPH concentrations are defined to be less than 100 mg/kg.

Elevated TPH concentrations are not expected to be encountered in borings SB-5 and SB-6, based on the EME 1995 soil data. The HSI GeoTrans field geologist will identify the most visually impacted sample in soil borings SB-5 and SB-6, confirm the visual identification with an OVA reading and select that sample for analysis. The remaining soil samples from borings SB-5 and SB-6 will be archived at the laboratory, pending the analytical results of the selected soil samples. The archived soil samples will be analyzed, as necessary, to define the vertical extent of TPH impacts to the OCD action level.

5.1.2 NORM Sampling

Six shallow soil borings (NM-1 through NM-6) are proposed to assess the vertical extent of NORM at the Site. The proposed borings will be sampled at 1, 2, and 3 feet bgs in the vicinity of the former borings H1-4A, H2-2A, H2-3A, H2-4A, H2-9A and H2-11A. The one foot soil sample from each boring location (total of six samples) will be analyzed for NORM and the remaining soil samples from these borings will be archived at the laboratory, pending the analytical results of the shallower soil samples. Archived soil samples will be analyzed, as necessary, to define the vertical extent of NORM impacts to the OCD proposed action level.

5.2 Delineation of Groundwater Impacts

Groundwater at the Site has had detections of TPH, VOCs and low concentrations of metals. The Site monitoring wells have been only sampled once. It is recommended that the monitoring wells be redeveloped and sampled for TPH, VOCs, and metals. + gen chem Additional groundwater sampling is recommended to characterize the horizontal extent of TPH, VOCs and metals in groundwater at the Site, as well as help delineate the Site

groundwater flow direction and gradient. The proposed groundwater sample locations are shown on Figure 3, and described below.

5.2.1 Grab Groundwater Sampling

Grab groundwater samples will be collected at each of the proposed boring locations (SB-1 through SB-6). The grab groundwater samples will be analyzed for TPH using EPA Method 8015 Modified, VOCs using EPA Method 8260 and dissolved metals. Four of the six soil boring locations are recommended to be converted into temporary wells to establish the Site groundwater flow direction and gradient. Temporary PVC casing will be installed at four boring locations (SB-1, SB-2, SB-5 and SB-6) and left in-place overnight to allow the perched water table to stabilize in the temporary PVC casings. Several depth to water readings will be measured and recorded at each temporary casing location.

The top of casing elevations of the temporary PVC casings and three monitor wells will be surveyed. After the well elevation survey has been completed, the four temporary casings will be removed and the boring locations properly abandoned in accordance with OCD requirements.

The Site groundwater flow direction and gradient and the analytical results of the monitoring well groundwater and grab groundwater sampling will be reviewed to evaluate whether installation of additional, permanent monitoring wells will be recommended.

5.2.2 Water Well Abandonment

It is recommended that the water well located in the northwestern corner of the Site be abandoned. The water well has not been used since at least 1993 and a metal plate has been welded on top of the well casing. The water well may be a potential conduit to the groundwater aquifer beneath the Site. The New Mexico State Engineers Office in Roswell will be contacted to obtain historical construction information pertaining to

the water well (i.e., depth, screened interval, etc.). The water well will be abandoned in accordance with OCD requirements.

5.3 Recommended Soil and Groundwater Characterization Method

Based on the Site lithology, a hollow stem auger drill rig with air rotary capabilities will be required to complete the proposed soil borings to a depth of 35 feet bgs. The soil cuttings and water generated during the drilling activities will be temporarily stored in 55-gallon drums at the Site.

6.0 SCHEDULE

Field activity preparation will begin following OCD approval of the Workplan. A total project duration of nine weeks is anticipated once the OCD has approved the Workplan. It is estimated that the OCD will review and approve the Workplan within 60 days. Based on discussions with OCD personnel, permits are not required for the soil borings, grab groundwater investigation or potential future monitor well installation. Scheduling and mobilization of subcontractors will require approximately three weeks. The duration of field work is expected to be completed in one week. The final laboratory results will be available approximately three weeks after the last day of field sampling. The evaluation and analysis of the data are expected to require three weeks to complete.

7.0 REPORTING

The field activities, boring logs, analytical results, and conclusions will be presented to OCD with recommended remedial actions.

TABLES

Table 1
Summary of Soil Analytical Results
Total Petroleum Hydrocarbons

February 1995

Sample ID	Sample Depth (feet)	TPH (mg/kg)
H1-1E	6	**1,530**
H1-1L	20	**7,558**
H1-2E	8	**5,673**
H1-2H	14	**9,760**
H1-3I	16	12
H1-3K	29	**835**
H1-4F	12	22
H1-4H	16	6
H1-5D	14	7
H1-7D	29	< 1
H1-8D	29	**120**
H3-1A (concrete catch basin)	Sludge	**6,154**
H3-2 (concrete catch basin)	Sludge	**19,222**
H4-1 (septic tank)	Sludge	**10,000**
H5-1 (wash vat tank)	Sludge	**5,490**
HBG-1A (background)	0 - 0.5	47
NM OCD	- - -	100

Note: Data collected by Environmental Management & Engineering, Inc.
Total Petroleum Hydrocarbons analyzed using EPA Method 418.1
Concentrations in bold exceed the NM OCD recommended action level.

NM OCD = New Mexico Oil Conservation Division recommended remediation action level.
TPH = Total Petroleum Hydrocarbons
mg/kg = milligrams per kilogram (ppm)

Table 2
Summary of Soil Analytical Results
Volatile Organic Compounds

February 1995

Sample ID	Sample Depth (ft. bgs.)	1,2,4-Trimethylbenzene	1,2-Dichlorobenzene	1,3,5-Trimethylbenzene	1,3-Dichlorobenzene	4-Isopropyltoluene	Ethylbenzene	n-Butylbenzene	n-Propylbenzene	Naphthalene	sec-Butylbenzene	tert-Butylbenzene	Toluene	Xylenes (total)
H1-1E	6 - 8	0.03	0.075	0.07	0.033	0.09	< 0.02	0.045	< 0.02	0.6	0.045	0.058	< 0.02	0.04
H1-1L	20 - 22	1.305	< 0.02	0.135	< 0.02	0.18	0.057	0.13	0.06	0.75	0.072	0.054	0.03	0.525
H1-2E	8- 10	0.068	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.47	< 0.02	< 0.02	< 0.02	< 0.02
H1-2H	14 - 16	0.03	< 0.02	0.088	< 0.02	< 0.02	0.035	0.06	0.044	0.25	0.007	0.015	< 0.02	0.2
H1-3I	16 - 17	0.045	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.018	< 0.02	0.12	< 0.02	< 0.02	< 0.02	< 0.02
H1-3K	29 - 31	0.427	< 0.02	0.036	< 0.02	0.105	< 0.02	< 0.02	< 0.02	0.225	0.045	0.06	< 0.02	< 0.02
H1-8D	29 - 31	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
HHSLs	---	5.7	370	70	140	---	230	240	240	190	220	390	520	210

Note: Data collected by Environmental Management & Engineering, Inc.
All results reported as milligrams per kilogram (mg/kg = ppm). Only detected analytes listed.
Volatile Organic Compounds analyzed using EPA Method 8260.

HHSLs = U.S. EPA Region 6 Human Health Medium-Specific Screening Levels for industrial soils.

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NEED TO CHECK GW

Table 3
Summary of Soil Analytical Results
Semi Volatile Organic Compounds

February 1995

Sample ID	Sample Depth (ft. bgs.)	2-Methylnaphthalene	Naphthalene(SVOC)
H1-1E	6 - 8	2.6	0.7
H1-1L	20 - 22	3.15	0.87
H1-2E	8- 10	< 0.1	0.58
H1-2H	14 - 16	1.5	0.8
H1-3I	16 - 17	< 0.1	< 0.1
H1-3K	29 - 31	0.18	0.28
H1-8D	29 - 31	< 0.1	< 0.1
HHSLs	---	---	190

Note: Data collected by Environmental Management & Engineering, Inc.
All results reported as milligrams per kilogram (mg/kg = ppm). Only detected analytes listed.
Semi Volatile Organic Compounds analyzed using EPA Method 8270.

HHSLs = U.S. EPA Region 6 Human Health Medium-Specific Screening Levels for industrial soils.

Table 4
Summary of Soil Analytical Results
RCRA 8 Metals

February 1995

DETECTION LIMIT?

Sample ID	Sample Depth (ft. bgs.)	Arsenic	Barium	Cadmium	Chromium (Total)	Lead	Mercury	Selenium	Silver
H1-1E	6-8	6.8	78.0	1.3	12.0	14.0	< 0.05	< 0.1	2.3
H1-1L	20-22	2.7	61.0	0.5	7.0	7.0	< 0.05	< 0.1	1.2
H1-2E	8-10	11.0	37.0	0.9	8.0	12.0	< 0.05	< 0.1	1.5
H1-2H	14-16	5.1	166.0	0.8	9.0	9.0	< 0.05	< 0.1	1.7
H1-3I	16-17	5.9	808.0	1.1	10.0	12.0	< 0.05	< 0.1	1.7
H1-3K	29-31	4.3	140.0	0.3	4.0	3.0	< 0.05	< 0.1	< 0.5
H1-5D	14-16	4.9	244.0	1.1	12.0	16.0	< 0.05	< 0.1	2.5
H1-8D	29-31	5.1	525.0	1.1	11.0	18.0	< 0.05	< 0.1	1.9
H3-1A (concrete catch basin)	Sludge	11.0	53.0	6.8	12.0	179.0	< 0.05	< 0.1	1.3
H3-2 (concrete catch basin)	Sludge	7.3	78.0	5.0	124.0	592.0	< 0.05	< 0.1	< 0.5
H4-1 (septic tank)	Sludge	6.5	104.0	10.0	86.0	776.0	< 0.05	< 0.1	0.9
H5-1 (wash vat tank)	Sludge	4.8	129.0	9.9	206.0	660.0	< 0.05	< 0.1	< 0.5
HBG-1A (background)	0-0.5	16.0	256.0	1.1	6.0	26.0	< 0.05	< 0.1	< 0.5
HHSLs	---	360	100,000	1,000	450	2,000	610	10,000	10,000

Note: Data collected by Environmental Management & Engineering, Inc.
All results reported as milligrams per kilogram (mg/kg = ppm).
RCRA 8 Metals analyzed using EPA Method 3010/3020/7000.

HHSLs = U.S. EPA Region 6 Human Health Medium-Specific Screening Levels for industrial soils.

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NEED TO CHECK GW

Table 5
Summary of Soil Analytical Results
Naturally Occuring Radioactive Material (NORM)

February 1995

Sample ID	Sample Depth (ft. bgs.)	Radium 226	Radium 228
H1-1A	0 - 0.5	3.2	<1.2
H1-4A	0 - 0.5	**35.3**	<1.4
H1-5A	0 - 0.5	<1.5	<0.8
H2-1A	0 - 0.5	15.8	<3.0
H2-2A	0 - 0.5	**387**	**45.3**
H2-3A	0 - 0.5	**405**	**49.3**
H2-4A	0 - 0.5	**76.6**	<1.9
H2-5A	0 - 0.5	23.9	2.5
H2-6A	0 - 0.5	21.5	<1.2
H2-7A	0 - 0.5	24	1.9
H2-8A	0 - 0.5	20.3	<0.7
H2-9A	0 - 0.5	**739**	**70.7**
H2-10A	0 - 0.5	<1.2	<0.6
H2-11A	0 - 0.5	**64.9**	<1.6
H3-1A (concrete catch basin)	Sludge	**104**	15
H3-2 (concrete catch basin)	Sludge	25.5	<0.7
H4-1 (septic tank)	Sludge	4.3	<0.4
H5-1 (wast vat tank)	Sludge	7.1	<0.7
NM NORM	---	30	30

Note: Data collected by Environmental Management & Engineering, Inc.
All results reported as pico Curies per gram (pCi/gm).
Concentrations in bold exceed the proposed State of New Mexico NORM limit.

NM NORM = Proposed State of New Mexico NORM Limit

Table 6
Summary of Water Analytical Results
Total Petroleum Hydrocarbons

February 1995

Sample ID	Location	TPH (mg/L)
H1-8	grab groundwater	1
H6-1	water well	<1
MW-1	monitor well	680
MW-2	monitor well	25
MW-3	monitor well	1

Note: Data collected by Environmental Management & Engineering, Inc.
TPH analyzed using EPA Method 8015 Modified

TPH = Total Petroleum Hydrocarbons
mg/L = milligrams per liter (ppm)

Table 7
Summary of Water Analytical Results
Volatile Organic Compounds

February 1995

Sample ID	Location	1,2,4-Trimethylbenzene	1,2-Dichloroethane	1,3,5-Trimethylbenzene	4-Isopropyltoluene	Benzene	Ethylbenzene	n-Butylbenzene	Naphthalene	tert-Butylbenzene	Tetrachloroethene PCE ?	Toluene	Xylenes (Total)
H1-8	grab groundwater	0.012	<0.005	< 0.005	0.01	< 0.005	< 0.005	0.01	0.015	0.01	<0.005	< 0.005	< 0.005
H6-1	water well	< 0.005	<0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	< 0.005	< 0.005
MW-1	monitor well	4.7	<0.005	1.5	1.0	**0.24**	0.28	<0.005	< 0.005	<0.005	<0.005	**1.2**	**1.225**
MW-2	monitor well	0.14	<0.005	0.15	0.145	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	0.065	< 0.005
MW-3	monitor well	< 0.005	**0.01**	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	**0.007**	< 0.005	< 0.005
WQCC	---	---	---	---	---	---	---	---	0.03	---	---	0.75	0.62
MCLs	---	---	0.005	---	---	0.005	0.7	---	---	---	0.005	---	---

Note: Data collected by Environmental Management & Engineering, Inc.
All results reported as milligrams per liter (mg/L = ppm). Only detected analytes listed.
Volatile Organic Compounds analyzed using EPA Method 8260.
Concentrations in bold exceed the WQCC or MCL values.
Semi Volatile Organic Compounds (SVOCs) not detected in the above listed water samples.

Most stringent comaprision criteria listed when both WQCC and MCL values exist.

WQCC = New Mexico Water Quality Control Commission Groundwater Standards
MCLs = U.S. EPA Drinking Water Maximum Contaminant Levels

Table 8
Summary of Water Analytical Results
RCRA 8 Metals

February 1995

Sample ID	Location	Arsenic	Barium	Cadmium	Chromium (Total)	Lead	Mercury	Selenium	Silver
H1-8	grab groundwater	**0.06**	0.08	< 0.02	< 0.3	< 0.3	< 0.005	< 0.01	< 0.05
H6-1	water well	**0.09**	0.08	< 0.02	< 0.3	< 0.3	< 0.005	< 0.01	< 0.05
MW-1	monitor well	**0.08**	0.14	< 0.02	< 0.3	< 0.3	< 0.005	< 0.01	< 0.05
MW-2	monitor well	**0.09**	0.08	< 0.02	< 0.3	< 0.3	< 0.005	< 0.01	< 0.05
MW-3	monitor well	**0.06**	0.07	< 0.02	< 0.3	< 0.3	< 0.005	< 0.01	< 0.05
WQCC	---	---	1.0	---	0.05	---	0.002	0.05	0.05
MCLs	---	0.05	---	0.005	---	0.015	---	---	---

Note: Data collected by Environmental Management & Engineering, Inc.
All results reported as milligrams per liter (mg/L = ppm).
RCRA 8 Metals analyzed using EPA Method 3010/3020/7000.
Concentrations in bold exceed the WQCC or MCL values.

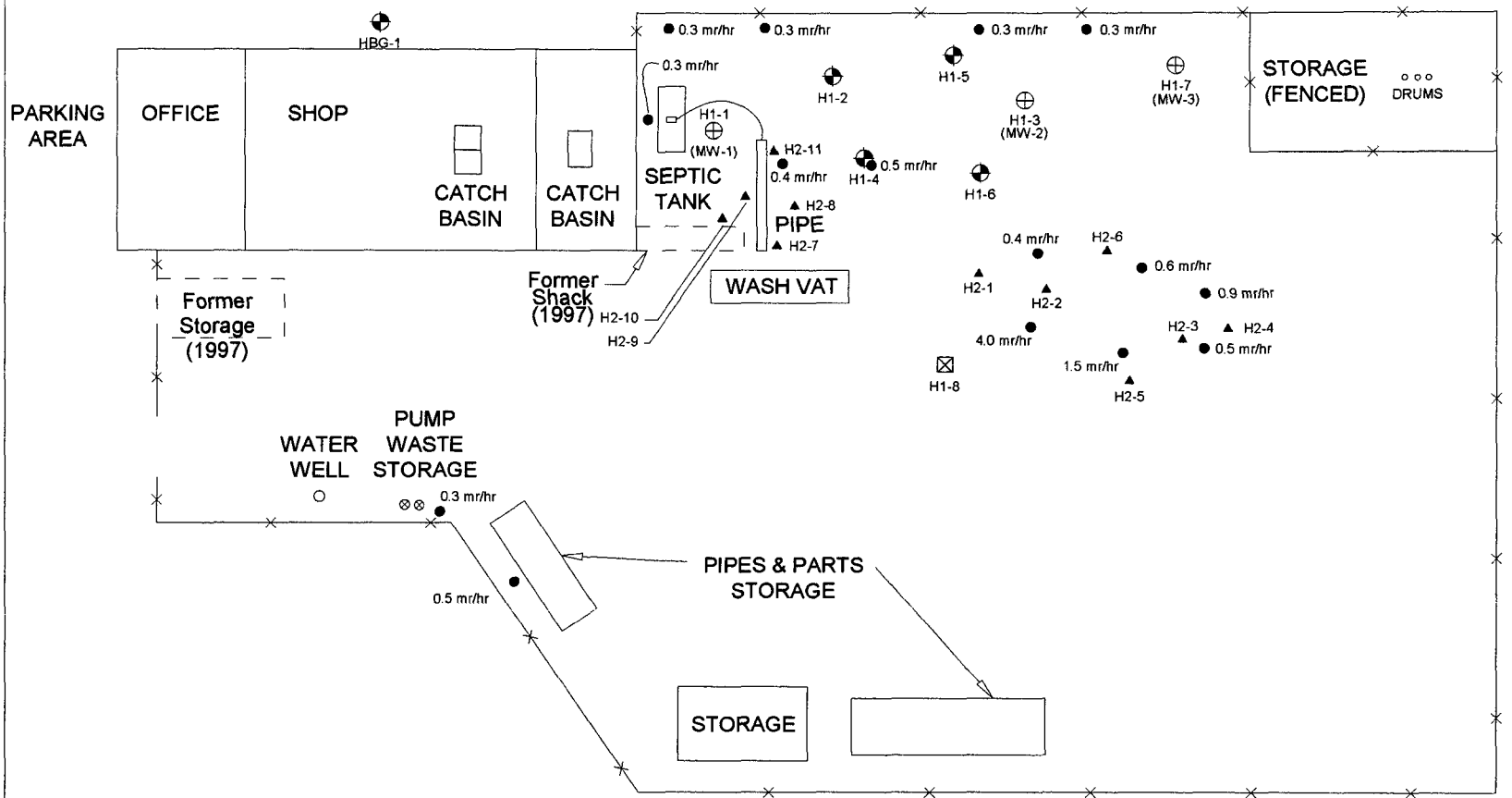
Most stringent comaprision criteria listed when both WQCC and MCL values exist.

WQCC = New Mexico Water Quality Control Commission Groundwater Standards
MCLs = U.S. EPA Drinking Water Maximum Contaminant Levels

FIGURES

Title: Site Location Map Former Axelson Facility		
Location: Hobbs, New Mexico		
File Name: P:\Projects\Beazer\P253\Hobbs\Arcview\base_maps.apr	Checked By:	Figure: 1
Date: 12/28/99	Prepared By: Tim Godwin	

HSI GEOTRANS
A TETRA TECH COMPANY

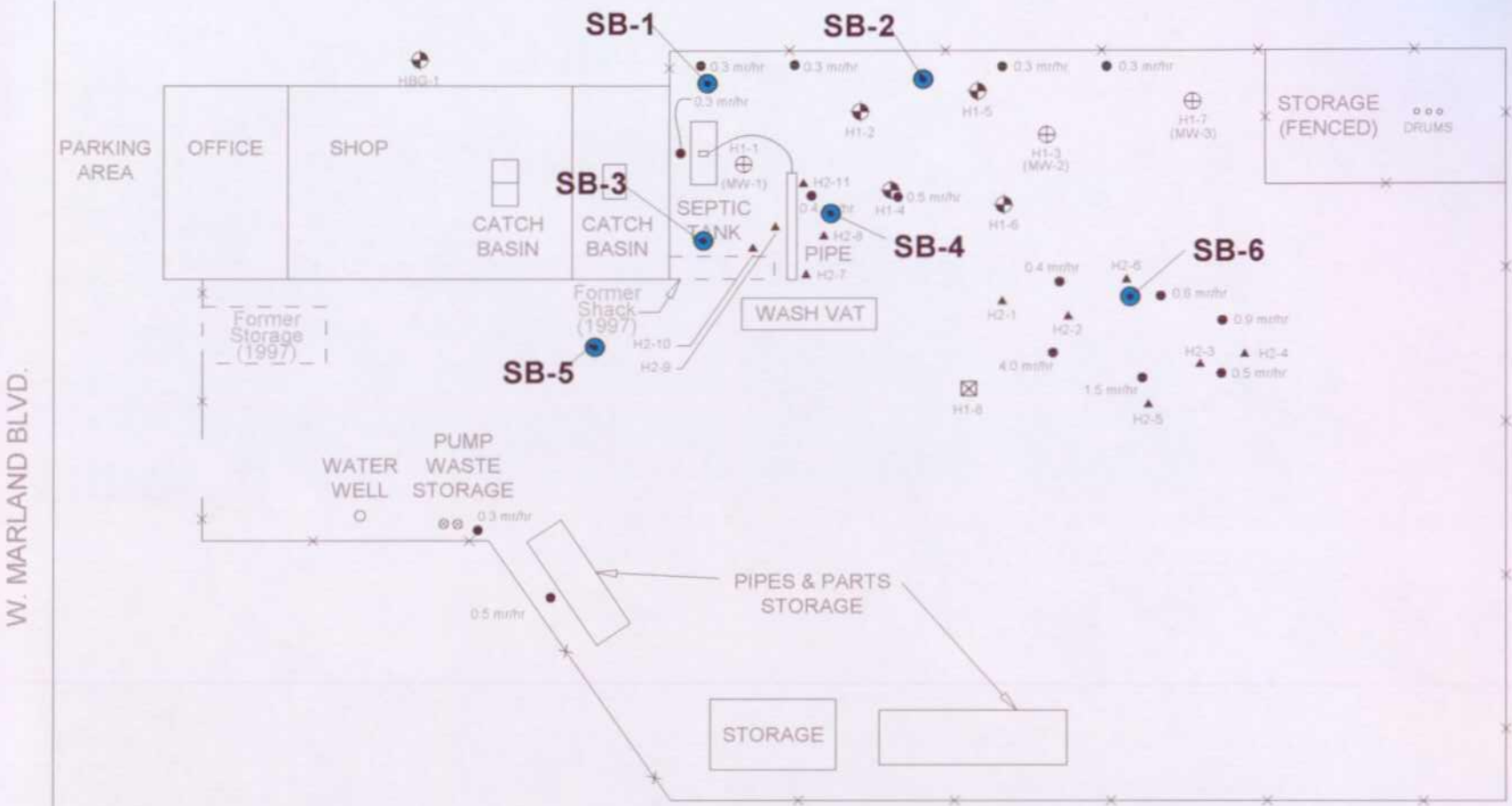


Note:
Samples collected by Environmental Management and Engineering, Inc., February 1995.

Title:	**Historical Sampling Locations Former Axelson Facility**
Location:	2703 West Marland Blvd. Hobbs, New Mexico
File Name: P:\Projects\Beazer\P253\Hobbs\Arcview\base_maps.apr	Checked By:
Date: 7/28/00	Prepared By: Tim Godwin

HSI GEOTRANS
A TETRA TECH COMPANY

Figure: 2



Legend

- Proposed Soil and Grab Groundwater Boring Location
- Soil and Grab Groundwater Boring Location
- Soil Boring Location
- Monitoring Well Location
- NORM Sample Location
- Area Radiation Survey
- Fence

N

Scale 1" = 40'

0 40 80 120 Feet

Note:
Samples collected by Environmental Management and Engineering, Inc., February 1995.

Title:	**Proposed Sampling Locations Former Axelson Facility**
Location:	2703 West Marland Blvd. Hobbs, New Mexico
File Name: P:\Projects\Beazer\P253\Hobbs\Arcview\base_maps.apr	**Checked By:**
Date: 7/28/00	**Prepared By:** Tim Godwin

HSI GEOTRANS
A TETRA TECH COMPANY

Figure: 3

APPENDIX A

APPENDIX A

1995 Laboratory Analytical Data Sheets

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 7, 1995
Attention:	Carl Roppolo	Reference #	1809
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	soil	Analytical	
Date Received:	02/27/95	Analyst:	Kelly Hester
Date Collected:	02/22-23/95	Date of Analysis:	03/02/95
Sample Collector:	G.P. & J.T.	Method:	*EPA 418.1; Modified for solids*

TOTAL PETROLEUM HYDROCARBONS

FIELD ID	LAB ID	TPH, PPM	D.L., PPM
H1 -1E	5559	1,530	1
H1 -1L	5560	7,558	1
H1 -2E	5561	5,673	1
H1 -2H	5562	9,760	1
H1 -3I	5563	12	1
H1 -4F	5564	22	1
H1 -4H	5564H	6	1
H1 -3K	5565	835	1

BDL = Below detection Limit
D.L. = Detection Limit, Practical
All results expressed as PPM (mg/Kg)

Respectfully submitted,

John Sutherland
Analytical Chemist
Director, ASI

Quality Environmental Testing Services

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 25, 1995
Attention:	Carl Roppolo	Reference #	1811
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	soil	Analytical	
Date Received:	02/27/95	Analyst:	Kelly Hester
Date Collected:	02/24/95	Date of Analysis:	03/03/95
Sample Collector:	G.P. & J.T.	Method:	***EPA 418.1; Modified for solids***

TOTAL PETROLEUM HYDROCARBONS

FIELD ID	LAB ID	TPH, PPM	D.L., PPM
HBG -1A	5572	47	1
H1 -5D	5573D	7	1
H3 -1A	5575	6,154	1
H3 -2	5576	19,222	1
H4 -1	5577	10,000	1
H5 -1	5578	5,490	1

BDL = Below detection Limit
D.L. = Detection Limit, Practical
All results expressed as PPM (mg/Kg)

Respectfully submitted,

John Sutherland
Analytical Chemist
Director, ASI

Analytical Systems, Inc.

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Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 7, 1995
Attention:	Carl Roppolo	Reference #	1824
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	soil	Analytical	
Date Received:	03/01/95	Analyst:	Kelly Hester
Date Collected:	02/27-28/95	Date of Analysis:	03/02/95
Sample Collector:	G.P. & J.T.	Method:	*EPA 418.1; Modified for solids*

TOTAL PETROLEUM HYDROCARBONS

FIELD ID	LAB ID	TPH, PPM	D.L., PPM
H1 -7D	5642	BDL	1
H1 -8D	5643	120	1

BDL = Below detection Limit
D.L. = Detection Limit, Practical
All results expressed as PPM (mg/Kg)

Respectfully submitted,

John Sutherland
Analytical Chemist
Director, ASI

Quality Environmental Testing Services

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 27, 1995
Attention:	Carl Roppolo	Reference #	1824
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	water	Analytical	
Date Received:	03/01/95	Analyst:	John Sutherland
Date Collected:	02/27-28/95	Date of Analysis:	03/24/95
Sample Collector:	G.P. & J.T.	Method:	***SW 846 Method 8015; Modified per California DHS***

TOTAL PETROLEUM HYDROCARBONS

	FIELD ID	FIELD ID					
	H1-8	H1-7					
Total Petroleum	LAB ID	LAB ID					Detection
Hydrocarbons	5644	5645					Limit, ppm
TPH	1.3	1.2					1

BDL = Below Detection Limit
Detection Limit is Practical Quantitation Limit
All results expressed as ppm (mg/L) of analyte

Respectfully submitted,

John Sutherland
Analytical Chemist
Director, ASI

Quality Environmental Testing Services

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 28, 1995
Attention:	Carl Roppolo	Reference #	1811
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	water	Analytical	
Date Received:	02/27/95	Analyst:	John Sutherland
Date Collected:	02/24/95	Date of Analysis:	03/01/95
Sample Collector:	G.P. & J.T.	Method:	***SW 846 Method 8015; Modified per California DHS***

TOTAL PETROLEUM HYDROCARBONS

	FIELD ID	FIELD ID	FIELD ID				
	H1-1	H1-3	H2-1A				
Total Petroleum	LAB ID	LAB ID	LAB ID				Detection
Hydrocarbons	5570	5571	5580				Limit, ppm
TPH	680	25	BDL				1

BDL = Below Detection Limit
Detection Limit is Practical Quantitation Limit
All results expressed as ppm (mg/L) of analyte

Respectfully submitted,

John Sutherland
Analytical Chemist
Director, ASI

Analytical Systems, Inc.

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Client:	E.M.E., Inc.	Report Date:	March 27, 1995
Attention:	Carl Roppolo	Reference #	1824
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	water	Analytical	
Date Received:	03/01/95	Analyst:	Kevin Doriety
Date Collected:	02/27-28/95	Date of Analysis:	03/14-24/95
Sample Collector:	G.P. & J.T.	Method:	*SW846 3010/3020/7000*

METALLIC ANALYTES

	FIELD ID	FIELD ID					
	H1-8	H1-7					
Analyte, mg/L	LAB ID	LAB ID					Detection
as Total	5644	5645					Limit, mg/L
Arsenic	0.06	0.06					0.01
Barium	0.08	0.07					0.01
Cadmium	BDL	BDL					0.02
Chromium	BDL	BDL					0.3
Lead	BDL	BDL					0.3
Mercury	BDL	BDL					0.005
Selenium	BDL	BDL					0.01
Silver	BDL	BDL					0.05

BDL = Below Detection Limit
Detection Limit is Method Detection Limit
All results expressed as PPM mg/L of total analyte

Respectfully submitted,

John Sutherland
Analytical Chemist
Director, ASI

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Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 27, 1995
Attention:	Carl Roppolo	Reference #	1824
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	soil	Analytical	
Date Received:	03/01/95	Analyst:	Kevin Doriety
Date Collected:	02/27-28/95	Date of Analysis:	03/14-24/95
Sample Collector:	G.P. & J.T.	Method:	*SW846 3010/3020/7000*

METALLIC ANALYTES

	FIELD ID						
	H1-8D						
Analyte, mg/kg	LAB ID						Detection
as Total	5643						Limit, mg/kg
Arsenic	5.1						0.1
Barium	525						1
Cadmium	1.1						0.2
Chromium	11						3
Lead	18						3
Mercury	BDL						0.05
Selenium	BDL						0.1
Silver	1.9						0.5

BDL = Below Detection Limit
Detection Limit is Method Detection Limit
All results expressed as PPM mg/kg of total analyte

Respectfully submitted,

John Sutherland
Analytical Chemist
Director, ASI

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Analytical Systems, Inc.

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Client:	E.M.E., Inc.	Report Date:	March 27, 1995
Attention:	Carl Roppolo	Reference #	1811
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	water	Analytical	
Date Received:	02/27/95	Analyst:	Kevin Doriety
Date Collected:	02/24/95	Date of Analysis:	03/14-24/95
Sample Collector:	G.P. & J.T.	Method:	*SW846 3010/3020/7000*

METALLIC ANALYTES

	FIELD ID	FIELD ID	FIELD ID				
	H1-1	H1-3	H2-1A				
Analyte, mg/L	LAB ID	LAB ID	LAB ID				Detection
as Total	5570	5571	5580				Limit, mg/L
Arsenic	0.08	0.09	BDL				0.01
Barium	0.14	0.08	0.16				0.01
Cadmium	BDL	BDL	BDL				0.02
Chromium	BDL	BDL	BDL				0.3
Lead	BDL	BDL	BDL				0.3
Mercury	BDL	BDL	BDL				0.005
Selenium	BDL	BDL	BDL				0.01
Silver	BDL	BDL	BDL				0.05

BDL = Below Detection Limit
Detection Limit is Method Detection Limit
All results expressed as PPM mg/L of total analyte

Respectfully submitted,

John Sutherland
Analytical Chemist
Director, ASI

Analytical Systems, Inc.

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Client:	E.M.E., Inc.	Report Date:	March 27, 1995
Attention:	Carl Roppolo	Reference #	1824
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	soil	Analytical	
Date Received:	03/01/95	Analyst:	John Sutherland
Date Collected:	02/27-28/95	Date of Analysis:	03/09/95
Sample Collector:	G.P. & J.T.	Method:	*SW 846 Method 8260*

VOLATILE ORGANIC COMPOUNDS

VOLATILE ORGANIC COMPOUNDS, PPB	FIELD ID: H1-8D / LAB ID: 5643					Practical Quantitation Limit PPB
Benzene	BDL					5
Bromobenzene	BDL					5
Bromochloromethane	BDL					5
Bromodichloromethane	BDL					5
Bromoform	BDL					5
Bromomethane	BDL					5
n-Butylbenzene	BDL					5
sec-Butylbenzene	BDL					5
tert-Butybenzene	BDL					5
Carbon Tetrachloride	BDL					5
Chlorobenzene	BDL					5
Chloroethane	BDL					5
Chloroform	BDL					5
Chloromethane	BDL					5
2-Chlorotoluene	BDL					5
4-Chlorotoluene	BDL					5
Dibromochloromethane	BDL					5
1,2-Dibromo-3-Chloropropane	BDL					5
1,2-Dibromoethane	BDL					5
Dibromomethane	BDL					5
1,2-Dichlorobenzene	BDL					5
1,3-Dichlorobenzene	BDL					5
1,4-Dichlorobenzene	BDL					5
Dichlorodifluoromethane	BDL					5
1-1,Dichloroethane	BDL					5
1,2-Dichloroethane	BDL					5

Compound List Continued next page

Detection Limit is Practical Quantitation Limit elevated due to matrix
BDL = Below Detection Limit
All results expressed as PPB (ug/Kg)

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 27, 1995
Attention:	Carl Roppolo	Reference #	1824
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	soil	Analytical	
Date Received:	03/01/95	Analyst:	John Sutherland
Date Collected:	02/27-28/95	Date of Analysis:	03/09/95
Sample Collector:	G.P. & J.T.	Method:	*SW 846 Method 8260*

VOLATILE ORGANIC COMPOUNDS

	FIELD ID					Practical
VOLATILE	H1-8D					Quantitation
ORGANIC	LAB ID					Limit
COMPOUNDS, PPB	5643					PPB
1,1-Dichloroethene	BDL					5
cis-1,2-Dichloroethene	BDL					5
trans-1,2-Dichloroethene	BDL					5
1,2-Dichloropropane	BDL					5
,3- Dichloropropane	BDL					5
2,2-Dichloropropane	BDL					5
1,1-Dichloropropene	BDL					5
cis-1-3,Dichloropropene	BDL					5
trans-1,3-Dichloropropene	BDL					5
Ethylbenzene	BDL					5
Hexachlorobutadiene	BDL					5
Isopropylbenzene	BDL					5
4-Isopropyltoluene	BDL					5
Methylene Chloride	BDL					5
Naphthalene	BDL					5
n-Propylbenzene	BDL					5
Styrene	BDL					5
1,1,1,2-Tetrachloroethane	BDL					5
1,1,2,2-Tetrachloroethane	BDL					5
Tetrachloroethene	BDL					5
Toluene	BDL					5
1,2,3-Trichlorobenzene	BDL					5
1,2,4-Trichlorobenzene	BDL					5
1,1,1-Trichloroethane	BDL					5
1,1,2-Trichloroethane	BDL					5
Trichloroethene	BDL					5
Trichlorofluoromethane	BDL					5

Compound List Continued next page

Detection Limit is Practical Quantitation Limit elevated due to matrix
BDL = Below Detection Limit
All results expressed as PPB (ug/Kg)

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 27, 1995
Attention:	Carl Roppolo	Reference #	1824
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	soil	Analytical		Preparative	
Date received:	03/01/95	Analyst:	John Sutherland	Analyst:	KH
Date collected:	02/27-28/95	Date Analysis:	03/25/95	Date:	03/03/95
Sample Collector:	G.P. & J.T.	Method:	***SW 846 Method 8270***		

SEMIVOLATILE ORGANIC COMPOUNDS

ACID AND BASE NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS, PPB	FIELD ID **H1-8D** LAB ID 5643					Practical Quantitation Limit PPB
Acenaphthene	BDL					100
Acenaphthylene	BDL					100
Anthracene	BDL					100
Aniline	BDL					100
Azobenzene	BDL					100
Benzidine	BDL					100
Benzoic Acid	BDL					500
Benzo(a)anthracene	BDL					100
Benzo(b)fluoranthene	BDL					100
Benzo(k)fluoranthene	BDL					100
Benzo(g,h,i)perylene	BDL					100
Benzo(a)pyrene	BDL					100
Benzyl alcohol	BDL					200
Bis(2-chloroethoxy)methane	BDL					100
Bis(2-chloroethyl)ether	BDL					100
Bis(2-chloroethoxy)ether	BDL					100
Bis(2-chloroisopropyl)ether	BDL					100
Bis(2-ethylhexyl)phthalate	BDL					100
4-bromophenyl phenyl ether	BDL					100
Butyl benzyl phthalate	BDL					100
4-Chloroaniline	BDL					200
1-Chloronaphthalene	BDL					100
2-Chloronaphthalene	BDL					100
4-Chloro-3-methylphenol	BDL					200
4-Chlorophenyl phenyl ether	BDL					100
Chrysene	BDL					100
Dibenz(a,h)anthracene	BDL					100
Dibenzofuran	BDL					100
Di-n-butylphthalate	BDL					100

Compound List Continued next page

BDL = Below detection Limit, Practical
All results expressed as PPB (ug/Kg)

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 27, 1995
Attention:	Carl Roppolo	Reference #	1824
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	soil	Analytical	
Date Received:	03/01/95	Analyst:	John Sutherland
Date Collected:	02/27-28/95	Date of Analysis:	03/09/95
Sample Collector:	G.P. & J.T.	Method:	*SW 846 Method 8260*

VOLATILE ORGANIC COMPOUNDS

	FIELD ID					Practical
VOLATILE	H1-8D					Quantitation
ORGANIC	LAB ID					Limit
COMPOUNDS, PPB	5643					PPB
1,2,3-Trichloropropane	BDL					5
1,2,4-Trimethylbenzene	BDL					5
1,3,5-Trimethylbenzene	BDL					5
Vinyl Chloride	BDL					5
Xylene, o,m,p	BDL					5

Detection Limit is Practical Quantitation Limit elevated due to matrix
BDL = Below Detection Limit
All results expressed as PPB (ug/Kg)

Respectfully submitted,

John Sutherland
Analytical Chemist
Director, ASI

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 27, 1995
Attention:	Carl Roppolo	Reference #	1824
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	water	Analytical	
Date received:	03/01/95	Analyst:	John Sutherland
Date collected:	02/27-28/95	Date Analysis:	03/09/95
Sample Collector:	G.P. & J.T.	Method:	*SW 846 Method 8260*

VOLATILE ORGANIC COMPOUNDS

VOLATILE ORGANIC COMPOUNDS, PPB	FIELD ID H1-8 LAB ID 5644	FIELD ID H1-7 LAB ID 5645				Practical Quantitation Limit, PPB
Benzene	BDL	BDL				5
Bromobenzene	BDL	BDL				5
Bromochloromethane	BDL	BDL				5
Bromodichloromethane	BDL	BDL				5
Bromoform	BDL	BDL				5
Bromomethane	BDL	BDL				5
n-Butylbenzene	10	BDL				5
sec-Butylbenzene	BDL	BDL				5
tert-Butybenzene	10	BDL				5
Carbon Tetrachloride	BDL	BDL				5
Chlorobenzene	BDL	BDL				5
Chloroethane	BDL	BDL				5
Chloroform	BDL	BDL				5
Chloromethane	BDL	BDL				5
2-Chlorotoluene	BDL	BDL				5
4-Chlorotoluene	BDL	BDL				5
Dibromochloromethane	BDL	BDL				5
1,2-Dibromo-3-Chloropropane	BDL	BDL				5
1,2-Dibromoethane	BDL	BDL				5
Dibromomethane	BDL	BDL				5
1,2-Dichlorobenzene	BDL	BDL				5
1,3-Dichlorobenzene	BDL	BDL				5
1,4-Dichlorobenzene	BDL	BDL				5
Dichlorodifluoromethane	BDL	BDL				5
1-1,Dichloroethane	BDL	BDL				5
1,2-Dichloroethane	BDL	10				5

Compound List Continued next page

BDL = Below detection Limit
Detection Limit is Practical Quantitation Limit
All results expressed as PPB (ug/L)

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 27, 1995
Attention:	Carl Roppolo	Reference #	1824
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	water	Analytical	
Date received:	03/01/95	Analyst:	John Sutherland
Date collected:	02/27-28/95	Date Analysis:	03/09/95
Sample Collector:	G.P. & J.T.	Method:	*SW 846 Method 8260*

VOLATILE ORGANIC COMPOUNDS

VOLATILE ORGANIC COMPOUNDS, PPB	FIELD ID H1-8 LAB ID 5644	FIELD ID H1-7 LAB ID 5645				Practical Quantitation Limit, PPB
1,1-Dichloroethene	BDL	BDL				5
cis-1,2-Dichloroethene	BDL	BDL				5
trans-1,2-Dichloroethene	BDL	BDL				5
1,2-Dichloropropane	BDL	BDL				5
1,3- Dichloropropane	BDL	BDL				5
2,2-Dichloropropane	BDL	BDL				5
1,1-Dichloropropene	BDL	BDL				5
cis-1-3,Dichloropropene	BDL	BDL				5
trans-1,3-Dichloropropene	BDL	BDL				5
Ethylbenzene	BDL	BDL				5
Hexachlorobutadiene	BDL	BDL				5
Isopropylbenzene	BDL	BDL				5
4-Isopropyltoluene	10	BDL				5
Methylene Chloride	BDL	BDL				5
Naphthalene	15	BDL				5
n-Propylbenzene	BDL	BDL				5
Styrene	BDL	BDL				5
1,1,1,2-Tetrachloroethane	BDL	BDL				5
1,1,2,2-Tetrachloroethane	BDL	BDL				5
Tetrachloroethene	BDL	7				5
Toluene	BDL	BDL				5
1,2,3-Trichlorobenzene	BDL	BDL				5
1,2,4-Trichlorobenzene	BDL	BDL				5
1,1,1-Trichloroethane	BDL	BDL				5
1,1,2-Trichloroethane	BDL	BDL				5
Trichloroethene	BDL	BDL				5
Trichlorofluoromethane	BDL	BDL				5

Compound List Continued next page

BDL = Below detection Limit
Detection Limit is Practical Quantitation Limit
All results expressed as PPB (ug/L)

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 27, 1995
Attention:	Carl Roppolo	Reference #	1824
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	water	Analytical	
Date received:	03/01/95	Analyst:	John Sutherland
Date collected:	02/27-28/95	Date Analysis:	03/09/95
Sample Collector:	G.P. & J.T.	Method:	*SW 846 Method 8260*

VOLATILE ORGANIC COMPOUNDS

VOLATILE ORGANIC COMPOUNDS, PPB	FIELD ID H1-8 LAB ID 5644	FIELD ID H1-7 LAB ID 5645				Practical Quantitation Limit, PPB
1,2,3-Trichloropropane	BDL	BDL				5
1,2,4-Trimethylbenzene	12	BDL				5
1,3,5-Trimethylbenzene	BDL	BDL				5
Vinyl Chloride	BDL	BDL				5
Xylenes, o,m,p	BDL	BDL				5

BDL = Below detection Limit
Detection Limit is Practical Quantitation Limit
All results expressed as PPB (ug/L)

Respectfully submitted,

John Sutherland
Analytical Chemist
Director, ASI

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 28, 1995
Attention:	Carl Roppolo	Reference #	1811
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	sludge	Analytical	
Date Received:	02/27/95	Analyst:	John Sutherland
Date Collected:	02/24/95	Date of Analysis:	03/01/95
Sample Collector:	G.P. & J.T.	Method:	*SW 846 Method 8260*

VOLATILE ORGANIC COMPOUNDS

VOLATILE ORGANIC COMPOUNDS, PPB	FIELD ID H3-1A LAB ID 5575	FIELD ID H3-2 LAB ID 5576	FIELD ID H4-1 LAB ID 5577	FIELD ID H5-1 LAB ID 5578		Practical Quantitation Limit PPB
Benzene	BDL	BDL	BDL	BDL		100
Bromobenzene	BDL	BDL	BDL	BDL		100
Bromochloromethane	BDL	BDL	BDL	BDL		100
Bromodichloromethane	BDL	BDL	BDL	BDL		100
Bromoform	BDL	BDL	BDL	BDL		100
Bromomethane	BDL	BDL	BDL	BDL		100
n-Butylbenzene	BDL	BDL	BDL	BDL		100
sec-Butylbenzene	BDL	BDL	BDL	BDL		100
tert-Butybenzene	BDL	BDL	BDL	BDL		100
Carbon Tetrachloride	BDL	BDL	BDL	BDL		100
Chlorobenzene	BDL	BDL	BDL	BDL		100
Chloroethane	BDL	BDL	BDL	BDL		100
Chloroform	BDL	BDL	BDL	BDL		100
Chloromethane	BDL	BDL	BDL	BDL		100
2-Chlorotoluene	BDL	BDL	BDL	BDL		100
4-Chlorotoluene	BDL	BDL	BDL	BDL		100
Dibromochloromethane	BDL	BDL	BDL	BDL		100
1,2-Dibromo-3-Chloropropane	BDL	BDL	BDL	BDL		100
1,2-Dibromoethane	BDL	BDL	BDL	BDL		100
Dibromomethane	BDL	BDL	BDL	BDL		100
1,2-Dichlorobenzene	BDL	BDL	BDL	BDL		100
1,3-Dichlorobenzene	BDL	BDL	BDL	BDL		100
1,4-Dichlorobenzene	BDL	BDL	BDL	BDL		100
Dichlorodifluoromethane	BDL	BDL	BDL	BDL		100
1-1,Dichloroethane	BDL	BDL	BDL	BDL		100
1,2-Dichloroethane	BDL	BDL	BDL	BDL		100

Compound List Continued next page

Detection Limit is Practical Quantitation Limit elevated due to matrix
BDL = Below Detection Limit
All results expressed as PPB (ug/Kg)

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 28, 1995
Attention:	Carl Roppolo	Reference #	1811
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	sludge	Analytical	
Date Received:	02/27/95	Analyst:	John Sutherland
Date Collected:	02/24/95	Date of Analysis:	03/01/95
Sample Collector:	G.P. & J.T.	Method:	*SW 846 Method 8260*

VOLATILE ORGANIC COMPOUNDS

VOLATILE ORGANIC COMPOUNDS, PPB	FIELD ID H3-1A LAB ID 5575	FIELD ID H3-2 LAB ID 5576	FIELD ID H4-1 LAB ID 5577	FIELD ID H5-1 LAB ID 5578		Practical Quantitation Limit PPB
1,1-Dichloroethene	BDL	BDL	BDL	BDL		100
cis-1,2-Dichloroethene	BDL	BDL	BDL	BDL		100
trans-1,2-Dichloroethene	BDL	BDL	BDL	BDL		100
1,2-Dichloropropane	BDL	BDL	BDL	BDL		100
1,3- Dichloropropane	BDL	BDL	BDL	BDL		100
2,2-Dichloropropane	BDL	BDL	BDL	BDL		100
1,1-Dichloropropene	BDL	BDL	BDL	BDL		100
cis-1-3,Dichloropropene	BDL	BDL	BDL	BDL		100
trans-1,3-Dichloropropene	BDL	BDL	BDL	BDL		100
Ethylbenzene	BDL	BDL	BDL	BDL		100
Hexachlorobutadiene	BDL	BDL	BDL	BDL		100
Isopropylbenzene	BDL	BDL	BDL	BDL		100
4-Isopropyltoluene	BDL	BDL	BDL	BDL		100
Methylene Chloride	BDL	BDL	BDL	BDL		100
Naphthalene	BDL	BDL	BDL	BDL		100
n-Propylbenzene	BDL	BDL	BDL	BDL		100
Styrene	BDL	BDL	BDL	BDL		100
1,1,1,2-Tetrachloroethane	BDL	BDL	BDL	BDL		100
1,1,2,2-Tetrachloroethane	BDL	BDL	BDL	BDL		100
Tetrachloroethene	BDL	BDL	BDL	BDL		100
Toluene	BDL	BDL	BDL	BDL		100
1,2,3-Trichlorobenzene	BDL	BDL	BDL	BDL		100
1,2,4-Trichlorobenzene	BDL	BDL	BDL	BDL		100
1,1,1-Trichloroethane	BDL	BDL	BDL	BDL		100
1,1,2-Trichloroethane	BDL	BDL	BDL	BDL		100
Trichloroethene	BDL	BDL	BDL	BDL		100
Trichlorofluoromethane	BDL	BDL	BDL	BDL		100

Compound List Continued next page

Detection Limit is Practical Quantitation Limit elevated due to matrix
BDL = Below Detection Limit
All results expressed as PPB (ug/Kg)

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 28, 1995
Attention:	Carl Roppolo	Reference #	1811
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	sludge	Analytical	
Date Received:	02/27/95	Analyst:	John Sutherland
Date Collected:	02/24/95	Date of Analysis:	03/01/95
Sample Collector:	G.P. & J.T.	Method:	*SW 846 Method 8260*

VOLATILE ORGANIC COMPOUNDS

VOLATILE ORGANIC COMPOUNDS, PPB	FIELD ID H3-1A LAB ID 5575	FIELD ID H3-2 LAB ID 5576	FIELD ID H4-1 LAB ID 5577	FIELD ID H5-1 LAB ID 5578		Practical Quantitation Limit PPB
1,2,3-Trichloropropane	BDL	BDL	BDL	BDL		100
1,2,4-Trimethylbenzene	BDL	BDL	BDL	BDL		100
1,3,5-Trimethylbenzene	BDL	BDL	BDL	BDL		100
Vinyl Chloride	BDL	BDL	BDL	BDL		100
ylene, o,m,p	BDL	BDL	BDL	BDL		100

Detection Limit is Practical Quantitation Limit elevated due to matrix
BDL = Below Detection Limit
All results expressed as PPB (ug/Kg)

Respectfully submitted,

John Sutherland
Analytical Chemist
Director, ASI

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 28, 1995
Attention:	Carl Roppolo	Reference #	1811
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	water	Analytical	
Date received:	02/27/95	Analyst:	John Sutherland
Date collected:	02/24/95	Date Analysis:	03/01/95
Sample Collector:	G.P. & J.T.	Method:	*SW 846 Method 8260*

VOLATILE ORGANIC COMPOUNDS

VOLATILE ORGANIC COMPOUNDS, PPB	FIELD ID H1-1 LAB ID 5570	FIELD ID H1-3 LAB ID 5571	FIELD ID H2-1A LAB ID 5580			Practical Quantitation Limit, PPB
Benzene	240	**BDL	BDL			5
Bromobenzene	*BDL	**BDL	BDL			5
Bromochloromethane	*BDL	**BDL	BDL			5
Bromodichloromethane	*BDL	**BDL	BDL			5
Bromoform	*BDL	**BDL	BDL			5
Bromomethane	*BDL	**BDL	BDL			5
n-Butylbenzene	*BDL	**BDL	BDL			5
sec-Butylbenzene	*BDL	**BDL	BDL			5
tert-Butybenzene	*BDL	**BDL	BDL			5
Carbon Tetrachloride	*BDL	**BDL	BDL			5
Chlorobenzene	*BDL	**BDL	BDL			5
Chloroethane	*BDL	**BDL	BDL			5
Chloroform	*BDL	**BDL	BDL			5
Chloromethane	*BDL	**BDL	BDL			5
2-Chlorotoluene	*BDL	**BDL	BDL			5
4-Chlorotoluene	*BDL	**BDL	BDL			5
Dibromochloromethane	*BDL	**BDL	BDL			5
1,2-Dibromo-3-Chloropropane	*BDL	**BDL	BDL			5
1,2-Dibromoethane	*BDL	**BDL	BDL			5
Dibromomethane	*BDL	**BDL	BDL			5
1,2-Dichlorobenzene	*BDL	**BDL	BDL			5
1,3-Dichlorobenzene	*BDL	**BDL	BDL			5
1,4-Dichlorobenzene	*BDL	**BDL	BDL			5
Dichlorodifluoromethane	*BDL	**BDL	BDL			5
1-1,Dichloroethane	*BDL	**BDL	BDL			5
1,2-Dichloroethane	*BDL	**BDL	BDL			5

BDL = Below detection Limit
Detection Limit is Practical Quantitation Limit
All results expressed as PPB (ug/L)

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 28, 1995
Attention:	Carl Roppolo	Reference #	1811
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	water	Analytical	
Date received:	02/27/95	Analyst:	John Sutherland
Date collected:	02/24/95	Date Analysis:	03/01/95
Sample Collector:	G.P. & J.T.	Method:	*SW 846 Method 8260*

VOLATILE ORGANIC COMPOUNDS

VOLATILE ORGANIC COMPOUNDS, PPB	FIELD ID H1-1 LAB ID 5570	FIELD ID H1-3 LAB ID 5571	FIELD ID H2-1A LAB ID 5580			Practical Quantitation Limit, PPB
1,1-Dichloroethene	*BDL	**BDL	BDL			5
cis-1,2-Dichloroethene	*BDL	**BDL	BDL			5
trans-1,2-Dichloroethene	*BDL	**BDL	BDL			5
1,2-Dichloropropane	*BDL	**BDL	BDL			5
,3- Dichloropropane	*BDL	**BDL	BDL			5
2,2-Dichloropropane	*BDL	**BDL	BDL			5
1,1-Dichloropropene	*BDL	**BDL	BDL			5
cis-1-3,Dichloropropene	*BDL	**BDL	BDL			5
trans-1,3-Dichloropropene	*BDL	**BDL	BDL			5
Ethylbenzene	280	**BDL	BDL			5
Hexachlorobutadiene	*BDL	**BDL	BDL			5
Isopropylbenzene	*BDL	**BDL	BDL			5
4-Isopropyltoluene	1,000	145	BDL			5
Methylene Chloride	*BDL	**BDL	BDL			5
Naphthalene	*BDL	**BDL	BDL			5
n-Propylbenzene	*BDL	**BDL	BDL			5
Styrene	*BDL	**BDL	BDL			5
1,1,1,2-Tetrachloroethane	*BDL	**BDL	BDL			5
1,1,2,2-Tetrachloroethane	*BDL	**BDL	BDL			5
Tetrachloroethene	*BDL	**BDL	BDL			5
Toluene	1,200	65	BDL			5
1,2,3-Trichlorobenzene	*BDL	**BDL	BDL			5
1,2,4-Trichlorobenzene	*BDL	**BDL	BDL			5
1,1,1-Trichloroethane	*BDL	**BDL	BDL			5
1,1,2-Trichloroethane	*BDL	**BDL	BDL			5
Trichloroethene	*BDL	**BDL	BDL			5
Trichlorofluoromethane	*BDL	**BDL	BDL			5

BDL = Below detection Limit
Detection Limit is Practical Quantitation Limit
All results expressed as PPB (ug/L)

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 28, 1995
Attention:	Carl Roppolo	Reference #	1811
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	water	Analytical	
Date received:	02/27/95	Analyst:	John Sutherland
Date collected:	02/24/95	Date Analysis:	03/01/95
Sample Collector:	G.P. & J.T.	Method:	*SW 846 Method 8260*

VOLATILE ORGANIC COMPOUNDS

VOLATILE ORGANIC COMPOUNDS, PPB	FIELD ID / LAB ID	FIELD ID / LAB ID	FIELD ID / LAB ID			Practical Quantitation Limit, PPB
	H1-1 / 5570	H1-3 / 5571	H2-1A / 5580			
1,2,3-Trichloropropane	*BDL	**BDL	BDL			5
1,2,4-Trimethylbenzene	4,700	140	BDL			5
1,3,5-Trimethylbenzene	1,500	150	BDL			5
Vinyl Chloride	*BDL	**BDL	BDL			5
Xylenes, o,m,p	1,225	**BDL	BDL			5

BDL = Below detection Limit
Detection Limit is Practical Quantitation Limit
*Multiply Practical Quantitation Limit by 40, elevated due to matrix
**Multiply Practical Quantitation Limit by 4, elevated due to matrix
All results expressed as PPB (ug/L)

Respectfully submitted,

John Sutherland
Analytical Chemist
Director, ASI

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 25, 1995
Attention:	Carl Roppolo	Reference #	1809
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	soil	Analytical	
Date Received:	02/27/95	Analyst:	John Sutherland
Date Collected:	02/22-23/95	Date of Analysis:	03/07/95
Sample Collector:	G.P. & J.T.	Method:	*SW 846 Method 8260*

VOLATILE ORGANIC COMPOUNDS

VOLATILE ORGANIC COMPOUNDS, PPB	FIELD ID H1-3K LAB ID 5565					Practical Quantitation Limit PPB
Benzene	BDL					20
Bromobenzene	BDL					20
Bromochloromethane	BDL					20
Bromodichloromethane	BDL					20
Bromoform	BDL					20
Bromomethane	BDL					20
n-Butylbenzene	BDL					20
sec-Butylbenzene	45					20
tert-Butybenzene	60					20
Carbon Tetrachloride	BDL					20
Chlorobenzene	BDL					20
Chloroethane	BDL					20
Chloroform	BDL					20
Chloromethane	BDL					20
2-Chlorotoluene	BDL					20
4-Chlorotoluene	BDL					20
Dibromochloromethane	BDL					20
1,2-Dibromo-3-Chloropropane	BDL					20
1,2-Dibromoethane	BDL					20
Dibromomethane	BDL					20
1,2-Dichlorobenzene	BDL					20
1,3-Dichlorobenzene	BDL					20
1,4-Dichlorobenzene	BDL					20
Dichlorodifluoromethane	BDL					20
1-1,Dichloroethane	BDL					20
1,2-Dichloroethane	BDL					20

Compound List Continued next page

Detection Limit is Practical Quantitation Limit elevated due to matrix
BDL = Below Detection Limit
All results expressed as PPB (ug/Kg)

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 25, 1995
Attention:	Carl Roppolo	Reference #	1809
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	soil	Analytical	
Date Received:	02/27/95	Analyst:	John Sutherland
Date Collected:	02/22-23/95	Date of Analysis:	03/07/95
Sample Collector:	G.P. & J.T.	Method:	*SW 846 Method 8260*

VOLATILE ORGANIC COMPOUNDS

	FIELD ID					Practical
VOLATILE	H1-3K					Quantitation
ORGANIC	LAB ID					Limit
COMPOUNDS, PPB	5565					PPB
1,1-Dichloroethene	BDL					20
cis-1,2-Dichloroethene	BDL					20
trans-1,2-Dichloroethene	BDL					20
1,2-Dichloropropane	BDL					20
1,3- Dichloropropane	BDL					20
2,2-Dichloropropane	BDL					20
1,1-Dichloropropene	BDL					20
cis-1-3,Dichloropropene	BDL					20
trans-1,3-Dichloropropene	BDL					20
Ethylbenzene	BDL					20
Hexachlorobutadiene	BDL					20
Isopropylbenzene	BDL					20
4-Isopropyltoluene	105					20
Methylene Chloride	BDL					20
Naphthalene	225					20
n-Propylbenzene	BDL					20
Styrene	BDL					20
1,1,1,2-Tetrachloroethane	BDL					20
1,1,2,2-Tetrachloroethane	BDL					20
Tetrachloroethene	BDL					20
Toluene	BDL					20
1,2,3-Trichlorobenzene	BDL					20
1,2,4-Trichlorobenzene	BDL					20
1,1,1-Trichloroethane	BDL					20
1,1,2-Trichloroethane	BDL					20
Trichloroethene	BDL					20
Trichlorofluoromethane	BDL					20

Compound List Continued next page

Detection Limit is Practical Quantitation Limit elevated due to matrix
BDL = Below Detection Limit
All results expressed as PPB (ug/Kg)

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 25, 1995
Attention:	Carl Roppolo	Reference #	1809
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	soil	Analytical	
Date Received:	02/27/95	Analyst:	John Sutherland
Date Collected:	02/22-23/95	Date of Analysis:	03/07/95
Sample Collector:	G.P. & J.T.	Method:	***SW 846 Method 8260***

VOLATILE ORGANIC COMPOUNDS

	FIELD ID					Practical Quantitation Limit PPB
VOLATILE ORGANIC COMPOUNDS, PPB	**H1-3K**					
	LAB ID					
	5565					
1,2,3-Trichloropropane	BDL					20
1,2,4-Trimethylbenzene	**427**					20
1,3,5-Trimethylbenzene	**36**					20
Vinyl Chloride	BDL					20
Xylene, o,m,p	BDL					20

Detection Limit is Practical Quantitation Limit elevated due to matrix
BDL = Below Detection Limit
All results expressed as PPB (ug/Kg)

Respectfully submitted,

John Sutherland
Analytical Chemist
Director, ASI

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 25, 1995
Attention:	Carl Roppolo	Reference #	1809
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	soil	Analytical	
Date Received:	02/27/95	Analyst:	John Sutherland
Date Collected:	02/22-23/95	Date of Analysis:	03/07/95
Sample Collector:	G.P. & J.T.	Method:	***SW 846 Method 8260***

VOLATILE ORGANIC COMPOUNDS

VOLATILE ORGANIC COMPOUNDS, PPB	FIELD ID **H1-1E** LAB ID 5559	FIELD ID **H1-1L** LAB ID 5560	FIELD ID **H1-2E** LAB ID 5561	FIELD ID **H1-2H** LAB ID 5562	FIELD ID **H1-3I** LAB ID 5563	Practical Quantitation Limit PPB
Benzene	BDL	BDL	BDL	BDL	BDL	20
Bromobenzene	BDL	BDL	BDL	BDL	BDL	20
Bromochloromethane	BDL	BDL	BDL	BDL	BDL	20
Bromodichloromethane	BDL	BDL	BDL	BDL	BDL	20
Bromoform	BDL	BDL	BDL	BDL	BDL	20
Bromomethane	BDL	BDL	BDL	BDL	BDL	20
n-Butylbenzene	**45**	**130**	BDL	**60**	**18**	20
sec-Butylbenzene	**45**	**72**	BDL	**7**	BDL	20
tert-Butybenzene	**58**	**54**	BDL	**15**	BDL	20
Carbon Tetrachloride	BDL	BDL	BDL	BDL	BDL	20
Chlorobenzene	BDL	BDL	BDL	BDL	BDL	20
Chloroethane	BDL	BDL	BDL	BDL	BDL	20
Chloroform	BDL	BDL	BDL	BDL	BDL	20
Chloromethane	BDL	BDL	BDL	BDL	BDL	20
2-Chlorotoluene	BDL	BDL	BDL	BDL	BDL	20
4-Chlorotoluene	BDL	BDL	BDL	BDL	BDL	20
Dibromochloromethane	BDL	BDL	BDL	BDL	BDL	20
1,2-Dibromo-3-Chloropropane	BDL	BDL	BDL	BDL	BDL	20
1,2-Dibromoethane	BDL	BDL	BDL	BDL	BDL	20
Dibromomethane	BDL	BDL	BDL	BDL	BDL	20
1,2-Dichlorobenzene	**75**	BDL	BDL	BDL	BDL	20
1,3-Dichlorobenzene	BDL	BDL	BDL	BDL	BDL	20
1,4-Dichlorobenzene	**33**	BDL	BDL	BDL	BDL	20
Dichlorodifluoromethane	BDL	BDL	BDL	BDL	BDL	20
1-1,Dichloroethane	BDL	BDL	BDL	BDL	BDL	20
1,2-Dichloroethane	BDL	BDL	BDL	BDL	BDL	20

Compound List Continued next page

Detection Limit is Practical Quantitation Limit elevated due to matrix
BDL = Below Detection Limit
All results expressed as PPB (ug/Kg)

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
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(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 25, 1995
Attention:	Carl Roppolo	Reference #	1809
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	soil	Analytical	
Date Received:	02/27/95	Analyst:	John Sutherland
Date Collected:	02/22-23/95	Date of Analysis:	03/07/95
Sample Collector:	G.P. & J.T.	Method:	*SW 846 Method 8260*

VOLATILE ORGANIC COMPOUNDS

VOLATILE ORGANIC COMPOUNDS, PPB	FIELD ID H1-1E LAB ID 5559	FIELD ID H1-1L LAB ID 5560	FIELD ID H1-2E LAB ID 5561	FIELD ID H1-2H LAB ID 5562	FIELD ID H1-3I LAB ID 5563	Practical Quantitation Limit PPB
1,1-Dichloroethene	BDL	BDL	BDL	BDL	BDL	20
cis-1,2-Dichloroethene	BDL	BDL	BDL	BDL	BDL	20
trans-1,2-Dichloroethene	BDL	BDL	BDL	BDL	BDL	20
,2-Dichloropropane	BDL	BDL	BDL	BDL	BDL	20
1,3- Dichloropropane	BDL	BDL	BDL	BDL	BDL	20
2,2-Dichloropropane	BDL	BDL	BDL	BDL	BDL	20
1,1-Dichloropropene	BDL	BDL	BDL	BDL	BDL	20
cis-1-3,Dichloropropene	BDL	BDL	BDL	BDL	BDL	20
trans-1,3-Dichloropropene	BDL	BDL	BDL	BDL	BDL	20
Ethylbenzene	BDL	57	BDL	35	BDL	20
Hexachlorobutadiene	BDL	BDL	BDL	BDL	BDL	20
Isopropylbenzene	BDL	BDL	BDL	BDL	BDL	20
4-Isopropyltoluene	90	180	BDL	BDL	BDL	20
Methylene Chloride	BDL	BDL	BDL	BDL	BDL	20
Naphthalene	600	750	470	250	120	20
n-Propylbenzene	BDL	60	BDL	44	BDL	20
Styrene	BDL	BDL	BDL	BDL	BDL	20
1,1,1,2-Tetrachloroethane	BDL	BDL	BDL	BDL	BDL	20
1,1,2,2-Tetrachloroethane	BDL	BDL	BDL	BDL	BDL	20
Tetrachloroethene	BDL	BDL	BDL	BDL	BDL	20
Toluene	BDL	30	BDL	BDL	BDL	20
1,2,3-Trichlorobenzene	BDL	BDL	BDL	BDL	BDL	20
1,2,4-Trichlorobenzene	BDL	BDL	BDL	BDL	BDL	20
1,1,1-Trichloroethane	BDL	BDL	BDL	BDL	BDL	20
1,1,2-Trichloroethane	BDL	BDL	BDL	BDL	BDL	20
Trichloroethene	BDL	BDL	BDL	BDL	BDL	20
Trichlorofluoromethane	BDL	BDL	BDL	BDL	BDL	20

Compound List Continued next page

Detection Limit is Practical Quantitation Limit elevated due to matrix
BDL = Below Detection Limit
All results expressed as PPB (ug/Kg)

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 25, 1995
Attention:	Carl Roppolo	Reference #	1809
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	soil	Analytical	
Date Received:	02/27/95	Analyst:	John Sutherland
Date Collected:	02/22-23/95	Date of Analysis:	03/07/95
Sample Collector:	G.P. & J.T.	Method:	***SW 846 Method 8260***

VOLATILE ORGANIC COMPOUNDS

VOLATILE ORGANIC COMPOUNDS, PPB	FIELD ID / LAB ID	FIELD ID / LAB ID	FIELD ID / LAB ID	FIELD ID / LAB ID	FIELD ID / LAB ID	Practical Quantitation Limit PPB
	H1-1E / **5559**	**H1-1L** / **5560**	**H1-2E** / **5561**	**H1-2H** / **5562**	**H1-3I** / **5563**	
1,2,3-Trichloropropane	BDL	BDL	BDL	BDL	BDL	20
1,2,4-Trimethylbenzene	**30**	**1,305**	***68***	**30**	**45**	20
1,3,5-Trimethylbenzene	**70**	**135**	BDL	**88**	BDL	20
Vinyl Chloride	BDL	BDL	BDL	BDL	BDL	20
Xylene, o,m,p	**40**	**525**	BDL	**200**	BDL	20

Detection Limit is Practical Quantitation Limit elevated due to matrix
BDL = Below Detection Limit
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Respectfully submitted,

John Sutherland
Analytical Chemist
Director, ASI

Analytical Systems, Inc.

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Client:	E.M.E., Inc.	Report Date:	March 25, 1995
Attention:	Carl Roppolo	Reference #	1809
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	soil	Analytical		Preparative	
Date received:	02/27/95	Analyst:	John Sutherland	Analyst:	KH
Date collected:	02/22-23/95	Date Analysis:	03/24/95	Date:	02/28/95
Sample Collector:	G.P. & J.T.	Method:	*SW 846 Method 8270*		

SEMIVOLATILE ORGANIC COMPOUNDS

ACID AND BASE NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS, PPB	FIELD ID: H1-3K LAB ID: 5565					Practical Quantitation Limit PPB
Acenaphthene	BDL					100
Acenaphthylene	BDL					100
Anthracene	BDL					100
Aniline	BDL					100
Azobenzene	BDL					100
Benzidine	BDL					100
Benzoic Acid	BDL					500
Benzo(a)anthracene	BDL					100
Benzo(b)fluoranthene	BDL					100
Benzo(k)fluoranthene	BDL					100
Benzo(g,h,i)perylene	BDL					100
Benzo(a)pyrene	BDL					100
Benzyl alcohol	BDL					200
Bis(2-chloroethoxy)methane	BDL					100
Bis(2-chloroethyl)ether	BDL					100
Bis(2-chloroethoxy)ether	BDL					100
Bis(2-chloroisopropyl)ether	BDL					100
Bis(2-ethylhexyl)phthalate	BDL					100
4-bromophenyl phenyl ether	BDL					100
Butyl benzyl phthalate	BDL					100
4-Chloroaniline	BDL					200
1-Chloronaphthalene	BDL					100
2-Chloronaphthalene	BDL					100
4-Chloro-3-methylphenol	BDL					200
4-Chlorophenyl phenyl ether	BDL					100
Chrysene	BDL					100
Dibenz(a,h)anthracene	BDL					100
Dibenzofuran	BDL					100
Di-n-butylphthalate	BDL					100

Compound List Continued next page

BDL = Below detection Limit, Practical
All results expressed as PPB (ug/Kg)

Analytical Systems, Inc.

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Attention:	Carl Roppolo	Reference #	1809
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	soil	Analytical		Preparative	
Date received:	02/27/95	Analyst:	John Sutherland	Analyst:	KH
Date collected:	02/22-23/95	Date Analysis:	03/24/95	Date:	02/28/95
Sample Collector:	G.P. & J.T.	Method:	*SW 846 Method 8270*		

SEMIVOLATILE ORGANIC COMPOUNDS

ACID AND BASE NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS, PPB	FIELD ID H1-3K LAB ID 5565	Practical Quantitation Limit PPB
1,3-Dichlorobenzene	BDL	100
1,4-Dichlorobenzene	BDL	100
1,2-Dichlorobenzene	BDL	100
3,3'-Dichlorobenzidine	BDL	200
2,4-Dichlorophenol	BDL	100
2,6-Dichlorophenol	BDL	100
Diethylphthalate	BDL	100
2,4-Dimethylphenol	BDL	100
Dimethylphthalate	BDL	100
4,6-Dinitro-2-methylphenol	BDL	100
2,4-Dinitrophenol	BDL	500
2,4-Dinitrotoluene	BDL	100
2,6-Dinitrotoluene	BDL	100
Di-n-octylphthalate	BDL	100
Fluoranthene	BDL	100
Fluorene	BDL	100
Hexachlorobenzene	BDL	100
Hexachlorobutadiene	BDL	100
Hexachlorocyclopentadiene	BDL	100
Hexachloroethane	BDL	100
Indeno(1,2,3-cd)pyrene	BDL	100
Isophorone	BDL	100
2-Methylnaphthalene	180	100
Methylphenols (o,m-cresol)	BDL	100
4-Methylphenol (p-cresol)	BDL	100
Naphthalene	280	100
2-Nitroaniline	BDL	500

Compound List Continued next page

BDL = Below detection Limit, Practical
All results expressed as PPB (ug/Kg)

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	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	soil	Analytical		Preparative	
Date received:	02/27/95	Analyst:	John Sutherland	Analyst:	KH
Date collected:	02/22-23/95	Date Analysis:	03/24/95	Date:	02/28/95
Sample Collector:	G.P. & J.T.	Method:	***SW 846 Method 8270***		

SEMIVOLATILE ORGANIC COMPOUNDS

ACID AND BASE NEUTRAL EXTRACTABLE ORGANICS COMPOUNDS, PPB	FIELD ID: H1-3K LAB ID: 5565	Practical Quantitation Limit PPB
3-Nitroaniline	BDL	500
4-Nitroaniline	BDL	500
Nitrobenzene	BDL	100
2-Nitrophenol	BDL	500
4-Nitrophenol	BDL	500
N-Nitrosodimethylamine	BDL	100
N-Nitrosodi-n-propylamine	BDL	100
N-Nitrosodiphenylamine	BDL	100
Pentachlorophenol	BDL	500
Phenanthrene	BDL	100
Phenol	BDL	100
Pyrene	BDL	100
1,2,4-Trichlorobenzene	BDL	100
2,4,5-Trichlorophenol	BDL	200
2,4,6-Trichlorophenol	BDL	100

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Respectfully submitted,

John Sutherland
Analytical Chemist
Director, ASI

Analytical Systems, Inc.

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Client:	E.M.E., Inc.	Report Date:	March 25, 1995
Attention:	Carl Roppolo	Reference #	1809
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	soil	Analytical		Preparative	
Date received:	02/27/95	Analyst:	John Sutherland	Analyst:	KH
Date collected:	02/22-23/95	Date Analysis:	03/24/95	Date:	02/28/95
Sample Collector:	G.P. & J.T.	Method:	*SW 846 Method 8270*		

SEMIVOLATILE ORGANIC COMPOUNDS

ACID AND BASE NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS, PPB	FIELD ID H1-1E LAB ID 5559	FIELD ID H1-1L LAB ID 5560	FIELD ID H1-2E LAB ID 5561	FIELD ID H1-2H LAB ID 5562	FIELD ID H1-3I LAB ID 5563	Practical Quantitation Limit PPB
Acenaphthene	BDL	BDL	BDL	BDL	BDL	100
Acenaphthylene	BDL	BDL	BDL	BDL	BDL	100
Anthracene	BDL	BDL	BDL	BDL	BDL	100
Aniline	BDL	BDL	BDL	BDL	BDL	100
Azobenzene	BDL	BDL	BDL	BDL	BDL	100
Benzidine	BDL	BDL	BDL	BDL	BDL	100
Benzoic Acid	BDL	BDL	BDL	BDL	BDL	500
Benzo(a)anthracene	BDL	BDL	BDL	BDL	BDL	100
Benzo(b)fluoranthene	BDL	BDL	BDL	BDL	BDL	100
Benzo(k)fluoranthene	BDL	BDL	BDL	BDL	BDL	100
Benzo(g,h,i)perylene	BDL	BDL	BDL	BDL	BDL	100
Benzo(a)pyrene	BDL	BDL	BDL	BDL	BDL	100
Benzyl alcohol	BDL	BDL	BDL	BDL	BDL	200
Bis(2-chloroethoxy)methane	BDL	BDL	BDL	BDL	BDL	100
Bis(2-chloroethyl)ether	BDL	BDL	BDL	BDL	BDL	100
Bis(2-chloroethoxy)ether	BDL	BDL	BDL	BDL	BDL	100
Bis(2-chloroisopropyl)ether	BDL	BDL	BDL	BDL	BDL	100
Bis(2-ethylhexyl)phthalate	BDL	BDL	BDL	BDL	BDL	100
4-bromophenyl phenyl ether	BDL	BDL	BDL	BDL	BDL	100
Butyl benzyl phthalate	BDL	BDL	BDL	BDL	BDL	100
4-Chloroaniline	BDL	BDL	BDL	BDL	BDL	200
1-Chloronaphthalene	BDL	BDL	BDL	BDL	BDL	100
2-Chloronaphthalene	BDL	BDL	BDL	BDL	BDL	100
4-Chloro-3-methylphenol	BDL	BDL	BDL	BDL	BDL	200
4-Chlorophenyl phenyl ether	BDL	BDL	BDL	BDL	BDL	100
Chrysene	BDL	BDL	BDL	BDL	BDL	100
Dibenz(a,h)anthracene	BDL	BDL	BDL	BDL	BDL	100
Dibenzofuran	BDL	BDL	BDL	BDL	BDL	100
Di-n-butylphthalate	BDL	BDL	BDL	BDL	BDL	100

Compound List Continued next page

BDL = Below detection Limit, Practical
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Analytical Systems, Inc.

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Client:	E.M.E., Inc.	Report Date:	March 25, 1995
Attention:	Carl Roppolo	Reference #	1809
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	soil	Analytical		Preparative	
Date received:	02/27/95	Analyst:	John Sutherland	Analyst:	KH
Date collected:	02/22-23/95	Date Analysis:	03/24/95	Date:	02/28/95
Sample Collector:	G.P. & J.T.	Method:	*SW 846 Method 8270*		

SEMIVOLATILE ORGANIC COMPOUNDS

ACID AND BASE NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS, PPB	FIELD ID H1-1E LAB ID 5559	FIELD ID H1-1L LAB ID 5560	FIELD ID H1-2E LAB ID 5561	FIELD ID H1-2H LAB ID 5562	FIELD ID H1-3I LAB ID 5563	Practical Quantitation Limit PPB
1,3-Dichlorobenzene	BDL	BDL	BDL	BDL	BDL	100
1,4-Dichlorobenzene	BDL	BDL	BDL	BDL	BDL	100
1,2-Dichlorobenzene	BDL	BDL	BDL	BDL	BDL	100
[redacted]Dichlorobenzidine	BDL	BDL	BDL	BDL	BDL	200
[redacted]Dichlorophenol	BDL	BDL	BDL	BDL	BDL	100
2,6-Dichlorophenol	BDL	BDL	BDL	BDL	BDL	100
Diethylphthalate	BDL	BDL	BDL	BDL	BDL	100
2,4-Dimethylphenol	BDL	BDL	BDL	BDL	BDL	100
Dimethylphthalate	BDL	BDL	BDL	BDL	BDL	100
4,6-Dinitro-2-methylphenol	BDL	BDL	BDL	BDL	BDL	100
2,4-Dinitrophenol	BDL	BDL	BDL	BDL	BDL	500
2,4-Dinitrotoluene	BDL	BDL	BDL	BDL	BDL	100
2,6-Dinitrotoluene	BDL	BDL	BDL	BDL	BDL	100
Di-n-octylphthalate	BDL	BDL	BDL	BDL	BDL	100
Fluoranthene	BDL	BDL	BDL	BDL	BDL	100
Fluorene	BDL	BDL	BDL	BDL	BDL	100
Hexachlorobenzene	BDL	BDL	BDL	BDL	BDL	100
Hexachlorobutadiene	BDL	BDL	BDL	BDL	BDL	100
Hexachlorocyclopentadiene	BDL	BDL	BDL	BDL	BDL	100
Hexachloroethane	BDL	BDL	BDL	BDL	BDL	100
Indeno(1,2,3-cd)pyrene	BDL	BDL	BDL	BDL	BDL	100
Isophorone	BDL	BDL	BDL	BDL	BDL	100
2-Methylnaphthalene	2600	3150	BDL	1500	BDL	100
Methylphenols (o,m-cresol)	BDL	BDL	BDL	BDL	BDL	100
4-Methylphenol (p-cresol)	BDL	BDL	BDL	BDL	BDL	100
Naphthalene	700	870	580	800	BDL	100
[redacted]Nitroaniline	BDL	BDL	BDL	BDL	BDL	500

Compound List Continued next page

BDL = Below detection Limit, Practical
All results expressed as PPB (ug/Kg)

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 25, 1995
Attention:	Carl Roppolo	Reference #	1809
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	soil	Analytical		Preparative	
Date received:	02/27/95	Analyst:	John Sutherland	Analyst:	KH
Date collected:	02/22-23/95	Date Analysis:	03/24/95	Date:	02/28/95
Sample Collector:	G.P. & J.T.	Method:	*SW 846 Method 8270*		

SEMIVOLATILE ORGANIC COMPOUNDS

ACID AND BASE NEUTRAL EXTRACTABLE ORGANICS COMPOUNDS, PPB	FIELD ID **H1-1E** LAB ID 5559	FIELD ID **H1-1L** LAB ID 5560	FIELD ID **H1-2E** LAB ID 5561	FIELD ID **H1-2H** LAB ID 5562	FIELD ID **H1-3I** LAB ID 5563	Practical Quantitation Limit PPB
3-Nitroaniline	BDL	BDL	BDL	BDL	BDL	500
4-Nitroaniline	BDL	BDL	BDL	BDL	BDL	500
Nitrobenzene	BDL	BDL	BDL	BDL	BDL	100
2-Nitrophenol	BDL	BDL	BDL	BDL	BDL	500
4-Nitrophenol	BDL	BDL	BDL	BDL	BDL	500
N-Nitrosodimethylamine	BDL	BDL	BDL	BDL	BDL	100
N-Nitrosodi-n-propylamine	BDL	BDL	BDL	BDL	BDL	100
N-Nitrosodiphenylamine	BDL	BDL	BDL	BDL	BDL	100
Pentachlorophenol	BDL	BDL	BDL	BDL	BDL	500
Phenanthrene	BDL	BDL	BDL	BDL	BDL	100
Phenol	BDL	BDL	BDL	BDL	BDL	100
Pyrene	BDL	BDL	BDL	BDL	BDL	100
1,2,4-Trichlorobenzene	BDL	BDL	BDL	BDL	BDL	100
2,4,5-Trichlorophenol	BDL	BDL	BDL	BDL	BDL	200
2,4,6-Trichlorophenol	BDL	BDL	BDL	BDL	BDL	100

BDL = Below detection Limit, Practical
All results expressed as PPB (ug/Kg)

Respectfully submitted,

John Sutherland
Analytical Chemist
Director, ASI

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
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(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 28, 1995
Attention:	Carl Roppolo	Reference #	1811
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	water	Analytical	
Date received:	02/27/95	Analyst:	John Sutherland
Date collected:	02/24/95	Date Analysis:	03/24/95
Sample Collector:	G.P. & J.T.	Method:	***SW 846 Method 8270***

SEMIVOLATILE ORGANIC COMPOUNDS

ACID AND BASE NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS, PPB	FIELD ID H1-1 LAB ID 5570	FIELD ID H1-3 LAB ID 5571				PRACTICAL DETECTION LIMIT, PPB
Acenaphthene	*BDL	BDL				10
Acenaphthylene	*BDL	BDL				10
Anthracene	*BDL	BDL				10
iline	*BDL	BDL				10
obenzene	*BDL	BDL				10
Benzidine	*BDL	BDL				10
Benzoic Acid	*BDL	BDL				10
Benzo(a)anthracene	*BDL	BDL				10
Benzo(b)fluoranthene	*BDL	BDL				10
Benzo(k)fluoranthene	*BDL	BDL				10
Benzo(g,h,i)perylene	*BDL	BDL				10
Benzo(a)pyrene	*BDL	BDL				10
Benzyl alcohol	*BDL	BDL				10
Bis(2-chloroethoxy)methane	*BDL	BDL				10
Bis(2-chloroethyl)ether	*BDL	BDL				10
Bis(2-chloroethoxy)ether	*BDL	BDL				10
Bis(2-chloroisopropyl)ether	*BDL	BDL				10
Bis(2-ethylhexyl)phthalate	*BDL	BDL				10
4-Bromophenyl phenyl ether	*BDL	BDL				10
Butyl benzyl phthalate	*BDL	BDL				10
Carbazole	*BDL	BDL				10
4-Chloroaniline	*BDL	BDL				10
1-Chloronaphthalene	*BDL	BDL				10
2-Chloronaphthalene	*BDL	BDL				10
4-Chloro-3-methylphenol	*BDL	BDL				10
4-Chlorophenyl phenyl ether	*BDL	BDL				10
Chrysene	*BDL	BDL				10

Compound List Continued next page

BDL = Below detection Limit
Detection Limit is Practical Quantitation Limit
*Multiply Practical Quantitation Limit by 5, elevated due to matrix
All results expressed as PPB (ug/L)

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 28, 1995
Attention:	Carl Roppolo	Reference #	1811
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	water	Analytical	
Date received:	02/27/95	Analyst:	John Sutherland
Date collected:	02/24/95	Date Analysis:	03/24/95
Sample Collector:	G.P. & J.T.	Method:	***SW 846 Method 8270***

SEMIVOLATILE ORGANIC COMPOUNDS

ACID AND BASE NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS, PPB	FIELD ID **H1-1** LAB ID **5570**	FIELD ID **H1-3** LAB ID **5571**				PRACTICAL DETECTION LIMIT, PPB
Dibenz(a,h)anthracene	*BDL	BDL				10
Dibenzofuran	*BDL	BDL				10
Di-n-butylphthalate	*BDL	BDL				10
1,3-Dichlorobenzene	*BDL	BDL				10
1,4-Dichlorobenzene	*BDL	BDL				10
1,2-Dichlorobenzene	*BDL	BDL				10
3,3'-Dichlorobenzidine	*BDL	BDL				10
2,4-Dichlorophenol	*BDL	BDL				10
2,6-Dichlorophenol	*BDL	BDL				10
Diethylphthalate	*BDL	BDL				10
2,4-Dimethylphenol	*BDL	BDL				10
Dimethylphthalate	*BDL	BDL				10
4,6-Dinitro-2-methylphenol	*BDL	BDL				25
2,4-Dinitrophenol	*BDL	BDL				25
2,4-Dinitrotoluene	*BDL	BDL				10
2,6-Dinitrotoluene	*BDL	BDL				10
Di-n-octylphthalate	*BDL	BDL				10
Fluoranthene	*BDL	BDL				10
Fluorene	*BDL	BDL				10
Hexachlorobenzene	*BDL	BDL				10
Hexachlorobutadiene	*BDL	BDL				10
Hexachlorocyclopentadiene	*BDL	BDL				10
Hexachloroethane	*BDL	BDL				10
Indeno(1,2,3-cd)pyrene	*BDL	BDL				10
Isophorone	*BDL	BDL				10
2-Methylnaphthalene	*BDL	BDL				10

Compound List Continued next page

BDL = Below detection Limit
Detection Limit is Practical Quantitation Limit
*Multiply Practical Quantitation Limit by 5, elevated due to matrix
All results expressed as PPB (ug/L)

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
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Client:	E.M.E., Inc.	Report Date:	March 28, 1995
Attention:	Carl Roppolo	Reference #	1811
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	water	Analytical	
Date received:	02/27/95	Analyst:	John Sutherland
Date collected:	02/24/95	Date Analysis:	03/24/95
Sample Collector:	G.P. & J.T.	Method:	***SW 846 Method 8270***

SEMIVOLATILE ORGANIC COMPOUNDS

ACID AND BASE NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS, PPB	FIELD ID / LAB ID H1-1 / 5570	FIELD ID / LAB ID H1-3 / 5571				PRACTICAL DETECTION LIMIT, PPB
Methylphenols (o,m-cresol)	*BDL	BDL				10
4-Methylphenol (p-cresol)	*BDL	BDL				10
Naphthalene	*BDL	BDL				10
[illegible]troaniline	*BDL	BDL				25
[illegible]troaniline	*BDL	BDL				25
4-Nitroaniline	*BDL	BDL				25
Nitrobenzene	*BDL	BDL				10
2-Nitrophenol	*BDL	BDL				10
4-Nitrophenol	*BDL	BDL				10
N-Nitrosodimethylamine	*BDL	BDL				10
N-Nitrosodi-n-propylamine	*BDL	BDL				10
N-Nitrosodiphenylamine	*BDL	BDL				10
Pentachlorophenol	*BDL	BDL				25
Phenanthrene	*BDL	BDL				10
Phenol	*BDL	BDL				10
Pyrene	*BDL	BDL				10
1,2,4-Trichlorobenzene	*BDL	BDL				10
2,4,5-Trichlorophenol	*BDL	BDL				25
2,4,6-Trichlorophenol	*BDL	BDL				25

BDL = Below detection Limit
Detection Limit is Practical Quantitation Limit
*Multiply Practical Quantitation Limit by 5, elevated due to matrix
All results expressed as PPB (ug/L)

Respectfully submitted,

John Sutherland
Analytical Chemist
Director, ASI

Quality Environmental Testing Services

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 27, 1995
Attention:	Carl Roppolo	Reference #	1824
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	soil	Analytical		Preparative	
Date received:	03/01/95	Analyst:	John Sutherland	Analyst:	KH
Date collected:	02/27-28/95	Date Analysis:	03/25/95	Date:	03/03/95
Sample Collector:	G.P. & J.T.	Method:	***SW 846 Method 8270***		

SEMIVOLATILE ORGANIC COMPOUNDS

ACID AND BASE NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS, PPB	FIELD ID: H1-8D LAB ID: 5643					Practical Quantitation Limit PPB
1,3-Dichlorobenzene	BDL					100
1,4-Dichlorobenzene	BDL					100
1,2-Dichlorobenzene	BDL					100
3,3'-Dichlorobenzidine	BDL					200
2,4-Dichlorophenol	BDL					100
2,6-Dichlorophenol	BDL					100
Diethylphthalate	BDL					100
2,4-Dimethylphenol	BDL					100
Dimethylphthalate	BDL					100
4,6-Dinitro-2-methylphenol	BDL					100
2,4-Dinitrophenol	BDL					500
2,4-Dinitrotoluene	BDL					100
2,6-Dinitrotoluene	BDL					100
Di-n-octylphthalate	BDL					100
Fluoranthene	BDL					100
Fluorene	BDL					100
Hexachlorobenzene	BDL					100
Hexachlorobutadiene	BDL					100
Hexachlorocyclopentadiene	BDL					100
Hexachloroethane	BDL					100
Indeno(1,2,3-cd)pyrene	BDL					100
Isophorone	BDL					100
2-Methylnaphthalene	BDL					100
Methylphenols (o,m-cresol)	BDL					100
4-Methylphenol (p-cresol)	BDL					100
Naphthalene	BDL					100
2-Nitroaniline	BDL					500

Compound List Continued next page

BDL = Below detection Limit, Practical
All results expressed as PPB (ug/Kg)

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 27, 1995
Attention:	Carl Roppolo	Reference #	1824
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	soil	Analytical		Preparative	
Date received:	03/01/95	Analyst:	John Sutherland	Analyst:	KH
Date collected:	02/27-28/95	Date Analysis:	03/25/95	Date:	03/03/95
Sample Collector:	G.P. & J.T.	Method:	***SW 846 Method 8270***		

SEMIVOLATILE ORGANIC COMPOUNDS

	FIELD ID					Practical
ACID AND BASE NEUTRAL	**H1-8D**					Quantitation
EXTRACTABLE ORGANICS	LAB ID					Limit
COMPOUNDS, PPB	**5643**					PPB
3-Nitroaniline	BDL					500
4-Nitroaniline	BDL					500
Nitrobenzene	BDL					100
2-Nitrophenol	BDL					500
4-Nitrophenol	BDL					500
N-Nitrosodimethylamine	BDL					100
N-Nitrosodi-n-propylamine	BDL					100
N-Nitrosodiphenylamine	BDL					100
Pentachlorophenol	BDL					500
Phenanthrene	BDL					100
Phenol	BDL					100
Pyrene	BDL					100
1,2,4-Trichlorobenzene	BDL					100
2,4,5-Trichlorophenol	BDL					200
2,4,6-Trichlorophenol	BDL					100

BDL = Below detection Limit, Practical
All results expressed as PPB (ug/Kg)

Respectfully submitted,

John Sutherland
Analytical Chemist
Director, ASI

Analytical Systems, Inc.

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Client:	E.M.E., Inc.	Report Date:	March 27, 1995
Attention:	Carl Roppolo	Reference #	1824
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	water	Analytical	
Date received:	03/01/95	Analyst:	John Sutherland
Date collected:	02/27-28/95	Date Analysis:	03/24/95
Sample Collector:	G.P. & J.T.	Method:	***SW 846 Method 8270***

SEMIVOLATILE ORGANIC COMPOUNDS

ACID AND BASE NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS, PPB	FIELD ID **H1-8** LAB ID **5644**	FIELD ID **H1-7** LAB ID **5645**				PRACTICAL DETECTION LIMIT, PPB
Acenaphthene	BDL	BDL				10
Acenaphthylene	BDL	BDL				10
Anthracene	BDL	BDL				10
Aniline	BDL	BDL				10
Azobenzene	BDL	BDL				10
Benzidine	BDL	BDL				10
Benzoic Acid	BDL	BDL				10
Benzo(a)anthracene	BDL	BDL				10
Benzo(b)fluoranthene	BDL	BDL				10
Benzo(k)fluoranthene	BDL	BDL				10
Benzo(g,h,i)perylene	BDL	BDL				10
Benzo(a)pyrene	BDL	BDL				10
Benzyl alcohol	BDL	BDL				10
Bis(2-chloroethoxy)methane	BDL	BDL				10
Bis(2-chloroethyl)ether	BDL	BDL				10
Bis(2-chloroethoxy)ether	BDL	BDL				10
Bis(2-chloroisopropyl)ether	BDL	BDL				10
Bis(2-ethylhexyl)phthalate	BDL	BDL				10
4-Bromophenyl phenyl ether	BDL	BDL				10
Butyl benzyl phthalate	BDL	BDL				10
Carbazole	BDL	BDL				10
4-Chloroaniline	BDL	BDL				10
1-Chloronaphthalene	BDL	BDL				10
2-Chloronaphthalene	BDL	BDL				10
4-Chloro-3-methylphenol	BDL	BDL				10
4-Chlorophenyl phenyl ether	BDL	BDL				10
Chrysene	BDL	BDL				10

Compound List Continued next page

BDL = Below detection Limit, Practical
All results expressed as PPB (ug/L)

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 27, 1995
Attention:	Carl Roppolo	Reference #	1824
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	water	Analytical	
Date received:	03/01/95	Analyst:	John Sutherland
Date collected:	02/27-28/95	Date Analysis:	03/24/95
Sample Collector:	G.P. & J.T.	Method:	***SW 846 Method 8270***

SEMIVOLATILE ORGANIC COMPOUNDS

ACID AND BASE NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS, PPB	FIELD ID **H1-8** LAB ID 5644	FIELD ID **H1-7** LAB ID 5645				PRACTICAL DETECTION LIMIT, PPB
Dibenz(a,h)anthracene	BDL	BDL				10
Dibenzofuran	BDL	BDL				10
Di-n-butylphthalate	BDL	BDL				10
1,3-Dichlorobenzene	BDL	BDL				10
1,4-Dichlorobenzene	BDL	BDL				10
1,2-Dichlorobenzene	BDL	BDL				10
3,3'-Dichlorobenzidine	BDL	BDL				10
2,4-Dichlorophenol	BDL	BDL				10
2,6-Dichlorophenol	BDL	BDL				10
Diethylphthalate	BDL	BDL				10
2,4-Dimethylphenol	BDL	BDL				10
Dimethylphthalate	BDL	BDL				10
4,6-Dinitro-2-methylphenol	BDL	BDL				10
2,4-Dinitrophenol	BDL	BDL				10
2,4-Dinitrotoluene	BDL	BDL				10
2,6-Dinitrotoluene	BDL	BDL				10
Di-n-octylphthalate	BDL	BDL				10
Fluoranthene	BDL	BDL				10
Fluorene	BDL	BDL				10
Hexachlorobenzene	BDL	BDL				10
Hexachlorobutadiene	BDL	BDL				10
Hexachlorocyclopentadiene	BDL	BDL				10
Hexachloroethane	BDL	BDL				10
Indeno(1,2,3-cd)pyrene	BDL	BDL				10
Isophorone	BDL	BDL				10
2-Methylnaphthalene	BDL	BDL				10

Compound List Continued next page

BDL = Below detection Limit, Practical
All results expressed as PPB (ug/L)

Analytical Systems, Inc.

439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205) 940-7724 Fax (205) 940-7701

Client:	E.M.E., Inc.	Report Date:	March 27, 1995
Attention:	Carl Roppolo	Reference #	1824
Address:	437 Industrial Lane	P.O. #	verbal
	Birmingham, AL 35211	Project ID:	DRS-94-E893 Hobbs

Sample Matrix:	water	Analytical	
Date received:	03/01/95	Analyst:	John Sutherland
Date collected:	02/27-28/95	Date Analysis:	03/24/95
Sample Collector:	G.P. & J.T.	Method:	***SW 846 Method 8270***

SEMIVOLATILE ORGANIC COMPOUNDS

ACID AND BASE NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS, PPB	FIELD ID **H1-8** LAB ID **5644**	FIELD ID **H1-7** LAB ID **5645**				PRACTICAL DETECTION LIMIT, PPB
Methylphenols (o,m-cresol)	BDL	BDL				10
4-Methylphenol (p-cresol)	BDL	BDL				10
Naphthalene	BDL	BDL				10
2-Nitroaniline	BDL	BDL				10
3-Nitroaniline	BDL	BDL				10
4-Nitroaniline	BDL	BDL				10
Nitrobenzene	BDL	BDL				10
2-Nitrophenol	BDL	BDL				10
4-Nitrophenol	BDL	BDL				10
N-Nitrosodimethylamine	BDL	BDL				10
N-Nitrosodi-n-propylamine	BDL	BDL				10
N-Nitrosodiphenylamine	BDL	BDL				10
Pentachlorophenol	BDL	BDL				10
Phenanthrene	BDL	BDL				10
Phenol	BDL	BDL				10
Pyrene	BDL	BDL				10
1,2,4-Trichlorobenzene	BDL	BDL				10
2,4,5-Trichlorophenol	BDL	BDL				10
2,4,6-Trichlorophenol	BDL	BDL				10

BDL = Below detection Limit, Practical
All results expressed as PPB (ug/L)

Respectfully submitted,

John Sutherland
Analytical Chemist
Director, ASI

CORE LAB

CORE LABORATORIES

CORE LABORATORIES
A N A L Y T I C A L R E P O R T

Job Number: 950419
Prepared For:

ENVIRONMENTAL MANAGEMENT & ENG.
CARL ROPPOLO
437 INDUSTRIAL LANE
BIRMINGHAM, AL 35211

Date: 03/03/95

Rondalynn Mull
Signature

3-03-95
Date:

Name: Rondalynn Mull

Title: Laboratory Supervisor

Core Laboratories, Inc.
420 West First Street
Casper, WY 82601

CORELAB

CORE LABORATORIES

LABORATORY TESTS RESULTS
03/08/95

B NUMBER: 950419 CUSTOMER: ENVIRONMENTAL MANAGEMENT & ENG. ATTN: CARL ROPPOLO

AMPLE NUMBER: 1 DATE RECEIVED: 02/27/95 TIME RECEIVED: 08:40 SAMPLE DATE: 02/23/95 SAMPLE TIME: 14:50
OJECT: DRS-94-E893 SAMPLE: H2-1A REM: SOLID

MPLE NUMBER: 2 DATE RECEIVED: 02/27/95 TIME RECEIVED: 08:40 SAMPLE DATE: 02/23/95 SAMPLE TIME: 15:05
OJECT: DRS-94-E893 SAMPLE: H2-2A REM: SOLID

MPLE NUMBER: 3 DATE RECEIVED: 02/27/95 TIME RECEIVED: 08:40 SAMPLE DATE: 02/23/95 SAMPLE TIME: 15:15
ROJECT: DRS-94-E893 SAMPLE: H2-3A REM: SOLID

MPLE NUMBER: 4 DATE RECEIVED: 02/27/95 TIME RECEIVED: 08:40 SAMPLE DATE: 02/23/95 SAMPLE TIME: 15:25
ROJECT: DRS-94-E893 SAMPLE: H2-4A REM: SOLID

MPLE NUMBER: 5 DATE RECEIVED: 02/27/95 TIME RECEIVED: 08:40 SAMPLE DATE: 02/23/95 SAMPLE TIME: 15:35
ROJECT: DRS-94-E893 SAMPLE: H2-5A REM: SOLID

MPLE NUMBER: 6 DATE RECEIVED: 02/27/95 TIME RECEIVED: 08:40 SAMPLE DATE: 02/23/95 SAMPLE TIME: 15:45
ROJECT: DRS-94-E893 SAMPLE: H2-6A REM: SOLID

ST DESCRIPTION	SAMPLE 1	SAMPLE 2	SAMPLE 3	SAMPLE 4	SAMPLE 5	SAMPLE 6	UNITS OF MEASURE
dium 226, by HPGe gamma	15.8	387	405	76.6	23.9	21.5	pCi/g
dium 226, HPGe,error, +/-	1.1	13.6	15.3	3.6	1.5	1.5	pCi/g
edium 228, by HPGe gamma	<3.0	45.3	49.3	<1.9	2.5	<1.2	pCi/g
dium 228, HPGe, error +/-		4.8	3.5		0.8		pCi/g

420 West First Street
Casper, WY 82601
(307) 235-5741

CORE LABORATORIES

LABORATORY TESTS RESULTS
03/08/95

B NUMBER: 950419 CUSTOMER: ENVIRONMENTAL MANAGEMENT & ENG. ATTN: CARL ROPPOLO

MPLE NUMBER: 7 DATE RECEIVED: 02/27/95 TIME RECEIVED: 08:40 SAMPLE DATE: 02/23/95 SAMPLE TIME: 15:55
OJECT: DRS-94-E893 SAMPLE: H2-7A REM: SOLID

MPLE NUMBER: 8 DATE RECEIVED: 02/27/95 TIME RECEIVED: 08:40 SAMPLE DATE: 02/23/95 SAMPLE TIME: 16:05
OJECT: DRS-94-E893 SAMPLE: H2-8A REM: SOLID

MPLE NUMBER: 9 DATE RECEIVED: 02/27/95 TIME RECEIVED: 08:40 SAMPLE DATE: 02/23/95 SAMPLE TIME: 16:15
OJECT: DRS-94-E893 SAMPLE: H2-9A REM: SOLID

MPLE NUMBER: 10 DATE RECEIVED: 02/27/95 TIME RECEIVED: 08:40 SAMPLE DATE: 02/23/95 SAMPLE TIME: 16:25
OJECT: DRS-94-E893 SAMPLE: H2-10A REM: SOLID

MPLE NUMBER: 11 DATE RECEIVED: 02/27/95 TIME RECEIVED: 08:40 SAMPLE DATE: 02/23/95 SAMPLE TIME: 16:35
OJECT: DRS-94-E893 SAMPLE: H2-11A REM: SOLID

MPLE NUMBER: 12

* * THIS SAMPLE NUMBER WAS NOT ASSIGNED * *

ST DESCRIPTION	SAMPLE 7	SAMPLE 8	SAMPLE 9	SAMPLE 10	SAMPLE 11	SAMPLE 12	UNITS OF MEASURE
dium 226, by HPGe gamma	24.0	20.3	739	<1.2	64.9		pCi/g
dium 226, HPGe,error, +/-	1.4	1.4	27.1		3.0		pCi/g
dium 228, by HPGe gamma	1.9	<0.7	70.7	<0.6	<1.6		pCi/g
dium 228, HPGe, error +/-	0.8		5.4				pCi/g

420 West First Street
Casper, WY 82601
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CORE LABORATORIES

QUALITY CONTROL REPORT
03/08/95

NUMBER: 950419 CUSTOMER: ENVIRONMENTAL MANAGEMENT & ENG. ATTN: CARL ROPPOLO

ANALYSIS				DUPLICATES		REFERENCE STANDARDS		MATRIX SPIKES		
LYSIS YPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
AMETER:Radium 226, by HPGe gamma ORTING LIMIT/DF: UNITS:pCi/g			DATE/TIME ANALYZED:03/01/95 10:34 METHOD REFERENCE :EPA 901.1							QC BATCH NUMBER:163883 TECHNICIAN:DF
NDARD	STD (GMX)	RA226	104000			103000	101			
NDARD	STD (GMX)	RA226	104000			103000	101			
LICATE	MD	950419-9	739	732	1					
AMETER:Radium 228, by HPGe gamma ORTING LIMIT/DF: UNITS:pCi/g			DATE/TIME ANALYZED:03/01/95 11:19 METHOD REFERENCE :EPA 901.1							QC BATCH NUMBER:163885 TECHNICIAN:DF
LICATE	MD	950419-9	70.7	65.2	8					

420 West First Street
Casper, WY 82601
(307) 235-5741

CORE LABORATORIES

QUALITY CONTROL FOOTER

METHOD REFERENCES

1) EPA 600/4-79-020, Methods for Chemical Analysis of Water and Wastes, March 1983
2) EPA SW-846, Test Methods for Evaluating Solid Waste, Third Edition, November 1990 and July 1992 update
3) Standard Methods for the Examination of Water and Wastewater, 17th, 1989
4) EPA 600/4-80-032, Prescribed Procedures for Measurement of Radioactivity in Drinking Water, August 1980
5) Federal Register, Friday, October 26, 1984 (40 CFR Part 136)
6) EPA 600/8-78-017, Microbiological Methods for Monitoring the Environment, December 1978

COMMENTS

1) The data in the Laboratory Test Results Report may differ from the data in the QC Report due to calculations for sample preparation and/or dilutions.
2) The "Time Analyzed" in the QC Report may not reflect the actual time of each analysis. The "Date Analyzed" is the actual date of analysis.
3) Soil and sludge samples are reported on a wet basis or on an "as received" basis unless otherwise indicated.
4) The data in this report are within the limits of uncertainty specified in the referenced method unless otherwise indicated.
5) Analyses performed by a subcontract laboratory are indicated with an asterisk and associated code in the "Technician" data field.

Subcontract Laboratories	Code
Core Laboratories - Anaheim, CA	* AN
Core Laboratories - Aurora, CO	* AU
Core Laboratories - Casper, WY	* CA
Core Laboratories - Corpus Christi, TX	* CC
Core Laboratories - Houston, TX	* HP
Core Laboratories - Lake Charles, LA	* LC
Core Laboratories - Long Beach, CA	* LB
Other Subcontract Laboratories	* XX

DEFINITIONS

) NC = Not Calculable due to values lower than the reporting limit.
) ND = Not Detected above the reporting limit.

QC SAMPLE IDENTIFICATIONS

BLANKS

B = Method Blank (also referred to as a preparation blank)
B = Reagent Blank
= Instrument Blank
B = Initial Calibration Blank
B = Continuing Calibration Blank
B = Holding Blank (also referred to as as a storage blank)

DUPLICATES

SD = Matrix Spike Duplicate
D = Method Duplicate

SPIKES

MS = Matrix Spike
MSD = Matrix Spike Duplicate
PDS = Post Digestion Spike
BS = Blank Spike (also referred to as a method spike)
SS = Surrogate Spike

REFERENCE STANDARDS

CS = Calibration Standard
RS = Reference Standard(also referred to as an external reference standard)
ICV = Initial Calibration Verification
CCV = Continuing Calibration Calibration
LCS = Laboratory Control Sample

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CORE LABORATORIES

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03/08/95

.B NUMBER: 950419

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A N A L Y T I C A L R E P O R T

Job Number: 950418
Prepared For:

ENVIRONMENTAL MANAGEMENT & ENG.
CARL ROPPOLO
437 INDUSTRIAL LANE
BIRMINGHAM, AL 35211

Date: 03/07/95

Rondalynn Mull
Signature

3-07-95
Date:

Name: Rondalynn Mull

Title: Laboratory Supervisor

Core Laboratories, Inc.
420 West First Street
Casper, WY 82601

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FINAL REPORT DISTRIBUTION
03/07/95

JB NUMBER: 950418

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CORE LABORATORIES

LABORATORY TESTS RESULTS
03/07/95

NUMBER: 950418 CUSTOMER: ENVIRONMENTAL MANAGEMENT & ENG. ATTN: CARL ROPPOLO

IPLE NUMBER: 1 DATE RECEIVED: 02/27/95 TIME RECEIVED: 08:40 SAMPLE DATE: 02/22/95 SAMPLE TIME: 07:50
)JECT: DRS-94-E894 SAMPLE: H1-1A REM: SOLID

IPLE NUMBER: 2 DATE RECEIVED: 02/27/95 TIME RECEIVED: 08:40 SAMPLE DATE: 02/22/95 SAMPLE TIME: 17:10
)JECT: DRS-94-E894 SAMPLE: H1-4A REM: SOLID

'PLE NUMBER: 3 DATE RECEIVED: 02/27/95 TIME RECEIVED: 08:40 SAMPLE DATE: 02/22/95 SAMPLE TIME: 15:25
)JECT: DRS-94-E894 SAMPLE: H3-2 REM: SOLID

PLE NUMBER: 4 DATE RECEIVED: 02/27/95 TIME RECEIVED: 08:40 SAMPLE DATE: 02/23/95 SAMPLE TIME: 14:55
JECT: DRS-94-E894 SAMPLE: H5-1 REM: SOLID

PLE NUMBER: 5 DATE RECEIVED: 02/27/95 TIME RECEIVED: 08:40 SAMPLE DATE: 02/24/95 SAMPLE TIME: 10:45
JECT: DRS-94-E894 SAMPLE: H3-1 REM: SOLID

PL BER: 6 DATE RECEIVED: 02/27/95 TIME RECEIVED: 08:40 SAMPLE DATE: 02/24/95 SAMPLE TIME: 11:50
JECT: DRS-94-E894 SAMPLE: H4-1 REM: SOLID

T DESCRIPTION	SAMPLE 1	SAMPLE 2	SAMPLE 3	SAMPLE 4	SAMPLE 5	SAMPLE 6	UNITS OF MEASURE
ium 226, by HPGe gamma	3.2	35.3	25.5	7.1	104	4.3	pCi/g
ium 226, HPGe,error, +/-	0.5	2.3	1.7	0.9	4.9	0.8	pCi/g
ium 228, by HPGe gamma	<1.2	<1.4	<0.7	<0.7	15.0	<0.4	pCi/g
ium 228, HPGe, error +/-					2.3		pCi/g

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CORE LABORATORIES

LABORATORY TESTS RESULTS
03/07/95

JB NUMBER: 950418 CUSTOMER: ENVIRONMENTAL MANAGEMENT & ENG. ATTN: CARL ROPPOLO

AMPLE NUMBER: 7 DATE RECEIVED: 02/27/95 TIME RECEIVED: 08:40 SAMPLE DATE: 02/24/95 SAMPLE TIME: 08:10
OJECT: DRS-94-E894 SAMPLE: H1-5A REM: SOLID

MPLE NUMBER: 8 DATE RECEIVED: 02/27/95 TIME RECEIVED: 08:40 SAMPLE DATE: 02/23/95 SAMPLE TIME: 10:10
OJECT: DRS-94-E894 SAMPLE: DC1-1 REM: SOLID

MPLE NUMBER: 9 DATE RECEIVED: 02/27/95 TIME RECEIVED: 08:40 SAMPLE DATE: 02/23/95 SAMPLE TIME: 11:05
ROJECT: DRS-94-E894 SAMPLE: DC1-4 REM: SOLID

MPLE NUMBER: 10 DATE RECEIVED: 02/27/95 TIME RECEIVED: 08:40 SAMPLE DATE: 02/21/95 SAMPLE TIME: 10:40
ROJECT: DRS-94-E894 SAMPLE: O6-1A REM: SOLID

MPLE NUMBER: 11 DATE RECEIVED: 02/27/95 TIME RECEIVED: 08:40 SAMPLE DATE: 02/21/95 SAMPLE TIME: 10:45
ROJECT: DRS-94-E894 SAMPLE: O6-2A REM: SOLID

EST DESCRIPTION	SAMPLE 7	SAMPLE 8	SAMPLE 9	SAMPLE 10	SAMPLE 11		UNITS OF MEASURE
idium 226, by HPGe gamma	<1.5	<0.3	<0.4	2.6	2.4		pCi/g
adium 226, HPGe,error, +/-				0.4	0.5		pCi/g
adium 228, by HPGe gamma	<0.8	<0.3	<0.1	<0.7	<0.3		pCi/g

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CORE LABORATORIES

QUALITY CONTROL REPORT
03/07/95

S NUMBER: 950418 CUSTOMER: ENVIRONMENTAL MANAGEMENT & ENG. ATTN: CARL ROPPOLO

ANALYSIS				DUPLICATES		REFERENCE STANDARDS		MATRIX SPIKES		
ALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
AMETER:Radium 226, by HPGe gamma			DATE/TIME ANALYZED:03/03/95 08:05							QC BATCH NUMBER:163946
ORTING LIMIT/DF:	UNITS:pCi/g		METHOD REFERENCE :EPA 901.1							TECHNICIAN:DF
NDARD	STD (GEM)	RA226 3/02	106000			103000	103			
NDARD	STD (GEM)	RA226 3/03	105000			103000	102			
LICATE	MD	950418-8	<0.3	<0.6	0					
AMETER:Radium 228, by HPGe gamma			DATE/TIME ANALYZED:03/03/95 09:31							QC BATCH NUMBER:163957
ORTING LIMIT/DF:	UNITS:pCi/g		METHOD REFERENCE :EPA 901.1							TECHNICIAN:DF
LICATE	MD	950418-8	<0.3	<0.3	0					

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QUALITY CONTROL FOOTER

METHOD REFERENCES

(1) EPA 600/4-79-020, Methods for Chemical Analysis of Water and Wastes, March 1983
(2) EPA SW-846, Test Methods for Evaluating Solid Waste, Third Edition, November 1990 and July 1992 update
(3) Standard Methods for the Examination of Water and Wastewater, 17th, 1989
(4) EPA 600/4-80-032, Prescribed Procedures for Measurement of Radioactivity in Drinking Water, August 1980
(5) Federal Register, Friday, October 26, 1984 (40 CFR Part 136)
(6) EPA 600/8-78-017, Microbiological Methods for Monitoring the Environment, December 1978

COMMENTS

(1) The data in the Laboratory Test Results Report may differ from the data in the QC Report due to calculations for sample preparation and/or dilutions.
(2) The "Time Analyzed" in the QC Report may not reflect the actual time of each analysis. The "Date Analyzed" is the actual date of analysis.
(3) Soil and sludge samples are reported on a wet basis or on an "as received" basis unless otherwise indicated.
(4) The data in this report are within the limits of uncertainty specified in the referenced method unless otherwise indicated.
(5) Analyses performed by a subcontract laboratory are indicated with an asterisk and associated code in the "Technician" data field.

Subcontract Laboratories	Code
Core Laboratories - Anaheim, CA	* AN
Core Laboratories - Aurora, CO	* AU
Core Laboratories - Casper, WY	* CA
Core Laboratories - Corpus Christi, TX	* CC
Core Laboratories - Houston, TX	* HP
Core Laboratories - Lake Charles, LA	* LC
Core Laboratories - Long Beach, CA	* LB
Other Subcontract Laboratories	* XX

DEFINITIONS

(1) NC = Not Calculable due to values lower than the reporting limit.
(2) ND = Not Detected above the reporting limit.

QC SAMPLE IDENTIFICATIONS

BLANKS

MB = Method Blank (also referred to as a preparation blank)
RB = Reagent Blank
IB = Instrument Blank
ICB = Initial Calibration Blank
CCB = Continuing Calibration Blank
HB = Holding Blank (also referred to as as a storage blank)

DUPLICATES

MSD = Matrix Spike Duplicate
MD = Method Duplicate

SPIKES

MS = Matrix Spike
MSD = Matrix Spike Duplicate
PDS = Post Digestion Spike
BS = Blank Spike (also referred to as a method spike)
SS = Surrogate Spike

REFERENCE STANDARDS

CS = Calibration Standard
RS = Reference Standard(also referred to as an external reference standard)
ICV = Initial Calibration Verification
CCV = Continuing Calibration Calibration
LCS = Laboratory Control Sample

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CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

Client

Project: Dresser Anadarko - Hobbs - NM
DRS - 96 - E893

Date Delivered

Samplers, (Signature): Cloyd Pelia

Analyses Requested: TPH | Metals | VOC | Semi Volatiles | | |

Send Report to: EMP

Phone

Remarks

Sample #	Date Sampled	Time Sampled	Sample Description	No. of Containers	TPH	Metals	VOC	Semi Volatiles			Remarks
H1-1A	2-22-95	7:56	Soil	1							
H1-1B	"	8:05	Soil	1							
H1-1C	"	8:15	Soil	1							
H1-1D	"	8:25	Soil	1							
H1-1E	"	840	Soil 5559	1	X	X	X	X	5559		Contact Carl Ryzwb
H1-1F	"	850	SOIL	1							
H1-1G	"	9:10	Soil	1							
H1-1H	"	9:20	Soil	1							
H1-1I	"	9:30	Soil	1							
H1-1J	"	9:45	Soil	1							
H1-1K	"	10:00	Soil	1							
H1-1L	"	1015	Soil 5560	1	X	X	X	X			
H1-1M	2-23-95	1120	Soil	1							
H1-1N	"	1140	Soil	1							
H1-1O	"	1150	Soil	1							
H1-1P	"	1250	Soil	1							

Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Cloyd Pelia	2/24/95 9:15				
Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Relinquished by (Signature)	Date Time	Received by Laboratory by (Signature)	Indicate Special Hazards Here		
	2-27-95	Kelly Hester			

D.C. # 1800

FIELD SAMPLE LOG

Project Name: Dresser Andsm - Hobbs-NM Sheet No. _____

Project No.: DRS-94-E893

Sample No.	Date	Location	Description	No. of Splits	Initials
HI-1A	2-22-95	Adjacent ~~to~~ (South of) Septic Tank 10'2" South of ~~Shop~~ bldg	Soil (0-6")	—	GP
HI-1B	"	16'3" West of East Prop line.	Soil (~~6~~"-2")	—	GP
HI-1C	"	"	Soil (2-4")	—	GP
HI-1D	"	"	Soil (4-6")	—	GP
HI-1E	"	"	Soil (~~4-6~~ 6-8')	—	GP
HI-1F	"	"	Soil (8-10')	—	GP
HI-1G	"	"	Soil (10-12')	—	GP
HI-1H	"	"	Soil (12-14')	—	GP
HI-1I	"	"	Soil (14-16')	—	GP
HI-1J	"	"	Soil (16-18')	—	GP
HI-1K	"	"	Soil (18-20')	—	GP
HI-1L	"	"	Soil (20-22')	—	GP
HI-1M	2-23-95	"	Soil (~~22-24~~ 25-27)	—	GP
HI-1N	"	"	Soil (27-29)	—	GP
HI-1O	"	"	Soil (29-31)	—	GP
HI-1P	"	"	Soil (31-33)	—	GP

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CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

Client

Project: Dresser Anderson - Hobbs - NM
DRS-94-B893

Samplers, (Signature): Capt Pelin

Date Delivered

Send Report to: EME

Phone

Remarks

Sample #	Date Sampled	Time Sampled	Sample Description	No. of Containers	TPH	Metals	VOC	Semi Vols.			Remarks
HI-2A	2/22/95	1055	Soil	1							
HI-2B	"	11.05	Soil	1							
HI-2C	"	11.20	Soil	1							
HI-2D	"	11.35	Soil	1							
HI-2E	"	12.00	Soil 5561	1	X	X	X	X			~~Capt~~ Capt Carl Riggle with analysis
HI-2F	"	1215	Soil	1							
HI-2G	"	1225	soil	1							
HI-2H	"	1240	Soil 5562	1	X	X	X	X			
HI-2I	"	13.20	Soil	1							
~~HI-2J~~	~~"~~		~~Soil~~	~~1~~							
HI-											

Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Capt Pelin	2/24/95 9:15				
Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Relinquished by (Signature)	Date Time	Received by Laboratory by (Signature)	Indicate Special Hazards Here		

FIELD SAMPLE LOG

Project Name: Dresser Anderson - Hobbs-NM Sheet No. _____

Project No.: DRS-94-E893

Sample No.	Date	Location	Description	No. of Splits	Initials
HI-2A	2/22/95	South of septic tank 15' 3" west of East Prop line	Soil (0-6")	—	GP
HI-2B	"	53' 6" South of office Shop bldg	Soil (6"-2')	—	GP
HI-2C	"	"	Soil (2-4')	—	GP
HI-2D	"	"	Soil (4-6')	—	GP
HI-2E	"	"	Soil (8-10')	—	GP
HI-2F	"	"	Soil (10-12')	—	GP
HI-2G	"	"	Soil (12-14')	—	GP
HI-2H	"	"	Soil (14-16')	—	GP
HI-2I	"	"	Soil (16-18')	—	GP
~~HI-2J~~	~~"~~		~~Soil (18-20')~~		

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CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

Client | Project: Dresser Axelson - Hobbs - NM DRS-94-E893 | Date Delivered | Analyses Requested | Send Report to: EMF

Samplers, (Signature): Angel Pena | Phone:

Sample #	Date Sampled	Time Sampled	Sample Description	No. of Containers	TPH	Metals	VOC	SemiVolat			Remarks
H1-3A	2-22-96	1155	Soil	1							
H1-3B	"	15.10	Soil	1							
H1-3C	"	15.20	Soil	1							
H1-3D	"	15.40	Soil	1							
H1-3E	"	15.50	Soil	1							Contact Carl Ryerson regarding gamma analysis
H1-3F	"	16.00	Soil	1							
H1-3G	"	16.15	Soil	1							
H1-3H	"	16.30	Soil	1							
H1-3I	"	16.40	Soil 5563	1	X	X	X	X			
				1							
H1-4A	"	17.00	Soil	1	*						
H1-4B	"	17.15	Soil	1							
H1-4C	"	17.25	Soil	1							
H1-4D	"	1750	Soil	1							
H1-4E	"	18.05	Soil	1							
H1-4F	"	18.15	Soil 5564	1	X	X					
H1-4G	"	18.25	Soil	1							

Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Angel Pena	2/24/96 9.15				
Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Relinquished by (Signature)	Date Time	Received by Laboratory by (Signature)	Indicate Special Hazards Here		

FIELD SAMPLE LOG

Project Name: Dresser Anderson - Hobbs - NM Sheet No. _____

Project No.: DRS-94-E893

Sample No.	Date	Location	Description	No. of Splits	Initials
HI-3A	2-22-95	~~South~~ 15'2" West of east Prop line	Soil 0-6"		
HI-3B	"	89'9" South of Shop &	Soil 6"-2"		
HI-3C	"	office bldg	Soil (2-4')		
HI-3D	"	"	Soil (6-8')		
HI-3E	"	"	Soil (8-10')		
HI-3F	"	"	Soil (10-12')		
HI-3G	"	"	Soil (12-14')		
HI-3H	"	"	Soil (14-16')		
HI-3I	"	"	Soil (16-18')		
HI-4A	2/22/95	41' West of east Prop line 48'7" South of Shop &	Soil (0-6")		
HI-4B	"	office bldg	Soil (6"-2")		
HI-4C	"	"	Soil (2-4')		
HI-4D	"	"	Soil (8-10')		
HI-4E	"	"	Soil (10-12')		
HI-4F	"	"	Soil (12-14')		
HI-4G	"	"	Soil (14-16')		

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CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

Client

Project: Dresser Avlon - Hobbs-NM DRS-94-E893

Samplers, (Signature): Carol Pena

Date Delivered

Send Report to: EME

Phone

Remarks

Sample #	Date Sampled	Time Sampled	Sample Description	No. of Containers	TPH	Metals	VOC	Semi Vols			Remarks
H1-4H	2/22/95	18-35	Soil 5564 H	1	X						
H1-3J	2-22-95	1615	Soil	1							
H1-3K	2-22-95	1640	Soil 5565	1	X	X	X	X			

Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Carol Pena	2/24/95 9:15				
Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Relinquished by (Signature)	Date Time	Received by Laboratory by (Signature)	Indicate Special Hazards Here		

FIELD SAMPLE LOG

Project Name: Dresser Axelson - Hobbs - NM Sheet No. _____

Project No.: DRS-94-E893

Sample No.	Date	Location	Description	No. of Splits	Initials
H1-4H	2/22/95	41' West of east prop line 48'7" South of shop & office bldg	Soil (16-18')		
H1-3J	2-23-95	15'2" West of east prop line 99'9" South of shop bldg	Soil (24-26')		
H1-3K	"	"	Soil (29-31')		

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CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

Client

Project: Dresser Axelson — Hobbs DRS-94-E893

Samplers, (Signature): Lloyd Penn

Date Delivered

Send Report to: EME

Phone

Remarks

Sample #	Date Sampled	Time Sampled	Sample Description	No. of Containers	TPH	Metals	VOC	Semi VOA			
HI-7A	2/27/95	10:40	Soil	1							
HI-7B	"	11:15	Soil	1							
HI-7C	"	11:30	Soil	1							
HI-7D	"	12:55	Soil 5642	1	X	X	X				
HI-8A	"	14:10	Soil	1							
HI-8B	"	14:40	Soil	1							
HI-8C	"	14:50	Soil	1							
HI-8D	"	17:25	Soil 5643	1	X	X	X	X			
HI-8	"	17:45	Water 5644	5	X	X	X	X			
HI-7	2-27-95	7:45	W.T. 5645	5	X	X	X	X			

Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Lloyd Penn	2/28/95 805				
Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Relinquished by (Signature)	Date Time 3-1-95 4:00 pm	Received by Laboratory by (Signature) Kelly Hester	Indicate Special Hazards Here		

FIELD SAMPLE LOG

Project Name: Dresser Anderson- Hobbs Sheet No. _____

Project No.: DRS- 94- E893

Sample No.	Date	Location	Description	No. of Splits	Initials
HI-7A	2/27/95	79' South of HI-3 16' West of east Prop line	Soil (0-6")	—	GP.
HI-7B	"	19'6' North of stone fence "	Soil (9-11')	—	GP.
HI-7C	"	"	Soil (14-16')	—	GP
HI-7D	"	"	Soil (29-31')	—	GP
HI-8A	"	83' from SW corner of main bldg.	Soil (0-6")	—	GP
HI-8B	"	63' west of east Prop line	Soil (9-11')	—	GP
HI-8C	"	"	Soil (14-16')	—	GP
HI-8D	"	"	Soil (29-31')	—	GP.
HI-8	"	"	Water	—	GP.
HI-7	2-28-95	79' South of HI-3 16' West of east Prop line	water		GP

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CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

Client

Project Dresser Axelson – Hobbs
DRS-94-E 893

Samplers, (Signature) James Smith

Date Delivered

Analyses Requested

Send Report to

Phone

Remarks

Sample #	Date Sampled	Time Sampled	Sample Description	No. of Containers	TPH	Metals	VOC	Spl Vol		
H3-1A	2-22-95	1455	Sludge 5575	1	X	X	X			
H3-2	"	15:25	Sludge 5576	1	X	X	X			
H4-1	"	1540	Sludge 5577	1	X	X	X			
H5-1	2-23-95	1455	Sludge 5578	1	X	X	X			
H3-1B	2-22-95	1455	water 5579	4		X	X	X		
H2-1A	2-22-95	1410	water 5580	5	X	X	X			

Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
James Smith	1200 2-23-95				
Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Relinquished by (Signature)	Date Time	Received by Laboratory by (Signature)	Indicate Special Hazards Here		

FIELD SAMPLE LOG

Project Name: Dresser Axelson – Hobbs Sheet No._____

Project No.: DRS-94-E893

Sample No.	Date	Location	Description	No. of Splits	Initials
H3-1A	2-22-95	North sump	sludge		
H3-2	2-22-95	South sump	sludge		
H4-1	2-22-95	Septic tank	sludge		
H5-1	2-23-95	exterior wash Rack	sludge		
H2-1A	2-22-95	on sit. well	water		
H3-1B	"	North sump	water		

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HI-5A ?

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

Client

Project: Dresser Anelsm- Hobbs DRS- 94-E893

Samplers, (Signature): Capt Perin

Date Delivered

Send Report to: EMF

Phone

Sample #	Date Sampled	Time Sampled	Sample Description	No. of Containers	TPH	METALS	Lead	SEMI			Remarks
HBG-1A	2/24/95	9.05	Soil 5572	1	X	X					
HBG-1B	"	9.10	Soil	1							
HBG-1C	"	9.20	Soil	1							
HI-5A	"	8.10	Soil 5573	1	X	X					
HI-5B	"	8.25	Soil	1							
HI-5C	"	8.40	Soil	1							
HI-5D	"	8.55	Soil [illegible]	1	X	X					
HI-6A	"	9.20	Soil 5574	1	X	X					
HI-6B	"	9.30	Soil	1							
HI-6C	"	9.50	Soil	1							

Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Capt Perin	2/24/95 12.0				
Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Relinquished by (Signature)	Date Time	Received by Laboratory by (Signature)	Indicate Special Hazards Here		

FIELD SAMPLE LOG

Project Name: Dresser Arelson – Hobbs Sheet No. _____

Project No.: DRS-94-E893

Sample No.	Date	Location	Description	No. of Splits	Initials
HBG-1A	2/24/95	East of office & shop bldg 60' NE Corner of bldg.	Soil (0-6") Backhoe	—	GP
HBG-1B	"	"	Soil (2-3') "	—	GP
HBG-1C	"	"	Soil (3-4') "	—	GP
HI-5A	"	6'10' West of east Prop line 71'4" South of shop bldg	Soil (0-6')	—	GP
HI-5B	"	"	Soil (4-6')	—	GP
HI-5C	"	"	Soil (9-11')	—	GP
HI-5D	"	"	Soil (14-16')	—	GP
HI-6A	"	39'4" west of east Prop line 72'6" South of shop bldg	Soil (0-6')	—	GP
HI-6B	"	"	Soil (9-11')	—	GP
HI-6C	"	"	Soil (14-16')	—	GP

Environmental Management & Engineering, Inc.
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Houston Office: (713) 939-7028 (205) 939-7029 Fax

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

Client

Project: Dresser Axelson – Hobbs DRS-94-E893

Samplers, (Signature): Gopal Pein

Date Delivered

Send Report to: EMF

Phone

Remarks

Sample #	Date Sampled	Time Sampled	Sample Description	No. of Containers	TPH	Metals	VOC	Semi Vols			Remarks
H1-1	2/24/95	8.05	Water 5570	5	X	X	X	X			
H1-3	"	10.15	Water 5571	5	X	X	X	X			

Analyses Requested

Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Gopal Pein	2/24/95 12.00				
Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Relinquished by (Signature)	Date Time	Received by Laboratory by (Signature)	Indicate Special Hazards Here		
	2-27	Kelly Hanks			

Ref # 1811

FIELD SAMPLE LOG

Project Name: Dresser Amulson - Hobbs Sheet No. _____

Project No.: DRS-94-E893

Sample No.	Date	Location	Description	No. of Splits	Initials
H1-1	2/24/95	10' 2" South of shop bldg 16' 3" west of east property line	Water	—	GP.
H1-3	"	15' 2" west of east property line 72' 6" South of bldg	Water	—	GP.

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CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

Client

Project: Dreeben Anderson-Hobbs · DRS-94-E893

Samplers, (Signature): Carl Rozek Capt Pair

Date Delivered

Send Report to: EME

Phone

Remarks

Sample #	Date Sampled	Time Sampled	Sample Description	No. of Containers	Analyses Requested: NORM	Screen
H29A	2/23/95	16:10	Soil	1	X	
H2-9B	"	16:15	Soil	1		
H2-10A	"	16:20	Soil	1	X	
H2-10B	"	16:25	Soil	1		
H2-11A	"	16:30	Soil	1	X	
H2-11B	"	16:35	Soil	1		

Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Carl Rozek	2/24/95 11:30				
Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Relinquished by (Signature)	Date Time 0845 2/27/95	Received by Laboratory by (Signature) Mark Erson	Indicate Special Hazards Here		

E[illegible] M[illegible] & [illegible], Inc.
Birmingham Office: (205) 940-7700 (205) 940-7701 Fax
Houston Office: (713) 939-7028 (205) 939-7029 Fax

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

Client:
Project: Dresser Arledson - Hobbs DRS-94-E893 Copy/Rin
Samplers, (Signature): [signature]
Date Delivered:
Send Report to: EME
Phone:

Sample #	Date Sampled	Time Sampled	Sample Description	No. of Containers	NORM	Screen					Remarks
H2-1A	2/23/93	14:50	Soil - 419-01 (H2-1A)	1	X						
H2-1B	"	14:55	Soil	1							
H2-2A	"	15:00	Soil	1	X						Following results
H2-2B	"	15:05	Soil	1							further analysis
H2-3A	"	15:10	Soil	1	X						MAY BE REQUIRE.
H2-3B	"	15:15	Soil								
H2-4A	"	15:20	Soil	1	X						
H2-4B	"	15:25	Soil	1							
H2-5A	"	15:30	Soil	1	X						
H2-5B	"	15:35	Soil	1							
H2-6A	"	15:40	Soil - 419-06	1	X						
H2-6B	"	15:45	Soil	1							
H2-7A	"	15:50	Soil 419-07 (H2-07A)	1	X						
H2-7B	"	15:55	Soil	1							
H2-8A	"	16:00	Soil	1	X						
H2-8B	"	16:05	Soil	1							

Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
[signature]	2/24/95 1130				
Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Relinquished by (Signature)	Date Time	Received by Laboratory by (Signature)	Indicate Special Hazards Here		
	2/27/95 0845	Mark Ensor			

Environmental Management & Engineering, Inc.
Birmingham Office: (205) 940-7700 (205) 940-7701 Fax
Houston Office: (713) 939-7028 (205) 939-7029 Fax

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

Client | Project | Date Delivered

Samplers, (Signature) Dresser Arelson – Hobbs
Carl Rymal DRS-94-E893 Copy/Rin

Sample #	Date Sampled	Time Sampled	Sample Description	No. of Containers	Analyses Requested: NORM	Analyses Requested: Screen				
H2-1A	2/23/95	14:50	Soil	1	X					
H2-1B	"	14:55	Soil	1						
H2-2A	"	15:00	Soil	1	X					
H2-2B	"	15:05	Soil	1						
H2-3A	"	15:10	Soil	1	X					
H2-3B	"	15:15	Soil	1						
H2-4A	"	15:20	Soil	1	X					
H2-4B	"	15:25	Soil	1						
H2-5A	"	15:30	Soil	1	X					
H2-5B	"	15:35	Soil	1						
H2-6A	"	15:40	Soil	1	X					
H2-6B	"	15:45	Soil	1						
H2-7A	"	15:50	Soil	1	X					
H2-7B	"	15:55	Soil	1						
H2-8A	"	16:00	Soil	1	X					
H2-8B	"	16:05	Soil	1						

Send Report to: EME
Phone:
Remarks: Following results further analysis may be require.

Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Carl Rymal	2/24/95 1130				
Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Relinquished by (Signature)	Date Time 2/27/95 0845	Received by Laboratory by (Signature) Mark Enson	Indicate Special Hazards Here		

APPENDIX B

1995 Soil Boring Logs

SUBSURFACE EXPLORATION LOG

Client:	Dresser Axelson	Page:	1 of 4
Project Number:	DRS-94-E893	Date:	02-22-95
Project Location:	Hobbs, NM	Drilling Method:	HSA
		Sampling Method:	SS
Boring Number:	H1-1	WELL COMPLETION INFORMATION	
Logged By:	JT/GP		
Drilled By:	Anderson & Associates	Screen Dia: NA Length: NA Type: NA	
		Slot Size: NA	
		Riser Dia: NA Length: NA Type: NA	

DEPTH	DESCRIPTION	INTERVAL	NUMBER	RECOVERY	BLOW COUNT	PID ppm	GRAPHIC	WELL COMP	WATER LVL	NORM
	Surface Elevation:									
	Limestone Fragments		A			0				0.2
1	Silt, Dark Gray to Dark Brown, Slightly Cayey		B			0				0.2
2										
	Sand, Buff, Fine Grained, Silty									
3			C			0				0.2
4										
5			D			0				0.2
6										
7	Petroleum Odor		E			7				0.2
8										
9			F			11				
10										
			G			19				
11										

SAMPLE TYPE: SS DRIVEN SPLIT SPOON RC ROCK CORE BORING METHOD: HAS HOLLOW STEM AUGER
ST PRESSED SHELBY TUBE CT CONT. TUBE DC DRIVEN CASING

SUBSURFACE EXPLORATION LOG

Client:	Dresser Axelson	Page:	2 of 4
Project Number:	DRS-94-E893	Date:	02-22-95
Project Location:	Hobbs, NM	Drilling Method:	HSA
		Sampling Method:	SS
Boring Number:	H1-1 (Contd...)	WELL COMPLETION INFORMATION	
Logged By:	JT/GP		
Drilled By:	Anderson & Associates	Screen Dia: NA Length: NA Type: NA	
		Slot Size: NA	
		Riser Dia: NA Length: NA Type: NA	

DEPTH	DESCRIPTION	INTERVAL	NUMBER	RECOVERY	BLOW COUNT	PID ppm	GRAPHIC	WELL COMP	WATER LVL	NORM
	Surface Elevation:									
	Petroleum odor									
12	Buff, Silty, Gray, Petroleum Odor		H			9				
13										
14	Sand, Silt, Light Gray, Petroluem Odor		I			35				
15										
16	Sand, Silt, Light Gray, Petroleum Odor		J			30				
17										
18	Petroleum Odor		K			13				
19										
20			L			40				
21										
22										

SAMPLE TYPE: SS DRIVEN SPLIT SPOON RC ROCK CORE BORING METHOD: HAS HOLLOW STEM AUGER
ST PRESSED SHELBY TUBE CT CONT. TUBE DC DRIVEN CASING

SUBSURFACE EXPLORATION LOG

Client:	Dresser Axelson	Page:	3 of 4
Project Number:	DRS-94-E893	Date:	02-22-95
Project Location:	Hobbs, NM	Drilling Method:	HSA/AR
		Sampling Method:	SS
Boring Number:	H1-1 (Contd...)	WELL COMPLETION INFORMATION	
Logged By:	JT/GP		
Drilled By:	Anderson & Associates	Screen Dia: NA Length: NA Type: NA	
		Slot Size: NA	
		Riser Dia: NA Length: NA Type: NA	

DEPTH	DESCRIPTION	INTERVAL	NUMBER	RECOVERY	BLOW COUNT	PID ppm	GRAPHIC	WELL COMP	WATER LVL	NORM
	Surface Elevation:									
23	Sandstone, White to Brown (02-23-95 switched to Air Rotary with tricone bit)									
24										
25	Sand, Brown, Silty, Petroleum Odor									
26			M			10				
27										
28			N			12				
29										
30			O			8				
31	Sand, Brown, Silty, Petroleum odor									
32	Groundwater Black Organic		P			6				
33										

SAMPLE TYPE: SS DRIVEN SPLIT SPOON RC ROCK CORE BORING METHOD: HAS HOLLOW STEM AUGER
ST PRESSED SHELBY TUBE CT CONT. TUBE DC DRIVEN CASING

SUBSURFACE EXPLORATION LOG

Client:	Dresser Axelson	Page:	4 of 4
Project Number:	DRS-94-E893	Date:	02-23-95
Project Location:	Hobbs, NM	Drilling Method:	AR
		Sampling Method:	SS
Boring Number:	H1-1 (Contd...)	WELL COMPLETION INFORMATION	
Logged By:	JT/GP		
Drilled By:	Anderson & Associates	Screen Dia: NA Length: NA Type: NA	
		Slot Size: NA	
		Riser Dia: NA Length: NA Type: NA	

DEPTH	DESCRIPTION	INTERVAL	NUMBER	RECOVERY	BLOW COUNT	PID ppm	GRAPHIC	WELL COMP	WATER LVL	NORM
	Surface Elevation:									
34	Hole Adjusted to 37' Using Air Rotary Techniques									
	Set Screen from 25' to 35'									
35										
36										
37	Bottom									
38										
39										
40										
41										
42										
43										
44										

SAMPLE TYPE: SS DRIVEN SPLIT SPOON RC ROCK CORE BORING METHOD: HAS HOLLOW STEM AUGER
ST PRESSED SHELBY TUBE CT CONT. TUBE DC DRIVEN CASING

SUBSURFACE EXPLORATION LOG

Client: Dresser Axelson
Project Number: DRS-94-E893
Project Location: Hobbs, NM

Page: 1 of 1
Date: 02-22-95
Drilling Method: HSA
Sampling Method: SS

Boring Number: H1-2
Logged By: JT/GP
Drilled By: Anderson & Associates

WELL COMPLETION INFORMATION

Screen Dia: NA Length: NA Type: NA
Slot Size: NA
Riser Dia: NA Length: NA Type: NA

DEPTH	DESCRIPTION	INTERVAL	NUMBER	RECOVERY	BLOW COUNT	PID ppm	GRAPHIC	WELL COMP	WATER LVL	NORM
	Surface Elevation:									
2	Sand, Some Stone		A			0				
			B			0				
4	Sand, White Silty		C			0				
6	Sand, White Silty, Some Limestone Rock		D			0				
8										
10	Sand, White Silty, Petroleum Odor		E			7				
12	Sand, Buff to White, Silty		F			11				
	Odor		G			8				
14										
16	Sand, White Buff Silty Odor (Solvents)		H			15				
18	Odor		I			14				
20	Sandstone Bottom									
22										

SAMPLE TYPE: SS DRIVEN SPLIT SPOON RC ROCK CORE BORING METHOD: HAS HOLLOW STEM AUGER
ST PRESSED SHELBY TUBE CT CONT. TUBE DC DRIVEN CASING

SUBSURFACE EXPLORATION LOG

Client:	Dresser Axelson	Page:	1 of 1
Project Number:	DRS-94-E893	Date:	02-23-95
Project Location:	Hobbs, NM	Drilling Method:	HSA
		Sampling Method:	SS
Boring Number:	H1-3		
Logged By:	JT/GP		
Drilled By:	Anderson & Associates		

WELL COMPLETION INFORMATION

Screen Dia: NA Length: NA Type: NA
Slot Size: NA
Riser Dia: NA Length: NA Type: NA

DEPTH	DESCRIPTION	INTERVAL	NUMBER	RECOVERY	BLOW COUNT	PID ppm	GRAPHIC	WELL COMP	WATER LVL	NORM
	Surface Elevation:									
	Sand, Some Stone		A			0				
	Sand, Silt, Clay		B			0				
4	Sand, Silt, Buff		C			0				
	Rock									
8	Sand, Silt, Buff		D			0				
	Sand, Silt,White Buff		E			0				
12	Sand, White Buffy Limestone		F			0				
	Sand, Silt, Tan		G			0				
			H			0				
16			I			2				
	(02-23-95 Switched to Air Rotary with Tricone Bit) Rock									
20										
24	Sand, Brown, Silty		J			4				
28										
			K			10				
32										
36										
	Bottom									
40										
44										

SAMPLE TYPE: SS DRIVEN SPLIT SPOON RC ROCK CORE BORING METHOD: HAS HOLLOW STEM AUGER
ST PRESSED SHELBY TUBE CT CONT. TUBE DC DRIVEN CASING

SUBSURFACE EXPLORATION LOG

Client:	Dresser Axelson	Page:	1 of 1
Project Number:	DRS-94-E893	Date:	02-22-95
Project Location:	Hobbs, NM	Drilling Method:	HSA
		Sampling Method:	SS
Boring Number:	H1-4	WELL COMPLETION INFORMATION	
Logged By:	JT/GP		
Drilled By:	Anderson & Associates	Screen Dia: NA	Length: NA Type: NA
		Slot Size: NA	
		Riser Dia: NA	Length: NA Type: NA

DEPTH	DESCRIPTION	INTERVAL	NUMBER	RECOVERY	BLOW COUNT	PID ppm	GRAPHIC	WELL COMP	WATER LVL	NORM
	Surface Elevation:									
0	Sand, Silty, Brown to gray		A			0				
2			B			0				
4			C			0				
6										
8										
10	Sand, Silt, White Buffy		D			0				
12			E			0				
14			F			0				
16			G			0				
18			H			0				
18	Bottom									
20										
22										

SAMPLE TYPE: SS DRIVEN SPLIT SPOON RC ROCK CORE BORING METHOD: HAS HOLLOW STEM AUGER
ST PRESSED SHELBY TUBE CT CONT. TUBE DC DRIVEN CASING

SUBSURFACE EXPLORATION LOG

Client:	Dresser Axelson	Page:	1 of 1
Project Number:	DRS-94-E893	Date:	02-22-95
Project Location:	Hobbs, NM	Drilling Method:	HSA
		Sampling Method:	SS
Boring Number:	H1-5	WELL COMPLETION INFORMATION	
Logged By:	JT/GP		
Drilled By:	Anderson & Associates	Screen Dia: NA Length: NA Type: NA	
		Slot Size: NA	
		Riser Dia: NA Length: NA Type: NA	

DEPTH	DESCRIPTION	INTERVAL	NUMBER	RECOVERY	BLOW COUNT	PID ppm	GRAPHIC	WELL COMP	WATER LVL	NORM
	Surface Elevation:									
	Sand and Gravel with Silt		A			0				0.2
1	Clay, Gray, Silty		B NORM							
2	Sand, White, Silty, Gravel									
3										
4										
5			B			0				0.2
6										
7										
8										
9										
10	Bottom		C			0				0.2
11										

SAMPLE TYPE: SS DRIVEN SPLIT SPOON RC ROCK CORE BORING METHOD: HAS HOLLOW STEM AUGER
ST PRESSED SHELBY TUBE CT CONT. TUBE DC DRIVEN CASING

SUBSURFACE EXPLORATION LOG

Client:	Dresser Axelson	Page:	1 of 1
Project Number:	DRS-94-E893	Date:	02-24-95
Project Location:	Hobbs, NM	Drilling Method:	HSA
		Sampling Method:	SS
Boring Number:	H1-6		
Logged By:	JT/GP		
Drilled By:	Anderson & Associates		

WELL COMPLETION INFORMATION

Screen Dia:	NA	Length:	NA	Type:	NA
Slot Size:	NA				
Riser Dia:	NA	Length:	NA	Type:	NA

Surface Elevation:

DEPTH	DESCRIPTION	INTERVAL	NUMBER	RECOVERY	BLOW COUNT	PID ppm	GRAPHIC	WELL COMP	WATER LVL	NORM
0	Sand and Gravel, White		A			0				0.2
	Clay, dark Brown, Silty		B							
2	Sand, Buff, Gravel, Silty		NORM							
4										
6										
8										
10			B			0				0.2
			C							
12										
14										
			D			0				0.2
16	Bottom (Refusal)									
18										
20										
22										

SAMPLE TYPE: SS DRIVEN SPLIT SPOON RC ROCK CORE BORING METHOD: HAS HOLLOW STEM AUGER
ST PRESSED SHELBY TUBE CT CONT. TUBE DC DRIVEN CASING

SUBSURFACE EXPLORATION LOG

Client:	Dresser Axelson	Page:	1 of 1
Project Number:	DRS-94-E893	Date:	02-27-95
Project Location:	Hobbs, NM	Drilling Method:	HSA/AR
		Sampling Method:	SS
Boring Number:	H1-7	WELL COMPLETION INFORMATION	
Logged By:	JT/GP		
Drilled By:	Anderson & Associates	Screen Dia: NA Length: NA Type: NA	
		Slot Size: NA	
		Riser Dia: NA Length: NA Type: NA	

DEPTH	DESCRIPTION	INTERVAL	NUMBER	NORM #	BLOW COUNT	PID ppm	GRAPHIC	WELL COMP	WATER LVL	NORM
	Surface Elevation:									
	Sand and Gravel, White		A	A		0				0.2
	Clay,Brown to Gray, Silty, Sandy, Damp			B						
4										
	Rock in Spoon (No Samples)									
	Rock									
8										
	Clay, White, Moist, Plastic									
	Rock									
	Sand, Silt, White, Buffy		B			0				0.2
12	Sand,Buff to White Silty, Dry									
			C			0				0.2
16										
20	Rock (Switched to Air Rotary with Tricone Bit)									
	Rock, Sandstone									
24										
	Sand,Brown, Silty									
28										
			D			0				0.2
	Groundwater									
32										
36										
	Bottom									
40										
44										

SAMPLE TYPE: SS DRIVEN SPLIT SPOON RC ROCK CORE BORING METHOD: HAS HOLLOW STEM AUGER
ST PRESSED SHELBY TUBE CT CONT. TUBE DC DRIVEN CASING

SUBSURFACE EXPLORATION LOG

Client:	Dresser Axelson	Page:	1 of 1
Project Number:	DRS-94-E893	Date:	02-27-95
Project Location:	Hobbs, NM	Drilling Method:	HSA/AR
		Sampling Method:	SS
Boring Number:	H1-8	WELL COMPLETION INFORMATION	
Logged By:	JT/GP		
Drilled By:	Harrison	Screen Dia: NA	Length: NA Type: NA
		Slot Size: NA	
		Riser Dia: NA	Length: NA Type: NA

DEPTH	DESCRIPTION	INTERVAL	NUMBER	NORM #	BLOW COUNT	PID ppm	GRAPHIC	WELL COMP	WATER LVL	NORM
	Surface Elevation:									
	Sand and Gravel, White		A							
	Clay,Gray to Brown, Silty, Sandy			B						
4										
	Empty Spoon									
	Sand, Buff, Silty									
8										
			B							
	Clay, White, Moist									
12										
			C							
16	Sand, White, Silty, Fine Grained									
	Rock, Sandstone, Brown, Indurated									
20										
	Rock									
	Sandstone, Brown, Indurated, Very Hard									
24										
	Sand, Fine Grained, Brown, Silty									
28										
			D							
	Groundwater									
32										
36										
	Bottom									
40										
44										

SAMPLE TYPE: SS DRIVEN SPLIT SPOON RC ROCK CORE BORING METHOD: HAS HOLLOW STEM AUGER
ST PRESSED SHELBY TUBE CT CONT. TUBE DC DRIVEN CASING

APPENDIX C

HSI GeoTrans Standard Operating Procedures

APPENDIX 1
STATIC WATER LEVEL MEASUREMENTS

A) PREPARATION

BEFORE ARRIVAL AT THE SITE.

1. **EQUIPMENT**. As with other field activities, start the day by performing battery and calibration checks on all of your site monitoring instruments. Fill out the appropriate calibration forms for each instrument. Retain these forms with the rest of the paperwork for the day, for later submittal to the office. Recalibrate instruments as needed, following the manufacturers' guidelines. It is assumed here that all personnel are familiar with the proper procedures for maintaining, calibrating and operating the various instruments and other items of equipment.

   Equipment and tools required for well opening and static water level measurements may include the following:

   - OVA (FID or PID);
   - Explosimeter;
   - Electric sounder or interface probe;
   - Teflon bailer with hand reel;
   - Decontamination buckets;
   - Cleaning brushes;
   - Keys for well locks;
   - Bolt cutters;
   - Well cap wrench;
   - Tool box with socket set, screwdrivers, pliers, other basic tools for field maintenance;
   - Mobile phone and/or pagers; and
   - Water cooler.

2. **THE SAMPLING VEHICLE.** At the beginning of each day, the vehicle is checked for the following:

   - The vehicle should be stocked each day with sufficient quantities of Tyvek suits, nitrile gloves and liners, respirator cartridges (dust/particle and organic vapor/acid gas), safety glasses, ear plugs, safety cones, trash bags and paper towels.

   - Fill the water cooler with ice water for drinking, sufficient for all personnel to be involved that day.

   - Make sure that Gatorade is available for all personnel. Make sure the mobile phone is plugged in and working.

   - Fill one set of water buckets for decontamination and one set for hand washing. Each set will include one bucket with potable water and soap (Alconox), one bucket of potable rinse water and one bucket of reagent grade (Type II) rinse water.

   - Fill two Teflon wash bottles with reagent grade (Type II) water.

3. **RECORD KEEPING.** The forms and other paperwork required during groundwater level measurements may include the following items. These should be kept with the vehicle during the course of the activity:

- The site-specific Health and Safety (H&S) Plan;
- Tailgate safety meeting form signed by all personnel;
- Field log book;
- Field data log sheet-static water levels; and
- Site safety monitoring data sheet.

Other forms that may be used during the day include:

- Instrument calibration sheets; and
- Daily equipment use forms.

4. **HEALTH AND SAFETY.** Make sure that all personnel have the proper personal protective equipment (PPE). This will typically include hard hats, steel toed boots, respirators (half- or full-face), Tyvek suits, safety glasses and earplugs. Additional equipment may be required by the site-specific H&S Plan. Make sure the sampling vehicle is equipped with a first aid kit, eyewash, fire extinguisher and copies of the corporate and site-specific Health and Safety Plans. These items should remain with the vehicle at all times.

AFTER ARRIVAL AT THE SITE.

1. **TAILGATE SAFETY MEETING.** As with other types of field activities, a tailgate safety meeting is held after arrival at the first work site of the day. Be sure that all individuals present are aware of potential hazards. All individuals sign the tailgate safety form. If at any time an employee becomes uncomfortable or unsure about the conditions at the site or the work he or she has been asked to do, vacate the site and contact the Project Manager. As with other types of sampling activities, the work area (exclusion zone) should be delineated with cones, caution tape or other approved safety devices.

2. **SITE SETUP.** Unlike other types of field activities, static water level measurement collection is normally a quick "in and out" procedure. A formal site delineation with caution tape, cones, etc., will not normally be required unless the well is to be left open for an extended period of time. Traffic safety devices will be required when working in streets or parking lots.

3. **OPENING THE WELL.** If wells have not been previously sampled or are known to have high VOC concentrations, assume that VOCs exist around the wells until screening indicates otherwise. Follow any special requirements of the site-specific H&S Plan when working around any monitoring well. The following steps should be followed when opening and approaching a well with high or unknown VOC concentrations.

- Wear a respirator when approaching the well.

- Unlock the well cover and remove the well cap.

- Screen the area around the well with the OVA and the explosimeter. If the explosimeter reads 15 percent of the LEL or greater, move personnel, vehicles and equipment away from the well and allow the gases to dissipate. If the OVA reading falls below the level at which the Health and Safety Plan requires respirator use, respirators can be removed.

- When there is no LEL problem around the well, check inside the casing with both instruments. If 15 percent or greater of the LEL is detected in the casing and does not dissipate quickly, close the well and leave the site.

- Record instrument readings on the static water level form.

- Visually inspect the monitoring well, making note of any damage.

- Use a mirror or flashlight to shine light into the well. A sheen or rainbow effect visible on the water surface is an indication of floating product.

B) MEASUREMENT

1. Determine where the elevation datum is located on the well casing. Typically, there will be a notch cut into the casing. Make the water level measurements from the top of this notch. If there is no notch or other indicator such as a mark made by a felt tip pen, take the measurements from the high spot on the casing. If none of these apply, measure from the north side of the casing.

2. Make a note of the datum used on the static water level form.

3. Lower the sounder or interface probe into the well. The probe will emit a specific tone, described in the instruction manual, upon contact with the first liquid surface.

4. If an interface probe is used, the tones will be different for water and water with floating product. Record both measurements.

5. If product is encountered, continue to lower the probe until it contacts water and record this value as well.

6. Check for potential measurement errors by comparing the new water level measurement with data from past measurements.

7. If high readings were obtained with the OVA or explosimeter and no immiscible layer was detected with the interface probe, lower the acrylic bailer to about one half it's length below the water surface, retrieve a sample, and check it for floating product.

8. Check for a heavy (sinking) immiscible layer and measure the total depth of the well by lowering the interface probe to the bottom of the well.

9. Record the measurements.

10. When raising the probe, wipe the tape to remove excess fluids.

11. After raising the probe, decontaminate the probe and tape. Wash with Alconox and potable water, then rinse with potable water followed by Type II reagent grade water. Refer to the Workplan or Health and Safety Plan for project specific decontamination procedures.

12. Before leaving the well, make sure the well cap, the cover and the lock are replaced. Pack the equipment and move on to the next well.

APPENDIX 2
GROUNDWATER SAMPLING

A) MOBILIZATION

BEFORE ARRIVAL AT THE SITE.

1. **EQUIPMENT.** As with other field activities, start each day by performing battery and calibration checks on all of the site monitoring and sampling instruments. Fill out the appropriate calibration forms for each instrument. Retain these forms with the rest of the paperwork for the day, for later submittal to the office. Recalibrate instruments as needed, following the manufacturers' guidelines. It is assumed here that all personnel are familiar with the proper procedures for maintaining, calibrating and operating the various instruments and other items of equipment. If you are unfamiliar or unsure about a particular piece of equipment, contact your supervisor for instruction.

   Equipment and tools required for groundwater sampling, well opening and purged water handling may include the following:

   - OVA (FID or PID);
   - Explosimeter;
   - pH meter;
   - Dissolved oxygen meter;
   - Turbidity meter;
   - Temperature/conductivity meter;
   - Interface probe;
   - Teflon bailers;
   - Decontamination buckets;
   - Cleaning brushes;
   - Keys for well locks;
   - Bolt cutters;
   - Well cap wrench;
   - Bung wrench for opening drums;
   - Drum dolly;
   - Tool box with socket set, screwdrivers, pliers, other basic tools for field maintenance;
   - Sufficient drums to contain all purged water;
   - Mobile phone and/or pagers; and
   - Water cooler.

2. **THE SAMPLING VEHICLE.** At the beginning of each day, check for the following:

   - The vehicle should be stocked each day with sufficient quantities of Tyvek suits, nitrile gloves and liners, respirator cartridges (dust/particle and organic vapor/acid gas), safety glasses, ear plugs, safety cones, trash bags and paper towels.
   - Check and refill, if necessary, all fluids required for equipment operation; oil, gas and antifreeze for the generator and hydraulic fluid for the sampling boom.
   - Fill the water cooler with ice water for drinking, sufficient for all personnel to be involved that day.

- Make sure that Gatorade is available for all personnel. Make sure the mobile phone is plugged in and working.

- Fill one set of water buckets for decontamination and one set for hand washing. Each set will include one bucket with potable water and soap (Alconox), one bucket of potable rinse water and one bucket of reagent grade (Type II) rinse water. Fill two Teflon wash bottles with reagent grade water. Refer to the project specific Workplan for decontamination specifics.

3. **RECORD KEEPING.** The forms and paperwork required for groundwater sampling may include the following. These should be kept with the sampling vehicle during the course of the work.

- The site-specific Health and Safety (H&S) Plan
- Tailgate safety meeting form sign by all personnel
- Field log book
- Field Data Log Sheet-Well Sampling
- Sample Chain-of-custody
- Sample container labels
- Site safety monitoring data sheet

Other forms that will be used during the day but do not have to be carried in the field include:

- Instrument calibration sheets; and
- Daily equipment use forms.

4. **SAMPLE CONTAINERS**

- Check the Workplan to determine what analytical procedures are to be run on the samples to be collected that day.

- Check with the project manager as to which laboratory will be used and determine the type and quantity of bottles required for each analysis. Bottles may be glass (clear or amber), polyethylene or Teflon, ranging in size from 40 ml VOC vials to 1-liter bottles.

- Determine how many ice chests will be needed for the water samples to be collected that day.

- Stock the ice chests with the appropriate sampling bottles needed for the day, and with enough "blue ice" to maintain the temperature of the empty sample bottles at about 4 degrees Celsius. Five or six blocks of "blue ice" are sufficient. Make sure the blocks are completely frozen and that none of them are cracked.

- Prepare the appropriate labels for sample containers and storage drums.

5. **HEALTH AND SAFETY.** Make sure that all personnel have the proper personal protective equipment (PPE). This will typically include hard hats, steel toed boots, respirators (half- or full-face), Tyvek suits, safety glasses and earplugs. Additional equipment may be required by the site-

specific Health and Safety Plan. Make sure the sampling vehicle is equipped with a first aid kit, eyewash, fire extinguisher and copies of the corporate and site-specific Health and Safety Plans. These items should remain with the vehicle at all times.

6. **QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS.** Quality assurance/quality control (QA/QC) requirements for water sampling may include the collection of field duplicates or triplicates, trip blanks, ambient blanks and equipment blanks. These requirements may vary from one project to another and from one laboratory to another. Specific requirements for QA/QC blanks for water sampling will be established in the Workplan for each individual project.

   a. Trip blanks will normally be supplied by the laboratory. They consist of sealed 40 ml VOC bottles filled with Type II reagent grade water. They are placed in the coolers used to carry the groundwater samples and travel with the samples throughout the sampling activity and the trip to the laboratory. They are handled like a sample, and are never opened in the field. The number of VOAs required for each cooler will be established by the testing laboratory.

   b. In some cases, the laboratory will not provide sealed trip blanks but will supply the VOC bottles, prepared with HCl. In this case, the trip blanks must be filled during the mobilization phase of the sampling day before arrival at the work site. This is done by filling the appropriate number of VOC bottles with Type II reagent grade water so that no bubble and no headspace remains after the bottle is capped. Never touch the inside of the bottle while filling it. After capping, check the bottle for bubbles by turning it upside down and tapping it gently against a hard surface such as a table top. Any bubbles will rise and become visible. If bubbles are present, remove the cap, discard the contents, refill, and reseal.

   c. VOAs for the ambient blanks must be filled with Type II water at the work site and left open while the sampling activity continues. Make sure to set them in a safe place where they won't be knocked over. Before leaving the site, top off the VOAs with Type II water to replace evaporation losses, cap the VOAs and place them in the sample cooler. They are then treated like a sample.

   d. Equipment blanks should be prepared immediately prior to collecting the samples. The Teflon bailer or other sampling device to be used for the water sampling should be filled with Type II reagent grade water. This water should then be decanted into the previously prepared bottles. Do not allow the water to come in contact with any objects except the bailer/sampler and the containers being filled.

   e. Once per every ten wells sampled, a duplicate set of samples may be collected at a well. This set will be identical to the regular set collected for the well.

   f. The duplicate set will be labeled with a mock well number which will be used for identification on the chain of custody.

   g. There should be nothing on the label or on the chain of custody that might alert the laboratory that it is a duplicate.

h. The well number and duplicate number are noted in the log book. See the Workplan for specific QA/QC and duplicate sample protocols.

AFTER ARRIVAL AT THE SITE.

1. **TAILGATE SAFETY MEETING.** As with other types of sampling, a tailgate safety meeting is held after arrival at the first work site of the day. Be sure that all individuals present are aware of potential hazards. All individuals must sign the tailgate safety form. If at any time an employee becomes uncomfortable or unsure about the conditions at the site or the work he or she has been asked to do, vacate the site and contact the Project Manager.

2. **SITE SETUP.** As with other types of sampling activities, the work area (exclusion zone) should be delineated with cones, caution tape or other approved safety devices.

   - Set up the work tables and sampling and water testing equipment.
   - Position the sampling truck and drums for purged water downwind for the well.
   - Make sure the drums are close enough to the truck for the drain line to reach.
   - Prepare the ambient blanks at this time. After preparation, the ambient VOAs are left exposed in the open while the sampling is completed at the well. They are then stored, handled, shipped, and analyzed like the trip blanks.

3. **OPENING THE WELL.** If wells have not been previously sampled or are known to have high VOC concentrations, assume that volatile organic compounds exist around all wells until screening indicates otherwise. Follow any special requirements of the site-specific H&S Plan when working around any monitoring well. The following steps may be required when opening a well with high or unknown VOC concentrations.

   - Don a respirator before approaching the well.
   - Unlock the well cover and remove the well cap.
   - Screen the area around the well with the OVA and the explosimeter. If the explosimeter reads 15 percent of the LEL or greater, move personnel, vehicles and equipment away from the well and allow the gases to dissipate. If the OVA reading falls below the level at which the H&S Plan requires respirator use, respirators can be removed.
   - When there is no LEL problem around the well, check inside the casing with both instruments. If 15 percent or greater of the LEL is detected in the casing and does not dissipate quickly, close the well and leave the site. The downhole sampling pumps are <u>not</u> intrinsically safe from explosive hazards and should never be placed in wells where such hazards are present.
   - Visually inspect the well, making not of any damage.
   - Record all instrument readings on the well sampling form.

B) SAMPLING PROCEDURE

1. INITIAL MEASUREMENTS

a. Visually inspect the monitoring well, making note of any damage. Use a mirror or flashlight to shine light into the well. A sheen or rainbow effect visible on the water surface is an indication of floating product.

b. Determine where the elevation datum is located on the well casing. Typically, there will be a notch cut into the casing. Make the water level measurements from the top of this notch. If there is no notch or other indicator such as a mark made by a felt tip pen, take the measurements from the high spot on the casing. If none of these apply, measure from the north side of the casing. Make a note of the datum used on the well purging form.

c. Lower the interface probe into the well. The probe will emit a specific tone, described in the instruction manual, upon contact with the first liquid surface. The tones are different for water and water with floating product.

d. Record this measurement.

e. If product is encountered, continue to lower the probe until it contacts water and record this value as well.

f. Check for potential measurement errors by comparing the new water level measurement with data from past measurements.

g. If high readings were obtained with the OVA or explosimeter and no immiscible layer was detected with the interface probe, lower the acrylic bailer to about one half it's length below the water surface, retrieve a sample, and check it for floating product.

h. Check for a heavy (sinking) immiscible layer and measure the total depth of the well by lowering the interface probe to the bottom of the well.

i. Record the measurements.

j. When raising the probe, wipe the tape to remove excess fluids.

2. PURGING THE WELL

a. Calculate the volume of water in the borehole based on the length of the water column and the volume of water per foot of casing and well screen.

b. Position the boom directly over the well.

c. Lower the sampling pump to five feet below the surface of the water at its maximum previous draw down.

This information can be obtained from the purge sheets from previous sampling rounds, or from the well development sheet if the well has not previously been sampled. Lower

the pump carefully, to minimize the agitation of sediments in the well and the adjacent formation.

d. Begin pumping at a rate that will not cause water to cascade through the screen.

e. After pumping the first ten gallons of water, take a water level measurement.

f. Collect the first set of water quality data. The water quality readings include temperature, pH, electrical conductivity (EC), turbidity and dissolved oxygen (D.O.). Also note physical characteristics of the water, including color, odor, sheen, etc.

g. After these initial readings, continue pumping the well. Take an additional set of readings after each time a complete borehole volume is purged from the well.

h. Samples can be collected after three borehole volumes have been purged from the well and the temperature, pH, EC and turbidity have stabilized. Stabilization is defined as follows:

- Temperature ± 1 degree Celsius
- pH ± 0.1
- EC ± 5 percent
- Turbidity <5 NTU

i. If these parameters have not stabilized after three borehole volumes have been purged, continue pumping the well.

j. Take additional readings after purging each additional volume.

k. The sample can be collected after the parameters do stabilize or six borehole volumes have been removed, whichever occurs first.

3. **SAMPLE COLLECTION**. Samples shall be collected after the water level has recovered to 80 percent of its static level or 16 hours after purging, whichever occurs first. An exception to the above rules occur if the well is pumped dry before three volumes have been removed. In this case, the sample should be collected as soon as a sufficient volume of fluid has reentered the well. Water sample collection includes the following steps:

a. All containers should be labeled before filling.

b. To collect the sample, lower the Teflon bailer to just below the water surface. Lower it slowly to minimize the agitation in the well and the water sample.

c. After ten seconds, reel up the bailer and fill the sample containers.

d. Sample containers are filled in the following order, depending on the analyses to be run:

- Volatile organics.
- Unfiltered metals.

- Total petroleum hydrocarbons - volatile fraction.
- Semivolatile organics.
- Total petroleum hydrocarbons - non-volatile fraction.
- Filtered general minerals.
- Filtered metals.

e. Water samples should not come in contact with any objects except the bailer in which they are collected and bottles in which they are transported.

f. Care should be taken to minimize the exposure of water samples to atmospheric oxygen.

g. All VOAs should be filled so that no headspace exists and no air bubbles are present.

h. Other containers should be filled, without overfilling, to minimize headspace and air bubbles.

i. All sample bottles should be promptly placed in the ice chests after filling.

j. All VOAs, including the blanks, must be kept together in the same ice chest.

C) **EQUIPMENT DECONTAMINATION.** All equipment that has come in contact with possible contaminants must be decontaminated before leaving each well. This must be done after the completion of sampling activity at each well. Conduct all on-site decontamination procedures in the back of the equipment truck. Use the appropriate protective equipment listed in the site H&S Plan. The following steps are included:

1. All equipment should first be rinsed off with the steam cleaner to remove all gross contaminants.

2. The equipment should then be washed with water and industrial soap, rinsed with potable water, then rinsed with Type II reagent grade water. Bailers should be wrapped in a plastic bag.

3. When decontamination procedures are finished, place all fluids in a separate drum, properly labeled to indicate the contents. See the Workplan or Health and Safety Plan for specific deconning equipment and procedures for each project.

4. Before leaving the site, make sure to replace the well cap, the cover and the lock.

D) **RECORD KEEPING/SAMPLE LOGGING.** Record keeping during groundwater sampling includes the following:

- All water quality data will be entered on the field data sheet.

- All samples will be recorded on the chain of custody (COC) along with the analyses scheduled to be run on them. When entering this information, check the COC against the labels on the sample containers to make sure there are no conflicts between the two.
- If the samples are to be held overnight, note them in the log book kept in the refrigerator. Samples shipped from the refrigerator are similarly logged out.

- The following data should be recorded in the field data log book:

1. Date of entry.
2. Name and affiliations of personnel.
3. General description of the day's field activities.
4. Weather conditions during sampling.
5. Sampling locations.
6. Observations of sample or collection environment.
7. Equipment or other problems encountered during sampling.
8. Names and affiliations of any visitors to the site.

- See the Workplan for the project specific record keeping requirements.

5) SAMPLE SHIPPING. This is discussed in a separate Standard Operating Procedure (SOP).

F) WASTE HANDLING. All purged well fluids and decontamination fluids must be placed in 55-gallon drums at the site. Each drum must be properly labeled and closed. If the work is being conducted on a military base, the drums may have to be moved to a designated storage area on the base. If the work is being done on private property such as an industrial site, it may be necessary to move drums within the property. Because HSI GeoTrans is not a licensed hazardous waste hauler, HSI GeoTrans employees are not permitted, under any circumstances, to haul waste drums on public roads.

G) FINAL DECONTAMINATION. At the end of each day, final decontamination of all exposed equipment is conducted at the equipment storage area. The following steps are included:

1. All bailers and their stainless steel containers should be washed following the same procedures used in the field.

2. If required by the Workplan they will then receive an additional final rinse; first with methanol, then with hexane.

3. The bailers and their containers should then be placed on a stainless steel rack to dry overnight.

4. The interface probe and the well water pump should be decontaminated in the same manner as in the field. Methanol and hexane are not to be used on this equipment.

H) FINAL EQUIPMENT CALIBRATION CHECK. Check the calibration and the batteries of all site monitoring and data collection instruments at the end of each day. Record this information on the appropriate calibration sheets for each instrument. If an instrument's reading are found to be outside the required parameters, make a note of this and inform the project manager.

APPENDIX 3
SAMPLE STORAGE, PACKING, AND SHIPPING

A) THE CHAIN-OF-CUSTODY

1. The Chain-of-Custody (COC) is the single most important form you will be responsible for during any type of field sampling activity. It is a continuously-maintained custody record that travels with the samples at all times

2. The COC is signed off by each person responsible for shipping or otherwise relinquishing the samples to an outside laboratory or other agency. A violation of the COC protocols is a serious matter that can result in the affected sample set being invalidated.

3. The COC includes the following:

   - Corporate name;
   - Sampler names and signature;
   - Project manager's name;
   - The site designation;
   - Sample designations;
   - Sampling date;
   - Sample collection times, these should be filled in on the COC as samples are collected; and
   - Analyses to be run or samples.

4. The schedule of tests to be run on the collected samples will normally be included in the Workplan for the project. This information can be entered on the COC at the end of the sampling day before the samples are either stored or shipped.

5. The person(s) collecting the samples signs the COC in the appropriate block at the end of the sampling day.

6. At this time, the labels on the sample containers should be checked against the COC to make sure there are no discrepancies between any of the information recorded on both.

7. If an error is found on a label or the COC, it should be lined through once, in ink, so the initial entry can still be read.

8. The correction should then be made in ink and initialed by the person making it.

9. When samples are held overnight or longer, the same comparison check should be made again by the person responsible for shipping them.

10. The person responsible for shipping the samples

    - signs the topmost "relinquished by" block and
    - fills in the shipping date and time,
    - the number of sample containers,
    - the shipping container number(s),
    - the shipping bill number,
    - any special shipping requirements such as overnight delivery,
    - and the HSI GeoTrans storage time and temperature (if applicable).

11. The pink (back) copy is retained for HSI GeoTrans records and handed in to the office together with the HSI GeoTrans copy of the shipping bill.

12. The remainder of the form is placed inside the shipping container, then sealed for shipment.

B) SAMPLE STORAGE

1. Protocols for handling and storing soil and water samples in the field are detailed in the sections of this document that pertain to field sampling procedures.

2. When samples are returned to the field office or trailer they will usually be chilled overnight or over the weekend in a refrigerator set to 4 °C or less, but not to freezing.

3. Soil sample sleeves should be left in their plastic bags when refrigerated.

4. The refrigerator will contain a log book. All samples placed in the refrigerator or retrieved from it for shipment should be recorded, along with the date, in this log book.

5. When retrieving samples for shipment, note the

    - time,
    - date,
    - sample IDs, and the
    - laboratory to which they are being shipped.

6. Initial all log book entries. The log book is a permanent record of the samples stored or shipped from that refrigerator.

7. The refrigerator should also contain one or more temperature blanks and a laboratory thermometer that meets NIST tolerance.

8. When the refrigerator is opened to retrieve samples for shipment, the temperature should immediately be checked and recorded on the COC. The best way to check the temperature is to open one of the temperature blanks and insert the thermometer in the water. This will give a more reliable reading than simply checking the air temperature, which will rise immediately when the door is opened.

   Some chemical analyses, such as that for hexavalent chromium, require very short sample holding times. If such a test is scheduled, the samples will have to be shipped immediately without being stored overnight. It is the responsibility of the person collecting the samples to know in advance when this situation will apply. If it does apply and the sampling day is a Friday or the day before a holiday, check with the testing laboratory in advance to make sure they will have someone available to receive the overnight shipment the following morning. Check the Workplan for sample method holding times.

C) **SHIPPING SUPPLIES**. The following items are needed for packing and shipping samples:

- Ice chest(s);
- "Blue ice" or equivalent (5 or 6 blocks per ice chest);
- Bubble wrap;
- Styrofoam packing material;
- Address labels;
- Nylon strapping tape;
- Temperature blanks (see below); and
- Shipping bill.

D) **TEMPERATURE BLANKS**

1. These are plastic bottles filled with reagent grade (Type II) water and labeled as temperature blanks.

2. One should be included in every ice chest shipped, after chilling in the refrigerator for at least 24 hours.

3. After samples are packed for shipment, make sure there are enough temperature blanks left for the next day's shipment, filling additional bottles as needed.

4. If there are not enough bottles, inform the Project Manager and make arrangements to have more bottles delivered immediately.

E) SAMPLE PACKING

1. Always wear nitrile liners when removing any sample containers from the refrigerator.

2. Check all container labels against the COC to make sure there are no discrepancies and both the labels and the COC are complete and legible.

3. Count the containers to make sure the number is recorded correctly on the COC.
4. Make sure all bottle caps are on tight.

5. If any samples were handled or treated in an unusual manner, make sure this is noted on both the sample and the COC.

I. WATER SAMPLES

1. To wrap VOA bottles, tear off one sheet of bubble wrap.

2. Lay two VOAs end to end (not touching) on the sheet, roll sheet and VOAs into a tight cylinder, fold in the middle (between the bottles) and secure with tape.

3. Larger glass bottles, such as the one-liter amber ones, should be wrapped individually in three sheets of bubble wrap and secured with tape.

II. WATER SAMPLE PLACEMENT

1. Water samples collected from a single site should be packed together in the same set of ice chests. (Typically, more than one ice chest will be required when shipping water samples).

2. All VOA bottles from the site, including both trip blanks and samples, should be packed in the same ice chest.

3. One-liter bottles should be placed upright in the ice chest, not stacked, mixing the glass and plastic bottles wherever possible.

4. Wrapped VOAs can be placed on top of the upright containers if necessary, without over-packing the ice chest.

5. Place a temperature blank in each ice chest being shipped.

6. Place five or six completely frozen blocks of "blue ice" in each ice chest, distributing them evenly among the samples to insure an even temperature distribution in the ice chest.

7. Discard any "blue ice" that shows any sign of possible leakage.

8. Dry ice should not be used because it will tend to freeze the samples.

9. Water ice should not be used because it will melt during shipment and possibly contaminate the samples.

10. Fill all void spaces in the ice chests with clean Styrofoam packing material.

11. Paper or cardboard should never be used as packing material.

III. SOIL SAMPLES

1. All metal sleeves containing soil from a single sample point should be sealed into plastic Ziploc bags. Whenever possible, use a single large bag for all sleeves from a single sample.

2. Never place sleeves from different samples in the same bag.

3. Different soil samples from the same site should always be placed in the same ice chest(s).

4. Never place soil samples from different sites in the same shipping container.

5. No other water samples should ever be packed in the same shipping containers as soil samples.

F) SHIPPING BILL AND CHAIN OF CUSTODY

1. Complete the shipping bill with shippers' and receivers' addresses, if these are not already printed on the bill.

2. Mark the bill for overnight delivery, if this is required.

3. Note the bill number in the appropriate box on the COC.

4. Next to each sample line on the COC, note the ice chest number the sample was placed in.

5. If multiple ice chests are being used, note which one contains the trip blanks and samples for volatile organic analysis.

6. Remove the back (pink) copy of the COC and set it aside.

7. Put the rest of the COC in a Ziploc bag and place it in an ice chest.

8. If desired, the bag can be taped to the inside of the container lid.

9. Remove old labels, tape, etc., from the ice chests.

10. Attach the shipping bill to the top of the same container that holds the COC.

G) SHIPPING CONTAINERS

1. Attach address labels to all shipping containers.

2. Make sure each container will close properly and that the drain is plugged.

3. Seal each container with strapping tape, wrapping the tape twice around the container at the hinge points.

4. If the lab has provided custody seals, attach these across the ends of the tape.

5. If not, sign across the end of each tape.

6. It is advisable to place "up" arrow stickers on the sides of containers holding water samples.

H) SHIPPING

1. If necessary, transport the samples to the shipping carrier's location.

2. If asked about the contents, explain that they are soil or water samples being shipped for analysis.

3. The carrier's representative will give you a copy of the shipping bill.

4. Staple this to the retained copy of the COC.

5. Give both papers to the HSI GeoTrans office staff, who will circulate or file them as needed.

APPENDIX 4
GROUNDWATER GRAB SAMPLING

A) MOBILIZATION

BEFORE ARRIVAL AT THE SITE.

1. **EQUIPMENT.** As with other field activities, start each day by performing battery and calibration checks on all of the site monitoring and sampling instruments. Fill out the appropriate calibration forms for each instrument. Retain these forms with the rest of the paperwork for the day, for later submittal to the office. Recalibrate instruments as needed, following the manufacturers' guidelines. It is assumed here that all personnel are familiar with the proper procedures for maintaining, calibrating and operating the various instruments and other items of equipment. If you are unfamiliar or unsure about a particular piece of equipment, contact your supervisor for instruction.

   Equipment and tools required for groundwater sampling, well opening and purged water handling may include the following:

   - OVA (FID or PID);
   - Explosimeter;
   - pH meter;
   - Dissolved oxygen meter;
   - Turbidity meter;
   - Temperature/conductivity meter;
   - Interface probe;
   - Teflon bailers;
   - Decontamination buckets;
   - Cleaning brushes;
   - Bung wrench for opening drums;
   - Drum dolly;
   - Tool box with socket set, screwdrivers, pliers, other basic tools for field maintenance;
   - Sufficient drums to contain all purged water;
   - Mobile phone and/or pagers; and
   - Water cooler.

2. **THE SAMPLING VEHICLE.** At the beginning of each day, check for the following:

   - The vehicle should be stocked each day with sufficient quantities of Tyvek suits, nitrile gloves and liners, respirator cartridges (dust/particle and organic vapor/acid gas), safety glasses, ear plugs, safety cones, trash bags and paper towels.

   - Fill the water cooler with ice water for drinking, sufficient for all personnel to be involved that day.
   - Make sure that Gatorade is available for all personnel. Make sure the mobile phone is plugged in and working.

   - Fill one set of water buckets for decontamination and one set for hand washing. Each set will include one bucket with potable water and soap (Alconox), one bucket of potable rinse

water and one bucket of reagent grade (Type II) rinse water. Fill two Teflon wash bottles with reagent grade water. Refer to the project specific Workplan or Health and Safety Plan for decontamination specifics.

3. **RECORD KEEPING.** The forms and paperwork required for groundwater sampling may include the following. These should be kept with the sampling vehicle during the course of the work.

- The site-specific Health and Safety (H&S) Plan
- Tailgate safety meeting form sign by all personnel
- Field log book
- Field Data Log Sheet-Well Sampling
- Sample Chain-of-Custody (COC)
- Sample container labels
- Site safety monitoring data sheet

Other forms that will be used during the day but do not have to be carried in the field include:

- Instrument calibration sheets; and
- Daily equipment use forms.

4. **SAMPLE CONTAINERS**

- Check the Workplan to determine what analytical procedures are to be run on the samples to be collected that day.

- Check with the project manager as to which laboratory will be used and determine the type and quantity of bottles required for each analysis. Bottles may be glass (clear or amber), polyethylene or Teflon, ranging in size from 40 ml VOC vials to 1-liter bottles.

- Determine how many ice chests will be needed for the water samples to be collected that day.

- Stock the ice chests with the appropriate sampling bottles needed for the day, and with enough "blue ice" to maintain the temperature of the empty sample bottles at about 4 degrees Celsius. Five or six blocks of "blue ice" are sufficient. Make sure the blocks are completely frozen and that none of them are cracked.

- Prepare the appropriate labels for sample containers and storage drums.

5. **HEALTH AND SAFETY.** Make sure that all personnel have the proper personal protective equipment (PPE). This will typically include hard hats, steel toed boots, respirators (half- or full-face), Tyvek suits, safety glasses and earplugs. Additional equipment may be required by the site-specific Health and Safety Plan. Make sure the sampling vehicle is equipped with a first aid kit, eyewash, fire extinguisher and copies of the corporate and site-specific Health and Safety Plans. These items should remain with the vehicle at all times.

6. **QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS**. Quality assurance/quality control (QA/QC) requirements for water sampling may include the collection of field duplicates or triplicates, trip blanks, ambient blanks and equipment blanks. These requirements may vary from

one project to another and from one laboratory to another. Specific requirements for QA/QC blanks for water sampling will be established in the Workplan for each individual project.

a. Trip blanks will normally be supplied by the laboratory. They consist of sealed 40 ml VOC bottles filled with Type II reagent grade water. They are placed in the coolers used to carry the groundwater samples and travel with the samples throughout the sampling activity and the trip to the laboratory. They are handled like a sample, and are never opened in the field. The number of VOAs required for each cooler will be established by the testing laboratory.

b. In some cases, the laboratory will not provide sealed trip blanks but will supply the VOC bottles, prepared with HCl. In this case, the trip blanks must be filled during the mobilization phase of the sampling day before arrival at the work site. This is done by filling the appropriate number of VOC bottles with Type II reagent grade water so that no bubble and no headspace remains after the bottle is capped. Never touch the inside of the bottle while filling it. After capping, check the bottle for bubbles by turning it upside down and tapping it gently against a hard surface such as a table top. Any bubbles will rise and become visible. If bubbles are present, remove the cap, discard the contents, refill, and reseal.

c. VOAs for the ambient blanks must be filled with Type II water at the work site and left open while the sampling activity continues. Make sure to set them in a safe place where they won't be knocked over. Before leaving the site, top off the VOAs with Type II water to replace evaporation losses, cap the VOAs and place them in the sample cooler. They are then treated like a sample.

d. Equipment blanks should be prepared immediately prior to collecting the samples. The Teflon bailer or other sampling device to be used for the water sampling should be filled with Type II reagent grade water. This water should then be decanted into the previously prepared bottles. Do not allow the water to come in contact with any objects except the bailer/sampler and the containers being filled.

AFTER ARRIVAL AT THE SITE.

1. **TAILGATE SAFETY MEETING.** As with other types of sampling, a tailgate safety meeting is held after arrival at the first work site of the day. Be sure that all individuals present are aware of potential hazards. All individuals must sign the tailgate safety form. If at any time an employee becomes uncomfortable or unsure about the conditions at the site or the work he or she has been asked to do, vacate the site and contact the Project Manager.

2. **SITE SETUP.** As with other types of sampling activities, the work area (exclusion zone) should be delineated with cones, caution tape or other approved safety devices.

   - Set up the work tables and sampling and water testing equipment.
   - Position the sampling truck and drums for purged water downwind from the groundwater grab sample borehole.
   - Make sure the drums are close enough to the truck for the drain line to reach.

- Prepare the ambient blanks at this time. After preparation, the ambient VOAs are left exposed in the open while the sampling is completed at the borehole. They are then stored, handled, shipped, and analyzed like the trip blanks.

B) SAMPLING PROCEDURE

1. INITIAL MEASUREMENTS

a. Drive the Geoprobe™ or equivalent device to at least five feet below the groundwater surface or at least two feet past the desired depth of the groundwater grab sample.

b. Withdraw the drill rod and insert a five-foot section of slotted polyvinyl chloride (PVC) well screen attached to blank PVC casing. Typically, 0.002- or 0.001-inch slotted pipe is used. Blank and slotted well pipe must be threaded. No glue of any type may be used to attached sections of well pipe.

c. Lower the interface probe into the temporary well. The probe will emit a specific tone, described in the instruction manual, upon contact with the first liquid surface. The tones are different for water and water with floating product.

d. Measure the depth to groundwater from ground surface by leveling the ground surface around the borehole, laying a ruler or flat piece of wood across the borehole and measuring from the bottom of the flat surface.

e. Record this measurement.

f. If product is encountered, continue to lower the probe until it contacts water and record this value as well.

g. Check for a heavy (sinking) immiscible layer and measure the total depth of the temporary well by lowering the interface probe to the bottom of the well.

h. Record the measurements.

i. When raising the probe, wipe the tape to remove excess fluids.

3. **SAMPLE COLLECTION**. Groundwater grab samples should be collected as soon as possible after allowing a few minutes for the water in the temporary well to stabilize. Water sample collection includes the following steps:

a. Collect water quality data, including temperature, pH, electrical conductivity (EC), turbidity, and dissolved oxygen (DO).

b. All containers should be labeled before filling.

c. To collect the sample, lower the Teflon bailer to just below the water surface. Lower it slowly to minimize the agitation in the temporary well and the water sample.

d. After ten seconds, reel up the bailer and fill the sample containers.

e. Sample containers are filled in the following order, depending on the analyses to be run:

- Volatile organics.
- Unfiltered metals.
- Total petroleum hydrocarbons - volatile fraction.
- Semivolatile organics.
- Total petroleum hydrocarbons - non-volatile fraction.
- Filtered general minerals.
- Filtered metals.

f. Water samples should not come in contact with any objects except the bailer in which they are collected and bottles in which they are transported.

g. Care should be taken to minimize the exposure of water samples to atmospheric oxygen.

h. All VOAs should be filled so that no headspace exists and no air bubbles are present.

i. Other containers should be filled, without overfilling, to minimize headspace and air bubbles.

j. All sample bottles should be promptly placed in the ice chests after filling.

k. All VOAs, including the blanks, must be kept together in the same ice chest.

C) **EQUIPMENT DECONTAMINATION**. All equipment that has come in contact with possible contaminants must be decontaminated before leaving each well. This must be done after the completion of sampling activity at each well. Conduct all on-site decontamination procedures in the back of the equipment truck. Use the appropriate protective equipment listed in the site H&S Plan. The following steps are included:

1. All equipment should first be rinsed off with the steam cleaner to remove all gross contaminants.

2. The equipment should then be washed with water and industrial soap, rinsed with potable water, then rinsed with Type II reagent grade water. Bailers should be wrapped in a plastic bag.

3. When decontamination procedures are finished, place all fluids in a separate drum, properly labeled to indicate the contents. See the Workplan or Health and Safety Plan for specific deconning equipment and procedures for each project.

4. Before leaving the site, make sure to replace the well cap, the cover and the lock.

D) **RECORD KEEPING/SAMPLE LOGGING**. Record keeping during groundwater sampling includes the following:

- All water quality data and physical characteristics of the water, including color, odor, sheen, etc., will be entered on the field data sheet.

- All samples will be recorded on the COC along with the analyses scheduled to be run on them. When entering this information, check the COC against the labels on the sample containers to make sure there are no conflicts between the two.

- If the samples are to be held overnight, note them in the log book kept in the refrigerator. Samples shipped from the refrigerator are similarly logged out.

- The following data should be recorded in the field data log book:

    1. Date of entry.
    2. Name and affiliations of personnel.
    3. General description of the day's field activities.
    4. Weather conditions during sampling.
    5. Sampling locations.
    6. Observations of sample or collection environment.
    7. Equipment or other problems encountered during sampling.
    8. Names and affiliations of any visitors to the site.

- See the Workplan for the project specific record keeping requirements.

E) **SAMPLE SHIPPING**. This is discussed in a separate Standard Operating Procedure (SOP).

F) **WASTE HANDLING**. All decontamination fluids must be placed in 55-gallon drums at the site. Each drum must be properly labeled and closed. If the work is being conducted on a military base, the drums may have to be moved to a designated storage area on the base. If the work is being done on private property such as an industrial site, it may be necessary to move drums within the property. Because HSI GeoTrans is not a licensed hazardous waste hauler, HSI GeoTrans employees are not permitted, under any circumstances, to haul waste drums on public roads.

G) **FINAL DECONTAMINATION**. At the end of each day, final decontamination of all exposed equipment is conducted at the equipment storage area. The following steps are included:

1. All bailers and their stainless steel containers should be washed following the same procedures used in the field.

2. If required by the Workplan or Health and Safety Plan, they will then receive an additional final rinse; first with methanol, then with hexane.

3. The bailers and their containers should then be placed on a stainless steel rack to dry overnight.

4. The interface probe should be decontaminated in the same manner as in the field. Methanol and hexane are not to be used on this equipment.

H) **FINAL EQUIPMENT CALIBRATION CHECK**. Check the calibration and the batteries of all site monitoring and data collection instruments at the end of each day. Record this information on the appropriate

calibration sheets for each instrument. If an instrument's reading are found to be outside the required parameters, make a note of this and inform the project manager.

APPENDIX 5
BOREHOLE DRILLING AND SAMPLING

A) PURPOSE. Borehole drilling and sampling are conducted during site investigations to characterize subsurface geologic and hydrologic conditions, and to collect soil and water samples for chemical analysis.

B) PREMOBILIZATION

BEFORE THE DRILLING DAY.

The project manager on a drilling job will need to do the following before the first day of drilling. Typically, the logistics of the drilling process may require 3 to 7 days of planning and preparation before the scheduled start date.

1. **DRILLING METHOD.** Determine the drilling method to be used. This will be determined by the known or assumed geologic and hydrologic conditions existing at the site, and by the proposed depth of the boreholes.

   The continuous flight hollow stem auger (HSA) method will most often be used. This method is suitable in poorly to moderately consolidated materials at depths up to about 150 feet. A 6- or 8-inch outside diameter (OD) HSAs in 5-foot sections will be employed. A drill bit attached to the leading auger section cuts the hole. Cuttings are forced to the surface by the spiral actions of the auger.

   In areas where hard rock or heaving sands are expected, or where the required depth is greater than the maximum achievable with the HSA method, the air rotary casing hammer technique may be used. In this method, the borehole is advanced by pumping air at high velocity through a rotating tricone bit while the drill casing is driven behind the bit. The casing holds the borehole open in unconsolidated materials. In hard rock, coring can be continued without advancing the casing.

   The mud rotary drilling method will normally not be permitted in environmental site investigations. The drilling fluids cause chemical changes in the soil and water media around the borehole, making it impossible to obtain representative soil and water samples for analysis.

   Other methods for extracting subsurface soil and water samples, such as hydropunching, can be used if allowed for in the site Workplan.

2. **PERMITS**. Make certain that all required permits are acquired and approved by the permitting agency. These may include county or state well installation permits, encroachment permits (for work in public right-of-way) and others. If there is doubt as to whether particular permits are required at a given site, contact the appropriate agencies and find out. Drilling cannot be initiated without all the legally required

permits. Always keep the signed permits, or copies thereof, at the site during drilling.

3. **BOREHOLE AND MONITORING WELL LOCATIONS**. Drilling locations should be marked out in advance. Typically, there will be a site map prepared in the office that shows the proposed borehole locations. Locate the borehole on the ground by measuring the appropriate distances from buildings, curbs, trees or other physical and permanent features that are visible from the map. Spray paint is used to mark drilling locations on paved surfaces and a wood stake or pin flag on unpaved). Always identify the well or borehole number on the markout. Make sure the marked drilling locations are visible for utility clearance and accessible for a drilling rig. Remember to look for overhead utilities. The minimum permissible distance between powerlines and the drilling tower is 20 feet. Final locations should be approved by the project manager prior to drilling.

4. **UTILITY CLEARANCES**. Before any drilling is done, all potentially affected utility companies are notified. In California, this can be done by calling Underground Service Alert (USA). In other areas, utility companies or public agencies may have to be notified individually. Advance markout of drilling locations will be required so that utility personnel can determine if their facilities will be affected. The project manager may be required to meet utility representatives at the site.

   In some situations, a subcontractor geophysics crew may check a site for underground utilities using geophysical methods. It is still necessary to contact the utility owners that may be affected by the work. It is also good practice to walk the site with the drilling foreman to check for signs of underground structures before drilling. When working in areas where such structures are present, it is good practice to hand auger the first five feet of the borehole. Cutting an electric cable or gas line may cause death or serious injury to site workers. Move the borehole, if necessary, to avoid damaging utilities.

5. **EQUIPMENT AND SUPPLY SCHEDULING**. Determine in advance what equipment and supplies are needed. Drilling contractors can provide these supplies on request.

   No drilling will be performed without the appropriate site monitoring equipment. Except where permitted by the site-specific Health and Safety Plan, this will always include an OVA (FID or PID) and may include other items (draeger tubes, explosivity meter, etc). Experience has shown that company-owned equipment is often in high demand and should be scheduled for use with the office as early as possible. Never expect an instrument to be available for your use on a given day unless you have arranged for it previously. When company-owned equipment is not available, make arrangements in advance to acquire rental equipment. Allow enough time for needed equipment to be ordered and delivered. Prior coordination, organization, and scheduling is essential to a successful drilling program.

6. **WASTE HANDLING ARRANGEMENTS**. These should also be made in advance. Typically, this will involve the use of 55-gallon drums. Baker tanks, roll off bins, or other containers may be used if allowed by the Workplan. Using the designed borehole depths and diameters, calculate the expected volume of soil cuttings and

determine the number of 55-gallon waste drums needed to contain them. In general, an 8-inch diameter borehole will require one waste drum for every 20 feet of borehole. If the job includes well construction and development, additional drums will be needed for the waste well water generated. Drums will also be needed for rinsate disposal from decontamination procedures and for disposal of used personal protective equipment. On small jobs involving a few wells or borings, HSI GeoTrans may simply ask the drilling company to supply the drums, which they will do at an extra charge. On larger contracts, HSI GeoTrans may order the required drums and arrange for delivery to the job site. Drilling cannot begin without waste disposal containers. Each drum should be properly identified as to the contents, borehole identification, site number and date. The drums should be grouped by site and contents at a designated storage area. Care should be taken to assure that the drums are secure and non accessible to the general public.

7. **PRE-FIELD ACTIVITIES MEETING**. On large or unusually sensitive projects, a pre-field activities meeting with the drilling contractor may be required. During this meeting, personnel involved in the project can review the project plans and any special job requirements or areas of concern with the drilling contractor. Make sure they understand what level of personal protection will be required for their workers, what the decontamination requirements are for their equipment, and what provisions there are for safe overnight storage of their equipment. Be prepared to listen as well as talk to the contractor. They will often have many years of drilling experience and can offer important insights on how to get the work done in a timely and efficient manner. Good communication with the contractor is important in getting the work done in a timely and problem-free manner, and will also make the work experience more pleasant for everyone involved.

C) MOBILIZATION

BEFORE ARRIVAL AT THE SITE.

1. **EQUIPMENT**. At the beginning of each day, perform calibration and battery checks on all of the site monitoring equipment. Record the data on the appropriate calibration form for each instrument Recalibrate instruments as needed, following manufacturers' guidelines.

   Required sampling supplies and equipment may include the following:

   - Brass or stainless steel sleeves, for use with the split-spoon sampler. The Workplan may specify one type or the other. Make sure you have enough sleeves of appropriate lengths for the number of samples to be collected. The split-spoon samplers themselves will be provided by the drilling contractor.

   - Plastic caps and Teflon tape sufficient for the number of sleeves to be collected and sealed.

   - Glass jars for disturbed or "grab" samples, if allowed by the Workplan.

- Mason jars and aluminum foil for headspace samples. Ziploc plastic bags *can also be used for this if permitted.*
- 40 milliliter (ml) volatile organic analysis (VOA) bottles, for trip blanks, if required to accompany samples to be tested for volative organics. In some cases, prepared trip blanks may be supplied by the designated testing laboratory.
- Labels for sample containers.
- Labels for waste drums.
- Ice chest(s) with blocks of "blue ice," for storing and shipping samples. Include temperature blank.
- Pliers or wrenches for opening samplers. Channel lock pliers are preferred.
- Nitrile gloves and liners.
- Latex gloves.
- Tyvek or other protective clothing for all HSI GeoTrans personnel who will be handling samples or working in the exclusion zone.
- OVA (FID or PID), Draeger tubes, other monitoring equipment as required in Health and Safety Plan.
- First aid kit, eye wash station, material safety data sheets (MSDS), Site Health and Safety Plan.
- Table and chairs for persons logging the samples.
- Duct tape.
- Pens with waterproof ink.
- Munsell Color Chart.
- *Unified Soil Classification System* (USCS) soil classification chart.
- Wash bottle for wetting soil for classification purposes.
- Oil-free foil.
- Trowel for splitting samples.
- Ziploc-type plastic bags (large and small).
- Paper towels.

- Brush and Chem-wipes for cleaning table. A stainless steel covered table is recommended.
- Bucket for collecting excess soil from samplers.
- Decontamination equipment - see Workplan or Health and Safety Plan for project specific requirements.
- Teflon wash bottles for Type II water.
- Teflon wash bottles for methanol and hexane, if required.
- Pager and cellular communication.
- Daily field log books.
- Trash bags.
- Camera and photo board.

Make sure to start out with sufficient Type II reagent grade water, methanol (if required) and hexane (if required) to perform all decontamination that will be needed during the day. See site Workplan or Health and Safety Plan for specific decontamination materials needed.

2. **FORMS AND RECORDKEEPING.** Make sure to carry all the appropriate forms and documents for the project. Keep papers organized on a clip board.

The following items should be kept at the site while drilling is in progress:

- The site Workplan;
- The site-specific H&S Plan;
- Chain of custody (COC) sheets for samples;
- Signed permits for the work;
- Tailgate safety meeting form signed by all site workers;
- Field log book;
- Boring logs;
- Sample labels;
- Instrument calibration sheets;
- Site safety monitoring data sheets;
- Daily equipment use forms;
- Boring and well data sheets; and
- County well completion report form.

3. **HEALTH AND SAFETY.** All HSI GeoTrans personnel are required to have the personal protective equipment specified in the site-specific H&S Plan. Minimal requirements on drilling sites will be Level D PPE, including hard hats, Tyvek overalls, safety glasses and steel toed boots. The site-specific H&S Plan may require higher levels of protection. Even where Level D is specified, each worker has a respirator with the proper cartridges available. These are required when

performing equipment decontamination using volatiles (methanol and/or hexane) and for protection upgrades that may be required by changes in site conditions during the work. A first aid kit should be available on site at all times. Traffic cones and/or yellow "caution" tape should be used to delineate the exclusion zone. Neoprene or Solvex gloves with nitrile glove liners should be worn when methanol or other volatile substances are required for equipment decontamination by the Workplan. Nitrile liners are also required when handling samples.

4. **QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS.** Quality assurance/quality control (QA/QC) requirements for drilling and soil sampling may include the collection of field replicates, trip blanks and ambient blanks. These requirements will vary from one project to another. Specific requirements for QA/QC blanks for soil sampling will be established in the Workplan for each individual project. Proper preparation for all drilling and soil sampling includes becoming thoroughly familiar with the QA/QC requirements for the project.

Field replicates, when required, will typically be collected at a ratio of one replicate sample for every ten soil samples. Replicate collection guidelines are as follows:

1. Drive two samplers back-to-back. (Example: drive sample at 20 ft and 21.5 ft.)

2. Open up samplers.

3. Put arrows on the sleeves to indicate pairs.

4. Put teflon tape and plastic caps on all sleeves, keeping them in order by pairs.

5. Pairs are the sleeves with arrows pointing together - A & B are a pair, and C & D are a pair, etc.

6. Write up two labels with different times, different depths, and the same analyses for each pair.

    - Times differ by 5 minutes. (Example: 20 ft sample comes out at 1:20, then label the 21 ft sample 1:25.)

    - The first sample is given its true depth (20 ft sample is called 20 ft sample). The second sample in the pair is given a depth 1 foot below the first sample. (21.5 ft sample is called a 21 ft sample for simplicity.)

    - The analyses sections labels in the pair are identical.

7. Put labels on the samples. Arrows on labels should match arrows marked on the sleeves. One label set (same analyses) will be put on samples in a pair (A, B, C, and D, etc.)

EXAMPLE:

Label for A	Time:	1:20
	Depth:	20 ft.
	Analyses:	8260
Label for B	Time:	1:25
	Depth:	21 ft.
	Analyses:	8260
Label for C	Time:	1:20
	Depth:	20 ft.
	Analyses:	Metals
Label for D	Time:	1:25
	Depth:	21 ft.
	Analyses:	Metals

8. Put all 20 feet samples in one baggie and all 21 feet samples in another baggie.

9. Place in cooler.

Note: If insufficient material is recovered, have the drillers send down another sampler before they auger down to the next depth. Look to see how much sample you get before allowing them to proceed.

Trip blanks will normally be required for soil sampling activities. Ambient blanks may also be required at sites where soils are suspected of containing high volatile concentrations.

Trip blanks will normally be supplied by the laboratory. They consist of sealed 40 ml VOA bottles filled with Type II reagent grade water. They are placed in the coolers used to carry the soil samples and travel with the samples throughout the sampling activity and the trip to the laboratory. They are handled like a sample, and are never opened in the field. The number of VOAs required for each cooler will be established by the testing laboratory.

In some cases, the laboratory will not provide sealed trip blanks but will supply the VOA bottles, prepared with HCl. In this case, the trip blanks are filled during the mobilization phase of the sampling day before arrival at the work site. This is done by filling the appropriate number of VOA bottles with Type II reagent grade water so that no bubble and no headspace remains after the bottle is capped. Never touch the inside of the bottle while filling it. After capping, check the bottle for bubbles by turning it upside down and tapping it gently against a hard surface such as a table top. Any bubbles will rise and become visible. If bubbles are present, remove the cap, discard the contents, refill, and reseal.

Ambient blanks may be required for soil sampling activities where elevated concentrations of volatiles are expected. VOAs for the ambient blanks are filled with Type II water at the work site and left open while the sampling activity continues.

Make sure to set them in a safe place where they won't be knocked over. Before leaving the site, top off the VOAs with Type II water to replace evaporation losses, cap the VOAs and place them in the sample cooler. They are then treated like a sample.

AFTER ARRIVAL AT THE SITE.

1. **TAILGATE SAFETY MEETING**. A tailgate safety meeting is held after arrival at the first work site of the day. Be sure that all individuals present are aware of potential hazards. All individuals sign the tailgate safety form. If at any time an employee becomes uncomfortable or unsure about the conditions at the site or the work he or she has been asked to do, vacate the site and contact the Project Manager.

2. **SITE SET UP**. Delineate the site, including the exclusion and contamination zones, with traffic cones, barricades, yellow "caution" tape or other standard safety devices. If the Workplan or the H&S Plan have mandated temporary fencing or other semipermanent access controls, these should have been installed before the start of drilling operations.

   Set up the work areas for sample handling, decontamination, logging and record keeping procedures upwind of the borehole. This is to avoid potential worker exposure and sample cross-contamination from windblown dust from the borehole. Fill the water buckets for decontamination. Fill one bucket with potable water and soap, one with potable rinse water, and at least one with reagent-grade (Type II) water. On jobs that involve a large number of soil samples, a second Type II bucket may be needed, as the first one will quickly get dirty. On projects where methanol and hexane rinses (from spray bottles) are required, an additional bucket will be needed for collecting the spray. See the site Workplan for specific requirements.

   Decontaminate the table or other working surface that will be used when handling samples. Oil-free foil can be placed over the working surface in lieu of decontaminating the surface. Decontaminate the split-spoon sampler and the sample sleeves before use. See the site Workplan for specific requirements.

   Begin setting up the paperwork. Make the required initial entries in the field log book. Set up the boring logs and site monitoring data sheets. Begin filling in the sample labels with the site name and borehole designation. Get as far ahead as possible with the required writing before the sampling actually starts.

   Have the drillers place plastic sheets and/or a wood template around the borehole before starting drilling. The area covered should be sufficient to contain any loose cuttings from the borehole.

3. **AIR MONITORING**. Begin air monitoring of the breathing zone with the OVA by checking background levels outside the designated site area. The site-specific Health and Safety Plan will establish the required monitoring interval.

   Make sure that sufficient waste drums have been brought to the site to contain the full volume of cuttings and decontamination fluids that will be generated by the drilling.

D) DRILLING OPERATIONS

1. **DRILLING PROTOCOLS**. These will be specified in the site Workplan. The continuous flight hollow stem auger (HSA) technique, with 6" or 8" diameter augers in 5-foot sections, will normally be used. Unless otherwise specified, samples will be collected using the California-modified split spoon sampler). During each sampling event, a 140-pound hammer with a 30-inch drop will be used to drive the sampler 18 inches. The number of blows required for each 6-inch increment will be counted and recorded in the appropriate column on the boring log. The Workplan will specify that soil borings will be advanced to one of the following:

   - Some predetermined depth.
   - To the capillary fringe, as determined by visual inspection of the moisture content of the cuttings.
   - To refusal, if no groundwater is encountered previously.

   Borings to be completed as monitoring wells will be advanced to a depth below the water table that will be specified in the Workplan.

   When working in areas where underground utilities may be close by, have the drillers hand auger the first five or six feet of the borehole after collecting a surface sample if one is required. The purpose is to check for the presence of underground utilities under the borehole site, most of which will be found within a few feet of the surface. Do this even if utility clearances have already been obtained for the site and the utility locations are marked out on the ground. Utility markout people do make mistakes and often do not mark things like individual household services. Look around for surface evidence of underground facilities, such as asphalt or concrete patches, manholes, valve boxes, drain inlets, transformer pads, etc. It is sometimes possible to tell if you are working in a utility trench by the presence of clean sand backfill or well sorted gravel pipe bedding in the cuttings.

   If contact is made with any manmade underground structure, stop drilling immediately. Backfill the hole. In most cases the borehole can be moved a few feet to clear the obstruction. Record the change of location in the field log book.

2. **SAMPLE COLLECTION AND HANDLING**

   - When a split-spoon sample is collected, have the drillers hand over the unopened sampler barrel. The drillers' hands should never come in contact with the sample sleeves.
   - Get the blow count from the drillers and record it on the boring log. You will need pipe wrenches or channel lock pliers to loosen the sampler head and shoe from the barrel. Whenever possible, avoid losing the soil from the sampler shoe.

- Separate the two halves of the sampler barrel by tapping the barrel, along the seam, against a hard surface, or by inserting a screwdriver into the top of the sampler and gently prying the halves apart. By working on the top of the sampler, you can avoid contacting the sample sleeves and soil with the screwdriver.

- Remove the soil from the sampler shoe. Retain some of it for soil identification purposes while placing the bulk of it in a Mason jar sealed with oil-free foil, or in a sealed Ziploc plastic bag.

- Set the container aside in a shaded area, such as under the work table. After a fifteen minute waiting period, carefully pierce the foil or plastic with the OVA probe and take a reading on the headspace gas.

- Record this reading on the boring log for that sample.

- Remove the sample sleeves from the barrel. Wear clean nitrile liners while doing this. A trowel or putty knife (decontaminated) will be needed to separate the sleeves. Avoid contact with the soil as much as possible.

- Record the total sample retention, counting only the completely filled sleeves. Discard partially filled sleeves with loose material, or use the material for the headspace sample and soil classification if there was insufficient material left in the shoe.

- Place Teflon tape (precut) and a plastic cap over the ends of each sleeve.

- Place the sample label over the sleeve so that it overlaps one of the caps. Make sure the label is fully filled in at this time. Make sure the recorded sample designations and collection times are identical on all sleeves from the same sample.

- Place the capped sample sleeves in a sealed Ziploc bag marked with the borehole number, sample depth and date and time collected.

- Place the plastic bag in the cooler.

- See the Workplan or Health and Safety Plan for specific decontamination and sample handling procedures for that project.

3. **RECORDKEEPING**. Boring logs will be continuously maintained throughout the drilling operation. Unconsolidated soils will be logged according to the Uniform Soil Classification System (USCS) and ASTM D-2487-85 using the Visual-Manual Procedure detailed in ASTM D-2488-84. Soil colors will be classified and noted according to the Munsell Color Chart. The boring logs include the geologist's name, the project name and charge number, the well or boring number, the standard penetration blow count, the sampling interval and depth, the sample recovery in percent (inches recovered/18"), the OVA or PID headspace readings, the estimated moisture content (range: dry to saturated), depth to the first encountered water and

total depth. A vertical cross-section of the borehole, showing the backfill materials for soil borings and well construction details for holes completed as wells, should be sketched in the boring log column reserved for that purpose. Each boring log sheet should be signed at the bottom by the person who wrote it.

The site monitoring is performed throughout the drilling operation, with instrument readings taken in the breathing zone over the borehole at intervals specified in the H&S Plan. Action levels (in ppm) for PPE upgrades will also be specified in the site H&S Plan. If action levels are reached, make sure that all personnel don the appropriate equipment and, if necessary, stop the drilling and cover the hole until the work can be completed by people wearing the appropriate level of protection.

The boring or monitoring well data sheet are filled out to the extent possible during the working day. These sheets require well development data, ground surface elevations (shot by surveyors) and certain other items that typically cannot be completed in the field during the drilling day. Items on the sheet that should be completed during the working day include a sketch map describing the location of the hole, the drilling company name, the drilling crew names, the drilling rig make and model, the drilling method and bit size, the drop hammer data (weight and length of drop), the starting time and date, the drilling completion time and date and, when applicable, the well completion time and date. The other data required on this form should be filled in as it becomes available.

4. **SAMPLE SHIPPING**. This is discussed in Appendix 3.

5. **BOREHOLE COMPLETION AND ABANDONMENT**. Borings drilled for soil sample collection will be grouted to the surface after sampling and logging are completed. The grout slurry mix will typically consist of 95 percent portland cement, 5 percent bentonite and not more than 8 gallons of water per sack of cement. The grouting will be done either while the augers are being removed or, if the borehole remains open, after the augers have been removed. The slurry will be placed from the bottom of the boring to the ground surface with a tremie pipe. 24 hours after completion, the boring is inspected and additional grout placed if settlement has occurred in the borehole. Borings in asphalt or concrete paved areas are resealed with the appropriate material to match the existing grades. Until closure of the hole is complete, traffic cones, barricades or other approved safety devices should be placed around it.

6. **MONITORING WELL COMPLETION**. See the monitoring well installation SOP.

7. **INCOMPLETE BORINGS AND WELLS**. There will be occasions when it is not possible to drill and backfill a boring, or complete a well, during a single working day. In this situation, the augers should be left in the ground until work can be resumed. The location should be clearly marked by traffic cones, barricades or other approved safety devices.

8. **SITE CLEANUP/WASTE HANDLING**. Never leave a drilling site without cleaning it up. All soil cuttings, decon fluids and PPE (gloves, Tyvek etc.) are placed in separate, properly labeled, sealed drums. Any paper trash can be placed with the PPE. All items on the label should be filled in. Drums containing cuttings with

elevated FID or PID readings (> 50 ppm) are labeled as "potentially contaminated." In addition to the label, drums should be spray-painted with the name of the contents. Unless otherwise specified in the Workplan or contract, drums of cuttings will be left on site to become the property of the client. In some cases the contract may call for HSI GeoTrans to arrange for the removal of the drummed wastes. This situation requires arranging for a licensed hazardous waste hauler to come in, as an HSI GeoTrans subcontractor, and remove the containers for proper disposal elsewhere. Because HSI GeoTrans is not a licensed hazardous waste hauler, HSI GeoTrans employees cannot transport filled waste containers on public roads. No waste materials should ever be returned to the HSI GeoTrans offices.

APPENDIX D

HSI GeoTrans

Limited Scale Health and Safety Plan

APPENDIX D

HSI GeoTrans
Limited Scale Health and Safety Plan

FORM HSP-3

HSI GEOTRANS
LIMITED SCALE SITE
HEALTH AND SAFETY PLAN

1.0 GENERAL INFORMATION

Site/Location: Former Axelson facility, 2703 W. Marland Boulevard, Hobbs, New Mexico

Project #: P253

Plan Prepared by: Tanya Akkerman **Date:** August 3, 2000

Hazard Assessment Prepared by: * Jennifer Abrahams **Date:** August 3, 2000

* I certify that I have assessed the type, risk level and severity of hazards for this project and have selected appropriate personal protective equipment for site personnel.

Plan Reviewed by: Jennifer Abrahams **Date:** August 3, 2000

Activity(s): Contact Underground Service Alert for Lea County, New Mexico (1-800-321-2537); conduct on-site utility clearance at each boring location; collect soil and grab groundwater samples; install temporary PVC casing at four boring locations for top of casing elevation survey; abandon boring locations after TOC survey has been completed; abandon on-site water well; redevelop and sample three existing groundwater monitoring wells; install, develop, and sample potential future groundwater monitor wells; and have professional survey completed at the subject site if proposed future wells are installed.

Dates of work: October through December 2000

HSI GeoTrans personnel:	**Signature**
Jennifer Abrahams	
Tanya Akkerman **	

* Safety coordinator/emergency coordinator

** On-site safety/emergency coordinator and designated First-Aid provider

2.0 SAFETY PLAN

Protective Equipment/Instruments (specify type, as necessary)

Hard hat:	X	Boots:	X	Glasses (type): Safety	X
Suits:	X	Respirator:	X	First aid kit:	X
PID:	X	CGI:		Hearing Protectors:	X
Detector tubes:	X				

Safety Equipment Levels/Upgrades: Level D: steel-toed boots, hearing protection, safety glasses, hard hat, gloves. Level C: add full- or half-face respirator with organic vapor and HEPA cartridge, and Tyvek.

Monitoring Requirements: Monitor breathing zone with PID every 30 minutes, or if obvious odors are noted by personnel. If levels exceed 25 ppm, monitor breathing space of person(s) closest to borehole and use benzene-specific detector tubes. Upgrade to Level C if PID detects 25 ppm for 15 minutes, or if obvious chemical odors are noted by personnel. Half-face or full-face respirator with organic cartridges will be used when benzene concentrations are greater than 1 ppm in the breathing zone. Cartridges will be changed and replaced with new cartridges on a daily basis. Continue monitoring. Stop work and move away from source if level in breathing space exceeds 100 ppm. Contact Health & Safety Officer.

Monitoring Instruments: Organic vapor meter. Detector tube kit with benzene-specific detector tubes.

Action Levels for Upgrades:	**Level of Protection:**
Benzene Concentration in breathing zone: 1 ppm	Upgrade to Level C
PID Concentration in breathing zone: 25 ppm for 15 minutes	Upgrade to Level C
PID Concentration in breathing zone: 100 ppm	Stop work, move out of source area.

Decontamination/Work Zone Requirements: Decontaminate drilling equipment between borings by steam cleaning or washing with Alconox (or equivalent) and triple rinsing. Decon water will be placed in a 55-gallon drum. Dispose of contaminated personal protective equipment by placing in a 55-gallon drum.

Calibration Procedures: Calibrate PID daily according to manufacturers specifications.

Description of Site: (include map if possible) Axelson, Inc. formerly operated a parts and repair shop for submersible oil (rod sucker) pumps at the subject site from 1980 to approximately 1987. The subject site is currently occupied by Performance Lift, Inc., an equipment rental business. Pump repair activities are not currently conducted at the subject site. The Site layout is presented on the attached Figures.

Types of hazardous material: Petroleum hydrocarbons, low concentrations of metals in soil and groundwater, low concentrations of VOCs in soil and groundwater, and Naturally Occurring Radioactive Materials in surface soils. See attached Tables for existing data.

Major safety/health hazards/risks: (contamination, equipment, fire etc.) Dermal and inhalation contact with hydrocarbon-impacted soil or groundwater. Physical hazards associated with drilling equipment and vehicle traffic.

3.0 EMERGENCY PLANNING

Emergency Phone Numbers

Hospital/Emergency Clinic: Columbia Lea Regional Medical Center

Address: 5419 N. Lovington Highway, Hobbs, New Mexico 88240

Phone Number: (505) 392-6581 or 911

Local Fire Department: 911

Local Police Department: 911

HSI GeoTrans: (916) 853-1800

Subcontractor: _____

Phone Number: _____

Subcontractor: _____

Phone Number: _____

Subcontractor: _____

Phone Number: _____

Note: Map of route to hospital must be attached.

Directions to Hospital (approximately 10 miles away from site):

1. Turn right (east) on W. Marland Boulevard.

2. Turn left (north) at Grimes Street.

3. Travel approximately 2 miles north on Grimes Street.

4. Turn left (northwest) on N. Turner Street (aka Lovington Highway).

5. Hospital located at 5419 N. Lovington Highway.

4.0 ATTACHMENTS

__X__ Site Map

__X__ Site Standard Safety Operating Procedures

__X__ Route to Hospital

__X__ Chemical Hazard Information

__X__ Site Safety Plan Acknowledgment Form

__X__ Health & Safety Guidelines for Field Activities Involving Petroleum Distillate Products

_____ Heat Stress

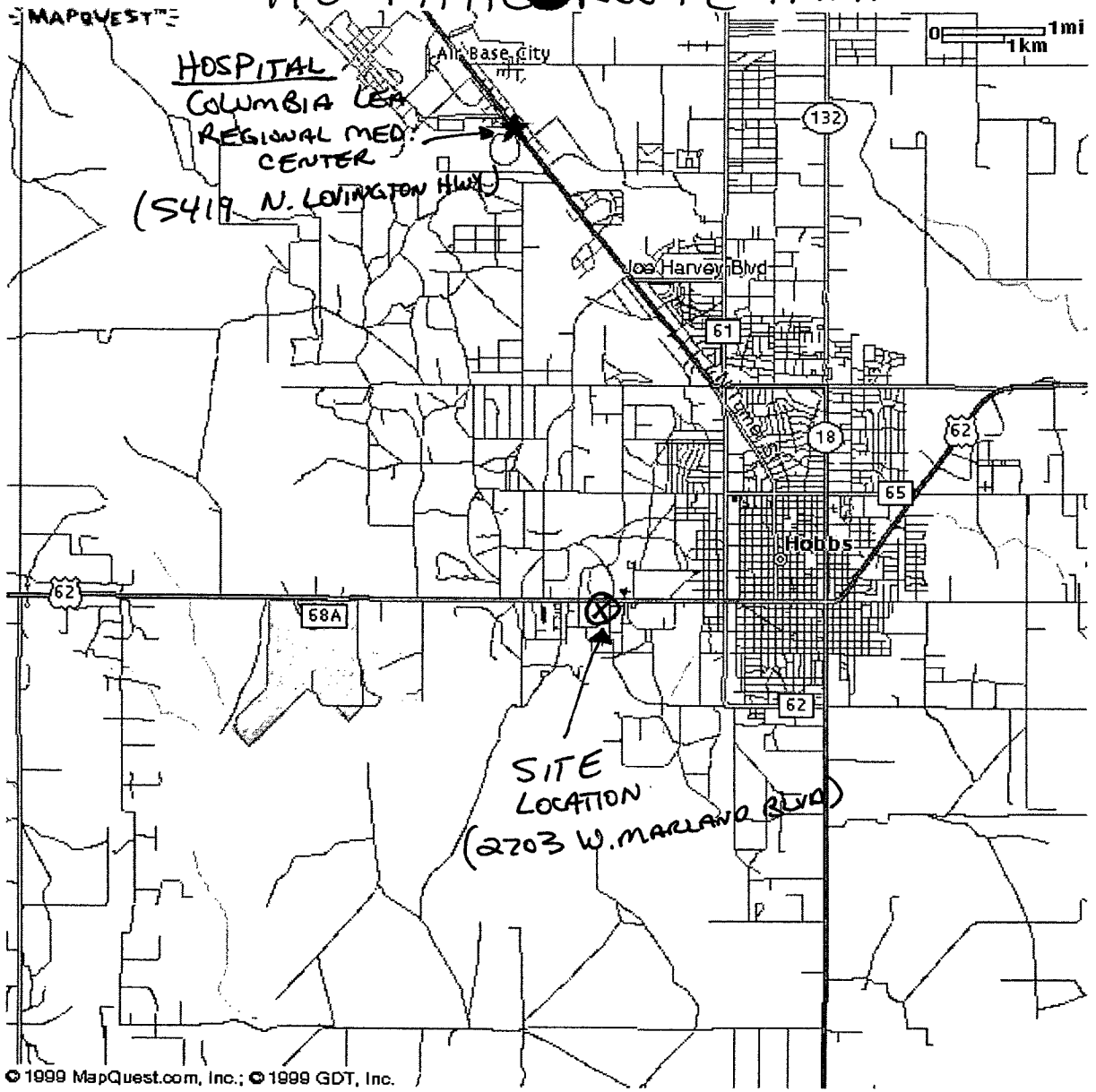
_____ Cold Stress

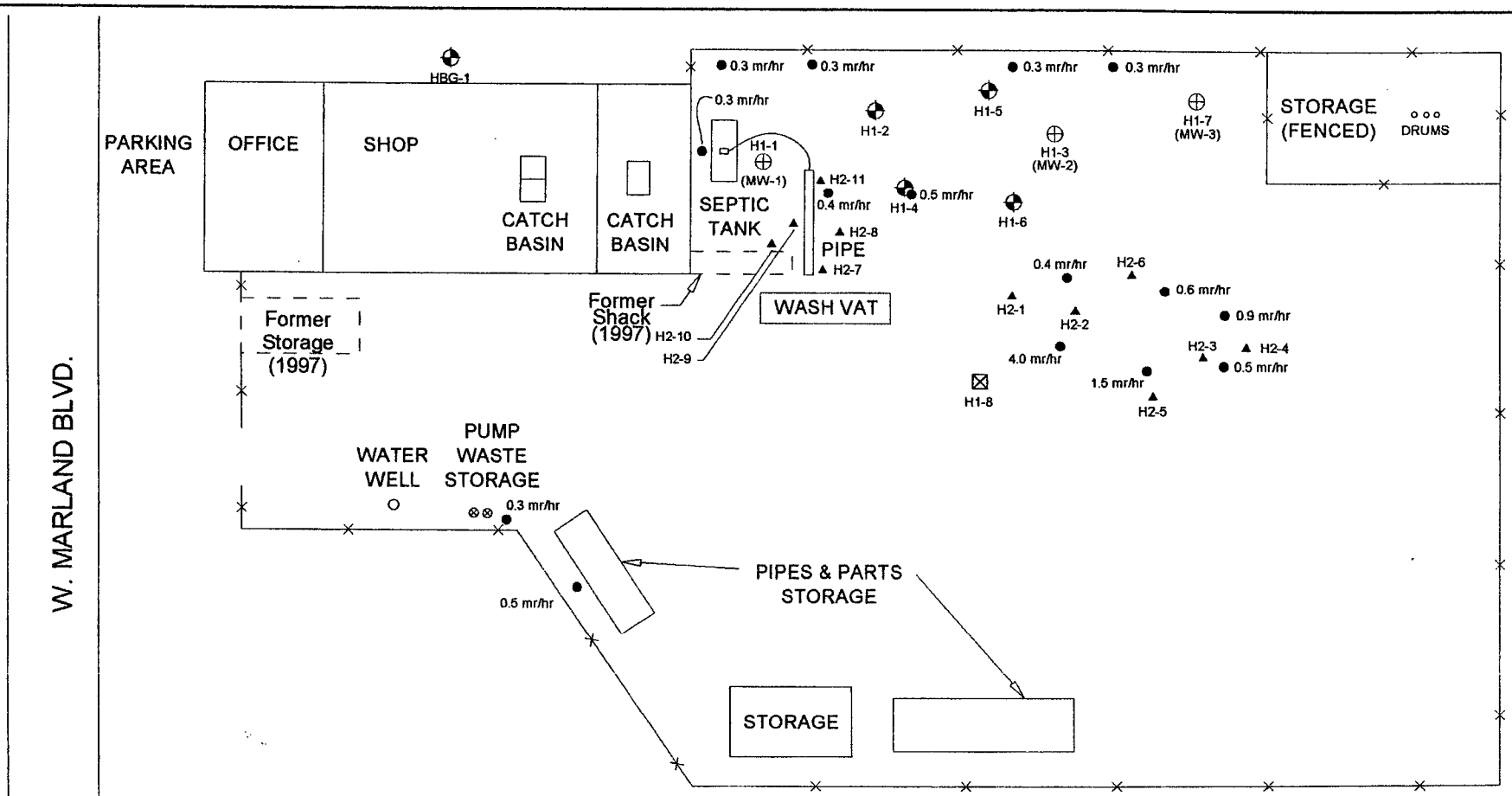
__X__ Drill Rig Safety Procedures

_____ UST Removal Safety Checklists

_____ Trenching Procedures

HOSPITAL ROUTE MAP





Legend

- Soil and Grab Groundwater Boring Location
- Soil Boring Location
- Monitoring Well Location
- NORM Sample Location
- Area Radiation Survey
- Fence

Scale 1" = 40'

N

0 40 80 120 Feet

Note:
Samples collected by Environmental Management and Engineering, Inc., February 1995.

Title:	**Historical Sampling Locations Former Axelson Facility**
Location:	2703 West Marland Blvd. Hobbs, New Mexico
File Name:	P:\Projects\Beazer\P253\Hobbs\Arcview\base_maps.apr
Checked By:	
Date: 7/28/00	**Prepared By:** Tim Godwin

HSI GEOTRANS
A TETRA TECH COMPANY

Figure: 2

Table 1
Summary of Soil Analytical Results
Total Petroleum Hydrocarbons

February 1995

Sample ID	Sample Depth (feet)	TPH (mg/kg)
H1-1E	6	**1,530**
H1-1L	20	**7,558**
H1-2E	8	**5,673**
H1-2H	14	**9,760**
H1-3I	16	12
H1-3K	29	**835**
H1-4F	12	22
H1-4H	16	6
H1-5D	14	7
H1-7D	29	< 1
H1-8D	29	**120**
H3-1A (concrete catch basin)	Sludge	**6,154**
H3-2 (concrete catch basin)	Sludge	**19,222**
H4-1 (septic tank)	Sludge	**10,000**
H5-1 (wash vat tank)	Sludge	**5,490**
HBG-1A (background)	0 - 0.5	47
NM OCD	- - -	100

Note: Data collected by Environmental Management & Engineering, Inc.
Total Petroleum Hydrocarbons analyzed using EPA Method 418.1
Concentrations in bold exceed the NM OCD recommended action level.

NM OCD = New Mexico Oil Conservation Division recommended remediation action level.
TPH = Total Petroleum Hydrocarbons
mg/kg = milligrams per kilogram (ppm)

Table 2
Summary of Soil Analytical Results
Volatile Organic Compounds

February 1995

Sample ID	Sample Depth (ft. bgs.)	1,2,4-Trimethylbenzene	1,2-Dichlorobenzene	1,3,5-Trimethylbenzene	1,3-Dichlorobenzene	4-Isopropyltoluene	Ethylbenzene	n-Butylbenzene	n-Propylbenzene	Naphthalene	sec-Butylbenzene	tert-Butylbenzene	Toluene	Xylenes (total)
H1-1E	6 - 8	0.03	0.075	0.07	0.033	0.09	< 0.02	0.045	< 0.02	0.6	0.045	0.058	< 0.02	0.04
H1-1L	20 - 22	1.305	< 0.02	0.135	< 0.02	0.18	0.057	0.13	0.06	0.75	0.072	0.054	0.03	0.525
H1-2E	8- 10	0.068	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.47	< 0.02	< 0.02	< 0.02	< 0.02
H1-2H	14 - 16	0.03	< 0.02	0.088	< 0.02	< 0.02	0.035	0.06	0.044	0.25	0.007	0.015	< 0.02	0.2
H1-3I	16 - 17	0.045	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.018	< 0.02	0.12	< 0.02	< 0.02	< 0.02	< 0.02
H1-3K	29 - 31	0.427	< 0.02	0.036	< 0.02	0.105	< 0.02	< 0.02	< 0.02	0.225	0.045	0.06	< 0.02	< 0.02
H1-8D	29 - 31	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
HHSLs	---	5.7	370	70	140	---	230	240	240	190	220	390	520	210

Note: Data collected by Environmental Management & Engineering, Inc.
All results reported as milligrams per kilogram (mg/kg = ppm). Only detected analytes listed.
Volatile Organic Compounds analyzed using EPA Method 8260.

HHSLs = U.S. EPA Region 6 Human Health Medium-Specific Screening Levels for industrial soils.

Table 3
Summary of Soil Analytical Results
Semi Volatile Organic Compounds

February 1995

Sample ID	Sample Depth (ft. bgs.)	2-Methylnaphthalene	Naphthalene(SVOC)
H1-1E	6 - 8	2.6	0.7
H1-1L	20 - 22	3.15	0.87
H1-2E	8- 10	< 0.1	0.58
H1-2H	14 - 16	1.5	0.8
H1-3I	16 - 17	< 0.1	< 0.1
H1-3K	29 - 31	0.18	0.28
H1-8D	29 - 31	< 0.1	< 0.1
HHSLs	---	---	190

Note: Data collected by Environmental Management & Engineering, Inc.
All results reported as milligrams per kilogram (mg/kg = ppm). Only detected analytes listed.
Semi Volatile Organic Compounds analyzed using EPA Method 8270.

HHSLs = U.S. EPA Region 6 Human Health Medium-Specific Screening Levels for industrial soils.

Table 4
Summary of Soil Analytical Results
RCRA 8 Metals

February 1995

Sample ID	Sample Depth (ft. bgs.)	Arsenic	Barium	Cadmium	Chromium (Total)	Lead	Mercury	Selenium	Silver
H1-1E	6-8	6.8	78.0	1.3	12.0	14.0	< 0.05	< 0.1	2.3
H1-1L	20-22	2.7	61.0	0.5	7.0	7.0	< 0.05	< 0.1	1.2
H1-2E	8-10	11.0	37.0	0.9	8.0	12.0	< 0.05	< 0.1	1.5
H1-2H	14-16	5.1	166.0	0.8	9.0	9.0	< 0.05	< 0.1	1.7
H1-3I	16-17	5.9	808.0	1.1	10.0	12.0	< 0.05	< 0.1	1.7
H1-3K	29-31	4.3	140.0	0.3	4.0	3.0	< 0.05	< 0.1	< 0.5
H1-5D	14-16	4.9	244.0	1.1	12.0	16.0	< 0.05	< 0.1	2.5
H1-8D	29-31	5.1	525.0	1.1	11.0	18.0	< 0.05	< 0.1	1.9
H3-1A (concrete catch basin)	Sludge	11.0	53.0	6.8	12.0	179.0	< 0.05	< 0.1	1.3
H3-2 (concrete catch basin)	Sludge	7.3	78.0	5.0	124.0	592.0	< 0.05	< 0.1	< 0.5
H4-1 (septic tank)	Sludge	6.5	104.0	10.0	86.0	776.0	< 0.05	< 0.1	0.9
H5-1 (wash vat tank)	Sludge	4.8	129.0	9.9	206.0	660.0	< 0.05	< 0.1	< 0.5
HBG-1A (background)	0-0.5	16.0	256.0	1.1	6.0	26.0	< 0.05	< 0.1	< 0.5
HHSLs	---	360	100,000	1,000	450	2,000	610	10,000	10,000

Note: Data collected by Environmental Management & Engineering, Inc.
All results reported as milligrams per kilogram (mg/kg = ppm).
RCRA 8 Metals analyzed using EPA Method 3010/3020/7000.

HHSLs = U.S. EPA Region 6 Human Health Medium-Specific Screening Levels for industrial soils.

Table 5
Summary of Soil Analytical Results
Naturally Occuring Radioactive Material (NORM)

February 1995

Sample ID	Sample Depth (ft. bgs.)	Radium 226	Radium 228
H1-1A	0 - 0.5	3.2	<1.2
H1-4A	0 - 0.5	**35.3**	<1.4
H1-5A	0 - 0.5	<1.5	<0.8
H2-1A	0 - 0.5	15.8	<3.0
H2-2A	0 - 0.5	**387**	**45.3**
H2-3A	0 - 0.5	**405**	**49.3**
H2-4A	0 - 0.5	**76.6**	<1.9
H2-5A	0 - 0.5	23.9	2.5
H2-6A	0 - 0.5	21.5	<1.2
H2-7A	0 - 0.5	24	1.9
H2-8A	0 - 0.5	20.3	<0.7
H2-9A	0 - 0.5	**739**	**70.7**
H2-10A	0 - 0.5	<1.2	<0.6
H2-11A	0 - 0.5	**64.9**	<1.6
H3-1A (concrete catch basin)	Sludge	**104**	15
H3-2 (concrete catch basin)	Sludge	25.5	<0.7
H4-1 (septic tank)	Sludge	4.3	<0.4
H5-1 (wast vat tank)	Sludge	7.1	<0.7
NM NORM	---	30	30

Note: Data collected by Environmental Management & Engineering, Inc.
All results reported as pico Curies per gram (pCi/gm).
Concentrations in bold exceed the proposed State of New Mexico NORM limit.

NM NORM = Proposed State of New Mexico NORM Limit

Table 6
Summary of Water Analytical Results
Total Petroleum Hydrocarbons

February 1995

Sample ID	Location	TPH (mg/L)
H1-8	grab groundwater	1
H6-1	water well	<1
MW-1	monitor well	680
MW-2	*monitor well*	25
MW-3	monitor well	1

Note: Data collected by Environmental Management & Engineering, Inc.
TPH analyzed using EPA Method 8015 Modified

TPH = Total Petroleum Hydrocarbons
mg/L = milligrams per liter (ppm)

Table 7
Summary of Water Analytical Results
Volatile Organic Compounds

February 1995

Sample ID	Location	1,2,4-Trimethylbenzene	1,2-Dichloroethane	1,3,5-Trimethylbenzene	4-Isopropyltoluene	Benzene	Ethylbenzene	n-Butylbenzene	Naphthalene	tert-Butylbenzene	Tetrachloroethene	Toluene	Xylenes (Total)
H1-8	grab groundwater	0.012	<0.005	< 0.005	0.01	< 0.005	< 0.005	0.01	0.015	0.01	<0.005	< 0.005	< 0.005
H6-1	water well	< 0.005	<0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	< 0.005	< 0.005
MW-1	monitor well	4.7	<0.005	1.5	1.0	**0.24**	0.28	<0.005	< 0.005	<0.005	<0.005	**1.2**	**1.225**
MW-2	monitor well	0.14	<0.005	0.15	0.145	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	0.065	< 0.005
MW-3	monitor well	< 0.005	**0.01**	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	**0.007**	< 0.005	< 0.005
WQCC	---	---	---	---	---	---	---	---	0.03	---	---	0.75	0.62
MCLs	---	---	0.005	---	---	0.005	0.7	---	---	---	0.005	---	---

Note: Data collected by Environmental Management & Engineering, Inc.
All results reported as milligrams per liter (mg/L = ppm). Only detected analytes listed.
Volatile Organic Compounds analyzed using EPA Method 8260.
Concentrations in bold exceed the WQCC or MCL values.
Semi Volatile Organic Compounds (SVOCs) not detected in the above listed water samples.

Most stringent comaprision criteria listed when both WQCC and MCL values exist.

WQCC = New Mexico Water Quality Control Commission Groundwater Standards
MCLs = U.S. EPA Drinking Water Maximum Contaminant Levels

Table 8
Summary of Water Analytical Results
RCRA 8 Metals

February 1995

Sample ID	Location	Arsenic	Barium	Cadmium	Chromium (Total)	Lead	Mercury	Selenium	Silver
H1-8	grab groundwater	**0.06**	0.08	< 0.02	< 0.3	< 0.3	< 0.005	< 0.01	< 0.05
H6-1	water well	**0.09**	0.08	< 0.02	< 0.3	< 0.3	< 0.005	< 0.01	< 0.05
MW-1	monitor well	**0.08**	0.14	< 0.02	< 0.3	< 0.3	< 0.005	< 0.01	< 0.05
MW-2	monitor well	**0.09**	0.08	< 0.02	< 0.3	< 0.3	< 0.005	< 0.01	< 0.05
MW-3	monitor well	**0.06**	0.07	< 0.02	< 0.3	< 0.3	< 0.005	< 0.01	< 0.05
WQCC	---	---	1.0	---	0.05	---	0.002	0.05	0.05
MCLs	---	0.05	---	0.005	---	0.015	---	---	---

Note: Data collected by Environmental Management & Engineering, Inc.
All results reported as milligrams per liter (mg/L = ppm).
RCRA 8 Metals analyzed using EPA Method 3010/3020/7000.
Concentrations in bold exceed the WQCC or MCL values.

Most stringent comaprision criteria listed when both WQCC and MCL values exist.

WQCC = New Mexico Water Quality Control Commission Groundwater Standards
MCLs = U.S. EPA Drinking Water Maximum Contaminant Levels

HSI GEOTRANS
SITE SAFETY STANDARD
OPERATING PROCEDURES

To prevent injuries and health effects, the following safe work practices are to be followed when dealing with known or unknown site hazards. These practices establish a pattern of general precautions and measures for reducing the risks associated with response operations. This list is not inclusive and shall be amended as necessary.

1. Eating, drinking, chewing gum or tobacco, taking medications, and smoking are prohibited in contaminated or potentially contaminated areas, or where the possibility for the transfer of contamination exists.

2. Upon leaving contaminated or suspected contaminated areas, hands and face must be thoroughly washed. A thorough shower and washing must be taken should excessive body contamination occur.

3. Avoid contact with potentially contaminated substances. Do not walk through puddles, pools, mud, etc. Avoid, whenever possible, kneeling on the ground or leaning or sitting on drums, equipment, or the ground. Do not place monitoring equipment on potentially contaminated surfaces.

4. No beard or facial hair may be worn which interferes with a satisfactory qualitative respirator fit test.

5. Be familiar, knowledgeable, and adhere to all instructions in the Site Health and Safety Plan. As a minimum, a safety meeting will be held at the start of each project to discuss this plan. Additional meetings will be held, as necessary to address new or continuing safety and health concerns.

6. Be aware of the location of all emergency phone numbers.

7. All personnel going on-site shall be briefed on the anticipated hazards, equipment requirements, safety practices, emergency procedures, and communication methods.

8. Entrance and exit routes should be planned, and emergency escape routes delineated.

9. Unfamiliar operations should be rehearsed prior to implementation.

10. Whenever respiratory protective equipment is in use, the buddy system must be used. Buddies should prearrange hand signals or other means of emergency communication in case of lack of radios or radio breakdown.

11. Visual contact must be maintained between pairs on-site with the team members remaining in close proximity in order to assist each other in case of emergencies.

12. The number of personnel and equipment in the contaminated area should be minimized consistent with site operations.

13. Appropriate work areas should be established for support, contamination reduction, and exclusion areas.

14. Establish appropriate decontamination procedures for leaving the site.

15. Report all injuries or illnesses, unsafe conditions, practices or equipment immediately to the site safety coordinator.

16. A portion of the site "field book" will be maintained as a project safety log. The project safety log will be used to record the names, entry and exit dates, and time of all HSI GeoTrans, Inc. and subcontractor personnel, and of project site visitors; air quality and personal exposure monitoring data; and other information related to safety matters. All accidents, illnesses or other incidents shall be reported immediately to the Operations Manager and to the HSI GeoTrans, Inc. Health and Safety Officer.

NIOSH Pocket Guide to Chemical Hazards

Benzene	**CAS** 71-43-2
C_6H_6	**RTECS** CY1400000
Synonyms & Trade Names Benzol, Phenyl hydride	**DOT ID & Guide** 1114 130

Exposure Limits	NIOSH REL: Ca TWA 0.1 ppm ST 1 ppm See Appendix A
	OSHA PEL: [1910.1028] TWA 1 ppm ST 5 ppm See Appendix F

IDLH Ca [500 ppm] See: 71432	**Conversion** 1 ppm = 3.19 mg/m^3

Physical Description
Colorless to light-yellow liquid with an aromatic odor. [Note: A solid below 42°F.]

MW: 78.1	BP: 176°F	FRZ: 42°F	Sol: 0.07%
VP: 75 mmHg	IP: 9.24 eV		Sp.Gr: 0.88
Fl.P: 12°F	UEL: 7.8%	LEL: 1.2%	

Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.

Incompatibilities & Reactivities
Strong oxidizers, many fluorides & perchlorates, nitric acid

Measurement Method
Charcoal tube; CS_2; Gas chromatography/Flame ionization detection; IV [#1500, Hydrocarbons] [Also #3700, #1501] See: NMAM INDEX

Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: N.R. Provide: Eyewash, Quick drench	**First Aid** (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Respirator Recommendations NIOSH
At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms irritation eyes, skin, nose, respiratory system; giddiness; headache, nausea, staggered gait; fatigue, anorexia, lassitude (weakness, exhaustion); dermatitis; bone marrow

depressant/depression; [Potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, blood, central nervous system, bone marrow

Cancer Site [leukemia]

See also: INTRODUCTION See ICSC CARD: 0015 See MEDICAL TESTS: 0022

SITE SAFETY "TAILGATE" TRAINING ATTENDANCE SHEET

Date: _____

Location: _____

Presented by: _____

Topics Covered:

HEALTH AND SAFETY PLAN

- Hazardous/Toxic Substances
- On-Site Organization and Coordination
- Emergency Medical Care and Procedures
- Contingency Plan
- Additional Controls for Complex/Hazardous Jobs

SPECIFIC PRECAUTIONS FOR DAY'S ACTIVITIES

OTHER: _____
_____
_____

ATTENDEE LIST

Name (Print)	Company	Signature

FORM HSP-3C

HEALTH AND SAFETY GUIDELINES
for
FIELD ACTIVITIES INVOLVING
PETROLEUM DISTILLATE PRODUCTS

1.0 PURPOSE

This operating procedure establishes minimum procedures for protecting personnel against the hazardous properties of motor oil and petroleum distillate fuels during the performance of field work including known and suspected releases of such materials. The procedure was developed to enable health and safety personnel and project managers to quickly prepare and issue site safety plans for investigations of such releases.

Whenever UST are being excavated and removed, Forms HSP-3A and B must also be completed and attached. Together, the completed forms and this operating procedure shall comprise a site safety plan. Safety procedures for drilling, trenching, and other construction operations should be attached as necessary.

2.0 APPLICABILITY

This procedure is applicable to field investigations involving the substances listed below and involving one or more of the activities listed below.

2.1 Substances

Motor Oil (used and unused)
Leaded and Unleaded Gasoline
No. 1 Fuel Oil (kerosene, JP-1)
No. 1-D Fuel Oil (light diesel)
No. 2 Fuel Oil (home heating oil)
No. 2-D Fuel Oil (medium diesel)
No. 4 Fuel Oil (residual fuel oil)
No. 5 Fuel Oil (residual fuel oil)
No. 6 Fuel Oil (Bunker C fuel oil)
JP-3, 4, & 5 (Jet fuel)
Gasohol

2.2 Activities

Collection of samples of subsurface soil with aid of truck-mounted drill rig, hand-held power auger, or hand auger.

Construction, completion, and testing of ground-water monitoring wells.

Collection of ground-water samples from new and existing wells.

Observing removal of underground fuel pipes and storage tanks.

Small scale removals of contaminated soils.

This procedure must not be used for confined space entry (including trench entry) or for installing or operating pilot and full-scale fuel recovery systems.

No safety plan is needed for non-intrusive geophysical surveys, reconnaissance surveys, and collection of surface soil, surface water, and biota.

3.0 HAZARD EVALUATION/RISK ANALYSIS

Motor oil and petroleum distillate fuels are mixtures of aliphatic and aromatic hydrocarbons. The predominant classes of compounds in motor oil, gasoline, kerosene, and jet fuels are the paraffins (e.g., hexane, octane), naphthenes (e.g., cyclohexane), and aromatics (e.g., benzene, toluene). Gasoline contains about 80% paraffins, 6% naphthenes, and 14% aromatics. Kerosene and jet fuels contain 42-48% paraffins, 36-68% naphthenes, and 16-20% aromatics. Diesel fuels and heating oils contain less than 10% paraffins, 14-23% naphthenes, and 68-78% non-volatile aromatics. These heavier fuels contain almost no volatile aromatic compounds. Chemicals may be added to automotive and aviation fuels to improve their burning properties. Examples are tetraethyl-lead and ethylene dibromide.

3.1 Flammability

Crude oil and petroleum distillate fuels possess two intrinsic hazardous properties, namely, flammability and toxicity. The flammable property of the oil and fuels presents a far greater hazard to field personnel than toxicity. Being flammable, the vapors of volatile components of crude oil and the fuels can also be explosive when confined.

The lower explosive limits (LEL) of the fuels listed in Section 2.1 range from 0.6% for JP-5 to 1.4% for gasoline. Flash points range from -36 degrees F for gasoline to greater than 150 degrees F for No. 6 fuel oil. JP-5 has a flashpoint of 140 degrees F. Although it has a lower LEL than gasoline, it can be considered less hazardous because its vapors must be heated to a higher temperature to ignite.

Crude oil and petroleum distillate fuels will not burn in the liquid form; only the vapors will burn and only if the vapor concentration is between the upper and lower explosive limits,

sufficient oxygen is present, and an ignition source is present. If these conditions occur in a confined area, an explosion may result.

The probability of fire and explosion can be minimized by eliminating any one of the three factors needed to produce combustion. Two of the factors -- ignition source and vapor concentration -- can be controlled in many cases. Ignition can be controlled by prohibiting open fires and smoking on site, installing spark arrestors on drill rig engines, and turning the engines off when LELs are approached. Vapor concentrations can be reduced by using fans. In fuel tanks, vapor concentrations in the head space can be reduced by introducing dry ice (solid carbon dioxide) into the tank; the carbon dioxide gas will displace the combustible vapors and oxygen.

3.2 Toxicity

Crude oil and petroleum distillate fuels exhibit relatively low acute inhalation and dermal toxicity. Concentrations of 160 to 270 ppm gasoline vapor have been reported to cause eye, nose, and throat irritation after several hours of exposure. Levels of 500 to 900 ppm can cause irritation and dizziness in one hour, and 2000 ppm produced mild anesthesia in 30 minutes. Most fuels, particularly gasoline, kerosene, and jet fuels, are capable of causing skin irritation after several hours contact with the skin.

Some of the additives to gasoline, such as ethylene dichloride, ethylene dibromide, and tetraethyl and tetramethyl lead, are highly toxic; however, they are present in low concentrations and their contribution to the overall toxicity of gasoline and other fuels is negligible in most instances.

3.3 Exposure Limits

OSHA has developed permissible workplace exposure limits of 300 ppm for gasoline. It has also established permissible exposure limits for individual components, such as benzene. ACGIH has established a permissible exposure limit of 300 ppm for gasoline. The limit took into consideration the average concentration of benzene in gasoline (1%) as well as its common additives. There are no exposure limits established for other petroleum fuels.

3.4 Physical Hazards

Various physical hazards may be associated with the activities outlined in Section 2.2. These include, but are not limited to, drill rig operational hazards, excavating and heavy equipment, excessive noise, heat and cold stress, underground and aboveground utilities, and fires. The anticipated hazards for this project are included in the General Information section of the site safety plan. Recommended safety practices are discussed in specific attachments to this plan.

4.0 HEALTH AND SAFETY

4.1 Personnel Clearance

4.1.1 Medical Surveillance

Personnel on-site must be certified by a physician as being physically fit to wear respiratory protective devices and to perform their assigned field work. This should be conducted through a medical surveillance program meeting the requirements of 29CFR1910.120 (f).

4.1.2 Training Requirements

All personnel exposed to site health and safety hazards must be certified as having successfully completed, as a minimum, an off-site training course meeting requirements of 29CFR1910.120 (e) for field personnel. Supervisory and refresher training must have been completed, as necessary, for applicable site personnel.

4.2 Site-Specific Safety Briefing

Before field work begins, all field personnel, including subcontractor employees, must be briefed on their work assignments and safety procedures contained in this document. Each must be provided with a copy of this document and submit a signed safety compliance agreement before commencing work. Individuals refusing to sign the agreement will be prohibited from working on the site.

4.3 Personnel Protective Equipment

4.3.1 Recommended Equipment

- NIOSH-approved full- or half-face respirator with organic vapor cartridges
- Saranex- or polyethylene-coated Tyvek coveralls
- Splash-proof safety goggles or glasses with full side shields
- Nitrile or neoprene gloves
- Neoprene or butyl boots, calf-length with steel toe and shank
- Hardhat

4.3.2 Equipment Usage

Chemical-resistant safety boots must be worn during the performance of work where surface soil is obviously contaminated with oil or fuel, when product quantities of oil or fuel are likely to be encountered, and within 10 feet of operating heavy equipment.

Respirators must be worn whenever total airborne hydrocarbon levels in the breathing zone of field personnel reach or exceed a 15-minute average of 11 ppm in summer and 25 ppm in winter. If total airborne hydrocarbons in the breathing zone exceed 100 ppm, work must be suspended, personnel directed to move a safe distance from the source, and the Corporate Health & Safety Officer or designee consulted.

Chemical resistant gloves must be worn whenever soil or water known or suspected of containing petroleum hydrocarbons is collected or otherwise handled.

Chemical resistant coveralls must be worn whenever product quantities of fuel are actually encountered and when oil- or fuel-saturated soil is handled.

Safety glasses must be worn when working within 10 feet of any operating heavy equipment (e.g., drill rig, backhoe). Splash-proof goggles or face shields must be worn whenever product quantities of oil or fuel are encountered.

Hardhats must be worn when working with or in the vicinity of an operating drill rig, backhoe, or other heavy equipment.

Operators of some facilities, such as refineries, often require all personnel working within facility boundaries to wear certain specified safety equipment. Such requirements shall be strictly observed by HSI GeoTrans personnel and its subcontractors.

5.0 ENVIRONMENTAL MONITORING

5.1 Required Equipment

- Organic vapor meter with flame- or photoionization detector
- Combustible gas meter

5.2 Monitoring Requirements and Guidelines

Vapor monitoring shall be performed as often as necessary and whenever necessary to protect field personnel from hazardous vapors. Monitoring must be performed by individuals trained in the use and care of the monitoring equipment.

During drilling operations, vapor emissions from boreholes must be measured whenever the auger is removed from the boring and whenever flights are added or removed from hollow-stem augers. This requirement does not apply to borings less than 5 feet deep and borings of any depth made to install monitoring wells in uncontaminated soils. Measurements should be made initially with an organic vapor meter, followed with a combustible gas meter if vapor levels exceed the highest concentration measurable with the organic vapor meter.

Initially, measurements shall be made about 12 inches from the borehole, both upwind and downwind positions. If the total hydrocarbon concentrations exceed the respirator use action level (See Section 4.3.2), measurements must be made in the breathing zone of the individual(s) working closest to the borehole. Decisions regarding respiratory protection should be made using vapor concentrations in the breathing zone.

If total organic vapor concentrations within 12 inches of the borehole exceed the capacity of the organic vapor meter, a combustible gas meter (CGM) must be used to determine if

explosive conditions exist. Operations must be suspended, the drill rig motor shut down, and corrective action taken if combustible gas concentrations reach 25% of LEL within a 12-inch radius of the borehole or 10% of LEL at a distance greater than 24 inches from the borehole. This procedure must also be followed whenever the organic vapor meter goes offscale at its highest range and no CGM is available. If corrective action cannot be taken, field personnel and all other individuals in the vicinity of the borehole must be directed to move to a safe area and the local fire department and facility management must be alerted.

Instruments used on-site must be maintained and calibrated in accordance with manufacturers requirements. Instrument manuals with calibration instructions shall be taken to each site with the instrument.

6.0 AREA CONTROL/WORK ZONES

Access to hazardous and potential hazardous areas of spill sites must be controlled to reduce the probability of occurrence of physical injury and chemical exposure of field personnel, visitors, and the public. A hazardous or potentially hazardous area includes any area where (1) field personnel are required to wear respirators, (2) borings are being drilled with powered augers, and (3) excavating operations with heavy equipment are being performed.

The boundaries of hazardous and potentially hazardous areas must be identified by cordons, barricades, or emergency traffic cones or posts, depending on conditions. If such areas are left unattended, signs warning of danger and forbidding entry must be placed around the perimeter if the areas are accessible to the public. Trenches and other large holes must be guarded with wooden or metal barricades spaced no further than 20 feet apart and connected with yellow or yellow and black nylon tape not less than 3/4-inch wide. The barricades must be placed no less than two feet from the edge of the excavation or hole.

Entry to hazardous areas shall be limited to individuals who must work in those areas. Unofficial visitors must not be permitted to enter hazardous area while work in those areas is in progress. Official visitors should be discouraged from entering hazardous areas, but may be allowed to enter only if they agree to abide by the provisions of this document, follow orders issued by the site safety officer, and are informed of the potential dangers that could be encountered in the areas.

7.0 DECONTAMINATION

Recommended decontamination procedures for personnel and equipment is as follows.

7.1 Personnel

Gasoline, kerosene, jet fuel, heating oil, gasohol, and diesel oil should be removed from skin using a mild detergent and water. Hot water is more effective than cold. Liquid

dishwashing detergent is more effective than hand soap. Motor oil and the heavier fuel oils (No. 4-6) can be removed with dishwashing detergent and hot water also; however, if weathered to an asphaltic condition, mechanic's waterless hand cleaner is recommended for initial cleaning followed by detergent and water.

7.2 Equipment

Gloves, respirators, hardhats, boots and goggles should be cleaned as described under personnel; however, if boots do not become clean after washing with detergent and water, wash them with a strong solution of trisodium phosphate and hot water.

Sampling equipment, augers, vehicle undercarriages, and tires should be steam cleaned. The steam cleaner is a convenient source of hot water for personnel and protective equipment cleaning.

8.0 SMOKING

Smoking and open flames are strictly prohibited at sites under investigation.

9.0 PREPARATION OF TANKS

The procedures to be used by the firm responsible for tank removal/transport must agree with procedures recommended by the American Petroleum Institute. If the firm's procedures, especially those addressing removal/inactivation of flammable vapors, disagree substantially with API's procedures, the PM must be notified immediately (by telephone if possible). In turn, the PM shall inform the client that HSI GeoTrans personnel will not report to the site during tank removal/transport operations unless proper procedures are used. If the firm responsible for tank removal/transport is under subcontract to HSI GeoTrans, it must be required to follow API procedures.

HSI GEOTRANS
STANDARD SAFETY
PROCEDURES DURING DRILLING

1) Hard hat, safety glasses or goggles, shirt and full length pants and work shoes/boots are required for all personnel working with or near the rig. Tuck shirts at belt.

2) No eating, drinking or smoking is allowed near the rig if site has known of suspected contamination of soils or ground water.

3) Direct contact with contaminated or suspected contaminated surfaces should be avoided.

4) Tools, materials, cords, hoses or debris should be located so as not to cause tripping or to come into contact with moving rig parts.

5) Tools, materials and equipment subject to displacement or falling must be adequately secured.

6) Flammable materials must be stored free of ignition sources. Flammable liquids must be stored in an approved container.

7) All underground utility locations must be identified prior to drilling.

8) Maintain adequate clearance of drill from overhead transmission lines. Minimum clearance is 25 feet unless special permission is granted by utility company. Call local utility company for proper clearance.

9) Loose and frayed clothing, loose long hair, loose jewelry, rings or chains may not be worn while working with rotating equipment.

10) Machinery must be shut down prior to repairs or lubrication (except parts that must be in motion for lubrication).

11) Mechanical equipment must be shut down prior to and during fueling operations. When refueling or transferring fuel, containers/equipment must be bonded.

12) Appropriate respiratory and personal protective equipment must be work when conditions warrant their use.

13) The drill rig, and any other machinery used, should be inspected daily by a competent, qualified individual.

10.0 EMERGENCY RESPONSE

The following summarizes standard procedures to be followed in the event of an emergency. All responses must be coordinated through the designated on-site project manager. First-aid may only be administered by a certified first-aid provider (see Form HSP-3, General Information).

Fire: Stop work, shut off equipment, and evacuate to safe distance (HSI GeoTrans vehicle should be kept at a reasonable distance from work area to prevent endangerment from fire). Contact fire department, then HSI GeoTrans. Keep at a safe distance until emergency services arrive. No fire fighting beyond incipient fires will be attempted!

Injury/Illness: Perform first aid, if possible, and call EMS. Do not move if broken bones are suspected unless life is endangered. If person is safe to move (minor cuts, burns, etc.), transport person to hospital. If serious, arrange for rescue squad.

Overexposure: Remove employee (only if there is no danger to rescue) from exposure source to location of fresh air. Contact rescue squad/ambulance as necessary. Do not continue work until source of contamination is found, identified, and controlled. Contact HSI GeoTrans office for technical assistance.

Hazardous Materials Accident: Stop equipment and work. Relocate to safe distance. To the extent possible, determine nature of incident (utility, gas, pipe, etc.). Contact HSI GeoTrans offices for instructions. Do not attempt equipment backout from utility strike without guidance of utility company.

11.0 ACCIDENT REPORTING

Form AI-1 must be completed and delivered to the Director of Health Sciences for each accident or incident involving HSI GeoTrans personnel. Near misses must be reported on form AI-2. These forms are available from the Office Health and Safety Coordinator.

OCD Rule 118 - HYDROGEN SULFIDE (H_2S) GAS- PUBLIC SAFETY

A. Intent-Provide protection for the public in areas where $H_2S \geq 100$ ppm.

B. Producing Operations :

1. If $H_2S \geq 100$ ppm then the following apply;
2. Producing Operations should be conducted per API RP-55.
3. Operators of lease producing or gas processing or other related facilities shall take reasonable measures to;
    a. forewarn and safeguard persons having occasion to be on or near the property, and
    b. training operators employees in H_2S safety, and
    c. posting of warning signs, and
    d. fencing of surface installations, and
    e. installation of safety devices and wind direction indicators, and
    f. maintain tanks, thief hatches and gaskets, valves and piping so as to prevent avoidable loss of vapors, and
    g. requires venting or burning in a manner to avoid endangering human life.

C. Drilling Operations:

1. If $H_2S \geq 100$ ppm then the following apply;
2. Drilling Operations should be conducted per API RP-49.
3. Well Servicing and Workover should be conducted per API RP-68.

D. H_2S Discovery and Submission of Analytical Results:

1. Operators have 90 days to test gas stream for all new wells or leases, or discovery of H_2S.
2. Requires operators to submit information on the pool and results of testing.
3. Requires testing to be industry-recognized method and procedure.
4. Allows test results to be submitted for previously producing leases if results are still representative and less than three (3) years old.