GW - 15

REPORTS

YEAR(S):

1994 - 1992

PRELIMINARY FIELD INVESTIGATION REPORT
FORMER LIQUID WASTE DISPOSAL PIT
ENRON GAS PROCESSING COMPANY,
MAIN PLANT
HOBBS, NEW MEXICO
OCTOBER–DECEMBER 1992

Prepared for:

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1.0 Introduction

At the request of the Enron Gas Processing Company (Enron), IT Corporation (IT) conducted a preliminary field investigation to assess the extent of hydrocarbon constituents in soil and groundwater in the vicinity of a former liquid waste disposal pit at Enron's main gas processing plant (Main Plant), Hobbs, New Mexico. Additionally, equipment was installed, and information was obtained to evaluate the application of vapor extraction technology for remediation at the site. The Main Plant is located approximately 8 miles west of Hobbs, Lea County, New Mexico. The scope of work for the investigation consisted of drilling nine soil borings; installing three groundwater monitoring wells; constructing two vapor extraction wells; installing ten vapor monitoring probes at four soil boring locations; conducting slug tests in each groundwater monitoring well to estimate hydraulic conductivity of the upper portion of the aquifer; performing vapor extraction tests of the vadose zone; collecting and analyzing soil, groundwater, and soil-gas samples; logging the sediments; field screening of soil samples; interpreting the data; and presenting findings concerning site conditions.

Previous environmental work at the Main Plant was conducted by Metric Corporation (Metric) of Albuquerque, New Mexico. The results of Metric's effort are summarized in their December 1991 report entitled "Shallow Subsurface Investigation at Hobbs Gas Treating Plant, Lea County, New Mexico." IT's scope of work for this phase was partially developed from information presented in that report.

2.0 Site Description

The site is located at 11525 West Carlsbad Highway, Lea County, Hobbs, New Mexico, and is shown on the Site Plan (Figure 1).

The Main Plant functions as a natural gas "sweetening" facility to remove impurities, including hydrogen sulfide, from the natural gas process stream after collection from the supply wells. After the sweetening process, the natural gas is compressed for transmission by pipeline to in-state and out-of-state customers. The sweetening process waste stream includes a clear liquid similar to white gas, which consists primarily of a mixed group of petroleum distillates (including benzene) consisting primarily of high molecular weight alkanes (C-10 to C-16), which could be considered part of the kerosene fraction. Another part of the waste stream includes a black carbon substance. Mixtures of the waste liquids were intermittently discharged into a 4- by 6-foot pit of unknown depth (probably not exceeding 6 to 8 feet). The walls of the pit were lined with concrete, but the bottom was unlined. The volume of

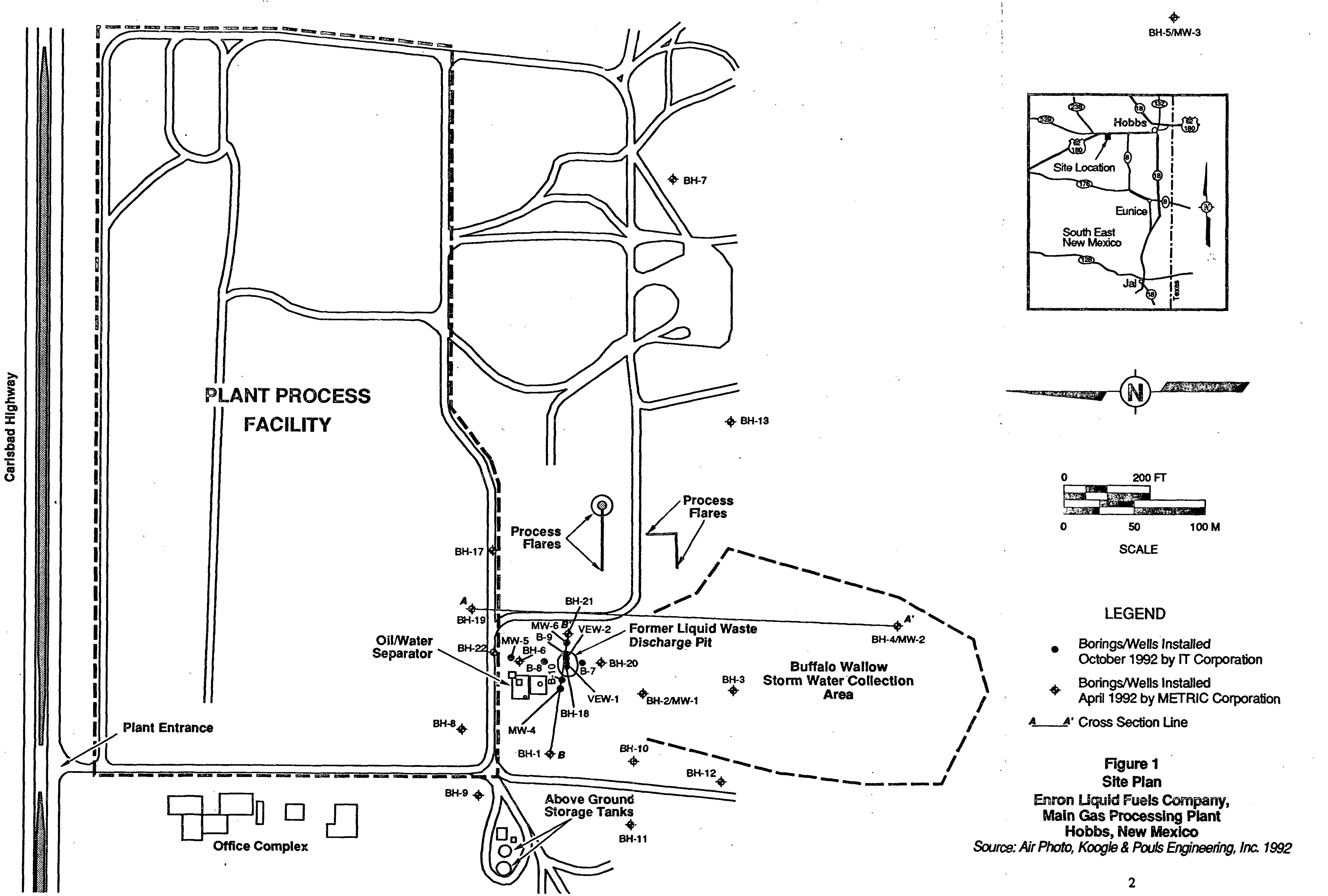

Figure 1
Site Plan
Enron Liquid Fuels Company,
Main Gas Processing Plant
Hobbs, New Mexico
Source: Air Photo, Koogle & Pouls Engineering, Inc. 1992

liquids discharged into the pit is unknown. In April 1992, the concrete pit was excavated and the pit filled in, with no remaining surface expression except for a concrete plug from a previously drilled soil boring (installed by Metric) and a lack of vegetation. The location of the former liquid waste disposal pit, relative to significant site features, is shown on the Site Plan (Figure 1). Several elevated flares are positioned in the vicinity of the former liquid waste disposal pit to burn gas-phase impurities from the natural gas process stream.

Topography of the site and the surrounding land is relatively flat. As shown on Figure 1, there are surface-water features positioned in the vicinity of the former liquid waste disposal pit, including an earthen storm-water holding area to the south and a process-water impoundment to the southwest.

3.0 Regional and Site Geology and Hydrology

3.1 Regional Geology

The town of Hobbs in southeastern New Mexico is located over the unconsolidated and consolidated sand, silt, and clay units of the Pliocene Ogalalla Formation. These deposits are locally veneered with younger Pleistocene or Holocene windblown sand; stream-deposited clay; silt, sand, and gravel; or colluvial deposits. In southeastern New Mexico, the Ogalalla Formation ranges in thickness from a few inches to approximately 300 feet and commonly is capped with a hard caliche-cemented layer that may be up to 60 feet thick. The Ogalalla overlies the Triassic Dockum Group (Nicholson and Clebsch, 1961), which typically exceeds 1,100 feet in thickness in this area. The uppermost Triassic sediments in the Hobbs area consist predominantly of clay and siltstone units locally enclosing porous and permeable sandstone stringers and lenses. This upper unit is typically over 300 feet in thickness and has been correlated with the Chinle Formation of northwestern New Mexico. Underlying the upper unit is approximately 300 feet of predominantly sandstone units that are correlative to the Santa Rosa Formation in northeastern New Mexico (Nicholson and Clebsch, 1961). Beneath these sandstone units are approximately 500 feet of interbedded siltstone and clay units. All units are nearly horizontal, dipping gently toward the east.

3.2 Regional Hydrology

The town of Hobbs derives its public water supply principally from the Ogalalla Formation, which produces copious amounts of water from depths of 200 to 300 feet. A few deeper wells produce water from the sandstone units in the Dockum Group, which is the principal aquifer to the west of the project area. Oil Center is the only community in the area that obtains its public water supply from the Triassic rocks (Dockum Group). The Ogalalla Aquifer in this area has been designated as moderately vulnerable to contamination from surface discharges (Wilson, 1981).

3.3 Site-Specific Geology

The site-specific geology consists primarily of light-brown fine-grained sand and laterally discontinuous strongly cemented sand layers up to 5 feet in thickness. The soil boring associated with MW-6 is typical of the subsurface lithology logged in the borings advanced by IT. From the land surface to approximately 15.75 feet below ground surface (bgs), a buff to white fine-grained sand was observed. Black staining and hydrocarbon vapors were noted from 15.5 to 15.75 feet. From approximately 15.75 to 20.2 feet bgs, a white strongly cemented sand was observed. Beneath the strongly cemented sand, a buff to white fine-grained sand was encountered from approximately 20.2 to 21.2 feet bgs. The majority of this sand was stained black and had hydrocarbon vapors associated with it. From approximately 21.2 to 28 feet bgs, a buff- to pink fine-grained, strongly cemented sand was observed. From approximately 28 to 30.5 feet bgs, a light-brown fine-grained sand was encountered. Beneath the light-brown sand, a brown to pink fine-grained, strongly cemented sand was observed from approximately 30.5 to 35.5 feet bgs. From approximately 35.5 to 40 feet bgs, a buff to light-tan fine-grained sand was encountered, which was stained black and had hydrocarbon vapors associated with it. From approximately 40 feet bgs to the bottom of the boring (at approximately 52 feet bgs), a light-brown fine-grained sand was observed. Strongly cemented sand layers were not encountered below approximately 40 feet bgs.

The sediments from the ground surface down to the top of the strongly cemented sand unit (at a depth of approximately 15.75 feet) are probably Pleistocene or Holocene in age. The strongly cemented sand unit encountered at approximately 21.2 feet bgs probably marks the approximate top of the Pliocene Age Ogalalla Formation.

Detailed logs of the borings associated with MW-4, MW-5, MW-6, B-7, B-8, B-9, VEW-1, and VEW-2 are presented in Appendix A. A north to south interpretive cross section is presented as Figure 2. A west to east interpretive cross section is presented as Figure 3. The locations of these cross sections are presented on Figure 1. Boring logs advanced by both IT and Metric were included in development of the cross sections. Subsurface investigation by both IT and Metric indicate the presence of several strongly cemented sand units that vary in

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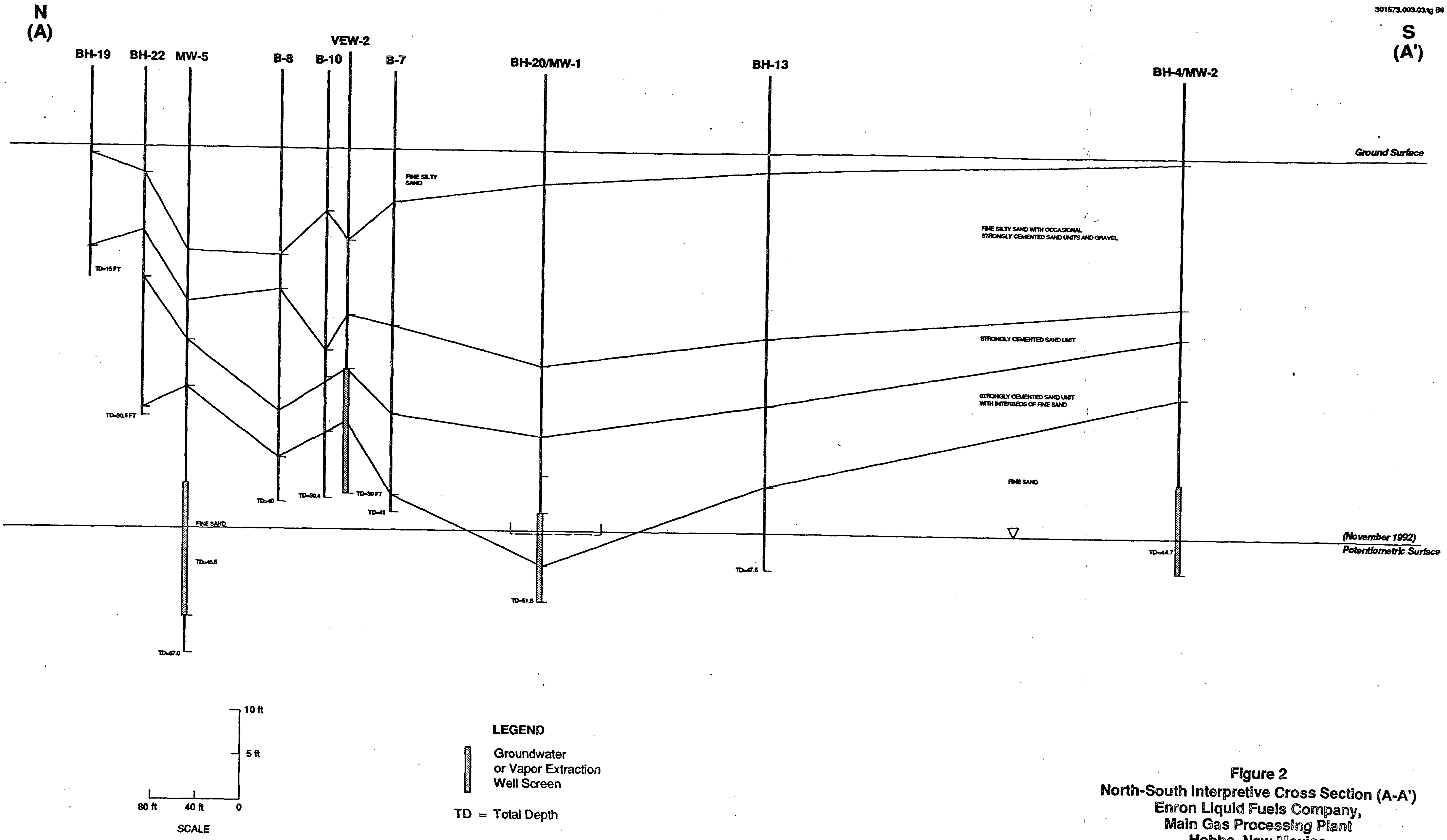

Figure 2
North-South Interpretive Cross Section (A-A')
Enron Liquid Fuels Company,
Main Gas Processing Plant
Hobbs, New Mexico

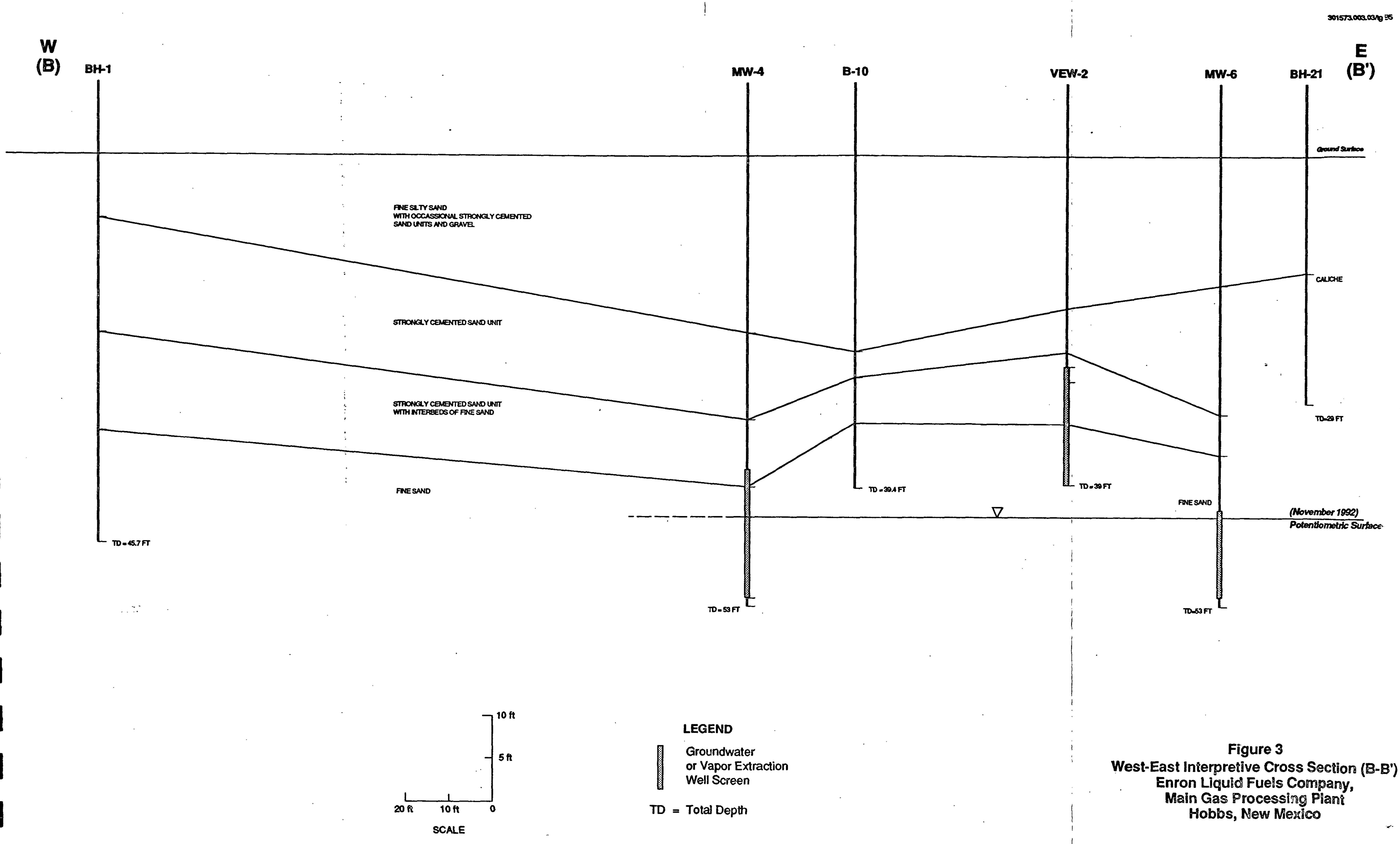

Figure 3
West-East Interpretive Cross Section (B-B')
Enron Liquid Fuels Company,
Main Gas Processing Plant
Hobbs, New Mexico

thickness from less than 0.08 foot to greater than 5 feet. The strongly cemented sand units are laterally discontinuous and vary in depth below ground surface.

3.4 Site-Specific Hydrology

Groundwater was encountered at approximately 42 feet bgs. Figure 4 presents a groundwater potentiometric surface map of the upper portion of the Ogalalla Formation based on the fluid-level measurements taken on December 1, 1992, from groundwater monitoring wells MW-1, MW-5, and MW-6. The groundwater flow direction is to the southeast, with a gradient of 0.006 ft/ft.

Based on discussions with Enron personnel, liquid wastes routinely overflowed the former liquid-waste disposal pit and flowed on the ground surface to the west and south of the pit. Distribution of subsurface contaminants will be affected by the location(s) of liquid waste infiltration. In addition, the former liquid-waste disposal pit is positioned near an area of storm-water collection and storage (i.e., Buffalo Wallow) for the plant. Enron personnel indicate that the pit has been submerged by storm water during periods of excessive precipitation. The ponding of water over the infiltration source(s) will also affect the subsurface distribution of hydrocarbon constituents.

4.0 Site Assessment Activities

IT geologists performed field assessment activities at the site on October 20 and October 21, and October 26 through November 7, 1992, that included observing drilling activities, providing lithologic descriptions of the sediments encountered during drilling, collecting soil and groundwater samples for laboratory analyses, field screening soil samples for the presence of volatile organic compounds, constructing groundwater monitoring wells, constructing vapor extraction wells, installing nested vapor monitoring probes, performing aquifer slug tests, and performing vapor extraction system (VES) pilot tests.

4.1 Soil Boring Installation

4.1.1 Drilling Activities

The soil borings were drilled using an Ingersoll-Rand Model TH60 air-rotary drilling rig equipped with 6- and 10-inch-diameter drill bits. The borings extended to a depth ranging from 18 feet to 53 feet bgs. During drilling, groundwater was encountered at a depth of approximately 42 feet bgs. Black and gray hydrocarbon staining of soil and hydrocarbon

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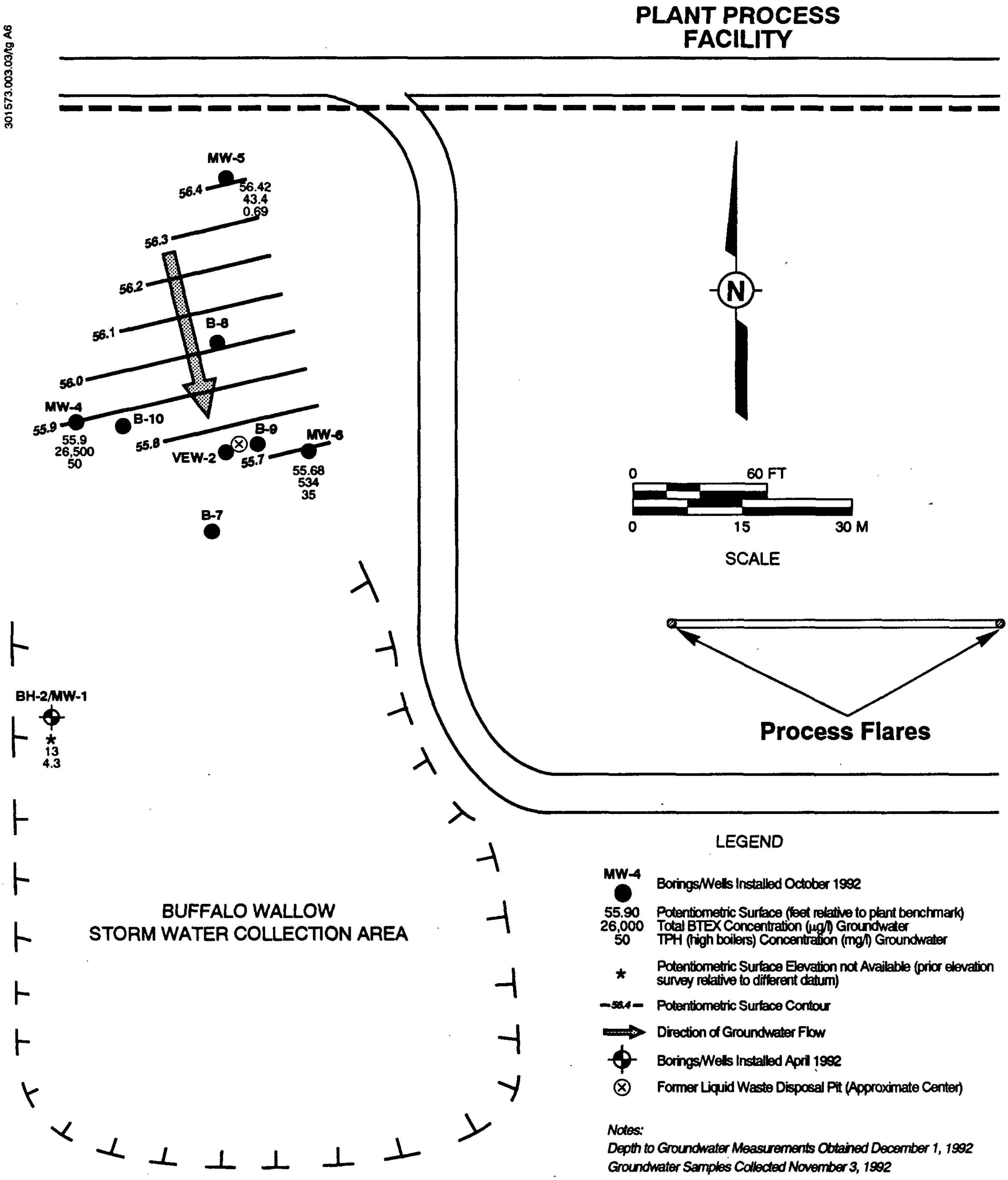

Notes:
Depth to Groundwater Measurements Obtained December 1, 1992
Groundwater Samples Collected November 3, 1992

Figure 4
Potentiometric Surface Map Showing BTEX and TPH Groundwater Concentrations
Enron Liquid Fuels Company, Main Gas Processing Plant
Hobbs, New Mexico

vapors were observed by the IT geologist during drilling of the soil borings associated with MW-4, MW-6, B-8, B-9, B-10, and VEW-2. Lithologic descriptions of the sediments encountered during drilling are presented in the Soil Boring Logs included in Appendix A.

The drill rig was operated by Geo Projects International of Austin, Texas. Drilling was performed under the supervision of the IT geologist. Downhole drilling equipment was steam-cleaned between borings, and the sampling equipment was cleaned between samples to reduce the potential for cross contamination. During drilling, soil sample collection was attempted at 5-foot intervals, using 24-inch-long, split-spoon samplers equipped with cleaned brass sleeves. Samples were collected in the undisturbed sediment below the drill bit.

During sampling, a Foxboro Model 128-GC flame-ionization detector (FID) was used in conjunction with the headspace method to characterize relative levels of light-end hydrocarbons (i.e., less than C-8). FID readings are useful for indicating relative levels of hydrocarbons but did not correlate directly with levels measured by laboratory analysis. The FID responds to a range of volatile organic chemical compounds and was used to monitor for volatile hydrocarbons that may be present in the soil. Levels detected in this manner were recorded in the field and subsequently used as a basis for selecting soil samples for chemical analysis. Table 1 presents a summary of the highest and lowest headspace readings and associated sample depths. The field-screening results and procedures are presented in Appendix B.

4.1.2 Soils Analyses

The soil samples selected for chemical analyses from the borings were collected at depths ranging from 5 to 42 feet bgs. The selection of the samples for analysis was based on the results of headspace field-screening measurements.

The soil samples were analyzed for total petroleum hydrocarbon (TPH) (high boilers), using modified U.S. Environmental Protection Agency (EPA) Method 8015; and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) using EPA Method 8020. Additionally, one soil sample was analyzed by gas chromatograph/mass spectrograph (GC/MS) library search to identify and quantify other constituents present (EPA Method 8270). These analyses were conducted at the IT Analytical Services Laboratory in Austin, Texas (ITAS-Austin). Copies of the Certificates of Analysis for the soil chemical analyses are included in Appendix C, while sample collection documentation is presented in Appendix D. Detection limits for the

Table 1

Summary of Headspace Readings
Enron Liquid Fuels Company, Main Gas Processing Plant
Hobbs, New Mexico

Soil Boring/ Well Location[a]	Highest Instrument Reading[b] (ppm)[c]	Sample Depth (feet)[d]	Lowest Instrument Reading[b] (ppm)	Sample Depth (feet)[d]
B-7	30	15	0.5	41
B-8	>1,000	All samples	>1,000	All samples
B-9	>1,000	All samples	>1,000	All samples
B-10	>1,000	All samples	>1,000	All samples
MW-4	>1,000	27	0	17
MW-5	0	All samples	0	All samples
MW-6	200	36.7	0	25
VEW-2	> 1,000	All (except 35 feet)	250	35

[a] See Figure 1 for locations.
[b] Foxboro Model 128-GC flame-ionization detector.
[c] ppm = Parts per million
[d] Depth below ground surface.

tests performed are shown on the Certificates of Analysis. Results of the soil sample analyses have been summarized in Table 2. BTEX and TPH concentrations in soil are presented next to the corresponding soil boring location shown on Figure 5.

Based on laboratory analyses of soil samples collected from six borings, hydrocarbon constituents appear to be distributed nonuniformly in the vadose zone. The lateral and vertical extent of hydrocarbon constituents relative to the former liquid waste disposal pit (FLWDP) is variable. At MW-5, positioned approximately 125 feet north (upgradient) of the FLWDP, analyses of a soil sample collected from a depth of 41 feet indicated that TPH and BTEX concentrations were below laboratory detection limits. At B-7, positioned approximately 35 feet south (downgradient) of the FLWDP, analyses of soil samples collected from depths of 16 and 41 feet indicated 71 micrograms per kilogram (µg/kg) of benzene and 31 milligrams per kilogram (mg/kg) of TPH, respectively, while the remaining constituents of interest were below laboratory detection limits. At B-9, positioned approximately 15 feet east of the FLWDP, analyses of a soil sample collected from a depth of 10.5 feet indicated 2,400 mg/kg of TPH and 352,400 µg/kg of total BTEX.

At MW-4, positioned approximately 65 feet west of the FLWDP, soil samples were collected from depths of 10.5 and 40 feet. Laboratory analysis of the sample collected at a depth of 10.5 feet indicated a xylene concentration of 160 µg/kg, with the remaining parameters below laboratory detection limits. Laboratory analysis of the sample collected at a depth of 40 feet indicated TPH concentrations of 1,000 mg/kg and a total BTEX concentration of 484 µg/kg, with benzene below laboratory detection limits.

At VEW-2, positioned near the center of the FLWDP, a soil sample collected from a depth of 39 feet had a TPH concentration of 7,500 mg/kg and a total BTEX concentration of 31,300 µg/kg.

Samples selected for chemical analysis were promptly sealed with aluminum foil, plastic caps, and tape. They were then labeled and placed in iced storage for transport to the analytical laboratory. Analysis Request and Chain of Custody Records (Appendix D) were initiated in the field by the IT geologist and accompanied the samples to the laboratory for the requested analyses. Cuttings generated during drilling were placed and sealed in 55-gallon drums and remain at the site for disposal by Enron.

Table 2

Summary of Soil Sample Analyses
Enron Liquid Fuels Company, Main Gas Processing Plant
Hobbs, New Mexico
October and November 1992

Soil Sample ID[a]	TPH[b] (mg/kg)	Benzene[c] (µg/kg)	Toluene[c] (µg/kg)	Ethylbenzene[c] (µg/kg)	Total Xylenes[c] (µg/kg)	Total BTEX (µg/kg)
B-7-16	ND (2)	71	ND (50)	ND (50)	ND (50)	71
B-7-41	31	ND (50)	ND (50)	ND (50)	ND (50)	ND
B-8-6.5	720	1,100	9,100	13,000	120,000	143,200
B-8-35	310	ND (200)	420	4,600	6,200	11,220
B-9-10.5	2,400	5,400	17,000	160,000	170,000	352,400
MW-4-10.5	ND (2)	ND (50)	ND (50)	ND (50)	160	160
MW-4-40	1000	ND (50)	84	230	170	484
MW-5-41	ND (2)	ND (50)	ND (50)	ND (50)	ND (50)	ND
VEW-2-39	7,500	3,100	2,200	13,000	13,000	31,300

[a] See Figure 1 for locations.

[b] TPH = Total extractable petroleum hydrocarbons (high boilers) using modified EPA Method 8015. Units = Milligrams per kilogram (mg/kg).

[c] BTEX analysis by EPA Method 8020. Units = micrograms per kilogram (µg/kg).

ND = Compound not detected above laboratory reporting limits. Reporting limit in parentheses.

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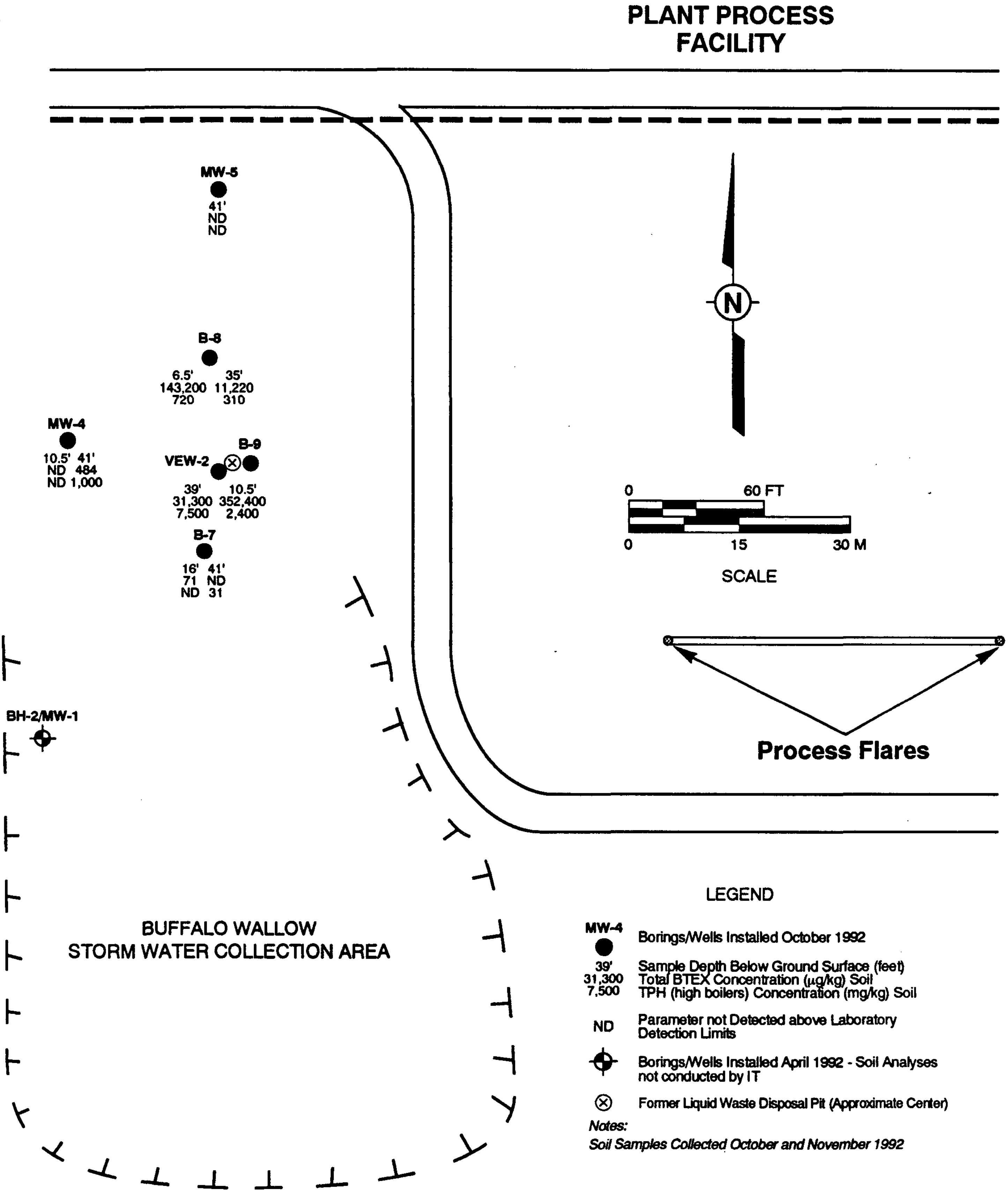


Figure 5
BTEX and TPH Concentrations in Soil
Enron Liquid Fuels Company, Main Gas Processing Plant
Hobbs, New Mexico

4.2 Groundwater Monitoring Well Installation

4.2.1 Well Installation

Three groundwater monitoring wells were installed (MW-4, MW-5, and MW-6). At two of the well locations (MW-4 and MW-6), field screening indicated the presence of vadose zone hydrocarbon constituents that required the installation of surface casing to minimize the transport of stained and contaminated soil to the aquifer during the drilling process. The surface casing is constructed of 8-inch-diameter polyvinyl chloride (PVC) casing with the annular space grouted from the terminal depth to ground surface. Installation of the groundwater monitoring well was accomplished by drilling inside the surface casing to the required depth and constructing the smaller diameter well (4-inch-inside-diameter) inside the surface casing.

The groundwater monitoring wells were constructed using flush joint-threaded, 4-inch-inside-diameter (I.D.), Schedule 40 PVC materials. No chemical cements, glues, or solvents were used in the well construction. A threaded PVC cap was screwed to the bottom length of the well screen, and each length of casing was consecutively threaded together and lowered into the borehole. Fifteen feet of 0.010-inch factory-slotted well screen was installed in each monitoring well. The well screen was positioned in the borehole to screen the upper 10 to 11 feet of the aquifer. Blank casing extended from the top of the screened interval to approximately 2.5 feet above ground surface. A filter pack, consisting of No. 8/16 (1.39 to 1.42 millimeters) Texas Mining Company silica industrial sand was installed in the annulus from the bottom of the borehole to approximately 2 feet above the top of the screened interval. A 3-foot-thick hydrated bentonite pellet seal was placed directly on top of the filter pack. The remaining annular space was filled to the ground surface with a cement/bentonite (5 percent) grout. The wellhead is protected by a steel sleeve with a hinged, locking lid and placed in a 3- by 3-foot concrete pad. Well-construction details are presented in Appendix A.

4.2.2 Groundwater Monitoring Well Development and Sampling

On November 2, 1992, the groundwater monitoring wells were developed using a 4-foot-long stainless steel bailer. Approximately 60 gallons (20 well volumes) of groundwater were purged from each well. For approximately every 5 to 10 gallons of water removed during development, pH, temperature, and specific conductance were measured. Well-development field logs are presented as Appendix E.

On November 3, 1992, the groundwater monitoring wells MW-1, MW-4, MW-5, and MW-6 were sampled to measure depth to water, presence, and thickness of any phase-separated hydrocarbons and to collect groundwater samples for laboratory analyses. Fluid-level measurements were taken to the nearest 0.01 foot with an ORS oil/water interface probe. A minimum of three casing volumes were purged from each monitoring well prior to sampling. During purging, pH, temperature, and specific conductance were measured. Groundwater samples were collected when the pH, temperature, and specific conductance readings had stabilized to within 10 percent of each other. Groundwater samples were collected using a 1- or 3-inch-diameter PVC bailer and dedicated rope. The sampling order was MW-1, MW-6, MW-5, and MW-4.

To verify the analytical results of the groundwater samples collected on November 3, 1992, groundwater monitoring wells MW-1, MW-4, MW-5, and MW-6 were resampled on December 2, 1992. The sampling procedure was the same as that performed during the November 3 sampling event except that new Teflon™ bailers and rope were dedicated to each monitoring well, and MW-4 was sampled twice. The sampling order was MW-4, MW-5, MW-6, MW-1, and MW-4. Groundwater monitoring well MW-4 was sampled twice at Enron's request to assess variations in hydrocarbon constituent concentrations. A trip blank was prepared by the laboratory and kept chilled in the cooler. A field blank was prepared using distilled water and transported to the analytical laboratory with the trip blank and the groundwater samples collected on December 2, 1992.

On November 3, 1992, the first bailer collected from groundwater monitoring well MW-4 may have had a clear nonaqueous phase liquid layer, up to 3 inches in thickness, present in it. However, this suspected layer was not present during the aquifer testing on November 6 or during the resampling activity on December 2, 1992.

4.2.3 Groundwater Analyses

Groundwater samples were collected from monitoring wells MW-1, MW-4, MW-5, and MW-6 on November 3, 1992. To obtain a representative sample of groundwater, each well was purged of approximately three well volumes of water prior to sampling. Termination of purging was based on the stabilization of temperature, pH, and specific conductance readings obtained during the purging process. Groundwater sample collection logs are presented in Appendix E.

The groundwater samples were analyzed for TPH (high boilers) using modified EPA Method 8015 and BTEX using EPA Method 8020. These analyses were conducted at ITAS-Austin. Copies of the Certificates of Analysis are included in Appendix C, while sample collection documentation is presented in Appendix D. Detection limits for the tests performed are shown on the Certificates of Analysis. Results of the groundwater sample analyses have been summarized in Table 3. BTEX and TPH concentrations are presented next to the corresponding well location on the groundwater potentiometric surface map for December 1992 (Figure 4).

Laboratory analyses of groundwater samples collected from the four monitoring wells indicate the presence of hydrocarbon constituents. TPH and total BTEX concentrations for each well sampled were above laboratory detection limits. The lowest TPH and BTEX concentrations were detected in groundwater samples collected from wells MW-1 and MW-5. The highest concentrations of TPH and BTEX were detected in the groundwater sample collected from well MW-4, with a TPH concentration of 50 mg/L, and a total BTEX concentration of 26,500 µg/L.

To verify the laboratory analytical results of the November 3, 1992, sampling event, Enron requested that IT resample groundwater monitoring wells MW-1, MW-4, MW-5, and MW-6 on December 2, 1992. The verification laboratory analyses are summarized in Table 3, which indicates similar analytical results for the groundwater monitoring wells between the November 3 and December 2 sampling events.

Samples from MW-2 and MW-3 were collected by Metric and analyzed for purgeable aromatics and purgeable hydrocarbons on October 8 and September 30, 1992. The laboratory analyses indicate that all concentrations of purgeable aromatics and hydrocarbons were found to be below the detection limit of 1.0 µg/L. The Metric water samples were analyzed by Assagai Analytical Laboratories Inc. in Albuquerque, New Mexico. The data is presented in Metric's December 1991 report (Metric, 1991). IT did not collect samples from MW-2 and MW-3 during this investigation.

Table 3

Summary of Groundwater Sample Analyses
Enron Liquid Fuels Company, Main Gas Processing Plant
Hobbs, New Mexico
November and December 1992

Water Sample ID[a]	Sample Date	TPH[b]	Benzene[c]	Toluene[c]	Ethyl Benzene[c]	Total Xylenes[c]	Total BTEX[c]	pH[d]	Total Dissolved Solids[e]
MW-1	November 1992	4.3	1.5	1.5	ND[f] (1.0)	10	13	6.4	2900
MW-4	November 1992	50	16000	8000	700	1800	26,500		
MW-5	November 1992	0.69	3.0	3.4	3.0	34	43.4		
MW-6	November 1992	35	340	23	51	120	534		
MW-1	December 1992	5.9	1.3	1.4	ND (1.0)	6.0	8.7		
MW-4	December 1992	15	17000	8200	530	1300	27,030		
MW-4A	December 1992	10	15000	6200	400	1000	22,600		
MW-5	December 1992	1.3	9.1	4.1	8.2	37	58.4		
MW-6	December 1992	10	520	20	58	120	718		
FB-1[g]	December 1992	NA[h]	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)		
TB-1[i]	December 1992	NA	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)		

[a] See Figure 1 for locations.

[b] TPH = Total extractable petroleum hydrocarbons (high boilers) using modified EPA Method 8015. Units = milligrams per liter (mg/L).

[c] BTEX analysis by EPA Method 8020. Units = micrograms per liter (μg/L).

[d] pH analysis by EPA Method 150.1; unitless.

[e] Total dissolved solids analysis by EPA Method 160.1 units = mg/L.

[f] ND = Not detected at the detection limit in parentheses.

[g] FB-1 = Field Blank No. 1

[h] NA = Not analyzed

[i] TB-1 = Trip Blank No. 1

4.3 Vapor Extraction Wells

Two vapor extraction wells were installed adjacent to the former liquid waste disposal pit. VEW-1 was located within 5 feet to the west of the disposal pit, and VEW-2 was located within 5 feet to the east of the pit (Figure 1). The two vapor extraction wells were constructed using flush joint-threaded, 4-inch-I.D., Schedule 40 PVC materials. No chemical cements, glues, or solvents were used in the well construction. A threaded PVC cap was screwed to the bottom length of the slotted casing, and each length of casing was consecutively joined together and lowered into the borehole. The screened portion of each well consists of factory-slotted casing with 0.032-inch-wide slots. In VEW-1 the borehole is screened between depths of approximately 5 and 18 feet bgs. VEW-1 was screened above the strongly cemented sand unit that was observed from a depth of approximately 18.8 to 23.0 feet bgs. In VEW-2 the borehole is screened between depths of approximately 24 and 38.5 feet bgs. VEW-2 was screened below the strongly cemented sand unit. VEW-1 and VEW-2 were screened above and below the strongly cemented sand unit, respectively, and separate VES pilot tests were conducted to assess what effects, if any, the strongly cemented sand unit would have on vapor transport through the vadose zone.

Blank casing was installed above the slotted interval to approximately 0.5 feet bgs. A filter pack consisting of No. 8/16 (1.39 to 1.42 millimeters) Texas Mining Company silica industrial sand was installed from the bottom of the well to approximately 2 feet above the top of the screened interval. A 4-foot-thick bentonite clay seal was placed directly on top of the filter pack. The annular space was filled with a cement/bentonite (5 percent) grout to approximately 1 foot bgs. A traffic-rated, locking steel utility box was installed at the vapor extraction wellheads, flush with the surrounding ground surface. Additionally, an 8-inch-diameter PVC surface casing was installed at VEW-2 from ground surface to approximately 20 feet bgs and keyed into the strongly cemented sand unit. The smaller diameter vapor extraction well (VEW-2) casing was installed inside this surface casing. Well-construction details are presented in Appendix A.

4.4 Vapor Extraction Monitoring Probes

The four observation probe borings were installed 35 feet south (B-7), 50 feet north (B-8), 15 feet east (B-9), and 45 feet west (B-10) from the extraction wells and contained three observation probes each, except for B-10, which contained one observation probe. The three observation probes in B-7 were placed at depths of 10, 16, and 32 feet bgs (bgs). The three observation probes in B-8 were placed at depths of 9, 15, and 30 feet bgs. The three observation probes in B-9 were placed at depths of 10, 16, and 27 feet bgs. The single observation probe in B-10 was placed at a depth of 31 feet bgs. The specific probe depth in each boring was selected to intersect a specific lithologic unit observed during drilling activities. Each cast-aluminum probe was attached to semirigid, 3/16-inch-I.D. polypropylene tubing. The tubing for each probe extends to above ground surface, where it is labeled and a one-way quick-connect valve is attached. Each probe was placed in an uncased borehole and positioned in the middle of an approximately 3-foot-thick layer of No. 8/16 (1.39 to 1.42 millimeters) Texas Mining Company silica industrial sand. A hydrated bentonite pellet seal was installed in between the sand layers to provide vertical isolation for each probe. A traffic-rated, locking steel utility box was installed at the surface of each soil boring, flush with the surrounding ground surface. The subsurface lithology and construction details of the observation probe borings are shown on the soil boring logs included in Appendix A.

Figure 1 presents the locations of the soil observation probe borings. The locations selected for installation of the observation probe borings were based on work done previously at the site by Metric and on IT's previous experience installing and conducting VES pilot tests. Vertical placement of the observation probes within each nest was based on the site-specific lithology. In each nest, one deeper probe was placed in unconsolidated material below the depth of the strongly cemented sand unit encountered in VEW-2 (at a depth between approximately 18.8 and 23 feet bgs). The deeper probes (ranging from approximately 27 to 32 feet bgs) were intended to measure influence from the VES pilot tests conducted in VEW-2. Two shallower probe placements were in unconsolidated material above the strongly cemented sand encountered in VEW-2. The first horizon ranges from approximately 9 to 10 feet bgs. The second horizon ranges from approximately 15 to 16 feet bgs. Only one probe was installed in boring B-10 at a depth of approximately 31 feet bgs. This boring (B-10) was initially to be converted to a groundwater monitoring well (MW-4). However, due to visual observations of soils containing hydrocarbon constituents above the strongly cemented sand unit, a surface casing was installed prior to continuing advancement of the boring below the strongly cemented sand unit. Soils containing hydrocarbon constituents were observed below the strongly cemented sand unit, and consequently, completion of this boring as a groundwater monitoring well was abandoned. The surface casing, therefore, prevented the installation of VES observation probes at shallower depths. MW-4 was relocated 20 feet west of B-10.

4.5 Vapor Extraction Tests

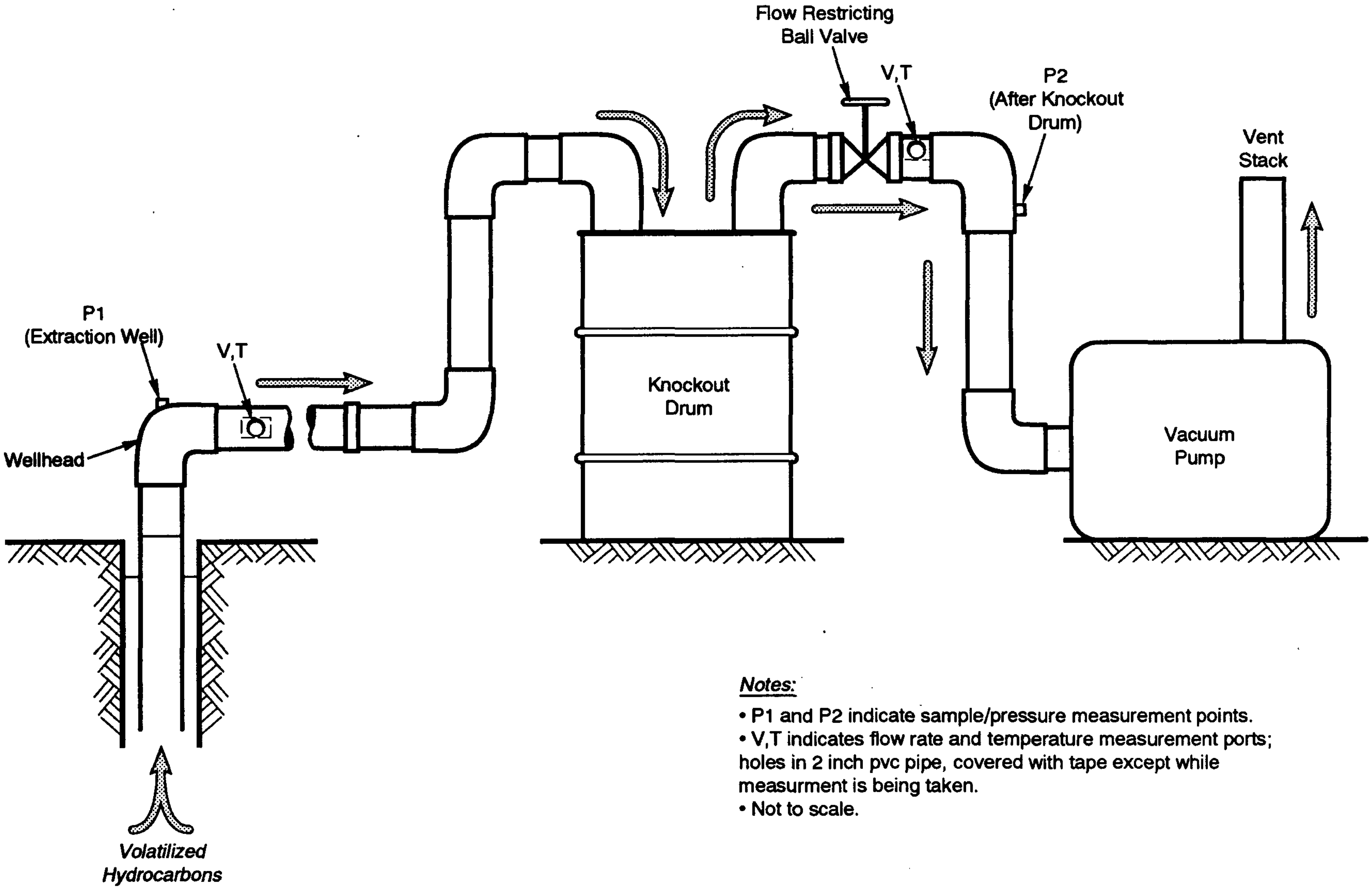
4.5.1 Pilot Tests

On November 4 and 5, 1992, soil vapor extraction system (VES) pilot tests were conducted in VEW-1 and VEW-2, respectively. The equipment used to conduct the pilot test consisted of a trailer-mounted vacuum pump, two vapor extraction wells (VEW-1 and VEW-2), and four observation probe locations, with a total of ten probes.

The VES pilot tests were conducted to assess the feasibility of moving air through the subsurface for remediation purposes. A continuous negative pressure (vacuum) was applied to the two extraction wells separately, for approximately 7 hours each. Based on IT's previous experience conducting VES pilot tests, 7 hours is an adequate duration for stabilization of the negative pressures at the observation probes and extraction well, and the extraction well flow rates and temperatures. The effects of that vacuum were measured at each of the ten observation probes.

The extraction wellhead was connected to a knockout drum on the VES pilot test equipment using PVC piping, with sampling and pressure measurement ports positioned near the wellhead. The vacuum pump used was a 5-horsepower/230-volt, alternating current motor with a Rotron blower. Electrical power for the VES motor was provided by an electrical outlet installed near the wellhead. The knockout drum served as a condensate and particulate removal point within the system. The VES pilot test equipment schematic is shown on Figure 6.

During the pilot tests, flow in the system was maintained at the highest flow rate possible to induce the greatest vacuum at the observation probes. This flow rate varied from approximately 2,000 to over 4,500 linear feet per minute, as shown in Table 4. The following parameters were recorded hourly during the pilot test: 1) percent of the lower explosive limit (LEL) for combustible cases and percent oxygen of the process stream at the extraction wellhead using a Gastech Model GX-3 explosimeter, while a Foxboro Model 128-GC FID was available to backup the explosimeter readings; 2) negative pressures (vacuum) at the extraction wellhead and each of the ten observation probes, using three Dwyer magnehelic differential pressure gauges measuring 0 to 0.25, 0 to 5, and 0 to 100 inches of water; and 3) air velocity and temperature measured with a Davis 100 UT-9110 hot-wire anemometer/temperature meter at the extraction well, after the knockout drum and after



Notes:

- P1 and P2 indicate sample/pressure measurement points.
- V,T indicates flow rate and temperature measurement ports; holes in 2 inch pvc pipe, covered with tape except while measurment is being taken.
- Not to scale.

Figure 6
VES Pilot Test Equipment Schematic
Enron Liquid Fuels Company, Main Gas Processing Plant
Hobbs, New Mexico
November 1992

Table 4

Summary of VES Pilot Test Monitoring Parameters Enron Liquid Fuels Company, Main Gas Processing Plant Hobbs, New Mexico

Date Vapor Extraction Well ID	Time	Vacuum[a] (in. H_2O)	Flow Rate[b] (ft/min)	Temperature[c] (°F)	% LEL[d]	FID Effluent Concentration[e] Parts Per Million
04-Nov-92 VEW-2	1230	54	2000	60	100	NA
	1330	54	2700	65	100	NA
	1430	54	2300	60	100	NA
	1530	54	2300	60	100	NA
	1630	54	2200	60	100	NA
	1730	55	2600	60	100	NA
	1830	55	2500	60	100	NA
	1930	55	2700	53	100	NA
05-Nov-92 VEW-1	0700	30	1400[f]	95[f]	100	NA
	0800	29	1800[f]	90[f]	100	NA
	0900	28	3000	60	100	NA
	1000	29	4800	60	100	NA
	1100	29	4200	60	100	NA
	1200	29	4200	65	100	NA
	1300	29	3800	65	NA	>1000
	1420	29	3800	65	NA	>1000

[a] Vacuum measured in inches of water.

[b] Airflow velocity measured with a hot-wire anemometer in a 2-inch-inside-diameter pipe in feet per minute.

[c] Temperature in degrees Fahrenheit as measured by a hot-wire anemometer.

[d] Lower explosive limit, percent.

[e] Organic vapor concentrations measured with an FID in parts per million by volume.

[f] During the first two readings on 12-5-92, the hot-wire anemometer was out of calibration.

NA = Not analyzed.

the blower. In addition, soil-vapor samples were taken from the extraction wellheads during the pilot tests and from five of the soil-vapor monitoring probes for laboratory analyses. One soil-vapor sample was collected from VEW-2 toward the beginning of that pilot test. Two soil-vapor samples were collected from VEW-1 at the midpoint and at the end of that pilot test. Vacuum, temperature, flow-rate measurements, and volatile hydrocarbon vapor concentration field measurements or percent LEL are summarized in Table 4. The VES pilot test observation probe data are summarized in Table 5. VES pilot test field data are presented in Appendix F.

On November 4 and 5, soil vapor samples were collected from vapor extraction wells VEW-1, VEW-2, and soil vapor monitoring probes B-7-32, B-8-15, B-9-10, B-9-16, and B-9-27. Soil vapor samples were collected at the extraction well by extracting soil vapor from the process stream to an 8-liter Tedlar bag via a small diaphragm pump. The soil vapor was transferred to an evacuated 6.6-liter stainless steel cylinder via a stainless steel tube. Soil vapor samples were collected by connecting the end of each probe's 3/16-inch tubing to the evacuated stainless steel cylinder via a stainless steel tube. The soil vapors were drawn into the stainless steel cylinders under less than 3 millimeters of mercury vacuum.

4.5.2 Soil-Vapor Analyses

Soil-vapor samples were collected on November 4 and 5, 1992, for laboratory analyses from vapor extraction wells VEW-1 and VEW-2 and soil vapor monitoring probes B-7-32, B-8-15, B-9-10, B-9-16, and B-9-27. The soil vapor samples were collected and stored in laboratory-prepared pressure-evacuated stainless steel canisters (TO-14-style sample collection canisters) and shipped under chain-of-custody protocol by overnight delivery to the IT Analytical Services Laboratory in Cincinnati, Ohio. The samples were analyzed by Air Toxics, Ltd., under an IT Analytical Services subcontract.

Selected soil-vapor samples were analyzed for natural gas (oxygen, nitrogen, carbon monoxide, methane, carbon dioxide, and total nonmethane hydrocarbons) by ASTM Method D-3416, BTEX by EPA Method TO-3, and TPH by gas chromatograph and FID. Copies of the Certificates of Analysis are included in Appendix C, while sample collection documentation is presented in Appendix D. Detection limits for the tests performed are

Table 5

Vapor Extraction System Pilot Test Soil Observation Probe Data
Enron Liquid Fuels Company, Main Gas Processing Plant
Hobbs, New Mexico

Date Vapor Extraction Well ID	Time	Soil Observation Probe Boring B-7				Soil Observation Probe Boring B-8				Soil Observation Probe Boring B-9				Soil Observation Probe Boring B-10	
		Distance From Extraction Well (feet)	Vacuum (inches of water) at Given Depth			Distance From Extraction Well (feet)	Vacuum (inches of water) of Given Depth			Distance From Extraction Well (Feet)	Vacuum (inches of water) at Given Depth			Distance From Extraction Well (feet)	Vacuum (inches of water)
			10 ft	16 ft	32 ft		9 ft	15 ft	30 ft		10 ft	16 ft	27 ft		
04-Nov-92	1230	35	0.00	.09	.21	50	0.00	0.00	0.00	15	.17	1.8	.25	45	.85
VEW-2	1330	35	0.00	.11	.23	50	0.00	0.00	0.00	15	.17	1.7	.24	45	.10
	1430	35	0.00	.14	.30	50	0.00	.005	0.00	15	.17	.8	.30	45	.12
	1530	35	0.00	.12	.20	50	0.00	.005	0.00	15	.18	1.7	.30	45	.12
	1630	35	0.00	.12	.23	50	.01	.01	0.00	15	.18	1.7	.20	45	.11
	1730	35	0.00	.10	.23	50	.03	.02	0.00	15	.17	1.7	.20	45	.15
	1830	35	0.00	.10	.20	50	.01	.01	0.00	15	.18	1.7	.20	45	.13
	1930	35	0.00	.11	.24	50	.02	.01	0.00	15	.18	1.7	.20	45	.14
05-Nov-92	0700	35	0.00	.21	.25	50	.10	.12	.11	15	.90	.60	1.0	45	.30
VEW-1	0800	35	0.00	.25	.25	50	.14	.14	.11	15	.90	.70	1.2	45	.35
	0900	35	0.00	.25	.30	50	.10	.10	.09	15	.90	.60	1.2	45	.30
	1000	35	0.00	.20	.30	50	.095	.10	.08	15	.90	.60	1.1	45	.30
	1100	35	0.00	.20	.30	50	.07	.06	.05	15	.90	.60	1.1	45	.25
	1200	35	0.00	.20	.30	50	.08	.07	.05	15	.90	.60	1.1	45	.30
	1300	35	0.00	.20	.30	50	.11	.10	.08	15	.90	.60	1.1	45	.30
	1430	35	0.00	.20	.30	50	.07	.08	.06	15	.90	.60	1.1	45	.30

shown on the Certificates of Analysis. Results of the soil vapor analyses have been summarized in Table 6. Benzene concentrations ranged from 1,900 micrograms per liter (µg/L) in VEW-2 to 3,400 µg/L in VEW-1. TPH ranged from 280,000 µg/L in VEW-1 to 380,000 µg/L in VEW-2.

4.6 Aquifer Slug Tests

On November 6, 1992, aquifer slug tests were conducted in groundwater monitoring wells MW-4, MW-5, and MW-6 to estimate the hydraulic conductivity of the aquifer material in the vicinity of each well. During the slug tests, hydraulic head changes in each well were monitored with a pressure transducer and a high-speed data recorder. To perform the test, a steel slug of known volume was rapidly removed from each well. The pressure transducer and high-speed data recorder monitored and recorded the hydraulic head changes.

Hydraulic conductivity was calculated using the slug test data and the Bouwer and Rice (1976) method for determining hydraulic conductivity of unconfined aquifers with partially penetrating wells (which are the conditions present at the site). The equations used to determine hydraulic conductivity using this method are presented in Appendix G. The hydraulic conductivity calculated for MW-4 was 3.6 feet per day (ft/day); for MW-5, 5.5 ft/day; and for MW-6, 1.7 ft/day. These hydraulic conductivity values are summarized in Table 7 and are within the range of published hydraulic conductivity valves for a silty sand (Freeze and Cherry, 1979). The value reported by the laboratory for constant head permeability is $3.2x10^{-5}$ centimeters per second (cm/sec) (0.0921 ft/day) as determined by ASTM Method D5084. The term permeability is substituted for the term hydraulic conductivity in the ASTM D5084 Method. Laboratory results are expected to vary from actual field hydraulic conductivities, due to the randomly located short length of the screened interval of the partially penetrating well. Samples may not represent the overall hydraulic conductivity of the entire aquifer, since variations of several orders of magnitude frequently occur at different depths and locations in an aquifer due to vertical and horizontal anisotropy (Todd, 1980). Slug test data plots and calculation notes are included in Appendix G.

Table 6

Summary of Soil Vapor Sample Analyses
Enron Liquid Fuels Company, Main Gas Processing Plant
Hobbs, New Mexico
November 1992

Vapor Sample ID^{a}	Sample Date	Sample Time	Oxygenb %	Nitrogen^{b} %	Carbon Monoxide^{b} %	Methane^{b} %	Carbon Dioxide^{b} %	Total Non-Methane Hydro-carbons^{b} %	Benzene^{c} (µg/L)	Toluene^{c} (µg/L)	Ethyl Benzene^{c} (µg/L)	Total Xylenes^{c} (µg/L)	TPH^{d} (µg/L)
B-7-32	11-4-92	11:15	ND^{e} (0.002)	87	0.002	8.1	2.7	2.4	NA^{f}	NA	NA	NA	NA
B-8-15	11-4-92	11:25	ND (0.002)	82	ND (0.002)	7.3	7.8	2.6	NA	NA	NA	NA	NA
B-9-10	11-4-92	11:00	9.5	85	ND (0.002)	1.9	2.2	1.6	NA	NA	NA	NA	NA
B-9-16	11-4-92	11:05	ND (0.003)	77	ND (0.003)	13	3.0	6.5	NA	NA	NA	NA	NA
B-9-27	11-4-92	11:10	4.0	84	ND (0.002)	3.6	3.2	5.1	NA	NA	NA	NA	NA
VEW-1-1	11-5-92	10:30	7.0	77	0.001	2.5	2.8	11	2,700	850	140	250	280,000
VEW-1-2	11-5-92	14:30	6.1	77	0.001	2.1	4.3	10	3,400	1,700	400	700	340,000
VEW-2-1	11-4-92	13.45	4.0	64	ND (0.002)	13	0.047	19	1,900	400	170	250	380,000

[a] See Figure 1 for soil boring and vapor extraction well locations. Example: B-7-32, where B-7 is the soil boring ID, and 32 is the depth below ground surface of the vapor probe intake.

[b] Analysis by ASTM D-3416; units = percent.

[c] Analysis by EPA Method TO-3 using purge and trap chromatography with photoionization detection; units = micrograms per liter (µg/L).

[d] Analysis by GC/FID; units = µg/L.

[e] ND = Compound not detected at method detection limit shown in parentheses.

[f] NA = Not analyzed.

Table 7

Summary of Aquifer Hydraulic Conductivities
Enron Liquid Fuels Company, Main Gas Processing Plant
Hobbs, New Mexico
November 1992

Well Location[a]	Hydraulic Conductivity (feet per day)[b]	Hydraulic Conductivity (meters per day)[b]
MW-4	3.6	1.1
MW-5	5.5	1.7
MW-6	1.7	0.52

[a] See Figure 1 for locations.

[b] Hydraulic conductivity based on slug test data obtained November 6, 1992, using the Bouwer and Rice (1976) method of calculation.

4.7 Soil Geotechnical Samples and Analyses

Soil samples were collected for geotechnical analyses from soil borings B-8, MW-4, and MW-5 during drilling activities. The soil samples were shipped under chain-of-custody protocol by overnight delivery to the IT Environmental Technology Development Center in Oak Ridge, Tennessee.

The selected soil samples were analyzed for particle-size distribution (sieve analysis), moisture content, air permeability, constant head permeability, and porosity. Sample collection documentation is presented in Appendix D, while copies of the Certificates of Analysis are included in Appendix H. Results of the geotechnical analyses have been summarized in Table 8. The geotechnical analyses indicate that the sediments underlying the site can be characterized as a silty sand.

4.8 Surveying

Following installation of the groundwater monitoring wells, extraction wells, and soil borings, the locations, ground surface elevations, and top-of-well-casing elevations were surveyed by John W. West Engineering Company of Hobbs, New Mexico. The elevations and locations are relative to a plant datum benchmark. Horizontal locations were surveyed to the nearest tenth of a foot, and elevations were surveyed to the nearest hundredth of a foot. The soil boring locations are shown on the Site Plan (Figure 1), while elevations are presented in Table 9. A copy of the survey notes is presented in Appendix A. All survey data was determined for the north side of the boring or monitoring well.

4.9 Soil and Groundwater Storage

All drill cuttings and groundwater development/purge water were containerized in 55-gallon drums and stored on site pending the results of laboratory analysis. Disposal of the soil and water remains the responsibility of Enron.

5.0 Vapor Extraction System Pilot Test Results

The vacuum readings from the observation probes indicate that the influence of the extraction well varies with depth and that the vacuum at depth is dependent on the depth of the extraction well (shallow or deep) in operation. The data in Table 5 indicate an increased vacuum in probes at all horizons as a result of applying a vacuum to VEW-1, the shallower extraction well. The only exception is probe B-9-16, which maintained higher vacuum readings under the influence of VEW-2 (the deeper extraction well) than VEW-1. VEW-2 is

Table 8

Summary of Soil Geotechnical Analyses Enron Liquid Fuels Company, Main Gas Processing Plant Hobbs, New Mexico

Soil Sample ID[a]	Percent Moisture %	Porosity (%)	Saturated Hydraulic Permeability[b] (cm/sec)/(ft/day)	Avg. Coeff. of Permeability[c] (m^2)	Sieve Analysis[d] (Estimated Soil Type)
B-8-10.5	NA[d]	55.5	NA	NA	NA
B-8-11	NA	40.2	NA	1.54 E-13	NA
B-8-12	12.0	NA	NA	NA	Silty gravel
MW-4-45	16.8	NA	NA	NA	Silty sand
MW-4-45.5	NA	NA	3.2 E-5/0.0921	NA	NA
MW-4-46	NA	34.9	NA	NA	NA
MW-5-11.5	17.5	NA	NA	1.07 E-13	Silty Sand
MW-5-16.5	NA	40.4	NA	NA	NA

[a] See Figure 1 for soil boring and monitoring well locations. Example: B-8-10.5, where B-8 is the soil boring ID, and 10.5 is the sample depth (feet below ground surface).

[b] Constant head permeability by ASTM D5084; units = centimeter per second (cm/sec).

[c] Average valve for flowing pressure of 60 pounds per square inch (psi). Average valves for 30 and 90 psi are available in Appendix G.

[d] Soil classification estimated from the sieve size analysis by the laboratory. Atterberg limits test were not performed to determine clay content; therefore, soil classifications are estimated.

NA = Parameter not analyzed.

Table 9

Summary of Survey Information
Enron Liquid Fuels Company, Main Gas Processing Plant
Hobbs, New Mexico

Soil Boring/ Well Location[a]	Ground Elevation (feet)	Top-of-Well-Casing Elevation (feet)
B-7	99.34	NA
B-8	99.39	NA
B-9	99.29	NA
B-10	98.97	NA
MW-4	98.79	101.25
MW-5	99.94	102.37
MW-6	99.33	101.89
VEW-1	98.99	NA
VEW-2	99.03	NA

Notes: Survey by John W. West Engineering Company, Hobbs, New Mexico, November 4, 1992.
Survey relative to plant datum (refer to survey notes: Appendix A).
NA = Not applicable.

screened from approximately 24 to 38.5 feet bgs, while VEW-1 is screened from approximately 5 to 18 feet bgs. Based on the field data (Table 5), it appears as though VEW-1 (the shallower well) is more effective in inducing higher vacuum at depth than VEW-2 (the deeper well), with the exception of the vacuum observed at probe B-9-16. The variation in vacuum efficiency may be attributed to the discontinuous and strongly cemented sand units observed in the subsurface, which may affect the lateral and vertical soil vapor flow paths.

Extraction rate calculations were performed using TPH concentrations reported by the laboratory for the soil-gas samples VEW-1-2 (84,000 parts per million by volume [ppmv], 340,000 mg/m^3) and VEW-2-1 (94,000 ppmv, 360,000 mg/m^3). The formula used for these calculations are:

$$ER = Q * C^{soil\text{-}gas} * MW * 1.581 \times 10^{-7} \text{ (EPA, 1989)}$$

where,

ER = Extraction rate in pounds (lb) per hour (/hr)
Q = Flow rate in ft^3/min
$C^{soil\text{-}gas}$ = Soil-gas hydrocarbon concentration in ppmv
MW = Molecular weight (the selected analytical laboratory used a gasoline in air standard of 100.0 grams per mole) and $1.581x10^{-7}$ conversion constant with units of [(lb-mole min)]/[(ft^3-ppmv hr)].

and

$$ER = \frac{mg}{m^3} * \frac{0.001}{1mg} * \frac{0.001kg}{1g} * \frac{2.205lbs}{1kg}$$

$$* \frac{1m^3}{35.31ft^3} * \frac{ft^3}{\min} * \frac{60\min}{hr} = \frac{lbs}{hr} \qquad \text{(Raugust et al., 1992)}$$

where,

ER = Emission rate of hydrocarbons in lb/hr
mg/m^3 = Concentration of hydrocarbons in the vapor stream
2.205 lb = 1 kg
1 m^3 = 35.51 ft^3

Using the flow rate of 53.1 cubic feet per minute (cfm) from pilot test VEW-2, the extraction rate was calculated to be 78.9 lb/hr using the EPA method and 75.6 lb/hr using Raugust's (1992) calculation. Using the flow rate of 87.3 cfm from the pilot test VEW-1, the extraction rate was calculated to be 115.9 lb/hour using the EPA calculation and 111.8 lb/hour using Raugust's equation.

Graphs 1 through 5, included in Appendix F, indicate an approximate linear relationship between the vacuum measured in the subsurface observation probes and the log of the distance from the extraction well(s). Interpreting the margin of the effective capture zone, where the vacuum falls to between 0.1 and 0.5 inches of water, the radius of the capture zone is approximately 20 feet, with extraction rates of 87.3 and 53.1 cfm at VEW-1 and VEW-2, respectively.

6.0 Limitations

Evaluation of the geologic and environmental conditions at the site for the purpose of this investigation is made from a limited number of observation points. Subsurface conditions may vary from the data points available. Additional work, including further subsurface investigation, can reduce the inherent uncertainties associated with this type of investigation.

7.0 References

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APPENDIX
A

APPENDIX A

LOGS OF SOIL BORINGS, GROUNDWATER MONITORING WELLS, VAPOR EXTRACTION WELLS, SOIL VAPOR MONITORING PROBE INSTALLATIONS, AND SURVEY NOTES

301541.02 A3

GENERAL NOTES AND LEGEND

Symbols to be used for designation of subsurface materials on all boring logs and subsurface sections

- ▨ CLAY
- ▨ SILT
- ▨ SAND
- ▨ SANDY CLAY
- ▨ GRAVEL
- ▨ CONCRETE OR GROUT
- ▨ SILTY CLAY
- ▨ SILTY SAND
- ▨ FINE SAND
- ▨ CALCIUM
- ▨ ASPHALT
- ▨ BENTONITE
- ▨ CLAYEY SAND

DENSITY	STANDARD PENETRATION RESISTANCE
VERY LOOSE	0 – 4
LOOSE	5 – 10
MEDIUM LOOSE	11 – 30
DENSE	31 – 50
VERY DENSE	OVER 50

THE BORING LOGS AND RELATED INFORMATION DEPICT SUBSURFACE CONDITIONS ONLY AT THE SPECIFIC LOCATION AND DATES INDICATED. SOIL CONDITIONS AND WATER LEVELS AT OTHER LOCATIONS MAY DIFFER FROM CONDITIONS OCCURRING AT THESE BORING LOCATIONS. THE PASSAGE OF TIME MAY RESULT IN A CHANGE IN THE CONDITIONS AT THESE BORING LOCATIONS.

STANDARD PENETRATION RESISTANCE IS THE NUMBER OF BLOWS REQUIRED TO DRIVE A 2.5 INCH O.D. SPLIT BARREL SAMPLER 12 INCHES USING A 140 POUND HAMMER FALLING FREELY THROUGH 30 INCHES. THE SAMPLER WAS DRIVEN 18 INCHES AND THE NUMBER OF BLOWS RECORDED FOR EACH 6 INCH INTERVAL. THE RESISTANCE TO PENETRATION IS INDICATED ON THE DRAWING AS BLOWS PER FOOT.

☒	2.5" OD SPLIT BARREL SAMPLE
75/0 5	PENETRATION REFUSAL RESISTANCE AND FRACTIONAL INCREMENT DRIVEN IN FEET
1 - 0 - 01 ▼	GROUND WATER LEVEL AND DATE

NOTE 1

Note: The range of standard penetration resistance are based on the SPT-Standard Penetration Test (ASTM D1586). The ranges provide at best only a crude indication of the density of coarse grained soils.

COBBLES	GRAVEL		SAND			SILT AND CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

USCS CLASSIFICATION FOR SOILS

BOULDER	COBBLE	PEBBLE	GRANULE	VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY	INDIVIDUAL PARTICLES
BOULDER CONGLOMERATE	COBBLE CONGLOMERATE	PEBBLE CONGLOMERATE	GRANULE CONGLOMERATE	VERY COARSE SANDSTONE	COARSE SANDSTONE	MEDIUM SANDSTONE	FINE SANDSTONE	VERY FINE SANDSTONE	SANDSTONE	CLAYSTONE AND SHALE	CONSOLIDATED ROCK

WENTWORTH SCALE FOR ROCK

GENERAL NOTES AND LEGEND

USCS CLASSIFICATION FOR SOILS

COARSE-GRAINED SOILS

CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
GRAVELS WITH FINES (APPRECIABLE AMOUNT) OF FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
	GC	CLAYEY GRAVELS GRAVEL-SAND-CLAY MIXTURES
CLEAN SANDS (LITTLE OR NO FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
SANDS WITH FINES (APPRECIABLE AMOUNT) OF FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
	SC	CLAYEY SANDS, SAND-CLAY MIXTURES

FINE-GRAINED/HIGHLY ORGANIC SOILS

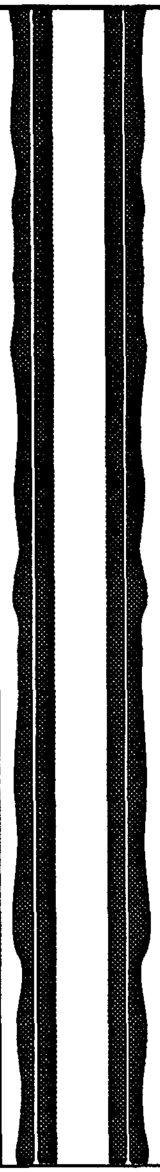
SILTS AND CLAYS LIQUID LIMITS (LESS THAN 50)	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
SILTS AND CLAYS LIQUID LIMIT (GREATER THAN 50)	MH	INORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	CH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS
	OH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
HIGHLY ORGANIC SOILS	PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

USCS UNIFIED SOIL CLASSIFICATION SYSTEM
(CAPITAL LETTERS INDICATE LAB TEST CLASSIFICATION, LOWER CASE LETTERS INDICATE VISUAL FIELD CLASSIFICATION)

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 301573.001.02
PROJECT NAME: ENRON - HOBBS PLANT
BORING NUMBER: MW-4
COORDINATES:
DATE: 11-3-92
ELEVATION: UNKNOWN
GWL: Depth N/A Date/Time
DATE STARTED: 10-31-92
ENGINEER/GEOLOGIST: MIKE CYROCKI
Depth N/A Date/Time
DATE COMPLETED: 11-1-92
DRILLING METHODS: INGERSOLL-RAND MODEL TH60 AIR ROTARY
PAGE: 1 OF 2

DEPTH (ft)	SAMPLE TYPE & NO.	RECOVERY (in.)	USCS SYMBOL	DESCRIPTION	CONSTRUCTION SCHEMATIC	REMARKS
5	MW-4-6	12	sp	Stained gray and black, silty, fine sand, dry, hydrocarbon odor		
10	MW-4 -11.75	19	ml	Stained gray and black, sandy silt with 0.08 feet thick dense caliche layer at 11.0 feet, moist, hydrocarbon odor		
15	MW-4 -17	24	sp/ol	Stained light gray and dark gray, fine sand to 16.75 feet; then white silt with no staining, dry		
20	MW-4 -20.5	6	-	Pink, fine grained strongly cemented sand in contact with vitreous, white silica (conchoidal fracture patterns) interbedded with 0.08 feet thick layers of unconsolidated fine sand, stained black and gray, hydrocarbon odor		
25	MW-4 -27	24	sp	Light gray, fine sand to 25.5 feet changing to light brown with <5% black staining, hydrocarbon odor.		
30						

NOTES:

During drilling ground water was encountered at an approximate depth of 42.0 Ft. below ground surface.

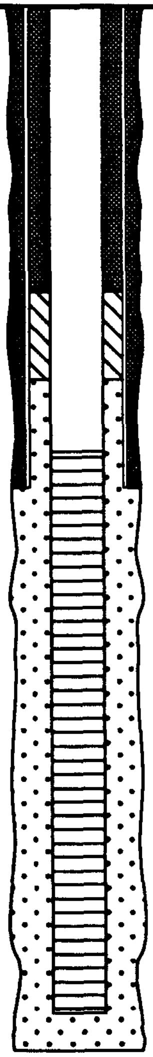
Description from observations by on-site geologist

301573.001.02/fdA1b

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 301573.001.02	PROJECT NAME: ENRON - HOBBS PLANT	
BORING NUMBER: MW-4	COORDINATES:	DATE: 11-3-92
ELEVATION: UNKNOWN	GWL: Depth N/A Date/Time	DATE STARTED: 10-31-92
ENGINEER/GEOLOGIST: MIKE CYROCKI	Depth N/A Date/Time	DATE COMPLETED: 11-1-92
DRILLING METHODS: INGERSOLL-RAND MODEL TH60 AIR ROTARY		PAGE: 2 OF 2

DEPTH (ft)	SAMPLE TYPE & NO.	RECOVERY (in.)	USCS SYMBOL	DESCRIPTION	CONSTRUCTION SCHEMATIC	REMARKS
30	MW-4 -31.2	14	sp	Light brown, fine sand, moist, no staining, hydrocarbon odor to 31.2 feet, buff to pink fine grained strongly cemented sand interbedded with 0.16 feet thick unconsolidated fine sand at 32.0 feet and 33.5 feet		
	MW-4 -33.5	18	sp			
35				Soft, black stained, strongly cemented sand from 37.0 feet to 39.0 feet, hydrocarbon odor		
40	MW-4 -40.75	19	sp	Light gray with medium gray staining, fine sand, moist, hydrocarbon odor		
45	MW-4 -47	24	sp	Light brown, fine sand, saturated with water, organic chemical odor, no staining		
50	MW-4 -52	24	sp	Same fine sand with minor dark gray mottling		
55						

NOTES:

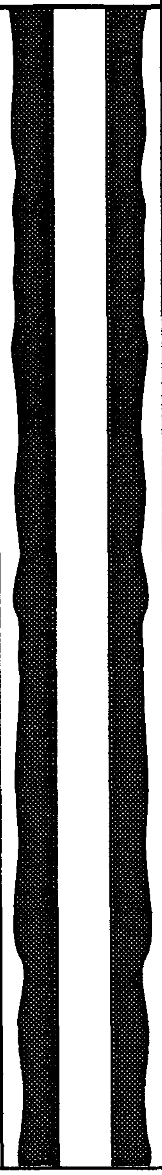
Total depth of boring = 53.0 Ft.

Description from observations by on-site geologist

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 301573.001.02	PROJECT NAME: ENRON - HOBBS PLANT	
BORING NUMBER: MW-5	COORDINATES:	DATE: 11-3-92
ELEVATION: UNKNOWN	GWL: Depth N/A Date/Time	DATE STARTED: 10-27-92
ENGINEER/GEOLOGIST: MIKE CYROCKI	Depth N/A Date/Time	DATE COMPLETED: 10-27-92
DRILLING METHODS: INGERSOLL-RAND MODEL TH60 AIR ROTARY		PAGE: 1 OF 2

DEPTH (ft)	SAMPLE TYPE & NO.	RECOVERY (in.)	USCS SYMBOL	DESCRIPTION	CONSTRUCTION SCHEMATIC	REMARKS
5	MW-5-7	24	sp	Weakly cemented, light brown mottled white, fine sand, no staining, no odor, dry		
10	MW-5-12	24	sp	Same with <10% angular medium gravel, 0.12 feet thick, very dense strongly cemented sand at 12.0 feet, no staining, no odor, dry		
15	MW-5-17	24	sp	Light tan to white, fine sand, 0.08 feet thick, pink, fine grained strongly cemented sand at 17.0 feet, no staining, no odor, dry		
20	MW-5-22	24	sp	Dense, light tan, brown to pink strongly cemented sand interbedded with 0.08 feet to 0.16 feet thick unconsolidated, fine sand layers, no staining, no odor, dry		
25	MW-5-27	24	sp	Light brown, fine sand with light tan, fine-grained strongly cemented sand, 0.16 feet thick at 25.5 feet		
30				Very dense, tan to buff, fine grained strongly cemented sand		

NOTES:

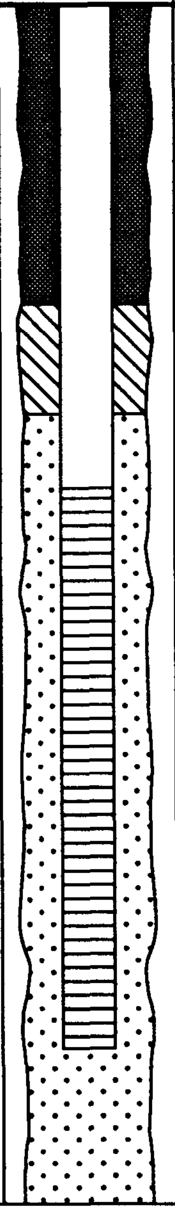
During drilling ground water was encountered at an approximate depth of 42.0 Ft. below ground surface.

Description from observations by on-site geologist.

INTERNATIONAL
TECHNOLOGY
CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 301573.001.02	PROJECT NAME: ENRON - HOBBS PLANT	
BORING NUMBER: MW-5	COORDINATES:	DATE: 11-3-92
ELEVATION: UNKNOWN	GWL: Depth N/A Date/Time	DATE STARTED: 10-27-92
ENGINEER/GEOLOGIST: MIKE CYROCKI	Depth N/A Date/Time	DATE COMPLETED: 10-27-92
DRILLING METHODS: INGERSOLL-RAND MODEL TH60 AIR ROTARY		PAGE: 2 OF 2

DEPTH (ft)	SAMPLE TYPE & NO.	RECOVERY (in.)	USCS SYMBOL	DESCRIPTION	CONSTRUCTION SCHEMATIC	REMARKS
30				Very dense, tan to buff, fine grained strongly cemented sand, no staining, no odor, dry		
35	MW-5 -36.5	18	sp	Same strongly cemented sand interbedded with brown unconsolidated fine sand, no staining, no odor, dry		
40	MW-5 -42	24	sp	Some weakly cemented areas, light brown, fine sand with 0.08 ft. thick pink strongly cemented sand at 40.0 feet, no staining, no odor, moist		
45	MW-5 -47	24	sp	Brown, saturated with water, fine sand, no staining, organic chemical odor		
50	MW-5 -52	24	sp	Light brown, fine sand, with <5% coarse, rounded, strongly cemented sand gravel, no staining, organic chemical odor		
55	MW-5 -57	24	sp	Same fine sand with no gravel present		

NOTES:

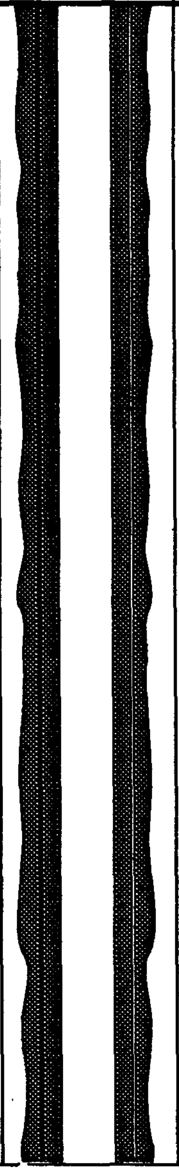
Total depth of boring = 57.0 Ft.

Description from observations by on-site geologist.

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 301573.001.02	PROJECT NAME: ENRON - HOBBS PLANT	
BORING NUMBER: MW-6	COORDINATES:	DATE: 11-3-92
ELEVATION: UNKNOWN	GWL: Depth N/A Date/Time	DATE STARTED: 10-28-92
ENGINEER/GEOLOGIST: MIKE CYROCKI	Depth N/A Date/Time	DATE COMPLETED: 11-2-92
DRILLING METHODS: INGERSOLL-RAND MODEL TH60 AIR ROTARY		PAGE: 1 OF 2

DEPTH (ft)	SAMPLE TYPE & NO.	RECOVERY (in.)	USCS SYMBOL	DESCRIPTION	CONSTRUCTION SCHEMATIC	REMARKS
						
5	MW-6-7	24	sp	Buff to white with <5% grayish black staining, fine sand with <5% subrounded, medium gravel, hydrocarbon odor, moist		
10	MW-6-12	24	sp	Same fine sand with 0.08 feet thick dense caliche at 11.75 feet		
15	MW-6-16.5	18	sp	Same fine sand to 15.5 feet, 50% black staining beginning at 15.5 feet, damp, hydrocarbon odor, dense buff to white strongly cemented sand beginning at 15.75 feet		
20	MW-6-21.5	18	sp	Same strongly cemented sand to 20.2 feet, then buff to white with 75% black staining, fine sand, damp, hydrocarbon odor, dense, pink strongly cemented sand beginning at 21.2 feet		
25	MW-6-26	12	sp	Buff to pink, fine grained strongly cemented sand, interbedded with unconsolidated, fine sand		
30						

NOTES:

During drilling ground water was encountered at an approximate depth of 42.0 Ft. below ground surface.

Description from observations by on-site geologist

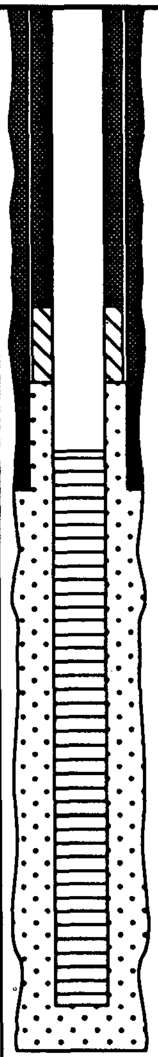
301573.001.02/MdA3b

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 301573.001.02	PROJECT NAME: ENRON - HOBBS PLANT	
BORING NUMBER: MW-6	COORDINATES:	DATE: 11-3-92
ELEVATION: UNKNOWN	GWL: Depth N/A Date/Time	DATE STARTED: 10-28-92
ENGINEER/GEOLOGIST: MIKE CYROCKI	Depth N/A Date/Time	DATE COMPLETED: 11-2-92
DRILLING METHODS: INGERSOLL-RAND MODEL TH60 AIR ROTARY		PAGE: 2 OF 2

DEPTH (ft)	SAMPLE TYPE & NO.	USCS SYMBOL	RECOVERY (in.)	DESCRIPTION	CONTRUCTION SCHEMATIC	REMARK
30	MW-6 -30.5	6	sp	Light brown, fine sand, hydrocarbon odor, brown to pink, fine grained strongly cemented sand beginning at 30.5 feet		
35	MW-6 -36.5	18	sp	Same strongly cemented sand to 35.5 feet then buff to light tan, stained black, fine sand, hydrocarbon odor		
40	MW-6 -40.5	6	sp	Light brown, fine sand, moist, no staining, hydrocarbon odor		
45	MW-6 -47	24	sp	Same fine sand		
50	MW-6 -52	24	sp	Same fine sand		
55						



NOTES:

Total depth of boring = 53.0 ft.

Description from observations by on-site geologist

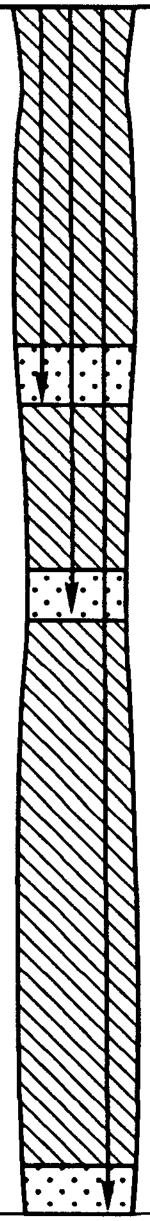
301573.001.02/fldA4a

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 301573.002.02	PROJECT NAME: ENRON - HOBBS PLANT	
BORING NUMBER: B-7	COORDINATES:	DATE: 11-10-92
ELEVATION: UNKNOWN	GWL: Depth N/A Date/Time	DATE STARTED: 11-3-92
ENGINEER/GEOLOGIST: J.S. RAUGUST	Depth N/A Date/Time	DATE COMPLETED: 11-3-92
DRILLING METHODS: INGERSOLL-RAND MODEL TH60 AIR ROTARY		PAGE: 1 OF 2

DEPTH (ft)	SAMPLE TYPE & NO.	RECOVERY (in.)	USCS SYMBOL	DESCRIPTION	CONSTRUCTION SCHEMATIC	REMARKS
5	B-7-6	12"	sm	Dense, light brown, homogeneous, poorly graded, angular, fine, silty sand - damp		
10	B-7-11	18"	sp	Medium dense, red and white mottled, homogeneous, poorly graded, angular, fine sand, moist, no odor		
15	B-7-16	20"	sm	Very dense, light brown (buff) heterogeneous, poorly graded, angular, fine silty sand and strongly cemented sand fragments up to 1.5 inches in diameter Driller notes hard drilling beginning with 20 ft. sample drive		
20	B-7-21	18"	-	Very dense, light brown and greenish mottling, strongly cemented sand, dry, slight hydrocarbon odor Driller notes easier drilling at 24'		
25	B-7-26	18"	sp	Dense red and light brown, heterogeneous, poorly graded, angular sand and interbedded, thin, strongly cemented sand layers, damp, slight hydrocarbon odor Driller notes hard drilling at 30'		
30	B-7-31	18"	sp	Dense, medium brown, heterogeneous, poorly graded, angular, fine sand and a strongly cemented sand layer up to 3" thick at top of sampler - moist		



NOTES:

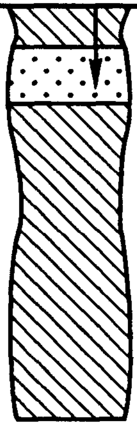
Description from observations by on-site geologist

301573.001.02/ftdA4

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 301573.002.02	PROJECT NAME: ENRON - HOBBS PLANT	
BORING NUMBER: B-7	COORDINATES:	DATE: 11-10-92
ELEVATION: UNKNOWN	GWL: Depth N/A Date/Time	DATE STARTED: 11-3-92
ENGINEER/GEOLOGIST: J.S. RAUGUST	Depth N/A Date/Time	DATE COMPLETED:
DRILLING METHODS: INGERSOLL-RAND MODEL TH60 AIR ROTARY		PAGE: 2 OF 2

DEPTH (ft)	SAMPLE TYPE & NO.	RECOVERY (in.)	USCS SYMBOL	DESCRIPTION	CONSTRUCTION SCHEMATIC	REMARKS
				Driller notes harder drilling, interbedded unconsolidated sand and strongly cemented sand layers to 35'		
35		6"	-	Very dense, light reddish brown, strongly cemented sand, dry - no sample collected		
40	B-7-41	12"	sp	Medium dense, gray brown, homogeneous, poorly graded angular fine sand, moist, slight odor, <10% black staining		

NOTES:

Bottom of boring at 41 feet
Vapor probes positioned at: 32.0 Ft. 16.0 Ft and 10.0 Ft.
Description from observations by on-site geologist

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 301573.002.02

PROJECT NAME: ENRON - HOBBS PLANT

BORING NUMBER: B-8

COORDINATES:

DATE: 11-3-92

ELEVATION: UNKNOWN

GWL: Depth N/A Date/Time

DATE STARTED: 10-31-92

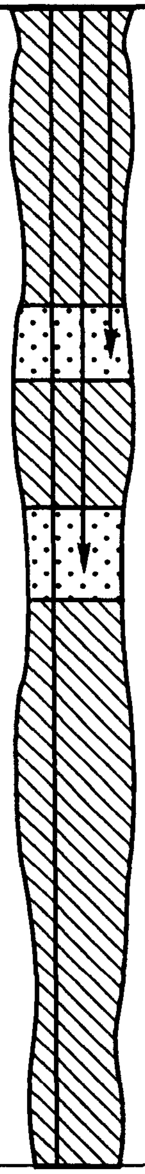
ENGINEER/GEOLOGIST: MIKE CYROCKI

Depth N/A Date/Time

DATE COMPLETED: 10-31-92

DRILLING METHODS: INGERSOLL-RAND MODEL TH60 AIR ROTARY

PAGE: 1 OF 2

DEPTH (ft)	SAMPLE TYPE & NO.	RECOVERY (in.)	USCS SYMBOL	DESCRIPTION	CONSTRUCTION SCHEMATIC	REMARKS
5	B-8-7	24	sm	Stained gray and black, silty, fine sand with <10% caliche nodules, dry, hydrocarbon odor		
10	B-8-12	24	sm	Same silty, fine sand		
15	B-8-17	24	sp	Stained gray and black, fine sand with 10% medium, rounded, strongly cemented sand gravel, hydrocarbon odor, moist. Beginning at 16.25 feet buff strongly cemented sand interbedded with 0.08 feet thick unconsolidated, buff, fine sand, some light gray staining		
20	B-8-21.5	18	-	Hard, buff, very fine grained strongly cemented sand, no staining in matrix of strongly cemented sand, hydrocarbon odor		
25	B-8-27	24	sp	Brown, fine sand with 20% medium, rounded, strongly cemented sand gravel to 25.5 feet, then same with <5% gravel, no staining, hydrocarbon odor present, pink strongly cemented sand at 26.9 feet		
30						

NOTES:

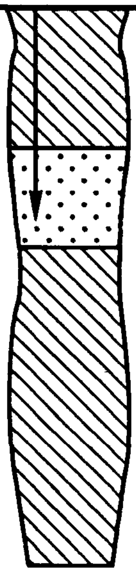
Description from observations by on-site geologist.

301573.002.02/lfd A1b

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 301573.002.02	PROJECT NAME: ENRON - HOBBS PLANT	
BORING NUMBER: B-8	COORDINATES:	DATE: 11-3-92
ELEVATION: UNKNOWN	GWL: Depth N/A Date/Time	DATE STARTED: 10-31-92
ENGINEER/GEOLOGIST: MIKE CYROCKI	Depth N/A Date/Time	DATE COMPLETED: 10-31-92
DRILLING METHODS: INGERSOLL-RAND MODEL TH60 AIR ROTARY		PAGE: 2 OF 2

DEPTH (ft)	SAMPLE TYPE & NO.	RECOVERY (in.)	USCS SYMBOL	DESCRIPTION	CONSTRUCTION SCHEMATIC	REMARKS
30	B-8-31	12	sp	Brown, fine sand, no staining, hydrocarbon odor, 25% black staining begining at 30.75 feet, 0.08 feet thick strongly cemented sand layer at 31.0 feet		
35	B-8-35.5	6	sp	Light gray staining, fine sand with 20% medium, rounded strongly cemented sand gravel, moist hydrocarbon odor Strongly cemented sand from 35.2 feet to 40.0 feet		
40						
45						
50						
55						

NOTES:

Total depth of boring = 40.0 Ft.
Vapor Probes positioned at: 30 Ft., 15 Ft and 9. Ft.

Description from observations by on-site geologist

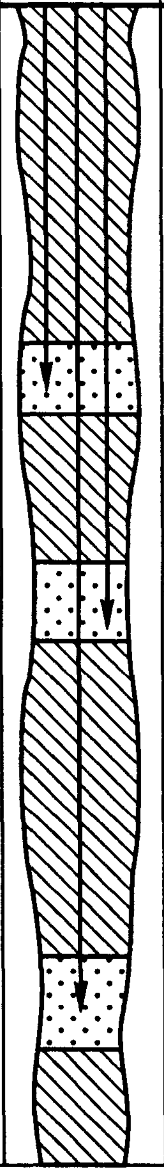
301573.002.02/ltd A2a

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 301573.002.02	PROJECT NAME: ENRON - HOBBS PLANT	
BORING NUMBER: B-9	COORDINATES:	DATE: 11-3-92
ELEVATION: UNKNOWN	GWL: Depth N/A Date/Time	DATE STARTED: 10-30-92
ENGINEER/GEOLOGIST: MIKE CYROCKI	Depth N/A Date/Time	DATE COMPLETED: 10-30-92
DRILLING METHODS: INGERSOLL-RAND MODEL TH60 AIR ROTARY		PAGE: 1 OF 2

DEPTH (ft)	SAMPLE TYPE & NO.	RECOVERY (in.)	USCS SYMBOL	DESCRIPTION	CONSTRUCTION SCHEMATIC	REMARKS
5	B-9-5.4	3	sp	Gray stained, fine sand, hydrocarbon odor, moist, with hard strongly cemented sand beginning at 5.4 feet		
10	B-9-11.3	14	sp	Gray stained, fine sand, hydrocarbon odor, moist, with strongly cemented sand beginning at 11.3 feet		
15	B-9-17	24	sp	White to light gray with darker gray mottling, fine sand, moist, hydrocarbon odor present		
20	B-9-20.5	6	sp	Same fine sand with strongly cemented sand beginning at 20.2 feet		
25	B-9-27	24	sp	15% gray staining, moist to wet with clear hydrocarbon liquid, fine sand. 0.08 feet to 0.16 feet thick, pink strongly cemented sand layers at 26 feet and 26.5 feet		
30						



NOTES:

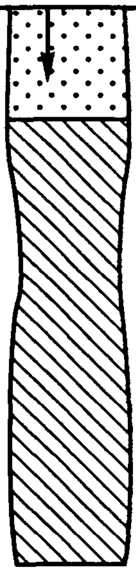
Description from observations by on-site geologist.

301573.002.02/fd A2b

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 301573.002.02	PROJECT NAME: ENRON - HOBBS PLANT	
BORING NUMBER: B-9	COORDINATES:	DATE: 11-3-92
ELEVATION: UNKNOWN	GWL: Depth N/A Date/Time	DATE STARTED: 10-30-92
ENGINEER/GEOLOGIST: MIKE CYROCKI	Depth N/A Date/Time	DATE COMPLETED: 10-30-92
DRILLING METHODS: INGERSOLL-RAND MODEL TH60 AIR ROTARY		PAGE: 2 OF 2

DEPTH (ft)	SAMPLE TYPE & NO.	RECOVERY (in.)	USCS SYMBOL	DESCRIPTION	CONSTRUCTION SCHEMATIC	REMARKS
30	B-9-31.2	14	sp	Same fine sand with strongly cemented sand at 31.2 feet		
35				31.2 feet to 40.0 feet; cemented sand with variation in hardness. Entire thickness is cemented.		
40						
45						
50						
55						

NOTES:

Total depth of boring = 40 feet
Vapor probes positioned at: 27.0 Ft., 16.0 Ft. and 10.0 Ft.

Description from observations by on-site geologist.

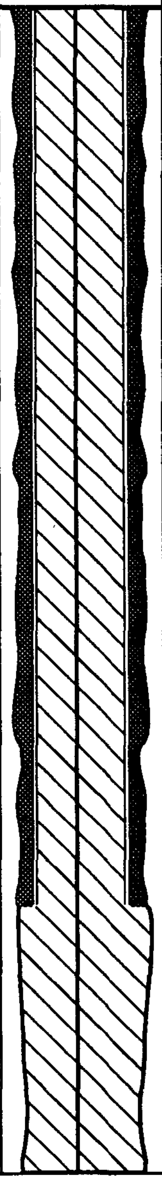
301573.002.02/fld A3a

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 301573.002.02	PROJECT NAME: ENRON - HOBBS PLANT	
BORING NUMBER: B-10	COORDINATES:	DATE: 11-3-92
ELEVATION: UNKNOWN	GWL: Depth N/A Date/Time	DATE STARTED: 10-20-92
ENGINEER/GEOLOGIST: MIKE CYROCKI	Depth N/A Date/Time	DATE COMPLETED: 10-30-92
DRILLING METHODS: HOLLOW-STEM AUGER AND AIR ROTARY		PAGE: 1 OF 2

DEPTH (ft)	SAMPLE TYPE & NO.	RECOVERY (in.)	USCS SYMBOL	DESCRIPTION	CONSTRUCTION SCHEMATIC	REMARKS
5	B-10-7	24	sm	Buff, silty sand, dry black staining, moist, hydrocarbon odor present		
10	B-10-12	24	cl	Plastic, white mottled green and black, silty clay, 10% coarse gravel, damp, hydrocarbon ordor present, very dense, gray caliche from 12.5 feet to 14.0 feet		
	B-10-14	24	-			
15	B-10-17	24	sp	Gray with minor black mottling, damp, fine sand, hydrocarbon odor present		
20	B-10-22	24	sp	Some weak cementing, white stained black, fine sand, 10% rounded medium to coarse gravel, roots present, hydrocarbon odor present		
25				Very dense, fine-grained, pink strongly cemented sand from 23.0 feet to 26.0 feet		
30						



NOTES:

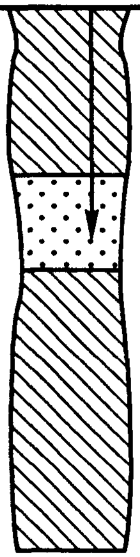
Description from observations by on-site geologist

301573.002.02/ltd A3b

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 301573.002.02	PROJECT NAME: ENRON - HOBBS PLANT	
BORING NUMBER: B-10	COORDINATES:	DATE: 11-3-92
ELEVATION: UNKNOWN	GWL: Depth N/A Date/Time	DATE STARTED: 10-20-92
ENGINEER/GEOLOGIST: MIKE CYROCKI	Depth N/A Date/Time	DATE COMPLETED: 10-30-92
DRILLING METHODS: HOLLOW-STEM AUGER AND AIR ROTARY		PAGE: 2 OF 2

DEPTH (ft)	SAMPLE TYPE & NO.	RECOVERY (in.)	USCS SYMBOL	DESCRIPTION	CONSTRUCTION SCHEMATIC	REMARKS
						
30	B-10-32	24	sp	Black stained, fine sand with dense, fine grained pink sandstone from 31.5 to 32.0 feet.		
35	B-10-35.4	3	sp	Buff, no black staining, fine sand, dry, hydrocarbon odor, some weakly cemented layers .25 inch thick becoming progressively more cemented at 35.4 feet		
				Gray stained, fine sand, hydrocarbon odor present		
40						
45						
50						
55						

NOTES:

Total depth of boring = 39.4 Ft.
Vapor probe positioned at: 31.0 Ft.

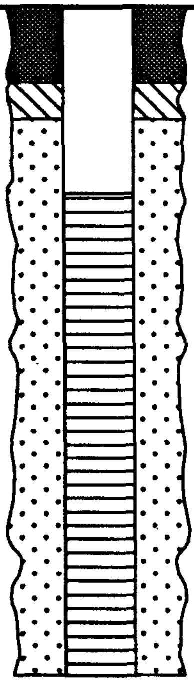
Description from observations by on-site geologist

301573.002.02/fld A4

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 301573.002.02	PROJECT NAME: ENRON - HOBBS PLANT	
BORING NUMBER: VEW-1	COORDINATES:	DATE: 11-3-92
ELEVATION: UNKNOWN	GWL: Depth N/A Date/Time	DATE STARTED: 10-30-92
ENGINEER/GEOLOGIST: MIKE CYROCKI	Depth N/A Date/Time	DATE COMPLETED: 10-30-92
DRILLING METHODS: INGERSOLL-RAND MODEL TH60 AIR ROTARY		PAGE: 1 OF 1

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER/(12 in.)	RECOVERY (in.)	DESCRIPTION	CONSTRUCTION SCHEMATIC	USCS SYMBOL	LITHOLOGIC SYMBOL
5				No Sediment Sampling See Notes			
10							
15							
20							
25							
30							

NOTES:

During the drilling of VEW-1, no sediment sampling occured. VEW-1 is located approximately 4 feet west of VEW-2. For lithology of VEW-1 refer to visual classification of soils for VEW-2. Total depth of VEW-1 equals 18.0 feet.

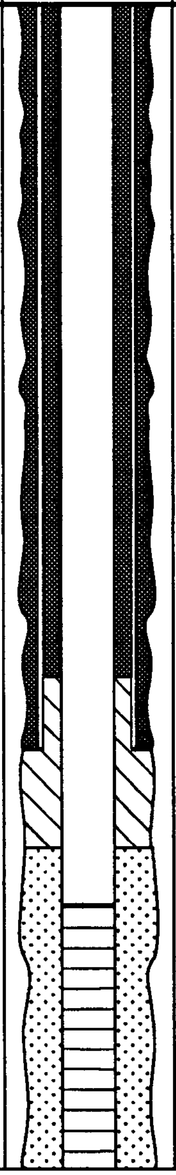
301573.002.02/fld A5a

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 301573.002.02	PROJECT NAME: ENRON - HOBBS PLANT	
BORING NUMBER: VEW-2	COORDINATES:	DATE: 11-3-92
ELEVATION: UNKNOWN	GWL: Depth N/A Date/Time	DATE STARTED: 10-29-92
ENGINEER/GEOLOGIST: MIKE CYROCKI	Depth N/A Date/Time	DATE COMPLETED: 10-30-92
DRILLING METHODS: INGERSOLL-RAND MODEL TH60 AIR ROTARY		PAGE: 1 OF 2

DEPTH (ft)	SAMPLE TYPE & NO.	RECOVERY (in.)	USCS SYMBOL	DESCRIPTION	CONSTRUCTION SCHEMATIC	REMARKS
5	VEW-2-7	24	sm	Reddish-brown silty sand, 10% fine to medium gravel (possible fill) to 5.5 feet. From 5.5 feet black-stained, silty, fine sand interbedded with 0.04 feet thick caliche layers, hydrocarbon odor present		
10	VEW-2 -12	24	sp	Buff to white, soft, fine-grained strongly cemented sand to 10.4 feet. From 10.4 feet black stained, fine sand with 0.04 feet thick caliche layers, hydrocarbon odor present		
15	VEW-2 -17	24	sp	Black and gray stained, fine sand with 10% medium gravel, hydrocarbon odor, moist		
20				Strongly cemented sand beginning at 18.8 feet		
				Strongly cemented sand terminates at 23.0 feet		
25	VEW-2 -27	24	sp	Black stained, fine sand with 10% medium to coarse, rounded strongly cemented sand gravel, hydrocarbon odor, moist		
30						



NOTES:

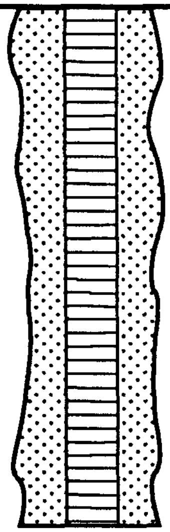
Description from observations by on-site geologist

301573.002.02/fld A5b

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 301573.002.02	PROJECT NAME: ENRON - HOBBS PLANT	
BORING NUMBER: VEW-2	COORDINATES:	DATE: 11-3-92
ELEVATION: UNKNOWN	GWL: Depth N/A Date/Time	DATE STARTED: 10-29-92
ENGINEER/GEOLOGIST: MIKE CYROCKI	Depth N/A Date/Time	DATE COMPLETED: 10-30-92
DRILLING METHODS: INGERSOLL-RAND MODEL TH60 AIR ROTARY		PAGE: 2 OF 2

DEPTH (ft)	SAMPLE TYPE & NO.	RECOVERY (in.)	USCS SYMBOL	DESCRIPTION	CONSTRUCTION SCHEMAITC	REMARKS
30	VEW-2 -31.5	18	sp	Black stained, fine sand with 0.12 feet thick strongly cemented sand layer at 31.0 feet, less black staining below 31.0 feet, moist, hydrocarbon odor		
35	VEW-2 -36	12	sp	Light gray stained, fine sand, moist, hydrocarbon odor, pink strongly cemented sand beginning at 36.0 feet		
	VEW-2 -39	12	sp	Fine sand, grading to no black staining between 38.5 feet to 39.0 feet, with a weakly cemented, 0.04 feet thick caliche layer at 38.4 feet, moist		
40						
45						
50						
55						

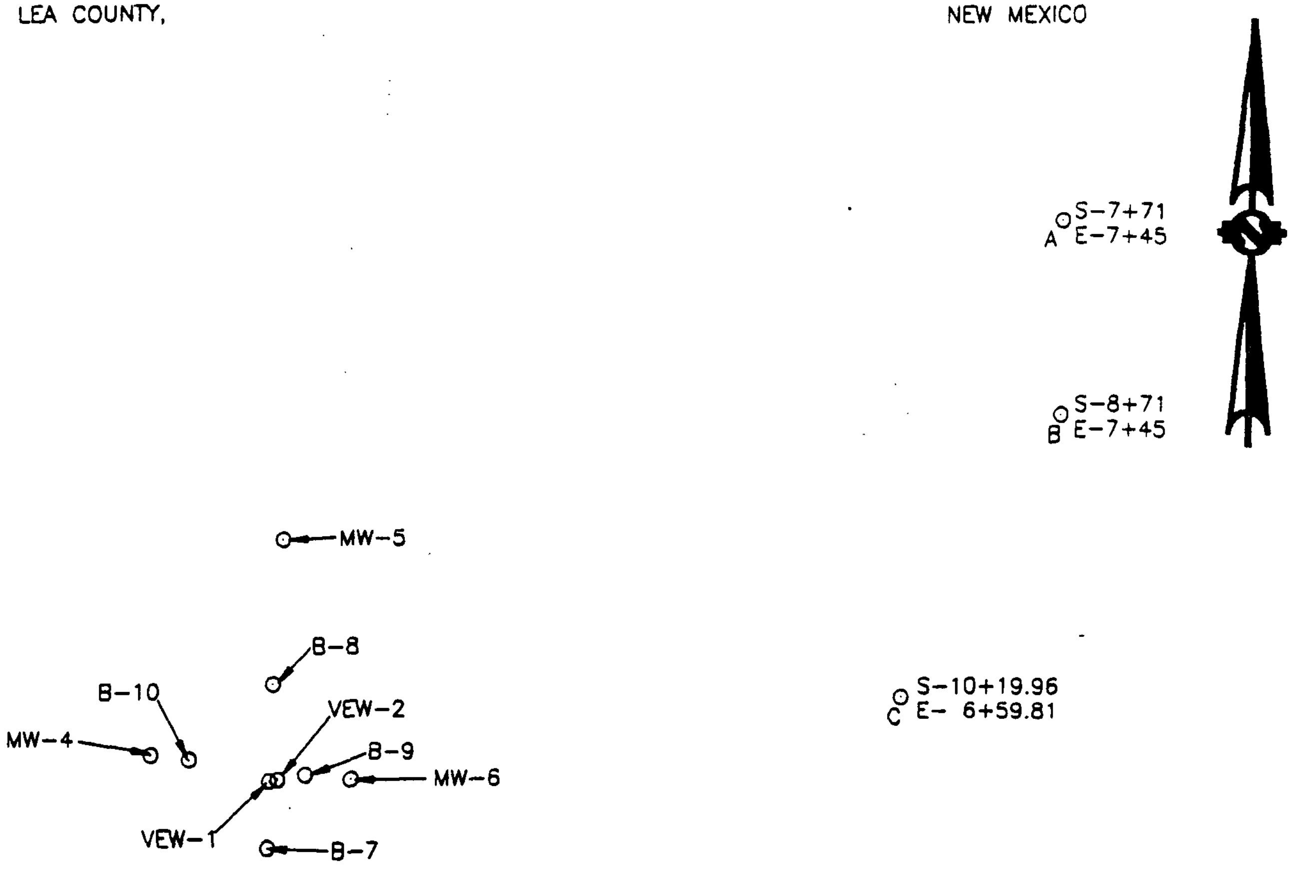
NOTES:

Total depth of boring = 39.0 Ft.

Description from observations by on-site geologist

SECTION 6, TOWNSHIP 19 SOUTH, RANGE 37 EAST, N.M.P.M.,

LEA COUNTY, NEW MEXICO



POINT No. WELL No.	SOUTH	EAST	ELEVATION	GROUND ELEVATION
POINT A	7+71	7+45		
POINT B	8+71	7+45	103.12	
POINT C	10+20.0	6+59.8		
MW-5	9+37.1	3+28.4	102.37	99.94
MW-6	10+63.2	3+65.2	101.89	99.33
B-8	10+13.5	3+23.2		99.39
B-9	10+61.1	3+40.9		99.29
VEW-2	10+63.7	3+26.2		99.03
VEW-1	10+64.4	3+21.5		98.99
B-10	10+52.7	2+78.7	98.97	
MW-4	10+50.3	2+58.5	101.25	98.79
B-7	10+99.5	3+20.8	99.34	

100 0 100 200

SCALE: 1"=100'

I HEREBY CERTIFY THAT THIS PLAT WAS PREPARED FROM FIELD NOTES OF AN ACTUAL SURVEY AND MEETS OR EXCEEDS ALL REQUIREMENTS FOR LAND SURVEYS AS SPECIFIED BY THIS STATE.

GARY L. JONES 7977

JOHN W. WEST, N.M. P.E. & P.S. No. 676
TEXAS P.L.S. No. 1138
RONALD J. EIDSON, N.M. L.S. No. 3239
TEXAS P.L.S. No. 1883
GARY L. JONES N.M. P.S. No. 7977

ENRON GAS PROCESSING

LOCATION OF MONITOR WELLS AT THE HOBBS PLANT LOCATED IN SECTION 6, TOWNSHIP 19 SOUTH, RANGE 37 EAST, N.M.P.M., LEA COUNTY, NEW MEXICO.

JOHN W. WEST ENGINEERING COMPANY
CONSULTING ENGINEERS & SURVEYORS – HOBBS, NEW MEXICO

Survey Date: 10/4/92		Sheet 1 of 1 Sheets	
W.O. Number: 92-11-1672		Drawn By: JAMES L. PRESLEY	
Date: 11/6/92	DISK: JLP#65	ENR1672	Scale: 1" = 100'

APPENDIX
B

APPENDIX B

LOGS OF FIELD HEADSPACE READINGS

301573.002.02/ftd A6

INTERNATIONAL
TECHNOLOGY
CORPORATION

HEADSPACE TESTING FOR VOLATILES

PROJECT NAME: ENRON-HOBBS PLANT

PROJECT NO.: 301573.002.02

INSTRUMENT TYPE: OVA FOXBORO FID

SERIAL NO.: A51822

PHOTOIONIZATION BULB POWER (ev): NA

ENGINEER/GEOLOGIST: MIKE CYROCKI

DATE: 10-20-92

CALIBRATION DATE: 10-20-92

CALIBRATION GAS TYPE/CONCENTRATION: 97.8 ppm METHANE

ROOM TEMPERATURE (°F): 72°

SAMPLE NUMBER	SAMPLING LOCATION	SAMPLE DEPTH (FEET)	SAMPLE MATRIX	PEAK INSTRUMENT READING (ppm)	COMMENTS
B-10-5	B-10	5.0	SOIL	>1000	
B-10-10	B-10	10.0	SOIL	>1000	
B-10-15	B-10	15.0	SOIL	>1000	
B-10-20	B-10	20.0	SOIL	>1000	

INTERNATIONAL TECHNOLOGY CORPORATION

HEADSPACE TESTING FOR VOLATILES

PROJECT NAME: ENRON-HOBBS PLANT

ENGINEER/GEOLOGIST: MIKE CYROCKI

PROJECT NO.: 301573.002.02

DATE: 10-27-92

INSTRUMENT TYPE: OVA FOXBORO FID

CALIBRATION DATE: 10-27-92

SERIAL NO.: A51822

CALIBRATION GAS TYPE/CONCENTRATION: 97.8 ppm METHANE

PHOTOIONIZATION BULB POWER (ev): NA

ROOM TEMPERATURE (°F): 70°

SAMPLE NUMBER	SAMPLING LOCATION	SAMPLE DEPTH (FEET)	SAMPLE MATRIX	PEAK INSTRUMENT READING (ppm)	COMMENTS
MW-5-7	MW-5	7.0	SAND	0	
MW-5-12	MW-5	12.0	SAND	0	
MW-5-17	MW-5	17.0	SAND	0	
MW-5-22	MW-5	22.0	SAND	0	
MW-5-27	MW-5	27.0	SAND	0	
MW-5-36.5	MW-5	36.5	SAND	0	
MW-5-41.5	MW-5	41.5	SAND	0	

301573.002.02/ftd A8

INTERNATIONAL
TECHNOLOGY
CORPORATION

HEADSPACE TESTING FOR VOLATILES

PROJECT NAME: ENRON-HOBBS PLANT

ENGINEER/GEOLOGIST: MIKE CYROCKI

PROJECT NO.: 301573.002.02

DATE: 10-29-92

INSTRUMENT TYPE: OVA FOXBORO FID

CALIBRATION DATE: 10-29-92

SERIAL NO.: A51822

CALIBRATION GAS TYPE/CONCENTRATION: 97.8 ppm METHANE

PHOTOIONIZATION BULB POWER (ev): NA

ROOM TEMPERATURE (°F): 75°

SAMPLE NUMBER	SAMPLING LOCATION	SAMPLE DEPTH (FEET)	SAMPLE MATRIX	PEAK INSTRUMENT READING (ppm)	COMMENTS
MW-6-7	MW-6	7.0	SOIL	1	
MW-6-12	MW-6	12.0	SOIL	1	
MW-6-16.3	MW-6	16.3	SOIL	1	
MW-6-21.3	MW-6	21.30	SOIL	1	
MW-6-25	MW-6	25.0	SOIL	0	
MW-6-36.7	MW-6	36.7	SOIL	200	
MW-6-30	MW-6	30	SOIL	10	
VEW-2-7	VEW-2	7	SOIL	>1000	
VEW-2-12	VEW-2	12	SOIL	>1000	
VEW-2-17	VEW-2	17	SOIL	>1000	

301573.002.02/tfd A9

INTERNATIONAL TECHNOLOGY CORPORATION

HEADSPACE TESTING FOR VOLATILES

PROJECT NAME: ENRON-HOBBS PLANT

ENGINEER/GEOLOGIST: MIKE CYROCKI

PROJECT NO.: 301573.002.02

DATE: 10-30-92

INSTRUMENT TYPE: OVA FOXBORO FID

CALIBRATION DATE: 10-30-92

SERIAL NO.: A51822

CALIBRATION GAS TYPE/CONCENTRATION: 97.8 ppm METHANE

PHOTOIONIZATION BULB POWER (ev): NA

ROOM TEMPERATURE (°F): 72°

SAMPLE NUMBER	SAMPLING LOCATION	SAMPLE DEPTH (FEET)	SAMPLE MATRIX	PEAK INSTRUMENT READING (ppm)	COMMENTS
VEW-2-27	VEW-2	27.0	SOIL	>1000	
VFW-2-31.2	VEW-2	31.2	SOIL	>1000	
VEW-2-35	VEW-2	35	SOIL	250	
VEW-2-39	VEW-2	39	SOIL	>1000	
B-9-5.4	B-9	5.4	SOIL	>1000	
B-9-11.4	B-9	11.4	SOIL	>1000	
B-9-17	B-9	17	SOIL	>1000	
B-9-20.2	B-9	20.2	SOIL	>1000	
B-9-27	B-9	27	SOIL	>1000	
B-9-30	B-9	30	SOIL	>1000	
B-10-32	B-10	32	SOIL	>1000	
B-10-35.4	B-10	35.4	SOIL	>1000	
B-10-39.4	B-10	39.4	SOIL	>1000	

INTERNATIONAL
TECHNOLOGY
CORPORATION

HEADSPACE TESTING FOR VOLATILES

PROJECT NAME: ENRON-HOBBS PLANT

ENGINEER/GEOLOGIST: MIKE CYROCKI

PROJECT NO.: 301573.002.02

DATE: 10-31-92

INSTRUMENT TYPE: OVA FOXBORO FID

CALIBRATION DATE: 10-31-92

SERIAL NO.: A51822

CALIBRATION GAS TYPE/CONCENTRATION: 97.8 ppm METHANE

PHOTOIONIZATION BULB POWER (eυ): NA

ROOM TEMPERATURE (°F): 72°

SAMPLE NUMBER	SAMPLING LOCATION	SAMPLE DEPTH (FEET)	SAMPLE MATRIX	PEAK INSTRUMENT READING (ppm)	COMMENTS
B-8-7	B-8	7	SOIL	>1000	
B-8-12	B-8	12	SOIL	>1000	
B-8-17	B-8	17	SOIL	>1000	
B-8-21	B-8	21	SOIL	>1000	
B-8-27	B-8	27	SOIL	>1000	
B-8-31	B-8	31	SOIL	>1000	
B-8-35.2	B-8	35.2	SOIL	>1000	
MW-4-7	MW-4	7	SOIL	0	
MW-4-11.4	MW-4	11.5	SOIL	4	
MW-4-17	MW-4	17	SOIL	0	
MW-4-20.6	MW-4	20.6	SOIL	1	
MW-4-27	MW-4	27	SOIL	>1000	
MW-4-31.2	MW-4	31.2	SOIL	10	
MW-4-40.6	MW-4	40.6	SOIL	800	

301573.002.02/tfd A11

INTERNATIONAL TECHNOLOGY CORPORATION

PAGE 1 0F 1

HEADSPACE TESTING FOR VOLATILES

PROJECT NAME: ENRON-HOBBS PLANT
ENGINEER/GEOLOGIST: MIKE CYROCKI
PROJECT NO.: 301573.002.02
DATE: 11-01-92
INSTRUMENT TYPE: OVA FOXBORO FID
CALIBRATION DATE: 11-01-92
SERIAL NO.: A51822
CALIBRATION GAS TYPE/CONCENTRATION: 97.8 ppm METHANE
PHOTOIONIZATION BULB POWER (eυ): NA
ROOM TEMPERATURE (°F): 72°

SAMPLE NUMBER	SAMPLING LOCATION	SAMPLE DEPTH (FEET)	SAMPLE MATRIX	PEAK INSTRUMENT READING (ppm)	COMMENTS
MW-6-40.2	MW-6	40.2	SOIL	40	

INTERNATIONAL TECHNOLOGY CORPORATION

HEADSPACE TESTING FOR VOLATILES

PROJECT NAME: ENRON-HOBBS PLANT

ENGINEER/GEOLOGIST: J. S. RAUGUST

PROJECT NO.: 301573.002.02

DATE: 11-2-92

INSTRUMENT TYPE: FOXBORO MODEL 128-GC FID

CALIBRATION DATE: 11-2-92

SERIAL NO.: A51822

CALIBRATION GAS TYPE/CONCENTRATION: METHANE 97.8

PHOTOIONIZATION BULB POWER (ev): NA

ROOM TEMPERATURE (°F): 50°

SAMPLE NUMBER	SAMPLING LOCATION	SAMPLE DEPTH (FEET)	SAMPLE MATRIX	PEAK INSTRUMENT READING (ppm)	COMMENTS
B-7-6	B-7	5'	SOIL	0	
B-7-11	B-7	10'	SOIL	0	
B-7-16	B-7	15'	SOIL	30	
B-7-21	B-7	20'	SOIL	26	
B-7-26	B-7	25'	SOIL	2	
B-7-31	B-7	30'	SOIL	1	
NO SAMPLE	B-7	35'	SOIL		Poor recovery
B-7-41	B-7	40'	SOIL	.5	

STANDARD OPERATING PROCEDURE 09

FIELD SCREENING OF VOLATILE ORGANIC COMPOUNDS

1.0 PURPOSE

To define a method that ensures acceptable, consistent soil vapor screening for onsite assessment of organic vapor contamination of soils. Included is the use of a photoionization detector (PID), a flame-ionization detector (FID), and use of a direct extraction/colorimetric method for the analysis of soils potentially contaminated with heavy hydrocarbons (e.g., diesel).

2.0 DISCUSSION

The PID and FID are useful tools as general survey instruments at hazardous waste sites. Both the PID and FID are capable of detecting and measuring real-time concentrations of many organic and inorganic vapors in the air. A PID is similar to an FID in application. The PID has somewhat broader capabilities because it can detect certain inorganic vapors. Conversely, the PID is unable to respond to certain low molecular weight hydrocarbons (like methane and ethane) that are readily detected by FID instruments.

Soil vapor screening may be used as a reconnaissance tool to delineate the extent of volatile organic contamination resulting from ground water and vadose-zone contamination. The "headspace" method involves collecting a sample of soil in a jar, allowing vapors to accumulate, then analyzing the concentration of vapors above the soil with a PID or FID.

For soils potentially contaminated with heavy hydrocarbons such as diesel, kerosene, or JP-4 jet fuel, the headspace method is not acceptable. Heavy hydrocarbon contamination may be assessed in the field using a direct extraction technique, such as the HNU-Hanby® Method. This method involves the collection of a small soil sample (usually 10 grams) which is reacted with a solvent. The extracted hydrocarbon and solvent solution is decanted and further reacted with a catalyst. The catalyst causes a colorimetric response upon reaction with hydrocarbons, and the resulting color is compared with known concentrations of the contaminant on a color chart. The direct extraction method is normally corroborated with a laboratory sample from the terminal depth of a boring.

3.0 DEFINITIONS

None

4.0 PROCEDURES

4.1 Headspace Field Method

4.1.1 Preparation

4.1.1.1 Office

A. Coordinate schedules/actions with the field and installation staff.

B. Obtain appropriate permission for property access.

C. Assemble the equipment and supplies listed in Appendix 6.1. Ensure the proper operation of the instrument(s) and perform the proper procedures for calibrating/adjusting the instrument(s).

4.1.1.2 Documentation

A. Obtain and start a Daily Field Activity Log, Daily Job Log, or logbook.

B. Record results of the equipment check in the log.

C. Obtain a sufficient number of the appropriate data collection forms (i.e., Sample Collection Logs, Analysis Request and Chain of Custody Record forms, etc.).

D. Record the calibration data on the appropriate form.

4.1.1.3 Field

A. Follow the start-up procedure, operational check, and calibration check for the appropriate instrument being used. If using a PID or FID, follow procedures described is SOP 3, Health and Safety Monitoring of Organic Vapors.

B. Set the function switch to the appropriate range. If the concentrations of gases or vapors is unknown, set the function switch to the 0 to 20 ppm range; adjust the range if necessary.

C. With the exception of the probe's inlet and exhaust, wrap the PID or FID in clear plastic to prevent it from becoming contaminated and to prevent water from getting inside the instrument in the event of precipitation.

4.1.2 Operation

A. Fill a clean 0.5 liter (16 ounce) or larger jar half full of soil sample.

B. Seal the top of the jar with clean aluminum foil.

C. Ensure sample is at 15° to 20°C (approximately 60° to 80°F). A warm water bath or vehicle heater should be used before testing if necessary.

D. Aromatic hydrocarbon concentrations must be allowed to develop in the headspace of the sample jar for 5 minutes. During this headspace development period, the sample should be shaken vigorously for a total of 1 minute (care should be taken not the puncture the aluminum foil).

E. Immediately pierce the aluminum foil seal with the probe of either a PID or FID, and read the highest (peak) measurement.

Note: If significant moisture is present in the soil, water vapor may affect the response of either instrument, especially the PID. A typical water vapor response differs from an organic vapor response in that the former will produce a slow increase in apparent concentration and may never show a distinct peak. The organic vapor response is normally a sharp rise to a peak, followed by a gradual decline.

4.1.3 Post Operation

4.1.3.1 Field

A. When the activity is completed, or at the end of the day, carefully clean the outside of the PID/FID with a damp disposable towel to remove any visible dirt. Return the instrument to a secure area and place on charge. Glass jars used for headspace screening are usually disposed of; however, it is not uncommon for the jars in which a sample yielded a non-detect response to be decontaminated and reused.

B. Ensure that all equipment is accounted for, and decontaminated (see SOP 24, Field Decontamination).

C. Make sure all survey or sampling locations are properly staked and the location ID is readily visible on the location stake.

4.1.3.2 Documentation

A. Record any uncompleted work (like site restoration or long-term additional monitoring) in the Daily Log or logbook.

B. Complete daily log entries, verify the accuracy of entries, and sign/initial all pages.

C. Review data collection forms for completeness.

4.1.3.3 Office

A. Deliver original forms and daily logs to the site manager for technical review. He/she will review, sign forms, and transmit to the document control officer (copies to the files) for eventual delivery to the Department of Energy.

B. Inventory equipment and supplies. Repair or replace all broken or damaged equipment. Replace expendable items and recharge the batteries. Return equipment to the equipment manager and report incidents of malfunction or damage.

5.0 REFERENCES

Foxboro Analytical (A Division of the Foxboro Company), 1985, "Instruction and Service Manual, Century Systems Portable Organic Vapor Analyzer, Model OVA-128," New Haven, Connecticut.

HNU Systems, Inc, 1986, "Instruction Manual for the Trace Gas Analyzer Model PI-101," Newton, Massachusetts.

New Mexico Environment Department (NMED), 1990, "Underground Storage Tank Regulations," Underground Storage Tank Bureau Regulations, Section XII, Appendix C: Soil Testing for Petroleum Releases, Environmental Improvement Board, Santa Fe, New Mexico.

U.S. Environmental Protection Agency (EPA), 1987, "A Compendium of Superfund Field Operations Methods," EPA-500/P-87/001, U.S. Government Printing Office, Washington, D.C.

APPENDIX
C

91A-9-91

APPENDIX C
CERTIFICATES OF ANALYSIS

INTERNATIONAL
TECHNOLOGY
CORPORATION

ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

IT ALBUQUERQUE
5301 CENTRAL AVE., N.E.
SUITE 700
ALBUQUERQUE, NM 87108
STEVE RAUGUST

Date: 11/16/92

Work Order: B2-11-030 P.O. Number: 93-066

This is the Certificate of Analysis for the following samples:

Client Work ID: ENRON-HOBBS/BTEX/TPH SOILS 301573-002-06
Date Received: 11/03/92
Number of Samples: 6
Sample Type: SOIL

I. Introduction

Samples were labeled as follows:

SAMPLE IDENTIFICATION	LABORATORY #
VEW-2-39	B2-11-030-01
B-9-10.5	B2-11-030-02
B-8-6.5	B2-11-030-03
B-8-35	B2-11-030-04
MW-4-40	B2-11-030-05
MW-4-10.5	B2-11-030-06

Reviewed and Approved:

Jon Bartell
Laboratory Director

American Council of Independent Laboratories
International Association of Environmental Testing Laboratories
American Association for Laboratory Accreditation

II. QA/QC

The results presented in this report meet the statement of work requirements in accordance with Quality Control and Quality Assurance protocol except as noted in Section IV or in an optional sample narrative at the end of Section III.

In the presented analytical data, 'ND' or '<' indicates that the compound is not detected at the specified limit.

III. Analytical Data

The following page(s) supply results for requested analyses performed on the samples listed above.

The test results relate to tested items only. ITAS-Austin reserves the right to control report production except in whole.

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPH SOILS 301573-002-06 **Work Order:** B2-11-030

SAMPLE ID: **VEW-2-39**
SAMPLE DATE: **10/30/92**
SAMPLE MATRIX: **SOIL**

Test Name	Note Ref	Result	Reporting Limit	Units	Date Analyzed	Method Reference
TPH by GC (mod EPA 8015)		7500	89	mg/kg	11/11/92	CALIFORNIA

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPH SOILS 301573-002-06 **Work Order:** B2-11-030

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **VEW-2-39**
SAMPLE DATE: **10/30/92**
SAMPLE MATRIX: **SOIL**
ANALYSIS DATE: 11/05/92
DILUTION FACTOR: 200
UNITS: ug/kg

	Result	Reporting Limit
Benzene	3100	200
Ethylbenzene	13000	200
Toluene	2200	200
Xylenes (total)	13000	200
Total BTEX concentration:	31300	ug/kg

Surrogates	% Recovery
4-Bromofluorobenzene	135*

Referenced notes for these results:

* High surrogate recovery due to coeluting peaks.

IT ANALYTICAL SERVICES
AUSTIN, TX

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPH SOILS 301573-002-06 Work Order: B2-11-030

SAMPLE ID: **B-9-10.5**
SAMPLE DATE: **10/30/92**
SAMPLE MATRIX: **SOIL**

Test Name	Note Ref	Result	Reporting Limit	Units	Date Analyzed	Method Reference
TPH by GC (mod EPA 8015)		2400	96	mg/kg	11/11/92	CALIFORNIA

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPH SOILS 301573-002-06 **Work Order: B2-11-030**

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **B-9-10.5**
SAMPLE DATE: **10/30/92**
SAMPLE MATRIX: **SOIL**
ANALYSIS DATE: **11/07/92**
FIRST ANALYSIS: **11/05/92**
DILUTION FACTOR: **1000**
UNITS: **ug/kg**

	Result	Reporting Limit
Benzene	**5400**	**1000**
Ethylbenzene	**160000**	**1000**
Toluene	**17000**	**1000**
Xylenes (total)	**170000**	**1000**
Total BTEX concentration:	352400	ug/kg

Surrogates	% Recovery
4-Bromofluorobenzene	176*

Referenced notes for these results:

* High surrogate recovery due to coeluting peaks.

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPH SOILS 301573-002-06 **Work Order:** B2-11-030

SAMPLE ID: **B-8-6.5**
SAMPLE DATE: **10/30/92**
SAMPLE MATRIX: **SOIL**

Test Name	Note Ref	Result	Reporting Limit	Units	Date Analyzed	Method Reference
TPH by GC (mod EPA 8015)		720	100	mg.kg	11/11/92	CALIFORNIA

IT ANALYTICAL SERVICES
AUSTIN, TX

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPH SOILS 301573-002-06 **Work Order:** B2-11-030

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **B-8-6.5**
SAMPLE DATE: **10/30/92**
SAMPLE MATRIX: **SOIL**
ANALYSIS DATE: 11/07/92
FIRST ANALYSIS: 11/05/92
DILUTION FACTOR: 1000
UNITS: ug/kg

	Result	Reporting Limit
Benzene	1100	1000
Ethylbenzene	13000	1000
Toluene	9100	1000
Xylenes (total)	120000	1000

Total BTEX concentration: 143200 ug/kg

Surrogates	% Recovery
4-Bromofluorobenzene	200*

Referenced notes for these results:

* High surrogate recovery due to coeluting peaks.

682-1-89

IT ANALYTICAL SERVICES
AUSTIN, TX

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPH SOILS 301573-002-06 **Work Order:** B2-11-030

SAMPLE ID: **B-8-35**
SAMPLE DATE: **10/30/92**
SAMPLE MATRIX: **SOIL**

Test Name	Note Ref	Result	Reporting Limit	Units	Date Analyzed	Method Reference
TPH by GC (mod EPA 8015)		310	9	mg/kg	11/11/92	CALIFORNIA

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPH SOILS 301573-002-06 **Work Order:** B2-11-030

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **B-8-35**
SAMPLE DATE: **10/30/92**
SAMPLE MATRIX: **SOIL**
ANALYSIS DATE: 11/06/92
DILUTION FACTOR: 200
UNITS: ug/kg

	Result	Reporting Limit
Benzene	ND	200
Ethylbenzene	**4600**	**200**
Toluene	**420**	**200**
Xylenes (total)	**6200**	**200**

Total BTEX concentration:	11220	ug/kg

Surrogates	% Recovery
4-Bromofluorobenzene	147*

Referenced notes for these results:

* High surrogate recovery due to coeluting peaks.

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPH SOILS 301573-002-06 Work Order: B2-11-030

SAMPLE ID: MW-4-40
SAMPLE DATE: 10/31/92
SAMPLE MATRIX: SOIL

Test Name	Note Ref	Result	Reporting Limit	Units	Date Analyzed	Method Reference
TPH by GC (mod EPA 8015)		1000	9	mg/kg	11/11/92	CALIFORNIA

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPH SOILS 301573-002-06 **Work Order:** B2-11-030

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **MW-4-40**
SAMPLE DATE: **10/31/92**
SAMPLE MATRIX: **SOIL**
ANALYSIS DATE: 11/06/92
DILUTION FACTOR: 50
UNITS: ug/kg

	Result	Reporting Limit
Benzene	ND	50
Ethylbenzene	**230**	50
Toluene	**84**	50
Xylenes (total)	**170**	50

Total BTEX concentration: 484 ug/kg

Surrogates	% Recovery
4-Bromofluorobenzene	101

IT ANALYTICAL SERVICES
AUSTIN, TX

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPH SOILS 301573-002-06 **Work Order:** B2-11-030

SAMPLE ID: **MW-4-10.5**
SAMPLE DATE: **10/31/92**
SAMPLE MATRIX: **SOIL**

Test Name	Note Ref	Result	Reporting Limit	Units	Date Analyzed	Method Reference
TPH by GC (mod EPA 8015)		ND	2	mg/kg	11/11/92	CALIFORNIA

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **MW-4-10.5**
SAMPLE DATE: **10/31/92**
SAMPLE MATRIX: **SOIL**
ANALYSIS DATE: **11/06/92**
DILUTION FACTOR: **50**
UNITS: **ug/kg**

	Result	Reporting Limit
Benzene	ND	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes (total)	**160**	**50**

Total BTEX concentration:	160	ug/kg

Surrogates	% Recovery
4-Bromofluorobenzene	107

IV. Methodology

Requested analyses were performed according to the following methods.

TEST NAME **BTEX - Purge and Trap** TEST CODE **BTEX**

BTEX	Method 8020, SW-846, Test Methods for Evaluating Solid Wastes, Third Edition. This technique uses a purge and trap with gas chromatography (GC) and photo ionization detection (PID) with a five point curve. This method exceeds the requirement of Method 602. Prep method is 5030.

TEST NAME **TPH by GC (mod EPA 8015)** TEST CODE **TPH_GC**

TPH-Extractable Petroleum Hydrocarbons	EPA Methods 3510/3520/3550/3580 for extraction of samples and modified EPA Method 8015 for GC/FID analysis of extracts run against a diesel standard.

INTERNATIONAL
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ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

IT ALBUQUERQUE
5301 CENTRAL AVE., N.E.
SUITE 700
ALBUQUERQUE, NM 87108
STEVE RANGUST

Date: 11/23/92

Work Order: B2-11-009
P.O. Number: 93-066

This is the Certificate of Analysis for the following samples:

Client Work ID: ENRON-HOBBS EXT SRCH 301573-002-06
Date Received: 10/31/92
Number of Samples: 1
Sample Type: SOIL

I. Introduction

Revised report. Previously reported on 11/23/92.
First Reported on 11/18/92.

Samples were labeled as follows:

SAMPLE IDENTIFICATION	LABORATORY #
VEW-2-15.5	B2-11-009-01

Reviewed and Approved:

Jon Bartell
Laboratory Director

American Council of Independent Laboratories
International Association of Environmental Testing Laboratories
American Association for Laboratory Accreditation

II. QA/QC

The results presented in this report meet the statement of work requirements in accordance with Quality Control and Quality Assurance protocol except as noted in Section IV or in an optional sample narrative at the end of Section III.

In the presented analytical data, 'ND' or '<' indicates that the compound is not detected at the specified limit.

III. Analytical Data

The following page(s) supply results for requested analyses performed on the samples listed above.

The test results relate to tested items only. ITAS-Austin reserves the right to control report production except in whole.

Company: IT ALBUQUERQUE
Date: 11/23/92
Client Work ID: ENRON-HOBBS EXT SRCH 301573-002-06 **Work Order:** B2-11-009

TEST NAME: **GCMS Library Search - BNA**
METHOD REFERENCE: **EPA8270**

SAMPLE ID: **VEW-2-15.5**
SAMPLE DATE: **10/29/92**
SAMPLE MATRIX: **SOIL**
ANALYSIS DATE: **11/09/92**
UNITS: **ug/L**

Compound Name	Retention Time	Estimated Concentration
Naphthalene	12.12	3.6
2-Methylnaphthalene	13.88	8.8
Unknown Compound	5.03	580
C2-Benzene	6.29	17
C2-Benzene	6.44	34
C10-Alkane	7.66	14
C10-Alkane	7.80	15
Unknown Compound	8.07	17
C3-Benzene	8.20	35
C10-Alkane	8.35	19
C10-Alkane	8.91	47
C11-Alkane	9.32	29
C11-Alkane	10.67	40
C12-Alkane	12.28	22
C13-Alkane	12.52	20
Unknown Compound	12.80	37
C14-Alkane	13.44	31
C14-Alkane	14.11	16
Unknown Cyclic Hydrocarbon	14.52	18
C15-Alkane	14.97	31
Unknown Compound	15.98	21
C16-Alkane	16.15	25
Unknown Compound	18.42	27
Unknown Compound	21.30	21

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AUSTIN, TX
(512) 892-6684

Company: IT ALBUQUERQUE
Date: 11/23/92
Client Work ID: ENRON-HOBBS EXT SRCH 301573-002-06 **Work Order: B2-11-009**

IV. Methodology

Requested analyses were performed according to the following methods.

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ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

IT ALBUQUERQUE
5301 CENTRAL AVE., N.E.
SUITE 700
ALBUQUERQUE, NM 87108
STEVE RAUGUST

Date: 11/16/92

Work Order: B2-11-073
P.O. Number: 93-066

This is the Certificate of Analysis for the following samples:

Client Work ID: ENRON-HOBBS/BTEX/TPH/SOILS 301573-002-06
Date Received: 11/05/92
Number of Samples: 2
Sample Type: SOIL

I. Introduction

Samples were labeled as follows:

SAMPLE IDENTIFICATION	LABORATORY #
B-7-16	B2-11-073-01
B-7-41	B2-11-073-02

Reviewed and Approved:

Jon Bartell
Laboratory Director

II. QA/QC

The results presented in this report meet the statement of work requirements in accordance with Quality Control and Quality Assurance protocol except as noted in Section IV or in an optional sample narrative at the end of Section III.

In the presented analytical data, 'ND' or '<' indicates that the compound is not detected at the specified limit.

III. Analytical Data

The following page(s) supply results for requested analyses performed on the samples listed above.

The test results relate to tested items only. ITAS-Austin reserves the right to control report production except in whole.

IT ANALYTICAL SERVICES
AUSTIN, TX

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPH/SOILS 301573-002-06 **Work Order:** B2-11-073

SAMPLE ID: **B-7-16**
SAMPLE DATE: **11/02/92**
SAMPLE MATRIX: **SOIL**

Test Name	Note Ref	Result	Reporting Limit	Units	Date Analyzed	Method Reference
TPH by GC (mod EPA 8015)		ND	2	mg/kg	11/11/92	CALIFORNIA

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPH/SOILS 301573-002-06 **Work Order:** B2-11-073

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **B-7-16**
SAMPLE DATE: **11/02/92**
SAMPLE MATRIX: **SOIL**
ANALYSIS DATE: **11/06/92**
DILUTION FACTOR: **50**
UNITS: **ug/kg**

	Result	Reporting Limit
Benzene	**71**	**50**
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes (total)	ND	50

Total BTEX concentration: 71 ug/kg

Surrogates	% Recovery
4-Bromofluorobenzene	102

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPH/SOILS 301573-002-06 **Work Order:** B2-11-073

SAMPLE ID: **B-7-41**
SAMPLE DATE: **11/02/92**
SAMPLE MATRIX: **SOIL**

Test Name	Note Ref	Result	Reporting Limit	Units	Date Analyzed	Method Reference
TPH by GC (mod EPA 8015)		31	2	mg/kg	11/12/92	CALIFORNIA

IT ANALYTICAL SERVICES
AUSTIN, TX

Company: **IT ALBUQUERQUE**
Date: **11/16/92**
Client Work ID: **ENRON-HOBBS/BTEX/TPH/SOILS** 301573-002-06 **Work Order:** **B2-11-073**

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **B-7-41**
SAMPLE DATE: **11/02/92**
SAMPLE MATRIX: **SOIL**
ANALYSIS DATE: **11/06/92**
DILUTION FACTOR: **50**
UNITS: **ug/kg**

	Result	Reporting Limit
Benzene	ND	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes (total)	ND	50

Total BTEX concentration: Not Detected

Surrogates	% Recovery
4-Bromofluorobenzene	101

IV. Methodology

Requested analyses were performed according to the following methods.

TEST NAME **BTEX - Purge and Trap** TEST CODE **BTEX**

BTEX	Method 8020, SW-846, Test Methods for Evaluating Solid Wastes, Third Edition. This technique uses a purge and trap with gas chromatography (GC) and photo ionization detection (PID) with a five point curve. This method exceeds the requirement of Method 602. Prep method is 5030.

TEST NAME **TPH by GC (mod EPA 8015)** TEST CODE **TPH_GC**

TPH-Extractable Petroleum Hydrocarbons	EPA Methods 3510/3520/3550/3580 for extraction of samples and modified EPA Method 8015 for GC/FID analysis of extracts run against a diesel standard.

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

IT ALBUQUERQUE
5301 CENTRAL AVE., N.E.
SUITE 700
ALBUQUERQUE, NM 87108
STEVE RAUGUST

Date: 11/16/92

Work Order: B2-11-010

P.O. Number: 93-066

This is the Certificate of Analysis for the following samples:

Client Work ID: ENRON-HOBBS/BTEX/TPHD/SOIL 301573-002-06
Date Received: 10/31/92
Number of Samples: 1
Sample Type: SOIL

I. Introduction

Samples were labeled as follows:

SAMPLE IDENTIFICATION	LABORATORY #
MW-5-41	B2-11-010-01

Reviewed and Approved:

Neal Saller for

Jon Bartell
Laboratory Director

II. QA/QC

The results presented in this report meet the statement of work requirements in accordance with Quality Control and Quality Assurance protocol except as noted in Section IV or in an optional sample narrative at the end of Section III.

In the presented analytical data, 'ND' or '<' indicates that the compound is not detected at the specified limit.

III. Analytical Data

The following page(s) supply results for requested analyses performed on the samples listed above.

The test results relate to tested items only. ITAS-Austin reserves the right to control report production except in whole.

IT ANALYTICAL SERVICES
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Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: **ENRON-HOBBS/BTEX/TPHD/SOIL** **301573-002-06** **Work Order:** **B2-11-010**

SAMPLE ID: **MW-5-41**
SAMPLE DATE: **10/27/92**
SAMPLE MATRIX: **SOIL**

Test Name	Note Ref	Result	Reporting Limit	Units	Date Analyzed	Method Reference
TPH by GC (mod EPA 8015)		ND	2	mg/kg	11/11/92	CALIFORNIA

IT ANALYTICAL SERVICES
AUSTIN, TX

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPHD/SOIL **301573-002-06** **Work Order: B2-11-010**

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **MW-5-41**
SAMPLE DATE: **10/27/92**
SAMPLE MATRIX: **SOIL**
ANALYSIS DATE: **11/03/92**
DILUTION FACTOR: **50**
UNITS: **ug/kg**

	Result	Reporting Limit
Benzene	ND	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes (total)	ND	50

Total BTEX concentration: Not Detected

Surrogates	% Recovery
4-Bromofluorobenzene	100

IV. Methodology

Requested analyses were performed according to the following methods.

TEST NAME **BTEX - Purge and Trap** TEST CODE **BTEX**

BTEX	Method 8020, SW-846, Test Methods for Evaluating Solid Wastes, Third Edition. This technique uses a purge and trap with gas chromatography (GC) and photo ionization detection (PID) with a five point curve. This method exceeds the requirement of Method 602. Prep method is 5030.

TEST NAME **TPH by GC (mod EPA 8015)** TEST CODE **TPH_GC**

TPH-Extractable Petroleum Hydrocarbons	EPA Methods 3510/3520/3550/3580 for extraction of samples and modified EPA Method 8015 for GC/FID analysis of extracts run against a diesel standard.

IT INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

IT ALBUQUERQUE
5301 CENTRAL AVE., N.E.
SUITE 700
ALBUQUERQUE, NM 87108
STEVE RAUGUST

Date: 11/16/92

Work Order: B2-11-074 P.O. Number: 93-066

This is the Certificate of Analysis for the following samples:

Client Work ID: ENRON-HOBBS/BTEX/TPH/WATERS 301573-002-06
Date Received: 11/05/92
Number of Samples: 4
Sample Type: WATER

I. Introduction

Samples were labeled as follows:

SAMPLE IDENTIFICATION	LABORATORY #
MW-1	B2-11-074-01
MW-6	B2-11-074-02
MW-5	B2-11-074-03
MW-4	B2-11-074-04

Reviewed and Approved:

Neal Walker for

Jon Bartell
Laboratory Director

II. QA/QC

The results presented in this report meet the statement of work requirements in accordance with Quality Control and Quality Assurance protocol except as noted in Section IV or in an optional sample narrative at the end of Section III.

In the presented analytical data, 'ND' or '<' indicates that the compound is not detected at the specified limit.

III. Analytical Data

The following page(s) supply results for requested analyses performed on the samples listed above.

The test results relate to tested items only. ITAS-Austin reserves the right to control report production except in whole.

IT ANALYTICAL SERVICES
AUSTIN, TX

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPH/WATERS 301573-002-06 **Work Order:** B2-11-074

SAMPLE ID: **MW-1**
SAMPLE DATE: **11/03/92**
SAMPLE MATRIX: **WATER**

Test Name	Note Ref	Result	Reporting Limit	Units	Date Analyzed	Method Reference
pH	1	6.4		none	11/05/92	EPA150_1
Total Dissolved Solids		2900	5	mg/L	11/05/92	EPA160_1
TPH by GC (mod EPA 8015)		4.3	0.05	mg/L	11/12/92	CALIFORNIA

Referenced notes for these results:

1 Sample received for pH 2 days past the holding time.

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPH/WATERS 301573-002-06 Work Order: B2-11-074

IT ANALYTICAL SERVICES
AUSTIN, TX

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **MW-1**
SAMPLE DATE: **11/03/92**
SAMPLE MATRIX: **WATER**
ANALYSIS DATE: 11/07/92
FIRST ANALYSIS: 11/06/92
DILUTION FACTOR: 1.0
UNITS: ug/L

	Result	Reporting Limit
Benzene	1.5	1.0
Ethylbenzene	ND	1.0
Toluene	1.5	1.0
Xylenes (total)	10	1.0

Total BTEX concentration:	13	ug/L

Surrogates	% Recovery
4-Bromofluorobenzene	107

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPH/WATERS 301573-002-06 **Work Order:** B2-11-074

SAMPLE ID: **MW-6**
SAMPLE DATE: **11/03/92**
SAMPLE MATRIX: **WATER**

Test Name	Note Ref	Result	Reporting Limit	Units	Date Analyzed	Method Reference
TPH by GC (mod EPA 8015)		35	0.5	mg/L	11/12/92	CALIFORNIA

IT ANALYTICAL SERVICES
AUSTIN, TX

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPH/WATERS 301573-002-06 Work Order: B2-11-074

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **MW-6**
SAMPLE DATE: **11/03/92**
SAMPLE MATRIX: **WATER**
ANALYSIS DATE: 11/06/92
DILUTION FACTOR: 5.0
UNITS: ug/L

	Result	Reporting Limit
Benzene	340	5.0
Ethylbenzene	51	5.0
Toluene	23	5.0
Xylenes (total)	120	5.0

Total BTEX concentration: 534 ug/L

Surrogates	% Recovery
4-Bromofluorobenzene	99

IT ANALYTICAL SERVICES
AUSTIN, TX

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPH/WATERS 301573-002-06 **Work Order:** B2-11-074

SAMPLE ID: **MW-5**
SAMPLE DATE: **11/03/92**
SAMPLE MATRIX: **WATER**

Test Name	Note Ref	Result	Reporting Limit	Units	Date Analyzed	Method Reference
TPH by GC (mod EPA 8015)		0.69	0.05	mg/L	11/12/92	CALIFORNIA

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPH/WATERS 301573-002-06 **Work Order:** B2-11-074

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **MW-5**
SAMPLE DATE: **11/03/92**
SAMPLE MATRIX: **WATER**
ANALYSIS DATE: 11/06/92
DILUTION FACTOR: 1.0
UNITS: ug/L

	Result	Reporting Limit
Benzene	3.0	1.0
Ethylbenzene	3.0	1.0
Toluene	3.4	1.0
Xylenes (total)	34	1.0

Total BTEX concentration: 43.4 ug/L

Surrogates	% Recovery
4-Bromofluorobenzene	101

IT ANALYTICAL SERVICES
AUSTIN, TX

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPH/WATERS 301573-002-06 Work Order: B2-11-074

SAMPLE ID: **MW-4**
SAMPLE DATE: **11/03/92**
SAMPLE MATRIX: **WATER**

Test Name	**Note Ref**	**Result**	**Reporting Limit**	**Units**	**Date Analyzed**	**Method Reference**
TPH by GC (mod EPA 8015)		50	0.5	mg/L	11/12/92	CALIFORNIA

Company: IT ALBUQUERQUE
Date: 11/16/92
Client Work ID: ENRON-HOBBS/BTEX/TPH/WATERS 301573-002-06 **Work Order:** B2-11-074

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **MW-4**
SAMPLE DATE: **11/03/92**
SAMPLE MATRIX: **WATER**
ANALYSIS DATE: **11/06/92**
DILUTION FACTOR: **200**
UNITS: **ug/L**

	Result	Reporting Limit
Benzene	**16000**	**200**
Ethylbenzene	**700**	**200**
Toluene	**8000**	**200**
Xylenes (total)	**1800**	**200**

Total BTEX concentration:	26500	ug/L

Surrogates	% Recovery
4-Bromofluorobenzene	102

IV. Methodology

Requested analyses were performed according to the following methods.

TEST NAME **BTEX - Purge and Trap** TEST CODE **BTEX**

BTEX	Method 8020, SW-846, Test Methods for Evaluating Solid Wastes, Third Edition. This technique uses a purge and trap with gas chromatography (GC) and photo ionization detection (PID) with a five point curve. This method exceeds the requirement of Method 602. Prep method is 5030.

TEST NAME **pH** TEST CODE **PH**

pH	Method 150.1-Chemical Analysis of Water and Wastewater, USEPA, 1983. Potentiometric analysis. Method 9045-SW 846, Third Edition. Electrometric analysis.

TEST NAME **Total Dissolved Solids** TEST CODE **TDS**

Total Dissolved Solids	Method 160.1-Chemical Analysis of Water and Wastewater, USEPA, 1983. Gravimetric analysis.

TEST NAME **TPH by GC (mod EPA 8015)** TEST CODE **TPH_GC**

TPH-Extractable Petroleum Hydrocarbons	EPA Methods 3510/3520/3550/3580 for extraction of samples and modified EPA Method 8015 for GC/FID analysis of extracts run against a diesel standard.

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

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CERTIFICATE OF ANALYSIS

IT ALBUQUERQUE
5301 CENTRAL AVE., N.E.
SUITE 700
ALBUQUERQUE, NM 87108
STEVE RAUGUST

Date: 12/11/92

Work Order: B2-12-028

P.O. Number: 93073

This is the Certificate of Analysis for the following samples:

Client Work ID: ENRON HOBBS

301573-001-03

Date Received: 12/03/92
Number of Samples: 7
Sample Type: LIQUID

I. Introduction

Samples were labeled as follows:

SAMPLE IDENTIFICATION	LABORATORY #
MW-4	B2-12-028-01
MW-5	B2-12-028-02
MW-6	B2-12-028-03
MW-1	B2-12-028-04
MW-4A	B2-12-028-05
FB-1	B2-12-028-06
TB-1	B2-12-028-07

Reviewed and Approved:

Jon Bartell
Laboratory Director

American Council of Independent Laboratories
International Association of Environmental Testing Laboratories
American Association for Laboratory Accreditation

II. QA/QC

The results presented in this report meet the statement of work requirements in accordance with Quality Control and Quality Assurance protocol except as noted in Section IV or in an optional sample narrative at the end of Section III.

In the presented analytical data, 'ND' or '<' indicates that the compound is not detected at the specified limit.

III. Analytical Data

The following page(s) supply results for requested analyses performed on the samples listed above.

The test results relate to tested items only. ITAS-Austin reserves the right to control report production except in whole.

IT ANALYTICAL SERVICES
AUSTIN, TX
(512) 892-6684

Company: IT ALBUQUERQUE
Date: 12/11/92
Client Work ID: ENRON HOBBS
301573-001-03 **Work Order:** B2-12-028

SAMPLE ID: **MW-4**
SAMPLE DATE: **12/02/92**
SAMPLE MATRIX: **LIQUID**

Test Name	**Note Ref**	**Result**	**Reporting Limit**	**Units**	**Date Analyzed**	**Method Reference**
TPH by GC (mod EPA 8015)		15	0.50	mg/L	12/09/92	CALIFORNIA

IT ANALYTICAL SERVICES
AUSTIN, TX
(512) 892-6684

Company: IT ALBUQUERQUE
Date: 12/11/92
Client Work ID: ENRON HOBBS

301573-001-03 Work Order: B2-12-028

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **MW-4**
SAMPLE DATE: **12/02/92**
SAMPLE MATRIX: **LIQUID**
ANALYSIS DATE: 12/05/92
DILUTION FACTOR: 200
UNITS: ug/L

	Result	Reporting Limit
Benzene	17000	200
Ethylbenzene	530	200
Toluene	8200	200
Xylenes (total)	1300	200

Total BTEX concentration: 27030 ug/L

Surrogates	% Recovery
4-Bromofluorobenzene	100

IT ANALYTICAL SERVICES
AUSTIN, TX
(512) 892-6684

Company: IT ALBUQUERQUE
Date: 12/11/92
Client Work ID: ENRON HOBBS 301573-001-03 **Work Order:** B2-12-028

SAMPLE ID: **MW-5**
SAMPLE DATE: **12/02/92**
SAMPLE MATRIX: **LIQUID**

Test Name	Note Ref	Result	Reporting Limit	Units	Date Analyzed	Method Reference
TPH by GC (mod EPA 8015)		1.3	0.050	mg/L	12/08/92	CALIFORNIA

Company: IT ALBUQUERQUE
Date: 12/11/92
Client Work ID: ENRON HOBBS

IT ANALYTICAL SERVICES
AUSTIN, TX
(512) 892-6684

301573-001-03 **Work Order:** B2-12-028

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **MW-5**
SAMPLE DATE: **12/02/92**
SAMPLE MATRIX: **LIQUID**
ANALYSIS DATE: 12/05/92
DILUTION FACTOR: 1.0
UNITS: ug/L

	Result	Reporting Limit
Benzene	9.1	1.0
Ethylbenzene	8.2	1.0
Toluene	4.1	1.0
Xylenes (total)	37	1.0

Total BTEX concentration:	58.4	ug/L

Surrogates	% Recovery
4-Bromofluorobenzene	99

IT ANALYTICAL SERVICES
AUSTIN, TX
(512) 892-6684

Company: IT ALBUQUERQUE
Date: 12/11/92
Client Work ID: ENRON HOBBS

301573-001-03 Work Order: B2-12-028

SAMPLE ID: **MW-6**
SAMPLE DATE: **12/02/92**
SAMPLE MATRIX: **LIQUID**

Test Name	Note Ref	Result	Reporting Limit	Units	Date Analyzed	Method Reference
TPH by GC (mod EPA 8015)		10	0.50	mg/L	12/09/92	CALIFORNIA

Company: IT ALBUQUERQUE
Date: 12/11/92
Client Work ID: ENRON HOBBS 301573-001-03 **Work Order:** B2-12-028

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **MW-6**
SAMPLE DATE: **12/02/92**
SAMPLE MATRIX: **LIQUID**
ANALYSIS DATE: 12/05/92
DILUTION FACTOR: 5.0
UNITS: ug/L

	Result	Reporting Limit
Benzene	520	5.0
Ethylbenzene	58	5.0
Toluene	20	5.0
Xylenes (total)	120	5.0

Total BTEX concentration:	718	ug/L

Surrogates	% Recovery
4-Bromofluorobenzene	101

IT ANALYTICAL SERVICES
AUSTIN, TX
(512) 892-6684

Company: **IT ALBUQUERQUE**
Date: **12/11/92**
Client Work ID: **ENRON HOBBS** 301573-001-03 **Work Order:** **B2-12-028**

SAMPLE ID: **MW-1**
SAMPLE DATE: **12/02/92**
SAMPLE MATRIX: **LIQUID**

Test Name	Note Ref	Result	Reporting Limit	Units	Date Analyzed	Method Reference
TPH by GC (mod EPA 8015)		5.9	0.050	mg/L	12/08/92	CALIFORNIA

IT ANALYTICAL SERVICES
AUSTIN, TX
(512) 892-6684

Company: IT ALBUQUERQUE
Date: 12/11/92
Client Work ID: ENRON HOBBS 301573-001-03 Work Order: B2-12-028

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **MW-1**
SAMPLE DATE: **12/02/92**
SAMPLE MATRIX: **LIQUID**
ANALYSIS DATE: **12/05/92**
DILUTION FACTOR: **1.0**
UNITS: ug/L

	Result	Reporting Limit
Benzene	1.3	1.0
Ethylbenzene	ND	1.0
Toluene	1.4	1.0
Xylenes (total)	6.0	1.0

Total BTEX concentration:	8.7	ug/L

Surrogates	% Recovery
4-Bromofluorobenzene	105

IT ANALYTICAL SERVICES
AUSTIN, TX
(512) 892-6684

Company: IT ALBUQUERQUE
Date: 12/11/92
Client Work ID: ENRON HOBBS 301573-001-03 **Work Order:** B2-12-028

SAMPLE ID: **MW-4A**
SAMPLE DATE: **12/02/92**
SAMPLE MATRIX: **LIQUID**

Test Name	Note Ref	Result	Reporting Limit	Units	Date Analyzed	Method Reference
TPH by GC (mod EPA 8015)		10	0.25	mg/L	12/09/92	CALIFORNIA

Company: IT ALBUQUERQUE
Date: 12/11/92
Client Work ID: ENRON HOBBS

301573-001-03 **Work Order:** B2-12-028

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **MW-4A**
SAMPLE DATE: **12/02/92**
SAMPLE MATRIX: **LIQUID**
ANALYSIS DATE: **12/07/92**
DILUTION FACTOR: **100**
UNITS: **ug/L**

	Result	Reporting Limit
Benzene	**15000**	**200**
Ethylbenzene	**400**	**100**
Toluene	**6200**	**100**
Xylenes (total)	**1000**	**100**

Total BTEX concentration:	22600	ug/L

Surrogates	% Recovery
4-Bromofluorobenzene	99

IT ANALYTICAL SERVICES
AUSTIN, TX
(512) 892-6684

Company: IT ALBUQUERQUE
Date: 12/11/92
Client Work ID: ENRON HOBBS 301573-001-03 **Work Order: B2-12-028**

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **FB-1**
SAMPLE DATE: **12/02/92**
SAMPLE MATRIX: **LIQUID**
ANALYSIS DATE: **12/04/92**
DILUTION FACTOR: **1.0**
UNITS: **ug/L**

	Result	Reporting Limit
Benzene	ND	1.0
Ethylbenzene	ND	1.0
Toluene	ND	1.0
Xylenes (total)	ND	1.0

Total BTEX concentration: Not Detected

Surrogates	% Recovery
4-Bromofluorobenzene	100

IT ANALYTICAL SERVICES
AUSTIN, TX
(512) 892-6684

Company: IT ALBUQUERQUE
Date: 12/11/92
Client Work ID: ENRON HOBBS 301573-001-03 Work Order: B2-12-028

TEST NAME: **BTEX - Purge and Trap**
METHOD REFERENCE: **EPA8020**

SAMPLE ID: **TB-1**
SAMPLE DATE: **11/24/92**
SAMPLE MATRIX: **LIQUID**
ANALYSIS DATE: **12/04/92**
DILUTION FACTOR: **1.0**
UNITS: **ug/L**

	Result	Reporting Limit
Benzene	ND	1.0
Ethylbenzene	ND	1.0
Toluene	ND	1.0
Xylenes (total)	ND	1.0

Total BTEX concentration: Not Detected

Surrogates	% Recovery
4-Bromofluorobenzene	101

IV. Methodology

Requested analyses were performed according to the following methods.

TEST NAME **BTEX - Purge and Trap**	TEST CODE **BTEX**
BTEX	Method 8020, SW-846, Test Methods for Evaluating Solid Wastes, Third Edition. This technique uses a purge and trap with gas chromatography (GC) and photo ionization detection (PID) with a five point curve. This method exceeds the requirement of Method 602. Prep method is 5030.
TEST NAME **TPH by GC (mod EPA 8015)**	TEST CODE **TPH_GC**
TPH-Extractable Petroleum Hydrocarbons	EPA Methods 3510/3520/3550/3580 for extraction of samples and modified EPA Method 8015 for GC/FID analysis of extracts run against a diesel standard.

IT INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

IT Corporation
5301 Central Ave., NE, Ste 700
ALbuquerque, NM 87108

Date: December 11, 1992

Attn: Mr. Steve Raugust

Job Number 21830

P.O. Number 93-068

This is the Certificate of Analysis for the following samples:

Client Project ID:	Enron Liquid Fuels
Date Received:	November 6, 1992
Work Order:	X2-11-059
Number of Samples:	8
Sample Type:	Air

I. Introduction

Eight air samples arrived at ITAS Cincinnati on November 6, 1992. The samples were labeled as follows:

Canister # VEW-2-1
Canister # B-9-16
Canister # B-9-27
Canister # B-7-32
Canister # B-8-15
Canister # B-9-10
Canister # VEW-1-1
Canister # VEW-1-2

II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. The data will include sample identification information, the analytical results, and the appropriate detection limits.

The analyses requested were Natural Gas by GC/TCD/FID; ASTM D-3416 and Benzene, Toluene, Ethyl Benzene, and Total Xylenes by Purge and Trap Gas Chromatography with Photo-ionization Detection; EPA Method TO-3 and Total Petroleum Hydrocarbons by GC/FID.

III. Comments

These samples were analyzed at Air Toxics, Ltd. under an ITAS subcontract.

Reviewed and Approved by:

Tim Soward

Tim Soward
Project Manager
211059

Client: IT Enron
Work Order: X2-11-059
21105901

IT ANALYTICAL SERVICES
CINCINNATI, OH

Analytical Results, %

Client Sample ID Canister # VEW-2-1

Lab No. 01

Date Analyzed: 11/18/92

Analyte		Detection Limit
Oxygen	4.0	0.002
Nitrogen	64	0.002
Carbon Monoxide	ND	0.002
Methane	13	0.002
Carbon Dioxide	0.047	0.002
Total Non-Methane Hydrocarbons *	19	0.002
	100 Total (%)	

Client Sample ID Canister # B-9-16

Lab No. 02

Date Analyzed: 11/18/92

Analyte		Detection Limit
Oxygen	ND	0.003
Nitrogen	77	0.003
Carbon Monoxide	ND	0.003
Methane	13	0.003
Carbon Dioxide	3.0	0.003
Total Non-Methane Hydrocarbons *	6.5	0.003
	100 Total (%)	

ND = Not detected at or above the reported detection limit

* Referenced to Propane

Client: IT Enron
Work Order: X2-11-059
21105902

IT ANALYTICAL SERVICES
CINCINNATI, OH

Analytical Results, %

Client Sample ID Canister # B-9-27

Lab No. 03

Date Analyzed: 11/18/92

Analyte		Detection Limit
Oxygen	4.0	0.002
Nitrogen	84	0.002
Carbon Monoxide	ND	0.002
Methane	3.6	0.002
Carbon Dioxide	3.2	0.002
Total Non-Methane Hydrocarbons *	5.1	0.002
	100 Total (%)	

Client Sample ID Canister # B-7-32

Lab No. 04

Date Analyzed: 11/18/92

Analyte		Detection Limit
Oxygen	ND	0.002
Nitrogen	87	0.002
Carbon Monoxide	0.002	0.002
Methane	8.1	0.002
Carbon Dioxide	2.7	0.002
Total Non-Methane Hydrocarbons *	2.4	0.002
	100 Total (%)	

ND = Not detected at or above the reported detection limit

* Referenced to Propane

Client: IT Enron
Work Order: X2-11-059
21105903

IT ANALYTICAL SERVICES
CINCINNATI, OH

Analytical Results, %

Client Sample ID Canister # B-8-15

Lab No. 05

Date Analyzed: 11/18/92

Analyte		Detection Limit
Oxygen	ND	0.002
Nitrogen	82	0.002
Carbon Monoxide	ND	0.002
Methane	7.3	0.002
Carbon Dioxide	7.8	0.002
Total Non-Methane Hydrocarbons *	2.6	0.002
	100 Total (%)	

Client Sample ID Canister # B-9-10

Lab No. 06

Date Analyzed: 11/18/92

Analyte		Detection Limit
Oxygen	9.5	0.002
Nitrogen	85	0.002
Carbon Monoxide	ND	0.002
Methane	1.9	0.002
Carbon Dioxide	2.2	0.002
Total Non-Methane Hydrocarbons *	1.6	0.002
	100 Total (%)	

ND = Not detected at or above the reported detection limit

* Referenced to Propane

Client: IT Enron
Work Order: X2-11-059
21105904

IT ANALYTICAL SERVICES
CINCINNATI, OH

Analytical Results, %

Client Sample ID: Canister # VEW-1-1

Lab No.: 07

Date Analyzed: 11/18/92

Analyte		Detection Limit
Oxygen	7.0	0.002
Nitrogen	77	0.002
Carbon Monoxide	0.001	0.002
Methane	2.5	0.002
Carbon Dioxide	2.8	0.002
Total Non-Methane Hydrocarbons *	11	0.002
	100 Total (%)	

Client Sample ID: Canister # VEW-1-2

Lab No.: 08

Date Analyzed: 11/18/92

Analyte		Detection Limit
Oxygen	6.1	0.002
Nitrogen	77	0.002
Carbon Monoxide	0.001	0.002
Methane	2.1	0.002
Carbon Dioxide	4.3	0.002
Total Non-Methane Hydrocarbons *	10	0.002
	100 Total (%)	

ND = Not detected at or above the reported detection limit

* Referenced to Propane

Client: IT Enron
Work Order: X2-11-059
21105905

IT ANALYTICAL SERVICES
CINCINNATI, OH

Analytical Results, %

Client Sample ID Method Blank

Lab No.

Date Analyzed: 11/18/92

Analyte		Detection Limit
Oxygen	ND	0.001
Nitrogen	100	0.001
Carbon Monoxide	ND	0.001
Methane	ND	0.001
Carbon Dioxide	ND	0.001
Total Non-Methane Hydrocarbons *	ND	0.001
	100 Total (%)	

ND = Not detected at or above the reported detection limit

* Referenced to Propane

Client: IT Enron
Work Order: X2-11-059
21105910

IT ANALYTICAL SERVICES
CINCINNATI, OH

Analytical Results, %

Client Sample ID Canister # VEW-1-1

Lab No. 07

Date Analyzed: 11/18/92

Analyte	ppmv	ug/L	Detection Limit ppmv	Detection Limit ug/L
Benzene	860	2700	3.8	12
Toluene	230	850	3.8	24
Ethyl Benzene	33	140	3.8	16
Total Xylenes	59	250	3.8	16
TPH *	70000	280000	38	150

Client Sample ID Canister # VEW-1-2

Lab No. 08

Date Analyzed: 11/18/92

Analyte	ppmv	ug/L	Detection Limit ppmv	Detection Limit ug/L
Benzene	1100	3400	3.9	12
Toluene	450	1700	3.9	14
Ethyl Benzene	96	400	3.9	17
Total Xylenes	170	700	3.9	17
TPH *	84000	340000	39	160

* TPH (Total Petroleum Hydrocarbon) referenced to Gasoline

ND = Not detected at or above the reported detection limit

Client: IT Enron
Work Order: X2-11-059
21105912

IT ANALYTICAL SERVICES
CINCINNATI, OH

Analytical Results, %

Client Sample ID Canister # VEW-2-1

Lab No. 01

Date Analyzed: 11/18/92

Analyte	ppmv	ug/L	Detection Limit ppmv	Detection Limit ug/L
Benzene	600	1900	0.76	2.4
Toluene	110	400	0.76	2.8
Ethyl Benzene	39	170	0.76	3.2
Total Xylenes	59	250	0.76	3.2
TPH *	94000	380000	38	150

* TPH (Total Petroleum Hydrocarbon) referenced to Gasoline

ND = Not detected at or above the reported detection limit

Client: IT Enron
Work Order: X2-11-059
21105911

IT ANALYTICAL SERVICES
CINCINNATI, OH

Analytical Results, %

Client Sample ID Method Blank

Lab No.

Date Analyzed:	11/18/92		Detection Limit	Detection Limit
Analyte	ppmv	ug/L	ppmv	ug/L
Benzene	ND	ND	0.001	0.003
Toluene	ND	ND	0.001	0.004
Ethyl Benzene	ND	ND	0.001	0.004
Total Xylenes	ND	ND	0.001	0.004
TPH *	ND	ND	0.01	0.04

* TPH (Total Petroleum Hydrocarbon) referenced to Gasoline

ND = Not detected at or above the reported detection limit

APPENDIX
D

APPENDIX D

CHAIN-OF-CUSTODY DOCUMENTATION AND FIELD SAMPLING LOGS

B211030

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 31881
Page 1 of ____

Project Name/No. 1 ENRON - HOBBS PLANT 301573.002.06
Sample Team Members 2 MIKE Cynocki
Profit Center No. 3 3515
Project Manager 4 JIM DAWSON
Purchase Order No. 6 93-066
Required Report Date 11 26NOV92

Samples Shipment Date 7 02 NOV 92
Lab Destination 8 ITAS / AUSTIN
Lab Contact 9 CARLA BUTLER
Project Contact/Phone 12 STEVE RAUGUST 505 262 8800
Carrier/Waybill No. 13 FED EX 5065280636

Bill to: 5 IT CORP
ALBUQUERQUE, NM

Report to: 10 STEVE RAUGUST
IT - ALBUQUERQUE

ONE CONTAINER PER LINE

Sample Number 14	Sample Description/Type 15	Date/Time Collected 16	Container Type 17	Sample Volume 18	Preservative 19	Requested Testing Program 20	Condition on Receipt 21	Disposal Record No. 22
VEW-2-39	SOIL	10/30/92 8:45	BRASS TUBE		4°C	BTEX 8020 TPH (HIGH BOILERS) 8015	Good Cond.	
B-9-10.5	SOIL	10/30/92 14:50	BRASS TUBE		4°C	BTEX 8020 TPH (HIGH BOILERS) 8015	Temp 4°C	
B-8-6.5	SOIL	10/30/92 7:35	BRASS TUBE		4°C	BTEX 8020 TPH (HIGH BOILERS) 8015	EVR CDS	11/3/92
B-8-35	SOIL	10/30/92 10:35	BRASS TUBE		4°C	BTEX 8020 TPH (HIGH BOILERS) 8015		
MW-4-40	SOIL	10/31/92 14:40	BRASS TUBE		4°C	BTEX 8020 TPH (HIGH BOILERS) 8015		
MW-4-10.5	SOIL	10/31/92 11:25	BRASS TUBE		4°C	BTEX 8020 TPH (HIGH BOILERS) 8015		

FOR LAB USE ONLY

Special Instructions: 23 CALL STEVE RAUGUST FOR ADDITIONAL GUIDANCE 505 262-8800

Possible Hazard Identification: 24
Non-hazard ☐ Flammable ☒ Skin Irritant ☒ Poison B ☐ Unknown ☒

Sample Disposal: 25
Return to Client ☐ Disposal by Lab ☒ Archive ______ (mos.)

Turnaround Time Required: 26
Normal ☒ Rush ☐

QC Level: 27
I. ☐ II. ☐ III. ☐ Project Specific (specify): ______

1. Relinquished by 28 (Signature/Affiliation) Mike Cynocki Date: 11/01/92 Time: 17:35
1. Received by 28 (Signature/Affiliation) IT Date: 11/3/92 Time: 0933
2. Relinquished by (Signature/Affiliation) Date: Time:
2. Received by (Signature/Affiliation) Date: Time:
3. Relinquished by (Signature/Affiliation) Date: Time:
3. Received by (Signature/Affiliation) Date: Time:

Comments: 29

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

B211009

Reference Document No. 318819
Page 1 of 1

Project Name/No. 1 ENRON - HOBBS PLANT 30/573.002.06
Sample Team Members 2 MIKE CYROCKI
Profit Center No. 3 3515
Project Manager 4 JIM DAWSON
Purchase Order No. 6 93-066
Required Report Date 11 23 NOV 92

Samples Shipment Date 7 30 OCT 92
Lab Destination 8 ITAS / AUSTIN
Lab Contact 9 CARLA BUTLER
Project Contact/Phone 12 STEVE RAUGUST 505 262 8800
Carrier/Waybill No. FEDEX 5065280614

Bill to: 5 IT CORP
ALBUQUERQUE, NM

Report to: 10 STEVE RAUGUST
IT - ALBUQUERQUE

ONE CONTAINER PER LINE

Sample Number 14	Sample Description/Type 15	Date/Time Collected 16	Container Type 17	Sample Volume 18	Pre-servative 19	Requested Testing Program 20	Condition on Receipt 21	Disposal Record No. 22
VEW-2-15.5	SOIL	10/29/92 13:45	BRASS TUBE		4°C	TPH + GC/MS LIBRARY SEARCH	10/31/92 1012 LW Good 1C see RUR	

FOR LAB USE ONLY

Special Instructions: 23 CONTACT STEVE RAUGUST FOR ADDITIONAL GUIDANCE AT 505 262 8800

Possible Hazard Identification: 24 POSSIBLE BENZENE
Non-hazard ☐ Flammable ☐ Skin Irritant ☒ Poison B ☐ Unknown ☐

Sample Disposal: 25
Return to Client ☐ Disposal by Lab ☒ Archive ______ (mos.)

Turnaround Time Required: 26
Normal ☒ Rush ☐

QC Level: 27
I. ☐ II. ☐ III. ☐ Project Specific (specify):

1. Relinquished by 28 (Signature/Affiliation) Mike Cyrocki / IT
Date: 30 OCT 92
Time: 7:25 A

1. Received by 28 (Signature/Affiliation) D Woodside IT
Date: 10-31-92
Time: 1012

2. Relinquished by (Signature/Affiliation)
Date:
Time:

2. Received by (Signature/Affiliation)
Date:
Time:

3. Relinquished by (Signature/Affiliation)
Date:
Time:

3. Received by (Signature/Affiliation)
Date:
Time:

Comments: 29

MCA 3/15/91

02 1707

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 318814
Page 1 of 1

Project Name/No. 1 ENRON-HOBBS PLANT 301573.002.06
Samples Shipment Date 7 11-4-92
Bill to: 5 IT CORP ALBUQUERQUE, NM
Sample Team Members 2 ~~MIKE CYROCKI~~ S. Raugust
Lab Destination 8 ITAS Austin
Profit Center No. 3 3515
Lab Contact 9 Carla Butler
Project Manager 4 JIM DAWSON
Project Contact/Phone 12 STEVE RAUGUST 505 262 8800
Report to: 10 STEVE RAUGUST IT - ALBUQUERQUE
Purchase Order No. 6 93-066
Carrier/Waybill No. 13 Fed Ex # 5066280695
Required Report Date 11 01 Dec 92

ONE CONTAINER PER LINE

Sample 14 Number	Sample 15 Description/Type	Date/Time 16 Collected	Container 17 Type	Sample 18 Volume	Pre- 19 servative	Requested Testing 20 Program	Condition on 21 Receipt	Disposal 22 Record No.
B-7-16	Soil	11-2-92 15:45	2½"x6" Brass sleeve	500 ml	NO	BTEX By 8020 TPH (High Boilers) By 8015		
B-7-41	↓	11-2-92 1630	↓	↓	↓	BTEX By 8020 TPH (High Boilers) By 8015		

FOR LAB USE ONLY

Special Instructions: 23 Petroleum Product

Possible Hazard Identification: 24
Non-hazard ☒ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: 25
Return to Client ☐ Disposal by Lab ☒ Archive ____ (mos.)

Turnaround Time Required: 26
Normal ☒ Rush ☐

QC Level: 27
I. ☒ II. ☐ III. ☐ Project Specific (specify): ____

1. Relinquished by 28 (Signature/Affiliation) SRaugust IT Corp Date: 11-4-92 Time: 1630
1. Received by 28 (Signature/Affiliation) Kevin Stewart IT Date: 11/5/92 Time: 0926
2. Relinquished by (Signature/Affiliation) Date: Time:
2. Received by (Signature/Affiliation) Date: Time:
3. Relinquished by (Signature/Affiliation) Date: Time:
3. Received by (Signature/Affiliation) Date: Time:

Comments: 29

MCA 3/15/91

B211010 Dr. Middlebrook

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 31881
Page 1 of 1

Project Name/No. 1 ENRON HOBBS PLANT
Sample Team Members 2 MIKE CYROCKI
Profit Center No. 3 3515
Project Manager 4 JIM DAWSON
Purchase Order No. 6 93-066
Required Report Date 11 21 NOV 92

Samples Shipment Date 7 28 OCT 92
Lab Destination 8 ITAS - AUSTIN
Lab Contact 9 KARMEN DEANE
Project Contact/Phone 12 STEVE RAUGUST 505 262 8800
Carrier/Waybill No. 13 5392413235

Bill to: 5 IT CORP
ALBUQUERQUE, NM

Report to: 10 STEVE RAUGUST
IT CORP
ALBUQUERQUE, NM

ONE CONTAINER PER LINE

Sample Number 14	Sample Description/Type 15	Date/Time Collected 16	Container Type 17	Sample Volume 18	Pre-servative 19	Requested Testing Program 20	Condition on Receipt 21	Disposal Record No. 22
MW-5-41	SOIL	10/27/92 1600	GLASS	125 ML	4°C	BTEX 8020 TPH (HIGH BOILERS) 8015	ETDC 3396 2°C	Good 3°C [illegible]

ETDC 3096

Special Instructions: 23 CONTACT STEVE RAUGUST 505 262 8800 FOR ADDITIONAL GUIDANCE

Possible Hazard Identification: 24
Non-hazard ☒ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: 25
Return to Client ☐ Disposal by Lab ☒ Archive ______ (mos.)

Turnaround Time Required: 26
Normal ☒ Rush ☐

QC Level: 27
I. ☐ II. ☐ III. ☐ Project Specific (specify):

1. Relinquished by 28 (Signature/Affiliation) Mike Cyrocki / IT	Date: 27 OCT 92 Time: 1730	1. Received by 28 (Signature/Affiliation)	Date: Time:
2. Relinquished by (Signature/Affiliation) Mike [illegible] / Enron	Date: 28 Oct 92 Time: 17:30	2. Received by (Signature/Affiliation) James [illegible] / IT ETDC	Date: 10/29/92 Time: 1015
3. Relinquished by (Signature/Affiliation) [illegible] IT	Date: 10/29/92 Time: 2130	3. Received by (Signature/Affiliation) [illegible] ITASK	Date: 10/30/92 Time: 0800

~~Comments:~~ 29 Relinquished: [illegible] ITASK 10/30/92 1830 Rec'd by [illegible] IT 10/31/92 1012

MCA 3/15/9

P2770

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 41896
Page 1 of 2

Project Name/No. 1 Enron Hobbs Plant
Sample Team Members 2 Boyd / Rauqust
Profit Center No. 3 3515
Project Manager 4 D. Dawson
Purchase Order No. 6 93-066
Required Report Date 11 26 Nov 92

Samples Shipment Date 7 11-3-92
Lab Destination 8 ITAS Austin
Lab Contact 9 Carla Butler
Project Contact/Phone 12 Steve Rauqust 505-262-8800
Carrier/Waybill No. 13 Fed Ex # 5065280695

Bill to: 5 IT Abq.
Report to: 10 Steve Rauqust IT - ABQ.

ONE CONTAINER PER LINE

Sample Number 14	Sample Description/Type 15	Date/Time Collected 16	Container Type 17	Sample Volume 18	Preservative 19	Requested Testing Program 20	Condition on Receipt 21	Disposal Record No. 22
mw-1	~~1l Amber~~ liquid	11-3-92/1021	glass	1 l	HCl 4°C	TPH (High Boilers) 8015	Good [illegible] 11/5/92	[illegible]
↓	↓	↓	↓	2x40ml.	↓ ↓	BTEX 8020	↓	Lot#2272013
↓		↓	plastic	500ml.	none ↓	TDS & PH.		
mw-6		1250	glass	1 l	HCl 4°C	TPH (High Boilers) 8015		
↓		↓	↓	2x40ml.	↓ ↓	BTEX 8020		Lot#82056010
mw-5		1350	glass	1 l	HCl 4°C	TPH (High Boilers) 8015		(Pam)
↓	↓	↓	↓	2x40ml.	↓ ↓	BTEX 8020	↓	↓
		↓						

Special Instructions: 23 Contact S. Rauqust for additional info

Possible Hazard Identification: 24
Non-hazard ☐ Flammable ☒ Skin Irritant ☒ Poison B ☐ Unknown ☒

Sample Disposal: 25
Return to Client ☐ Disposal by Lab ☒ Archive (mos.)

Turnaround Time Required: 26
Normal ☒ Rush ☐

QC Level: 27
I. ☐ II. ☐ III. ☐ Project Specific (specify):

1. Relinquished by 28 (Signature/Affiliation) John Boyd	Date: 11-3-92 Time: 1630	1. Received by 28 (Signature/Affiliation)	Date: 11/5/92 Time: 0926
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: 29

B2 11074

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)*

Reference Document No.30 418966

Page 2 of 2

Project Name Enron

Project No. 301573.001.03

Samples Shipment Date 11-3-92

ONE CONTAINER PER LINE

Sample 14 Number	Sample 15 Description/Type	Date/Time 16 Collected	Container 17 Type	Sample 18 Volume	Pre- 19 servative	Requested Testing 20 Program	Condition on 21 Receipt	Disposal 22 Record No.
mw-4	liquid	11-3-92 1450	glass	1 l	HCl 4°C	TPH (High Boilers) 8015	Good / 1°C	
↓	↓	↓ ↓	↓	2x40ml	↓ ↓	BTEX 8020	11/5/92 DS	Lot# B2056010A

See back of form for special instructions.

MCA 3/15/91

B212028

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 417772
Page 1 of 2

Project Name/No.[1] Enron Hubbs Plant
Sample Team Members[2] J. Boyd
Profit Center No.[3] 3515
Project Manager[4] S. Dawson
Purchase Order No.[6] 93-013
Required Report Date[11] Verbal By 12-10-92

Samples Shipment Date[7] 12-2-92
Lab Destination[8] ITAS Austin
Lab Contact[9] Carla Butler
Project Contact/Phone[12] Steve Rauquist 505-262-8800
Carrier/Waybill No.[13] Fed Ex # 6123513270

Bill to:[5] IT-ABQ
Report to:[10] Steve Rauquist · IT-ABQ

White: To accompany samples
Yellow: Field copy
*See back of form for special instructions.

ONE CONTAINER PER LINE

Sample Number[14]	Sample Description/Type[15]	Date/Time Collected[16]	Container Type[17]	Sample Volume[18]	Preservative[19]	Requested Testing Program[20]	Condition on Receipt[21]	Disposal Record No.[22]
MW-4	liquid	12-2-92 0810	glass	500 ml	HCl 4°C	TPH By 8015 Diesel standard	Good 1°C	
MW-4		↓		2x40ml.		BTEX By 8020	12/3/92	Lot # 2244013
MW-5		0935		500ml		TPH By 8015 Diesel standard		
MW-5		↓		2x40ml.		BTEX By 8020		↓
MW-6		1055		500 ml		TPH By 8015 Diesel standard		
MW-6		↓		2x40ml.		BTEX By 8020		↓
MW-1		1255		500 ml.		TPH By 8015 Diesel standard		
MW-1	↓	↓	↓		↓	BTEX By 8020	↓	↓

Special Instructions:[23]

Possible Hazard Identification:[24]
Non-hazard ☐ Flammable ☒ Skin Irritant ☒ Poison B ☐ Unknown ☐

Sample Disposal:[25]
Return to Client ☐ Disposal by Lab ☒ Archive (mos.)

Turnaround Time Required:[26]
Normal ☒ Rush ☐ Verbal By 12-10-92

QC Level:[27]
I. ☐ II. ☐ III. ☐ Project Specific (specify):

1. Relinquished by[28] (Signature/Affiliation) John Boyd	Date: 12-2-92 Time: 1630	1. Received by[28] (Signature/Affiliation) IT	Date: 12/3/92 Time: 0938
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments:[29]

MCA 3/15/91

B212028

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)*

Reference Document No.30 417772
Page 2 of 2

Project Name Enron Hobbs Plant

Project No. 301573 .001 .03

Samples Shipment Date 12-2-92

ONE CONTAINER PER LINE

Sample 14 Number	Sample 15 Description/Type	Date/Time 16 Collected	Container 17 Type	Sample 18 Volume	Pre-19 servative	Requested Testing 20 Program	Condition on 21 Receipt	Disposal 22 Record No.
MW 4-A	liquid	12-2-92/1355	glass	500 ml.	HCl 4°C	TPH By 8015 Diesel Standard	Good 1°C	
MW4-A	↓	↓ ↓	↓	2x40 ml	↓	BTEX By 8020	12/3/92 (purged 11/29/92)	↓
TB-1	↓	↓ 1430	↓	1x40 ml	↓	BTEX By 8020	↓	↓
FB-1	↓	↓ ↓	↓	1x40 ml	4°C	BTEX By 8020	↓	↓

White: To accompany samples Yellow: Field copy *See back of form for special instructions.

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 318822
Page 1 of 1

Project Name/No. 1 ENRON 301573.002.03
Sample Team Members 2 RAWKVIST/BOYD
Profit Center No. 3 3575
Project Manager 4 J.W. DAWSON
Purchase Order No. 6 93-068
Required Report Date 11 11-20-92

Samples Shipment Date 7 11-5-92
Lab Destination 8 ITAS CINCINATTI
Lab Contact 9 TIM SONARO
Project Contact/Phone 12 STEVE RAWKVIST (505) 262-8800
Carrier/Waybill No. 13 Fed Ex# 5065280732

Bill to: 5 IT ALBUQUERQUE
Report to: 10 IT ALBUQUERQUE ATTN: STEVE RAWKVIST

White: To accompany samples
Yellow: Field copy
*See back of form for special instructions.

ONE CONTAINER PER LINE

Sample Number 14	Sample Description/Type 15	Date/Time Collected 16	Container Type 17	Sample Volume 18	Pre-servative 19	Requested Testing Program 20	Condition on Receipt 21	Disposal Record No. 22
VEW-2-1	AIR	11-4-92 13:45	GAS CANNISTER	6.6L	NO	ASTM D8416 BTEX AND TPH BY TO14 GC-FID/PID		
B-9-16	AIR	11-4-92 11:05				ASTM D3416	Samples FOR LAB USE ONLY	
B-9-27	AIR	11-4-92 11:10				ASTM D3416	received in	
B-7-32	AIR	11-4-92 11:15				ASTM D3416	good condition	
B-8-15	AIR	11-4-92 11:25				ASTM D3416	J Moore FOR LAB	
B-9-10	AIR	11-4-92 11:00				ASTM D3416	11/6 USE ONLY	

Special Instructions: 23 NATURAL GAS CONDENSATE, UNKNOWN COMPOSITION HIGH CONCENTRATIONS

Possible Hazard Identification: 24 ~~[illegible]~~
Non-hazard ☒ Flammable ☒ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: 25
Return to Client ☐ Disposal by Lab ☒ Archive ______ (mos.)

Turnaround Time Required: 26
Normal ☒ Rush ☐

QC Level: 27
I. ☒ II. ☐ III. ☐ Project Specific (specify): ______

1. Relinquished by 28 (Signature/Affiliation)	Date: 11-5-92 Time: 13:45	1. Received by 28 (Signature/Affiliation) Julie Moore ITAS-Cin	Date: 11/6/92 Time: 0835
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: 29

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 318823
Page 1 of 1

White: To accompany samples
Yellow: Field copy
*See back of form for special instructions.

Project Name/No. 1 ENRON 301573.002.03
Sample Team Members 2 RAWLWST / BOYD
Profit Center No. 3 3515
Project Manager 4 J. W. Dawson
Purchase Order No. 6 93-068
Required Report Date 11 11-20-92

Samples Shipment Date 7 11-~~4~~ 5-92
Lab Destination 8 ITAS CINCINATTI
Lab Contact 9 TIM SOWARD
Project Contact/Phone 12 STEVE RAWLWST
Carrier/Waybill No. 13 5065260743

Bill to: 5 IT ALBUQUERQUE
Report to: 10 STEVE RAWLWST
IT ALBUQUERQUE

ONE CONTAINER PER LINE

Sample Number 14	Sample Description/Type 15	Date/Time Collected 16	Container Type 17	Sample Volume 18	Pre-servative 19	Requested Testing Program 20	Condition on Receipt 21	Disposal Record No. 22
VEW-1-1	AIR	11-5-92 10:30	GAS CANNISTER	6.6L	NO	TPH, BTEX BY TO14 GC-FID/PID, ASTM D3416	Samples	
VEW-1-2	AIR	11-5-92 11:30	"	"	"	" "	recd in	
							good condition	
							J Moore	
							11/6/92	

FOR LAB USE ONLY

FOR LAB USE ONLY

Special Instructions: 23 NATURAL GAS CONDENSATE, UNKNOWN COMPOSITION, HIGH CONCENTRATIONS

Possible Hazard Identification: 24 ~~[illegible]~~
Non-hazard ☐ Flammable ☒ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: 25
Return to Client ☐ Disposal by Lab ☒ Archive ______ (mos.)

Turnaround Time Required: 26
Normal ☒ Rush ☐

QC Level: 27
I. ☒ II. ☐ III. ☐ Project Specific (specify): ______

1. Relinquished by 28 (Signature/Affiliation) Date: 11-5-92 Time: 14:30
1. Received by 28 (Signature/Affiliation) Julie Moore ITAS Cin Date: 11/6/92 Time: 0835
2. Relinquished by (Signature/Affiliation) Date: Time:
2. Received by (Signature/Affiliation) Date: Time:
3. Relinquished by (Signature/Affiliation) Date: Time:
3. Received by (Signature/Affiliation) Date: Time:

Comments: 29

MCA 3/15/91

White: To accompany samples Yellow: Field copy *See back of form for special instructions.

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 318815
Page 1 of 1

Project Name/No. 1 ENRON - HOBBS PLANT 301573.002.06
Sample Team Members 2 MIKE CYROCKI
Profit Center No. 3 3515
Project Manager 4 JIM DAWSON
Purchase Order No. 6 93-069
Required Report Date 11 23 NOV 92

Samples Shipment Date 7 02 NOV 92
Lab Destination 8 ITAS / OAK RIDGE
Lab Contact 9 BEVERLY LEHMAN
Project Contact/Phone 12 STEVE RAUGUST 505 262 8800
Carrier/Waybill No. 13 FED EX 5065280625

Bill to: 5 IT CORP
ALBUQUERQUE, NM

Report to: 10 STEVE RAUGUST
IT - ALBUQUERQUE

ONE CONTAINER PER LINE

Sample Number 14	Sample Description/Type 15	Date/Time Collected 16	Container Type 17	Sample Volume 18	Pre-servative 19	Requested Testing Program 20	Condition on Receipt 21	Disposal Record No. 22
B-8-10.5	SOIL	10/31/92 7:45	BRASS TUBE		4°C	POROSITY	ETDC 3113	
B-8-11	SOIL	10/31/92 7:50	BRASS TUBE		4°C	AIR PERM	ETDC 3114	AB
B-8-12	SOIL	10/31/92 7:55	BRASS TUBE		4°C	SIEVE ANALYSIS & % MOISTURE	ETDC 3115	NLY
MW-4-45	SOIL	11/01/92 8:20	BRASS TUBE		4°C	SIEVE ANALYSIS ~~& % MOISTURE~~	ETDC 3116	
MW-4-45.5	SOIL	11/01/92 8:21	BRASS TUBE		4°C	SATURATED HYDRAULIC CONDUCTIVITY	ETDC 3117	
MW-4-46	SOIL	11/01/92 8:22	BRASS TUBE		4°C	POROSITY	ETDC 3118	B LY
MW-4-46.5	SOIL	11/01/92 8:23	BRASS TUBE		4°C	EXTRA SAMPLE	ETDC 3119	

Special Instructions: 23 CONTACT STEVE RAUGUST FOR ADDITIONAL GUIDANCE 505 262 8800

Possible Hazard Identification: 24
Non-hazard ☐ Flammable ☑ Skin Irritant ☑ Poison B ☐ Unknown ☑

Sample Disposal: 25
Return to Client ☐ Disposal by Lab ☑ Archive ______ (mos.)

Turnaround Time Required: 26
Normal ☑ Rush ☐

QC Level: 27
I. ☐ II. ☐ III. ☐ Project Specific (specify): ______

1. Relinquished by 28 (Signature/Affiliation) Mike Cyrocki Date: 01 NOV 92 Time: 17:30
1. Received by 28 (Signature/Affiliation) James Bola / ETDC Date: 11/03/92 Time: 1330
2. Relinquished by (Signature/Affiliation) Date: Time:
2. Received by (Signature/Affiliation) Date: Time:
3. Relinquished by (Signature/Affiliation) Date: Time:
3. Received by (Signature/Affiliation) Date: Time:

Comments: 29

MCA 3/15/91

[redacted] INTE[redacted]TION[redacted] TECHNOLOGY CORPORATION [redacted] 4 835[redacted]0.05[redacted] AN[redacted]LYS[redacted]RE[redacted]EST[redacted]ND [redacted] [redacted] H[redacted]ren[redacted]Do[redacted]hen[redacted]o. [redacted]8[redacted]

CHAIN OF CUSTODY RECORD*

Page 1 of 1

Project Name/No. 1 ENRON HOBBS PLANT

Sample Team Members 2 MIKE CYROCKI

Profit Center No. 3 3515

Project Manager 4 JIM DAWSON

Purchase Order No. 6 93-069

Required Report Date 11 21 NOV 92

Samples Shipment Date 7 28 OCT 92

Lab Destination 8 ITAS OAK RIDGE

Lab Contact 9 BEVERLY LEHMAN

Project Contact/Phone 12 STEVE RAUGUST 505 262 8800

Carrier/Waybill No. 13

Bill to: 5 IT CORP
ALBUQUERQUE

Report to: 10 STEVE RAUGUST
IT CORP
ALBUQUERQUE, NM

White: To accompany samples Yellow: Fiel

ONE CONTAINER PER LINE

Sample Number 14	Sample Description/Type 15	Date/Time Collected 16	Container Type 17	Sample Volume 18	Preservative 19	Requested Testing Program 20	Condition on Receipt 21	Disposal 22
MW-5-11.5	SOIL	10/27/92 1430	BRASS TUBE	500 ML	~~4°C~~ mc	SIEVE ANALYSIS / PARTICAL SIZE / % MOISTURE		ETDC 3097
MW-5-16.5	SOIL	10/27/92 1500	BRASS TUBE	500 ML		~~SATURATED~~ ~~HYDRAULIC CONDUCTIVITY~~ ~~SIEVE A~~ mc	cmB air [illegible] 10-29-92 as per phone conversation with Steve RAugust	ETDC 3098

FOR LAB USE ONLY

FOR LAB USE ONLY

Special Instructions: 23 CONTACT STEVE RAUGUST 505 262 8800 FOR ADDITIONAL GUIDANCE

Possible Hazard Identification: 24
Non-hazard ☒ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: 25
Return to Client ☐ Disposal by Lab ☒ Archive ______ (mos.)

Turnaround Time Required: 26
Normal ☐ Rush ☐

QC Level: 27
I. ☐ II. ☐ III. ☐ Project Specific (specify):

1. Relinquished by 28 (Signature/Affiliation) Mike Cyrocki / IT	Date: 27 OCT 92 Time: 1731	1. Received by 28 (Signature/Affiliation)	Date: Time:
2. Relinquished by (Signature/Affiliation)	Date: 28 oct 92 Time: 17.30	2. Received by (Signature/Affiliation) Devin Stewart IT	Date: 10/29/92 Time: 0927
3. Relinquished by (Signature/Affiliation) Devin Stewart	Date: 10/29/92 Time: 1800	3. Received by (Signature/Affiliation) IT/ETDC	Date: 11/2/92 Time: 1554

Comments: 29

*See back of form for special instructions.

MCA 3/15/91

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TRACKING NUMBER

2213M **5065280614**

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Date 10/30/92

From (Your Name) Please Print MIKE KNEESE
Your Phone Number (Very Important) 505-393-5109
Company ENRON GAS PROCESSING
Department/Floor No.
Street Address 11525 W CARLSBAD HWY
City HOBBS
State NM
ZIP Required 88240

2 To (Recipient's Name) Please Print CARLA BUTLER
Recipient's Phone Number (Very Important) (512) 892 666
Company ITAS / AUSTIN
Department/Floor No.
Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.) 5307 INDUSTRIAL OAKS BLVD SUITE 160
City AUSTIN
State TX
ZIP Required 78735

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.) 301573.002.06

H IF HOLD FOR PICK-UP, Print FEDEX Address Here
Street Address
City
State
ZIP Required

3 PAYMENT 1 ☒ Bill Sender 2 ☐ Bill Recipient's FedEx Acct. No. 3 ☐ Bill 3rd Party FedEx Acct. No. 4 ☐ Bill Credit Card
5 ☐ Cash/Check
Acct./Credit Card No.
Exp. Date /

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning†)
- 11 ☒ YOUR PACKAGING
- 16 ☐ FEDEX LETTER*
- 12 ☐ FEDEX PAK*
- 13 ☐ FEDEX BOX
- 14 ☐ FEDEX TUBE

Standard Overnight (Delivery by next business afternoon. No Saturday delivery†)
- 51 ☐ YOUR PACKAGING
- 56 ☐ FEDEX LETTER*
- 52 ☐ FEDEX PAK*
- 53 ☐ FEDEX BOX
- 54 ☐ FEDEX TUBE

Economy Two-Day (Delivery by second business day †)
- 30 ☐ ECONOMY

Government Overnight (Restricted for authorized users only)
- 46 ☐ GOV'T LETTER
- 41 ☐ GOV'T PACKAGE

Freight Service (for packages over 150 lbs.)
- 70 ☐ OVERNIGHT FREIGHT** (Confirmed reservation required)
- 80 ☐ TWO-DAY FREIGHT**

†Delivery commitment may be later in some areas.
*Declared Value Limit $500.
**Call for delivery schedule.

5 DELIVERY AND SPECIAL HANDLING (Check services required)
- 1 ☐ HOLD FOR PICK-UP (Fill in Box H)
- 2 ☐ DELIVER WEEKDAY
- 3 DELIVER SATURDAY (Extra charge) (Not available to all locations) ☒
- 4 ☐ DANGEROUS GOODS (Extra charge)
- 5 ☐
- 6 ☐ DRY ICE ______ Lbs.
- 7 ☐ OTHER SPECIAL SERVICE
- 8 ☐
- 9 ☐ SATURDAY PICK-UP (Extra charge)
- 10 ☐
- ☐
- 12 ☐ HOLIDAY DELIVERY (If offered) (Extra charge)

6
PACKAGES	WEIGHT In Pounds Only	YOUR DECLARED VALUE (See right)
Total	Total	Total

DIM SHIPMENT (Chargeable Weight)
☐ lbs.
L x W x H

Received At
1 ☐ Regular Stop 3 ☐ Drop Box
2 ☐ On-Call Stop 4 ☐ B.S.C. 5 ☐ Station

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7 Release Signature: Mike

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Declared Value Charge
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Other 2
Total Charges

REVISION DATE 2/92
PART #137204 FXEM 7/92
FORMAT #126
126

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PACKAGE
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5065280603

2213M **5065280603**

SENDER'S COPY

1 SENDER'S FEDERAL EXPRESS ACCOUNT NUMBER 1595-5315-9
Date 10/30/92

From (Your Name) Please Print MIKE KNEESE
Your Phone Number (Very Important) 505-393-5109
Company ENRON GAS PROCESSING
Department/Floor No.
Street Address 11525 W CARLSBAD HWY
City HOBBS
State NM
ZIP Required 88240

2 To (Recipient's Name) Please Print ~~BIO ASSESSMENT~~ DR. DUANE GRAVES
Recipient's Phone Number (Very Imp (615) 588-6
Company ITAS / KNOXVILLE
Department/Flo
Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.) 5815 MIDDLEBROOK PIKE
City KNOXVILLE
State TN
ZIP Required 37921

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.) 301573.002.06

H IF HOLD FOR PICK-UP, Print FEDEX Address Here
Street Address
City
State
ZIP Required

3 PAYMENT 1 ☒ Bill Sender 2 ☐ Bill Recipient's FedEx Acct. No. 3 ☐ Bill 3rd Party FedEx Acct. No. 4 ☐ Bill Credit Card
5 ☐ Cash/Check
Acct./Credit Card No.
Exp. Date /

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning†)
- 11 ☒ YOUR PACKAGING
- 16 ☐ FEDEX LETTER*
- 12 ☐ FEDEX PAK*
- 13 ☐ FEDEX BOX
- 14 ☐ FEDEX TUBE

Standard Overnight (Delivery by next business afternoon. No Saturday delivery†)
- 51 ☐ YOUR PACKAGING
- 56 ☐ FEDEX LETTER*
- 52 ☐ FEDEX PAK*
- 53 ☐ FEDEX BOX
- 54 ☐ FEDEX TUBE

Economy Two-Day (Delivery by second business day †)
- 30 ☐ ECONOMY

Government Overnight (Restricted for authorized users only)
- 46 ☐ GOV'T LETTER
- 41 ☐ GOV'T PACKAGE

Freight Service (for packages over 150 lbs.)
- 70 ☐ OVERNIGHT FREIGHT
- 80 ☐ TWO-DAY

5 DELIVERY AND SPECIAL HANDLING (Check services required)
- 1 ☐ HOLD FOR PICK-UP (Fill in Box H)
- 2 ☐ DELIVER WEEKDAY
- 3 DELIVER SATURDAY (Extra charge) (Not available to all locations) ☒
- 4 ☐ DANGEROUS GOODS (Extra charge)
- 5 ☐
- 6 ☐ DRY ICE ______ Lbs.
- 7 ☐ OTHER SPECIAL SERVICE
- 8 ☐
- 9 ☐ SATURDAY PICK-UP (Extra charge)
- 10 ☐
- ☐

6
PACKAGES	WEIGHT In Pounds Only	YOUR DECLARED VALUE (See right)
Total	Total	Total

DIM SHIPMENT (Chargeable Weight)
☐ lbs.
L x W x H

Received At
1 ☐ Regular Stop 3 ☐ Drop Box

SERVICE CONDITIONS, DECLARED VALUE AND LIMIT OF LIABILITY

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In the event of untimely delivery, Federal Express will at your request and with some limitations refund all transportation charges paid. See Service Guide for further information.

Sender authorizes Federal Express to deliver this shipment without obtaining a delivery signature and shall indemnify and hold harmless Federal Express from any claims resulting therefrom.

Federal Express
Base Charges
Declared Value Ch
Other 1
Other 2
Total Charges

REVISION DATE 2/92
PART #137204 FXEN
FORMAT #126
126

SENDER'S COPY
DROP OFF YOUR PACKAGE AND SAVE

QUESTIONS? CALL 800-238-5355 TOLL FREE.

2213M 5065280625

SENDER'S COPY / DROP OFF YOUR PACKAGE AND SAVE

SENDER'S COPY

1 SENDER'S FEDERAL EXPRESS ACCOUNT NUMBER 1595-5315-9
Date 11/2/92

From (Your Name) Please Print MIKE KNEESE
Your Phone Number (Very Important) (505-393-5109
Company ENRON GAS PROCESSING
Department/Floor No.
Street Address 11525 W CARLSBAD HWY
City HOBBS
State NM
ZIP Required 8 5 2 4 0

2 To (Recipient's Name) Please Print BEVERLY LEHMAN (615) 482-
Recipient's Phone Number (Very I
Company IT CORP
Department/Fl
Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.) 1570 BEAR CREEK ROAD
City OAK RIDGE
State TN
ZIP Required 37830

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.)
301573.002.06

H IF HOLD FOR PICK-UP, Print FEDEX Address Here
Street Address
City
State
ZIP Required

3 PAYMENT 1 ☒ Bill Sender 2 ☐ Bill Recipient's FedEx Acct. No. 3 ☐ Bill 3rd Party FedEx Acct. No. 4 ☐ Bill Credit Card
5 ☐ Cash/Check
Acct./Credit Card No.
Exp. Date /

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning†)
11 ☒ YOUR PACKAGING
16 ☐ FEDEX LETTER*
12 ☐ FEDEX PAK*
13 ☐ FEDEX BOX
14 ☐ FEDEX TUBE

Standard Overnight (Delivery by next business afternoon. No Saturday delivery†)
51 ☐ YOUR PACKAGING
56 ☐ FEDEX LETTER*
52 ☐ FEDEX PAK*
53 ☐ FEDEX BOX
54 ☐ FEDEX TUBE

Economy Two-Day (Delivery by second business day †)
30 ☐ ECONOMY

Government Overnight (Restricted for authorized users only)
46 ☐ GOVT LETTER
41 ☐ GOVT PACKAGE

Freight Service (for packages over 150 lbs.)
70 ☐ OVERNIGHT FREIGHT** (Confirmed reservation required)
80 ☐ TWO-DAY FREIGHT**
†Delivery commitment may be later in some areas.
*Declared Value Limit $500.
**Call for delivery schedule.

5 DELIVERY AND SPECIAL HANDLING (Check services required)
1 ☐ HOLD FOR PICK-UP (Fill in Box H)
2 ☐ DELIVER WEEKDAY
3 DELIVER SATURDAY (Extra charge) (Not available to all locations) ☐
4 ☐ DANGEROUS GOODS (Extra charge)
5 ☐
6 ☐ DRY ICE ______ Lbs.
7 ☐ OTHER SPECIAL SERVICE ______
8 ☐
9 ☐ SATURDAY PICK-UP (Extra charge)
10 ☐
☐
12 ☐ HOLIDAY DELIVERY (If offered) (Extra charge)

6
PACKAGES	WEIGHT In Pounds Only	YOUR DECLARED VALUE (See right)
Total	Total	Total

DIM SHIPMENT (Chargeable Weight)
☐ ______ lbs.
L x W x H

Received At
1 ☐ Regular Stop
2 ☐ On-Call Stop
3 ☐ Drop Box
4 ☐ B.S.C.
5 ☐ Station

SERVICE CONDITIONS, DECLARED VALUE AND LIMIT OF LIABILITY

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Sender authorizes Federal Express to deliver this shipment without obtaining a delivery signature and shall indemnify and hold harmless Federal Express from any claims resulting therefrom.

7 Release Signature: ______

Federal Expres
Base Charges
Declared Value C
Other 1
Other 2
Total Charges

REVISION DATE 2/92
PART #137204 FX
FORMAT #126
126

PRINTED IN U.S.A.

FEDERAL EXPRESS

USE THIS AIRBILL FOR SHIPMENTS WITHIN THE CONTINENTAL U.S.A., ALASKA AND HAWAII.
USE THE INTERNATIONAL AIR WAYBILL FOR SHIPMENTS TO PUERTO RICO AND ALL NON U.S. LOCATIONS.
QUESTIONS? CALL 800-238-5355 TOLL FREE.

AIRBILL PACKAGE TRACKING NUMBER 5065280636

2213M 5065280636

SENDER'S COPY / DROP OFF YOUR PACKAGE AND SAVE

SENDER'S COPY

1 SENDER'S FEDERAL EXPRESS ACCOUNT NUMBER 1595-5315-9
Date 11/2/92

From (Your Name) Please Print MIKE KNEESE
Your Phone Number (Very Important) (505-393-5109
Company ENRON GAS PROCESSING
Department/Floor No.
Street Address 11525 W CARLSBAD HWY
City HOBBS
State NM
ZIP Required 8 8 2 4 0

2 To (Recipient's Name) Please Print CARLA BUTLER (512) 892
Recipient's Phone Number (Very
Company ITAS SUITE 160
Department/F
Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.) 5307 INDUSTRIAL OAKS BLV
City AUSTIN
State TX
ZIP Required 78735

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.)
301573.002.06

H IF HOLD FOR PICK-UP, Print FEDEX Address Here
Street Address
City
State
ZIP Required

3 PAYMENT 1 ☒ Bill Sender 2 ☐ Bill Recipient's FedEx Acct. No. 3 ☐ Bill 3rd Party FedEx Acct. No. 4 ☐ Bill Credit Card
5 ☐ Cash/Check
Acct./Credit Card No.
Exp. Date /

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning†)
11 ☒ YOUR PACKAGING
16 ☐ FEDEX LETTER*
12 ☐ FEDEX PAK*
13 ☐ FEDEX BOX
14 ☐ FEDEX TUBE

Standard Overnight (Delivery by next business afternoon. No Saturday delivery†)
51 ☐ YOUR PACKAGING
56 ☐ FEDEX LETTER*
52 ☐ FEDEX PAK*
53 ☐ FEDEX BOX
54 ☐ FEDEX TUBE

Economy Two-Day (Delivery by second business day †)
30 ☐ ECONOMY

Government Overnight (Restricted for authorized users only)
46 ☐ GOVT LETTER
41 ☐ GOVT PACKAGE

Freight Service (for packages over 150 lbs.)
70 ☐ OVERNIGHT FREIGHT** (Confirmed reservation required)
80 ☐ TWO-DAY FREIGHT**
†Delivery commitment may be later in some areas.
*Declared Value Limit $500.
**Call for delivery schedule.

5 DELIVERY AND SPECIAL HANDLING (Check services required)
1 ☐ HOLD FOR PICK-UP (Fill in Box H)
2 ☐ DELIVER WEEKDAY
3 DELIVER SATURDAY (Extra charge) (Not available to all locations) ☐
4 ☐ DANGEROUS GOODS (Extra charge)
5 ☐
6 ☐ DRY ICE ______ Lbs.
7 ☐ OTHER SPECIAL SERVICE ______
8 ☐
9 ☐ SATURDAY PICK-UP (Extra charge)
10 ☐
☐
12 ☐ HOLIDAY DELIVERY (If offered) (Extra charge)

6
PACKAGES	WEIGHT In Pounds Only	YOUR DECLARED VALUE (See right)
Total	Total	Total

DIM SHIPMENT (Chargeable Weight)
☐ ______ lbs.
L x W x H

Received At
1 ☐ Regular Stop
2 ☐ On-Call Stop
3 ☐ Drop Box
4 ☐ B.S.C.
5 ☐ Station

SERVICE CONDITIONS, DECLARED VALUE AND LIMIT OF LIABILITY

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In the event of untimely delivery, Federal Express will at your request and with some limitations refund all transportation charges paid. See Service Guide for further information.

Sender authorizes Federal Express to deliver this shipment without obtaining a delivery signature and shall indemnify and hold harmless Federal Express from any claims resulting therefrom.

7 Release Signature:

Federal Expres
Base Charges
Declared Value C
Other 1
Other 2
Total Charges

REVISION DATE 2/92
PART #137204 FX
FORMAT #126
126

PRINTED IN U.S.A.

FEDERAL EXPRESS

USE THIS AIRBILL FOR SHIPMENTS WITHIN THE CONTINENTAL U.S.A., ALASKA AND HAWAII.
USE THE INTERNATIONAL AIR WAYBILL FOR SHIPMENTS TO PUERTO RICO AND ALL NON U.S. LOCATIONS.
QUESTIONS? CALL 800-238-5355 TOLL FREE.

PACKAGE
TRACKING NUMBER

2213M 5065280566

SENDER'S COPY

SENDER'S COPY
DROP OFF YOUR PACKAGE AND SAVE

1 SENDER'S FEDERAL EXPRESS ACCOUNT NUMBER: 1595-5315-9
Date: 10-28-92

From (Your Name) Please Print: Michael Kneese
Your Phone Number (Very Important): (505)393-5109
Company: ENRON GAS PROCESSING
Department/Floor No.:
Street Address: 11525 W CARLSBAD HWY
City: HOBBS
State: NM
ZIP Required: 8 8 2 4 0

2 To (Recipient's Name) Please Print: Beverly Lehman
Recipient's Phone Number (Very Impo: (615 482-6497
Company: IT Corp./Labor
Department/Floo
Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.): 1570 Bear Creek Road
City: Oak Ridge,
State: TN
ZIP Required: 37830

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.)

H IF HOLD FOR PICK-UP, Print FEDEX Address Here
Street Address
City
State
ZIP Required

3 PAYMENT 1 ☒ Bill Sender 2 ☐ Bill Recipient's FedEx Acct. No. 3 ☐ Bill 3rd Party FedEx Acct. No. 4 ☐ Bill Credit Card 5 ☐ Cash/Check
Acct./Credit Card No.
Exp. Date /

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning†)
- 11 ☐ YOUR PACKAGING
- 16 ☐ FEDEX LETTER*
- 12 ☐ FEDEX PAK*
- 13 ☐ FEDEX BOX
- 14 ☐ FEDEX TUBE

Standard Overnight (Delivery by next business afternoon. No Saturday delivery†)
- 51 ☒ YOUR PACKAGING
- 56 ☐ FEDEX LETTER*
- 52 ☐ FEDEX PAK*
- 53 ☐ FEDEX BOX
- 54 ☐ FEDEX TUBE

Economy Two-Day (Delivery by second business day †)
- 30 ☐ ECONOMY

Government Overnight (Restricted for authorized users only)
- 46 ☐ GOV'T LETTER
- 41 ☐ GOV'T PACKAGE

Freight Service (for packages over 150 lbs.)
- 70 ☐ OVERNIGHT FREIGHT** (Confirmed reservation required)
- 80 ☐ TWO-DAY FREIGHT**

† Delivery commitment may be later in some areas.
*Declared Value Limit $500.
**Call for delivery schedule.

5 DELIVERY AND SPECIAL HANDLING (Check services required)
- 1 ☐ HOLD FOR PICK-UP (Fill in Box H)
- 2 ☐ DELIVER WEEKDAY
- 3 DELIVER SATURDAY (Extra charge) ☐ (Not available to all locations)
- 4 ☐ DANGEROUS GOODS (Extra charge)
- 5 ☐
- 6 ☐ DRY ICE ______ Lbs.
- 7 ☐ OTHER SPECIAL SERVICE ______
- 8 ☐
- 9 ☐ SATURDAY PICK-UP (Extra charge)
- 10 ☐
- ☐
- 12 ☐ HOLIDAY DELIVERY (If offered) (Extra charge)

6
PACKAGES	WEIGHT In Pounds Only	YOUR DECLARED VALUE (See right)
1		
Total 1	Total	Total

DIM SHIPMENT (Chargeable Weight)
☐ ______ lbs.
L x W x H

Received At
1 ☐ Regular Stop 2 ☐ On-Call Stop 3 ☐ Drop Box 4 ☐ B.S.C. 5 ☐ Station

SERVICE CONDITIONS, DECLARED VALUE AND LIMIT OF LIABILITY

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In the event of untimely delivery, Federal Express will at your request and with some limitations refund all transportation charges paid. See Service Guide for further information.

Sender authorizes Federal Express to deliver this shipment without obtaining a delivery signature and shall indemnify and hold harmless Federal Express from any claims resulting therefrom.

7 Release Signature:

Federal Express
Base Charges
Declared Value Cha
Other 1
Other 2
Total Charges

REVISION DATE 2/92
PART #137204 FXEM
FORMAT #126
126

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FEDERAL EXPRESS

USE THIS AIRBILL FOR SHIPMENTS WITHIN THE CONTINENTAL U.S.A., ALASKA AND HAWAII.
USE THE INTERNATIONAL AIR WAYBILL FOR SHIPMENTS TO PUERTO RICO AND ALL NON U.S. LOCATIONS.
QUESTIONS? CALL 800-238-5355 TOLL FREE.

AIRBILL
PACKAGE
TRACKING NUMBER
5065280555

2213M 5065280555

SENDER'S COPY

SENDER'S COPY
DROP OFF YOUR PACKAGE AND SAVE

1 SENDER'S FEDERAL EXPRESS ACCOUNT NUMBER: 1595-5315-9
Date: 10-28-92

From (Your Name) Please Print: Michael Kneese
Your Phone Number (Very Important): (505)393-5109
Company: ENRON GAS PROCESSING
Department/Floor No.:
Street Address: 11525 W CARLSBAD HWY
City: HOBBS
State: NM
ZIP Required: 8 8 2 4 0

2 To (Recipient's Name) Please Print: Carla Butler
Recipient's Phone Number (Very I: (512)892-66
Company: IT Corp./Laboratory
Department/Fl
Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.): 5307 Industrial Oaks Blvd #160
City: Austin,
State: TX.
ZIP Required: 78735

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.)

H IF HOLD FOR PICK-UP, Print FEDEX Address Here
Street Address
City
State
ZIP Required

3 PAYMENT 1 ☒ Bill Sender 2 ☐ Bill Recipient's FedEx Acct. No. 3 ☐ Bill 3rd Party FedEx Acct. No. 4 ☐ Bill Credit Card 5 ☐ Cash/Check
Acct./Credit Card No.
Exp. Date /

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning†)
- 11 ☐ YOUR PACKAGING
- 16 ☐ FEDEX LETTER*
- 12 ☐ FEDEX PAK*
- 13 ☐ FEDEX BOX
- 14 ☐ FEDEX TUBE

Standard Overnight (Delivery by next business afternoon. No Saturday delivery†)
- 51 ☒ YOUR PACKAGING
- 56 ☐ FEDEX LETTER*
- 52 ☐ FEDEX PAK*
- 53 ☐ FEDEX BOX
- 54 ☐ FEDEX TUBE

Economy Two-Day (Delivery by second business day †)
- 30 ☐ ECONOMY

Government Overnight (Restricted for authorized users only)
- 46 ☐ GOV'T LETTER
- 41 ☐ GOV'T PACKAGE

Freight Service (for packages over 150 lbs.)
- 70 ☐ OVERNIGHT FREIGHT** (Confirmed reservation required)
- 80 ☐ TWO-DAY FREIGHT**

5 DELIVERY AND SPECIAL HANDLING (Check services required)
- 1 ☐ HOLD FOR PICK-UP (Fill in Box H)
- 2 ☐ DELIVER WEEKDAY
- 3 DELIVER SATURDAY (Extra charge) ☐ (Not available to all locations)
- 4 ☐ DANGEROUS GOODS (Extra charge)
- 5 ☐
- 6 ☐ DRY ICE ______ Lbs.
- 7 ☐ OTHER SPECIAL SERVICE ______
- 8 ☐
- 9 ☐ SATURDAY PICK-UP (Extra charge)
- 10 ☐
- ☐

6
PACKAGES	WEIGHT In Pounds Only	YOUR DECLARED VALUE (See right)
1		
Total 1	Total	Total

DIM SHIPMENT (Chargeable Weight)
☐ ______ lbs.
L x W x H

Received At
1 ☐ Regular Stop 3 ☐ Drop Box 4 ☐ B.S.C.

SERVICE CONDITIONS, DECLARED VALUE AND LIMIT OF LIABILITY

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7 Release

Federal Expres
Base Charges
Declared Value C
Other 1
Other 2
Total Charges

REVISION DATE 2/92
PART #137204 FX
FORMAT #126
126

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SENDER'S COPY
DROP OFF YOUR PACKAGE AND SAVE

FEDERAL EXPRESS

USE THIS AIRBILL FOR SHIPMENTS WITHIN THE CONTINENTAL U.S.A., ALASKA AND HAWAII.
USE THE INTERNATIONAL AIR WAYBILL FOR SHIPMENTS TO PUERTO RICO AND ALL NON U.S. LOCATIONS.
QUESTIONS? CALL 800-238-5355 TOLL FREE.

AIRBILL
PACKAGE
TRACKING NUMBER 506528054i

2213M 5065280544

SENDER'S COPY

1 SENDER'S FEDERAL EXPRESS ACCOUNT NUMBER: 1595-5315-9
Date: 10-28-92

From (Your Name) Please Print: Michael Kneese
Your Phone Number (Very Important): (505)-393-5109
Company: ENRON GAS PROCESSING
Department/Floor No.:
Street Address: 11525 W CARLSBAD HWY
City: HOBBS
State: NM
ZIP Required: 8 8 2 4 0

2 To (Recipient's Name) Please Print: Duane Graves
Recipient's Phone Number (Ver: (615)690-32
Company: IT Copr/Biotechnologies
Department/
Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.): 9041 Executive Pk. Dr. Ste 309
City: Knoxville.
State: TN.
ZIP Required: 37923

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.)

H IF HOLD FOR PICK-UP, Print FEDEX Address Here
Street Address
City
State
ZIP Required

3 PAYMENT
1 ☒ Bill Sender
2 ☐ Bill Recipient's FedEx Acct. No.
3 ☐ Bill 3rd Party FedEx Acct. No.
4 ☐ Bill Credit Card
5 ☐ Cash/Check
Acct./Credit Card No.
Exp. Date /

4 SERVICES
(Check only one box)

Priority Overnight
(Delivery by next business morning†)
11 ☐ YOUR PACKAGING
16 ☐ FEDEX LETTER*
12 ☐ FEDEX PAK*
13 ☐ FEDEX BOX
14 ☐ FEDEX TUBE

Standard Overnight
(Delivery by next business afternoon. No Saturday delivery†)
51 ☒ YOUR PACKAGING
56 ☐ FEDEX LETTER*
52 ☐ FEDEX PAK*
53 ☐ FEDEX BOX
54 ☐ FEDEX TUBE

Economy Two-Day
(Delivery by second business day †)
30 ☐ ECONOMY

Government Overnight
(Restricted for authorized users only)
46 ☐ GOV'T LETTER
41 ☐ GOV'T PACKAGE

Freight Service
(for packages over 150 lbs.)
70 ☐ OVERNIGHT FREIGHT**
(Confirmed reservation required)
80 ☐ TWO-DAY FREIGHT**

† Delivery commitment may be later in some areas.
*Declared Value Limit $500.
**Call for delivery schedule.

5 DELIVERY AND SPECIAL HANDLING
(Check services required)
1 ☐ HOLD FOR PICK-UP (Fill in Box H)
2 ☐ DELIVER WEEKDAY
3 DELIVER SATURDAY (Extra charge) (Not available to all locations) ☐
4 ☐ DANGEROUS GOODS (Extra charge)
5 ☐
6 ☐ DRY ICE ______ Lbs.
7 ☐ OTHER SPECIAL SERVICE ______
8 ☐
9 ☐ SATURDAY PICK-UP (Extra charge)
10 ☐
☐
12 ☐ HOLIDAY DELIVERY (If offered) (Extra charge)

6
PACKAGES	WEIGHT In Pounds Only	YOUR DECLARED VALUE (See right)
1		
Total 1	Total	Total

DIM SHIPMENT (Chargeable Weight)
☐ ______ lbs.
L x W x H

Received At
1 ☐ Regular Stop
2 ☐ On-Call Stop
3 ☐ Drop Box
4 ☐ B.S.C.
5 ☐ Station

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7 Release Signature:

Federal Expr
Base Charges
Declared Value
Other 1
Other 2
Total Charges

REVISION DATE 2/9
PART #137204 F
FORMAT #126
126

PRINTED IN U.S.A.

SENDER'S COPY
DROP OFF YOUR PACKAGE AND SAVE

EXPRESS

USE THE INTERNATIONAL AIR WAYBILL FOR SHIPMENTS TO PUERTO RICO AND ALL NON U.S. LOCATIONS.
QUESTIONS? CALL 800-238-5355 TOLL FREE.

TRACKING NUMBER

2213N 5065280640

SENDER'S COPY

1 SENDER'S FEDERAL EXPRESS ACCOUNT NUMBER: 1595-5315-9
Date: 11/2/92

From (Your Name) Please Print: MIKE KNEESE
Your Phone Number (Very Important): 805-393-5109
Company: ENRON GAS PROCESSING
Department/Floor No.
Street Address: 11525 W CARLSBAD HWY
City: HOBBS
State: NM
ZIP Required: 88240

2 To (Recipient's Name) Please Print: DUANE GRAVES
Recipient's Phone Number (Very: (615) 6903
Company: IT CORP
Department/Fl: BUILDING 30
Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.): 9041 EXECUTIVE PARK ECO
City: KNOXVILLE
State: TN
ZIP Required: 3792

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.): 30/573.002.06

H IF HOLD FOR PICK-UP, Print FEDEX Address Here
Street Address
City
State
ZIP Required

3 PAYMENT
1 ☒ Bill Sender
2 ☐ Bill Recipient's FedEx Acct. No.
3 ☐ Bill 3rd Party FedEx Acct. No.
4 ☐ Bill Credit Card
5 ☐ Cash/Check
Acct./Credit Card No.
Exp. Date /

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning†)
11 ☒ YOUR PACKAGING
16 ☐ FEDEX LETTER*
12 ☐ FEDEX PAK*
13 ☐ FEDEX BOX
14 ☐ FEDEX TUBE

Standard Overnight (Delivery by next business afternoon. No Saturday delivery†)
51 ☐ YOUR PACKAGING
56 ☐ FEDEX LETTER*
52 ☐ FEDEX PAK*
53 ☐ FEDEX BOX
54 ☐ FEDEX TUBE

Economy Two-Day (Delivery by second business day †)
30 ☐ ECONOMY

Government Overnight (Restricted for authorized users only)
46 ☐ GOVT LETTER
41 ☐ GOVT PACKAGE

Freight Service (for packages over 150 lbs.)
70 ☐ OVERNIGHT FREIGHT** (Confirmed reservation required)
80 ☐ TWO-DAY FREIGHT**

† Delivery commitment may be later in some areas.
*Declared Value Limit $500.
**Call for delivery schedule.

5 DELIVERY AND SPECIAL HANDLING (Check services required)
1 ☐ HOLD FOR PICK-UP (Fill in Box H)
2 ☐ DELIVER WEEKDAY
3 DELIVER SATURDAY (Extra charge) (Not available to all locations) ☐
4 ☐ DANGEROUS GOODS (Extra charge)
5 ☐
6 ☐ DRY ICE ______ Lbs.
7 ☐ OTHER SPECIAL SERVICE ______
8 ☐
9 ☐ SATURDAY PICK-UP (Extra charge)
10 ☐
☐
12 ☐ HOLIDAY DELIVERY (If offered) (Extra charge)

6
PACKAGES	WEIGHT In Pounds Only	YOUR DECLARED VALUE (See right)
Total	Total	Total

DIM SHIPMENT (Chargeable Weight)
☐ ______ lbs.
L x W x H

Received At
1 ☐ Regular Stop
2 ☐ On-Call Stop
3 ☐ Drop Box
4 ☐ B.S.C.
5 ☐ Station

SERVICE CONDITIONS, DECLARED VALUE AND LIMIT OF LIABILITY

Use of this airbill constitutes your agreement to the service conditions in our current Service Guide, available upon request. See back of sender's copy of this airbill for information. Service conditions may vary for Government Overnight Service. See U.S. Government Service Guide for details.

We will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, and document your actual loss for a timely claim. Limitations found in the current Federal Express Service Guide apply. Your right to recover from Federal Express for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental, consequential, or special is limited to the greater of $100 or the declared value specified to the left. Recovery cannot exceed actual documented loss. The maximum Declared Value for FedEx Letter and FedEx Pak packages is $500.00.

In the event of untimely delivery, Federal Express will at your request and with some limitations refund all transportation charges paid. See Service Guide for further information.

Sender authorizes Federal Express to deliver this shipment without obtaining a delivery signature and shall indemnify and hold harmless Federal Express from any claims resulting therefrom.

7 Release Signature: ______

Federal Expre
Base Charges
Declared Value (
Other 1
Other 2
Total Charges

REVISION DATE 2/92
PART #137204 FX
FORMAT #126
126

APPENDIX E

APPENDIX E

WELL DEVELOPMENT AND GROUNDWATER SAMPLE COLLECTION LOGS

PAGE 1 OF 1

WELL DEVELOPMENT RECORD

WELL MW-4

PROJECT NAME: Enron-Hobbs Plant

PROJECT NUMBER: 301573.001.02

LOCATION: Hobbs, NM

WELL DEPTH= 52 **FEET**

REFERENCE POINT FOR
DEPTH MEASUREMENTS TWC
TPC = TOP OF PROTECTIVE COVER
TWC = TOP OF WELL CASING
GS = GROUND SURFACE

DEVELOPERS INITIALS	DATE	INITIAL WATER DEPTH (FEET)	SURGING EQUIP./ METHOD	EVACUATION			FINAL WATER LEVEL (FOR RECOVERY RATE)		WATER VISUAL APPEARANCE	COMMENTS (ODOR, CHEMICALS USED, NAPL, ETC.)			
				STARTING TIME	METHOD	TOTAL VOLUME REMOVED (GALLONS)	DEPTH (FEET)	TIME		°C Temp	pH	Micromho/ cm Conductivity	Odor
JB	11/2/92		Bailer	1340	Bailer					20.6	7.1	2,520	
	11/2/92		Bailer	1345	Bailer					20.7	7.1	2,480	
	11/2/92		Bailer	1355	Bailer					19.9	7.1	2,520	
	11/2/92		Bailer	1400	Bailer					19.9	7.1	2,520	
	11/2/92		Bailer	1405	Bailer	55.0				19.5	7.1	2,560	

WELL DEVELOPMENT RECORD

WELL MW-5

PROJECT NAME: Enron-Hobbs Plant

PROJECT NUMBER: 301573.001.02

LOCATION: Hobbs, NM

WELL DEPTH= 52 **FEET**

REFERENCE POINT FOR DEPTH MEASUREMENTS TWC

TPC = TOP OF PROTECTIVE COVER
TWC = TOP OF WELL CASING
GS = GROUND SURFACE

				EVACUATION			FINAL WATER LEVEL (FOR RECOVERY RATE)			COMMENTS (ODOR, CHEMICALS USED, NAPL, ETC.)			
DEVELOPERS INITIALS	DATE	INITIAL WATER DEPTH (FEET)	SURGING EQUIP./ METHOD	STARTING TIME	METHOD	TOTAL VOLUME REMOVED (GALLONS)	DEPTH (FEET)	TIME	WATER VISUAL APPEARANCE	°C Temp	pH	Micromho/ cm Conductivity	Odor
JB	11/2/92		Bailer	1030	Bailer					16.5	7.1	4,320	
	11/2/92		Bailer	1045	Bailer					19.1	7.1	4,140	
	11/2/92		Bailer	1050	Bailer					18.8	7.1	4,280	
	11/2/92		Bailer	1240	Bailer					18.8	7.0	4,280	
	11/2/92		Bailer	1250	Bailer					19.4	7.0	4,260	
	11/2/92		Bailer	1300	Bailer					19.1	7.1	4,280	
	11/2/92		Bailer	1310	Bailer	55.0				19.3	7.0	4,300	

PAGE 1 OF 1

WELL DEVELOPMENT RECORD

WELL MW-6

PROJECT NAME: Enron-Hobbs Plant

PROJECT NUMBER: 301573.001.02

LOCATION: Hobbs, NM

WELL DEPTH= 52 **FEET**

REFERENCE POINT FOR DEPTH MEASUREMENTS TWC
TPC = TOP OF PROTECTIVE COVER
TWC = TOP OF WELL CASING
GS = GROUND SURFACE

DEVELOPERS INITIALS	DATE	INITIAL WATER DEPTH (FEET)	SURGING EQUIP./ METHOD	EVACUATION			FINAL WATER LEVEL (FOR RECOVERY RATE)		WATER VISUAL APPEARANCE	COMMENTS (ODOR, CHEMICALS USED, NAPL, ETC.)			
				STARTING TIME	METHOD	TOTAL VOLUME REMOVED (GALLONS)	DEPTH (FEET)	TIME		°C Temp	pH	Micromho/ cm Conductivity	Odor
JB	11/2/92		Bailer	0830	Bailer					16.6	7.5		
	11/2/92		Bailer	0850	Bailer					17.1	7.6		
	11/2/92		Bailer	0900	Bailer					17.5	7.7		
	11/2/92		Bailer	0930	Bailer					17.8	7.6	2,042	
	11/2/92		Bailer	0935	Bailer					17.8	7.6	2,094	
	11/2/92		Bailer	0940	Bailer					17.8	7.6	2,092	
	11/2/92		Bailer	0945	Bailer	60.0				17.4	7.5	2,084	

GROUND WATER SAMPLE COLLECTION LOG

Project Name: Enron
Project No.: 301573.001.03
Request-for-Analysis Control No.: 418966
Chain-of-Custody Control No.: 418966

Sample Number: MW-1
Sample Location or Well I.D. MW-1
(attach map if necessary)
Date and Time Collected: 1021
11/3/92
Sample Collected By: Boyd, Raugust

Weather:

EQUIPMENT

Purge Method/Equipment: 2" PVC Bailer
Sampling Equipment: 1" PVC Bailer
Filtering Equipment:

Equipment Calibration

EQUIPMENT MODEL	SERIAL NO.	DATE/TIME CALIBRATED
Orion pH/Temp	6431	11/3/92 0900
Cole-Parmer E.C.	890607	11/3/92 0900

TEMP (°C)	pH STD	pH STD
	7.0	4.4
7.5	7.0	4.0

Other Calibration (e.g. D.O., eH):

CONDUCTIVITY (micromhos/cm)	
TEMP (°C)	STANDARD READING
	0 Distilled H2O
9.6	0.046

Equipment Decontamination:

FIELD PARAMETERS

Water Sample Temp. (°C): 16.4
Air Temperature (°F): 40
pH: 6.75
Conductance (umhos/cm): 1.890

Sample Depth (Feet): 45
Initial Depth to Water (Feet): 42.48
Reference Point:
Conductance corrected to 25°C (Y/N):

SAMPLE PACKAGING

Container(s) Type and Volume	Filtered (Y/N)	Preservatives	Parameters
1 Amber Glass Liter	N	HCL 4°C	TPH (high boilers) by 8015
2 40 ml VOA Clear	N	HCL 4°C	BTEX by 8020
500 ml Plastic	N	4°C	TDS and pH

Project Name: Enron **Sample Number:** MW-1

Project Number: 301573.001.03

PURGING INFORMATION

Casing I.D. (a)(In.) 2 **Unit Casing Volume (b):** 0.165 **(Gal/Ln. Ft.)**

Depth of Well (c):(Ft.) ~54.0 **Depth to Water (d): (Ft):** 42.48

Length of Static Water Column in Casing (e)=(c)-(d): 54.0 **(-)** 42.48 **(=)** 11.52

Casing Water Volume (f)=(b)x(e): 11.52 **(x)** 0.165 **(=)** 1.9 **(Gal)**

Casing Volumes: 3 **(x) (f) =** 6.0 **(Gal)**

Volume Purged (Gallon)	Time	2,000 Scale Conductance (umhos/cm)	Temp. (°C)	Water Description (Color,Turbidity, Odor, Oil)	pH
0.5	0955	1.975	17.1	Cloudy	6.8
1.0	0958	1.875	12.0	Light Brown	6.6
2.5	1005	1.885	17.4	Light Brown	6.61
3.0	1007	1.870	17.1	Light Brown	6.74
5.0	1010	1.870	16.5	Brown	6.6
6.0	1015	1.865	17.5	Brown	6.63
6.5	1021	1.890	16.4	Brown	6.75

Total Volume Purged: 6.5 **(gal)** **Time:** 1021 **Purged Dry (Y/N):** N

CASING VOLUME

Casing I.D. (In.)	Unit Casing Volume (Gal/Lin.Ft.)	(L/Lin.Ft.)
1.0	0.04	0.15
1.5	0.09	0.34
2.0	0.16	0.61
2.2	0.20	0.76
3.0	0.37	1.4
4.0	0.65	2.5
4.3	0.75	2.8
5.0	1.0	3.8
6.0	1.5	5.7
7.0	2.0	7.6
8.0	2.6	9.8

Additional Remarks:

GROUND WATER SAMPLE COLLECTION LOG

Project Name: Enron
Project No.: 301573.001.03
Request-for-Analysis Control No.: 418966
Chain-of-Custody Control No.: 418966

Sample Number: MW-4
Sample Location or Well I.D. MW-4
(attach map if necessary)
Date and Time Collected: 1450
11/3/92
Sample Collected By: Boyd, Raugust

Weather:

EQUIPMENT

Purge Method/Equipment: 3" PVC BAiler
Sampling Equipment: 3" PVC Bailer
Filtering Equipment: N/A

Equipment Calibration

EQUIPMENT MODEL	SERIAL NO.	DATE/TIME CALIBRATED
Orion pH/Temp	6431	11/3/92 0900
Cole-Parmer E.C.	890607	11/3/92 0900

TEMP (°C)	pH STD	pH STD
	7.0	4.4
7.5	7.0	4.0

Other Calibration (e.g. D.O., eH):

CONDUCTIVITY (micromhos/cm)	
TEMP (°C)	STANDARD READING
	0 Distilled H2O
9.6	0.046

Equipment Decontamination:

FIELD PARAMETERS

Water Sample Temp. (°C): 18.5
Air Temperature (°F): 40
pH: 6.52
Conductance (umhos/cm): 0.182

Sample Depth (Feet): 47
Initial Depth to Water (Feet): 44.25
Reference Point:
Conductance corrected to 25°C (Y/N):

SAMPLE PACKAGING

Container(s) Type and Volume	Filtered (Y/N)	Preservatives	Parameters
1 Amber Glass Liter	N	HCl, 4°C	TPH (high boilers) by 8015
2 Amber 40 ml VOA	N	HCl, 4°C	BTEX by 8020
2 Amber Glass Liters	N	4°C	Bioassessment
1 40 ml VOA Clear	N	HNO3, 4°C	Bioassessment

Project Name: Enron **Sample Number:** MW-4
Project Number: 301573.001.03

PURGING INFORMATION

Casing I.D. (a)(in.) 4 **Unit Casing Volume (b):** 0.652 **(Gal/Ln. Ft.)**
Depth of Well (c):(Ft.) 53.53 **Depth to Water (d): (Ft):** 44.25
Length of Static Water Column in Casing (e)=(c)-(d): 53.53 **(-)** 44.25 **(=)** 9.28
Casing Water Volume (f)=(b)x(e): 9.28 **(x)** 0.652 **(=)** 6.05 **(Gal)**
Casing Volumes: 3 **(x) (f) =** 18.2 **(Gal)**

Volume Purged (Gallon)	Time	20,000 Scale Conductance (umhos/cm)	Temp. (°C)	Water Description (Color,Turbidity, Odor, Oil)	pH
3	1420	0.188	18.4	Yellow-brown, sheen, odor	6.89
8	1430	0.187	18.8	Yellow-brown, sheen, odor	6.90
13	1435	0.184	18.5	Yellow-brown, sheen, odor	6.89
18	1440	0.182	18.5	Yellow-brown, sheen, odor	6.91
19	1450	0.182	18.5	Yellow-brown, sheen, odor	6.92

Total Volume Purged: 19 **(gal)** **Time:** 1450 **Purged Dry (Y/N):** N

CASING VOLUME

Casing I.D. (in.)	Unit Casing Volume (Gal/Lin.Ft.)	(L/Lin.Ft.)
1.0	0.04	0.15
1.5	0.09	0.34
2.0	0.16	0.61
2.2	0.20	0.76
3.0	0.37	1.4
4.0	0.65	2.5
4.3	0.75	2.8
5.0	1.0	3.8
6.0	1.5	5.7
7.0	2.0	7.6
8.0	2.6	9.8

Additional Remarks:

Noticeable odor from well while taking initial reading.

Approximate 3-inch thick separated hydrocarbon liquid (clear) inside initial bailer.

GROUND WATER SAMPLE COLLECTION LOG

Project Name: Enron
Project No.: 301573.001.03
Request-for-Analysis Control No.: 418966
Chain-of-Custody Control No.: 418966

Sample Number: MW-5
Sample Location or Well I.D. MW-5
(attach map if necessary)
Date and Time Collected: 1350
11/3/92
Sample Collected By: Boyd, Raugust

Weather:

EQUIPMENT

Purge Method/Equipment: 3" PVC Bailer
Sampling Equipment: 3" PVC Bailer
Filtering Equipment:

Equipment Calibration

EQUIPMENT MODEL	SERIAL NO.	DATE/TIME CALIBRATED
Orion pH/Temp	6431	11/3/92 0900
Cole-Parmer E.C.	890607	11/3/92 0900

TEMP (°C)	pH STD	pH STD
	7.0	4.4
7.5	7.0	4.0

Other Calibration (e.g. D.O., eH):

CONDUCTIVITY (micromhos/cm)	
TEMP (°C)	STANDARD READING
	0 Distilled H2O
9.6	0.046

Equipment Decontamination:

FIELD PARAMETERS

Water Sample Temp. (°C): 17.9
Air Temperature (°F): 45
pH: 7.03
Conductance (umhos/cm): 1.163

Sample Depth (Feet): 47
Initial Depth to Water (Feet): 44.98
Reference Point:
Conductance corrected to 25°C (Y/N):

SAMPLE PACKAGING

Container(s) Type and Volume	Filtered (Y/N)	Preservatives	Parameters
1 Amber Glass Liter	N	HCl, 4°C	TPH (high boilers) by 8015
2 Amber 40 ml VOA	N	HCl, 4°C	BTEX by 8020

Project Name: Enron **Sample Number:** MW-5
Project Number: 301573.001.03

PURGING INFORMATION

Casing I.D. (a)(in.) 4 **Unit Casing Volume (b):** 0.652 (Gal/Ln. Ft.)
Depth of Well (c):(Ft.) 55.06 **Depth to Water (d): (Ft):** 44.98
Length of Static Water Column in Casing (e)=(c)-(d): 55.06 (-) 44.98 (=) 10.08
Casing Water Volume (f)=(b)x(e): 0.652 (x) 10.08 (=) 6.57 (Gal)
Casing Volumes: 3 (x) (f) = 19.7 (Gal)

Volume Purged (Gallon)	Time	2,000 Scale Conductance (umhos/cm)	Temp. (°C)	Water Description (Color,Turbidity, Odor, Oil)	pH
3	1330	1.160	19.2	Brown	7.05
6	1333	1.170	19.1	Brown	7.00
12	1337	1.160	19.1	Brown	6.99
15	1340	1.160	19.0	Brown	7.01
20	1343	1.168	19.2	Brown	7.00
21	1350	1.163	17.9	Brown	7.03

Total Volume Purged: 21 (gal) **Time:** 1350 **Purged Dry (Y/N):** N

CASING VOLUME

Casing I.D. (in.)	Unit Casing Volume (Gal/Lin.Ft.)	(L/Lin.Ft.)
1.0	0.04	0.15
1.5	0.09	0.34
2.0	0.16	0.61
2.2	0.20	0.76
3.0	0.37	1.4
4.0	0.65	2.5
4.3	0.75	2.8
5.0	1.0	3.8
6.0	1.5	5.7
7.0	2.0	7.6
8.0	2.6	9.8

Additional Remarks:

GROUND WATER SAMPLE COLLECTION LOG

Project Name: Enron
Project No.: 301573.001.03
Request-for-Analysis Control No.: 418966
Chain-of-Custody Control No.: 418966

Sample Number: MW-6
Sample Location or Well I.D. MW-6
(attach map if necessary)
Date and Time Collected: 1250
11/3/92
Sample Collected By: Boyd, Raugust

Weather:

EQUIPMENT

Purge Method/Equipment: 3" PVC Bailer
Sampling Equipment: 1" PVC Bailer
Filtering Equipment:

Equipment Calibration

EQUIPMENT MODEL	SERIAL NO.	DATE/TIME CALIBRATED
Orion pH/Temp	6431	11/3/92 0900
Cole-Parmer E.C.	890607	11/3/92 0900

TEMP (°C)	pH STD	pH STD
	7.0	4.4
7.5	7.0	4.0

Other Calibration (e.g. D.O., eH):

CONDUCTIVITY (micromhos/cm)	
TEMP (°C)	STANDARD READING
	0 Distilled H2O
9.6	0.046

Equipment Decontamination:

FIELD PARAMETERS

Water Sample Temp. (°C): 18
Air Temperature (°F): 40
pH: 7.14
Conductance (umhos/cm): 0.980

Sample Depth (Feet): 50
Initial Depth to Water (Feet): 45.10
Reference Point:
Conductance corrected to 25°C (Y/N):

SAMPLE PACKAGING

Container(s) Type and Volume	Filtered (Y/N)	Preservatives	Parameters
1 Amber Glass Liter	N	HCl 4°C	TPH (high boilers) by 8015
2 Amber 40 ml VOA	N	HCl 4°C	BTEX by 8020
2 Amber Glass Liters	N	4°C	Bioassessment
1 40 ml VOA Clear	N	HNO3 4°C	Bioassessment

Project Name: Enron **Sample Number:** MW-6
Project Number: 301573.001.03

PURGING INFORMATION

Casing I.D. (a)(in.) 4 **Unit Casing Volume (b):** 0.652 **(Gal/Ln. Ft.)**
Depth of Well (c):(Ft.) 53.50 **Depth to Water (d): (Ft):** 45.10
Length of Static Water Column in Casing (e)=(c)-(d): 53.50 **(-)** 45.10 **(=)** 8.4
Casing Water Volume (f)=(b)x(e): 0.652 **(x)** 8.4 **(=)** 5.5 **(Gal)**
Casing Volumes: 3 **(x) (f) =** 16.4 **(Gal)**

2,000 Scale

Volume Purged (Gallon)	Time	Conductance (umhos/cm)	Temp. (°C)	Water Description (Color,Turbidity, Odor, Oil)	pH
3	1230	1.010	18.2	Brown, slight odor	7.1
6	1235	1.010	18.3	Brown, slight odor	7.1
9	1237	0.980	18.1	Brown, slight odor	7.11
12	1240	0.980	18.2	Brown, slight odor	7.17
15	1243	0.920	18.1	Brown, slight odor	7.18
16.5	1250	0.980	18.0	Brown, slight odor	7.14

Total Volume Purged: 16.5 **(gal)** **Time:** 1243 **Purged Dry (Y/N):** N

CASING VOLUME

Casing I.D. (in.)	Unit Casing Volume	
	(Gal/Lin.Ft.)	(L/Lin.Ft.)
1.0	0.04	0.15
1.5	0.09	0.34
2.0	0.16	0.61
2.2	0.20	0.76
3.0	0.37	1.4
4.0	0.65	2.5
4.3	0.75	2.8
5.0	1.0	3.8
6.0	1.5	5.7
7.0	2.0	7.6
8.0	2.6	9.8

Additional Remarks:

GROUND WATER SAMPLE COLLECTION LOG

Project Name: Enron
Project No.: 301573.001.03
Request-for-Analysis Control No.: 417772
Chain-of-Custody Control No.: 417772

Sample Number: MW-1
Sample Location or Well I.D. MW-1
(attach map if necessary)
Date and Time Collected: 1255 12/2/92
Sample Collected By: Boyd

Weather:

EQUIPMENT

Purge Method/Equipment: 3" PVC Bailer
Sampling Equipment: 1" Teflon Bailer
Filtering Equipment: NA

Equipment Calibration

EQUIPMENT MODEL	SERIAL NO.	DATE/TIME CALIBRATED
Orion pH Meter	6431	12/2/92
Cole-Parmer Cond.	890607	12/2/92

TEMP (°C)	pH STD	pH STD
	6.99	4.0
	7.0	4.0

Other Calibration (e.g. D.O., eH):

CONDUCTIVITY (micromhos/cm)	
TEMP (°C)	STANDARD READING
	1000
25°	999

Equipment Decontamination:
Alconox wash, DI rinse

FIELD PARAMETERS

Water Sample Temp. (°C): 18.2
Air Temperature (°F): ~60°
pH: 7.07
Conductance (umhos/cm): 0.313
Sample Depth (Feet):
Initial Depth to Water (Feet): 43.70
Reference Point:
Conductance corrected to 25°C (Y/N):

SAMPLE PACKAGING

Container(s) Type and Volume	Filtered (Y/N)	Preservatives	Parameters
500 ml Amber Glass	N	HCl 4°C	TPH (high boilers) by 8015
2 x 40 ml VOAs	N	HCl 4°C	BTEX by 8020

Project Name: Enron **Sample Number:** MW-1
Project Number: 301573.001.03

PURGING INFORMATION

Casing I.D. (a)(in.) 2 **Unit Casing Volume (b):** 0.16 **(Gal/Ln. Ft.)**
Depth of Well (c):(Ft.) 53.93 **Depth to Water (d): (Ft):** 43.70
Length of Static Water Column in Casing (e)=(c)-(d): 53.93 **(-)** 43.70 **(=)** 10.23
Casing Water Volume (f)=(b)x(e): 10.23 **(x)** 0.16 **(=)** 1.60 **(Gal)**
Casing Volumes: 3 **(x) (f) =** 5 **(Gal)**

20,000 Scale

Volume Purged (Gallon)	Time	Conductance (umhos/cm)	Temp. (°C)	Water Description (Color,Turbidity, Odor, Oil)	pH
1	1227	0.337	19.4	No odor, lt. brown	6.99
2	1230	0.338	18.4	No odor, dark brown	7.03
3	1235	0.316	18.9	No odor, dark brown	7.02
4	1240	0.312	18.4	No odor, dark brown	7.03
5	1250	0.308	18.7		7.03
6.5	1305	0.313	18.2		7.07

Total Volume Purged: 6.5 **(gal)** **Time:** 1305 **Purged Dry (Y/N):** N

CASING VOLUME

Casing I.D. (in.)	Unit Casing Volume (Gal/Lin.Ft.)	(L/Lin.Ft.)
1.0	0.04	0.15
1.5	0.09	0.34
2.0	0.16	0.61
2.2	0.20	0.76
3.0	0.37	1.4
4.0	0.65	2.5
4.3	0.75	2.8
5.0	1.0	3.8
6.0	1.5	5.7
7.0	2.0	7.6
8.0	2.6	9.8

Additional Remarks:

GROUND WATER SAMPLE COLLECTION LOG

Project Name: Enron
Project No.: 301573.001.03
Request-for-Analysis Control No.: 417772
Chain-of-Custody Control No.: 417772

Sample Number: MW-4
Sample Location or Well I.D. MW-4
(attach map if necessary)
Date and Time Collected: 0810
12/2/92
Sample Collected By: Boyd

Weather:

EQUIPMENT

Purge Method/Equipment: 3" PVC Bailer
Sampling Equipment: 1" Teflon Bailer
Filtering Equipment: NA

Equipment Calibration

EQUIPMENT MODEL	SERIAL NO.	DATE/TIME CALIBRATED
Orion pH Meter	6431	12/2/92
Cole-Parmer Cond.	890607	12/2/92

TEMP (°C)	pH STD	pH STD
	6.99	4.0
	7.0	4.01

Other Calibration (e.g. D.O., eH):

CONDUCTIVITY (micromhos/cm)	
TEMP (°C)	STANDARD
	READING
	1000
	999

Equipment Decontamination:
Alconox wash, DI rinse

FIELD PARAMETERS

Water Sample Temp. (°C): 19.3
Air Temperature (°F): ~60°
pH: 7.13
Conductance (umhos/cm): 0.320

Sample Depth (Feet):
Initial Depth to Water (Feet): 45.35
Reference Point:
Conductance corrected to 25°C (Y/N):

SAMPLE PACKAGING

Container(s) Type and Volume	Filtered (Y/N)	Preservatives	Parameters
500 ml Amber Glass	N	HCl 4°C	TPH (high boilers) by 8015
2 x 40 ml VOAs	N	HCl 4°C	BTEX by 8020

Project Name: Enron **Sample Number:** MW-4

Project Number: 301573.001.03

PURGING INFORMATION

Casing I.D. (a)(In.) 4 **Unit Casing Volume (b):** 0.65 (Gal/Ln. Ft.)

Depth of Well (c):(Ft.) 53.53 **Depth to Water (d): (Ft):** 45.35

Length of Static Water Column In Casing (e)=(c)-(d): 53.53 (-) 45.35 (=) 8.18

Casing Water Volume (f)=(b)x(e): 8.18 (x) 0.65 (=) 5.317 (Gal)

Casing Volumes: 3 (x) (f) = 16 (Gal)

Volume Purged (Gallon)	Time	20,000 Scale Conductance (umhos/cm)	Temp. (°C)	Water Description (Color,Turbidity, Odor, Oil)	pH
3	0747	0.293	18.3	Lt. brown, fuel odor	7.27
6	0752	0.284	18.7	Lt. brown, cloudy	7.20
9	0755	0.332	19.0	Cloudy, lt. brown	7.13
12	0800	0.304	18.3	Cloudy, lt. brown	7.18
15	0805	0.326	18.8	Cloudy, lt. brown	7.19
16	0806	0.308	20.0	Cloudy, lt. brown	7.20
18.0	0830	0.320	19.3		7.13

Total Volume Purged: 18.0 (gal) **Time:** 0830 **Purged Dry (Y/N):** N

CASING VOLUME

Casing I.D. (In.)	Unit Casing Volume (Gal/Lin.Ft.)	(L/Lin.Ft.)
1.0	0.04	0.15
1.5	0.09	0.34
2.0	0.16	0.61
2.2	0.20	0.76
3.0	0.37	1.4
4.0	0.65	2.5
4.3	0.75	2.8
5.0	1.0	3.8
6.0	1.5	5.7
7.0	2.0	7.6
8.0	2.6	9.8

Additional Remarks:

GROUND WATER SAMPLE COLLECTION LOG

Project Name: Enron
Project No.: 301573.001.03
Request-for-Analysis Control No.: 417772
Chain-of-Custody Control No.: 417772

Sample Number: MW-4-A
Sample Location or Well I.D. MW-4
(attach map if necessary)
Date and Time Collected: 1355
12/2/92
Sample Collected By: Boyd

Weather:

EQUIPMENT

Purge Method/Equipment: 3" PVC Bailer
Sampling Equipment: 1" Teflon Bailer
Filtering Equipment: NA

Equipment Calibration

EQUIPMENT MODEL	SERIAL NO.	DATE/TIME CALIBRATED
Orion pH Meter	6431	12/2/92
Cole-Parmer Cond.	890607	12/2/92

TEMP (°C)	pH STD	pH STD
	6.99	4.0
	7.0	4.01

Other Calibration (e.g. D.O., eH):

CONDUCTIVITY (micromhos/cm)	
TEMP (°C)	STANDARD READING
	1000
	999

Equipment Decontamination:
Alconox wash, DI rinse

FIELD PARAMETERS

Water Sample Temp. (°C): 21.6
Air Temperature (°F): ~60°
pH: 7.32
Conductance (umhos/cm): 0.311

Sample Depth (Feet):
Initial Depth to Water (Feet): 45.31
Reference Point:
Conductance corrected to 25°C (Y/N):

SAMPLE PACKAGING

Container(s) Type and Volume	Filtered (Y/N)	Preservatives	Parameters
500 ml Amber Glass	N	HCl 4°C	TPH (high boilers) by 8015
2 x 40 ml VOAs	N	HCl 4°C	BTEX by 8020

Project Name: Enron **Sample Number:** MW-4-A
Project Number: 301573.001.03

PURGING INFORMATION

Casing I.D. (a)(in.) 4 **Unit Casing Volume (b):** 0.65 (Gal/Ln. Ft.)
Depth of Well (c):(Ft.) 53.53 **Depth to Water (d): (Ft):** 45.31
Length of Static Water Column in Casing (e)=(c)-(d): 53.53 (-) 45.31 (=) 8.22
Casing Water Volume (f)=(b)x(e): 8.22 (x) 0.65 (=) 5.3 (Gal)
Casing Volumes: 3 (x) (f) = 16 (Gal)

Volume Purged (Gallon)	Time	20,000 Scale Conductance (umhos/cm)	Temp. (°C)	Water Description (Color,Turbidity, Odor, Oil)	pH
3	1333	0.271	18.9	Cloudy, fuel odor	7.31
6	1336	0.336	19.3	Cloudy, fuel odor	7.27
9	1340	0.277	18.4	Cloudy, fuel odor, sheen	7.3
12	1343	0.301	18.7	Cloudy, fuel odor, sheen	7.31
15	1346	0.311	18.7	Slightly cloudy, fuel odor	7.31
16	1349	0.309	18.6	Slightly cloudy, fuel odor	7.29
18.0	1400	0.311	21.6		7.32

Total Volume Purged: 18.0 (gal) **Time:** 1400 **Purged Dry (Y/N):** N

CASING VOLUME

Casing I.D. (in.)	Unit Casing Volume (Gal/Lin.Ft.)	(L/Lin.Ft.)
1.0	0.04	0.15
1.5	0.09	0.34
2.0	0.16	0.61
2.2	0.20	0.76
3.0	0.37	1.4
4.0	0.65	2.5
4.3	0.75	2.8
5.0	1.0	3.8
6.0	1.5	5.7
7.0	2.0	7.6
8.0	2.6	9.8

Additional Remarks:

GROUND WATER SAMPLE COLLECTION LOG

Project Name: Enron
Project No.: 301573.001.03
Request-for-Analysis Control No.: 417772
Chain-of-Custody Control No.: 417772

Sample Number: MW-5
Sample Location or Well I.D. MW-5
(attach map if necessary)
Date and Time Collected: 0935 12/2/92
Sample Collected By: Boyd

Weather: ______

EQUIPMENT

Purge Method/Equipment: 3" PVC Bailer
Sampling Equipment: 1" Teflon Bailer
Filtering Equipment: NA

Equipment Calibration

EQUIPMENT MODEL	SERIAL NO.	DATE/TIME CALIBRATED
Orion pH Meter	6431	12/2/92
Cole-Parmer Cond.	890607	12/2/92

TEMP (°C)	pH STD	pH STD
	6.99	4.0
	7.0	4.0

Other Calibration (e.g. D.O., eH):

CONDUCTIVITY (micromhos/cm)	
TEMP (°C)	STANDARD READING
	1000
	999

Equipment Decontamination:
Alconox wash, DI rinse

FIELD PARAMETERS

Water Sample Temp. (°C): 18.5
Air Temperature (°F): ~45°
pH: 7.16
Conductance (umhos/cm): 1.506

Sample Depth (Feet):
Initial Depth to Water (Feet): 45.95
Reference Point:
Conductance corrected to 25°C (Y/N):

SAMPLE PACKAGING

Container(s) Type and Volume	Filtered (Y/N)	Preservatives	Parameters
500 ml Amber Glass	N	HCl 4°C	TPH (high boilers) by 8015
2 x 40 ml VOAs	N	HCl 4°C	BTEX by 8020

Project Name: Enron **Sample Number:** MW-5
Project Number: 301573.001.03

PURGING INFORMATION

Casing I.D. (a)(in.) 4 **Unit Casing Volume (b):** 0.65 (Gal/Ln. Ft.)
Depth of Well (c):(Ft.) 55.94 **Depth to Water (d): (Ft):** 45.95
Length of Static Water Column in Casing (e)=(c)-(d): 55.94 (-) 45.95 (=) 9.99
Casing Water Volume (f)=(b)x(e): 0.65 (x) 9.99 (=) 6.50 (Gal)
Casing Volumes: 3 (x) (f) = 19.5 (Gal)

Volume Purged (Gallon)	Time	2,000 Scale Conductance (umhos/cm)	Temp. (°C)	Water Description (Color,Turbidity, Odor, Oil)	pH
3	0913	1.403	18.7	Cloudy, no odor	7.07
6	0916	1.426	18.4	Cloudy, no odor	7.09
9	0920	1.446	18.5	Cloudy, no odor	7.11
12	0923	1.311	18.4	Clear, no odor	7.14
15	0927	1.322	18.6		7.13
18	0931	1.330	19.0		7.14
19.5	0933	1.328	18.9		7.13
21	0945	1.506	18.5		7.16

Total Volume Purged: 21.0 (gal) **Time:** 0945 **Purged Dry (Y/N):** N

CASING VOLUME

Casing I.D. (in.)	Unit Casing Volume (Gal/Lin.Ft.)	Unit Casing Volume (L/Lin.Ft.)
1.0	0.04	0.15
1.5	0.09	0.34
2.0	0.16	0.61
2.2	0.20	0.76
3.0	0.37	1.4
4.0	0.65	2.5
4.3	0.75	2.8
5.0	1.0	3.8
6.0	1.5	5.7
7.0	2.0	7.6
8.0	2.6	9.8

Additional Remarks:

GROUND WATER SAMPLE COLLECTION LOG

Project Name: Enron
Project No.: 301573.001.03
Request-for-Analysis Control No.: 417772
Chain-of-Custody Control No.: 417772

Sample Number: MW-6
Sample Location or Well I.D. MW-6
(attach map if necessary)
Date and Time Collected: 1055
12/2/92
Sample Collected By: Boyd

Weather:

EQUIPMENT

Purge Method/Equipment: 3" PVC Bailer
Sampling Equipment: 1" Teflon Bailer
Filtering Equipment: NA

Equipment Calibration

EQUIPMENT MODEL	SERIAL NO.	DATE/TIME CALIBRATED
Orion pH Meter	6431	12/2/92
Cole-Parmer Cond.	890607	12/2/92

TEMP (°C)	pH STD	pH STD
	6.99	4.0
	7.0	4.0

Other Calibration (e.g. D.O., eH):

CONDUCTIVITY (micromhos/cm)	
TEMP (°C)	STANDARD READING
	1000
	999

Equipment Decontamination:
Alconox wash, DI rinse

FIELD PARAMETERS

Water Sample Temp. (°C): 18.7
Air Temperature (°F): ~50°
pH: 7.34
Conductance (umhos/cm): 1.265

Sample Depth (Feet):
Initial Depth to Water (Feet): 46.21
Reference Point:
Conductance corrected to 25°C (Y/N):

SAMPLE PACKAGING

Container(s) Type and Volume	Filtered (Y/N)	Preservatives	Parameters
500 ml Amber Glass	N	HCl 4°C	TPH (high boilers) by 8015
2 x 40 ml VOAs	N	HCl 4°C	BTEX by 8020

Project Name: Enron **Sample Number:** MW-6

Project Number: 301573.001.03

PURGING INFORMATION

Casing I.D. (a)(In.) 4 **Unit Casing Volume (b):** 0.65 (Gal/Ln. Ft.)

Depth of Well (c):(Ft.) 54.41 **Depth to Water (d): (Ft):** 46.21

Length of Static Water Column in Casing (e)=(c)-(d): 54.41 (-) 46.21 (=) 8.2

Casing Water Volume (f)=(b)x(e): 0.65 (x) 8.2 (=) 5.33 (Gal)

Casing Volumes: 3 (x) (f) = 16 (Gal)

Volume Purged (Gallon)	Time	2,000 Scale Conductance (umhos/cm)	Temp. (°C)	Water Description (Color,Turbidity, Odor, Oil)	pH
3	1030	1.445	18.2	Muddy, slight odor	7.12
6	1037	1.413	18.2	Muddy, slight odor	7.24
9	1040	1.343	18.6	Cloudy, lt. brown	7.26
12	1043	1.345	18.4	Cloudy, lt. brown	7.35
15	1046	1.301	18.5		7.31
16	1047	1.310	16.9		7.32
18	1105	1.265	18.7		7.34

Total Volume Purged: 18.0 (gal) **Time:** 1105 **Purged Dry (Y/N):** N

CASING VOLUME

Casing I.D. (in.)	Unit Casing Volume (Gal/Lin.Ft.)	(L/Lin.Ft.)
1.0	0.04	0.15
1.5	0.09	0.34
2.0	0.16	0.61
2.2	0.20	0.76
3.0	0.37	1.4
4.0	0.65	2.5
4.3	0.75	2.8
5.0	1.0	3.8
6.0	1.5	5.7
7.0	2.0	7.6
8.0	2.6	9.8

Additional Remarks:

APPENDIX
F

APPENDIX F

VAPOR EXTRACTION SYSTEM PILOT TEST FIELD DATA AND ANALYSIS CALCULATIONS

INTERNATIONAL TECHNOLOGY CORPORATION

By ______ Date 11/4/92 Subject PILOT TEST (VES) Sheet No. 1 of 2
Chkd. By ____ Date ____ VEW-2 Proj. No. 301573.002.0

0.5cm. X 0.5cm.

Test started at 12:15 11-4-92

BW2-1 13:38

Check LEL of extraction well over 1000 ppm

		EXTRACTION WELL			EFFLUENT CONCENTRATION			~~BEFORE~~ AFTER KNOCK OUT DRUM			~~AFTER KNOCK OUT DRUM~~ PUMP		
	TIME	IN OF H2O VACUUM	FLOW RATE Ft/min	°F TEMP	%LEL	PPM (FID) PPM	O2 %	IN H2O VACUUM	FLOW RATE Ft/min	°F TEMP	IN OF H2O VACUUM	FLOW RATE Ft/min	°F TEMP
	~~1223~~												
1	1230 ~~1223~~	54"	2000	60°	+100		0	58"	2500	50°	~~2800~~ MB	2800	145°
2	1330	54"	2700	65°	+100		0	58"	4000	50°		2600	140°
3	1430	54"	2300	60°	+100		3%	58"	3200 ~~4500~~	45°		2500	140°
4	1530	54"	2300	60°	+100		3%	58"	4100	45°		2600	140°
5	1630	54"	2200	60°	+100		2%	58"	4500	40°		2200	135°
6	1730	55"	2600	60°	+100		3%	58"	3000	35°		2700	135°
7	1830	55"	2500	60°	+100		2%	58"	4200	35°		3800	135°
8	1930	55"	2700	53°	+100		.25%	58"	3000	20°		3500	125°
			x̄ = 2412										

INTERNATIONAL TECHNOLOGY CORPORATION

By KBR Date 11/4/92 Subject VES PILOT TEST Sheet No. 2 of 2

Chkd. By____ Date____ VEW-2 Proj. No. 301573.002.0

0.5cm. X 0.5cm.

TIME	IN OF H2O OBV-7			IN OF H2O OBV-8			IN OF H2O OBV-9			COMMENT MW-4	MW-5	M-6	8-10
	10'	16'	32'	9'	15'	30'	10'	16'	27'				31'
1230 ~~1240~~	0	.09	0.21	0	0	0	.17	1.8	.025	0	0	0	.085
1330	0	.11	0.23	0	0	0	.17	1.7	0.24	0	0	.04	.10
1430	0	.14	.3	0	~~0~~ .005	0	.17	.8	.3	0	0	0	.12
1530	0	.12	0.2	0	.005	0	.18	1.7	.3	0	0	0	.12
1630	0	.12	.23	.01	.01	0	.18	1.7	.2	0	0	0	.11
1730	0	.10	.23	.03	.02	0	.17	1.7	.2				.15
1830	0	.10	.2	.01	.01	0	.18	1.7	.2				.13
1930	0	.11	.24	.02	.01	0	.18	1.7	.2				.14
		.11	.23		.01			1.6	.24				.12

INTERNATIONAL TECHNOLOGY CORPORATION

By BP Date 11-5-92 Subject VEW-1 PILOT TEST Sheet No. 1 of 2

Chkd. By ___ Date ___ Proj. No. 301573.00203

0.5cm. X 0.5cm.

First two reading air velocity meter was not calibrated properly.

	EXTRACTION WELL					BEFORE KNOCK OUT DRUM			AFTER KNOCK-OUT DR		
TIME	VACUUM IN OF H_2O	FLOW RATE Ft/min	TEMP °F	EFFLUENT CONCENTRATION % LEL PPM (FID)	O_2	VACUUM IN H_2O	FLOW RATE Ft/min	TEMP °F	VACUUM IN OF H_2O	FLOW RATE Ft/min	TEMP °F
0700	30"	1400	95°	+100	3%	42"	2300	72°		1900	115°
0800	29	1800	90	+100	3%	44"	2100	75°		1500	125°
0900	28	3,000	60	+100	4%	44"	76000	50°		5200	100°
1000	29	4800	60	+100	5%	44"	76000	55°		5900	105°
1100	29	4200	60	+100	5.5%	42"	76000	53°		3500	105°
1200	29	4200	65	+100	4%	44"	4300	55		4900	113°
1300	29	3800	65	PPM +1,000		44	4800	60		4000	115
1420	29	3800	65	+1,000		44	5200	57		4000	110
		$\bar{X}$ = 3375									

AIR SAMPLE VEW-1-1 COLLECTED DURING 0900 SAMPLING ROUND

GX-3 EXPLOSIMETER APPEARS TO BE OUT OF SERVICE AT 1300 ON 11/5/92 SWITCHING TO FID

INTERNATIONAL TECHNOLOGY CORPORATION

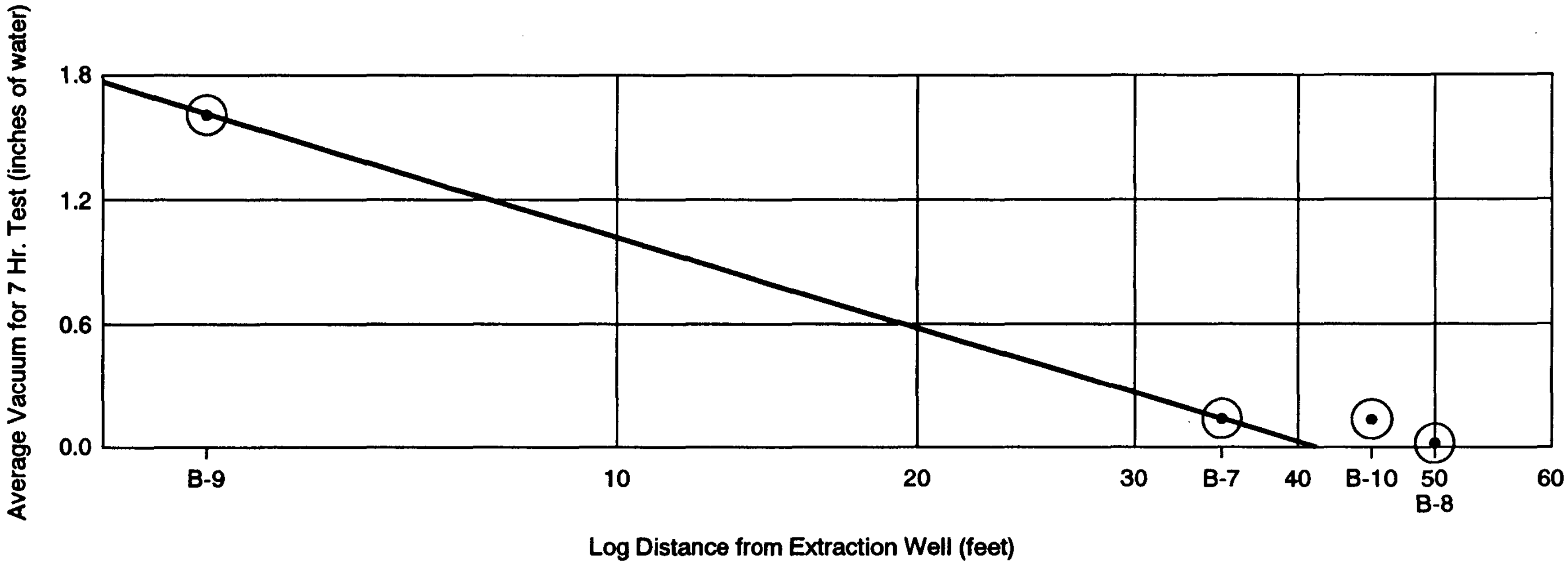
By NSR Date 11-5-92 Subject VEW-~~3~~ PILOT TEST Sheet No. 2 of 2

Chkd. By____ Date____ Proj. No. 301573.003-02

0.5cm. X 0.5cm.

○

TIME	OBV-7 IN OF H_2O			OBV-8 IN OF H_2O			OBV-9 IN OF H_2O			COMMENT			31'
	10'	16'	32'	~~4~~	15'	30'	10' ~~.9~~	16' ~~.6~~	27' ~~1.1~~	MW-4	MW-5	MW-6	B-10
0700 ~~0700~~	0	.21	.25 ~~.25~~	.10	.12	.11	.9	.6	1	0	0	0	.3
0800	0	.25	.25	.145	.14	.11	.9	.7	1.2	0	0	0	.35
0900	0	.25	.3	.1	.1	.09	.9	.6	1.2				.3
1000	0	.2	.3	.095 ~~.95~~ MC 4/4/93	.1	.085	.9	.6	1.1				.3
1100	0	.2	.3	.07	.06	.05	.9	.6	1.1				.25
1200	0	.2	.3	.08	.07	.05	.9	.6	1.1				.3
1300	0	.2	.3	.11	.1	.085	.9	.6	1.1				.3
1430	0	.2	.3	0.07	.08	.06	.9	.6	1.1				.3
		.2	.3	.1	.1	.08	.9	.6	1.1				.3

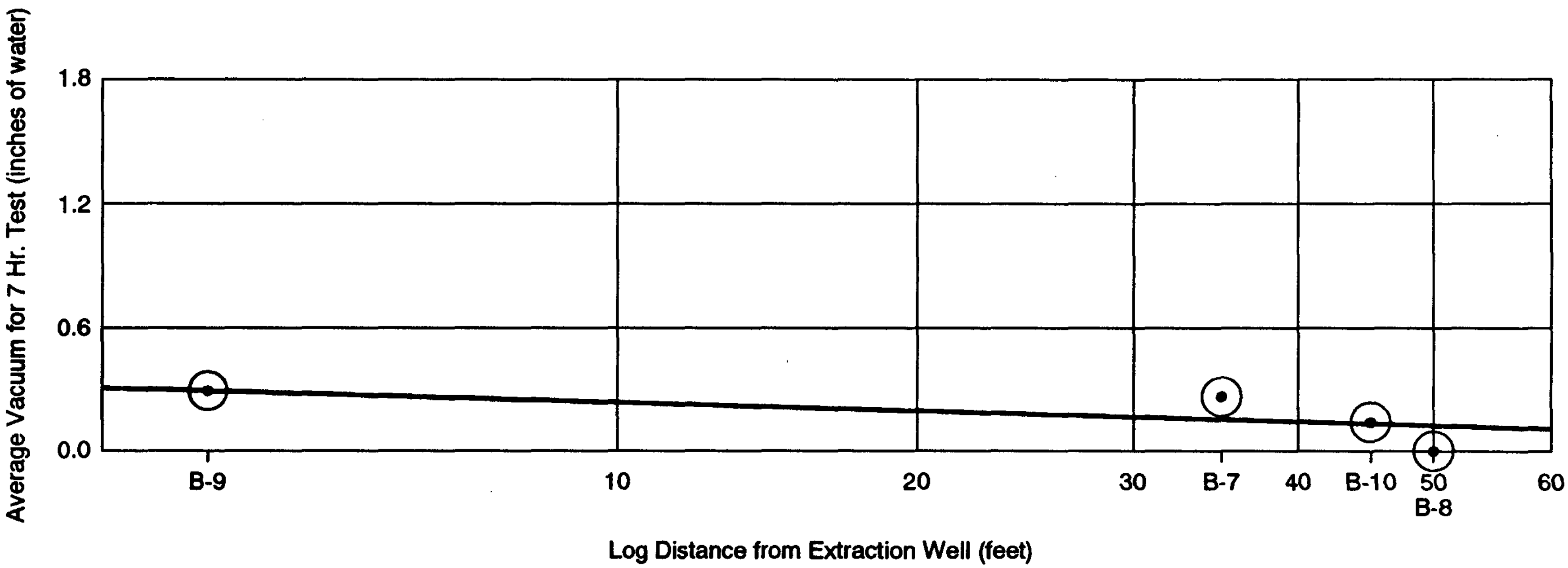


Extraction rate = 53.1 CFM at VEW-2.

Soil vapor probes positioned 15 to 16 feet
below ground surface.

⊙ = Vacuum reading from indicated soil probe.
B-9

Graph 1
Change in Vacuum with Distance from Extraction Well
VES Pilot Test, Enron Liquid Fuels Company, Main Gas Processing Plant, Hobbs, New Mexico
November, 1992

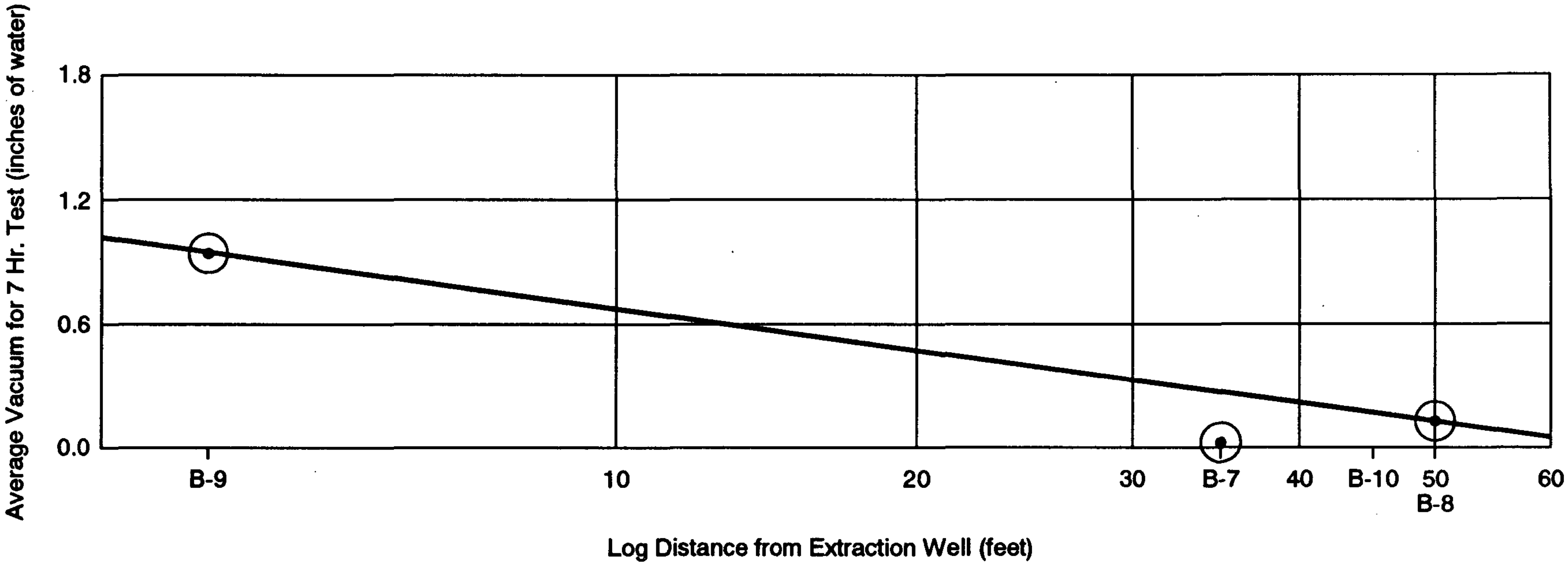


Extraction rate = 53.1 CFM at VEW-2.

Soil vapor probes positioned 27 to 32 feet
below ground surface.

⊙ = Vacuum reading from indicated soil probe.
B-9

Graph 2
Change in Vacuum with Distance from Extraction Well
VES Pilot Test, Enron Liquid Fuels Company, Main Gas Processing Plant, Hobbs, New Mexico
November, 1992

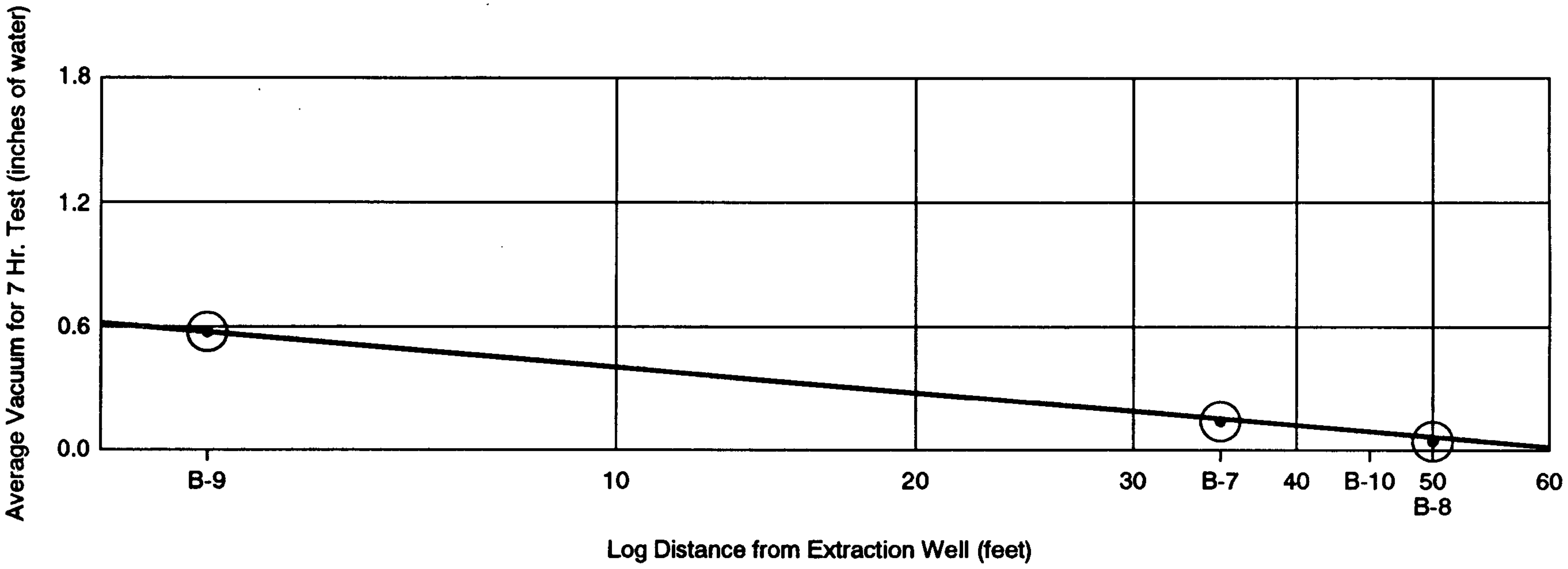


Extraction rate = 87.3 CFM at VEW-1.

Soil vapor probes positioned 9 to 10 feet
below ground surface.

⊙ = Vacuum reading from indicated soil probe.
B-9

Graph 3
Change in Vacuum with Distance from Extraction Well
VES Pilot Test, Enron Liquid Fuels Company, Main Gas Processing Plant, Hobbs, New Mexico
November, 1992



Extraction rate = 87.3 CFM at VEW-1.

Soil vapor probes positioned 15 to 16 feet
below ground surface.

⊙ = Vacuum reading from indicated soil probe.
B-9

Graph 4
Change in Vacuum with Distance from Extraction Well
VES Pilot Test, Enron Liquid Fuels Company, Main Gas Processing Plant, Hobbs, New Mexico
November, 1992

Extraction rate = 87.3 CFM at VEW-1.

Soil vapor probes positioned 27 to 32 feet
below ground surface.

⊙ = Vacuum reading from indicated soil probe.
B-9

Graph 5
Change in Vacuum with Distance from Extraction Well
VES Pilot Test, Enron Liquid Fuels Company, Main Gas Processing Plant, Hobbs, New Mexico
November, 1992

APPENDIX
G

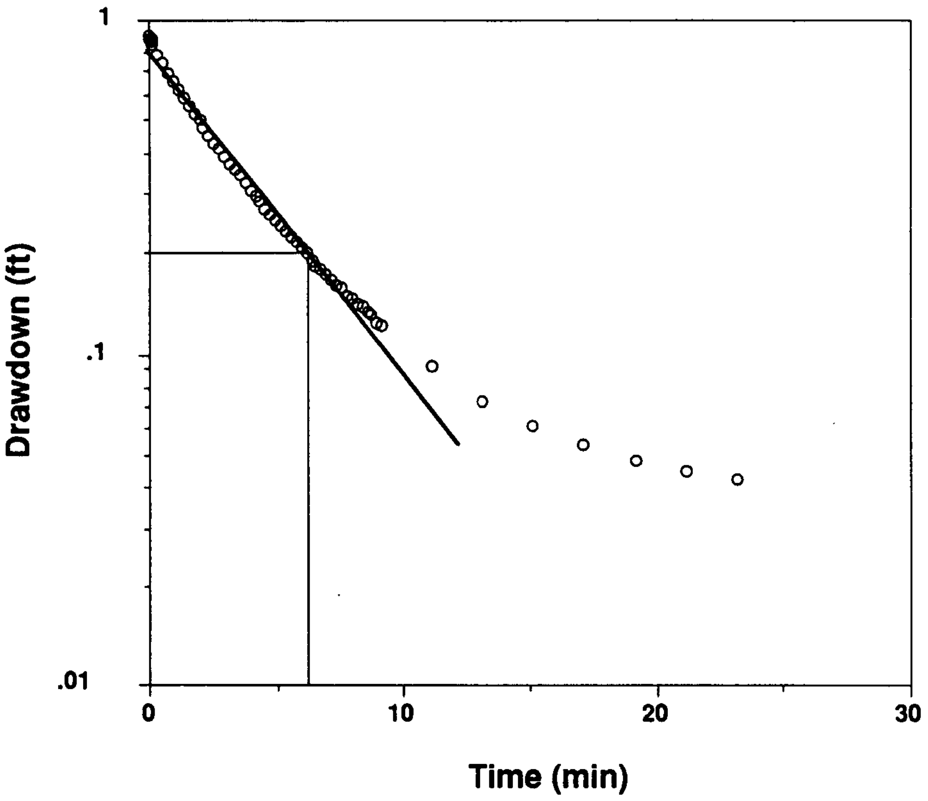
APPENDIX G

AQUIFER SLUG TEST DATA AND ANALYSIS CALCULATIONS

ENRON - HOBBS PLANT MW-4 Slug Test

INITIAL DRAWDOWN/BUILDUP, Y0 (ft)	0.9
DRAWDOWN/BUILDUP AT TIME T, YT (ft)	0.2
TIME, T (min)	6.15
SCREEN LENGTH, L (ft)	7.824
ESTIMATED INITIAL SATURATED THICKNESS, D (ft)	300
DISTANCE FROM BOTTOM OF SCREEN TO WATER TABLE, H (ft)	7.824
WELL RADIUS (INCLUDING GRAVEL PACK), RW (ft)	0.3333
CASING RADIUS, RC (ft)	0.1667
GRAVEL PACK POROSITY (0 IF SIMILAR TO FORMATION), N	0.35
NEW RC BASED ON GRAVEL PACK POROSITY (ft)	0.23862919
COEFFICIENT A	2.2
COEFFICIENT B	0.4
LN((D-H)/RW)	6.77606865
IF LN((D-H)/RW)>6 THEN SET IT EQUAL TO 6 HERE OTHERWISE COPY IT	6
LN(RE/RW)	2.79592044
ESTIMATE OF HYDRAULIC CONDUCTIVITY, K (ft/min)	0.00248833
ESTIMATE OF HYDRAULIC CONDUCTIVITY, K (ft/day)	3.58319682

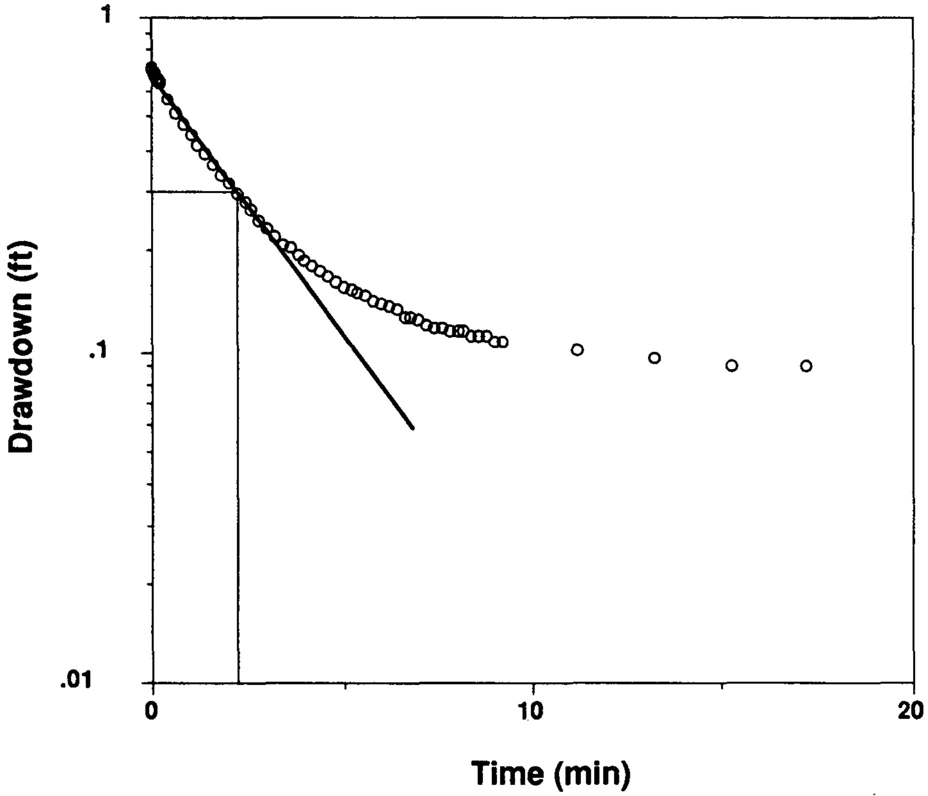
ENRON - HOBBS PLANT
MW-4 Slug Test



ENRON - HOBBS PLANT MW-5 Slug Test

INITIAL DRAWDOWN/BUILDUP, Y0 (ft)	0.7
DRAWDOWN/BUILDUP AT TIME T, YT (ft)	0.3
TIME, T (min)	2.2
SCREEN LENGTH, L (ft)	8.146
ESTIMATED INITIAL SATURATED THICKNESS, D (ft)	300
DISTANCE FROM BOTTOM OF SCREEN TO WATER TABLE, H (ft)	8.146
WELL RADIUS (INCLUDING GRAVEL PACK), RW (ft)	0.3333
CASING RADIUS, RC (ft)	0.1667
GRAVEL PACK POROSITY (0 IF SIMILAR TO FORMATION), N	0.35
NEW RC BASED ON GRAVEL PACK POROSITY (ft)	0.23862919
COEFFICIENT A	2.2
COEFFICIENT B	0.4
LN((D-H)/RW)	6.77496597
IF LN((D-H)/RW)>6 THEN SET IT EQUAL TO 6 HERE OTHERWISE COPY IT	6
LN(RE/RW)	2.85781241
ESTIMATE OF HYDRAULIC CONDUCTIVITY, K (ft/min)	0.00384698
ESTIMATE OF HYDRAULIC CONDUCTIVITY, K (ft/day)	5.53965054

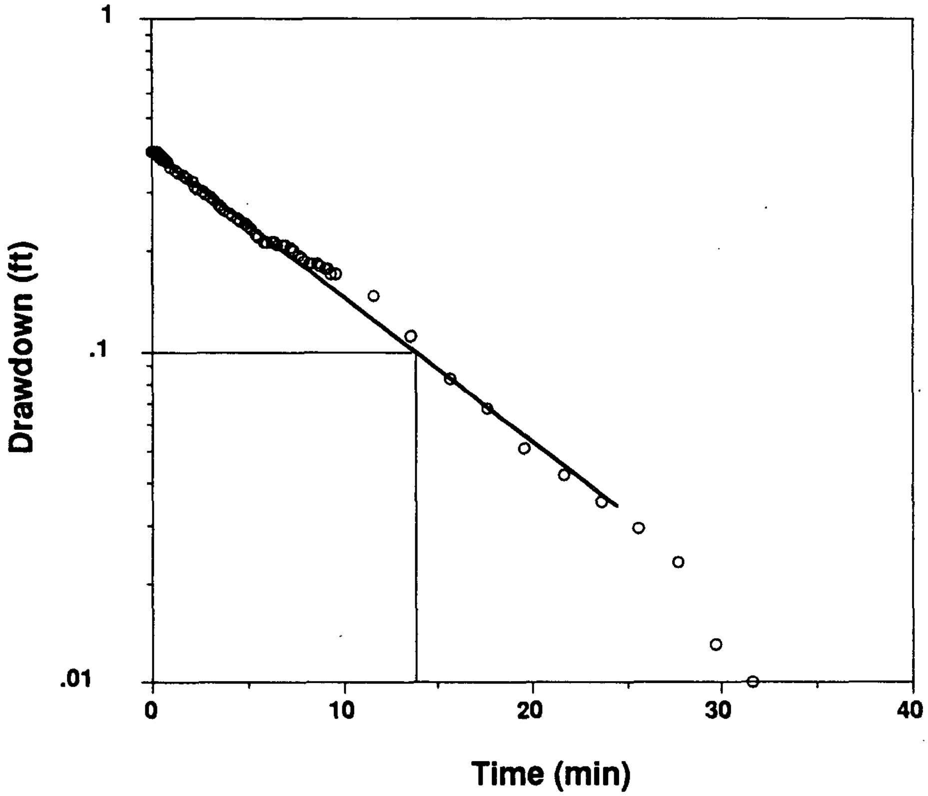
ENRON - HOBBS PLANT
MW-5 Slug Test



ENRON - HOBBS PLANT MW-6 Slug Test

INITIAL DRAWDOWN/BUILDUP, Y0 (ft)	0.4
DRAWDOWN/BUILDUP AT TIME T, YT (ft)	0.1
TIME, T (min)	14
SCREEN LENGTH, L (ft)	6.934
ESTIMATED INITIAL SATURATED THICKNESS, D (ft)	300
DISTANCE FROM BOTTOM OF SCREEN TO WATER TABLE, H (ft)	6.934
WELL RADIUS (INCLUDING GRAVEL PACK), RW (ft)	0.3333
CASING RADIUS, RC (ft)	0.1667
GRAVEL PACK POROSITY (0 IF SIMILAR TO FORMATION), N	0.35
NEW RC BASED ON GRAVEL PACK POROSITY (ft)	0.23862919
COEFFICIENT A	2.15
COEFFICIENT B	0.3
LN((D-H)/RW)	6.77911013
IF LN((D-H)/RW)>6 THEN SET IT EQUAL TO 6 HERE OTHERWISE COPY IT	6
LN(RE/RW)	2.84436775
ESTIMATE OF HYDRAULIC CONDUCTIVITY, K (ft/min)	0.0011565
ESTIMATE OF HYDRAULIC CONDUCTIVITY, K (ft/day)	1.66536318

ENRON - HOBBS PLANT
MW-6 Slug Test



APPENDIX
H

91A-9-91

APPENDIX H
SOIL GEOTECHNICAL ANALYSES

IT INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

Steve Raugust
IT Corporation
5301 Central Avenue N.E.
Suite 700
Alburquerque, New Mexico 87108

December 23, 1992

ETDC Project Number: **483500.056.01** **P.O. Number:** **93-069**
Job Number: **301573.001.06**

This is the Certificate of Analysis for the following samples:

Client Project ID: **Enron-Hobbs Plant**
Date Received by Lab: **November 2 & 3, 1992**
Number of Samples: **Nine (9)**
Sample Type: **Soil**

I. Introduction/Case Narrative

Nine soil samples were received by IT/ETDC on November 2 and 3, 1992 for analysis of particle size distribution, moisture content, air permeability, constant head permeability, and porosity. Not all samples required all test parameters.

Please see Appendix A, the Sample Number Cross Reference List; Appendix B, the Analysis Results; and Appendix C, the Chain of Custody and Request for Analysis Records.

Reviewed and Approved:

Leamon

Beverly L. Leamon
Project Manager, Geotechnical Services

American Council of Independent Laboratories
International Association of Environmental Testing Laboratories
American Association for Laboratory Accreditation

IT Analytical Services • 1570 Bear Creek Road, Kingston, TN 37763 • (615) 482-6497

II. Analytical Results/Methodology

REFERENCES: Annual Book of ASTM Standards, Section 4, Construction, Volume 04.08, Soil and Rock; Dimension Stone; Geosynthetics. Army Corps of Engineers Laboratory Soils Testing, EM1110-2-1906.

Particle Size Distribution	**ASTM D 422**
Moisture Content	**ASTM D 2216**
Permeability of Rocks by Flowing Air	**ASTM D 4525**
Constant Head Permeability	**ASTM D 5084**
Porosity	**EM1110-2-1906, Appendix II**

III. Quality Control

Quality control checks such as duplicates and spikes (QC samples), are not normally applicable to geotechnical testing. This is due to the inability of obtaining samples with known characteristics, the heterogenous nature of the samples, and Quality Control procedures built-in to the analytical method.

QC measures to ensure accuracy and precision of test results include the following:

- 100% verification on all numerical results - all raw data entries, transcriptions and calculations entered by lab technicians are checked, recalculated and verified. Most data calculations are performed by computer programs.
- Data validation through test reasonableness - summaries of all test results for individual reports are reviewed to determine the overall reasonableness of data and to determine the presence of any data that may be considered outliers.
- Quality control procedures are built into most standardized geotechnical procedures. For example, many analyses routinely call for a re-analysis, specifying an acceptance criteria.
- Routine instrument calibration - all instruments, gauges and equipment used in testing is calibrated on a routine basis. All instrument calibration follows ASTM or manufacturer guidelines.

- Maintenance of all past calibration records - records and certification documents of all instruments, gauges and equipment are updated routinely and maintained in the Quality Control Coordinators Quality/Operations files.
- Use of trained personnel for conducting tests - all technicians are trained in the application of standard laboratory procedures for geotechnical analyses as well as the quality assurance measures implemented by IT.

IV. Data Qualification

The referenced ASTM method (ASTM D 4525) was written for determination of permeability through rock core samples or well-indurated soils. Laboratory precision cannot be verified because the samples tested were composed of non-cohesive soil material.

Standard constant head permeability equipment was used with air as the permeant medium for the air permeability test. The flowing air pressure values which are given in the test data are gauge pressure readings. Barometric pressure readings were employed to determine entrance and exit pressure values which were used to calculate the coefficient of permeability values.

Specific gravities used to determine particle size/hydrometer results were assumed from specific gravities of sample material from the same location or station number, but not from the same sample numbers. Please see Particle Size/Moisture Content Analysis Results for reference.

ETDC-3113 contained sample material which was inadequate to perform a representative density measurement on. The given porosity value for ETDC-3113 was determined from measurements taken by remolding the sample material. For this reason, accuracy of the porosity value can not be related to an actual in-place field soil porosity for this sample.

A porosity value was determined on ETDC-3114 since an accurate porosity value could not be determined from ETDC-3113. Although the two samples were taken from different depths, according to the COC/RFA Record, ETDC-3114 represents material from the same location as ETDC-3113.

Appendix A

CROSS-REFERENCE LIST

ETDC SAMPLE NO.	CLIENT SAMPLE NO.
ETDC-3097	MW-5-11.5
ETDC-3098	MW-5-16.5
ETDC-3113	B-8-10.5
ETDC-3114	B-8-11.0
ETDC-3115	B-8-12.0
ETDC-3116	MW-4-45.0
ETDC-3117	MW-4-45.5
ETDC-3118	MW-4-46.0
ETDC-3119	MW-4-46.5

Appendix B

PARTICLE SIZE/MOISTURE CONTENT ANALYSIS RESULTS

PROJECT NAME: ENRON-HOBBS PLANT
PROJECT NO.: 483500.056.01
CUST. SAMPLE NO.: MW-5-11.5
ETDC SAMPLE NO.: ETDC-3097
SPECIFIC GRAVITY: 2.6703 (ASSUMED)*

USCS SYMBOL: NOT REQUESTED
WATER CONTENT, %: 17.5
LIQUID LIMIT: NOT REQUESTED
PLASTICITY INDEX: NOT REQUESTED

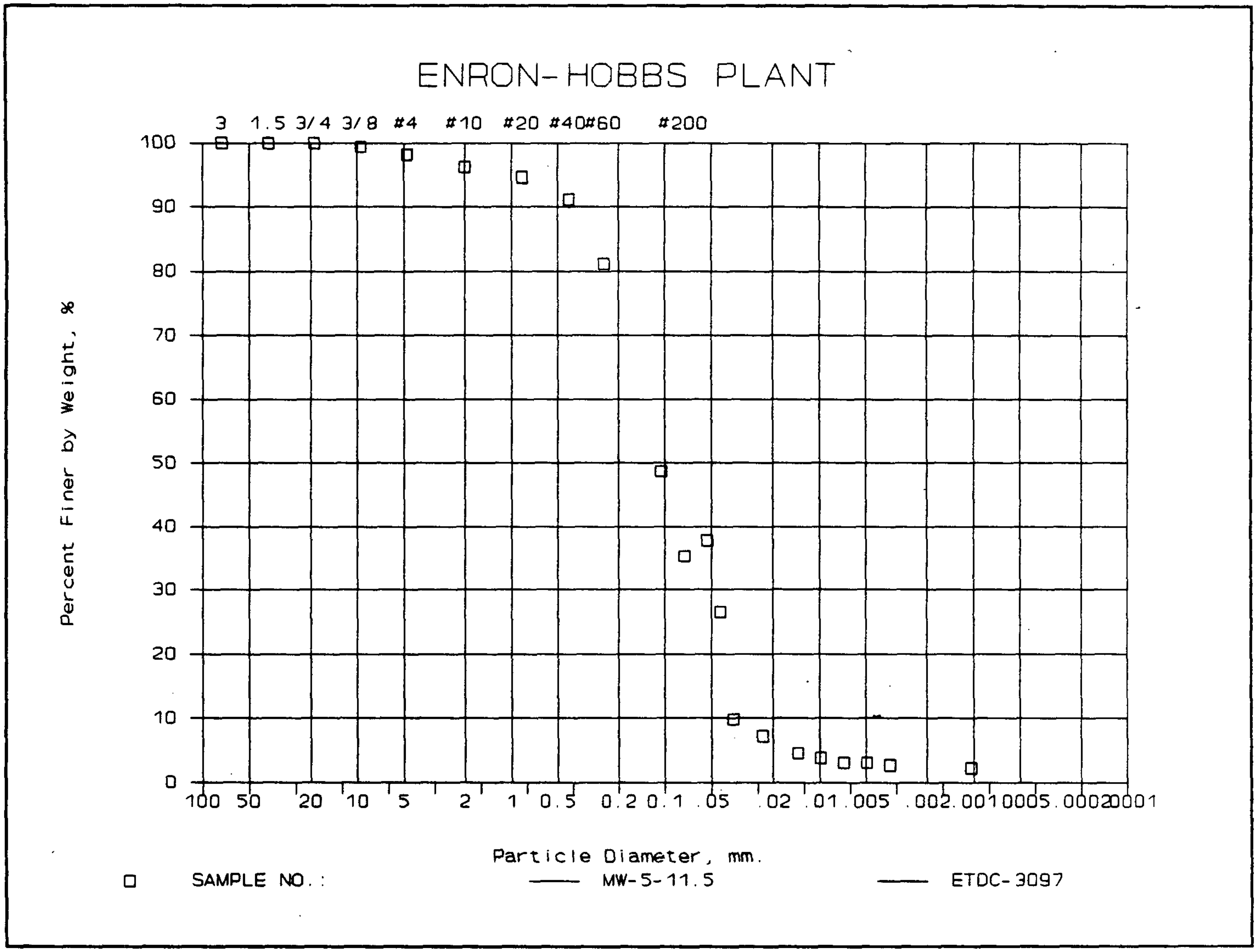
SIEVE ANALYSIS

SIEVE NO.	DIAMETER (mm)	PERCENT FINER (%)
3.0 in	75.000	100.0
1.5 in	37.500	100.0
0.75 in	19.000	100.0
0.375 in	9.500	99.5
NO. 4	4.750	98.2
NO. 10	2.000	96.3
NO. 20	0.850	94.6
NO. 40	0.425	91.1
NO. 60	0.250	81.2
NO. 140	0.106	48.7
NO. 200	0.075	35.4

HYDROMETER ANALYSIS

DIAMETER (mm)	PERCENT FINER (%)
0.0535	37.8
0.0436	26.5
0.0361	9.8
0.0233	7.2
0.0138	4.5
0.0098	3.8
0.0069	3.0
0.0049	3.0
0.0035	2.6
0.0010	2.3

*SPECIFIC GRAVITY ASSUMED FROM VALUE CALCULATED FROM TEST PERFORMED ON ETDC-3098.


ENRON-HOBBS PLANT
3
1.5
3/4
3/8
#4
#10
#20
#40
#60
#200
100
90
80
70
60
50
40
30
20
10
0
Percent Finer by Weight, %
100
50
20
10
5
2
1
0.5
0.2
0.1
.05
.02
.01
.005
.002
.001
.0005
.0002
.0001
Particle Diameter, mm.
□ SAMPLE NO.:
MW-5-11.5
ETDC-3097

PARTICLE SIZE/MOISTURE CONTENT ANALYSIS RESULTS

PROJECT NAME: ENRON-HOBBS PLANT
PROJECT NO.: 483500.056.01
CUST. SAMPLE NO.: B-8-12
ETDC SAMPLE NO.: ETDC-3115
SPECIFIC GRAVITY: 2.6871 (ASSUMED)*

USCS SYMBOL: NOT REQUESTED
WATER CONTENT, %: 12.0
LIQUID LIMIT: NOT REQUESTED
PLASTICITY INDEX: NOT REQUESTED

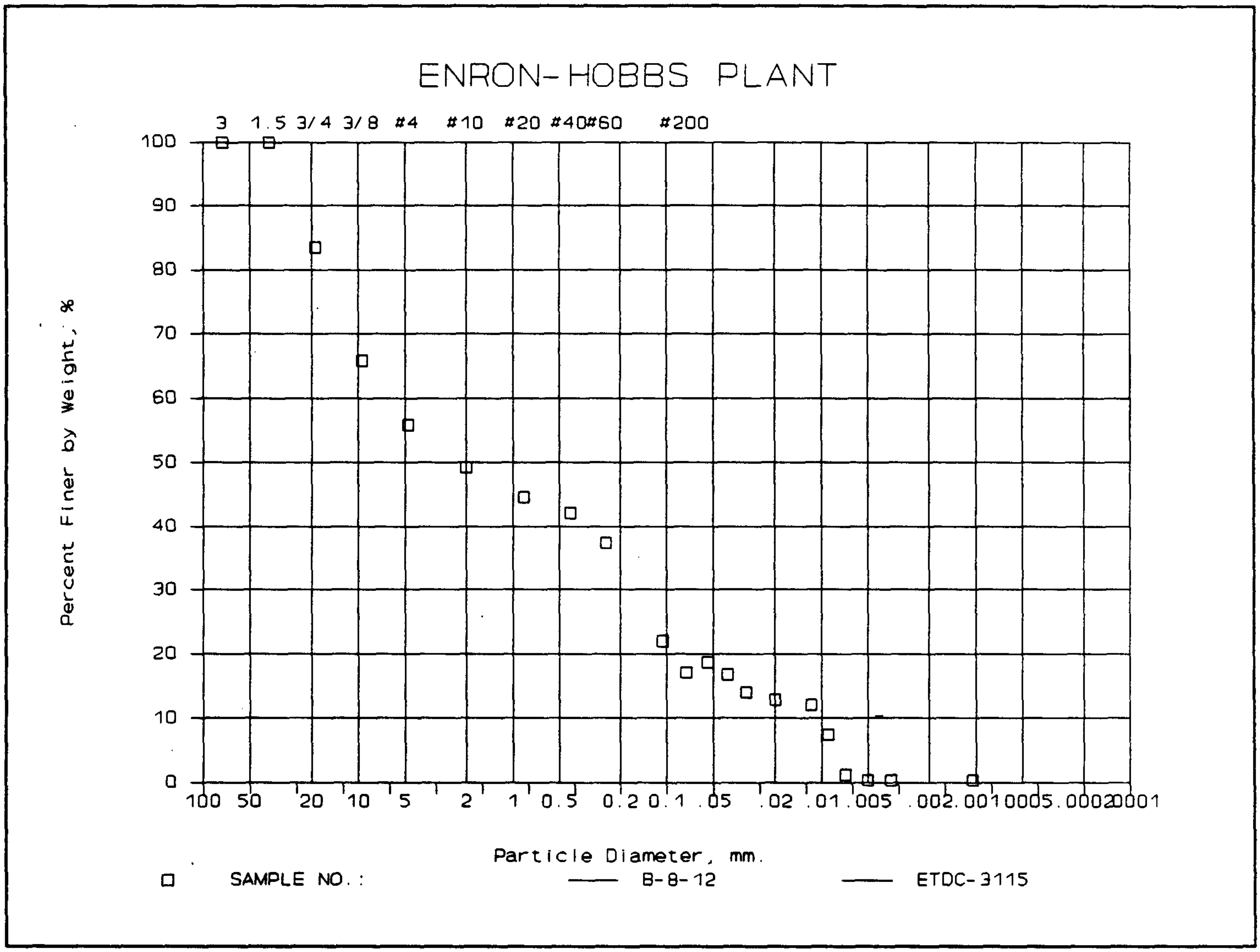
SIEVE ANALYSIS

SIEVE NO.	DIAMETER (mm)	PERCENT FINER (%)
3.0 in	75.000	100.0
1.5 in	37.500	100.0
0.75 in	19.000	83.5
0.375 in	9.500	65.8
NO. 4	4.750	55.9
NO. 10	2.000	49.2
NO. 20	0.850	44.6
NO. 40	0.425	42.1
NO. 60	0.250	37.4
NO. 140	0.106	22.0
NO. 200	0.075	17.1

HYDROMETER ANALYSIS

DIAMETER (mm)	PERCENT FINER (%)
0.0545	18.7
0.0405	16.8
0.0307	14.0
0.0199	12.9
0.0116	12.1
0.0090	7.4
0.0070	1.2
0.0050	0.4
0.0035	0.4
0.0011	0.4

*SPECIFIC GRAVITY ASSUMED FROM VALUE CALCULATED FROM TEST PERFORMED ON ETDC-3114.


ENRON-HOBBS PLANT
3
1.5
3/4
3/8
#4
#10
#20
#40
#60
#200
100
90
80
70
60
50
40
30
20
10
0
Percent Finer by Weight, %
100
50
20
10
5
2
1
0.5
0.2
0.1
.05
.02
.01
.005
.002
.001
.0005
.0002
.0001
Particle Diameter, mm.
□ SAMPLE NO.:
B-8-12
ETDC-3115

PARTICLE SIZE/MOISTURE CONTENT ANALYSIS RESULTS

PROJECT NAME: ENRON-HOBBS PLANT
PROJECT NO.: 483500.056.01
CUST. SAMPLE NO.: MW-4-45
ETDC SAMPLE NO.: ETDC-3116
SPECIFIC GRAVITY: 2.6483 (ASSUMED)

USCS SYMBOL: NOT REQUESTED
WATER CONTENT, %: 16.8
LIQUID LIMIT: NOT REQUESTED
PLASTICITY INDEX: NOT REQUESTED

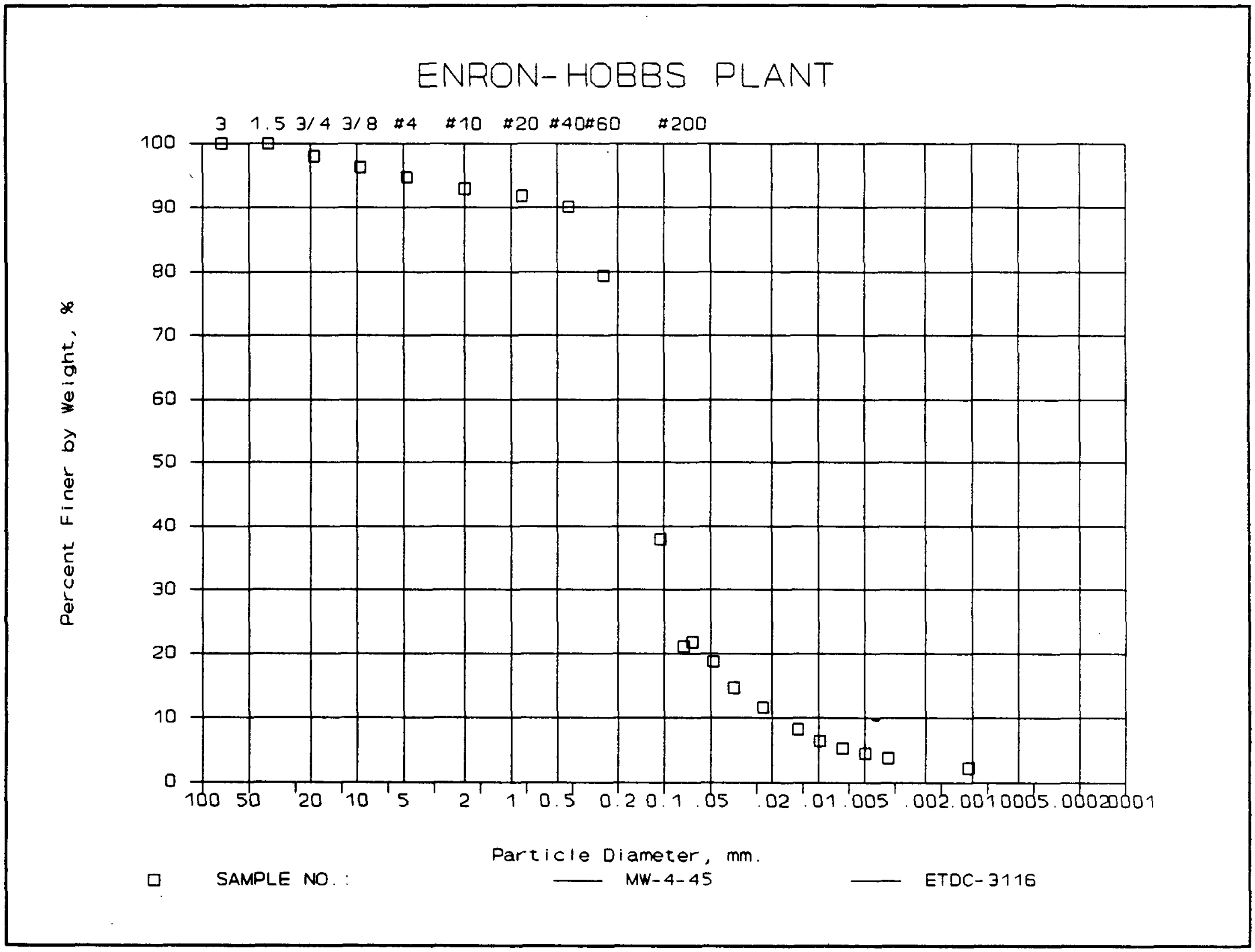
====================SIEVE ANALYSIS===================

SIEVE NO.	DIAMETER (mm)	PERCENT FINER (%)
3.0 in	75.000	100.0
1.5 in	37.500	100.0
0.75 in	19.000	98.0
0.375 in	9.500	96.3
NO. 4	4.750	94.7
NO. 10	2.000	93.0
NO. 20	0.850	91.9
NO. 40	0.425	90.1
NO. 60	0.250	79.4
NO. 140	0.106	38.0
NO. 200	0.075	21.1

==================HYDROMETER ANALYSIS================

DIAMETER (mm)	PERCENT FINER (%)
0.0657	21.8
0.0480	18.8
0.0352	14.6
0.0229	11.6
0.0136	8.3
0.0097	6.4
0.0069	5.3
0.0049	4.5
0.0035	3.8
0.0011	2.3

*SPECIFIC GRAVITY ASSUMED FROM VALUE CALCULATED FROM TEST PERFORMED ON ETDC-3118.


ENRON-HOBBS PLANT
3
1.5
3/4
3/8
#4
#10
#20
#40
#60
#200
100
90
80
70
60
50
40
30
20
10
0
Percent Finer by Weight, %
100
50
20
10
5
2
1
0.5
0.2
0.1
.05
.02
.01
.005
.002
.001
.0005
.0002
.0001
Particle Diameter, mm.
☐ SAMPLE NO.:
MW-4-45
ETDC-3116

AIR PERMEABILITY ANALYSIS RESULTS

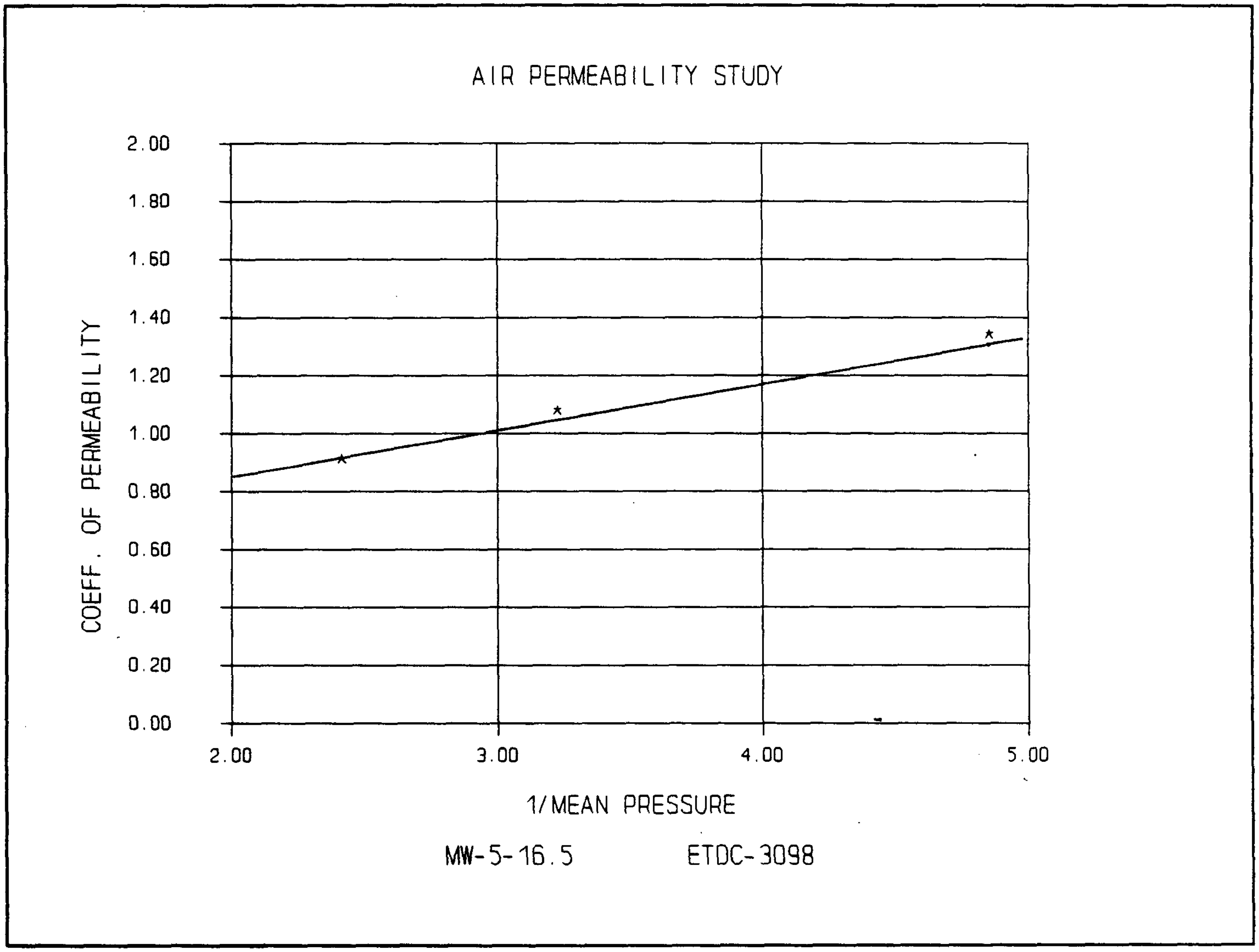
PROJECT NAME: Enron-Hobbs Plant
PROJECT NUMBER: 483500.056.01
CUSTOMER NUMBER: MW-5-11.5
ETDC SAMPLE NUMBER: ETDC-3098

SAMPLE LENGTH: 4.30 in.
SAMPLE DIAMETER: 2.42 in.

EQUATION OF LINE: y = 1.7 E-8(x) + 4.9 E-14

FLOWING PRESSURE (psi)	AVG. RECIPROCAL OF MEAN PRESSURE (pa^{-1})*	AVG. FLOW - QE (m^3/sec)	AVG. COEFF. OF PERMEABILITY (m^2)
90.0	2.42 E-6	3.37 E-4	0.90 E-13
60.0	3.23 E-6	2.01 E-4	1.07 E-13
30.0	4.86 E-6	0.82 E-4	1.33 E-13

*Pascals^{-1}



UNITS:

PERMEABILITY: E-13 M^2
1/MEAN PRESSURE: E-6 PA^{-1}

AIR PERMEABILITY ANALYSIS RESULTS

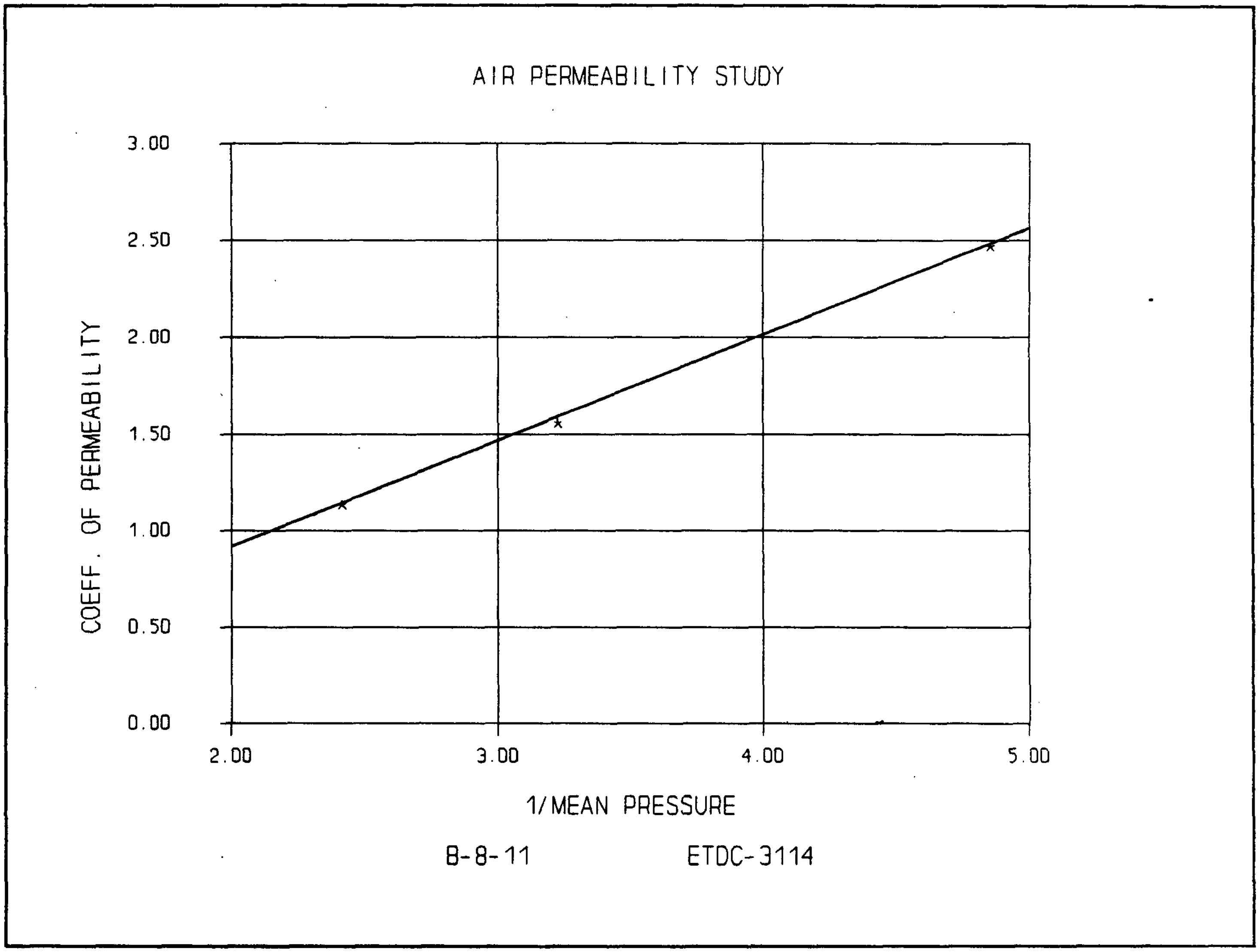
PROJECT NAME: Enron-Hobbs Plant
PROJECT NUMBER: 483500.056.01
CUSTOMER NUMBER: B-8-11
ETDC SAMPLE NUMBER: ETDC-3114

SAMPLE LENGTH: 2.78 in.
SAMPLE DIAMETER: 2.38 in.

EQUATION OF LINE: $y = 5.5\ E\text{-}8(x) - 2.1\ E\text{-}14$

FLOWING PRESSURE (psi)	AVG. RECIPROCAL OF MEAN PRESSURE (pa^{-1})*	AVG. FLOW - QE (m^3/sec)	AVG. COEFF. OF PERMEABILITY (m^2)
90.0	2.42 E-6	6.26 E-4	1.12 E-13
60.0	3.23 E-6	4.29 E-4	1.54 E-13
30.0	4.86 E-6	2.26 E-4	2.45 E-13

*Pascals^{-1}



UNITS:

PERMEABILITY: E-13 M^2
1/MEAN PRESSURE: E-6 PA^{-1}

CONSTANT HEAD PERMEABILITY ANALYSIS RESULTS

CLIENT NUMBER	ETDC SAMPLE NUMBER	PERMEABILITY (cm/sec)
MW-4-45.5	ETDC-3117	3.2 E-5

POROSITY ANALYSIS RESULTS

CLIENT NUMBER	ETDC SAMPLE NUMBER	POROSITY, %
MW-5-16.5	ETDC-3098	40.4
B-8-10.5	ETDC-3113	55.5
B-8-11.0	ETDC-3114	40.2
MW-4-46.0	ETDC-3118	34.9

DANIEL B. STEPHENS & ASSOCIATES, INC.
ENVIRONMENTAL SCIENTISTS AND ENGINEERS

SUPPLEMENTAL ENVIRONMENTAL INVESTIGATION
ENRON-HOBBS NATURAL GAS PROCESSING PLANT

Prepared for
ENRON Operations Corp.
Houston, Texas

February 14, 1994

6020 ACADEMY NE • SUITE 100 • ALBUQUERQUE, NM 87109 • (505) 822-9400

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EXECUTIVE SUMMARY

Daniel B. Stephens & Associates, Inc. was retained by ENRON Corporation to conduct a supplemental environmental investigation of soils and ground water at the ENRON-Hobbs Natural Gas Processing Plant, located in southeastern New Mexico. This environmental investigation supplements the previous investigations performed by IT Corporation in 1993 and Metric Corporation in 1991. The objective of this investigation was to characterize the distribution of volatile organic compounds in subsurface soils and ground water near the oil/water separator. A total of 19 borings were advanced to determine the areal extent of soil and ground-water contamination. Of these borings, 7 were used to determine the extent of impacted soils, 11 were drilled to delineate the extent of ground-water impacts, and 1 was used to determine the background-water quality.

Soils containing detectable concentrations of petroleum hydrocarbons are limited to a circular area with a radius of approximately 100 feet. Near the source area, soils are vertically impacted from approximately the land surface to the ground-water table, which is roughly 45 feet below land surface. The vertical extent of the remaining impacted soils varies from approximately 5 to 15 feet in thickness away from the source areas and is generally contained within the upper 30 feet of the soil column.

To delineate the extent of ground-water impacts, 1 monitor well and 10 temporary wells were installed. The temporary wells identified the areal extent of petroleum hydrocarbons in ground water. The actionable extent of benzene is limited to an elliptical plume extending approximately 420 feet southeast from the vicinity of the oil/water separator.

1. INTRODUCTION

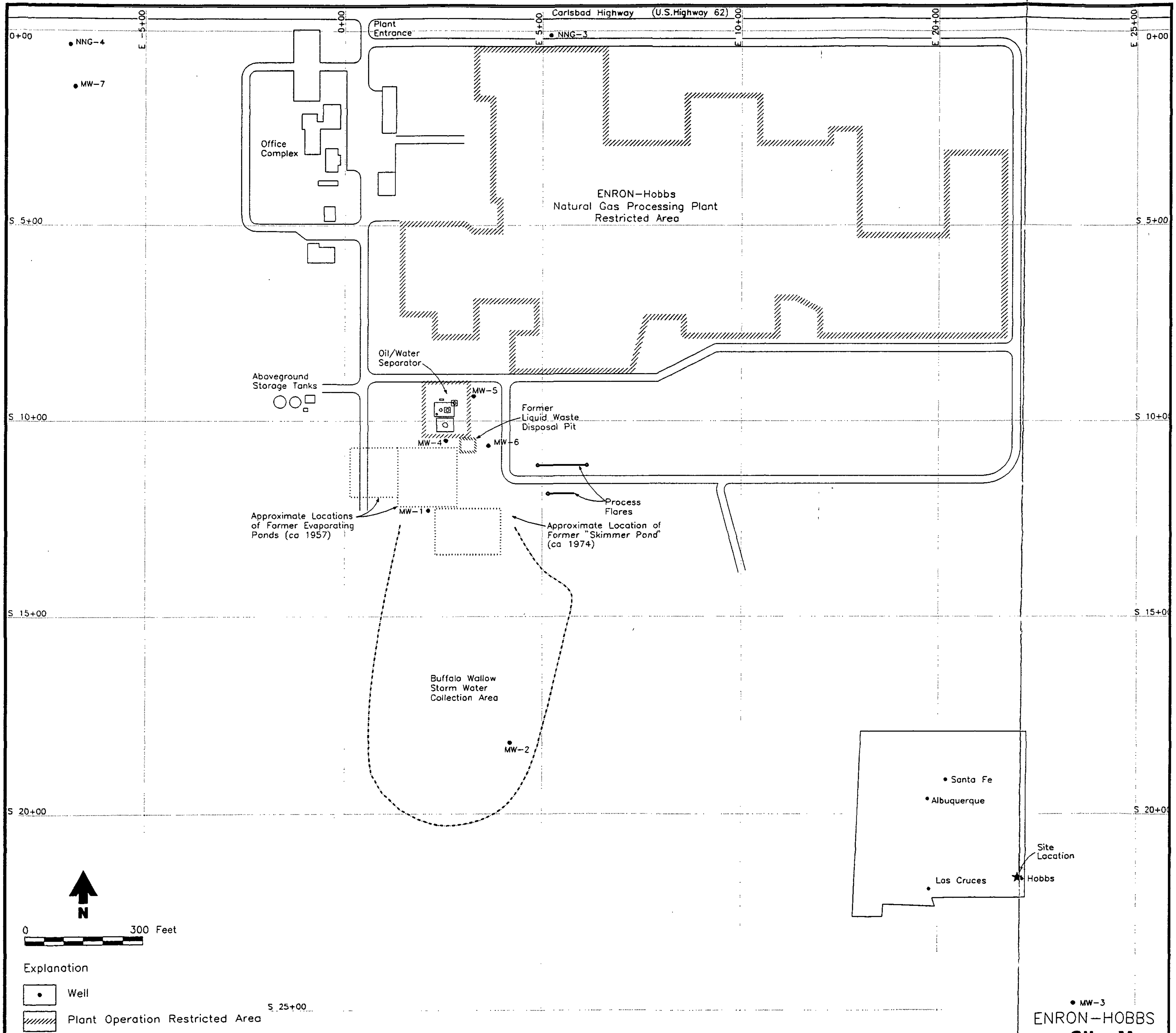
ENRON Corporation retained Daniel B. Stephens & Associates, Inc. (DBS&A) to conduct a supplemental environmental investigation (SEI) of the soils and ground water at the ENRON-Hobbs Natural Gas Processing Plant (Plant). The plant is located approximately 8 miles west of Hobbs, New Mexico along State Highway 62 (Figure 1). The objective of this investigation was to determine the subsurface distribution of volatile organic compounds (VOCs) near the oil/water separator and former liquid waste disposal pit.

In the past, the plant waste water was discharged to the former liquid waste disposal pit depicted on the site map (Figure 1). Historical aerial photographs indicate that excess waste water was stored at two evaporation ponds next to the former liquid waste disposal pit. A "skimmer pond," directly south of the evaporation ponds was used to remove the petroleum hydrocarbons. Apparently, these operations resulted in the release of VOCs to the subsurface.

Currently, the discharged waste water is routed to the oil/water separator located near the southwestern edge of the gas processing area. The hydrocarbons separated from the waste water are contained in aboveground tanks for proper disposal while the remaining water is piped to a permitted injection well. The bermed area directly south of the oil/water separator (referred to as the Buffalo Wallow on Figure 1) continues to retain surface-water run-off from the plant.

Previous hydrogeologic investigations identified impacts to soil and ground water underlying the former waste pit and oil/water separator area (Metric Corporation, 1991; IT Corporation, 1993). As discussed in these previous investigation reports, the plant is underlain by unconsolidated and consolidated sand, silt, and clay deposits which regionally comprise the Ogallala Formation of Pliocene Age. The Ogallala Formation is the major fresh-water bearing formation in southeastern New Mexico.

The first hydrogeologic investigation was performed by Metric Corporation in 1991. Metric advanced a total of 23 borings (BH-1 through BH-23) and installed 3 monitor wells (MW-1 through MW-3) to investigate subsurface conditions throughout the Plant area. Approximately 16 of their borings were located in the area surrounding the former waste pit (Figure 2). Soil samples

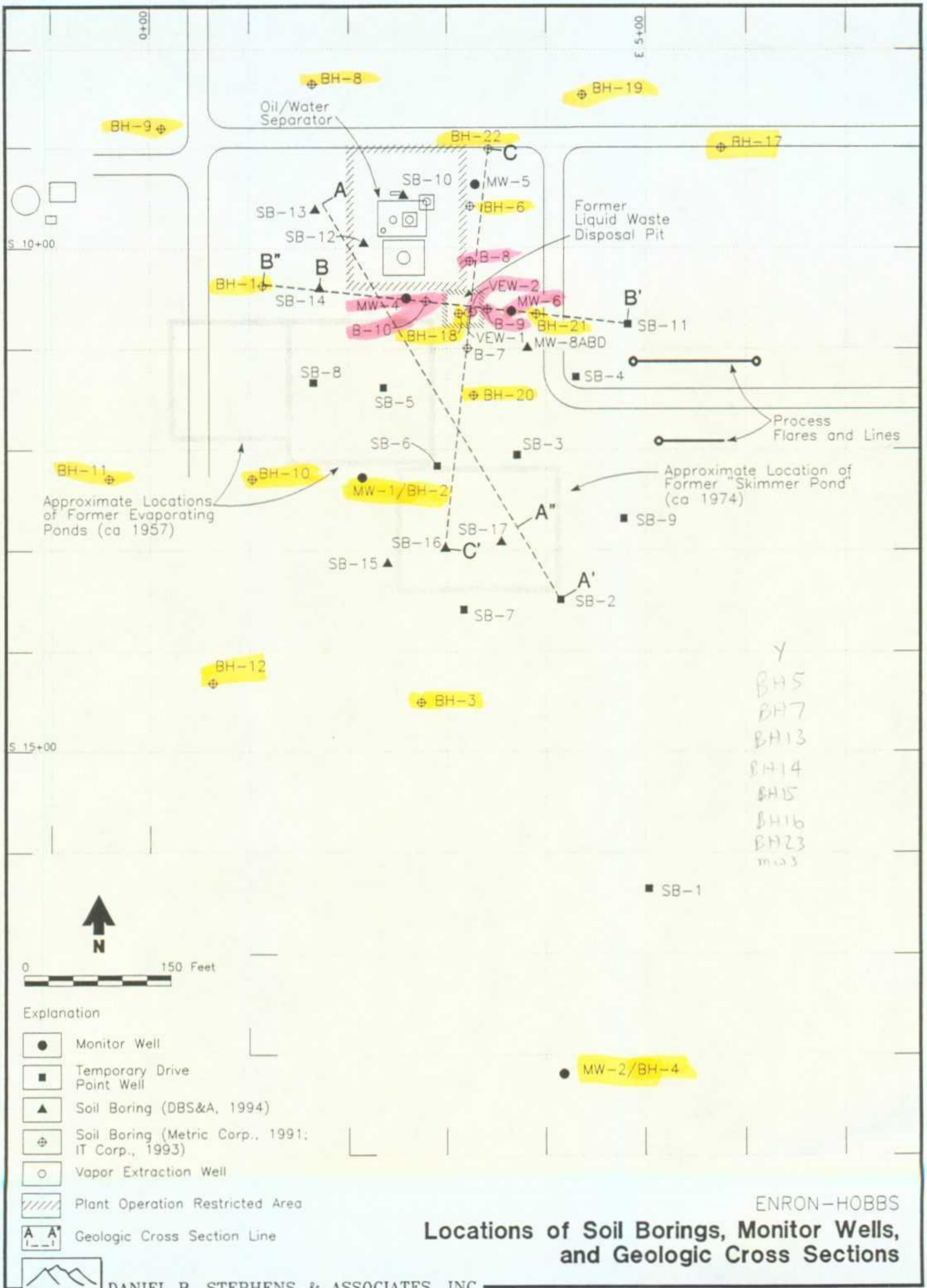


ENRON—HOBBS

Site Map

DANIEL B. STEPHENS & ASSOCIATES, INC.
2-94
JN 3260

Figure 1



Y
BH5
BH7
BH13
BH14
BH15
BH16
BH23
MW3

ENRON-HOBBS

Locations of Soil Borings, Monitor Wells, and Geologic Cross Sections

Figure 2

collected during drilling were analyzed for total petroleum hydrocarbons (TPH) and benzene, toluene, ethylbenzene, and xylene (BTEX). Regulatory standards set by the New Mexico Oil Conservation Division (OCD, 1993) for these compounds were exceeded only in BH-18, which is located at the approximate center of the former pit. Metric also analyzed soils and ground-water samples collected from monitor wells MW-1, MW-2, and MW-3 for purgeable halocarbons and the O-, F-, and M- series of the toxic characteristic leaching procedure (TCLP). For each sample, these analyses indicated that purgeable halocarbons were below detectable concentrations and that the TCLPs for organic and inorganic constituents yielded concentrations that were below regulatory standards.

In 1992 IT Corporation conducted an investigation of the area immediately surrounding the former disposal pit (IT Corporation, 1993). They found stained soils and hydrocarbon vapors in borings MW-4, MW-6, B-8, B-9, B-10, and VEW-2. TPH and BTEX results for soils and ground water indicated that the area close to the former pit contained organic concentrations above regulatory standards for soil. In addition to their drilling program, IT conducted two pilot soil vapor extraction (SVE) tests and performed hydraulic tests to determine the hydraulic properties of the upper portion of the aquifer.

Although the two previous investigations identified soil and ground-water impacts near the former pit, the extent of the actual impact remained to be defined. DBS&A conducted an SEI to determine the actionable soil and ground-water contamination resulting from prior releases within the former pit and the oil/water separator area. The DBS&A investigation included the following tasks:

- Sample five existing monitor wells and one plant supply well.
- Drill and install ten temporary drive point wells for acquisition of ground-water samples.
- Drill seven soil borings to determine the extent of impacted soils.
- Install and sample one upgradient monitor well to establish background water quality.

- Survey the location of new borings and establish the current ground-water flow direction.

This report provides a comprehensive accounting of the subsurface hydrocarbon distributions near the oil/water separator and former pit based on all available data. Section 2 describes the site investigation and local hydrogeology, and Section 3 discusses the distribution of subsurface contaminants. Finally, Section 4 summarizes the conclusions of the SEI.

2. OIL/WATER SEPARATOR AREA INVESTIGATION

DBS&A completed the SEI of the oil/water separator area in January 1994. In order to characterize the soil and identify the area(s) of contamination, seven soil borings were advanced to approximately 40 feet below ground surface (bgs), and soil samples were collected for chemical analysis. To characterize the extent of impacted ground water, 10 temporary wells were installed in the upper portion of the aquifer, and ground-water samples were collected for chemical analysis.

The locations of all soil borings and monitor wells installed during this and previous investigations of the oil/water separator area are shown on Figure 2. The locations of each boring advanced during this investigation and all monitor wells were surveyed in reference to the plant grid by John W. West Engineering Company, Hobbs, New Mexico (Table 1).

The following sections provide a discussion of the field activities undertaken to complete this SEI. Sections 2.1 through 2.4 provide general information regarding drilling and sampling activities. The data collected during the SEI is then incorporated into a discussion of the local hydrogeologic framework in Section 2.5.

2.1 Supplemental Soil Investigation

The supplemental soil investigation was undertaken to determine if the oil/water separator and former skimmer pond are actionable source areas. Drilling services were provided by Harrison Drilling Company (Harrison) and Eades Drilling Company (Eades), both of Hobbs, New Mexico, using hollow-stem auger and air rotary methods respectively. Drilling performed by Harrison using a Mobile Drill B-61 auger rig proved to be extremely slow due to the presence of well-cemented (calichified) layers at approximately 18 feet bgs. Consequently, auger drilling was terminated after attempting two soil borings (SB-10 and SB-12). The remaining five borings were drilled by Eades using a Midway-10 air rotary rig.

During drilling, soil samples were collected at 5-foot intervals by driving a split-spoon sampler into the undisturbed soil ahead of the borehole. Samples were used for lithologic descriptions and checked for the presence of VOCs. Appendix A contains lithologic logs produced for each soil and ground-water sampling boring advanced during the SEI. All sampling equipment was decontaminated prior to each use by washing with Liquinox® detergent followed by a deionized water rinse. Drilling equipment was steam-cleaned and inspected by DBS&A personnel before drilling each boring.

Soil samples were analyzed in the field for volatile organic vapors using an organic vapor meter equipped with a photoionization detector (PID). The sample yielding the highest PID reading above background measurements and/or the sample from the bottom of each boring was retained for laboratory analysis for BTEX (by EPA method 8020) and TPH (C_6-C_{16} range by EPA method 8015 modified). Soil samples were placed in clean soil jars with Teflon caps, packed on ice, and delivered to Analytical Technologies, Inc. (ATI) in Albuquerque, New Mexico, for analysis. All samples delivered to ATI were accompanied by chain-of-custody forms. Field measurable vapor concentrations were not detected in several borings from the ground surface to the total drilled depth; therefore, no soil samples from these borings were sent to ATI for analysis. Table 2 provides a summary of the TPH and BTEX concentrations measured in soils sampled by DBS&A and previous investigators. Appendix B contains the ATI analytical chemistry report for the SEI.

All drill cuttings were field tested for volatile organics using the PID. Those with concentrations above the 100 ppm limits set forth in the *Unlined Surface Impoundment Closure Guidelines* (OCD, 1993) were containerized for appropriate disposal. Cuttings below the applicable regulatory guidelines were spread around the boring. Each boring was filled with a cement-bentonite slurry.

2.2 Ground-Water Plume Delineation

During the plume delineation, Eades installed ten borings using a Midway-10 air-rotary drill rig. Drill cuttings were collected at 5-foot intervals for geologic descriptions (Appendix A). Additionally, as described in Section 2.1, drill duttings were field tested with a PID and were properly contained when field screening detected VOCs above the 100-ppm regulatory guideline set by OCD.

Each boring was advanced to the water table, whereupon a temporary drive point well was installed to collect a ground-water sample from the upper 3 to 5 feet of the aquifer. The locations of the temporary wells are shown on Figure 2. The first three borings (SB-1, SB-2, and SB-3) were drilled along a line extending directly downgradient from the former waste pit. The direction of ground-water flow was determined from depth to water measurements in monitor wells in the vicinity of the oil/water separator (Table 1). The lateral extent of organic constituents was further explored along several east-west lines.

The ground-water sampling device used to delineate subsurface impacts consisted of a 2-inch-diameter galvanized steel pipe attached to a drive point. The drive point was constructed of stainless steel wire-wrapped screen. Approximately 45 feet of 2-inch-diameter galvanized steel casing was attached to the drive point for hydraulically pushing the drive point and allowing access to the screened interval for collection of ground-water samples.

After the sampling device was installed, the drill rig moved off-hole and proceeded with decontamination prior to setting up at the next drilling location. A second drive point was used in the next boring. Each sampling device was thoroughly decontaminated using a steam cleaner prior to entry into another borehole. One field equipment blank was collected by running deionized water through the screened portion of the sampling device and collecting a sample of the run-off. The field blank was included with the other ground-water samples for BTEX and TPH analyses to verify that the sampling device was decontaminated between borings.

Prior to sample collection, each drive point was purged of at least three casing volumes to ensure that samples were representative of aquifer water. Electrical conductivity, temperature, and pH were measured every half casing volume to evaluate the effectiveness of the purging process. After purging, ground-water samples were collected by hand using dedicated, disposable polyethylene bailers. The ground-water samples were shipped to ATI in Albuquerque on Mesa Airlines and analyzed immediately for BTEX and TPH (C_6-C_{16}) by EPA methods 8020 and modified 8015 respectively. ATI provided DBS&A with facsimile copies of the analytical results within 24 hours of sample collection. The analytical results were used to determine the locations of subsequent boreholes.

2.3 Monitor Well Construction

One monitor well (MW-7) was installed in the northwest corner of the plant to serve as an indicator of background water quality (Figure 1). The monitor well was constructed using 25 feet of 2-inch 0.010-slot polyvinyl chloride (PVC) screen, 35 feet of flush-threaded 2-inch PVC blank casing, 12-20 silica sand filter pack, and a cement-bentonite grout seal from the top of the filter pack to ground surface. Additional construction details are provided in Appendix A. Following well completion, the well was developed by the surge and bail method until the field parameters (pH, temperature, and electrical conductivity) stabilized and the well yielded relatively sediment-free ground water.

2.4 Sampling of Monitor Wells

Ground-water samples were collected from all monitor wells installed by previous investigators with the exception of MW-3, the newly installed upgradient monitor well (MW-7), and one upgradient water supply well (NNG-4). MW-3 is located outside the area investigated during the SEI. Samples were analyzed for BTEX (EPA method 8020) and TPH (EPA method 8015 modified). In addition, monitor wells MW-4 and MW-6 were analyzed for halogenated organic compounds and the full TPH range by EPA methods 8010 and 8015 (C_6-C_{36} range) respectively. Samples for inorganic analysis were collected from MW-4, MW-7, and NNG-4 and analyzed for major ions, total dissolved solids (TDS), and the 8-RCRA metals. All samples were analyzed by ATI.

Prior to sampling, each monitor well was purged using a dedicated disposable bailer, and the water supply well was pumped for approximately 45 minutes at 16 gallons per minute to ensure that samples were representative of aquifer water. During purging, field parameters were measured and recorded every half casing volume; samples were collected after field parameters stabilized. A program of trip blanks, field equipment blanks, and sample replicates was implemented to ensure intralaboratory precision during the entire investigation. The field equipment blank was collected as described in Section 2.2.

Tables 3 and 4 provide summaries of the analytical results from the ground-water samples collected during this SEI and during the previous two investigations (Metric Corporation, 1991; IT Corporation, 1993). Appendix B contains the ATI report with the supporting quality assurance and chain of custody documents.

2.5 Local Hydrogeology

The site is underlain by unconsolidated and consolidated sand, silt, and clay deposits, which regionally comprise the Ogallala Formation. On-site, the base of the Ogallala Formation is approximately 170 feet bgs based on the available driller's logs for the site water supply wells. The depth to ground-water near the oil/water separator is approximately 44 feet bgs based on January 1994 measurements by DBS&A. Therefore, the saturated thickness of the Ogallala aquifer is approximately 125 feet at the site.

The Ogallala Formation near Hobbs, New Mexico is often capped by a layer of well hardened caliche which grades into underlying fine-grained sands (Nicholson and Clebsch, 1961). IT Corporation (1993) suggested that the strongly cemented sand units encountered at approximately 20 feet beneath the site mark the transition from alluvium into the Ogallala Formation. Nicholson and Clebsch (1961) have described the Ogallala Formation as chiefly a calcareous, unconsolidated sand that contains some clay, silt, gravel, and beds of well-consolidated sandstone.

The information gathered from the soil borings advanced by DBS&A (Appendix A) was consistent with the above lithologic description. As determined by the SEI, the lithology under the site is as follows:

- From the ground surface to a depth of approximately 15 to 25 feet bgs, a white to pale brown calcareous sandy silt with highly calcareous clayey lenses was encountered. The sandy silt grades into pink to light brown silty sand and fine sands that contain numerous strongly cemented layers of sandstone.

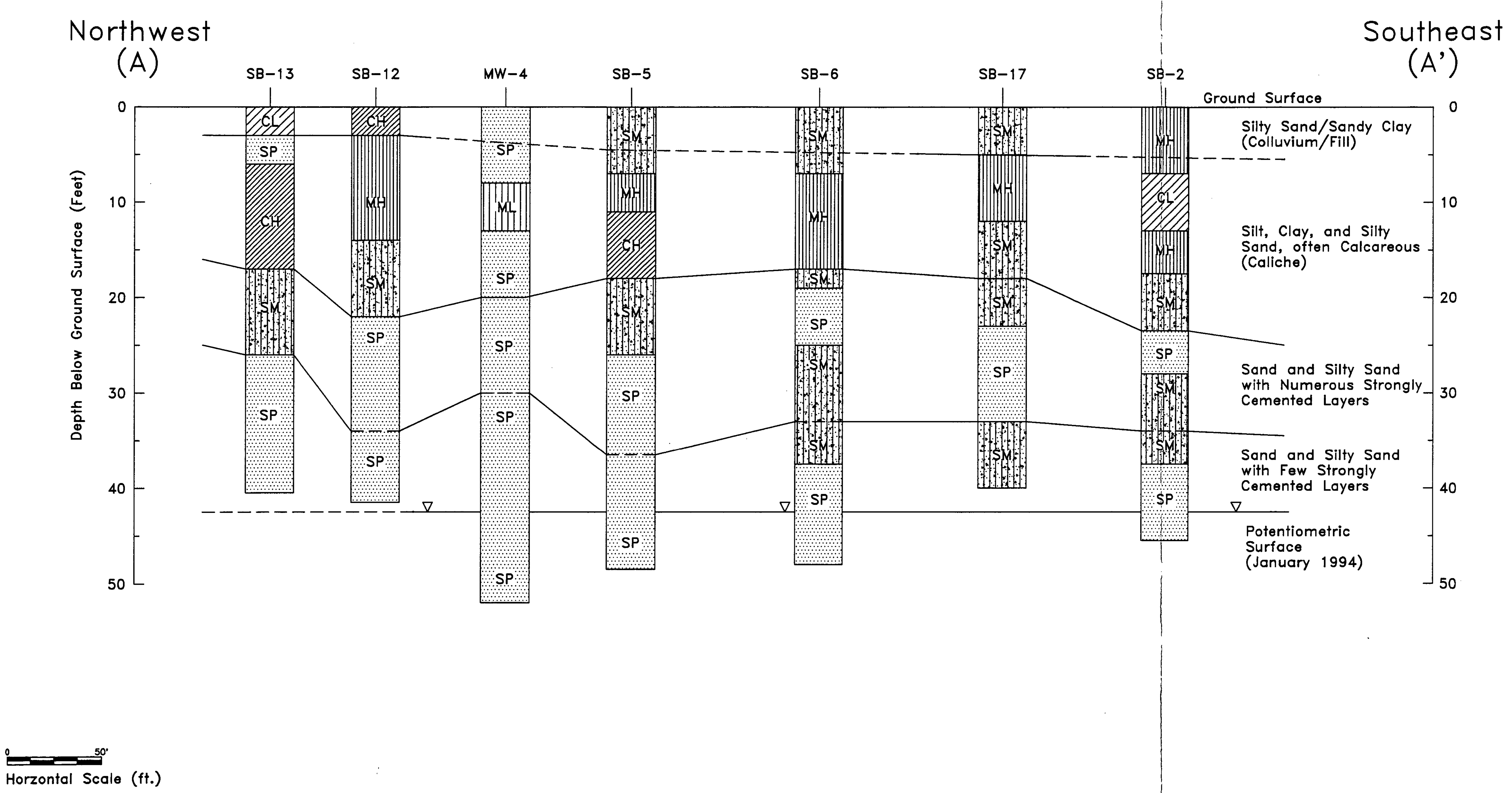
- At depths of approximately 25 to 35 feet bgs, a light brown to reddish-brown, clean, mostly unconsolidated, well-sorted sand with fewer and thinner cemented layers is present.

- From approximately 35 to 45 feet bgs, a light brown to reddish-brown, clean, unconsolidated, well-sorted sand with infrequent cemented layers is present.

Two geologic cross sections were developed using DBS&A and IT lithologic descriptions (Figures 3 and 4); Figure 2 shows the cross section locations. The soil types found in each boring were defined using the Unified Soil Classification System (USCS), symbols for which are defined in Appendix A.

In 1989, DBS&A compiled the available water level data for wells within a 5-mile radius of the plant and determined that regional ground-water flow is toward the southeast (DBS&A, 1989). A map of regional water table elevations is provided in Figure 5. Water levels measured in the monitor wells during the SEI confirm that the ground-water flow is toward the southeast (Figure 6); however, the on-site direction of ground-water flow appears to be approximately 25 degrees south of the regional flow direction. The discrepancy in flow direction may result from the scale of the investigation area and local heterogeneities in geology that affect flow direction, and/or possibly from an insufficient number of on-site monitor wells for determination of hydraulic gradient.

The local ground-water gradient decreases in the direction of flow from approximately 0.008 ft/ft near the oil/water separator to 0.003 ft/ft beneath the Buffalo Wallow (Figure 6). The change in gradient may be the result of an increase in hydraulic conductivity. Hydraulic testing conducted by IT Corporation (1993) indicated that the upper Ogallala Aquifer is moderately permeable with hydraulic conductivity values on the order of 10^{-3} cm/sec. This value is consistent with published values for fine sands (Freeze and Cherry, 1979).



SP USCS Code Symbol

Note: All Information on MW-4
from IT Corporation (1993)

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Geologic Cross Section A-A'

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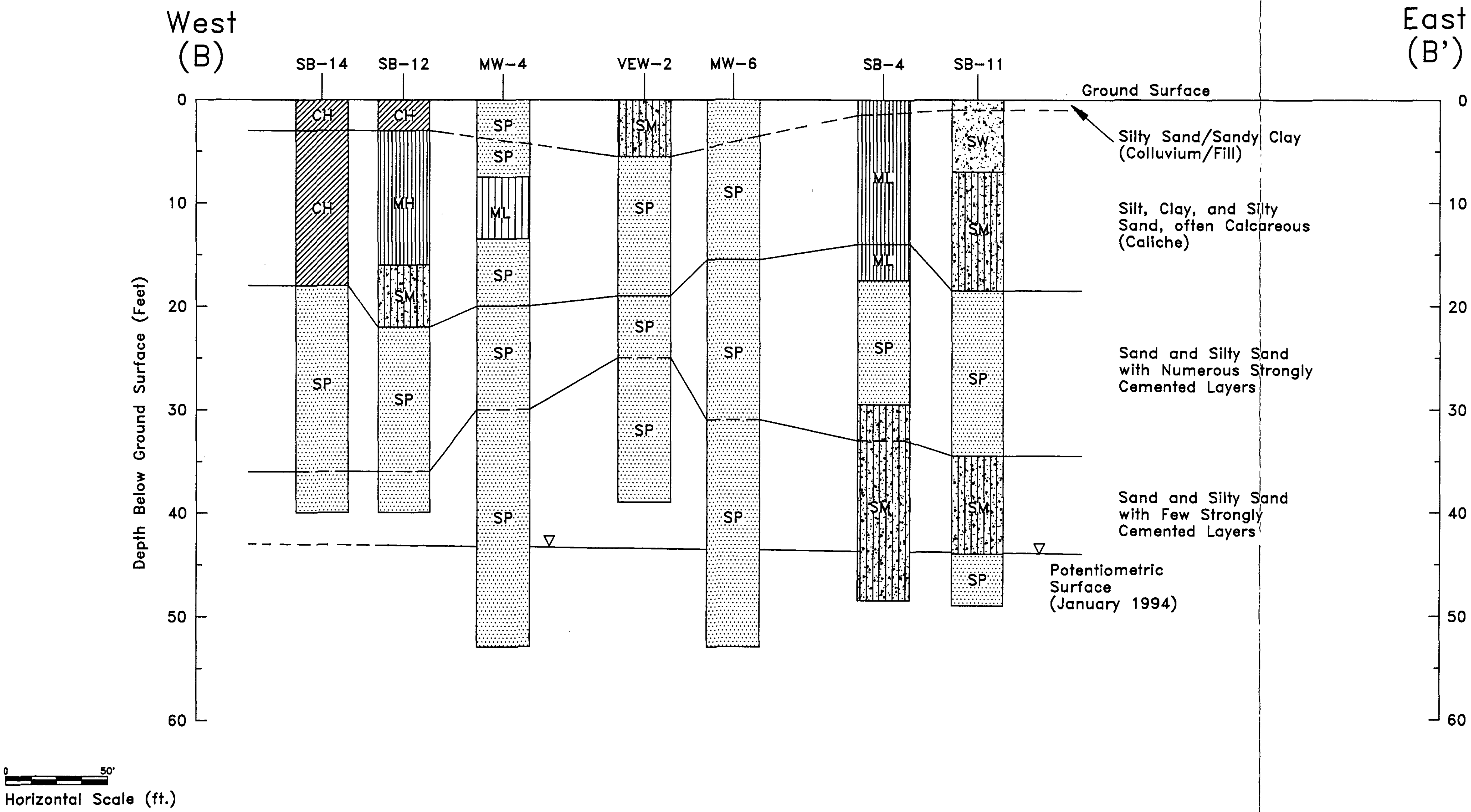
Figure 3



SP USCS Classification Code Symbol

Note: All Information on MW-4, MW-6, and VEW-2 from IT Corporation (1993)

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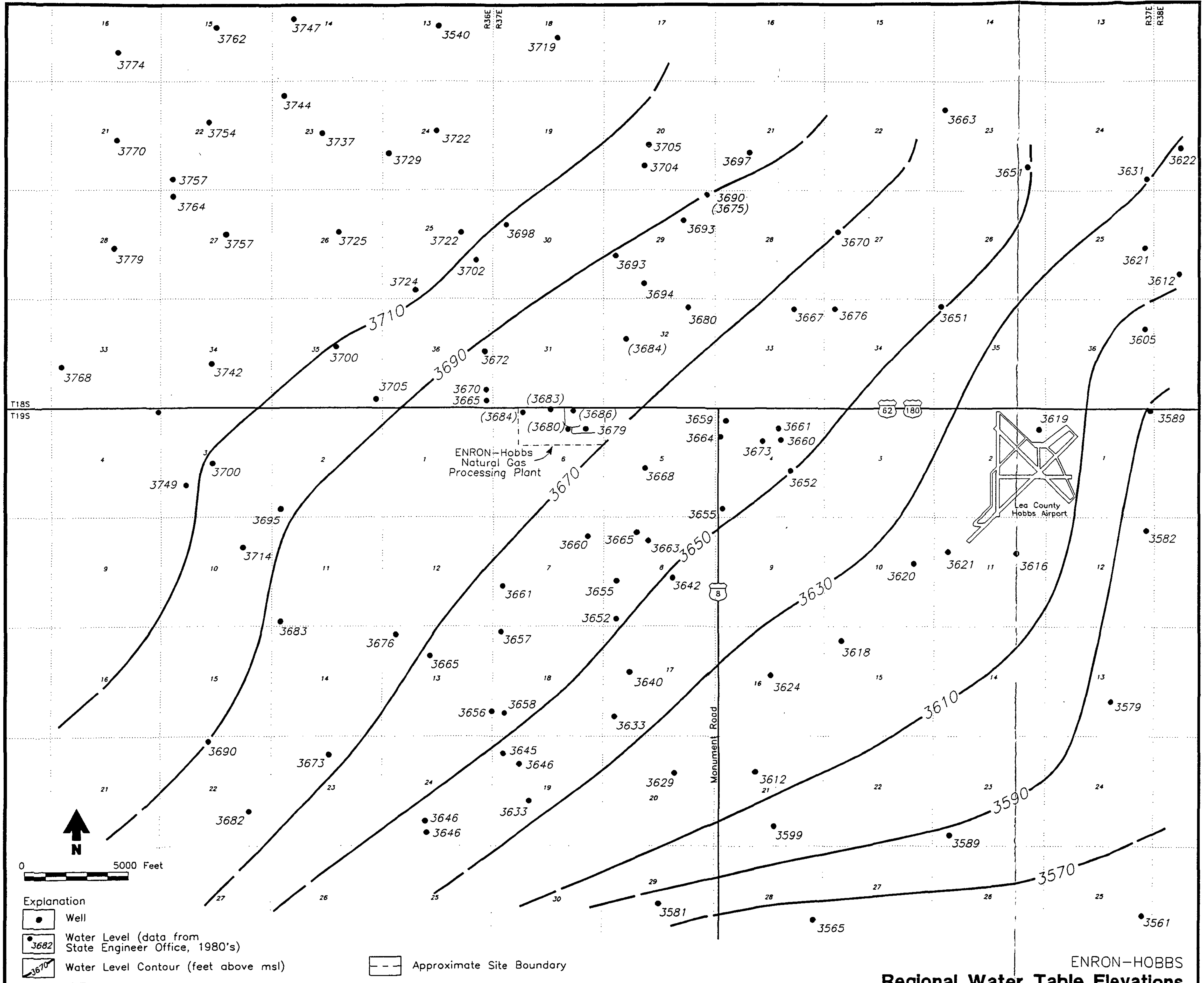
Geologic Cross Section B-B'

Figure 4



Explanation

●	Well
3682	Water Level (data from State Engineer Office, 1980's)
3670	Water Level Contour (feet above msl)
- - -	Approximate Site Boundary

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Regional Water Table Elevations

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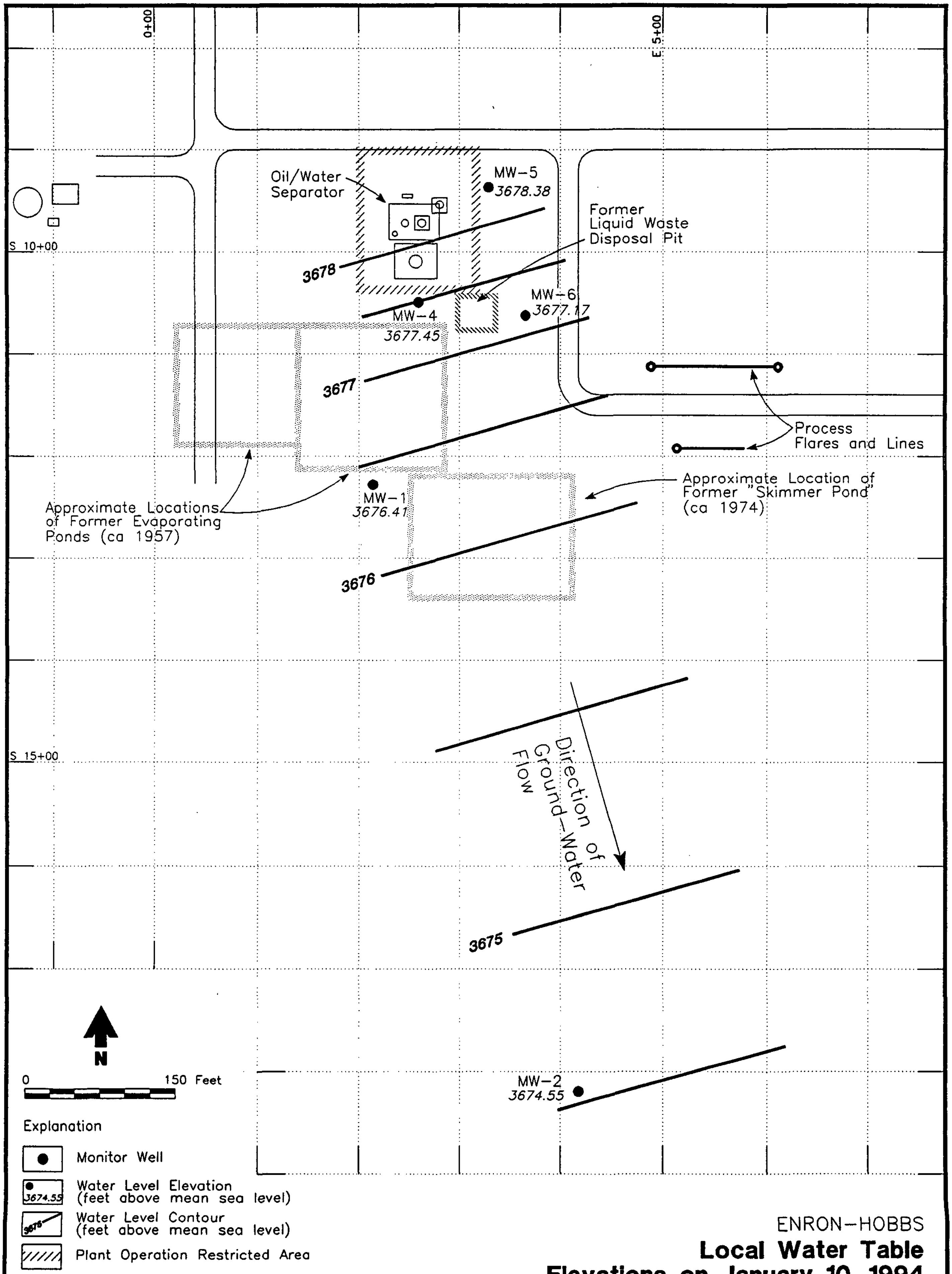
Figure 5



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Local Water Table Elevations on January 10, 1994

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Figure 6

3. DISTRIBUTION OF SUBSURFACE IMPACTS

The primary contaminants of concern are the BTEX and TPH released to the subsurface near the oil/water separator. High molecular weight organic compounds such as chlorinated solvents and greater than C_{20} hydrocarbons have not been detected in the ground-water samples analyzed during the present and past investigations.

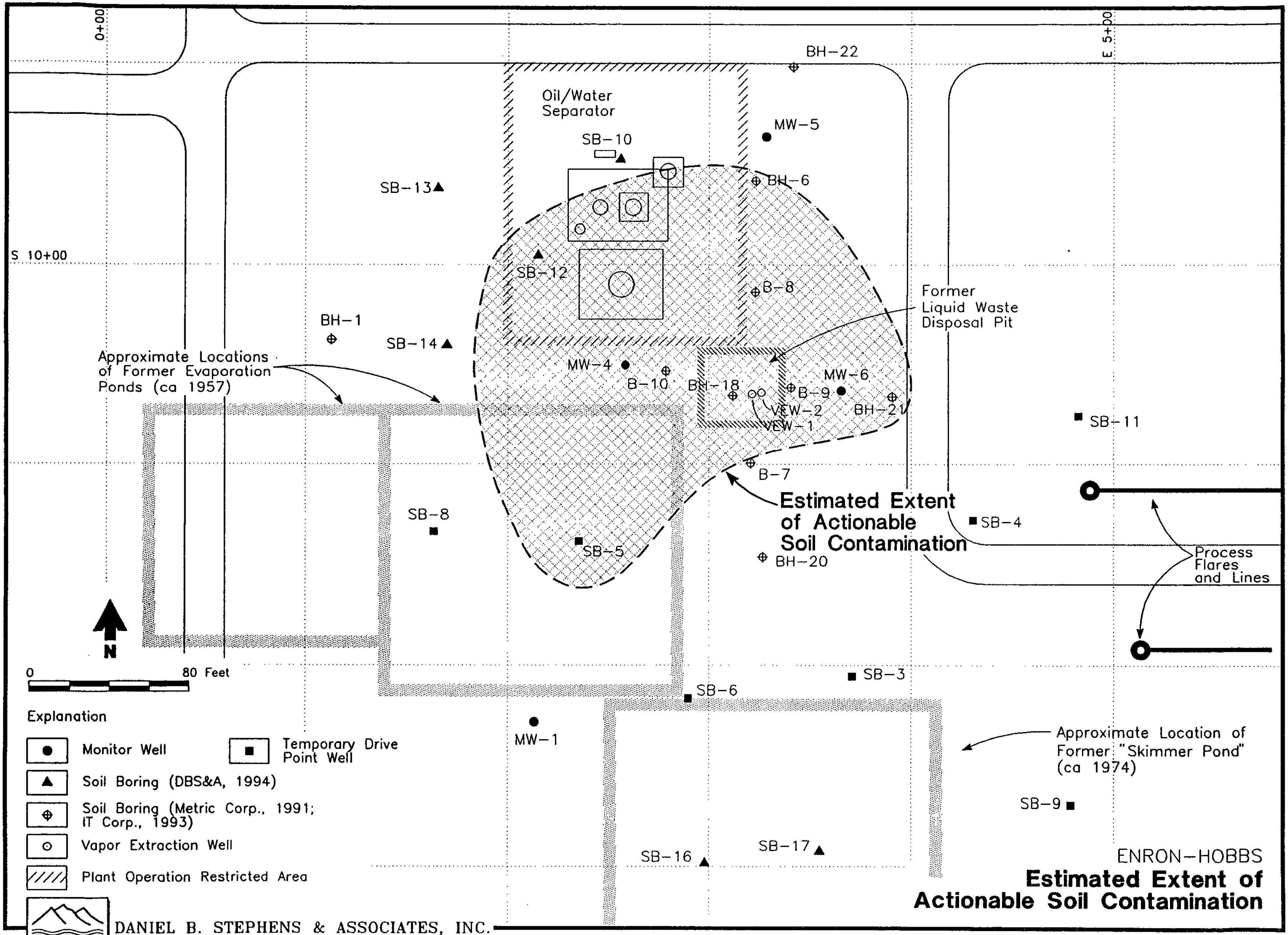
OCD has set regulatory guidelines for the actionable concentrations of TPH and BTEX compounds in soil and ground water. Actionable concentration is defined as any concentration that exceeds New Mexico Water Quality Control Commission (NMWQCC) standards and OCD guidelines. For soil, the regulatory criteria for TPH is 100 ppm and for total BTEX, 50 ppm. Field PID measurements of 100 ppm or greater can also be used to determine actionable soils (New Mexico OCD, 1993). The NMWQCC ground-water standards for BTEX are listed on Table 3. OCD has not provided guidelines for the maximum allowable concentration of TPH in ground water.

The following sections provide an accounting of the distribution of hydrocarbons in the subsurface soils and ground water. In addition, a discussion of secondary inorganic standards that are exceeded is provided.

3.1 Soil Impacts

Based on the field observations and analytical chemistry results from the borings drilled during the three investigations, it appears that actionable hydrocarbon impacts are limited to a circular area centered between the current oil/water separator and the former waste pit. Based on the data obtained from borings SB-15 through SB-17, the former skimmer pond does not appear to contain any actionable hydrocarbon contamination as defined according to the above criteria for field screening. Figure 7 depicts in plan view the estimated extent of actionable soil contamination based on the OCD regulatory guideline of 100 mg/kg for TPH.

Near the former waste pit and the oil/water separator, soils are vertically impacted from approximately land surface to the ground-water table. The vertical extent of impacts in soil decreases non-uniformly as one moves away from the original hydrocarbon source area. Due



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Estimated Extent of Actionable Soil Contamination

Figure 7

to local heterogeneities, it appears that hydrocarbons have spread out laterally along preferential pathways. Cross-sectional profiles of actionable soils are given in Figure 8, and Figure 2 shows the locations of the cross sections. The distribution of actionable soils shown in Figure 8 is based on organic vapor meter readings and TPH concentrations in analyzed soils.

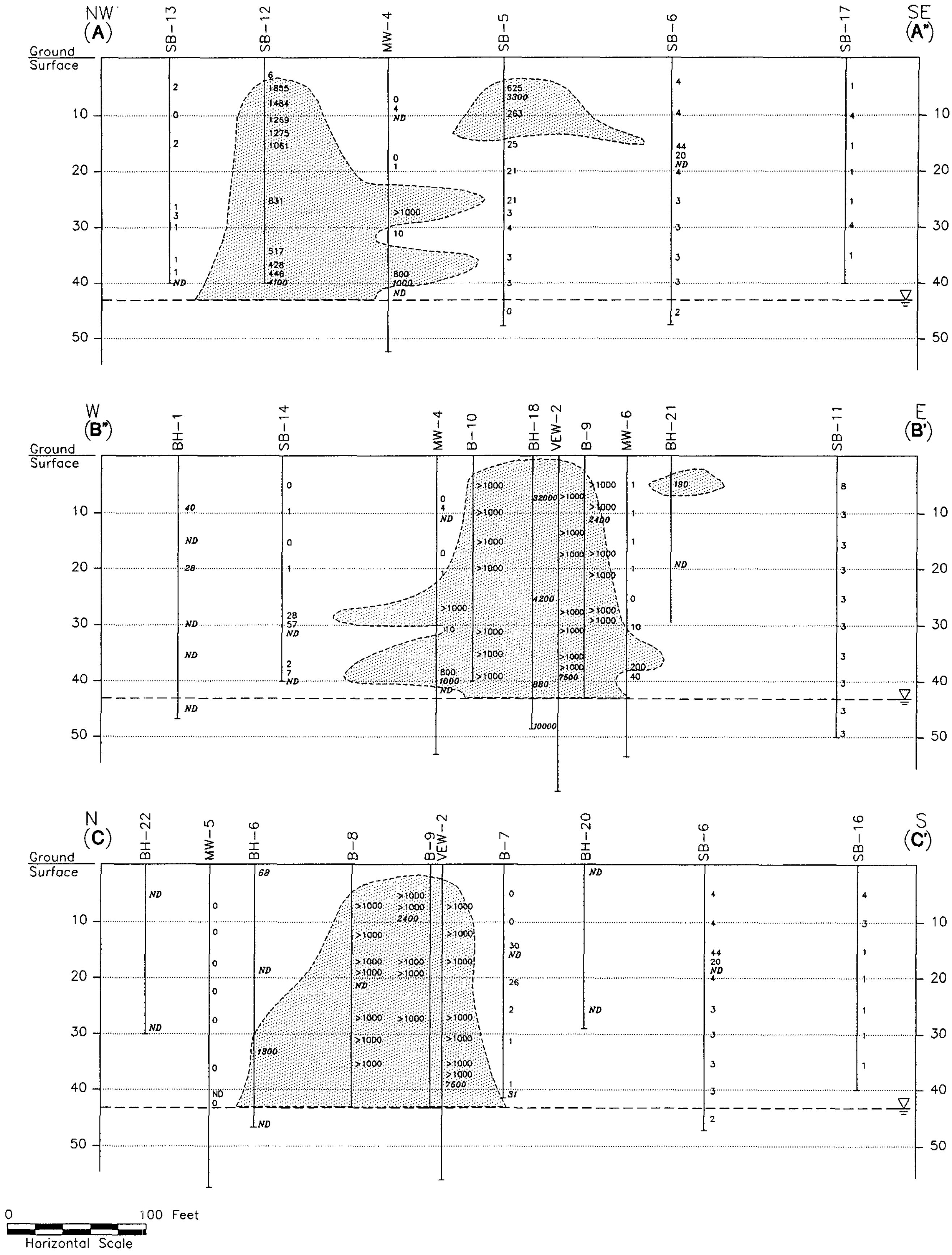
3.2 Ground-Water Impacts

The estimated extent of actionable BTEX in ground water is shown in Figure 9. Benzene, which has the lowest regulatory standard (10 µg/L) of the BTEX constituents, has been used to determine the extent of actionable ground water. Actionable benzene is limited to a plume about 200 feet wide extending from the vicinity of the oil/water separator about 420 feet to the southeast. The discrepancy between the plume orientation and the measured ground-flow direction may be a local phenomenon caused by the low hydraulic gradient. Alternatively, the orientation of the benzene plume may be controlled by the distribution of impacted soils that are releasing benzene to ground water. Benzene was also detected in the upgradient water supply well (NNG-4) but was below the regulatory action level.

The estimated extent of detectable TPH in ground water is shown in Figure 10. The TPH plume is bisected by a region defined by SB-2 and SB-3, which is free of hydrocarbons. The lack of petroleum hydrocarbons in this region may be because of the nonuniform distribution of hydrocarbons in the vadose zone and/or permeable channels in the Ogallala Formation.

The results from inorganic chemical analyses indicate that chloride and TDS in well MW-4 exceed NMWQCC standards (Table 4). The high concentration of TDS detected in MW-4 (Table 4) are attributed to elevated concentrations of chloride and bicarbonate. The elevated anion concentrations may have resulted from local recharge of waste and storm water near the oil/water separator and former evaporation ponds.

Metal concentrations in ground water appear to be below all regulatory standards set by the NMWQCC. Analysis for metals was performed on samples collected from MW-4 and MW-7. Metal concentrations in MW-4 do not appear to be elevated compared to background concentrations as represented by MW-7 (Table 4).



800	Organic Vapor Meter Reading (ppm)	▨	Estimated Extent of Actionable TPH in Soil
1300	TPH (mg/kg)	*ND*	Not Detected

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Cross-Sectional Profiles of Total Petroleum Hydrocarbons in Soil

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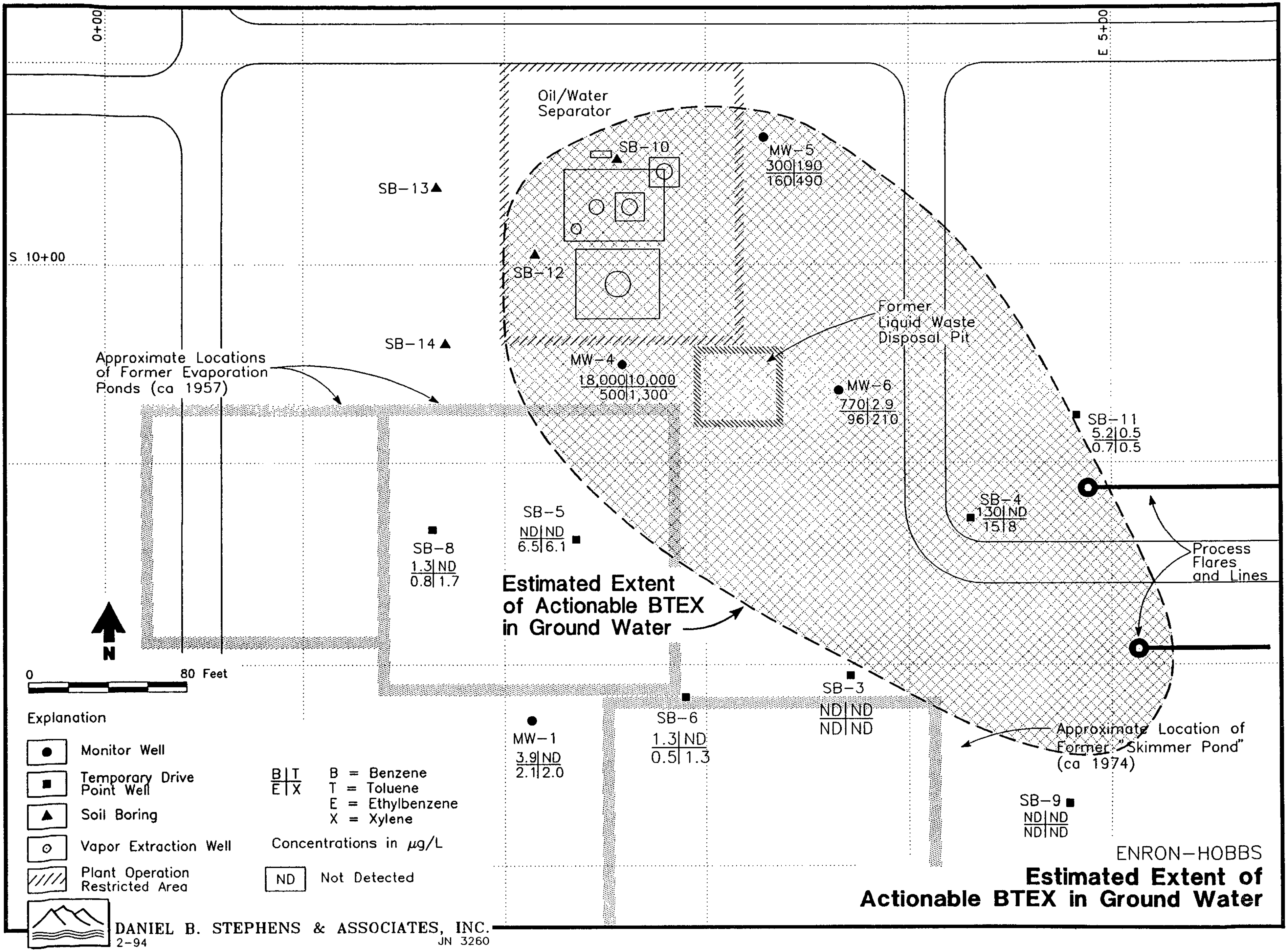
Figure 8



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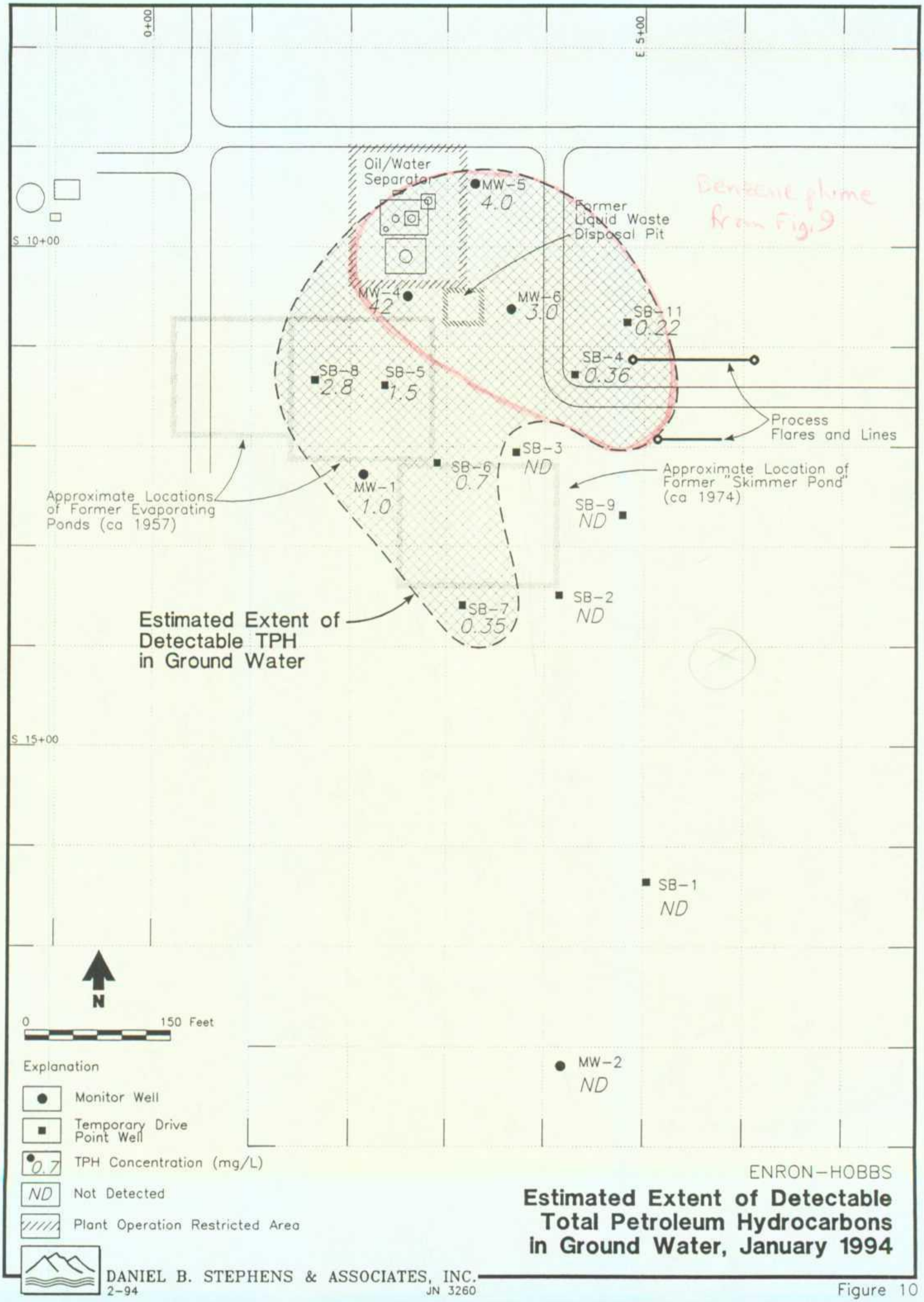
Estimated Extent of Actionable BTEX in Ground Water

Figure 9



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Estimated Extent of Detectable Total Petroleum Hydrocarbons in Ground Water, January 1994

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Figure 10

4. SUMMARY AND CONCLUSIONS

The supplemental environmental investigation completed by DBS&A in January 1994 in combination with previous investigations by Metric Corporation in 1991 and IT Corporation in 1993 have determined the extent of TPH, BTEX, and inorganic impacts near the former liquid waste disposal pit and the oil/water separator area. Specifically, the investigatory drilling programs performed around the waste water disposal areas have revealed the following:

- The area of impacted soils extends to the west and south of the former water disposal pit investigated by Metric (1991) and IT (1993) Corporations. Actionable levels of TPH (100 ppm and above) determined from soil analyses and PID readings indicate that impacted soils encompass an area approximately 200 feet by 200 feet. BTEX concentrations were above OCD actionable levels in soil samples from borings BH-18, B-8, B-9, and SB-12.

- The vertical extent of actionable soils varies from a thickness of approximately 45 feet near the center of hydrocarbon mass to approximately 5 feet near the perimeter of the impacted area.

- The former skimmer pond area does not appear to be an actionable source area based on PID readings collected during the DBS&A supplemental environmental investigation.

- Inorganic chemical analyses of soil samples collected by Metric Corporation (1991) indicated that no regulatory standards were exceeded.

- High molecular weight chlorinated solvents and hydrocarbons (C_{20} and greater) were not present in any of the ground-water samples.

- BTEX concentrations above the applicable regulatory standards are present in ground water beneath the site. The plume is elliptical in shape and trends from northwest near the oil/water separator to the southeast toward the process flares. The longitudinal axis of the plume is approximately 420 feet and the transverse axis is approximately 200 feet.

- TPH was detected within the BTEX ground-water plume and southeast of the former evaporation ponds. The downgradient extent of TPH in ground water is estimated to be 400 feet below the oil/water separator.

- Inorganic chemical analysis of major ions, TDS, and metals indicate that only TDS and chloride exceed NMWQCC standards in well MW-4.

In summary, the recharge of plant waste water has resulted in impacts to the soils directly underlying the source area and ground water south and southeast of the area in which recharge occurred.

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TABLES

Table 1. Monitor Well and Soil Boring Locations and Water Table Elevation Data, January 1994

Well/Boring[1]	South[2] (feet)	East[2] (feet)	Measuring Point[3] Elevation (feet above msl)	Depth to Water from Measuring Point[3] (feet)	Water Table Elevation (feet above msl)
MW-1	1227.92	213.26	3720.18	43.77	3676.41
MW-2	1819.27	418.07	3717.24	42.69	3674.55
MW-3	2482.66	1842.27	3717.70	46.24	3671.46
MW-4	1049.74	258.40	3722.45	45.00	3677.45
MW-5	936.63	328.47	3723.60	45.22	3678.38
MW-6	1062.66	365.27	3723.08	45.91	3677.17
MW-7	144.45	-676.61	3730.84	54.34	3676.50
SB-1	1635.45	503.39	3714.68	NA	NA
SB-2	1348.47	414.84	3717.31	NA	NA
SB-3	1205.46	370.79	3719.60	NA	NA
SB-4	1127.92	429.99	3719.78	NA	NA
SB-5	1138.49	235.13	3719.05	NA	NA
SB-6	1216.35	289.73	ND	NA	NA
SB-7	1358.47	316.51	3716.82	NA	NA
SB-8	1133.49	163.83	3718.71	NA	NA
SB-9	1268.78	478.64	3719.42	NA	NA
SB-10	947.94	255.75	3721.21	NA	NA
SB-11	1075.65	482.60	3720.68	NA	NA
SB-12	995.38	215.02	3720.24	NA	NA
SB-13	962.32	165.78	3720.15	NA	NA
SB-14	1039.97	170.28	3719.75	NA	NA
SB-15	1312.97	239.27	3717.60	NA	NA
SB-16	1298.30	297.96	3717.79	NA	NA
SB-17	1292.29	354.89	3717.83	NA	NA
MW-8ABD	1099.35	381.51	3728.73	NA	NA

Notes: Survey conducted by John W. West Engineering, Hobbs, NM.
Survey base elevation datum ± 0.5 feet.

NA = Not applicable
ND = No data available

[1] *Refer to Figure 2 for locations*

[2] South and east coordinates relative to plant survey grid

[3] Measuring point is top of PVC casing

Table 2. Soil Chemistry Results
ENRON - Hobbs
Page 1 of 4

					Concentration (mg/kg)							
Sample ID[1]	Sample Depth (ft)	Date (M/D/Y)	Source[2]	Lab[3]	TPH[4]	Hydro-carbon Range	DL	Benzene[4]	Toluene[4]	Ethyl-benzene[4]	Total Xylenes[4]	DL
BH-1	8.8-9.2	8/91	Metric	AAL	40	NQ	5.0	NA	NA	NA	NA	0.1
	15.0-15.5	8/91	Metric	AAL	ND	NQ	5.0	ND	ND	ND	ND	0.1
	19.9-20.2	8/91	Metric	AAL	28	NQ	5.0	ND	ND	ND	ND	0.1
	30.0-30.3	8/91	Metric	AAL	ND	NQ	5.0	ND	ND	ND	ND	0.1
	36.5-36.7	8/91	Metric	AAL	ND	NQ	5.0	ND	ND	ND	ND	0.1
	45.2-45.5	8/91	Metric	AAL	ND	NQ	5.0	ND	ND	ND	ND	0.1
BH-2	0.0-1.0	8/91	Metric	AAL	ND	NQ	5.0	ND	ND	ND	ND	0.1
	15.0-15.3	8/91	Metric	AAL	ND	NQ	5.0	ND	ND	ND	ND	0.1
	30.0-30.3	8/91	Metric	AAL	ND	NQ	5.0	ND	ND	ND	ND	0.1
	40.1-40.4	8/91	Metric	AAL	ND	NQ	5.0	ND	ND	ND	ND	0.1
	51.2-51.4	8/91	Metric	AAL	ND	NQ	5.0	ND	ND	ND	ND	0.1
BH-3	2.0-2.5	8/22/91	Metric	AAL	ND	NQ	5.0	ND	ND	ND	ND	0.1
	10.5-10.7	8/22/91	Metric	AAL	24	NQ	5.0	ND	ND	ND	ND	0.1
	30.0-30.3	8/22/91	Metric	AAL	36	NQ	5.0	ND	ND	ND	ND	0.1
	45.0-45.3	8/22/91	Metric	AAL	20	NQ	5.0	ND	ND	ND	ND	0.1
BH-4	29.0-29.3	8/23/91	Metric	AAL	28	NQ	5.0	ND	ND	ND	ND	0.1
	37.9-38.2	8/23/91	Metric	AAL	20	NQ	5.0	ND	ND	ND	ND	0.1

[1] Refer to Figure 2 for sample locations

[2] Metric = Metric Corporation, 1991
IT = IT Corporation, 1993
DBS&A = Daniel B. Stephens & Associates, Inc., 1994

[3] AAL = Assaigai Analytical Laboratories
ITAS = IT Analytical Services
ATI = Analytical Technologies, Inc.

[4] New Mexico Oil Conservation Division soil standards for TPH = 100 mg/kg and for total BTEX = 50 mg/kg

TPH = Total petroleum hydrocarbons
DL = Detection limit
NQ = Not quantified
NA = Not analyzed
ND = Not detected

Table 2. Soil Chemistry Results
ENRON - Hobbs
Page 2 of 4

					Concentration (mg/kg)								
Sample ID[1]	Sample Depth (ft)	Date (M/D/Y)	Source[2]	Lab[3]	TPH[4]	Hydro-carbon Range	DL	Benzene[4]	Toluene[4]	Ethyl-benzene[4]	Total Xylenes[4]	DL
BH-6	0.0-2.0	8/29/91	Metric	AAL	68	NQ	5.0	ND	ND	ND	ND	0.1
	18.9-19.5	8/27/91	Metric	AAL	ND	NQ	5.0	ND	ND	ND	ND	0.1
	33.0-33.5	8/27/91	Metric	AAL	1,300	NQ	5.0	ND	ND	ND	ND	0.1
	46.0-46.3	8/27/91	Metric	AAL	ND	NQ	5.0	ND	ND	ND	ND	0.1
BH-8	21.4-21.7	8/28/91	Metric	AAL	ND	NQ	5.0	ND	ND	ND	ND	0.1
BH-9	22.7-23.4	9/91	Metric	AAL	8	NQ	5.0	ND	ND	ND	ND	0.1
	44.2-44.5	9/91	Metric	AAL	ND	NQ	5.0	ND	ND	ND	ND	0.1
BH-10	19.6-19.9	9/91	Metric	AAL	ND	NQ	5.0	ND	ND	ND	ND	0.1
BH-11	45.2-45.4	9/91	Metric	AAL	ND	NQ	5.0	ND	ND	ND	ND	0.1
BH-12	44.2-44.4	9/91	Metric	AAL	ND	NQ	5.0	ND	ND	ND	ND	0.1
BH-18	6.1-6.3	9/19/91	Metric	AAL	32,000	NQ	5.0	61	160	130	370	2.5
	24.6-24.8	9/19/91	Metric	AAL	4,200	NQ	5.0	0.65	5.5	15	36	0.1
	35.3-35.5	9/19/91	Metric	AAL	880	NQ	5.0	ND	ND	0.19	0.67	0.1
	48.0-48.2	9/19/91	Metric	AAL	10,000	NQ	5.0	0.69	1.6	11	35	0.1
BH-20	1.0-1.3	10/91	Metric	AAL	ND	NQ	5.0	ND	ND	ND	ND	0.1
	26.2-26.5	10/91	Metric	AAL	ND	NQ	5.0	ND	ND	ND	ND	0.1

[1] Refer to Figure 2 for sample locations

[2] Metric = Metric Corporation, 1991
IT = IT Corporation, 1993
DBS&A = Daniel B. Stephens & Associates, Inc., 1994

[3] AAL = Assaigai Analytical Laboratories
ITAS = IT Analytical Services
ATI = Analytical Technologies, Inc.

[4] New Mexico Oil Conservation Division soil standards for TPH = 100 mg/kg and for total BTEX = 50 mg/kg

TPH = Total petroleum hydrocarbons
DL = Detection limit
NQ = Not quantified
NA = Not analyzed
ND = Not detected

Table 2. Soil Chemistry Results
ENRON - Hobbs
Page 3 of 4

Sample ID[1]	Sample Depth (ft)	Date (M/D/Y)	Source[2]	Lab[3]	Concentration (mg/kg)							
					TPH[4]	Hydro-carbon Range	DL	Benzene[4]	Toluene[4]	Ethyl-benzene[4]	Total Xylenes[4]	DL
BH-21	3.8-4.3	10/91	Metric	AAL	190	NQ	5.0	ND	ND	ND	ND	0.1
	18.6-19.0	10/91	Metric	AAL	ND	NQ	5.0	ND	ND	ND	ND	0.1
BH-22	3.9-4.3	10/91	Metric	AAL	ND	NQ	5.0	ND	ND	ND	ND	0.1
	29.2-29.6	10/91	Metric	AAL	ND	NQ	5.0	ND	ND	ND	ND	0.1
B-7-16	16	11/02/92	IT	ITAS	ND	NQ	2	0.071	ND	ND	ND	0.050
B-7-41	41	11/02/92	IT	ITAS	31	NQ	2	ND	ND	ND	ND	0.050
B-8-6.5	6.5	10/30/92	IT	ITAS	720	NQ	100	1.1	9.1	13	120	1.0
B-8-35	35	10/30/92	IT	ITAS	310	NQ	9	ND	0.42	4.6	6.2	0.20
B-9-10.5	10.5	10/30/92	IT	ITAS	2,400	NQ	96	5.4	17	160	170	1.0
MW-4-10.5	10.5	10/31/92	IT	ITAS	ND	NQ	2	ND	ND	ND	0.16	0.050
MW-4-40	40	10/31/92	IT	ITAS	1,000	NQ	9	ND	0.084	0.23	0.17	0.050
MW-5-41	41	10/27/92	IT	ITAS	ND	NQ	2	ND	ND	ND	ND	0.050
VEW-2-39	39	10/30/92	IT	ITAS	7,500	NQ	89	3.1	2.2	13	13	0.20
SB-5 @ 6.5'	6.5	1/18/94	DBS&A	ATI	3,300	C6-C16	10	ND	ND	18	ND	0.5
SB-6 @ 18.5'	18.5	1/13/94	DBS&A	ATI	ND	C6-C16	5.0	ND	ND	ND	ND	0.025
SB-7 @ 16'	16	1/13/94	DBS&A	ATI	29	C9-C16	5.0	ND	ND	ND	ND	0.025

[1] Refer to Figure 2 for sample locations

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[4] New Mexico Oil Conservation Division soil standards for TPH = 100 mg/kg and for total BTEX = 50 mg/kg

TPH = Total petroleum hydrocarbons
DL = Detection limit
NQ = Not quantified
NA = Not analyzed
ND = Not detected

Table 2. Soil Chemistry Results
ENRON - Hobbs
Page 4 of 4

Sample ID[1]	Sample Depth (ft)	Date (M/D/Y)	Source[2]	Lab[3]	Concentration (mg/kg)							
					TPH[4]	Hydro-carbon Range	DL	Benzene[4]	Toluene[4]	Ethyl-benzene[4]	Total Xylenes[4]	DL
SB-10 @ 10'	10	1/14/94	DBS&A	ATI	ND	C6-C16	5.0	ND	ND	ND	ND	0.025
SB-10 @ 40'	40	1/15/94	DBS&A	ATI	ND	C6-C16	5.0	ND	ND	ND	ND	0.025
SB-12 @ 5'	5	1/14/94	DBS&A	ATI	3,100	C6-C16	250	ND	4.6	21	82	1.2
SB-12 @ 40'	40	1/14/94	DBS&A	ATI	4,100	C6-C16	250	9.4	60	18	58	1.2
SB-13 @ 40'	40	1/15/94	DBS&A	ATI	ND	C6-C16	5.0	ND	ND	ND	ND	0.025
SB-14 @ 30'	30	1/15/94	DBS&A	ATI	ND	C6-C16	5.0	ND	ND	ND	ND	0.025
SB-14 @ 40'	40	1/15/94	DBS&A	ATI	ND	C6-C16	5.0	ND	ND	ND	ND	0.025

[1] Refer to Figure 2 for sample locations

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[3] AAL = Assaigai Analytical Laboratories
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[4] New Mexico Oil Conservation Division soil standards for TPH = 100 mg/kg and for total BTEX = 50 mg/kg

TPH = Total petroleum hydrocarbons
DL = Detection limit
NQ = Not quantified
NA = Not analyzed
ND = Not detected

Table 3. Water Chemistry Results
ENRON - Hobbs
Page 1 of 2

Sample ID	Date (M/D/Y)	Source[1]	Lab[2]	Concentration (mg/L)			Concentration (µg/L)				
				TPH	Hydro-carbon Range	DL	Benzene[3]	Toluene[3]	Ethyl-benzene[3]	Total Xylenes[3]	DL
MW-1	9/91	Metric	AAL	NA	NA	NA	5.3	6.7	1.0	NA	NA
	11/92	IT	ITAS	4.3	NQ	0.05	1.5	1.5	ND	10	1.0
	12/92	IT	ITAS	5.9	NQ	0.05	1.3	1.4	ND	6.0	1.0
	1/12/93	DBS&A	ATI	1.0	C6-C16	0.050	3.9	ND	2.1	2.0	0.5
MW-2	9/91	Metric	AAL	NA	NA	NA	ND	ND	ND	NA	NA
	1/12/94	DBS&A	ATI	ND	C6-C16	0.050	ND	ND	ND	ND	0.5
MW-4	11/92	IT	ITAS	50	NQ	0.5	16,000	8,000	700	1,800	200
	12/92	IT	ITAS	15	NQ	0.5	17,000	8,200	530	1,300	200
	1/10/94	DBS&A	ATI	42	C6-C18	0.050	18,000	10,000	500	1,300	250
MW-4A	12/92	IT	ITAS	10	NQ	0.25	15,000	6,200	400	1,000	100
MW-5	11/92	IT	ITAS	0.69	NQ	0.05	3.0	3.4	3.0	34	1.0
	12/92	IT	ITAS	1.3	NQ	0.05	9.1	4.1	8.2	37	1.0
	1/16/94	DBS&A	ATI	4.0	C6-C14	0.250	300	190	160	490	2.5
MW-6	11/92	IT	ITAS	35	NQ	0.5	340	23	51	120	5.0
	12/92	IT	ITAS	10	NQ	0.5	520	20	58	120	5.0
	1/10/94	DBS&A	ATI	3	C6-C20	0.050	770[D]	2.9	96	210	2.5

[D] Detection limit is 250 µg/L

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IT = IT Corporation, 1993
DBS&A = Daniel B. Stephens & Associates, Inc., 1994

[2] AAL = Assaigai Analytical Laboratories
ITAS = IT Analytical Services
ATI = Analytical Technologies, Inc.

[3] New Mexico Water Quality Control Commission standards (µg/L):
Benzene = 10
Toluene = 750
Ethylbenzene = 750
Xylene = 620

TPH = Total petroleum hydrocarbons
DL = Detection limit
NQ = Not quantified
NA = Not analyzed
ND = Not detected

Table 3. Water Chemistry Results
ENRON - Hobbs
Page 2 of 2

Sample ID	Date (M/D/Y)	Source[1]	Lab[2]	Concentration (mg/L)			Concentration (µg/L)				
				TPH	Hydro-carbon Range	DL	Benzene[3]	Toluene[3]	Ethyl-benzene[3]	Total Xylenes[3]	DL
MW-7	1/16/94	DBS&A	ATI	ND	C6-C16	0.050	ND	ND	ND	ND	0.5
SB-1	1/11/94	DBS&A	ATI	ND	C6-C16	0.050	ND	ND	ND	ND	0.5
SB-2	1/11/94	DBS&A	ATI	ND	C6-C16	0.050	ND	ND	ND	0.6	0.5
SB-3	1/12/94	DBS&A	ATI	ND	C6-C16	0.050	ND	ND	ND	ND	0.5
SB-4	1/12/94	DBS&A	ATI	0.36	C6-C14	0.050	130	ND	15	8.0	0.5
SB-5	1/12/94	DBS&A	ATI	1.5	C6-C16	0.050	ND	ND	6.5	6.1	0.5
SB-6	1/13/94	DBS&A	ATI	0.70	C6-C16	0.050	1.3	ND	0.5	1.3	0.5
SB-7	1/13/94	DBS&A	ATI	0.35	C6-C16	0.050	ND	ND	0.6	ND	0.5
SB-8	1/13/94	DBS&A	ATI	2.8	C6-C16	0.050	1.3	ND	0.8	17	0.5
SB-9	1/14/94	DBS&A	ATI	ND	C6-C16	0.050	ND	ND	ND	0.5	0.5
SB-11	1/14/94	DBS&A	ATI	0.22	C6-C16	0.050	5.2	ND	0.7	0.5	0.5
NNG-4	1/17/94	DBS&A	ATI	ND	C6-C16	0.050	2.6	ND	ND	ND	0.5

[D] Detection limit is 250 µg/L

[1] Metric = Metric Corporation, 1991
IT = IT Corporation, 1993
DBS&A = Daniel B. Stephens & Associates, Inc., 1994

[2] AAL = Assaigai Analytical Laboratories
ITAS = IT Analytical Services
ATI = Analytical Technologies, Inc.

[3] New Mexico Water Quality Control Commission standards (µg/L):
Benzene = 10
Toluene = 750
Ethylbenzene = 750
Xylene = 620

TPH = Total petroleum hydrocarbons
DL = Detection limit
NQ = Not quantified
NA = Not analyzed
ND = Not detected

Table 4. Inorganic Analysis of Ground Water
ENRON - Hobbs

Parameter	Concentration (mg/L)						NMWQCC Standard (mg/L)
	MW-1	MW-2	MW-3	MW-4	MW-7	NNG-4	
Date sampled	*09/23/91*	*09/91*	*09/23/91*	*01/10/94*	*01/10/94*	*01/10/94*	---
Source[1]	*Metric*	*Metric*	*Metric*	*DBS&A*	*DBS&A*	*DBS&A*	---
Major Ions							
Calcium	310	76	160	104	112	75.3	None
Potassium	90	13	3.2	21.5	4.7	2.4	None
Magnesium	66	6.5	12	70	11.5	10.0	None
Sodium	410	13	11	553	145	52.6	None
Bicarbonate ($CaCO_3$)	NA	NA	NA	706	262	184	None
Total alkalinity (as $CaCO_3$)	NA	NA	NA	706	262	184	None
Chloride	NA	NA	NA	770	120	66	250
NO_2/NO_3-N, total	NA	NA	NA	<0.06	2.7	2.6	10.0
Sulfate	NA	NA	NA	0.4	140	51	600
Total dissolved solids	NA	NA	NA	1,900	720	410	1,000
Metals							
Silver	NA	NA	NA	<0.010	<0.010	NA	0.05
Arsenic	NA	NA	NA	0.077	<0.005	NA	0.1
Barium	ND	ND	ND	0.667	0.059	NA	1.0
Cadmium	NA	NA	NA	<0.0005	<0.0005	NA	0.01
Chromium	NA	NA	NA	<0.010	<0.010	NA	0.05
Mercury	NA	NA	NA	<0.0002	<0.0002	NA	0.002
Lead	ND	ND	ND	<0.002	<0.002	NA	0.05
Selenium	NA	NA	NA	<0.005	<0.005	NA	0.05

[1] Metric = Metric Corporation, 1991
DBS&A = Daniel B. Stephens & Associates, Inc., 1994

NMWQCC = New Mexico Water Quality Control Commission
NA = Not analyzed
ND = Not detected

APPENDIX A

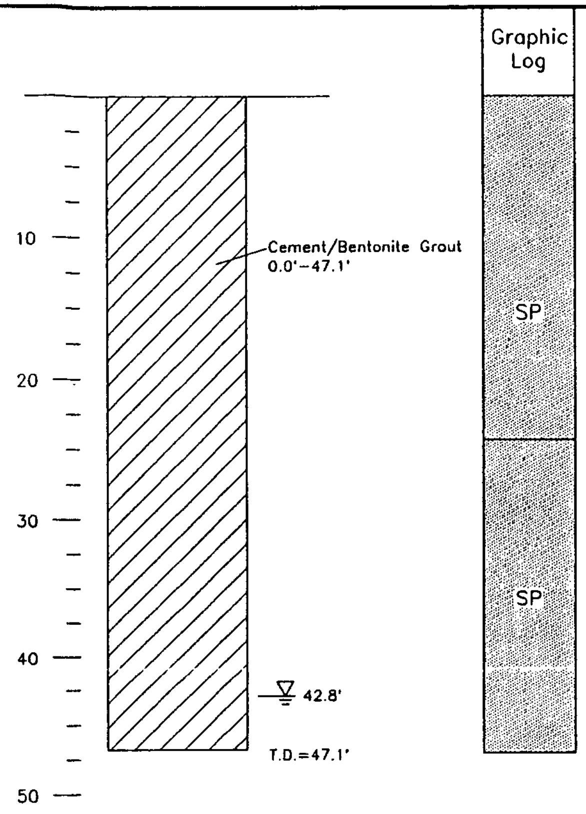
BORING LOGS AND COMPLETION DIAGRAMS

⁘	GW	Well–graded gravels, gravel–sand mixtures, little or no fines
⁘	GP	Poorly–graded gravels, gravel–sand mixtures, little or no fines
▥	GM	Silty gravels, gravel–sand–silt mixtures
▨	GC	Clayey gravels, gravel–sand–clay mixtures
░	SW	Well–graded sands, gravelly sands, little or no fines
▒	SP	Poorly–graded sands, gravelly sands, little or no fines
▥	SM	Silty sands, sand–silt mixtures
▨	SC	Clayey sands, sand–clay mixtures
▥	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silt with slight plasticity
▨	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
▥	OL	Organic silts and organic silty clays of low plasticity
▥	MH	Elastic silts, sandy silts, and clayey silts with low to moderate plasticity
▨	CH	Inorganic clays of high plasticity, fat clays
▨	OH	Organic clays of medium to high plasticity, organic silts

ENRON–HOBBS

Unified Soil Classification System
Graphic Symbols and General Descriptions for Soil Boring Logs

DANIEL B. STEPHENS & ASSOCIATES, INC.
2–94
JN 3260



PID Reading (ppm)	Sampling Device	Sample Interval	Comments and Lithology
1.0	Split Spoon	5-6.5	Sand (SP), very pale brown (10YR-8/2), fine- to medium-grained, well sorted, subrounded, dry, weakly cemented with calcite
0.0	Split Spoon	10-11.5	Sand (SP), very pale brown (10YR-8/2), fine- to medium-grained, well sorted, subrounded, dry, weakly cemented with calcite
3.1	Split Spoon	15-15.5	Sand (SP), very pale brown (10YR-8/2), fine- to medium-grained, well sorted, subrounded, dry, cemented with calcite
0.6	Split Spoon	26.5-27	Sand (SP), pink (5YR-7/3), fine-grained, well sorted, subrounded, damp, strongly cemented with calcite
0.0	Split Spoon	30-32	Sand (SP), light reddish-brown (5YR-6/4), fine-grained, well sorted, subrounded, damp, unconsolidated
	Split Spoon	35-35.3	Same as 30' sample except light reddish-brown (2.5YR-6/4)
0.0	Split Spoon	40-42	Same as 30' sample except light reddish-brown (2.5YR-6/4) and wet
		42.8	Depth to water
		47.1	Total depth

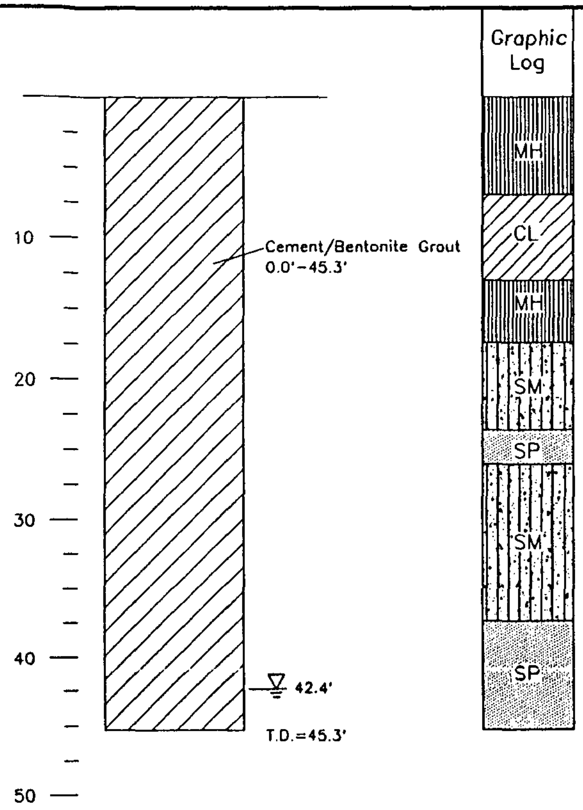
Hydrologists: BM/CMP
Driller: Eades Drilling
Date Completed: 1/11/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

ENRON-HOBBS
Hobbs, New Mexico

BORING LOG: SB-1

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-94
JN 3260



PID Reading (ppm)	Sampling Device	Sample Interval	Comments and Lithology
0.6	Grab	3–5	Elastic silt (MH), very pale brown (10YR-8/2), damp to moist, calcareous, 70% silt, 30% clay
0.6	Grab	8–10	Lean clay (CL), very pale brown (10YR-8/2), moist, calcareous, 60% clay, 40% silt
0.6	Grab	13–15	Elastic silt with gravel (MH), very pale brown (10YR-8/2), moist, calcareous, 50% silt, 30% clay, 5% sand, 15% gravel
0.6	Grab	18–20	Sand with silt (SW–SM), light gray (10YR-7/2), fine- to medium-grained, moderately sorted, subangular, moist, moderately cemented, 80% sand, 15% silt, 5% clay
0.0	Grab	23–25	Sand (SP), light brown (7.5YR-6/3), fine-grained, well sorted, subrounded, moist, unconsolidated, 95% sand, 5% silt
0.0	Grab	28–30	Silty sand (SM), pink (7.5YR-7/3), fine-grained, poorly sorted, angular to subrounded, dry, strongly cemented, 60% sand, 30% silt, 10% clay
0.0	Grab	33–35	Silty sand (SM), pink (7.5YR-7/3), fine-grained, poorly sorted, angular, damp, slightly cemented, 80% sand, 20% silt
0.0	Grab	38–40	Sand (SP), light brown (7.5YR-6/4), medium-grained, well sorted, subrounded, moist, unconsolidated, 95% sand, 5% silt
0.0	Split Spoon	41.5–42.5 42.4	Sand (SP), same as 40' but wet Depth to water
0.0	Split Spoon	44–45.5 45.3	Sand (SP), same as 40' but saturated Total depth

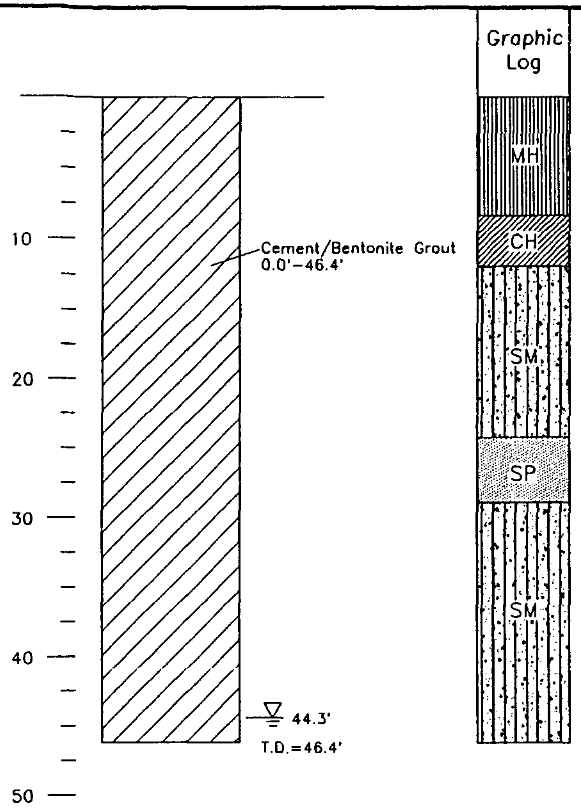
Hydrologists: BM/CMP
Driller: Eades Drilling
Date Completed: 1/11/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

ENRON–HOBBS
Hobbs, New Mexico

BORING LOG: SB-2

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-94 JN 3260



PID Reading (ppm)	Sampling Device	Sample Interval	Comments and Lithology
37.6	Split Spoon	5-6.0	Elastic silt with sand (MH), white (10YR-8/1), damp, calcareous (slightly cemented), plastic, 80% silt, 20% very fine sand
4.9	Split Spoon	10-11.5	Fat clay (CH), very pale brown (10YR-8/2), moist, calcareous, unconsolidated, *highly plastic*, 80% clay, 20% silt
3.2	Split Spoon	15-15.3	Silty sand (SM), very pale brown (10YR-8/2), very fine to fine-grained, poorly sorted, subangular, *damp, unconsolidated*, 70% sand, 30% silt
1.6	Split Spoon	20-20.5	Sand with silt (SP-SM), light gray (10YR-7/2), very fine- to fine grained, well sorted, subrounded, moist, unconsolidated, 85% sand, 15% silt
1.6	Split Spoon	25-26	Sand (SP), light reddish-brown (5YR-6/4), fine- to medium-grained, well sorted, subrounded, moist, unconsolidated, 95% sand, 5% silt
1.6	Split Spoon	30-30.8	Sand with silt (SP-SM), *light brown* (7.5YR-6/4), *fine- to medium-grained*, well sorted, subrounded, moist, unconsolidated, 90% sand, 10% silt
1.6	Split Spoon	35-35.1	Silty sand (SM), light brown (7.5YR-6/4), very fine- to fine-grained, moderately sorted, subrounded, damp, unconsolidated, with strongly cemented layers, 85% sand, 15% silt
1.6	Split Spoon	40-41.3	Sand with silt (SP-SM), reddish-brown (5YR-5/6), fine-grained, well sorted, rounded, moist, unconsolidated, 90% sand, 10% silt
1.6	Split Spoon	45-45.8	Sand with silt (SP-SM), reddish-brown (5YR-5/6), fine- to medium-grained, moderately sorted, subrounded, moist to wet, unconsolidated, with thin < 1 inch layers of strongly cemented fine-grained sand, 90% sand, 10% silt
		44.3	Depth to water
3.2	Split Spoon	46-47.5	Sand with silt (SP-SM), same as 45'
		46.4	Total depth

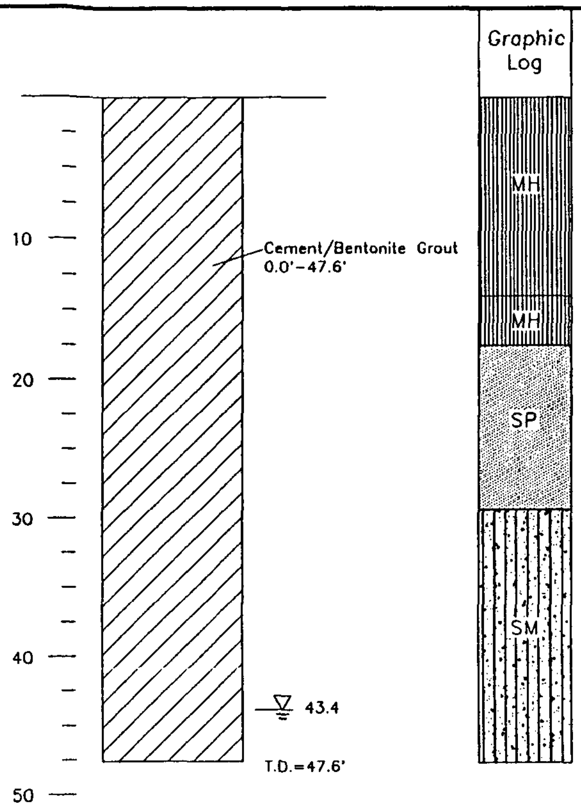
Hydrologists: CMP
Driller: Eades Drilling
Date Completed: 1/12/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

ENRON-HOBBS
Hobbs, New Mexico

BORING LOG: SB-3

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-94
JN 3260



PID Reading (ppm)	Sampling Device	Sample Interval	Comments and Lithology
1.6	Grab	3-5	Silt with sand (MH), pink (7.5YR-8/3), very fine-grained sand, dry, slightly cemented, 80% silt, 20% very fine sand
1.0	Grab	8-10	Same as above, except damp
1.6	Grab	13-15	Silt with sand (MH), pinkish white (7.5YR-8/3), very fine-grained, damp, slightly to strongly cemented
1.0	Grab	18-20	Sand (SP), pink (7.5YR-7/3), very fine-grained, well sorted, subrounded, damp
1.6	Grab	23-25	Sand (SP), light reddish-brown (5YR-6/4), *fine- to medium-grained*, well sorted, subrounded, damp, unconsolidated
1.0	Grab	28-30	Same as 25' sample except strongly cemented layers (0.2 to 1.0' thick), calcareous cement
1.0	Grab	33-35	Silty sand (SM), light brown (7.5YR-6/4), very fine- to medium-grained, poorly sorted, subrounded, moist, slightly cemented with strongly cemented layers, 80% sand, 20% silt
1.0	Grab	38-40	Same as 35' but with fewer strongly cemented layers and more reddish in color, light reddish-brown (5YR-6/4)
3.0	Grab	43-45	Same as 35' but with fewer strongly cemented layers and more reddish in color, light reddish-brown (5YR-6/4)
		43.4	Depth to water
1.0	Split Spoon	47-48.5	Same as 35' but unconsolidated and saturated, darker in color, reddish-brown (5YR-4/4)
		47.6	Total depth

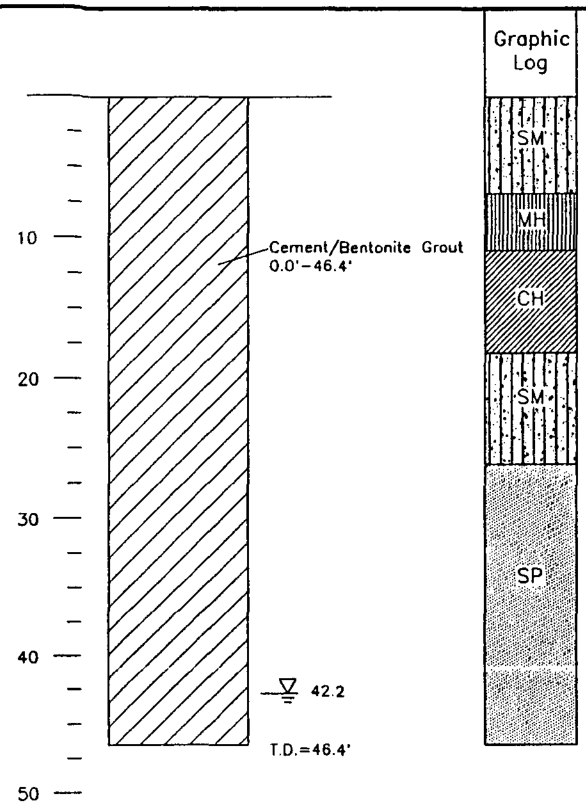
Hydrologists: BM
Driller: Eades Drilling
Date Completed: 1/12/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

ENRON-HOBBS
Hobbs, New Mexico

BORING LOG: SB-4

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-94
JN 3260



PID Reading (ppm)	Sampling Device	Sample Interval	Comments and Lithology
625	Grab	3-5	Silty sand with gravel (SM), gray (7.5YR-5/1), very fine to coarse-grained sand, poorly sorted, angular, dry, unconsolidated
263	Grab	8-10	Elastic silt (MH), white (2.5Y-8/1), moist, plastic, minor gravel, mottled with black to gray organics, calcareous, 60% silt, 40% clay
24.5	Grab	13-15	Fat clay (CH), pale yellow (2.5Y-8/2), minor sand, damp, plastic, calcareous, slightly consolidated, 60% clay, 40% silt
21.0	Grab	18-20	Silty sand (SM), light gray (10YR-7/1), very fine- to fine-grained, poorly sorted, angular to subangular, damp, unconsolidated, gray staining (possible organics), 75% sand, 25% silt
21.2	Grab	23-25	Same as 20' but with thin layers of highly cemented pink silts and sands
3.0	Grab	26-27	Sand (SP), gray (2.5Y-5/1), fine- to medium-grained, well sorted, subrounded, moist, unconsolidated, black grains (possible organic staining), 95% sand, 5% silt
4.0	Grab	28-30	Sand (SP), pinkish gray (7.5YR-7/2), *fine-grained, well sorted, rounded, moist,* unconsolidated, minor amount of fine black grains (possible organic staining), thin layers of strongly cemented sand, 95% sand, 5% silt
3.2	Grab	33-35	Sand (SP), same as 30'
3.0	Grab	38-40	Sand (SP), brown (7.5YR-5/4), same as 30' but fewer black grains
		42.2	Depth to water
0.0	Grab	43-45	Sand (SP), reddish-brown (5YR-5/4), same as 30' but with fewer black grains and wet
	Grab	45-47	Same as 45' but saturated
		46.4	Total depth

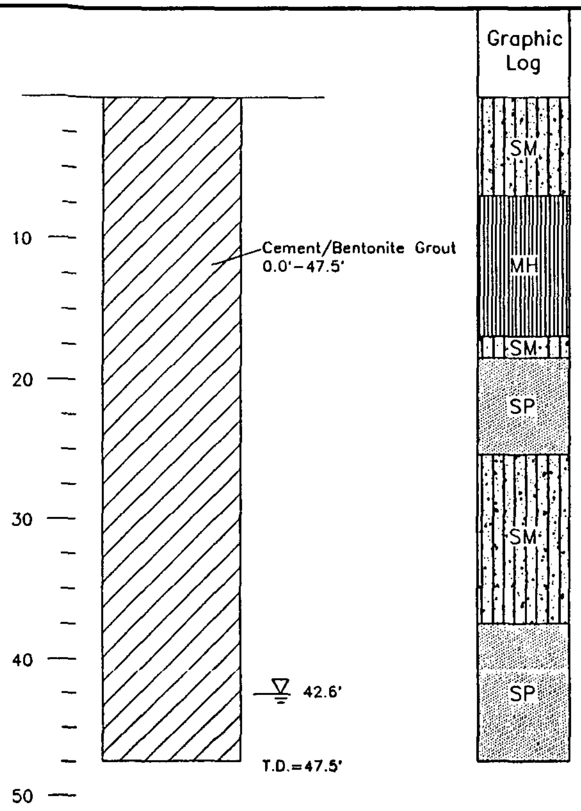
Hydrologists: BM/CMP
Driller: Eades Drilling
Date Completed: 1/12/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

ENRON-HOBBS
Hobbs, New Mexico

BORING LOG: SB-5

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-94
JN 3260



PID Reading (ppm)	Sampling Device	Sample Interval	Comments and Lithology
4.4	Grab	3–5	Silty sand (SM), light yellowish brown (2.5Y–6/3), very fine- to fine-grained, moderately sorted, subangular, slight plasticity, moist, slightly cemented, 65% sand, 25% silt, 10% clay
4.4	Grab	7–10	Elastic silt (MH), white (5Y–8/1), plastic, wet, calcareous, 60% silt, 40% clay
44.1	Grab	13–15	Same as 10'
20.3	Split Spoon	18–19	Silty sand (SM), gray (5Y–6/1), very fine-grained, well sorted, subrounded, moist, unconsolidated
4.4	Grab	19–20	Sand (SP), light gray (10YR–7/1), very fine-grained, well sorted, subrounded, moist, unconsolidated, 95% sand, 5% silt
2.6	Grab	23–25	Same as 20' only slightly darker, gray (10YR–6/1), also has layers of reddish brown (5YR–5/4) silt and very fine-grained sand that is strongly cemented
2.6	Grab	27–30	Silty sand (SM), light brownish gray (10YR–6/2), very fine- to medium-grained, poorly sorted, subangular, moist, unconsolidated, with thin layers of strongly cemented sand, 80% sand, 20% silt
2.6	Grab	33–35	Silty sand (SM), pinkish gray (7.5YR–7/2), very fine-grained, moderately sorted, subangular, moist, unconsolidated with thin layers of strongly cemented sand
2.6	Grab	38–40	Sand (SP), brown (7.5YR–5/4), fine-grained, well sorted, subrounded, wet, unconsolidated, 95% sand, 5% silt
		42.6	Depth to water
2.0	Grab	43–45	Sand (SP), same as 40'
	Split Spoon	47	No recovery
		47.5	Total depth

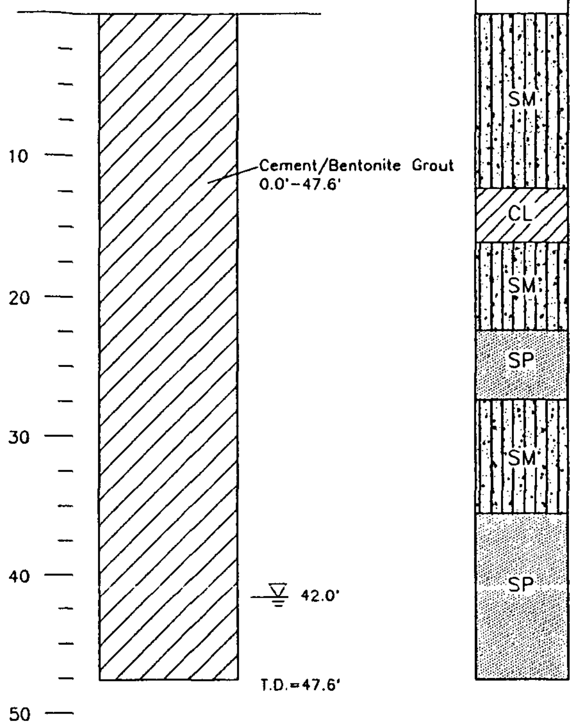
Hydrologists: BM/CMP
Driller: Eades Drilling
Date Completed: 1/13/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

ENRON–HOBBS
Hobbs, New Mexico

BORING LOG: SB–6

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-94 JN 3260



PID Reading (ppm)	Sampling Device	Sample Interval	Comments and Lithology
2.0	Grab	3-5	Silty sand (SM), grayish brown (2.5Y-5/2), very fine- to fine-grained, moderately sorted, subrounded, moist, very slight plasticity, unconsolidated, 80% sand, 15% silt, 5% clay
2.6	Grab	8-10	Silty sand (SM), dark yellowish brown (10YR-4/6), very fine- to medium-grained, poorly sorted, subrounded, damp, unconsolidated, 85% sand, 15% silt
4.0	Grab	13-15	Sandy lean clay (CL), very dark grayish brown (10YR-3/2), moderate plasticity, sand is fine- to medium-grained, moist, dark color is possibly due to organics, 60% clay, 20% silt, 20% sand
25	Split Spoon	16-17	Silty sand (SM), light brownish gray (2.5Y-6/2), fine-grained, moderately sorted, subangular, moist, mottled dark gray to black (possible organics), unconsolidated, 85% sand, 10% silt, 5% clay
21	Grab	18-20	Silty sand (SM), pale yellow (2.5Y-8/2), very fine- to fine-grained, poorly sorted, subangular, moist, unconsolidated, 80% sand, 20% silt
2.0	Grab	23-25	Sand (SP), light gray (10YR-7/2), fine- to medium-grained, well sorted, subrounded, moist, unconsolidated, 95% sand, 5% silt
2.6	Grab	28-30	Silty sand (SM), pinkish gray (7.5YR-7/2), very fine- to medium-grained, poorly sorted, subangular, damp, unconsolidated but with numerous strongly cemented layers of very fine sands and silts, 85% sand, 15% silt
2.0	Grab	33-35	Sand with silt (SP-SM), light brown (7.5YR-6/3), fine-grained, well sorted, subrounded, moist, unconsolidated, 90% sand, 10% silt
2.0	Grab	38-40	Sand (SP), light brown (7.5YR-6/4), fine-grained, well sorted, subrounded, wet, unconsolidated, 95% sand, 5% silt
		42.0	Depth to water
2.0	Grab	43-45	Sand (SP), same as 40'
	Split Spoon	47	No recovery
		47.6	Total depth

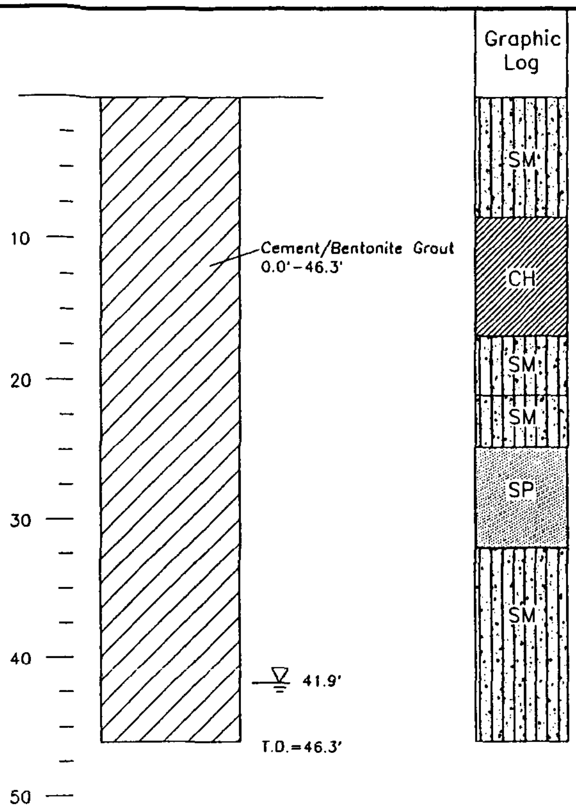
Hydrologists: CMP/BM
Driller: Eades Drilling
Date Completed: 1/13/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

ENRON-HOBBS
Hobbs, New Mexico

BORING LOG: SB-7

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-94
JN 3260



PID Reading (ppm)	Sampling Device	Sample Interval	Comments and Lithology
2.3	Grab	3-5	Sand with silt (SW-SM), light brownish gray (2.5Y-6/2), very fine- to very coarse-grained, poorly sorted, subangular, damp, unconsolidated, 80% sand, 10% silt, 5% clay, 5% gravel
2.6	Grab	8-10	Fat clay (CH), light gray (2.5Y-7/2), plastic, wet, organics, 80% clay, 20% silt
2.6	Grab	13-15	Fat clay (CH), pale yellow (2.5Y-8/2), plastic, damp, organics, 60% clay, 35% silt, 5% very fine sand
2.6	Grab	18-20	Sand with silt (SW-SM), light olive gray (5Y-6/2), very fine- to fine-grained, poorly sorted, subangular, moist, unconsolidated, 90% sand, 10% silt
0.8	Grab	23-25	Sand with silt (SW-SM), pale yellow (2.5Y-7/3), fine-grained, well sorted, subangular, damp, mostly consolidated, strongly cemented layers of fine sand and silt that vary in color to pale red
0.8	Grab	28-30	Sand (SP), brown (7.5YR-5/4), fine- to medium-grained, well sorted, subrounded, moist, unconsolidated, 95% sand, 5% silt
2.6	Grab	33-35	Sand with silt (SW-SM), light brown (7.5YR-6/4), very fine- to fine-grained, moderately sorted, subangular, moist, unconsolidated, with thin layers of cemented sands, 90% sand, 10% silt
2.6	Grab	38-40	Sand with silt (SW-SM), same as 35'
		41.9	Depth to water
0.8	Grab	43-45	Sand with silt (SW-SM), same as 35' only wet
		46.3	Total depth

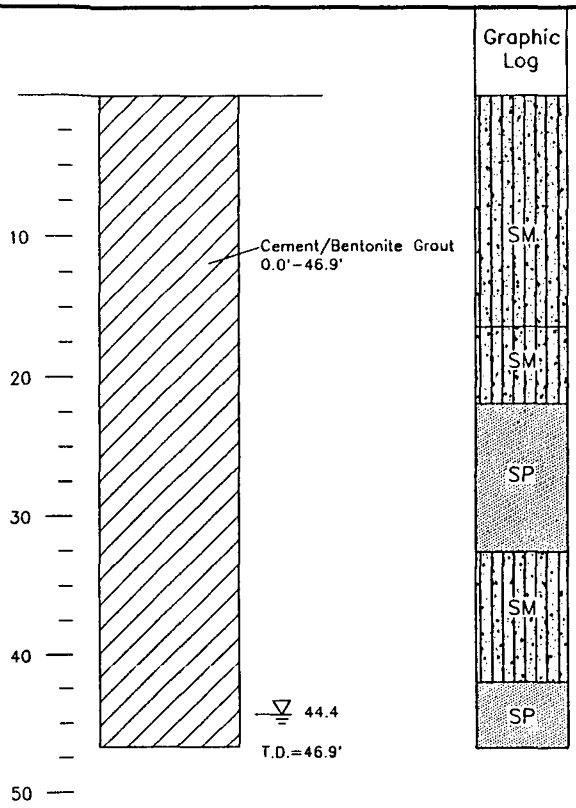
Hydrologists: CMP/BM
Driller: Eades Drilling
Date Completed: 1/13/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

ENRON-HOBBS
Hobbs, New Mexico

BORING LOG: SB-8

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-94
JN 3260



PID Reading (ppm)	Sampling Device	Sample Interval	Comments and Lithology
2.9	Grab	3-5	Silty sand (SM), dark grayish brown (10YR-4/2), very fine- to fine-grained, poorly sorted, subrounded, dry, slightly consolidated, 75% sand, 20% silt, 5% clay
		6	Contact with underlying silty sand
2.9	Grab	7-10	Silty sand (SM), very pale brown (10YR-8/2), very fine- to medium-grained, poorly sorted, subangular, damp, moderately consolidated, 60% sand, 35% silt, 5% clay
2.9	Grab	13-15	Silty sand (SM), pinkish gray (7.5YR-7/2), very fine- to medium-grained, poorly sorted, subangular, damp, some thin layers of moderately consolidated sands, 80% sand, 20% silt
2.9	Grab	18-20	Silty sand (SM), light brown (7.5YR-6/4), very fine- to medium-grained, poorly sorted, subangular, moist, unconsolidated, with layers of strongly cemented sands and silts, 85% sand, 15% silt
2.9	Grab	23-25	Sand (SP), light brown (7.5YR-6/4), fine-grained, well sorted, subrounded, moist, mostly unconsolidated but with thin strongly cemented layers, 95% sand, 5% silt
2.9	Grab	28-30	Sand (SP), light gray (10YR-7/2), fine- to medium-grained well sorted, subrounded, damp, unconsolidated with thin strongly cemented layers, 95% sand, 5% silt
2.9	Grab	33-35	Sand with silt (SW-SM), light brown (7.5 YR-6/4), very fine to medium-grained, moderately sorted, subangular, moist, unconsolidated, with thin layers of strongly cemented fine sands and silts, 90% sand, 10% silt
2.9	Grab	38-40	Sand (SW-SM), same as 35'
2.9	Grab	43-45	Sand (SP), brown (7.5YR-5/4), fine- to medium-grained, well sorted, subrounded, wet, unconsolidated, 95% sand, 5% silt
		44.4	Depth to water
		46.9	Total depth

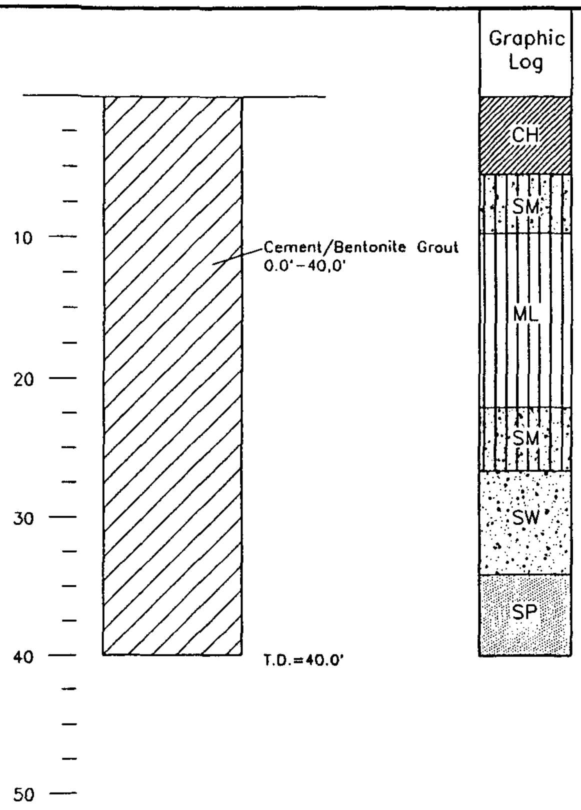
Hydrologists: BM/CMP
Driller: Eades Drilling
Date Completed: 1/14/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

ENRON-HOBBS
Hobbs, New Mexico

BORING LOG: SB-9

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-94
JN 3260



PID Reading (ppm)	Sampling Device	Sample Interval	Comments and Lithology
0.8	Grab	1-2	Fat clay (CH), dark brown to gray, 10% fine-grained sand, moderately sorted, plastic, moist, no odor
8	Split Spoon	4.5-5.5	Same as above to 4.9'; below 4.9', silt, light brown, moderately well sorted, calcareous, damp
8.8	Grab	6-8	Silty sand (SM), white, very fine-grained, well sorted, damp, 40% silt
28.0	Split Spoon	10-11.5	Silt (ML), white, well sorted, dry; at 12' hard layer, ~0.4' thick
12.0	Split Spoon	15-15.4	Same as 10' sample, except hydrocarbon odor
		18	Hard layer, well cemented (~1' thick)
		19	Auger refusal, go back and finish drilling with air rotary
4.8	Split Spoon	20-20.4	Silt with sand (ML), white, very fine-grained sand, moist to wet, hydrocarbon odor
	Split Spoon	24-25	Silty sand (SM), light gray
4.8	Split Spoon	26.5-27	Sand (SW), pinkish gray, fine- to medium-grained, moderately sorted, unconsolidated, moist
2.9	Split Spoon	29.5-29.7	Sand (SW), pinkish gray, fine- to medium-grained, moderately sorted, unconsolidated, damp, many strongly cemented layers of pink fine-grained to silty sands
2.9	Split Spoon	35-35.4	Sand (SP), gray, fine-grained, well sorted, unconsolidated, moist (possible hydrocarbon staining)
		40	Sand (SP), same as 35', except fine- to medium-grained

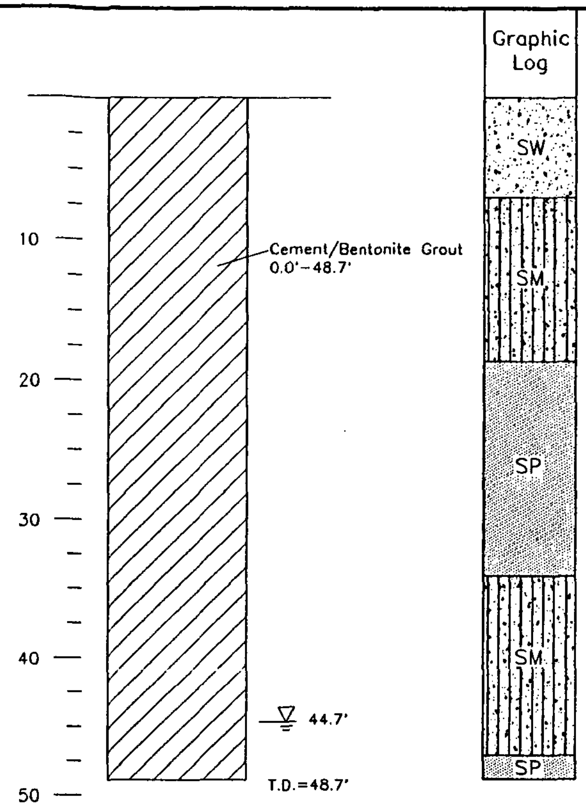
Hydrologists: BM
Driller: Harrison/Eades Drilling
Date Completed: 1/14/94

Drilling Method: Hollow-Stem Auger/Air Rotary
Bit Diameter: 7.25 In./5.5 In.

ENRON-HOBBS
Hobbs, New Mexico

BORING LOG: SB-10

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-94
JN 3260



PID Reading (ppm)	Sampling Device	Sample Interval	Comments and Lithology
7.6	Grab	3–5	Sand with gravel (SW), light gray (10YR-7/2), very fine- to very coarse-grained, poorly sorted, angular, unconsolidated, dry, 85% sand, 10% gravel, 5% silt
2.9	Grab	7–10	Sand with silt (SW-SM), very pale brown (10YR-7/3), very fine to coarse-grained, poorly sorted, angular, slightly consolidated, damp, with strongly cemented layers of fine sands and silts, 90% sand, 10% silt
2.9	Grab	13–15	Sand with silt (SW-SM), same as 10'
2.9	Grab	17–20	Sand (SP), light brown (7.5YR-6/3), fine- to medium-grained, well sorted, subrounded, damp, unconsolidated with thin layers of strongly cemented very fine-grained sand, 95% sand, 5% silt
2.9	Grab	23–25	Sand (SP), light brown (7.5YR-6/4), fine- to medium-grained, well sorted, rounded, moist, unconsolidated, with strongly cemented layers of fine sand and silt, 95% sand, 5% silt
2.9	Grab	28–30	Sand (SP), pink (7.5YR-7/4), fine- to medium-grained, well sorted, subrounded, moist, unconsolidated, with thin layers of strongly cemented sands and silts, 95% sand, 5% silt
2.9	Grab	33–35	Sand with silt (SW-SM), pinkish gray (7.5YR-7/2), very fine- to medium-grained, moderately sorted, subrounded, damp, unconsolidated with numerous strongly cemented layers of fine sands and silts, 90% sand, 10% silt
2.9	Grab	38–40	Sand with silt (SW-SM), pink (7.5YR-7/3), very fine- to medium-grained, moderately sorted, subrounded, unconsolidated, with thin layers of strongly cemented fine-grained sands and silts, 90% sand, 10% silt
2.9	Grab	43–45	Sand with silt (SW-SM), light brown (7.5YR-6/4), same as 40' but wet and fewer cemented layers
		44.7	Depth to water
2.9	Grab	47–49	Sand (SP), light brown (7.5YR-6/4), fine- to medium-grained, well sorted, subangular, wet, unconsolidated, 95% sand, 5% silt
		48.7	Total depth

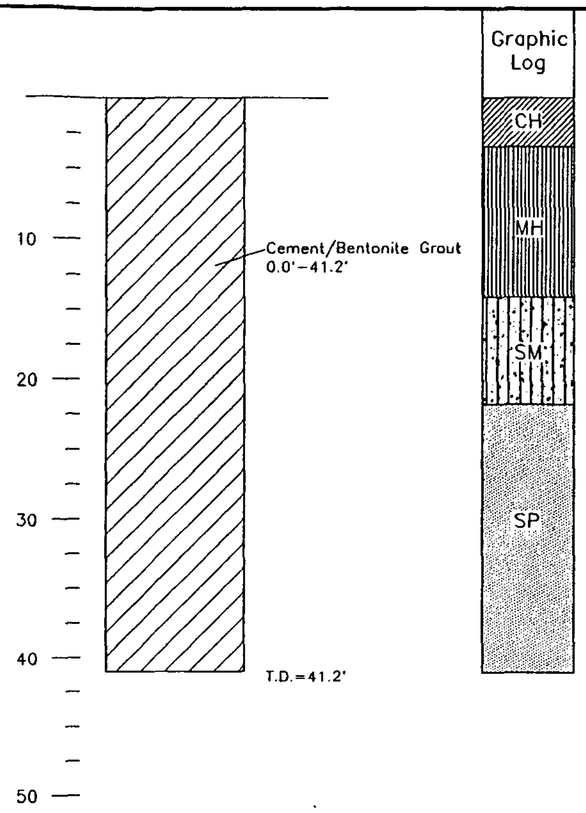
Hydrologists: CMP
Driller: Eades Drilling
Date Completed: 1/14/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

ENRON–HOBBS
Hobbs, New Mexico

BORING LOG: SB-11

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-94
JN 3260



PID Reading (ppm)	Sampling Device	Sample Interval	Comments and Lithology
6.2	Grab	2–3	Sandy clay (CH), dark brown to gray, plastic, damp
1855	Split Spoon	4.5–5.5	Silt (MH), white, very fine-grained, well sorted, plastic, dry to damp, weakly to strongly cemented
1484	Split Spoon	7–9	Silt (MH), same as 5.5'
1269	Split Spoon	9–11	Silt (MH) same as 5.5'
1275	Split Spoon	11–13	Silt (MH) same as 5.5'
1061		13–15	Silt (MH) same as 5.5'
		18	No recovery, top of hard layer
	Split Spoon	20	Silty sand (SM), Hard, consolidated, with strong hydrocarbon odor
		22	Contact with underlying sands
831	Split Spoon	24–26	Sand (SP), light brown, fine- to medium-grained, well sorted, unconsolidated, damp, strong hydrocarbon odor
		29	No recovery
517	Split Spoon	34–34.2	Sand (SP), pale reddish-brown, fine-grained, well sorted, unconsolidated, moist, strong hydrocarbon odor
428	Split Spoon	36–37	Sand (SP), light brown, fine-grained, well sorted, moist, unconsolidated, strong hydrocarbon odor
446	Split Spoon	40–41.2	Sand (SP), reddish-brown, fine-grained, well sorted, unconsolidated, wet, strong hydrocarbon odor

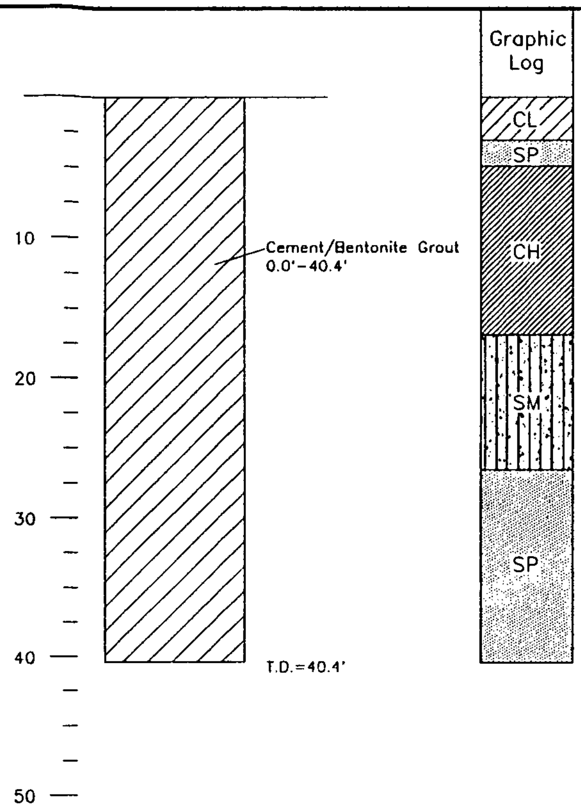
Hydrologists: BM/CMP
Driller: Harrison Drilling
Date Completed: 1/14/94

Drilling Method: Hollow-Stem Auger
Bit Diameter: 7.25 In.

ENRON–HOBBS
Hobbs, New Mexico

BORING LOG: SB-12

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-94
JN 3260



PID Reading (ppm)	Sampling Device	Sample Interval	Comments and Lithology
0.0	Grab	1-3	Sandy clay (CL), very dark grayish brown (10YR-3/2), dry
2.0	Split Spoon	5-5.4	Sand (SP), brown (10YR-5/3), fine- to medium-grained, well sorted, subrounded, dry
0.0	Split Spoon	10-10.6	Fat clay (CH), pale yellow (2.5Y-8/2), plastic, damp, calcareous, 60% clay, 35% silt, 5% very fine sand
2.0	Split Spoon	15-15.3	Clay (CH), same as 10', at 17' strongly cemented layers
	Split Spoon	20	No recovery, resistant, strongly cemented zone 20-22'
0.9	Split Spoon	25-25.1	Thin layers of strongly cemented sands and silts (SM)
2.9	Split Spoon	27-28.5	Sand (SP), light brown (7.5YR-6/3), fine- to medium-grained, well sorted, subrounded, moist, unconsolidated, 95% sand, 5% silt
0.9	Split Spoon	30-30.3	Same as 27'
0.9	Split Spoon	35-35.2	Sand (SP), same as 27' with thin strongly cemented layers
0.9	Split Spoon	40-40.4	Sand (SP), light brown (7.5YR-6/3), fine- to medium-grained, well sorted, subrounded, moist, unconsolidated, 95% sand, 5% silt

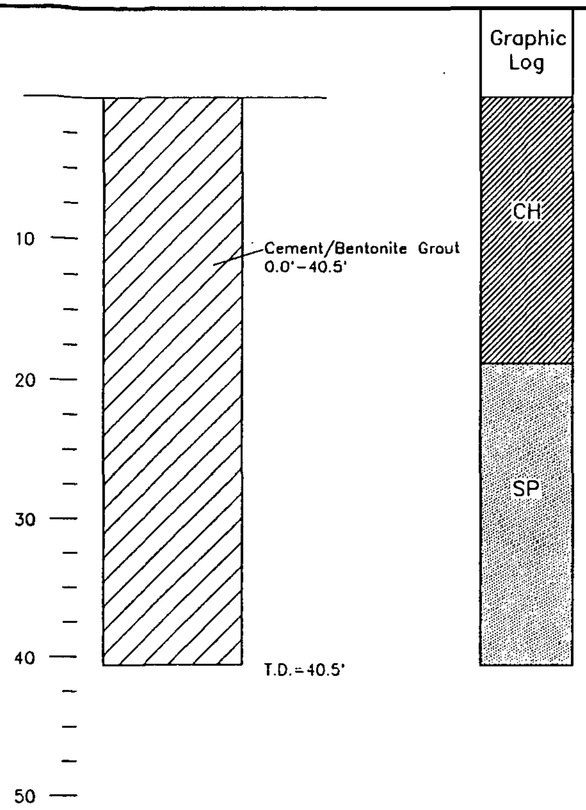
Hydrologists: BM/CMP
Driller: Eades Drilling
Date Completed: 1/15/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

ENRON-HOBBS
Hobbs, New Mexico

BORING LOG: SB-13

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-94
JN 3260



PID Reading (ppm)	Sampling Device	Sample Interval	Comments and Lithology
	Grab	1-2	Sandy fat clay (CH), very dark grayish brown (10YR-3/2), plastic, dry
		3	Contact between top soil and underlying clay
0.0	Split Spoon	5-6.5	Fat clay (CH), Pale yellow (2.5Y-8/2), plastic, damp, 60% clay, 40% silt
0.9	Split Spoon	10-11	Fat clay (CH), same as 5'
0.0	Split Spoon	15-15.4	Fat clay (CH), same as 5' except moist
0.9	Split Spoon	20-20.2	Sand (SP), very pale brown (10YR-8/2), very fine-grained, well sorted, subrounded, damp
28	Split Spoon	25-26.5	Sand (SP), light brown (7.5YR-6/4), fine- to medium-grained, well sorted, subrounded, unconsolidated, dry
57	Split Spoon	30-31.5	Sand (SP), light brown (7.5YR-6/4), medium-grained, well sorted, subrounded, unconsolidated, dry
2.0	Split Spoon	35-35.8	Sand (SP), light brown (7.5YR-6/4), fine- to medium-grained, well sorted, subrounded, moist, unconsolidated, with thin layers of strongly cemented fine-grained sands and silts
6.7	Split Spoon	40-40.5	Sand (SP), same as 35'

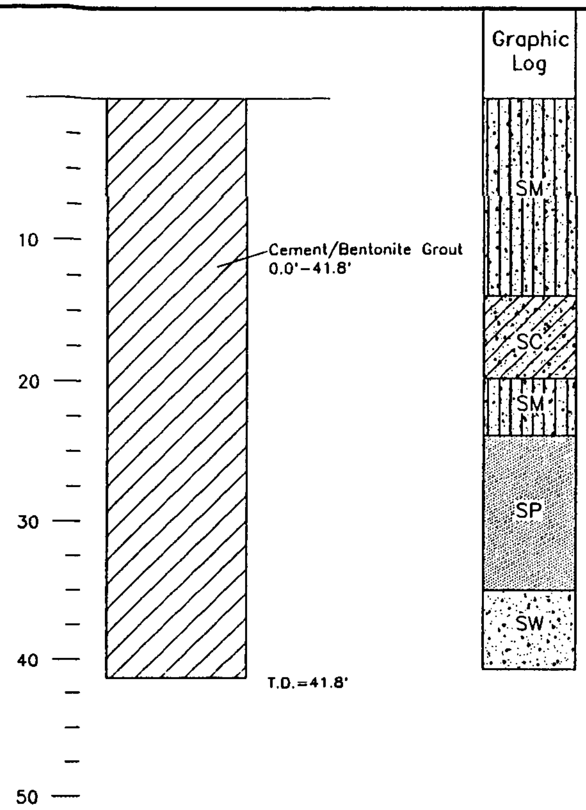
Hydrologists: BM/CMP
Driller: Eades Drilling
Date Completed: 1/15/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

ENRON-HOBBS
Hobbs, New Mexico

BORING LOG: SB-14

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-94
JN 3260



PID Reading (ppm)	Sampling Device	Sample Interval	Comments and Lithology
18.9	Split Spoon	5-7	Silty sand (SM), light gray (2.5Y-7/2), very fine- to fine-grained, poorly sorted, subangular, damp, unconsolidated, with white mottling, highly calcareous, slight plasticity, 85% sand, 15% silt
1.2	Split Spoon	10-11.8	Silty sand (SM), light yellowish brown (2.5Y-6/3), very fine- to fine-grained, poorly sorted, subrounded, damp, unconsolidated, slight plasticity, with white mottling, highly calcareous, 80% sand, 15% silt, 5% clay
1.2	Split Spoon	15-17	Clayey sand (SC) to fat clay (CH), light yellowish brown (2.5Y-6/3), plastic, sand is fine-grained, a lot of black organic material (possible carbonized plants), moist to wet, clay: sand variable, 0-60% sand, 20-40% silt, 20-60% clay
1.2	Split Spoon	20-20.3	Silty sand (SM), very pale brown (10YR-8/2), very fine- to fine-grained, moderately sorted, subrounded, moist, unconsolidated, 85% sand, 15% silt
1.2	Split Spoon	25-26.3	Sand (SP), very pale brown (10YR-8/2), fine-grained, well sorted, rounded, moist, unconsolidated, 95% sand, 5% sand
1.2	Split Spoon	30-31.3	Sand (SP), light brown (7.5YR-6/4), fine- to medium-grained, well sorted, subrounded, moist, unconsolidated, 95% sand, 5% silt
1.2	Split Spoon	35-35.4	Sand (SP), pink (7.5YR-8/4), fine-grained, well sorted, rounded, unconsolidated, moist, 95% sand, 5% silt
1.2	Split Spoon	40-41.8	Sand (SW), brown (7.5YR-5/4), very fine- to medium-grained, moderately sorted, subrounded, wet, unconsolidated, 95% sand, 5% silt

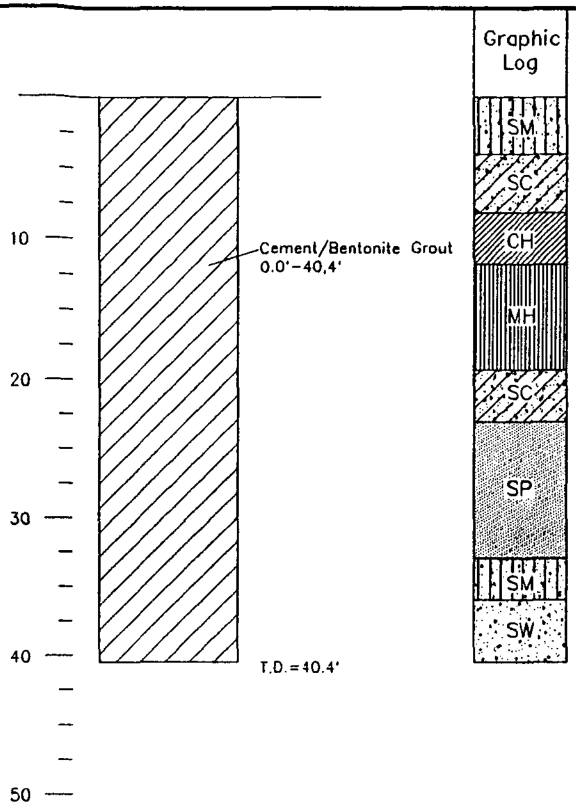
Hydrologists: BM/CMP
Driller: Eades Drilling
Date Completed: 1/17/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-94 JN 3260

ENRON-HOBBS
Hobbs, New Mexico

BORING LOG: SB-15



PID Reading (ppm)	Sampling Device	Sample Interval	Comments and Lithology
	Grab	1-3	Silty sand (SM), very dark gray (5Y-3/1), very fine- to medium-grained, poorly sorted, subangular, dry, unconsolidated, 60% sand, 30% silt, 10% clay
3.7	Split Spoon	5-7	Clayey sand (SC), light gray (2.5Y-7/2), very fine- to fine-grained, poorly sorted, subangular, moist, moderate plasticity, calcareous, 50% sand, 35% clay, 15% silt
3.0	Split Spoon	10-12	Clay with sand (CH), light brownish gray (2.5Y-6/2), highly plastic, moist, unconsolidated, white mottling of highly calcareous material
1.2	Split Spoon	15-16.8	Elastic silt with sand (MH), white (2.5Y-8/1), highly plastic, moist, unconsolidated, 50% silt, 40% clay, 10% sand
1.2	Split Spoon	20-21	Sand with clay (SW-SC), light gray (5Y-7/1), very fine-grained, poorly sorted, subangular, moderately plastic, unconsolidated, calcareous, 50% sand, 30% clay, 20% silt
1.2	Split Spoon	25-27	Sand (SP), light gray (2.5Y-7/2), medium-grained, well sorted, rounded, moist, unconsolidated, with few strongly cemented layers, 95% sand, 5% silt
1.2	Split Spoon	30-30.8	Sand (SP), light gray (10YR-7/2), fine-grained, well sorted, subrounded, unconsolidated, moist, several strongly cemented layers that are pinkish in color and very fine-grained, 95% sand, 5% silt
1.2	Split Spoon	35-35.3	Sand with silt (SW-SM), light gray (10YR-7/2), very fine- to fine-grained, moderately sorted, moist, unconsolidated, with few strongly cemented (with calcite) layers, 90% sand, 10% silt
	Split Spoon	40-40.4	Sand (SW), light brown (7.5YR-6/4), very fine- to fine-grained, moderately sorted, subrounded to rounded, moist, unconsolidated, with few strongly cemented layers, 95% sand, 5% silt

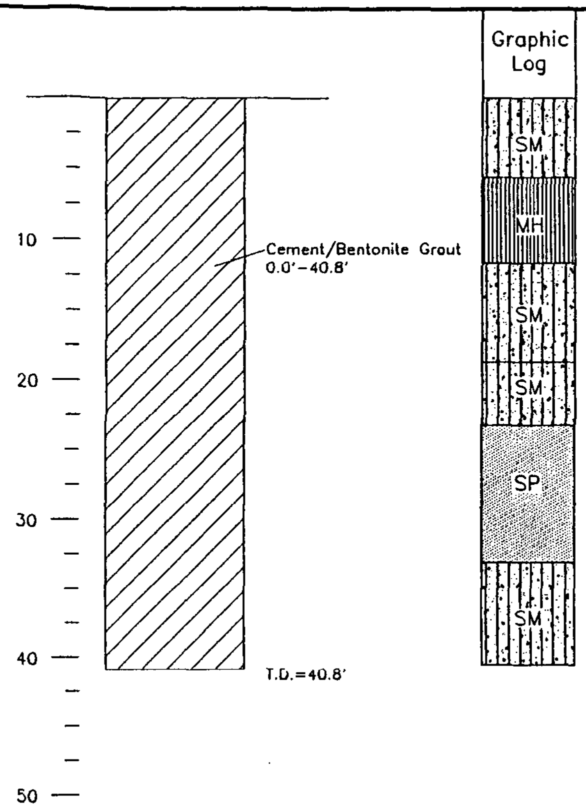
Hydrologists: CMP/BM
Driller: Eades Drilling
Date Completed: 1/18/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

ENRON-HOBBS
Hobbs, New Mexico

BORING LOG: SB-16

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-94
JN 3260



PID Reading (ppm)	Sampling Device	Sample Interval	Comments and Lithology
	Split Spoon	0.5-1.5	Silty sand (SM), very dark grayish brown (2.5Y-3/2), very fine- to medium-grained, poorly sorted, subrounded, dry, unconsolidated
1.2	Split Spoon	5-7.0	Elastic silt (MH), pale yellow (2.5Y-8/2), moderate plasticity, unconsolidated, moist, highly calcareous, 60% silt, 35% clay, 5% sand
3.7	Split Spoon	10-11.0	Elastic silt (MH), very pale brown (10YR-8/2), moderate plasticity, moist, unconsolidated, calcareous, 60% silt, 35% clay, 5% sand
1.2	Split Spoon	15-16.8	Silty sand (SM), light gray (10YR-7/2), very fine- to fine-grained, poorly sorted, subangular, moist, unconsolidated, calcareous, 65% sand, 25% silt, 10% clay
1.2	Split Spoon	20-20.5	Silty sand (SM), very pale brown (10YR-8/2), very fine- to medium-grained, poorly sorted, subangular, unconsolidated, with numerous strongly cemented layers of reddish-brown fine-grained sand, 80% sand, 20% silt
1.0	Split Spoon	25-27	Sand (SP), reddish-yellow (7.5YR-6/6), fine- to medium-grained, well sorted, rounded, moist, unconsolidated, 95% sand, 5% silt
3.7	Split Spoon	30-30.5	Sand (SP), light brown (7.5YR-6/4), fine- to medium-grained, well sorted, rounded, unconsolidated, moist, with layers of strongly cemented fine-grained sand
1.2	Split Spoon	35-35.5	Sand with silt (SW-SM), light brown (7.5YR-6/4), very fine- to fine-grained, moderately sorted, subrounded, moist, unconsolidated, calcareous, 90% sand, 10% silt
	Split Spoon	40-40.8	Sand with silt (SW-SM), same as 35'

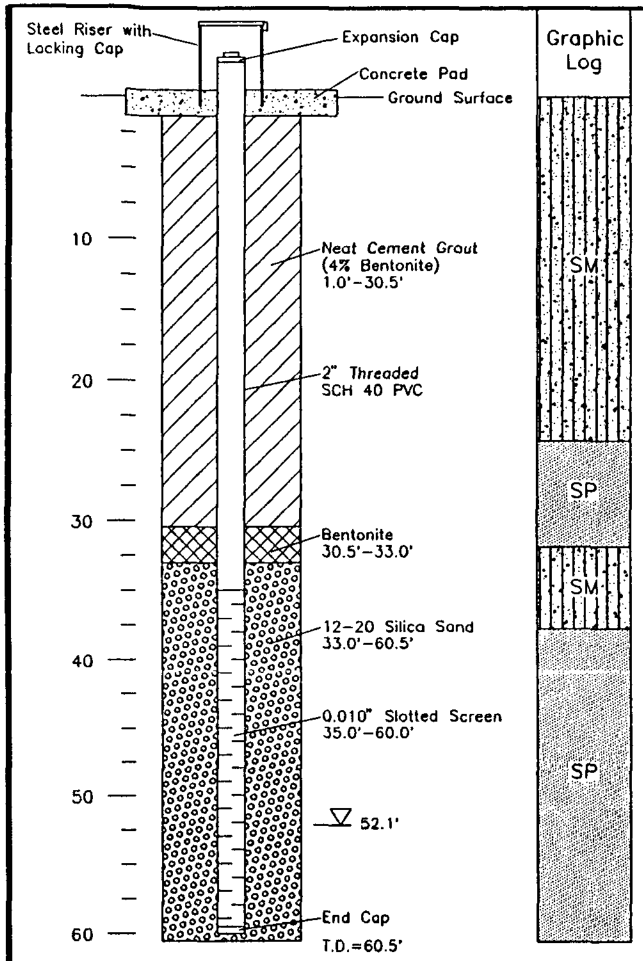
Hydrologists: CMP/BM
Driller: Eades Drilling
Date Completed: 1/18/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

ENRON-HOBBS
Hobbs, New Mexico

BORING LOG: SB-17

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-94
JN 3260



PID Reading	Sampling Device	Sample Interval	Comments and Lithology
	Grab	3-5	Silty sand (SM), very pale brown (10YR-7/3), very fine- to coarse-grained, poorly sorted, subrounded, dry, unconsolidated, 80% sand, 15% silt, 5% gravel
	Grab	8-10	Silty sand (SM), same as 5'
	Grab	13-15	Silty sand (SM), light brown (7.5YR-6/4), very fine- to medium-grained, poorly sorted, subangular, damp, with thin layers of strongly cemented fine sands and silts, 80% sand, 20% silt
	Grab	18-20	Silty sand (SM), pinkish white (7.5YR-8/2), very fine- to medium-grained, poorly sorted, subangular, damp, with thin layers of strongly cemented fine sands and silts, 80% sand, 20% silt
	Grab	23-25	Silty sand (SM), same as 20'
	Grab	28-30	Sand (SP), pink (7.5YR-7/3), fine- to medium-grained, well sorted, subrounded, moist, unconsolidated, with thin strongly cemented layers, 95% sand, 5% silt
	Grab	33-35	Sand with silt (SP-SM), pink (7.5YR-7/3), fine-grained, well sorted, subrounded, moist, unconsolidated, with minor thin layers of strongly cemented sands and silts, 90% sand, 10% silt
	Grab	38-40	Sand (SP), light brown (7.5YR-6/4), fine-grained, well sorted, subrounded, moist, unconsolidated, with minor strongly cemented layers, 95% sand, 5% silt
	Grab	43-45	Sand (SP), same as 40'
	Grab	48-50	Sand (SP), light brown (7.5YR-6/4), fine- to medium-grained, well sorted, subrounded, unconsolidated, wet, 95% sand, 5% silt
		53-55	Sand, same as 50'
	Grab	52.1	Depth to water
	Grab	58-60	Sand (SP), light brown (7.5YR-6/4), fine- to medium-grained, well sorted, subrounded, unconsolidated, saturated, 95% sand, 5% silt
		60.5	Total depth

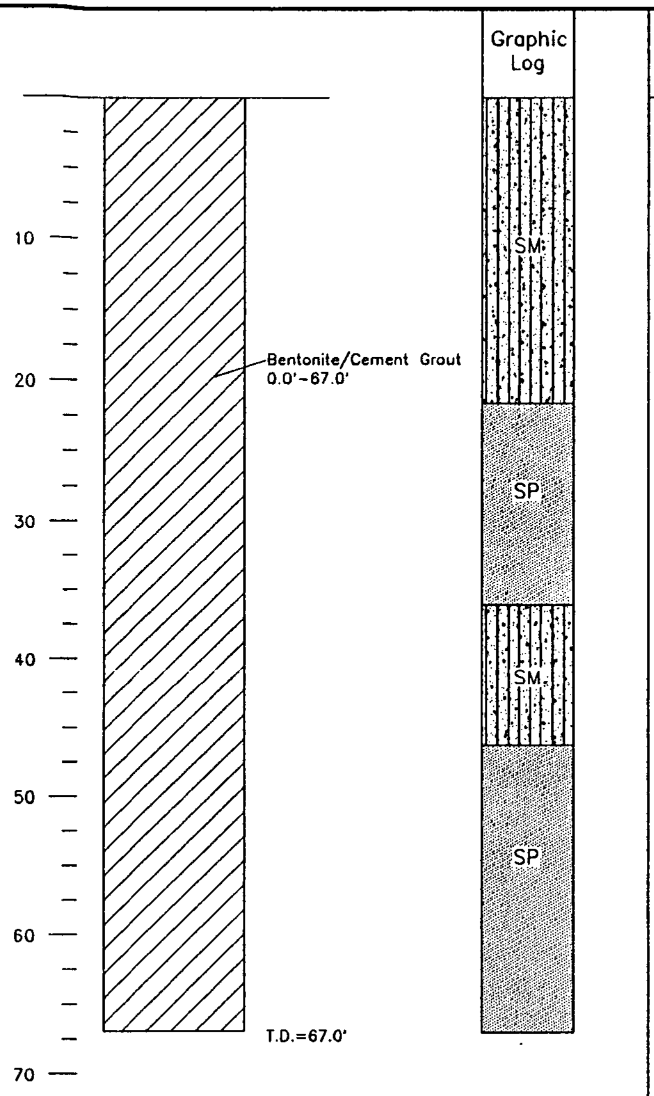
Hydrologists: BM/CMP
Driller: Eades Drilling
Date Completed: 1/14/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-94
JN 3260

ENRON-HOBBS
Hobbs, New Mexico

WELL LOG: MW-7



PID Reading (ppm)	Sampling Device	Sample Interval	Comments and Lithology
3.7	Grab	4-5	Silty sand (SM), very pale brown (10YR-7/3), very fine- to coarse-grained, poorly sorted, subangular, dry, slight plasticity, 75% sand, 20% silt, 5% clay
1.2	Grab	8-10	Silty sand (SM), pink (7.5YR-7/3), very fine- to medium-grained, poorly sorted, subangular, moist, unconsolidated, 85% sand, 15% silt
1.2	Grab	13-15	Silty sand (SM), pinkish white (7.5YR-8/2), very fine- to fine-grained, moderately sorted, subangular, damp, unconsolidated, with numerous strongly cemented very fine sands and silts, 85% sand, 15% silt
1.2	Grab	18-20	Silty sand (SM), same as 15'
1.2	Grab	23-25	Sand (SP), pink (7.5YR-8/2), fine- to medium-grained, well sorted, rounded, moist, unconsolidated, 95% sand, 5% silt
1.2	Grab	28-30	Sand (SP), light brown (7.5YR-6/4), fine- to medium-grained, well sorted, rounded, moist to wet, unconsolidated, with strongly cemented layers of very fine sands and silts, 95% sand, 5% silt
8.8	Grab	33-35	Sand (SP), pink (7.5YR-7/4), fine- to medium-grained, well sorted, subrounded, moist, unconsolidated, 95% sand, 5% silt
3.7	Grab	38-40	Sand with silt (SW-SM), pink (7.5YR-8/3), very fine- to medium-grained, poorly sorted, subrounded, damp, unconsolidated, with numerous layers of strongly cemented fine sands and silts, 90% sand, 10% silt
1.2	Grab	46-48	Sand (SP), light brown (7.5YR-6/4), fine- to medium-grained, well sorted, subrounded, wet, unconsolidated, 95% sand, 5% silt
1.2		53-55	Sand (SP), light brown (7.5YR-6/4), fine- to medium-grained, well sorted, rounded, saturated, unconsolidated, with layers of strongly cemented sand, 95% sand, 5% silt
1.2		58-60	Sand (SP), same as 55'
		67	Abandon hole

Hydrologists: BM/CMP
Driller: Eades Drilling
Date Completed: 1/16/94

Drilling Method: Air Rotary (0-50 Ft.)
Water Circulated (50-65 Ft.)
Bit Diameter: 5.5 In.

ENRON-HOBBS
Hobbs, New Mexico

WELL LOG: MW-8ABD

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-94
JN 3260

APPENDIX B

ANALYTICAL LABORATORY REPORT

Analytical**Technologies,** Inc.

2709-D Pan American Freeway, NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. **401324**

February 10, 1994

Daniel B. Stephens & Associates
6020 Academy, NE - Suite 100
Albuquerque, NM 87106

Project Name/Number: ENRON-HOBBS 3260

Attention: Bob Marley

From **01/10/94** through **01/19/94**, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **aqueous and non-aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

High surrogate recovery for EPA Method 8020/8015 for sample SB-5 @ 6.5' was confirmed by re-analysis at a dilution. The diluted results are reported. The acceptable recoveries for bromofluorobenzene for EPA Method 8020/8015 for non-aqueous samples are 64 to 116 percent.

The 8 RCRA metals by total digestion was requested for samples MW-4 and MW-7. The sample container for MW-7 was marked as filtered. To confirm, turbidity was measured and found to be <1 NTU. Per ATI protocol, the State of Arizona Health Services, and USEPA, it is not necessary to digest such samples. Per Standard Methods for the Examination of Water and Wastes, 17 ed., "...Colorless, transparent samples (primarily drinking water) containing a turbidity of <1 NTU...may be analyzed directly by atomic absorption spectroscopy or inductively coupled plasma spectroscopy for total metals without digestion..."

EPA Method 8015, 8020 and 8010/8020 analyses were performed by Analytical Technologies, Inc., Albuquerque, NM.

All other analyses were performed by Analytical Technologies, Inc., 9830 S. 51st Street, Suite B-113, Phoenix, AZ.

This report is being reissued in part to include clarification for the above notes and to correct the EPA method number for sulfate. The method number was originally reported as EPA 375.2 instead of 300.0.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Letitia Krakowski

Letitia Krakowski, Ph.D.
Project Manager

MR:jd

Enclosure

Analytical**Technologies,** Inc.

CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

DATE RECEIVED: 01/10/94
THROUGH: 01/19/94
REPORT DATE : 01/27/94

ATI I.D.: 401324

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	MW-4	AQUEOUS	01/10/94
02	TRIP BLANK	AQUEOUS	01/05/94
03	MW-6	AQUEOUS	01/10/94
04	SB-1	AQUEOUS	01/11/94
05	TRIP BLANK	AQUEOUS	01/05/94
06	MW-4	AQUEOUS	01/10/94
07	SB-2	AQUEOUS	01/11/94
08	TRIP BLANK	AQUEOUS	01/05/94
09	SB-3	AQUEOUS	01/12/94
10	MW-1	AQUEOUS	01/12/94
11	TRIP BLANK	AQUEOUS	01/05/94
12	SB-4	AQUEOUS	01/12/94
13	MW-2	AQUEOUS	01/12/94
14	SB-5	AQUEOUS	01/12/94
15	SB-6	AQUEOUS	01/13/94
16	TRIP BLANK	AQUEOUS	01/05/94
17	EQUIPMENT BLANK 1	AQUEOUS	01/13/94
18	SB-7	AQUEOUS	01/13/94
19	SB-8	AQUEOUS	01/13/94
20	SB-9	AQUEOUS	01/14/94
21	TRIP BLANK	AQUEOUS	01/05/94
22	SB-11	AQUEOUS	01/14/94
23	SB-10 @ 10′	NON-AQ	01/14/94
24	SB-10 @ 40′	NON-AQ	01/15/94
25	SB-12 @ 5.0′	NON-AQ	01/14/94
26	SB-12 @ 40′	NON-AQ	01/14/94
27	SB-13 @ 40′	NON-AQ	01/15/94
28	SB-14 @ 30′	NON-AQ	01/15/94
29	SB-14 @ 40′	NON-AQ	01/15/94
30	MW-5	AQUEOUS	01/16/94
31	MW-7	AQUEOUS	01/16/94
32	TRIP BLANK	AQUEOUS	01/05/94
33	NNG-4	AQUEOUS	01/17/94
34	PORTABLE PIT	AQUEOUS	01/17/94
35	REPLICATE I	AQUEOUS	NA
36	REPLICATE II	AQUEOUS	NA
37	SB-6 @ 18.5′	NON-AQ	01/13/94
38	SB-7 @ 16.0′	NON-AQ	01/13/94
39	SB-5 @ 6.5′	NON-AQ	01/18/94

----TOTALS----

MATRIX	# SAMPLES
AQUEOUS	29
NON-AQUEOUS	10

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

D.B. STEPHENS AND ASSOCIATES
ENRON-HOBBS
ATI LAB NO. 401324

ATI'S DETECTION LIMITS FOR GENERAL CHEMISTRY - AQUEOUS

COMPOUND	DETECTION LIMIT (MG/L)
NITRATE/NITRITE - EPA METHOD 353.2	0.06
ALKALINITY - EPA METHOD 310.1	1
CHLORIDE - EPA METHOD 325.2	0.5
SULFATE - EPA METHOD 300.0	0.3
TOTAL DISSOLVED SOLIDS	10

ATI'S DETECTION LIMITS FOR METALS ANALYSES - AQUEOUS

COMPOUND	DETECTION LIMIT (MG/L)
CALCIUM - EPA METHOD 6010	0.1
POTASSIUM - EPA METHOD 6010	1.0
MAGNESIUM - EPA METHOD 6010	0.1
SODIUM - EPA METHOD 6010	0.1
SILVER - EPA METHOD 6010	0.010
ARSENIC - EPA METHOD 7060	0.005
BARIUM - EPA METHOD 6010	0.010
CADMIUM - EPA METHOD 6010	0.0005
CHROMIUM - EPA METHOD 6010	0.010
MERCURY - EPA METHOD 7470	0.0002
LEAD - EPA METHOD 7421	0.020
SELENIUM - EPA METHOD 7740	0.005

D.B. STEPHENS AND ASSOCIATES
ENRON-HOBBS
METHOD NUMBER AND DETECTION LIMITS
ATI LAB NO. 401324

Water

EPA 8015 MODIFIED, ANALYZED AT 1X, UG/L:

PARAMETER	DETECTION LIMIT
FUEL HYDROCARBONS	50

EPA 8015 MODIFIED, ANALYZED AT 5X, UG/L:

PARAMETER	DETECTION LIMIT
FUEL HYDROCARBONS	250

Soils

EPA 8015 MODIFIED, ANALYZED AT 1X, MG/KG:

PARAMETER	DETECTION LIMIT
FUEL HYDROCARBONS	5

EPA 8015 MODIFIED, ANALYZED AT 20X, MG/KG:

PARAMETER	DETECTION LIMIT
FUEL HYDROCARBONS	100

EPA 8015 MODIFIED, ANALYZED AT 50X, MG/KG:

PARAMETER	DETECTION LIMIT
FUEL HYDROCARBONS	250

EPA 8015 MODIFIED, ANALYZED AT 1X, MG/L:

PARAMETER	DETECTION LIMIT
FUEL HYDROCARBONS	1

D.B. STEPHENS AND ASSOCIATES
ENRON-HOBBS
METHOD NUMBER AND DETECTION LIMITS
ATI LAB NO. 401324

— Water —

EPA 8020, ANALYZED AT 1X, UG/L:

PARAMETER	DETECTION LIMIT
BENZENE	0.5
TOLUENE	0.5
ETHYLBENZENE	0.5
TOTAL XYLENES	0.5

EPA 8020, ANALYZED AT 5X, UG/L:

PARAMETER	DETECTION LIMIT
BENZENE	2.5
TOLUENE	2.5
ETHYLBENZENE	2.5
TOTAL XYLENES	2.5

AnalyticalTechnologies, Inc.

D.B. STEPHENS AND ASSOCIATES
ENRON-HOBBS
METHOD NUMBER AND DETECTION LIMITS
ATI LAB NO. 401324

— Soils —

EPA 8020, ANALYZED AT 1X, MG/KG:

PARAMETER	DETECTION LIMIT
BENZENE	0.025
TOLUENE	0.025
ETHYLBENZENE	0.025
TOTAL XYLENES	0.025

EPA 8020, ANALYZED AT 20X, MG/KG:

PARAMETER	DETECTION LIMIT
BENZENE	0.5
TOLUENE	0.5
ETHYLBENZENE	0.5
TOTAL XYLENES	0.5

EPA 8020, ANALYZED AT 50X, MG/KG:

PARAMETER	DETECTION LIMIT
BENZENE	1.25
TOLUENE	1.25
ETHYLBENZENE	1.25
TOTAL XYLENES	1.25

Analytical**Technologies,** Inc.

D.B. STEPHENS AND ASSOCIATES
ENRON-HOBBS
METHOD NUMBER AND DETECTION LIMITS
ATI LAB NO. 401324

— Water —

EPA 8010/8020, ANALYZED AT 1X, UG/L:

PARAMETER	DETECTION LIMIT
BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.5
BROMOMETHANE	<0.5
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.5
DIBROMOCHLOROMETHANE	<0.2
1,2-DIBROMOETHANE (EDB)	<0.5
1,2-DICHLOROBENZENE	<0.5
1,3-DICHLOROBENZENE	<0.5
1,4-DICHLOROBENZENE	<0.5
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE (EDC)	<0.2
1,1-DICHLOROETHENE	<0.2
CIS-1,2-DICHLOROETHENE	<0.2
TRANS-1,2-DICHLOROETHENE	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.5
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYL-t-BUTYL ETHER	<2.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.2
VINYL CHLORIDE	<0.5
TOTAL XYLENES	<0.5

Analytical**Technologies,**Inc.

D.B. STEPHENS AND ASSOCIATES
ENRON-HOBBS
METHOD NUMBER AND DETECTION LIMITS
ATI LAB NO. 401324

— Water —

EPA 8010/8020, ANALYZED AT 5X, UG/L:

PARAMETER	DETECTION LIMIT
BENZENE	<2.5
BROMODICHLOROMETHANE	<1.0
BROMOFORM	<2.5
BROMOMETHANE	<2.5
CARBON TETRACHLORIDE	<1.0
CHLOROBENZENE	<2.5
CHLOROETHANE	<1.0
CHLOROFORM	<1.0
CHLOROMETHANE	<2.5
DIBROMOCHLOROMETHANE	<1.0
1,2-DIBROMOETHANE (EDB)	<2.5
1,2-DICHLOROBENZENE	<2.5
1,3-DICHLOROBENZENE	<2.5
1,4-DICHLOROBENZENE	<2.5
1,1-DICHLOROETHANE	<1.0
1,2-DICHLOROETHANE (EDC)	<1.0
1,1-DICHLOROETHENE	<1.0
CIS-1,2-DICHLOROETHENE	<1.0
TRANS-1,2-DICHLOROETHENE	<1.0
1,2-DICHLOROPROPANE	<1.0
CIS-1,3-DICHLOROPROPENE	<2.5
TRANS-1,3-DICHLOROPROPENE	<1.0
ETHYLBENZENE	<2.5
METHYL-t-BUTYL ETHER	<12
METHYLENE CHLORIDE	<10
1,1,2,2-TETRACHLOROETHANE	<1.0
TETRACHLOROETHENE	<1.0
TOLUENE	<2.5
1,1,1-TRICHLOROETHANE	<1.0
1,1,2-TRICHLOROETHANE	<1.0
TRICHLOROETHENE	<1.0
TRICHLOROFLUOROMETHANE	<1.0
VINYL CHLORIDE	<2.5
TOTAL XYLENES	<2.5

Analytical**Technologies**, Inc.

D.B. STEPHENS AND ASSOCIATES
ENRON-HOBBS
METHOD NUMBER AND DETECTION LIMITS
ATI LAB NO. 401324

— Water —

EPA 8010/8020, ANALYZED AT 500X, UG/L:

PARAMETER	DETECTION LIMIT
BENZENE	<250
BROMODICHLOROMETHANE	<100
BROMOFORM	<250
BROMOMETHANE	<250
CARBON TETRACHLORIDE	<100
CHLOROBENZENE	<250
CHLOROETHANE	<100
CHLOROFORM	<100
CHLOROMETHANE	<250
DIBROMOCHLOROMETHANE	<100
1,2-DIBROMOETHANE (EDB)	<250
1,2-DICHLOROBENZENE	<250
1,3-DICHLOROBENZENE	<250
1,4-DICHLOROBENZENE	<250
1,1-DICHLOROETHANE	<100
1,2-DICHLOROETHANE (EDC)	<100
1,1-DICHLOROETHENE	<100
CIS-1,2-DICHLOROETHENE	<100
TRANS-1,2-DICHLOROETHENE	<100
1,2-DICHLOROPROPANE	<100
CIS-1,3-DICHLOROPROPENE	<250
TRANS-1,3-DICHLOROPROPENE	<100
ETHYLBENZENE	<250
METHYL-t-BUTYL ETHER	<1200
METHYLENE CHLORIDE	<1000
1,1,2,2-TETRACHLOROETHANE	<100
TETRACHLOROETHENE	<100
TOLUENE	<250
1,1,1-TRICHLOROETHANE	<100
1,1,2-TRICHLOROETHANE	<100
TRICHLOROETHENE	<100
TRICHLOROFLUOROMETHANE	<100
VINYL CHLORIDE	<250
TOTAL XYLENES	<250

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 401324

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 3260
PROJECT NAME : ENRON-HOBBS

DATE RECEIVED : 01/10/94
REPORT DATE : 01/27/94

PARAMETER	UNITS	06	31	33	36
CARBONATE (CACO3)	MG/L	<1	<1	<1	<1
BICARBONATE (CACO3)	MG/L	706	262	184	187
HYDROXIDE (CACO3)	MG/L	<1	<1	<1	<1
TOTAL ALKALINITY (AS CACO3)	MG/L	706	262	184	187
CHLORIDE (EPA 325.2)	MG/L	770	120	66	64
NO2/NO3-N, TOTAL (353.2)	MG/L	<0.06	2.7	2.6	2.6
SULFATE (EPA 300.0)	MG/L	0.4	140	51	51
T. DISSOLVED SOLIDS (160.1)	MG/L	1900	720	410	410

Analytical**Technologies,** Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 3260
PROJECT NAME : ENRON-HOBBS
ATI I.D. : 401324

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CARBONATE	MG/L	40165812	<1	<1	NA	NA	NA	NA
BICARBONATE	MG/L		330	330	0	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		330	330	0	NA	NA	NA
CARBONATE	MG/L	40175001	<1	<1	NA	NA	NA	NA
BICARBONATE	MG/L		87	89	2	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		87	89	2	NA	NA	NA
CHLORIDE	MG/L	40132431	120	120	0	260	125	112
NITRITE/NITRATE-N (TOT	MG/L	40166702	4.0	4.0	0	24	20	100
NITRITE/NITRATE-N (TOT	MG/L	40132431	2.7	2.7	0	6.5	4.0	95
SULFATE	MG/L	40132406	0.4	0.4	0	5.2	5.0	96
SULFATE	MG/L	40132431	140	140	0	290	150	100
TOTAL DISSOLVED SOLIDS	MG/L	40165801	2500	2500	0	NA	NA	NA
TOTAL DISSOLVED SOLIDS	MG/L	40187605	2000	2000	0	NA	NA	NA

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical**Technologies,** Inc.

METALS RESULTS

ATI I.D. : 401324

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 3260
PROJECT NAME : ENRON-HOBBS

DATE RECEIVED : 01/10/94

REPORT DATE : 01/27/94

PARAMETER	UNITS	06	31	33	36
SILVER (EPA 200.7/6010)	MG/L	<0.010	<0.010	-	-
ARSENIC (EPA 206.2/7060)	MG/L	0.077	<0.005	-	-
BARIUM (EPA 200.7/6010)	MG/L	0.667	0.059	-	-
CALCIUM (EPA 200.7/6010)	MG/L	104	112	75.3	75.7
CADMIUM (EPA 213.2/7131)	MG/L	<0.0005	<0.0005	-	-
CHROMIUM (EPA 200.7/6010)	MG/L	<0.010	<0.010	-	-
MERCURY (EPA 245.1/7470)	MG/L	<0.0002	<0.0002	-	-
POTASSIUM (EPA 200.7/6010)	MG/L	21.5	4.7	2.4	2.6
MAGNESIUM (EPA 200.7/6010)	MG/L	70	11.5	10.0	10.0
SODIUM (EPA 200.7/6010)	MG/L	553	145	52.6	52.5
LEAD (EPA 239.2/7421)	MG/L	<0.002	<0.002	-	-
SELENIUM (EPA 270.2/7740)	MG/L	<0.005	<0.005	-	-

Analytical **Technologies**, Inc.

METALS - QUALITY CONTROL

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 3260
PROJECT NAME : ENRON-HOBBS
ATI I.D. : 401324

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
SILVER	MG/L	40167001	<0.010	<0.010	NA	0.442	0.500	88
SILVER	MG/L	40132431	<0.010	<0.010	NA	0.968	1.000	97
ARSENIC	MG/L	40167001	<0.005	<0.005	NA	0.051	0.050	102
ARSENIC	MG/L	40187601	<0.005	<0.005	NA	0.049	0.050	98
BARIUM	MG/L	40165801	0.026	0.026	0	0.976	1.00	95
BARIUM	MG/L	40132431	0.059	0.057	3	0.989	1.000	93
CALCIUM	MG/L	40132406	104	103	1	157	50.0	106
CALCIUM	MG/L	40132431	112	106	6	156	500	88
CADMIUM	MG/L	40166701	0.0026	0.0026	0	0.0075	0.0050	98
CADMIUM	MG/L	40187001	0.0014	0.0014	0	0.0058	0.0050	88
CHROMIUM	MG/L	40167001	<0.010	<0.010	NA	0.961	1.00	96
CHROMIUM	MG/L	40132431	<0.010	<0.010	NA	1.00	1.00	100
MERCURY	MG/L	40167004	<0.0002	<0.0002	NA	0.0051	0.0050	102
MERCURY	MG/L	40180404	<0.0002	<0.0002	NA	0.0048	0.0050	96
POTASSIUM	MG/L	40132406	21.5	21.3	0.9	69.2	50.0	95
POTASSIUM	MG/L	40132431	4.7	4.5	4	56.1	50.0	103
MAGNESIUM	MG/L	40132406	70	68	3	323	250	101
MAGNESIUM	MG/L	40132431	11.5	10.9	5	36.1	25.0	98
SODIUM	MG/L	40132406	553	542	2	1050	500	99
SODIUM	MG/L	40132431	145	138	5	185	50.0	80
LEAD	MG/L	40168101	<0.002	<0.002	NA	0.050	0.050	100
LEAD	MG/L	40187701	<0.002	0.003	NA	0.049	0.050	98
SELENIUM	MG/L	40167001	<0.005	<0.005	NA	0.034	0.050	68
SELENIUM	MG/L	40186801	<0.0005	<0.0005	NA	0.035	0.050	70

$$\%\ \text{Recovery} = \frac{\text{(Spike Sample Result - Sample Result)}}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{\text{(Sample Result - Duplicate Result)}}{\text{Average Result}} \times 100$$

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (C6-C16)
CLIENT : D.B STEPHENS AND ASSOCIATES ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
23	SB-10 @ 10'	NON-AQ	01/14/94	01/18/94	01/19/94	1
24	SB-10 @ 40'	NON-AQ	01/15/94	01/18/94	01/19/94	1
25	SB-12 @ 5.0'	NON-AQ	01/14/94	01/18/94	01/20/94	50

PARAMETER	UNITS	23	24	25
FUEL HYDROCARBONS	MG/KG	<5	<5	3100
HYDROCARBON RANGE		-	-	C6-C16
HYDROCARBONS QUANTITATED USING		-	-	GASOLINE
BROMOFLUOROBENZENE (%)		90	95	121*

*SURROGATE OUTSIDE ATI ACCEPTANCE CRITERIA DUE TO MATRIX INTERFERENCE

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (C6-C16)
CLIENT : D.B STEPHENS AND ASSOCIATES ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
26	SB-12 @ 40'	NON-AQ	01/14/94	01/18/94	01/20/94	50
27	SB-13 @ 40'	NON-AQ	01/15/94	01/18/94	01/19/94	1
28	SB-14 @ 30'	NON-AQ	01/15/94	01/18/94	01/19/94	1

PARAMETER	UNITS	26	27	28
FUEL HYDROCARBONS	MG/KG	4100	<5	<5
HYDROCARBON RANGE		C6-C16	-	-
HYDROCARBONS QUANTITATED USING		GASOLINE	-	-
BROMOFLUOROBENZENE (%)		74	91	92

AnalyticalTechnologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (C6-C16)
CLIENT : D.B STEPHENS AND ASSOCIATES ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
29	SB-14 @ 40′	NON-AQ	01/15/94	01/18/94	01/19/94	1
37	SB-6 @ 18.5′	NON-AQ	01/13/94	01/21/94	01/24/94	1
38	SB-7 @ 16.0′	NON-AQ	01/13/94	01/21/94	01/24/94	1

PARAMETER	UNITS	29	37	38
FUEL HYDROCARBONS	MG/KG	<5	<5	29
HYDROCARBON RANGE		-	-	C9-C16
HYDROCARBONS QUANTITATED USING		-	-	GASOLINE
BROMOFLUOROBENZENE (%)		87	80	80

Analytical**Technologies,** Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (C6-C16)
CLIENT : D.B STEPHENS AND ASSOCIATES ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
39	SB-5 @ 6.5'	NON-AQ	01/18/94	01/21/94	01/24/94	20

PARAMETER	UNITS	39
FUEL HYDROCARBONS	MG/KG	3300
HYDROCARBON RANGE		C6-C16
HYDROCARBONS QUANTITATED USING		GASOLINE
BROMOFLUOROBENZENE (%)		486*

*SURROGATE RECOVERY OUTSIDE ATI ACCEPTANCE CRITERA DUE TO MATRIX INTERFERENCE.

Analytical**Technologies,** Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST : EPA 8015 MODIFIED (C6-C16)
BLANK I.D. : 011894
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED : 01/18/94
DATE ANALYZED : 01/19/94
DILUTION FACTOR: 1

PARAMETER	UNITS	
FUEL HYDROCARBONS	MG/KG	<5
HYDROCARBON RANGE		-
HYDROCARBONS QUANTITATED USING		-
BROMOFLUOROBENZENE (%)		98

AnalyticalTechnologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST : EPA 8015 MODIFIED (C6-C16)
BLANK I.D. : 012194
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED : 01/21/94
DATE ANALYZED : 01/24/94
DILUTION FACTOR: 1

PARAMETER	UNITS	
FUEL HYDROCARBONS	MG/KG	<5
HYDROCARBON RANGE		-
HYDROCARBONS QUANTITATED USING		-
BROMOFLUOROBENZENE (%)		77

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : D.B STEPHENS AND ASSOCIATES ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
23	SB-10 @ 10′	NON-AQ	01/14/94	01/18/94	01/19/94	1
24	SB-10 @ 40′	NON-AQ	01/15/94	01/18/94	01/19/94	1
25	SB-12 @ 5.0′	NON-AQ	01/14/94	01/18/94	01/20/94	50

PARAMETER	UNITS	23	24	25
BENZENE	MG/KG	<0.025	<0.025	<1.2
TOLUENE	MG/KG	<0.025	<0.025	4.6
ETHYLBENZENE	MG/KG	<0.025	<0.025	21
TOTAL XYLENES	MG/KG	<0.025	<0.025	82
BROMOFLUOROBENZENE (%)		90	95	121*

*SURROGATE RECOVERY OUTSIDE ATI ACCEPTANCE CRITERIA DUE TO MATRIX INTERFERENCE.

Analytical **Technologies,** Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : D.B STEPHENS AND ASSOCIATES ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
26	SB-12 @ 40'	NON-AQ	01/14/94	01/18/94	01/20/94	50
27	SB-13 @ 40'	NON-AQ	01/15/94	01/18/94	01/19/94	1
28	SB-14 @ 30'	NON-AQ	01/15/94	01/18/94	01/19/94	1

PARAMETER	UNITS	26	27	28
BENZENE	MG/KG	9.4	<0.025	<0.025
TOLUENE	MG/KG	60	<0.025	<0.025
ETHYLBENZENE	MG/KG	18	<0.025	<0.025
TOTAL XYLENES	MG/KG	58	<0.025	<0.025
BROMOFLUOROBENZENE (%)		74	91	92

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : D.B STEPHENS AND ASSOCIATES
ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
39	SB-5 @ 6.5'	NON-AQ	01/18/94	01/21/94	01/24/94	20

PARAMETER	UNITS	39
BENZENE	MG/KG	<0.5
TOLUENE	MG/KG	<0.5
ETHYLBENZENE	MG/KG	18
TOTAL XYLENES	MG/KG	<0.5
BROMOFLUOROBENZENE (%)		486*

*SURROGATE RECOVERY OUTSIDE ATI ACCEPTANCE CRITERIA DUE TO MATRIX INTERFERENCE.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST : BTEX (EPA 8020)
BLANK I.D. : 011893
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED : 01/18/94
DATE ANALYZED : 01/19/94
DILUTION FACTOR: 1

PARAMETER	UNITS	
BENZENE	MG/KG	<0.025
TOLUENE	MG/KG	<0.025
ETHYLBENZENE	MG/KG	<0.025
TOTAL XYLENES	MG/KG	<0.025
BROMOFLUOROBENZENE (%)		98

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST : BTEX (EPA 8020)
BLANK I.D. : 012194
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED : 01/21/94
DATE ANALYZED : 01/24/94
DILUTION FACTOR: 1

PARAMETER	UNITS	
BENZENE	MG/KG	<0.025
TOLUENE	MG/KG	<0.025
ETHYLBENZENE	MG/KG	<0.025
TOTAL XYLENES	MG/KG	<0.025
BROMOFLUOROBENZENE (%)		77

Analytical**Technologies,** Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST : BTEX (EPA 8020)/8015, MOD (C6-C16)
MSMSD # : 40132423
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED: 01/18/94
DATE ANALYZED : 01/19/94
SAMPLE MATRIX : NON-AQ
REF. I.D. : 40132423
UNITS : MG/KG

PARAMETERS	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.025	1.0	0.88	88	0.91	91	3
TOLUENE	<0.025	1.0	0.85	85	0.86	86	1
ETHYL BENZENE	<0.025	1.0	0.88	88	0.88	88	0
TOTAL XYLENES	<0.025	3.0	2.7	90	2.7	90	0

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST : BTEX (EPA 8020)/8015, MOD (C6-C16)

MSMSD # : 40132437
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED: 01/21/94
DATE ANALYZED : 01/24/94
SAMPLE MATRIX : NON-AQ
REF. I.D. : 40132437
UNITS : MG/KG

PARAMETERS	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.025	1.0	0.97	97	0.97	97	0
TOLUENE	<0.025	1.0	0.92	92	0.92	92	0
ETHYL BENZENE	<0.025	1.0	0.94	94	0.94	94	0
TOTAL XYLENES	<0.025	3.0	2.9	97	2.9	97	0

$$\% \text{ Recovery} = \frac{\text{(Spike Sample Result - Sample Result)}}{\text{Spike Concentration}} \text{ X } 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{\text{(Sample Result - Duplicate Result)}}{\text{Average Result}} \text{ X } 100$$

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (C6-C16)
CLIENT : D.B STEPHENS AND ASSOCIATES ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
04	SB-1	AQUEOUS	01/11/94	NA	01/12/94	1
07	SB-2	AQUEOUS	01/11/94	NA	01/12/94	1
08	TRIP BLANK	AQUEOUS	01/05/94	NA	01/12/94	1

PARAMETER	UNITS	04	07	08
FUEL HYDROCARBONS	UG/L	<50	<50	<50
HYDROCARBON RANGE		-	-	-
HYDROCARBONS QUANTITATED USING		-	-	-
BROMOFLUOROBENZENE (%)		100	110	101

AnalyticalTechnologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (C6-C16)
CLIENT : D.B STEPHENS AND ASSOCIATES ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
09	SB-3	AQUEOUS	01/12/94	NA	01/12/94	1
10	MW-1	AQUEOUS	01/12/94	NA	01/13/94	1
11	TRIP BLANK	AQUEOUS	01/05/94	NA	01/12/94	1

PARAMETER	UNITS	09	10	11
FUEL HYDROCARBONS	UG/L	<50	1000	<50
HYDROCARBON RANGE		-	C6-C16	-
HYDROCARBONS QUANTITATED USING		-	GASOLINE	-
BROMOFLUOROBENZENE (%)		101	99	100

Analytical**Technologies,**Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (C6-C16)
CLIENT : D.B STEPHENS AND ASSOCIATES ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
12	SB-4	AQUEOUS	01/12/94	NA	01/12/94	1
13	MW-2	AQUEOUS	01/12/94	NA	01/14/94	1
14	SB-5	AQUEOUS	01/12/94	NA	01/14/94	1

PARAMETER	UNITS	12	13	14
FUEL HYDROCARBONS	UG/L	360	<50	1500
HYDROCARBON RANGE		C6-C14	-	C6-C16
HYDROCARBONS QUANTITATED USING		GASOLINE	-	GASOLINE
BROMOFLUOROBENZENE (%)		109	101	94

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (C6-C16)
CLIENT : D.B STEPHENS AND ASSOCIATES ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
15	SB-6	AQUEOUS	01/13/94	NA	01/14/94	1
16	TRIP BLANK	AQUEOUS	01/05/94	NA	01/14/94	1
17	EQUIPMENT BLANK 1	AQUEOUS	01/13/94	NA	01/14/94	1

PARAMETER	UNITS	15	16	17
FUEL HYDROCARBONS	UG/L	700	<50	<50
HYDROCARBON RANGE		C6-C16	-	-
HYDROCARBONS QUANTITATED USING		GASOLINE	-	-
BROMOFLUOROBENZENE (%)		102	102	100

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (C6-C16)
CLIENT : D.B STEPHENS AND ASSOCIATES ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
18	SB-7	AQUEOUS	01/13/94	NA	01/14/94	1
19	SB-8	AQUEOUS	01/13/94	NA	01/14/94	1
20	SB-9	AQUEOUS	01/14/94	NA	01/14/94	1

PARAMETER	UNITS	18	19	20
FUEL HYDROCARBONS	UG/L	350	2800	<50
HYDROCARBON RANGE		C6-C16	C6-C16	-
HYDROCARBONS QUANTITATED USING		GASOLINE	GASOLINE	-
BROMOFLUOROBENZENE (%)		101	91	98

Analytical **Technologies,** Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (C6-C16)
CLIENT : D.B STEPHENS AND ASSOCIATES ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
21	TRIP BLANK	AQUEOUS	01/05/94	NA	01/14/94	1
22	SB-11	AQUEOUS	01/14/94	NA	01/14/94	1
30	MW-5	AQUEOUS	01/16/94	NA	01/19/94	5

PARAMETER	UNITS	21	22	30
FUEL HYDROCARBONS	UG/L	<50	220	4000
HYDROCARBON RANGE		-	C6-C16	C6-C14
HYDROCARBONS QUANTITATED USING		-	GASOLINE	GASOLINE
BROMOFLUOROBENZENE (%)		99	109	117

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (C6-C16)
CLIENT : D.B STEPHENS AND ASSOCIATES ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
31	MW-7	AQUEOUS	01/16/94	NA	01/19/94	1
32	TRIP BLANK	AQUEOUS	01/05/94	NA	01/19/94	1
33	NNG-4	AQUEOUS	01/17/94	NA	01/19/94	1

PARAMETER	UNITS	31	32	33
FUEL HYDROCARBONS	UG/L	<50	<50	<50
HYDROCARBON RANGE		-	-	-
HYDROCARBONS QUANTITATED USING		-	-	-
BROMOFLUOROBENZENE (%)		105	102	105

Analytical**Technologies,** Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (C6-C16)
CLIENT : D.B STEPHENS AND ASSOCIATES ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
34	PORTABLE PIT	AQUEOUS	01/17/94	NA	01/17/94	1

PARAMETER	UNITS	34
FUEL HYDROCARBONS	UG/L	72
HYDROCARBON RANGE		C6-C16
HYDROCARBONS QUANTITATED USING		GASOLINE
BROMOFLUOROBENZENE (%)		102

Analytical**Technologies,** Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST : EPA 8015 MODIFIED (C6-C16)
BLANK I.D. : 011294
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED : NA
DATE ANALYZED : 01/12/94
DILUTION FACTOR: 1
MATRIX : AQUEOUS

PARAMETER	UNITS	
FUEL HYDROCARBONS	UG/L	<50
HYDROCARBON RANGE		-
HYDROCARBONS QUANTITATED USING		-
BROMOFLUOROBENZENE (%)		102

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST : EPA 8015 MODIFIED (C6-C16)
BLANK I.D. : 011394
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED : NA
DATE ANALYZED : 01/13/94
DILUTION FACTOR: 1
MATRIX : AQUEOUS

PARAMETER	UNITS	
FUEL HYDROCARBONS	UG/L	<50
HYDROCARBON RANGE		-
HYDROCARBONS QUANTITATED USING		-
BROMOFLUOROBENZENE (%)		101

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	EPA 8015 MODIFIED (C6-C16)	ATI I.D.	401324
BLANK I.D.	011494	DATE EXTRACTED	NA
CLIENT	D.B STEPHENS AND ASSOCIATES	DATE ANALYZED	01/14/94
PROJECT #	3260	DILUTION FACTOR	1
PROJECT NAME	ENRON-HOBBS	MATRIX	AQUEOUS

PARAMETER	UNITS	
FUEL HYDROCARBONS	UG/L	<50
HYDROCARBON RANGE		-
HYDROCARBONS QUANTITATED USING		-
BROMOFLUOROBENZENE (%)		101

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST : EPA 8015 MODIFIED (C6-C16)
BLANK I.D. : 011494
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED : NA
DATE ANALYZED : 01/14/94
DILUTION FACTOR: 1
MATRIX : AQUEOUS

PARAMETER	UNITS	
FUEL HYDROCARBONS	UG/L	<50
HYDROCARBON RANGE		-
HYDROCARBONS QUANTITATED USING		-
BROMOFLUOROBENZENE (%)		102

Analytical **Technologies,** Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST : EPA 8015 MODIFIED (C6-C16)
BLANK I.D. : 011794
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED : NA
DATE ANALYZED : 01/17/94
DILUTION FACTOR: 1
MATRIX : AQUEOUS

PARAMETER	UNITS	
FUEL HYDROCARBONS	UG/L	<50
HYDROCARBON RANGE		-
HYDROCARBONS QUANTITATED USING		-
BROMOFLUOROBENZENE (%)		102

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST : EPA 8015 MODIFIED (C6-C16)
BLANK I.D. : 011894
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED : NA
DATE ANALYZED : 01/18/94
DILUTION FACTOR: 1
MATRIX : AQUEOUS

PARAMETER	UNITS	
FUEL HYDROCARBONS	UG/L	<50
HYDROCARBON RANGE		-
HYDROCARBONS QUANTITATED USING		-
BROMOFLUOROBENZENE (%)		106

Analytical **Technologies,** Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST : EPA 8015 MODIFIED (C6-C16)
BLANK I.D. : 011994
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED : NA
DATE ANALYZED : 01/19/94
DILUTION FACTOR: 1
MATRIX : AQUEOUS

PARAMETER	UNITS	
FUEL HYDROCARBONS	UG/L	<50
HYDROCARBON RANGE		-
HYDROCARBONS QUANTITATED USING		-
BROMOFLUOROBENZENE (%)		101

Analytical **Technologies,** Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : D.B STEPHENS AND ASSOCIATES
ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
04	SB-1	AQUEOUS	01/11/94	NA	01/12/94	1
07	SB-2	AQUEOUS	01/11/94	NA	01/12/94	1
08	TRIP BLANK	AQUEOUS	01/05/94	NA	01/12/94	1

PARAMETER	UNITS	04	07	08
BENZENE	UG/L	<0.5	<0.5	<0.5
TOLUENE	UG/L	<0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	<0.5	<0.5	<0.5
TOTAL XYLENES	UG/L	<0.5	0.6	<0.5
BROMOFLUOROBENZENE (%)		100	110	101

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : D.B STEPHENS AND ASSOCIATES ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
09	SB-3	AQUEOUS	01/12/94	NA	01/12/94	1
10	MW-1	AQUEOUS	01/12/94	NA	01/13/94	1
11	TRIP BLANK	AQUEOUS	01/05/94	NA	01/12/94	1

PARAMETER	UNITS	09	10	11
BENZENE	UG/L	<0.5	3.9	<0.5
TOLUENE	UG/L	<0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	<0.5	2.1	<0.5
TOTAL XYLENES	UG/L	<0.5	2.0	<0.5
BROMOFLUOROBENZENE (%)		101	99	100

Analytical **Technologies,** Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : D.B STEPHENS AND ASSOCIATES ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
12	SB-4	AQUEOUS	01/12/94	NA	01/12/94	1
13	MW-2	AQUEOUS	01/12/94	NA	01/14/94	1
14	SB-5	AQUEOUS	01/12/94	NA	01/14/94	1

PARAMETER	UNITS	12	13	14
BENZENE	UG/L	130	<0.5	<0.5
TOLUENE	UG/L	<0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	15	<0.5	6.5
TOTAL XYLENES	UG/L	8.0	<0.5	6.1
BROMOFLUOROBENZENE (%)		109	101	94

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : D.B STEPHENS AND ASSOCIATES
ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
15	SB-6	AQUEOUS	01/13/94	NA	01/14/94	1
16	TRIP BLANK	AQUEOUS	01/05/94	NA	01/14/94	1
17	EQUIPMENT BLANK 1	AQUEOUS	01/13/94	NA	01/14/94	1

PARAMETER	UNITS	15	16	17
BENZENE	UG/L	1.3	<0.5	<0.5
TOLUENE	UG/L	<0.5	<0.5	0.5
ETHYLBENZENE	UG/L	0.5	<0.5	<0.5
TOTAL XYLENES	UG/L	1.3	<0.5	<0.5
BROMOFLUOROBENZENE (%)		102	102	100

Analytical **Technologies,** Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : D.B STEPHENS AND ASSOCIATES
ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
18	SB-7	AQUEOUS	01/13/94	NA	01/14/94	1
19	SB-8	AQUEOUS	01/13/94	NA	01/14/94	1
20	SB-9	AQUEOUS	01/14/94	NA	01/14/94	1

PARAMETER	UNITS	18	19	20
BENZENE	UG/L	<0.5	1.3	<0.5
TOLUENE	UG/L	<0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	0.6	0.8	<0.5
TOTAL XYLENES	UG/L	<0.5	17	0.5
BROMOFLUOROBENZENE (%)		101	91	98

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : D.B STEPHENS AND ASSOCIATES
ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
21	TRIP BLANK	AQUEOUS	01/05/94	NA	01/14/94	1
22	SB-11	AQUEOUS	01/14/94	NA	01/14/94	1
30	MW-5	AQUEOUS	01/16/94	NA	01/19/94	5

PARAMETER	UNITS	21	22	30
BENZENE	UG/L	<0.5	5.2	300
TOLUENE	UG/L	<0.5	<0.5	190
ETHYLBENZENE	UG/L	<0.5	0.7	160
TOTAL XYLENES	UG/L	<0.5	0.5	490
BROMOFLUOROBENZENE (%)		99	109	117

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GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : D.B STEPHENS AND ASSOCIATES
ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
31	MW-7	AQUEOUS	01/16/94	NA	01/19/94	1
32	TRIP BLANK	AQUEOUS	01/05/94	NA	01/19/94	1
33	NNG-4	AQUEOUS	01/17/94	NA	01/19/94	1

PARAMETER	UNITS	31	32	33
BENZENE	UG/L	<0.5	<0.5	2.6
TOLUENE	UG/L	<0.5	<0.5	<0.5
ETHYLBENZENE	UG/L	<0.5	<0.5	<0.5
TOTAL XYLENES	UG/L	<0.5	<0.5	<0.5
BROMOFLUOROBENZENE (%)		105	102	105

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX (EPA 8020)
CLIENT : D.B STEPHENS AND ASSOCIATES ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
34	PORTABLE PIT	AQUEOUS	01/17/94	NA	01/17/94	1

PARAMETER	UNITS	34
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	0.5
TOTAL XYLENES	UG/L	<0.5
BROMOFLUOROBENZENE (%)		102

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	BTEX (EPA 8020)	ATI I.D.	401324
BLANK I.D.	011294	DATE EXTRACTED	NA
CLIENT	D.B STEPHENS AND ASSOCIATES	DATE ANALYZED	01/12/94
PROJECT #	3260	DILUTION FACTOR	1
PROJECT NAME	ENRON-HOBBS	MATRIX	AQUEOUS

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
BROMOFLUOROBENZENE (%)		102

Analytical **Technologies,** Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST : BTEX (EPA 8020)
BLANK I.D. : 011394
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED : NA
DATE ANALYZED : 01/13/94
DILUTION FACTOR: 1
MATRIX : AQUEOUS

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
BROMOFLUOROBENZENE (%)		101

Analytical **Technologies,** Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST : BTEX (EPA 8020)
BLANK I.D. : 011494
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED : NA
DATE ANALYZED : 01/14/94
DILUTION FACTOR: 1
MATRIX : AQUEOUS

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
BROMOFLUOROBENZENE (%)		101

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST : BTEX (EPA 8020)
BLANK I.D. : 011494
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED : NA
DATE ANALYZED : 01/14/94
DILUTION FACTOR: 1
MATRIX : AQUEOUS

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
BROMOFLUOROBENZENE (%)		102

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST	BTEX (EPA 8020)	ATI I.D.	401324
BLANK I.D.	011794	DATE EXTRACTED	NA
CLIENT	D.B STEPHENS AND ASSOCIATES	DATE ANALYZED	01/17/94
PROJECT #	3260	DILUTION FACTOR	1
PROJECT NAME	ENRON-HOBBS	MATRIX	AQUEOUS

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
BROMOFLUOROBENZENE (%)		102

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST : BTEX (EPA 8020)
BLANK I.D. : 011894
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED : NA
DATE ANALYZED : 01/18/94
DILUTION FACTOR: 1
MATRIX : AQUEOUS

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
BROMOFLUOROBENZENE (%)		106

Analytical**Technologies,** Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST : BTEX (EPA 8020)
BLANK I.D. : 011994
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED : NA
DATE ANALYZED : 01/19/94
DILUTION FACTOR: 1
MATRIX : AQUEOUS

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
BROMOFLUOROBENZENE (%)		101

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST : BTEX (EPA 8020)/8015, MOD (C6-C16)
ATI I.D. : 401324
MSMSD # : 40132404
DATE EXTRACTED: NA
CLIENT : D.B STEPHENS AND ASSOCIATES
DATE ANALYZED : 01/12/94
PROJECT # : 3260
SAMPLE MATRIX : AQUEOUS
PROJECT NAME: ENRON-HOBBS
REF. I.D. : 40132404
UNITS : UG/L

PARAMETERS	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	10	100	10	100	0
TOLUENE	<0.5	10	9.5	95	9.3	93	2
ETHYL BENZENE	<0.5	10	9.5	95	9.2	92	3
TOTAL XYLENES	<0.5	30	29	97	28	93	4

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \text{ X } 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \text{ X } 100$$

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST : BTEX (EPA 8020)/8015, MOD (C6-C16)
ATI I.D. : 401324
MSMSD # : 40132410
DATE EXTRACTED: NA
CLIENT : D.B STEPHENS AND ASSOCIATES
DATE ANALYZED : 01/13/94
PROJECT # : 3260
SAMPLE MATRIX : AQUEOUS
PROJECT NAME: ENRON-HOBBS
REF. I.D. : 40132410
UNITS : UG/L

PARAMETERS	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	3.9	10	14	101	14	101	0
TOLUENE	<0.5	10	8.0	80	8.4	84	5
ETHYL BENZENE	2.1	10	11	89	11	89	0
TOTAL XYLENES	2.0	30	31	97	32	100	3

$$\%\ \text{Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \quad X \quad 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \quad X \quad 100$$

Analytical **Technologies,** Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST : BTEX (EPA 8020)/8015, MOD (C6-C16)

MSMSD # : 40132413
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED: NA
DATE ANALYZED : 01/14/94
SAMPLE MATRIX : AQUEOUS
REF. I.D. : 40132413
UNITS : UG/L

PARAMETERS	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	11	110	10	100	10
TOLUENE	<0.5	10	9.9	99	9.7	97	2
ETHYL BENZENE	<0.5	10	9.8	98	9.4	94	4
TOTAL XYLENES	<0.5	30	30	100	29	97	3

$$\% \text{ Recovery} = \frac{\text{(Spike Sample Result - Sample Result)}}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{\text{(Sample Result - Duplicate Result)}}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST : BTEX (EPA 8020)/8015, MOD (C6-C16)
MSMSD # : 40133403
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED: NA
DATE ANALYZED : 01/19/94
SAMPLE MATRIX : AQUEOUS
REF. I.D. : 40133403
UNITS : UG/L

PARAMETERS	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	10	100	11	110	10
TOLUENE	<0.5	10	9.4	94	9.8	98	4
ETHYL BENZENE	<0.5	10	9.4	94	9.7	97	3
TOTAL XYLENES	<0.5	30	29	97	30	100	3

$$\%\ \text{Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \quad \text{X} \quad 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \quad \text{X} \quad 100$$

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST : BTEX (EPA 8020)/8015, MOD (C6-C16)

MSMSD # : 40133403
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED: NA
DATE ANALYZED : 01/17/94
SAMPLE MATRIX : AQUEOUS
REF. I.D. : 40133403
UNITS : UG/L

PARAMETERS	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	9.2	92	10	100	8
TOLUENE	0.6	10	8.9	83	10	94	12
ETHYL BENZENE	<0.5	10	8.4	84	10	100	17
TOTAL XYLENES	<0.5	30	26	87	31	103	18

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \text{ X } 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \text{ X } 100$$

Analytical**Technologies,** Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED
CLIENT : D.B STEPHENS AND ASSOCIATES ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	MW-4	AQUEOUS	01/10/94	01/10/94	01/11/94	1
03	MW-6	AQUEOUS	01/10/94	01/11/94	01/11/94	1

PARAMETER	UNITS	01	03
FUEL HYDROCARBONS	MG/L	42	3
HYDROCARBON RANGE		C6-C18	C6-C20
HYDROCARBONS QUANTITATED USING		GASOLINE	GASOLINE
O-TERPHENYL (%)		103	98

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST : EPA 8015 MODIFIED
BLANK I.D. : 011094
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED : 01/10/94
DATE ANALYZED : 01/10/94
DILUTION FACTOR: 1

PARAMETER	UNITS	
FUEL HYDROCARBONS	MG/L	<1
HYDROCARBON RANGE		-
HYDROCARBONS QUANTITATED USING		-
O-TERPHENYL (%)		102

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST : EPA 8015 MODIFIED
BLANK I.D. : 011194
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED : 01/11/94
DATE ANALYZED : 01/11/94
DILUTION FACTOR: 1

PARAMETER	UNITS	
FUEL HYDROCARBONS	MG/L	<1
HYDROCARBON RANGE		-
HYDROCARBONS QUANTITATED USING		-
O-TERPHENYL (%)		97

Analytical **Technologies,** Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST : EPA 8015 MODIFIED
MSMSD # : 011094
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED: 01/10/94
DATE ANALYZED : 01/10/94
SAMPLE MATRIX : AQUEOUS
REF. I.D. : 011094
UNITS : MG/L

PARAMETERS	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
FUEL HYDROCARBONS	<1	36	35	97	34	94	3

$$\text{% Recovery} = \frac{\text{(Spike Sample Result - Sample Result)}}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{\text{(Sample Result - Duplicate Result)}}{\text{Average Result}} \times 100$$

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST : EPA 8015 MODIFIED
MSMSD # : 011194
CLIENT : D.B STEPHENS AND ASSOCIATES

PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED: 01/11/94
DATE ANALYZED : 01/11/94
SAMPLE MATRIX : AQUEOUS
REF. I.D. : 011194
UNITS : MG/L

PARAMETERS	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
FUEL HYDROCARBONS	<1	36	34	94	35	97	3

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical **Technologies,** Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : PURGEABLE HALOCARBONS/AROMATICS (EPA 8010/8020)
CLIENT : D.B STEPHENS AND ASSOCIATES ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	MW-4	AQUEOUS	01/10/94	NA	01/10/94	500
02	TRIP BLANK	AQUEOUS	01/05/94	NA	01/10/94	1
03	MW-6	AQUEOUS	01/10/94	NA	01/13/94	5

PARAMETER	UNITS	01	02	03
BENZENE	UG/L	18000	<0.5	770 D(100)
BROMODICHLOROMETHANE	UG/L	<100	<0.2	<1.0
BROMOFORM	UG/L	<250	<0.5	<2.5
BROMOMETHANE	UG/L	<250	<0.5	<2.5
CARBON TETRACHLORIDE	UG/L	<100	<0.2	<1.0
CHLOROBENZENE	UG/L	<250	<0.5	<2.5
CHLOROETHANE	UG/L	<100	<0.2	<1.0
CHLOROFORM	UG/L	<100	<0.2	<1.0
CHLOROMETHANE	UG/L	<250	<0.5	<2.5
DIBROMOCHLOROMETHANE	UG/L	<100	<0.2	<1.0
1,2-DIBROMOETHANE (EDB)	UG/L	<250	<0.5	<2.5
1,2-DICHLOROBENZENE	UG/L	<250	<0.5	<2.5
1,3-DICHLOROBENZENE	UG/L	<250	<0.5	<2.5
1,4-DICHLOROBENZENE	UG/L	<250	<0.5	<2.5
1,1-DICHLOROETHANE	UG/L	<100	<0.2	<1.0
1,2-DICHLOROETHANE (EDC)	UG/L	<100	<0.2	<1.0
1,1-DICHLOROETHENE	UG/L	<100	<0.2	<1.0
CIS-1,2-DICHLOROETHENE	UG/L	<100	<0.2	<1.0
TRANS-1,2-DICHLOROETHENE	UG/L	<100	<0.2	<1.0
1,2-DICHLOROPROPANE	UG/L	<100	<0.2	<1.0
CIS-1,3-DICHLOROPROPENE	UG/L	<250	<0.5	<2.5
TRANS-1,3-DICHLOROPROPENE	UG/L	<100	<0.2	<1.0
ETHYLBENZENE	UG/L	500	<0.5	96
METHYL-t-BUTYL ETHER	UG/L	<1200	<2.5	<12
METHYLENE CHLORIDE	UG/L	<1000	<2.0	<10
1,1,2,2-TETRACHLOROETHANE	UG/L	<100	<0.2	<1.0
TETRACHLOROETHENE	UG/L	<100	<0.2	<1.0
TOLUENE	UG/L	10000	<0.5	2.9
1,1,1-TRICHLOROETHANE	UG/L	<100	<0.2	<1.0
1,1,2-TRICHLOROETHANE	UG/L	<100	<0.2	<1.0
TRICHLOROETHENE	UG/L	<100	<0.2	<1.0
TRICHLOROFLUOROMETHANE	UG/L	<100	<0.2	<1.0
VINYL CHLORIDE	UG/L	<250	<0.5	<2.5
TOTAL XYLENES	UG/L	1300	<0.5	210
SURROGATES:				
BROMOCHLOROMETHANE (%)		103	108	103
TRIFLUOROTOLUENE (%)		104	105	90

D(100)=DILUTED 100X, ANALYZED 01/13/94

AnalyticalTechnologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : PURGEABLE HALOCARBONS/AROMATICS (EPA 8010/8020)
CLIENT : D.B STEPHENS AND ASSOCIATES ATI I.D.: 401324
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
05	TRIP BLANK	AQUEOUS	01/05/94	NA	01/13/94	1

PARAMETER	UNITS	05
BENZENE	UG/L	<0.5
BROMODICHLOROMETHANE	UG/L	<0.2
BROMOFORM	UG/L	<0.5
BROMOMETHANE	UG/L	<0.5
CARBON TETRACHLORIDE	UG/L	<0.2
CHLOROBENZENE	UG/L	<0.5
CHLOROETHANE	UG/L	<0.2
CHLOROFORM	UG/L	<0.2
CHLOROMETHANE	UG/L	<0.5
DIBROMOCHLOROMETHANE	UG/L	<0.2
1,2-DIBROMOETHANE (EDB)	UG/L	<0.5
1,2-DICHLOROBENZENE	UG/L	<0.5
1,3-DICHLOROBENZENE	UG/L	<0.5
1,4-DICHLOROBENZENE	UG/L	<0.5
1,1-DICHLOROETHANE	UG/L	<0.2
1,2-DICHLOROETHANE (EDC)	UG/L	<0.2
1,1-DICHLOROETHENE	UG/L	<0.2
CIS-1,2-DICHLOROETHENE	UG/L	<0.2
TRANS-1,2-DICHLOROETHENE	UG/L	<0.2
1,2-DICHLOROPROPANE	UG/L	<0.2
CIS-1,3-DICHLOROPROPENE	UG/L	<0.5
TRANS-1,3-DICHLOROPROPENE	UG/L	<0.2
ETHYLBENZENE	UG/L	<0.5
METHYL-t-BUTYL ETHER	UG/L	<2.5
METHYLENE CHLORIDE	UG/L	<2.0
1,1,2,2-TETRACHLOROETHANE	UG/L	<0.2
TETRACHLOROETHENE	UG/L	<0.2
TOLUENE	UG/L	<0.5
1,1,1-TRICHLOROETHANE	UG/L	<0.2
1,1,2-TRICHLOROETHANE	UG/L	<0.2
TRICHLOROETHENE	UG/L	<0.2
TRICHLOROFLUOROMETHANE	UG/L	<0.2
VINYL CHLORIDE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATES:		
BROMOCHLOROMETHANE (%)		102
TRIFLUOROTOLUENE (%)		98

GAS CHROMATOGRAPHY - QUALITY CONTROL

REAGENT BLANK
PURGEABLE HALOCARBONS/AROMATICS

TEST : EPA 8010/8020
BLANK I.D. : 011094
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED: NA
DATE ANALYZED : 01/10/94
DIL. FACTOR : 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
BROMODICHLOROMETHANE	UG/L	<0.2
BROMOFORM	UG/L	<0.5
BROMOMETHANE	UG/L	<0.5
CARBON TETRACHLORIDE	UG/L	<0.2
CHLOROBENZENE	UG/L	<0.5
CHLOROETHANE	UG/L	<0.2
CHLOROFORM	UG/L	<0.2
CHLOROMETHANE	UG/L	<0.5
DIBROMOCHLOROMETHANE	UG/L	<0.2
1,2-DIBROMOETHANE (EDB)	UG/L	<0.5
1,2-DICHLOROBENZENE	UG/L	<0.5
1,3-DICHLOROBENZENE	UG/L	<0.5
1,4-DICHLOROBENZENE	UG/L	<0.5
1,1-DICHLOROETHANE	UG/L	<0.2
1,2-DICHLOROETHANE (EDC)	UG/L	<0.2
1,1-DICHLOROETHENE	UG/L	<0.2
CIS-1,2-DICHLOROETHENE	UG/L	<0.2
TRANS-1,2-DICHLOROETHENE	UG/L	<0.2
1,2-DICHLOROPROPANE	UG/L	<0.2
CIS-1,3-DICHLOROPROPENE	UG/L	<0.5
TRANS-1,3-DICHLOROPROPENE	UG/L	<0.2
ETHYLBENZENE	UG/L	<0.5
METHYL-t-BUTYL ETHER	UG/L	<2.5
METHYLENE CHLORIDE	UG/L	<2.0
1,1,2,2-TETRACHLOROETHANE	UG/L	<0.2
TETRACHLOROETHENE	UG/L	<0.2
TOLUENE	UG/L	<0.5
1,1,1-TRICHLOROETHANE	UG/L	<0.2
1,1,2-TRICHLOROETHANE	UG/L	<0.2
TRICHLOROETHENE	UG/L	<0.2
TRICHLOROFLUOROMETHANE	UG/L	<0.2
VINYL CHLORIDE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5

SURROGATES:		
BROMOCHLOROMETHANE (%)		102
TRIFLUOROTOLUENE (%)		106

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

REAGENT BLANK
PURGEABLE HALOCARBONS/AROMATICS

TEST : EPA 8010/8020
BLANK I.D. : 011394
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS

ATI I.D. : 401324
DATE EXTRACTED: NA
DATE ANALYZED : 01/13/94
DIL. FACTOR : 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
BROMODICHLOROMETHANE	UG/L	<0.2
BROMOFORM	UG/L	<0.5
BROMOMETHANE	UG/L	<0.5
CARBON TETRACHLORIDE	UG/L	<0.2
CHLOROBENZENE	UG/L	<0.5
CHLOROETHANE	UG/L	<0.2
CHLOROFORM	UG/L	<0.2
CHLOROMETHANE	UG/L	<0.5
DIBROMOCHLOROMETHANE	UG/L	<0.2
1,2-DIBROMOETHANE (EDB)	UG/L	<0.5
1,2-DICHLOROBENZENE	UG/L	<0.5
1,3-DICHLOROBENZENE	UG/L	<0.5
1,4-DICHLOROBENZENE	UG/L	<0.5
1,1-DICHLOROETHANE	UG/L	<0.2
1,2-DICHLOROETHANE (EDC)	UG/L	<0.2
1,1-DICHLOROETHENE	UG/L	<0.2
CIS-1,2-DICHLOROETHENE	UG/L	<0.2
TRANS-1,2-DICHLOROETHENE	UG/L	<0.2
1,2-DICHLOROPROPANE	UG/L	<0.2
CIS-1,3-DICHLOROPROPENE	UG/L	<0.5
TRANS-1,3-DICHLOROPROPENE	UG/L	<0.2
ETHYLBENZENE	UG/L	<0.5
METHYL-t-BUTYL ETHER	UG/L	<2.5
METHYLENE CHLORIDE	UG/L	<2.0
1,1,2,2-TETRACHLOROETHANE	UG/L	<0.2
TETRACHLOROETHENE	UG/L	<0.2
TOLUENE	UG/L	<0.5
1,1,1-TRICHLOROETHANE	UG/L	<0.2
1,1,2-TRICHLOROETHANE	UG/L	<0.2
TRICHLOROETHENE	UG/L	<0.2
TRICHLOROFLUOROMETHANE	UG/L	<0.2
VINYL CHLORIDE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5

SURROGATES:

BROMOCHLOROMETHANE (%)	103
TRIFLUOROTOLUENE (%)	98

GAS CHROMATOGRAPHY - QUALITY CONTROL

TEST : PURGEABLE HALOCARBONS/AROMATICS (8010/8020)
CLIENT : D.B STEPHENS AND ASSOCIATES
PROJECT # : 3260
PROJECT NAME: ENRON-HOBBS
REF. I.D. : 40131906

ATI I.D. : 401324
DATE ANALYZED : 01/13/94
SAMPLE MATRIX : AQUEOUS
UNITS : UG/L

COMPOUNDS	SAMPLE RESULT	CONC. SPIKED	SPIKED SAMPLE	% REC.	DUP. SPIKE SAMPLE	DUP. % REC.	RPD
BENZENE	<0.5	10	11	110	11	110	0
CHLOROBENZENE	<0.5	10	10	100	11	110	10
1,1-DICHLOROETHENE	<0.2	10	13	130	12	120	8
TOLUENE	<0.5	10	11	110	10	100	10
TRICHLOROETHENE	<0.2	10	11	110	11	110	0

$$\% \text{ Recovery} = \frac{\text{(Spike Sample Result - Sample Result)}}{\text{Spike Concentration}} \text{ X } 100$$

$$\textit{RPD (Relative Percent Difference)} = \frac{\text{(Sample Result - Duplicate Result)}}{\text{Average Result}} \text{ X } 100$$

AnalyticalTechnologies,Inc., Albuquerque, NM
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CHAIN OF CUSTODY

DATE: 1/10/94 PAGE 1 OF ____

ATI LAB I.D. 401324

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PROJECT MANAGER: Bob Marley

COMPANY: Daniel B. Stephens & Associates
ADDRESS: 6020 Academy NE Suite 100
Albuq. NM 87106
PHONE: 505 822 9400
FAX: 505 822 8877

BILL TO: Akhtar Alvi
COMPANY: ENRON Corp
ADDRESS: P.O. Box 1188
Houston, Tx 77251-1188

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel C6-C36	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	BTXE/MTBE (8020)	8010/8020		Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.			Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	Polynuclear Aromatics (610/8310)			SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal			The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)		NUMBER OF CONTAINERS
MW-4	1/10/94	1225	H_2O	01		X			X																								4
Trip Blank	1/5/94	—	H_2O	02		X			X																								1

PROJECT INFORMATION

PROJ. NO.: ENRON - Hobbs BM
PROJ. NAME: 3260
P.O. NO.:
SHIPPED VIA: Mesa Airlines

SAMPLE RECEIPT

NO. CONTAINERS	5
CUSTODY SEALS	Y / N / [✓ NA]
RECEIVED INTACT	Y
RECEIVED COLD	✓

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

[✓ (RUSH)] ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☐ 2 WEEK

Comments: Rush analysis (by 12 ~~am~~ PM 1/11/94)
• This sampling program will continue under this ~~@~~ ATI Lab I.D. - BM

SAMPLED & RELINQUISHED BY: 1.

Signature: BobMarley Time:
Printed Name: Bob Marley Date: 1/10/94
Company: DBS&A Phone: 822-9400

RELINQUISHED BY: 2.

Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 3.

Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: 1.

Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: 2.

Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: (LAB) 3.

Signature: Time: 1640
Printed Name: Teri Dettre Date: 1/10/94
Analytical Technologies, Inc.

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CHAIN OF CUSTODY

DATE: 1/11/94 PAGE 2 OF ____

ATI LAB I.D. 401324

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PROJECT MANAGER: Bob Marley

COMPANY: Daniel B. Stephens & Assoc
ADDRESS: 6020 Academy NE Suite 100
Albuq. NM, 87109
PHONE: 505 822-9400
FAX: 822-8877

BILL TO: See 1st Chain of
COMPANY: Custody
ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel C6-C36	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020) C6-C16	BTXE/MTBE (8020)	8010/8020		Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.			Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	Polynuclear Aromatics (610/8310)			SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal	NO2 / NO3	Cl, SO4, T Alk, bicarb, TDS	The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311), Mg, Ca, Na, K		NUMBER OF CONTAINERS
MW-6	1/10/94	1630	H2O	03		X			X																								4
SB-1	1/11/94	1300	H2O	04			X																										2
Tripblank	1/5/94	—	H2O	05		~~X~~	X		X																								1
MW-4	1/10/94	1225	H2O	06																							X	X	~~X~~		X		3

PROJECT INFORMATION

PROJ. NO.: 3260
PROJ. NAME: ENRON - Hobbs
P.O. NO.:
SHIPPED VIA: Mesa Airlines

SAMPLE RECEIPT

NO. CONTAINERS	10
CUSTODY SEALS	Y / N / [✓ NA]
RECEIVED INTACT	Y
RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

[✓ (RUSH)] ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☐ 2 WEEK

Comments:
Rush Analysis
• SB-1 (by 12^{00} pm 1/12/94)
• MW-4, 8-RCRA Metals only (5 day turnaround)

SAMPLED & RELINQUISHED BY: 1.		RELINQUISHED BY: 2.		RELINQUISHED BY: 3.	
Signature: Bob Marley	Time: 1400	Signature:	Time:	Signature:	Time:
Printed Name: Bob Marley	Date: 1/11/94	Printed Name:	Date:	Printed Name:	Date:
Company: DBS:A	Phone: 822-9400	Company:		Company:	

RECEIVED BY: 1.		RECEIVED BY: 2.		RECEIVED BY: (LAB) 3.	
Signature:	Time:	Signature:	Time:	Signature: Terri Dattre	Time: 1630
Printed Name:	Date:	Printed Name:	Date:	Printed Name: Terri Dattre	Date: 1/11/94
Company:		Company:		Analytical Technologies, Inc.	

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CHAIN OF CUSTODY

DATE: 1/11/94 PAGE 3 OF ____

ATI LAB I.D. 401324

PROJECT MANAGER: Bob Murley

COMPANY: Daniel B. Stephens & Assoc.
ADDRESS: 6020 Academy NE Suite 100
Albuq, NM 87109
PHONE: 822-9400
FAX: 822-8877

BILL TO: See 1st Chain of Custody
COMPANY:
ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/[✓ Gasoline]/BTXE/~~MTBE~~ (MOD 8015/8020) (C6-C16)	BTXE/MTBE (8020)			Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.			Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	Polynuclear Aromatics (610/8310)			SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal			The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)		NUMBER OF CONTAINERS
SB-2	1/11/94	1650	H2O	07			X																										2
Trip blank	1/5/94	—	H2O	08			X																										1

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.:	3260	NO. CONTAINERS	3
PROJ. NAME:	ENRON - Hobbs	CUSTODY SEALS	Y / N [✓ NA]
P.O. NO.:		RECEIVED INTACT	Y
SHIPPED VIA:	Fed-X ~~Meso Airlines~~ BM	RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

[✓ RUSH] ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☐ 2 WEEK

Comments:
Rush Analysis (by closing 1/12/94)

SAMPLED & RELINQUISHED BY: 1.		RELINQUISHED BY: 2.		RELINQUISHED BY: 3.	
Signature: Bob Murley	Time: 1730	Signature:	Time:	Signature:	Time:
Printed Name: Bob Murley	Date: 1/11/94	Printed Name:	Date:	Printed Name:	Date:
Company: DBS&A	Phone: 822-9400	Company:		Company:	

RECEIVED BY: 1.		RECEIVED BY: 2.		RECEIVED BY:(LAB) 3.	
Signature:	Time:	Signature:	Time:	Signature: Lori Dettre	Time: 0855
Printed Name:	Date:	Printed Name:	Date:	Printed Name: Lori Dettre	Date: 1/12/94
Company:		Company:		Analytical Technologies, Inc.	

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CHAIN OF CUSTODY

DATE: 1/12/94 PAGE 4 OF

ATI LAB I.D. 401324

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PROJECT MANAGER: Bob Murley

COMPANY: Daniel B. Stephens & Assoc
ADDRESS: 6020 Academy NE Suite 100
Albuq. NM 87109
PHONE: 822 9400
FAX: 822 8877

BILL TO: See 1st Chain of Custody
COMPANY:
ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	BTXE/MTBE (8020)			Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.			Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	Polynuclear Aromatics (610/8310)			SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal			The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)		NUMBER OF CONTAINERS
SB-3	1/12/94	1130	H_2O	09			X																										2
MW-1	1/12/94	1310	H_2O	10			X																										2
~~SB-4~~	~~1/12/94~~	~~1345~~	~~H_2O~~				~~X~~																										~~2~~ BN
Trip Blank	1/5/94	—	H_2O	11			X																										1
SB-4	1/12/94	1345	H_2O	12			X																										2

PROJECT INFORMATION

PROJ. NO.: 3260
PROJ. NAME: ENRON - Hobbs
P.O. NO.:
SHIPPED VIA: Mesa Airlines

SAMPLE RECEIPT

NO. CONTAINERS: 7
CUSTODY SEALS: Y / N / [✓ NA]
RECEIVED INTACT: Y
RECEIVED COLD: Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

[✓ (RUSH)] ☑ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☐ 2 WEEK

Comments:
Rush: SB-3 (by 12$^{00}_{PM}$ 1/13/94)
SB-4 " "

SAMPLED & RELINQUISHED BY: 1.
Signature: Bob Murley Time: 1400
Printed Name: Bob Murley Date: 1/12/94
Company: DBS&A Phone: 822-9400

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 3.
Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: 1.
Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: 2.
Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: (LAB) 3.
Signature: Time: 1010
Printed Name: Terri Dottle Date: 1/12/94
Analytical Technologies, Inc.

ATI Labs: San Diego (619) 458-9141 • Phoenix (602) 496-4400 • Seattle (206) 228-8335 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Albuquerque (505) 344-3777 DISTRIBUTION: White, Canary - ATI • Pink - ORIGINATOR

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San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 1/13/94 PAGE 5 OF ____

ATI LAB I.D. 401324

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Bob Marley

COMPANY: Daniel B. Stephens & Assoc
ADDRESS: 6020 Academy NE Suite 100
Albuq. NM 87109
PHONE: 822 9400
FAX: 822 8077

BILL TO:
COMPANY:
ADDRESS:

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	BTXE/MTBE (8020)	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	Polynuclear Aromatics (610/8310)	SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal	The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)	NUMBER OF CONTAINERS
MW-2	1/12/94	1620	H_2O	13			X																	2
SB-5	1/12/94	1710	H_2O	14			X																	2
SB-6	1/13/94	1020	H_2O	15			X																	2
Trip Blank	1/5/94	—	H_2O	16			X																	1
Equipment Blank 1	1/13/94	1205	H_2O	17			X																	2
SB-7	1/13/94	1340	H_2O	18			X																	2

PROJECT INFORMATION

PROJ. NO.: 3260
PROJ. NAME: ENRON-Hobbs
P.O. NO.:
SHIPPED VIA: Mesa Airlines

SAMPLE RECEIPT

NO. CONTAINERS	11
CUSTODY SEALS	Y / N / [✓ NA]*
RECEIVED INTACT	Y
RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

[✓ (RUSH)] ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☐ 2 WEEK

Comments:
∘ Rush SB-5, SB-6, SB-7, Equipment Blank 1

*no seals intact on outside cooler.

SAMPLED & RELINQUISHED BY: 1.
Signature: Bob Marley Time:
Printed Name: Bob Marley Date: 1/13/94
Company: DBS&A Phone: 822-9400

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 3.
Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: 1.
Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: 2.
Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY:(LAB) 3.
Signature: Terri Dattke Time: 1625
Printed Name: Terri Dattke Date: 1/13/94
Analytical Technologies, Inc.

(505) 344-3777 DISTRIBUTION: White, Canary - ATI • Pink - ORIGINATOR

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CHAIN OF CUSTODY

DATE: 1/14/94 PAGE 6 OF ____

ATI LAB I.D. 401324

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Bob Marley

COMPANY: Daniel B Stephens & Assoc
ADDRESS: 6020 Academy NE Suite 100
Alb, NM 87109

PHONE:
FAX:

BILL TO:
COMPANY:
ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	BTXE/MTBE (8020) C6 - C16	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	Polynuclear Aromatics (610/8310)	SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal	The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)	NUMBER OF CONTAINERS
SB-8	1/13/94	1725	H2O	19			X																	2
SB-9	1/14/94	1200	H2O	20			X																	2
Trip Blank	1/5/94	—	H2O	21			X																	1
SB-11	1/14/94	1345	AQ	22			X																	2

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.:	3260	NO. CONTAINERS	7
PROJ. NAME:	Enron - Hobbs	CUSTODY SEALS	Y / N [✓ NA]*
P.O. NO.:		RECEIVED INTACT	Y
SHIPPED VIA:	Mesa Airlines	RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

[✓ (RUSH)] ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☐ 2 WEEK

Comments:
• SB-8, SB-9, SB-11
*C.O.C. Seals intact on outside of cooler.

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: B Marley Time: 1400	Signature: Time:	Signature: Time:
Printed Name: Bob Marley Date: 1/14/94	Printed Name: Date:	Printed Name: Date:
Company: DBS&A Phone: 822 9400	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY:(LAB) 3.
Signature: Time:	Signature: Time:	Signature: Toni Dattre Time: 1630
Printed Name: Date:	Printed Name: Date:	Printed Name: Toni Dattre Date: 1/14/94
Company:	Company:	Analytical Technologies, Inc.

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CHAIN OF CUSTODY

DATE: 1/17/94 PAGE 7 OF ____

ATI LAB I.D. 401324

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Bob Marley

COMPANY: Daniel B. Stephens & Assoc.
ADDRESS: 6020 Academy NE Suite 100
Albuq., NM 87109
PHONE: 822-9400
FAX: 822-8877

BILL TO: See 1st page
COMPANY:
ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	BTXE/MTBE (8020)			Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.			Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	Polynuclear Aromatics (610/8310)			SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal	NO2/NO3	Cl, SO4, T-Alk, bicarb, TDS	The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion, Mg, Ca, Na, K	RCRA Metals by TCLP (1311)		NUMBER OF CONTAINERS
SB-10@ 10'	1/14/94	—	Soil	23			X																										1
SB-10@ 40'	1/15/94	—	Soil	24			X																										1
SB-12@ 5.0'	1/14/94	—	Soil	25			X																										1
SB-12@ 40'	1/14/94	—	Soil	26			X																										1
SB-13@ 40'	1/15/94	1320	Soil	27			X																										1
SB-14@ 30'	1/15/94	—	Soil	28			X																										1
SB-14 @ 40'	1/15/94	—	Soil	29			X																										1
MW-5	1/16/94	1225	H2O	30			X																										2
MW-7	1/16/94	1540	H2O	31			X																				X	X		X			5

PROJECT INFORMATION

PROJ. NO.: 3260
PROJ. NAME: ENRON - Hobbs
P.O. NO.:
SHIPPED VIA: Mesa Airlines

SAMPLE RECEIPT

NO. CONTAINERS	14
CUSTODY SEALS	Y / N / [✓ NA]*
RECEIVED INTACT	Y
RECEIVED COLD	Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☐ 2 WEEK

Comments:
*COC seals intact on outside of cooler.

SAMPLED & RELINQUISHED BY: 1.
Signature: BMMarley Time: 1400
Printed Name: Bob Marley Date: 1/17/94
Company: DBS&A Phone: 822-9400

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 3.
Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: 1.
Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: 2.
Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: (LAB) 3.
Signature: Terri Dattre Time: 1650
Printed Name: Terri Dattre Date: 1/17/94
Analytical Technologies, Inc.

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CHAIN OF CUSTODY

DATE: 1/17/94 PAGE 8 OF ____

ATI LAB I.D. 401324

PROJECT MANAGER: Bob Marley

COMPANY: Daniel B. Stephens & Assoc.
ADDRESS: 6020 Academy NE
Albuq, NM 87109
PHONE: 822-9400
FAX: 822-8877

BILL TO:
COMPANY:
ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	BTXE/MTBE (8020)			Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.			Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	Polynuclear Aromatics (610/8310)			SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal	NO_2/NO_3	Cl, SO_4, T-Alk, bicarb, TDS	The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)	Mg, Ca, Na, K	NUMBER OF CONTAINERS
Trip Blank	1/5/94	—	H_2O	32			X																							BM			1
NNG-4	1/17/94	1000	H_2O	33			X																				X	X		X		X	5
Portable P.t	1/17/94	1030	H_2O	34			X																										2
Replicate 1	—	—	H_2O	35			X																										2
Replicate 11	—	—	H_2O	36																							X	X				X	3

PROJECT INFORMATION

PROJ. NO.: 3260
PROJ. NAME: ENRON - Hobbs
P.O. NO.:
SHIPPED VIA: Mesa Airlines

SAMPLE RECEIPT

NO. CONTAINERS: 13
CUSTODY SEALS: Y / N / [✓ NA]
RECEIVED INTACT: Y
RECEIVED COLD: Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

[✓ RUSH] ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☐ 2 WEEK

Comments:
• 24 Rush: Portable P.t
• Do not analyze Sample ID: Replicate 1 until Authorization from Bob Marley (Hold)

SAMPLED & RELINQUISHED BY: 1.
Signature: Bob Marley Time: 1400
Printed Name: Bob Marley Date: 1/17/94
Company: DBS&A Phone: 822 9400

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 3.
Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: 1.
Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: 2.
Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: (LAB) 3.
Signature: Terri Dettre Time: 1650
Printed Name: Terri Dettre Date: 1/17/94
Analytical Technologies, Inc.

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PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

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CHAIN OF CUSTODY

DATE: 1/19/94 PAGE 9 OF ~~9~~ 10

ATI LAB I.D. 401324

PROJECT MANAGER: Bob Marley

COMPANY: DBS&A
ADDRESS: 6020 Academy NE Suite 100
Albuq. NM 87109
PHONE: 822-9400
FAX: 822-8877

BILL TO: See 1st page
COMPANY:
ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	BTXE/MTBE (8020)	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	Polynuclear Aromatics (610/8310)	SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal	The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)	NUMBER OF CONTAINERS
SB-6 @ 18.5'	1/13/94	0800	Soil	37			X																	1
SB-7 @ 16.0'	1/13/94	1125	Soil	38			X																	1
SB-5 @ 6.5'	1/18/94	1230	Soil	39			X																	1

PROJECT INFORMATION

PROJ. NO.: 3260
PROJ. NAME: ENRON - Hobbs
P.O. NO.:
SHIPPED VIA: —

SAMPLE RECEIPT

NO. CONTAINERS: 3
CUSTODY SEALS: [✓ Y] / N / NA
RECEIVED INTACT: Y
RECEIVED COLD: Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK [✓ (NORMAL)] ☐ 2 WEEK

Comments:

SAMPLED & RELINQUISHED BY: 1.
Signature: Bob Marley Time: 1250
Printed Name: Bob Marley Date: 1/19/94
Company: DBS&A Phone: 822 9400

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 3.
Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: 1.
Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: 2.
Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: (LAB) 3.
Signature: Time: 1250
Printed Name: Date: 1/19/94
Analytical Technologies, Inc.

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Analytical Technologies, Inc. Albuquerque, NM

Chain of Custody

DATE 1/11/94 PAGE 1 OF 1

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**
ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	NO2/NO3	632/632 MOD	619/619 MOD	610/8310	Cl SO4 Alk TDS	8 RCRA Metals + Mg, Ca, Na	~~8240 (TCLP 1311) ZHE~~ K, Ba, Total	Digestion	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)		NACE	ASBESTOS		BOD	TOTAL COLIFORM	FECAL COLIFORM		GROSS ALPHA/BETA	RADIUM 226/228		AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
401324-06	1/10/94	1225	AQ	6						X				X	Y	Y	Y																3

PROJECT INFORMATION
PROJECT NUMBER: 401324
PROJECT NAME: DBS
QC LEVEL: [✓ STD.] IV
QC REQUIRED: MS MSD BLANK
TAT: [✓ STANDARD] RUSH!

DUE DATE: 1/18-1/25
RUSH SURCHARGE: 50% on Metals only
CLIENT DISCOUNT: 10 %

W.O. #
LK495

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS	3
CHAIN OF CUSTODY SEALS	NA
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	401324

SAMPLES SENT TO:

SAN DIEGO	
FT. COLLINS	
RENTON	
PENSACOLA	
PHOENIX	X
BARRINGER	
FIBERQUANT	

RELINQUISHED BY: 1.
Signature: Terri Dettre Time: 1730
Printed Name: Terri Dettre Date 1/11/94
Analytical Technologies, Inc.
Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:

RECEIVED BY: (LAB) 2.
Signature: Time: 929
Printed Name: Linda Eshelman Date: 1/12/94
Company: ATI

ATI Labs: San Diego (619) 458-9141 • Phoenix (602) 496-4400 • Seattle (206) 228-8335 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Albuquerque (505) 344-3777

DISTRIBUTION: White, Canary - ATI • Pink - ORIGINATOR

Analytical Technologies, Inc. Albuquerque, NM

Chain of Custody

DATE 1/16/94 PAGE 1 OF 1

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**
ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)		632/632 MOD	619/619 MOD	610/8310	NO3/NO3	Cl, SO4, Alk, TDS	8240 (TCLP 1311) ZHE		Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)		NACE	ASBESTOS	Mg Ca Na K + 8 RCRA	~~8000~~ Metals by total	TOTAL COLIFORM	FECAL COLIFORM	Mo Ca Ua K	GROSS ALPHA/BETA	RADIUM 226/228		AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
401324-31	1/16/94	1546	AQ	31										X	X								X	X									3
-33	1/17/94	1000	〃	33										X	X								X	X			X						3
-36	—	—		36										X	X								X	X			X						3

PROJECT INFORMATION

PROJECT NUMBER: 401324
PROJECT NAME: DBS
QC LEVEL: [✓ STD] IV
QC REQUIRED: MS MSD BLANK
TAT: [✓ STANDARD] RUSH!

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS	9
CHAIN OF CUSTODY SEALS	
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	401324

DUE DATE: ~~[illegible]~~ 1/26/94 W.O.# LK499
RUSH SURCHARGE:
CLIENT DISCOUNT: 10 %

SAMPLES SENT TO:

SAN DIEGO	
FT. COLLINS	\
RENTON	
PENSACOLA	
PHOENIX	X
BARRINGER	
FIBERC. ANT	

RELINQUISHED BY: 1.
Signature: Terri Dillree Time: 1515
Printed Name: Terri Dillree Date: 1/16/94
Analytical Technologies, Inc.
Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: (LAB) 2.
Signature: Time: 1135
Printed Name: Richard A Bauer Date: 1/20/94
Company:

ATI Labs: San Diego (619) 458-9141 • Phoenix (602) 496-4400 • Seattle (206) 228-8335 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Albuquerque [illegible]