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MONITORING REPORTS

DATE:

1995

DANIEL B. STEPHENS & ASSOCIATES, INC.
ENVIRONMENTAL SCIENTISTS AND ENGINEERS

July 25, 1995

0814-4230-95

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Environmental Bureau
Oil Conservation Division

Mr. George Robinson
ENRON Operations Corp.
Environmental Affairs Department
1400 Smith St., Suite 3AC-3142
Houston, Texas 77002

Dear George:

Enclosed please find a conceptual corrective action plan for the dehydration area at WT-1 Compressor Station. An associated cost estimate for system implementation is also included.

Please review the plan at your convenience and feel free to contact me with any questions at (505) 822-9400.

Sincerely,

DANIEL B. STEPHENS & ASSOCIATES, INC.

Bob Marley

Bob Marley
Project Manager

BM/et
Enclosure

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DANIEL B. STEPHENS & ASSOCIATES, INC.
ENVIRONMENTAL SCIENTISTS AND ENGINEERS

CONCEPTUAL CORRECTIVE ACTION PLAN FOR SOIL REMEDIATION
WT-1 COMPRESSOR STATION, DEHYDRATION AREA
CARLSBAD, NEW MEXICO

INTRODUCTION

Daniel B. Stephens & Associates, Inc. (DBS&A) has been retained by ENRON Operations Corp. (EOC) to prepare a conceptual reclamation design for the remediation of contaminated soils at the Transwestern Pipeline Company's (TPC) WT-1 Compressor Station. The facility is located approximately 30 miles east of Carlsbad, New Mexico, along U.S. Highway 62.

The area of contamination addressed by this reclamation design is located in the southwest corner of the WT-1 Compressor Station site (Figure 1). In this area (referred to as the dehydration area on Figure 1) pipeline liquids, consisting primarily of water with limited quantities of petroleum distillates, are removed from the gas stream by dehydration. The soil contamination beneath the dehydration units resulted from the release to the subsurface of wastewaters generated by this process.

PROJECT BACKGROUND

Two previous hydrogeologic investigation were conducted to delineate the extent of soil and ground-water impacts in the dehydration area (Brown & Caldwell, 1993; DBS&A, 1995). Once the extent of subsurface impacts were determined, Cypress Engineering Services, Inc (CES) implemented a work plan to excavate and treat near-surface soils underlying the dehydration area. A brief summary of these activities is provided below.

The first investigation was performed by Brown & Caldwell in November 1993. They advanced a total of eight soil borings (B-1 through B-8 on Figure 2) to the water table and collected soil and ground-water samples for analysis of total petroleum hydrocarbons (TPH) and benzene, toluene, ethylbenzene, and xylene (BTEX). Soil samples from B-1, B-2, and B-7 were impacted above the New Mexico Oil Conservation Division (NMOCD) guidelines for TPH and BTEX. Ground-

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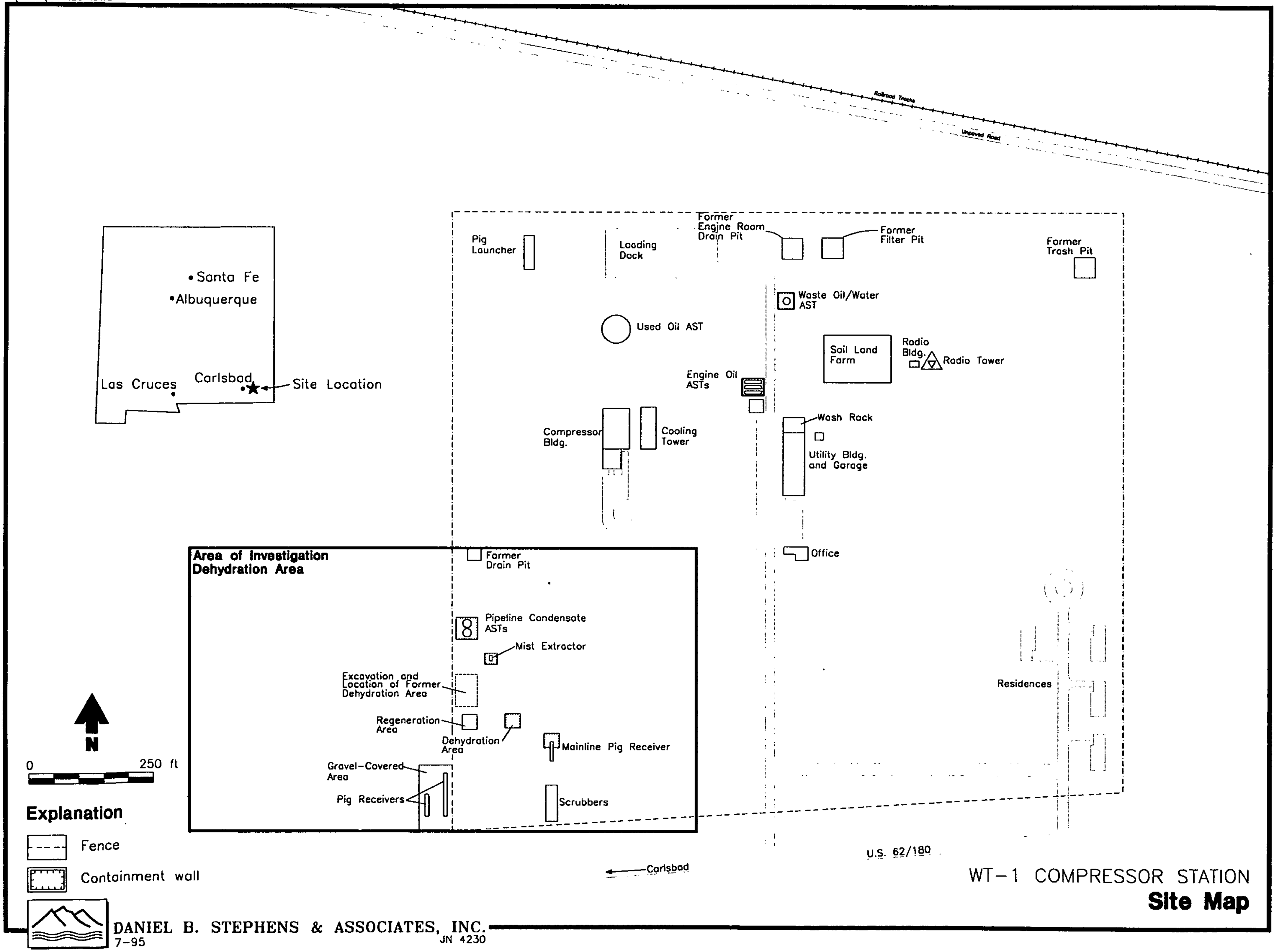

WT-1 COMPRESSOR STATION

Site Map

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Figure 1

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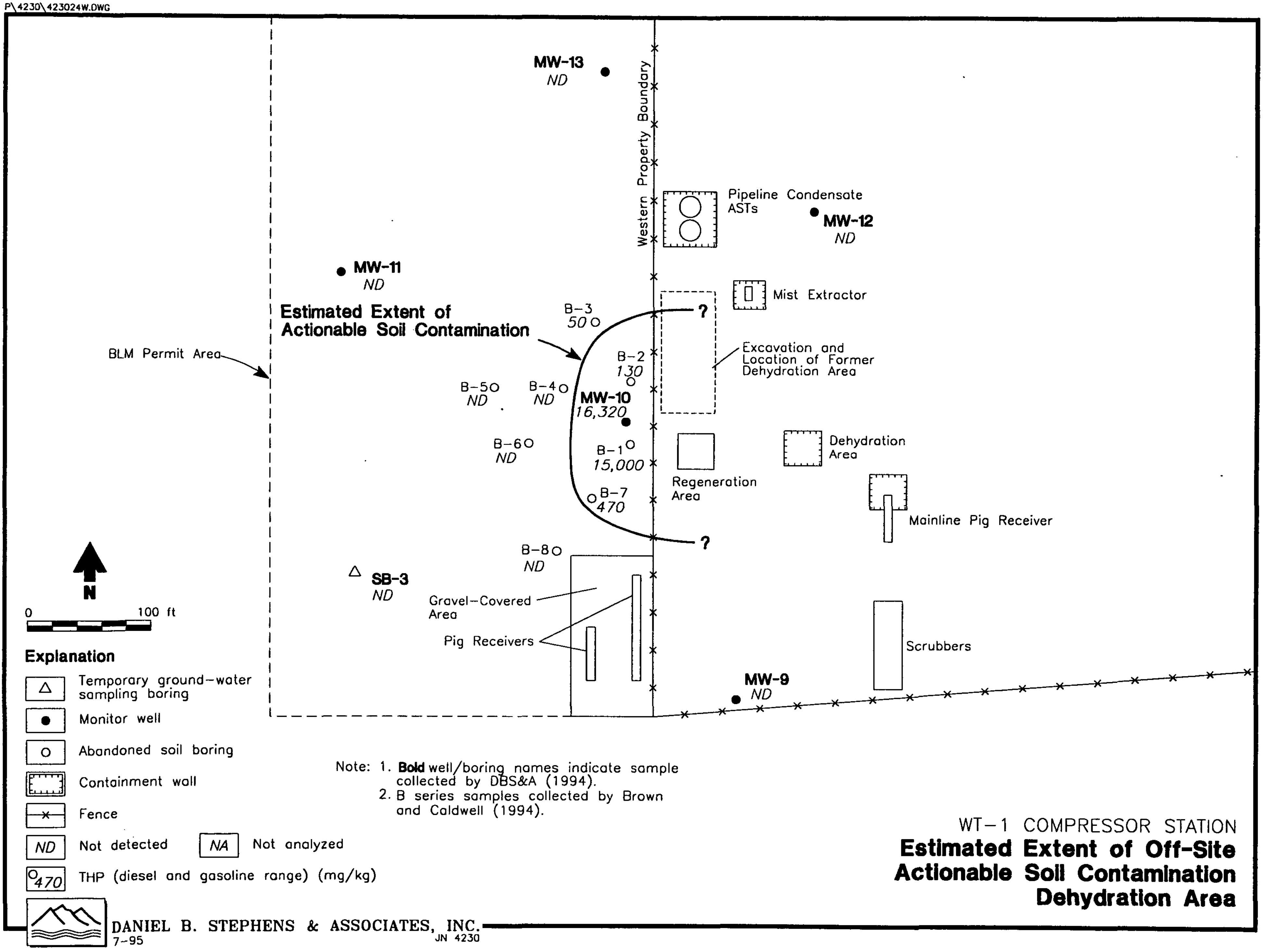

Note: 1. **Bold** well/boring names indicate sample collected by DBS&A (1994).
2. B series samples collected by Brown and Caldwell (1994).

WT-1 COMPRESSOR STATION
Estimated Extent of Off-Site Actionable Soil Contamination Dehydration Area

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Figure 2

water samples collected from each open boring exceeded the New Mexico Water Quality Control Commission (NMWQCC) regulation standards for BTEX.

In November 1994, DBS&A drilled five monitor wells and a temporary ground-water sampling boring, conducted two bail-recovery tests to determine local hydraulic conductivity, and conducted a soil vapor extraction (SVE) pilot test. The investigation defined the off-site extent of soil and ground-water impacts originating from the dehydration units. In addition, the results of the SVE pilot test indicated that SVE was a feasible remedial technology for the site.

The site hydrogeology and extent of subsurface contamination, based on the data gathered to date, are described below:

- Perched ground water is present within the Santa Rosa sandstone at depths of approximately 45 to 55 feet below ground surface. The saturated thickness of the perched system ranges from approximately 0 to 10 feet; locally, ground water flows toward the northwest. There are no known uses for the perched water.

- Results of bail-down/recovery tests indicated that the average hydraulic conductivity is on the order of 10^{-2} feet per day. As evidenced by two borings that did not encounter ground water, the perched system appears to be of limited extent west of the site.

- Field headspace and laboratory analyses indicated that actionable soil contamination, based on NMOCD (1993) guidelines of 100 mg/kg TPH, extends approximately 60 feet beyond the western property line (Figure 2).

- Phase-separated hydrocarbons (PSH) are present near the western fence line, as evidenced by the 1 foot of PSH measured in monitor well MW-10.

- Concentrations of benzene, toluene, xylene, and total naphthalene exceed NMWQCC standards in the vicinity of monitor well MW-10. TPH in ground water was identified as primarily gasoline-range constituents.

- The majority of the contaminant mass appears to be present in the sorbed and vapor phase within the soil and as PSH in contact with the perched water.

In December 1994, CES implemented a work plan to remediate near-surface soils below the dehydration area. This remediation program included the excavation of approximately 3,300 cubic yards of soil underneath the dehydration area and the subsequent augmentation of the excavated soil with a nutrient solution to enhance biodegradation of hydrocarbons. The treated soils were placed back into the excavated area.

PROPOSED CORRECTIVE ACTION SYSTEM

The proposed corrective action technology for removal of subsurface contaminants beneath the dehydration area is soil vapor extraction. This process will recover sorbed-phase, vapor-phase, and PSH contamination. Because the dissolved-phase contamination is a small fraction of the total contaminant mass, no action is proposed to address the dissolved-phase contamination present within the limited perched system. Following cleanup of soil contamination and PSH, ground-water contamination will naturally attenuate.

Soil Vapor Extraction System

Soil vapor extraction is a proven technology for the removal of volatile organic compounds (VOCs) from soils with moderate to high air permeability. In addition to removing VOCs, the process enhances aerobic microbial degradation of residual sorbed soil contaminants by increasing the oxygen concentration in the subsurface. Based on the results of the SVE pilot test (DBS&A, 1995), it appears that SVE will be highly effective in removing the low-molecular-weight hydrocarbon distillates at the site. SVE can also be highly effective in removing PSH.

In order to achieve closure in a reasonably short time frame, the SVE system will consist of nine SVE wells, three independent soil vapor conveyance circuits, and a 200-standard cubic feet per minute (scfm) thermal catalytic oxidizer. Figure 3 depicts the locations of proposed SVE wells. The SVE pilot test indicated that a flow rate of approximately 1 to 2 scfm per linear foot of screen could be obtained from 2-inch-diameter SVE wells. The radius of influence was estimated as

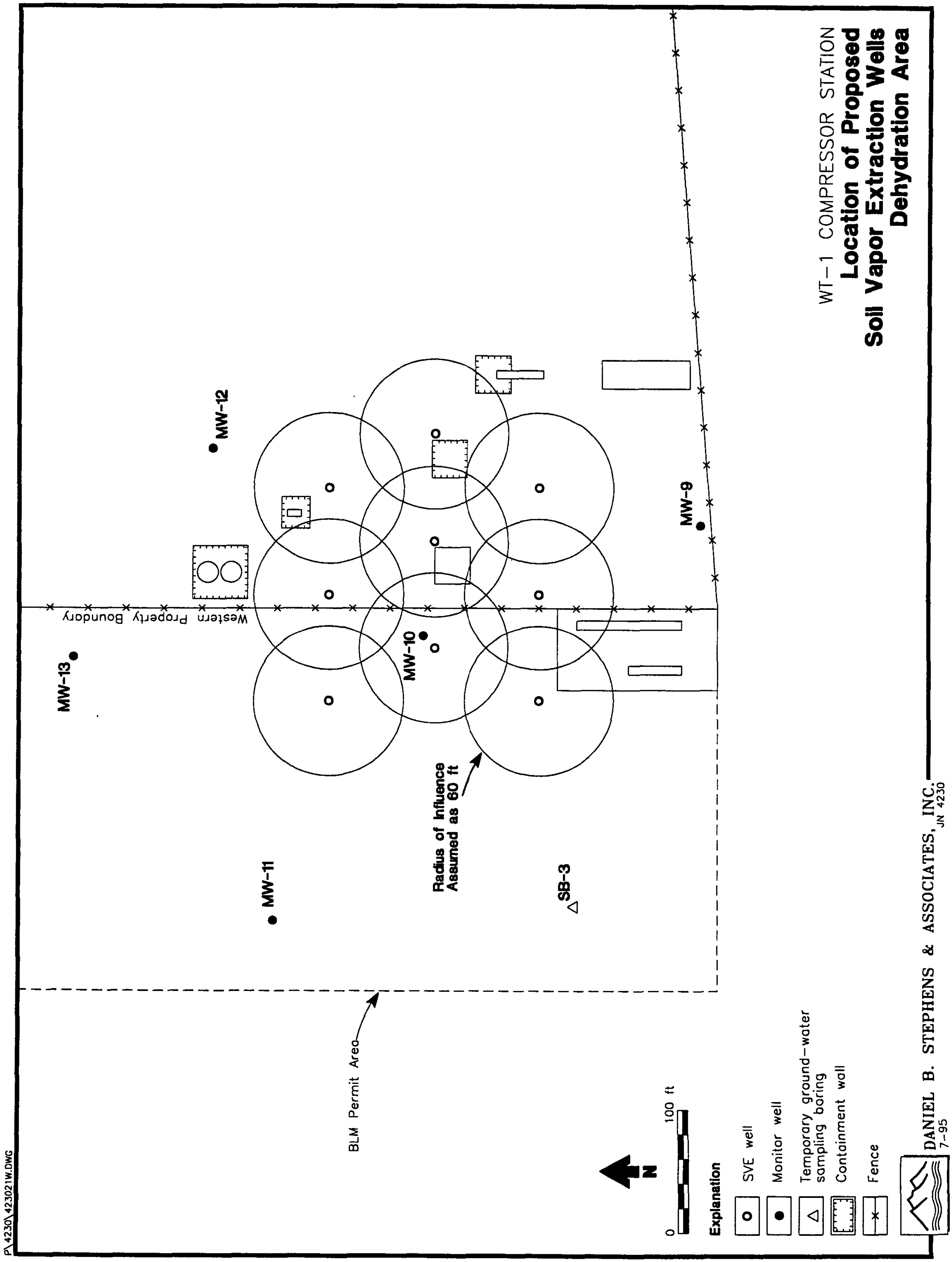
WT-1 COMPRESSOR STATION
Location of Proposed
Soil Vapor Extraction Wells
Dehydration Area
MW-12
MW-9
MW-10
MW-13
MW-11
SB-3
Western Property Boundary
Radius of Influence
Assumed as 60 ft
BLM Permit Area
N
0
100 ft
Explanation
SVE well
Monitor well
Temporary ground-water sampling boring
Containment wall
Fence
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Figure 3

60 feet. The proposed design assumes 2 scfm per linear foot of screen and 20 feet of screened interval per well for a total flow rate of 40 scfm per well. The SVE wells will be screened from approximately 35 to 55 feet bgs. The nine SVE wells will be divided into three soil vapor conveyance circuits.

Based on the estimated flow rate requirements of the SVE well field and the contaminant mass removal rates, emission control will be required for full-scale operation of the SVE system. TPC will obtain the necessary air quality permit from the New Mexico Environment Department Air Quality Bureau.

Vapor conveyance piping will consist of high-density polyethylene (HDPE) pipe in various diameters according to head loss calculations along the three circuits. The proposed piping and SVE circuit configurations are shown in Figure 4. Due to the remoteness of the location and the short-term nature of the project, it is proposed that the piping be laid on the ground surface rather than in trenches. HDPE piping is better suited to this application than PVC because it is more flexible and less likely to be damaged by ultraviolet radiation or vehicular traffic.

Equipment

The proposed treatment system for the extracted soil vapors is a thermal catalytic oxidizer manufactured by Baker Furnace, Inc. (Attachment 1). The 200-scfm oxidizer will extract soil vapors using a 7.5-hp positive displacement pump. Extracted vapors are passed through a moisture separator and then into a combustion chamber where the operating temperature is maintained at or above 1400°F. After destruction of the VOCs, the air stream is vented to the atmosphere.

To ensure that the combustion temperature is maintained within the required operating range, the oxidizer is equipped to use natural gas as a supplemental fuel. The 7.5-hp positive displacement pump will require a 3-phase, 220-volt electrical hookup. These required utilities will be hooked up at the equipment compound.

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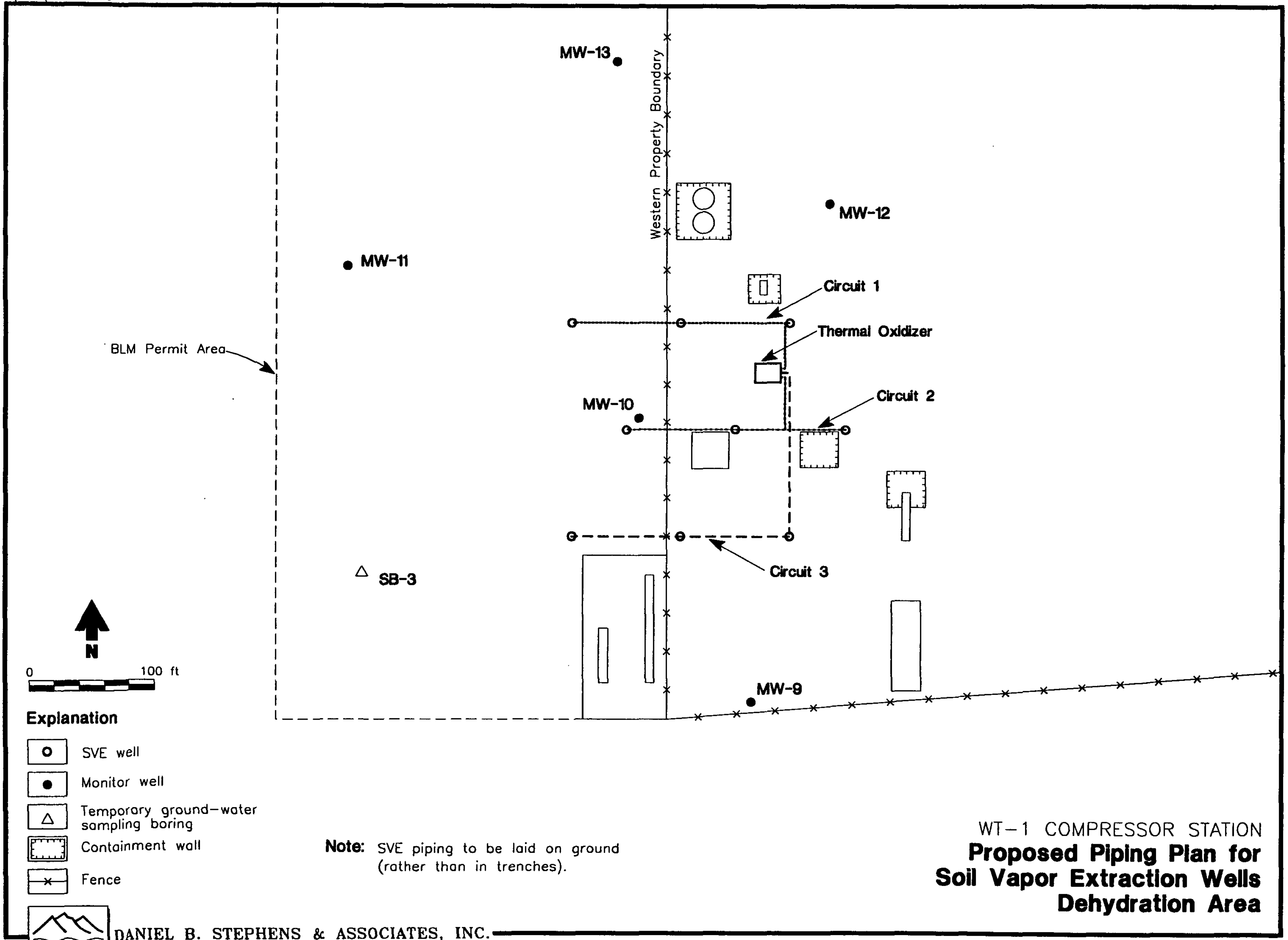

Note: SVE piping to be laid on ground (rather than in trenches).

WT-1 COMPRESSOR STATION
Proposed Piping Plan for Soil Vapor Extraction Wells Dehydration Area

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Figure 4

When emission control is no longer required, the turnkey thermal oxidizer will be replaced with a low flow rate regenerative blower. The blower will be used to circulate air in the subsurface, thereby continuing to enhance the in-situ biodegradation of contaminants by maintaining adequate oxygen levels in the subsurface.

Corrective Action Activities and Performance Milestones

The following tasks will be required to implement the proposed corrective action.

- File air quality permit application
- Finalize SVE system design and prepare construction plans; solicit contractor bid quotations and select construction contractors
- Construct SVE well field and order equipment
- Construct SVE conveyance system and equipment compound; install equipment

In addition, the following tasks will be required following system startup:

- Operate and maintain system
- Collect confirmation soil samples
- Achieve OCD soil standards and terminate SVE

Performance Reporting

During the first year of operation, TPC will prepare semiannual reports detailing the operation and maintenance (O&M) of the system. These reports will summarize quarterly activities, which will include sampling of monitor wells near the dehydration area for BTEX and emissions from the SVE well field for TPH. After the first year of operation, TPC proposes to submit annual reports on O&M activities. Performance reporting will continue until site closure is obtained.

REFERENCES

Brown & Caldwell. 1994. Subsurface Investigation, Transwestern WT-1 Compressor Station, Lea County, New Mexico. April 1994.

Daniel B. Stephens & Associates, Inc. (DBS&A). 1995. Supplemental Environmental Investigation, WT-1 Compressor Station, Dehydration Area. Prepared for ENRON Operations Corp., Environmental Affairs Department, Houston, Texas. March 28, 1995.

Attachment 1

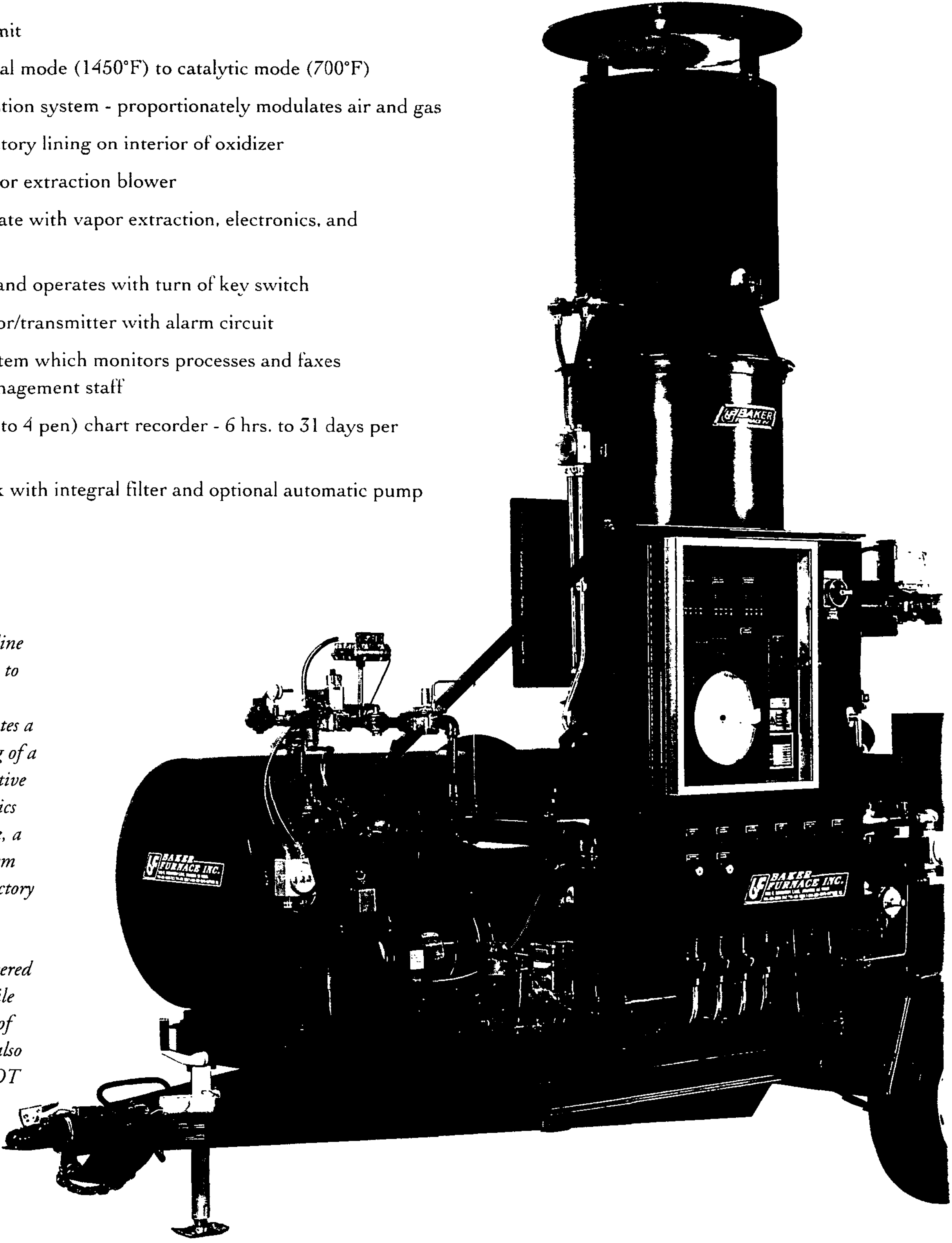
Description of Thermal Oxidizer

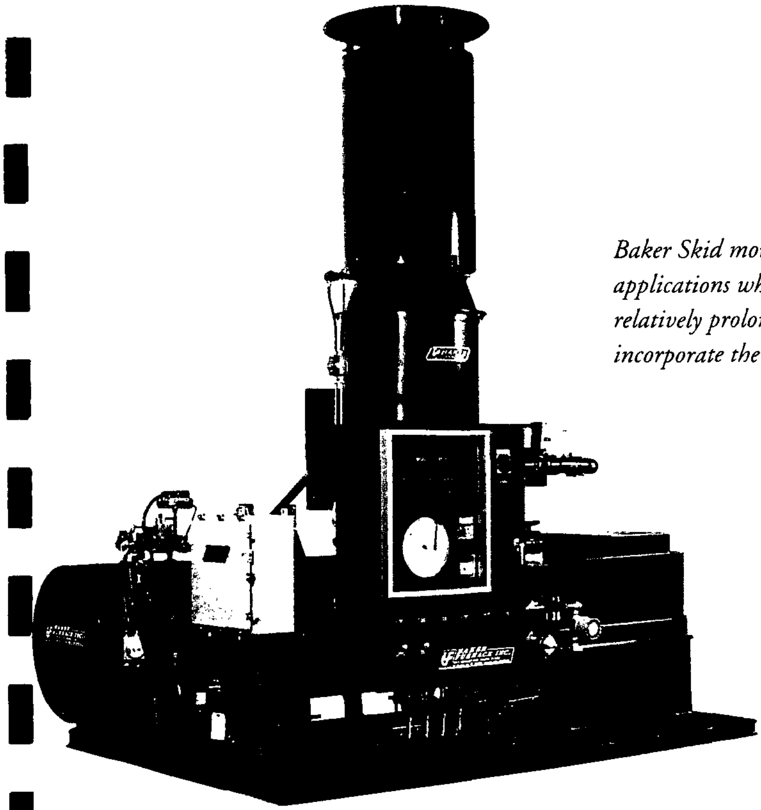
VAPOR PHASE HYDROCARBON - THERMAL OXIDATION

Committed to improving our environment

- Five separate safety interlocks
- AGA (American Gas Association) engineering report on Baker Oxidizers
- Automatic and proportional dilution air control as a function of LEL
- SCAQMD general permit
- Convertible from thermal mode (1450°F) to catalytic mode (700°F)
- Highly efficient combustion system - proportionately modulates air and gas
- Highly insulating refractory lining on interior of oxidizer
- Silence package for vapor extraction blower
- Complete ready to operate with vapor extraction, electronics, and combustion system
- Fully automatic- starts and operates with turn of key switch
- LEL combustibles sensor/transmitter with alarm circuit
- On board telemetry system which monitors processes and faxes information back to management staff
- Three pen (expandable to 4 pen) chart recorder - 6 hrs. to 31 days per revolution
- Moisture knockout tank with integral filter and optional automatic pump with level switches

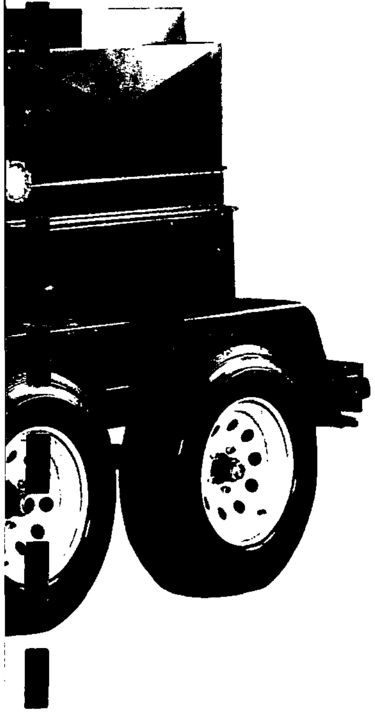
Baker manufactures a standard line of Trailer mounted Oxidizers up to 500 cfm flow rate in 100 cfm increments. Each unit incorporates a vapor extraction system consisting of a positive displacement or regenerative blower, a U.L. classified electronics panel, a moisture knock-out tank, a complete combustion burner system and 5 safety interlocks with a Factory Mutual (FM) supplemental fuel train. The trailered (and skid mounted) units have been engineered to fit in a minimum of space while still retaining a full compliment of equipment. The trailered units also have electric brakes and meet DOT (Department of Transportation) specifications.

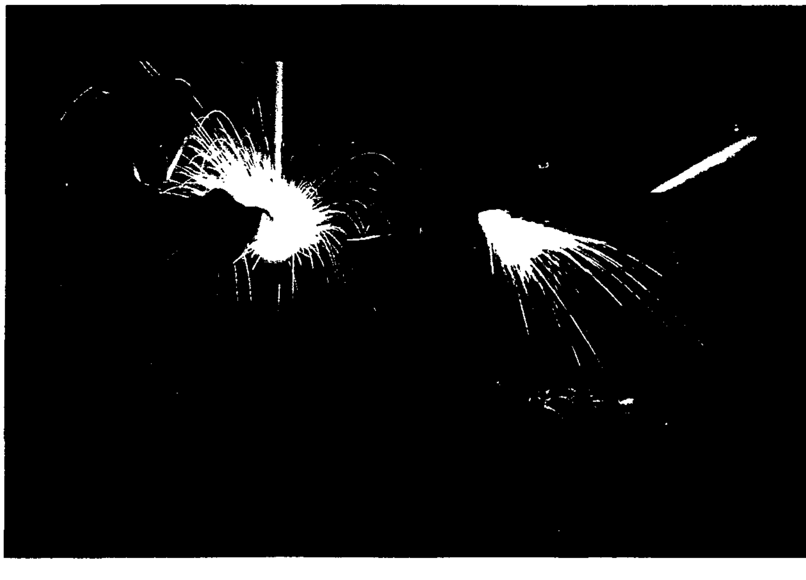




Baker Skid mounted Oxidizers are designed for those remediation applications where the Thermal Oxidizer is going to be stationary for a relatively prolonged period of time. Skid and trailer mounted units both incorporate the same design features.

In addition to Thermal Oxidizers, Baker Furnace also manufactures Carbon Systems (either skid or trailer mounted). These systems are complete, ready to operate with Vapor Extraction Blower, LEL combustibles sensor, Electronic Control Panel and Carbon canisters.





Baker Furnace maintains a complete fabrication/assembly shop and constructs each Oxidizer from the ground up. We do not utilize sub-contractors and as such have tight quality and production controls. Baker Oxidizers are subjected to rigorous tests before shipment and every component group (Electronics, Combustion and Vapor Extraction) is assembled on our premises.

TRAILER MOUNTED THERMAL OXIDIZERS

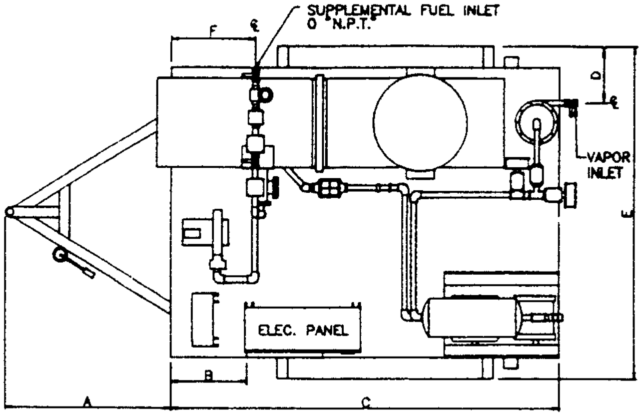
dimensions in inches

OXIDIZER	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q
100 CFM	51	20	120	20	91	18	82.5	171	19.5	162	56	60.5	2	1	8	75
200 CFM	51	20	120	20	91	18	82.5	171	19.5	162	56	60.5	2.5	1	8	75
300 CFM	60	20	144	20	97	18	87	204	24	162	56	60.5	3	1	8	81
400 CFM	60	20	168	20	97	18	87	204	24	162	70	75.5	4	1.5	8	81
500 CFM	60	20	168	20	97	18	87	228	24	162	70	75.5	5	1.5	8	81

SKID MOUNTED THERMAL OXIDIZERS

dimensions in inches

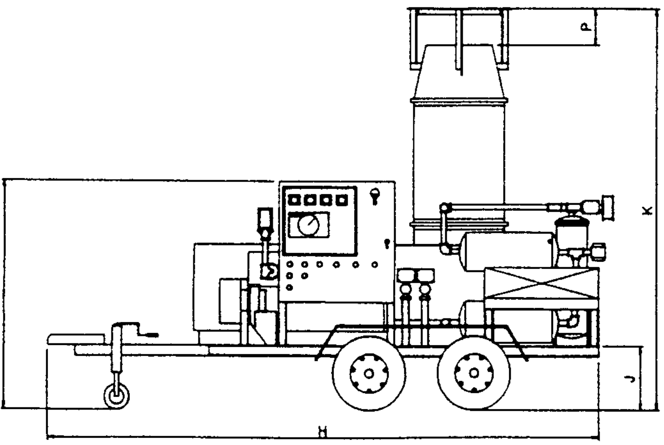
OXIDIZER	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q
100 CFM	N/A	20	120	18	N/A	18	69	N/A	6	162	39	39	2	1	8	84
200 CFM	N/A	20	120	18	N/A	18	69	N/A	6	162	39	39	2.5	1	8	84
300 CFM	N/A	20	132	18	N/A	18	69	N/A	6	162	39	42	3	1	8	84
400 CFM	N/A	20	168	18	N/A	18	69	N/A	6	162	53	45	4	1.5	8	96
500 CFM	N/A	20	168	18	N/A	18	69	N/A	6	162	53	50	5	1.5	8	96

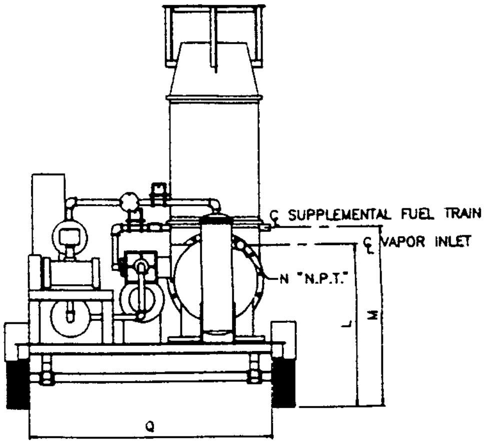


OXIDIZER

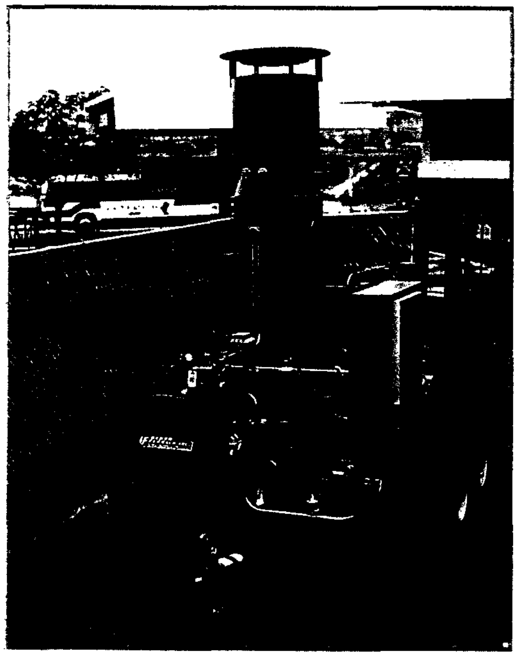
Weights in lbs. (approximate)

TYPE	100 CFM	200 CFM	300 CFM	400 CFM	500 CFM
Skid	4600	4800	5100	5700	5900
Trailer	5800	5900	6500	6800	7100



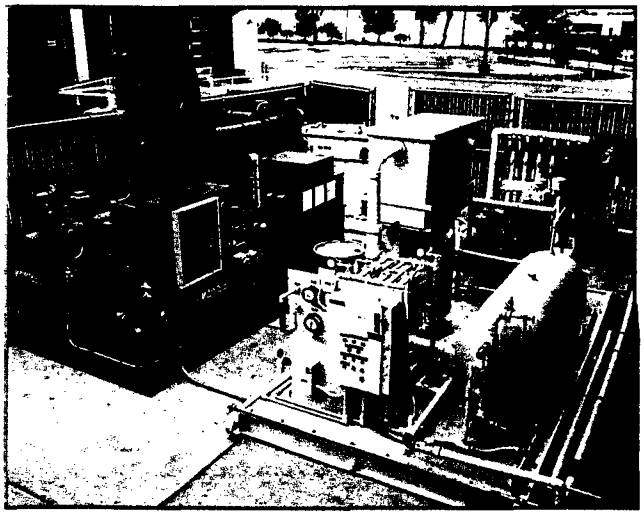


One day pilot study performed at active retail service station. 200 cfm trailer mounted units are available for short or long term rental periods. Factory trained personnel are available to operate equipment on pilot studies, perform onsite field service, or provide technical assistance over the telephone.



Trailer mounted 200 cfm oxidizer remediating gasoline storage tank leak at active retail service station.

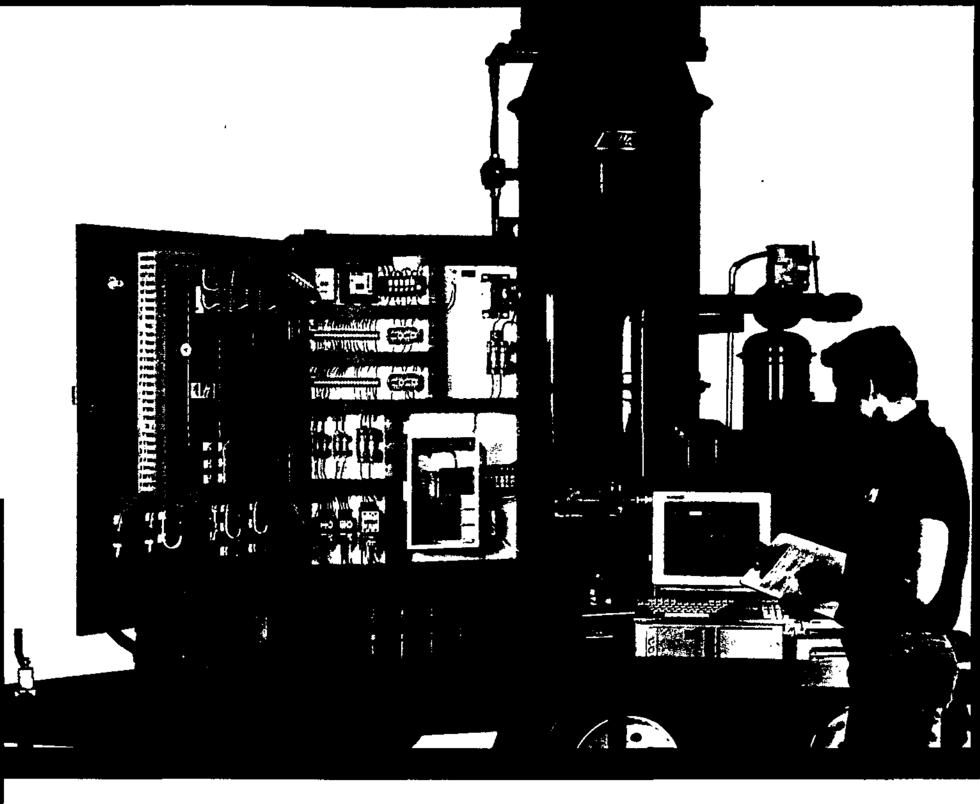
Skid mounted 400 cfm Baker Oxidizer being utilized to remediate hydrocarbon contaminated soil concurrently with water filtration system. Soil contaminant's include gasoline and diesel fuel.

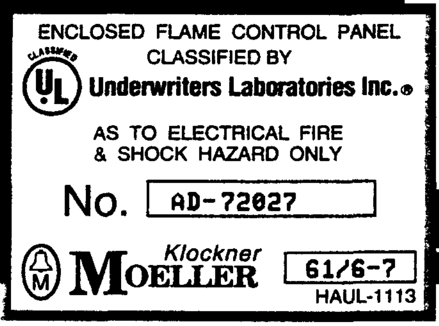


Applications for Baker Oxidation systems include:

- Underground storage tank remediation
- Paint spray booths and drying ovens
- Lithographic printing
- Bakeries - (ethyl alcohol)
- Other industrial processes which emit volatile organic compounds

Baker Furnace Thermal Oxidizers are equipped with a U.L. (Underwriters Laboratory) classified control panel. A U.L. Classification sticker is applied after a thorough diagnostics check via our computer software.





ENCLOSED FLAME CONTROL PANEL
CLASSIFIED BY
Underwriters Laboratories Inc.®
AS TO ELECTRICAL FIRE
& SHOCK HAZARD ONLY
No. AD-72027
Klockner MOELLER 61/6-7
HAUL-1113

Baker Furnace has complete engineering services and can assist its clients with remediation projects as related to Catalytic or Thermal Oxidation. We can provide general arrangement, P&ID and other drawings as required.

BAKER FURNACE INC.

1015 E. Discovery Lane, Anaheim, CA 92801 • (714) 491-9293
Fax (714) 491-8221 • 800-237-5675 (Outside CA)

DISTRIBUTED BY

Baker Thermal Oxidizer Specifications

100 through 500 CFM Units *(600 through 10,000 CFM quoted on request)*

Baker Thermal Oxidizers are designed for vapor extraction based soil remediation projects and other VOC destruction applications where burning the volatiles has been specified as the most cost effective method. Baker Oxidizers feature fully automatic operation, and use either natural gas or propane as supplemental fuel. The VOC destruction rates achieved by our Direct Fired and Catalytic units are excellent. (Please refer to the section on destruction rates for actual quantified rates.) The units are equipped with 6 separate safety interlocks and feature U.L. (Underwriters Laboratory), F.M. (Factory Mutual) and C.S.A. (Canadian Standards) approved components where applicable. Our 100 – 500 CFM units have been approved by A.G.A. (American Gas Association) Laboratories. Selected units have been granted general approval by the South Coast Air Quality Management District (responsible for greater Los Angeles area.) Baker Furnace was the first oxidizer manufacturer to secure this type of approval. Each unit is carefully sized for the correct volume of air and correct residence time for the vapors being oxidized. We size our Thermal Oxidizers for 1 full second of residence time to ensure a thorough destruction of the vapors being introduced into the Oxidizer.

Dimensions

For specific dimensions on the #100 through #500 CFM Thermal Oxidizers (either skid or trailer mounted), please refer to our general arrangement drawing #101212 enclosed with these specifications.

Oxidizer Weights in lbs.

TYPE	100CFM	200CFM	300CFM	400CFM	500CFM
Skid	3400	3600	4100	4300	4300
Trailer	4200	4300	4900	5100	5100

Vapor Extraction Blower

A positive displacement blower with a 208/230/460 volt three phase (or 220 volt single phase) sixty (60) HZ. motor to deliver a correct volume of air at 4" of Hg. will be provided. Higher vacuums are available on request in the 10 to 12" Hg. range. The blower is belt driven and is equipped with an O.S.H.A. approved guard over the belts and sheaves. The blower also is fitted with inlet and outlet silencers and a "Kunkle" vacuum relief valve. Baker Furnace can provide a regenerative blower in lieu of the positive displacement blower if so desired.

Blower Horsepower and Amperage Ratings at 4" HG Vacuum

Oxidizer	100CFM	200CFM	300CFM	400CFM	500CFM
Horsepower	2	3	5	5	7.5
Amperage 230 V. 1 Ph.	12	17	28	28	40
208 V. 3 Ph.	7.8	11	17.5	17.5	25.3
230 V. 3 Ph.	6.8	9.6	15.2	15.2	22
460 V. 3 Ph.	3.4	4.8	7.6	7.6	11

Knock Out Pot

A 12" or 16" diameter knock out pot with a manual drain is an integral part of the vapor extraction train. The pot is equipped with a sight glass and a brass ball cock for draining off liquid. An automatic pump with level switches can be fitted to the knock out pot on request. (See also high level knockout drain/shutoff in options section).

Air Filters

Replaceable air filters are furnished with the unit and are located in the knock out pot and on the two dilution air inlets. The knock out pot filter can be readily changed by removing the top of the knock out pot. The air dilution filters are external and can also be readily changed. Baker Furnace maintains a supply of replacement filters in stock at all times.

Three Way Valving with Automatic Air Dilution

Motor actuated three-way valves are installed to supply clean air to purge the combustion system prior to ignition of the pilot and to restrict VOC laden air from entering the Thermal Oxidizer until it reaches its operating temperature. The valves automatically switch over at a preset temperature which is configured into the process temperature controller. Two of the valves are proportionally modulated and are linked to oxygen and L.E.L. sensors. The sensors are connected to digital microprocessor based P.I.D. controllers which proportionately modulate the butterfly valves around a setpoint which has been selected. L.E.L. and oxygen levels are simply set on the P.I.D. controllers and then maintained automatically by the amount of dilution air which enters the Oxidizer.

Supplemental Fuel and Vapor Inlet Pipe Sizes

Please refer to our general arrangement drawing #101212 included with these specifications for specific pipe sizes for the #100 through #500 Thermal Oxidizers.

Air Flow Measurement

Post dilution process air flow to the combustion chamber is measured via a pitot tube and electronic air flow transmitter. An averaging pitot tube measures differential pressure, which is translated into an electronic signal by the transmitter, and sent to the chart recorder. Air flow is one of the three process variables monitored and recorded continuously by our Honeywell 3-pen chart recorder.

Combustion System

An Eclipse MVTA (medium velocity tempered air) combustion burner will be supplied with the Thermal Oxidizer utilizing a combustion blower, modulating gas butterfly valve, spark ignition, piloting and FM approved flame safety relays. The combustion burner is also equipped with a FM approved gas fuel train. The burner will fire on propane or natural gas. Inlet gas pressure should be 2-5 PSI at the regulator on the fuel train. Please refer to the fuel usage charts provided with these specifications for data regarding the use of supplemental fuel versus VOC concentrations at the influent to the Oxidizer. The charts are available for both Catalytic and Direct fired operation.

Control Panel

A complete, U.L. Approved Three Phase control panel is included with a choice of 208/230/460 volts (or 220 volt Single Phase if required) and would consist of the following component parts:

1. Honeywell 3 pen chart recorder (4 pen available)
2. Honeywell digital microprocessor based process controller
3. Honeywell high limit temperature controller
4. Honeywell L.E.L. controller with alarm setpoint -4-20 output
5. Honeywell O_2 controller -4-20 milliamp output
6. Totalizing hour meter - up to 9999 hours
7. Nema four panel with 3 Phase or 1 Phase disconnect
8. Step down transformer for 120 V. circuitry (3 ph. panels)
9. Alarm contacts in process and high limit controllers
10. FM approved flame safety relays
11. Combustion purge timer
12. All necessary fuses, terminal strips, wiring
13. Complete wiring schematic
14. Locking glass enclosure over instruments

Refractory Lining

A 5" thick 2300° F. ceramic fiber lining is installed in the Thermal Oxidizer to keep the exterior surface at a safe temperature. The ceramic fiber material has a very low K value which means it is an excellent insulator (does not store or transfer heat readily). A ceramic throat is fitted within the Oxidizer at a specific location and is sized for velocity of 15 ft/sec. The combustion chamber is sized for 10 ft/sec.

Steel Construction

All components are manufactured from heavy grades of hot rolled A-36 steel plate. Weldments are accomplished under an argon CO_2 purge to assure gas free homogeneous bonding of components. The Oxidizer is to be of a cylindrical design with flanged connections for maintenance purposes in the future. All components will be skid mounted on a heavy channel base with slots for forklift access.

Operating Temperatures

Direct fired Oxidizers are designed to operate at 1450° F. (AQMD requires minimum 1400° F.) while the Catalytic units are designed to operate at 700° F. (at the entry to the Catalyst).

Residence Time for Vapors

Our Oxidizers are designed for 1 full second of residence time. Los Angeles AQMD requires 0.7 seconds for Thermal Oxidizers.

Destruction Efficiencies

Direct fired units have destruction efficiencies above 99% while the Catalytic units are advertised to have rates above 97%. We generally see higher than 97% destruction efficiency for Catalytic operation and we are still exceeding the criteria set forth by AQMD at 97% destruction.

Options:

Catalytic "Plug In" Module

Baker Furnace has developed a "plug in" Catalytic Module which can be installed in our existing direct fired Oxidizer with a minimum of effort. The catalyst inside the module is a monolithic material which significantly reduces the pressure drop across it and provides maximum surface area for the gasses which are to be catalyzed.

Each module is designed to fit down inside the Thermal Oxidizer chamber and bolt in place between the cone and stack section. Please refer to our enclosed drawing which shows the relationship of the Catalytic Module to the Thermal Oxidizer.

Once the Module is bolted in place, the only remaining task is to reduce the temperature setting on the process temperature and high limit controllers. The entire process to install the Catalytic Module should only take 1 – 2 hours.

The use of the Catalytic Module Option will greatly reduce supplemental fuel usage when the concentrations of VOC's are at low levels because the temperature requirement for a catalyst based system is approximately one-half that of a direct fired unit. The incoming vapors need only be heated to 700° prior to the catalyst versus 1450° in the direct fired unit. The delta T (change in temperature) is reduced by almost one-half, which results in a significant reduction in supplemental fuel usage.

Our Thermal Oxidation unit is configured with a "High Limit" temperature controller, as standard equipment, which will protect the catalyst in the event the catalytic process becomes overly exothermic and the temperature attempts to run away.

Baker Furnace can provide installation (on site) of the Catalytic Module at a nominal cost. Please refer to the charts provided with these specifications for supplemental fuel usage at various VOC concentrations for both Catalytic and Direct Fired Oxidizers to project the savings you might achieve by using the Catalytic Module.

Trailer

We can mount the Oxidizer on a tandem axle trailer with a steel deck. Each oxidizer component is mounted securely with bolts, which allows the component to be removed for maintenance if required. The trailer is equipped with electric brakes and all lights necessary for licensing the unit for the road. Please refer to our general arrangement drawing #101212 for specific overall dimensions on the trailer. The trailer, as well as the Thermal Oxidizer, is painted with federal safety blue enamel.

Telemetry "Remote Monitoring" Fax System

The Oxidizer can be equipped with a remote monitoring and reporting system which interfaces with the control instrumentation on the unit. This information can be faxed to a maximum of three locations. The IBM compatible operating software is extremely user friendly and allows you to select the destination of the fax reports, the number of reports you wish to receive each day, and the time of day at which you receive them. The fax reports are typically configured to show process combustion temperature, process air flow to the combustion chamber, and the percent of L.E.L. in the process vapor stream. In addition to the "routine" faxes, the system will also send an alarm fax in the event the unit shuts down for any reason. This report will specify which one of four failure conditions caused the unit to shut down. The addition of the telemetry system requires a dedicated phone line at the site and a fax machine at the receiving end.

Silence package

If you anticipate installing the Oxidizer in an area where noise levels are a critical issue, i.e. residential area etc., the unit can be configured with a quiet design blower package. The blower inlet and exhaust silencers, as well as the blower itself are enclosed with a soundproofed material.

Vacuum Upgrade

Our standard unit will generate a maximum of 4" hg vacuum. Per your specifications we can provide up to 10" hg vacuum in 2" increments. Proper vacuum sizing is very important to ensure that your unit can operate at the engineered flow rate.

High Water Level Shutoff/Pump

If you believe that water will be a problem at the site(s) where you install the Oxidizer, we can install a shutoff switch in the knockout tank which will shut the Oxidizer down if the knockout tank fills up with water. In addition, we can also install a pump which will automatically drain the knockout tank if it fills up with water. Assuming appropriate secondary storage was in place, this process would only require your attention when the secondary holding tank filled up.

Safety Interlocks and Safety Devices on Baker Thermal Oxidizers

Air Proving Switch

Two U.L., FM and CSA approved air proving switches are provided to ascertain that the positive displacement vapor extraction blower and combustion blower are operational. In the event that either blower fails, the air proving switch will "open" the limits circuit thereby causing the unit to shut down the supplemental fuel line and to close the vapor line to the Oxidizer.

High/Low Gas Pressure Switch

A U.L., FM and CSA approved gas pressure switch is provided in the supplemental fuel train which will also "open" the limits circuit in the event an unusually high or low gas pressure condition exists.

High Temperature Limit Controller

A U.L. and FM approved high temperature limit controller has been engineered into the limits circuit to shut down the Oxidizer in the event a high temperature condition exists. The limit controller must be manually reset (per FM requirement) before the Oxidizer can be rendered operational. While in the high limit condition, the Oxidizer will not utilize supplemental fuel nor will vapors be allowed to enter the Oxidizer until the controller is manually reset.

FM Approved Flame Safety Device

Our Thermal Oxidizers utilize a FM approved and U.L. recognized flame safety device which lights the combustion burner on the Thermal Oxidizer after a 60 second purge (5 air changes) of the combustion chamber. The burner has a 15 second ignition trial which lights pilot only. In the event the pilot does not light, the flame safety device locks out the supplemental fuel train thereby reducing the potential for an explosion. The main gas valve in the supplemental fuel train cannot open unless the pilot has been established. Flame monitoring is accomplished via a 3/16" diameter inconel flame rod.

L.E.L. Combustibles Sensor and Controller

A catalytic bead L.E.L. sensor and controller have been integrated into the limits circuit. In the event that the alarm set point for L.E.L. has been exceeded, the L.E.L. controller "opens" the limits circuit which subsequently closes the vapor butterfly valve and temporarily shuts down the combustion burner until the L.E.L. returns to a safe level below the alarm setpoint.

Flame Arrester

A U.L. approved flame arrester has been piped into the vapor extraction discharge line in close proximity to the Thermal Oxidizer. The flame arrester prevents propagation of flame back to the source.

FM Approved Supplemental Fuel Train

A FM supplemental fuel train is provided with the Oxidizer and is fitted with an approved safety shut off valve for the main gas. The shut off valve will close in 0.3 seconds in the event of flame failure. The main gas valve is held shut with a 150 lb. force to assure a tight closure.

Oxygen Sensor and Proportional Dilution Valve

A O_2 sensor and P.I.D. controller is provided to monitor oxygen content in the vapor stream. We require 18% oxygen (minimum) in the stream for sufficient combustion of volatiles. In the event the oxygen content of the vapor stream drops off significantly the O_2 controller opens a proportionally modulated butterfly valve and lets in dilution air to bring the oxygen content up to a satisfactory level.

Alarm Card in Process Temperature Controller

We have integrated an alarm card into the process temperature controller to restrict the entry of volatiles into the Oxidizer until it reaches its correct operating temperature (1400° F.). This is accomplished by setting an alarm value equal to 1400 in the controller. When this value (in temperature) is reached, the process controller sends a signal to a butterfly valve drive motor which opens the valve and allows the vapor stream to enter the Oxidizer. Vapors cannot enter the Oxidizer at any temperature below which the alarm value has been set. This prevents the incomplete burning of hydrocarbons which occurs at lower operating temperatures.

Catalytic Oxidizer

BTU's/hr of Supplemental Fuel Required to Raise Air Temperature of Influent Vapor Stream from 100° F. to 700° F. at Various PPM VOC Concentrations

PPM VOC'S	% LEL	AIR FLOW SCFM				
		100	200	300	400	500
0	0	79,000	158,000	237,000	316,000	395,000
250	1.8	72,500	145,000	217,500	290,000	362,500
500	3.6	65,000	130,000	195,000	260,000	325,000
750	5.4	57,500	115,000	172,500	230,000	287,500
1000	7.3	52,500	105,000	157,500	210,000	262,500
1500	10.9	39,000	78,000	117,000	156,000	195,000
2000	14.5	25,000	50,000	75,000	100,000	125,000
2500	18.1	12,500	25,000	37,500	50,000	62,500
3000	21.7	0	0	0	0	0

Direct Fired Oxidizer

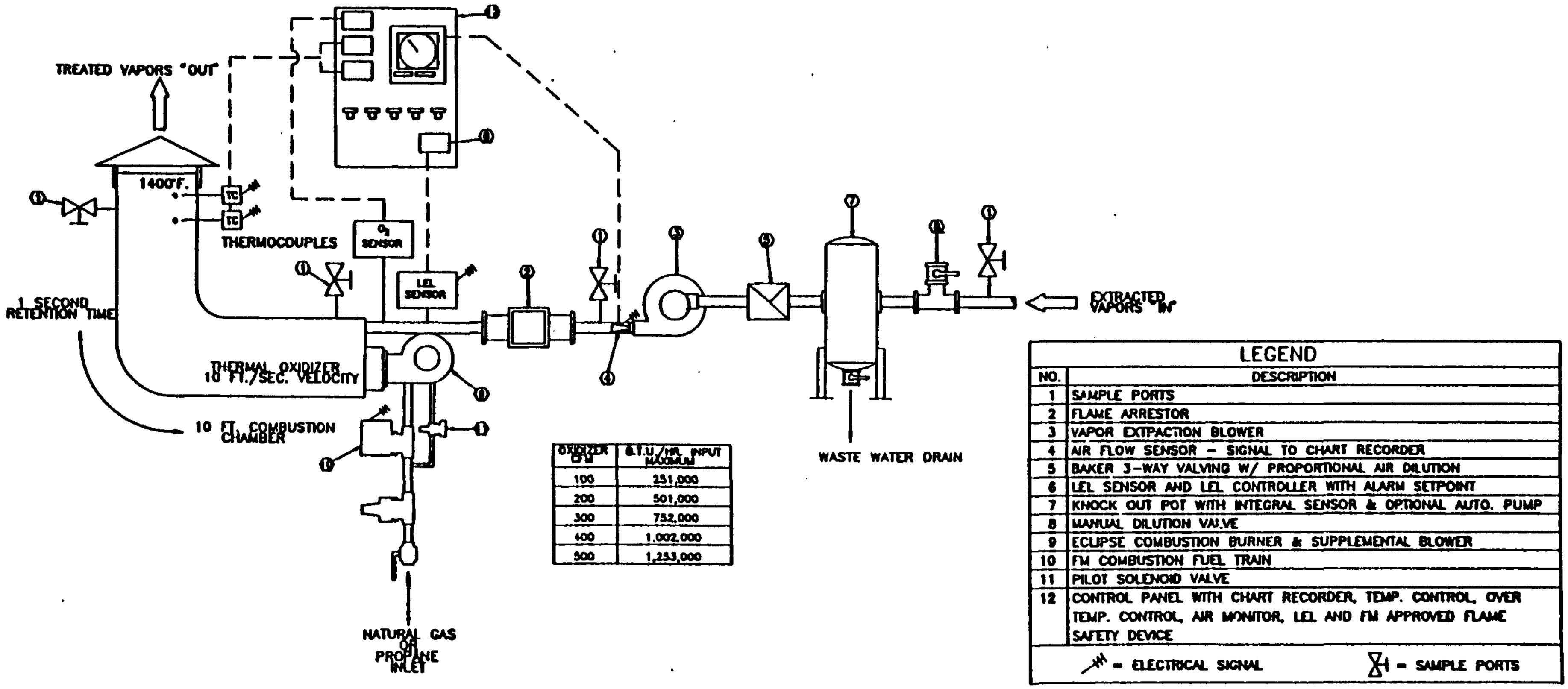
BTU's/hr of Supplemental Fuel Required to Raise Air Temperature of Influent Vapor Stream from 100° F. to 1400° F. at Various PPM VOC Concentrations

250
370,000 490,000

300,000

PPM VOC'S	% LEL	AIR FLOW SCFM				
		100	200	300	400	500
500	3.6	134,000	268,000	402,000	536,000	670,000
1000	7.3	120,000	240,000	360,000	480,000	600,000
1500	10.9	108,000	216,000	324,000	432,000	540,000
2000	14.5	92,500	185,000	277,500	370,000	462,500
2500	18.1	80,000	160,000	240,000	320,000	400,000
3000	21.7	67,500	135,000	202,500	270,000	337,500
3500	25.4	57,500	115,000	172,500	230,000	287,500
4000	29.0	40,000	80,000	120,000	160,000	200,000
4500	32.6	26,000	52,000	78,000	104,000	130,000
5000	36.2	14,000	28,000	42,000	56,000	70,000
5500	39.9	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -
6000	43.5	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -

GENERAL ARRANGEMENT DRAWING



OXIDIZER CFM	B.T.U./HR. INPUT MAXIMUM
100	251,000
200	501,000
300	752,000
400	1,002,000
500	1,253,000

LEGEND

NO.	DESCRIPTION
1	SAMPLE PORTS
2	FLAME ARRESTOR
3	VAPOR EXTPACTION BLOWER
4	AIR FLOW SENSOR – SIGNAL TO CHART RECORDER
5	BAKER 3-WAY VALVING W/ PROPORTIONAL AIR DILUTION
6	LEL SENSOR AND LEL CONTROLLER WITH ALARM SETPOINT
7	KNOCK OUT POT WITH INTEGRAL SENSOR & OPTIONAL AUTO. PUMP
8	MANUAL DILUTION VALVE
9	ECLIPSE COMBUSTION BURNER & SUPPLEMENTAL BLOWER
10	FM COMBUSTION FUEL TRAIN
11	PILOT SOLENOID VALVE
12	CONTROL PANEL WITH CHART RECORDER, TEMP. CONTROL, OVER TEMP. CONTROL, AIR MONITOR, LEL AND FM APPROVED FLAME SAFETY DEVICE

⫽ = ELECTRICAL SIGNAL

⋈ = SAMPLE PORTS

THERMAL OXIDIZER PROCESS AND INSTRUMENTATION DIAGRAM

Cost Estimate

DANIEL B. STEPHENS & ASSOCIATES, INC.
ENVIRONMENTAL SCIENTISTS AND ENGINEERS

Cost Summary for
Implementation of Corrective Action Plan
WT-1 Compressor Station, Dehydration Area

Task Description	Cost
File air permit	
Professional services	$ 3,000
Expenses	1,300
Subcontractors	0
Subtotal	$ 4,300
Prepare system design and specifications and select subcontractors	
Professional services	$ 3,950
Expenses	150
Subcontractors	0
Subtotal	$ 4,100
Construct SVE wells	
Professional services	$ 5,200
Expenses*	1,100
Subcontractors*	13,500
Subtotal	$ 19,800
Construct conveyance system and install equipment	
Professional services	$ 7,000
Expenses (includes Baker Furnace[1])*	56,000
Subcontractors*	12,000
Subtotal	$ 75,000
Total direct cost	$ 103,200
* Markup on third party services @ 10%	3,460
Project total	$ 106,660
New Mexico gross receipts tax	6,200
GRAND TOTAL	**$ 112,860**

[1] Assumes Baker Furnace will be purchased by ENRON Corp.

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CONFIDENTIAL

DANIEL B. STEPHENS & ASSOCIATES, INC.
ENVIRONMENTAL SCIENTISTS AND ENGINEERS

SUPPLEMENTAL ENVIRONMENTAL INVESTIGATION
WT-1 COMPRESSOR STATION
DEHYDRADATION AREA

Prepared for
ENRON Operations Corp.
Environmental Affairs Department
Houston, Texas

March 28, 1995

6020 ACADEMY NE • SUITE 100 • ALBUQUERQUE, NM 87109 • (505) 822-9400

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EXECUTIVE SUMMARY

Daniel B. Stephens & Associates, Inc. (DBS&A) was retained by ENRON Operations Corp. to conduct a supplemental environmental investigation at Transwestern Pipeline Company's (TPC) WT-1 Compressor Station, located in southeastern New Mexico. The compressor station boosts the pressure of the natural gas stream originating from two lateral pipelines and one primary pipeline heading to the northwest. This environmental investigation supplements the previous work performed by Brown and Caldwell (1994).

The objective of this investigation was to characterize the distribution of organic and inorganic constituents in underlying soils and ground water detected during the previous investigation of a dehydration area at the compressor station. The scope of work included a background data review, completion of five ground-water monitor wells and one temporary ground-water sampling boring, soil and ground-water quality sampling, in-situ tests of hydraulic properties, and summarizing interim corrective actions performed by TPC to date.

The site is underlain by the Quaternary Mescalero caliche and Gatuña Formation and the Triassic Santa Rosa sandstone. Perched ground water is present within the Santa Rosa sandstone at depths of approximately 45 to 55 feet below ground surface. The saturated thickness of the perched system ranges from approximately 0 to 10 feet; locally, ground-water flows toward the northwest. Bail-recovery tests indicate that the perched aquifer is of low permeability with an average hydraulic conductivity of 5.0×10^{-2} feet per day. The average ground-water flow velocity is approximately 5 feet per year based on the in-situ hydraulic tests. The perched system is underlain by approximately 350 to 550 feet of very fine-grained sandstones, siltstones, and shales of the Permian Dewey Lake Red Beds. In general, potable ground water is not present in the region.

Hydrocarbon-impacted soils extend from the dehydration area approximately 60 feet beyond the western TPC property boundary. Ground-water impacts are primarily concentrated immediately west of the dehydration area. The perched ground-water system appears to be of limited extent west of the site as evidenced by two borings that did not encounter ground water. New Mexico Water Quality Control Commission (NMWQCC) standards for benzene, toluene, total xylene, and total naphthalene were exceeded in ground-water samples collected from monitor well MW-10, installed near the western property boundary. Subsequent fluid-level measurements determined that monitor well MW-10 contained approximately 1.0 feet of phase-separated hydrocarbons. In addition, benzene concentrations slightly exceeded the NMWQCC standard near the southwestern property corner.

During this investigation, DBS&A conducted four short-term soil vapor extraction (SVE) pilot tests in order to assess hydrocarbon removal by vapor means. The single well tests indicated that approximately 1 to 2 cubic feet per minute per linear foot of screen can be obtained with applied vacuums ranging from 45 to 233 inches of water. The pilot tests indicated that an SVE system will be an effective remediation method in the dehydration area, where soils are impacted primarily by low-molecular-weight pipeline distillates.

In addition to the SVE pilot tests conducted by DBS&A, TPC implemented a work plan to remediate near-surface soils below the dehydration area. Remediation of near-surface soils included the excavation of approximately 3,300 cubic yards of soil underneath the former dehydration area and the subsequent augmentation of the soil with a nutrient solution to enhance biodegradation of hydrocarbons. The treated soils were placed back into the excavated area.

1. INTRODUCTION

ENRON Operations Corp. (EOC) retained Daniel B. Stephens & Associates, Inc. (DBS&A) to conduct a supplemental environmental investigation (SEI) of soils and ground water underlying Transwestern Pipeline Company's (TPC) WT-1 Compressor Station. The site is located approximately 30 miles east of Carlsbad, New Mexico along U.S. Highway 62. The general site layout, showing the location of buildings, liquid storage areas, and the current area of investigation, is provided in Figure 1.

The compressor station boosts the pressure of the natural gas stream originating from two lateral pipelines and one primary pipeline heading toward Roswell, New Mexico. In the past, pipeline liquids consisting primarily of water were removed from the gas stream by dehydration units near the southwest corner of the site and routed to temporary storage tanks. Wastewaters generated by the dehydration process contained petroleum hydrocarbon distillates. Soil and ground-water impacts resulting from the release of wastewater from the dehydration area are the subject of this report.

A previous hydrogeologic investigation at the site had identified impacts to soil and perched ground water near the former dehydration units (Brown and Caldwell, 1994). The objectives of the SEI were to evaluate (1) the extent of subsurface impacts identified along the western fence line by Brown and Caldwell (1994), (2) the vertical extent and the hydraulic characteristics of the perched ground-water system, and (3) soil vapor extraction (SVE) parameters for future remedial design.

The SEI was conducted during the period of November 15 through December 1, 1994. In order to evaluate areas of potential hydrocarbon releases, DBS&A analyzed soils for volatile organic compounds (VOCs) using field and laboratory techniques. In addition, ground-water samples were submitted for analyses of organic and inorganic constituents to determine if water quality standards set by the New Mexico Water Quality Control Commission (NMWQCC) were exceeded. Specifically, the DBS&A investigation near the dehydration area included the following work:

- Five monitor wells and one temporary ground-water sampling boring were installed.

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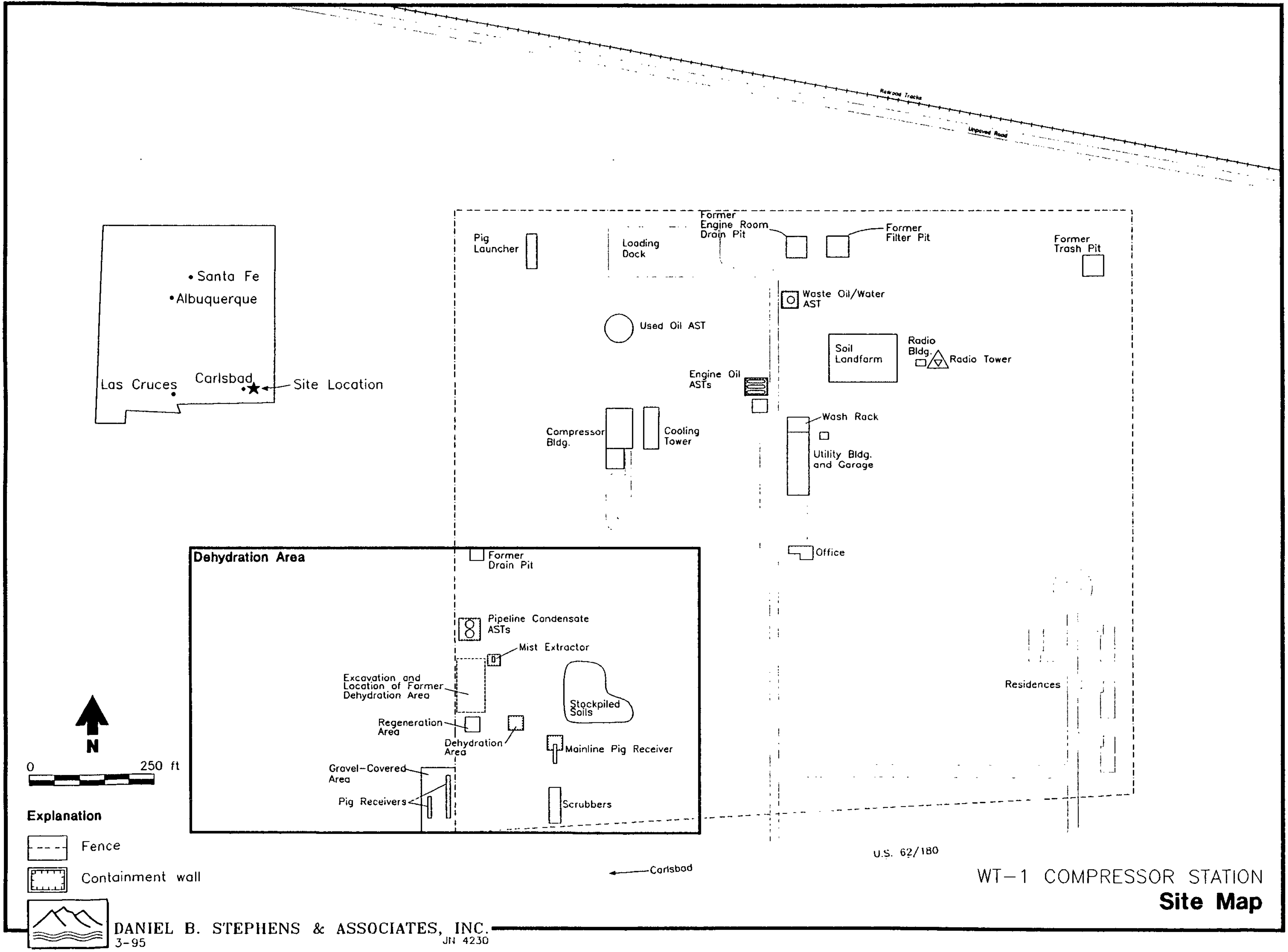

WT-1 COMPRESSOR STATION
Site Map

Figure 1

- Soil samples were collected from each boring for field and laboratory analyses.
- Ground-water samples were collected from the newly installed monitor wells for laboratory analyses.
- Five hydraulic tests were conducted.
- Four SVE pilot tests were performed.
- The locations of all monitor wells were surveyed.

This report presents the methods and results of the investigation. Section 2 provides background information on the compressor station, including a summary of previously completed environmental work at the dehydration area. Section 3 describes the field procedures used during the investigation and the findings of the subsurface investigation. Section 4 provides a summary of the interim corrective actions completed by TPC and the SVE pilot tests conducted by DBS&A. Finally, Section 5 provides a summary of and the conclusions derived from the investigation.

Concurrently with the investigation of the dehydration area, DBS&A investigated another area at the compressor station, the engine room drain and filter pit area along the northern fence line. Investigation activities conducted by DBS&A in this area are described in a separate report (DBS&A, 1995).

2. SITE BACKGROUND

This section provides background information relevant to DBS&A's investigation. Section 2.1 describes the site in greater detail. Section 2.2 describes the regional hydrogeologic setting. Section 2.3 provides a summary of previous environmental investigations undertaken at the site.

2.1 Site Description

The compressor station is situated on approximately 40 acres of land within Township 20 S, Range 32 E, Section 31 of Lea County, New Mexico. The site is located within the Pecos Valley section of the Great Plains physiographic province. The surrounding area is characterized by an irregular (hummocky) erosional surface containing numerous internally drained flat-bottomed playas. The interior drainages have formed in response to dissolution of underlying salt deposits and the subsequent collapse of overlying sedimentary beds. The ground at the compressor station gently slopes northward toward a collapse feature, and directly south of U.S. Highway 62, the ground surface slopes toward the southwest into another collapse feature known as Nash Draw. The station elevation is about 3550 feet above mean sea level; the mean annual precipitation is about 9 inches. Vegetative cover mostly consists of native grasses adapted to the arid environment.

2.2 Regional Hydrogeologic Framework

The stratigraphic units of importance regarding the regional hydrogeologic framework are, in ascending order, (1) the Permian Dewey Red Beds, (2) Triassic Santa Rosa sandstone, and (3) the Quaternary Gatuña Formation and Mescalero caliche. In general, potable ground water is not present below the Permian-Triassic unconformity marked by the contact between the Dewey Lake Red Beds and the Santa Rosa sandstone (Nicholson and Clebsch, 1961). Because of the limited occurrence of water, the compressor station receives its water from a pipeline that supplies local ranchers and industry. Sections 2.2.1 through 2.2.3 describe in detail the stratigraphic units present.

2.2.1 Dewey Lake Red Beds

The Dewey Lake Red Beds consist of alternating thinly bedded sequences of reddish brown siltstones, shales, and very fine- to fine-grained sandstones. The sediments are frequently gypsiferous and are mottled by greenish-gray reduction spots (Lucas and Anderson, 1993). Lithologically, the sediments are well sorted, well rounded quartzarenites to slightly micaceous quartzarenites. In the vicinity of the site, the formation ranges in thickness from approximately 350 to 550 feet, thinning toward the west (Mercer, 1983). The formation impedes the interchange of perched water within the overlying Santa Rosa sandstone with the underlying evaporite-bearing rocks of Permian age.

2.2.2 Santa Rosa Sandstone

An erosional unconformity marks the contact between the Permian Dewey Lake Red Beds and the overlying Santa Rosa sandstone of Late Triassic age. The Santa Rosa sandstone consists of fine- to coarse-grained, poorly to moderately sorted, subangular to subrounded micaceous sandstones and conglomerate with interbeds of siltstone and mudstone (Mercer, 1983). In comparison to the Dewey Lake Red Beds, the formation is a relatively immature litharenite that does not contain gypsum.

The Santa Rosa sandstone is the lowest member of the Dockum group. The upper member of the Dockum group, the Chinle Formation, is absent in the area. The Santa Rosa sandstone is approximately 75 feet thick near the site and thickens rapidly to the east (Bachman, 1987).

The recharge area for the Santa Rosa sandstone is along north-trending outcrops located just west of the site and possibly along the Mescalero Ridge located approximately 15 miles to the north. Ground-water maps produced by Nicholson and Clebsch (1961) indicate a regional flow direction generally coincident with the south and east dip of the Triassic beds. However, on a more local scale, Wright (1990) presented monitor well water level data that indicated a northwesterly flow direction toward Laguna Totson. At the compressor station, ground-water elevations measured by DBS&A are consistent with a northwesterly flow direction or toward the internally drained basins (Section 3.2).

Regional studies differ over the location of the Permian-Triassic boundary, the presence of internally drained regions, and perched ground-water lenses. This lack of consensus makes regional correlations extremely difficult with respect to formational contacts and flow directions. One area of agreement amongst previous investigators is that the Santa Rosa sandstone provides low yields to wells due to low formation permeability. Nicholson and Clebsch (1961) estimated the porosity of the formation to be on the order of 13 percent.

2.2.3 Gatuña Formation and Mescalero Caliche

The Quaternary Gatuña Formation is distributed intermittently over a broad area in the Pecos drainage system. It consists of generally poorly consolidated pale reddish brown to yellowish sand, sandy clay, lenticular beds of gravel, and caliche that can be gypsiferous. The unit was deposited primarily in channels and depressions probably related to the dissolution of underlying Permian Formations. The Gatuña Formation ranges from 0 to 100 feet thick in the region and thins to the east as it laps onto topographically high areas. This unit may be present in the most northern extent of the site (DBS&A, 1995). Ground water, if present, is restricted to discontinuous perched zones (Mercer, 1983).

The Gatuña Formation, and the Santa Rosa sandstone where the Gatuña Formation is not present, are covered with a caliche horizon of middle Pleistocene age that is informally referred to as the Mescalero caliche. The caliche was thought to be formed by calcium carbonate from migrating sands leaching into underlying soil horizons (Bachman, 1987).

2.3 Previous Hydrogeologic Investigations

In November 1993, Brown and Caldwell investigated the subsurface near the dehydration area located in the southwestern corner of the site (Figure 1). In order to drill off-site, TPC acquired access from the U.S. Bureau of Land Management for an area extending 300 feet west of the site fence line. The general layout of this investigation area, including the locations of soil borings and monitor wells installed by Brown and Caldwell (1994) and DBS&A, is shown in Figure 2.

Eight soil borings (B-1 through B-8) were advanced to the water table by Brown and Caldwell, and soil and ground-water samples were collected for total petroleum hydrocarbons (TPH) and

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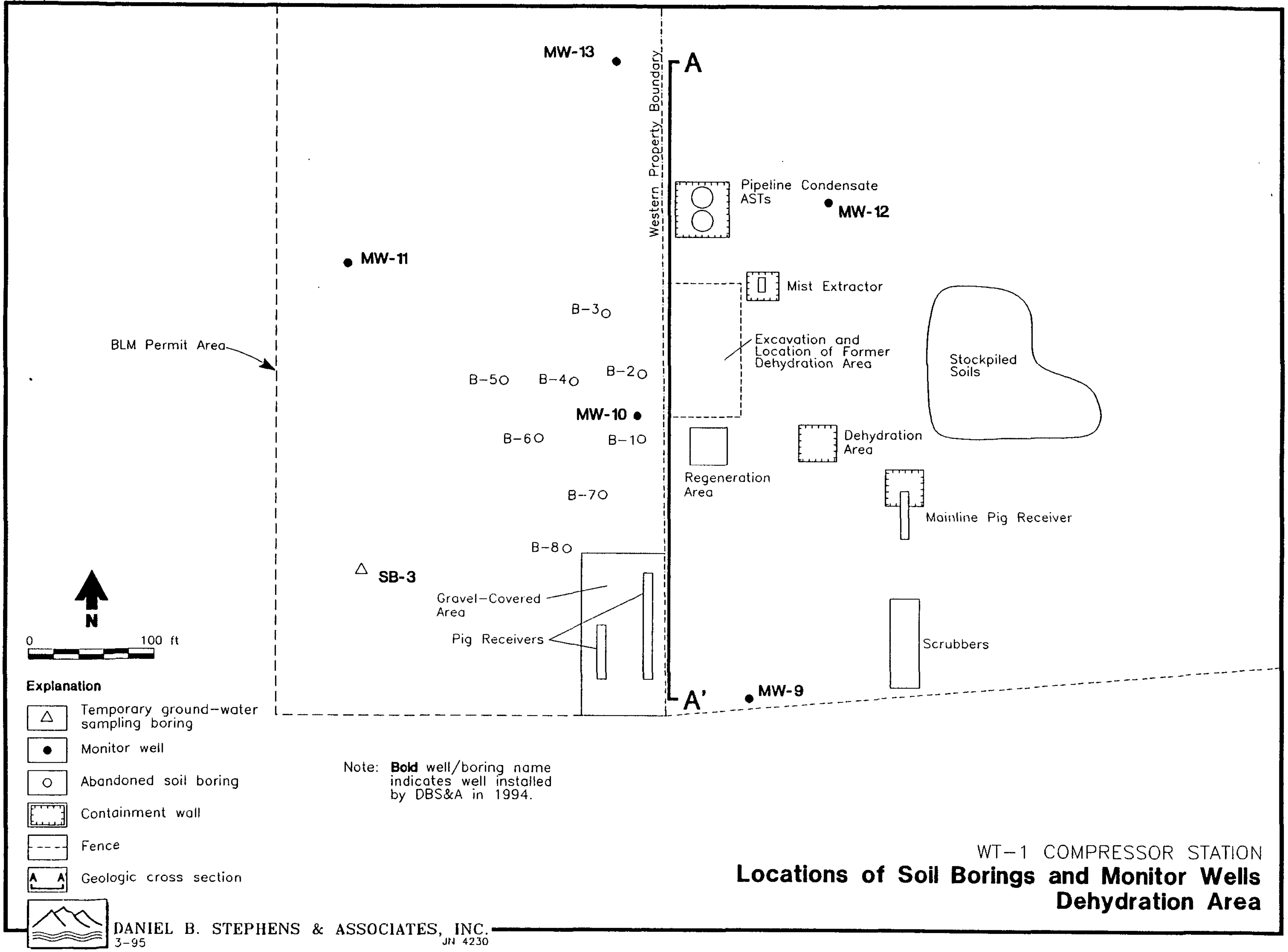


Note: **Bold** well/boring name indicates well installed by DBS&A in 1994.

WT-1 COMPRESSOR STATION

Locations of Soil Borings and Monitor Wells Dehydration Area

DANIEL B. STEPHENS & ASSOCIATES, INC.
3-95
JN 4230

Figure 2

benzene, toluene, ethylbenzene, and xylene (BTEX) analyses. Soil samples collected from B-1, B-2, and B-7 were impacted by TPH and BTEX concentrations above New Mexico Oil Conservation Division (OCD, 1993) guidelines, which are 100 mg/kg and 50 mg/kg, respectively. Ground-water samples collected from each open soil boring also exceeded the NMWQCC standards for BTEX. Benzene concentrations ranged from 720 µg/L to 5,800 µg/L.

3. SUBSURFACE INVESTIGATIONS

The following sections describe the subsurface investigation conducted by DBS&A in order to evaluate the extent of impacts identified by Brown and Caldwell (1994). The general field procedures followed during this investigation are outlined in Section 3.1. Sections 3.2 and 3.3 describe the results of the site characterization and investigation. All field work was conducted in accordance with DBS&A standard operating procedures and a site-specific health and safety plan developed for the field program.

3.1 Drilling and Sampling Procedures

During the investigation, DBS&A installed five monitor wells and one temporary ground-water sampling boring to establish the distribution of soil and ground-water impacts, the direction of ground-water flow, ground-water hydraulics, and SVE design parameters. Drilling at the site was completed by Eades Drilling Company of Hobbs, New Mexico, using an Ingersoll Rand TH-75W air-rotary drilling rig. Drilling equipment and sampling devices were steam cleaned and inspected by DBS&A personnel prior to beginning each boring. In addition, all sampling equipment was decontaminated prior to each use by washing with Liquinox® detergent followed by a deionized water rinse.

3.1.1 Soil Sampling

As each borehole was advanced, core-barrel samples were collected at 5-foot intervals for geologic logging. In addition, drill cuttings were inspected to aid in logging. Appendix A contains the lithologic logs produced for each boring and, where applicable, the corresponding well construction diagrams.

Soil samples collected during drilling were tested for the presence of VOCs with an OVM equipped with a photoionization detector (PID). Field PID measurements were used to determine the presence of contaminated soils above guidelines (those with PID readings greater than 100 parts per million volume [ppmv]) as described by OCD (1993). Drill cuttings generated during the investigation were stockpiled on clean plastic; one composite sample was collected from each investigation area to determine proper disposal.

In general, the soil sample yielding the highest PID reading above background measurements and the soil sample collected from immediately above the water table were retained for laboratory analysis of TPH (EPA method 8015 modified) and BTEX (EPA method 8020). All samples were collected in 250-ml glass jars and placed in an ice-filled cooler for shipment to Hall Environmental Analysis Laboratory (HEAL) in Albuquerque, New Mexico.

3.1.2 Well Installation

Monitor well borings were drilled to approximately 10 feet below the water table, or the bottom of the perched ground-water zone, whereupon a 2-inch-diameter monitor well was constructed in order to evaluate ground-water quality. Monitor wells were constructed with 15 feet of 2-inch, 0.010-inch machine-slotted polyvinyl chloride (PVC) screen, approximately 45 feet of flush-threaded 2-inch PVC blank casing, and 17 feet of 12-20 silica sand filter pack. Bentonite seals were emplaced on top of the filter packs, followed by a cement-bentonite grout to the ground surface. Surface completions consisted of 12-inch-diameter flush-grade vaults set within concrete.

The temporary ground-water sampling boring was drilled to a depth of approximately 10 feet below the projected water table, whereupon a 2-inch-diameter galvanized steel pipe attached to a well screen was lowered into the open borehole. After determining that ground water was not present, the temporary well was removed from the open boring, and the hole was abandoned with cement-bentonite grout poured from the surface.

Following well installation, John W. West Engineering Co. of Hobbs, New Mexico surveyed all borings and monitor wells installed by DBS&A relative to the northeast property corner (for horizontal control) and to mean sea level. Additionally, monitor wells installed by previous investigators were surveyed to the same reference so that accurate determination of ground-water flow directions could be made. A summary of monitor well completion information is provided in Table 1.

Table 1. Monitor Well/Soil Boring Locations and November 1994 Water Table Elevation Data Dehydration Area

Well/Boring[1]	Location		Date of Completion	Measuring Point[3] Elevation (feet above msl)	Depth to Water from Measuring Point[3] (feet)	Water Table Elevation (feet above msl)	Total Boring Depth (feet bgs)	Screened Interval (feet bgs)	Top of Silica Sand (feet bgs)
	South[2] (feet)	West[2] (feet)							
MW-9	1209.4	1254.2	11/18/94	3557.31	55.14	3502.17	60.5	44.0-59.0	40.5
MW-10	986.6	1342.1	11/17/94	3553.45	52.63[4]	3500.82	62.5	47.5-62.5	43.5
MW-11	864.7	1562.5	11/21/94	3547.84	Dry	Dry	65.0	45.0-60.0	38.5
MW-12	818.4	1192.9	11/16/94	3551.19	49.31	3501.88	60.0	45.0-60.0	42.3
MW-13	708.9	1359.2	11/16/94	3547.78	49.70	3498.08	58.0	43.0-58.0	39.5
SB-3	1108.6	1557.8	11/29/94	3551.76[5]	Dry	Dry	59.0	NA	NA

Survey conducted by John W. West Engineering, Hobbs, NM; all measurements were made in November 1994.

[1] Refer to Figure 2 for locations
[2] South and west coordinates relative to northeast property corner
[3] Measuring point is top of PVC casing
[4] Corrected for PSH (assuming a specific gravity of 0.8)
[5] Measuring point is top of cement plug

msl = Mean sea level
bgs = Below ground surface
PSH = Phase-separated hydrocarbons
NA = Not applicable

3.1.3 Ground-Water Sampling

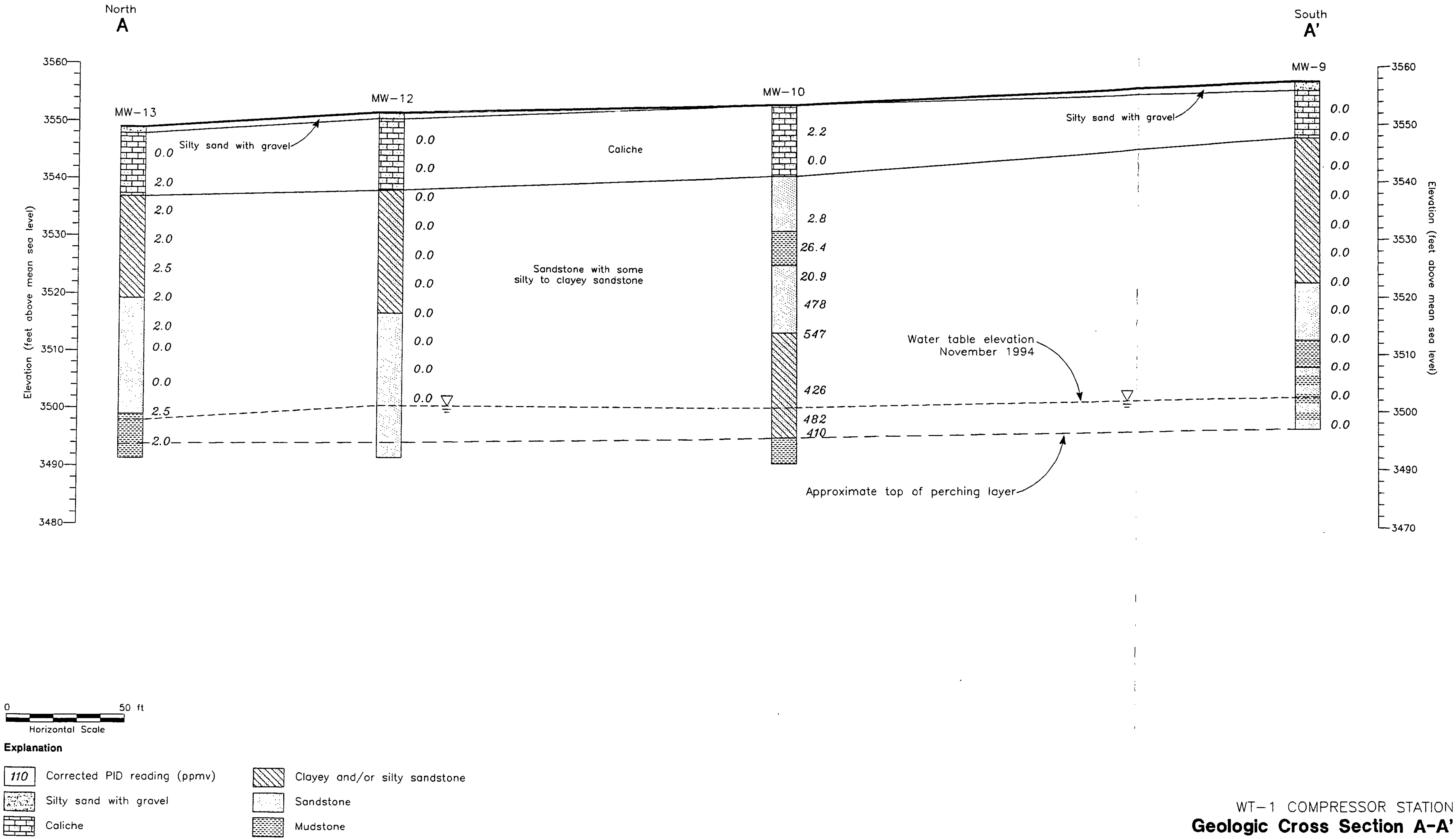
During the investigation, ground-water samples were collected from each monitor well at the dehydration area. Prior to sampling, the depth to water was measured. The presence or absence of PSH was checked with product-finding paste and a fiberglass tape. The well was then bailed until approximately three casing volumes were purged or until the well was dry. During purging, field parameters (pH, temperature, and electrical conductivity) were measured and recorded every half casing volume. Purged ground water was contained in 55-gallon drums to be disposed by TPC upon receipt of analytical results. Ground-water samples were collected using dedicated, disposable polyethylene bailers.

Ground-water samples were analyzed for halogenated and aromatic VOCs (EPA method 8010/8020), TPH (EPA method 8015 modified), polynuclear aromatic hydrocarbons (PAHs) (EPA method 8100), major ions, total dissolved solids (TDS), and metals regulated by the NMWQCC. Samples were shipped in ice-filled chests to HEAL for organic analyses and to Analytical Technologies, Inc. (ATI) for inorganic analyses. Both laboratories are located in Albuquerque, New Mexico.

In order to check intralaboratory precision, quality assurance/quality control samples, consisting of trip blanks and sample replicates, comprised approximately 5 percent of the water samples collected. Appendix B contains the HEAL and ATI reports with the supporting quality assurance and chain-of-custody documents for all soil and water samples submitted for analysis.

3.2 Site Hydrogeology

A hydrogeologic cross section developed from lithologic descriptions is provided as Figure 3. The location of the cross section is shown on Figure 2. Borings advanced during the investigation intersected sediments of the Mescalero caliche and alternating sandstones, siltstones, and mudstones of the underlying Santa Rosa sandstone. In general, the lithology of the sediments directly underlying the site consist of the following:



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WT-1 COMPRESSOR STATION

Geologic Cross Section A-A'
Dehydration Area

Figure 3

- From ground surface to approximately 1.5 feet below ground surface (bgs), a brown to reddish gray gravelly sand to silty sand was encountered. The unit is poorly sorted, angular to rounded, unconsolidated, calcareous, and dry.

- From 1.5 to approximately 15 feet bgs, a pinkish gray to reddish orange, poorly to strongly consolidated sandy caliche (locally referred to as the Mescalero caliche) was encountered. The sand within the caliche is fine- to medium-grained, well sorted, subrounded to rounded, and dry. The unit grades downward into a calcareous silty sandstone.

- From approximately 15 to 25 feet bgs, a light brown to reddish orange calcareous silty sandstone to sandstone is present. The unit is very fine- to medium-grained, poorly sorted, subangular to rounded, poorly to moderately consolidated, sometimes gypsiferous, and dry. This unit represents a transitional zone between overlying caliche and underlying Santa Rosa sandstone. The presence of gypsum at the northern part of the study area suggests that this unit may correspond to the Quaternary Gatuña Formation (DBS&A, 1995).

- From approximately 25 to 55 feet bgs, a moderate reddish brown sandstone and silty sandstone is present. The unit is very fine- to medium-grained with minor coarse-grained zones and some siltstone and mudstone layers that become more abundant with depth. The unit is often micaceous and is poorly to well sorted, subangular to rounded, and moderately to strongly consolidated with carbonate and noncarbonate cements. The sediments are often moist to wet where interbedded with mudstone.

- From approximately 55 to 80 feet bgs, a light brown to moderate reddish brown sandstone to clayey sandstone is present, based on a separate investigation by DBS&A (1995). The sandstone is generally silty or very fine-grained with interbeds of clay, mudstone, and siltstone. The interval is poorly to strongly consolidated. Moisture content ranges from dry to saturated.

Ground water beneath the site is unconfined and occurs approximately 45 to 55 feet bgs based on November to December 1994 measurements (Table 1; DBS&A, 1995). The depth to water measurements listed in Table 1 represent the highest water table elevation recorded during the entire period of the field program. Following well completion, multiple measurements indicated that the water level recovery to static conditions required several hours to days as a result of the low permeability of the bedrock.

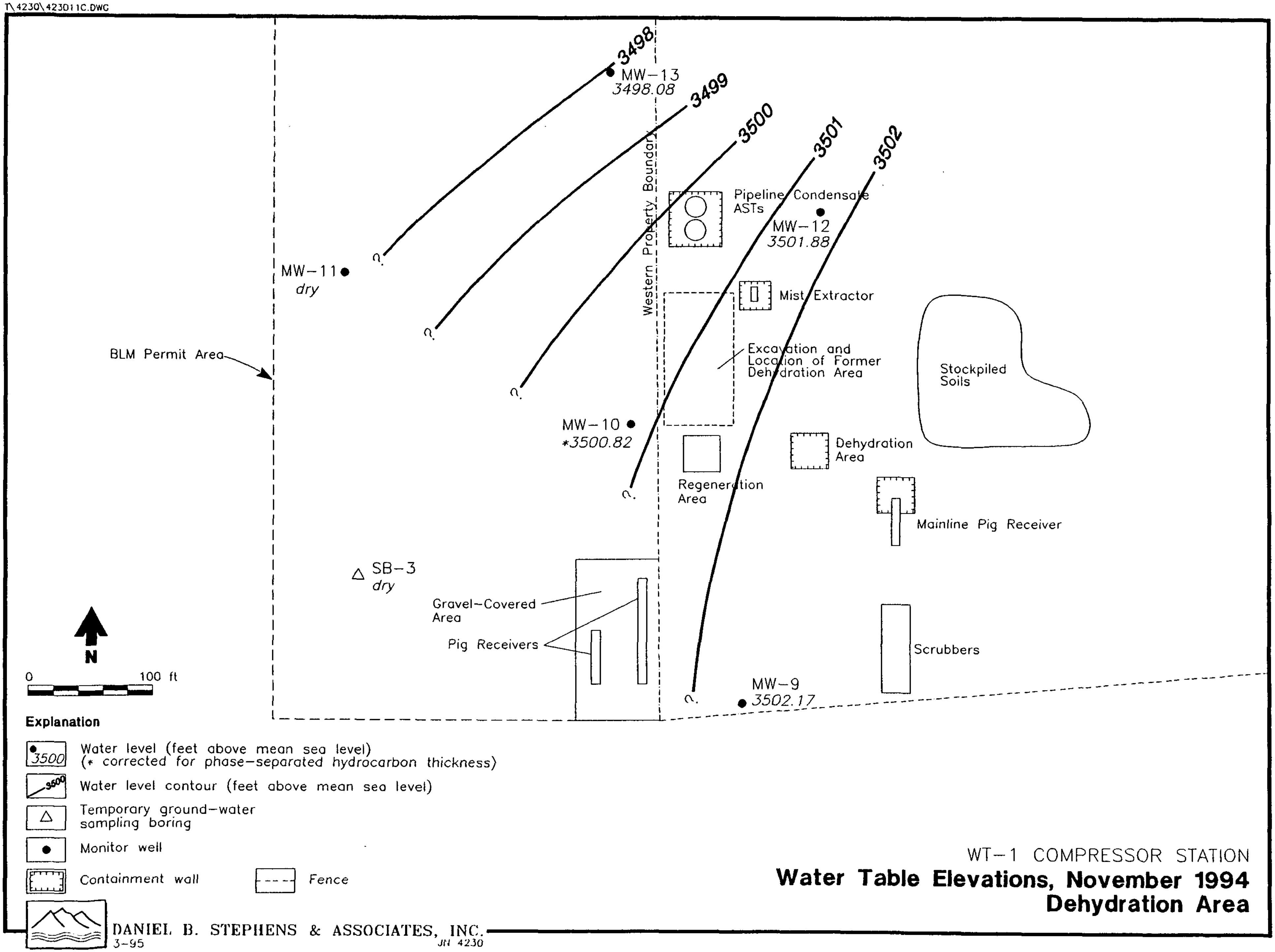
Ground water in the Santa Rosa sandstone is perched upon clays and mudstone present at approximately 60 feet bgs across the site. The perching layer is at least 20 feet thick based on lithologic descriptions from monitor well MW-4 (DBS&A, 1995). The saturated thickness of the perched zone appears to be controlled by the presence of local recharge and the textural composition of the underlying perching layer. Based on field observation, the saturated thickness of perched ground water appears to be less than or equal to 10 feet.

Water table elevations generated from November 1994 depth to water measurements are shown in Figure 4. The map indicates that ground water generally flows toward the northwest, a finding that agrees with the flow direction determined by Wright (1990). The hydraulic gradient in the perched system averages 0.015 ft/ft.

3.2.1 Hydraulic Testing and Data Analysis

Following well completion, DBS&A conducted bail-recovery tests on monitor wells MW-9 and MW-12 at the dehydration area, as well as three other wells (MW-4, MW-5, and MW-8) at the compressor station (DBS&A, 1995), to evaluate the in-situ hydraulic conductivity of the perched ground-water system. The five tests provided an expedient means of estimating local hydraulic conductivity (K). The test procedure consisted of bailing each monitor well dry and monitoring the recovery of the water level to the initial static level if practicable. The water level recovery was recorded at frequent intervals using a electronic water level indicator.

The bail-recovery test data were analyzed using an equation developed for recovery from constant rate pumping (Cooper and Jacob, 1946). The solution is a modification of the Theis equation for ground-water flow toward a pumping well. The solution can be applied to late-time data by treating the bail-down tests as short-term pumping tests. Late-time data are used to avoid well bore storage effects, which can significantly distort the early recovery data.



WT-1 COMPRESSOR STATION

Water Table Elevations, November 1994
Dehydration Area

Figure 4

The procedure requires a graphical plot of residual head or recovery (arithmetic scale) versus t/t' (logarithmic scale). The value of t/t' equals the total time since bailing initially began divided by the time since bailing stopped. The total recovery over one log cycle and the average bailing rate are used to estimate transmissivity. The calculated transmissivity is then divided by the saturated thickness to estimate the average hydraulic conductivity for the test zone. Data plots resulting from the bail-recovery test analyses are included in Appendix C.

The estimated values of K for the five tests ranged from 2.5×10^{-3} ft/day to 2.0×10^{-1} ft/day with a geometric mean of 5.0×10^{-2} ft/day (Table 2). Estimates of specific yield (S_y) cannot be obtained by this method, but based on the observed grain size distributions and cementation, S_y values are probably on the order of 0.04 to 0.08 for the perched system.

Table 2. Results of Hydraulic Tests
WT-1 Compressor Station

Monitor Well	Hydraulic Conductivity[1] (ft/day
MW-4	2.0×10^{-1}
MW-5	2.5×10^{-3}
MW-8	7.4×10^{-2}
MW-9	6.1×10^{-2}
MW-12	1.4×10^{-1}
Geometric mean	5.0×10^{-2}

[1] Calculated using Jacob-Cooper (1946) method

3.2.2 Rate of Ground-Water Movement

Average ground-water flow velocities can be estimated by Darcy's Law, using the following equation:

$$v = \frac{Ki}{n_e}$$

where v = average pore velocity
K = hydraulic conductivity
i = hydraulic gradient
n_e = effective porosity

Assuming an effective porosity of 0.06 (estimated as 50% of total porosity), an average hydraulic gradient of 0.015, and a geometric mean hydraulic conductivity of 5.0×10^{-2} ft/day (1.8×10^{-5} cm/sec), the average ground-water velocity at the compressor station is approximately 5 ft/yr. This equation provides a relatively high estimate of contaminant transport rates since it does not take into account retardation effects that inhibit contaminant migration.

3.3 Delineation of Subsurface Impacts

As described in Section 3.1, soil and ground-water samples were collected from each monitor well at the dehydration area and analyzed for organic and inorganic constituents. Appendix A contains the results of the headspace analysis for each boring, and analytical chemistry results are provided in Appendix B. The extent of soil and ground-water impacts near the dehydration area is discussed in Sections 3.3.1 and 3.3.2, respectively.

3.3.1 Soil Impacts

Headspace analysis and analytical chemistry results for samples collected during the SEI indicate that soil impacts are limited primarily to the area previously identified by Brown and Caldwell (1994). With the exception of soil encountered while drilling monitor well MW-10, all PID readings were below the 100-ppmv OCD guideline. During the advancement of monitor well MW-10, PID readings exceeded 100 ppmv from approximately 35 feet bgs to the total depth of the boring. Soil samples collected for laboratory chemical analyses in the dehydration area contained no detectable TPH or BTEX with the exception of those from monitor well MW-10 (Table 3). The TPH analyses indicated that the organic compounds were primarily low-molecular-weight (gasoline range) compounds.

Table 3. Summary of Soils Analyses for Organic Constituents Dehydration Area

Constituent	Detection Limit	Sample No. (Sample Date)								
		MW-9 @ 50' (11/19/94)	MW-9 @ 55' (11/19/94)	MW-10 @ 41.5' (11/17/94)	MW-10 @ 49.0' (11/17/94)	MW-11 @ 40' (11/21/94)	MW-11 @ 56' (11/21/94)	MW-12 @ 47.0' (11/16/94)	MW-13 @ 52.5' (11/16/94)	SB-3 @ 55' (11/28/94)
Total petroleum hydrocarbons by EPA method 8015 modified (mg/kg)										
Gasoline range (C_6-C_{16})	5.0	ND	ND	7,300[a]	16,000[b]	ND	ND	ND[c]	ND[c]	ND
Diesel range (C_{16}-C_{36})	5.0	ND	ND	380[d]	320[d]	ND	ND	ND	ND	ND
Aromatic VOCs by EPA method 8020 (mg/kg)										
Benzene	0.05	ND	ND	5.1[e]	18[e]	ND	ND	ND	ND	ND
Toluene	0.05	ND	ND	71[e]	260[e]	ND	ND	ND	ND	ND
Ethylbenzene	0.05	ND	ND	5.1[e]	27[e]	ND	ND	ND	ND	ND
Total xylenes	0.05	ND	ND	140[e]	400[e]	ND	ND	ND	ND	ND

Notes: All analyses performed by Hall Environmental Analysis Laboratory, Albuquerque, NM

NMWQCC = New Mexico Water Quality Control Commission
ND = Not detected
VOCs = Volatile organic compounds
NA = Not analyzed

[a] Sample analyzed at 50x dilution; detection limit = 500 mg/kg
[b] Sample analyzed at 100x dilution; detection limit = 1,000 mg/kg
[c] Detection limit = 10 mg/kg

[d] Sample analyzed at 10x dilution. Due to matrix interference from gasoline range hydrocarbons, peak pattern was not characteristic of only diesel fuel; therefore, only that which was in diesel range (>C_{18}-C_{26}) was quantitated.

[e] Sample analyzed at 50x dilution

Figure 5 shows in plan view the estimated extent of off-site actionable soil contamination, based on the OCD guideline of 100 mg/kg for TPH, originating from the dehydration area. Soil impacts extend approximately 60 feet beyond the western fence line. The on-site extent of soil impacts has been characterized by TPC, who has implemented interim corrective measures to clean up near-surface soils near the dehydration area. Section 4.1 describes these excavation and remedial measures in detail.

3.3.2 Ground-Water Impacts

Tables 4 and 5 summarize the constituents detected in the ground water near the dehydration area. Based on analyses of aromatic and halogenated VOCs and PAHs, compounds that exceeded the NMWQCC standards were benzene, toluene, xylenes, and total naphthalene (naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene). As shown on Table 4, monitor well MW-10 exceeded NMWQCC standards for all the above compounds, and monitor well MW-9 exceeded the NMWQCC standard for benzene.

Halogenated VOCs detected in ground-water samples from MW-9 and MW-12 are trihalomethane compounds, which are typical drinking water disinfection byproducts that result from chlorination. The source of these compounds is most likely a result of the operation of electrical ground bed wells used for corrosion control. Ground bed wells produce low concentrations of chlorine gas, which can migrate up the wellbore to shallow ground water and result in the production of trihalomethane compounds. There are two ground bed wells located at the WT-1 compressor station. One ground bed well is located approximately 50 feet east of MW-9, and the other is located approximately 50 feet west of MW-9.

Fluid-level measurements revealed that monitor well MW-10 contains approximately 1 foot of PSH. Monitor wells MW-11 and SB-3 were not sampled since they were dry.

TPH analyses indicated that ground water in the source area contained mostly hydrocarbon distillates of low molecular weight. The relatively higher ratio of BTEX to TPH in ground water as opposed to soil possibly results from the higher solubility of BTEX in ground water when

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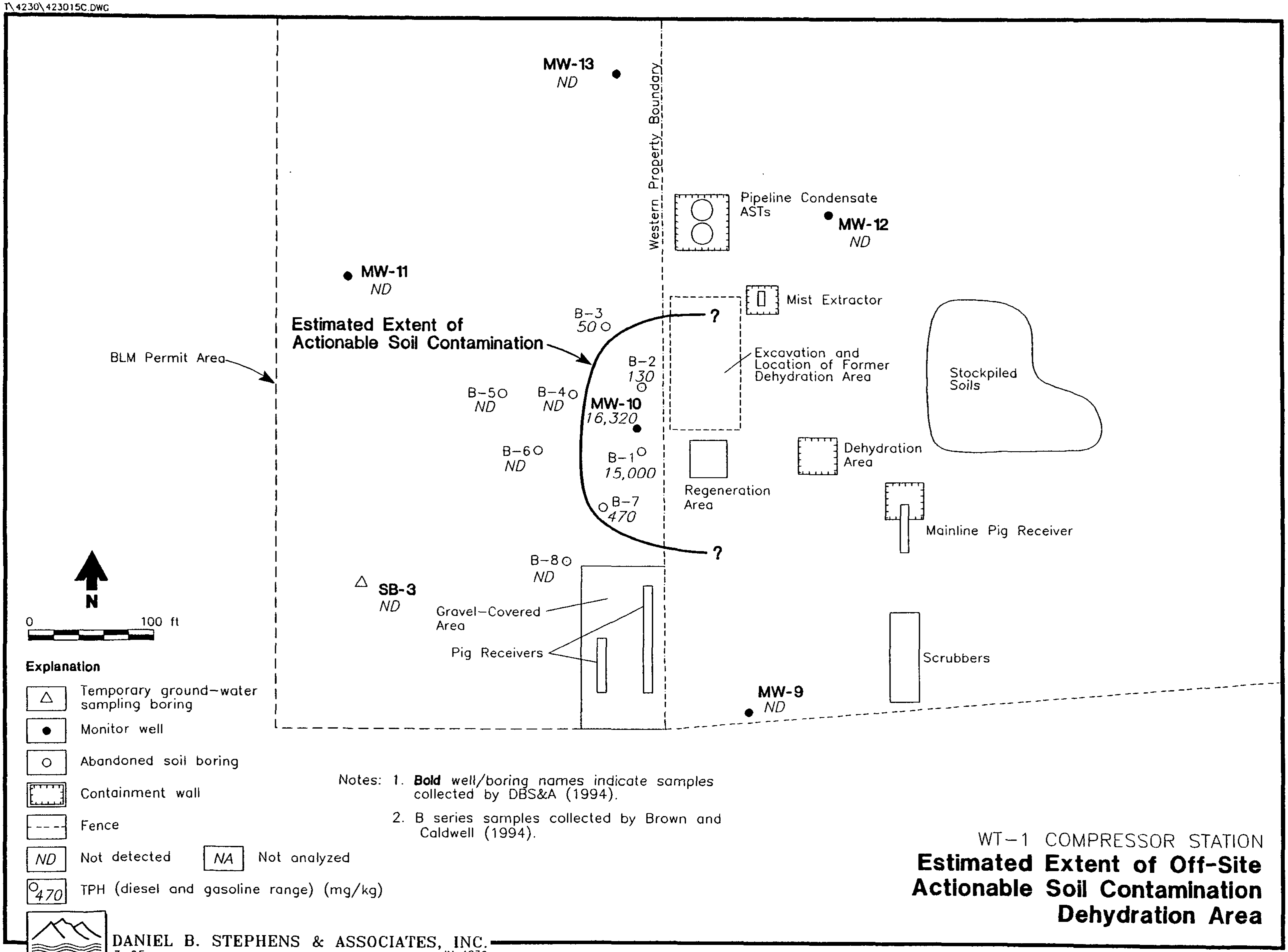

Notes: 1. **Bold** well/boring names indicate samples collected by DBS&A (1994).

2. B series samples collected by Brown and Caldwell (1994).

WT-1 COMPRESSOR STATION

Estimated Extent of Off-Site Actionable Soil Contamination Dehydration Area

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Figure 5

Table 4. Summary of Ground-Water Analyses for Organic Constituents Dehydration Area

		Well/Boring No. (Sample Date)				
Constituent	Detection Limit	MW-9 (11/21/94)	MW-10 (11/18/94)	MW-12 (11/17/94)	MW-13 (12/01/94)	NMWQCC Standard
Total petroleum hydrocarbons by EPA method 8015 modified (mg/L)						
Gasoline range (C_6-C_{16})	0.05	ND	69[a]	ND	ND	None
Diesel range (C_{16}-C_{36})	1.0	ND	10[b]	ND	ND	None
Aromatic VOCs by EPA method 8020 (µg/L)						
Benzene	0.5	**12**	**9,000**[c]	ND	ND	10
Toluene	0.5	ND	**16,000**[c]	1.9	ND	750
Ethylbenzene	0.5	ND	620[c]	ND	ND	750
Total xylenes	0.5	ND	**8,500**[c]	3.1	ND	620
Halogenated VOCs by EPA method 8010 (µg/L)						
Bromodichloromethane	0.2	1.4	ND[c]	3.5	ND	None
Chloroform	0.2	27	ND[c]	26	ND	100
Polynuclear aromatic hydrocarbons by EPA method 8100 (µg/L)						
Naphthalene	0.5	ND	**850**[d]	ND[e]	ND[f]	30[g]
1-Methylnaphthalene	0.5	0.7	**200**[d]	ND[e]	ND[f]	
2-Methylnaphthalene	0.5	ND	**220**[d]	ND[e]	ND[f]	
Acenaphthene	0.5	ND	14[d]	ND[e]	ND[f]	None

Notes: All analyses performed by Hall Environmental Analysis Laboratory, Albuquerque, NM
Bold values indicate concentration exceeds NMWQCC ground-water standard

NMWQCC = New Mexico Water Quality Control Commission
ND = Not detected
VOCs = Volatile organic compounds

[a] Sample analyzed at 50x dilution
[b] Detection limit = 5.0 mg/L
[c] Sample analyzed at 25x dilution
[d] Detection limit = 10 µg/L
[e] Sampled on 11/18/94
[f] Sampled on 11/30/94
[g] NMWQCC standard is for total naphthalene, which includes naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene

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Table 5. Summary of Ground-Water Analyses for Inorganic Constituents Dehydration Area

Constituent	Detection Limit	Well No. (Sample Date)				NMWQCC Standard
		MW-9 (11/21/94)	MW-10 (11/18/94)	MW-12 (11/18/94)	MW-13 (12/01/94)	
Major ions (mg/L)						
Calcium	0.1	452	348	506	491	None
Potassium	1.0	9.6	5.6	12.6	9.3	None
Magnesium	0.1	222	201	244	184	None
Sodium	0.1	295	165	247	116	None
Total alkalinity (as $CaCO_3$)	1.0	326	804	228	273	None
Chloride	0.5	**860**	**650**	**980**	**340**	250
NO_2/NO_3 - N, total	0.06	8.4	ND	**17**	NA	10.0
Sulfate	5	**850**	12	**1,100**	**1,400**	600
Total dissolved solids	10	**2,800**	**2,500**	**3,300**	**2,900**	1,000
Metals (mg/L)						
Silver	0.010	ND	ND	ND	ND	0.05
Arsenic	0.005	ND	0.019	ND	0.006	0.1
Barium	0.01	0.043	0.580	0.049	0.048	1.0
Cadmium	0.0005	ND	ND	ND	ND	0.01
Chromium	0.010	ND	ND	ND	ND	0.05
Copper	0.010	ND	ND	0.012	ND	1.0
Iron	0.050	ND	**1.87**	**1.22**	ND	1.0
Mercury	0.0002	ND	ND	ND	ND	0.002
Manganese	0.010	**0.229**	**2.41**	**0.352**	ND	0.2
Lead	0.002	ND	ND	ND	ND	0.05
Selenium	0.005	0.009	ND	0.016	0.009	0.05
Zinc	0.050	0.092	0.057	0.082	ND	10

Notes: All analyses performed by Analytical Technologies, Inc., Albuquerque, NM
Bold values indicate concentration exceeds NMWQCC ground-water standard.
Metals samples were field filtered and acidified.

NMWQCC = New Mexico Water Quality Control Commission
ND = Not detected
NA = Not analyzed

compared to other hydrocarbons. Figure 6 depicts the distribution of BTEX within the perched ground-water system.

Each monitor well near the dehydration area exceeds the NMWQCC standards for TDS and chloride (Table 5). Several samples also exceeded NMWQCC standards for manganese, iron, and/or sulfate.

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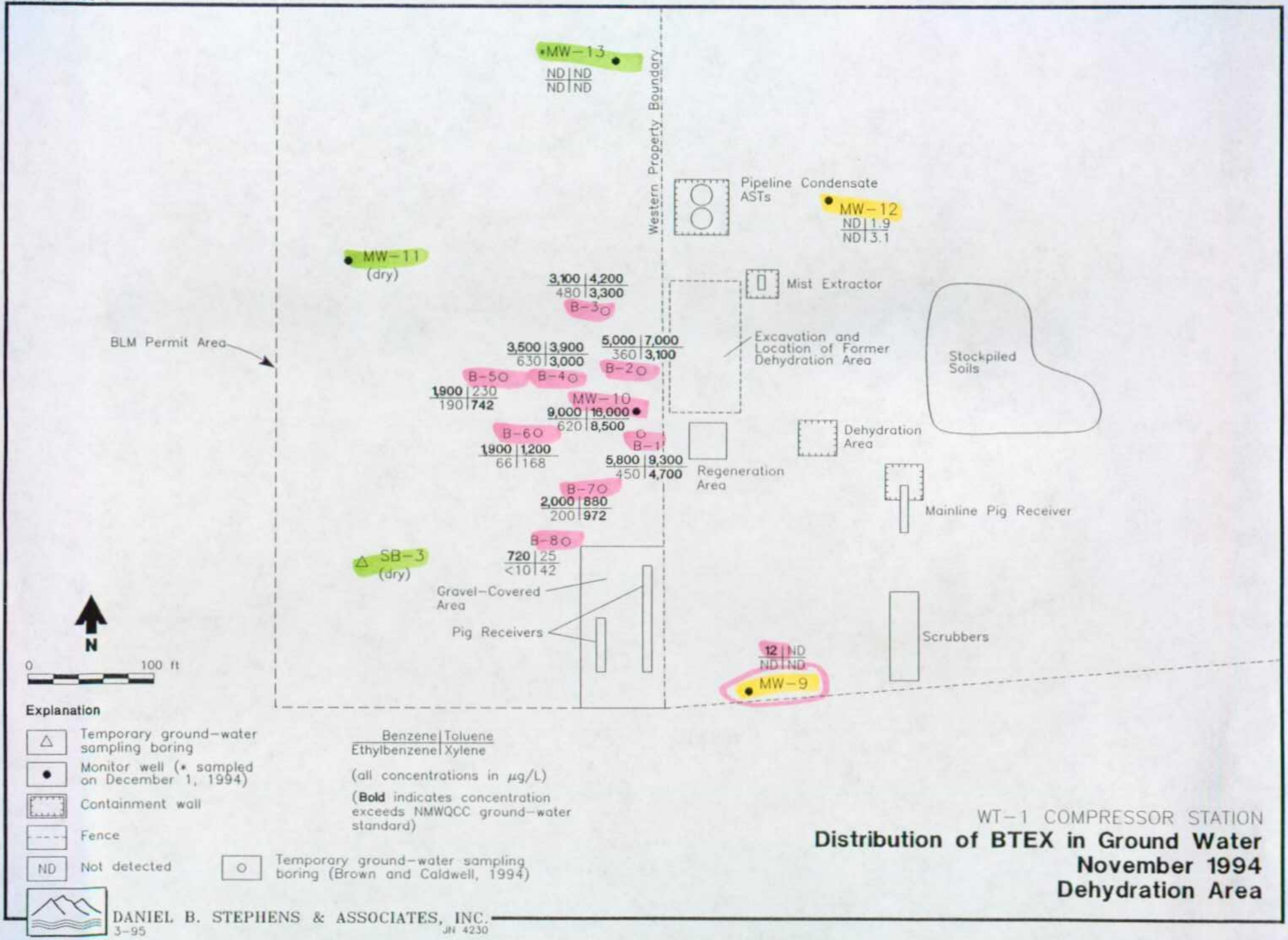

WT-1 COMPRESSOR STATION

Distribution of BTEX in Ground Water
November 1994
Dehydration Area

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Figure 6

4. CORRECTIVE ACTIONS

In order to prevent continued hydrocarbon releases to the subsurface, TPC has (1) constructed secondary concrete containment walls around each aboveground storage tank, (2) excavated soils near the former dehydration units, and (3) treated the excavated soils to promote biodegradation. This section provides information concerning the interim corrective measures taken to remediate the contaminants identified by the SEI (Section 3). Section 4.1 provides a summary of the excavation and treatment of near-surface soils underlying the dehydration area. Section 4.2 describes the SVE pilot test conducted on several of the wells present at the site.

4.1 Soil Excavation and Treatment

This section provides a summary of the excavation and treatment of near-surface soils underlying the former dehydration area and several other minor source areas. The analytical data, the TPC treatment and disposal work plan, and the OCD work plan approval are contained in Appendix D.

In mid-1992, TPC moved the location of the dehydration units and excavated approximately 2,300 cubic yards of hydrocarbon-contaminated soils from beneath the location of the former dehydration area (Figure 7). Actionable soils were removed from the excavation to a depth of approximately 12 feet bgs, at which point the trackhoe in use could no longer operate effectively in the partially to well cemented Mescalero caliche. In addition, the excavation was constricted to the west by the site boundary and to the east by high pressure gas lines. Excavated soils were stockpiled on plastic sheeting near the dehydration units until a treatment plan was in place.

In October 1994, Cypress Engineering Services, Inc. (CES) of Houston, Texas collected five soil samples from around the perimeter of the excavation, from the stockpiled soils, and from a soil landfarm located near the radio towers (Figure 1). The soil landfarm is used for the treatment of hydrocarbon-contaminated soils removed from near the compressor building. All samples were analyzed for TPH (EPA method 418.1) and BTEX. TPH concentrations ranged from 240 to 4,500 mg/kg for samples collected from the perimeter of the excavation, and BTEX concentrations were below detection with the exception of one sample (Table 6).

Table 6. Summary of TPH and BTEX Analyses of Excavated Soils Dehydration Area

Sample No.[1]	Date	Constituent (mg/kg)				
		TPH	Benzene	Toluene	Ethylbenzene	Xylene
EN-1	10/05/94	4300	ND	ND	ND	ND
EE-1	10/05/94	3700	ND	ND	ND	ND
EW-1	10/05/94	4500	0.105	0.288	0.053	0.414
ES-1	10/05/94	240	ND	ND	ND	ND
ES-2	10/05/94	ND	ND	ND	ND	ND
EE-1-S	12/11/94	970	ND	ND	ND	ND
EE-2-N	12/11/94	ND	ND	ND	ND	ND
EN-1-E	12/11/94	ND	ND	ND	ND	.026
EN-2-W	12/11/94	15	ND	ND	ND	ND
EB-1-E	12/11/94	2600	ND	ND	4.0	63
EB-2-N	12/11/94	1400	ND	ND	ND	.29

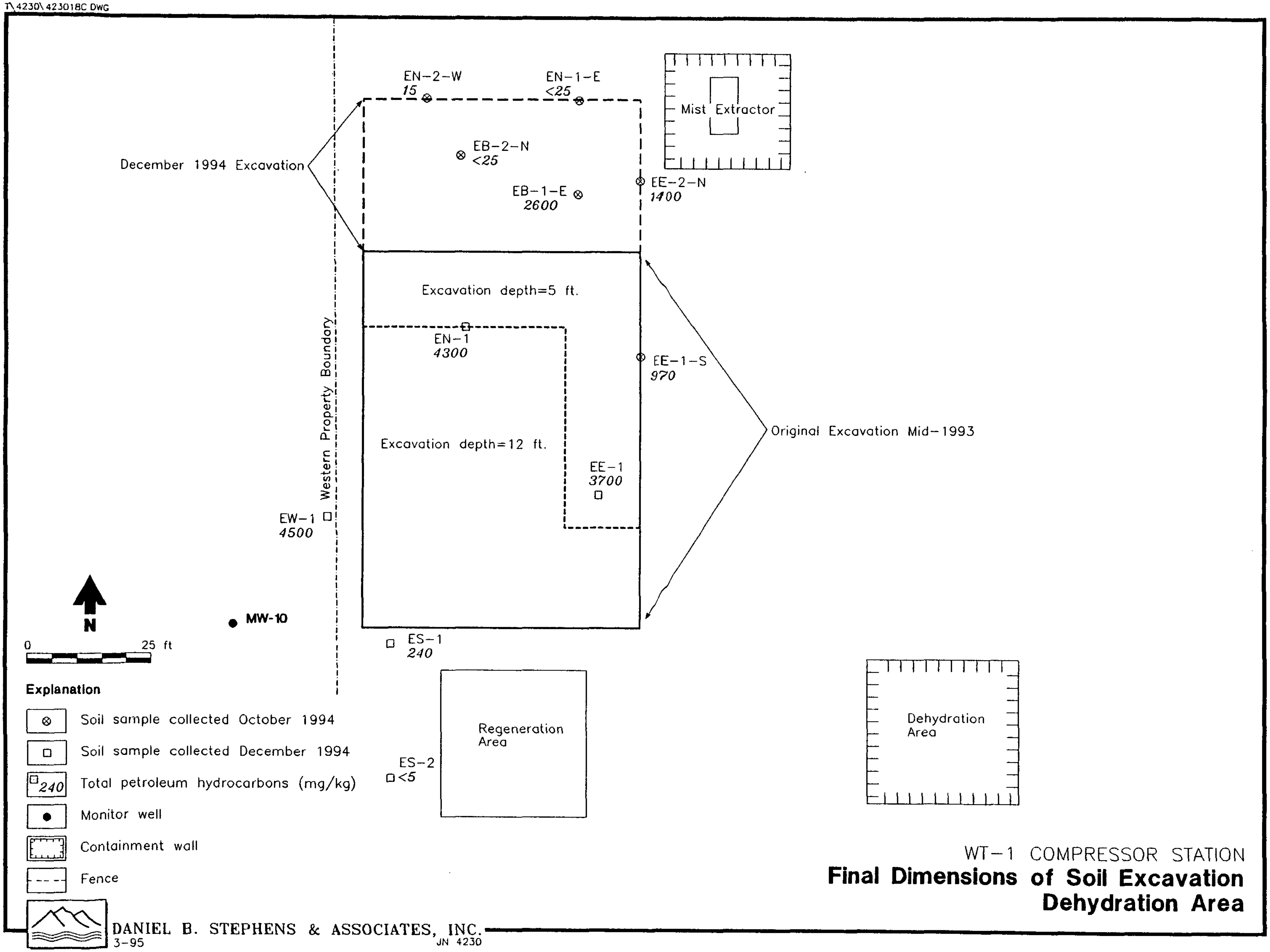
TPH analyzed using EPA method 418.1
BTEX analyzed using EPA method 8020

[1] Refer to Figure 7 for locations of samples

ND = Not detected

In November 1994, DBS&A collected two composite samples, one from the dehydration area excavation soils and one from the soils from off-site sources, and delivered the samples to ATI for analysis of hazardous characteristics. A TCLP extract (EPA method 1311) of each sample was analyzed for volatile organics (EPA method 8240) and for the eight Resource Conservation and Recovery Act (RCRA) metals (EPA method 6010). Analytical results indicated that all constituents were below RCRA regulatory levels. The analytical reports for the samples collected by DBS&A are contained in Appendix B.

Based on the analytical results, on December 2, 1994, CES submitted a work plan to OCD outlining additional excavation and treatment of all stockpiled soils. After OCD acceptance of the proposed work plan, TPC extended the dehydration area excavation primarily to the north and removed an additional 1,000 cubic yards of hydrocarbon-contaminated soil (Figure 7).



WT-1 COMPRESSOR STATION
Final Dimensions of Soil Excavation
Dehydration Area

Figure 7

During and after completing the additional excavation, TPC collected six soil samples to determine the remaining TPH and BTEX concentrations. Samples were collected at 7 feet and 12 feet bgs. Samples collected from 7 feet bgs contained TPH concentrations ranging from 15 to 2,600 mg/kg; samples collected from 12 feet bgs had no detectable TPH concentrations. BTEX concentrations at both depths were below the 50-mg/kg OCD standard with the exception of one sample (Table 6).

In order to complete the work plan approved by OCD, the stockpiled soils were treated. During the period of December 11 through 23, 1994, Pecos Valley Field Services of Pecos, Texas ran the stockpiled soils through a Kolberg soil screening plant and amended the soil with a nutrient solution to enhance biodegradation of hydrocarbons. The processed soils were placed back into the excavated area following treatment through the soil screening plant.

4.2 SVE Pilot Tests

On November 20, 1994, DBS&A conducted four short-term SVE pilot tests. The pilot testing was conducted with the assistance of AcuVac Remediation (AcuVac) of Houston, Texas. AcuVac transported a mobile internal combustion engine (ICE) vapor extraction unit to the compressor station site and operated the unit under DBS&A's direction. The ICE draws a vacuum on the wells and at the same time achieves nearly complete oxidation of well vapors. The AcuVac pilot testing report is provided in Appendix E.

The SVE tests were conducted in order to assess whether an SVE system is a viable technology for the removal of PSH and adsorbed hydrocarbons by vapor means. The specific objectives of the SVE pilot tests were to

- Evaluate the effective radius of influence for SVE wells
- Determine operational flow rates and vacuums
- Estimate hydrocarbon mass removal rates

The SVE pilot tests consisted of (1) a 4-hour test on monitor well MW-10, (2) a 3-hour test on well SVE-1A (deep zone), (3) a 30-minute test on well SVE-1B (shallow zone), and (4) a 1.5-hour test on monitor well MW-2. Wells SVE-1A, SVE-1B, and MW-2 are located near the engine room pits (DBS&A, 1995, Fig. 2). Tests were conducted at air flow rates ranging from approximately 3 to 15 cubic feet per minute (cfm) and vacuums of 45 to 233 inches of water. The single well tests indicated that approximately 1 to 2 cfm per linear foot of screen could be obtained from 2-inch-diameter SVE wells. AcuVac estimated that the effective radii of influence ranged from 70 feet to 100 feet.

Soil vapor samples were collected during testing of wells SVE-1B, MW-2, and MW-10 in order to evaluate hydrocarbon mass removal rates. Samples were collected in stainless steel canisters and shipped to Core Laboratories in Houston, Texas for analysis of BTEX, extended refinery gases (aliphatics and branched paraffins), and fixed gases ($O_2/N_2/CO_2$). The analytical results from samples collected during the pilot tests are provided in Appendix E. In addition to the collection of samples for laboratory analyses, soil vapor concentrations were measured in the field with a Horiba® auto emissions analyzer provided by AcuVac. Fixed gas concentrations indicate that natural in-situ biodegradation of hydrocarbons is occurring, as evidenced by elevated CO_2 concentrations (Appendix E). Non-methane hydrocarbon concentrations measured by Core Laboratory (23,200 ppmv in well MW-10) compare favorably with the Horiba® measurement made by AcuVac.

Table 7 summarizes the results of vapor analyses performed on samples collected during the SVE pilot testing. The highest concentrations of total hydrocarbon vapors, approximately 21,000 ppmv as measured by AcuVac, were extracted from monitor well MW-10 during the 4-hour SVE test.

The test results indicate that an SVE system can be used to remove hydrocarbon contamination by vapor means and that such a system will be effective in the dehydration area where contaminants are primarily low-molecular-weight pipeline distillates. SVE success will depend on the volatility of the subsurface hydrocarbons and sustainable air flow rates.

Table 7. Summary of Vapor Analyses in Soil Gas Recovered from Above the Water Table
WT-1 Compressor Station
November 20, 1994

Constituent	Location		
	SVE-1B	MW-2	MW-10
Benzene	23	<1	319
Toluene	20	<1	504
Ethylbenzene	<1	<1	19
Xylene (total)	14	<10	153
Non-methane hydrocarbon	320	190	23,200
Methane	2,290	28,390	7,510

All analyses performed by Core Laboratories, Houston, TX
All concentrations in ppmv

5. SUMMARY AND CONCLUSIONS

This report summarizes the November 15 through December 1, 1994 supplemental environmental investigation undertaken by Daniel B. Stephens & Associates, Inc. at Transwestern Pipeline Company's WT-1 compressor station. The purpose of the investigation was to evaluate the extent of subsurface impacts related to the release of wastewaters from the dehydration area. During the course of the investigation, background information was reviewed, and one temporary ground-water sampling boring and five monitor wells were installed. In addition, hydraulic tests (bail-down/recovery) were conducted, fluid levels were measured, all site monitor wells were surveyed to a common datum, and samples were collected from all site monitor wells for laboratory analysis.

Based on the data gathered to date, the following conclusions can be made regarding the site hydrogeologic properties and the extent of subsurface contamination:

- Ground water beneath the compressor station site is perched on underlying fine-grained sandstone and mudstone units. Ground water is encountered at approximately 45 to 55 feet below ground surface, and the saturated thickness ranges from 0 to 10 feet. Ground-water flow is generally to the northwest. There are no known uses for the perched water.

- Bail-down/recovery tests indicate that the average hydraulic conductivity of the perched ground-water system is approximately 5 x 10^{-2} feet per day. The local ground-water velocity is estimated to be 5 feet per year.

- Field headspace and laboratory analyses indicate that the extent of actionable soil contamination near the dehydration area extends approximately 60 feet beyond the western property fence line.

- Benzene, toluene, xylene, and total naphthalene exceed the NMWQCC standards in the vicinity of monitor well MW-10. TPH concentrations in ground water consist primarily of gasoline-range constituents. PSH is present near the western fence line, as evidenced by the 1 foot of PSH measured in monitor well MW-10. Inorganic chemical analyses of water samples from the dehydration area indicated that NMWQCC standards were exceeded for TDS, chloride, iron, sulfate, and manganese.

- To date, corrective actions have consisted of constructing aboveground storage tanks within secondary containment structures, excavating and treating near-surface soils beneath the former dehydration area, and performing four soil vapor extraction pilot tests to determine remedial design parameters.

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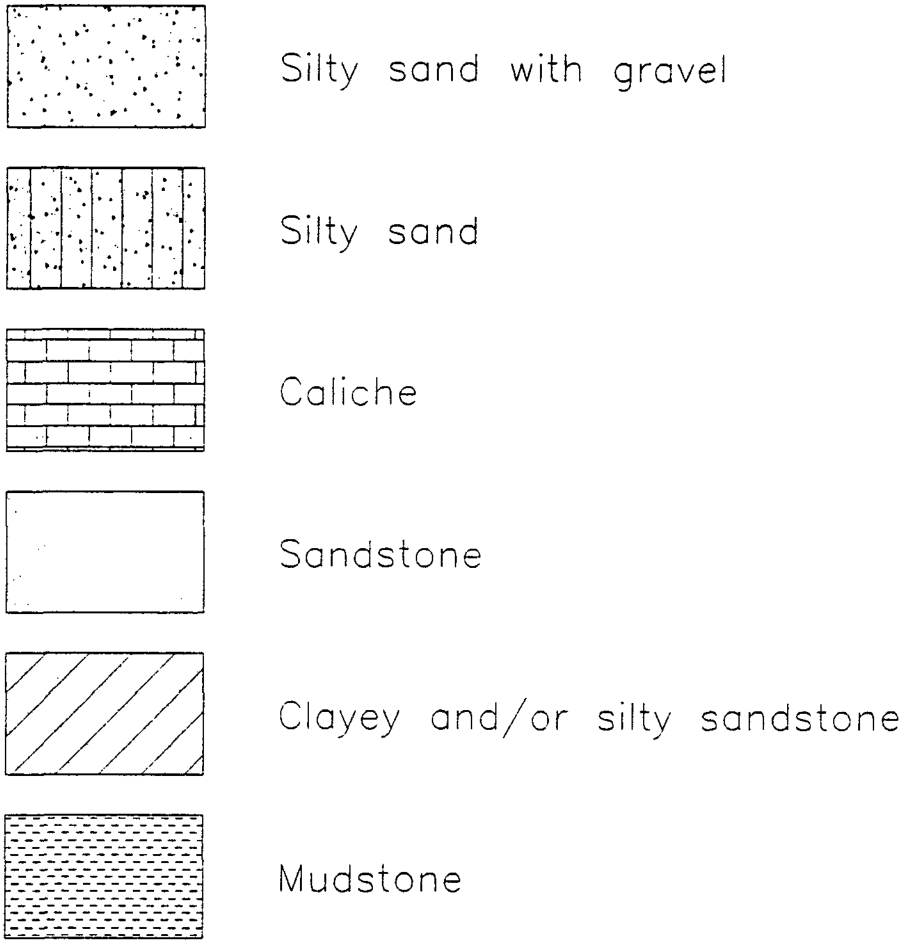
APPENDIX A

SOIL BORING LOGS AND WELL COMPLETION FORMS



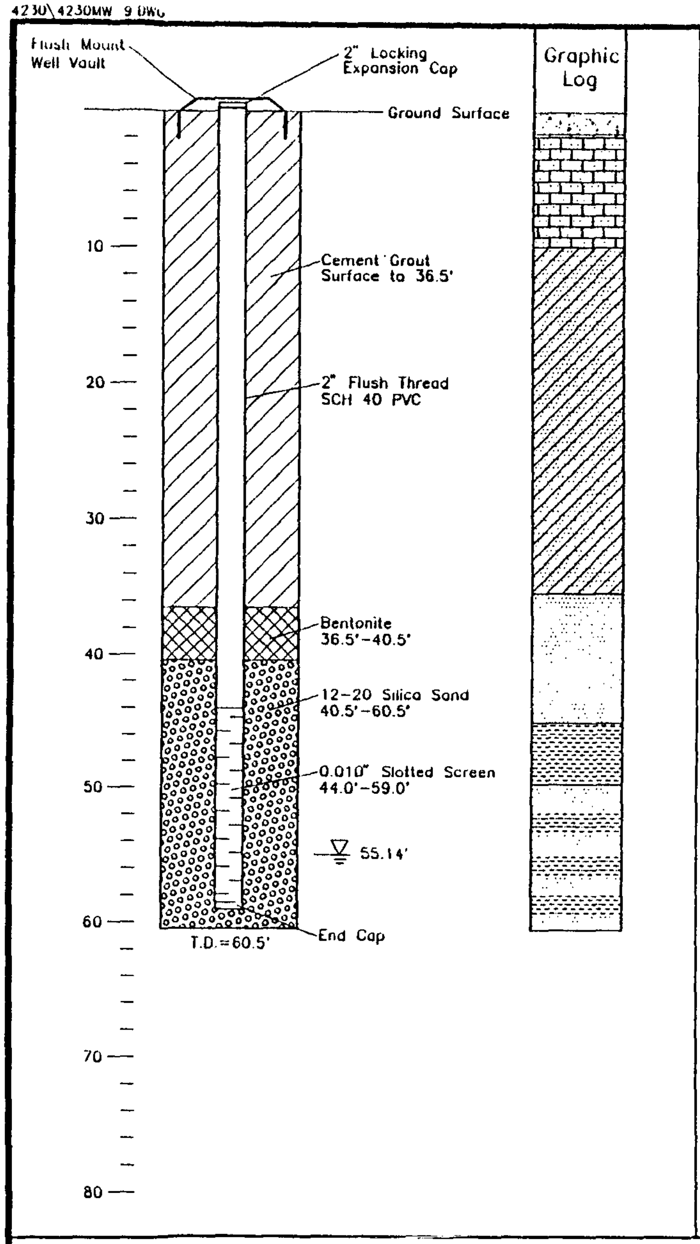
WT-1 COMPRESSOR STATION

Graphic Symbols and General Descriptions of Boring Logs

DANIEL B. STEPHENS & ASSOCIATES, INC.
2-95
JN 4230

T\4230\423016C.DWG

4230\4230MW 9 DWG



PID Reading (ppm)	Sampling Device	Comments and Lithology
-	Cuttings	1.5 feet – Soil, silty sand with gravel
1.2	Split Spoon	5 feet – Caliche, pinkish gray (5 YR 8/1 RCK), medium-grained, well sorted, rounded grains, 70% sand in 30% carbonate matrix, poorly to moderately consolidated, dry
1.2	Split Spoon	10 feet – Silty sandstone, light brown (5 YR 5/6 RCK), very fine- to fine-grained, poorly sorted, subrounded grains, 85% quartz, 10% feldspar, 5% lithic grains, poorly to moderately consolidated, calcareous, dry
0.6	Split Spoon	15 feet – Same as above
0.6	Split Spoon	20 feet – Same as above, more lithic grains, 10% pebbles of black obsidian, subangular
0.6	Split Spoon	25 feet – Silty sandstone, moderate reddish brown (10 R 4/6 RCK), very fine- to medium-grained, poorly sorted, angular to subrounded grains, minor small gravel (pebbles), 60% quartz, 25% feldspar, 15% lithic grains, moderately consolidated, carbonate cement, dry
0.6	Split Spoon	30 feet – Same as above, no pebbles
0.6	Split Spoon	35 feet – Sandstone, pale red (10 R 6/2 RCK), fine-grained, moderately to well sorted, subangular to subrounded grains, 55% quartz, 30% feldspar, 15% lithic grains, well consolidated, no carbonate, dry
0.6	Split Spoon	40 feet – Same as above, fine- to medium-grained
0.6	Split Spoon	45 feet – Silty mudstone, moderate reddish brown (10 R 4/6 RCK), moderate plasticity, friable, micaceous, moderately to well consolidated, damp to moist
1.8	Split Spoon	50 feet – Sandstone, moderate reddish brown (10 R 4/6 RCK), fine-grained, well sorted, subrounded grains, 70% quartz, 25% feldspar, 5% lithic grains, moderately to strongly consolidated, minor carbonate cement, damp
1.9	Split Spoon	55 feet – Same as above with few thin layers of mudstone
1.9	Split Spoon	60 feet – Same as above, alternating sandstone and mudstone layers, mudstone layers moist to wet

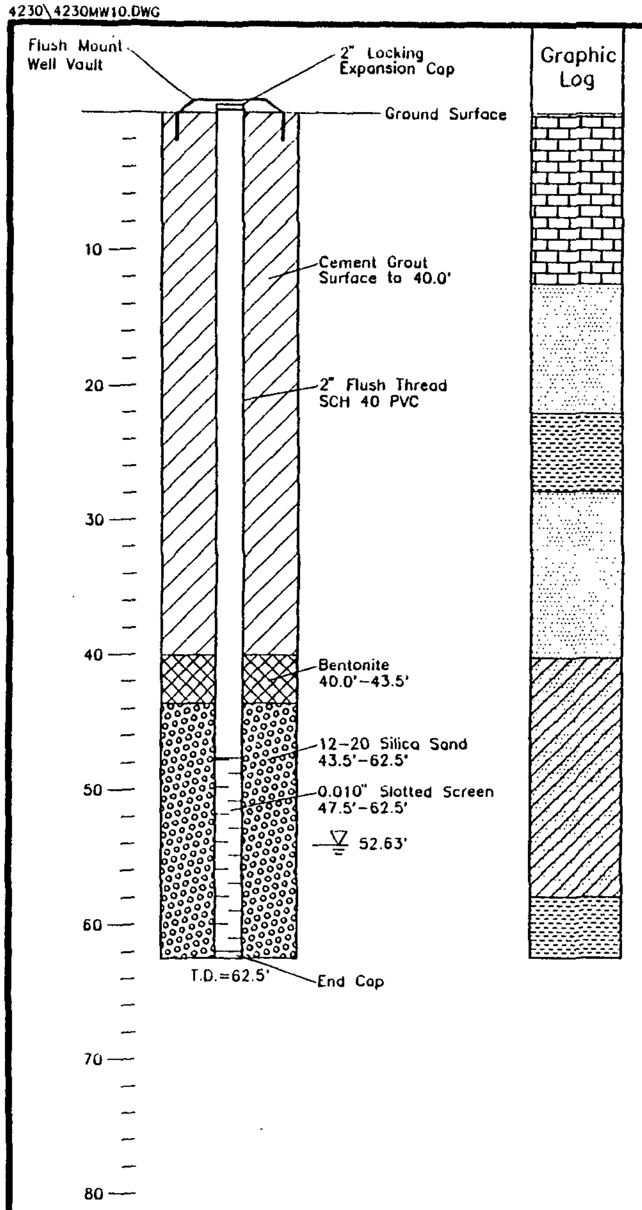
Hydrologists: CMP
Driller: Eades Drilling
Date Completed: 11/18/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

WT-1 COMPRESSOR STATION
Well Log: MW-9

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-95
JN 4230

4230\4230MW10.DWG



PID Reading (ppm)	Sampling Device	Comments and Lithology
2.2	Split Spoon	5 feet – Caliche, pinkish gray (5 YR 8/1 RCK), 40% quartz and feldspar, 60% carbonate matrix, rounded sand grains, medium-grained, moderately to well consolidated, dry
1.1	Cuttings	10 feet – Same as above
2.8	Split Spoon	20 feet – Sandstone, moderate reddish orange (10 R 6/6 RCK), very fine-grained to pebbles, poorly sorted, subangular grains, 60% quartz, 20% feldspar, 20% lithic grains, moderately consolidated, carbonate cement, dry
26.4	Split Spoon	25 feet – Sandy siltstone, moderate reddish brown (10 R 4/6 RCK) sand, very fine-grained to fine-grained, 30% sand, 60% silt, 10% clay, friable, poorly to moderately consolidated, dry
20.9	Split Spoon	30 feet – Sandstone with silt, moderate reddish orange (10 R 6/6 RCK), silt to medium-grained, poorly sorted, subangular grains, 70% quartz, 20% feldspar, 10% lithic grains, moderately consolidated, carbonate cement, dry, porous
478	Split Spoon	35 feet – Sandstone, moderate reddish brown (10 R 4/6 RCK), fine- to medium-grained, well sorted, subrounded grains, 50% quartz, 35% feldspar, 15% lithic grains, strongly consolidated, no carbonate, dry, porous
547	Split Spoon	40 feet – Silty sandstone, moderate reddish brown (10 R 4/6 RCK), very fine- to fine-grained, moderately sorted, subrounded grains, 50% quartz, 30% feldspar, 20% lithic grains, moderately to poorly consolidated, no carbonate, damp
426	Split Spoon	50 feet – Same as above
482	Cuttings	
410	Split Spoon	58 feet – Mudstone and siltstone, moderate reddish brown (10 R 4/6 RCK), high plasticity, friable, poorly consolidated, saturated at 57.5 feet for 6 inch interval, dry below 58 feet

Hydrologists: CMP
Driller: Eades Drilling
Date Completed: 11/17/94

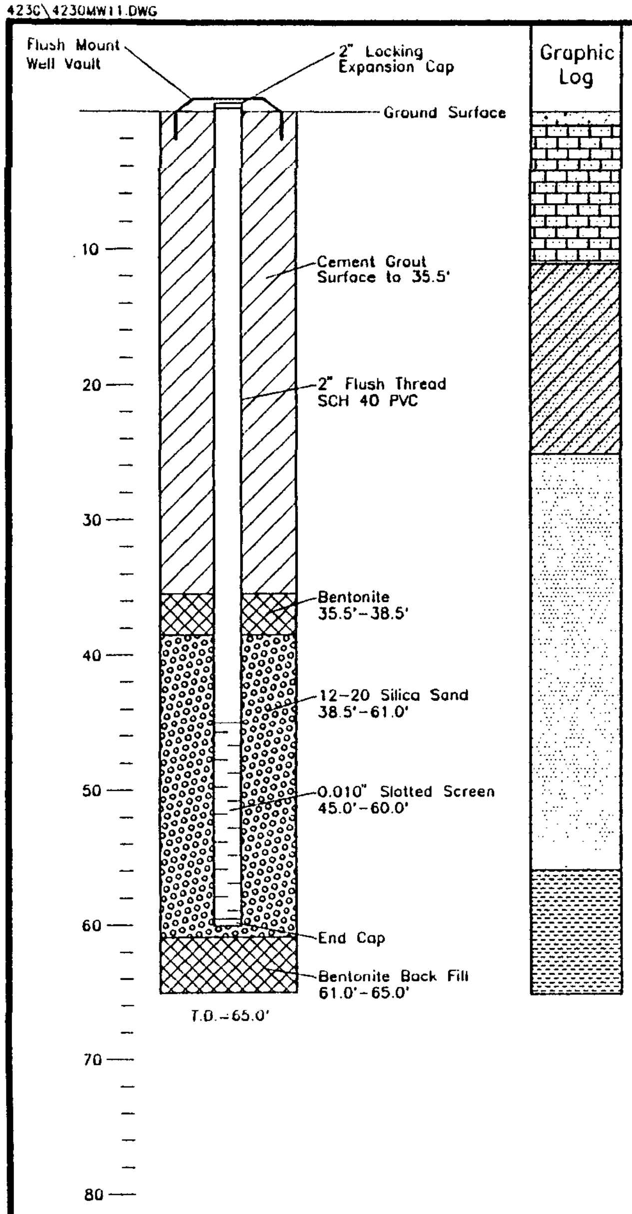
Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

WT-1 COMPRESSOR STATION

Well Log: MW-10

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-95
JN 4230

4230\4230MW11.DWG



PID Reading (ppm)	Sampling Device	Comments and Lithology
-	Cuttings	1 foot – Soil
1.4	Split Spoon	5 feet – Caliche, grayish pink (5 R 8/2 RCK), medium-grained, well to moderately sorted, 50% sand in carbonate matrix, moderately to poorly consolidated, dry
1.4	Cuttings	10 feet – Same as above; 11 ft. silty sandstone
1.4	Split Spoon	15 feet – Silty sandstone, moderate reddish brown (10 R 4/6 RCK), very fine- to medium-grained, poorly sorted, subangular grains, 65% quartz, 25% feldspar, 10% lithic grains, poorly to moderately consolidated, carbonate cement, dry, porous
1.4	Cuttings	20 feet – Same as above
1.4	Split Spoon	25 feet – Sandstone, pale reddish brown (10 R 5/4 RCK), fine-grained, moderately to well sorted, subangular to rounded grains, 60% quartz, 25% feldspar, 15% lithic grains, moderately to strongly consolidated, no carbonate, dry, porous
1.4	Cuttings	30 feet – Same as above; 33', becomes darker (moderate) reddish brown
1.4	Split Spoon	35 feet – Sandstone, moderate to pale reddish brown (10 R 5/4 RCK), very fine- to fine-grained, well sorted, 75% quartz, 20% feldspar, 5% lithic grains, subangular grains, well consolidated, dry, no carbonate, nonporous, small white mottlings or spots 1-2mm in diameter; 38', medium-grained sandstone
2.4	Split Spoon	40 feet – Sandstone, moderate reddish orange (10 R 6/6 RCK), medium-grained, well sorted, subrounded grains, 60% quartz, 30% feldspar, 10% lithic grains, strongly consolidated, noncarbonate cement, dry, porous
2.4	Split Spoon	45 feet – Sandstone, pale reddish brown (10 R 5/4 RCK), very fine-grained, well sorted, subangular grains, strongly consolidated, noncarbonate cement, nonporous, damp
3.4	Split Spoon	50 feet – Sandstone, pale red (10 R 6/2 RCK), fine- to medium-grained, well sorted, subangular grains, 65% quartz, 25% feldspar, 10% lithic grains, strongly consolidated, minor carbonate cement, dry, slightly porous; 54-56', white, fine-grained sandstone
1.4	Split Spoon	56 feet – Mudstone with minor silt, moderate reddish brown (10 R 4/6 RCK), poorly to strongly consolidated, slight plasticity where wet, poorly consolidated at 56-57 feet, dry at 58 feet
1.4	Cuttings	60 feet – Siltstone, white, very resistant; 60-61', strongly consolidated
2.4	Split Spoon	65 feet – Mudstone and very fine-grained sandstone, pale reddish brown (10 R 5/4 RCK), moderately to poorly consolidated, dry, no carbonate, nonporous

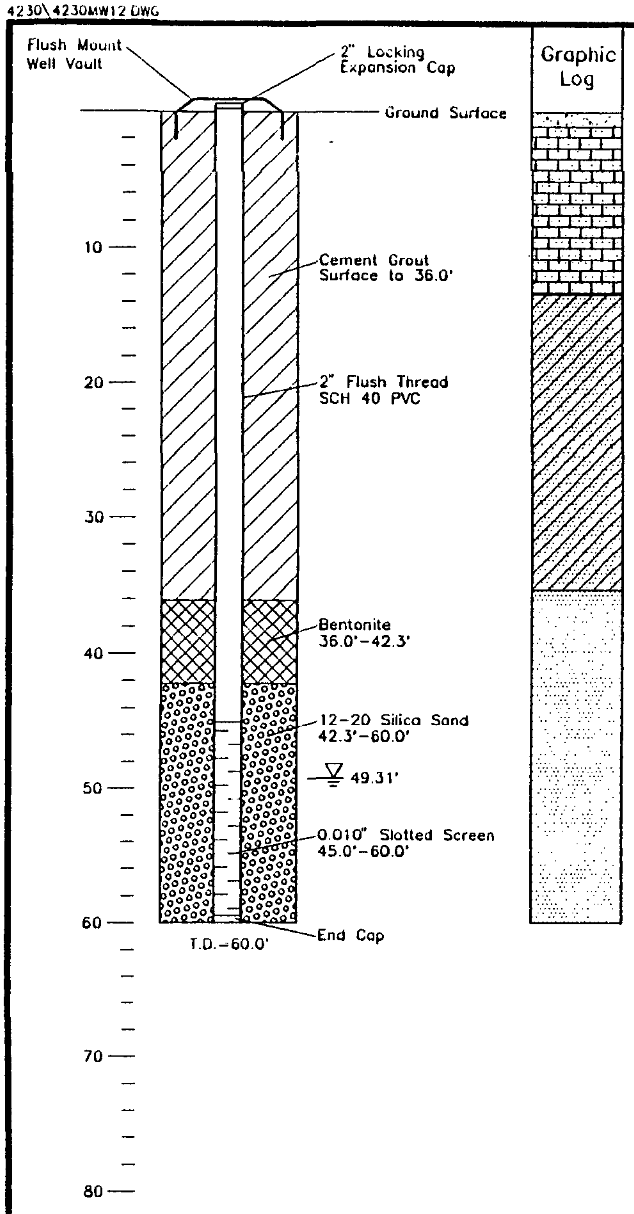
Hydrologists: CMP
Driller: Eades Drilling
Date Completed: 11/21/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

WT-1 COMPRESSOR STATION
Well Log: MW-11

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-95
JN 4230

4230\4230MW12.DWG



PID Reading (ppm)	Sampling Device	Comments and Lithology
–	Cuttings	1.5 feet – Silty sand, brown (7.5 YR 4/3 soil), very fine- to coarse-grained, poorly sorted, subrounded grains, unconsolidated, dry
1.1	Split Spoon	5 feet – Caliche, pinkish white (7.5 YR 8/2), fine-grained, moderately sorted, rounded to subrounded grains, 35% quartz, 35% feldspars, 30% carbonate matrix, moderately consolidated, dry
1.1	Split Spoon	10 feet – Caliche, pink (7.5 YR 8/3 SOIL), 50% very fine-grained, rounded to subrounded grains, 50% quartz, 10% lithic grains, 40% carbonaceous matrix, well consolidated, dry; 13.5', silty sandstone
1.1	Split Spoon	15 feet – Silty sandstone, pink (7.5 YR 7/4 SOIL), same as above, slight color change, carbonate cement, dry
1.1	Split Spoon	20 feet – Silty carbonaceous sandstone, red (2.5 YR 6/6 SOIL), fine-grained, moderately sorted, rounded grains, 50% quartz, 30% carbonaceous matrix, 20% fine lithic grains, well consolidated, dry
1.1	Split Spoon	25 feet – Silty sandstone, moderate reddish brown (10 R 4/6 RCK), very fine- to coarse-grained, poorly sorted, angular grains, 60% quartz, 20% feldspar, 20% lithic grains, moderately consolidated, dry, no carbonate
0.6	Split Spoon	30 feet – Same as above, except carbonate cement, some pebble-size gravel composed of sandstone
0.2	Split Spoon	35 feet – Sandstone, light brown (5 YR 6/4 RCK), fine- to medium-grained, well sorted, subangular grains, 65% quartz, 15% feldspar, 20% lithic grains, strongly consolidated, no carbonate cement, dry
0.6	Split Spoon	40 feet – Same as above
0.2	Split Spoon	45 feet – Sandstone, moderate reddish brown (10 R 4/6 RCK), very fine-grained, well sorted, angular to subrounded grains, slightly micaceous, strongly cemented, no carbonate, dry
0.6	Split Spoon	50 feet – Sandstone, moderate reddish brown (10 R 4/6 RCK), very fine- to fine-grained, well sorted, subangular to rounded, 70% quartz, 20% feldspar, 10% lithic grains, poorly consolidated, no carbonate, saturated
–	Cuttings	55 feet – Same as above but dry, color change to grayish orange (10 YR 7/4 RCK)

Hydrologists: CMP/RH
Driller: Eades Drilling
Date Completed: 11/16/94

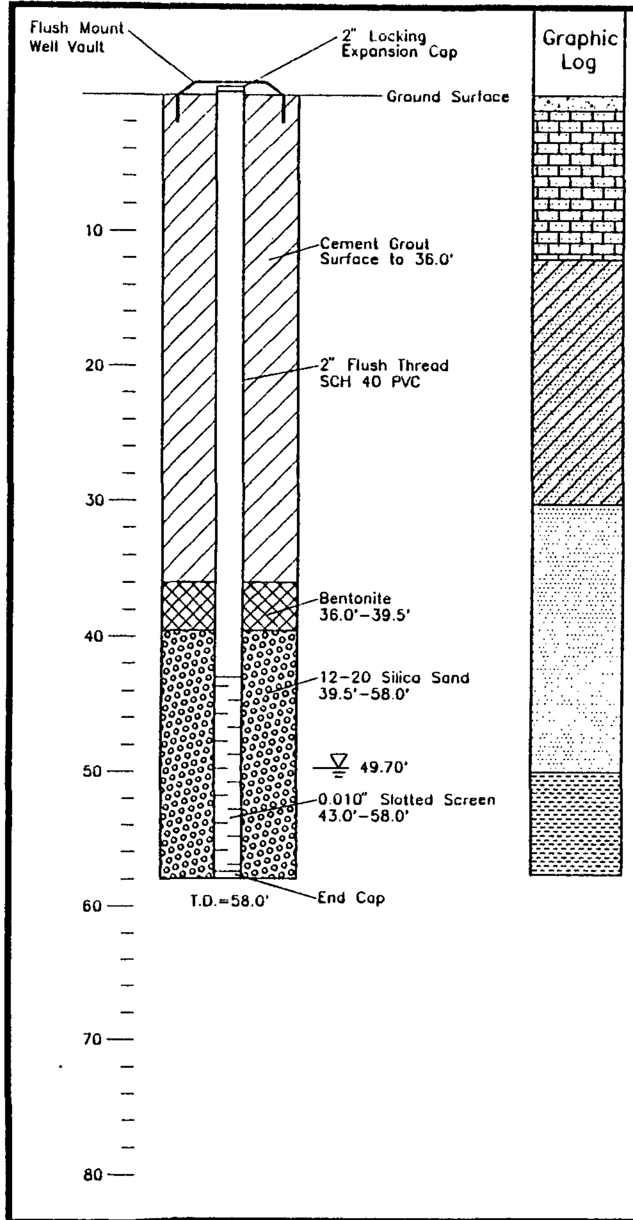
Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

WT-1 COMPRESSOR STATION

Well Log: MW-12

DANIEL B. STEPHENS & ASSOCIATES, INC.
.1-95
JN 4230

4230\4230MW13.DWG



PID Reading (ppm)	Sampling Device	Comments and Lithology
–	Cuttings	1 foot – Silty sand, pinkish gray (7.5 YR 6/2 SOIL), very fine- to coarse-grained, rounded grains, poorly sorted, unconsolidated, dry, calcareous
1.6	Split Spoon	5 feet – Caliche, pinkish gray (5 YR 8/1 RCK), fine- to medium-grained, moderately sorted, rounded grains, grains of quartz and carbonate in carbonate matrix, 35% quartz, 35% carbonate grains, 30% matrix, moderately consolidated, dry
2.0	Split Spoon	10 feet – Same as above, 12' encounter silty sandstone
2.0	Split Spoon	15 feet – Silty sandstone, light brown (5 YR 5/6 RCK), very fine- to medium-grained, poorly sorted, angular to rounded grains, 55% quartz, 30% feldspar, 15% lithic grains, poorly consolidated, carbonate cement, dry
2.0	Split Spoon	20 feet – Silty sandstone, moderate reddish brown (10 R 4/6 RCK), fine- to medium-grained, moderately sorted, angular to rounded grains, 60% quartz, 25% feldspar, 15% lithic grains, poorly consolidated, minor carbonate cement, dry
2.5	Split Spoon	25 feet – Silty sandstone, light brown (5 YR 5/4 RCK), very fine- to medium-grained, poorly sorted, subrounded grains, 60% quartz, 20% feldspar, 20% lithic grains, moderately consolidated, carbonate cement, dry, very porous
2.0	Split Spoon	30 feet – Sandstone, moderate reddish orange (10 R 6/6 RCK), fine- to medium-grained, well sorted, subrounded grains, 50% quartz, 35% feldspar, 15% lithic grains, strongly consolidated, no carbonate, dry, porous
2.0	Split Spoon	35 feet – Micaceous sandstone, moderate brown (5 YR 4/4 RCK), very fine- to fine-grained, well sorted, angular to subangular grains, 50% quartz, 40% feldspar, 10% lithic grains (mica), strongly consolidated, carbonate cement, very porous
1.6	Split Spoon	40 feet – Sandstone, light brown (5 YR 6/4 RCK), fine- to medium-grained, well sorted, subangular to rounded grains, 60% quartz, 30% feldspar, 10% lithic grains, strongly consolidated, carbonate cement, dry
1.6	Split Spoon	45 feet – Same as above
2.5	Split Spoon	50 feet – Mudstone, moderate reddish brown (10 R 4/6 RCK), friable, minor silt and mica, poorly consolidated, moist
2.0	Split Spoon	55 feet – Same as above, slightly siltier

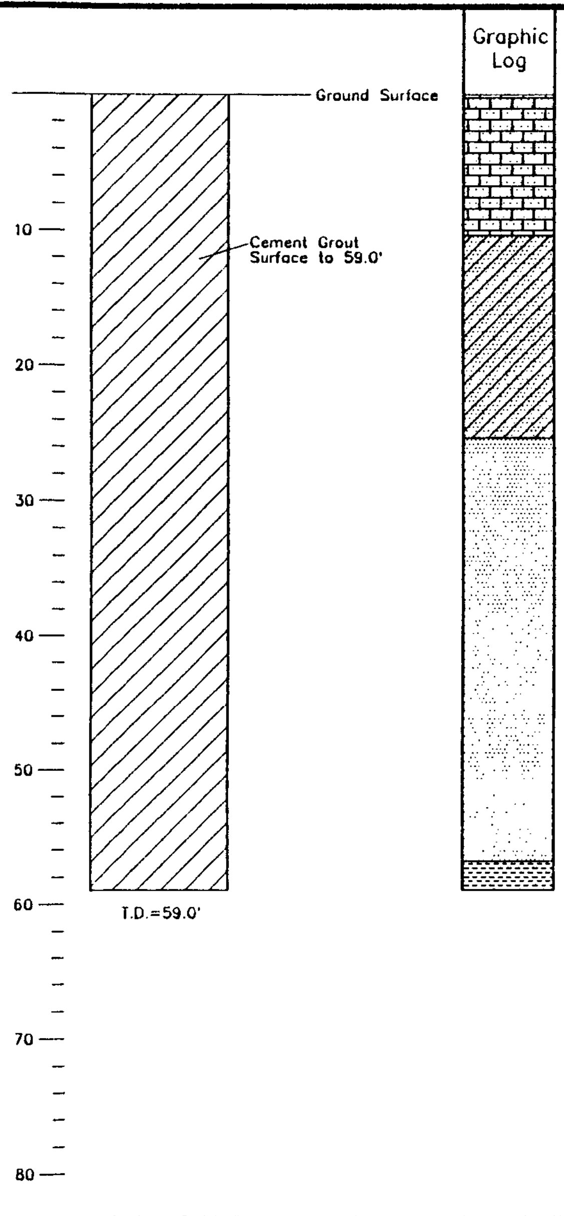
Hydrologists: CMP
Driller: Eades Drilling
Date Completed: 11/16/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

WT-1 COMPRESSOR STATION
Well Log: MW-13

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-95
JN 4230

4230\4230SB-3 DWG



PID Reading (ppm)	Sampling Device	Comments and Lithology
NA	Cuttings	5 feet – Caliche, pinkish gray (5 YR 8/1 RCK), medium-grained, moderately sorted, 50-60% sand in carbonate matrix, moderately consolidated, dry
NA	Cuttings	10 feet – Same as above; 11-12 feet encounter silty sandstone
NA	Cuttings	15 feet – Silty sandstone, moderate reddish orange (10 R 6/6 RCK) to light brown (5 YR 5/6 RCK), very fine- to medium-grained, poorly sorted, subangular grains, poorly to moderately consolidated, carbonate cement, porous, dry
NA	Cuttings	20 feet – Same as above
NA	Cuttings	25 feet – Sandstone, light brown (5 YR 6/4 RCK) to moderate reddish brown (10 YR 4/6 RCK), very fine- to medium-grained, moderately to poorly sorted, subangular to rounded grains, moderately consolidated, porous, dry
NA	Cuttings	40 feet – Sandstone, light brown (5 YR 6/4 RCK) to moderate reddish brown (10 YR RCK), very fine- to fine-grained, moderately to well sorted, subangular to rounded grains, moderately to strongly consolidated, dry to damp
NA	Cuttings	50 feet – Sandstone, pale red (10 YR 6/2 RCK) to moderate reddish brown (10 R 4/6 RCK), very fine- to medium-grained, moderately to well sorted, subangular to rounded grains, moderately to strongly consolidated, damp; 55 feet, white fine-grained sandstone
NA	Cuttings	57 feet – Mudstone, moderate reddish brown (10 YR 4/6 RCK), friable, poorly to moderately consolidated, wet

Hydrologists: CMP
Driller: Eades Drilling
Date Completed: 11/29/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

WT-1 COMPRESSOR STATION
Boring Log: SB-3

DANIEL B. STEPHENS & ASSOCIATES, INC.
1 95
JN 4230

APPENDIX B

ANALYTICAL LABORATORY REPORTS FOR SOIL AND GROUND-WATER ANALYSES

Organic Analyses

Hall Environmental
Analysis Laboratory

Hall Environmental Analysis Laboratory
2403 San Mateo NE, Suite P-13
Albuquerque, NM 87110

12/1/94

Daniel B. Stephens and Associates, Inc.
6020 Academy NE, Suite 100
Albuquerque, NM 87109

Dear Mr. Bob Marley,

Enclosed are the results for the analyses that were requested. These were done according to EPA procedures or the equivalent.

Detection limits are determined by EPA methodology. Unless noted on sample page, all criteria for QA/QC acceptance levels fall within established parameters. These parameters are modeled from the EPA-600 14-79 019, March 1979, "Handbook for Analytical Quality Control in Water and Waste Water."

Please don't hesitate to contact me for any additional information or clarifications

Sincerely,

12/5/94

Scott Hallenbeck, Lab Manager

Project: ENRON WT-1

Results for sample: MW-13 (52.5')

Date collected: 11/16/94	Date received: 11/18/94
Date extracted: 11/21,22/94	Date analyzed: 11/22,23/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9411046-1
Project Manager: Bob Marley	Sampled by: RH/CP
Matrix: Non-aqueous	

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 85 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	10	PPM (MG/KG)

BFB (Surrogate) Recovery = 99 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	5.0	PPM (MG/KG)

DNOP (Surrogate) Recovery = 96 %

Dilution Factor = 1

Results for sample: MW-12 (47.0')

Date collected: 11/16/94 Date received: 11/18/94
Date extracted: 11/21,22/94 Date analyzed: 11/22,23/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: 9411046-2
Project Manager: Bob Marley Sampled by: RH/CP
Matrix: Non-aqueous

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 87 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	10	PPM (MG/KG)

BFB (Surrogate) Recovery = 101 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	5	PPM (MG/KG)

DNOP (Surrogate) Recovery = 102 %

Dilution Factor = 1

Results for sample: MW-10 (41.5')

Date collected: 11/17/94 Date received: 11/18/94
Date extracted: 11/21,22/94 Date analyzed: 11/22,23/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: 9411046-3
Project Manager: Bob Marley Sampled by: RH/CP
Matrix: Non-aqueous

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	5.1	2.5	PPM (MG/KG)
Toluene	71	2.5	PPM (MG/KG)
Ethylbenzene	5.1	2.5	PPM (MG/KG)
Total Xylenes	140	2.5	PPM (MG/KG)

BFB (Surrogate) Recovery = ** %

Dilution Factor = 50

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	7,300	500	PPM (MG/KG)

BFB (Surrogate) Recovery = ** %

Dilution Factor = 50

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	380*	50	PPM (MG/KG)

DNOP (Surrogate) Recovery = 96 %

Dilution Factor = 10

*Due to matrix interference from gasoline range H-C; peak pattern not characteristic of only diesel fuel,therefore, quantitated only that which was in diesel range and after gasoline range (>C18-C26).

** Surrogate non-recoverable due to sample dilution

Results for sample: MW-12

Date collected: 11/17/94	Date received: 11/18/94
Date extracted: NA	Date analyzed: 11/18/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9411046-4
Project Manager: Bob Marley	Sampled by: RH/CP
Matrix: Aqueous	

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.5	PPB (UG/L)
Bromodichloromethane	3.5	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	nd	0.2	PPB (UG/L)
Chloroform	26	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1,3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethane	nd	0.2	PPB (UG/L)
1,2-Dichloroethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethene	nd	0.2	PPB (UG/L)
1,2-Dichloroethene (Cis)	nd	0.2	PPB (UG/L)
1,2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1,2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1,1,2,2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	nd	0.2	PPB (UG/L)
Toluene	1.9	0.5	PPB (UG/L)
1,1,1-Trichloroethane	nd	0.2	PPB (UG/L)
1,1,2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	nd	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	3.1	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 92 %
BCM (Surrogate) Recovery = 113 %
Dilution Factor = 1

Results for sample: MW-12

Date collected: 11/17/94 Date received: 11/18/94
Date extracted: 11/22/94 Date analyzed: 11/18,22/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9411046-4
Project Manager: Bob Marley Sampled by: RH/CP
Matrix: Aqueous

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 100 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 123 %

Dilution Factor = 1

Results for sample: Trip Blank

Date collected: NA	Date received: 11/18/94
Date extracted: NA	Date analyzed: 11/18/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9411046-7
Project Manager: Bob Marley	Sampled by: RH/CP
Matrix: Aqueous	

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	nd	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1,3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethane	nd	0.2	PPB (UG/L)
1,2-Dichloroethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethene	nd	0.2	PPB (UG/L)
1,2-Dichloroethene (Cis)	nd	0.2	PPB (UG/L)
1,2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1,2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1,1,2,2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	nd	0.2	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
1,1,1-Trichloroethane	nd	0.2	PPB (UG/L)
1,1,2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	nd	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	nd	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 90 %
BCM (Surrogate) Recovery = 101 %
Dilution Factor = 1

Results for sample: Trip Blank

Date collected: NA	Date received: 11/18/94
Date extracted: 11/22/94	Date analyzed: 11/18,22/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	Heal #: 9411046-7
Project Manager: Bob Marley	Sampled by: RH/CP
Matrix: Aqueous	

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 102 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 131 %

Dilution Factor = 1

Results for sample: MW-10 (49.0')

Date collected: 11/17/94	Date received: 11/18/94
Date extracted: 11/21,22/94	Date analyzed: 11/22,23/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9411046-8
Project Manager: Bob Marley	Sampled by: NA
Matrix: Non-aqueous	

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	18	2.5	PPM (MG/KG)
Toluene	260	2.5	PPM (MG/KG)
Ethylbenzene	27	2.5	PPM (MG/KG)
Total Xylenes	400	2.5	PPM (MG/KG)

BFB (Surrogate) Recovery =** %

Dilution Factor = 50

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	16,000	1000	PPM (MG/KG)

BFB (Surrogate) Recovery = ** %

Dilution Factor = 100

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	320*	50	PPM (MG/KG)

DNOP (Surrogate) Recovery = 94 %

Dilution Factor = 10

*Due to matrix interference from gasoline range H-C; peak pattern not characteristic of only diesel fuel, therefore, quantitated only that which was in diesel range (>C18-C26).

** Surrogate non-recoverable due to sample dilution

Results for QC: Reagent Blank

Date extracted: NA Date analyzed: 11/18/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: RB 11/18
Project Manager: Bob Marley
Matrix: Aqueous

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	nd	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1.3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethane	nd	0.2	PPB (UG/L)
1.2-Dichloroethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethene	nd	0.2	PPB (UG/L)
1.2-Dichloroethene (Cis)	nd	0.2	PPB (UG/L)
1.2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1.2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1.1.2.2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	nd	0.2	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
1.1.1-Trichloroethane	nd	0.2	PPB (UG/L)
1.1.2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	nd	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	nd	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 89 %
BCM (Surrogate) Recovery = 80 %
Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 11/22/94 Date analyzed: 11/29/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 11/22
Project Manager: Bob Marley
Matrix: Aqueous

Test: EPA 8100

Compound	Result	Detection limit	Units
Naphthalene	nd	0.5	PPB (UG/L)
2-Methyl Naphthalene	nd	0.5	PPB (UG/L)
1-Methyl Naphthalene	nd	0.5	PPB (UG/L)
Acenaphthalene	nd	0.5	PPB (UG/L)
Acenaphthene	nd	0.5	PPB (UG/L)
Fluorene	nd	0.5	PPB (UG/L)
Phenanthrene	nd	0.5	PPB (UG/L)
Anthracene	nd	0.5	PPB (UG/L)
Fluoranthrene	nd	0.5	PPB (UG/L)
Pyrene	nd	0.5	PPB (UG/L)
Benzo (a) anthracene	nd	0.5	PPB (UG/L)
Chrysene	nd	0.5	PPB (UG/L)
Benzo (b) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (k) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (a) pyrene	nd	0.5	PPB (UG/L)
Indeno (1,2,3-cd) pyrene	nd	1.0	PPB (UG/L)
Dibenzo (a,h) anthracene	nd	1.0	PPB (UG/L)
Benzo (g,h,i) perylene	nd	1.0	PPB (UG/L)

Hexadecane (Surrogate) Recovery = 81 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 11/22/94 Date analyzed: 11/22/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 11/22
Project Manager: Bob Marley
Matrix: Aqueous

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 98 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 125 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 11/21,22/94 Date analyzed: 11/22,23/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 11/21,22
Project Manager: Bob Marley
Matrix: Non-Aqueous

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 87 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	10	PPM (MG/KG)

BFB (Surrogate) Recovery = 104 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	10	PPM (MG/KG)

DNOP (Surrogate) Recovery = 97 %

Dilution Factor = 1

Results for QC: Matrix Spike / Matrix Spike Dup

Date extracted: NA Date analyzed: 11/18/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9411045-1 MS/MSD
Project Manager: Bob Marley
Matrix: Aqueous Units: PPB (UG/L)

Test: EPA 8010/8020

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Chlorobenzene	<0.2	20.0	20.0	100	20.4	102	2
Ethylbenzene	<0.5	20.0	19.8	99	20.3	102	2
1,1-DCE	<0.2	20.0	18.8	94	19.8	99	5
Trans-1,2-DCE	<0.2	20.0	20.3	102	20.8	104	2
Carbon Tetrachloride	<0.2	20.0	20.7	104	20.8	104	0
1,2-DCA	<0.2	20.0	22.6	113	22.5	113	0
1,2-Dichloro-propane	<0.2	20.0	20.3	102	21.3	107	5
1,1,2-TCA	<0.2	20.0	21.1	106	20.8	104	1
PCE	<0.2	20.0	20.8	104	21.1	106	1
1,3-Dichloro-benzene	<0.2	20.0	18.0	90	20.2	101	12
1,4-Dichloro-benzene	<0.2	20.0	17.6	88	20.3	102	14

Results for QC: Blank Spike/Blank Spike Dup

Date extracted: 11/22/94 Date analyzed: 11/30/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: BS/BSD 11/22
Project Manager: Bob Marley
Matrix: Aqueous Units: PPB (UG/L)

Test: EPA 8100

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
Naphthalene	<0.5	10.0	7.3	73	6.9	69	6
Acenaphthylene	<0.5	10.0	7.6	76	7.9	79	4
Acenaphthene	<0.5	10.0	7.8	78	7.8	78	0
Flourene	<0.5	10.0	8.3	83	8.0	80	4
Phenanthrene	<0.5	10.0	9.5	95	9.7	97	2
Anthracene	<0.5	10.0	9.1	91	9.0	90	1
Pyrene	<0.5	10.0	9.2	92	9.1	91	1
Benzo(a)pyrene	<0.5	10.0	9.3	93	9.4	94	1
Benzo(g,h,i)-perylene	<1.0	10.0	10.1	101	10.0	100	1

Results for QC: Matrix Spike/ Matrix Spike Dup
Blank Spike / Blank Spike Dup

Date extracted: 11/21,23/94	Date analyzed: 11/22,23/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: BS/BSD 11/21
Project Manager: Bob Marley	9411039-4 MS/MSD
Matrix: Aqueous	Units: PPM (MG/L)

Test: EPA 8020

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Benzene	<0.5	20.0	22.7	114	21.5	108	5
Toluene	<0.5	20.0	21.3	107	20.6	103	3
Ethylbenzene	<0.5	20.0	20.1	101	19.1	95	5
Total Xylenes	<0.5	60.0	59.7	100	57.0	95	5

Test: EPA 504.1

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
EDB	<0.01	0.67	0.60	90	0.57	85	5

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
Gasoline	<0.05	0.50	0.44	89	0.43	87	2

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
Diesel	<1.0	5.4	5.9	109	5.5	102	7

Results for QC: Matrix Spike / Matrix Spike Dup

Date extracted: 11/17,22/94 Date analyzed: 11/18,23/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9411044-4 MS/MSD
Project Manager: Bob Marley BS/BSD 11/22
Matrix: Non-Aqueous Units: PPM (MG/KG)

Test: EPA 8020

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Benzene	<0.05	1.00	0.98	98	0.94	94	4
Toluene	<0.05	1.00	1.02	102	0.99	99	3
Ethylbenzene	<0.05	1.00	0.92	92	0.94	94	2
Total Xylenes	<0.05	3.00	2.88	96	2.93	98	2

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Gasoline	<10	50	43	87	44	88	2

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Diesel	<5.0	54	57	106	59	109	3

CHAIN-OF-CUSTODY RECORD

HALL ENVIRONMENTAL ANALYSIS LABORATORY
2403 San Mateo NE, Suite P-13
Albuquerque, New Mexico 87110
505.880.1803

Client: Daniel B. Stephens + Assoc.

Address: 6020 Academy NE
Abq. nm 87110

Phone #: 822-9400

Fax #: 822-8877

Project Name: Enron WT-1

Project #: 4230

Project Manager: Bob Marley

Sampler: RH/CP

Samples Cold? ☒ Yes ☐ No

ANALYSIS REQUEST

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative HgCl$_2$	Preservative HCl	Preservative Other	HEAL No.	BTEX (Method 602/8020)	BTEX + MTBE (602/8020)	TPH Method 8015 MOD (Gas/Diesel)	BTEX + TPH + MTBE (Gasoline Only)	BTEX + MTBE + TPH (Gas + Diesel)	TPH (Method 418.1)	601/602 Volatiles Purgeable Halo-carbons 8010	EDB (Method 504.1)	EDC	610 (PNA or PAH) 8100					Air Bubbles or Headspace (Y or N)
11/16/94	1130	soiL	mw-13 (52.5')	1-250mL	—	—	—	9411046-1	X		X												N
11/16/94	1650	soiL	mw-12 (47.0')	1-250mL	—	—	—	-2	X		X												N
11/17/94	1525	soiL	mw-10 (41.5')	1-250mL	—	—	—	-3	X		X												N
11/17/94	1440	H2O	mw-12	6-40mL	X			-4	X		X				X								N
11/16/94	1010	H2O	mw-3	~~4-40mL~~	X			-5	X		X												N
11/15/94	1545	H2O	mw-1	[illegible] 40mL	X			-6	X		X				X								N
11/[illegible]/94	1635	H2O	Trip Blank	2-40mL	X			-7	X		X				X								N
11/17/94	1600	soiL	mw-10 (149.0')	1-~~250mL~~	—	—	—	-8	X		X												N
11/15/94	1545	H2O	mw-1	1-500mL	—	—	—	-6										X					N

Date: 11/18 Time: 11:10 Relinquished By: (Signature) Received By: (Signature) Theresa Lowe

Date: Time: Relinquished By: (Signature) Received By: (Signature)

Remarks:

Hall Environmental
Analysis Laboratory

Hall Environmental Analysis Laboratory
2403 San Mateo NE, Suite P-13
Albuquerque, NM 87110

12/05/94

Daniel B. Stephens and Associates, Inc.
6020 Academy NE, Suite 100
Albuquerque, NM 87109

Dear Mr. Bob Marley,

Enclosed are the results for the analyses that were requested. These were done according to EPA procedures or the equivalent.

Detection limits are determined by EPA methodology. Unless noted on sample page, all criteria for QA/QC acceptance levels fall within established parameters. These parameters are modeled from the EPA-600 14-79 019, March 1979, "Handbook for Analytical Quality Control in Water and Waste Water."

Please don't hesitate to contact me for any additional information or clarifications

Sincerely,

12/5/94

Scott Hallenbeck, Lab Manager

Project: ENRON WT-1

Results for sample: MW-10

Date collected: 11/18/94 Date received: 11/20/94
Date extracted: NA Date analyzed: 11/21/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9411052-1
Project Manager: Bob Marley Sampled by: Rene Hill
Matrix: Aqueous

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	9.000	13	PPB (UG/L)
Bromodichloromethane	nd	5.0	PPB (UG/L)
Bromoform	nd	25	PPB (UG/L)
Bromomethane	nd	25	PPB (UG/L)
Carbon Tetrachloride	nd	5.0	PPB (UG/L)
Chlorobenzene	nd	5.0	PPB (UG/L)
Chloroethane	nd	5.0	PPB (UG/L)
Chloroform	nd	5.0	PPB (UG/L)
Chloromethane	nd	5.0	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	25	PPB (UG/L)
Dibromochloromethane	nd	5.0	PPB (UG/L)
1,3-Dichlorobenzene	nd	5.0	PPB (UG/L)
1,2-Dichlorobenzene	nd	5.0	PPB (UG/L)
1,4-Dichlorobenzene	nd	5.0	PPB (UG/L)
Dichlorodifluoromethane	nd	5.0	PPB (UG/L)
1,1-Dichloroethane	nd	5.0	PPB (UG/L)
1,2-Dichloroethane	nd	5.0	PPB (UG/L)
1,1-Dichloroethene	nd	5.0	PPB (UG/L)
1,2-Dichloroethene (Cis)	nd	5.0	PPB (UG/L)
1,2-Dichloroethene (Trans)	nd	5.0	PPB (UG/L)
1,2-Dichloropropane	nd	5.0	PPB (UG/L)
cis-1,3-Dichloropropene	nd	5.0	PPB (UG/L)
trans-1,3-Dichloropropene	nd	5.0	PPB (UG/L)
Ethylbenzene	620	13	PPB (UG/L)
Dichloromethane	nd	50	PPB (UG/L)
1,1,2,2-Tetrachloroethane	nd	5.0	PPB (UG/L)
Tetrachloroethene (PCE)	nd	5.0	PPB (UG/L)
Toluene	16.000	13	PPB (UG/L)
1,1,1-Trichloroethane	nd	0.2	PPB (UG/L)
1,1,2-Trichloroethane	nd	5.0	PPB (UG/L)
Trichloroethene (TCE)	nd	5.0	PPB (UG/L)
Vinyl Chloride	nd	5.0	PPB (UG/L)
Xylenes (Total)	8.500	13	PPB (UG/L)
Trichlorofluoromethane	nd	5.0	PPB (UG/L)

BFB (Surrogate) Recovery = 103 %
BCM (Surrogate) Recovery = 85 %
Dilution Factor = 25

Results for sample: MW-10

Results for sample: MW-10

Date collected: 11/18/94 Date received: 11/20/94
Date extracted: 11/21,23/94 Date analyzed: 11/21,23,30/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9411052-1
Project Manager: Bob Marley Sampled by: Rene Hill
Matrix: Aqueous

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	69	2.5	PPM (MG/L)

BFB (Surrogate) Recovery = 120 %

Dilution Factor = 50

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	10	5.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 104 %

Dilution Factor = 1

Results for sample: MW-10

Date collected: 11/18/94 Date received: 11/20/94
Date extracted: 11/22/94 Date analyzed: 11/30/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9411052-1
Project Manager: Bob Marley Sampled by: Rene Hill
Matrix: Aqueous

Test: EPA 8100

Compound	Result	Detection limit	Units
Naphthalene	850	10	PPB (UG/L)
2-Methyl Naphthalene	220	10	PPB (UG/L)
1-Methyl Naphthalene	200	10	PPB (UG/L)
Acenaphthalene	nd	10	PPB (UG/L)
Acenaphthene	14	10	PPB (UG/L)
Fluorene	nd	10	PPB (UG/L)
Phenanthrene	nd	10	PPB (UG/L)
Anthracene	nd	10	PPB (UG/L)
Fluoranthrene	nd	0.5	PPB (UG/L)
Pyrene	nd	0.5	PPB (UG/L)
Benzo (a) anthracene	nd	0.5	PPB (UG/L)
Chrysene	nd	0.5	PPB (UG/L)
Benzo (b) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (k) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (a) pyrene	nd	0.5	PPB (UG/L)
Indeno (1,2,3-cd) pyrene	nd	1.0	PPB (UG/L)
Dibenzo (a,h) anthracene	nd	1.0	PPB (UG/L)
Benzo (g,h,i) perylene	nd	1.0	PPB (UG/L)

Hexadecane (Surrogate) Recovery = 105 %

Dilution Factor = 1

Results for sample: MW-12

Date collected: 11/18/94	Date received: 11/20/94
Date extracted: 11/22/94	Date analyzed: 11/30/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	Heal #: 9411052-2
Project Manager: Bob Marley	Sampled by: Rene Hill
Matrix: Aqueous	

Test: EPA 8100

Compound	Result	Detection limit	Units
Naphthalene	nd	0.5	PPB (UG/L)
2-Methyl Naphthalene	nd	0.5	PPB (UG/L)
1-Methyl Naphthalene	nd	0.5	PPB (UG/L)
Acenaphthalene	nd	0.5	PPB (UG/L)
Acenaphthene	nd	0.5	PPB (UG/L)
Fluorene	nd	0.5	PPB (UG/L)
Phenanthrene	nd	0.5	PPB (UG/L)
Anthracene	nd	0.5	PPB (UG/L)
Fluoranthrene	nd	0.5	PPB (UG/L)
Pyrene	nd	0.5	PPB (UG/L)
Benzo (a) anthracene	nd	0.5	PPB (UG/L)
Chrysene	nd	0.5	PPB (UG/L)
Benzo (b) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (k) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (a) pyrene	nd	0.5	PPB (UG/L)
Indeno (1,2.3-cd) pyrene	nd	1.0	PPB (UG/L)
Dibenzo (a.h) anthracene	nd	1.0	PPB (UG/L)
Benzo (g,h.i) perylene	nd	1.0	PPB (UG/L)

Hexadecane (Surrogate) Recovery = 83 %

Dilution Factor = 1

Results for sample: Trip Blank

Date collected: NA	Date received: 11/20/94
Date extracted: NA	Date analyzed: 11/21/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	Heal #: 9411052-6
Project Manager: Bob Marley	Sampled by: Rene Hill
Matrix: Aqueous	

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	nd	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1,3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethane	nd	0.2	PPB (UG/L)
1,2-Dichloroethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethene	nd	0.2	PPB (UG/L)
1,2-Dichloroethene (Cis)	nd	0.2	PPB (UG/L)
1,2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1,2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1,1,2,2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	nd	0.2	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
1,1,1-Trichloroethane	nd	0.2	PPB (UG/L)
1,1,2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	nd	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	nd	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 89 %
BCM (Surrogate) Recovery = 88 %
Dilution Factor = 1

Results for sample: Trip Blank

Date collected: NA	Date received: 11/20/94
Date extracted: NA	Date analyzed: 11/21,23,30/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	Heal #: 9411052-6
Project Manager: Bob Marley	Sampled by: Rene Hill
Matrix: Aqueous	

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 101 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 113 %

Dilution Factor = 1

Results for sample: MW-9 (50')

Date collected: 11/19/94	Date received: 11/20/94
Date extracted: 11/22/94	Date analyzed: 11/23,28/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	Heal #: 9411052-7
Project Manager: Bob Marley	Sampled by: Rene Hill
Matrix: Non-aqueous	

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery =90 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	5.0	PPM (MG/KG)

BFB (Surrogate) Recovery = 97 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	5.0	PPM (MG/KG)

DNOP (Surrogate) Recovery = 96 %

Dilution Factor = 1

Results for sample: MW-9 (55')

Date collected: 11/19/94	Date received: 11/20/94
Date extracted: 11/22/94	Date analyzed: 11/23,28/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9411052-8
Project Manager: Bob Marley	Sampled by: Rene Hill
Matrix: Non-aqueous	

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 82 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	5.0	PPM (MG/KG)

BFB (Surrogate) Recovery = 84 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	5.0	PPM (MG/KG)

DNOP (Surrogate) Recovery = 100 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: NA Date analyzed: 11/21/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: RB 11/21
Project Manager: Bob Marley
Matrix: Aqueous

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	nd	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1,3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethane	nd	0.2	PPB (UG/L)
1,2-Dichloroethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethene	nd	0.2	PPB (UG/L)
1,2-Dichloroethene (Cis)	nd	0.2	PPB (UG/L)
1,2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1,2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1,1,2,2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	nd	0.2	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
1,1,1-Trichloroethane	nd	0.2	PPB (UG/L)
1,1,2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	nd	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	nd	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 93 %
BCM (Surrogate) Recovery = 119 %
Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 11/22/94 Date analyzed: 11/29/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 11/22
Project Manager: Bob Marley
Matrix: Aqueous

Test: EPA 8100

Compound	Result	Detection limit	Units
Naphthalene	nd	0.5	PPB (UG/L)
2-Methyl Naphthalene	nd	0.5	PPB (UG/L)
1-Methyl Naphthalene	nd	0.5	PPB (UG/L)
Acenaphthalene	nd	0.5	PPB (UG/L)
Acenaphthene	nd	0.5	PPB (UG/L)
Fluorene	nd	0.5	PPB (UG/L)
Phenanthrene	nd	0.5	PPB (UG/L)
Anthracene	nd	0.5	PPB (UG/L)
Fluoranthrene	nd	0.5	PPB (UG/L)
Pyrene	nd	0.5	PPB (UG/L)
Benzo (a) anthracene	nd	0.5	PPB (UG/L)
Chrysene	nd	0.5	PPB (UG/L)
Benzo (b) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (k) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (a) pyrene	nd	0.5	PPB (UG/L)
Indeno (1,2,3-cd) pyrene	nd	1.0	PPB (UG/L)
Dibenzo (a,h) anthracene	nd	1.0	PPB (UG/L)
Benzo (g,h,i) perylene	nd	1.0	PPB (UG/L)

Hexadecane (Surrogate) Recovery = 81 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 11/22/94 Date analyzed: 11/28/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 11/22
Project Manager: Bob Marley
Matrix: Non-Aqueous

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 96 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	10	PPM (MG/KG)

BFB (Surrogate) Recovery = 115 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	10	PPM (MG/KG)

DNOP (Surrogate) Recovery = 97 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 11/22/94 Date analyzed: 11/28/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 11/22
Project Manager: Bob Marley
Matrix: Non-Aqueous

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Bromodichloromethane	nd	0.01	PPM (MG/KG)
Bromoform	nd	0.05	PPM (MG/KG)
Bromomethane	nd	0.05	PPM (MG/KG)
Carbon Tetrachloride	nd	0.01	PPM (MG/KG)
Chlorobenzene	nd	0.01	PPM (MG/KG)
Chloroethane	nd	0.01	PPM (MG/KG)
Chloroform	nd	0.01	PPM (MG/KG)
Chloromethane	nd	0.01	PPM (MG/KG)
2-Chloroethylvinyl Ether	nd	0.05	PPM (MG/KG)
Dibromochloromethane	nd	0.01	PPM (MG/KG)
1,3-Dichlorobenzene	nd	0.01	PPM (MG/KG)
1,2-Dichlorobenzene	nd	0.01	PPM (MG/KG)
1,4-Dichlorobenzene	nd	0.01	PPM (MG/KG)
Dichlorodifluoromethane	nd	0.01	PPM (MG/KG)
1,1-Dichloroethane	nd	0.01	PPM (MG/KG)
1,2-Dichloroethane	nd	0.01	PPM (MG/KG)
1,1-Dichloroethene	nd	0.01	PPM (MG/KG)
1,2-Dichloroethene (Cis)	nd	0.01	PPM (MG/KG)
1,2-Dichloroethene (Trans)	nd	0.01	PPM (MG/KG)
1,2-Dichloropropane	nd	0.01	PPM (MG/KG)
cis-1,3-Dichloropropene	nd	0.01	PPM (MG/KG)
trans-1,3-Dichloropropene	nd	0.01	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Dichloromethane	nd	0.1	PPM (MG/KG)
1,1,2,2-Tetrachloroethane	nd	0.01	PPM (MG/KG)
Tetrachloroethene (PCE)	nd	0.01	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
1,1,1-Trichloroethane	nd	0.01	PPM (MG/KG)
1,1,2-Trichloroethane	nd	0.01	PPM (MG/KG)
Trichloroethene (TCE)	nd	0.01	PPM (MG/KG)
Vinyl Chloride	nd	0.01	PPM (MG/KG)
Xylenes (Total)	nd	0.05	PPM (MG/KG)
Trichlorofluoromethane	nd	0.01	PPM (MG/KG)

BFB (Surrogate) Recovery = 78 %
BCM (Surrogate) Recovery = 89 %
Dilution Factor = 1

Results for QC: Matrix Spike / Matrix Spike Dup

Date extracted: NA	Date analyzed: 11/18/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9411045-1 MS/MSD
Project Manager: Bob Marley	
Matrix: Aqueous	Units: PPB (UG/L)

Test: EPA 8010/8020

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Chlorobenzene	<0.2	20.0	20.0	100	20.4	102	2
Ethylbenzene	<0.5	20.0	19.8	99	20.3	102	2
1,1-DCE	<0.2	20.0	18.8	94	19.8	99	5
Trans-1,2-DCE	<0.2	20.0	20.3	102	20.8	104	2
Carbon Tetrachloride	<0.2	20.0	20.7	104	20.8	104	0
1,2-DCA	<0.2	20.0	22.6	113	22.5	113	0
1,2-Dichloro-propane	<0.2	20.0	20.3	102	21.3	107	5
1,1,2-TCA	<0.2	20.0	21.1	106	20.8	104	1
PCE	<0.2	20.0	20.8	104	21.1	106	1
1,3-Dichloro-benzene	<0.2	20.0	18.0	90	20.2	101	12
1,4-Dichloro-benzene	<0.2	20.0	17.6	88	20.3	102	14

Results for QC: Blank Spike/Blank Spike Dup

Date extracted: 11/22/94 Date analyzed: 11/30/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: BS/BSD 11/22
Project Manager: Bob Marley
Matrix: Aqueous Units: PPB (UG/L)

Test: EPA 8100

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
Naphthalene	<0.5	10.0	7.3	73	6.9	69	6
Acenaphthylene	<0.5	10.0	7.6	76	7.9	79	4
Acenaphthene	<0.5	10.0	7.8	78	7.8	78	0
Flourene	<0.5	10.0	8.3	83	8.0	80	4
Phenanthrene	<0.5	10.0	9.5	95	9.7	97	2
Anthracene	<0.5	10.0	9.1	91	9.0	90	1
Pyrene	<0.5	10.0	9.2	92	9.1	91	1
Benzo(a)pyrene	<0.5	10.0	9.3	93	9.4	94	1
Benzo(g,h,i)-perylene	<1.0	10.0	10.1	101	10.0	100	1

Results for QC: Matrix Spike/ Matrix Spike Dup
Blank Spike / Blank Spike Dup

Date extracted: 11/21,23/94	Date analyzed: 11/21,23,30/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: BS/BSD 11/21,23
Project Manager: Bob Marley	9411052-5 MS/MSD
Matrix: Aqueous	Units: PPM (MG/L)

Test: EPA 504.1

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
EDB	<0.01	0.67	0.60	90	0.57	85	5

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Gasoline	0.16	0.50	0.67	101	0.68	103	1

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
Diesel	<1.0	5.4	5.9	109	5.5	102	7

Results for QC: Matrix Spike / Matrix Spike Dup

Date extracted: 11/22/94 Date analyzed: 11/28/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9411052-7 MS/MSD
Project Manager: Bob Marley
Matrix: Non-Aqueous Units: PPM (MG/KG)

Test: EPA 8010/8020

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Chlorobenzene	<0.01	1.00	1.08	108	1.03	103	5
Ethylbenzene	<0.05	1.00	1.07	107	1.03	103	4
1,1-DCE	<0.01	1.00	0.86	86	0.94	94	9
Trans-1,2-DCE	<0.01	1.00	0.86	86	0.93	93	8
Carbon Tetrachloride	<0.01	1.00	0.97	97	1.00	100	3
1,2-DCA	<0.01	1.00	0.97	97	1.01	101	4
1,2-Dichloro-propane	<0.01	1.00	1.06	106	1.12	112	6
1,1,2-TCA	<0.01	1.00	0.98	98	1.07	107	9
PCE	<0.01	1.00	0.93	93	1.06	106	13
1,3-Dichloro-benzene	<0.01	1.00	1.03	103	1.18	118	14
1,4-Dichloro-benzene	<0.01	1.00	1.10	110	1.19	119	8

CHAIN-OF-CUSTODY RECORD

HALL ENVIRONMENTAL ANALYSIS LABORATORY
2403 San Mateo NE, Suite P-13
Albuquerque, New Mexico 87110
505.880.1803

Client: DANIEL B STEPHENS & ASSOC

Address: 6020 ACADEMY #100
ALBUQUERQUE NM
87109

Phone #: 505-822-9400

Fax #: 505-822-7788

Project Name: ENRON WT-1

Project #: 4230

Project Manager: BOB MARLEY

Sampler: RENE HILL

Samples Cold? ☒ Yes ☐ No

ANALYSIS REQUEST

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative HgCl₂	Preservative HCl	Preservative Other	HEAL No.	BTEX (Method 602/8020)	BTEX + MTBE (602/8020)	TPH Method 8015 MOD (Gas/Diesel)	BTEX + TPH + MTBE (Gasoline Only)	BTEX + MTBE + TPH (Gas + Diesel)	TPH (Method 418.1)	601/602 Volatiles 8010 PURGEABLE HALOCARBONS	EDB (Method 504.1)	EDC	610 (PNA or PAH) 8100 POLYNUC AROMATIC HYDRO				Air Bubbles or Headspace (Y or N)
11/18/94	1330	H_2O	MW-10	1/L 6/40ml	X		NONE	9411052-1	X		X				X			X				N
11/18/94	1430	H_2O	MW-12	1/L	[illegible]		NONE	-2										X				N
NA	NA	H_2O	DUP-1	1/L 6/40ml	X		NONE	-3	X		X				X			X				N
11/19/94	1330	H_2O	SVE-1-MW	1/L 6/40ml	X		NONE	-4	X		X				X			X				N
11/19/94	1700	H_2O	SB-2	1/L 6/40ml	X		NONE	-5	X		X				X			X				N
11/[illegible]/94	1635	H_2O	TRIP BLANK	3/40ml	X			-6	X		X				X							N
11/19/94	0730	SOIL	MW-9 (50')	1/250ml			NONE	-7	X		X											N
11/19/94	0815	SOIL	MW-9 (55')	1/250ml			NONE	-8	X		X											N
11/18/94	0930	SOIL	SVE-1 (30')	1/250ml			NONE	-9	X		X				X							N
11/18/94	1015	SOIL	SVE-1 (45')	1/250ml			NONE	-10	X		X											N
11/19/94	1320	SOIL	SB-2 (45')	1/250ml			NONE	-11	X		X											N
11/20/94	1025	SOIL	SB-1 (47')	1/250ml			NONE	-12	X		X											N

Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)
11/21/94	2130	Clarence Pagona	11/21/94 3900
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)

Remarks:
Page 1 of 2

CHAIN-OF-CUSTODY RECORD

HALL ENVIRONMENTAL ANALYSIS LABORATORY
2403 San Mateo NE, Suite P-13
Albuquerque, New Mexico 87110
505.880.1803

Client: DANIEL B. STEPHENS + ASSOC

Address: 6020 ACADEMY NE #100
ALBUQUERQUE NM
87109

Phone #: 505-822-9400

Fax #: 505-822-2878

Project Name: ENRON WT-1
~~4230~~

Project #: 4230

Project Manager: BOB MARLEY

Sampler: CP / RH

Samples Cold? ☒ Yes ☐ No

ANALYSIS REQUEST

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative			HEAL No.	BTEX (Method 602/8020)	BTEX + MTBE (602/8020)	TPH Method 8015 MOD (Gas/Diesel)	BTEX + TPH + MTBE (Gasoline Only)	BTEX + MTBE + TPH (Gas + Diesel)	TPH (Method 418.1)	601/602 Volatiles	EDB (Method 504.1)	EDC	610 (PNA or PAH)				Air Bubbles or Headspace (Y or N)
					HgCl$_2$	HCl	Other															
11/20/94	1450	SOIL	MW-8 (45)	1/250ml			NONE	9411052 13	X		X											N

Date: 11/20/94
Time: 2130
Relinquished By: (Signature)

Received By: (Signature)
0900
11/21/94

Date:
Time:
Relinquished By: (Signature)

Received By: (Signature)

Remarks:
Page 2 of 2

Hall Environmental
Analysis Laboratory

Hall Environmental Analysis Laboratory
2403 San Mateo NE, Suite P-13
Albuquerque, NM 87110

12/05/94

Daniel B. Stephens and Associates, Inc.
6020 Academy NE, Suite 100
Albuquerque, NM 87109

Dear Mr. Bob Marley,

Enclosed are the results for the analyses that were requested. These were done according to EPA procedures or the equivalent.

Detection limits are determined by EPA methodology. Unless noted on sample page, all criteria for QA/QC acceptance levels fall within established parameters. These parameters are modeled from the EPA-600 14-79 019, March 1979, "Handbook for Analytical Quality Control in Water and Waste Water."

Please don't hesitate to contact me for any additional information or clarifications

Sincerely,

12/5/94

Scott Hallenbeck, Lab Manager

Project: ENRON WT-1

Results for sample: MW-9

Date collected: 11/21/94 Date received: 11/23/94
Date extracted: NA Date analyzed: 11/23/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9411059-1
Project Manager: Bob Marley Sampled by: Clarence Pigman
Matrix: Aqueous

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	12	0.5	PPB (UG/L)
Bromodichloromethane	1.4	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	nd	0.2	PPB (UG/L)
Chloroform	27	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1,3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethane	nd	0.2	PPB (UG/L)
1,2-Dichloroethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethene	nd	0.2	PPB (UG/L)
1,2-Dichloroethene (Cis)	nd	0.2	PPB (UG/L)
1,2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1,2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1,1,2,2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	nd	0.2	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
1,1,1-Trichloroethane	nd	0.2	PPB (UG/L)
1,1,2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	nd	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	nd	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 93 %
BCM (Surrogate) Recovery = 90 %
Dilution Factor = 1

Results for sample: MW-9

Date collected: 11/21/94 Date received: 11/23/94
Date extracted: 11/29/94 Date analyzed: 11/29,12/01/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9411059-1
Project Manager: Bob Marley Sampled by: Clarence Pigman
Matrix: Aqueous

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 101 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 111 %

Dilution Factor = 1

Results for sample: MW-9

Date collected: 11/21/94	Date received: 11/23/94
Date extracted: 11/23/94	Date analyzed: 12/02/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9411059-1
Project Manager: Bob Marley	Sampled by: Clarence Pigman
Matrix: Aqueous	

Test: EPA 8100

Compound	Result	Detection limit	Units
Naphthalene	nd	0.5	PPB (UG/L)
2-Methyl Naphthalene	nd	0.5	PPB (UG/L)
1-Methyl Naphthalene	0.7	0.5	PPB (UG/L)
Acenaphthalene	nd	0.5	PPB (UG/L)
Acenaphthene	nd	0.5	PPB (UG/L)
Fluorene	nd	0.5	PPB (UG/L)
Phenanthrene	nd	0.5	PPB (UG/L)
Anthracene	nd	0.5	PPB (UG/L)
Fluoranthrene	nd	0.5	PPB (UG/L)
Pyrene	nd	0.5	PPB (UG/L)
Benzo (a) anthracene	nd	0.5	PPB (UG/L)
Chrysene	nd	0.5	PPB (UG/L)
Benzo (b) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (k) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (a) pyrene	nd	0.5	PPB (UG/L)
Indeno (1,2,3-cd) pyrene	nd	1.0	PPB (UG/L)
Dibenzo (a,h) anthracene	nd	1.0	PPB (UG/L)
Benzo (g,h.i) perylene	nd	1.0	PPB (UG/L)

Hexadecane (Surrogate) Recovery = 83 %

Dilution Factor = 1

Results for sample: MW-11 (40')

Date collected: 11/21/94	Date received: 11/23/94
Date extracted: 11/28,29/94	Date analyzed: 11/29,12/01/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	Heal #: 9411059-4
Project Manager: Bob Marley	Sampled by:Clarence Pigman
Matrix: Non-aqueous	

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 98 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	5.0	PPM (MG/KG)

BFB (Surrogate) Recovery = 103 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	5.0	PPM (MG/KG)

DNOP (Surrogate) Recovery = 104 %

Dilution Factor = 1

Results for sample: MW-11 (56')

Date collected: 11/21/94 Date received: 11/23/94
Date extracted: 11/28,29/94 Date analyzed: 11/29,12/01/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9411059-5
Project Manager: Bob Marley Sampled by: Clarence Pigman
Matrix: Non-aqueous

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 100 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	5.0	PPM (MG/KG)

BFB (Surrogate) Recovery = 95 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	5.0	PPM (MG/KG)

DNOP (Surrogate) Recovery = 100 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: NA Date analyzed: 11/23/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: RB 11/23
Project Manager: Bob Marley
Matrix: Aqueous

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	nd	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1.3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethane	nd	0.2	PPB (UG/L)
1.2-Dichloroethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethene	nd	0.2	PPB (UG/L)
1.2-Dichloroethene (Cis)	nd	0.2	PPB (UG/L)
1.2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1.2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1.1.2.2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	nd	0.2	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
1.1.1-Trichloroethane	nd	0.2	PPB (UG/L)
1.1.2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	nd	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	nd	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 90 %
BCM (Surrogate) Recovery = 105 %
Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 11/23/94 Date analyzed: 12/02/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 11/23
Project Manager: Bob Marley
Matrix: Aqueous

Test: EPA 8100

Compound	Result	Detection limit	Units
Naphthalene	nd	0.5	PPB (UG/L)
2-Methyl Naphthalene	nd	0.5	PPB (UG/L)
1-Methyl Naphthalene	nd	0.5	PPB (UG/L)
Acenaphthalene	nd	0.5	PPB (UG/L)
Acenaphthene	nd	0.5	PPB (UG/L)
Fluorene	nd	0.5	PPB (UG/L)
Phenanthrene	nd	0.5	PPB (UG/L)
Anthracene	nd	0.5	PPB (UG/L)
Fluoranthrene	nd	0.5	PPB (UG/L)
Pyrene	nd	0.5	PPB (UG/L)
Benzo (a) anthracene	nd	0.5	PPB (UG/L)
Chrysene	nd	0.5	PPB (UG/L)
Benzo (b) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (k) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (a) pyrene	nd	0.5	PPB (UG/L)
Indeno (1,2,3-cd) pyrene	nd	1.0	PPB (UG/L)
Dibenzo (a,h) anthracene	nd	1.0	PPB (UG/L)
Benzo (g,h,i) perylene	nd	1.0	PPB (UG/L)

Hexadecane (Surrogate) Recovery = 79 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 11/29/94 Date analyzed: 11/29,12/02/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 11/29
Project Manager: Bob Marley
Matrix: Aqueous

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 98 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 113 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 11/28,29/94 Date analyzed: 11/29,12/01/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 11/28,29
Project Manager: Bob Marley
Matrix: Non-Aqueous

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 106 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	5.0	PPM (MG/KG)

BFB (Surrogate) Recovery = 107 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	5.0	PPM (MG/KG)

DNOP (Surrogate) Recovery = 88 %

Dilution Factor = 1

Results for QC: Matrix Spike / Matrix Spike Dup

Date extracted: NA	Date analyzed: 11/23/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9411059-1 MS/MSD
Project Manager: Bob Marley	
Matrix: Aqueous	Units: PPB (UG/L)

Test: EPA 8010/8020

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Chlorobenzene	<0.2	20.0	20.6	103	17.7	89	15
Ethylbenzene	<0.5	20.0	20.3	102	17.6	88	14
1,1-DCE	<0.2	20.0	20.2	101	17.2	86	16
Trans-1,2-DCE	<0.2	20.0	19.9	100	17.2	86	15
1,2-DCA	<0.2	20.0	21.7	109	19.0	95	13
1,2-Dichloropropane	<0.2	20.0	21.7	109	18.9	95	14
1,1,2-TCA	<0.2	20.0	22.4	112	20.2	101	10
PCE	<0.2	20.0	20.8	104	18.2	91	13
1,3-Dichlorobenzene	<0.2	20.0	19.8	99	17.5	88	12
1,4-Dichlorobenzene	<0.2	20.0	20.3	102	18.0	90	12

Results for QC: Blank Spike/Blank Spike Dup

Date extracted: 11/23/94 Date analyzed: 12/02/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: BS/BSD 11/23
Project Manager: Bob Marley
Matrix: Aqueous Units: PPB (UG/L)

Test: EPA 8100

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
Naphthalene	<0.5	10.0	7.7	77	7.5	75	3
Acenaphthylene	<0.5	10.0	8.3	83	7.9	79	5
Acenaphthene	<0.5	10.0	8.4	84	8.0	80	5
Flourene	<0.5	10.0	9.3	93	8.9	89	4
Phenanthrene	<0.5	10.0	9.9	99	10.2	102	3
Anthracene	<0.5	10.0	9.6	96	9.8	98	2
Pyrene	<0.5	10.0	9.8	98	9.8	98	0
Benzo(a)pyrene	<0.5	10.0	9.6	96	9.6	96	0
Benzo(g,h,i)-perylene	<1.0	10.0	10.5	105	10.6	106	1

Results for QC: Matrix Spike/ Matrix Spike Dup
Blank Spike / Blank Spike Dup

Date extracted: 11/29/94　Date analyzed: 11/29,12/01/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1　HEAL #: BS/BSD 11/29
Project Manager: Bob Marley　9411052-5 MS/MSD
Matrix: Aqueous　Units: PPM (MG/L)

Test: EPA 504.1

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
EDB	<0.01	0.67	0.61	91	0.59	88	3

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Gasoline	0.16	0.50	0.67	101	0.68	103	1

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
Diesel	<1.0	5.4	5.4	100	5.7	106	5

Results for QC: Matrix Spike / Matrix Spike Dup
Blank Spike/Blank Spike Dup

Date extracted: 11/28,29/94 Date analyzed: 11/29,12/01/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9411059-5 MS/MSD
Project Manager: Bob Marley 9411059-4 MS/MSD
Matrix: Non-Aqueous Units: PPM (MG/KG)

Test: EPA 8020

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Benzene	<0.05	1.00	1.09	109	1.12	112	3
Toluene	<0.05	1.00	1.05	105	1.09	109	4
Ethylbenzene	<0.05	1.00	0.97	97	1.01	101	4
Total Xylenes	<0.05	3.00	3.13	104	3.25	108	4

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Gasoline	<10	50	44	88	43	86	2

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
Diesel	<5.0	54	47	87	55	102	16

CHAIN-OF-CUSTODY RECORD

HALL ENVIRONMENTAL ANALYSIS LABORATORY
2403 San Mateo NE, Suite P-13
Albuquerque, New Mexico 87110
505.880.1803

Client: DANIEL B. STEPHENS + ASSOC

Address: 6020 ACADEMY NE #100
ALBUQUERQUE NM 87109

Phone #: 505-822-9400

Fax #: 505-822-7878

Project Name: ENRON WT-1

Project #: 4230

Project Manager: BOB MARLEY

Sampler: CLARENCE PIGMAN

Samples Cold? ☒ Yes ☐ No

ANALYSIS REQUEST

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative $HgCl_2$	Preservative HCl	Preservative Other	HEAL No.	BTEX (Method 602/8020)	BTEX + MTBE (602/8020)	TPH Method 8015 MOD (Gas/Diesel)	BTEX + TPH + MTBE (Gasoline Only)	BTEX + MTBE + TPH (Gas + Diesel)	TPH (Method 418.1)	601/602 Volatiles HALOCARBONS 8010	EDB (Method 504.1)	EDC	610 (PNA or PAH) POLYNUCLEAR AROMATIC H.C.				Air Bubbles or Headspace (Y or N)
11/21/94	1430	H_2O	MW-9	1/ℓ 6/40ml	X		NONE	9411059-1	X		X				X			X				
11/22/94	0915	H_2O	SB-1	1/ℓ 6/40ml	X		NONE	-2	X		X				X			X				
11/22/94	1310	H_2O	MW-7	1/ℓ 6/40ml	X		NONE	-3	X		X				X			X				
11/21/94	0940	SOIL	MW-11 (40)	1/250ml			NONE	-4	X		X											
11/21/94	1105	SOIL	MW-11 (56)	1/250ml			NONE	-5	X		X											
11/21/94	1630	SOIL	MW-7 (45)	1/250ml			NONE	-6	X		X											

Date: 11/22/94 Time: 0849 Relinquished By: (Signature) Clarence Pigman

Received By: (Signature)

Date: Time: Relinquished By: (Signature)

Received By: (Signature)

Remarks:

Hall Environmental
Analysis Laboratory

Hall Environmental Analysis Laboratory
2403 San Mateo NE, Suite P-13
Albuquerque, NM 87110

12/12 /94

Daniel B. Stephens and Associates, Inc.
6020 Academy NE, Suite 100
Albuquerque, NM 87109

Dear Mr. Bob Marley,

Enclosed are the results for the analyses that were requested. These were done according to EPA procedures or the equivalent.

Detection limits are determined by EPA methodology. Unless noted on sample page, all criteria for QA/QC acceptance levels fall within established parameters. These parameters are modeled from the EPA-600 14-79 019, March 1979, "Handbook for Analytical Quality Control in Water and Waste Water."

Please don't hesitate to contact me for any additional information or clarifications

Sincerely,

12/12/94

Scott Hallenbeck, Lab Manager

Project: ENRON WT-1

Results for sample: MW-13

Date collected: 12/1/94	Date received: 12/2/94
Date extracted: NA	Date analyzed: 12/5/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9412007-5
Project Manager: Bob Marley	Sampled by: BM/CP
Matrix: Aqueous	

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	nd	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1.3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethane	nd	0.2	PPB (UG/L)
1.2-Dichloroethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethene	nd	0.2	PPB (UG/L)
1.2-Dichloroethene (Cis)	nd	0.2	PPB (UG/L)
1.2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1.2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1.1.2.2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	nd	0.2	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
1.1.1-Trichloroethane	nd	0.2	PPB (UG/L)
1.1.2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	nd	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	nd	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 95 %
BCM (Surrogate) Recovery = 94 %
Dilution Factor = 1

Results for sample: MW-13

Date collected: 12/1/94 Date received: 12/2/94
Date extracted: 12/5,6/94 Date analyzed: 12/5,6,7/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9412007-5
Project Manager: Bob Marley Sampled by: BM/CP
Matrix: Aqueous

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 99 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 117 %

Dilution Factor = 1

Results for sample: MW-13

Date collected: 11/30/94	Date received: 12/2/94
Date extracted: 12/7/94	Date analyzed: 12/9/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9412007-5
Project Manager: Bob Marley	Sampled by: BM/CP
Matrix: Aqueous	

Test: EPA 8100

Compound	Result	Detection limit	Units
Naphthalene	nd	0.5	PPB (UG/L)
2-Methyl Naphthalene	nd	0.5	PPB (UG/L)
1-Methyl Naphthalene	nd	0.5	PPB (UG/L)
Acenaphthalene	nd	0.5	PPB (UG/L)
Acenaphthene	nd	0.5	PPB (UG/L)
Fluorene	nd	0.5	PPB (UG/L)
Phenanthrene	nd	0.5	PPB (UG/L)
Anthracene	nd	0.5	PPB (UG/L)
Fluoranthrene	nd	0.5	PPB (UG/L)
Pyrene	nd	0.5	PPB (UG/L)
Benzo (a) anthracene	nd	0.5	PPB (UG/L)
Chrysene	nd	0.5	PPB (UG/L)
Benzo (b) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (k) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (a) pyrene	nd	0.5	PPB (UG/L)
Indeno (1,2,3-cd) pyrene	nd	1.0	PPB (UG/L)
Dibenzo (a,h) anthracene	nd	1.0	PPB (UG/L)
Benzo (g,h,i) perylene	nd	1.0	PPB (UG/L)

Hexadecane (Surrogate) Recovery = 86 %

Dilution Factor = 1

Results for sample: SB-3 @ 55'

Date collected: 11/28/94 Date received: 12/2/94
Date extracted: 12/5/94 Date analyzed: 12/6,7/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: 9412007-6
Project Manager: Bob Marley Sampled by:BM/CP
Matrix: Non-aqueous

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 99 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	5.0	PPM (MG/KG)

BFB (Surrogate) Recovery = 98 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd*	5.0	PPM (MG/KG)

DNOP (Surrogate) Recovery = ** %

Dilution Factor = 1

* Motor oil range H-C @ ~460 MG/KG
**Surrogate non-recoverable due to matrix interference

Results for QC: Reagent Blank

Date extracted: NA Date analyzed: 12/5/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: RB 12/5
Project Manager: Bob Marley
Matrix: Aqueous

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	nd	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1,3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethane	nd	0.2	PPB (UG/L)
1,2-Dichloroethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethene	nd	0.2	PPB (UG/L)
1,2-Dichloroethene (Cis)	nd	0.2	PPB (UG/L)
1,2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1,2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1,1,2,2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	nd	0.2	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
1,1,1-Trichloroethane	nd	0.2	PPB (UG/L)
1,1,2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	nd	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	nd	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 95 %
BCM (Surrogate) Recovery = 96 %
Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 12/5,6/94 Date analyzed: 12/5,6,7/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 12/5,6,7
Project Manager: Bob Marley
Matrix: Aqueous

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 97 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 99 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 12/7/94 Date analyzed: 12/9/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 12/7
Project Manager: Bob Marley
Matrix: Aqueous

Test: EPA 8100

Compound	Result	Detection limit	Units
Naphthalene	nd	0.5	PPB (UG/L)
2-Methyl Naphthalene	nd	0.5	PPB (UG/L)
1-Methyl Naphthalene	nd	0.5	PPB (UG/L)
Acenaphthalene	nd	0.5	PPB (UG/L)
Acenaphthene	nd	0.5	PPB (UG/L)
Fluorene	nd	0.5	PPB (UG/L)
Phenanthrene	nd	0.5	PPB (UG/L)
Anthracene	nd	0.5	PPB (UG/L)
Fluoranthrene	nd	0.5	PPB (UG/L)
Pyrene	nd	0.5	PPB (UG/L)
Benzo (a) anthracene	nd	0.5	PPB (UG/L)
Chrysene	nd	0.5	PPB (UG/L)
Benzo (b) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (k) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (a) pyrene	nd	0.5	PPB (UG/L)
Indeno (1,2,3-cd) pyrene	nd	1.0	PPB (UG/L)
Dibenzo (a,h) anthracene	nd	1.0	PPB (UG/L)
Benzo (g,h.i) perylene	nd	1.0	PPB (UG/L)

Hexadecane (Surrogate) Recovery = 87 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 12/5/94 Date analyzed: 12/6,7/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 12/5
Project Manager: Bob Marley
Matrix: Non-Aqueous

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 100 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	5.0	PPM (MG/KG)

BFB (Surrogate) Recovery = 99 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	5.0	PPM (MG/KG)

DNOP (Surrogate) Recovery = 109 %

Dilution Factor = 1

Results for QC: Matrix Spike / Matrix Spike Dup

Date extracted: NA Date analyzed: 12/5/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9412007-5 MS/MSD
Project Manager: Bob Marley
Matrix: Aqueous Units: PPB (UG/L)

Test: EPA 8010/8020

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Chlorobenzene	<0.2	20.0	19.7	99	21.0	105	6
Ethylbenzene	<0.5	20.0	19.8	99	20.6	103	4
1,1-DCE	<0.2	20.0	22.2	111	20.5	103	8
Trans-1,2-DCE	<0.2	20.0	19.1	96	19.4	97	2
Carbon tet.	<0.2	20.0	18.3	92	16.9	85	8
1,2-DCA	<0.2	20.0	16.2	81	17.0	85	5
1,2-Dichloro-propane	<0.2	20.0	20.7	104	20.4	102	1
1,1,2-TCA	<0.2	20.0	19.2	96	18.4	92	4
PCE	<0.2	20.0	21.6	108	20.4	102	6
1,3-Dichloro-benzene	<0.2	20.0	19.8	99	19.6	98	1
1,4-Dichloro-benzene	<0.2	20.0	20.8	104	18.5	93	12

Results for QC: Matrix Spike/ Matrix Spike Dup
Blank Spike / Blank Spike Dup

Date extracted: 16/5,6/94 Date analyzed: 12/5,6,7/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: BS/BSD 12/5,6
Project Manager: Bob Marley 9411069-6 MS/MSD
Matrix: Aqueous Units: PPM (MG/L), PPB (UG/L)

Test: EPA 504.1

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
EDB	<0.01	0.67	0.59	88	0.60	90	2

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Gasoline	<0.05	0.50	0.51	102	0.54	108	6

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
Diesel	<1.0	5.4	5.6	104	6.2	115	10

Results for QC: Blank Spike/Blank Spike Dup

Date extracted: 12/6/94 Date analyzed: 12/9/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: BS/BSD 12/6
Project Manager: Bob Marley
Matrix: Aqueous Units: PPB (UG/L)

Test: EPA 8100

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
Naphthalene	<0.5	10.0	7.7	77	7.9	79	3
Acenaphthylene	<0.5	10.0	9.1	91	8.8	88	3
Acenaphthene	<0.5	10.0	8.2	82	8.2	82	0
Flourene	<0.5	10.0	8.9	89	8.9	89	0
Phenanthrene	<0.5	10.0	10.0	100	10.0	100	0
Anthracene	<0.5	10.0	10.1	101	10.2	102	1
Pyrene	<0.5	10.0	9.8	98	10.2	102	4
Benzo(a)pyrene	<0.5	10.0	10.5	105	10.4	104	1
Benzo(g,h,i)-perylene	<1.0	10.0	12.3	123	11.9	119	3

Results for QC: Matrix Spike / Matrix Spike Dup
Blank Spike/Blank Spike Dup

Date extracted: 12/5/94 Date analyzed: 12/6,7/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9412007-8 MS/MSD
Project Manager: Bob Marley 9412007-7 MS/MSD
Matrix: Non-Aqueous Units: PPM (MG/KG)

Test: EPA 8020

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Benzene	<0.05	1.00	0.94	94	0.87	87	8
Toluene	<0.05	1.00	0.95	95	0.88	88	8
Ethylbenzene	<0.05	1.00	0.88	88	0.81	81	8
Total Xylenes	<0.05	3.00	2.59	86	2.43	81	6

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Gasoline	<5.0	50	42	84	40	80	5

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
Diesel	<5.0	54	54	100	56	104	4

CHAIN-OF-CUSTODY RECORD

HALL ENVIRONMENTAL ANALYSIS LABORATORY
2403 San Mateo NE, Suite P-13
Albuquerque, New Mexico 87110
505.880.1803

Client: Daniel B. Stephens & Assoc

Address: 6020 Academy NE Suite 100
Alb. NM 87109

Phone #: 822 9400

Fax #: 822 8877

Project Name: ENRON - WTI

Project #: 4230.2

Project Manager: Bob Marley

Sampler: BM/CP

Samples Cold? ☒ Yes ☐ No

ANALYSIS REQUEST

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative HgCl$_2$	Preservative HCl	Preservative Other	HEAL No.	BTEX (Method 602/8020)	BTEX + MTBE (602/8020)	TPH Method 8015 MOD (Gas/Diesel)	BTEX + TPH + MTBE (Gasoline Only)	BTEX + MTBE + TPH (Gas + Diesel)	TPH (Method 418.1)	601/602 Volatiles 8010	EDB (Method 504.1)	EDC	610 (PNA or PAH) 8100				Air Bubbles or Headspace (Y or N)
12/1/94	0850	H_2O	MW-4	6-40ml 1-1l	X		none	9412007-1	X		X				X	X		X				N
12/1/94	1350	H_2O	MW-5	6-40ml 1-1l	X		none	-2	X		X				X	X		X				
11/30/94	1540	H_2O	MW-6	6-40ml 1-1l	X		none	-3	X		X				X	X		X				
11/30/94	1515	H_2O	MW-8	6-40ml 1-1l	X		none	-4	X		X				X	X		X				
12/1/94	1000	H_2O	MW-13	5-40ml 1-1l	X		none	-5	X		X				X	X		X				
~~11/28/94~~	—	~~H_2O~~	~~SB3 @ 40'~~	~~1-250ml Jar~~			~~None~~														BM	
11/28/94	1310	Soil ~~H_2O~~ BM	SB-3 @ 55'	1-250 ml Jar			None	-6	X		X											
11/29/94	0905	Soil	MW-5 @ 35'	1-250ml Jar			none	-7	X		X											
11/29/94	0930	Soil	MW-5 @ 47'	1-250ml Jar			none	-8	X		X											
11/29/94	1415	Soil	MW-4 @ 47'	1-250ml Jar			none	-9	X		X											
11/28/94	1650	Soil	MW-6 @ 48'	1-250ml Jar			none	-10	X		X											

Date: 12/2/94
Time: 1200
Relinquished By: (Signature) Bob Marley
Received By: (Signature)

Date:
Time:
Relinquished By: (Signature)
Received By: (Signature)

Remarks:

Inorganic Analyses

Analytical **Technologies,** Inc.

2709-D Pan American Freeway, NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. **411373**

December 12, 1994

Daniel B. Stephens & Associates
6020 Academy NE, Suite 100
Albuquerque, NM 87109

Project Name/Number: ENRON WT-1 4230

Attention: Bob Marley

On **11/18/94**, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **non-aqueous and 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.

EPA Method 8240 by TCLP analyses were added on 11/18/94 for samples "ENRON WT-1 EXCAVATION PIT (WT-1)", "MONUMENT" and "HAT MESA" per Bob Marley.

EPA Method 8080 analyses were cancelled on 11/18/94 for samples "ENRON WT-1 EXCAVATION PIT (WT-1)", "MONUMENT" and "HAT MESA" per Bob Marley.

EPA Method 418.1 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.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jt

Enclosure

Corporate Offices: 5550 Morehouse Drive San Diego, CA 92121 (619) 458-9141

Analytical **Technologies,** Inc.

CLIENT : DANIEL B. STEPHENS & ASSOC.
PROJECT # : 4230
PROJECT NAME : ENRON WT-1

DATE RECEIVED : 11/18/94
REPORT DATE : 12/12/94

ATI ID: 411373

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	ENRON WT-1 EXCAVATION PIT (WT-1)	NON-AQ	11/17/94
02	MONUMENT	NON-AQ	11/17/94
03	HAT MESA	NON-AQ	11/17/94
04	MW-1	AQUEOUS	11/15/94

---TOTALS---

MATRIX	#SAMPLES
NON-AQ	3
AQUEOUS	1

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.

GENERAL CHEMISTRY RESULTS

CLIENT	: DANIEL B. STEPHENS & ASSOC.	ATI I.D.	: 411373
PROJECT #	: 4230	DATE RECEIVED	: 11/18/94
PROJECT NAME	: ENRON WT-1	DATE ANALYZED	: 11/19/94 11/22/94

PARAMETER	UNITS	01	02	03
PETROLEUM HYDROCARBONS, IR	MG/KG	31000	5600	1200

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT	: DANIEL B. STEPHENS & ASSOC.	ATI I.D.	: 411373
PROJECT #	: 4230	SAMPLE MATRIX	: NON-AQ
PROJECT NAME	: ENRON WT-1	UNITS	: MG/KG

PARAMETER	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC.	% REC
PETROLEUM HYDROCARBONS	111994#2	<20	<20	NA	180	140	129

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \text{ X } 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \text{ X } 100$$

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : DANIEL B. STEPHENS & ASSOC.
PROJECT # : 4230
PROJECT NAME : ENRON WT-1

ATI I.D. : 411373
SAMPLE MATRIX : NON-AQ
UNITS : MG/KG

PARAMETER	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC.	% REC
PETROLEUM HYDROCARBONS	41137207	<20	<20	NA	170	140	121

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

AnalyticalTechnologies, Inc.

METALS RESULTS

ATI I.D. : 411373

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1

DATE RECEIVED : 11/18/94

REPORT DATE : 12/12/94

PARAMETER	UNITS	01	02	03
SILVER (TCLP 1311/6010)	MG/L	<0.05	<0.05	<0.05
ARSENIC (TCLP 1311/6010)	MG/L	<0.1	<0.2	<0.1
BARIUM (TCLP 1311/6010)	MG/L	0.66	0.67	0.98
CADMIUM (TCLP 1311/6010)	MG/L	<0.05	<0.05	<0.05
CHROMIUM (TCLP 1311/6010)	MG/L	<0.10	<0.10	<0.10
MERCURY (TCLP 1311/7470)	MG/L	<0.002	0.003	<0.002
LEAD (TCLP 1311/6010)	MG/L	<0.10	<0.20	<0.10
SELENIUM (TCLP 1311/6010)	MG/L	<0.1	<0.2	<0.1

Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 41137301

TEST : EPA METHOD 8240 (TCLP 1311)

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1
CLIENT I.D. : ENRON WT-1 EXCAVATION PIT (WT-1)
SAMPLE MATRIX : SOIL

DATE SAMPLED : 11/17/94
DATE RECEIVED : 11/18/94
DATE EXTRACTED : 11/21/94
DATE ANALYZED : 11/29/94
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
BENZENE	<10
CARBON TETRACHLORIDE	<10
CHLOROBENZENE	<10
CHLOROFORM	<10
1,2-DICHLOROETHANE	<10
1,1-DICHLOROETHENE	<10
METHYL ETHYL KETONE	<100
TETRACHLOROETHENE	<10
TRICHLOROETHENE	<10
VINYL CHLORIDE	<10

SURROGATE PERCENT RECOVERIES

DIBROMOFLUOROMETHANE (%)	103
BROMOFLUOROBENZENE (%)	103
TOLUENE-D8 (%)	100

Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 41137302

TEST : EPA METHOD 8240 (TCLP 1311)

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1
CLIENT I.D. : MONUMENT
SAMPLE MATRIX : SOIL

DATE SAMPLED : 11/17/94
DATE RECEIVED : 11/18/94
DATE EXTRACTED : 11/21/94
DATE ANALYZED : 11/29/94
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
BENZENE	<10
CARBON TETRACHLORIDE	<10
CHLOROBENZENE	<10
CHLOROFORM	<10
1,2-DICHLOROETHANE	<10
1,1-DICHLOROETHENE	<10
METHYL ETHYL KETONE	<100
TETRACHLOROETHENE	<10
TRICHLOROETHENE	<10
VINYL CHLORIDE	<10

SURROGATE PERCENT RECOVERIES

DIBROMOFLUOROMETHANE (%)	103
BROMOFLUOROBENZENE (%)	103
TOLUENE-D8 (%)	99

Analytical**Technologies,** Inc.

GCMS - RESULTS

ATI I.D. : 41137303

TEST : EPA METHOD 8240 (TCLP 1311)

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1
CLIENT I.D. : HAT MESA
SAMPLE MATRIX : SOIL

DATE SAMPLED : 11/17/94
DATE RECEIVED : 11/18/94
DATE EXTRACTED : 11/21/94
DATE ANALYZED : 11/29/94
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
BENZENE	<10
CARBON TETRACHLORIDE	<10
CHLOROBENZENE	<10
CHLOROFORM	<10
1,2-DICHLOROETHANE	<10
1,1-DICHLOROETHENE	<10
METHYL ETHYL KETONE	<100
TETRACHLOROETHENE	<10
TRICHLOROETHENE	<10
VINYL CHLORIDE	<10

SURROGATE PERCENT RECOVERIES

DIBROMOFLUOROMETHANE (%)	104
BROMOFLUOROBENZENE (%)	102
TOLUENE-D8 (%)	100

AnalyticalTechnologies, Inc.

GCMS - RESULTS

REAGENT BLANK

TEST : EPA METHOD 8240 (TCLP 1311)

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1
CLIENT I.D. : REAGENT BLANK

ATI I.D. : 411373
DATE EXTRACTED : 11/21/94
DATE ANALYZED : 11/29/94
UNITS : UG/L
DILUTION FACTOR : N/A

COMPOUNDS	RESULTS
BENZENE	<10
CARBON TETRACHLORIDE	<10
CHLOROBENZENE	<10
CHLOROFORM	<10
1,2-DICHLOROETHANE	<10
1,1-DICHLOROETHENE	<10
METHYL ETHYL KETONE	<100
TETRACHLOROETHENE	<10
TRICHLOROETHENE	<10
VINYL CHLORIDE	<10

SURROGATE PERCENT RECOVERIES

DIBROMOFLUOROMETHANE (%)	100
BROMOFLUOROBENZENE (%)	102
TOLUENE-D8 (%)	99

QUALITY CONTROL DATA

ATI I.D. : 411373

TEST : EPA METHOD 8240 (TCLP 1311)

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1
REF I.D. : 41249916

DATE ANALYZED : 11/29/94
SAMPLE MATRIX : NON-AQUEOUS
UNITS : UG/L

COMPOUNDS	SAMPLE RESULT	CONC. SPIKED	SPIKED SAMPLE	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
1,1-DICHLOROETHENE	<1	20	20	100	18	90	11
TRICHLOROETHENE	<1	20	21	105	18	90	15
CHLOROBENZENE	<1	20	19	95	17	85	11
BENZENE	<1	20	20	100	18	90	11

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Spiked Sample Result} - \text{Duplicate Spike Sample Result})}{\text{Average of Spiked Sample}} \times 100$$

AnalyticalTechnologies, Inc., Albuquerque, NM
San Diego • Phoenix • Seattle • Pensacola • Ft Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 11/17/94 PAGE ____ OF ____

ATI LAB I.D. 411373

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: R.L. Marley

COMPANY: Daniel B. Stephens + Assoc.
ADDRESS: 6020 Academy NE
Albq. NM 87110
PHONE: 822-9400
FAX: 822-8877

BILL TO: Daniel B. Stephens + Assoc.
COMPANY: Project 4230
ADDRESS: Same as Above

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)	NO2/NO3	Ca, Na, Mg, K, Fe, Mn, Cu, As, Ba, Cr, Pb, Hg, Ag, Cd, Se	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.	Cl, SO4, Tot. Alk., TDS		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
~~Enron WT-1 Excavation Pit~~ (WT-1)	~~11/17/94~~	~~12:00~~	~~Soil~~		~~X~~																												~~4~~
Enron WT-1 Excavation Pit (WT-1)	11/17/94	12:00	Soil	01	X											X															X		4
~~Enron WT-1 Excavation Pit~~ (WT-1)	~~11/17/94~~	~~12:00~~	~~Soil~~													~~X~~																	~~4~~
~~Enron WT-1 Excavation Pit~~ (WT-1)	~~11/17/94~~	~~12:00~~	~~Soil~~																														~~4~~
Monument	11/17/94	11:30	Soil	02	X											X															X		4
Hat Mesa	11/17/94	11:45	Soil	03	X											X															X		4
MW-1	11/15/94	15:45	H2O	04					X	X				X																			3

PROJECT INFORMATION

PROJ. NO.: 4230
PROJ. NAME: Enron WT-1
P.O. NO.: 4230
SHIPPED VIA: Mesa Airlines

SAMPLE RECEIPT

NO. CONTAINERS	5
CUSTODY SEALS	Y [✓ N] NA
RECEIVED INTACT	✓
RECEIVED COLD	✓

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☒ 1 WEEK (NORMAL) ☒ 2 WEEK
Comments: Soils only

SAMPLED & RELINQUISHED BY: 1.
Signature: Time:
Printed Name: Date:
Company: Phone:

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: D. Cutter Time: 1005
Printed Name: Dianne Cutter Date: 11/18/9
Analytical Technologies, Inc

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AnalyticalTechnologies,Inc. Albuquerque, NM

Chain of Custody

DATE 11/18/94 PAGE 1 OF 1

NETWORK PROJECT MANAGER: LETITIA KRAKOWSKI

COMPANY: **Analytical Technologies, Inc.**
ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Pesticides/PCB 8080	632/632 MOD	619/619 MOD	610/8310	Ca,Na,Mg,K,Fe,Mn,Cu,As,Se,	Cr,Zn,Pb,Hg,Ag,Cd,Se	8240 (TCLP 1311) ZHE	Cl,SO4,Alk,TDS	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)	NO2/NO3	NACE	ASBESTOS	RCRA metals by TCLP	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
411373 -01	11/17	1200	Nonaq	1						X													X										3
-02		1130		2						X													X										9
-03		1145		3						X													X										3
-04	11/15	1545	AQ	4										X	X	X	X			X													3

DL 11/19/94

PROJECT INFORMATION	
PROJECT NUMBER:	411373
PROJECT NAME:	SDB
QC LEVEL:	[✓ STD] IV
[✓ QC REQUIRED:]	MS MSD BLANK
TAT:	[✓ STANDARD] RUSH!

DUE DATE: 12/6
RUSH SURCHARGE: 0
CLIENT DISCOUNT: 10 %

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	18
CHAIN OF CUSTODY SEALS	N
INTACT?	
RECEIVED GOOD COND./COLD	
LAB NUMBER	411373

COTT LK11124

SAMPLES SENT TO:
- SAN DIEGO
- FT. COLLINS
- RENTON
- PENSACOLA
- PORTLAND
- PHOENIX X
- FIBERQUANT

RELINQUISHED BY: 1.
Signature: D. Cutler Time: 1730
Printed Name: Dianne Cutler Date: 11/18/94
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: [illegible]
Printed Name: MARGUERITE C[illegible] Date: 11/19/94
Company: ATI

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Analytical Technologies, Inc. Albuquerque, NM

Chain of Custody

DATE 11/18/94 PAGE 1 OF 1

NETWORK PROJECT MANAGER: LETITIA KRAKOWSKI

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)	[illegible]	632/632 MOD	619/619 MOD	610/5310	[illegible]	[illegible]	8240 (TCLP 1311)ZHE	Cl, SO4, ALK, TDS	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)	NO3/NO2	NACE	ASBESTOS	RCRA [illegible] TCLP	BOD	TOTAL COLIFORM	FECAL COLIFORM	8240 BY TCLP	11/18 [illegible] GROSS ALPHA/BETA	RADIUM 226/228		AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
411373-01	11/17	1200	Water	1						X													X				X						
-02	↓	1130	↓	2						X													X				X						
-03	↓	1145	↓	3						X													X				X						
-04	11/15	1545	AQ	4										X	X	\	X			X													
														X	X		X			X													

PROJECT INFORMATION

PROJECT NUMBER: 411373
PROJECT NAME: SDB
QC LEVEL: [✓ STD] IV
QC REQUIRED: MS MSD BLANK
TAT: [✓ STANDARD] RUSH!
DUE DATE: 12/6
RUSH SURCHARGE: 0
CLIENT DISCOUNT: 10 %

with 411124

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS
CHAIN OF CUSTODY SEALS
INTACT?
RECEIVED GOOD COND./COLD
LAB NUMBER

SAMPLES SENT TO

SAN DIEGO	
FT. COLLINS	
RENTON	
PENSACOLA	
PORTLAND	
PHOENIX	X
FIBERQUANT	

RELINQUISHED BY: 1.
Signature: D. Tuller Time: 1720
Printed Name: Diane Tuller Date: 11/[illegible]
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:
Printed Name: Date:
Company:

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RECEIVED DEC 1 3 1994

Analytical Technologies, Inc.

2709-D Pan American Freeway, NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. **411383**

December 13, 1994

Daniel B. Stephens
6020 Academy NE, Suite 100
Albuquerque, NM 87109

Project Name/Number: ENRON WT-1 4230

Attention: Bob Marley

On **11/21/94**, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **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.

All analyses were performed by Analytical Technologies, Inc., 9830 S. 51st Street, Suite B-113, Phoenix, AZ.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

H Mitchell

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jt

Enclosure

Corporate Offices: 5550 Morehouse Drive San Diego, CA 92121 (619) 458-9141

Analytical **Technologies,** Inc.

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1
DATE RECEIVED : 11/21/94
REPORT DATE : 12/13/94
ATI I.D. : 411383

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	MW-10	AQUEOUS	11/18/94
02	MW-12	AQUEOUS	11/18/94
03	DUP-1	AQUEOUS	11/18/94
04	SVE-1-MW	AQUEOUS	11/19/94
05	SB-2	AQUEOUS	11/19/94

----- TOTALS -----

MATRIX	# SAMPLES
AQUEOUS	5

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.

Analytical **Technologies,** Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 411383

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1

DATE RECEIVED : 11/21/94

REPORT DATE : 12/13/94

PARAMETER	UNITS	01	02	03	04	05
CARBONATE (CACO3)	MG/L	<1	<1	<1	<1	<1
BICARBONATE (CACO3)	MG/L	804	228	1910	1940	460
HYDROXIDE (CACO3)	MG/L	<1	<1	<1	<1	<1
TOTAL ALKALINITY (AS CACO3)	MG/L	804	228	1910	1940	460
CHLORIDE (EPA 325.2)	MG/L	650	980	270	290	610
NO2/NO3-N, TOTAL (353.2)	MG/L	<0.06	17	0.08	0.07	0.12
SULFATE (EPA 375.2)	MG/L	12	1100	5	5	460
T. DISSOLVED SOLIDS (160.1)	MG/L	2500	3300	4300	4200	2100

Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1
ATI I.D. : 411383

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CARBONATE	MG/L	41178604	<1	<1	NA	NA	NA	NA
BICARBONATE	MG/L		118	117	0.9	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		118	117	0.9	NA	NA	NA
CARBONATE	MG/L	41138303	<1	<1	NA	NA	NA	NA
BICARBONATE	MG/L		1910	1930	1	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		1910	1930	1	NA	NA	NA
CHLORIDE	MG/L	41138301	650	650	0	1600	1000	95
NITRITE/NITRATE-N (TOT	MG/L	41138301	<0.06	<0.06	NA	2.05	2.00	102
SULFATE	MG/L	41138302	1100	1100	0	1700	500	120
TOTAL DISSOLVED SOLIDS	MG/L	41138302	3300	3200	3	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. : 411383

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1

DATE RECEIVED : 11/21/94

REPORT DATE : 12/13/94

PARAMETER	UNITS	01	02	03	04	05
SILVER (EPA 200.7/6010)	MG/L	<0.010	<0.010	<0.010	<0.010	<0.010
ARSENIC (EPA 206.2/7060)	MG/L	0.019	<0.005	0.038	0.039	<0.005
BARIUM (EPA 200.7/6010)	MG/L	0.580	0.049	56.2	49.8	0.094
CALCIUM (EPA 200.7/6010)	MG/L	348	506	298	293	248
CADMIUM (EPA 213.2/7131)	MG/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
CHROMIUM (EPA 200.7/6010)	MG/L	<0.010	<0.010	<0.010	<0.010	0.013
COPPER (EPA 200.7/6010)	MG/L	<0.010	0.012	<0.010	<0.010	0.013
IRON (EPA 200.7/6010)	MG/L	1.87	1.22	0.139	0.090	<0.050
MERCURY (EPA 245.1/7470)	MG/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
POTASSIUM (EPA 200.7/6010)	MG/L	5.6	12.5	7.2	6.5	13.4
MAGNESIUM (EPA 200.7/6010)	MG/L	201	244	392	383	143
MANGANESE (EPA 200.7/6010)	MG/L	2.41	0.352	0.078	0.082	0.231
SODIUM (EPA 200.7/6010)	MG/L	165	247	342	339	279
LEAD (EPA 239.2/7421)	MG/L	<0.002	<0.002	<0.002	<0.002	<0.002
SELENIUM (EPA 270.2/7740)	MG/L	<0.005	0.016	<0.005	<0.005	<0.005
ZINC (EPA 200.7/6010)	MG/L	0.057	0.082	<0.050	<0.050	1.15

AnalyticalTechnologies, Inc.

METALS - QUALITY CONTROL

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1
ATI I.D. : 411383

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
SILVER	MG/L	41138305	<0.010	<0.010	NA	0.439	0.500	88
ARSENIC	MG/L	41138302	<0.005	<0.005	NA	0.050	0.050	100
BARIUM	MG/L	41138305	0.094	0.101	7	1.03	1.00	94
CALCIUM	MG/L	41178604	57.8	56.5	2	104	50.0	92
CADMIUM	MG/L	41138302	<0.0005	<0.0005	NA	0.0042	0.0050	84
CHROMIUM	MG/L	41138305	0.013	0.012	8	0.900	1.00	89
COPPER	MG/L	41138305	0.013	0.012	8	0.465	0.500	90
IRON	MG/L	41138305	<0.050	<0.050	NA	0.884	1.00	88
MERCURY	MG/L	41138304	<0.0002	0.0002	NA	0.0048	0.0050	96
POTASSIUM	MG/L	41178604	3.6	3.6	0	51.6	50.0	96
MAGNESIUM	MG/L	41178604	10.0	9.8	2	34.0	25.0	95
MANGANESE	MG/L	41138305	0.231	0.231	0	1.12	1.00	89
SODIUM	MG/L	41178604	19.6	19.0	3	67.2	50.0	95
LEAD	MG/L	41138302	<0.002	<0.002	NA	0.046	0.050	92
SELENIUM	MG/L	41138302	0.016	0.017	6	0.050	0.050	68
ZINC	MG/L	41138305	1.15	1.15	0	1.60	0.500	90

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc., Albuquerque, NM
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 11/20/94 PAGE 1 OF 1

ATI LAB I.D. 411383

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 #100

PHONE: 505-822-9400
FAX:

BILL TO: DANIEL B. STEPHENS & ASSOC
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)	Cl, SO4, TDS, TOT ALKALINITY	NO3/NO2	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volaties (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	METALS Ca, Na, Mg, K, Fe, Mn, Cu, As Ba, Cr, Zn, Pb, Hg, Cd, Se, Ag		The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)		NUMBER OF CONTAINERS
MW-10	11/18/94	1330	H_2O	01					X	X																	X						
MW-12	11/18/94	1430	H_2O	02					X	X																	X						
DUP-1	NA	NA	H_2O	03					X	X																	X						
SVE-1-MW	11/19/94	1330	H_2O	04					X	X																	X						
SB-2	11/19/94	1700	H_2O	05					X	X																	X						

PROJECT INFORMATION

PROJ. NO.: 4230
PROJ. NAME: ENRON WT-1
P.O. NO.:
SHIPPED VIA: MESA AIRLINES

SAMPLE RECEIPT

NO. CONTAINERS: 15
CUSTODY SEALS: Y [✓ N] / NA
RECEIVED INTACT:
RECEIVED COLD:

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☑ 2 WEEK

Comments:
ALL METALS SAMPLES FIELD FILTERED

SAMPLED & RELINQUISHED BY: 1.

Signature: Clarence Pyeatt Time: 1105
Printed Name: CLARENCE PYEATT Date: 11/20/94
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: V. Cutler Time: 0930
Printed Name: Dianne Cutler Date: 11/21/94
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

AnalyticalTechnologies,Inc. Albuquerque, NM

Chain of Custody

DATE 11/21/94 PAGE 1 OF 1

NETWORK PROJECT MANAGER: LETITIA KRAKOWSKI

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)	Cl, SO4, TDS, Alk, NO2/NO3	632/632 MOD	615/619 MOD	610/8310	Ca, Na, Mg, K, Fe, Mn, Cu, Ag	Ba, Cr, Zn, Pb, Hg, Cd, Se	8240 (TCLP 1311) ZHE		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
411383-01	11/18	1330	Aq	1						X				X	X																		3
-02	↓	1130		2						X				X	X																		3
-03	NA	NA		3						X				X	X																		3
-04	11/19	1330		4						X				X	X																		3
-05	↓	1700	↓	5						X				X	X																		3

PROJECT INFORMATION

PROJECT NUMBER: 411383
PROJECT NAME: SDP
QC LEVEL: [✓ STD] IV
[✓ QC REQUIRED:] MS MSD BLANK
TAT: [✓ STANDARD] RUSH

DUE DATE: 12/7
RUSH SURCHARGE: -0-
CLIENT DISCOUNT: 10 %

WOH LK1130

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS	15
CHAIN OF CUSTODY SEALS	NA
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	411383

SAMPLES SENT TO
SAN DIEGO
FT. COLLINS
RENTON
PENSACOLA
PORTLAND
PHOENIX X
FIBERQUANT

RELINQUISHED BY: 1.
Signature: D. Miller Time: 1230
Printed Name: Dianne Miller Date: 11/21/94
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: Rosella Vidal Time: 0914
Printed Name: Rosella Vidal Date: 11/22/94
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.   9830 S. 51st Street Suite B-113 Phoenix, AZ 85044 (602) 496-4400

ATI I.D. **411818**

December 13, 1994

Daniel B. Stephens & Associates
6020 Academy NE
Suite 100
Albuquerque, NM 87109

Project Name/Number: Enron WT-1/4230

Attention: Bob Marley

On **11/23/94**, Analytical Technologies, Inc., received a request to analyze **aqeuous** sample(s). The sample(s) 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.

If you have any questions or comments, please do not hesitate to contact us at (602) 496-4400.

Mary H. Tyer
Mary Tyer
Project Manager

MT/jat

Enclosure

ADHS License No. AZ0061
Donald F. Weber, Laboratory Manager

Corporate Offices: 5550 Morehouse Drive San Diego, CA 92121 (619) 458-9141

Analytical Technologies, Inc.

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1

DATE RECEIVED : 11/23/94
REPORT DATE : 12/12/94

ATI I.D. : 411818

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	MW-9	AQUEOUS	11/21/94
02	SB-1	AQUEOUS	11/22/94
03	MW-7	AQUEOUS	11/22/94

----- TOTALS -----

MATRIX	# SAMPLES
AQUEOUS	3

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.

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 411818

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1

DATE RECEIVED : 11/23/94
REPORT DATE : 12/12/94

PARAMETER	UNITS	01	02	03
CARBONATE (CACO3)	MG/L	<1	<1	<1
BICARBONATE (CACO3)	MG/L	326	492	327
HYDROXIDE (CACO3)	MG/L	<1	<1	<1
TOTAL ALKALINITY (AS CACO3)	MG/L	326	492	327
CHLORIDE (EPA 325.2)	MG/L	860	750	400
NITRITE (EPA 354.1)	MG/L	1.3	<0.05	<0.05
NITRATE AS N (EPA 353.2)	MG/L	8.4	0.28	6.8
SULFATE (EPA 375.2)	MG/L	850	450	920
T. DISSOLVED SOLIDS (160.1)	MG/L	2800	2300	2400

AnalyticalTechnologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1
ATI I.D. : 411818

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CARBONATE	MG/L	41138303	<1	<1	NA	NA	NA	NA
BICARBONATE	MG/L		1910	1930	1	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		1910	1930	1	NA	NA	NA
CHLORIDE	MG/L	41185701	126	126	0	226	100	100
NITRITE AS NITROGEN	MG/L	41149912	<0.05	<0.05	NA	0.25	0.25	100
NITRATE AS NITROGEN	MG/L	41181802	0.28	0.28	0	2.31	2.00	102
SULFATE	MG/L	41185701	240	240	0	430	200	95
TOTAL DISSOLVED SOLIDS	MG/L	41181801	2800	2900	4	NA	NA	NA

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

AnalyticalTechnologies, Inc.

METALS RESULTS

ATI I.D. : 411818

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1

DATE RECEIVED : 11/23/94
REPORT DATE : 12/12/94

PARAMETER	UNITS	01	02	03
SILVER (EPA 200.7/6010)	MG/L	<0.010	<0.010	<0.010
ARSENIC (EPA 206.2/7060)	MG/L	<0.005	0.005	0.006
BARIUM (EPA 200.7/6010)	MG/L	0.043	0.085	0.032
CALCIUM (EPA 200.7/6010)	MG/L	452	275	323
CADMIUM (EPA 213.2/7131)	MG/L	<0.0005	<0.0005	<0.0005
CHROMIUM (EPA 200.7/6010)	MG/L	<0.010	<0.010	<0.010
COPPER (EPA 200.7/6010)	MG/L	<0.010	0.010	0.014
IRON (EPA 200.7/6010)	MG/L	<0.050	<0.050	<0.050
MERCURY (EPA 245.1/7470)	MG/L	<0.0002	<0.0002	<0.0002
POTASSIUM (EPA 200.7/6010)	MG/L	9.6	9.4	7.9
MAGNESIUM (EPA 200.7/6010)	MG/L	222	209	148
MANGANESE (EPA 200.7/6010)	MG/L	0.229	0.254	0.069
SODIUM (EPA 200.7/6010)	MG/L	295	322	244
LEAD (EPA 239.2/7421)	MG/L	<0.002	<0.002	<0.002
SELENIUM (EPA 270.2/7740)	MG/L	0.009	<0.005	0.008
ZINC (EPA 200.7/6010)	MG/L	0.092	4.73	<0.050

AnalyticalTechnologies, Inc.

METALS - QUALITY CONTROL

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1
ATI I.D. : 411818

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
SILVER	MG/L	41181802	<0.010	<0.010	NA	0.439	0.500	88
ARSENIC	MG/L	41185801	0.016	0.015	6	0.060	0.050	88
BARIUM	MG/L	41181802	0.085	0.079	7	0.982	1.00	90
CALCIUM	MG/L	41181803	323	334	3	378	50.0	110
CADMIUM	MG/L	41178801	<0.0005	<0.0005	NA	MSA	CC=	.9988
CHROMIUM	MG/L	41181802	<0.010	<0.010	NA	0.896	1.00	90
COPPER	MG/L	41181802	0.010	<0.010	NA	0.459	0.500	90
IRON	MG/L	41181802	<0.050	<0.050	NA	0.888	1.00	89
MERCURY	MG/L	41138304	<0.0002	0.0002	NA	0.0048	0.0050	96
MERCURY	MG/L	41183001	<0.0002	<0.0002	NA	0.0050	0.0050	100
POTASSIUM	MG/L	41181803	7.9	8.0	1	58.7	50.0	102
MAGNESIUM	MG/L	41181803	148	145	2	401	250	101
MANGANESE	MG/L	41181802	0.254	0.237	7	1.15	1.00	90
SODIUM	MG/L	41181803	244	251	3	284	50.0	80
LEAD	MG/L	41180601	<0.002	<0.002	NA	0.042	0.050	84
SELENIUM	MG/L	41138302	0.016	0.017	6	0.050	0.050	68
ZINC	MG/L	41181802	4.73	4.43	7	14.9	10.0	102

$$\text{\% Recovery} = \frac{\text{(Spike Sample Result - Sample Result)}}{\text{Spike Concentration}} \text{ X } 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{\text{(Sample Result - Duplicate Result)}}{\text{Average Result}} \text{ X } 100$$

[redacted] Analytical Technologies, Inc., Albuquerque, NM [redacted]
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN [redacted] CUSTODY

DATE: 11/22 PAGE 1 OF 1

TI L[redacted]D. 411818

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 #100
ALBUQUERQUE NM 87109
PHONE: 505-822-9400
FAX: 505-822-7878

BILL TO: DANIEL B. STEPHENS + ASSOC
COMPANY:
ADDRESS:

SAMPLE ID	DATE	TIME	MATRIX	LAB ID
MW-9	11/21/94	1430	H_2O	1
SB-1	11/22/94	0915	H_2O	2
MW-7	11/22/94	1310	H_2O	3

ANALYSIS REQUEST

SAMPLE ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	BTXE/MTBE (8020)	Cl, SO4, TDS, TOT ALKALINITY	NO_2/NO_3	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)	METALS Ca, Na, Mg, K, Fe, Mn, [illegible]	NUMBER OF CONTAINERS
MW-9					X	X																						X	3
SB-1					X	X																						X	3
MW-7					X	X																						X	3

PROJECT INFORMATION

PROJ. NO.: 4230
PROJ. NAME: ENRON WT-1
P.O. NO.: 4230
SHIPPED VIA: FED EX

SAMPLE RECEIPT

NO. CONTAINERS	9
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:
METALS FIELD FILTERED

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Clarence Pigman Time: 1700	Signature: Time:	Signature: Time:
Printed Name: CLARENCE PIGMAN Date: 11/22/94	Printed Name: Date:	Printed Name: Date:
Company: Phone:	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Time:	Signature: Time:	Signature: Rosella Vidal Time: 1111
Printed Name: Date:	Printed Name: Date:	Printed Name: Rosella Vidal Date: 11/23/9
Company:	Company:	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

REC [illegible] 994

Analytical**Technologies,** Inc.

2709-D Pan American Freeway, NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. **412312**

December 22, 1994

Daniel B. Stephens & Associates
6020 Academy NE, Suite 100
Albuquerque, NM 87109

Project Name/Number: ENRON-WT1 4230.2

Attention: Bob Marley

On **12/02/94**, 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.

Due to matrix interferences, selenium spike analysis was performed using the Method of Standard Additions (MSA). The spike result given is the correlation coefficient (CC), which is $\geq$ 0.995.

For sample "MW-13", the Sulfuric Acid preserved bottle for Nitrate/Nitrite analysis was not received by ATI, Albuquerque.

EPA Method 8240 and RCRA Metal by TCLP analyses were performed by Analytical Technologies, Inc., 225 Commerce Drive, Fort Collins, CO.

All other analyses were performed by Analytical Technologies, Inc., 9830 S. 51st Street, Suite B-113, Phoenix, AZ.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jt

Enclosure

Corporate Offices: 5550 Morehouse Drive San Diego, CA 92121 (619) 458-9141

CLIENT : DANIEL B. STEPHENS
PROJECT # : 4230.2
PROJECT NAME : ENRON-WT1

DATE RECEIVED : 12/02/94
REPORT DATE : 12/22/94

ATI ID: 412312

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	MW-4	AQUEOUS	12/01/94
02	MW-5	AQUEOUS	12/01/94
03	MW-6	AQUEOUS	11/30/94
04	MW-8	AQUEOUS	11/30/94
05	MW-13	AQUEOUS	12/01/94
06	PIT	NON-AQ	11/30/94
07	DEHY	NON-AQ	11/30/94

---TOTALS---

MATRIX	#SAMPLES
AQUEOUS	5
NON-AQ	2

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.

Analytical**Technologies,** Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 412312

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230.2
PROJECT NAME : ENRON-WT1

DATE RECEIVED : 12/02/94
REPORT DATE : 12/22/94

PARAMETER	UNITS	01	02	03	04	05
CARBONATE (CACO3)	MG/L	<1	<1	<1	<1	<1
BICARBONATE (CACO3)	MG/L	273	1080	624	441	273
HYDROXIDE (CACO3)	MG/L	<1	<1	<1	<1	<1
TOTAL ALKALINITY (AS CACO3)	MG/L	273	1080	624	441	273
CHLORIDE (EPA 325.2)	MG/L	540	360	700	590	340
NO2/NO3-N, TOTAL (353.2)	MG/L	20	<0.06	<0.06	0.44	-
SULFATE (EPA 375.2)	MG/L	1000	<5	410	330	1400
T. DISSOLVED SOLIDS (160.1)	MG/L	2800	2000	2400	1900	2900

Analytical **Technologies**, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230.2
PROJECT NAME : ENRON-WT1

ATI I.D. : 412312

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CARBONATE	MG/L	41231204	<1	<1	NA	NA	NA	NA
BICARBONATE	MG/L		441	444	0.7	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		441	444	0.7	NA	NA	NA
CARBONATE	MG/L	41256810	<1	<1	NA	NA	NA	NA
BICARBONATE	MG/L		451	456	1	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		451	461	1	NA	NA	NA
CHLORIDE	MG/L	41253101	26	26	0	51	25	100
NITRITE/NITRATE-N (TOT	MG/L	41180301	6.7	6.7	0	27.2	20.0	102
SULFATE	MG/L	41231204	330	330	0	520	200	95
SULFATE	MG/L	41255506	67	67	0	106	40	98
TOTAL DISSOLVED SOLIDS	MG/L	41231202	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. : 412312

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230.2
PROJECT NAME : ENRON-WT1

DATE RECEIVED : 12/02/94

REPORT DATE : 12/22/94

PARAMETER	UNITS	01	02	03	04	05
SILVER (EPA 200.7/6010)	MG/L	<0.010	<0.010	<0.010	<0.010	<0.010
ARSENIC (EPA 206.2/7060)	MG/L	0.007	0.036	<0.005	0.006	0.006
BARIUM (EPA 200.7/6010)	MG/L	0.025	17.3	0.109	0.052	0.048
CALCIUM (EPA 200.7/6010)	MG/L	332	185	293	247	491
CADMIUM (EPA 213.2/7131)	MG/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
CHROMIUM (EPA 200.7/6010)	MG/L	<0.010	<0.010	<0.010	<0.010	<0.010
COPPER (EPA 200.7/6010)	MG/L	<0.010	<0.010	<0.010	0.014	<0.010
IRON (EPA 200.7/6010)	MG/L	<0.050	0.097	<0.050	<0.050	<0.050
MERCURY (EPA 245.1/7470)	MG/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
POTASSIUM (EPA 200.7/6010)	MG/L	5.9	6.1	7.1	6.0	9.3
MAGNESIUM (EPA 200.7/6010)	MG/L	153	200	197	137	184
MANGANESE (EPA 200.7/6010)	MG/L	0.024	0.112	0.562	0.136	<0.010
SODIUM (EPA 200.7/6010)	MG/L	353	326	267	221	116
LEAD (EPA 239.2/7421)	MG/L	<0.002	<0.002	<0.002	<0.002	<0.002
SELENIUM (EPA 270.2/7740)	MG/L	0.020	<0.005	<0.005	<0.005	0.009
ZINC (EPA 200.7/6010)	MG/L	<0.050	<0.050	<0.050	<0.050	<0.050

METALS - QUALITY CONTROL

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230.2
PROJECT NAME : ENRON-WT1

ATI I.D. : 412312

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
SILVER	MG/L	41231204	<0.010	<0.010	NA	0.477	0.500	95
ARSENIC	MG/L	41251801	0.054	0.055	2	0.096	0.050	84
BARIUM	MG/L	41231204	0.052	0.052	0	1.04	1.00	99
CALCIUM	MG/L	41231201	332	321	3	558	250	90
CADMIUM	MG/L	41231201	<0.0005	<0.0005	NA	0.0043	0.0050	86
CHROMIUM	MG/L	41231204	<0.010	<0.010	NA	0.955	1.00	96
COPPER	MG/L	41231204	0.014	0.015	7	0.511	0.500	99
IRON	MG/L	41231204	<0.050	<0.050	NA	0.959	1.00	96
MERCURY	MG/L	41253707	<0.0002	<0.0002	NA	0.0048	0.0050	96
POTASSIUM	MG/L	41250102	12.4	12.6	2	62.8	50.0	101
MAGNESIUM	MG/L	41231201	153	148	3	266	125	90
MANGANESE	MG/L	41231204	0.136	0.134	1	1.10	1.00	96
SODIUM	MG/L	41231201	353	346	2	459	100	106
LEAD	MG/L	41231201	<0.002	<0.002	NA	0.050	0.050	100
SELENIUM	MG/L	41231201	0.020	0.019	5	MSA	CC=	.9995
ZINC	MG/L	41231204	<0.050	<0.050	NA	0.504	0.500	101

$$\%\ \text{Recovery} = \frac{(\text{Spike Sample Result - Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result - Duplicate Result})}{\text{Average Result}} \times 100$$

AnalyticalTechnologies, Inc.

TCLP METALS

Sample ID

TCLP Blank

Lab Name: Analytical Technologies, Inc.

Client Name: ATI-NM

Date Collected: N/A

Client Project ID: SDM -- 412312

Prep Date: 12/12, 14/94

Lab Sample ID: RB 94-12-049

Date Analyzed: 12/12, 14/94

Sample Matrix: TCLP Leachate

EPA HW Number	CAS Number	Analyte	Method	Concentration (mg/L)	Detection Limit (mg/L)
D004	7440-38-2	Arsenic	6010	ND	0.06
D005	7440-39-3	Barium	6010	ND	0.9
D006	7440-43-9	Cadmium	6010	ND	0.005
D007	7440-47-3	Chromium	6010	ND	0.01
D008	7439-92-1	Lead	6010	ND	0.05
D009	7439-97-6	Mercury	7470	ND	0.002
D010	7782-49-2	Selenium	6010	ND	0.1
D011	7440-22-4	Silver	6010	ND	0.01

ND = Not Detected

Analytical **Technologies,** Inc.

TCLP METALS

Sample ID

Pit

Lab Name: Analytical Technologies, Inc.

Client Name: ATI-NM

Client Project ID: SDM -- 412312

Lab Sample ID: 94-12-049-01

Sample Matrix: TCLP Leachate

Date Collected: 11/30/94

Prep Date: 12/12, 14/94

Date Analyzed: 12/12, 14/94

EPA HW Number	CAS Number	Analyte	Method	Concentration (mg/L)	Detection Limit (mg/L)
D004	7440-38-2	Arsenic	6010	ND	0.06
D005	7440-39-3	Barium	6010	ND	0.9
D006	7440-43-9	Cadmium	6010	ND	0.005
D007	7440-47-3	Chromium	6010	ND	0.01
D008	7439-92-1	Lead	6010	ND	0.05
D009	7439-97-6	Mercury	7470	ND	0.002
D010	7782-49-2	Selenium	6010	ND	0.1
D011	7440-22-4	Silver	6010	ND	0.01

ND = Not Detected

Analytical**Technologies,** Inc.

TCLP METALS

Sample ID

DEHY

Lab Name: Analytical Technologies, Inc.

Client Name: ATI-NM

Date Collected: 11/30/94

Client Project ID: SDM -- 412312

Prep Date: 12/12, 14/94

Lab Sample ID: 94-12-049-02

Date Analyzed: 12/12, 14/94

Sample Matrix: TCLP Leachate

EPA HW Number	CAS Number	Analyte	Method	Concentration (mg/L)	Detection Limit (mg/L)
D004	7440-38-2	Arsenic	6010	ND	0.05
D005	7440-39-3	Barium	6010	ND	0.9
D006	7440-43-9	Cadmium	6010	ND	0.005
D007	7440-47-3	Chromium	6010	ND	0.01
D008	7439-92-1	Lead	6010	ND	0.05
D009	7439-97-6	Mercury	7470	ND	0.002
D010	7782-49-2	Selenium	6010	ND	0.1
D011	7440-22-4	Silver	6010	ND	0.01

ND = Not Detected

Analytical**Technologies,** Inc.

TCLP METALS
MATRIX SPIKE

Sample ID

Pit

Lab Name: Analytical Technologies, Inc.

Client Name: ATI-NM

Lab Sample ID: 94-12-049-01

Prep Date: 12/14/94

Sample Matrix: TCLP Leachate

Date Analyzed: 12/14/94

Analyte	Spike Added (mg/L)	Sample Concentration (mg/L)	MS Concentration (mg/L)	MS Percent Recovery
Arsenic	2.0	< 0.06	2.1	105
Barium *	2.0	0.7	2.6	95
Cadmium	0.050	< 0.005	0.051	102
Chromium	0.20	< 0.01	0.16	80
Lead	0.50	< 0.05	0.50	100
Selenium	2.0	< 0.1	2.2	110
Silver	0.20	< 0.01	0.19	95

*Native concentration is above instrument detection limit but below reporting limit.

Analyte	MSD Concentration (mg/L)	MSD Percent Recovery	RPD %
Arsenic	2.1	105	0
Barium	2.6	95	0
Cadmium	0.052	104	2
Chromium	0.16	80	0
Lead	0.50	100	0
Selenium	2.1	105	5
Silver	0.19	95	0

Analytical**Technologies,** Inc.

TCLP METALS
MATRIX SPIKE

Sample ID

In House

Lab Name: Analytical Technologies, Inc.

Client Name: ATI-NM

Lab Sample ID: 94-11-289-01

Prep Date: 12/12/94

Sample Matrix: TCLP Leachate

Date Analyzed: 12/12/94

Analyte	Spike Added (mg/L)	Sample Concentration (mg/L)	MS Concentration (mg/L)	MS Percent Recovery
Mercury	0.020	< 0.002	0.019	95

Analyte	MSD Concentration (mg/L)	MSD Percent Recovery	RPD %
Mercury	0.019	95	0

Analytical Technologies, Inc.

TCLP VOLATILE ORGANICS

Method 8240

Sample ID

Reagent Blank

Lab Name: Analytical Technologies, Inc.
Client Name: ATI-NM
Client Project ID: SDM -- 412312
Lab Sample ID: WRB1 12/15/94

Sample Matrix: Water
Sample Volume: 5 mL

Date Collected: N/A
Date Extracted: N/A
Date Analyzed: 12/15/94

EPA HW Number	Analyte	CAS Number	Result (mg/L)	Detection Limit (mg/L)
D043	Vinyl chloride	75-01-4	ND	0.01
D029	1,1-Dichloroethylene	75-35-4	ND	0.01
D022	Chloroform	67-66-3	ND	0.01
D028	1,2-Dichloroethane	107-06-2	ND	0.01
D035	Methyl ethyl ketone	78-93-3	ND	0.01
D019	Carbon tetrachloride	56-23-5	ND	0.01
D040	Trichloroethylene	79-01-6	ND	0.01
D018	Benzene	71-43-2	ND	0.01
D039	Tetrachloroethylene	127-18-4	ND	0.01
D021	Chlorobenzene	108-90-7	ND	0.01

SURROGATE RECOVERIES

Analyte	% Recovery	% Rec Limits
1,2-Dichloroethane-d4	109	76 - 114
Toluene-d8	99	88 - 110
Bromofluorobenzene	101	86 - 115

ND = Not Detected

Analytical Technologies, Inc.

TCLP VOLATILE ORGANICS
Method 8240

Sample ID
TCLP Reagent Blank

Lab Name: Analytical Technologies, Inc.
Client Name: ATI-NM
Client Project ID: SDM -- 412312
Lab Sample ID: TCLPRB1 12/08/94

Date Collected: N/A
Date Extracted: 12/08/94
Date Analyzed: 12/15/94

Sample Matrix: TCLP Leachate
Sample Volume: 0.5 mL

EPA HW Number	Analyte	CAS Number	Result (mg/L)	Detection Limit (mg/L)
D043	Vinyl chloride	75-01-4	ND	0.1
D029	1,1-Dichloroethylene	75-35-4	ND	0.1
D022	Chloroform	67-66-3	ND	0.1
D028	1,2-Dichloroethane	107-06-2	ND	0.1
D035	Methyl ethyl ketone	78-93-3	ND	0.1
D019	Carbon tetrachloride	56-23-5	ND	0.1
D040	Trichloroethylene	79-01-6	ND	0.1
D018	Benzene	71-43-2	ND	0.1
D039	Tetrachloroethylene	127-18-4	ND	0.1
D021	Chlorobenzene	108-90-7	ND	0.1

SURROGATE RECOVERIES

Analyte	% Recovery	% Rec Limits
1,2-Dichloroethane-d4	110	76 - 114
Toluene-d8	100	88 - 110
Bromofluorobenzene	100	86 - 115

ND = Not Detected

Analytical **Technologies,** Inc.

TCLP VOLATILE ORGANICS

Method 8240

Sample ID

Pit

Lab Name: Analytical Technologies, Inc.
Client Name: ATI-NM
Client Project ID: SDM -- 412312
Lab Sample ID: 94-12-049-01

Date Collected: 11/30/94
Date Extracted: 12/08/94
Date Analyzed: 12/15/94

Sample Matrix: TCLP Leachate
Sample Volume: 0.5 mL

EPA HW Number	Analyte	CAS Number	Result (mg/L)	Detection Limit (mg/L)
D043	Vinyl chloride	75-01-4	ND	0.1
D029	1,1-Dichloroethylene	75-35-4	ND	0.1
D022	Chloroform	67-66-3	ND	0.1
D028	1,2-Dichloroethane	107-06-2	ND	0.1
D035	Methyl ethyl ketone	78-93-3	ND	0.1
D019	Carbon tetrachloride	56-23-5	ND	0.1
D040	Trichloroethylene	79-01-6	ND	0.1
D018	Benzene	71-43-2	ND	0.1
D039	Tetrachloroethylene	127-18-4	ND	0.1
D021	Chlorobenzene	108-90-7	ND	0.1

SURROGATE RECOVERIES

Analyte	% Recovery	% Rec Limits
1,2-Dichloroethane-d4	107	76 - 114
Toluene-d8	98	88 - 110
Bromofluorobenzene	101	86 - 115

ND = Not Detected

TCLP VOLATILE ORGANICS

Method 8240

Sample ID

DEHY

Lab Name: Analytical Technologies, Inc.
Client Name: ATI-NM
Client Project ID: SDM -- 412312
Lab Sample ID: 94-12-049-02

Date Collected: 11/30/94
Date Extracted: 12/08/94
Date Analyzed: 12/15/94

Sample Matrix: TCLP Leachate
Sample Volume: 0.5 mL

EPA HW Number	Analyte	CAS Number	Result (mg/L)	Detection Limit (mg/L)
D043	Vinyl chloride	75-01-4	ND	0.1
D029	1,1-Dichloroethylene	75-35-4	ND	0.1
D022	Chloroform	67-66-3	ND	0.1
D028	1,2-Dichloroethane	107-06-2	ND	0.1
D035	Methyl ethyl ketone	78-93-3	ND	0.1
D019	Carbon tetrachloride	56-23-5	ND	0.1
D040	Trichloroethylene	79-01-6	ND	0.1
D018	Benzene	71-43-2	ND	0.1
D039	Tetrachloroethylene	127-18-4	ND	0.1
D021	Chlorobenzene	108-90-7	ND	0.1

SURROGATE RECOVERIES

Analyte	% Recovery	% Rec Limits
1,2-Dichloroethane-d4	107	76 - 114
Toluene-d8	100	88 - 110
Bromofluorobenzene	102	86 - 115

ND = Not Detected

Analytical **Technologies,** Inc.

TCLP VOLATILE MATRIX SPIKE RECOVERY

Method 8240

Sample ID

DEHY

Lab Name: Analytical Technologies, Inc.
Client Name: ATI-NM
Client Project ID: SDM -- 412312
Lab Sample ID: 94-12-049-02

Date Collected: 11/30/94
Date Extracted: 12/08/94
Date Analyzed: 12/15/94

Sample Matrix: TCLP Leachate
Sample Volume: 0.5 mL

Analyte	Spike Added (mg/L)	Sample Concentration (mg/L)	MS Concentration (mg/L)	MS % Rec	QC Limit Recovery
Vinyl chloride	0.500	ND	0.424	85	49 - 132
1,1-Dichloroethylene	0.500	ND	0.450	90	65 - 126
Chloroform	0.500	ND	0.493	99	68 - 123
1,2-Dichloroethane	0.500	ND	0.510	102	61 - 122
Methyl ethyl ketone	0.500	ND	0.445	89	26 - 156
Carbon tetrachloride	0.500	ND	0.475	95	80 - 113
Trichloroethylene	0.500	ND	0.500	100	81 - 108
Benzene	0.500	ND	0.506	101	60 - 129
Tetrachloroethylene	0.500	ND	0.457	91	75 - 116
Chlorobenzene	0.500	ND	0.497	99	81 - 107

SURROGATE RECOVERIES

Analyte	% Recovery	% Rec Limits
1,2-Dichloroethane-d4	99	76 - 114
Toluene-d8	97	88 - 110
Bromofluorobenzene	105	86 - 115

ND = Not Detected

Analytical Technologies, Inc., Albuquerque, NM
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 12/2/94 PAGE 1 OF 1

ATI LAB I.D. 412312

PROJECT MANAGER: Paul Marley

COMPANY: Daniel B. Stephens & Assoc.
ADDRESS: 6020 Academy NE Suite 100

PHONE: 822 9400
FAX: 822 8877

BILL TO: George Robinson
COMPANY: ENRON Enviro Affairs
ADDRESS: 1400 Smith St
Houston, TX 77002

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.	TCLP Volatiles (8240)		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	Cl, SO4, TDS, T-Alk	NO2/NO3	The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)	Ca, Mg, Na, K, Fe, Mn, Zn, Cu	NUMBER OF CONTAINERS
MW-4	12/1/94	0850	H2O	01																							X	X		X		X	3
MW-5	12/1/94	1350	H2O	02																							X	X		X		X	3
MW-6	11/30/94	1540	H2O	03																							X	X		X		X	3
MW-8	11/30/94	1575	H2O	04																							X	X		X		X	3
MW-13	12/1/94	1000	H2O	05																							X	X		X		X	3
Pit	11/30/94	1700	Soil	06										X																	X		4
DEHY	11/30/94	1645	Soil	07										X																	X		4

PROJECT INFORMATION

PROJ. NO.: 4230.2
PROJ. NAME: ENRON - WT1
P.O. NO.:
SHIPPED VIA: HAND Delivered

SAMPLE RECEIPT

NO. CONTAINERS	23
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:
o Metal Samples are field filtered

SAMPLED & RELINQUISHED BY: 1.

Signature: Time: 1505
Printed Name: Thomas Ford Date: 12-2-94
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: 1505
Printed Name: Date: 12/2/94
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

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

Analytical**Technologies,**Inc. Albuquerque, NM

Chain of Custody

DATE 12/2/91 PAGE 1 OF 1

NETWORK PROJECT MANAGER: LETITIA KRAKOWSKI

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	Ca, Mg, Na, K, Fe, Mn, Zn, Cu	Cl, SO4, TDS, Alk	8240 (TCLP 1311) ZHE	NO2/NO3	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)	RCRA METAL BUT TOT Dig.	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
412312 -01	12/1	0850	AQ	1										X	X		X			X													3
-02	12/1	1350		2										X	X		X			X													3
-03	11/30	1540		3										X	X		X			X													3
-04	11/30	1575		4										X	X		X			X													3
-05	12/1	1600		5										X	X					X													2

PROJECT INFORMATION

PROJECT NUMBER: 412312
PROJECT NAME: SDB
QC LEVEL: [✓ STD.] IV
QC REQUIRED: MS MSD BLANK
TAT: [✓ STANDARD] RUSH!!

DUE DATE: 12/16
RUSH SURCHARGE:
CLIENT DISCOUNT: 10 %

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS	15
CHAIN OF CUSTODY SEALS	N/A
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	412312

WO#LK1140

SAMPLES SENT TO:
SAN DIEGO
FT. COLLINS
RENTON
PENSACOLA
PORTLAND
PHOENIX X
FIBERQUANT

RELINQUISHED BY: 1.
Signature: Time: 1730
Printed Name: D. Vannelleller Date: 12/2/91
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: 1136
Printed Name: Linda Estelman Date: 12/3/91
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

94-12-094

AnalyticalTechnologies,Inc. Albuquerque, NM

Chain of Custody

DATE 12/2/94 PAGE 1 OF 1

NETWORK PROJECT MANAGER: LETITIA KRAKOWSKI

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			8240 (TCLP 1311) ZHE	RCRA Metals by TCLP	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
412312-06	11/30	1700	Nonaq	01												X	X																4
-07	11/30	1640	Nonaq	02												X	X																4

PROJECT INFORMATION

PROJECT NUMBER: 412312

PROJECT NAME: SDm

QC LEVEL: [✓ STD] IV

QC REQUIRED: MS MSD BLANK

TAT: [✓ STANDARD] RUSH!

DUE DATE: 12/16

RUSH SURCHARGE: 0

CLIENT DISCOUNT: 10 %

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS	8
CHAIN OF CUSTODY SEALS	NA
INTACT?	NA
RECEIVED GOOD COND/COLD	Y
LAB NUMBER	

WO#LK1141

SAMPLES SENT TO:
- SAN DIEGO
- FT. COLLINS X
- RENTON
- PENSACOLA
- PORTLAND
- PHOENIX
- FIBERQUANT

RELINQUISHED BY: 1.
Signature: Time: 1730
Printed Name: Dianne Adler Date: 12/2/94
Analytical Technologies, Inc.
Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company: FED X

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company: FED-X

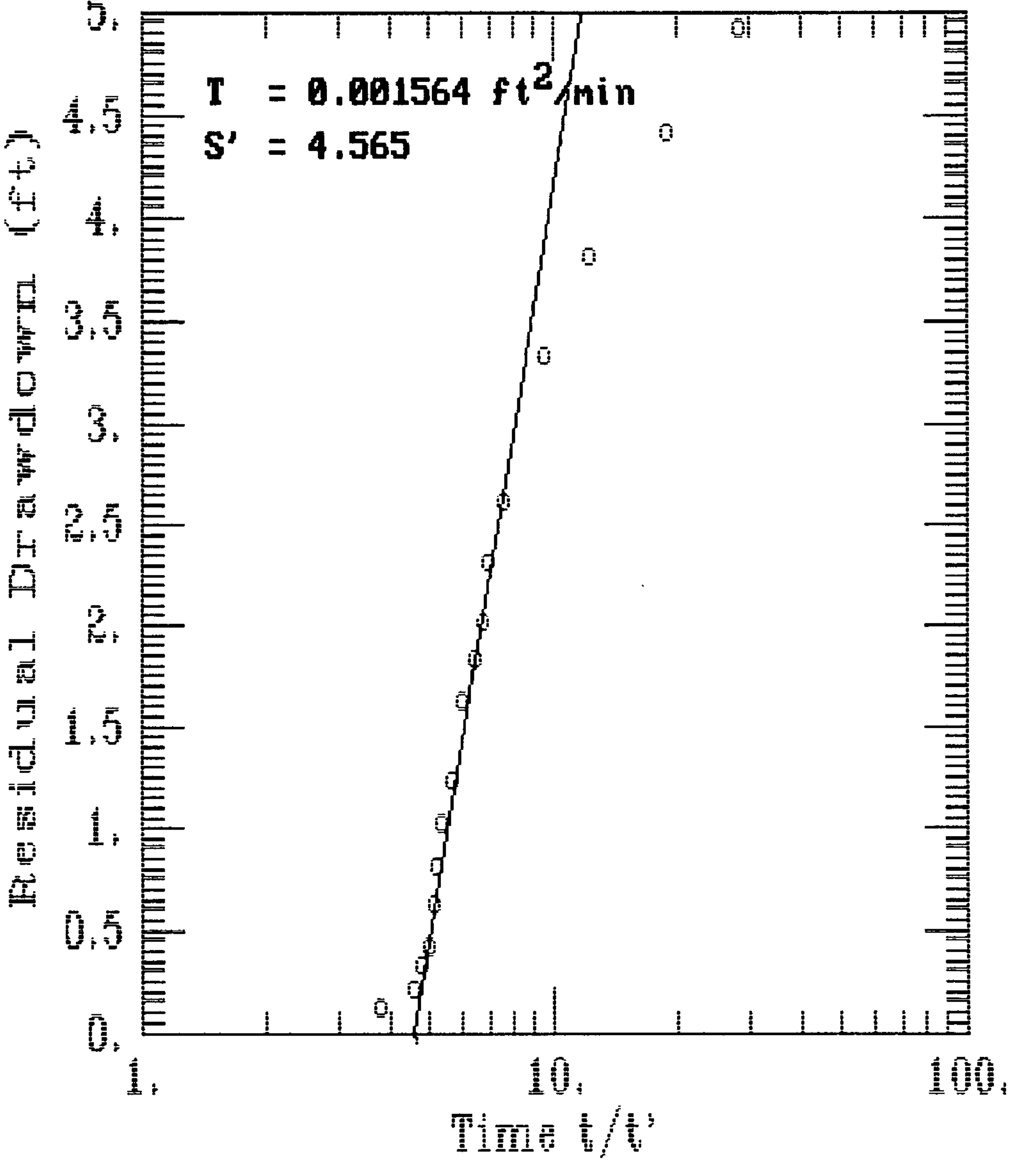
RECEIVED BY: (LAB) 2.
Signature: Time: 10:00
Printed Name: L. Kelly Date: 12-3-94
Company: ATI

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

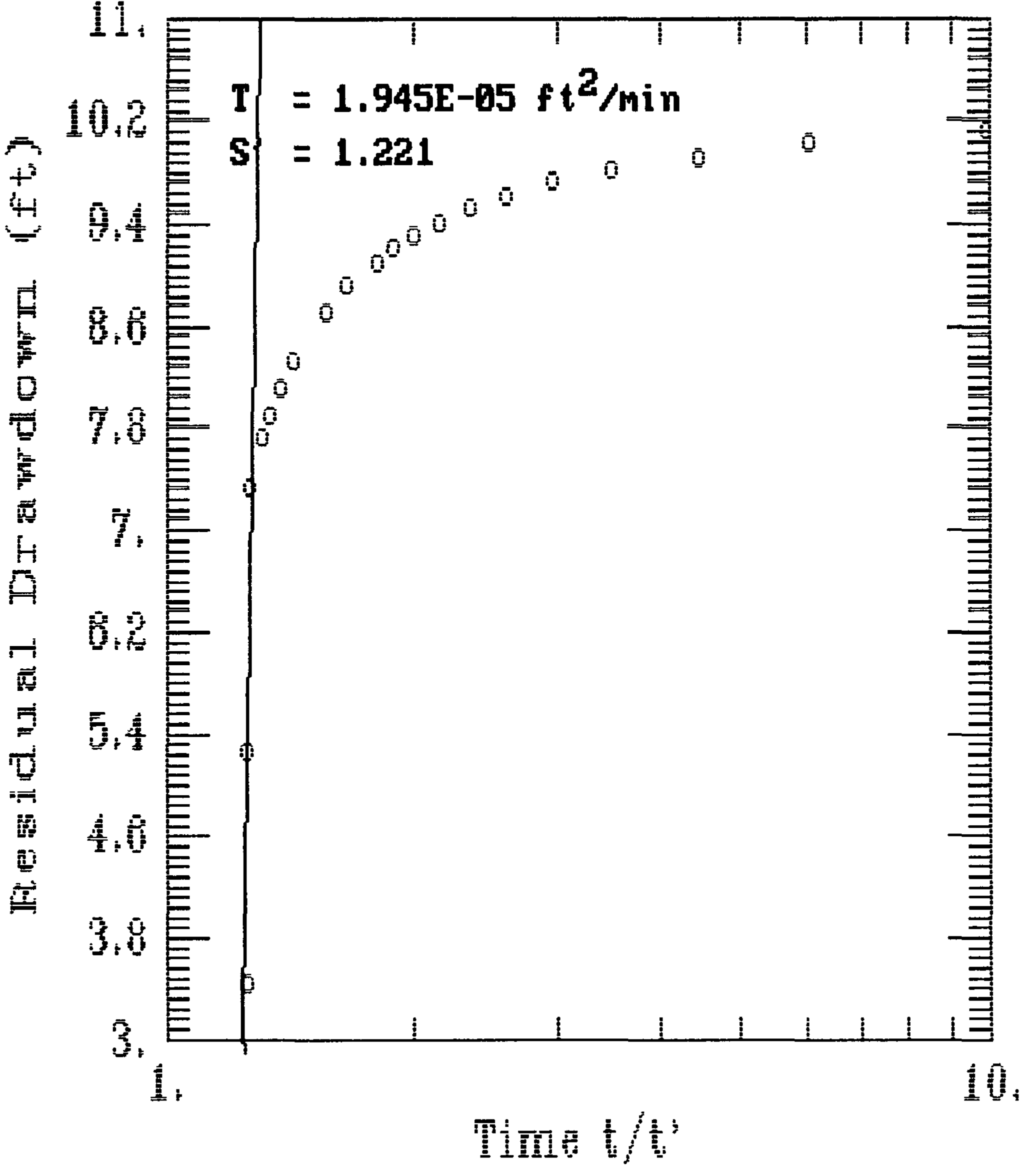
APPENDIX C

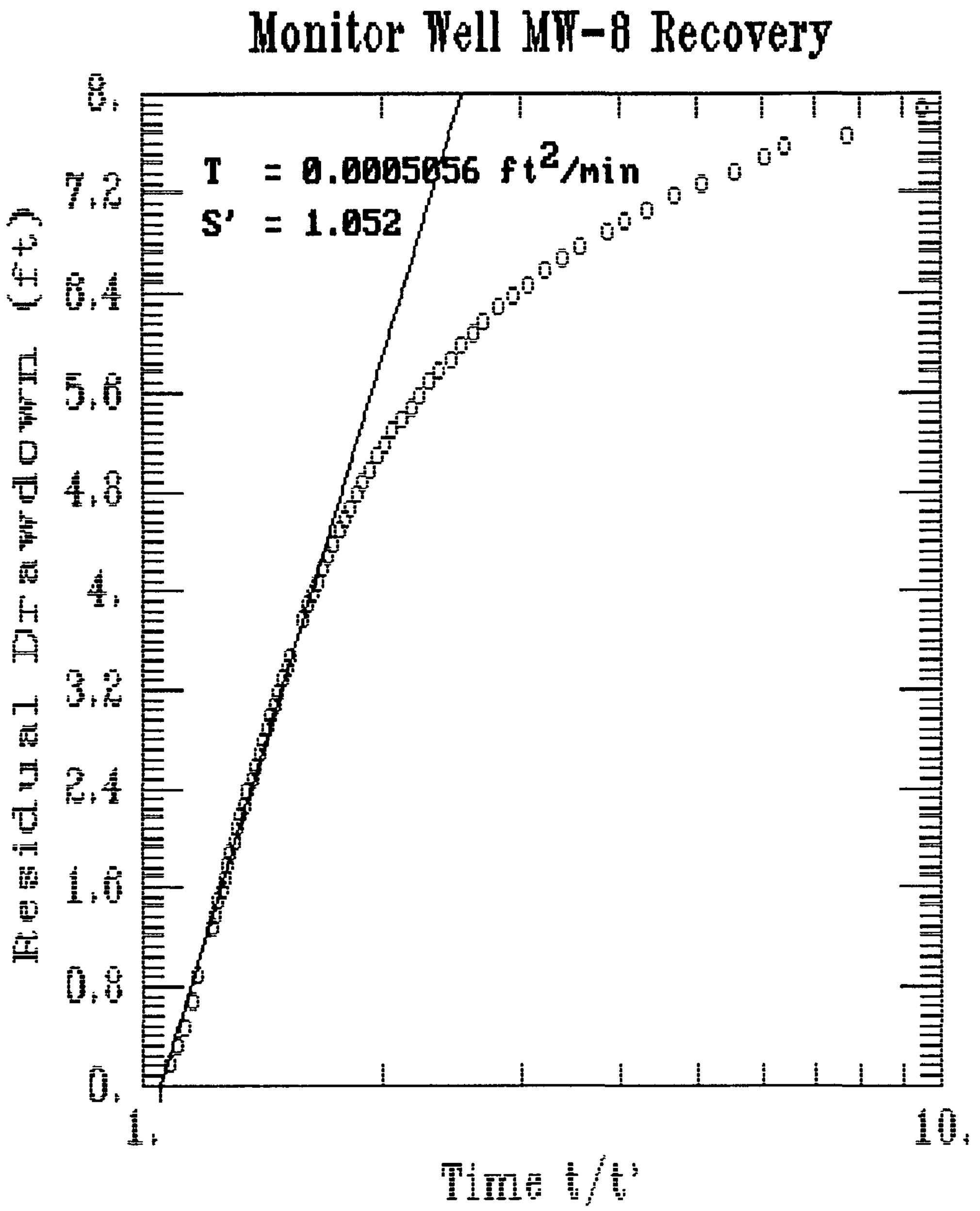
RESULTS OF HYDRAULIC TESTING

Monitor Well MW-4 Recovery

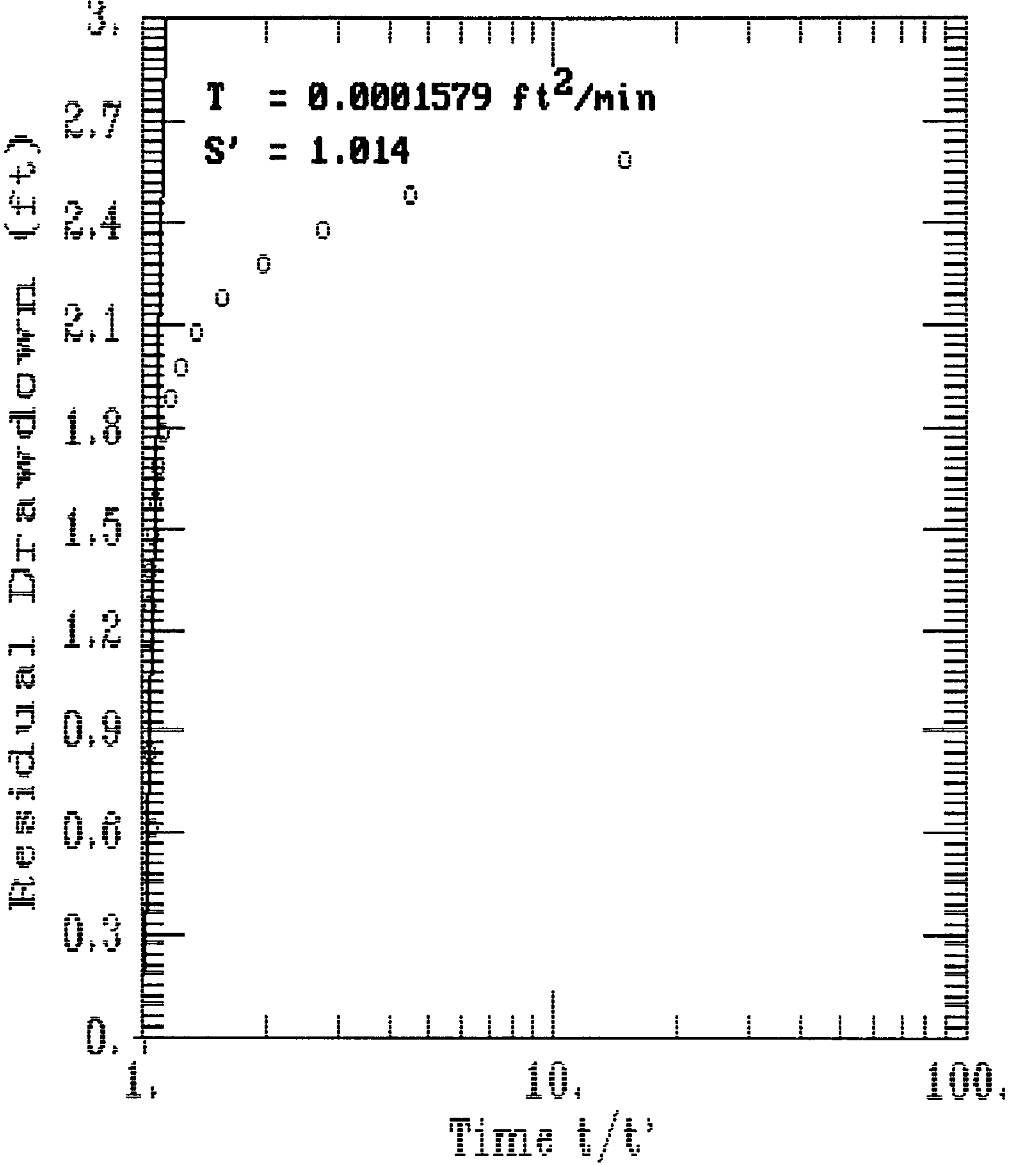


Monitor Well MW-5 Recovery

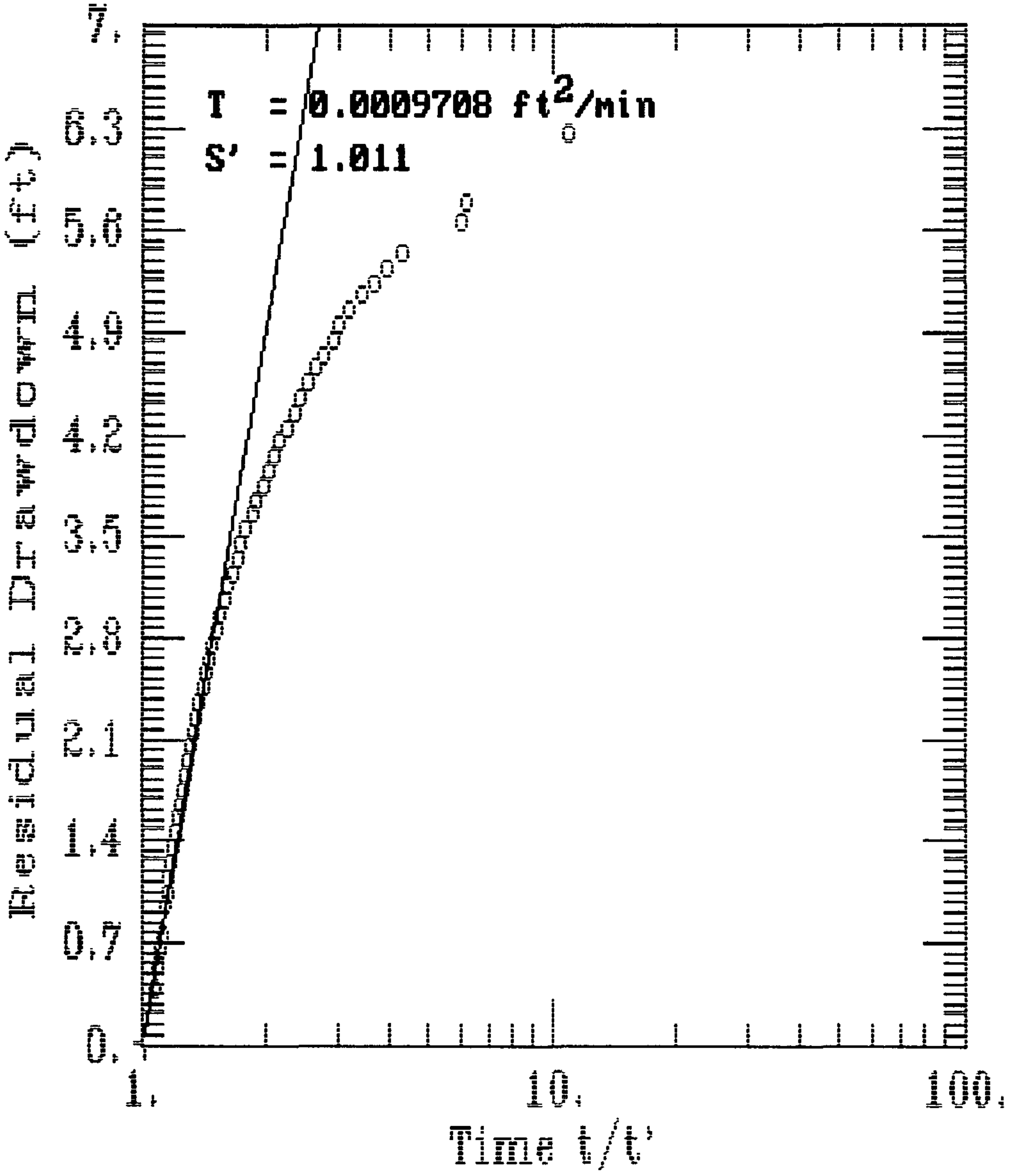



Monitor Well MW-8 Recovery
T = 0.0005056 ft^2/min
S' = 1.052
Residual Drawdown (ft)
8.
7.2
6.4
5.6
4.8
4.
3.2
2.4
1.6
0.8
0.
1.
10.
Time t/t'

Monitor Well MW-9 Recovery



Monitor Well MW-12 Recovery



Monitor Well MW-4 Bail-Recovery Test

Date:	12/01/94	
Initial depth to water:	47.18	(ft.)
Total depth of well:	58.37	(ft.)
Start Bailing:	08:19:00	
Stop Bailing:	08:28:10	
Purge volume:	15.00	(gal.)

Elapse Time (minutes)	Displacement (feet)
0.33	4.92
0.50	4.42
0.80	3.82
1.05	3.32
1.38	2.62
1.53	2.32
1.58	2.02
1.65	1.82
1.80	1.62
1.92	1.22
2.07	1.02
2.15	0.82
2.20	0.62
2.28	0.42
2.38	0.32
2.53	0.22
3.20	0.12

Monitor Well MW-5 Bail-Recovery Test

Date: 12/1/94
Initial depth to water: 48.68 (ft.)
Total depth of well: 59.80 (ft.)
Start Bailing: 10:54:30
Stop Bailing: 11:14:30
Purge volume: 5.00 (gal.)

Elapse Time (minutes)	Displacement (feet)
1.67	10.12
2.97	10.02
4.35	9.92
6.02	9.82
7.67	9.72
9.37	9.62
11.15	9.52
13.02	9.42
14.87	9.32
16.73	9.22
18.63	9.12
22.82	8.92
26.32	8.72
34.75	8.32
39.67	8.12
43.75	7.92
48.22	7.72
56.83	7.32
104.50	5.26
154.50	3.42

Monitor Well MW-8 Bail-Recovery Test

Date: 11/30/94
Initial depth to water: 49.52 (ft.)
Total depth of well: 59.27 (ft.)
Start Bailing: 13:05:00
Stop Bailiing: 13:14:15
Purge volume: 4.00 (gal.)

Elapse Time (minutes)	Displacement (feet)	Elapse Time (minutes)	Displacement (feet)
10.33	7.88	23.73	3.98
10.63	7.68	24.27	3.88
10.95	7.58	24.78	3.78
11.07	7.48	25.33	4.68
11.28	7.38	25.90	4.58
11.53	7.28	26.48	3.48
11.77	7.18	27.07	3.38
12.02	7.08	27.67	3.28
12.27	6.98	28.35	3.18
12.50	6.88	29.03	3.08
12.85	6.78	29.72	2.98
13.12	6.68	30.47	2.88
13.42	6.58	31.37	2.78
13.73	6.48	32.23	2.68
14.03	6.38	33.07	2.58
14.37	6.28	34.03	2.48
14.70	6.18	34.97	2.38
15.00	6.08	35.93	2.28
15.33	5.98	37.08	2.18
15.65	5.88	38.17	2.08
16.03	5.78	39.35	1.98
16.38	5.68	40.68	1.88
16.77	5.58	41.97	1.78
17.12	5.48	43.50	1.68
17.53	5.38	44.97	1.58
17.93	5.28	46.50	1.48
18.35	5.18	48.30	1.38
18.77	5.08	50.17	1.28
19.23	4.98	61.00	0.88
19.62	4.88	68.08	0.68
20.03	4.78	80.00	0.46
20.45	4.68	92.00	0.31
20.88	4.58	114.00	0.17
21.28	4.48		
21.80	4.38		
22.25	4.28		
22.75	4.18		
23.25	4.08		

Monitor Well MW-9 Bail-Recovery Test

Date:	11/30/94	
Initial depth to water:	55.52	(ft.)
Total depth of well:	59.30	(ft.)
Start Bailing:	09:33:00	
Stop Bailing:	09:36:30	
Purge volume:	1.20	(gal.)

Elapse Time (minutes)	Displacement (feet)
3.75	2.58
4.50	2.48
5.48	2.38
7.12	2.28
9.60	2.18
12.90	2.08
17.67	1.98
23.48	1.88
30.07	1.78
36.63	1.68
45.18	1.58
54.50	1.48
64.08	1.38
74.10	1.28
86.42	1.18
74.00	0.84
52.00	0.61

Monitor Well MW-12 Bail-Recovery Test

Date: 11/30/94
Initial depth to water: 50.45 (ft.)
Total depth of well: 60.20 (ft.)
Start Bailing: 11:05:00
Stop Bailing: 11:10:00
Purge volume: 3.30 (gal.)

Elapse Time (minutes)	Displacement (feet)	Elapse Time (minutes)	Displacement (feet)
5.50	6.25	21.58	1.95
5.97	5.80	22.68	1.85
6.00	5.65	23.83	1.75
6.50	5.45	25.08	1.65
6.70	5.35	26.72	1.55
6.85	5.25	27.77	1.45
7.05	5.15	30.57	1.35
7.27	5.05	32.72	1.25
7.47	4.95	34.23	1.15
7.63	4.85	35.97	1.05
7.87	4.75	38.42	0.95
8.07	4.65	45.82	0.75
8.28	4.55	50.28	0.65
8.48	4.45	55.12	0.55
8.72	4.35	68.92	0.37
8.97	4.25		
9.27	4.15		
9.53	4.05		
9.85	3.95		
10.17	3.85		
10.50	3.75		
10.83	3.65		
11.23	3.55		
11.67	3.45		
12.10	3.35		
12.53	3.25		
13.00	3.15		
13.42	3.05		
13.93	2.95		
14.52	2.85		
15.08	2.75		
15.67	2.65		
16.30	2.55		
16.97	2.45		
17.88	2.35		
18.50	2.25		
19.55	2.15		
20.55	2.05		

APPENDIX D

SOIL EXCAVATION AND TREATMENT

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

December 8, 1994

DEC 1994
RECEIVED
Environmental
Houston

CERTIFIED MAIL
RETURN RECEIPT NO: P-667-242-184

Mr. Bill Kendrick
ENRON Operations Corp.
P.O. Box 1188
Houston, Texas 77251-1188

RE: WORK PLAN FOR REMEDIATION OF CONTAMINATED SOILS
WT-1 COMPRESSOR STATION
TRANSWESTERN PIPELINE CO.

Dear Mr. Kendrick:

The New Mexico Oil Conservation Division (OCD) has completed a review of Transwestern Pipeline Company's (TPC) December 2, 1994 "TREATMENT AND FINAL DISPOSITION OF SOIL AND CONCRETE DEBRIS AT THE TRANSWESTERN PIPELINE COMPANY WT-1 COMPRESSOR STATION". This document contains TPC's proposed work plan for onsite treatment of contaminated soils generated during remedial actions at TPC's WT-1 Compressor Station.

The above referenced work plan is approved with the following conditions:

1. Prior to implementing the remedial actions, TPC will provide to the OCD for approval the analyses which demonstrate that the soils are characteristically non-hazardous

2. Upon completion of the remedial actions, TPC will:

    a. analyze the remediated soils for benzene, toluene, ethylbenzene, xylene and total petroleum hydrocarbons concentrations to determine the final remediation level achieved.

    b. submit to the OCD a report containing the results of the remedial actions.

3. TPC will notify the OCD at least one week in advance of scheduled activities such that the OCD has the opportunity to witness the events and/or split samples.

4. All original documents will be sent to the OCD Santa Fe Office with copies sent to the OCD Hobbs Office.

Please be advised that OCD approval does not relieve TPC of liability should their actions fail to adequately remediate contaminants related to TPC's activities. In addition, OCD approval does not relieve TPC of responsibility for compliance with any other federal, state or local laws and/or regulations.

If you have any questions, please contact me at (505) 827-5885.

Sincerely,

Will C. Olson

William C. Olson
Hydrogeologist
Environmental Bureau

xc: Jerry Sexton, OCD Hobbs District Supervisor
Wayne Price, OCD Hobbs District Office
George Robinson, Cypress Engineering Sevices, Inc.

ENRON
OPERATIONS CORP.

P. O. Box 1188 Houston, Texas 77251-1188 (713) 853-6161

December 2, 1994

Mr. William C. Olson
Environmental Bureau
New Mexico Oil Conservation Division
2040 S. Pacheco St.
Santa Fe, New Mexico 87505

RE: Treatment and Final Disposition of Soil and Concrete Debris at the Transwestern Pipeline Company WT-1 Compressor Station

Dear Bill,

The purpose of this letter is to request approval for the proposed treatment and final disposition of soil which contains elevated TPH concentrations and the final disposition of concrete debris stockpiled on-site. The volume and origin of the stockpiled soil and debris is described in Table 1 below:

Table 1. Volume and origin of stockpiled soil and debris at the WT-1 Compressor Station.

Origin	Description	Volume cu. yds.
WT-1 Dehy Area	soil excavated from the former WT-1 dehydration area	2300
WT-1 Dehy Area	soil remaining to be excavated from the former WT-1 dehydration area	1000
WT-1 Landfarm	soil from the cleanup of lube oil spills around the WT-1 engine room; this soil is currently managed in an on-site landfarm	850
Hat Mesa Field Compressor Unit	soil containing lube oil from a cleanup around the compressor engine foundation	20
Monument Junction Pig Trap	soil containing natural gas condensate from a cleanup around the pig trap	20
South Carlsbad Compressor Station	concrete debris from the removal of a compressor engine foundation	15
Total Volume of Soil & Debris		4205

The following discussion presents a brief description of the origin, contaminant concentrations, hazardous characteristics, and proposed treatment and/or final disposition of each of the soil and concrete debris stockpiles described in Table 1.

WT-1 Dehy Area Soil

The dehy area soil was excavated from an area located on the Western boundary of the subject facility, Figure 1. This area was the former location of three dehydration reboilers and a pipeline pig receiver blowdown impoundment. Approximately 2300 cubic yards of soil were excavated in the summer of 1992 and stockpiled on-site. Several soil samples were recently collected from the stockpiled soil and delivered to a laboratory for analysis for TPH (EPA Method 418.1) and for BTEX compounds (EPA Method 8020). The results are presented in Table 2 below:

Table 2. Analytical results for soil samples collected from the WT-1 Dehy Area soil.

Sample ID	TPH mg/kg	Benzene mg/kg	Toluene mg/kg	Ethylbenzene mg/kg	Xylene(s) mg/kg	Total BTEX mg/kg
SP-1	4500	<0.010	<0.010	<0.010	<0.010	<0.040
SP-2	4500	<0.010	<0.010	<0.010	<0.010	<0.040
SP-3	4500	<0.010	<0.010	<0.010	<0.010	<0.040
SP-4	2000	<0.010	<0.010	<0.010	<0.010	<0.040
SP-5	4400	0.012	0.064	0.036	0.285	0.397
SP-8	3600	<0.010	<0.010	<0.010	<0.010	<0.040

A single composite soil sample was also recently collected from the stockpiled soil and delivered to a laboratory for analysis for hazardous characteristics. A TCLP extract (EPA Method 1311) of the sample was analyzed for volatile organics (EPA Method 8240) and for the eight RCRA metals (EPA Method 6010). Results indicated that all constituents were below detection limits with the exception of barium which was detected at a concentration of 0.66 mg/L in the TCLP extract, well below the RCRA regulatory level for barium of 100 mg/L.

WT-1 Landfarm Soil

Approximately 850 cubic yards of soil, which was generated from the cleanup of lube oil spills around the WT-1 engine room, is currently managed in an on-site landfarm. Soil samples were collected from the landfarm soil in order to determine if the clean-up criteria had been met. The clean-up criteria for the landfarm soil was established at 100 mg/kg TPH concentration. The results of laboratory analysis are presented in Table 3 below:

Table 3. Analytical results for soil samples collected from the Landfarm Area soil.

Sample ID	TPH mg/kg	Benzene mg/kg	Toluene mg/kg	Ethylbenzene mg/kg	Xylene(s) mg/kg	Total BTEX mg/kg
LF-1	350	<0.010	<0.010	<0.010	<0.010	<0.040
LF-2	200	NA	NA	NA	NA	NA
LF-3	110	<0.010	<0.010	<0.010	<0.010	<0.040
LF-4	160	NA	NA	NA	NA	NA
LF-5	150	<0.010	<0.010	<0.010	<0.010	<0.040
LF-6	210	NA	NA	NA	NA	NA
LF-7	620	<0.010	<0.010	<0.010	<0.010	<0.040
LF-8	150	NA	NA	NA	NA	NA
Geometric Mean Conc.	209					

Analysis for hazardous characteristics were not run for this soil since this would have been completed prior to the issuance of a landfarm permit by the NMOCD.

Although the mean TPH concentration is greater than the permitted cleanup criteria, TPC proposes to cease operation of the on-site landfarm and to process the soil along with the dehy area excavated soil. It is apparent from the results presented in Table 3, with all BTEX compounds below detection limits, that the landfarm area soil no longer could pose a threat to ground water resources.

Hat Mesa Field Compressor Unit Soil

Also included in the WT-1 soil stockpile is approximately 20 cubic yards of soil that was recently hauled in from the Hat Mesa field compressor unit which is located approximately ten miles southeast of the WT-1 Station. This soil contains lube oil and was generated from a cleanup around a compressor engine foundation. A soil sample was recently collected from the stockpiled soil and delivered to a laboratory for analysis for TPH (EPA Method 418.1) and for BTEX compounds (EPA Method 8020). The results are presented in Table 4 below:

Table 4. Analytical results for soil samples collected from the Hat Mesa soil.

Sample ID	TPH mg/kg	Benzene mg/kg	Toluene mg/kg	Ethylbenzene mg/kg	Xylene(s) mg/kg	Total BTEX mg/kg
SP-6R	590	< 0.010	< 0.010	< 0.010	< 0.010	< 0.040

A single composite soil sample was recently collected from the Hat Mesa stockpiled soil and delivered to a laboratory for analysis for hazardous characteristics. A TCLP extract (EPA Method 1311) of the sample was analyzed for volatile organics (EPA Method 8240) and for the eight RCRA metals (EPA Method 6010). Results indicated that all constituents were below detection limits with the exception of barium which was detected at a concentration of 0.98 mg/L in the TCLP extract, well below the RCRA regulatory level for barium of 100 mg/L.

Monument Junction Pig Trap Soil

Also included in the WT-1 soil stockpile is approximately 20 cubic yards of soil that was hauled in from the Monument Junction pig trap site which is located approximately fifteen miles south of the WT-1 Station. This soil contains natural gas condensate and was generated from a cleanup around a pig trap. A soil sample was recently collected from the stockpiled soil and delivered to a laboratory for analysis for TPH (EPA Method 418.1) and for BTEX compounds (EPA Method 8020). The results are presented in Table 5 below:

Table 5. Analytical results for soil samples collected from the Monument Junction soil.

Sample ID	TPH mg/kg	Benzene mg/kg	Toluene mg/kg	Ethylbenzene mg/kg	Xylene(s) mg/kg	Total BTEX mg/kg
SP-7R	4500	0.029	0.026	< 0.010	0.118	< 0.183

A single composite soil sample was recently collected from the Monument Junction stockpiled soil and delivered to a laboratory for analysis for hazardous characteristics. A TCLP extract (EPA Method 1311) of the sample was analyzed for volatile organics (EPA Method 8240) and for the eight RCRA metals (EPA Method 6010). Results indicated that all constituents were below detection limits with the exception of barium which was detected at a concentration of 0.67 mg/L in the TCLP extract, and mercury which was detected at a concentration of 0.003 mg/L in the TCLP extract, well below the RCRA regulatory levels for barium and mercury of 100 mg/L of 0.2 mg/L, respectively.

South Carlsbad Station Concrete Debris

Approximately 20 cubic yards of concrete debris from the removal of a compressor engine foundation at the South Carlsbad Station is currently stockpiled at the WT-1 Station. The concrete debris appears to be clean; i.e., free from either hydrocarbon impacted liquids, sludges, and/or soil.

Excavation Soil Samples

Soil samples were collected from the excavation area in order to determine if additional excavation might be necessary. The results of laboratory analysis are presented in Table 6 below:

Table 6. Analytical results for soil samples collected from the Excavation Area soil.

Sample ID	TPH mg/kg	Benzene mg/kg	Toluene mg/kg	Ethylbenzene mg/kg	Xylene(s) mg/kg	Total BTEX mg/kg
EN-1	4300	<0.010	<0.010	<0.010	<0.010	<0.040
EE-1	3700	<0.010	<0.010	<0.010	<0.010	<0.040
EW-1	4500	0.105	0.288	0.050	0.414	0.857
ES-1	240	<0.010	<0.010	<0.010	<0.010	<0.040
ES-2	<5	<0.010	<0.010	<0.010	<0.010	<0.040

Soil samples collected from South of the excavation area (ES-1 & ES-2) are relatively clean and therefore excavation is not proposed to extend any further South. The TPH concentration is apparently elevated to the East and West of the excavation (EE-1 & EW-1); however, Transwestern does not propose to extend the excavation in these directions because the current excavation is already bounded by the facility boundary on the West and gas pipelines on the East. Prior excavation activities extended the North wall of the excavation to the approximate center of a former pipeline pig receiver blowdown impoundment. This was a concrete surface impoundment which has been backfilled for several years. Transwestern proposes to extend the excavation area to the North approximately 20-30 feet in order to remove potentially impacted soil and concrete debris in this area. This will generate an additional 800 to 1000 cubic yards of impacted soil.

Proposed Final Disposition for Concrete Debris

The concrete debris stockpiled on-site will be placed in the bottom of the excavation area and will be buried in-place.

Proposed Soil Treatment and Final Disposition

Transwestern proposes to process all of the stockpiled soil described above through a Kolberg soil screening plant. A copy of a brochure from the equipment manufacturer is attached. The contractor providing the labor and equipment will be Pecos Valley Field Service out of Pecos, Texas. Pecos Valley Field Service was selected due to their prior experience operating this type of equipment. During the screening process, a water based nutrient solution will be sprayed on the soil as the soil exits the screening plant. The nutrient solution will consist of a 50/50 mixture of the commonly available fertilizers indicated below (or a comparable brand and formulation):

Miracle-Gro; 36-6-6

Total Nitrogen	36%
1.2% Ammoniacal Nitrogen	
1.9% Nitrate Nitrogen	
32.9% Urea Nitrogen	
Phosphoric Acid (P_2O_5)	6%
Soluble Potash (K_2O)	6%
Chelated Iron	0.325%

and, Miracle-Gro; 18-24-16

Total Nitrogen	18%
6.3% Ammoniacal Nitrogen	
5.0% Nitrate Nitrogen	
6.7% Urea Nitrogen	
Phosphoric Acid (P_2O_5)	24%
Soluble Potash (K_2O)	16%
Chelated Iron	0.10%
Copper	0.05%
Manganese	0.05%
Zinc	0.05%

Prior experience with this method of processing soil has indicated that, within a period of two to three months after processing, BTEX concentrations can be reduced to below detection levels and TPH concentrations can reasonably be expected to be reduced to approximately 50% of the original concentration. Transwestern has proposed this action because it is a cost effective method to reduce the potential for future leaching of hydrocarbon compounds to ground water to a level commensurate with the specific conditions and environmental setting of the WT-1 Station site. The specific conditions and setting include such factors as: 1) the lack of current ground water use in the area; 2) the limited amount of storm water infiltration in the area; 3) the relatively low initial TPH and BTEX concentrations; and 4) the effectiveness of the soil shredding process to further reduce BTEX concentrations.

The processed soil, with the exception of the landfarm area soil, will be placed directly back into the excavated area as it exits the soil screening plant. The soil from the landfarm area will either be spread out over a large area on-site or stockpiled for future use as backfill material.

Transwestern will complete the additional excavation activities and implement the proposed soil treatment upon approval of this proposal by your office. If you have any questions regarding this proposal, please contact George Robinson at (713) 646-7327.

Sincerely,

Bill Kendrick
Projects Group Manager
EOC Environmental Affairs

gcr/BK/attachments

xc: Wayne Price NMOCD Hobbs District Office

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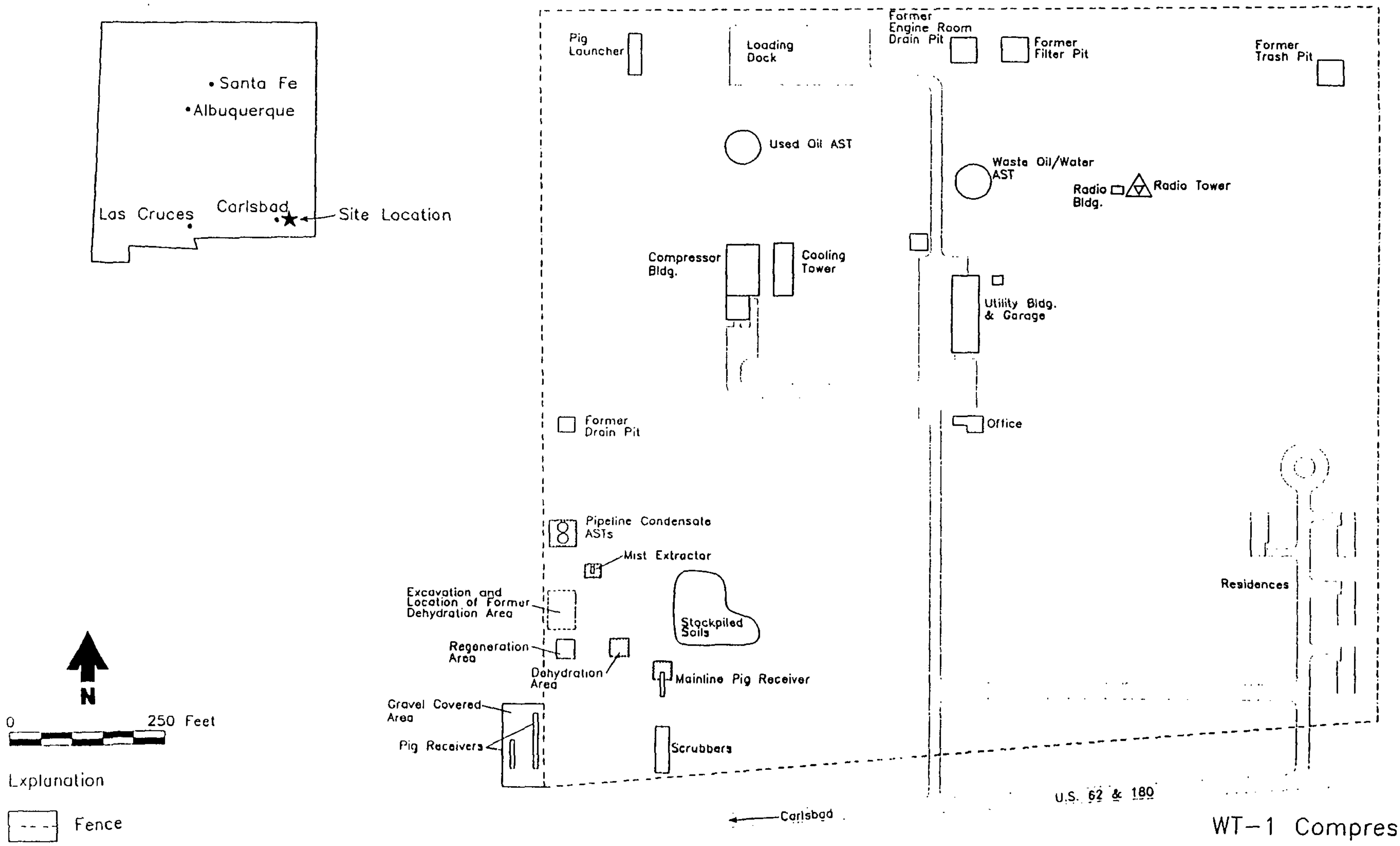


WT-1 Compressor Station
Site Map

DANIEL B. STEPHENS & ASSOCIATES, INC.
11-94
JN 4230

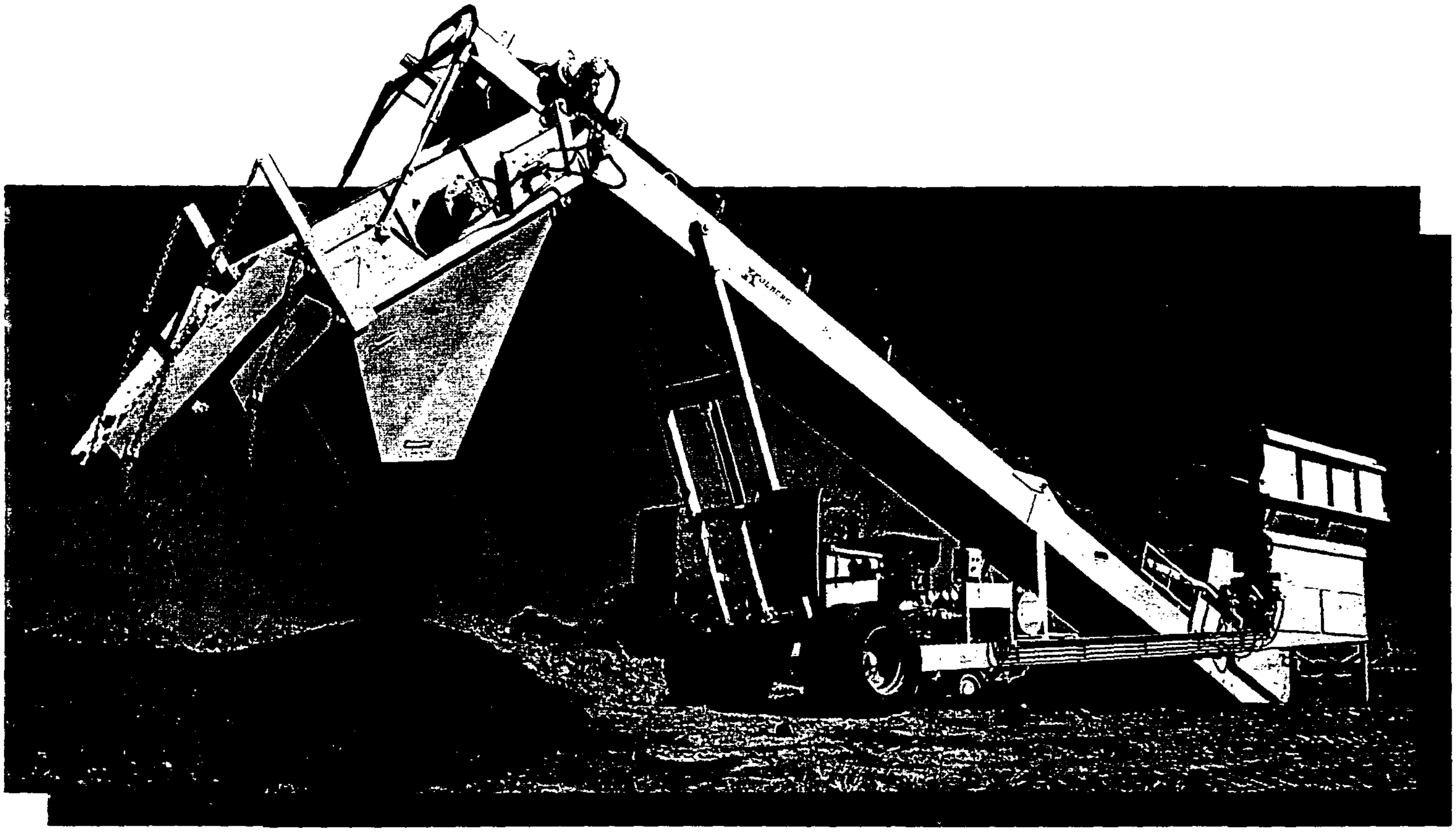
Figure

KOLBERG®

BULLETIN 271-A

MODEL 271 SHREDDER SCREENING PLANT

30"x40' CONVEYOR ● 4'x8' 2-DECK SCREEN



MULTIPLE APPLICATIONS

- ● TOP SOIL
- ● COMPOST
- ● SLUDGE PROCESS
- ○ NURSERY
- ● REMEDIATION
- ● RECYCLED ASPHALT
- ● AGLIME
- ● SAND & GRAVEL
- ○ LANDFILLS
- ○ CLAY
- ○ PEAT
- ○ COAL
- ○ ASH

SCREENING PLANTS WITH FLEXIBILITY

PORTEC™
Construction Equipment Division
KOLBERG PRODUCTS

KOLBERG®

MODEL 271 SHREDDER

30"x40' CONVEYO

ADJUSTABLE MATERIAL SPREADER

Evenly spreads material onto the screen cloth for maximum screening capability.

4'x8' 2-DECK HIGH FREQUENCY SCREEN WITH VARIABLE SPEED CONTROL

Designed to provide maximum screening efficiency in multiple applications.

HYDRAULIC SCREEN ADJUST

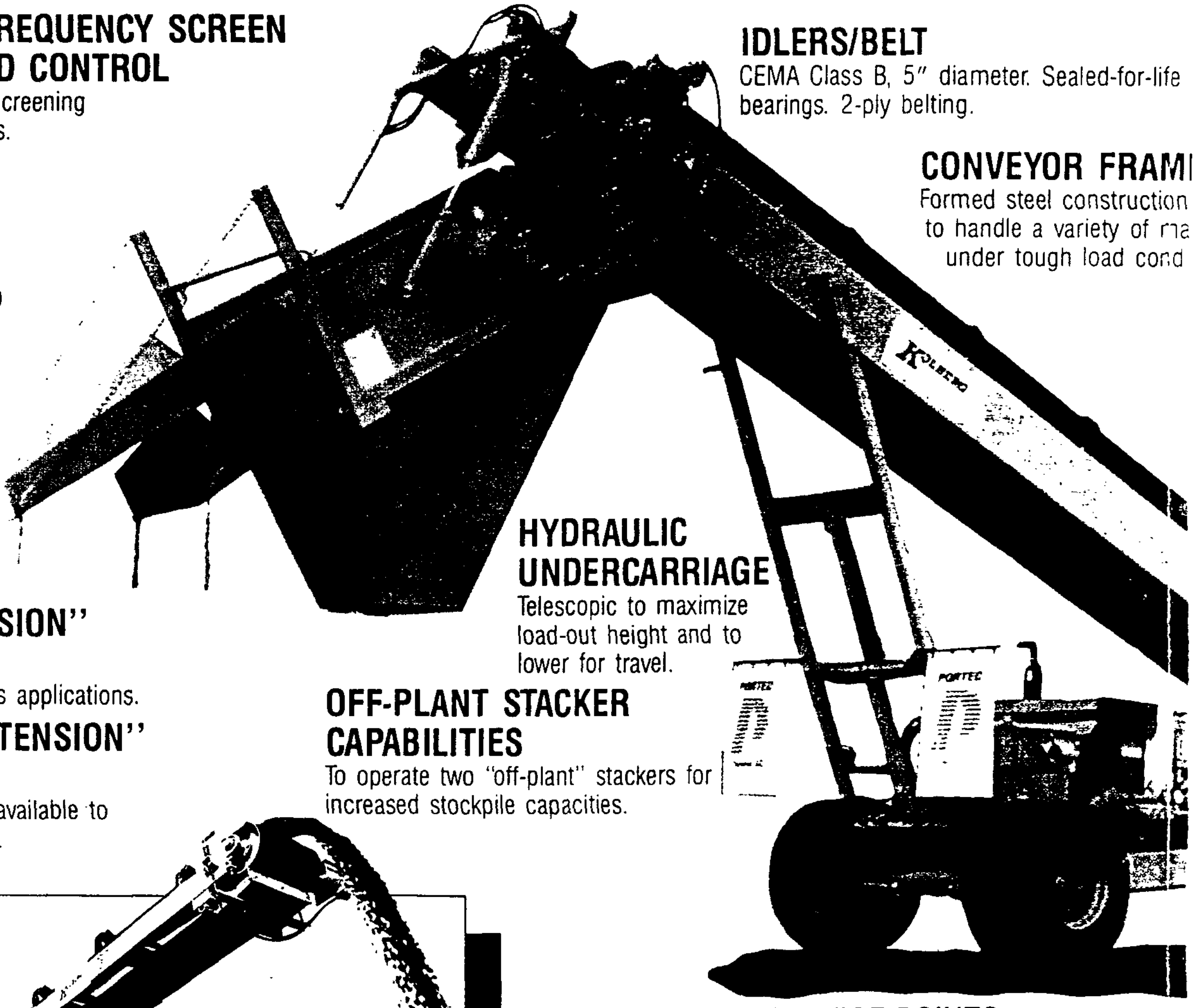
Allows for quick "On the Fly" screen pitch adjustment of 15 to 50 degrees for optimum screening of various material characteristics.

TOP DECK "SIDE TENSION" SCREEN CLOTH

Wide range of choice for various applications.

BOTTOM DECK "END TENSION" SCREEN CLOTH

Numerous styles and openings available to meet your specific requirements.



IDLERS/BELT

CEMA Class B, 5" diameter. Sealed-for-life bearings. 2-ply belting.

CONVEYOR FRAM

Formed steel construction to handle a variety of ma under tough load cond

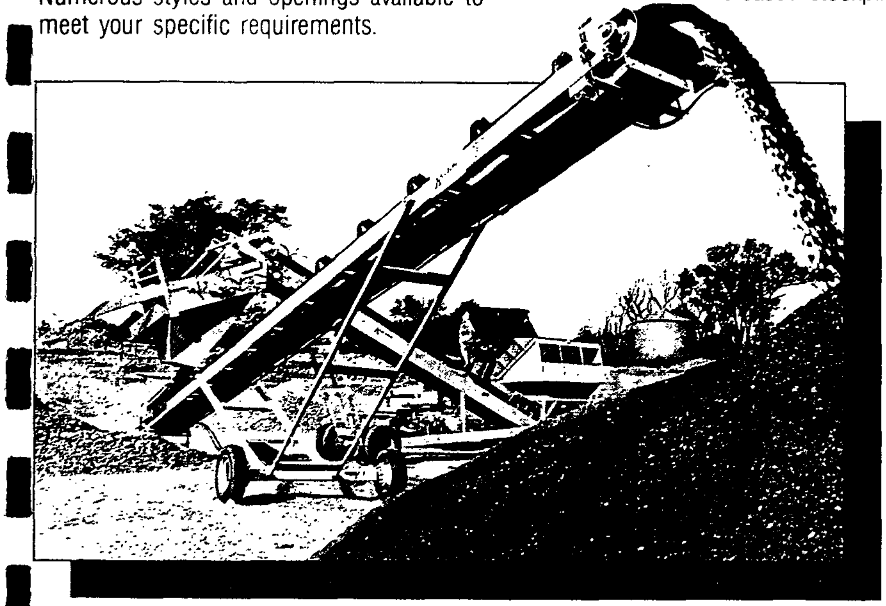
HYDRAULIC UNDERCARRIAGE

Telescopic to maximize load-out height and to lower for travel.

OFF-PLANT STACKER CAPABILITIES

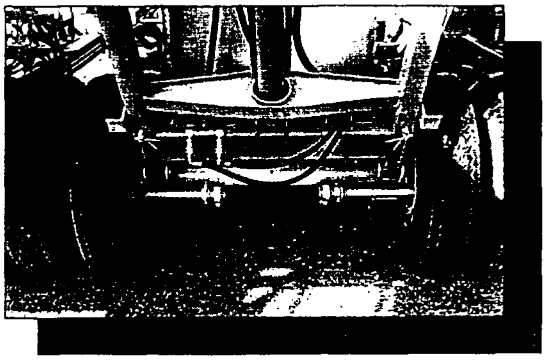
To operate two "off-plant" stackers for increased stockpile capacities.

SERVICE POINTS: Remote grease z



SERIES 2 PORTABLE STACKING CONVEYOR

These optional stacking conveyors are ideally suited as companion stackers for the Model 271 screening plant. Available in 24" widths, 40' and 50' lengths and 30" width x 50' length. Reference the Kolberg Series 2 brochure for more detailed information.



HIGHWAY PORTABLE

Heavy-duty chassis, featuring single axle, dual wheels, air brakes, mud flaps, brake, tail and turn lights.

SCREENING PLANT

STANDARD FEATURES

R ● 4'x8' 2-DECK SCREEN

life ball

ME

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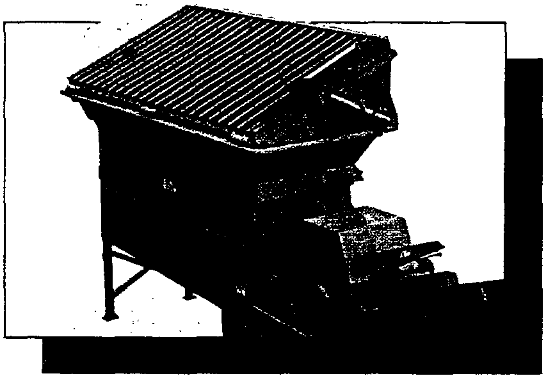
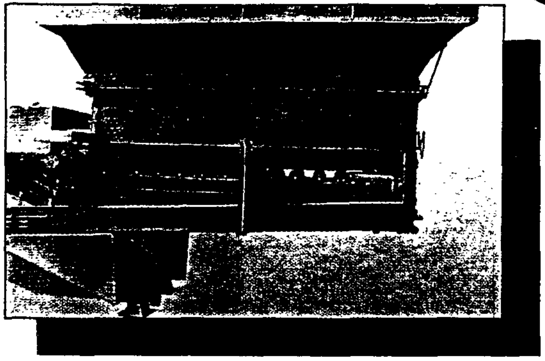


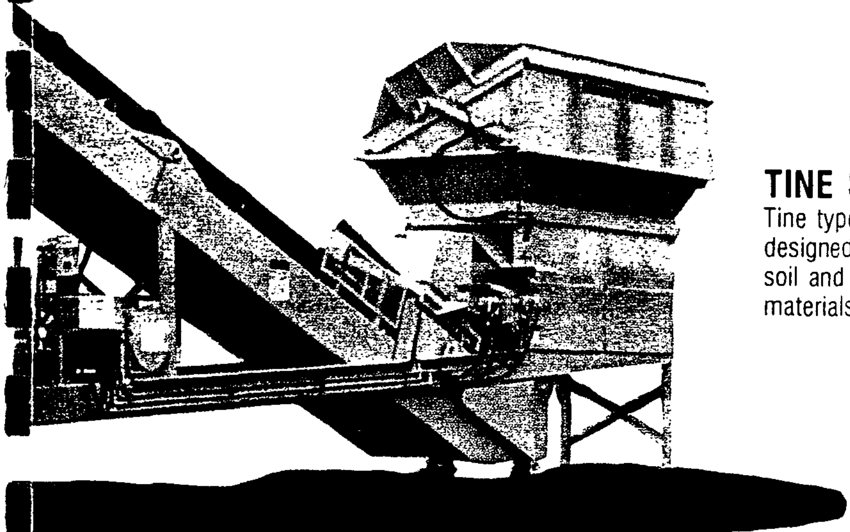
SELF-RELIEVING HOPPER/GRIZZLY

9 cu. yd. capacity designed to reduce material bridging and equipped with a rugged hydraulic activated sloped grizzly. Optional hopper wings are shown in photos.



VARIABLE SPEED BELT FEEDER

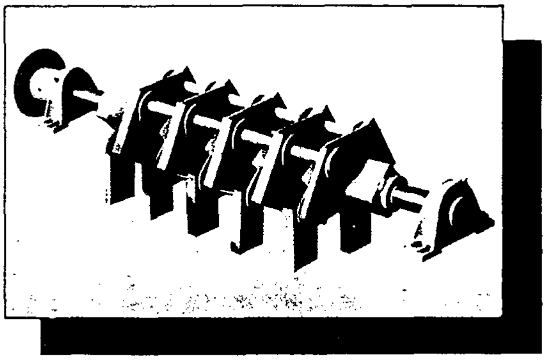
9' - 6" long roller belt designed for precise material metering. Enclosed with easy access doors.



e zerks for daily maintenance.

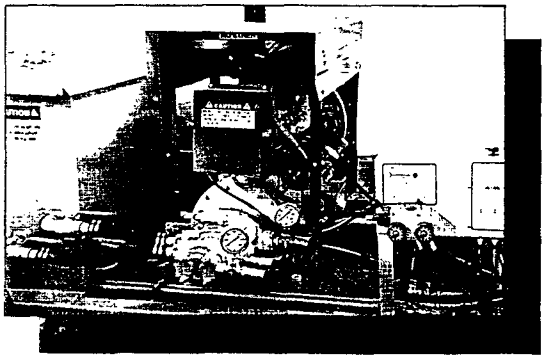
TINE SHREDDER

Tine type shredder is designed for use in top soil and other related materials.



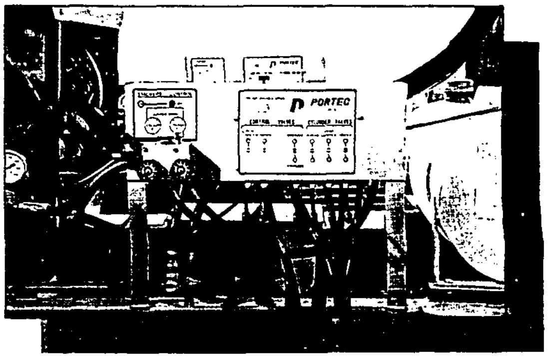
MILL SHREDDER

An optional mill type shredder is available.



POWER UNIT

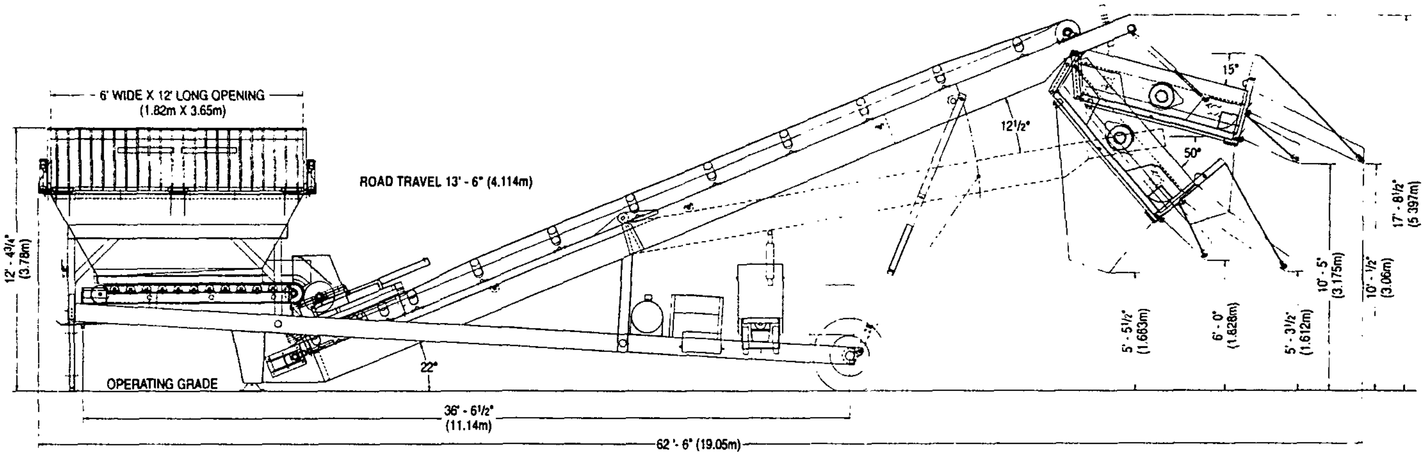
68 HP water cooled diesel with instrumentation, electric start and "high temperature/low oil" shut-down system to prevent engine damage.



CONTROL CENTER

Instrumentation and controls mounted at ground level for ease of operation.

STANDARD SPECIFICATIONS



SPECIFICATIONS AND/OR DIMENSIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

VIBRATING SCREEN:
4′ x 8′ 2-Deck high frequency with variable speed control. Adjustable eccentrics provide maximum screening efficiency in multiple applications.

SCREEN SPRINGS: Rubber shear springs enable screen to function vigorously at any angle.

CHUTE/SUPPORTS: Chute Support frame complete with a 6′-0″ (1.82m) long top and 3′-0″ (.914m) long bottom chute plus a fines collecting hopper.

HOPPER/BELT FEEDER:
SELF-RELIEVING HOPPER: Reduces material bridging and increases material flow with long, steep side walls. Hopper capacity of 9 cu. yd. heaped, and heavy ¼″ (6.35mm) plate steel construction and telescopic support legs for increased stability.

SLOPED GRIZZLY DUMP: Hydraulic activated cylinders and heavy duty 5½" (139.7mm) clear opening grizzly.

BELT FEEDER: Heavy-duty 9' - 6" (2.89m) long roller belt design with variable speed hydraulic drive for precise material metering.

SHREDDER CAPABILITIES:
THE SHREDDER: A "Tine" type shredder is included and designed for use in top soil and related applications.

SHREDDER HOUSING: Hydraulically slides "open" and "closed" for inspection and operation.

UNIQUE INTERCHANGEABILITY: A "Mill" design shredder is available for interchangeability or can be supplied in lieu of the standard "soil tiller."

POWER AND DRIVE SYSTEM:
POWER UNIT: A water cooled diesel produces 68 HP and is equipped with all instrumentation, electric start, battery, 45 gallon lockable fuel tank, and "high temperature/low oil" shut-down system.

DRIVES: All hydraulic with instrumentation and controls conveniently mounted at ground level to operate the main belt, screen, screen pitch, belt feeder, shredder, grizzly dump and conveyor lift. 100 gallon lockable Hydraulic Reservoir is also included.

AMPLE POWER: The diesel/hydraulic power unit is designed to operate two additional "off-plant" conveyors. (Conveyors not included).

HEAVY-DUTY CHASSIS/UNDERCARRIAGE:
TRUCK TYPE CHASSIS: Designed for dependable legal highway portability featuring a single axle with dual wheels, a king pin towing attachment, air brakes and a two speed landing gear.

UNDERCARRIAGE MEMBERS: Telescopic tubular design with hydraulic lift to elevate the conveyor to a maximum 22 degree operating incline, maximizing load-out height.

BASIC CONVEYOR:
CONVEYOR: 30″ (762mm) wide x 40′ (12.92m) long rigidly formed steel construction designed to handle a variety of material under tough load conditions. The conveyor frame also has a hinge design for lower travel dimensions.

CONVEYOR COMPONENTS:
HEAD PULLEY: Rubber lagged.
TAIL PULLEY: Self cleaning wing.
TROUGHING IDLERS: are 35 degree CEMA B type spaced on 4' - 0" (1.21m) centers.

RETURN IDLERS: are spaced on 10'0" (3.048m) centers.
TAKE-UP: are heavy-duty screw type with protective rod covers.
BELT CLEANER: positive cleaning with spring tensions.
PAINT: Standard enamel Portec beige.

HIGHLY MOBILE TRAVEL: Width = 8' - 6" (2.590m)
Height = 13' - 6" (4.114m) Weight = 22,000 lbs. (Approx.)

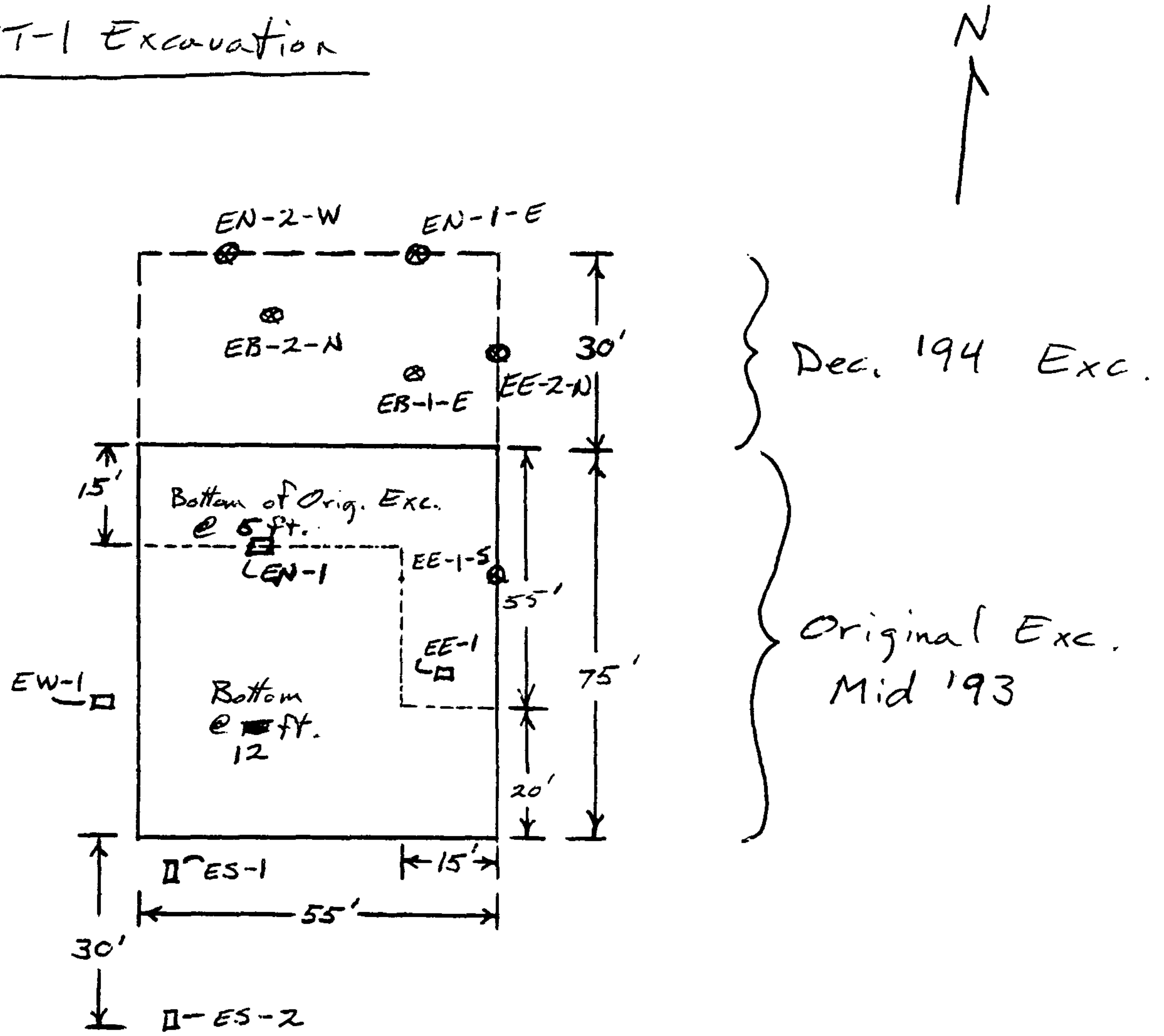
These well balanced machines can be moved quickly and easily.

STANDARD OPTIONS:

- ● REMOTE CONTROL GRIZZLY DUMP
- ● WET SCREEN WITH SPRAY BARS
- ● COMPOSITE HOPPER LINERS
- ● "AR" STEEL LINERS
- ● FEED HOPPER WINGS

PORTEC™
Construction Equipment Division
KOLBERG PRODUCTS
P.O. BOX 220 • YANKTON, SOUTH DAKOTA
PHONE: (605) 665-8771 • FAX: (605) 665-8858

WT-1 Excavation



Final Dimension of Exc.: 105' x 55' x 10'

Collected 5 samples on 10-5-94
EW-1 @ depth = 6' bgs
ES-1 6'
ES-2 5'
EE-1 7'
EN-1 7'

On 12/10 & 12/11 completed additional excavation
Collected 6 samples on 12/11/94
EE-1-S, EE-2-N, EN-1-E, & EN-2-W @ 7' bgs.
EB-1-E & EB-2-N @ 12' bgs

Terra Laboratories, Ltd.
Quality Analytical Services

October 13, 1994

George Robinson
Transwestern Pipeline
PO Box 1188, Rm. 3Ac3142
Houston, TX 77251

Re: Five (5) solid samples (Project Name: WT-1 Excavation) received on 10/06/94

Dear Mr. Robinson:

Attached are the final reports of analysis of the samples referenced above as per your analysis and/or method requests. The analysis for BTEX was subcontracted to Chem Coast Laboratory.

The samples were received in good condition and at 12^{o} Centigrade.

We appreciate this opportunity to serve Transwestern Pipeline. Please let me, or Linda McKee, know if there is any other way we can help you.

Sincerely,

Larry D. Wallace
Laboratory Director

2525 South Shore Blvd. ♦ League City, Texas 77573 ♦ (713) 334-5052 Fax: (713) 334-3116

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: OCT. 13 1994 | Page # 1

Transwestern Pipeline Co
P.O. BOX 1188, RM 3AC 3142
Houston , Tx 77251

Reviewed by:JMH
Customer#:
Job Number:

Attn: Robinson, George

Date Collected:10/05/94

Sample Number: 94007002
Project Name: WT-1 EXCAVATION
Sample ID: EN-1 GRAB

Time Collected:1115

Date Received: 10/06/94

Test Code	Analyte	Result	Units	Method	Analyst
418_1S'D	TPH Analysis Prep(Date/Time)	10/11 1400	init.	6-3550	WJW
TPH'S	TPH(Total Petroleum Hydrocarbon	4300	ppm	2-418.1	WJW
LAB'NAME	Analyses subcontracted to:	Chemcoast			JMH
SUBCON'D	Date subcontracted:	10/11 1200			JMH

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rw 10/13/94

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LAB ANALYSIS REPORT

Report Date: OCT. 13 1994 Page # 1

Transwestern Pipeline Co
P.O. BOX 1188, RM 3AC 3142
Houston , Tx 77251

Attn: Robinson, George

Sample Number: 94007003
Project Name: WT-1 EXCAVATION
Sample ID: EE-1 GRAB

Reviewed by:JMH
Customer#:
Job Number:

Date Collected:10/05/94

Time Collected:1120

Date Received: 10/06/94

Test Code	Analyte	Result	Units	Method	Analyst
418_1S'D	TPH Analysis Prep(Date/Time)	10/11 1400	init.	6-3550	WJW
TPH'S	TPH(Total Petroleum Hydrocarbon	3700	ppm	2-418.1	WJW
LAB'NAME	Analyses subcontracted to:	Chemcoast			JMH
SUBCON'D	Date subcontracted:	10/11 1200			JMH

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
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6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rw 10/13/94

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LAB ANALYSIS REPORT

Report Date: OCT. 13 1994

ranswestern Pipeline Co
P.O. BOX 1188, RM 3AC 3142
Houston , Tx 77251

ttn: Robinson, George

Reviewed by:JMH
Customer#:
Job Number:

Date Collected:10/05/94

Time Collected:1240

Date Received: 10/06/94

Sample Number: 94007004
Project Name: WT-1 EXCAVATION
Sample ID: EW-1 GRAB

Test Code	Analyte	Result	Units	Method	Analyst
418_1S'D	TPH Analysis Prep(Date/Time)	10/11 1400	init.	6-3550	WJW
TPH'S	TPH(Total Petroleum Hydrocarbon	4500	ppm	2-418.1	WJW
AB'NAME	Analyses subcontracted to:	Chemcoast			JMH
SUBCON'D	Date subcontracted:	10/11 1200			JMH

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

reparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Kw 10/13/94

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LAB ANALYSIS REPORT

Report Date: OCT. 13 1994 Page # 1

ranswestern Pipeline Co
P.O. BOX 1188, RM 3AC 3142
Houston , Tx 77251

ttn: Robinson, George

ample Number: 94007005
roject Name: WT-1 EXCAVATION
Sample ID: ES-1 GRAB

Reviewed by:JMH
Customer#:
Job Number:

Date Collected:10/05/94

Time Collected:1300

Date Received: 10/06/94

Test Code	Analyte	Result	Units	Method	Analyst
418_1S'D	TPH Analysis Prep(Date/Time)	10/11 1400	init.	6-3550	WJW
PH'S	TPH(Total Petroleum Hydrocarbon	240	ppm	2-418.1	WJW
AB'NAME	Analyses subcontracted to:	Chemcoast			JMH
SUBCON'D	Date subcontracted:	10/11 1200			JMH

OMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

reparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
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10/13/94

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LAB ANALYSIS REPORT

Report Date: OCT. 13 1994

ranswestern Pipeline Co
P.O. BOX 1188, RM 3AC 3142
Houston , Tx 77251

ttn: Robinson, George

Reviewed by:JMH
Customer#:
Job Number:

Date Collected:10/05/94

Time Collected:1320

Date Received: 10/06/94

ample Number: 94007006
roject Name: WT-1 EXCAVATION
Sample ID: ES-2 GRAB

Test Code	Analyte	Result	Units	Method	Analyst
418_1S'D	TPH Analysis Prep(Date/Time)	10/11 1400	init.	6-3550	WJW
PH'S	TPH(Total Petroleum Hydrocarbon	<5	ppm	2-418.1	WJW
AB'NAME	Analyses subcontracted to:	Chemcoast			JMH
SUBCON'D	Date subcontracted:	10/11 1200			JMH

OMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

reparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rw 10/13/94

QUALITY CONTROL REPORT

Report To: Transwestern Pipeline
Terra Laboratories Sample No(s). 94007002 - 94007006

			Precision			Accuracy	
Analyte	Units	Blank	Orig	Dup	RPD(%)	MSR(%)	LCSR(%)
TPH (Batch A101194S)							
Sample No. 94007006	mg/kg	< 5	< 1	< 1	-		95

Rw 10/17/94

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11820 North H Street
La Porte, Tx. USA 77572-1338

713-470-8710
FAX: 713-470-8711
TLX: 765468

CERTIFICATE OF ANALYSIS
L-4131-4

SAMPLE DATE: 10/11/94

MARKINGS: 96-7002

CUSTOMER: TERRA LABORATORIES

COMMODITY: WASTE SOLID

SAMPLING: SUBMITTED

ANALYSIS

METHOD	TEST	INITIALS	RESULTS
SW 846 8020	BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	TOLUENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	ETHYLENE BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	XYLENES, PPB	JG/TB	LESS THAN 10

BROMO FLUORO BENZENE (SURR) % RECOVERY = 119.9

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CERTIFICATE OF ANALYSIS
L-4131-4

SAMPLE DATE: 10/11/94

MARKINGS: 96-7003

CUSTOMER: TERRA LABORATORIES

COMMODITY: WASTE SOLID

SAMPLING: SUBMITTED

ANALYSIS

METHOD	TEST	INITIALS	RESULTS
SW 846 8020	BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	TOLUENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	ETHYLENE BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	XYLENES, PPB	JG/TB	LESS THAN 10

BROMO FLUORO BENZENE (SURR) % RECOVERY = 93.34

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CERTIFICATE OF ANALYSIS
L-4131-4

SAMPLE DATE: 10/11/94

MARKINGS: 96-7004

CUSTOMER: TERRA LABORATORIES

COMMODITY: WASTE SOLID

SAMPLING: SUBMITTED

ANALYSIS

METHOD	TEST	INITIALS	RESULTS
SW 846 8020	BENZENE, PPB	JG/TB	105
SW 846 8020	TOLUENE, PPB	JG/TB	288
SW 846 8020	ETHYLENE BENZENE, PPB	JG/TB	50.3
SW 846 8020	XYLENES, PPB	JG/TB	414

BROMO FLUORO BENZENE (SURR) % RECOVERY = 90.61

NOTE: 1:10 DILUTION FACTOR

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CERTIFICATE OF ANALYSIS
L-4131-4

SAMPLE DATE: 10/11/94

MARKINGS: 96-7005

CUSTOMER: TERRA LABORATORIES

COMMODITY: WASTE SOLID

SAMPLING: SUBMITTED

ANALYSIS

METHOD	TEST	INITIALS	RESULTS
SW 846 8020	BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	TOLUENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	ETHYLENE BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	XYLENES, PPB	JG/TB	LESS THAN 10

BROMO FLUORO BENZENE (SURR) % RECOVERY = 95.20

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FAX: 713-470-8711
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CERTIFICATE OF ANALYSIS
L-4131-4

SAMPLE DATE: 10/11/94

MARKINGS: 96-7006

CUSTOMER: TERRA LABORATORIES

COMMODITY: WASTE SOLID

SAMPLING: SUBMITTED

ANALYSIS

METHOD	TEST	INITIALS	RESULTS
SW 846 8020	BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	TOLUENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	ETHYLENE BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	XYLENES, PPB	JG/TB	LESS THAN 10

BROMO FLUORO BENZENE (SURR) % RECOVERY = 94.95

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FAX: 713-470-8711
TLX: 765468

QUALITY ASSURANCE/QUALITY CONTROL

ANALYZED DATE: 10/12/94

SAMPLE ID: L-4131-4

INITIALS: JG/TB

CUSTOMER: TERRA LABORATORIES

CUSTOMER SAMPLE ID: 94-7001

PARAMETERS	BLANK	SPIKE VALUE ORIGINAL	RECOVER -ED	SPIKE RECOVERY %	SAMPLE ORIGINAL	SAMPLE DUPLICATE	%DEV. DUP.
BFB (SURR)		20	18.9	94.50	21.4	20.8	2.84
BENZENE	0	20	18.8	94.00	18.4	18.7	1.62
TOLUENE	0	20	18.3	91.50	19.2	18.6	3.17
ETHYL BENZENE	0	20	19.2	96.00	20.1	20.9	3.90
XYLENES	0	30	29.7	99.00	30.5	30.1	1.32

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La Porte, Tx. USA 77572-1338

713-470-8710
FAX: 713-470-8711
TLX: 765468

QUALITY ASSURANCE/QUALITY CONTROL

ANALYZED DATE: 10/12/94

SAMPLE ID: L-4131-4

INITIALS: JG/TB

CUSTOMER: TERRA LABORATORIES

CUSTOMER SAMPLE ID: 94-6988

PARAMETERS	BLANK	SPIKE VALUE ORIGINAL	RECOVER-ED	SPIKE RECOVERY %	SAMPLE ORIGINAL	SAMPLE DUPLICATE	%DEV. DUP.
BFB (SURR)		20	19.8	99.00	21.2	20.5	3.36
BENZENE	0	20	20.1	100.50	19.0	19.0	0
TOLUENE	0	20	20.7	103.50	18.2	18.9	3.77
ETHYL BENZENE	0	20	20.5	102.50	19.3	18.4	5.84
XYLENES	0	30	30.1	100.33	30.3	31.0	2.28

TERRA LABORATORIES LTD.

2525 South Shore Blvd. League City, Texas 77573 (713) 334-5052 Fax: (713) 334-3116

CHAIN OF CUSTODY

REPORT TO:

COMPANY Transwestern Pipeline Co.
ADDRESS P.O. Box 1188, Rm 3AC-3142
CITY Houston STATE TX ZIP 77251
ATTN George Robinson PHONE 646-7327 FAX 6467247
Client Comments:

REMIT TO:

COMPANY Transwestern Pipeline Co.
ADDRESS
CITY STATE ZIP
ATTN George R. PHONE FAX
Project Name: WT-1 Excavation
P.O. #
Turnaround Time Normal
Release #

ANALYSES REQUESTED

DATE	24HR TIME	MATRIX	COMPOSITE	GRAB	SAMPLE DESCRIPTION	NUMBER CONTAINERS	TPH 418.1	BTEX 8020	TERRA SAMPLE NO.
10/5/94	11:15	Soil		1	EN-1	1	✓	✓	94-7002
	11:20			1	EE-1	1	✓	✓	94-7003
	12:40			1	EW-1	1	✓	✓	94-7004
	13:00			1	ES-1	1	✓	✓	94-7005
	13:20			1	ES-2	1	✓	✓	94-7006

Collected by:	Date: 10/5/94	Time:	Received by Terra: Neil Zapata	Date: 10-6-94	Time: 1:00	Remarks 12°C W2 10-6-94
Relinquished by:	Date:	Time:	Received by:	Date:	Time:	
Relinquished by:	Date:	Time:	Received by:	Date:	Time:	

Terra Laboratories, Ltd.
Quality Analytical Services

October 13, 1994

George Robinson
Transwestern Pipeline
PO Box 1188, Rm. 3Ac3142
Houston, TX 77251

Re: Eight (8) solid samples (Project Name: WT-1 Soil Pile) received on 10/06/94

Dear Mr. Robinson:

Attached are the final reports of analysis of the samples referenced above as per your analysis and/or method requests. The analysis for BTEX was subcontracted to Chem Coast Laboratory.

The samples were received in good condition and at 12° Centigrade.

We appreciate this opportunity to serve Transwestern Pipeline. Please let me, or Linda McKee, know if there is any other way we can help you.

Sincerely,

Larry D Wallace

Larry D. Wallace
Laboratory Director

2525 South Shore Blvd. ♦ League City, Texas 77573 ♦ (713) 334-5052 Fax: (713) 334-3116

TERRA LABORATORIES, LTD.
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LEAGUE CITY, TX 77573
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LAB ANALYSIS REPORT

Report Date: OCT. 13 1994

Page # 1

Transwestern Pipeline Co
P.O. BOX 1188, RM 3AC 3142
Houston , Tx 77251

Attn: Robinson, George

Reviewed by:JMH
Customer#:
Job Number:

Date Collected:10/05/94

Time Collected:1130

Date Received: 10/06/94

Sample Number: 94006986
Project Name: WT-1 SOIL PILE
Sample ID: SP-1 GRAB

Test Code	Analyte	Result	Units	Method	Analyst
418_1S'D	TPH Analysis Prep(Date/Time)	10/11 1300	init.	6-3550	WJW
TPH'S	TPH(Total Petroleum Hydrocarbon	4500	ppm	2-418.1	WJW
LAB'NAME	Analyses subcontracted to:	Chemcoast			JMH
SUBCON'D	Date subcontracted:	10/11 1200			JMH

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

RW 10/13/94

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LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: OCT. 13 1994 Page # 1

Transwestern Pipeline Co
P.O. BOX 1188, RM 3AC 3142
Houston , Tx 77251

Attn: Robinson, George

Reviewed by: JMH
Customer#:
Job Number:

Date Collected: 10/05/94

Sample Number: 94006987
Project Name: WT-1 SOIL PILE
Sample ID: SP-2 GRAB

Time Collected: 1130

Date Received: 10/06/94

Test Code	Analyte	Result	Units	Method	Analyst
418_1S'D	TPH Analysis Prep(Date/Time)	10/11 1300	init.	6-3550	WJW
TPH'S	TPH(Total Petroleum Hydrocarbon	4500	ppm	2-418.1	WJW
LAB'NAME	Analyses subcontracted to:	Chemcoast			JMH
SUBCON'D	Date subcontracted:	10/11 1200			JMH

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Kw 10/13/94
Larry

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LAB ANALYSIS REPORT

Report Date: OCT. 13 1994 | Page # 1

Transwestern Pipeline Co
P.O. BOX 1188, RM 3AC 3142
Houston , Tx 77251

Attn: Robinson, George

Reviewed by:JMH
Customer#:
Job Number:

Date Collected:10/05/94

Time Collected:1140

Sample Number: 94006988
Project Name: WT-1 SOIL PILE
Sample ID: SP-3 GRAB

Date Received: 10/06/94

Test Code	Analyte	Result	Units	Method	Analyst
418_1S'D	TPH Analysis Prep(Date/Time)	10/11 1300	init.	6-3550	WJW
TPH'S	TPH(Total Petroleum Hydrocarbon	4500	ppm	2-418.1	WJW
LAB'NAME	Analyses subcontracted to:	Chemcoast			JMH
SUBCON'D	Date subcontracted:	10/11 1200			JMH

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
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LAB ANALYSIS REPORT

Report Date: OCT. 13 1994
Page # 1

Transwestern Pipeline Co
P.O. BOX 1188, RM 3AC 3142
Houston , Tx 77251

Reviewed by:JMH
Customer#:
Job Number:

Attn: Robinson, George

Date Collected:10/05/94

Sample Number: 94006989
Project Name: WT-1 SOIL PILE
Sample ID: SP-4 GRAB

Time Collected:1145

Date Received: 10/06/94

Test Code	Analyte	Result	Units	Method	Analyst
418_1S'D	TPH Analysis Prep(Date/Time)	10/11 1300	init.	6-3550	WJW
TPH'S	TPH(Total Petroleum Hydrocarbon	2000	ppm	2-418.1	WJW
LAB'NAME	Analyses subcontracted to:	Chemcoast			JMH
SUBCON'D	Date subcontracted:	10/11 1200			JMH

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

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2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
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LAB ANALYSIS REPORT

Report Date: OCT. 13 1994

Page # 1

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P.O. BOX 1188, RM 3AC 3142
Houston , Tx 77251

Attn: Robinson, George

Reviewed by:JMH
Customer#:
Job Number:

Date Collected:10/05/94

ample Number: 94006990
roject Name: WT-1 SOIL PILE
Sample ID: SP-5 GRAB

Time Collected:1135

Date Received: 10/06/94

Test Code	Analyte	Result	Units	Method	Analyst
418_1S'D	TPH Analysis Prep(Date/Time)	10/11 1300	init.	6-3550	WJW
TPH'S	TPH(Total Petroleum Hydrocarbon	4400	ppm	2-418.1	WJW
LAB'NAME	Analyses subcontracted to:	Chemcoast			JMH
SUBCON'D	Date subcontracted:	10/11 1200			JMH

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

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2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
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LAB ANALYSIS REPORT

Report Date: OCT. 13 1994

Page # 1

Transwestern Pipeline Co
P.O. BOX 1188, RM 3AC 3142
Houston , Tx 77251

Attn: Robinson, George

Sample Number: 94006991
Project Name: WT-1 SOIL PILE
Sample ID: SP-6R GRAB

Reviewed by:JMH
Customer#:
Job Number:

Date Collected:10/05/94

Time Collected:1155

Date Received: 10/06/94

Test Code	Analyte	Result	Units	Method	Analyst
418_1S'D	TPH Analysis Prep(Date/Time)	10/11 1300	init.	6-3550	WJW
TPH'S	TPH(Total Petroleum Hydrocarbon	590	ppm	2-418.1	WJW
LAB'NAME	Analyses subcontracted to:	Chemcoast			JMH
SUBCON'D	Date subcontracted:	10/11 1200			JMH

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
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LAB ANALYSIS REPORT

Report Date: OCT. 13 1994 Page # 1

ranswestern Pipeline Co
P.O. BOX 1188, RM 3AC 3142
Houston , Tx 77251

Reviewed by:JMH
Customer#:
Job Number:

ttn: Robinson, George

Date Collected:10/05/94

Sample Number: 94006992
roject Name: WT-1 SOIL PILE
Sample ID: SP-7R GRAB

Time Collected:1200

Date Received: 10/06/94

Test Code	Analyte	Result	Units	Method	Analyst
418_1S'D	TPH Analysis Prep(Date/Time)	10/11 1300	init.	6-3550	WJW
TPH'S	TPH(Total Petroleum Hydrocarbon	4500	ppm	2-418.1	WJW
LAB'NAME	Analyses subcontracted to:	Chemcoast			JMH
SUBCON'D	Date subcontracted:	10/11 1200			JMH

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

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2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
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LAB ANALYSIS REPORT

Report Date: OCT. 13 1994
Page # 1

Transwestern Pipeline Co
P.O. BOX 1188, RM 3AC 3142
Houston , Tx 77251

Attn: Robinson, George

Reviewed by:JMH
Customer#:
Job Number:

Date Collected:10/05/94

Time Collected:1210

Date Received: 10/06/94

Sample Number: 94006993
Project Name: WT-1 SOIL PILE
Sample ID: SP-8 GRAB

Test Code	Analyte	Result	Units	Method	Analyst
418_1S'D	TPH Analysis Prep(Date/Time)	10/11 1300	init.	6-3550	WJW
TPH'S	TPH(Total Petroleum Hydrocarbon	3600	ppm	2-418.1	WJW
LAB'NAME	Analyses subcontracted to:	Chemcoast			JMH
SUBCON'D	Date subcontracted:	10/11 1200			JMH

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

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2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
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Rev 10/13/94

QUALITY CONTROL REPORT

Report To: Transwestern Pipeline
Terra Laboratories Sample No(s). 94006986 - 94006993

			Precision			Accuracy	
Analyte	Units	Blank	Orig	Dup	RPD(%)	MSR(%)	LCSR(%)
TPH (Batch 101194S)							
Sample No. 94006995	mg/kg	< 5	189	199	5.2		93

Rw 10/14/94

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11820 North H Street
La Porte, Tx. USA 77572-1338

713-470-8710
FAX: 713-470-8711
TLX: 765468

CERTIFICATE OF ANALYSIS
L-4131-4

SAMPLE DATE: 10/11/94

MARKINGS: 96-6986

CUSTOMER: TERRA LABORATORIES

COMMODITY: WASTE SOLID

SAMPLING: SUBMITTED

ANALYSIS

METHOD	TEST	INITIALS	RESULTS
SW 846 8020	BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	TOLUENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	ETHYLENE BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	XYLENES, PPB	JG/TB	LESS THAN 10

BROMO FLUORO BENZENE (SURR) % RECOVERY = 91.3

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CERTIFICATE OF ANALYSIS
L-4131-4

SAMPLE DATE: 10/11/94

MARKINGS: 96-6987

CUSTOMER: TERRA LABORATORIES

COMMODITY: WASTE SOLID

SAMPLING: SUBMITTED

ANALYSIS

METHOD	TEST	INITIALS	RESULTS
SW 846 8020	BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	TOLUENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	ETHYLENE BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	XYLENES, PPB	JG/TB	LESS THAN 10

BROMO FLUORO BENZENE (SURR) % RECOVERY = 90.26

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CERTIFICATE OF ANALYSIS
L-4131-4

SAMPLE DATE: 10/11/94

MARKINGS: 96-6988

CUSTOMER: TERRA LABORATORIES

COMMODITY: WASTE SOLID

SAMPLING: SUBMITTED

ANALYSIS

METHOD	TEST	INITIALS	RESULTS
SW 846 8020	BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	TOLUENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	ETHYLENE BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	XYLENES, PPB	JG/TB	LESS THAN 10

BROMO FLUORO BENZENE (SURR) % RECOVERY = 97.20

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CERTIFICATE OF ANALYSIS
L-4131-4

SAMPLE DATE: 10/11/94

MARKINGS: 96-6989

CUSTOMER: TERRA LABORATORIES

COMMODITY: WASTE SOLID

SAMPLING: SUBMITTED

ANALYSIS

METHOD	TEST	INITIALS	RESULTS
SW 846 8020	BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	TOLUENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	ETHYLENE BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	XYLENES, PPB	JG/TB	LESS THAN 10

BROMO FLUORO BENZENE (SURR) % RECOVERY = 108.1

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CERTIFICATE OF ANALYSIS
L-4131-4

SAMPLE DATE: 10/11/94

MARKINGS: 96-6990

CUSTOMER: TERRA LABORATORIES

COMMODITY: WASTE SOLID

SAMPLING: SUBMITTED

ANALYSIS

METHOD	TEST	INITIALS	RESULTS
SW 846 8020	BENZENE, PPB	JG/TB	11.8
SW 846 8020	TOLUENE, PPB	JG/TB	64.1
SW 846 8020	ETHYLENE BENZENE, PPB	JG/TB	35.5
SW 846 8020	XYLENES, PPB	JG/TB	284.5

BROMO FLUORO BENZENE (SURR) % RECOVERY = 93.00

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CERTIFICATE OF ANALYSIS
L-4131-4

SAMPLE DATE: 10/11/94

MARKINGS: 96-6991

CUSTOMER: TERRA LABORATORIES

COMMODITY: WASTE SOLID

SAMPLING: SUBMITTED

ANALYSIS

METHOD	TEST	INITIALS	RESULTS
SW 846 8020	BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	TOLUENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	ETHYLENE BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	XYLENES, PPB	JG/TB	LESS THAN 10

BROMO FLUORO BENZENE (SURR) % RECOVERY = 107.94

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CERTIFICATE OF ANALYSIS
L-4131-4

SAMPLE DATE: 10/11/94

MARKINGS: 96-6992

CUSTOMER: TERRA LABORATORIES

COMMODITY: WASTE SOLID

SAMPLING: SUBMITTED

ANALYSIS

METHOD	TEST	INITIALS	RESULTS
SW 846 8020	BENZENE, PPB	JG/TB	28.7
SW 846 8020	TOLUENE, PPB	JG/TB	26.3
SW 846 8020	ETHYLENE BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	XYLENES, PPB	JG/TB	118.4

BROMO FLUORO BENZENE (SURR) % RECOVERY = 106.0

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FAX: 713-470-8711
TLX: 765468

CERTIFICATE OF ANALYSIS
L-4131-4

SAMPLE DATE: 10/11/94

MARKINGS: 96-6993

CUSTOMER: TERRA LABORATORIES

COMMODITY: WASTE SOLID

SAMPLING: SUBMITTED

ANALYSIS

METHOD	TEST	INITIALS	RESULTS
SW 846 8020	BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	TOLUENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	ETHYLENE BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	XYLENES, PPB	JG/TB	LESS THAN 10

BROMO FLUORO BENZENE (SURR) % RECOVERY = 97.64

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713-470-8710
FAX: 713-470-8711
TLX: 765468

QUALITY ASSURANCE/QUALITY CONTROL

ANALYZED DATE: 10/12/94

SAMPLE ID: L-4131-4

INITIALS: JG/TB

CUSTOMER: TERRA LABORATORIES

CUSTOMER SAMPLE ID: 94-7001

PARAMETERS	BLANK	SPIKE VALUE		SPIKE RECOVERY %	SAMPLE ORIGINAL	SAMPLE DUPLICATE	%DEV. DUP.
		ORIGINAL	RECOVER -ED				
BFB (SURR)		20	18.9	94.50	21.4	20.8	2.84
BENZENE	0	20	18.8	94.00	18.4	18.7	1.62
TOLUENE	0	20	18.3	91.50	19.2	18.6	3.17
ETHYL BENZENE	0	20	19.2	96.00	20.1	20.9	3.90
XYLENES	0	30	29.7	99.00	30.5	30.1	1.32

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La Porte, Tx. USA 77572-1338

713-470-8710
FAX: 713-470-8711
TLX: 765468

QUALITY ASSURANCE/QUALITY CONTROL

ANALYZED DATE: 10/12/94

SAMPLE ID: L-4131-4

INITIALS: JG/TB

CUSTOMER: TERRA LABORATORIES

CUSTOMER SAMPLE ID: 94-6988

PARAMETERS	BLANK	SPIKE VALUE ORIGINAL	SPIKE VALUE RECOVER-ED	SPIKE RECOVERY %	SAMPLE ORIGINAL	SAMPLE DUPLICATE	%DEV. DUP.
BFB (SURR)		20	19.8	99.00	21.2	20.5	3.36
BENZENE	0	20	20.1	100.50	19.0	19.0	0
TOLUENE	0	20	20.7	103.50	18.2	18.9	3.77
ETHYL BENZENE	0	20	20.5	102.50	19.3	18.4	5.84
XYLENES	0	30	30.1	100.33	30.3	31.0	2.28

TERRA LABORATORIES LTD.

2525 South Shore Blvd. League City, Texas 77573 (713) 334-5052 Fax: (713) 334-3116

CHAIN OF CUSTODY

REPORT TO:

COMPANY Transwestern Pipeline Co.
ADDRESS P.O. Box 1188, Rm 3AC 3142
CITY Houston STATE TX ZIP 77251
ATTN George Robinson PHONE 646-7327 FAX 646-7247
Client Comments:

REMIT TO:

COMPANY Same
ADDRESS
CITY STATE ZIP
ATTN PHONE FAX
Project Name: WT-1 Soil Pile
P.O. # —
Turnaround Time Normal
Release # —

ANALYSES REQUESTED

DATE	24HR TIME	MATRIX	COMPOSITE	GRAB	SAMPLE DESCRIPTION	NUMBER CONTAINERS	TPH 418.1	BTEX 8020	TERRA SAMPLE NO.
10/5/94	11:30	Soil		✓	SP-1	1	✓	✓	94-6986
	11:30				SP-2	1	✓	✓	94-6987
	11:40				SP-3	1	✓	✓	94-698[illegible] 88 kc
	11:45				SP-4	1	✓	✓	94-698[illegible] 89
	11:55				SP-5	1	✓	✓	94-~~6987~~ 6990 WZ
	11:55				SP-6R	1	✓	✓	94-6991
	12:00				SP-7R	1	✓	✓	94-6992
	12:10				SP-8	1	✓	✓	94-6993

Collected by:	Date: 10/5/94	Time: 12:15	Received by Terra:	Date: 10-6-94	Time: 11:00	Remarks	10-6-94 wz 12°c
Relinquished by:	Date:	Time:	Received by:	Date:	Time:		
Relinquished by:	Date:	Time:	Received by:	Date:	Time:		

Terra Laboratories, Ltd.
Quality Analytical Services

October 13, 1994

George Robinson
Transwestern Pipeline
PO Box 1188, Rm. 3Ac3142
Houston, TX 77251

Re: Eight (8) solid samples (Project Name: WT-1 Landfarm) received on 10/06/94

Dear Mr. Robinson:

Attached are the final reports of analysis of the samples referenced above as per your analysis and/or method requests. The analysis for BTEX was subcontracted to Chem Coast Laboratory.

The samples were received in good condition and at 12° Centigrade.

We appreciate this opportunity to serve Transwestern Pipeline. Please let me, or Linda McKee, know if there is any other way we can help you.

Sincerely,

Larry D. Wallace

Larry D. Wallace
Laboratory Director

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: OCT. 13 1994

Page # 1

Transwestern Pipeline Co
P.O. BOX 1188, RM 3AC 3142
Houston , Tx 77251

Reviewed by: JMH
Customer#:
Job Number:

Attn: Robinson, George

Date Collected: 10/05/94

Sample Number: 94006994
Project Name: WT-1 LANDFARM
Sample ID: LF-1 GRAB

Time Collected: 1000

Date Received: 10/06/94

Test Code	Analyte	Result	Units	Method	Analyst
418_1S'D	TPH Analysis Prep(Date/Time)	10/11 1300	init.	6-3550	WJW
TPH'S	TPH(Total Petroleum Hydrocarbon	350	ppm	2-418.1	WJW
LAB'NAME	Analyses subcontracted to:	Chemcoast			JMH
SUBCON'D	Date subcontracted:	10/11 1200			JMH

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

10/13/94

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LAB ANALYSIS REPORT

Report Date: OCT. 13 1994

Page # 1

Transwestern Pipeline Co
P.O. BOX 1188, RM 3AC 3142
Houston , Tx 77251

Reviewed by:JMH
Customer#:
Job Number:

Attn: Robinson, George

Date Collected:10/05/94

Sample Number: 94006995
Project Name: WT-1 LANDFARM
Sample ID: LF-2 GRAB

Time Collected:1000

Date Received: 10/06/94

Test Code	Analyte	Result	Units	Method	Analyst
418_1S'D	TPH Analysis Prep(Date/Time)	10/11 1300	init.	6-3550	WJW
TPH'S	TPH(Total Petroleum Hydrocarbon	200	ppm	2-418.1	WJW

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
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Rw 10/13/94

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LAB ANALYSIS REPORT

Report Date: OCT. 13 1994

Page # 1

Transwestern Pipeline Co
P.O. BOX 1188, RM 3AC 3142
Houston , Tx 77251

Attn: Robinson, George

Sample Number: 94006996
Project Name: WT-1 LANDFARM
Sample ID: LF-3 GRAB

Reviewed by:JMH
Customer#:
Job Number:

Date Collected:10/05/94

Time Collected:1000

Date Received: 10/06/94

Test Code	Analyte	Result	Units	Method	Analyst
418_1S'D	TPH Analysis Prep(Date/Time)	10/11 1400	init.	6-3550	WJW
TPH'S	TPH(Total Petroleum Hydrocarbon	110	ppm	2-418.1	WJW
LAB'NAME	Analyses subcontracted to:	Chemcoast			JMH
SUBCON'D	Date subcontracted:	10/11 1200			JMH

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
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Rw 10/13/94

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LAB ANALYSIS REPORT

Report Date: OCT. 13 1994

Page # 1

Transwestern Pipeline Co
P.O. BOX 1188, RM 3AC 3142
Houston , Tx 77251

Attn: Robinson, George

Sample Number: 94006997
Project Name: WT-1 LANDFARM
Sample ID: LF-4 GRAB

Reviewed by:JMH
Customer#:
Job Number:

Date Collected:10/05/94

Time Collected:1000

Date Received: 10/06/94

Test Code	Analyte	Result	Units	Method	Analyst
418_1S'D	TPH Analysis Prep(Date/Time)	10/11 1400	init.	6-3550	WJW
TPH'S	TPH(Total Petroleum Hydrocarbon	160	ppm	2-418.1	WJW

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
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KW 10/13/94

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LAB ANALYSIS REPORT

Report Date: OCT. 13 1994 Page # 1

Transwestern Pipeline Co
P.O. BOX 1188, RM 3AC 3142
Houston , Tx 77251

Reviewed by:JMH
Customer#:
Job Number:

Attn: Robinson, George

Date Collected:10/05/94

Sample Number: 94006998
Project Name: WT-1 LANDFARM
Sample ID: LF-5 GRAB

Time Collected:1000

Date Received: 10/06/94

Test Code	Analyte	Result	Units	Method	Analyst
418_1S'D	TPH Analysis Prep(Date/Time)	10/11 1400	init.	6-3550	WJW
TPH'S	TPH(Total Petroleum Hydrocarbon	150	ppm	2-418.1	WJW
LAB'NAME	Analyses subcontracted to:	Chemcoast			JMH
SUBCON'D	Date subcontracted:	10/11 1200			JMH

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rw 10/13/94

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LAB ANALYSIS REPORT

Report Date: OCT. 13 1994

Page # 1

Transwestern Pipeline Co
P.O. BOX 1188, RM 3AC 3142
Houston , Tx 77251

Reviewed by: JMH
Customer#:
Job Number:

Attn: Robinson, George

Date Collected: 10/05/94

Sample Number: 94006999
Project Name: WT-1 LANDFARM
Sample ID: LF-6 GRAB

Time Collected: 1000

Date Received: 10/06/94

Test Code	Analyte	Result	Units	Method	Analyst
418_1S'D	TPH Analysis Prep(Date/Time)	10/11 1400	init.	6-3550	WJW
TPH'S	TPH(Total Petroleum Hydrocarbon	210	ppm	2-418.1	WJW

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rw 10/15/94

Larry

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LAB ANALYSIS REPORT

Report Date: OCT. 13 1994

Page # 1

Transwestern Pipeline Co
P.O. BOX 1188, RM 3AC 3142
Houston , Tx 77251

Attn: Robinson, George

Reviewed by:JMH
Customer#:
Job Number:

Date Collected:10/05/94

Time Collected:1000

Date Received: 10/06/94

Sample Number: 94007000
Project Name: WT-1 LANDFARM
Sample ID: LF-7 GRAB

Test Code	Analyte	Result	Units	Method	Analyst
418_1S'D	TPH Analysis Prep(Date/Time)	10/11 1400	init.	6-3550	WJW
TPH'S	TPH(Total Petroleum Hydrocarbon	620	ppm	2-418.1	WJW
LAB'NAME	Analyses subcontracted to:	Chemcoast			JMH
SUBCON'D	Date subcontracted:	10/11 1200			JMH

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
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6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rec'd 10/13/94

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LAB ANALYSIS REPORT

Report Date: OCT. 13 1994 Page # 1

Transwestern Pipeline Co
P.O. BOX 1188, RM 3AC 3142
Houston , Tx 77251

Reviewed by:JMH
Customer#:
Job Number:

Attn: Robinson, George

Date Collected:10/05/94

Sample Number: 94007001
Project Name: WT-1 LANDFARM
Sample ID: LF-8 GRAB

Time Collected:1000

Date Received: 10/06/94

Test Code	Analyte	Result	Units	Method	Analyst
418_1S'D	TPH Analysis Prep(Date/Time)	10/11 1400	init.	6-3550	WJW
TPH'S	TPH(Total Petroleum Hydrocarbon	150	ppm	2-418.1	WJW

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
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6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rcv 10/17/94
Larry Dildine

CHEM COAST INC.

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CHEM COAST LABORATORY

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11820 North H Street
La Porte, Tx. USA 77572-1338

713-470-8710
FAX: 713-470-8711
TLX: 765468

CERTIFICATE OF ANALYSIS
L-4131-4

SAMPLE DATE: 10/11/94

MARKINGS: 96-6994

CUSTOMER: TERRA LABORATORIES

COMMODITY: WASTE SOLID

SAMPLING: SUBMITTED

ANALYSIS

METHOD	TEST	INITIALS	RESULTS
SW 846 8020	BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	TOLUENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	ETHYLENE BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	XYLENES, PPB	JG/TB	LESS THAN 10

BROMO FLUORO BENZENE (SURR) % RECOVERY = 99.68

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La Porte, Tx. USA 77572-1338

713-470-8710
FAX: 713-470-8711
TLX: 765468

CERTIFICATE OF ANALYSIS
L-4131-4

SAMPLE DATE: 10/11/94

MARKINGS: 96-6996

CUSTOMER: TERRA LABORATORIES

COMMODITY: WASTE SOLID

SAMPLING: SUBMITTED

ANALYSIS

METHOD	TEST	INITIALS	RESULTS
SW 846 8020	BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	TOLUENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	ETHYLENE BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	XYLENES, PPB	JG/TB	LESS THAN 10

BROMO FLUORO BENZENE (SURR) % RECOVERY = 116.4

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FAX: 713-470-8711
TLX: 765468

CERTIFICATE OF ANALYSIS
L-4131-4

SAMPLE DATE: 10/11/94

MARKINGS: 96-6998

CUSTOMER: TERRA LABORATORIES

COMMODITY: WASTE SOLID

SAMPLING: SUBMITTED

ANALYSIS

METHOD	TEST	INITIALS	RESULTS
SW 846 8020	BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	TOLUENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	ETHYLENE BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	XYLENES, PPB	JG/TB	LESS THAN 10

BROMO FLUORO BENZENE (SURR) % RECOVERY = 89.99

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CERTIFICATE OF ANALYSIS
L-4131-4

SAMPLE DATE: 10/11/94

MARKINGS: 96-7000

CUSTOMER: TERRA LABORATORIES

COMMODITY: WASTE SOLID

SAMPLING: SUBMITTED

ANALYSIS

METHOD	TEST	INITIALS	RESULTS
SW 846 8020	BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	TOLUENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	ETHYLENE BENZENE, PPB	JG/TB	LESS THAN 10
SW 846 8020	XYLENES, PPB	JG/TB	LESS THAN 10

BROMO FLUORO BENZENE (SURR) % RECOVERY = 108.0

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QUALITY ASSURANCE/QUALITY CONTROL

ANALYZED DATE: 10/12/94

SAMPLE ID: L-4131-4

INITIALS: JG/TB

CUSTOMER: TERRA LABORATORIES

CUSTOMER SAMPLE ID: 94-7001

PARAMETERS	BLANK	SPIKE VALUE		SPIKE RECOVERY %	SAMPLE ORIGINAL	SAMPLE DUPLICATE	%DEV. DUP.
		ORIGINAL	RECOVER-ED				
BFB (SURR)		20	18.9	94.50	21.4	20.8	2.84
BENZENE	0	20	18.8	94.00	18.4	18.7	1.62
TOLUENE	0	20	18.3	91.50	19.2	18.6	3.17
ETHYL BENZENE	0	20	19.2	96.00	20.1	20.9	3.90
XYLENES	0	30	29.7	99.00	30.5	30.1	1.32

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QUALITY ASSURANCE/QUALITY CONTROL

ANALYZED DATE: 10/12/94

SAMPLE ID: L-4131-4

INITIALS: JG/TB

CUSTOMER: TERRA LABORATORIES

CUSTOMER SAMPLE ID: 94-6988

PARAMETERS	BLANK	SPIKE VALUE ORIGINAL	SPIKE VALUE RECOVER-ED	SPIKE RECOVERY %	SAMPLE ORIGINAL	SAMPLE DUPLICATE	%DEV. DUP.
BFB (SURR)		20	19.8	99.00	21.2	20.5	3.36
BENZENE	0	20	20.1	100.50	19.0	19.0	0
TOLUENE	0	20	20.7	103.50	18.2	18.9	3.77
ETHYL BENZENE	0	20	20.5	102.50	19.3	18.4	5.84
XYLENES	0	30	30.1	100.33	30.3	31.0	2.28

QUALITY CONTROL REPORT

Report To: Transwestern Pipeline
Terra Laboratories Sample No(s). 94006994 - 94007001

			Precision			Accuracy	
Analyte	Units	Blank	Orig	Dup	RPD(%)	MSR(%)	LCSR(%)
TPH (Batch A101194S)							
Sample No. 94007006	mg/kg	< 5	< 1	< 1	-		95

Rw 10/17/94
Larry D Wallace

TERRA LABORATORIES LTD.

2525 South Shore Blvd. League City, Texas 77573 (713) 334-5052 Fax: (713) 334-3116

CHAIN OF CUSTODY

REPORT TO:

COMPANY Transwestern Pipeline Co.
ADDRESS P.O. Box 1188 / Rm. 3AC3142
CITY Houston STATE TX ZIP 77251
ATTN George Robinson PHONE 646-7327 FAX 646-7247
Client Comments:

REMIT TO:

COMPANY Transwestern Pipeline Co.
ADDRESS
CITY Roswell STATE NM ZIP
ATTN Larry Campbell PHONE 505 625 8022 FAX
Project Name: WT-1 LandFarm P.O. # —
Turnaround Time Normal Release # —

ANALYSES REQUESTED

DATE	24HR TIME	MATRIX	COMPOSITE	GRAB	SAMPLE DESCRIPTION	NUMBER CONTAINERS	TPH 418.1	BTEX 8020	TERRA SAMPLE NO.
10/5/94	10:00	Soil		✓	LF-1	1	✓	✓	94-6994
				✓	LF-2	1	✓		94-6995
				✓	LF-3	1	✓	✓	94-6996
				✓	LF-4	1	✓		94-6997
				✓	LF-5	1	✓	✓	94-6998
				✓	LF-6	1	✓		94-6999
				✓	LF-7	1	✓	✓	94-7000
				✓	LF-8	1	✓		94-7001

Collected by: George Robinson Date: 10/5/94 Time: 10:30
Received by Terra: Date: 10-6-94 Time: 11:00
Relinquished by: Date: Time:
Received by: Date: Time:
Relinquished by: Date: Time:
Received by: Date: Time:

Remarks
WZ
12°c
10-6-94

Terra Laboratories, Ltd.
Quality Analytical Services

December 20, 1994

James Robinson
Cypress Engineering
16300 Katy Freeway, Suite 105
Houston, TX 77094

Re: Six (6) solid samples (Project Name: TPC WT-1 Pit) received on 12/12/94

Dear Mr. Robinson:

Attached are the final reports of analysis of samples referenced above as per your analysis and/or method requests.

The sample were received in good condition and at 0^{o} Centigrade.

We appreciate this opportunity to serve Cypress Engineering. Please let me, or Linda McKee, know if there is any other way we can help you.

Sincerely,

Larry D Wallace

Larry D. Wallace
Laboratory Director

2525 South Shore Blvd. ♦ League City, Texas 77573 ♦ (713) 334-5052 Fax: (713) 334-3116

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 19 1994

Page # 1

ypress Engineering
16300 Katy Frwy, Ste 105
Houston , Tx 77094

Attn: Robinson, James

Reviewed by:TMG
Customer#:
Job Number:

Date Collected:12/11/94

ample Number: 94008742
roject Name: TPC WT-1 PIT
Sample ID: EE-1-S

Time Collected:1400

Date Received: 12/12/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	12/15 1621	init.	6-5030	NSH
Z8020S	Benzene	< 0.005	ppm	6-8020	NSH
OL8020S	Toluene	< 0.005	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	NSH
YLSTLs	Total Xylenes	< 0.010	ppm	6-8020	NSH
TEXTLs	Total BTEX	< 0.025	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	97.	%	74-121	NSH
4BFBs	4-BFB (surr)	95.	%	75-115	NSH
18_1S'D	TPH Analysis Prep(Date/Time)	12/16 1145	init.	6-3550	MLC
TPH'S	TPH(Total Petroleum Hydrocarbon	970	ppm	2-418.1	MLC

OMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

reparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rw 12/19/94
Larry D Wallace

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LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 19 1994 | Page # 1

ypress Engineering
16300 Katy Frwy. Ste 105
Houston , TX 77094

Attn: Robinson, James

ample Number: 94008743
Project Name: TPC WT-1 PIT
Sample ID: EE-2-N

Reviewed by:TMG
Customer#:
Job Number:

Date Collected:12/11/94

Time Collected:1400

Date Received: 12/12/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	12/15 1640	init.	6-5030	NSH
Z8020S	Benzene	< 0.005	ppm	6-8020	NSH
TOL8020S	Toluene	< 0.005	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	NSH
YLSTLs	Total Xylenes	< 0.010	ppm	6-8020	NSH
TEXTLs	Total BTEX	< 0.025	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	97.	%	74-121	NSH
BFBs	4-BFB (surr)	96.	%	75-115	NSH
18_1S'D	TPH Analysis Prep(Date/Time)	12/16 1145	init.	6-3550	MLC
TPH'S	TPH(Total Petroleum Hydrocarbon	< 25	ppm	2-418.1	MLC

OMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

reparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rw 12/19/94

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2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 19 1994 Page # 1

ypress Engineering
16300 Katy Fwy., Ste 105
Houston , Tx 77094

Reviewed by:TMG
Customer#:
Job Number:

ttn: Robinson, James

Date Collected:12/11/94

ample Number: 94008744
roject Name: TPC WT-1 PIT
Sample ID: EN-1-E

Time Collected:1400

Date Received: 12/12/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	12/15 1758	init.	6-5030	NSH
Z8020S	Benzene	< 0.005	ppm	6-8020	NSH
OL8020S	Toluene	< 0.005	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	NSH
YLSTLs	Total Xylenes	.026	ppm	6-8020	NSH
TEXTLs	Total BTEX	< 0.041	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	99.	%	74-121	NSH
4BFBs	4-BFB (surr)	103.	%	75-115	NSH
18_1S'D	TPH Analysis Prep(Date/Time)	12/16 1145	init.	6-3550	MLC
PH'S	TPH(Total Petroleum Hydrocarbon	< 25	ppm	2-418.1	MLC

OMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

reparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

RW 12/19/94

TERRA LABORATORIES, LTD.
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LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 16 1994 Page # 1

ypress Engineering
16300 Katy Fwy., Ste 105
Houston , Tx 77094

Attn: Robinson, James

Reviewed by:JMH
Customer#:
Job Number:

Date Collected:12/11/94

ample Number: 94008813
roject Name: TPC WT-1 PIT
Sample ID: EN-2-W

Time Collected:1400

Date Received: 12/12/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	12/15 1818	init.	6-5030	NSH
Z8020S	Benzene	< 0.005	ppm	6-8020	NSH
OL8020S	Toluene	< 0.005	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	NSH
YLSTLs	Total Xylenes	< 0.010	ppm	6-8020	NSH
TEXTLs	Total BTEX	< 0.025	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	104.	%	74-121	NSH
4BFBs	4-BFB (surr)	102.	%	75-115	NSH
18_1S'D	TPH Analysis Prep(Date/Time)	12/14 1330	init.	6-3550	MLC
TPH'S	TPH(Total Petroleum Hydrocarbon	15	ppm	2-418.1	MLC

OMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

reparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rw 12/19/94

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LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 19 1994 Page # 1

ypress Engineering
16300 Katy Fwy., Ste 105
Houston , Tx 77094

Reviewed by: TMG
Customer#:
Job Number:

ttn: Robinson, James

Date Collected: 12/11/94

ample Number: 94008814
roject Name: TPC WT-1 PIT
Sample ID: EB-1-E

Time Collected: 1400

Date Received: 12/12/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	12/16 1628	init.	6-5030	NSH
Z8020S	Benzene	< 0.4	ppm	6-8020	NSH
OL8020S	Toluene	< 0.4	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	4.0	ppm	6-8020	NSH
YLSTLs	Total Xylenes	63	ppm	6-8020	TMG
TEXTLs	Total BTEX	< 67.8	ppm	6-8020	TMG
aaaTFTs	aaa-TFT (surr)	108.	%	74-121	NSH
BFBs	4-BFB (surr)	MI	%	75-115	NSH
18_1S'D	TPH Analysis Prep(Date/Time)	12/14 1330	init.	6-3550	MLC
PH'S	TPH(Total Petroleum Hydrocarbon	2600	ppm	2-418.1	MLC

OMMENTS: BTEX Dil.Fx. X 200

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

reparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rw 12/19/94

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LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 16 1994 Page # 1

Cypress Engineering
16300 Katy Fwy., Ste 105
Houston , Tx 77094

Reviewed by:JMH
Customer#:
Job Number:

Attn: Robinson, James

Date Collected:12/11/94

Sample Number: 94008815
Project Name: TPC WT-1 PIT
Sample ID: EB-2-N

Time Collected:1400

Date Received: 12/12/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	12/15 1601	init.	6-5030	NSH
BZ8020S	Benzene	< 0.010	ppm	6-8020	NSH
TOL8020S	Toluene	< 0.010	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	< 0.010	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	.29	ppm	6-8020	JMH
BTEXTLs	Total BTEX	< 0.32	ppm	6-8020	JMH
aaaTFTs	aaa-TFT (surr)	93.	%	74-121	NSH
4BFBs	4-BFB (surr)	108.	%	75-115	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	12/14 1330	init.	6-3550	MLC
TPH'S	TPH(Total Petroleum Hydrocarbon	1400	ppm	2-418.1	MLC

COMMENTS: BTEX Dil. Factor X 5

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rw 12/19/94
Larry Dollar

QUALITY CONTROL REPORT

Report To: Cypress Engineering
Terra Laboratories Sample No(s). 94008742 - 94008744 & 94008813 - 94008815

			Precision			Accuracy	
Analyte	Units	Blank	Orig	Dup	RPD(%)	MSR(%)	LCSR(%)
BTEX (Batch 121594S) Sample No. 94008807 Spike							
MTBE	ppb	< 5	23	23	0	115	
Benzene	ppb	< 5	24	23	4	110	99
Toluene	ppb	< 5	26	25	4	115	100
Ethylbenzene	ppb	< 5	24	22	9	120	94
Xylenes	ppb	< 10	87	77	12	122	101
TPH (Batch 121694S)							
Sample No. 94008870	mg/kg	< 25	< 25	< 25	-		99
TPH (Batch 121494S)							
Sample No. 94008696	mg/kg	< 25	< 25	< 25	-		91
BTEX MEOH (Batch 121694S) Blank Spike							
MTBE	ppb	< 5	17.64	19.85	11.8		88
Benzene	ppb	< 5	19.92	20.55	3.1		100
Toluene	ppb	< 5	20.25	20.58	1.6		101
Ethylbenzene	ppb	< 5	20.29	20.71	2.0		101
Xylenes	ppb	< 10	61.66	61.33	0.5		103
1,3 DiCl2Bz	ppb	< 5	16.92	17.98	6.1		85
1,4 DiCl2Bz	ppb	< 5	17.95	18.96	5.5		88
1-2 DiCl2Bz	ppb	< 5	15.59	17.32	10.5		78
BTEX MEOH (Batch A121694S) Sample No. 94008814 Spike							
Benzene	ppb	< 5	13	14	7	104	98
Toluene	ppb	< 5	13	15	14	160*	102
Ethylbenzene	ppb	< 5	20	23	14	24*	96
Xylenes	ppb	< 10	168	191	13	147*	102
1,3 DiCl2Bz	ppb	< 5	34	33	3.0	*	
1,4 DiCl2Bz	ppb	< 5	44	45	2.2	*	
1-2 DiCl2Bz	ppb	< 5	38	37	2.7	*	

*Matrix Interference with Spike Recoveries; See MeOH Blank Spike and MeOH Blank Spike Dup ran same day.

RW 12/27/94
Larry W

TERRA LABORATORIES LTD.

2525 South Shore Blvd. League City, Texas 77573 (713) 334-5052 Fax: (713) 334-3116

CHAIN OF COUSTODY

REPORT TO:

COMPANY Cypress Engineering
ADDRESS 16300 Katy Fwy., Ste. 105
CITY Houston STATE TX ZIP 77094
ATTN James Robinson PHONE 646-7696 FAX 646-7247
Client Comments: Transwestern Pipeline Company project

REMIT TO:

COMPANY (same)
ADDRESS
CITY STATE ZIP
ATTN PHONE FAX
Project Name: TPC WT-1 pit
P.O. #
Turnaround Time standard
Release #

ANALYSES REQUESTED

DATE	24HR TIME	MATRIX	COMPOSITE	GRAB	SAMPLE DESCRIPTION	NUMBER CONTAINERS	TPH	BTEX	TERRA SAMPLE NO.
12/11	1400	soil		X	~~EE1-S~~ EE-1-S	1	X	X	94-87~~39~~ 42
↓	↓	↓		↓	~~EE2-N~~ EE-2-N	1	X	X	87~~40~~ 43
↓	↓	↓		↓	~~NE1-E~~ EN-1-E	1	X	X	87~~41~~ 44
↓	↓	↓		↓	~~NE2-W~~ EN-2-W	1	X	X	8~~742~~ 813
↓	↓	↓		↓	~~BE1-E~~ EB-1-E	1	X	X	8~~743~~814
↓	↓	↓		↓	~~BE2-N~~ EB-2-N	1	X	X	8~~744~~ 815

Collected by: James Robinson	Date: 12/11	Time: 14:00	Received by Terra:	Date: 12-12-94	Time: 1800	Remarks: 0°C Temp AC 12/12/94
Relinquished by:	Date:	Time:	Received by:	Date:	Time:	
Relinquished by:	Date: 12/12/94	Time: 1800	Received by:	Date:	Time:	

APPENDIX E

SOIL VAPOR EXTRACTION PILOT TEST

AcuVac Remediation Report

AcuVac Remediation, Inc.

9111 Katy Freeway
Suite 303
Houston, TX 77024
(713) 468-6688: TEL
(713) 468-6689: FAX

November 25, 1994

Mr Bob Marley
Project Geologist
Daniel B. Stephens & Associates, Inc.
6020 Academy NE, Ste 100
Albuquerque, NM 87109

Re: Pilot Test - Enron WT-1, DBS & A; Project #4230

Dear Bob:

Enclosed is the report on Pilot Testing performed ~~October~~ November 20, 1994 at the above referenced location. The test was conducted using the AcuVac SVE I-6 System with various instrumentation including the HORIBA Analyzer.

Project Scope:

- Connect the SVE System to wells MW-10, SVE-1, SVE-1MW and MW-2 as extraction wells (EW) and apply vacuum; record the vacuum and well flow and record all System data, including fuel flow (propane).
- The Test procedure is to provide variable rates of vacuum and flow over the test period.
- Install and observe the magnehelic gauges on the outer monitoring wells to determine if the selected extraction well is in vacuum communication with the outer monitoring wells.
- Take influent vapor samples to provide on-site HORIBA Analyzer data.
- Provide a method of sampling influent vapors with the flow through canisters.
- Measure the distances from the selected extraction wells to the outer wells.
- Operate the SVE System in a manner that all well vapors are passed through the engine to destruct the contaminants and exhausted to meet air emission standards.
- Complete the tests by providing a report consisting of operating and analytical data.

Fuel Use Information:

When the SVE System is running 100% on fuel from extraction well vapors at an altitude of 3,600 ft and the engine at 2,000 - 2,300 rpm, the maximum contaminated fuel destruction or burn rate is approximately 23.8 lbs/hr or 3.72 gals/hr of VOC contamination. During these tests, the wells vapors provided 29.0% of the fuel based on the calculations below.

Fuel Use Calculations:

At 2,000 - 2,300 rpm and 44 BHP, the engine burns 6.08 gals propane/hr.
Propane has 21,591 BTU/lb, and 4.24 lbs/gal.
Total BTU = 21,591 x 6.08 x 4.24 = 556,833 BTU/hr.
Gasoline = 149,520 BTU/gal.
SVE Sys. max. contaminant consumption = $\frac{556,833}{149,520}$ = 3.72 gals/hr.
Total engine hours = 10.0 hrs.
Total gallons of propane burned = 43.0 gals = fuel for 7.07 hrs.
Total gallons of contaminant vapors burned for 2.93 hrs = 10.9 gals.
Gasoline weighs 6.38 lbs/gal.
Total contaminant = 69.54 lbs = 6.95 lbs/hr (1.09 gals/hr) average for 10 hrs.

Summary of Data: See Exhibit A

Discussion of Data:

Prior to starting each test, all the SVE systems are checked for normal operation and each magnehelic gauge is checked and calibrated to "0". The propane tank is full so an accurate fuel consumption can be estimated for the total test time. Expandable well plugs are placed in the outer wells. Static well data is recorded on each outer well.

Test #1 was a 3.9 hour SVE test conducted from extraction well (EW) MW-10. The well is constructed from 2" schedule 80 PVC with TD of 62.60 ft and screened up 15 ft with sand pack, bentonite seal and grouted. DTGW at test time was 53.20 ft leaving a screened area above groundwater of 5.60 ft.

At the start of the test (0735 hours), the extraction well (EW) vacuum was set at 50" H_2O with an initial flow of 10 cfm. Outer wells MW-9, 12 & 13 all recorded a pressure which was the static pressure data. Well MW-12 data was not included in the well data averaging since the vacuum was ineffective due to a large and deep excavation between EW and the well. HORIBA data indicated that the total HC was in the 15,500 ppm range with CO_2 at 2.82%. As the EW vacuum was increased to 60" H_2O, a slight amount of surging on the EW vacuum gauge was noted. With all systems held constant, the EW vacuum increased to 80, 100 and +100" H_2O indicating the screened area was probably reduced due to rising groundwater. The SVE vacuum was shut off to allow the groundwater to seek its natural level and the test was then restarted at 0825 hours. The EW vacuum was set at 30" H_2O with a flow of 5 cfm. By 0900 hours, outer well MW-9 indicated a vacuum of 0.14" H_2O, a change of approximately 0.30" H_2O in 0.5 hours. The EW vacuum was increase to 40" H_2O and a flow of 9 cfm. HORIBA data indicated that the total HC had increased to over 21,000 ppm and CO_2 over 4.20%. By 1030 hours, outer wells MW-9 & 13 were recording a vacuum in response to the EW vacuum of 50" H_2O and flow of 12 cfm. Prior to the completion of the test, the EW vacuum was increased to 60" H_2O with a flow of 14 cfm. By 1130 hours, significant vacuums were recorded on MW-9 & 13 and each well was over 220 ft from the extraction well (EW). The HC from the HORIBA data indicated the range remained approximately 21,500 ppm. After the SVE System was shut off, the outer well expandable plugs were left in place. At 1245 hours (1.25 hours after completion of Test #1), the static well data on MW-9, 12 & 13 indicated (0.15)" H_2O pressure [( ) indicates well pressure]. This indicates that the recorded vacuums were the result of the vacuum placed on the extraction well.

Test #2 was a 3.0 hour SVE test conducted from extraction well (EW) SVE-1. This well is constructed from 2" schedule 80 PVC with TD = 36.0 ft and screened up 15.0 ft. There was no groundwater at this depth. Prior to the start of the test at 1200 hours, the static well data for the outer wells was recorded. Each recorded a well pressure varying from (0.10)" to (0.34)" H_2O.

The initial EW vacuum was set at 40" H_2O with a flow of 9 cfm. An instant vacuum was recorded on well SVE-1MW which was nested with SVE-1. The screened areas were 6.5 ft apart with a 2.0 ft bentonite seal. HORIBA data indicated the HC was 334 ppm with CO_2 of 2.54%. After two hours and the EW vacuum at 60" H_2O and flow of 16 cfm, all the outer wells were recording a slight vacuum with SVE-1MW recording 1.30" H_2O vacuum. During the next hour, the EW vacuum was increased to 80" H_2O with flow of 24 cfm. By 1500 hours, all the outer wells had overcome the initial pressures and were recording reasonable vacuums. The trend on the HORIBA data was down, dropping from a high of 370 ppm to 210 ppm. At the completion of the test, the outer wells were responding quicker to EW vacuum and flow increases indicating a drying effect of the subsurface. One to two additional hours of SVE would most likely have enhanced the data.

Test #3 was a 0.42 hour SVE test conducted from extraction well (EW) SVE-1MW. This was planned as a quick test to determine well vacuum and flow. This well is constructed from 2" PVC with TD = 53.0 ft and screened up from 52.5 ft to 42.4 ft. DTGW at test time was 45.6 ft leaving 3.1 ft of screen above the groundwater. Prior to starting the test, the static well data indicated that vacuums from Test #2 remained on all the outer wells including SVE-1 which is the nested well described in Test #2.

The initial EW vacuum was set at 80" H_2O with a flow of 3 cfm. From an SVE standpoint, the subsurface was considered a tight structure. Each outer well recorded a vacuum increase over the static data. HORIBA data indicated the HC was 866 ppm with CO_2 at 1.00%. After the initial data, the EW vacuum was set at 100" H_2O and the flow dropped to 1-2 cfm. This was most likely due to rising groundwater reducing the screened area. However, at the end of the test, the outer wells, with the exception of SVE-1, recorded a vacuum increase. At 1535 hours, the test was completed.

Test #4 was a 1.5 hour SVE test conducted from well MW-2 as the extraction well (EW). The well data was not available (older existing well) to the SVE project engineer other than it was a 2" PVC well extending into the groundwater.

Prior to the start of the test, static data recorded from the outer wells indicated a vacuum remaining near the maximum recorded during Test #3. The initial vacuum was set at 120" H_2O with a flow of +- 1 cfm. The reason the initial vacuum was set this high was because no well flow was recorded below this level. No change was recorded in the outer well vacuums. HORIBA data indicated the HC was 1,440 ppm with CO_2 of 3.76%. After the initial data was recorded, the well flow valve was opened to allow the EW vacuum to seek its maximum vacuum of 270" H_2O and flow of 5-7 cfm. This well did not provide good SVE data as the outer well vacuums continued to decrease for the first hour of testing. The last data recorded, prior to the end of the test, indicated the outer wells were recording a slight increasing trend with the EW vacuum over 270" H_2O. It is very unlikely that this well would respond as an SVE well.

Additional Information:

- Summary of Operating Data (Distances may vary from actual survey)
- Field Operating Data and Notes
- Figure 1 - Plot of Observed Vacuum versus Distance at the Facility
- Site Photographs

Conclusion:

The tests indicated that soil vacuum extraction (SVE) would be an effective method of remediation for this facility. Although the observed vacuum on the outer observation wells was relatively low at the beginning of the test, the duration of the pilot test was short compared to continuous operation. However, the results give positive indication that the observed and reported wells were in vacuum communication with the selected SVE extraction well. Figure #1 indicated that the effective radius of influence would be from 70 to 100 ft with extraction well flow of 10 - 17 cfm and extraction well vacuum in the 50" - 70" H_2O range. An approximation of the radius of influence may be obtained by determining the point at which the measured vacuum is 0.30 to 0.50" H_2O. It is assumed that beyond the lower point, the pressure gradient (driving force) is negligible to effectively transport vaporized contaminants to the extraction well. Under continuous operation, vacuum and radius of influence may continue to increase 1 to 3 days. All other data must be considered in the final design for a remedial plan.

The AcuVac SVE System performed as represented and should be considered a viable technology to use for the remediation of this location. The SVE System with the 140 CID, 4 cylinder engine can provide total extraction well flow of approximately 50 cfm with a vacuum, if required, up to 20" Hg. The System with 300 CID, 6 cylinder engine can provide total extraction well flow of approximately 120 cfm with a vacuum up to 20" Hg. These Systems are designed to consume heavy concentrations of VOCs and meet all air emission standards. The auxiliary fuel can be propane or natural gas.

Once you have reviewed the report, please call me if you have any questions.

Sincerely,

James E. Sadler
Product Engineer

Enclosure

EXHIBIT "A"

Test #1

WT-1 Enron/DBS&A #4230

11/20/94	First Data Time 0735	Second Data Time 0805	Third Data Time 0825	Fourth Data Time 0900	Fifth Data Time 0930	Sixth Data Time 1000	Seventh Data Time 1030
Horiba-HC PPM	-	15,400	18,430	19,130	-	21,230	21,370
Horiba - CO_2%	-	2.82	4.00	3.88	-	4.22	4.54
Extraction Well Flow-CFM Well MW-10	10	8	5	5	9	9	12
Extraction Well Vacuum "H_20 Well MW-10	50	60	30	30	40	40	50
Well MW-13 Vacuum "H_20 Dist. 255 ft.	(.14)	(.15)	(.15)	(.12)	(.03)	(.02)	.25
Well MW-12 Vacuum "H_20 Dist. - ft.	(.05)	(.05)	(.03)	(.12)	(.12)	(.12)	(.12)
Well MW-9 Vacuum "H_20 Dist. 225 ft.	(.05)	(.06)	(.15)	.14	.20	.24	.35

11/20/94	Eighth Data Time 1100	Ninth Data Time 1130	Tenth Data Time 1245	Average Data 4.0 Hrs.	Maximum Data
Horiba-HC PPM	21,450	21,720	-	19,819	21,513
Horiba - CO_2%	4.58	4.64		4.10	4.64
Extraction Well Flow-CFM Well MW-10	12	14	-	9.33	14
Extraction Well Vacuum "H_20 Well MW-10	50	60	-	45.56	60
Well MW-13 Vacuum "H_20 Dist. 255 ft.	.30	.36	(.15)	.30	.36
Well MW-12 Vacuum "H_20 Dist. ft.	(.12)	(.12)	(.15)	.09	(.15)
Well MW-9 Vacuum "H_20 Dist. 225 ft.	.40	.47	(.15)	.30	.47

( ) Indicates Well Pressure

Test #2

WT-1 Enron/DBS&A #4230

11/20/94	First Data Time 1200	Second Data Time 1230	Third Data Time 1300	Fourth Data Time 1330	Fifth Data Time 1400	Sixth Data Time 1430	Seventh Data Time 1500
Horiba-HC PPM	334	370	340	286	246	-	210
Horiba - $C0_2$%	2.54	2.38	2.42	3.10	2.92	-	2.76
Extraction Well Flow-CFM Well SVE-1	9	9	9	16	16	24	25
Extraction Well Vacuum "H_20 Well SVE-1	40	40	40	60	60	80	80
Well SVE-1MW Vacuum "H_20 Dist. 0 ft.	.30	.50	.70	.98	1.30	1.65	1.90
Well MW-1 Vacuum "H_20 Dist. 58 ft.	(.24)	(.20)	(.13)	(.08)	.05	.10	.28
Well MW-2 Vacuum "H_20 Dist. 95ft.	(.35)	(.35)	(.25)	(.15)	0	.10	.26
Well MW-3 Vacuum "H_20 Dist. 101 ft.	(.07)	(.12)	.03	.03	.05	.12	.17

11/20/94	Average Data 3.0 Hrs.	Maximum Data
Horiba - $C0_2$%	2.69	3.1
Horiba-HC PPM	298	370
Extraction Well Flow-CFM Well SVE-1	15.43	25
Extraction Well Vacuum "H_20 Well SVE-1	57.14	80
Well SVE-1MW Vacuum "H_20 Dist. 0 ft.	1.05	1.90
Well MW-1 Vacuum "H_20 Dist. 58 ft.	.14	.28
Well MW-2 Vacuum "H_20 Dist. 95ft.	.12	.26
Well MW-3 Vacuum "H_20 Dist. 101 ft.	.08	.17

( ) Indicates Well Pressure

Test #3

WT-1 Enron/DBS&A #4230

11/20/94	First Data Time 1510	Second Data Time 1535	Average Data 0.5 Hrs.	Maximum Data
Horiba-HC PPM	866	-	866	866
Horiba $C0_2$%	1.00		1.00	1.00
Extraction Well Flow-CFM Well SVE-1MW	3	1	2	3
Extraction Well Vacuum "H_20 Well SVE-1MW	80	100	90	100
Well SVE-1 Vacuum "H_20 Dist. 0 ft.	.26	.26	.26	.26
Well MW-1 Vacuum "H_20 Dist. 58 ft.	.39	1.05	.72	1.05
Well MW-2 Vacuum "H_20 Dist. 95 ft.	.24	.36	.30	.36
Well MW-3 Vacuum "H_20 Dist. 101 ft.	.16	.18	.17	.18

( ) Indicates Well Pressure

Test #4

WT-1 Enron/DBS&A #4230

11/20/94	First Data Time 1600	Second Data Time 1620	Third Data Time 1700	Fourth Data Time 1730	Average Data 1.5 Hrs.	Maximum Data
Horiba - CO_2%	3.76	4.14	-	-	3.95	4.14
Horiba-HC PPM	1,440	1,370	-	-	1,405	1,440
Extraction Well Flow-CFM Well MW-2	1	4	5	7	4.25	7.00
Extraction Well Vacuum "H_20 Well MW-2	120	270	270	270	233	270
Well SVE-1MW Vacuum "H_20 Dist. 0 ft.	1.3	1.05	.52	.50	.84	1.30
Well SVE-1 Vacuum "H_20 Dist. - ft.	.08	.08	.05	.07	.07	.08
Well MW-1 Vacuum "H_20 Dist. 120 ft.	.96	.88	.42	.48	.69	.96
Well MW-3 Vacuum "H_20 Dist. 190 ft.	.19	.22	.07	.20	.17	.22

Note: First Data is static well vacuum - No SVE

AcuVac Remediation

OPERATING DATA - TEST NO 1

ACUVAC
SVE SYSTEM

age 1 Location ENRON WT-1 DBS&A 4230 Project Engr. SADLER | LUNDGREN

	Date	11/20/94	→				
	Parameter	Time 0735 Hr. Meter 20.2	Time 0805 Hr. Meter 20.7	Time 0825 Hr. Meter 21.0	Time 0900 Hr. Meter 21.6	Time 0930 Hr. Meter 22.1	Time 1000 Hr. Meter 22.6
ENGINE/BLOWER	R.P.M.	2100	2100	2100	2100	2200	2200
	Oil Press P.S.I.	60	60	60	55	55	50
	Water Temp °F	160	160	160	160	160	160
	Volts	13.5	13.5	13.5	13.5	13.5	13.5
	Intake Vac Hg	17	17	17	15	15	15
FUEL/AIR	Gas Flow Fuel/Propane cfh	110	100	120	105	110	110
	Air Flow cfm	18	18	21	25	25	9
	Well Flow MW-10 cfm	10	8	5	5	9	9
	Recovery Well Vac MW-10 "H_2O	50	60	30	30	40	40
	Air Temp °F	39	40	42	48	49	52
	Barometric Pressure Hg	—	—	—	—	—	—
MONITOR WELL VACUUM	MW-13 "H_2O	(.14)	(.15)	(.15)	(.12)	(.03)	(.02)
	MW-12 "H_2O	(.05)	(.05)	(.03)	(.12)	(.12)	(.12)
	MW-9 "H_2O	(.05)	(.06)	(.15)	.14	.20	.24
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O		( )	Indicates Well Pressure			
	"H_2O						
	"H_2O						
MANIFOLD	Vapor Wells On/Off	ON	→				
	Air Injection Pressure P.S.I.	OFF	→				
	Air Injection Flow cfm	OFF	→				
	Samples		HORIBA INFLUENT	HORIBA INFLUENT	HORIBA INFLUENT	HORIBA INFLUENT	

TEST	Instrument	HORIBA	→				
	Time	0755	0835	0910	0945		
VAPOR INFLUENT	H-C ppmv	15,400	18,430	19,130	21,230		
	CO_2 %	2.82	4.00	3.88	4.22		
	C-O %	.03	.03	.03	.04		
EMISSIONS	H-C ppmv						
	CO_2 %						
	C-O %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE 11/20/94 TEST NO. 1

0700	Arrived at location - Positioned SVE System near well
	MW-10 as extraction well (EW) - Well Data - 2" PVC,
	TD = 62.60', screened up 15.0' - DTGW = 53.20' - Large open
	pit between EW and MW-12 - Distance MW-10 to ≈ $\frac{\text{MW-9}}{225'}$ $\frac{\text{MW-13}}{255}$
0735	START TEST #1 - Set initial vacuum @ 50" H_2O, flow @ 10 CFM - All
	SVE systems normal - Propane @ 110 CFH
0755	HORIBA DATA - HC @ 15,400 ppm, CO_2 @ 2.82
0805	Recorded Data - EW vacuum @ 60" H_2O, flow @ 8 CFM - Sub surface
	structure moderately tight -
0810	Rapid rise in EW vacuum 50 - 80 - 100+ " H_2O - Most likely
	rising groundwater reducing screened area -
0820	Shut off EW - DTGW 52.54'
0825	Restart Test # 1 - Initial vacuum @ 30" H_2O, flow @ 5 CFM
0835	HORIBA Data - HC up @ 18,430 ppm
0900	Recorded Data - All SVE systems steady - Increased EW vac to 40" H_2O
0930	Recorded Data - Outer well MW-9 recording vacuum - EW vacuum @ 40" H_2O
0945	HORIBA Data - HC increasing @ 19,130 ppm
1000	Recorded Data - All SVE systems normal - Outer wells MW-13 & 9 recording vacuum

AcuVac Remediation

OPERATING DATA - TEST NO 1

ACUVAC
SVE SYSTEM

Page 2 Location EROW WT-1 -DBS&A 4230 Project Engr. SADLER/LUNDGREN

	Date	11/20/94	→	→	→		
	Parameter	Time 1030 Hr. Meter 23.1	Time 1100 Hr. Meter 23.6	Time 1130 Hr. Meter 24.1	Time 1245 Hr. Meter —	Time Hr. Meter	Time Hr. Meter
ENGINE/BLOWER	R.P.M.	2200	2200	2200	—		
	Oil Press P.S.I.	50	50	50	—		
	Water Temp °F	160	160	160	—		
	Volts	13.5	13.5	13.5	—		
	Intake Vac Hg	15	15	14	—		
FUEL/AIR	Gas Flow Fuel/Propane cfh	100	100	95	—		
	Air Flow cfm	25	25	25	—		
	Well Flow MW-10 cfm	12	12	14	—		
	Recovery Well Vac MW-10 "H_2O	50	50	60	—		
	Air Temp °F	54	55	56	58		
	Barometric Pressure Hg	—	—	—	—		
MONITOR WELL VACUUM	MW-13 "H_2O	.25	.30	.36	(.15)		
	MW-12 "H_2O	(.12)	(.12)	(.12)	(.15)		
	MW-9 "H_2O	.35	.40	.47	(.15)		
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
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	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O			( ) Indicates	Well Pressure		
	"H_2O						
	"H_2O						
MANIFOLD	Vapor Wells On/Off	ON	→	→	OFF		
	Air Injection Pressure P.S.I.	OFF	→	→	→		
	Air Injection Flow cfm	OFF	→	→	→		
	Samples	HORIBA INFLUENT	HORIBA INFLUENT	HORIBA INFLUENT			

TEST	Instrument	HORIBA	→				
	Time	1015	1045	1115			
VAPOR INFLUENT	H-C ppmv	21,370	21,450	21,720			
	CO_2 %	4.54	4.58	4.64			
	C-O %	.04	.04	.04			
EMISSIONS	H-C ppmv						
	CO_2 %						
	C-O %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE 11/20/94 TEST NO. 1

1005	Increased EW vacuum to 50" H_2O, flow @ 12 CFM
	Propane @ 100 CFH - All steady - No surging
1015	HORIBA Data - HC up slightly
1030	Recorded Data - All systems steady - EW vacuum & flow steady
	Outer wells MW-9 & 13 responding to EW vacuum increase
1045	HORIBA Data - HC steady
1100	Recorded Data - All SVE systems normal - Outer wells
	MW 9 & 13 continue on increasing trend - Good ROI
1105	Increased EW vacuum to 60" H_2O, flow @ 14 CFM
	Slight surging of EW vacuum gauge indicating ground-
	water closing off screened area.
1130	Recorded Data - All SUE systems normal - Good vacuum
	response from outer wells MW-9 & 13 - No vacuum
	response on well MW-12 due to large excavation between
	EW and outer well
	Test Completed -
1245	Recorded static data on MW 9 & 13 - 1.25 hours after
	SUE off - All wells recorded (.15)" H_2O (Pressure)

AcuVac Remediation

OPERATING DATA - TEST NO 2

ACUVAC
SVE SYSTEM

Page 1 Location ENRON WT-1 - DBS&A 4230 Project Engr. SADLER | LUNDGREN

	Date	11/20/94	→				
	Parameter	Time 1150	Time 1200	Time 1230	Time 1300	Time 1330	Time 1400
		Hr. Meter —	Hr. Meter 24.7	Hr. Meter 25.2	Hr. Meter 25.7	Hr. Meter 26.2	Hr. Meter 26.7
ENGINE/BLOWER	R.P.M.	—	1900	1900	1900	2200	2200
	Oil Press P.S.I.	—	50	50	50	50	50
	Water Temp °F	—	160	160	160	160	160
	Volts	—	13.5	13.5	13.5	13.5	13.5
	Intake Vac Hg	—	16	16	16	15	15
FUEL/AIR	Gas Flow Fuel/Propane cfh	—	140	140	140	170	170
	Air Flow cfm	—	20	20	20	25	25
	Well Flow SVE-1 cfm	—	9	9	9	16	16
	Recovery Well Vac SVE-1 "H_2O	—	40	40	40	60	60
	Air Temp °F	57	58	58	59	60	60
	Barometric Pressure Hg	—					
MONITOR WELL VACUUM	SUE-1mw "H_2O	(.25)	.30	.50	.70	.98	1.30
	mw-1 "H_2O	(.24)	(.24)	(.20)	(.13)	(.08)	.05
	mw-2 "H_2O	(.34)	(.35)	(.35)	(.25)	(.15)	0
	mw-3 "H_2O	(.10)	(.07)	(.12)	.03	.03	.05
	"H_2O	STATIC WELL DATA NO SVE					
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O		( ) INDICATES WELL PRESSURE				
	"H_2O						
	"H_2O						
MANIFOLD	Vapor Wells On/Off	OFF	ON	→			
	Air Injection Pressure P.S.I.	OFF	→				
	Air Injection Flow cfm	OFF	→				
	Samples		HORIBA INFLUENT	→	→	→	→

TEST	Instrument	HORIBA	→				
	Time	1210	1245	1315	1345	1415	
VAPOR INFLUENT	H-C ppmv	334	370	340	286	246	
	CO_2 %	2.54	2.38	2.42	3.10	2.92	
	C-O %	.02	.01	.01	.01	.01	
EMISSIONS	H-C ppmv						
	CO_2 %						
	C-O %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE 11/20/94 TEST NO. 2

1140	Positioned SUE System near well SUE-1 as extraction well (EW)
1150	Recorded static well data - Well Data - SUE-1 2" PVC
	TD = 36.0' - Screened 21' to 36' - No groundwater
1200	START TEST # 2 Initial EW vacuum @ 40" H_2O, flow @ 9cFm
1210	HORIBA Data - HC low @ 334 ppm, CO_2 @ 2.54%
1230	Recorded Data - All SUE systems normal - No vacuum response
	from outer wells
1245	HORIBA Data - HC up slightly @ 370 ppm
1300	Recorded Data - Outer wells indicating slight vacuum response
1315	HORIBA Data - HC @ 340 ppm, CO_2 level @ 2.42%
1320	Increased EW vacuum to 60" H_2O, flow 16cFm
1330	Recorded Data - SUE-1 MW continues an increasing trend
	Other outer wells indicating decreasing pressure trend
1345	HORIBA Data - HC @ 286 ppm, decreasing trend
1400	Recorded Data - All SUE Systems normal - Slight vacuum response
1405	on outer wells - 1405 - Increased EW vacuum to 80" H_2O, flow @ 22cfm
1415	HORIBA Data - HC decreasing, @ 246 ppm
NOTE	Well SUE-1 MW nested with SUE-1 with TD = 53', Screen 52.5' - 42.5 DTGW 45.6

AcuVac Remediation

OPERATING DATA - TEST NO 2

ACUVAC
SVE SYSTEM

Page 2 Location ENRON WT-1 -DBS&A 4230 Project Engr. SADLER/LUNDGREN

	Date	11/20/94	→				
	Parameter	Time 1430 Hr. Meter 27.2	Time 1500 Hr. Meter 27.7	Time Hr. Meter	Time Hr. Meter	Time Hr. Meter	Time Hr. Meter
ENGINE/BLOWER	R.P.M.	2500	2500				
	Oil Press P.S.I.	50	50				
	Water Temp °F	170	170				
	Volts	13.5	13.5				
	Intake Vac Hg	13	13				
FUEL/AIR	Gas Flow Fuel/Propane cfh	190	200+				
	Air Flow cfm	25	25				
	Well Flow SVE-1 cfm	24	25				
	Recovery Well Vac SVE-1 "H_2O	80	80				
	Air Temp °F	61	60				
	Barometric Pressure Hg						
MONITOR WELL VACUUM	SVE-1 MW "H_2O	1.65	1.90				
	MW-1 "H_2O	.10	.28				
	MW-2 "H_2O	.10	.26				
	MW-3 "H_2O	.12	.17				
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
MANIFOLD	Vapor Wells On/Off	ON	ON				
	Air Injection Pressure P.S.I.	OFF	→				
	Air Injection Flow cfm	OFF	→				
	Samples		HORIBA INFLUENT				

TEST	Instrument	HORIBA					
	Time	1455					
VAPOR INFLUENT	H-C ppmv	210					
	CO_2 %	2.76					
	C-O %	.01					
EMISSIONS	H-C ppmv						
	CO_2 %						
	C-O %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE 11/20/94 TEST NO. 2

1430 Recorded Data - All SVE Systems normal - Outer wells indicating good vacuum response to increased EW vacuum

1455 HORIBA Data - HC continue on decreasing trend, HC recorded @ 210 ppm

1500 Recorded Data - Outer wells continuing to respond to EW vacuum of 80" H_2O and flow of 25CFM - All SVE systems normal - Propane flow over 200CFH
TEST # 2 Completed -

AcuVac Remediation

OPERATING DATA - TEST NO 3

ACUVAC
SVE SYSTEM

Page 1 Location ENRON WT-1 DBS&A 4230 Project Engr SADLER/LUNDGREN

	Date	11/20/94	→	→			
	Parameter	Time 1505	Time 1510	Time 1535	Time	Time	Time
		Hr. Meter —	Hr. Meter 27.8	Hr. Meter 28.3	Hr. Meter	Hr. Meter	Hr. Meter
ENGINE/BLOWER	R.P.M.	—	2000	2200			
	Oil Press P.S.I.	—	50	50			
	Water Temp °F	—	170	170			
	Volts	—	13.5	13.5			
	Intake Vac Hg	—	13	13			
FUEL/AIR	Gas Flow Fuel/Propane cfh	—	180	190			
	Air Flow cfm	—	56	56			
	Well Flow SVE-1 MW cfm	—	3	1			
	Recovery Well Vac SVE-1 MW "H_2O	—	80	100			
	Air Temp °F	58	58	56			
	Barometric Pressure Hg	—					
MONITOR WELL VACUUM	SVE-1 "H_2O	.20	.26	.26			
	MW-1 "H_2O	.22	.39	1.05			
	MW-2 "H_2O	.21	.24	.36			
	MW-3 "H_2O	.12	.16	.18			
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O	STATIC DATA NO SVE					
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
MANIFOLD	Vapor Wells On/Off	OFF	ON	ON			
	Air Injection Pressure P.S.I.	OFF	→	→			
	Air Injection Flow cfm	OFF	→	→			
	Samples		HORIBA Influent				

TEST	Instrument	HORIBA					
	Time	1515					
VAPOR INFLUENT	H-C ppmv	866					
	CO_2 %	1.00					
	C-O %	.02					
EMISSIONS	H-C ppmv						
	CO_2 %						
	C-O %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE 11/20/94 TEST NO. 3

1505	Connected SVE System to well SVE-1MW as extraction well - Well Data - This well is nested with well SVE-1 with TD = 53.0' and screened 52.5-42.5' - The well is constructed from 2.0" PVC pipe - DTGW = 45.6' - 3.1' screened area above groundwater NOTE - STATIC vacuum remaining from prior SVE test on well SVE-1
1510	Start Test # 3 - Initial EW vacuum @ 80" H_2O, flow @ 3.0 cfm - Subsurface structure very tight. Recorded data - Outer wells indicating slight vacuum increase over static data
1515	HORIBA Data - HC @ 866 ppm
1520	Increase EW vacuum to 100" H_2O, flow @ 1-2 cfm Flow most likely dropped because of groundwater closing off screened area.
1535	Recorded Data - Nested well SVE-1 steady - Other outer wells indicating increased vacuum - EW vacuum gauge surging TEST Completed

AcuVac Remediation

OPERATING DATA - TEST NO 4

ACUVAC
SVE SYSTEM

Page 1 Location ENRON WT-1 - DBS&A 4230 Project Engr. SADLER | LUNDGREN

	Date	11/20/94	→				
	Parameter	Time 1600 Hr. Meter 28.7	Time 1620 Hr. Meter 29.0	Time 1700 Hr. Meter 29.7	Time 1730 Hr. Meter 30.2	Time Hr. Meter	Time Hr. Meter
ENGINE/BLOWER	R.P.M.	2100	2000	2000	2000		
	Oil Press P.S.I.	50	50	50	50		
	Water Temp °F	165	165	165	160		
	Volts	13.5	13.5	13.5	13.5		
	Intake Vac Hg	15	18	18	18		
FUEL/AIR	Gas Flow Fuel/Propane cfh	160	180	180	180		
	Air Flow cfm	25	18	18	18		
	Well Flow mw-2 cfm	± 1	4	5	7		
	Recovery Well Vac mw-2 "H_2O	120	270	270	270		
	Air Temp °F	54	54	52	50		
	Barometric Pressure Hg	—	—	—	—		
MONITOR WELL VACUUM	SVE-1mw "H_2O	1.30	1.05	.52	.50		
	SVE-1 "H_2O	.08	.08	.05	.07		
	mw-1 "H_2O	.96	.88	.42	.48		
	mw-3 "H_2O	.19	.22	.07	.20		
	"H_2O						
	"H_2O	NOTE - STATIC WELL DATA AND INITIAL DATA THE SAME					
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
MANIFOLD	Vapor Wells On/Off	OFF | ON	ON	ON	ON		
	Air Injection Pressure P.S.I.	OFF	→				
	Air Injection Flow cfm	OFF	→				
	Samples	HORIBA Influent	HORIBA Influent				

TEST	Instrument	HORIBA	HORIBA				
	Time	1610	1630				
VAPOR INFLUENT	H-C ppmv	1440	1370				
	CO_2 %	3.76	4.14				
	C-O %	.01	.01				
EMISSIONS	H-C ppmv						
	CO_2 %						
	C-O %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

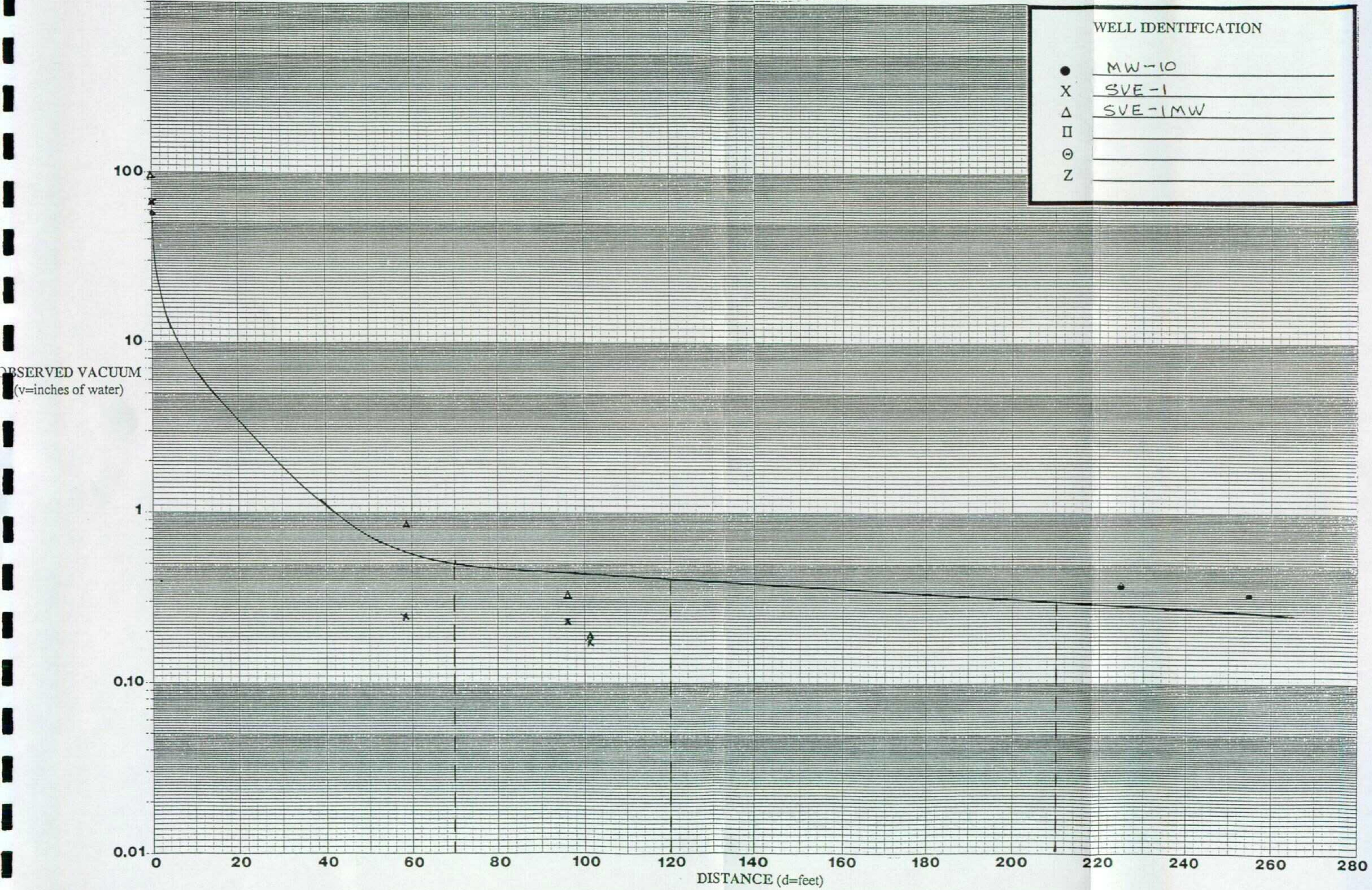
DATE 11/20/94 TEST NO. 4

1550	Positioned SVE System near well MW-2 as extraction
	well (EW) - Well data unknown other than 2" PVC
	pipe into groundwater
1555	Recorded static well data - Vacuum on outer wells
	remain near maximum level obtained during Test #3
1600	START Test #3 - Outer wells recording some vacuum
	as static data - Subsurface structure and/or
	well construction contributing to high SVE vacuums
1610	Open SVE flow to maximum, EW vacuum maximum
	at 270-275" H_2O, flow @ 7-8 cfm
1620	Recorded Data - Outer wells recording reduced vacuums X
	MW-3 which is up slightly -
1630	HORIBA Data - HC @ 1370 ppm
1700	Recorded Data - All outer wells continue to record decrease
	EW vacuum @ 270" H_2O, flow 5-7 cfm
1730	Recorded Data - Outer wells indicating slight increasing
	trend
1730	Test terminated - Well not responding to SVE - Closed all wells Departed site @ 1815

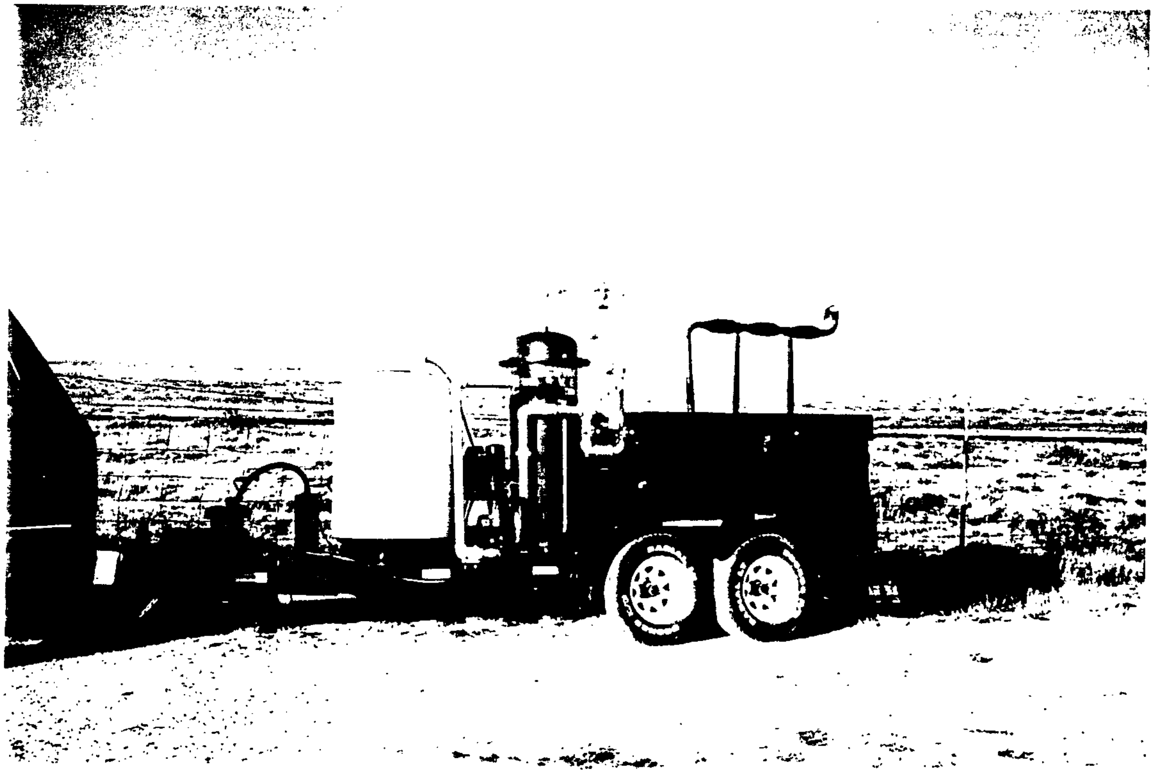
(933107-PAGE2)

AcuVac Remediation, Inc.

FIGURE 1 - PLOT OF OBSERVED VACUUM VERSUS DISTANCE AT THE FACILITY



ENRON WT-1 - DANIEL B. STEPHENS & ASSOCIATES, INC.
PROJECT #4230



Soil Vapor Analyses

[illegible] 994

CORELAB

CORE LABORATORIES

CORE LABORATORIES
ANALYTICAL REPORT

Job Number: 945993
Prepared For:

DANIEL B. STEPHENS & ASSOCIATES
BOB MARLEY
6020 ACADEMY NE
ALBUQUERQUE, NM 87109

Date: 12/13/94

MJWaits
Signature

12/13/94
Date:

Name: M. Jean Waits

Title: Supervising Chemist

CORE LABORATORIES
P O BOX 34766
HOUSTON, TX 77234-4282

CORELAB

CORE LABORATORIES

LABORATORY TESTS RESULTS

12/13/94

JOB NUMBER: 945993 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: BOB MARLEY

CLIENT I.D.........: ENRON-WT-1 #4230
DATE SAMPLED.......: 11/20/94
TIME SAMPLED.......: 16:35
WORK DESCRIPTION...: MW-2

LABORATORY I.D...: 945993-0001
DATE RECEIVED....: 11/23/94
TIME RECEIVED....: 15:07
REMARKS..........: Core cylinder #1207

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Benzene, Toluene, Xylenes in Gas		*1			12/09/94	MJW
Benzene	<1	1	ppm v/v			
Toluene	<1	1	ppm v/v			
Ethyl Benzene	<1	1	ppm v/v			
Total Xylenes	<10	10	ppm v/v			
Refinery Gas Analysis, Extended		*1			12/08/94	PKT
Hydrogen	<0.01	0.01	Mol %	ASTM D-1945		
Oxygen	13.311	0.01	Mol %	ASTM D-1945		
Nitrogen	77.970	0.01	Mol %	ASTM D-1945		
Carbon Monoxide	<0.01	0.01	Mol %	ASTM D-1946		
Carbon Dioxide	5.861	0.01	Mol %	ASTM D-1945		
Hydrogen Sulfide	<0.01	0.01	Mol %			
Methane	2.839	0.01	Mol %	ASTM D-1945		
Ethylene	<0.001	0.001	Mol %	ASTM D-1946		
Ethane	<0.001	0.001	Mol %	ASTM D-1945		
Propylene	<0.001	0.001	Mol %	ASTM D-2163		
Propane	<0.001	0.001	Mol %	ASTM D-1945		
Isobutane	<0.001	0.001	Mol %	ASTM D-1945		
Isobutylene	<0.001	0.001	Mol %	ASTM D-2163		
1-Butene	<0.001	0.001	Mol %	ASTM D-2163		
n-Butane	<0.001	0.001	Mol %	ASTM D-1945		
trans-2-Butene	<0.001	0.001	Mol %	ASTM D-2163		
cis-2-Butene	<0.001	0.001	Mol %	ASTM D-2163		
Isopentane	<0.001	0.001	Mol %	ASTM D-2163		
n-Pentane	<0.001	0.001	Mol %	ASTM D-2163		
Hexanes	0.001	0.001	Mol %			
Heptanes	0.001	0.001	Mol %			
Octanes	0.005	0.001	Mol %			
Nonanes	0.005	0.001	Mol %			
Decanes	0.005	0.001	Mol %			
Undecanes	0.002	0	Mol %			
Dodecanes Plus	0	0	Mol %			

CORELAB

CORE LABORATORIES

LABORATORY TESTS RESULTS

12/13/94

JOB NUMBER: 945993 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: BOB MARLEY

CLIENT I.D.........: ENRON-WT-1 #4230
DATE SAMPLED.......: 11/20/94
TIME SAMPLED.......: 13:40
WORK DESCRIPTION...: SVE-1

LABORATORY I.D...: 945993-0002
DATE RECEIVED....: 11/23/94
TIME RECEIVED....: 15:07
REMARKS..........: Core cylinder #1097

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Benzene, Toluene, Xylenes in Gas		*1			12/09/94	MJW
Benzene	23	1	ppm v/v			
Toluene	20	1	ppm v/v			
Ethyl Benzene	<1	1	ppm v/v			
Total Xylenes	14	10	ppm v/v			
Refinery Gas Analysis, Extended		*1			12/08/94	PKT
Hydrogen	<0.01	0.01	Mol %	ASTM D-1945		
Oxygen	4.367	0.01	Mol %	ASTM D-1945		
Nitrogen	87.986	0.01	Mol %	ASTM D-1945		
Carbon Monoxide	<0.01	0.01	Mol %	ASTM D-1946		
Carbon Dioxide	7.386	0.01	Mol %	ASTM D-1945		
Hydrogen Sulfide	<0.01	0.01	Mol %			
Methane	0.229	0.01	Mol %	ASTM D-1945		
Ethylene	<0.001	0.001	Mol %	ASTM D-1946		
Ethane	<0.001	0.001	Mol %	ASTM D-1945		
Propylene	<0.001	0.001	Mol %	ASTM D-2163		
Propane	0.007	0.001	Mol %	ASTM D-1945		
Isobutane	0.004	0.001	Mol %	ASTM D-1945		
Isobutylene	<0.001	0.001	Mol %	ASTM D-2163		
1-Butene	<0.001	0.001	Mol %	ASTM D-2163		
n-Butane	0.002	0.001	Mol %	ASTM D-1945		
trans-2-Butene	<0.001	0.001	Mol %	ASTM D-2163		
cis-2-Butene	<0.001	0.001	Mol %	ASTM D-2163		
Isopentane	0.001	0.001	Mol %	ASTM D-2163		
n-Pentane	0.001	0.001	Mol %	ASTM D-2163		
Hexanes	0.002	0.001	Mol %			
Heptanes	0.007	0.001	Mol %			
Octanes	0.005	0.001	Mol %			
Nonanes	0.003	0.001	Mol %			
Decanes	<0.001	0.001	Mol %			
Undecanes	0	0	Mol %			
Dodecanes Plus	0	0	Mol %			

P O BOX 34766
HOUSTON, TX 77234-4282
(713) 943-9776

LABORATORY TESTS RESULTS

12/13/94

JOB NUMBER: 945993 **CUSTOMER:** DANIEL B. STEPHENS & ASSOCIATES **ATTN:** BOB MARLEY

CLIENT I.D.........: ENRON-WT-1 #4230
DATE SAMPLED.......: 11/20/94
TIME SAMPLED.......: 10:20
WORK DESCRIPTION...: MW-10

LABORATORY I.D...: 945993-0003
DATE RECEIVED....: 11/23/94
TIME RECEIVED....: 15:07
REMARKS..........: Core cylinder #1011

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Benzene, Toluene, Xylenes in Gas		*1			12/09/94	MJW
Benzene	319	1	ppm v/v			
Toluene	504	1	ppm v/v			
Ethyl Benzene	19	1	ppm v/v			
Total Xylenes	153	10	ppm v/v			
Refinery Gas Analysis, Extended		*1			12/08/94	PKT
Hydrogen	<0.01	0.01	Mol %	ASTM D-1945		
Oxygen	2.833	0.01	Mol %	ASTM D-1945		
Nitrogen	80.836	0.01	Mol %	ASTM D-1945		
Carbon Monoxide	<0.01	0.01	Mol %	ASTM D-1946		
Carbon Dioxide	13.260	0.01	Mol %	ASTM D-1945		
Hydrogen Sulfide	<0.01	0.01	Mol %			
Methane	0.751	0.01	Mol %	ASTM D-1945		
Ethylene	<0.001	0.001	Mol %	ASTM D-1946		
Ethane	0.002	0.001	Mol %	ASTM D-1945		
Propylene	<0.001	0.001	Mol %	ASTM D-2163		
Propane	0.007	0.001	Mol %	ASTM D-1945		
Isobutane	0.006	0.001	Mol %	ASTM D-1945		
Isobutylene	0.001	0.001	Mol %	ASTM D-2163		
1-Butene	<0.001	0.001	Mol %	ASTM D-2163		
n-Butane	0.039	0.001	Mol %	ASTM D-1945		
trans-2-Butene	<0.001	0.001	Mol %	ASTM D-2163		
cis-2-Butene	<0.001	0.001	Mol %	ASTM D-2163		
Isopentane	0.151	0.001	Mol %	ASTM D-2163		
n-Pentane	0.211	0.001	Mol %	ASTM D-2163		
Hexanes	0.615	0.001	Mol %			
Heptanes	0.704	0.001	Mol %			
Octanes	0.434	0.001	Mol %			
Nonanes	0.121	0.001	Mol %			
Decanes	0.027	0.001	Mol %			
Undecanes	0.002	0	Mol %			
Dodecanes Plus	0	0	Mol %			

CHAIN-OF-CUSTODY RECORD

[redacted]

Client: DANIEL B. STEPHENS + ASSOC

Address: 6020 ACADEMY NE #100
ALBUQUERQUE NM 87109

Phone #: 505-822-9400

Fax #:

Project Name: ENRON WT-1

Project #: 4230

Project Manager: BOB MARLEY

Sampler: ACUVAC

Samples Cold? ☐ Yes ☒ No

ANALYSIS REQUEST

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative			HEAL No.	BTEX (Method 602/8020)	BTEX + MTBE (602/8020)	TPH Method 8015 MOD (Gas/Diesel)	BTEX + TPH + MTBE (Gasoline Only)	BTEX + MTBE + TPH (Gas + Diesel)	TPH (Method 418.1)	601/602 Volatiles	EDB (Method 504.1)	EDC	610 (PNA or PAH)	BTEX	EXTENDED REFINERY GASES	FIXED GASES	Air Bubbles or Headspace (Y or N)
					$HgCl_2$	HCl	Other															
11/20/94	1635	VAPOR	MW-2	1/500 ml			NONE												X	X	X	
11/20/94	1340	VAPOR	SVE-1	⇕			⇕												X	X	X	
11/20/94	1020	VAPOR	MW-10	1/500 ml			NONE												X	X	X	

Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)
11/22/94	1630		Craig Bromley 11/23/94 10:25A
Date:	Time:	Relinquished By: (Signature)	Received/By: (Signature)

Remarks:

DANIEL B. STEPHENS & ASSOCIATES, INC.
ENVIRONMENTAL SCIENTISTS AND ENGINEERS

SUPPLEMENTAL ENVIRONMENTAL INVESTIGATION
WT-1 COMPRESSOR STATION
FORMER ENGINE ROOM DRAIN AND FILTER PIT AREA

RECEIVED
MAR 3 1 1995
Environmental Bureau
Oil Conservation Division

Prepared for
ENRON Operations Corp.
Environmental Affairs Department
Houston, Texas

March 28, 1995

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EXECUTIVE SUMMARY

Daniel B. Stephens & Associates, Inc. (DBS&A) was retained by ENRON Operations Corp. to conduct a supplemental environmental investigation at Transwestern Pipeline Company's (TPC) WT-1 Compressor Station, located in southeastern New Mexico. The compressor station boosts the pressure of the natural gas stream originating from two lateral pipelines and one primary pipeline heading to the northwest. This environmental investigation supplements the previous work performed by Metric Corporation (1991) and Brown & Root Environmental (1993).

The objective of this investigation was to characterize the distribution of organic and inorganic constituents in underlying soils and ground water detected during previous investigations of the former engine room drain and filter pit area. The scope of work included a background data review, completion of five additional ground-water monitor wells, one dual-completion soil vapor extraction (SVE) well, and two temporary ground-water sampling borings, sampling of soil and ground-water, in-situ tests of hydraulic properties, and summarizing interim corrective actions performed by TPC to date.

The site is underlain by the Quaternary Mescalero caliche and Gatuña Formation and the Triassic Santa Rosa sandstone. Perched ground water is present within the Santa Rosa sandstone at depths of approximately 45 to 55 feet below ground surface. The saturated thickness of the perched system ranges from approximately 0 to 10 feet; locally, ground-water flows toward the northwest. Bail-recovery tests indicate that the perched aquifer is of low permeability with an average hydraulic conductivity of 5.0×10^{-2} feet per day. The average ground-water flow velocity is approximately 5 feet per year based on the in-situ hydraulic tests. The perched system is underlain by approximately 350 to 550 feet of very fine-grained sandstones, siltstones, and shales of the Permian Dewey Lake Red Beds. In general, potable ground water is not present in the region.

The extent of actionable soil contamination near the former engine room drain and filter pits is limited to a roughly elliptical area centered on the pits that covers approximately 0.7 acre. Ground-water impacts extend north of the former pits; the New Mexico Water Quality Control Commission (NMWQCC) numerical standards for benzene, 1,1-dichloroethane, total dissolved

solids, chloride, barium, sulfate, and manganese were exceeded in at least 1 of the 10 samples collected from wells in the area. In addition, 3.6 feet of phase-separated hydrocarbons (PSH) were measured within an on-site monitor well downgradient of the pits.

During this investigation, DBS&A conducted four short-term SVE pilot tests in order to assess hydrocarbon removal by vapor means. The single well tests indicated that approximately 1 to 2 cubic feet per minute per linear foot of screen can be obtained with applied vacuums ranging from 45 to 233 inches of water.

1. INTRODUCTION

ENRON Operations Corp. (EOC) retained Daniel B. Stephens & Associates, Inc. (DBS&A) to conduct a supplemental environmental investigation (SEI) of soils and ground water underlying Transwestern Pipeline Company's (TPC) WT-1 Compressor Station. The site is located approximately 30 miles east of Carlsbad, New Mexico along U.S. Highway 62. The general site layout, showing the location of buildings, liquid storage areas, and the current area of investigation, is provided in Figure 1.

The compressor station boosts the pressure of the natural gas stream originating from two lateral pipelines and one primary pipeline heading toward Roswell, New Mexico. Past operational practices at the facility resulted in the release of waste liquids to the subsurface, primarily through the use of disposal pits. The engine room drain and filter pits (engine room pits) along the northern fence line received spent lubrication oils, degreasers, and filters generated during routine engine maintenance. Soil and ground-water impacts resulting from the use of the engine room pits are the subject of this report.

Previous hydrogeologic investigations at the site have identified impacts to soil and perched ground water underlying the former engine room pits (Metric Corporation, 1991; Brown & Root Environmental, 1993). The objectives of the SEI were to evaluate (1) the extent of subsurface impacts identified along the northern fence line by previous investigators, (2) the vertical extent and the hydraulic characteristics of the perched ground-water system, and (3) soil vapor extraction (SVE) parameters for future remedial design.

The SEI was conducted during the period of November 15 through December 1, 1994. In order to evaluate areas of potential hydrocarbon releases, DBS&A analyzed soils for volatile organic compounds (VOCs) using field and laboratory techniques. In addition, ground-water samples were submitted for analyses of organic and inorganic constituents to determine if water quality standards set by the New Mexico Water Quality Control Commission (NMWQCC) were exceeded. Specifically, the DBS&A investigation near the engine room pits included the following work:

- Three existing monitor wells near the engine room pits were sampled.

T\4230\423017C.DWG

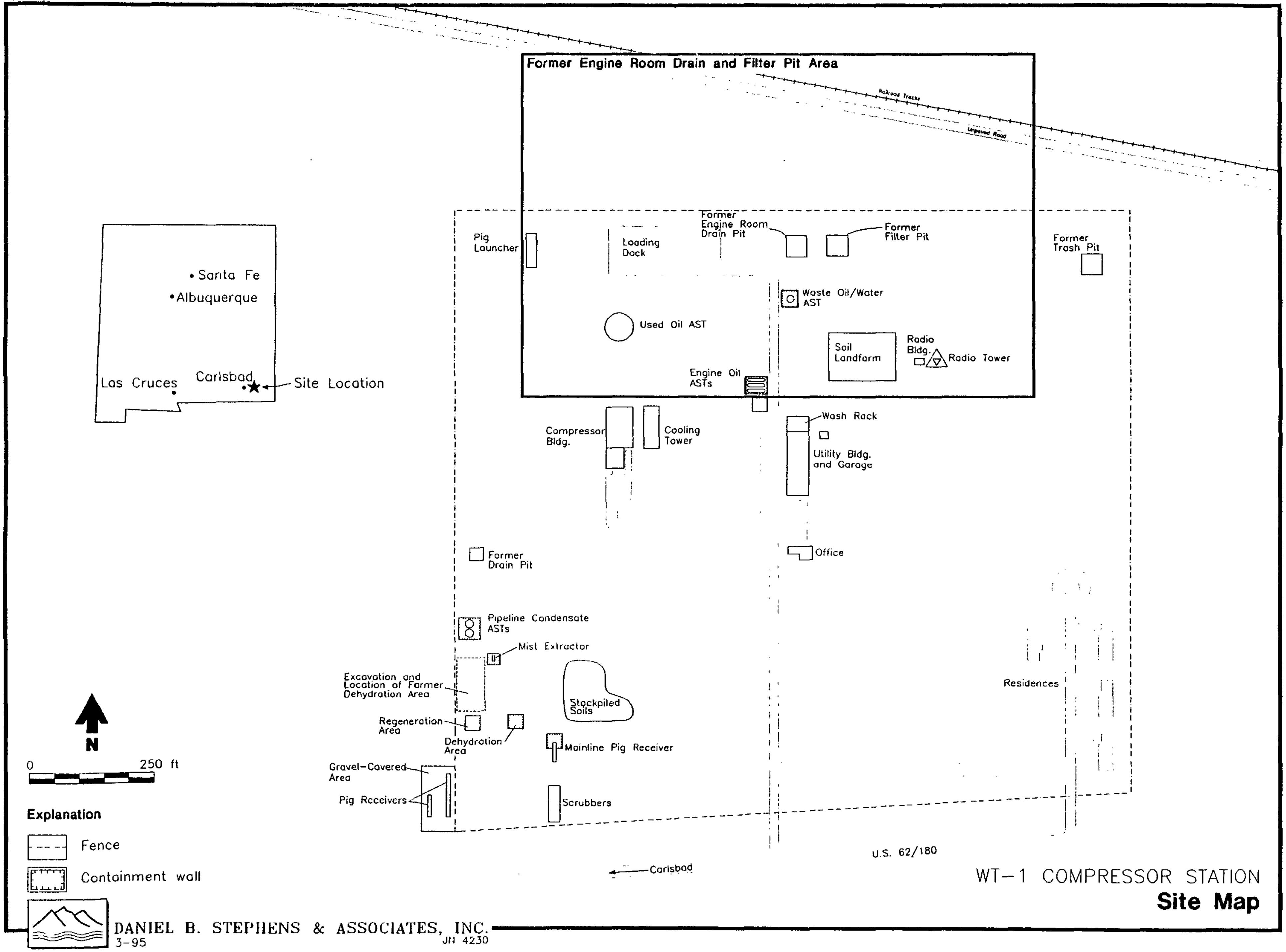


Figure 1

- Five monitor wells, two temporary ground-water sampling borings, and one dual-completion SVE well were installed.

- Soil samples were collected from each boring for field and laboratory analyses.

- Ground-water samples were collected from the newly installed monitor wells for laboratory analyses.

- Five hydraulic tests were conducted.

- Four SVE pilot tests were performed.

- The locations of all monitor wells were surveyed.

This report presents the methods and results of the investigation. Section 2 provides background information on the compressor station, including a summary of previously completed environmental work at the former engine room drain and filter pits. Section 3 describes the field procedures used during the investigation and the findings of the subsurface investigation. Section 4 provides a summary of the interim corrective actions completed by TPC and the SVE pilot tests conducted by DBS&A. Finally, Section 5 provides a summary of and the conclusions derived from the investigation.

Concurrently with the investigation of the former engine room drain and filter pits, DBS&A investigated another area at the compressor station, the former dehydration area near the southwest corner of the site. Investigation activities conducted by DBS&A in this area are described in a separate report (DBS&A, 1995).

2. SITE BACKGROUND

This section provides background information relevant to DBS&A's investigation. Section 2.1 describes the site in greater detail. Section 2.2 describes the regional hydrogeologic setting. Section 2.3 provides a summary of previous environmental investigations undertaken at the former engine room drain and filter pits.

2.1 Site Description

The compressor station is situated on approximately 40 acres of land within Township 20 S, Range 32 E, Section 31 of Lea County, New Mexico. The site is located within the Pecos Valley section of the Great Plains physiographic province. The surrounding area is characterized by an irregular (hummocky) erosional surface containing numerous internally drained flat-bottomed playas. The interior drainages have formed in response to dissolution of underlying salt deposits and the subsequent collapse of overlying sedimentary beds. The ground at the compressor station gently slopes northward toward a collapse feature, and directly south of U.S. Highway 62, the ground surface slopes toward the southwest into another collapse feature known as Nash Draw. The station elevation is about 3550 feet above mean sea level; the mean annual precipitation is about 9 inches. Vegetative cover mostly consists of native grasses adapted to the arid environment.

2.2 Regional Hydrogeologic Framework

The stratigraphic units of importance regarding the regional hydrogeologic framework are, in ascending order, (1) the Permian Dewey Red Beds, (2) Triassic Santa Rosa sandstone, and (3) the Quaternary Gatuña Formation and Mescalero caliche. In general, potable ground water is not present below the Permian-Triassic unconformity marked by the contact between the Dewey Lake Red Beds and the Santa Rosa sandstone (Nicholson and Clebsch, 1961). Because of the limited occurrence of water, the compressor station receives its water from a pipeline that supplies local ranchers and industry. Sections 2.2.1 through 2.2.3 describe in detail the stratigraphic units present.

2.2.1 Dewey Lake Red Beds

The Dewey Lake Red Beds consist of alternating thinly bedded sequences of reddish brown siltstones, shales, and very fine- to fine-grained sandstones. The sediments are frequently gypsiferous and are mottled by greenish-gray reduction spots (Lucas and Anderson, 1993). Lithologically, the sediments are well sorted, well rounded quartzarenites to slightly micaceous quartzarenites. In the vicinity of the site, the formation ranges in thickness from approximately 350 to 550 feet, thinning toward the west (Mercer, 1983). The formation impedes the interchange of perched water within the overlying Santa Rosa sandstone with the underlying evaporite-bearing rocks of Permian age.

2.2.2 Santa Rosa Sandstone

An erosional unconformity marks the contact between the Permian Dewey Lake Red Beds and the overlying Santa Rosa sandstone of Late Triassic age. The Santa Rosa sandstone consists of fine- to coarse-grained, poorly to moderately sorted, subangular to subrounded micaceous sandstones and conglomerate with interbeds of siltstone and mudstone (Mercer, 1983). In comparison to the Dewey Lake Red Beds, the formation is a relatively immature litharenite that does not contain gypsum.

The Santa Rosa sandstone is the lowest member of the Dockum group. The upper member of the Dockum group, the Chinle Formation, is absent in the area. The Santa Rosa sandstone is approximately 75 feet thick near the site and thickens rapidly to the east (Bachman, 1987).

The recharge area for the Santa Rosa sandstone is along north-trending outcrops located just west of the site and possibly along the Mescalero Ridge located approximately 15 miles to the north. Ground-water maps produced by Nicholson and Clebsch (1961) indicate a regional flow direction generally coincident with the south and east dip of the Triassic beds. However, on a more local scale, Wright (1990) presented monitor well water level data that indicated a northwesterly flow direction toward Laguna Totson. At the compressor station, ground-water elevations measured by DBS&A are consistent with a northwesterly flow direction or toward the internally drained basins (Section 3.2).

Regional studies differ over the location of the Permian-Triassic boundary, the presence of internally drained regions, and perched ground-water lenses. This lack of consensus makes regional correlations extremely difficult with respect to formational contacts and flow directions. One area of agreement amongst previous investigators is that the Santa Rosa sandstone provides low yields to wells due to low formation permeability. Nicholson and Clebsch (1961) estimated the porosity of the formation to be on the order of 13 percent.

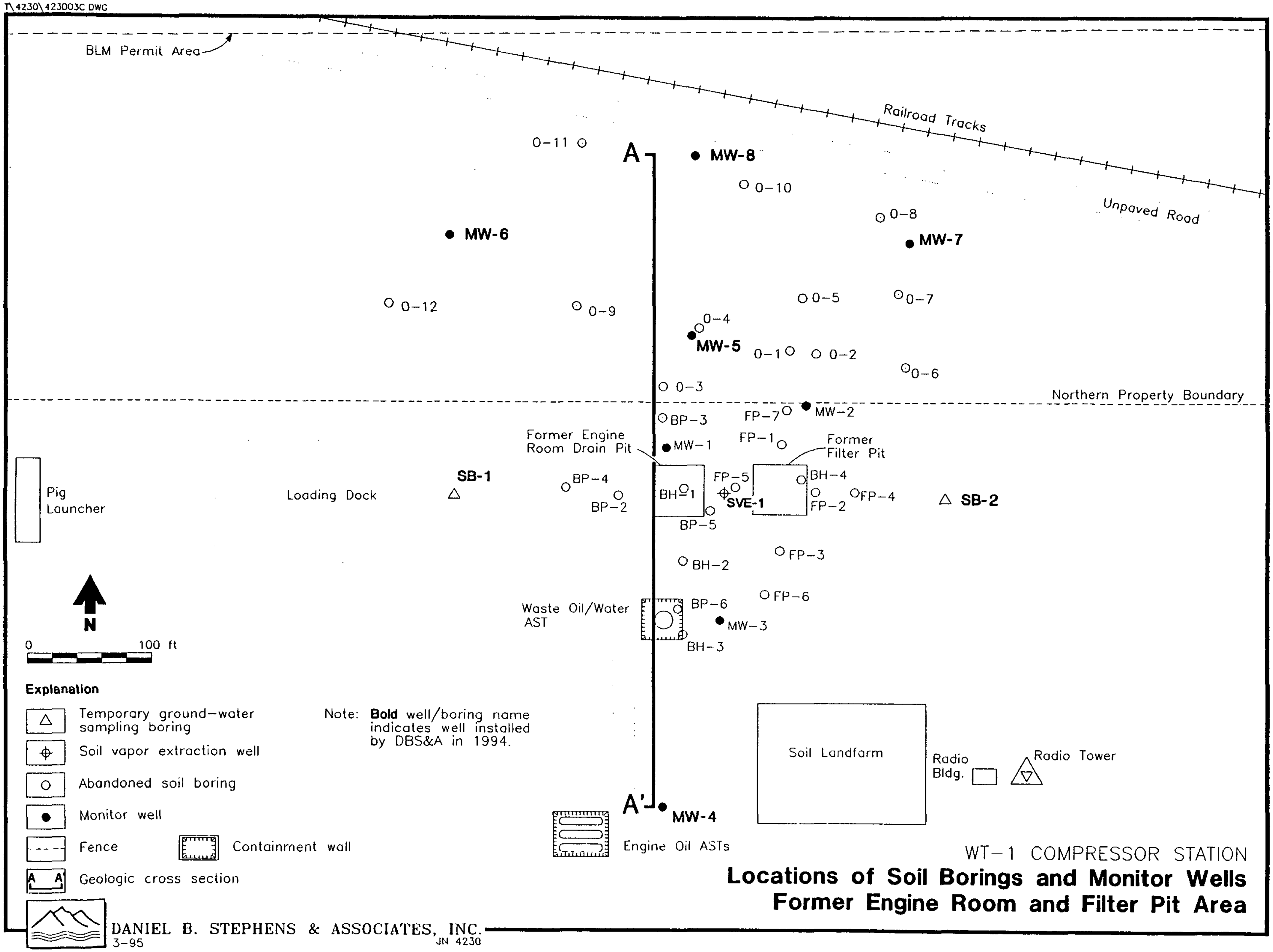
2.2.3 Gatuña Formation and Mescalero Caliche

The Quaternary Gatuña Formation is distributed intermittently over a broad area in the Pecos drainage system. It consists of generally poorly consolidated pale reddish brown to yellowish sand, sandy clay, lenticular beds of gravel, and caliche that can be gypiferous. The unit was deposited primarily in channels and depressions probably related to the dissolution of underlying Permian Formations. The Gatuña Formation ranges from 0 to 100 feet thick in the region and thins to the east as it laps onto topographically high areas. This unit may be present in the most northern extent of the investigated area (Section 3.2). Ground water, if present, is restricted to discontinuous perched zones (Mercer, 1983).

The Gatuña Formation, and the Santa Rosa sandstone where the Gatuña Formation is not present, are covered with a caliche horizon of middle Pleistocene age that is informally referred to as the Mescalero caliche. The caliche was thought to be formed by calcium carbonate from migrating sands leaching into underlying soil horizons (Bachman, 1987).

2.3 Previous Hydrogeologic Investigations

The first investigation at the compressor station was performed by Metric Corporation in October 1991. Metric advanced a total of 6 soil borings (BH-1 through BH-6) to investigate subsurface conditions near the former engine room drain and filter pits, trash pit, and drain pit (Figures 1 and 2). Metric tested soil samples for the presence of VOCs using an organic vapor meter (OVM) and selected 2 to 3 samples from each soil boring (based on the OVM field screen) for submission to a laboratory for chemical analyses. Soil samples were analyzed for total recoverable petroleum hydrocarbons (TRPH) using EPA method 418.1, benzene, toluene,



WT-1 COMPRESSOR STATION

Locations of Soil Borings and Monitor Wells Former Engine Room and Filter Pit Area

Figure 2

ethylbenzene, and xylene (BTEX) using EPA method 8020 (modified), and selected organic compounds and metals using the toxic characteristic leaching procedure (TCLP).

Metric determined that actionable soil impacts were limited primarily to the engine room drain and filter pit area shown in Figure 2. The New Mexico Oil Conservation Division (OCD, 1993) regulatory guideline of 100 mg/kg total petroleum hydrocarbons (TPH) was exceeded for soils collected from borings BH-1, BH-2, and BH-4, located near the former engine room drain and filter pits. However, the OCD regulatory guideline of 50 mg/kg for total BTEX and the Environmental Protection Agency (EPA) TCLP limits (Code of Federal Regulations, Title 40, Section 261.24[b]) were not exceeded in any of the analyzed soils.

During the period of August through October 1992, Brown & Root Environmental advanced 28 soil borings and installed 3 monitor wells (MW-1 through MW-3 on Figure 2) to delineate the extent of subsurface impacts identified by Metric. Soil and ground-water samples were analyzed for TPH, BTEX, and TCLP organic compounds and metals. In order to drill off-site, TPC acquired access from the U.S. Bureau of Land Management for an area extending 300 feet north and west of the site fence line.

Brown & Root confirmed that actionable soil contamination is limited to the area immediately surrounding the engine room drain and filter pits and that ground-water impacts extend off-site to the north. Several core samples collected from soil borings near the former pits contained phase-separated hydrocarbons (PSH), and soil boring O-3 and monitor well MW-2 had measurable thicknesses of PSH in contact with the water table. Total BTEX concentrations ranged from non-detectable to over 1,900 µg/L for ground-water samples collected during the investigation. With the exception of samples collected from soil boring BP-2, soil and ground-water samples did not exceed TCLP limits for the analyzed organic compounds and metals.

3. SUBSURFACE INVESTIGATIONS

The following sections describe the subsurface investigation conducted by DBS&A in order to evaluate the extent of impacts identified by previous investigators. The general field procedures followed during this investigation are outlined in Section 3.1. Sections 3.2 and 3.3 describe the results of the site characterization and investigation. All field work was conducted in accordance with DBS&A standard operating procedures and a site-specific health and safety plan developed for the field program.

3.1 Drilling and Sampling Procedures

During the investigation, DBS&A installed five monitor wells, two temporary ground-water sampling borings, and one dual-completion SVE well to establish the distribution of soil and ground-water impacts, the direction of ground-water flow, ground-water hydraulics, and SVE design parameters. Drilling at the site was completed by Eades Drilling Company of Hobbs, New Mexico, using an Ingersoll Rand TH-75W air-rotary drilling rig. Drilling equipment and sampling devices were steam cleaned and inspected by DBS&A personnel prior to beginning each boring. In addition, all sampling equipment was decontaminated prior to each use by washing with Liquinox® detergent followed by a deionized water rinse.

3.1.1 Soil Sampling

As each borehole was advanced, core-barrel samples were collected at 5-foot intervals for geologic logging. In addition, drill cuttings were inspected to aid in logging. Appendix A contains the lithologic logs produced for each boring and, where applicable, the corresponding well construction diagrams.

Soil samples collected during drilling were tested for the presence of VOCs with an OVM equipped with a photoionization detector (PID). Field PID measurements were used to determine the presence of contaminated soils above applicable guidelines (those with PID readings greater than 100 parts per million volume [ppmv]) as described by OCD (1993). Drill cuttings generated during the investigation were stockpiled on clean plastic; one composite sample was collected from each investigation area to determine proper disposal.

In general, the soil sample yielding the highest PID reading above background measurements and the soil sample collected from immediately above the water table were retained for laboratory analysis of TPH (EPA method 8015 modified) and BTEX. Soil samples collected from well SVE-1 were also analyzed for halogenated VOCs (EPA method 8010). All samples were collected in 250-ml glass jars and placed in an ice-filled cooler for shipment to Hall Environmental Analysis Laboratory (HEAL) in Albuquerque, New Mexico.

3.1.2 Well Installation

Monitor well borings were drilled to approximately 10 feet below the water table, or the bottom of the perched ground-water zone, whereupon a 2-inch-diameter monitor well was constructed in order to evaluate ground-water quality. The monitor well MW-4 soil boring was drilled approximately 20 feet below the perching layer for additional characterization of subsurface lithology and was subsequently backfilled with bentonite to the top of the perching layer prior to monitor well construction. Monitor wells were constructed with 15 feet of 2-inch, 0.010-inch machine-slotted polyvinyl chloride (PVC) screen, approximately 45 feet of flush-threaded 2-inch PVC blank casing, and 17 feet of 12-20 silica sand filter pack. Bentonite seals were emplaced on top of the filter packs, followed by a cement-bentonite grout to the ground surface. Surface completions consisted of 12-inch-diameter flush-grade vaults set within concrete.

In order to evaluate SVE design parameters, well cluster SVE-1 was drilled to a depth of approximately 5 feet below the water table. The well cluster consisted of two SVE wells with unique screened intervals. The wells were designated SVE-1A and SVE-1B for the deep and shallow zones, respectively (Appendix A). The annulus surrounding each screened interval was completed with 12-20 silica sand filter pack. A bentonite seal was placed between the two screened zones in order to isolate them. The upper bentonite seal was followed by a cement-bentonite grout to ground surface, whereupon the surface was completed as described for the monitor wells.

Temporary ground-water sampling borings were drilled to a depth of 10 feet below the water table, whereupon a 2-inch-diameter galvanized steel pipe attached to a well screen was lowered into the open borehole. Following collection of ground-water samples, the temporary well was removed from the open boring and the hole was abandoned with cement-bentonite grout poured from the surface.

Following well installation, all borings and monitor wells installed by DBS&A were surveyed relative to the northeast property corner (for horizontal control) and mean sea level by John W. West Engineering Co. of Hobbs, New Mexico. Additionally, monitor wells installed by previous investigators were surveyed to the same reference so that accurate determination of ground-water flow directions could be made. A summary of completion information for wells and soil borings installed in the former engine room drain and filter pit area is provided in Table 1.

3.1.3 Ground-Water Sampling

During the investigation, ground-water samples were collected from each monitor well at the site. Prior to sampling, the depth to water was measured. The presence or absence of PSH was checked with product-finding paste and a fiberglass tape. The well was then bailed until approximately three casing volumes were purged or until the well was dry. During purging, field parameters (pH, temperature, and electrical conductivity) were measured and recorded every half casing volume. Purged ground water was contained in 55-gallon drums to be disposed by TPC upon receipt of analytical results. Ground-water samples were collected using dedicated, disposable polyethylene bailers.

Ground-water samples were analyzed for halogenated and aromatic VOCs (EPA method 8010/8020), TPH (EPA method 8015 modified), polynuclear aromatic hydrocarbons (PAHs) (EPA method 8100), major ions, total dissolved solids (TDS), and metals regulated by the NMWQCC. Samples were shipped in ice-filled chests to HEAL for organic analyses and to Analytical Technologies, Inc. (ATI) for inorganic analyses. Both laboratories are located in Albuquerque, New Mexico.

Table 1. Monitor Well/Soil Boring Locations and November 1994 Water Table Elevation Data Former Engine Room Drain and Filter Pits

Well/Boring[1]	Location		Date of Completion	Measuring Point[3] Elevation (feet above msl)	Depth to Water from Measuring Point[3] (feet)	Water Table Elevation (feet above msl)	Total Boring Depth (feet bgs)	Screened Interval (feet bgs)	Top of Silica Sand (feet bgs)
	South[2] (feet)	West[2] (feet)							
MW-1[4]	36.2	661.8	08/12/92	3547.67	47.59	3500.08	53.5	43.5-53.5	41.0
MW-2[4]	2.8	552.0	09/01/92	3546.28	PSH only	NA	50.0	40.0-50.0	38.0
MW-3[4]	174.5	619.3	08/28/92	3548.99	48.71	3500.28	48.5	38.5-48.5	35.5
MW-4	322.5	664.2	11/29/94	3548.29	47.18	3501.11	80.0	43.5-58.5	41.0
MW-5	–52.4	642.0	11/29/94	3543.59	48.68	3494.91	59.6	44.6-59.6	41.0
MW-6	–132.1	834.3	11/28/94	3543.29	50.22	3493.07	61.0	46.0-61.0	42.5
MW-7	–129.5	470.6	11/21/94	3541.97	47.67	3494.30	56.0	40.0-55.0	37.0
MW-8	–195.3	639.1	11/20/94	3541.47	49.20	3492.27	59.0	44.0-59.0	42.0
SB-1	74.9	830.2	11/20/94	3545.97[5]	46.68	3499.29[6]	56.8	NA	NA
SB-2	78.0	442.1	11/19/94	3543.67[5]	46.84	3496.83[6]	56.0	NA	NA
SVE-1A	73.0	616.0	11/18/94	3545.58	45.38	3500.20	53.0	42.5-52.5	41.2
SVE-1B	73.0	616.0	11/18/94	3545.61	NA	NA	37.5	21.0-36.0	18.3

Survey conducted by John W. West Engineering, Hobbs, NM; all measurements were made in November 1994.

[1] Refer to Figure 2 for locations
[2] South and west coordinates relative to northeast property corner
[3] Measuring point is top of PVC casing
[4] From Brown & Root Environmental, February 1993
[5] Measuring point is top of cement plug
[6] Water table elevation suspect due to incomplete recovery

msl = Mean sea level
bgs = Below ground surface
PSH = Phase-separated hydrocarbons
NA = Not applicable

In order to check intralaboratory precision, quality assurance/quality control samples, consisting of trip blanks and sample replicates, comprised approximately 5 percent of the water samples collected. Appendix B contains the HEAL and ATI reports with the supporting quality assurance and chain-of-custody documents for all soil and water samples submitted for analysis.

3.2 Site Hydrogeology

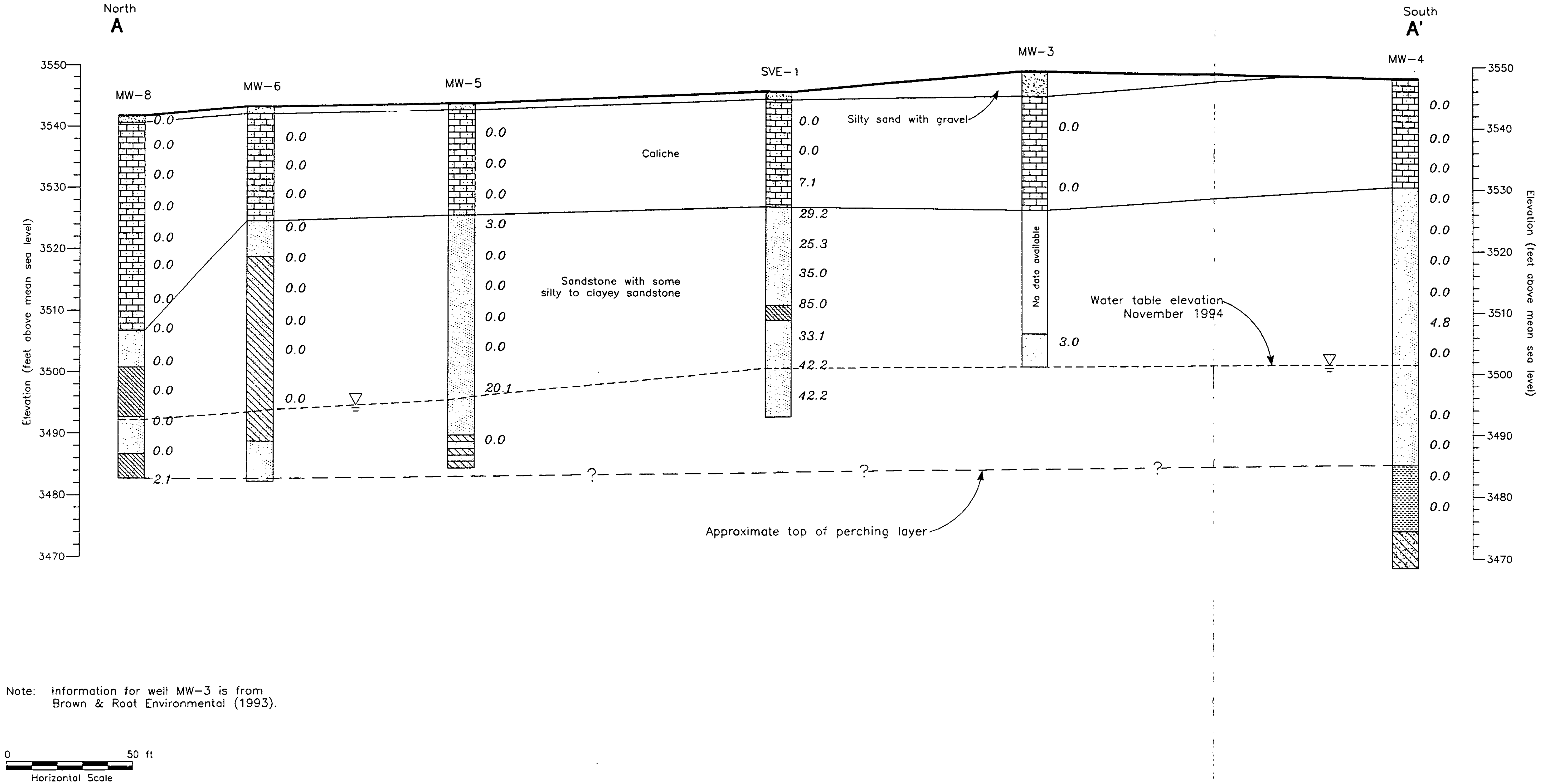
A hydrogeologic cross section developed from lithologic descriptions is provided as Figure 3; the location of the cross section is shown on Figure 2. Borings advanced during the investigation intersected sediments of the Mescalero caliche, and perhaps the Gatuña Formation at the northernmost extent of the investigation, and alternating sandstones, siltstones, and mudstones of the underlying Santa Rosa sandstone. In general, the lithology of the sediments directly underlying the site consist of the following:

- From ground surface to approximately 1.5 feet below ground surface (bgs), a brown to reddish gray gravelly sand to silty sand was encountered. The unit is poorly sorted, angular to rounded, unconsolidated, calcareous, and dry.

- From 1.5 to approximately 15 feet bgs, a pinkish gray to reddish orange, poorly to strongly consolidated sandy caliche (locally referred to as the Mescalero caliche) was encountered. The sand is fine- to medium-grained, well sorted, subrounded to rounded, and dry. The unit grades downward into a calcareous silty sandstone.

- From approximately 15 to 25 feet bgs, a light brown to reddish orange calcareous silty sandstone to sandstone is present. The unit is very fine- to medium-grained, poorly sorted, subangular to rounded, poorly to moderately consolidated, sometimes gypsiferous, and dry. This unit represents a transitional zone between overlying caliche and underlying Santa Rosa sandstone. The presence of gypsum at the northern part of the study area suggests that this unit may correspond to the Quaternary Gatuña Formation.

- From approximately 25 to 55 feet bgs, a moderate reddish brown sandstone and silty sandstone is present. The unit is very fine- to medium-grained with minor coarse-grained



Note: Information for well MW-3 is from Brown & Root Environmental (1993).

Explanation

110	Corrected PID reading (ppmv)	░	Sandstone		
░	Silty sand with gravel	▨	Clayey and/or silty sandstone		
▦	Caliche	▒	Mudstone	▨	Clayey sand

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Geologic Cross Section A-A'
Former Engine Room Drain and Filter Pit Area

Figure 3

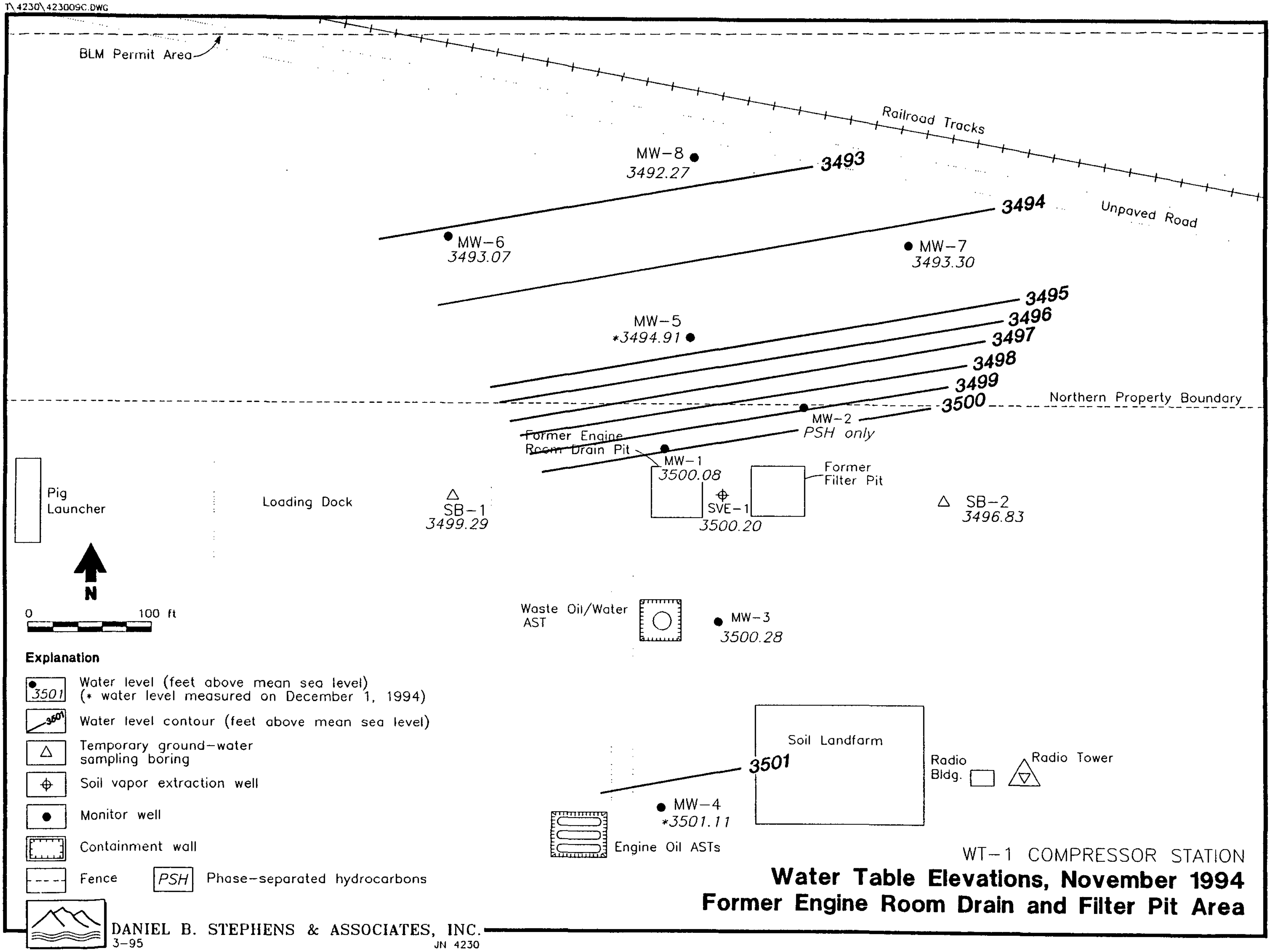
zones and some siltstone and mudstone layers that become more abundant with depth. The unit is often micaceous and is poorly to well sorted, subangular to rounded, and moderately to strongly consolidated with carbonate and noncarbonate cements. The sediments are often moist to wet where interbedded with mudstone.

- From approximately 55 to 80 feet bgs, a light brown to moderate reddish brown sandstone to clayey sandstone is present. The sandstone is generally silty or very fine-grained with interbeds of clay, mudstone, and siltstone. The interval is poorly to strongly consolidated. Moisture content ranges from dry to saturated.

Ground water beneath the site is unconfined and occurs approximately 45 to 55 feet bgs based on November to December 1994 measurements (Table 1; DBS&A, 1995). The depth to water measurements listed on Table 1 represent the highest water table elevations recorded during the entire period of the field program. Following well completion, multiple measurements indicated that the water level recovery to static conditions required several hours to days as a result of the low permeability of the bedrock.

Ground water in the Santa Rosa sandstone is perched upon clays and mudstone present at approximately 60 feet bgs across the site. The perching layer is at least 20 feet thick based on lithologic descriptions from monitor well MW-4 (Appendix A). The saturated thickness of the perched zone appears to be controlled by the presence of local recharge and the textural composition of the underlying perching layer. Based on field observation, ground water that is perched upon the underlying units appears to be less than or equal to 10 feet thick.

A water table elevation map generated from depth to water measurements is shown in Figure 4. The map indicates that ground water generally flows toward the north-northwest, a finding that agrees with the flow direction determined by Wright (1990). The hydraulic gradient in the perched system averages 0.015 ft/ft, but ranges from 0.004 ft/ft near monitor well MW-3 to 0.064 ft/ft immediately downgradient of the engine room pits. The variation in local hydraulic gradient likely results from localized recharge near the former engine room waste pits.



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Water Table Elevations, November 1994
Former Engine Room Drain and Filter Pit Area

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Figure 4

3.2.1 Hydraulic Testing and Data Analysis

Following well completion, DBS&A conducted bail-recovery tests on monitor wells MW-4, MW-5, and MW-8, as well as on MW-9 and MW-12 (DBS&A, 1995), to evaluate the in-situ hydraulic conductivity of the perched ground-water system. The five tests provided an expedient means of estimating local hydraulic conductivity (K). The test procedure consisted of bailing each monitor well dry and monitoring the recovery of the water level to the initial static level if practicable. The water level recovery was recorded at frequent intervals using a electronic water level indicator.

The bail-recovery test data were analyzed using an equation developed for recovery from constant rate pumping (Cooper and Jacob, 1946). The solution is a modification of the Theis equation for ground-water flow toward a pumping well. The solution can be applied to late-time data by treating the bail-down tests as short-term pumping tests. Late-time data are used to avoid well bore storage effects, which can significantly distort the early recovery data.

The procedure requires a graphical plot of residual head or recovery (arithmetic scale) versus t/t' (logarithmic scale). The value of t/t' equals the total time since bailing initially began divided by the time since bailing stopped. The total recovery over one log cycle and the average bailing rate are used to estimate transmissivity. The calculated transmissivity is then divided by the saturated thickness to estimate the average hydraulic conductivity for the test zone. Data plots resulting from the bail-recovery test analyses are included in Appendix C.

The estimated values of K for the five tests ranged from 2.5×10^{-3} ft/day to 2.0×10^{-1} ft/day with a geometric mean of 5.0×10^{-2} ft/day (Table 2). Estimates of specific yield (S_y) cannot be obtained by this method, but based on the observed grain size distributions and cementation, S_y values are probably on the order of 0.04 to 0.08 for the perched system.

Table 2. Results of Hydraulic Tests
WT-1 Compressor Station

Monitor Well	Hydraulic Conductivity[1] (ft/day
MW-4	2.0×10^{-1}
MW-5	2.5×10^{-3}
MW-8	7.4×10^{-2}
MW-9	6.1×10^{-2}
MW-12	1.4×10^{-1}
Geometric mean	5.0×10^{-2}

[1] Calculated using Jacob-Cooper (1946) method

3.2.2 Rate of Ground-Water Movement

Average ground-water flow velocities can be estimated by Darcy's Law, using the following equation:

$$v = \frac{Ki}{n_e}$$

where v = average pore velocity
K = hydraulic conductivity
i = hydraulic gradient
n_e = effective porosity

Assuming an effective porosity of 0.06 (estimated as 50% of total porosity), an average hydraulic gradient of 0.015, and a geometric mean hydraulic conductivity of 5.0×10^{-2} ft/day (1.8×10^{-5} cm/sec), the average ground-water velocity at the site is approximately 5 ft/yr. This equation provides a relatively high estimate of contaminant transport rates since it does not take into account retardation effects that inhibit contaminant migration.

3.3 Delineation of Subsurface Impacts

As described in Section 3.1, soil and ground-water samples were collected from each monitor well and analyzed for organic and inorganic constituents. Appendix A contains the results of the headspace analysis for each boring, and analytical chemistry results are provided in Appendix B. The extents of soil and ground-water impacts near the former engine room pits are discussed in Sections 3.3.1 and 3.3.2, respectively.

3.3.1 Soil Impacts

Headspace analysis and analytical chemistry results for samples collected during the DBS&A SEI revealed that hydrocarbon concentrations near the former engine room pits were either not detectable or were well below OCD guidelines for hydrocarbons in soil. Table 3 summarizes organic analytical data for soils sampled by DBS&A in the investigation area.

Based on the data collected to date, it appears that actionable hydrocarbon impacts are limited to a roughly elliptical area centered between the two former pits covering an area of approximately 0.7 acre. Figure 5 shows in plan view the estimated extent of actionable soil contamination, based on the OCD regulatory guideline of 100 mg/kg for TPH, originating from the engine room pits. The posted values on Figure 5 represent the highest measured hydrocarbon concentrations based on samples collected during past and present investigations. Hydrocarbon contamination has spread laterally while migrating so that, as one moves farther away from the pits, the vertical extent of soil impacts diminish.

One soil sample was collected from well SVE-1 and analyzed for halogenated VOCs (EPA method 8010) to determine if these compounds had been released from the former engine room pits. The analyses indicated that low concentrations of 1,1,-dichloroethane (1,1,-DCA), tetrachloroethene (PCE), and 1,1,1-trichloroethane (1,1,1-TCA) are present in soil near the former pits (Table 3).

Table 3. Summary of Soils Analyses for Organic Constituents Former Engine Room Drain and Filter Pits

Constituent	Detection Limit	Sample No. (Sample Date)									
		MW-4 @ 47' (11/29/94)	MW-5 @ 35' (11/29/94)	MW-5 @ 47' (11/29/94)	MW-6 @ 48' (11/29/94)	MW-7 @ 45' (11/21/94)	MW-8 @ 45' (11/18/94)	SB-1 @ 47' (11/18/94)	SB-2 @ 45' (11/18/94)	SVE-1 @ 30' (11/18/94)	SVE-1 @ 45' (11/18/94)
Total petroleum hydrocarbons by EPA method 8015 modified (mg/kg)											
Gasoline range (C_6-C_{16})	5.0	ND	ND	ND	ND	ND	ND	ND	ND	140[a]	63
Diesel range (C_{16}-C_{36})	5.0	ND	ND	ND	ND	ND	ND	ND	ND	640[b]	98[c]
Aromatic VOCs by EPA method 8020 (mg/kg)											
Benzene	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND[d]	ND
Toluene	0.05	ND	ND	ND	ND	ND	ND	ND	ND	0.08[d]	0.05
Ethylbenzene	0.05	ND	ND	ND	ND	ND	ND	ND	ND	0.13[d]	ND
Total xylenes	0.05	ND	ND	ND	ND	ND	ND	ND	ND	1.3[d]	0.82
Halogenated VOCs by EPA method 8010 (mg/kg)											
1,1-Dichloroethane	0.01	NA	NA	NA	NA	NA	NA	NA	NA	0.4[d]	NA
Tetrachloroethene	0.01	NA	NA	NA	NA	NA	NA	NA	NA	8.2[d]	NA
1,1,1-Trichloroethane	0.01	NA	NA	NA	NA	NA	NA	NA	NA	7.3[d]	NA

Notes: All analyses performed by Hall Environmental Analysis Laboratory, Albuquerque, NM

ND = Not detected
VOCs = Volatile organic compounds
NA = Not analyzed

[a] Sample analyzed at 5x dilution
[b] Sample analyzed at 10x dilution; motor oil range hydrocarbons at ~33,000 mg/kg
[c] Sample analyzed at 10x dilution; motor oil range hydrocarbons at ~860 mg/kg
[d] Sample analyzed at 2x dilution

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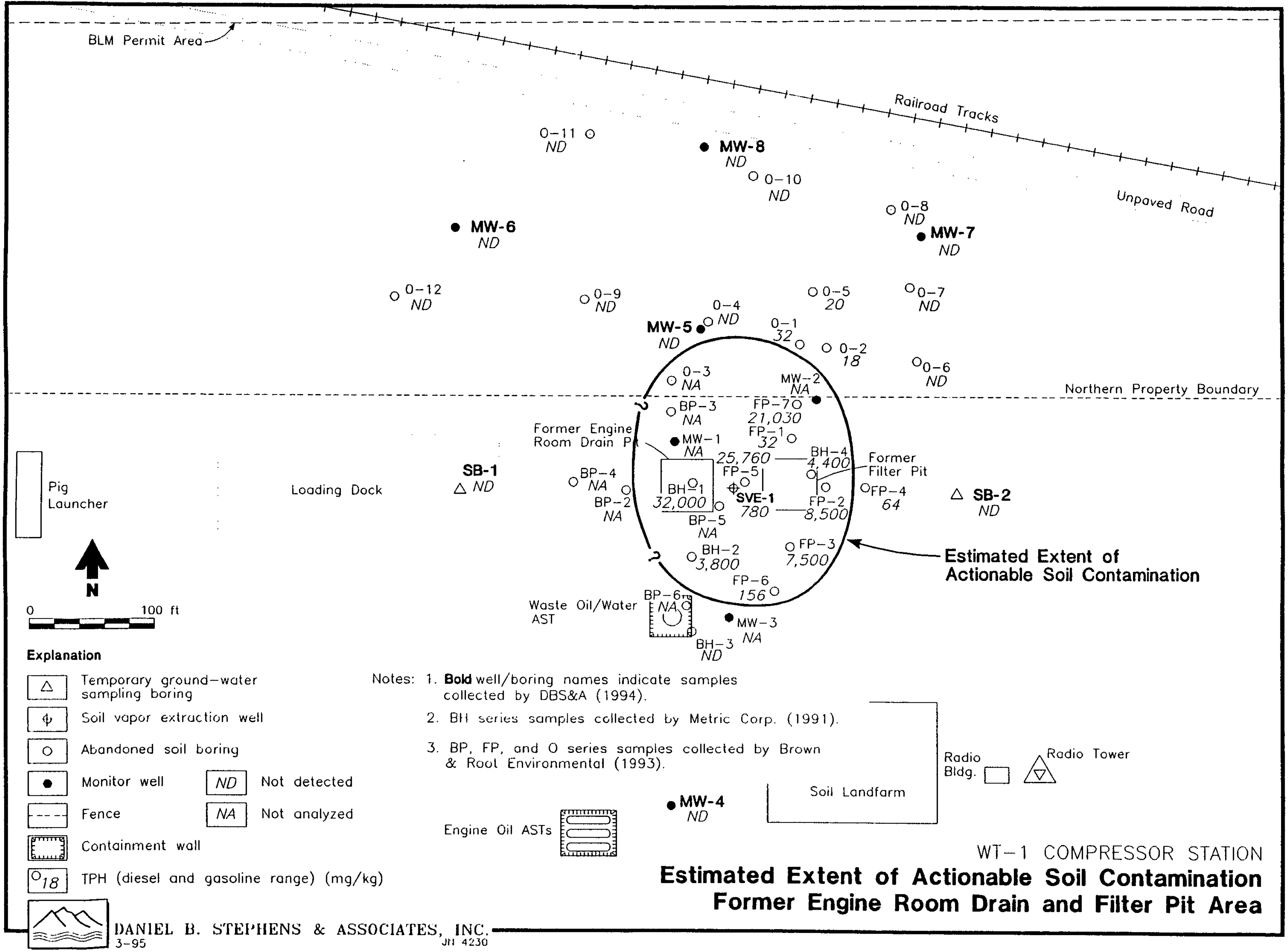

Explanation

△	Temporary ground-water sampling boring
⏀	Soil vapor extraction well
○	Abandoned soil boring
●	Monitor well
- - -	Fence
▨	Containment wall
○18	TPH (diesel and gasoline range) (mg/kg)
ND	Not detected
NA	Not analyzed

Notes:
1. **Bold** well/boring names indicate samples collected by DBS&A (1994).
2. BH series samples collected by Metric Corp. (1991).
3. BP, FP, and O series samples collected by Brown & Root Environmental (1993).

WT-1 COMPRESSOR STATION

Estimated Extent of Actionable Soil Contamination Former Engine Room Drain and Filter Pit Area

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Figure 5

3.3.2 Ground-Water Impacts

Tables 4 and 5 summarize the constituents detected in ground water beneath the former pits. The NMWQCC standard is also given in each table for comparison. Based on analyses of aromatic and halogenated VOCs and PAHs, the compounds that exceeded the NMWQCC standards are benzene, 1,1-DCA, and vinyl chloride. As shown in Table 4, ground-water samples from monitor wells MW-1, MW-5, and MW-8, temporary ground-water sampling borings SB-1 and SB-2, and SVE well SVE-1A contained organic compounds at concentrations exceeding the NMWQCC standards for one or more of the above compounds. Monitor well MW-2 was not sampled due to the absence of water and the presence of approximately 3.6 feet of PSH.

The TPH analyses indicated that petroleum hydrocarbons detected in ground water were primarily high-molecular-weight (diesel range) compounds (Table 4). The hydrocarbon composition is consistent with an engine lubrication oil source.

Benzene concentrations were slightly above the NMWQCC standards throughout much of the investigated area and displayed no particular concentration gradients or trends. Benzene is a relatively minor component of lubrication oils. In contrast, 1,1-DCA concentrations were highest near the former pits, as evidenced by data from monitor well MW-1, and decreased in the downgradient direction. Low concentrations of other organic compounds were detected in ground water, but were below NMWQCC standards. Figures 6 and 7 depict the distribution of selected organic compounds in the ground water beneath the former engine room pits.

The inorganic chemical analyses indicated that ground-water samples from each monitor well, including upgradient monitor well MW-4, exceeded the NMWQCC standards for TDS and chloride (Table 5). Several samples also exceeded NMWQCC standards for manganese, barium, and/or sulfate.

Table 4. Summary of Ground-Water Analyses for Organic Constituents
Former Engine Room Drain and Filter Pits
Page 1 of 2

Constituent	Detection Limit	Well/Boring No. (Sample Date) MW-1 (11/15/94)	MW-3 (11/16/94)	MW-4 (12/01/94)	MW-5 (12/01/94)	MW-6 (11/30/94)	MW-7 (11/22/94)	MW-8 (11/30/94)	SB-1 (11/22/94)	SB-2 (11/19/94)	SVE-1A (11/19/94)	NMWQCC Standard
Total petroleum hydrocarbons by EPA method 8015 modified (mg/L)												
Gasoline range (C_6-C_{16})	0.05	1.6^{a}	ND	ND	0.35	ND	ND	ND	0.13	0.16	0.98	None
Diesel range (C_{16}-C_{36})	1.0	16^{b}	ND	ND	6.9^{c}	ND	ND	ND	ND	1.5^{b}	3.5^{d}	None
Aromatic VOCs by EPA method 8020 (µg/L)												
Benzene	0.5	**12^{e}**	5.0	ND	**20**	1.8	7.0	**12**	**16**	**24**	**12**	10
Toluene	0.5	100^{e}	ND	ND	19	ND	ND	ND	29	ND	18	750
Ethylbenzene	0.5	10^{e}	ND	ND	8.3	ND	ND	ND	2.1	3.2	4.6	750
Total xylenes	0.5	110^{e}	0.5	ND	26	0.5	ND	ND	19	0.7	15	620
Halogenated VOCs by EPA method 8010 (µg/L)												
Bromodichloromethane	0.2	ND^{e}	NA	0.2	ND	ND	ND	ND	ND	ND	ND	None
Chloroethane	0.2	ND^{e}	NA	ND	8.9	0.5	ND	0.5	ND	2.2	35	None
Chloroform	0.2	ND^{e}	NA	7.6	ND	ND	ND	ND	ND	ND	ND	100
1,2-Dichlorobenzene	0.2	ND^{e}	NA	ND	0.5	0.2	ND	0.4	ND	ND	ND	None
1,1-Dichloroethane	0.2	**690^{e}**	NA	0.9	18	13	23	**71**	5.8	21	**120**	25
1,2-Dichloroethane	0.2	6.7^{e}	NA	ND	1.1	ND	0.3	0.9	ND	ND	5.3	10

Notes: All analyses performed by Hall Environmental Analysis Laboratory, Albuquerque, NM
Bold values indicate concentration exceeds NMWQCC ground-water standard

NMWQCC = New Mexico Water Quality Control Commission
ND = Not detected
VOCs = Volatile organic compounds
NA = Not analyzed

[a] Sample analyzed at 2x dilution
[b] C_{14}-C_{26} non-characteristic diesel range hydrocarbons
[c] Non-characteristic diesel range hydrocarbons
[d] C_{14}-C_{26} non-characteristic diesel range hydrocarbons; detection limit = 1.0 µg/L
[e] Sample analyzed at 10x dilution

Table 4. Summary of Ground-Water Analyses for Organic Constituents
Former Engine Room Drain and Filter Pits
Page 2 of 2

Constituent	Detection Limit	Well/Boring No. (Sample Date)										NMWQCC Standard
		MW-1 (11/15/94)	MW-3 (11/16/94)	MW-4 (12/01/94)	MW-5 (12/01/94)	MW-6 (11/30/94)	MW-7 (11/22/94)	MW-8 (11/30/94)	SB-1 (11/22/94)	SB-2 (11/19/94)	SVE-1A (11/19/94)	
Halogenated VOCs by EPA method 8010 (µg/L) (cont.)												
1,1-Dichloroethene	0.2	2.2[e]	NA	4.7	ND	2.9	2.3	1.3	ND	1.8	1.0	5
cis-1,2-Dichloroethene	0.2	2.8[e]	NA	ND	12	6.8	7.3	18	0.5	0.3	20	None
Dichloromethane	2.0	420[e]	NA	ND	43	ND	ND	ND	ND	ND	900	None
Tetrachloroethene	0.2	16[e]	NA	0.5	0.8	0.4	0.4	ND	0.3	ND	4.6	20
1,1,1-Trichloroethane	0.2	ND[e]	NA	ND	ND	ND	1.6	ND	ND	ND	6.8	60
Trichloroethene	0.2	28[e]	NA	ND	3.2	15	14	17	1.5	8.4	16	100
Vinyl chloride	0.2	ND[e]	NA	ND	ND	ND	0.3	0.2	ND	ND	1.2	1
Polynuclear aromatic hydrocarbons by EPA method 8100 (µg/L)												
Naphthalene	0.5	7.0[f]	NA	ND	ND	ND	ND	ND	ND	ND	ND	30[g]
1-Methylnaphthalene	0.5	ND[f]	NA	ND	ND	ND	ND	ND	ND	1.0	ND	
2-Methylnaphthalene	0.5	ND[f]	NA	ND	ND	ND	ND	ND	ND	2.2	ND	
Fluorene	0.5	ND[f]	NA	ND	ND	ND	ND	ND	0.8	0.9	ND	None

Notes: All analyses performed by Hall Environmental Analysis Laboratory, Albuquerque, NM
Bold values indicate concentration exceeds NMWQCC ground-water standard

NMWQCC = New Mexico Water Quality Control Commission
ND = Not detected
VOCs = Volatile organic compounds
NA = Not analyzed

[e] Sample analyzed at 10x dilution
[f] Detection limit = 5.0 µg/L
[g] NMWQCC standard is for total naphthalene, which includes naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene

Table 5. Summary of Ground-Water Analyses for Inorganic Constituents
Former Engine Room Drain and Filter Pits

Constituent	Detection Limit	Well No. (Sample Date)								NMWQCC Standard
		MW-4 (12/01/94)	MW-5 (12/01/94)	MW-6 (11/30/94)	MW-7 (11/22/94)	MW-8 (11/30/94)	SB-1 (11/22/94)	SB-2 (11/19/94)	SVE-1A (11/19/94)	
Major ions (mg/L)										
Calcium	0.1	332	185	293	323	247	275	248	293	None
Potassium	1.0	5.9	6.1	7.1	7.9	6.0	9.4	13.4	6.5	None
Magnesium	0.1	153	200	197	148	137	209	143	383	None
Sodium	0.1	353	326	267	244	221	322	279	339	None
Total alkalinity (as $CaCO_3$)	1.0	273	1,080	624	327	441	492	460	1,940	None
Chloride	0.5	**540**	**360**	**700**	**400**	**590**	**750**	**610**	**290**	250
NO_2/NO_3 - N, total	0.06	**20**	ND	ND	6.8	0.44	0.28	0.12	0.07	10.0
Sulfate	5	**1,000**	ND	410	**920**	330	450	460	5	600
Total dissolved solids	10	**2,800**	**2,000**	**2,400**	**2,400**	**1,900**	**2,300**	**2,100**	**4,200**	1,000
Metals (mg/L)										
Silver	0.010	ND	ND	ND	ND	ND	ND	ND	ND	0.05
Arsenic	0.005	0.007	0.036	ND	0.006	0.006	0.005	ND	0.039	0.1
Barium	0.01	0.025	**17.3**	0.109	0.032	0.052	0.085	0.094	**49.8**	1.0
Cadmium	0.0005	ND	ND	ND	ND	ND	ND	ND	ND	0.01
Chromium	0.010	ND	ND	ND	ND	ND	ND	0.013	ND	0.05
Copper	0.010	ND	ND	ND	0.014	0.014	0.010	0.013	ND	1.0
Iron	0.050	ND	0.097	ND	ND	ND	ND	ND	0.090	1.0
Mercury	0.0002	ND	ND	ND	ND	ND	ND	ND	ND	0.002
Manganese	0.010	0.024	0.112	**0.562**	0.069	0.136	**0.254**	**0.231**	0.082	0.2
Lead	0.002	ND	ND	ND	ND	ND	ND	ND	ND	0.05
Selenium	0.005	0.020	ND	ND	0.008	ND	ND	ND	ND	0.05
Zinc	0.050	ND	ND	ND	ND	ND	4.73	1.15	ND	10

Notes: All analyses performed by Analytical Technologies, Inc., Albuquerque, NM
Bold values indicate concentration exceeds NMWQCC ground-water standard.
Metals samples were field filtered and acidified.

NMWQCC = New Mexico Water Quality Control Commission
ND = Not detected

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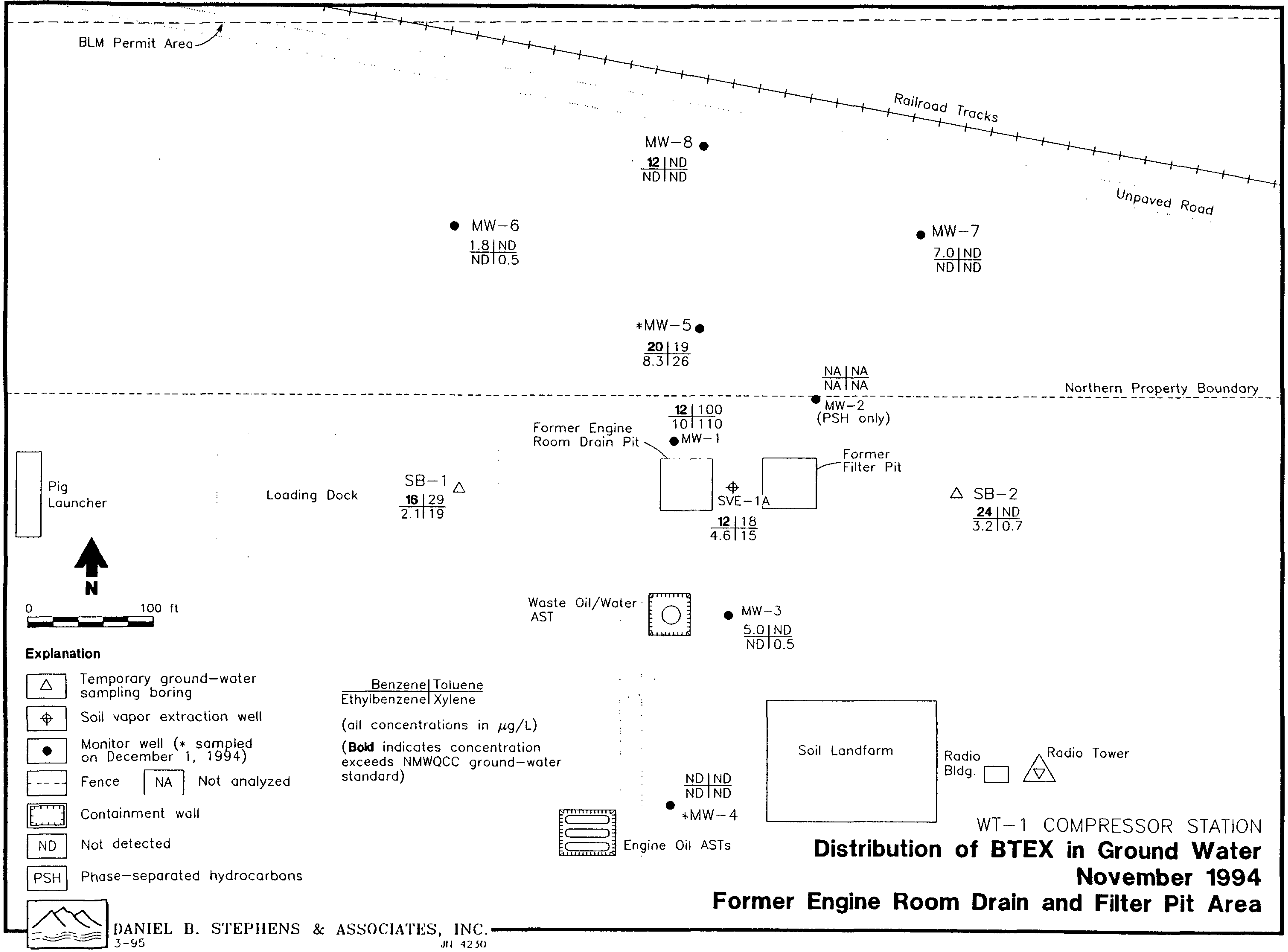


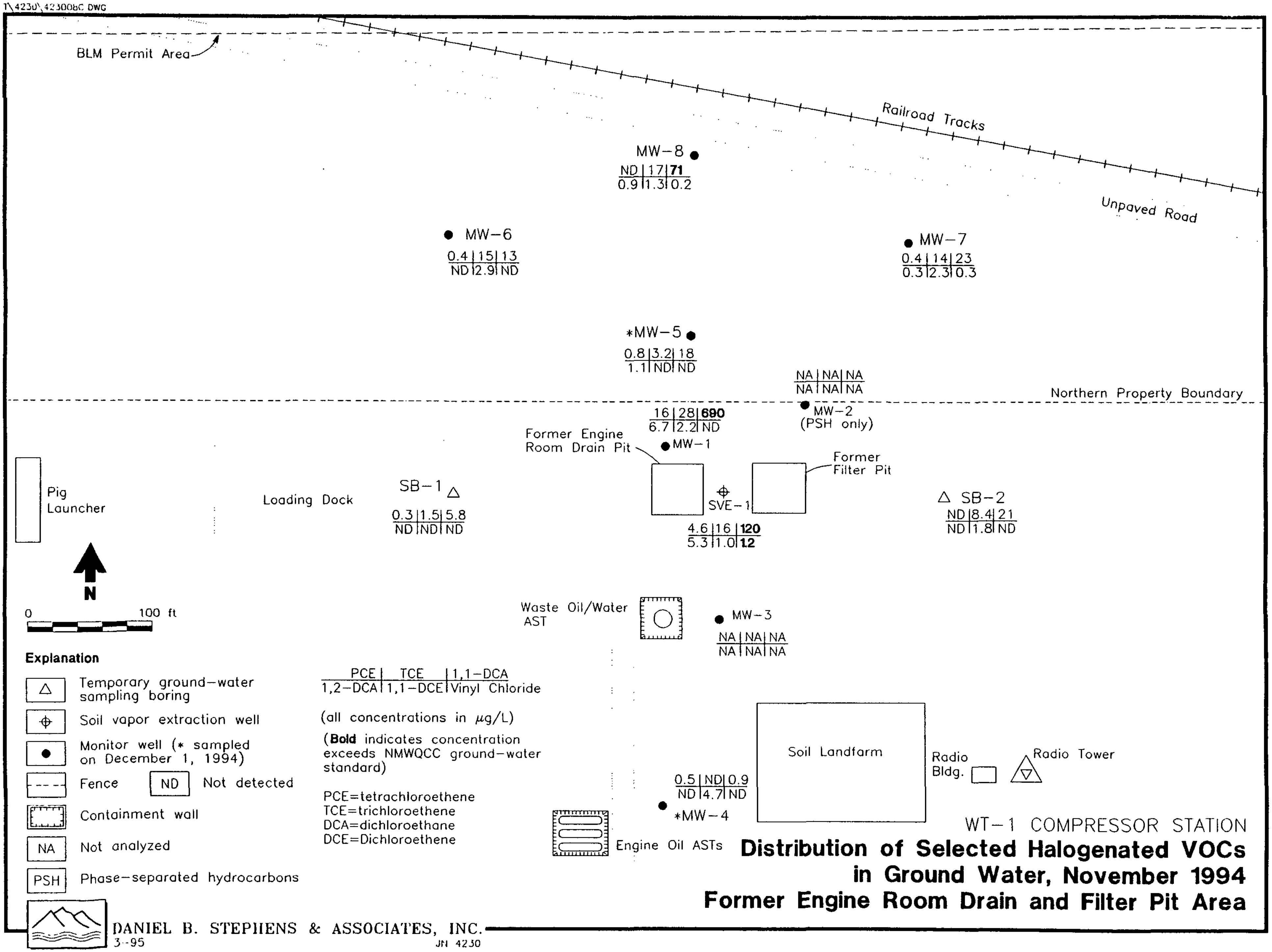
WT-1 COMPRESSOR STATION

Distribution of BTEX in Ground Water

November 1994

Former Engine Room Drain and Filter Pit Area

Figure 6



WT-1 COMPRESSOR STATION

Distribution of Selected Halogenated VOCs in Ground Water, November 1994 Former Engine Room Drain and Filter Pit Area

Figure 7

4. CORRECTIVE ACTIONS

This section provides information concerning the interim corrective measures taken to remediate the contaminants identified by the SEI (Section 3). In order to prevent continued hydrocarbon releases to the subsurface, TPC has decommissioned the former engine pits and constructed secondary concrete containment walls around each AST. The pits were decommissioned by placing an impermeable soil/cement cap over each pit, thereby eliminating direct infiltration of precipitation.

Additionally, on November 20, 1994, DBS&A conducted four short-term SVE pilot tests on several of the wells present at the compressor station. The pilot testing was conducted with the assistance of AcuVac Remediation (AcuVac) of Houston, Texas. AcuVac transported a mobile internal combustion engine (ICE) vapor extraction unit to the site and operated the unit under DBS&A's direction. The ICE draws a vacuum on the wells and at the same time achieves nearly complete oxidation of well vapors. The AcuVac pilot testing report is provided in Appendix D.

The SVE tests were conducted in order to assess whether an SVE system is a viable technology for the removal of PSH and adsorbed hydrocarbons by vapor means. The specific objectives of the SVE pilot tests were to

- Evaluate the effective radius of influence for SVE wells
- Determine operational flow rates and vacuums
- Estimate hydrocarbon mass removal rates

The SVE pilot tests consisted of (1) a 4-hour test on monitor well MW-10 (DBS&A, 1995), (2) a 3-hour test on well SVE-1A (deep zone), (3) a 30-minute test on well SVE-1B (shallow zone), and (4) a 1.5-hour test on monitor well MW-2. Monitor well MW-10 is located near the dehydration area (Figure 1). Tests were conducted at air flow rates ranging from approximately 3 to 15 cubic feet per minute (cfm) and vacuums of 45 to 233 inches of water. The single well tests indicated that approximately 1 to 2 cfm per linear foot of screen could be obtained from 2-inch-diameter SVE wells. AcuVac estimated that the effective radii of influence ranged from 70 feet to 100 feet.

Soil vapor samples were collected during testing of wells SVE-1B, MW-2, and MW-10 in order to evaluate hydrocarbon mass removal rates. Samples were collected in stainless steel canisters and shipped to Core Laboratories in Houston, Texas for analysis of BTEX, extended refinery gases (aliphatics and branched paraffins), and fixed gases ($O_2/N_2/CO_2$). The analytical results from samples collected during the pilot tests are provided in Appendix D. In addition to the collection of samples for laboratory analyses, soil vapor concentrations were measured in the field with a Horiba® auto emissions analyzer provided by AcuVac. Fixed gas concentrations indicate that natural in-situ biodegradation of hydrocarbons is occurring, as evidenced by elevated CO_2 concentrations (Appendix D). Non-methane hydrocarbon concentrations measured by Core Laboratory (23,200 ppmv in well MW-10) compare favorably with the Horiba® measurement made by AcuVac.

Table 6 summarizes the results of vapor analyses performed on samples collected during the SVE pilot testing. The highest concentrations of total hydrocarbon vapors, approximately 21,000 ppmv as measured by AcuVac, were extracted from monitor well MW-10 during the 4-hour SVE test. Vapor concentrations near the former engine room drain and filter pits are apparently not as high.

The test results indicate that an SVE system can be used to remove hydrocarbon contamination by vapor means. SVE success will depend on the volatility of the subsurface hydrocarbons and sustainable air flow rates. Although an SVE system will be more effective in the former dehydration area (DBS&A, 1995), where contaminants are primarily low-molecular-weight pipeline distillates, SVE is a viable technology for mitigation of hydrocarbon-impacted soil and PSH on ground water.

Table 6. Summary of Vapor Analyses in Soil Gas Recovered from Above the Water Table
WT-1 Compressor Station
November 20, 1994

Constituent	Location		
	SVE-1B	MW-2	MW-10
Benzene	23	<1	319
Toluene	20	<1	504
Ethylbenzene	<1	<1	19
Xylene (total)	14	<10	153
Non-methane hydrocarbon	320	190	23,200
Methane	2,290	28,390	7,510

All analyses performed by Core Laboratories, Houston, TX
All concentrations in ppmv

5. SUMMARY AND CONCLUSIONS

This report summarizes the November 15 through December 1, 1994 supplemental environmental investigation undertaken by Daniel B. Stephens & Associates, Inc. at Transwestern Pipeline Company's WT-1 compressor station. The purpose of the investigation was to evaluate the extent of subsurface impacts related to the release of petroleum hydrocarbons and wastewaters from near the former engine room drain and filter pits. During the course of the investigation, background information was reviewed, and two temporary ground-water sampling borings, five monitor wells, and one dual-completion soil vapor extraction well were installed. In addition, hydraulic tests (bail-down/recovery) were conducted, fluid levels were measured, all site monitor wells were surveyed to a common datum, and samples were collected from all site monitor wells for laboratory analysis.

Based on the data gathered to date, the following conclusions can be made regarding the site hydrogeologic properties and the extent of subsurface contamination near the former engine room drain and filter pits:

- Ground water beneath the compressor station is perched on underlying fine-grained sandstone and mudstone units. Ground water is encountered at approximately 45 to 55 feet below ground surface, and the saturated thickness ranges from 0 to 10 feet. Ground-water flow is generally to the north-northwest; however, local flow directions appear to vary, perhaps in response to local heterogeneity and recharge zones. There are no known uses for the perched water.

- Bail-down/recovery tests indicate that the average hydraulic conductivity of the perched ground-water system is approximately 5×10^{-2} feet per day. The local ground-water velocity is estimated to be 5 feet per year.

- Field headspace and laboratory analyses indicate that the extent of actionable soil contamination near the former engine room drain and filter pits cover a roughly elliptical area, centered on the former pits, of approximately 0.7 acre.

- Near the former engine room drain and filter pits, benzene and 1,1-DCA exceed the New Mexico Water Quality Control Commission (NMWQCC) ground-water standards. Total petroleum hydrocarbons (TPH) in ground water are composed primarily of diesel-range constituents. Phase-separated hydrocarbons (PSH) are present near the northern fence line, as evidenced by the 3.6 feet of PSH measured in monitor well MW-2. Inorganic chemical analyses of water samples indicated that NMWQCC standards were exceeded for total dissolved solids (TDS) and chloride in all monitor wells and for barium, sulfate, and manganese in several wells. However, TDS and chloride concentrations were also exceeded in samples collected from an upgradient well.

- To date, corrective actions have consisted of decommissioning the former engine room pits, constructing aboveground storage tanks within secondary containment structures, and performing four soil vapor extraction pilot tests to determine remedial design parameters.

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APPENDIX A

SOIL BORING LOGS AND WELL COMPLETION FORMS

⁙	Silty sand with gravel
▥	Silty sand
▦	Caliche
░	Sandstone
▨	Clayey and/or silty sandstone
▤	Mudstone

WT-1 COMPRESSOR STATION

Graphic Symbols and General Descriptions of Boring Logs

DANIEL B. STEPHENS & ASSOCIATES, INC.
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JN 4230

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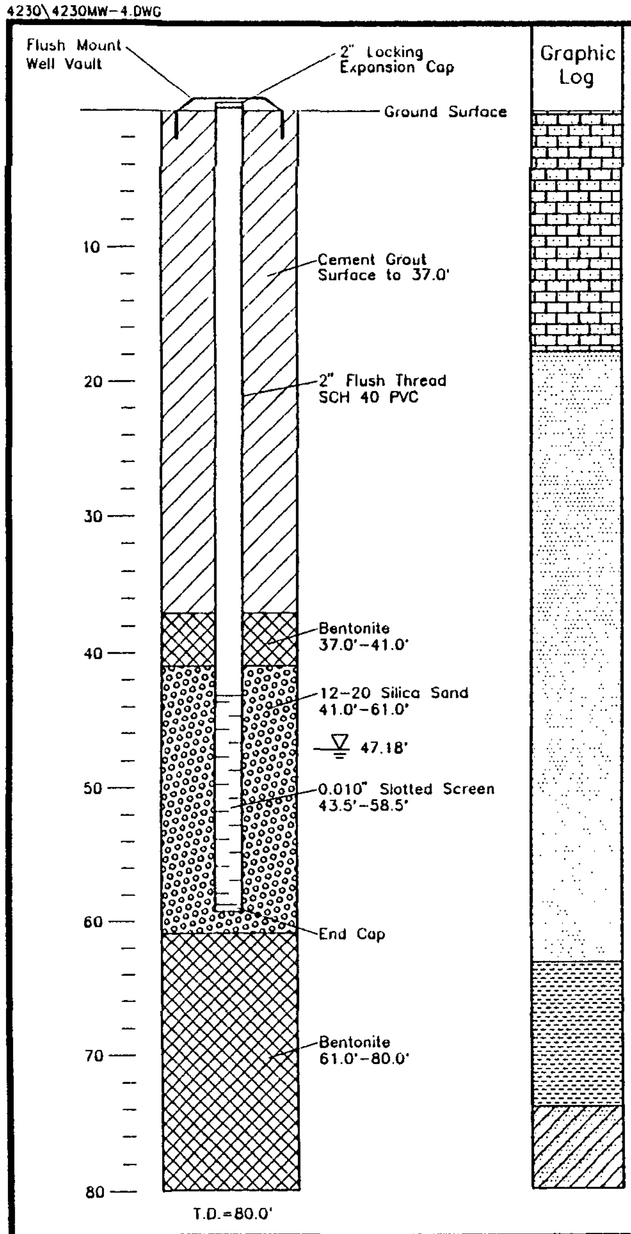
4230\4230MW-4.DWG



PID Reading (ppm)	Sampling Device	Comments and Lithology
0.6	Split Spoon	5 feet – Caliche, grayish orange pink (10 R 8/2 RCK) to moderate reddish orange (10 R 6/6 RCK), fine- to medium-grained, moderately sorted, subrounded grains, 70% sand in 30% carbonate matrix, moderate to poorly consolidated, dry
0.6	Split Spoon	10 feet – Same as above
0.6	Split Spoon	15 feet – Caliche, moderate reddish orange (10 R 6/6 RCK), mostly fine- to medium-size carbonate clasts, poorly sorted, subangular grains, little or no quartz sand, moderately to strongly consolidated, dry
0.6	Split Spoon	20 feet – Sandstone, moderate reddish orange (10 R 6/6 RCK), fine-grained, well sorted, subangular grain, 70% quartz, 20% feldspar, 10% lithic grains, moderately consolidated, carbonate cement, very porous, damp
0.6	Split Spoon	25 feet – Sandstone, dark reddish brown (10 R 3/4 RCK), fine- to medium-grained, well sorted, subrounded grains, 70% quartz, 20% feldspar, 10% lithic grains, moderately to strongly consolidated, minor carbonate, very porous, damp
0.6	Split Spoon	30 feet – Same as above
1.8	Split Spoon	35 feet – Same as above, pale reddish brown (10 R 4/2 RCK), not as well sorted, few 7- to 8-mm-across clay gauls
1.8	Split Spoon	40 feet – Same as above except moderate reddish brown (10 R 4/6) and moist, no clay gauls
1.8	Cuttings	45 feet – Same as above, moderate reddish brown
–	Split Spoon	47 feet – Sandstone, moderate reddish brown (10 R 4/6 RCK), fine-grained, well sorted, subrounded grains, moderately to strongly consolidated, noncarbonate cement, nonporous, saturated, minor clay in matrix
1.8	Split Spoon	55 feet – Same as above except fine- to medium-grained, moist, not saturated
0 6	Split Spoon	60 feet – Sandstone, light brown (5 YR 6/4 RCK), very fine- to fine-grained, poorly sorted, subangular grains, 60% quartz, 30% feldspar, 10% lithic grains, strongly consolidated, carbonate cement, damp, porous
0.6	Split Spoon	65 feet – Mudstone (shale), moderate reddish brown (10 R 4/6 RCK), micaceous, minor silt, friable, moderately to poorly consolidated, dry to damp, high plasticity when wetted
0.6	Split Spoon	70 feet – Same as above with 1- to 2-cm-across pale green reduction spots
		75 feet – Clayey sand, pale reddish brown (10 R 6/2), very fine to fine-grained, poorly sorted, micaceous, clay matrix, moderately to strongly consolidated, dry, noncarbonate cement, nonporous
		80 feet – Same as above

Hydrologists: CMP
Driller: Eades Drilling
Date Completed: 11/29/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

WT-1 COMPRESSOR STATION
Well Log: MW-4

DANIEL B. STEPHENS & ASSOCIATES, INC.
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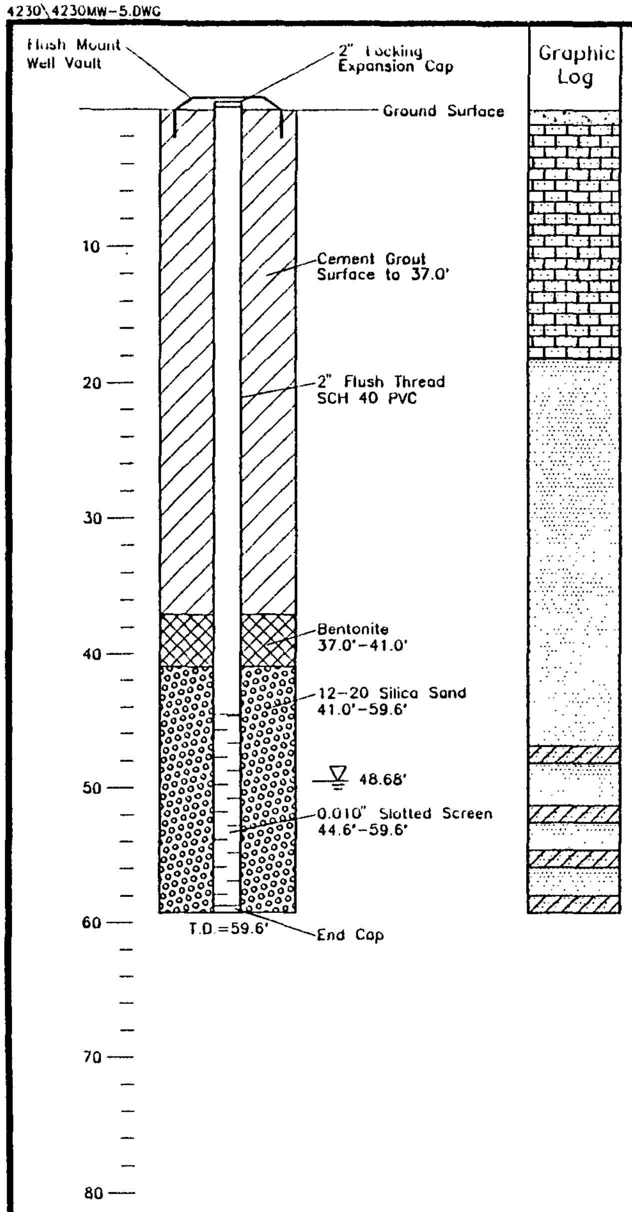
JN 4230

4230\4230MW-5.DWG



PID Reading (ppm)	Sampling Device	Comments and Lithology
-	Cuttings	1 foot - Gravelly sand with silt, pale brown (10 YR 6/3 SOIL), silt to gravel, poorly sorted, angular to subrounded clasts, 40% gravel, 50% sand, 10% silt and clay, unconsolidated, dry
0.6	Cuttings	5 feet - Caliche, grayish orange pink (10 R 8/2 RCK), 10-20% *very fine- to fine-grained sand in carbonate* matrix, poorly to moderately consolidated, dry
0.6	Cuttings	10 feet - Caliche, grayish orange pink (10 R 8/2 RCK), fine- to medium-grained sand, poorly sorted, subrounded grains, 40% sand in 60% carbonate matrix, poorly to moderately consolidated, dry
0.6	Split Spoon	15 feet - Caliche, moderate orange pink (10 R 7/4 RCK), very fine- to medium-grained, sand and carbonate grains, 10% quartz sand, 30% carbonate sand, 60% carbonate matrix, moderately to poorly consolidated, dry; 18', becomes reddish brown and sandier
3.0	Split Spoon	20 feet - Sandstone, moderate reddish orange (10 R 6/6 RCK), fine- to medium-grained, well sorted, subangular grains, 60% sand in 40% carbonate and silt matrix, strongly consolidated, dry
0.6	Split Spoon	25 feet - Sandstone, pale reddish brown (10 R 5/4), fine-grained, well sorted, subangular grains, 50% quartz, 35% feldspar, 15% lithic grains, strongly consolidated, noncarbonate cement, porous, damp
0.6	Split Spoon	30 feet - Sandstone, moderate reddish orange (10 R 6/6 RCK), very fine- to fine-grained, poorly to moderately sorted, subangular clasts, 65% quartz, 25% feldspar, 10% lithic grains, strongly to moderately consolidated, minor carbonate, porous, damp
1.8	Split Spoon	35 feet - Sandstone with silt, moderate reddish brown (10 R 4/6 RCK), very fine- to fine-grained, moderately to well sorted, subangular grains, moderately to strongly consolidated, noncarbonate cement, moist
1.8	Split Spoon	40 feet - Sandstone with silt, moderate reddish brown (10 4/6 RCK), very fine- to medium-grained, poorly sorted, subangular grains, 50% quartz, 35% feldspar, 15% lithic grains, strongly consolidated, carbonate cement, moist, porous
20.1	Split Spoon	47 feet - Sandstone with clay, moderate reddish grain (10 R 6/6 RCK), very fine- to fine-grained, moderately to poorly sorted, subangular grains, moderately to strongly consolidated, carbonate cement, white mottling and spots 0.5-1 cm across, friable thin clay laminae between friable sandstone partings, moist, strong hydrocarbon odor
1.8	Split Spoon	55 feet - Same as above except moist to saturated

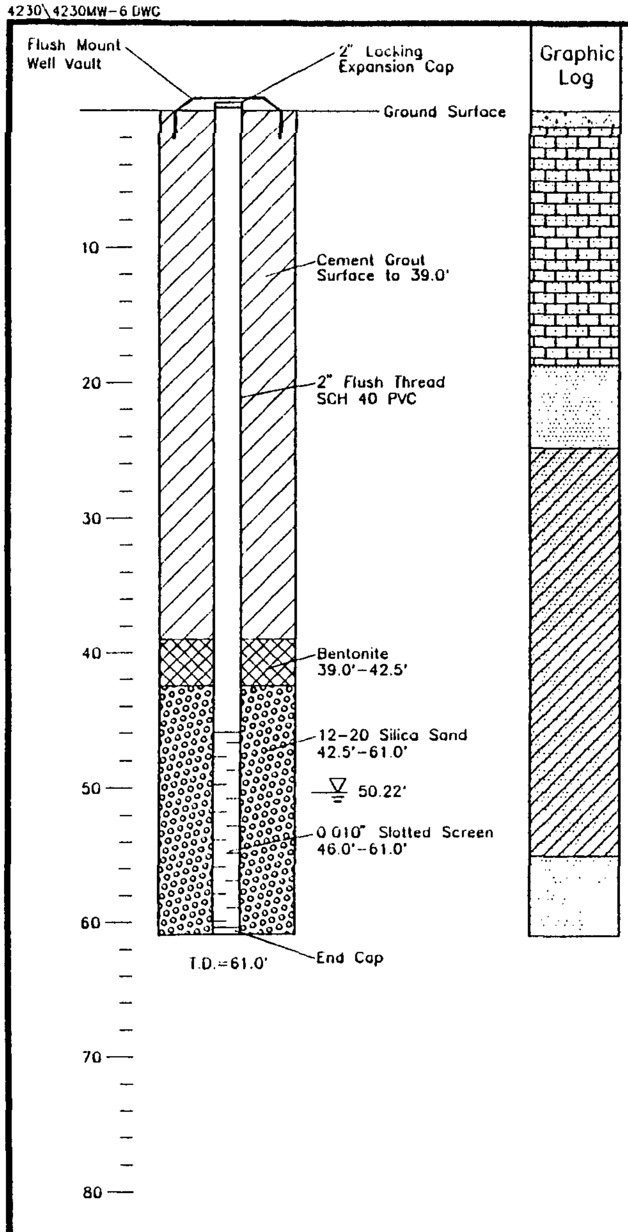
Hydrologists: CMP
Driller: Eades Drilling
Date Completed: 11/29/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

WT-1 COMPRESSOR STATION
Well Log: MW-5

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-95
JN 4230

4230\4230MW-6 DWG



PID Reading (ppm)	Sampling Device	Comments and Lithology
0.0	Cuttings	1 foot – Silty sand with gravel, reddish gray (5 YR 5/2 SOIL)
0.0	Cuttings	5 feet – Caliche, pinkish gray (5 YR 8/1 RCK), medium-grained, well sorted, rounded grains, 70% sand in 30% carbonate matrix, poorly to moderately consolidated, dry
0.0	Cuttings	10 feet – Same as above, grayish orange pink (5 YR 7/2 RCK)
1.1	Split Spoon	15 feet – Caliche, moderate orange pink (10 R 7/4 RCK), fine- to medium-grained, moderately sorted, subrounded grains, 60% sand in 40% carbonate matrix, moderately to strongly consolidated, dry
1.1	Split Spoon	20 feet – Sandstone, moderate *reddish orange* (10 R 6/6 RCK), *fine- to medium-grained, poorly sorted, angular* grains, 40% quartz, 40% feldspar, 20% lithic grains, in 10% silt and carbonate matrix, moderately to strongly consolidated
1.1	Split Spoon	25 feet – Silty sandstone, moderate reddish brown (10 R 4/6 RCK), very fine- to to medium-grained, poorly sorted, angular grains, 30% quartz, 40% feldspar, 30% lithic grains, in silty carbonate matrix, moderately to strongly consolidated, dry, porous
0.0	Split Spoon	30 feet – Sandstone with silt, moderate reddish brown (10 R 4/6 RCK), fine- to medium-grained, well sorted, subrounded to rounded grains, minor coarse sand, 60% quartz, 30% feldspar, 10% lithic grains, moderately to poorly consolidated, carbonate and silt matrix carbonate cement, damp, porous
0.0	Split Spoon	35 feet – Silty sand with mudstone gravels, predominatly yellowish gray (5 Y 8/1 RCK), fine- to medium-grained, moderately sorted, subrounded grains, reddish brown and olive gray stringers and gauls of mudstone, moderately consolidated, damp
0.0	Split Spoon	40 feet – Similar to above except sandstone is moderate reddish brown (10 R 4/6 RCK) with reddish brown mudstone and olive gray mottling comprised of silt and fine-grained sandstone
1.1	Split Spoon	48 feet – Silty sandstone with mudstone gravels, moderate reddish brown (10 R 4/6 RCK), medium-grained, moderately to poorly sorted, subrounded grains, strongly consolidated, no carbonate, nonporous, wet, mudstone gauls up to several cm across
–	Split Spoon	55 feet – Sandstone, moderate reddish brown, fine- to medium-grained, well sorted, subrounded grains, 70% quartz, 25% feldspar, 5% lithic grains, moderately to strongly consolidated, no carbonate, porous, saturated, minor clay matrix

Hydrologists: CMP
Driller: Eades Drilling
Date Completed: 11/28/94

Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

WT-1 COMPRESSOR STATION
Well Log: MW-6

DANIEL B. STEPHENS & ASSOCIATES, INC.
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JN 4230

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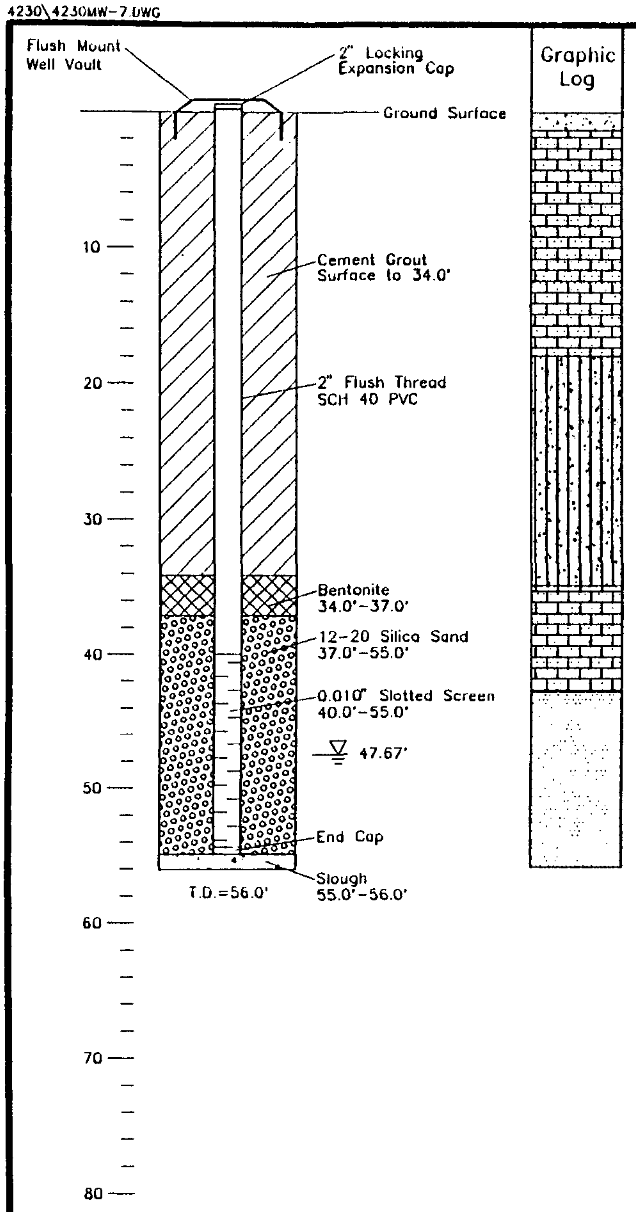


PID Reading (ppm)	Sampling Device	Comments and Lithology
	Cuttings	1 foot – Soil
1.4	Split Spoon	5 feet – Caliche, grayish pink (5 R 8/2 RCK), fine to medium sand in calcareous matrix, 60% sand, 40% matrix, poorly to moderately sorted, dry
1.4	Cuttings	10 feet – Same as above
2.4	Split Spoon	15 feet – Caliche, pinkish gray (5 YR 8/1 RCK), fine-grained, well sorted, rounded grains, 30% sand, in 70% matrix, moderately to poorly consolidated, dry
1.4	Cuttings	20 feet – Silty sand, moderate reddish brown (10 R 3/4 RCK), very fine- to medium-grained, poorly sorted, subangular grains, moderately consolidated, dry
1.4	Split Spoon	25 feet – Silty sand, moderate reddish brown (10 R 3/4 RCK), very fine- to medium-grained, poorly sorted, subangular grains, 60% quartz, 25% feldspar, 15% lithic grains, moderately consolidated, carbonate cement, dry, porous, gauls of mudstone
0.4	Cuttings	30 feet – Same as above
1.4	Cuttings Split Spoon	34 feet – Same as above 35 feet – Calcareous sandstone, grayish orange pink (10 R 8/2), medium-grained, well sorted, rounded grains, 80% sand in 20% carbonate matrix, strongly consolidated, dry, may be slough from higher up borehole
1.4	Split Spoon	40 feet – Calcareous sandstone, grayish orange pink (10 R 8/2), same as above, may be slough from higher up borehole
1.4	Split Spoon	45 feet – Sandstone, pale reddish brown (10 R 5/4 RCK), fine-grained, subangular grains, well sorted, strongly consolidated, carbonate cement, wet, porous
2.4	Split Spoon	50 feet – Sandstone, moderate reddish brown (10 R 3/4 RCK), fine-grained, moderately sorted, subangular grains, 65% quartz, 25% feldspar, 10% lithic grains, moderately to strongly consolidated, saturated

Hydrologists: CMP
Driller: Eades Drilling
Date Completed. 11/21/94

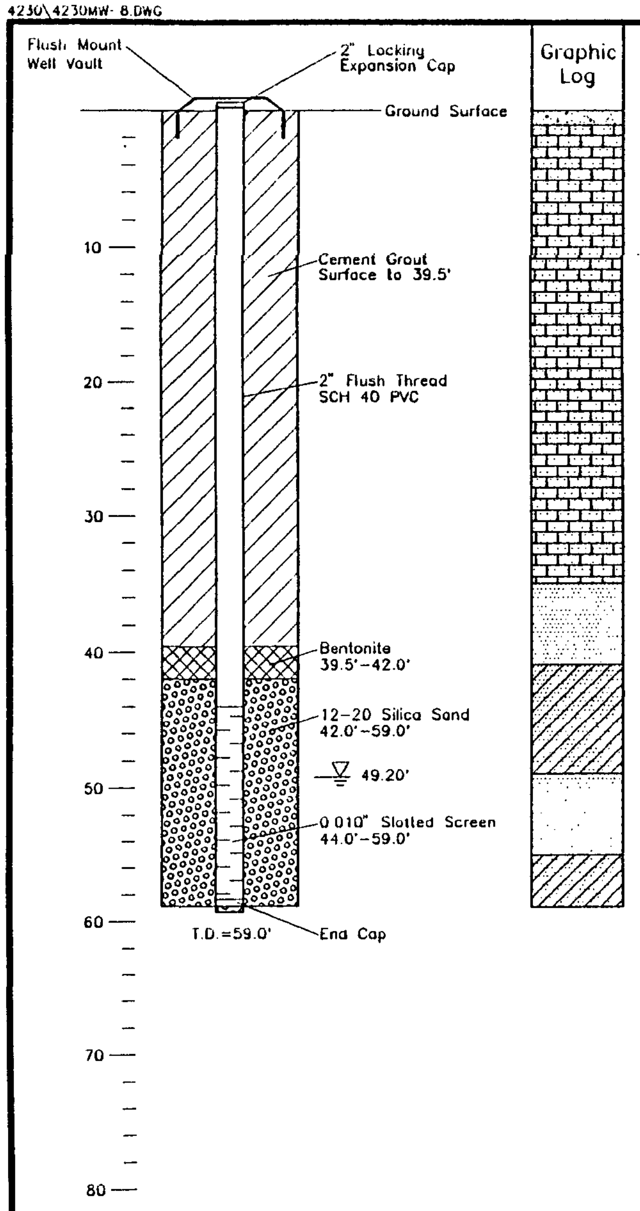
Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

WT-1 COMPRESSOR STATION

Well Log: MW-7

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-95
JN 4230

4230\4230MW- 8.DWG



PID Reading (ppm)	Sampling Device	Comments and Lithology
0.4	Cuttings	1 foot – Silty sand with gravel, very pale brown (10 YR 8/2 SOIL), fine silt to gravel, angular clasts, calcareous, dry
0.4	Split Spoon	5 feet – Caliche, very pale orange (10 YR 8/2 RCK), very fine-grained, well sorted, subangular to subrounded grains, 35% quartz, 35% feldspar, 30% calcareous matrix, no odor, strongly consolidated, dry
0.4	Cuttings	10 feet – Caliche, moderate orange pink (5 YR 8/4 RCK), same as above
0.4	Split Spoon	15 feet – Caliche, light brown (5 YR 6/4), very fine- to medium-grained, poorly sorted, subrounded grains, 35% quartz, 35% feldspar, 30% matrix (calcareous), moderately to well consolidated, dry
0.4	Cuttings	20 feet – Caliche, moderate orange pink (10 R 7/4), very fine- to medium-grained, poorly sorted, subrounded grains, 35% quartz, 35% feldspar, 30% matrix (calcareous), well consolidated, dry
0.4	Split Spoon	25 feet – Caliche, moderate reddish orange (10 R 6/6), very fine- to fine-grained, well sorted, subrounded grains, 35% quartz, 35% feldspar and lithic grains, 30% matrix (calcareous), strongly consolidated, slightly damp
0.4	Cuttings	30 feet – Caliche, light brown (5 YR 6/4), fine- to medium-grained, well sorted, 40% quartz, 20% feldspar, 10% lithic grains, 30% matrix (calcareous), consolidated and slightly damp
0.4	Split Spoon	35 feet – Sandstone, light brown (5 YR 6/4), fine- to medium-grained, well sorted, subrounded grains, 50% quartz, 20% feldspar, 10% lithic grains, 20% calcareous matrix, moderately consolidated, slight hydrocarbon odor, damp
0.4	Split Spoon	40 feet – Sandstone, pale reddish brown (10 R 5/4), fine- to medium-grained, poorly sorted, subangular to angular grains, 50% quartz, 20% feldspar, 10% lithic grains, slight hydrocarbon odor; also siltstone with very fine sand, moderate brown (5 YR 4/4), some mudstone layers, fine texture
0.4	Split Spoon	45 feet – Silty sandstone, light brown (5 YR 5/6), fine- to coarse-grained, poorly sorted, subangular to subrounded grains, calcareous matrix, 60% quartz, 30% feldspar and lithic grains, 10% matrix, very moist, poorly consolidated
	Cuttings	48 feet – Clayey sand, moderate reddish brown (10 R 4/6), very fine- to fine-grained, moist, medium plasticity
0.4	Split Spoon	50 feet – Sandstone with silt, very fine- to fine-grained, well sorted, 60% quartz, 30% feldspar, 10% calcareous matrix, moderately consolidated, moist
0.4	Cuttings	55 feet – Clayey sandstone, light brown (5 YR 5/6), very fine- to fine-grained, well sorted subangular grains, slightly to moderately plastic, slight hydrocarbon odor, damp
2.1	Cuttings	60 feet – Silty sandstone, light brown (5 YR 5/6), very fine- to fine-grained, well sorted, subrounded grains, 35% quartz, 35% feldspar, 30% silt, slightly calcareous

Hydrologists: RH
Driller: Eades Drilling
Date Completed: 11/20/94

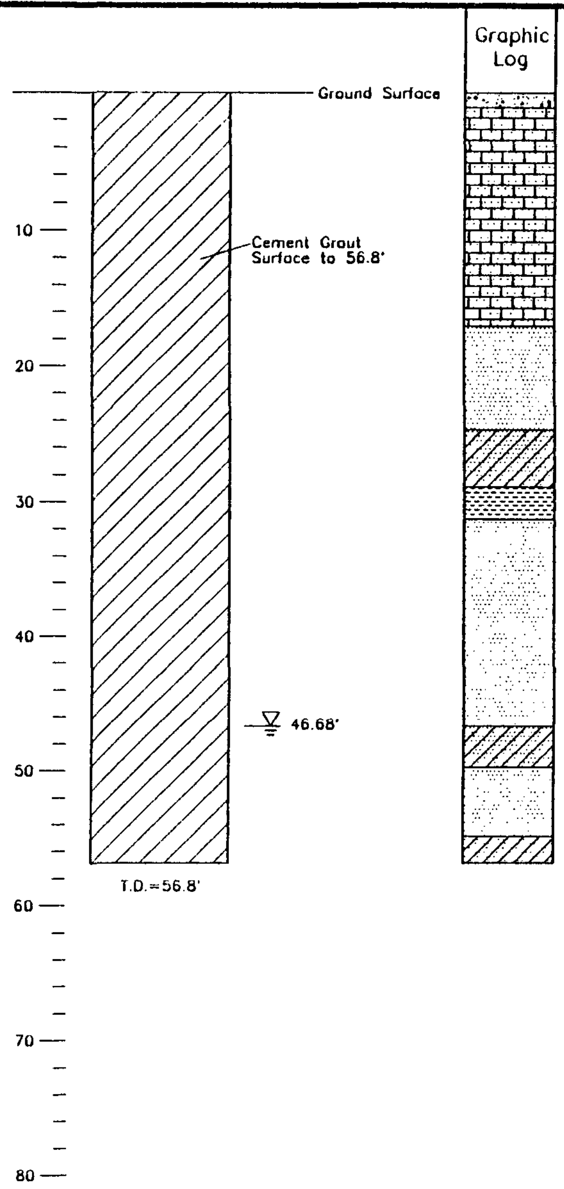
Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

WT-1 COMPRESSOR STATION

Well Log: MW-8

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-95
JN 4230

4230\4230SB-1.DWG



PID Reading (ppm)	Sampling Device	Comments and Lithology
-	Cuttings	1 foot – Silty sand with gravel, brown (7.5 YR 5/3), silt to gravel clasts, poorly sorted, angular clasts, unconsolidated, calcareous, dry
0.0	Split Spoon	5 feet – Caliche, very pale orange (10 YR 8/2), fine- to medium-grained, poorly sorted, subrounded grains, moderately consolidated, dry
0.4	Split Spoon	10 feet – Caliche, very pale orange (10 YR 8/2), very fine- to medium-grained, poorly sorted, subangular to subrounded grains, more consolidated than above, dry
0.4	Split Spoon	15 feet – Caliche, light brown (5 YR 6/4), medium- to fine-grained, well sorted, subrounded grains, moderately consolidated, dry
0.4	Split Spoon	20 feet – Calcareous sandstone, moderate reddish orange (10 R 6/2), coarse- to fine-grained, poorly sorted, subangula grains, strongly consolidated, damp, hydrocarbon odor
0.4	Split Spoon	25 feet – Silty sandstone, moderate reddish brown (10 R 4/6), medium- to fine-grained, well sorted, subrounded grains, moderately consolidated, damp
2.1	Split Spoon	30 feet – Siltstone and mudstone, moderate reddish brown (10 R 4/6 RCK), high plasticity, wet, no carbonate, poorly consolidated
1.2	Split Spoon	35 feet – Sandstone with silt, pale reddish brown (10 R 5/4), medium-grained, well sorted, poorly consolidated, no carbonate
0.4	Split Spoon	40 feet – Sandstone with silt, light brown (5 YR 5/6), coarse- to medium-grained, well sorted, poorly consolidated, calcareous matrix, hydrocarbon odor, damp
1.2	Split Spoon	47 feet – Silty sandstone, moderate brown (5 YR 5/6), medium- to coarse-grained, well sorted, poorly consolidated, no carbonate; at 47.5' there is a 1- to 2-foot-thick very moist clay layer with fine-grained sand
1.2	Split Spoon	50 feet – Sandstone with silt, moderate brown (5 YR 4/4), very fine-grained, well sorted, moderately consolidated, no carbonate, dry
-	Cuttings	55 feet – Silty sandstone, light brown (5 YR 5/6), very fine- to fine-grained, well sorted, calcareous, moist

Hydrologists: RH
Driller: Eades Drilling
Date Completed: 11/20/94

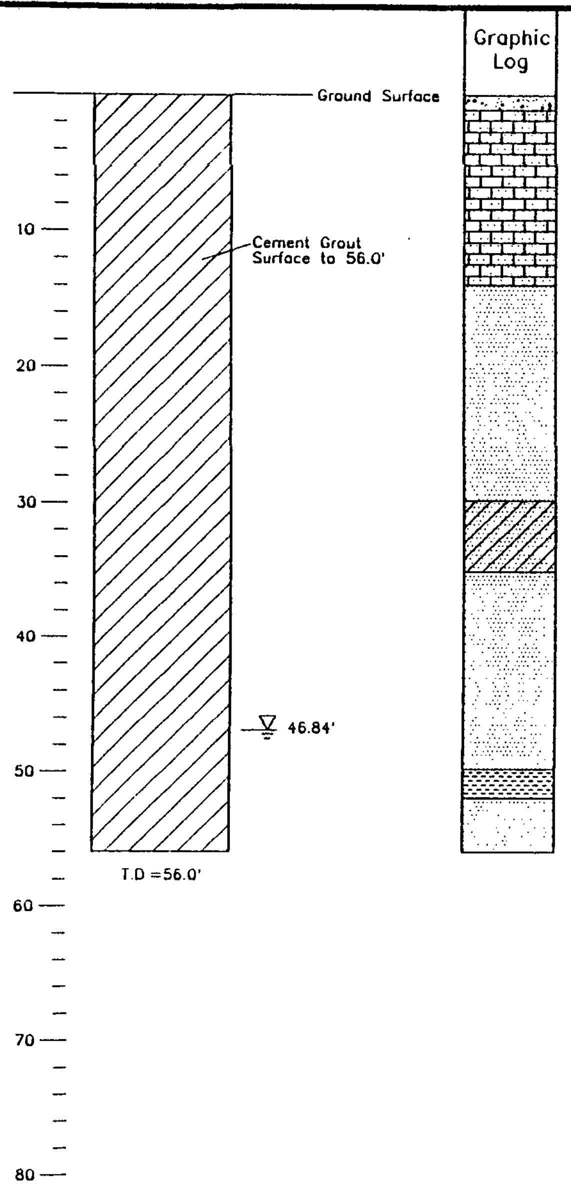
Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

WT-1 COMPRESSOR STATION

Boring Log: SB-1

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-95
JN 4230

4230\4230SB-2 DWG



PID Reading (ppm)	Sampling Device	Comments and Lithology
-	Cuttings	0.8 foot – Silty sand with gravel, light brownish gray (10 YR 6/2 SOIL), silt to small gravel, poorly sorted, unconsolidated (soil), calcareous, dry
1.1	Split Spoon	5 feet – Caliche, very pale orange (10 YR 8/2 RCK), fine-grained, well sorted, rounded grains, 80% sand, 20% carbonate matrix, matrix supported, poorly to moderately consolidated, dry
1.9	Split Spoon	10 feet – Same as above
1.1	Split Spoon	15 feet – Sandstone, moderate reddish brown (10 R 4/6 RCK), medium-grained, moderately sorted, subangular grains, matrix supported, carbonate and clay matrix, 85% sand, 15% matrix, poorly to moderately consolidated, damp
1.9	Split Spoon	20 feet – Sandstone, pale reddish brown (10 R 5/4 RCK), very fine- to fine-grained, well sorted, subangular grains, moderately to well consolidated, moist, no carbonate cement
-	Cuttings	23 feet – Brown to tan medium-grained sand (23-25')
2.7	Split Spoon	25 feet – Same as above, fine-grained, well sorted, 70% quartz, 25% feldspar, 5% lithic grains
1.1	Split Spoon	30 feet – Silty sandstone, pale reddish brown (10 R 5/4 RCK), very fine- to medium-grained, poorly sorted, subanglar grains, 60% quartz, 25% feldspar, 15% lithic grains, moderately to well consolidated, damp, carbonate cement
1.9	Split Spoon	35 feet – Sandstone, moderate brown (5 YR 4/4 RCK), very fine- to fine-grained, well sorted, subangular grains, 70% quartz, 20% feldspar, 10% lithic grains, moderately to well consolidated, minor carbonate cement, moist
1.9	Split Spoon	40 feet – Same as above
2.7	Split Spoon	45 feet – Same as above except wet; 46', encounter water
4.2	Split Spoon	48 feet – Same as above except saturated, some thin mudstone layers; 50'–52', mudstone layer
3.4	Cuttings	55 feet – Same as above except wet to moist

Hydrologists: CMP
Driller: Eades Drilling
Date Completed: 11/19/94

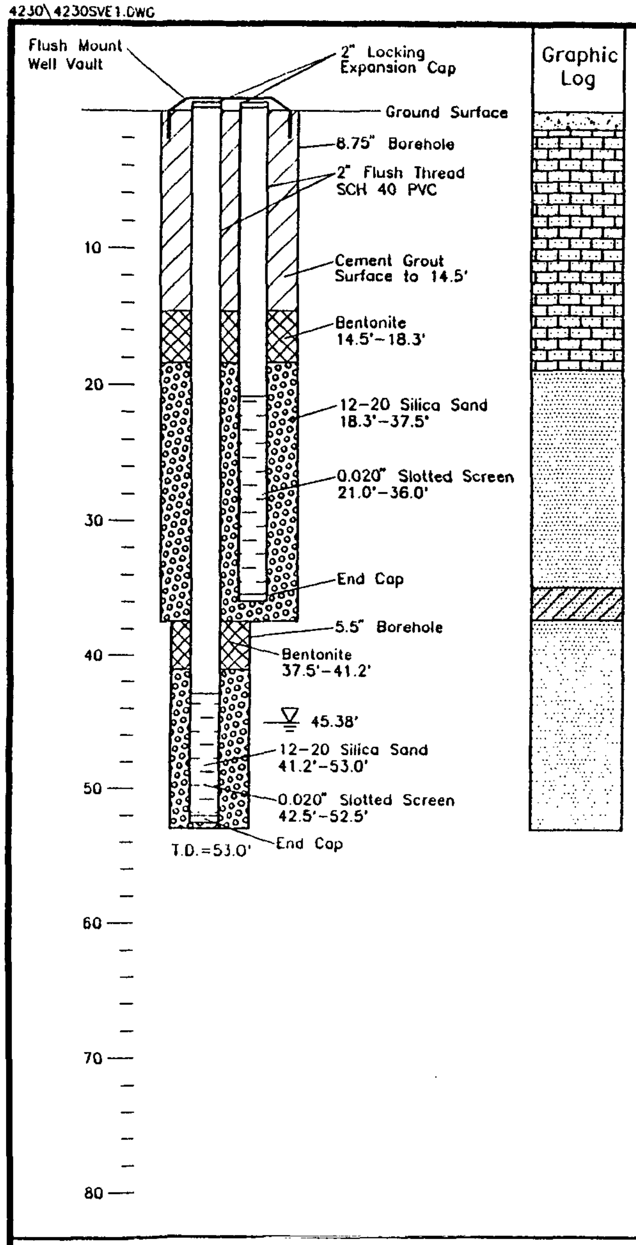
Drilling Method: Air Rotary
Bit Diameter: 5.5 In.

WT–1 COMPRESSOR STATION

Boring Log: SB-2

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-95
JN 4230

4230\4230SVE1.DWG



PID Reading (ppm)	Sampling Device	Comments and Lithology
-	Cuttings	1 foot – Silty sand with gravel, pale brown (10 YR 6/3 soil), silt to gravel, poorly sorted, angular grains, unconsolidated, dry
0.6	Split Spoon	5 feet – Caliche, grayish orange pink (5 YR 7/2 RCK), fine- to medium-grained, well sorted, rounded grains, 70% sand, 30% carbonate matrix, moderately to poorly consolidated, dry
1.9	Split Spoon	10 feet – Sand with silt, pale yellowish brown (gray) (10 YR 6/2 RCK), fine- to medium-grained, moderately sorted, subrounded grains, 95% quartz, 5% feldspar, 10% lithic grains, poorly consolidated, carbonate cement, damp, strong hydrocarbon odor, hydrocarbon staining
7.1	Split Spoon	15 feet – Caliche, light olive green (5 Y 6/1 RCK), very fine- to medium-grained, poorly sorted, subangular to rounded grains, 90% sand, 10% carbonate matrix, moderately consolidated, carbonate cement, damp, hydrocarbon staining and odor
29.2	Split Spoon	20 feet – Sand, light brown (5 YR 6/4 RCK), very fine- to medium-grained, poorly sorted, subrounded grains, 75% quartz, 20% feldspar, 5% lithic grains, poorly consolidated, carbonate cement, damp, hydrocarbon staining and odor
25.3	Split Spoon	25 feet – Sandstone, dark reddish brown (10 R 3/4 RCK), fine-grained, well sorted, rounded grains, 80% quartz, 5% feldspar, 15% lithic grains, poorly consolidated, minor carbonate, hydrocarbon staining and odor, moist
35.0	Split Spoon	30 feet – Same as above
85.0	Split Spoon	35 feet – Sandstone with clay, moderate reddish brown (10 R 4/6 RCK), clay to very fine-grained sand, poorly sorted, slight plasticity, poorly consolidated, carbonate cement, hydrocarbon odor, damp
33.1	Split Spoon	40 feet – Sandstone, pale reddish brown (10 R 5/4 RCK), fine- to medium-grained, well sorted, subangular to rounded grains, 60% quartz, 25% feldspar, 15% lithic grains, strongly consolidated, little carbonate, dry, porous
42.2	Split Spoon	45 feet – Same as above except fine-grained and moist, strong hydrocarbon odor below 44 feet
42.2	Split Spoon	50 feet – Sandstone, dark reddish brown (10 R 3/4 RCK), fine-grained, well sorted, subrounded grains, 50% quartz, 35% feldspar, 15% lithic grains, moderately to strongly consolidated, minor carbonate, wet, thin layer of clay near 50 feet

Hydrologists: CMP
Driller: Eades Drilling
Date Completed: 11/18/94

Drilling Method: Air Rotary
Bit Diameter: 8.75 In. to 37.5 Ft., 5.5 In. to T.D.

WT-1 COMPRESSOR STATION

Well Log: SVE-1

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-95
JN 4230

APPENDIX B

ANALYTICAL LABORATORY REPORTS FOR SOIL AND GROUND-WATER ANALYSES

Organic Analyses

Hall Environmental
Analysis Laboratory

Hall Environmental Analysis Laboratory
2403 San Mateo NE, Suite P-13
Albuquerque, NM 87110

12/1/94

Daniel B. Stephens and Associates, Inc.
6020 Academy NE, Suite 100
Albuquerque, NM 87109

Dear Mr. Bob Marley,

Enclosed are the results for the analyses that were requested. These were done according to EPA procedures or the equivalent.

Detection limits are determined by EPA methodology. Unless noted on sample page, all criteria for QA/QC acceptance levels fall within established parameters. These parameters are modeled from the EPA-600 14-79 019, March 1979, "Handbook for Analytical Quality Control in Water and Waste Water."

Please don't hesitate to contact me for any additional information or clarifications

Sincerely,

Scott Hall 12/5/94

Scott Hallenbeck, Lab Manager

Project: ENRON WT-1

Results for sample: MW-3

Date collected: 11/16/94	Date received: 11/18/94
Date extracted: 11/22/94	Date analyzed: 11/22/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	Heal #: 9411046-5
Project Manager: Bob Marley	Sampled by: RH/CP
Matrix: Aqueous	

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	5.0	0.5	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Total Xylenes	0.5	0.5	PPB (UG/L)

BFB (Surrogate) Recovery = 96 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 102 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 122 %

Dilution Factor = 1

Results for sample: MW-1

Date collected: 11/15/94	Date received: 11/18/94
Date extracted: NA	Date analyzed: 11/21/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	Heal #: 9411046-6
Project Manager: Bob Marley	Sampled by: RH/CP
Matrix: Aqueous	

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	12	5.0	PPB (UG/L)
Bromodichloromethane	nd	2.0	PPB (UG/L)
Bromoform	nd	10	PPB (UG/L)
Bromomethane	nd	10	PPB (UG/L)
Carbon Tetrachloride	nd	2.0	PPB (UG/L)
Chlorobenzene	nd	2.0	PPB (UG/L)
Chloroethane	nd	2.0	PPB (UG/L)
Chloroform	nd	2.0	PPB (UG/L)
Chloromethane	nd	2.0	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	10	PPB (UG/L)
Dibromochloromethane	nd	2.0	PPB (UG/L)
1,3-Dichlorobenzene	nd	2.0	PPB (UG/L)
1,2-Dichlorobenzene	nd	2.0	PPB (UG/L)
1,4-Dichlorobenzene	nd	2.0	PPB (UG/L)
Dichlorodifluoromethane	nd	2.0	PPB (UG/L)
1,1-Dichloroethane	690	2.0	PPB (UG/L)
1,2-Dichloroethane	6.7	2.0	PPB (UG/L)
1,1-Dichloroethene	2.2	2.0	PPB (UG/L)
1,2-Dichloroethene (Cis)	2.8	2.0	PPB (UG/L)
1,2-Dichloroethene (Trans)	nd	2.0	PPB (UG/L)
1,2-Dichloropropane	nd	2.0	PPB (UG/L)
cis-1,3-Dichloropropene	nd	2.0	PPB (UG/L)
trans-1,3-Dichloropropene	nd	2.0	PPB (UG/L)
Ethylbenzene	10	5.0	PPB (UG/L)
Dichloromethane	420	20	PPB (UG/L)
1,1,2,2-Tetrachloroethane	nd	2.0	PPB (UG/L)
Tetrachloroethene (PCE)	16	2.0	PPB (UG/L)
Toluene	100	5.0	PPB (UG/L)
1,1,1-Trichloroethane	nd	2.0	PPB (UG/L)
1,1,2-Trichloroethane	nd	2.0	PPB (UG/L)
Trichloroethene (TCE)	28	2.0	PPB (UG/L)
Vinyl Chloride	nd	2.0	PPB (UG/L)
Xylenes (Total)	110	5.0	PPB (UG/L)
Trichlorofluoromethane	nd	2.0	PPB (UG/L)

BFB (Surrogate) Recovery = 93 %
BCM (Surrogate) Recovery = 97 %
Dilution Factor = 10

Results for sample: MW-1

Date collected: 11/15/94 Date received: 11/18/94
Date extracted: 11/22/94 Date analyzed: 11/30/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: 9411046-6
Project Manager: Bob Marley Sampled by: RH/CP
Matrix: Aqueous

Test: **EPA 8100**

Compound	Result	Detection limit	Units
Naphthalene	7.0	5.0	PPB (UG/L)
2-Methyl Naphthalene	nd	5.0	PPB (UG/L)
1-Methyl Naphthalene	nd	5.0	PPB (UG/L)
Acenaphthalene	nd	5.0	PPB (UG/L)
Acenaphthene	nd	5.0	PPB (UG/L)
Fluorene	nd	5.0	PPB (UG/L)
Phenanthrene	nd	5.0	PPB (UG/L)
Anthracene	nd	5.0	PPB (UG/L)
Fluoranthrene	nd	0.5	PPB (UG/L)
Pyrene	nd	0.5	PPB (UG/L)
Benzo (a) anthracene	nd	0.5	PPB (UG/L)
Chrysene	nd	0.5	PPB (UG/L)
Benzo (b) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (k) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (a) pyrene	nd	0.5	PPB (UG/L)
Indeno (1.2.3-cd) pyrene	nd	1.0	PPB (UG/L)
Dibenzo (a,h) anthracene	nd	1.0	PPB (UG/L)
Benzo (g,h.i) perylene	nd	1.0	PPB (UG/L)

Hexadecane (Surrogate) Recovery = 80 %

Dilution Factor = 1

Results for sample: MW-1

Date collected: 11/15/94	Date received: 11/18/94
Date extracted: 11/22/94	Date analyzed: 11/21,22/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	Heal #: 9411046-6
Project Manager: Bob Marley	Sampled by: RH/CP
Matrix: Aqueous	

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	1.6	0.1	PPM (MG/L)

BFB (Surrogate) Recovery = 103 %

Dilution Factor = 2

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	16*	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 120 %

Dilution Factor = 1

*C14-C26 non-characteristic diesel range hydrocarbons

Results for sample: Trip Blank

Date collected: NA	Date received: 11/18/94
Date extracted: NA	Date analyzed: 11/18/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9411046-7
Project Manager: Bob Marley	Sampled by: RH/CP
Matrix: Aqueous	

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	nd	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1.3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethane	nd	0.2	PPB (UG/L)
1.2-Dichloroethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethene	nd	0.2	PPB (UG/L)
1.2-Dichloroethene (Cis)	nd	0.2	PPB (UG/L)
1.2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1.2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1.1.2.2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	nd	0.2	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
1.1.1-Trichloroethane	nd	0.2	PPB (UG/L)
1.1.2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	nd	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	nd	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 90 %
BCM (Surrogate) Recovery = 101 %
Dilution Factor = 1

Results for sample: Trip Blank

Date collected: NA	Date received: 11/18/94
Date extracted: 11/22/94	Date analyzed: 11/18,22/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	Heal #: 9411046-7
Project Manager: Bob Marley	Sampled by: RH/CP
Matrix: Aqueous	

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 102 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 131 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: NA Date analyzed: 11/18/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: RB 11/18
Project Manager: Bob Marley
Matrix: Aqueous

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	nd	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1.3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethane	nd	0.2	PPB (UG/L)
1.2-Dichloroethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethene	nd	0.2	PPB (UG/L)
1.2-Dichloroethene (Cis)	nd	0.2	PPB (UG/L)
1.2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1.2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1.1,2.2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	nd	0.2	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
1.1.1-Trichloroethane	nd	0.2	PPB (UG/L)
1.1.2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	nd	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	nd	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 89 %
BCM (Surrogate) Recovery = 80 %
Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 11/22/94 Date analyzed: 11/29/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 11/22
Project Manager: Bob Marley
Matrix: Aqueous

Test: EPA 8100

Compound	Result	Detection limit	Units
Naphthalene	nd	0.5	PPB (UG/L)
2-Methyl Naphthalene	nd	0.5	PPB (UG/L)
1-Methyl Naphthalene	nd	0.5	PPB (UG/L)
Acenaphthalene	nd	0.5	PPB (UG/L)
Acenaphthene	nd	0.5	PPB (UG/L)
Fluorene	nd	0.5	PPB (UG/L)
Phenanthrene	nd	0.5	PPB (UG/L)
Anthracene	nd	0.5	PPB (UG/L)
Fluoranthrene	nd	0.5	PPB (UG/L)
Pyrene	nd	0.5	PPB (UG/L)
Benzo (a) anthracene	nd	0.5	PPB (UG/L)
Chrysene	nd	0.5	PPB (UG/L)
Benzo (b) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (k) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (a) pyrene	nd	0.5	PPB (UG/L)
Indeno (1,2,3-cd) pyrene	nd	1.0	PPB (UG/L)
Dibenzo (a,h) anthracene	nd	1.0	PPB (UG/L)
Benzo (g,h,i) perylene	nd	1.0	PPB (UG/L)

Hexadecane (Surrogate) Recovery = 81 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 11/22/94 Date analyzed: 11/22/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 11/22
Project Manager: Bob Marley
Matrix: Aqueous

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 98 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 125 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 11/21,22/94 Date analyzed: 11/22,23/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 11/21,22
Project Manager: Bob Marley
Matrix: Non-Aqueous

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 87 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	10	PPM (MG/KG)

BFB (Surrogate) Recovery = 104 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	10	PPM (MG/KG)

DNOP (Surrogate) Recovery = 97 %

Dilution Factor = 1

Results for QC: Matrix Spike / Matrix Spike Dup

Date extracted: NA	Date analyzed: 11/18/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9411045-1 MS/MSD
Project Manager: Bob Marley	
Matrix: Aqueous	Units: PPB (UG/L)

Test: EPA 8010/8020

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Chlorobenzene	<0.2	20.0	20.0	100	20.4	102	2
Ethylbenzene	<0.5	20.0	19.8	99	20.3	102	2
1,1-DCE	<0.2	20.0	18.8	94	19.8	99	5
Trans-1,2-DCE	<0.2	20.0	20.3	102	20.8	104	2
Carbon Tetrachloride	<0.2	20.0	20.7	104	20.8	104	0
1,2-DCA	<0.2	20.0	22.6	113	22.5	113	0
1,2-Dichloro-propane	<0.2	20.0	20.3	102	21.3	107	5
1,1,2-TCA	<0.2	20.0	21.1	106	20.8	104	1
PCE	<0.2	20.0	20.8	104	21.1	106	1
1,3-Dichloro-benzene	<0.2	20.0	18.0	90	20.2	101	12
1,4-Dichloro-benzene	<0.2	20.0	17.6	88	20.3	102	14

Results for QC: Blank Spike/Blank Spike Dup

Date extracted: 11/22/94 Date analyzed: 11/30/94

Client: Daniel B. Stephens and Associates, Inc.

Project Name: ENRON WT-1 HEAL #: BS/BSD 11/22

Project Manager: Bob Marley

Matrix: Aqueous Units: PPB (UG/L)

Test: EPA 8100

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
Naphthalene	<0.5	10.0	7.3	73	6.9	69	6
Acenaphthylene	<0.5	10.0	7.6	76	7.9	79	4
Acenaphthene	<0.5	10.0	7.8	78	7.8	78	0
Flourene	<0.5	10.0	8.3	83	8.0	80	4
Phenanthrene	<0.5	10.0	9.5	95	9.7	97	2
Anthracene	<0.5	10.0	9.1	91	9.0	90	1
Pyrene	<0.5	10.0	9.2	92	9.1	91	1
Benzo(a)pyrene	<0.5	10.0	9.3	93	9.4	94	1
Benzo(g,h,i)-perylene	<1.0	10.0	10.1	101	10.0	100	1

Results for QC: Matrix Spike/ Matrix Spike Dup
Blank Spike / Blank Spike Dup

Date extracted: 11/21,23/94 Date analyzed: 11/22,23/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: BS/BSD 11/21
Project Manager: Bob Marley 9411039-4 MS/MSD
Matrix: Aqueous Units: PPM (MG/L)

Test: EPA 8020

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Benzene	<0.5	20.0	22.7	114	21.5	108	5
Toluene	<0.5	20.0	21.3	107	20.6	103	3
Ethylbenzene	<0.5	20.0	20.1	101	19.1	95	5
Total Xylenes	<0.5	60.0	59.7	100	57.0	95	5

Test: EPA 504.1

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
EDB	<0.01	0.67	0.60	90	0.57	85	5

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
Gasoline	<0.05	0.50	0.44	89	0.43	87	2

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
Diesel	<1.0	5.4	5.9	109	5.5	102	7

Results for QC: Matrix Spike / Matrix Spike Dup

Date extracted: 11/17,22/94 Date analyzed: 11/18,23/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9411044-4 MS/MSD
Project Manager: Bob Marley BS/BSD 11/22
Matrix: Non-Aqueous Units: PPM (MG/KG)

Test: EPA 8020

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Benzene	<0.05	1.00	0.98	98	0.94	94	4
Toluene	<0.05	1.00	1.02	102	0.99	99	3
Ethylbenzene	<0.05	1.00	0.92	92	0.94	94	2
Total Xylenes	<0.05	3.00	2.88	96	2.93	98	2

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Gasoline	<10	50	43	87	44	88	2

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Diesel	<5.0	54	57	106	59	109	3

CHAIN-OF-CUSTODY RECORD

HALL ENVIRONMENTAL ANALYSIS LABORATORY
2403 San Mateo NE, Suite P-13
Albuquerque, New Mexico 87110
505.880.1803

Client: Daniel B. Stephens + Assoc.

Address: 6020 Academy NE
Abq. nm 87110

Phone #: 822-9400

Fax #: 822-8877

Project Name: Enron WT-1

Project #: 4230

Project Manager: Bob Marley

Sampler: RH/CP

Samples Cold? ☒ Yes ☐ No

ANALYSIS REQUEST

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative			HEAL No.	BTEX (Method 602/8020)	BTEX + MTBE (602/8020)	TPH Method 8015 MOD (Gas/Diesel)	BTEX + TPH + MTBE (Gasoline Only)	BTEX + MTBE + TPH (Gas + Diesel)	TPH (Method 418.1)	601/602 Volatiles Purgeable Halo-carbons 8010	EDB (Method 504.1)	EDC	610 (PNA or PAH) 8100				Air Bubbles or Headspace (Y or N)
					HgCl2	HCl	Other															
11/16/94	1130	soiL	mw-13 (52.5')	1-250mL	→	—	—	9411046-1	X		X											N
11/16/94	1650	soiL	mw-12 (47.0')	1-250mL	—	—	—	-2	X		X											N
11/17/94	1525	soiL	mw-10 (41.5')	1-250mL	—	—	—	-3	X		X											N
11/17/94	1440	H2O	mw-12	6-40mL	X	[illegible]		-4	X		X				X							N
11/16/94	1010	H2O	mw-3	~~4-40mL~~	X			-5	X		X											N
11/15/94	1545	H2O	mw-1	[illegible]	X			-6	X		X				X							N
11/[illegible]/94	1635	H2O	Trip Blank	2-40mL	X			-7	X		X				X							N
11/17/94	1600	soiL	mw-10 (49.0')	1-~~250mL~~	—	—	—	-8	X		X											N
11/15/94	1545	H2O	mw-1	4-500mL	—	—	—	-6										X				N

Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)
11/18	11:10		Theresa Lowe
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)

Remarks:

Hall Environmental
Analysis Laboratory

Hall Environmental Analysis Laboratory
2403 San Mateo NE, Suite P-13
Albuquerque, NM 87110

12/05/94

Daniel B. Stephens and Associates, Inc.
6020 Academy NE, Suite 100
Albuquerque, NM 87109

Dear Mr. Bob Marley,

Enclosed are the results for the analyses that were requested. These were done according to EPA procedures or the equivalent.

Detection limits are determined by EPA methodology. Unless noted on sample page, all criteria for QA/QC acceptance levels fall within established parameters. These parameters are modeled from the EPA-600 14-79 019, March 1979, "Handbook for Analytical Quality Control in Water and Waste Water."

Please don't hesitate to contact me for any additional information or clarifications

Sincerely,

Scott Hall 12/5/94

Scott Hallenbeck, Lab Manager

Project: ENRON WT-1

Results for sample: Dup-1

Date collected: NA
Date received: 11/20/94
Date extracted: NA
Date analyzed: 11/21/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1
Heal #: 9411052-3
Project Manager: Bob Marley
Sampled by: Rene Hill
Matrix: Aqueous

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	12	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	40	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1.3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethane	100	0.2	PPB (UG/L)
1.2-Dichloroethane	5.6	0.2	PPB (UG/L)
1.1-Dichloroethene	0.9	0.2	PPB (UG/L)
1.2-Dichloroethene (Cis)	23	0.2	PPB (UG/L)
1.2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1.2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	4.9	0.5	PPB (UG/L)
Dichloromethane	950	2.0	PPB (UG/L)
1.1.2.2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	5.0	0.2	PPB (UG/L)
Toluene	20	0.5	PPB (UG/L)
1.1.1-Trichloroethane	7.2	0.2	PPB (UG/L)
1.1.2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	19	0.2	PPB (UG/L)
Vinyl Chloride	1.0	0.2	PPB (UG/L)
Xylenes (Total)	28	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 95 %
BCM (Surrogate) Recovery = 106 %
Dilution Factor = 1

Results for sample: Dup-1

Date collected: NA	Date received: 11/20/94
Date extracted: 11/21,23/94	Date analyzed: 11/21,23,12/2/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	Heal #: 9411052-3
Project Manager: Bob Marley	Sampled by: Rene Hill
Matrix: Aqueous	

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	0.97	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 105 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	3.2 *	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 111 %

Dilution Factor = 1

* C-14-C26 non-characteristic diesel range H-C

Results for sample: Dup-1

Date collected: NA	Date received: 11/20/94
Date extracted: 11/22/94	Date analyzed: 11/30/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	Heal #: 9411052-3
Project Manager: Bob Marley	Sampled by: Rene Hill
Matrix: Aqueous	

Test: EPA 8100

Compound	Result	Detection limit	Units
Naphthalene	nd	0.5	PPB (UG/L)
2-Methyl Naphthalene	nd	0.5	PPB (UG/L)
1-Methyl Naphthalene	nd	0.5	PPB (UG/L)
Acenaphthalene	nd	0.5	PPB (UG/L)
Acenaphthene	nd	0.5	PPB (UG/L)
Fluorene	nd	0.5	PPB (UG/L)
Phenanthrene	nd	0.5	PPB (UG/L)
Anthracene	nd	0.5	PPB (UG/L)
Fluoranthrene	nd	0.5	PPB (UG/L)
Pyrene	nd	0.5	PPB (UG/L)
Benzo (a) anthracene	nd	0.5	PPB (UG/L)
Chrysene	nd	0.5	PPB (UG/L)
Benzo (b) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (k) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (a) pyrene	nd	0.5	PPB (UG/L)
Indeno (1,2,3-cd) pyrene	nd	1.0	PPB (UG/L)
Dibenzo (a,h) anthracene	nd	1.0	PPB (UG/L)
Benzo (g,h,i) perylene	nd	1.0	PPB (UG/L)

Hexadecane (Surrogate) Recovery = 86 %

Dilution Factor = 1

Results for sample: SVE-1-MW

Date collected: 11/19/94 Date received: 11/20/94
Date extracted: NA Date analyzed: 11/21/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9411052-4
Project Manager: Bob Marley Sampled by: Rene Hill
Matrix: Aqueous

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	12	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	35	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1,3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethane	120	0.2	PPB (UG/L)
1,2-Dichloroethane	5.3	0.2	PPB (UG/L)
1,1-Dichloroethene	1.0	0.2	PPB (UG/L)
1,2-Dichloroethene (Cis)	20	0.2	PPB (UG/L)
1,2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1,2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	4.6	0.5	PPB (UG/L)
Dichloromethane	900	2.0	PPB (UG/L)
1,1,2,2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	4.6	0.2	PPB (UG/L)
Toluene	18	0.5	PPB (UG/L)
1,1,1-Trichloroethane	6.8	0.2	PPB (UG/L)
1,1,2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	16	0.2	PPB (UG/L)
Vinyl Chloride	1.2	0.2	PPB (UG/L)
Xylenes (Total)	15	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 96 %
BCM (Surrogate) Recovery = 111 %
Dilution Factor = 1

Results for sample: SVE-1-MW

Date collected: 11/19/94
Date received: 11/20/94
Date extracted: 11/21,23/94
Date analyzed: 11/21,23,12/2/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1
HEAL #: 9411052-4
Project Manager: Bob Marley
Sampled by: Rene Hill
Matrix: Aqueous

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	0.98	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 104 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	3.5 *	<1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 124 %

Dilution Factor = 1

*C14-C26 non-characteristic diesel range H-C

Results for sample: SVE-1-MW

Date collected: 11/19/94	Date received: 11/20/94
Date extracted: 11/22/94	Date analyzed: 11/30/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9411052-4
Project Manager: Bob Marley	Sampled by: Rene Hill
Matrix: Aqueous	

Test: EPA 8100

Compound	Result	Detection limit	Units
Naphthalene	nd	0.5	PPB (UG/L)
2-Methyl Naphthalene	nd	0.5	PPB (UG/L)
1-Methyl Naphthalene	nd	0.5	PPB (UG/L)
Acenaphthalene	nd	0.5	PPB (UG/L)
Acenaphthene	nd	0.5	PPB (UG/L)
Fluorene	nd	0.5	PPB (UG/L)
Phenanthrene	nd	0.5	PPB (UG/L)
Anthracene	nd	0.5	PPB (UG/L)
Fluoranthrene	nd	0.5	PPB (UG/L)
Pyrene	nd	0.5	PPB (UG/L)
Benzo (a) anthracene	nd	0.5	PPB (UG/L)
Chrysene	nd	0.5	PPB (UG/L)
Benzo (b) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (k) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (a) pyrene	nd	0.5	PPB (UG/L)
Indeno (1,2,3-cd) pyrene	nd	1.0	PPB (UG/L)
Dibenzo (a.h) anthracene	nd	1.0	PPB (UG/L)
Benzo (g,h.i) perylene	nd	1.0	PPB (UG/L)

Hexadecane (Surrogate) Recovery = 59 %

Dilution Factor = 1

Results for sample: SB-2

Date collected: 11/19/94 Date received: 11/20/94
Date extracted: NA Date analyzed: 11/21/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9411052-5
Project Manager: Bob Marley Sampled by: Rene Hill
Matrix: Aqueous

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	24	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	2.2	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1.3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethane	21	0.2	PPB (UG/L)
1.2-Dichloroethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethene	1.8	0.2	PPB (UG/L)
1.2-Dichloroethene (Cis)	0.3	0.2	PPB (UG/L)
1.2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1.2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	3.2	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1.1.2.2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	nd	0.2	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
1.1.1-Trichloroethane	nd	0.2	PPB (UG/L)
1.1.2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	8.4	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	0.7	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 93 %
BCM (Surrogate) Recovery = 88 %
Dilution Factor = 1

Results for sample: SB-2

Date collected: 11/19/94 Date received: 11/20/94
Date extracted: 11/21,23/94 Date analyzed: 11/21,23,30/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9411052-5
Project Manager: Bob Marley Sampled by: Rene Hill
Matrix: Aqueous

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	0.16	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 107 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	1.5*	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 118 %

Dilution Factor = 1

* C-14-C26 Non-characteristic diesel range hydrocarbons

Results for sample: SB-2

Date collected: 11/19/94	Date received: 11/20/94
Date extracted: 11/22/94	Date analyzed: 11/30/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9411052-5
Project Manager: Bob Marley	Sampled by: Rene Hill
Matrix: Aqueous	

Test: EPA 8100

Compound	Result	Detection limit	Units
Naphthalene	nd	0.5	PPB (UG/L)
2-Methyl Naphthalene	2.2	0.5	PPB (UG/L)
1-Methyl Naphthalene	1.0	0.5	PPB (UG/L)
Acenaphthalene	nd	0.5	PPB (UG/L)
Acenaphthene	nd	0.5	PPB (UG/L)
Fluorene	0.9	0.5	PPB (UG/L)
Phenanthrene	nd	0.5	PPB (UG/L)
Anthracene	nd	0.5	PPB (UG/L)
Fluoranthrene	nd	0.5	PPB (UG/L)
Pyrene	nd	0.5	PPB (UG/L)
Benzo (a) anthracene	nd	0.5	PPB (UG/L)
Chrysene	nd	0.5	PPB (UG/L)
Benzo (b) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (k) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (a) pyrene	nd	0.5	PPB (UG/L)
Indeno (1,2,3-cd) pyrene	nd	1.0	PPB (UG/L)
Dibenzo (a,h) anthracene	nd	1.0	PPB (UG/L)
Benzo (g,h,i) perylene	nd	1.0	PPB (UG/L)

Hexadecane (Surrogate) Recovery = 69 %

Dilution Factor = 1

Results for sample: Trip Blank

Date collected: NA	Date received: 11/20/94
Date extracted: NA	Date analyzed: 11/21/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	Heal #: 9411052-6
Project Manager: Bob Marley	Sampled by: Rene Hill
Matrix: Aqueous	

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	nd	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1.3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethane	nd	0.2	PPB (UG/L)
1.2-Dichloroethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethene	nd	0.2	PPB (UG/L)
1.2-Dichloroethene (Cis)	nd	0.2	PPB (UG/L)
1.2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1.2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1.1.2.2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	nd	0.2	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
1.1.1-Trichloroethane	nd	0.2	PPB (UG/L)
1.1.2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	nd	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	nd	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 89 %
BCM (Surrogate) Recovery = 88 %
Dilution Factor = 1

Results for sample: Trip Blank

Date collected: NA	Date received: 11/20/94
Date extracted: NA	Date analyzed: 11/21,23,30/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	Heal #: 9411052-6
Project Manager: Bob Marley	Sampled by: Rene Hill
Matrix: Aqueous	

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 101 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 113 %

Dilution Factor = 1

Results for sample: SVE-1 (30')

Date collected: 11/18/94
Date received: 11/20/94
Date extracted: 11/22/94
Date analyzed: 11/23,29/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1
HEAL #: 9411052-9
Project Manager: Bob Marley
Sampled by: NA
Matrix: Non-aqueous

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	140	25	PPM (MG/KG)

BFB (Surrogate) Recovery = ** %

Dilution Factor = 5

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	640*	50	PPM (MG/KG)

DNOP (Surrogate) Recovery = ** %

Dilution Factor = 10

* Motor oil Range H-C @ approximately 33,000 MG/KG

** Surrogate unrecoverable due to matrix interference and sample dilution.

Results for sample: SVE-1 (30')

Date collected: 11/18/94 Date received: 11/20/94
Date extracted: 11/22/94 Date analyzed: 11/30/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9411052-9
Project Manager: Bob Marley Sampled by: Rene Hill
Matrix: Non-aqueous

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.1	PPM (MG/KG)
Bromodichloromethane	nd	0.02	PPM (MG/KG)
Bromoform	nd	0.1	PPM (MG/KG)
Bromomethane	nd	0.1	PPM (MG/KG)
Carbon Tetrachloride	nd	0.02	PPM (MG/KG)
Chlorobenzene	nd	0.02	PPM (MG/KG)
Chloroethane	nd	0.02	PPM (MG/KG)
Chloroform	nd	0.02	PPM (MG/KG)
Chloromethane	nd	0.02	PPM (MG/KG)
2-Chloroethylvinyl Ether	nd	0.1	PPM (MG/KG)
Dibromochloromethane	nd	0.02	PPM (MG/KG)
1.3-Dichlorobenzene	nd	0.02	PPM (MG/KG)
1.2-Dichlorobenzene	nd	0.02	PPM (MG/KG)
1.4-Dichlorobenzene	nd	0.02	PPM (MG/KG)
Dichlorodifluoromethane	nd	0.02	PPM (MG/KG)
1.1-Dichloroethane	0.4	0.02	PPM (MG/KG)
1.2-Dichloroethane	nd	0.02	PPM (MG/KG)
1.1-Dichloroethene	nd	0.02	PPM (MG/KG)
1.2-Dichloroethene (Cis)	nd	0.02	PPM (MG/KG)
1.2-Dichloroethene (Trans)	nd	0.02	PPM (MG/KG)
1.2-Dichloropropane	nd	0.02	PPM (MG/KG)
cis-1.3-Dichloropropene	nd	0.02	PPM (MG/KG)
trans-1.3-Dichloropropene	nd	0.02	PPM (MG/KG)
Ethylbenzene	0.13	0.1	PPM (MG/KG)
Dichloromethane	nd	0.2	PPM (MG/KG)
1.1.2.2-Tetrachloroethane	nd	0.02	PPM (MG/KG)
Tetrachloroethene (PCE)	8.2	0.02	PPM (MG/KG)
Toluene	0.08	0.1	PPM (MG/KG)
1.1.1-Trichloroethane	7.3	0.02	PPM (MG/KG)
1.1.2-Trichloroethane	nd	0.02	PPM (MG/KG)
Trichloroethene (TCE)	nd	0.02	PPM (MG/KG)
Vinyl Chloride	nd	0.02	PPM (MG/KG)
Xylenes (Total)	1.3	0.1	PPM (MG/KG)
Trichlorofluoromethane	nd	0.02	PPM (MG/KG)

BFB (Surrogate) Recovery = 84 %
BCM (Surrogate) Recovery = 106 %
Dilution Factor = 2

Results for sample: SVE-1 (45')

Date collected: 11/18/94	Date received: 11/20/94
Date extracted: 11/22/94	Date analyzed: 11/23,29/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9411052-10
Project Manager: Bob Marley	Sampled by: NA
Matrix: Non-aqueous	

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	0.05	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	0.82	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 98 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	63	5.0	PPM (MG/KG)

BFB (Surrogate) Recovery = ** %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	98	50	PPM (MG/KG)

DNOP (Surrogate) Recovery = * %

Dilution Factor = 10

* Motor oil range H-C at approximately 860 MG/KG

** Surrogate unrecoverable due to matrix interference.

Results for sample: SB-2 (45')

Date collected: 11/18/94	Date received: 11/20/94
Date extracted: 11/22/94	Date analyzed: 11/23,29/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9411052-11
Project Manager: Bob Marley	Sampled by: NA
Matrix: Non-aqueous	

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 94 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	5.0	PPM (MG/KG)

BFB (Surrogate) Recovery = 99 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	5.0	PPM (MG/KG)

DNOP (Surrogate) Recovery = 82 %

Dilution Factor = 1

Results for sample: SB-1 (47')

Date collected: 11/18/94 Date received: 11/20/94
Date extracted: 11/22/94 Date analyzed: 11/23,28/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9411052-12
Project Manager: Bob Marley Sampled by: NA
Matrix: Non-aqueous

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 89 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	5.0	PPM (MG/KG)

BFB (Surrogate) Recovery = 95 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	5.0	PPM (MG/KG)

DNOP (Surrogate) Recovery = 84 %

Dilution Factor = 1

Results for sample: MW-8 (45')

Date collected: 11/18/94 Date received: 11/20/94
Date extracted: 11/22/94 Date analyzed: 11/23,28/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9411052-13
Project Manager: Bob Marley Sampled by: NA
Matrix: Non-aqueous

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 93 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	5.0	PPM (MG/KG)

BFB (Surrogate) Recovery = 96 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	5.0	PPM (MG/KG)

DNOP (Surrogate) Recovery = 86 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: NA Date analyzed: 11/21/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: RB 11/21
Project Manager: Bob Marley
Matrix: Aqueous

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	nd	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1.3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethane	nd	0.2	PPB (UG/L)
1.2-Dichloroethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethene	nd	0.2	PPB (UG/L)
1.2-Dichloroethene (Cis)	nd	0.2	PPB (UG/L)
1.2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1.2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1.1.2.2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	nd	0.2	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
1.1.1-Trichloroethane	nd	0.2	PPB (UG/L)
1.1.2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	nd	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	nd	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 93 %
BCM (Surrogate) Recovery = 119 %
Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 11/22/94 Date analyzed: 11/29/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 11/22
Project Manager: Bob Marley
Matrix: Aqueous

Test: EPA 8100

Compound	Result	Detection limit	Units
Naphthalene	nd	0.5	PPB (UG/L)
2-Methyl Naphthalene	nd	0.5	PPB (UG/L)
1-Methyl Naphthalene	nd	0.5	PPB (UG/L)
Acenaphthalene	nd	0.5	PPB (UG/L)
Acenaphthene	nd	0.5	PPB (UG/L)
Fluorene	nd	0.5	PPB (UG/L)
Phenanthrene	nd	0.5	PPB (UG/L)
Anthracene	nd	0.5	PPB (UG/L)
Fluoranthrene	nd	0.5	PPB (UG/L)
Pyrene	nd	0.5	PPB (UG/L)
Benzo (a) anthracene	nd	0.5	PPB (UG/L)
Chrysene	nd	0.5	PPB (UG/L)
Benzo (b) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (k) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (a) pyrene	nd	0.5	PPB (UG/L)
Indeno (1,2.3-cd) pyrene	nd	1.0	PPB (UG/L)
Dibenzo (a,h) anthracene	nd	1.0	PPB (UG/L)
Benzo (g,h,i) perylene	nd	1.0	PPB (UG/L)

Hexadecane (Surrogate) Recovery = 81 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 11/21,23,30/94 Date analyzed: 11/21,23,30/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 11/21,23,30
Project Manager: Bob Marley
Matrix: Aqueous

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 96 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 112 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 11/22/94 Date analyzed: 11/28/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 11/22
Project Manager: Bob Marley
Matrix: Non-Aqueous

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 96 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	10	PPM (MG/KG)

BFB (Surrogate) Recovery = 115 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	10	PPM (MG/KG)

DNOP (Surrogate) Recovery = 97 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 11/22/94 Date analyzed: 11/28/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 11/22
Project Manager: Bob Marley
Matrix: Non-Aqueous

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Bromodichloromethane	nd	0.01	PPM (MG/KG)
Bromoform	nd	0.05	PPM (MG/KG)
Bromomethane	nd	0.05	PPM (MG/KG)
Carbon Tetrachloride	nd	0.01	PPM (MG/KG)
Chlorobenzene	nd	0.01	PPM (MG/KG)
Chloroethane	nd	0.01	PPM (MG/KG)
Chloroform	nd	0.01	PPM (MG/KG)
Chloromethane	nd	0.01	PPM (MG/KG)
2-Chloroethylvinyl Ether	nd	0.05	PPM (MG/KG)
Dibromochloromethane	nd	0.01	PPM (MG/KG)
1.3-Dichlorobenzene	nd	0.01	PPM (MG/KG)
1.2-Dichlorobenzene	nd	0.01	PPM (MG/KG)
1.4-Dichlorobenzene	nd	0.01	PPM (MG/KG)
Dichlorodifluoromethane	nd	0.01	PPM (MG/KG)
1.1-Dichloroethane	nd	0.01	PPM (MG/KG)
1.2-Dichloroethane	nd	0.01	PPM (MG/KG)
1.1-Dichloroethene	nd	0.01	PPM (MG/KG)
1.2-Dichloroethene (Cis)	nd	0.01	PPM (MG/KG)
1.2-Dichloroethene (Trans)	nd	0.01	PPM (MG/KG)
1.2-Dichloropropane	nd	0.01	PPM (MG/KG)
cis-1.3-Dichloropropene	nd	0.01	PPM (MG/KG)
trans-1.3-Dichloropropene	nd	0.01	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Dichloromethane	nd	0.1	PPM (MG/KG)
1,1.2.2-Tetrachloroethane	nd	0.01	PPM (MG/KG)
Tetrachloroethene (PCE)	nd	0.01	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
1.1.1-Trichloroethane	nd	0.01	PPM (MG/KG)
1.1.2-Trichloroethane	nd	0.01	PPM (MG/KG)
Trichloroethene (TCE)	nd	0.01	PPM (MG/KG)
Vinyl Chloride	nd	0.01	PPM (MG/KG)
Xylenes (Total)	nd	0.05	PPM (MG/KG)
Trichlorofluoromethane	nd	0.01	PPM (MG/KG)

BFB (Surrogate) Recovery = 78 %
BCM (Surrogate) Recovery = 89 %
Dilution Factor = 1

Results for QC: Matrix Spike / Matrix Spike Dup

Date extracted: NA
Date analyzed: 11/18/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1
HEAL #: 9411045-1 MS/MSD
Project Manager: Bob Marley
Matrix: Aqueous
Units: PPB (UG/L)

Test: EPA 8010/8020

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Chlorobenzene	<0.2	20.0	20.0	100	20.4	102	2
Ethylbenzene	<0.5	20.0	19.8	99	20.3	102	2
1,1-DCE	<0.2	20.0	18.8	94	19.8	99	5
Trans-1,2-DCE	<0.2	20.0	20.3	102	20.8	104	2
Carbon Tetrachloride	<0.2	20.0	20.7	104	20.8	104	0
1,2-DCA	<0.2	20.0	22.6	113	22.5	113	0
1,2-Dichloro-propane	<0.2	20.0	20.3	102	21.3	107	5
1,1,2-TCA	<0.2	20.0	21.1	106	20.8	104	1
PCE	<0.2	20.0	20.8	104	21.1	106	1
1,3-Dichloro-benzene	<0.2	20.0	18.0	90	20.2	101	12
1,4-Dichloro-benzene	<0.2	20.0	17.6	88	20.3	102	14

Results for QC: Blank Spike/Blank Spike Dup

Date extracted: 11/22/94 Date analyzed: 11/30/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: BS/BSD 11/22
Project Manager: Bob Marley
Matrix: Aqueous Units: PPB (UG/L)

Test: EPA 8100

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
Naphthalene	<0.5	10.0	7.3	73	6.9	69	6
Acenaphthylene	<0.5	10.0	7.6	76	7.9	79	4
Acenaphthene	<0.5	10.0	7.8	78	7.8	78	0
Flourene	<0.5	10.0	8.3	83	8.0	80	4
Phenanthrene	<0.5	10.0	9.5	95	9.7	97	2
Anthracene	<0.5	10.0	9.1	91	9.0	90	1
Pyrene	<0.5	10.0	9.2	92	9.1	91	1
Benzo(a)pyrene	<0.5	10.0	9.3	93	9.4	94	1
Benzo(g,h,i)-perylene	<1.0	10.0	10.1	101	10.0	100	1

Results for QC: Matrix Spike/ Matrix Spike Dup
Blank Spike / Blank Spike Dup

Date extracted: 11/21,23/94	Date analyzed: 11/21,23,30/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: BS/BSD 11/21,23
Project Manager: Bob Marley	9411052-5 MS/MSD
Matrix: Aqueous	Units: PPM (MG/L)

Test: EPA 504.1

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
EDB	<0.01	0.67	0.60	90	0.57	85	5

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Gasoline	0.16	0.50	0.67	101	0.68	103	1

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
Diesel	<1.0	5.4	5.9	109	5.5	102	7

Results for QC: Matrix Spike / Matrix Spike Dup

Date extracted: 11/22/94	Date analyzed: 11/28/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9411052-7 MS/MSD
Project Manager: Bob Marley	
Matrix: Non-Aqueous	Units: PPM (MG/KG)

Test: EPA 8010/8020

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Chlorobenzene	<0.01	1.00	1.08	108	1.03	103	5
Ethylbenzene	<0.05	1.00	1.07	107	1.03	103	4
1,1-DCE	<0.01	1.00	0.86	86	0.94	94	9
Trans-1,2-DCE	<0.01	1.00	0.86	86	0.93	93	8
Carbon Tetrachloride	<0.01	1.00	0.97	97	1.00	100	3
1,2-DCA	<0.01	1.00	0.97	97	1.01	101	4
1,2-Dichloropropane	<0.01	1.00	1.06	106	1.12	112	6
1,1,2-TCA	<0.01	1.00	0.98	98	1.07	107	9
PCE	<0.01	1.00	0.93	93	1.06	106	13
1,3-Dichlorobenzene	<0.01	1.00	1.03	103	1.18	118	14
1,4-Dichlorobenzene	<0.01	1.00	1.10	110	1.19	119	8

CHAIN-OF-CUSTODY RECORD

HALL ENVIRONMENTAL ANALYSIS LABORATORY
2403 San Mateo NE, Suite P-13
Albuquerque, New Mexico 87110
505.880.1803

Client: DANIEL B STEPHENS & ASSOC

Address: 6020 ACADEMY #100
ALBUQUERQUE NM
87109

Phone #: 505-822-9400

Fax #: 505-822-7788

Project Name: ENRON WT-1

Project #: 4230

Project Manager: BOB MARLEY

Sampler: RENE HILL

Samples Cold? ☒ Yes ☐ No

ANALYSIS REQUEST

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative			HEAL No.	BTEX (Method 602/8020)	BTEX + MTBE (602/8020)	TPH Method 8015 MOD (Gas/Diesel)	BTEX + TPH + MTBE (Gasoline Only)	BTEX + MTBE + TPH (Gas + Diesel)	TPH (Method 418.1)	601/602 Volatiles 8010 PURGABLE HALOCARBONS	EDB (Method 504.1)	EDC	610 (PNA or PAH) 8100 POLYNUC AROMATIC HYDROC				Air Bubbles or Headspace (Y or N)
					HgCl$_2$	HCl	Other															
11/18/94	1330	H_2O	MW-10	1/L 6/40ml	X		NONE	9411052-1	X		X				X			X				N
11/18/94	1430	H_2O	MW-12	1/L			NONE	-2										X				N
NA	NA	H_2O	DUP-1	1/L 6/40ml	X		NONE	-3	X		X				X			X				N
11/19/94	1330	H_2O	SVE-1-MW	1/L 6/40ml	X		NONE	-4	X		X				X			X				N
11/19/94	1700	H_2O	SB-2	1/L 6/40ml	X		NONE	-5	X		X				X			X				N
11/18/94	1635	H_2O	TRIP BLANK	3/40ml	X			-6	X		X				X							N
11/19/94	0730	SOIL	MW-9 (50')	1/250ml			NONE	-7	X		X											N
11/19/94	0815	SOIL	MW-9 (55')	1/250ml			NONE	-8	X		X											N
11/18/94	0930	SOIL	SVE-1 (30')	1/250ml			NONE	-9	X		X				X							N
11/18/94	1015	SOIL	SVE-1 (45')	1/250ml			NONE	-10	X		X											N
11/19/94	1320	SOIL	SB-2 (45')	1/250ml			NONE	-11	X		X											N
11/20/94	1025	SOIL	SB-1 (47')	1/250ml			NONE	-12	X		X											N

Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)
11/20/94	2130	Clarence Pazmino	0900 11/21/94
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)

Remarks:

Page 1 of 2

CHAIN-OF-CUSTODY RECORD

HALL ENVIRONMENTAL ANALYSIS LABORATORY
2403 San Mateo NE, Suite P-13
Albuquerque, New Mexico 87110
505.880.1803

Client: DANIEL B. STEPHENS + ASSOC

Project Name: ENRON WT-1 ~~4230~~

Address: 6020 ACADEMY NE #100
ALBUQUERQUE NM
87109

Project #: 4230

Project Manager: BOB MARLEY

Phone #: 505-822-9400

Sampler: CP / RH

Fax #: 505-822-2878

Samples Cold? ☒ Yes ☐ No

ANALYSIS REQUEST

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative			HEAL No.	BTEX (Method 602/8020)	BTEX + MTBE (602/8020)	TPH Method 8015 MOD (Gas/Diesel)	BTEX + TPH + MTBE (Gasoline Only)	BTEX + MTBE + TPH (Gas + Diesel)	TPH (Method 418.1)	601/602 Volatiles	EDB (Method 504.1)	EDC	610 (PNA or PAH)					Air Bubbles or Headspace (Y or N)
					$HgCl_2$	HCl	Other																
11/20/94	1450	SOIL	MW-8 (45)	1/250ml			NONE	9411052.13	X		X												N

Date: 11/20/94
Time: 2130
Relinquished By: (Signature)

Received By: (Signature) 0900 11/21/94

Date:
Time:
Relinquished By: (Signature)

Received By: (Signature)

Remarks:
Page 2 of 2

Hall Environmental
Analysis Laboratory

Hall Environmental Analysis Laboratory
2403 San Mateo NE, Suite P-13
Albuquerque, NM 87110

12/05/94

Daniel B. Stephens and Associates, Inc.
6020 Academy NE, Suite 100
Albuquerque, NM 87109

Dear Mr. Bob Marley,

Enclosed are the results for the analyses that were requested. These were done according to EPA procedures or the equivalent.

Detection limits are determined by EPA methodology. Unless noted on sample page, all criteria for QA/QC acceptance levels fall within established parameters. These parameters are modeled from the EPA-600 14-79 019, March 1979, "Handbook for Analytical Quality Control in Water and Waste Water."

Please don't hesitate to contact me for any additional information or clarifications

Sincerely,

12/5/94

Scott Hallenbeck, Lab Manager

Project: ENRON WT-1

Results for sample: SB-1

Date collected: 11/22/94	Date received: 11/23/94
Date extracted: NA	Date analyzed: 11/23/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	Heal #: 9411059-2
Project Manager: Bob Marley	Sampled by:Clarence Pigman
Matrix: Aqueous	

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	16	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	nd	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1.3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethane	5.8	0.2	PPB (UG/L)
1.2-Dichloroethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethene	nd	0.2	PPB (UG/L)
1.2-Dichloroethene (Cis)	0.5	0.2	PPB (UG/L)
1.2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1.2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	2.1	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1.1.2.2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	0.3	0.2	PPB (UG/L)
Toluene	29	0.5	PPB (UG/L)
1.1.1-Trichloroethane	nd	0.2	PPB (UG/L)
1.1.2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	1.5	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	19	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 91%
BCM (Surrogate) Recovery = 119 %
Dilution Factor = 1

Results for sample: SB-1

Date collected: 11/22/94	Date received: 11/23/94
Date extracted: 11/29/94	Date analyzed: 11/29,12/1/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	Heal #: 9411059-2
Project Manager: Bob Marley	Sampled by:Clarence Pigman
Matrix: Aqueous	

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	0.13	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 104 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 117 %

Dilution Factor = 1

Results for sample: SB-1

Date collected: 11/22/94	Date received: 11/23/94
Date extracted: 11/23/94	Date analyzed: 12/02/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	Heal #: 9411059-2
Project Manager: Bob Marley	Sampled by:Clarence Pigman
Matrix: Aqueous	

Test: EPA 8100

Compound	Result	Detection limit	Units
Naphthalene	nd	0.5	PPB (UG/L)
2-Methyl Naphthalene	nd	0.5	PPB (UG/L)
1-Methyl Naphthalene	nd	0.5	PPB (UG/L)
Acenaphthalene	nd	0.5	PPB (UG/L)
Acenaphthene	nd	0.5	PPB (UG/L)
Fluorene	0.8	0.5	PPB (UG/L)
Phenanthrene	nd	0.5	PPB (UG/L)
Anthracene	nd	0.5	PPB (UG/L)
Fluoranthrene	nd	0.5	PPB (UG/L)
Pyrene	nd	0.5	PPB (UG/L)
Benzo (a) anthracene	nd	0.5	PPB (UG/L)
Chrysene	nd	0.5	PPB (UG/L)
Benzo (b) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (k) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (a) pyrene	nd	0.5	PPB (UG/L)
Indeno (1,2,3-cd) pyrene	nd	1.0	PPB (UG/L)
Dibenzo (a,h) anthracene	nd	1.0	PPB (UG/L)
Benzo (g,h,i) perylene	nd	1.0	PPB (UG/L)

Hexadecane (Surrogate) Recovery = 73 %

Dilution Factor = 1

Results for sample: MW-7

Date collected: 11/22/94	Date received: 11/23/94
Date extracted: NA	Date analyzed: 11/23/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9411059-3
Project Manager: Bob Marley	Sampled by: Clarence Pigman
Matrix: Aqueous	

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	7.0	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	nd	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1,3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethane	23	0.2	PPB (UG/L)
1,2-Dichloroethane	0.3	0.2	PPB (UG/L)
1,1-Dichloroethene	2.3	0.2	PPB (UG/L)
1,2-Dichloroethene (Cis)	7.3	0.2	PPB (UG/L)
1,2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1,2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1,1,2,2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	0.4	0.2	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
1,1,1-Trichloroethane	1.6	0.2	PPB (UG/L)
1,1,2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	14	0.2	PPB (UG/L)
Vinyl Chloride	0.3	0.2	PPB (UG/L)
Xylenes (Total)	nd	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 90 %
BCM (Surrogate) Recovery = 97 %
Dilution Factor = 1

Results for sample: MW-7

Date collected: 11/22/94	Date received: 11/23/94
Date extracted: 11/29/94	Date analyzed: 11/29,12/01/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9411059-3
Project Manager: Bob Marley	Sampled by: Clarence Pigman
Matrix: Aqueous	

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 109 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 117 %

Dilution Factor = 1

Results for sample: MW-7

Date collected: 11/22/94	Date received: 11/23/94
Date extracted: 11/23/94	Date analyzed: 12/02/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9411059-3
Project Manager: Bob Marley	Sampled by: Clarence Pigman
Matrix: Aqueous	

Test: EPA 8100

Compound	Result	Detection limit	Units
Naphthalene	nd	0.5	PPB (UG/L)
2-Methyl Naphthalene	nd	0.5	PPB (UG/L)
1-Methyl Naphthalene	nd	0.5	PPB (UG/L)
Acenaphthalene	nd	0.5	PPB (UG/L)
Acenaphthene	nd	0.5	PPB (UG/L)
Fluorene	nd	0.5	PPB (UG/L)
Phenanthrene	nd	0.5	PPB (UG/L)
Anthracene	nd	0.5	PPB (UG/L)
Fluoranthrene	nd	0.5	PPB (UG/L)
Pyrene	nd	0.5	PPB (UG/L)
Benzo (a) anthracene	nd	0.5	PPB (UG/L)
Chrysene	nd	0.5	PPB (UG/L)
Benzo (b) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (k) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (a) pyrene	nd	0.5	PPB (UG/L)
Indeno (1,2,3-cd) pyrene	nd	1.0	PPB (UG/L)
Dibenzo (a,h) anthracene	nd	1.0	PPB (UG/L)
Benzo (g,h,i) perylene	nd	1.0	PPB (UG/L)

Hexadecane (Surrogate) Recovery = 69 %

Dilution Factor = 1

Results for sample: MW-7 (45')

Date collected: 11/21/94	Date received: 11/23/94
Date extracted: 11/28,29/94	Date analyzed: 11/29,12/01/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9411059-6
Project Manager: Bob Marley	Sampled by: Clarence Pigman
Matrix: Non-aqueous	

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 95 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	5.0	PPM (MG/KG)

BFB (Surrogate) Recovery = 99 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	5.0	PPM(MG/KG)

DNOP (Surrogate) Recovery = 115 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: NA Date analyzed: 11/23/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: RB 11/23
Project Manager: Bob Marley
Matrix: Aqueous

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	nd	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1,3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethane	nd	0.2	PPB (UG/L)
1,2-Dichloroethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethene	nd	0.2	PPB (UG/L)
1,2-Dichloroethene (Cis)	nd	0.2	PPB (UG/L)
1,2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1,2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1,1,2,2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	nd	0.2	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
1,1,1-Trichloroethane	nd	0.2	PPB (UG/L)
1,1,2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	nd	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	nd	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 90 %
BCM (Surrogate) Recovery = 105 %
Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 11/23/94 Date analyzed: 12/02/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 11/23
Project Manager: Bob Marley
Matrix: Aqueous

Test: EPA 8100

Compound	Result	Detection limit	Units
Naphthalene	nd	0.5	PPB (UG/L)
2-Methyl Naphthalene	nd	0.5	PPB (UG/L)
1-Methyl Naphthalene	nd	0.5	PPB (UG/L)
Acenaphthalene	nd	0.5	PPB (UG/L)
Acenaphthene	nd	0.5	PPB (UG/L)
Fluorene	nd	0.5	PPB (UG/L)
Phenanthrene	nd	0.5	PPB (UG/L)
Anthracene	nd	0.5	PPB (UG/L)
Fluoranthrene	nd	0.5	PPB (UG/L)
Pyrene	nd	0.5	PPB (UG/L)
Benzo (a) anthracene	nd	0.5	PPB (UG/L)
Chrysene	nd	0.5	PPB (UG/L)
Benzo (b) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (k) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (a) pyrene	nd	0.5	PPB (UG/L)
Indeno (1,2.3-cd) pyrene	nd	1.0	PPB (UG/L)
Dibenzo (a.h) anthracene	nd	1.0	PPB (UG/L)
Benzo (g,h,i) perylene	nd	1.0	PPB (UG/L)

Hexadecane (Surrogate) Recovery = 79 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 11/29/94 Date analyzed: 11/29,12/02/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 11/29
Project Manager: Bob Marley
Matrix: Aqueous

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 98 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 113 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 11/28,29/94 Date analyzed: 11/29,12/01/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 11/28,29
Project Manager: Bob Marley
Matrix: Non-Aqueous

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 106 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	5.0	PPM (MG/KG)

BFB (Surrogate) Recovery = 107 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	5.0	PPM (MG/KG)

DNOP (Surrogate) Recovery = 88 %

Dilution Factor = 1

Results for QC: Matrix Spike / Matrix Spike Dup

Date extracted: NA	Date analyzed: 11/23/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9411059-1 MS/MSD
Project Manager: Bob Marley	
Matrix: Aqueous	Units: PPB (UG/L)

Test: EPA 8010/8020

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Chlorobenzene	<0.2	20.0	20.6	103	17.7	89	15
Ethylbenzene	<0.5	20.0	20.3	102	17.6	88	14
1,1-DCE	<0.2	20.0	20.2	101	17.2	86	16
Trans-1,2-DCE	<0.2	20.0	19.9	100	17.2	86	15
1,2-DCA	<0.2	20.0	21.7	109	19.0	95	13
1,2-Dichloro-propane	<0.2	20.0	21.7	109	18.9	95	14
1,1,2-TCA	<0.2	20.0	22.4	112	20.2	101	10
PCE	<0.2	20.0	20.8	104	18.2	91	13
1,3-Dichloro-benzene	<0.2	20.0	19.8	99	17.5	88	12
1,4-Dichloro-benzene	<0.2	20.0	20.3	102	18.0	90	12

Results for QC: Blank Spike/Blank Spike Dup

Date extracted: 11/23/94	Date analyzed: 12/02/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: BS/BSD 11/23
Project Manager: Bob Marley	
Matrix: Aqueous	Units: PPB (UG/L)

Test: EPA 8100

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
Naphthalene	<0.5	10.0	7.7	77	7.5	75	3
Acenaphthylene	<0.5	10.0	8.3	83	7.9	79	5
Acenaphthene	<0.5	10.0	8.4	84	8.0	80	5
Flourene	<0.5	10.0	9.3	93	8.9	89	4
Phenanthrene	<0.5	10.0	9.9	99	10.2	102	3
Anthracene	<0.5	10.0	9.6	96	9.8	98	2
Pyrene	<0.5	10.0	9.8	98	9.8	98	0
Benzo(a)pyrene	<0.5	10.0	9.6	96	9.6	96	0
Benzo(g,h,i)-perylene	<1.0	10.0	10.5	105	10.6	106	1

Results for QC: Matrix Spike/ Matrix Spike Dup
Blank Spike / Blank Spike Dup

Date extracted: 11/29/94	Date analyzed: 11/29,12/01/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: BS/BSD 11/29
Project Manager: Bob Marley	9411052-5 MS/MSD
Matrix: Aqueous	Units: PPM (MG/L)

Test: EPA 504.1

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
EDB	<0.01	0.67	0.61	91	0.59	88	3

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Gasoline	0.16	0.50	0.67	101	0.68	103	1

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
Diesel	<1.0	5.4	5.4	100	5.7	106	5

Results for QC: Matrix Spike / Matrix Spike Dup
Blank Spike/Blank Spike Dup

Date extracted: 11/28,29/94 Date analyzed: 11/29,12/01/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9411059-5 MS/MSD
Project Manager: Bob Marley 9411059-4 MS/MSD
Matrix: Non-Aqueous Units: PPM (MG/KG)

Test: EPA 8020

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Benzene	<0.05	1.00	1.09	109	1.12	112	3
Toluene	<0.05	1.00	1.05	105	1.09	109	4
Ethylbenzene	<0.05	1.00	0.97	97	1.01	101	4
Total Xylenes	<0.05	3.00	3.13	104	3.25	108	4

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Gasoline	<10	50	44	88	43	86	2

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
Diesel	<5.0	54	47	87	55	102	16

CHAIN-OF-CUSTODY RECORD

HALL ENVIRONMENTAL ANALYSIS LABORATORY
2403 San Mateo NE, Suite P-13
Albuquerque, New Mexico 87110
505.880.1803

Client: DANIEL B. STEPHENS + ASSOC
Address: 6020 ACADEMY NE #100
ALBUQUERQUE NM 87109
Phone #: 505-822-9400
Fax #: 505-822-7878

Project Name: ENRON WT-1
Project #: 4230
Project Manager: BOB MARLEY
Sampler: CLARENCE PIGMAN
Samples Cold? ☒ Yes ☐ No

ANALYSIS REQUEST

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative			HEAL No.	BTEX (Method 602/8020)	BTEX + MTBE (602/8020)	TPH Method 8015 MOD (Gas/Diesel)	BTEX + TPH + MTBE (Gasoline Only)	BTEX + MTBE + TPH (Gas + Diesel)	TPH (Method 418.1)	601/602 Volatiles HALOCARBONS 8010	EDB (Method 504.1)	EDC	610 (PNA or PAH) POLYNUCLEAR AROMATIC H.C.				Air Bubbles or Headspace (Y or N)
					$HgCl_2$	HCl	Other															
11/21/94	1430	H_2O	MW-9	1/L 6/40ml	X		NONE	9411059-1	X		X				X			X				
11/22/94	0915	H_2O	SB-1	1/L 6/40ml	X		NONE	-2	X		X				X			X				
11/22/94	1310	H_2O	MW-7	1/L 6/40ml	X		NONE	-3	X		X				X			X				
11/21/94	0940	SOIL	MW-11 (40)	1/250ml			NONE	-4	X		X											
11/21/94	1105	SOIL	MW-11 (56)	1/250ml			NONE	-5	X		X											
11/21/94	1630	SOIL	MW-7 (45)	1/250ml			NONE	-6	X		X											

Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)
11/23/94	0849	Clarence Pigman	
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)

Remarks:

Hall Environmental
Analysis Laboratory

Hall Environmental Analysis Laboratory
2403 San Mateo NE, Suite P-13
Albuquerque, NM 87110

12/12 /94

Daniel B. Stephens and Associates, Inc.
6020 Academy NE, Suite 100
Albuquerque, NM 87109

Dear Mr. Bob Marley,

Enclosed are the results for the analyses that were requested. These were done according to EPA procedures or the equivalent.

Detection limits are determined by EPA methodology. Unless noted on sample page, all criteria for QA/QC acceptance levels fall within established parameters. These parameters are modeled from the EPA-600 14-79 019, March 1979, "Handbook for Analytical Quality Control in Water and Waste Water."

Please don't hesitate to contact me for any additional information or clarifications

Sincerely,

Scott Hall 12/12/94

Scott Hallenbeck, Lab Manager

Project: ENRON WT-1

Results for sample: MW-4

Date collected: 12/1/94
Date received: 12/2/94
Date extracted: NA
Date analyzed: 12/5/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1
HEAL #: 9412007-1
Project Manager: Bob Marley
Sampled by: BM/CP
Matrix: Aqueous

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.5	PPB (UG/L)
Bromodichloromethane	0.2	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	nd	0.2	PPB (UG/L)
Chloroform	7.6	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1.3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethane	0.9	0.2	PPB (UG/L)
1.2-Dichloroethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethene	4.7	0.2	PPB (UG/L)
1.2-Dichloroethene (Cis)	nd	0.2	PPB (UG/L)
1.2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1.2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1.1.2.2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	0.5	0.2	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
1.1.1-Trichloroethane	nd	0.2	PPB (UG/L)
1.1.2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	nd	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	nd	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 92 %
BCM (Surrogate) Recovery = 85 %
Dilution Factor = 1

Results for sample: MW-4

Date collected: 12/1/94 Date received: 12/2/94
Date extracted: 12/5,6/94 Date analyzed: 12/5,6,7/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9412007-1
Project Manager: Bob Marley Sampled by: BM/CP
Matrix: Aqueous

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 97 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 117 %

Dilution Factor = 1

Results for sample: MW-4

Date collected: 12/1/94	Date received: 12/2/94
Date extracted: 12/7/94	Date analyzed: 12/9/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9412007-1
Project Manager: Bob Marley	Sampled by: BM/CP
Matrix: Aqueous	

Test: EPA 8100

Compound	Result	Detection limit	Units
Naphthalene	nd	0.5	PPB (UG/L)
2-Methyl Naphthalene	nd	0.5	PPB (UG/L)
1-Methyl Naphthalene	nd	0.5	PPB (UG/L)
Acenaphthalene	nd	0.5	PPB (UG/L)
Acenaphthene	nd	0.5	PPB (UG/L)
Fluorene	nd	0.5	PPB (UG/L)
Phenanthrene	nd	0.5	PPB (UG/L)
Anthracene	nd	0.5	PPB (UG/L)
Fluoranthrene	nd	0.5	PPB (UG/L)
Pyrene	nd	0.5	PPB (UG/L)
Benzo (a) anthracene	nd	0.5	PPB (UG/L)
Chrysene	nd	0.5	PPB (UG/L)
Benzo (b) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (k) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (a) pyrene	nd	0.5	PPB (UG/L)
Indeno (1,2,3-cd) pyrene	nd	1.0	PPB (UG/L)
Dibenzo (a,h) anthracene	nd	1.0	PPB (UG/L)
Benzo (g,h,i) perylene	nd	1.0	PPB (UG/L)

Hexadecane (Surrogate) Recovery = 80 %

Dilution Factor = 1

Results for sample: MW-5

Date collected: 12/1/94 Date received: 12/2/94
Date extracted: NA Date analyzed: 12/6/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: 9412007-2
Project Manager: Bob Marley Sampled by:BM/CP
Matrix: Aqueous

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	20	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	8.9	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1.3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.2-Dichlorobenzene	0.5	0.2	PPB (UG/L)
1.4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethane	18	0.2	PPB (UG/L)
1.2-Dichloroethane	1.1	0.2	PPB (UG/L)
1.1-Dichloroethene	nd	0.2	PPB (UG/L)
1.2-Dichloroethene (Cis)	12	0.2	PPB (UG/L)
1.2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1.2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	8.3	0.5	PPB (UG/L)
Dichloromethane	43	2.0	PPB (UG/L)
1.1.2.2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	0.8	0.2	PPB (UG/L)
Toluene	19	0.5	PPB (UG/L)
1.1.1-Trichloroethane	nd	0.2	PPB (UG/L)
1.1.2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	3.2	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	26	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 100
BCM (Surrogate) Recovery = 102 %
Dilution Factor = 1

Results for sample: MW-5

Date collected: 12/1/94 Date received: 12/2/94
Date extracted: 12/5,6/94 Date analyzed: 12/5,6,7/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: 9412007-2
Project Manager: Bob Marley Sampled by:BM/CP
Matrix: Aqueous

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	0.35	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 111 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	6.9*	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 112 %

Dilution Factor = 1

* Non-characteristic diesel range H-C

Results for sample: MW-5

Date collected: 12/1/94	Date received: 12/2/94
Date extracted: 12/7/94	Date analyzed: 12/9/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	Heal #: 9412007-2
Project Manager: Bob Marley	Sampled by:BM/CP
Matrix: Aqueous	

Test: EPA 8100

Compound	Result	Detection limit	Units
Naphthalene	nd	0.5	PPB (UG/L)
2-Methyl Naphthalene	nd	0.5	PPB (UG/L)
1-Methyl Naphthalene	nd	0.5	PPB (UG/L)
Acenaphthalene	nd	0.5	PPB (UG/L)
Acenaphthene	nd	0.5	PPB (UG/L)
Fluorene	nd	0.5	PPB (UG/L)
Phenanthrene	nd	0.5	PPB (UG/L)
Anthracene	nd	0.5	PPB (UG/L)
Fluoranthrene	nd	0.5	PPB (UG/L)
Pyrene	nd	0.5	PPB (UG/L)
Benzo (a) anthracene	nd	0.5	PPB (UG/L)
Chrysene	nd	0.5	PPB (UG/L)
Benzo (b) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (k) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (a) pyrene	nd	0.5	PPB (UG/L)
Indeno (1,2,3-cd) pyrene	nd	1.0	PPB (UG/L)
Dibenzo (a,h) anthracene	nd	1.0	PPB (UG/L)
Benzo (g,h,i) perylene	nd	1.0	PPB (UG/L)

Hexadecane (Surrogate) Recovery = 84 %

Dilution Factor = 1

Results for sample: MW-6

Date collected: 11/30/94	Date received: 12/2/94
Date extracted: NA	Date analyzed: 12/5/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9412007-3
Project Manager: Bob Marley	Sampled by: BM/CP
Matrix: Aqueous	

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	1.8	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	0.5	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1,3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,2-Dichlorobenzene	0.2	0.2	PPB (UG/L)
1,4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethane	13	0.2	PPB (UG/L)
1,2-Dichloroethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethene	2.9	0.2	PPB (UG/L)
1,2-Dichloroethene (Cis)	6.8	0.2	PPB (UG/L)
1,2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1,2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1,1,2,2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	0.4	0.2	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
1,1,1-Trichloroethane	nd	0.2	PPB (UG/L)
1,1,2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	15	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	0.5	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 96 %
BCM (Surrogate) Recovery = 103 %
Dilution Factor = 1

Results for sample: MW-6

Date collected: 11/30/94	Date received: 12/2/94
Date extracted: 12/5,6/94	Date analyzed: 12/5,6,7/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9412007-3
Project Manager: Bob Marley	Sampled by: BM/CP
Matrix: Aqueous	

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 96 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 116 %

Dilution Factor = 1

Results for sample: MW-6

Date collected: 11/30/94	Date received: 12/2/94
Date extracted: 12/7/94	Date analyzed: 12/9/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9412007-3
Project Manager: Bob Marley	Sampled by: BM/CP
Matrix: Aqueous	

Test: EPA 8100

Compound	Result	Detection limit	Units
Naphthalene	nd	0.5	PPB (UG/L)
2-Methyl Naphthalene	nd	0.5	PPB (UG/L)
1-Methyl Naphthalene	nd	0.5	PPB (UG/L)
Acenaphthalene	nd	0.5	PPB (UG/L)
Acenaphthene	nd	0.5	PPB (UG/L)
Fluorene	nd	0.5	PPB (UG/L)
Phenanthrene	nd	0.5	PPB (UG/L)
Anthracene	nd	0.5	PPB (UG/L)
Fluoranthrene	nd	0.5	PPB (UG/L)
Pyrene	nd	0.5	PPB (UG/L)
Benzo (a) anthracene	nd	0.5	PPB (UG/L)
Chrysene	nd	0.5	PPB (UG/L)
Benzo (b) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (k) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (a) pyrene	nd	0.5	PPB (UG/L)
Indeno (1,2,3-cd) pyrene	nd	1.0	PPB (UG/L)
Dibenzo (a,h) anthracene	nd	1.0	PPB (UG/L)
Benzo (g,h,i) perylene	nd	1.0	PPB (UG/L)

Hexadecane (Surrogate) Recovery = 64 %

Dilution Factor = 1

Results for sample: MW- 8

Date collected: 11/30/94 Date received: 12/2/94
Date extracted: NA Date analyzed: 12/5/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9412007-4
Project Manager: Bob Marley Sampled by: BM/CP
Matrix: Aqueous

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	12	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	0.5	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1,3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,2-Dichlorobenzene	0.4	0.2	PPB (UG/L)
1,4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethane	71	0.2	PPB (UG/L)
1,2-Dichloroethane	0.9	0.2	PPB (UG/L)
1,1-Dichloroethene	1.3	0.2	PPB (UG/L)
1,2-Dichloroethene (Cis)	18	0.2	PPB (UG/L)
1,2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1,2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1,1,2,2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	nd	0.2	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
1,1,1-Trichloroethane	nd	0.2	PPB (UG/L)
1,1,2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	17	0.2	PPB (UG/L)
Vinyl Chloride	0.2	0.2	PPB (UG/L)
Xylenes (Total)	nd	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 94 %
BCM (Surrogate) Recovery = 108 %
Dilution Factor = 1

Results for sample: MW-8

Date collected: 11/30/94 Date received: 12/2/94
Date extracted: 12/5,6/94 Date analyzed: 12/5,6,7/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9412007-4
Project Manager: Bob Marley Sampled by: BM/CP
Matrix: Aqueous

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 103 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 114 %

Dilution Factor = 1

Results for sample: MW-8

Date collected: 11/30/94	Date received: 12/2/94
Date extracted: 12/7/94	Date analyzed: 12/9/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9412007-4
Project Manager: Bob Marley	Sampled by: BM/CP
Matrix: Aqueous	

Test: EPA 8100

Compound	Result	Detection limit	Units
Naphthalene	nd	0.5	PPB (UG/L)
2-Methyl Naphthalene	nd	0.5	PPB (UG/L)
1-Methyl Naphthalene	nd	0.5	PPB (UG/L)
Acenaphthalene	nd	0.5	PPB (UG/L)
Acenaphthene	nd	0.5	PPB (UG/L)
Fluorene	nd	0.5	PPB (UG/L)
Phenanthrene	nd	0.5	PPB (UG/L)
Anthracene	nd	0.5	PPB (UG/L)
Fluoranthrene	nd	0.5	PPB (UG/L)
Pyrene	nd	0.5	PPB (UG/L)
Benzo (a) anthracene	nd	0.5	PPB (UG/L)
Chrysene	nd	0.5	PPB (UG/L)
Benzo (b) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (k) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (a) pyrene	nd	0.5	PPB (UG/L)
Indeno (1,2,3-cd) pyrene	nd	1.0	PPB (UG/L)
Dibenzo (a.h) anthracene	nd	1.0	PPB (UG/L)
Benzo (g,h,i) perylene	nd	1.0	PPB (UG/L)

Hexadecane (Surrogate) Recovery = 79 %

Dilution Factor = 1

Results for sample: MW-5 @ 35'

Date collected: 11/29/94 Date received: 12/2/94
Date extracted: 12/5/94 Date analyzed: 12/6,7/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9412007-7
Project Manager: Bob Marley Sampled by: BM/CP
Matrix: Non-aqueous

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 93 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	5.0	PPM (MG/KG)

BFB (Surrogate) Recovery = 93 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	5.0	PPM (MG/KG)

DNOP (Surrogate) Recovery = 108 %

Dilution Factor = 1

Results for sample: MW-5 @ 47'

Date collected: 11/29/94	Date received: 12/2/94
Date extracted: 12/5/94	Date analyzed: 12/6,7/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9412007-8
Project Manager: Bob Marley	Sampled by: BM/CP
Matrix: Non-aqueous	

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 87 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	5.0	PPM (MG/KG)

BFB (Surrogate) Recovery = 88 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	5.0	PPM(MG/KG)

DNOP (Surrogate) Recovery = 114 %

Dilution Factor = 1

Results for sample: MW-4 @ 47'

Date collected: 11/29/94	Date received: 12/2/94
Date extracted: 12/5/94	Date analyzed: 12/6,7/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9412007-9
Project Manager: Bob Marley	Sampled by: BM/CP
Matrix: Non-aqueous	

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 91 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	5.0	PPM (MG/KG)

BFB (Surrogate) Recovery = 91 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	5.0	PPM(MG/KG)

DNOP (Surrogate) Recovery = 121 %

Dilution Factor = 1

Results for sample: MW-6 @ 48'

Date collected: 11/29/94 Date received: 12/2/94
Date extracted: 12/5/94 Date analyzed: 12/7/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: 9412007-10
Project Manager: Bob Marley Sampled by: BM/CP
Matrix: Non-aqueous

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 83 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	5.0	PPM (MG/KG)

BFB (Surrogate) Recovery = 83 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	5.0	PPM(MG/KG)

DNOP (Surrogate) Recovery = 116 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: NA	Date analyzed: 12/5/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: RB 12/5
Project Manager: Bob Marley	
Matrix: Aqueous	

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	nd	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1.3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1.4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethane	nd	0.2	PPB (UG/L)
1.2-Dichloroethane	nd	0.2	PPB (UG/L)
1.1-Dichloroethene	nd	0.2	PPB (UG/L)
1.2-Dichloroethene (Cis)	nd	0.2	PPB (UG/L)
1.2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1.2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1.3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1.1.2.2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	nd	0.2	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
1.1.1-Trichloroethane	nd	0.2	PPB (UG/L)
1.1.2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	nd	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	nd	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 95 %
BCM (Surrogate) Recovery = 96 %
Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 12/5,6/94 Date analyzed: 12/5,6,7/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 12/5,6,7
Project Manager: Bob Marley
Matrix: Aqueous

Test: EPA 504.1

Compound	Result	Detection Limit	Units
EDB	nd	0.01	PPB (UG/L)

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	0.05	PPM (MG/L)

BFB (Surrogate) Recovery = 97 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	1.0	PPM (MG/L)

DNOP (Surrogate) Recovery = 99 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 12/7/94 Date analyzed: 12/9/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 12/7
Project Manager: Bob Marley
Matrix: Aqueous

Test: EPA 8100

Compound	Result	Detection limit	Units
Naphthalene	nd	0.5	PPB (UG/L)
2-Methyl Naphthalene	nd	0.5	PPB (UG/L)
1-Methyl Naphthalene	nd	0.5	PPB (UG/L)
Acenaphthalene	nd	0.5	PPB (UG/L)
Acenaphthene	nd	0.5	PPB (UG/L)
Fluorene	nd	0.5	PPB (UG/L)
Phenanthrene	nd	0.5	PPB (UG/L)
Anthracene	nd	0.5	PPB (UG/L)
Fluoranthrene	nd	0.5	PPB (UG/L)
Pyrene	nd	0.5	PPB (UG/L)
Benzo (a) anthracene	nd	0.5	PPB (UG/L)
Chrysene	nd	0.5	PPB (UG/L)
Benzo (b) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (k) fluoranthene	nd	0.5	PPB (UG/L)
Benzo (a) pyrene	nd	0.5	PPB (UG/L)
Indeno (1,2,3-cd) pyrene	nd	1.0	PPB (UG/L)
Dibenzo (a,h) anthracene	nd	1.0	PPB (UG/L)
Benzo (g,h.i) perylene	nd	1.0	PPB (UG/L)

Hexadecane (Surrogate) Recovery = 87 %

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 12/5/94 Date analyzed: 12/6,7/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 Heal #: RB 12/5
Project Manager: Bob Marley
Matrix: Non-Aqueous

Test: EPA 8020

Compound	Result	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Total Xylenes	nd	0.05	PPM (MG/KG)

BFB (Surrogate) Recovery = 100 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Gasoline	nd	5.0	PPM (MG/KG)

BFB (Surrogate) Recovery = 99 %

Dilution Factor = 1

Test: EPA 8015 Modified

Compound	Result	Detection Limit	Units
Diesel	nd	5.0	PPM (MG/KG)

DNOP (Surrogate) Recovery = 109 %

Dilution Factor = 1

Results for QC: Matrix Spike / Matrix Spike Dup

Date extracted: NA	Date analyzed: 12/5/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9412007-5 MS/MSD
Project Manager: Bob Marley	
Matrix: Aqueous	Units: PPB (UG/L)

Test: EPA 8010/8020

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Chlorobenzene	<0.2	20.0	19.7	99	21.0	105	6
Ethylbenzene	<0.5	20.0	19.8	99	20.6	103	4
1,1-DCE	<0.2	20.0	22.2	111	20.5	103	8
Trans-1,2-DCE	<0.2	20.0	19.1	96	19.4	97	2
Carbon tet.	<0.2	20.0	18.3	92	16.9	85	8
1,2-DCA	<0.2	20.0	16.2	81	17.0	85	5
1,2-Dichloropropane	<0.2	20.0	20.7	104	20.4	102	1
1.1,2-TCA	<0.2	20.0	19.2	96	18.4	92	4
PCE	<0.2	20.0	21.6	108	20.4	102	6
1,3-Dichlorobenzene	<0.2	20.0	19.8	99	19.6	98	1
1,4-Dichlorobenzene	<0.2	20.0	20.8	104	18.5	93	12

Results for QC: Matrix Spike/ Matrix Spike Dup
Blank Spike / Blank Spike Dup

Date extracted: 16/5,6/94 Date analyzed: 12/5,6,7/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: BS/BSD 12/5,6
Project Manager: Bob Marley 9411069-6 MS/MSD
Matrix: Aqueous Units: PPM (MG/L), PPB (UG/L)

Test: EPA 504.1

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
EDB	<0.01	0.67	0.59	88	0.60	90	2

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Gasoline	<0.05	0.50	0.51	102	0.54	108	6

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
Diesel	<1.0	5.4	5.6	104	6.2	115	10

Results for QC: Blank Spike/Blank Spike Dup

Date extracted: 12/6/94 Date analyzed: 12/9/94
Client: Daniel B. Stephens and Associates, Inc.
Project Name: ENRON WT-1 HEAL #: BS/BSD 12/6
Project Manager: Bob Marley
Matrix: Aqueous Units: PPB (UG/L)

Test: EPA 8100

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
Naphthalene	<0.5	10.0	7.7	77	7.9	79	3
Acenaphthylene	<0.5	10.0	9.1	91	8.8	88	3
Acenaphthene	<0.5	10.0	8.2	82	8.2	82	0
Flourene	<0.5	10.0	8.9	89	8.9	89	0
Phenanthrene	<0.5	10.0	10.0	100	10.0	100	0
Anthracene	<0.5	10.0	10.1	101	10.2	102	1
Pyrene	<0.5	10.0	9.8	98	10.2	102	4
Benzo(a)pyrene	<0.5	10.0	10.5	105	10.4	104	1
Benzo(g,h,i)-perylene	<1.0	10.0	12.3	123	11.9	119	3

Results for QC: Matrix Spike / Matrix Spike Dup
Blank Spike/Blank Spike Dup

Date extracted: 12/5/94	Date analyzed: 12/6,7/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON WT-1	HEAL #: 9412007-8 MS/MSD
Project Manager: Bob Marley	9412007-7 MS/MSD
Matrix: Non-Aqueous	Units: PPM (MG/KG)

Test: EPA 8020

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Benzene	<0.05	1.00	0.94	94	0.87	87	8
Toluene	<0.05	1.00	0.95	95	0.88	88	8
Ethylbenzene	<0.05	1.00	0.88	88	0.81	81	8
Total Xylenes	<0.05	3.00	2.59	86	2.43	81	6

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Gasoline	<5.0	50	42	84	40	80	5

Test: EPA 8015 Modified

Compound	Sample Result	Amount Added	Blank Recov.	BS %	BSD Recov.	BSD %	RPD
Diesel	<5.0	54	54	100	56	104	4

CHAIN-OF-CUSTODY RECORD

HALL ENVIRONMENTAL ANALYSIS LABORATORY
2403 San Mateo NE, Suite P-13
Albuquerque, New Mexico 87110
505.880.1803

Client: Daniel B. Stephens & Assoc

Address: 6020 Academy NE Suite 100
Alb. NM 87109

Phone # : 822 9400

Fax # : 822 8877

Project Name: ENRON - WTI

Project #: 4230.2

Project Manager: Bob Marley

Sampler: BM/CP

Samples Cold? ☒ Yes ☐ No

ANALYSIS REQUEST

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative HgCl2	HCl	Other	HEAL No.	BTEX (Method 602/[✓ 8020])	BTEX + MTBE (602/8020)	TPH Method 8015 MOD ([✓ Gas/Diesel])	BTEX + TPH + MTBE (Gasoline Only)	BTEX + MTBE + TPH (Gas + Diesel)	TPH (Method 418.1)	601/602 Volatiles 8010	EDB (Method 504.1)	EDC	610 (PNA or PAH) 8100				Air Bubbles or Headspace (Y or N)
12/1/94	0850	H2O	MW-4	6-40ml 1-1l	X		none	9412007-1	X		X				X	X		X				N
12/1/94	1350	H2O	MW-5	6-40ml 1-1l	X		none	-2	X		X				X	X		X				
11/30/94	1540	H2O	MW-6	6-40ml 1-1l	X		none	-3	X		X				X	X		X				
11/30/94	1515	H2O	MW-8	6-40ml 1-1l	X		none	-4	X		X				X	X		X				
12/1/94	1000	H2O	MW-13	5-40ml 1-1l	X		none	-5	X		X				X	X		X				
~~11/28/94~~		~~H2O~~	~~SB3 @ 40'~~	~~1-250ml Jar~~			~~None~~														BM	
11/28/94	1310	Soil ~~H2O~~ BM	SB-3 @ 55'	1-250ml Jar			None	-6	X		X											
11/29/94	0905	Soil	MW-5 @ 35'	1-250ml Jar			none	-7	X		X											
11/29/94	0930	Soil	MW-5 @ 47'	1-250ml Jar			none	-8	X		X											
11/29/94	1415	Soil	MW-4 @ 47'	1-250ml Jar			none	-9	X		X											
11/28/94	1650	Soil	MW-6 @ 48'	1-250ml Jar			none	-10	X		X											

Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)
12/2/94	1200	Bob Marley	Mike Jones

Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)

Remarks:

Inorganic Analyses

Analytical Technologies, Inc.

2709-D Pan American Freeway NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. **411373**

December 12, 1994

Daniel B. Stephens & Associates
6020 Academy NE, Suite 100
Albuquerque, NM 87109

Project Name/Number: ENRON WT-1 4230

Attention: Bob Marley

On **11/18/94**, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **non-aqueous and 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.

EPA Method 8240 by TCLP analyses were added on 11/18/94 for samples "ENRON WT-1 EXCAVATION PIT (WT-1)", "MONUMENT" and "HAT MESA" per Bob Marley.

EPA Method 8080 analyses were cancelled on 11/18/94 for samples "ENRON WT-1 EXCAVATION PIT (WT-1)", "MONUMENT" and "HAT MESA" per Bob Marley.

EPA Method 418.1 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.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

H Mitchell Rubenstein

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jt

Enclosure

CLIENT : DANIEL B. STEPHENS & ASSOC.
PROJECT # : 4230
PROJECT NAME : ENRON WT-1

DATE RECEIVED : 11/18/94
REPORT DATE : 12/12/94

ATI ID: 411373

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	ENRON WT-1 EXCAVATION PIT (WT-1)	NON-AQ	11/17/94
02	MONUMENT	NON-AQ	11/17/94
03	HAT MESA	NON-AQ	11/17/94
04	MW-1	AQUEOUS	11/15/94

---TOTALS---

MATRIX	#SAMPLES
NON-AQ	3
AQUEOUS	1

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.

Analytical **Technologies,** Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 411373

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1

DATE RECEIVED : 11/18/94
REPORT DATE : 12/12/94

PARAMETER	UNITS	04
CARBONATE (CACO3)	MG/L	<1
BICARBONATE (CACO3)	MG/L	1610
HYDROXIDE (CACO3)	MG/L	<1
TOTAL ALKALINITY (AS CACO3)	MG/L	1610
CHLORIDE (EPA 325.2)	MG/L	190
NO2/NO3-N, TOTAL (353.2)	MG/L	<0.06
SULFATE (EPA 375.2)	MG/L	<5
T. DISSOLVED SOLIDS (160.1)	MG/L	2900

AnalyticalTechnologies,Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1

ATI I.D. : 411373

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CARBONATE	MG/L	41137304	<1	<1	NA	NA	NA	NA
BICARBONATE	MG/L		1610	1600	0.6	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		1610	1600	0.6	NA	NA	NA
CHLORIDE	MG/L	41138301	650	650	0	1600	1000	95
NITRITE/NITRATE-N (TOT	MG/L	41249902	<0.06	<0.06	NA	2.00	2.00	100
SULFATE	MG/L	41163931	1100	1100	0	2000	1000	90
TOTAL DISSOLVED SOLIDS	MG/L	41136801	3400	3400	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. : 411373

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1

DATE RECEIVED : 11/18/94

REPORT DATE : 12/12/94

PARAMETER	UNITS	04
SILVER (EPA 200.7/6010)	MG/L	<0.010
ARSENIC (EPA 206.2/7060)	MG/L	0.110
BARIUM (EPA 200.7/6010)	MG/L	24.0
CALCIUM (EPA 200.7/6010)	MG/L	485
CADMIUM (EPA 213.2/7131)	MG/L	<0.0005
CHROMIUM (EPA 200.7/6010)	MG/L	<0.010
COPPER (EPA 200.7/6010)	MG/L	<0.010
IRON (EPA 200.7/6010)	MG/L	0.325
MERCURY (EPA 245.1/7470)	MG/L	<0.0002
POTASSIUM (EPA 200.7/6010)	MG/L	59.1
MAGNESIUM (EPA 200.7/6010)	MG/L	175
MANGANESE (EPA 200.7/6010)	MG/L	0.100
SODIUM (EPA 200.7/6010)	MG/L	216
LEAD (EPA 239.2/7421)	MG/L	<0.002
SELENIUM (EPA 270.2/7740)	MG/L	<0.005
ZINC (EPA 200.7/6010)	MG/L	<0.050

METALS - QUALITY CONTROL

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1 ATI I.D. : 411373

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
SILVER	MG/L	41137304	<0.010	<0.010	NA	0.409	0.500	82
SILVER	MG/L	41173728	<0.05	<0.05	NA	0.88	1.00	88
ARSENIC	MG/L	41137304	0.110	0.105	5	0.150	0.050	80
ARSENIC	MG/L	41173728	<0.1	<0.1	NA	1.0	1.0	100
BARIUM	MG/L	41137304	24.0	23.0	4	34.0	10.0	100
BARIUM	MG/L	41173728	0.80	0.78	3	4.34	4.00	88
CALCIUM	MG/L	41176501	94.9	94.1	0.8	148	50.0	106
CADMIUM	MG/L	41137304	<0.0005	<0.0005	NA	0.0046	0.0050	92
CADMIUM	MG/L	41173728	<0.05	<0.05	NA	0.92	1.00	92
CHROMIUM	MG/L	41137304	<0.010	<0.010	NA	0.852	1.00	85
CHROMIUM	MG/L	41173728	<0.10	<0.10	NA	0.87	1.00	87
COPPER	MG/L	41137304	<0.010	<0.010	NA	0.449	0.500	90
IRON	MG/L	41137304	0.325	0.310	5	1.16	1.00	84
MERCURY	MG/L	41178607	<0.0002	<0.0002	NA	0.0050	0.0050	100
MERCURY	MG/L	41173716	<0.002	<0.002	NA	0.048	0.050	96
POTASSIUM	MG/L	41176501	6.2	5.6	6	52.1	50.0	92
MAGNESIUM	MG/L	41176501	22.4	22.0	2	47.1	25.0	99
MANGANESE	MG/L	41137304	0.100	0.098	2	0.968	1.00	87
SODIUM	MG/L	41176501	114	112	2	208	100	94
LEAD	MG/L	41137304	<0.002	<0.002	NA	0.042	0.050	84
LEAD	MG/L	41173728	<0.10	<0.10	NA	0.90	1.00	90
SELENIUM	MG/L	41137304	<0.005	<0.005	NA	0.027	0.050	54
SELENIUM	MG/L	41173728	<0.1	<0.1	NA	1.0	1.0	100
ZINC	MG/L	41137304	<0.050	<0.050	NA	0.468	0.500	94

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc., Albuquerque, NM
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 11/17/94 PAGE ____ OF ____

ATI LAB I.D. 411373

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: R.L. mBRley

COMPANY: Daniel B. Stephens + Assoc.
ADDRESS: 6020 Academy NE
Abq. NM 87110
PHONE: 822-9400
FAX: 822-8877

BILL TO: Daniel B. Stephens + Assoc.
COMPANY: Project 4230
ADDRESS: Same as above

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)	NO2/NO3	Ca, Na, Mg, K, Fe, Mn, Cu, As, Ba, Cr, Pb, Hg, Ag, Cd, Se	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.	CL, SO4, Tot. Alk., TDS		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
~~Enron WT-1 Excavation Pit (WT-1)~~	~~11/17/94~~	~~12:00~~	~~Soil~~		~~X~~																												[illegible]
Enron WT-1 Excavation Pit (WT-1)	11/17/94	12:00	Soil	01	X											X															X		4
~~Enron WT-1 Excavation Pit (WT-1)~~	~~11/17/94~~	~~12:00~~	~~Soil~~													~~X~~																	[illegible]
~~Enron WT-1 Excavation Pit (WT-1)~~	~~11/17/94~~	~~12:00~~	~~Soil~~																														[illegible]
Monument	11/17/94	11:30	Soil	02	X											X															X		4
Hat Mesa	11/17/94	11:45	Soil	03	X											X															X		4
MW-1	11/15/94	15:45	H2O	04					X	X				X																			3

PROJECT INFORMATION

PROJ. NO.: 4230
PROJ. NAME: Enron WT-1
P.O. NO.: 4230
SHIPPED VIA: Mesa Airlines

SAMPLE RECEIPT

NO. CONTAINERS	5
CUSTODY SEALS	Y [✓ N] NA
RECEIVED INTACT	✓
RECEIVED COLD	✓

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐24hr ☐48hr ☐72hr ☒1 WEEK (NORMAL) ☒2 WEEK

Comments: Soils only

SAMPLED & RELINQUISHED BY: 1.

Signature: Time:
Printed Name: Date:
Company: Phone:

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: D. Cutler Time: 1005
Printed Name: Dianne Cutler Date: 11/18/94
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

AnalyticalTechnologies,Inc. Albuquerque, NM

Chain of Custody

DATE 11/18/94 PAGE 1 OF 1

NETWORK PROJECT MANAGER: LETITIA KRAKOWSKI

COMPANY: **Analytical Technologies, Inc.**

ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

SAMPLE ID	DATE	TIME	MATRIX	LAB ID
411373 -01	11/17	1200	Nonaq	1
-02	↓	1130	↓	2
-03	↓	1145	↓	3
-04	11/15	1545	AQ	4

ANALYSIS REQUEST

SAMPLE ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Pesticides/PCB 8080	532/632 MOD	619/519 MOD	610/8310	Ca,Na,Mg,K,Fe,Mn,Cu,As,Se	Cr,Zn,Pb,Hg,Ag,Cd,Se	8240 (TCLP 1311) ZHE	Cl,SO4,Alk,TDS	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)	NO2/NO3	NACE	ASBESTOS	RCRA metals, TCLP	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
-01						X													X										3
-02						X													X										9
-03						X													X										3
-04										X	X		X			X													3
										X	X		X			X													
																[illegible] 11/19/94													

PROJECT INFORMATION

PROJECT NUMBER: 411373

PROJECT NAME: SDB

QC LEVEL: [✓ STD] IV

QC REQUIRED: MS MSD BLANK

TAT: [✓ STANDARD] RUSH!

DUE DATE: 12/6

RUSH SURCHARGE: 0

CLIENT DISCOUNT: 10 %

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS	18
CHAIN OF CUSTODY SEALS	✓
INTACT?	✓
RECEIVED GOOD COND./COLD	✓
LAB NUMBER	411373

CREDIT LK11121

SAMPLES SENT TO
SAN DIEGO
FT. COLLINS
RENTON
PENSACOLA
PORTLAND
PHOENIX X
FIBERQUANT

RELINQUISHED BY: 1.

Signature: D. Lutter Time: 1730

Printed Name: Diane Lutter Date: 11/18/94

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: 920

Printed Name: MARGUERITE C[illegible] Date: 11/19/94

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 11/18/94 PAGE 1 OF 1

NETWORK PROJECT MANAGER: LETITIA KRAKOWSKI

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)	[illegible]	632/632 MOD	619/619 MOD	610/5310	[illegible]	[illegible]	8240 (TCLP 1311)ZHE	Cl, SO4, Alk, TDS	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)	NO2/NO3	NACE	ASBESTOS	RCRA [illegible] by TCLP	BOD	TOTAL COLIFORM	FECAL COLIFORM	8240 by TCLP	GROSS ALPHA/BETA	RADIUM 226/228		AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
411373 -01	11/17	1200	Water	1						X													X				X						
-02	↓	1130	↓	2						X													X				X						
-03	↓	1145	↓	3						X													X				X						
-04	11/15	1545	AQ	4										X	X		X			X													
														X	X		X			X													

11/18 M

PROJECT INFORMATION	
PROJECT NUMBER:	411373
PROJECT NAME:	SDB
QC LEVEL:	[✓ STD] IV
QC REQUIRED:	MS MSD BLANK
TAT:	[✓ STANDARD] RUSH!
DUE DATE:	12/6
RUSH SURCHARGE:	0
CLIENT DISCOUNT:	10 %

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS	
INTACT?	
RECEIVED GOOD COND./COLD	
LAB NUMBER	

WOH LK1124

SAMPLES SENT TO
SAN DIEGO
FT. COLLINS
RENTON
PENSACOLA
PORTLAND
PHOENIX X
FIBERQUANT

RELINQUISHED BY: 1.
Signature: D. Tuller Time: 1720
Printed Name: Diana Tuller Date: 11/18/94
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:
Printed Name: Date:
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 (505) 344 3777 DISTRIBUTION: White, Canary - ATI • Pink - ORIGINATOR

RECEIVED DEC 1 3 1994

AnalyticalTechnologies, Inc.

2709-D Pan American Freeway, NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. **411383**

December 13, 1994

Daniel B. Stephens
6020 Academy NE, Suite 100
Albuquerque, NM 87109

Project Name/Number: ENRON WT-1 4230

Attention: Bob Marley

On **11/21/94**, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **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.

All analyses were performed by Analytical Technologies, Inc., 9830 S. 51st Street, Suite B-113, Phoenix, AZ.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

H Mitchell

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jt

Enclosure

Corporate Offices: 5550 Morehouse Drive San Diego, CA 92121 (619) 458-9141

Analytical **Technologies,** Inc.

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1
ATI I.D. : 411383

DATE RECEIVED : 11/21/94
REPORT DATE : 12/13/94

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	MW-10	AQUEOUS	11/18/94
02	MW-12	AQUEOUS	11/18/94
03	DUP-1	AQUEOUS	11/18/94
04	SVE-1-MW	AQUEOUS	11/19/94
05	SB-2	AQUEOUS	11/19/94

----- TOTALS -----

MATRIX	# SAMPLES
AQUEOUS	5

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.

Analytical **Technologies**, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 411383

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1

DATE RECEIVED : 11/21/94

REPORT DATE : 12/13/94

PARAMETER	UNITS	01	02	03	04	05
CARBONATE (CACO3)	MG/L	<1	<1	<1	<1	<1
BICARBONATE (CACO3)	MG/L	804	228	1910	1940	460
HYDROXIDE (CACO3)	MG/L	<1	<1	<1	<1	<1
TOTAL ALKALINITY (AS CACO3)	MG/L	804	228	1910	1940	460
CHLORIDE (EPA 325.2)	MG/L	650	980	270	290	510
NO2/NO3-N, TOTAL (353.2)	MG/L	<0.06	17	0.08	0.07	0.12
SULFATE (EPA 375.2)	MG/L	12	1100	5	5	460
T. DISSOLVED SOLIDS (160.1)	MG/L	2500	3300	4300	4200	2100

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1
ATI I.D. : 411383

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CARBONATE	MG/L	41178604	<1	<1	NA	NA	NA	NA
BICARBONATE	MG/L		118	117	0.9	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		118	117	0.9	NA	NA	NA
CARBONATE	MG/L	41138303	<1	<1	NA	NA	NA	NA
BICARBONATE	MG/L		1910	1930	1	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		1910	1930	1	NA	NA	NA
CHLORIDE	MG/L	41138301	650	650	0	1600	1000	95
NITRITE/NITRATE-N (TOT	MG/L	41138301	<0.06	<0.06	NA	2.05	2.00	102
SULFATE	MG/L	41138302	1100	1100	0	1700	500	120
TOTAL DISSOLVED SOLIDS	MG/L	41138302	3300	3200	3	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. : 411383

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1

DATE RECEIVED : 11/21/94
REPORT DATE : 12/13/94

PARAMETER	UNITS	01	02	03	04	05
SILVER (EPA 200.7/6010)	MG/L	<0.010	<0.010	<0.010	<0.010	<0.010
ARSENIC (EPA 206.2/7060)	MG/L	0.019	<0.005	0.038	0.039	<0.005
BARIUM (EPA 200.7/6010)	MG/L	0.580	0.049	56.2	49.8	0.094
CALCIUM (EPA 200.7/6010)	MG/L	348	506	298	293	248
CADMIUM (EPA 213.2/7131)	MG/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
CHROMIUM (EPA 200.7/6010)	MG/L	<0.010	<0.010	<0.010	<0.010	0.013
COPPER (EPA 200.7/6010)	MG/L	<0.010	0.012	<0.010	<0.010	0.013
IRON (EPA 200.7/6010)	MG/L	1.87	1.22	0.139	0.090	<0.050
MERCURY (EPA 245.1/7470)	MG/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
POTASSIUM (EPA 200.7/6010)	MG/L	5.5	12.6	7.2	6.5	13.4
MAGNESIUM (EPA 200.7/6010)	MG/L	201	244	392	383	143
MANGANESE (EPA 200.7/6010)	MG/L	2.41	0.352	0.078	0.082	0.231
SODIUM (EPA 200.7/6010)	MG/L	165	247	342	339	279
LEAD (EPA 239.2/7421)	MG/L	<0.002	<0.002	<0.002	<0.002	<0.002
SELENIUM (EPA 270.2/7740)	MG/L	<0.005	0.016	<0.005	<0.005	<0.005
ZINC (EPA 200.7/6010)	MG/L	0.057	0.082	<0.050	<0.050	1.15

AnalyticalTechnologies, Inc.

METALS - QUALITY CONTROL

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1
ATI I.D. : 411383

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
SILVER	MG/L	41138305	<0.010	<0.010	NA	0.439	0.500	88
ARSENIC	MG/L	41138302	<0.005	<0.005	NA	0.050	0.050	100
BARIUM	MG/L	41138305	0.094	0.101	7	1.03	1.00	94
CALCIUM	MG/L	41178604	57.8	56.5	2	104	50.0	92
CADMIUM	MG/L	41138302	<0.0005	<0.0005	NA	0.0042	0.0050	84
CHROMIUM	MG/L	41138305	0.013	0.012	8	0.900	1.00	89
COPPER	MG/L	41138305	0.013	0.012	8	0.465	0.500	90
IRON	MG/L	41138305	<0.050	<0.050	NA	0.884	1.00	88
MERCURY	MG/L	41138304	<0.0002	0.0002	NA	0.0048	0.0050	96
POTASSIUM	MG/L	41178604	3.6	3.6	0	51.6	50.0	96
MAGNESIUM	MG/L	41178604	10.0	9.8	2	34.0	25.0	96
MANGANESE	MG/L	41138305	0.231	0.231	0	1.12	1.00	89
SODIUM	MG/L	41178604	19.6	19.0	3	67.2	50.0	95
LEAD	MG/L	41138302	<0.002	<0.002	NA	0.046	0.050	92
SELENIUM	MG/L	41138302	0.016	0.017	6	0.050	0.050	68
ZINC	MG/L	41138305	1.15	1.15	0	1.60	0.500	90

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc., Albuquerque, NM
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 11/20/94 PAGE 1 OF 1

ATI LAB I.D. 411383

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 #100

PHONE: 505-822-9400
FAX:

BILL TO: DANIEL B. STEPHENS & ASSOC
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)	Cl, SO4, TDS, TOT ALKALINITY	NO3/NO2	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	METALS Ca, Na, Mg, K, Fe, Mn, Cu, As, Ba, Cr, Zn, Pb, Hg, Cd, Se, Ag		The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)		NUMBER OF CONTAINERS
MW-10	11/18/94	1330	H2O	01					X	X																	X						
MW-12	11/18/94	1430	H2O	02					X	X																	X						
DUP-1	NA	NA	H2O	03					X	X																	X						
SVE-1-MW	11/19/94	1330	H2O	04					X	X																	X						
SB-2	11/19/94	1700	H2O	05					X	X																	X						

PROJECT INFORMATION

PROJ. NO.: 4230
PROJ. NAME: ENRON WT-1
P.O. NO.:
SHIPPED VIA: MESA AIRLINES

SAMPLE RECEIPT

NO. CONTAINERS	15
CUSTODY SEALS	Y [✓ N] / NA
RECEIVED INTACT	✓
RECEIVED COLD	✓

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:
ALL METALS SAMPLES FIELD FILTERED

SAMPLED & RELINQUISHED BY: 1.

Signature: Clarence P[illegible] Time: 1105
Printed Name: CLARENCE P[illegible] Date: 11/20/94
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: V. Tuller Time: 0930
Printed Name: Dianne Tuller Date: 11/21/94
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

AnalyticalTechnologies,Inc. Albuquerque, NM

Chain of Custody

DATE 11/21/94 PAGE 1 OF 1

NETWORK PROJECT MANAGER: LETITIA KRAKOWSKI

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)	Cl, SO4, TDS, alk, NO3/NO2	602/602 MOD	619/615 MOD	610/8310	Ca, Na, Mg, K, Fe, Mn, Cu, As	Ba, Cr, Zn, Pb, Hg, Cd, Se, Ag	8240 TCLP 1311 ZHE		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
411383-01	11/18	1330	AQ	1						X				X	X																		3
-02	↓	1136	|	2						X				X	X																		3
-03	NA	NA	|	3						X				X	X																		3
-04	11/19	1336	|	4						X				X	X																		3
-05	↓	1700	↓	5						X				X	X																		3

PROJECT INFORMATION

PROJECT NUMBER: 411383
PROJECT NAME: SDB
QC LEVEL: [✓ STD] IV
QC REQUIRED: MS MSD BLANK
TAT: [✓ STANDARD] RUSH

DUE DATE: 12/7
RUSH SURCHARGE: 0
CLIENT DISCOUNT: 10 %

WOH LK1130

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS	15
CHAIN OF CUSTODY SEALS	NA
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	411383

SAMPLES SENT TO
SAN DIEGO
FT. COLLINS
RENTON
PENSACOLA
PORTLAND
PHOENIX X
ALBUQUERQUE

RELINQUISHED BY: 1.
Signature: D. Muller Time: 1936
Printed Name: Danne Muller Date: 11/21/94
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: Rosella Vidal Time: 0941
Printed Name: Rosella Vidal Date: 11/22/94
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

AnalyticalTechnologies, Inc. 9830 S. 51st Street Suite B-113 Phoenix, AZ 85044 (602) 496-4400

ATI I.D. **411818**

December 13, 1994

Daniel B. Stephens & Associates
6020 Academy NE
Suite 100
Albuquerque, NM 87109

Project Name/Number: Enron WT-1/4230

Attention: Bob Marley

On **11/23/94**, Analytical Technologies, Inc., received a request to analyze **aqeuous** sample(s). The sample(s) 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.

If you have any questions or comments, please do not hesitate to contact us at (602) 496-4400.

Mary H. Tyer

Mary Tyer
Project Manager

MT/jat

Enclosure

ADHS License No. AZ0061
Donald F. Weber, Laboratory Manager

Corporate Offices: 5550 Morehouse Drive San Diego, CA 92121 (619) 458-9141

Analytical **Technologies,** Inc.

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1
DATE RECEIVED : 11/23/94
REPORT DATE : 12/12/94
ATI I.D. : 411818

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	MW-9	AQUEOUS	11/21/94
02	SB-1	AQUEOUS	11/22/94
03	MW-7	AQUEOUS	11/22/94

----- TOTALS -----

MATRIX	# SAMPLES
AQUEOUS	3

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.

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 411818

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1

DATE RECEIVED : 11/23/94
REPORT DATE : 12/12/94

PARAMETER	UNITS	01	02	03
CARBONATE (CACO3)	MG/L	<1	<1	<1
BICARBONATE (CACO3)	MG/L	326	492	327
HYDROXIDE (CACO3)	MG/L	<1	<1	<1
TOTAL ALKALINITY (AS CACO3)	MG/L	326	492	327
CHLORIDE (EPA 325.2)	MG/L	860	750	400
NITRITE (EPA 354.1)	MG/L	1.3	<0.05	<0.05
NITRATE AS N (EPA 353.2)	MG/L	8.4	0.28	6.8
SULFATE (EPA 375.2)	MG/L	850	450	920
T. DISSOLVED SOLIDS (160.1)	MG/L	2800	2300	2400

Analytical **Technologies,** Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1 ATI I.D. : 411818

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CARBONATE	MG/L	41138303	<1	<1	NA	NA	NA	NA
BICARBONATE	MG/L		1910	1930	1	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		1910	1930	1	NA	NA	NA
CHLORIDE	MG/L	41185701	126	126	0	226	100	100
NITRITE AS NITROGEN	MG/L	41149912	<0.05	<0.05	NA	0.25	0.25	100
NITRATE AS NITROGEN	MG/L	41181802	0.28	0.28	0	2.31	2.00	102
SULFATE	MG/L	41185701	240	240	0	430	200	95
TOTAL DISSOLVED SOLIDS	MG/L	41181801	2800	2900	4	NA	NA	NA

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result - Sample Result})}{\text{Spike Concentration}} \text{ X } 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result - Duplicate Result})}{\text{Average Result}} \text{ X } 100$$

Analytical**Technologies,** Inc.

METALS RESULTS

ATI I.D. : 411818

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1

DATE RECEIVED : 11/23/94

REPORT DATE : 12/12/94

PARAMETER	UNITS	01	02	03
SILVER (EPA 200.7/6010)	MG/L	<0.010	<0.010	<0.010
ARSENIC (EPA 206.2/7060)	MG/L	<0.005	0.005	0.006
BARIUM (EPA 200.7/6010)	MG/L	0.043	0.085	0.032
CALCIUM (EPA 200.7/6010)	MG/L	452	275	323
CADMIUM (EPA 213.2/7131)	MG/L	<0.0005	<0.0005	<0.0005
CHROMIUM (EPA 200.7/6010)	MG/L	<0.010	<0.010	<0.010
COPPER (EPA 200.7/6010)	MG/L	<0.010	0.010	0.014
IRON (EPA 200.7/6010)	MG/L	<0.050	<0.050	<0.050
MERCURY (EPA 245.1/7470)	MG/L	<0.0002	<0.0002	<0.0002
POTASSIUM (EPA 200.7/6010)	MG/L	9.6	9.4	7.9
MAGNESIUM (EPA 200.7/6010)	MG/L	222	209	148
MANGANESE (EPA 200.7/6010)	MG/L	0.229	0.254	0.069
SODIUM (EPA 200.7/6010)	MG/L	295	322	244
LEAD (EPA 239.2/7421)	MG/L	<0.002	<0.002	<0.002
SELENIUM (EPA 270.2/7740)	MG/L	0.009	<0.005	0.008
ZINC (EPA 200.7/6010)	MG/L	0.092	4.73	<0.050

Analytical Technologies, Inc.

METALS - QUALITY CONTROL

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230
PROJECT NAME : ENRON WT-1
ATI I.D. : 411818

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
SILVER	MG/L	41181802	<0.010	<0.010	NA	0.439	0.500	88
ARSENIC	MG/L	41185801	0.016	0.015	6	0.060	0.050	88
BARIUM	MG/L	41181802	0.085	0.079	7	0.982	1.00	90
CALCIUM	MG/L	41181803	323	334	3	378	50.0	110
CADMIUM	MG/L	41178801	<0.0005	<0.0005	NA	MSA	CC=	.9988
CHROMIUM	MG/L	41181802	<0.010	<0.010	NA	0.896	1.00	90
COPPER	MG/L	41181802	0.010	<0.010	NA	0.459	0.500	90
IRON	MG/L	41181802	<0.050	<0.050	NA	0.888	1.00	89
MERCURY	MG/L	41138304	<0.0002	0.0002	NA	0.0048	0.0050	96
MERCURY	MG/L	41183001	<0.0002	<0.0002	NA	0.0050	0.0050	100
POTASSIUM	MG/L	41181803	7.9	8.0	1	58.7	50.0	102
MAGNESIUM	MG/L	41181803	148	145	2	401	250	101
MANGANESE	MG/L	41181802	0.254	0.237	7	1.15	1.00	90
SODIUM	MG/L	41181803	244	251	3	284	50.0	80
LEAD	MG/L	41180601	<0.002	<0.002	NA	0.042	0.050	84
SELENIUM	MG/L	41138302	0.016	0.017	6	0.050	0.050	68
ZINC	MG/L	41181802	4.73	4.43	7	14.9	10.0	102

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

[redacted] Analytical Technologies, Inc., [redacted] Albuquerque, NM
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

[redacted] CHAIN OF CUSTODY [redacted]

DATE: 11/22 PAGE 1 OF 1

[redacted] ATI LAB I.D.: 411818 [redacted]

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 #100
ALBUQUERQUE NM 87109
PHONE: 505-822-9400
FAX: 505-822-7878

BILL TO: DANIEL B. STEPHENS + ASSOC
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)	Cl, SO4, TDS, TOT ALKALINITY	NO2/NO3	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)	METALS Ca, Na, Mg, K, Fe, Mn, [illegible] Fe, Cu, Zn, Pb, Hg, Ba, Cd, Se	NUMBER OF CONTAINERS
MW-9	11/21/94	1430	H_2O	1					X	X																						X	3
SB-1	11/22/94	0915	H_2O	2					X	X																						X	3
MW-7	11/22/94	1310	H_2O	3					X	X																						X	3

PROJECT INFORMATION

PROJ. NO.: 4230
PROJ. NAME: ENRON WT-1
P.O. NO.: 4230
SHIPPED VIA: FED EX

SAMPLE RECEIPT

NO. CONTAINERS	9
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:
METALS FIELD FILTERED

SAMPLED & RELINQUISHED BY: 1.

Signature: Clarence Pigman Time: 1700
Printed Name: CLARENCE PIGMAN Date: 11/22/94
Company: Phone:

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: Rosella Vidal Time: 1111
Printed Name: Rosella Vidal Date: 11/23/94
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

Analytical **Technologies,** Inc.

2709-D Pan American Freeway, NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

RE[illegible] '994

ATI I.D. **412312**

December 22, 1994

Daniel B. Stephens & Associates
6020 Academy NE, Suite 100
Albuquerque, NM 87109

Project Name/Number: ENRON-WT1 4230.2

Attention: Bob Marley

On **12/02/94**, 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.

Due to matrix interferences, selenium spike analysis was performed using the Method of Standard Additions (MSA). The spike result given is the correlation coefficient (CC), which is ≥ 0.995.

For sample "MW-13", the Sulfuric Acid preserved bottle for Nitrate/Nitrite analysis was not received by ATI, Albuquerque.

EPA Method 8240 and RCRA Metal by TCLP analyses were performed by Analytical Technologies, Inc., 225 Commerce Drive, Fort Collins, CO.

All other analyses were performed by Analytical Technologies, Inc., 9830 S. 51st Street, Suite B-113, Phoenix, AZ.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

H Mitchell

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jt

Enclosure

Analytical **Technologies,** Inc.

CLIENT : DANIEL B. STEPHENS
PROJECT # : 4230.2
PROJECT NAME : ENRON-WT1

DATE RECEIVED : 12/02/94
REPORT DATE : 12/22/94

ATI ID: 412312

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	MW-4	AQUEOUS	12/01/94
02	MW-5	AQUEOUS	12/01/94
03	MW-6	AQUEOUS	11/30/94
04	MW-8	AQUEOUS	11/30/94
05	MW-13	AQUEOUS	12/01/94
06	PIT	NON-AQ	11/30/94
07	DEHY	NON-AQ	11/30/94

---TOTALS---

MATRIX	#SAMPLES
AQUEOUS	5
NON-AQ	2

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.

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 412312

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230.2
PROJECT NAME : ENRON-WT1

DATE RECEIVED : 12/02/94

REPORT DATE : 12/22/94

PARAMETER	UNITS	01	02	03	04	05
CARBONATE (CACO3)	MG/L	<1	<1	<1	<1	<1
BICARBONATE (CACO3)	MG/L	273	1080	624	441	273
HYDROXIDE (CACO3)	MG/L	<1	<1	<1	<1	<1
TOTAL ALKALINITY (AS CACO3)	MG/L	273	1080	624	441	273
CHLORIDE (EPA 325.2)	MG/L	540	360	700	590	340
NO2/NO3-N, TOTAL (353.2)	MG/L	20	<0.06	<0.06	0.44	-
SULFATE (EPA 375.2)	MG/L	1000	<5	410	330	1400
T. DISSOLVED SOLIDS (160.1)	MG/L	2800	2000	2400	1900	2900

AnalyticalTechnologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230.2
PROJECT NAME : ENRON-WT1
ATI I.D. : 412312

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CARBONATE	MG/L	41231204	<1	<1	NA	NA	NA	NA
BICARBONATE	MG/L		441	444	0.7	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		441	444	0.7	NA	NA	NA
CARBONATE	MG/L	41256810	<1	<1	NA	NA	NA	NA
BICARBONATE	MG/L		451	456	1	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		451	461	1	NA	NA	NA
CHLORIDE	MG/L	41253101	26	26	0	51	25	100
NITRITE/NITRATE-N (TOT	MG/L	41180301	6.7	6.7	0	27.2	20.0	102
SULFATE	MG/L	41231204	330	330	0	520	200	95
SULFATE	MG/L	41255506	67	67	0	106	40	98
TOTAL DISSOLVED SOLIDS	MG/L	41231202	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. : 412312

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230.2
PROJECT NAME : ENRON-WT1

DATE RECEIVED : 12/02/94

REPORT DATE : 12/22/94

PARAMETER	UNITS	01	02	03	04	05
SILVER (EPA 200.7/6010)	MG/L	<0.010	<0.010	<0.010	<0.010	<0.010
ARSENIC (EPA 206.2/7060)	MG/L	0.007	0.036	<0.005	0.006	0.006
BARIUM (EPA 200.7/6010)	MG/L	0.025	17.3	0.109	0.052	0.048
CALCIUM (EPA 200.7/6010)	MG/L	332	185	293	247	491
CADMIUM (EPA 213.2/7131)	MG/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
CHROMIUM (EPA 200.7/6010)	MG/L	<0.010	<0.010	<0.010	<0.010	<0.010
COPPER (EPA 200.7/6010)	MG/L	<0.010	<0.010	<0.010	0.014	<0.010
IRON (EPA 200.7/6010)	MG/L	<0.050	0.097	<0.050	<0.050	<0.050
MERCURY (EPA 245.1/7470)	MG/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
POTASSIUM (EPA 200.7/6010)	MG/L	5.9	6.1	7.1	6.0	9.3
MAGNESIUM (EPA 200.7/6010)	MG/L	153	200	197	137	134
MANGANESE (EPA 200.7/6010)	MG/L	0.024	0.112	0.562	0.136	<0.010
SODIUM (EPA 200.7/6010)	MG/L	353	326	267	221	115
LEAD (EPA 239.2/7421)	MG/L	<0.002	<0.002	<0.002	<0.002	<0.002
SELENIUM (EPA 270.2/7740)	MG/L	0.020	<0.005	<0.005	<0.005	0.009
ZINC (EPA 200.7/6010)	MG/L	<0.050	<0.050	<0.050	<0.050	<0.050

AnalyticalTechnologies,Inc.

METALS - QUALITY CONTROL

CLIENT : D.B. STEPHENS & ASSOCIATES
PROJECT # : 4230.2
PROJECT NAME : ENRON-WT1

ATI I.D. : 412312

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
SILVER	MG/L	41231204	<0.010	<0.010	NA	0.477	0.500	95
ARSENIC	MG/L	41251801	0.054	0.055	2	0.096	0.050	84
BARIUM	MG/L	41231204	0.052	0.052	0	1.04	1.00	99
CALCIUM	MG/L	41231201	332	321	3	558	250	90
CADMIUM	MG/L	41231201	<0.0005	<0.0005	NA	0.0043	0.0050	86
CHROMIUM	MG/L	41231204	<0.010	<0.010	NA	0.955	1.00	96
COPPER	MG/L	41231204	0.014	0.015	7	0.511	0.500	99
IRON	MG/L	41231204	<0.050	<0.050	NA	0.959	1.00	95
MERCURY	MG/L	41253707	<0.0002	<0.0002	NA	0.0048	0.0050	96
POTASSIUM	MG/L	41250102	12.4	12.6	2	62.3	50.0	101
MAGNESIUM	MG/L	41231201	153	148	3	266	125	90
MANGANESE	MG/L	41231204	0.136	0.134	1	1.10	1.00	96
SODIUM	MG/L	41231201	353	346	2	459	100	105
LEAD	MG/L	41231201	<0.002	<0.002	NA	0.050	0.050	100
SELENIUM	MG/L	41231201	0.020	0.019	5	MSA	CC=	.9995
ZINC	MG/L	41231204	<0.050	<0.050	NA	0.504	0.500	101

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc., Albuquerque, NM
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 12/2/94 PAGE 1 OF 1

ATI LAB I.D. 412312

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

PROJECT MANAGER: Rob Marley

COMPANY: Daniel B. Stephens & Assoc.
ADDRESS: 6020 Academy NE Suite 100

PHONE: 822 9400
FAX: 822 8877

BILL TO: George Robinson
COMPANY: ENRON Enviro Affairs
ADDRESS: 1400 Smith St
Houston, TX 77002

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.	TCLP Volatiles (8240)		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	Cl, SO_4, TDS, T-Alk	NO_2/NO_3	The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)	Ca, Mg, Na, K, Fe, Mn, Zn, Cu	NUMBER OF CONTAINERS
MW-4	12/1/94	0850	H_2O	01																							X	X		X		X	3
MW-5	12/1/94	1350	H_2O	02																							X	X		X		X	3
MW-6	11/30/94	1540	H_2O	03																							X	X		X		X	3
MW-8	11/30/94	1575	H_2O	04																							X	X		X		X	3
MW-13	12/1/94	1000	H_2O	05																							X	X		X		X	3
Pit	11/30/94	1700	Soil	06										X																	X		4
DEHY	11/30/94	1645	Soil	07										X																	X		4

PROJECT INFORMATION

PROJ. NO.: 4230.2
PROJ. NAME: ENRON - WTI
P.O. NO.:
SHIPPED VIA: HAND Delivered

SAMPLE RECEIPT

NO. CONTAINERS	23
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:
o Metal Samples are field filtered

SAMPLED & RELINQUISHED BY: 1.

Signature: Time: 1505
Printed Name: Thomas Ford Date: 12-2-94
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: 1505
Printed Name: Date: 12/2/94
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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Chain of Custody

DATE 12/2/94 PAGE 1 OF 1

NETWORK PROJECT MANAGER: LETITIA KRAKOWSKI

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	Ca, Mg, Na, K, Fe, Mn, Zn, Cu	Cl, SO4, TDS, Alk	8240 (TCLP 1311) ZHE	NO2 / NO3	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240)	RCRA METAL BUT TOT Dig.	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
412312 -01	12/1	0850	AQ	1										X	X		X			X													3
-02	12/1	1350		2										X	X		X			X													3
-03	11/30	1540		3										X	X		X			X													3
-04	11/30	1575		4										X	X		X			X													3
-05	12/1	1000	↓	5										X	X					X													2

PROJECT INFORMATION

PROJECT NUMBER: 412312
PROJECT NAME: SDB
QC LEVEL: [✓ STD.] IV
QC REQUIRED: MS MSD BLANK
TAT: [✓ STANDARD] RUSH!

DUE DATE: 12/16
RUSH SURCHARGE: 0
CLIENT DISCOUNT: 10 %

WO#LK1140

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS: 15
CHAIN OF CUSTODY SEALS: NA
INTACT? Y
RECEIVED GOOD COND./COLD: Y
LAB NUMBER 412312

SAMPLES SENT TO:
SAN DIEGO
FT. COLLINS
RENTON
PENSACOLA
PORTLAND
PHOENIX X
FIBERQUANT

RELINQUISHED BY: 1.
Signature: D. Walker Time: 1730
Printed Name: Dianne Walker Date: 12/2/94
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: L. Estelman Time: 1136
Printed Name: Linda Estelman Date: 12/3/94
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

94-12-011

AnalyticalTechnologies,Inc. Albuquerque, NM

Chain of Custody

DATE 12/2/94 PAGE 1 OF 1

NETWORK PROJECT MANAGER: LETITIA KRAKOWSKI

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			8240 (TCLP 1311) ZHE	RCRA Metals by TCLP	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
412312-06	11/30	1700	Nonaq	01												X	X																4
-07	11/30	1640	Nonaq	02												X	X																4

PROJECT INFORMATION

PROJECT NUMBER: 412312

PROJECT NAME: SDm

QC LEVEL: [✓ STD] IV

[✓ QC REQUIRED:] MS MSD BLANK

TAT: [✓ STANDARD] RUSH!

DUE DATE: 12/16

RUSH SURCHARGE: 0

CLIENT DISCOUNT: 10 %

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS	8
CHAIN OF CUSTODY SEALS	NA
INTACT?	NA
RECEIVED GOOD COND./[✓ COLD]	Y
LAB NUMBER	

W0#LK1141

SAMPLES SENT TO:

SAN DIEGO	
FT. COLLINS	X
RENTON	
PENSACOLA	
PORTLAND	
PHOENIX	
FIBERQUANT	

RELINQUISHED BY: 1.

Signature: Time: 1730

Printed Name: Dianne Adler Date: 12/2/94

Analytical Technologies, Inc.
Albuquerque

RECEIVED BY: (LAB) 1.

Signature: Time:

Printed Name: Date:

Company: FED X

RELINQUISHED BY: 2.

Signature: Time:

Printed Name: Date

Company: FED-X

RECEIVED BY: (LAB) 2.

Signature: Time: 10:00

Printed Name: L. Kelly Date: 12-3-94

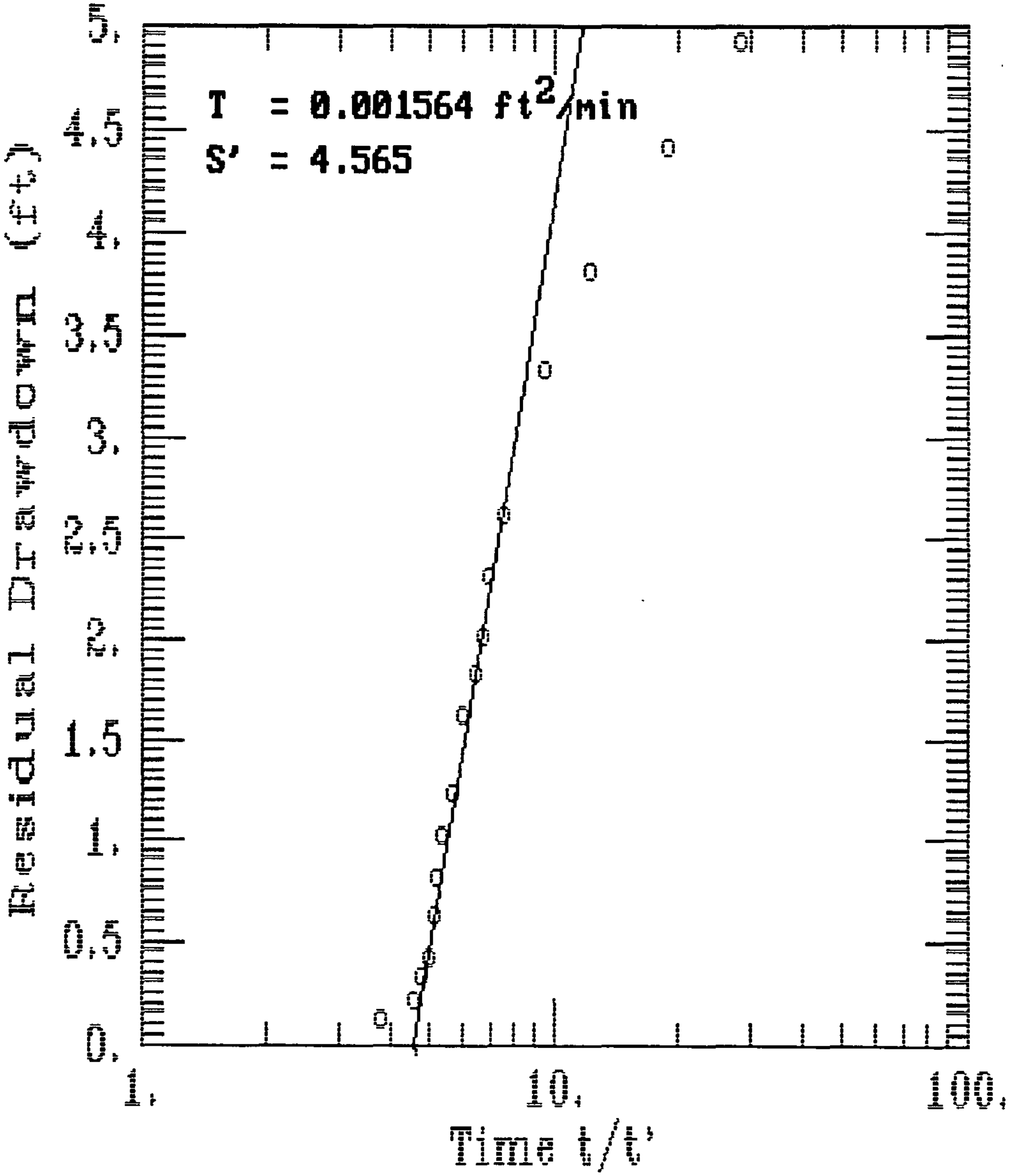
Company: ATI

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

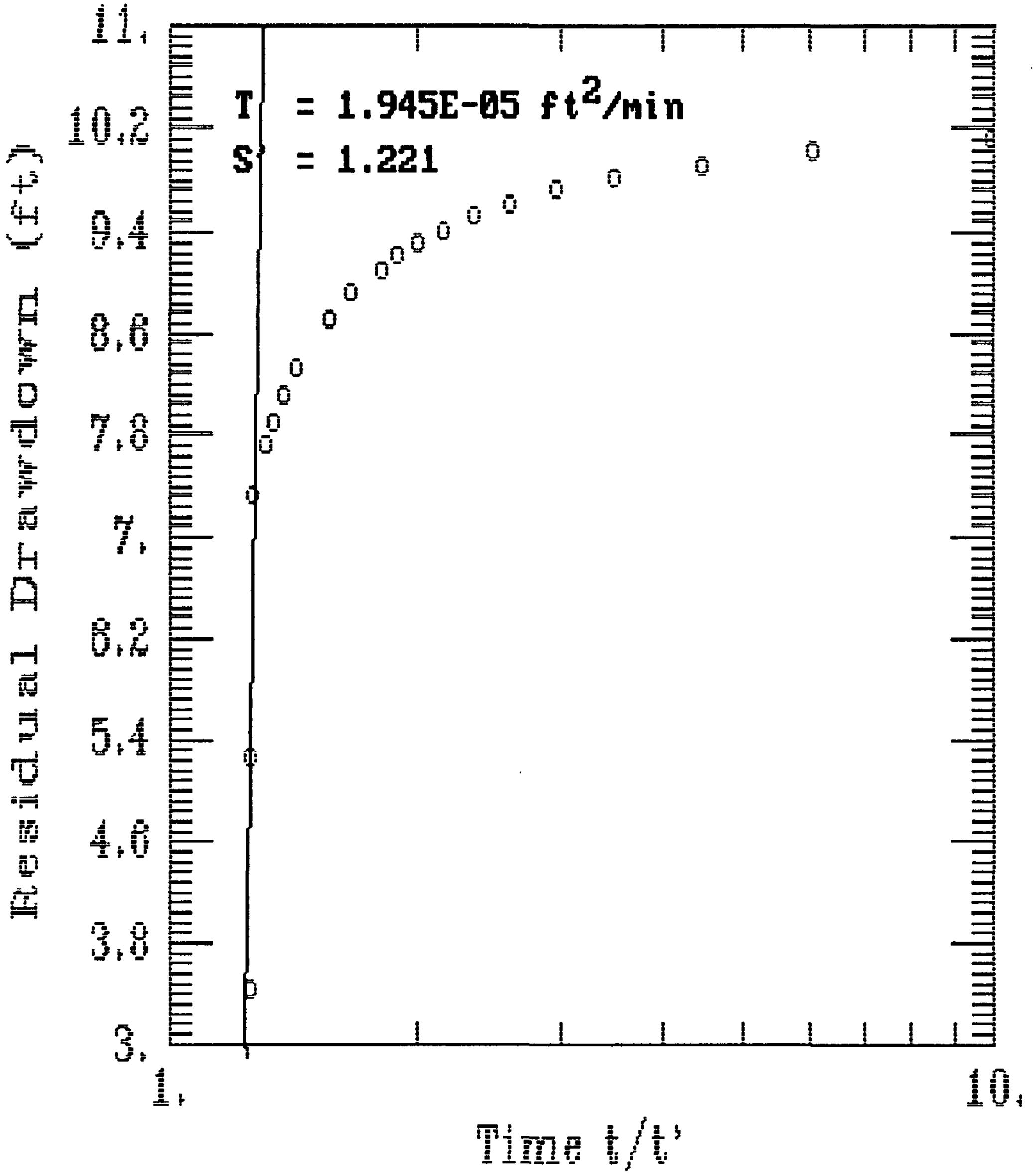
APPENDIX C

RESULTS OF HYDRAULIC TESTING

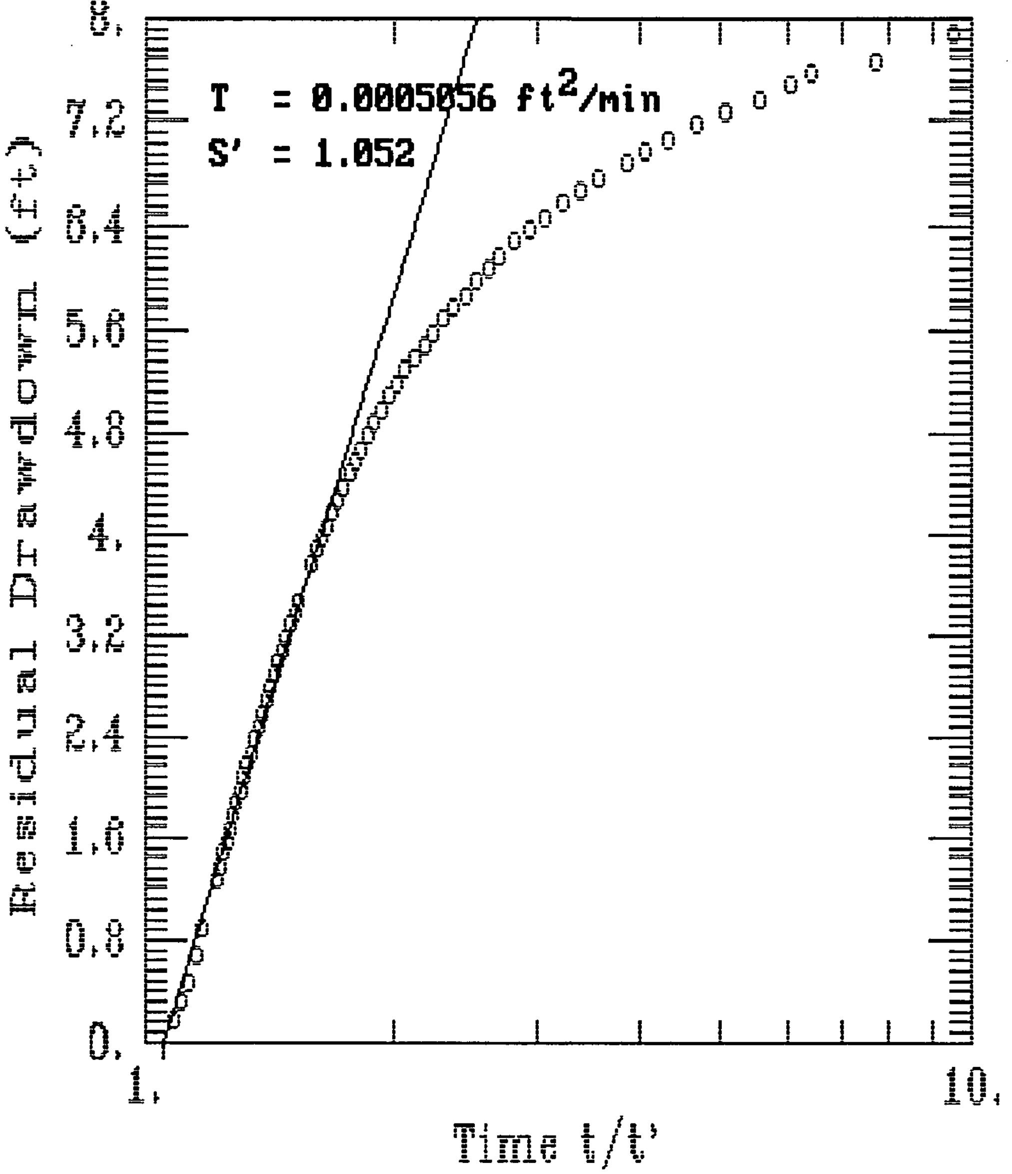
Monitor Well MW-4 Recovery



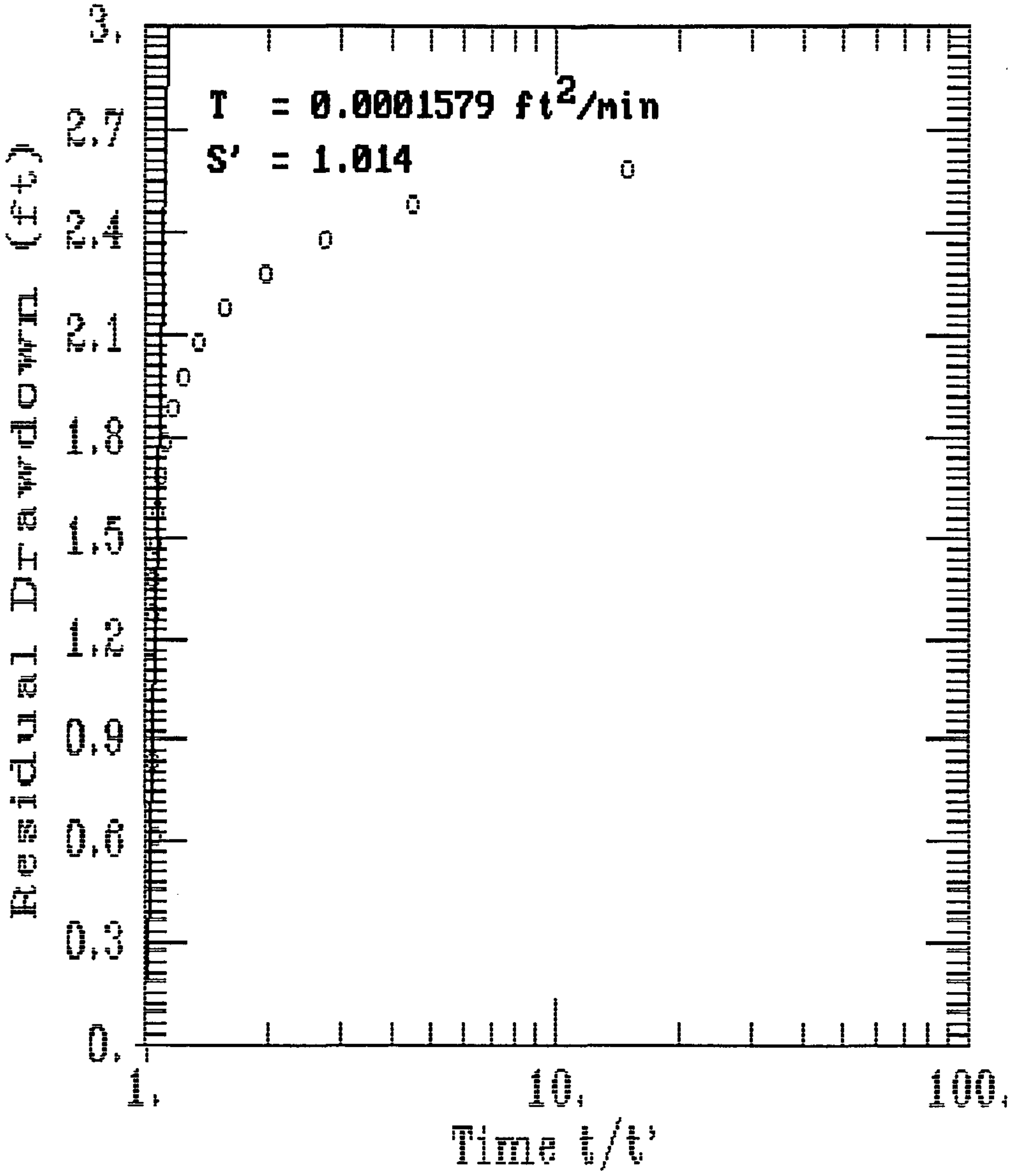
Monitor Well MW-5 Recovery



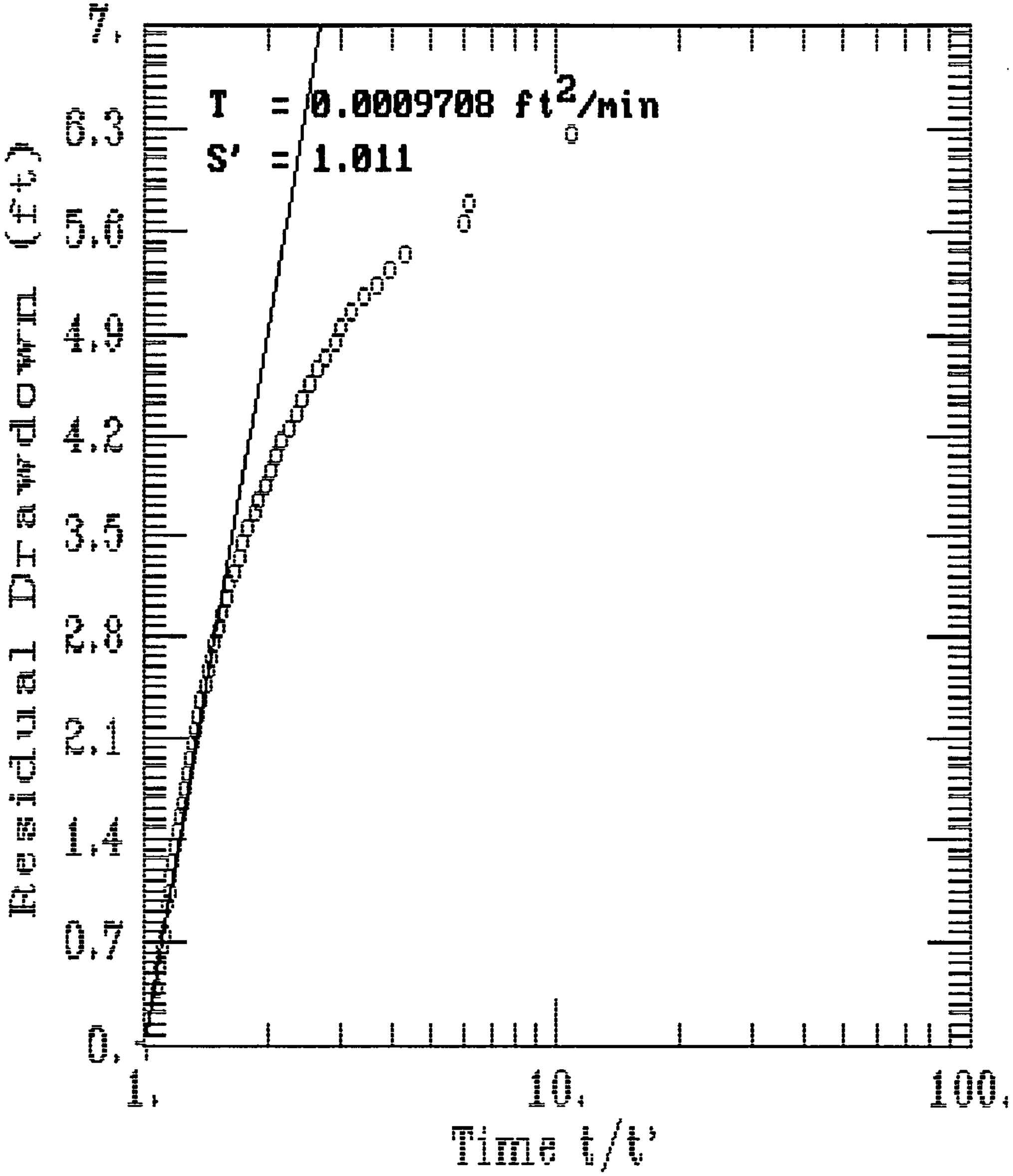
Monitor Well MW-8 Recovery



Monitor Well MW-9 Recovery



Monitor Well MW-12 Recovery



Monitor Well MW-4 Bail-Recovery Test

Date:	12/01/94	
Initial depth to water:	47.18	(ft.)
Total depth of well:	58.37	(ft.)
Start Bailing:	08:19:00	
Stop Bailing:	08:28:10	
Purge volume:	15.00	(gal.)

Elapse Time (minutes)	Displacement (feet)
0.33	4.92
0.50	4.42
0.80	3.82
1.05	3.32
1.38	2.62
1.53	2.32
1.58	2.02
1.65	1.82
1.80	1.62
1.92	1.22
2.07	1.02
2.15	0.82
2.20	0.62
2.28	0.42
2.38	0.32
2.53	0.22
3.20	0.12

Monitor Well MW-5 Bail-Recovery Test

Date:	12/1/94	
Initial depth to water:	48.68	(ft.)
Total depth of well:	59.80	(ft.)
Start Bailing:	10:54:30	
Stop Bailing:	11:14:30	
Purge volume:	5.00	(gal.)

Elapse Time (minutes)	Displacement (feet)
1.67	10.12
2.97	10.02
4.35	9.92
6.02	9.82
7.67	9.72
9.37	9.62
11.15	9.52
13.02	9.42
14.87	9.32
16.73	9.22
18.63	9.12
22.82	8.92
26.32	8.72
34.75	8.32
39.67	8.12
43.75	7.92
48.22	7.72
56.83	7.32
104.50	5.26
154.50	3.42

Monitor Well MW-8 Bail-Recovery Test

Date:	11/30/94	
Initial depth to water:	49.52	(ft.)
Total depth of well:	59.27	(ft.)
Start Bailing:	13:05:00	
Stop Bailiing:	13:14:15	
Purge volume:	4.00	(gal.)

Elapse Time (minutes)	Displacement (feet)	Elapse Time (minutes)	Displacement (feet)
10.33	7.88	23.73	3.98
10.63	7.68	24.27	3.88
10.95	7.58	24.78	3.78
11.07	7.48	25.33	4.68
11.28	7.38	25.90	4.58
11.53	7.28	26.48	3.48
11.77	7.18	27.07	3.38
12.02	7.08	27.67	3.28
12.27	6.98	28.35	3.18
12.50	6.88	29.03	3.08
12.85	6.78	29.72	2.98
13.12	6.68	30.47	2.88
13.42	6.58	31.37	2.78
13.73	6.48	32.23	2.68
14.03	6.38	33.07	2.58
14.37	6.28	34.03	2.48
14.70	6.18	34.97	2.38
15.00	6.08	35.93	2.28
15.33	5.98	37.08	2.18
15.65	5.88	38.17	2.08
16.03	5.78	39.35	1.98
16.38	5.68	40.68	1.88
16.77	5.58	41.97	1.78
17.12	5.48	43.50	1.68
17.53	5.38	44.97	1.58
17.93	5.28	46.50	1.48
18.35	5.18	48.30	1.38
18.77	5.08	50.17	1.28
19.23	4.98	61.00	0.88
19.62	4.88	68.08	0.68
20.03	4.78	80.00	0.46
20.45	4.68	92.00	0.31
20.88	4.58	114.00	0.17
21.28	4.48		
21.80	4.38		
22.25	4.28		
22.75	4.18		
23.25	4.08		

Monitor Well MW-9 Bail-Recovery Test

Date:	11/30/94	
Initial depth to water:	55.52	(ft.)
Total depth of well:	59.30	(ft.)
Start Bailing:	09:33:00	
Stop Bailing:	09:36:30	
Purge volume:	1.20	(gal.)

Elapse Time (minutes)	Displacement (feet)
3.75	2.58
4.50	2.48
5.48	2.38
7.12	2.28
9.60	2.18
12.90	2.08
17.67	1.98
23.48	1.88
30.07	1.78
36.63	1.68
45.18	1.58
54.50	1.48
64.08	1.38
74.10	1.28
86.42	1.18
74.00	0.84
52.00	0.61

Monitor Well MW-12 Bail-Recovery Test

Date: 11/30/94
Initial depth to water: 50.45 (ft.)
Total depth of well: 60.20 (ft.)
Start Bailing: 11:05:00
Stop Bailing: 11:10:00
Purge volume: 3.30 (gal.)

Elapse Time (minutes)	Displacement (feet)	Elapse Time (minutes)	Displacement (feet)
5.50	6.25	21.58	1.95
5.97	5.80	22.68	1.85
6.00	5.65	23.83	1.75
6.50	5.45	25.08	1.65
6.70	5.35	26.72	1.55
6.85	5.25	27.77	1.45
7.05	5.15	30.57	1.35
7.27	5.05	32.72	1.25
7.47	4.95	34.23	1.15
7.63	4.85	35.97	1.05
7.87	4.75	38.42	0.95
8.07	4.65	45.82	0.75
8.28	4.55	50.28	0.65
8.48	4.45	55.12	0.55
8.72	4.35	68.92	0.37
8.97	4.25		
9.27	4.15		
9.53	4.05		
9.85	3.95		
10.17	3.85		
10.50	3.75		
10.83	3.65		
11.23	3.55		
11.67	3.45		
12.10	3.35		
12.53	3.25		
13.00	3.15		
13.42	3.05		
13.93	2.95		
14.52	2.85		
15.08	2.75		
15.67	2.65		
16.30	2.55		
16.97	2.45		
17.88	2.35		
18.50	2.25		
19.55	2.15		
20.55	2.05		

APPENDIX D

SOIL VAPOR EXTRACTION PILOT TEST

AcuVac Remediation Report

AcuVac Remediation, Inc.

9111 Katy Freeway
Suite 303
Houston, TX 77024
(713) 468-6688: TEL
(713) 468-6689: FAX

November 25, 1994

Mr Bob Marley
Project Geologist
Daniel B. Stephens & Associates, Inc.
6020 Academy NE, Ste 100
Albuquerque, NM 87109

Re: Pilot Test - Enron WT-1, DBS & A; Project #4230

Dear Bob:

Enclosed is the report on Pilot Testing performed ~~October~~ November 20, 1994 at the above referenced location. The test was conducted using the AcuVac SVE I-6 System with various instrumentation including the HORIBA Analyzer.

Project Scope:

- Connect the SVE System to wells MW-10, SVE-1, SVE-1MW and MW-2 as extraction wells (EW) and apply vacuum; record the vacuum and well flow and record all System data, including fuel flow (propane).
- The Test procedure is to provide variable rates of vacuum and flow over the test period.
- Install and observe the magnehelic gauges on the outer monitoring wells to determine if the selected extraction well is in vacuum communication with the outer monitoring wells.
- Take influent vapor samples to provide on-site HORIBA Analyzer data.
- Provide a method of sampling influent vapors with the flow through canisters.
- Measure the distances from the selected extraction wells to the outer wells.
- Operate the SVE System in a manner that all well vapors are passed through the engine to destruct the contaminants and exhausted to meet air emission standards.
- Complete the tests by providing a report consisting of operating and analytical data.

Fuel Use Information:

When the SVE System is running 100% on fuel from extraction well vapors at an altitude of 3,600 ft and the engine at 2,000 - 2,300 rpm, the maximum contaminated fuel destruction or burn rate is approximately 23.8 lbs/hr or 3.72 gals/hr of VOC contamination. During these tests, the wells vapors provided 29.0% of the fuel based on the calculations below.

Fuel Use Calculations:

At 2,000 - 2,300 rpm and 44 BHP, the engine burns 6.08 gals propane/hr.
Propane has 21,591 BTU/lb, and 4.24 lbs/gal.
Total BTU = 21,591 x 6.08 x 4.24 = 556,833 BTU/hr.
Gasoline = 149,520 BTU/gal.
SVE Sys. max. contaminant consumption = $\frac{556,833}{149,520}$ = 3.72 gals/hr.
Total engine hours = 10.0 hrs.
Total gallons of propane burned = 43.0 gals = fuel for 7.07 hrs.
Total gallons of contaminant vapors burned for 2.93 hrs = 10.9 gals.
Gasoline weighs 6.38 lbs/gal.
Total contaminant = 69.54 lbs = 6.95 lbs/hr (1.09 gals/hr) average for 10 hrs.

Summary of Data: See Exhibit A

Discussion of Data:

Prior to starting each test, all the SVE systems are checked for normal operation and each magnehelic gauge is checked and calibrated to "0". The propane tank is full so an accurate fuel consumption can be estimated for the total test time. Expandable well plugs are placed in the outer wells. Static well data is recorded on each outer well.

Test #1 was a 3.9 hour SVE test conducted from extraction well (EW) MW-10. The well is constructed from 2" schedule 80 PVC with TD of 62.60 ft and screened up 15 ft with sand pack, bentonite seal and grouted. DTGW at test time was 53.20 ft leaving a screened area above groundwater of 5.60 ft.

At the start of the test (0735 hours), the extraction well (EW) vacuum was set at 50" H_2O with an initial flow of 10 cfm. Outer wells MW-9, 12 & 13 all recorded a pressure which was the static pressure data. Well MW-12 data was not included in the well data averaging since the vacuum was ineffective due to a large and deep excavation between EW and the well. HORIBA data indicated that the total HC was in the 15,500 ppm range with CO_2 at 2.82%. As the EW vacuum was increased to 60" H_2O, a slight amount of surging on the EW vacuum gauge was noted. With all systems held constant, the EW vacuum increased to 80, 100 and +100" H_2O indicating the screened area was probably reduced due to rising groundwater. The SVE vacuum was shut off to allow the groundwater to seek its natural level and the test was then restarted at 0825 hours. The EW vacuum was set at 30" H_2O with a flow of 5 cfm. By 0900 hours, outer well MW-9 indicated a vacuum of 0.14" H_2O, a change of approximately 0.30" H_2O in 0.5 hours. The EW vacuum was increase to 40" H_2O and a flow of 9 cfm. HORIBA data indicated that the total HC had increased to over 21,000 ppm and CO_2 over 4.20%. By 1030 hours, outer wells MW-9 & 13 were recording a vacuum in response to the EW vacuum of 50" H_2O and flow of 12 cfm. Prior to the completion of the test, the EW vacuum was increased to 60" H_2O with a flow of 14 cfm. By 1130 hours, significant vacuums were recorded on MW-9 & 13 and each well was over 220 ft from the extraction well (EW). The HC from the HORIBA data indicated the range remained approximately 21,500 ppm. After the SVE System was shut off, the outer well expandable plugs were left in place. At 1245 hours (1.25 hours after completion of Test #1), the static well data on MW-9, 12 & 13 indicated (0.15)" H_2O pressure [( ) indicates well pressure]. This indicates that the recorded vacuums were the result of the vacuum placed on the extraction well.

Test #2 was a 3.0 hour SVE test conducted from extraction well (EW) SVE-1. This well is constructed from 2" schedule 80 PVC with TD = 36.0 ft and screened up 15.0 ft. There was no groundwater at this depth. Prior to the start of the test at 1200 hours, the static well data for the outer wells was recorded. Each recorded a well pressure varying from (0.10)" to (0.34)" H_2O.

The initial EW vacuum was set at 40" H_2O with a flow of 9 cfm. An instant vacuum was recorded on well SVE-1MW which was nested with SVE-1. The screened areas were 6.5 ft apart with a 2.0 ft bentonite seal. HORIBA data indicated the HC was 334 ppm with CO_2 of 2.54%. After two hours and the EW vacuum at 60" H_2O and flow of 16 cfm, all the outer wells were recording a slight vacuum with SVE-1MW recording 1.30" H_2O vacuum. During the next hour, the EW vacuum was increased to 80" H_2O with flow of 24 cfm. By 1500 hours, all the outer wells had overcome the initial pressures and were recording reasonable vacuums. The trend on the HORIBA data was down, dropping from a high of 370 ppm to 210 ppm. At the completion of the test, the outer wells were responding quicker to EW vacuum and flow increases indicating a drying effect of the subsurface. One to two additional hours of SVE would most likely have enhanced the data.

Test #3 was a 0.42 hour SVE test conducted from extraction well (EW) SVE-1MW. This was planned as a quick test to determine well vacuum and flow. This well is constructed from 2" PVC with TD = 53.0 ft and screened up from 52.5 ft to 42.4 ft. DTGW at test time was 45.6 ft leaving 3.1 ft of screen above the groundwater. Prior to starting the test, the static well data indicated that vacuums from Test #2 remained on all the outer wells including SVE-1 which is the nested well described in Test #2.

The initial EW vacuum was set at 80" H_2O with a flow of 3 cfm. From an SVE standpoint, *the subsurface was considered a tight structure.* Each outer well recorded a vacuum increase over the static data. HORIBA data indicated the HC was 866 ppm with CO_2 at 1.00%. After the initial data, the EW vacuum was set at 100" H_2O and the flow dropped to 1-2 cfm. This was most likely due to rising groundwater reducing the screened area. However, at the end of the test, the outer wells, with the exception of SVE-1, recorded a vacuum increase. At 1535 hours, the test was completed.

Test #4 was a 1.5 hour SVE test conducted from well MW-2 as the extraction well (EW). The well data was not available (older existing well) to the SVE project engineer other than it was a 2" PVC well extending into the groundwater.

Prior to the start of the test, static data recorded from the outer wells indicated a vacuum remaining near the maximum recorded during Test #3. The initial vacuum was set at 120" H_2O with a flow of +- 1 cfm. The reason the initial vacuum was set this high was because no well flow was recorded below this level. No change was recorded in the outer well vacuums. HORIBA data indicated the HC was 1,440 ppm with CO_2 of 3.76%. After the initial data was recorded, the well flow valve was opened to allow the EW vacuum to seek its maximum vacuum of 270" H_2O and flow of 5-7 cfm. This well did not provide good SVE data as the outer well vacuums continued to decrease for the first hour of testing. The last data recorded, prior to the end of the test, indicated the outer wells were recording a slight increasing trend with the EW vacuum over 270" H_2O. It is very unlikely that this well would respond as an SVE well.

Additional Information:

- Summary of Operating Data (Distances may vary from actual survey)
- Field Operating Data and Notes
- Figure 1 - Plot of Observed Vacuum versus Distance at the Facility
- Site Photographs

Conclusion:

The tests indicated that soil vacuum extraction (SVE) would be an effective method of remediation for this facility. Although the observed vacuum on the outer observation wells was relatively low at the beginning of the test, the duration of the pilot test was short compared to continuous operation. However, the results give positive indication that the observed and reported wells were in vacuum communication with the selected SVE extraction well. Figure #1 indicated that the effective radius of influence would be from 70 to 100 ft with extraction well flow of 10 - 17 cfm and extraction well vacuum in the 50" - 70" H_2O range. An approximation of the radius of influence may be obtained by determining the point at which the measured vacuum is 0.30 to 0.50" H_2O. It is assumed that beyond the lower point, the pressure gradient (driving force) is negligible to effectively transport vaporized contaminants to the extraction well. Under continuous operation, vacuum and radius of influence may continue to increase 1 to 3 days. All other data must be considered in the final design for a remedial plan.

The AcuVac SVE System performed as represented and should be considered a viable technology to use for the remediation of this location. The SVE System with the 140 CID, 4 cylinder engine can provide total extraction well flow of approximately 50 cfm with a vacuum, if required, up to 20" Hg. The System with 300 CID, 6 cylinder engine can provide total extraction well flow of approximately 120 cfm with a vacuum up to 20" Hg. These Systems are designed to consume heavy concentrations of VOCs and meet all air emission standards. The auxiliary fuel can be propane or natural gas.

Once you have reviewed the report, please call me if you have any questions.

Sincerely,

James E. Sadler
Product Engineer

Enclosure

EXHIBIT "A"

Test #1

WT-1 Enron/DBS&A #4230

11/20/94	First Data Time 0735	Second Data Time 0805	Third Data Time 0825	Fourth Data Time 0900	Fifth Data Time 0930	Sixth Data Time 1000	Seventh Data Time 1030
Horiba-HC PPM	-	15,400	18,430	19,130	-	21,230	21,370
Horiba - $C0_2$%	-	2.82	4.00	3.88	-	4.22	4.54
Extraction Well Flow-CFM Well MW-10	10	8	5	5	9	9	12
Extraction Well Vacuum "H_20 Well MW-10	50	60	30	30	40	40	50
Well MW-13 Vacuum "H_20 Dist. 255 ft.	(.14)	(.15)	(.15)	(.12)	(.03)	(.02)	.25
Well MW-12 Vacuum "H_20 Dist. - ft.	(.05)	(.05)	(.03)	(.12)	(.12)	(.12)	(.12)
Well MW-9 Vacuum "H_20 Dist. 225 ft.	(.05)	(.06)	(.15)	.14	.20	.24	.35

11/20/94	Eighth Data Time 1100	Ninth Data Time 1130	Tenth Data Time 1245	Average Data 4.0 Hrs.	Maximum Data
Horiba-HC PPM	21,450	21,720	-	19,819	21,513
Horiba - $C0_2$%	4.58	4.64		4.10	4.64
Extraction Well Flow-CFM Well MW-10	12	14	-	9.33	14
Extraction Well Vacuum "H_20 Well MW-10	50	60	-	45.56	60
Well MW-13 Vacuum "H_20 Dist. 255 ft.	.30	.36	(.15)	.30	.36
Well MW-12 Vacuum "H_20 Dist. ft.	(.12)	(.12)	(.15)	.09	(.15)
Well MW-9 Vacuum "H_20 Dist. 225 ft.	.40	.47	(.15)	.30	.47

( ) Indicates Well Pressure

Test #2

WT-1 Enron/DBS&A #4230

11/20/94	First Data Time 1200	Second Data Time 1230	Third Data Time 1300	Fourth Data Time 1330	Fifth Data Time 1400	Sixth Data Time 1430	Seventh Data Time 1500
Horiba-HC PPM	334	370	340	286	246	-	210
Horiba - $C0_2$%	2.54	2.38	2.42	3.10	2.92	-	2.76
Extraction Well Flow-CFM Well SVE-1	9	9	9	16	16	24	25
Extraction Well Vacuum "H_20 Well SVE-1	40	40	40	60	60	80	80
Well SVE-1MW Vacuum "H_20 Dist. 0 ft.	.30	.50	.70	.98	1.30	1.65	1.90
Well MW-1 Vacuum "H_20 Dist. 58 ft.	(.24)	(.20)	(.13)	(.08)	.05	.10	.28
Well MW-2 Vacuum "H_20 Dist. 95ft.	(.35)	(.35)	(.25)	(.15)	0	.10	.26
Well MW-3 Vacuum "H_20 Dist. 101 ft.	(.07)	(.12)	.03	.03	.05	.12	.17

11/20/94	Average Data 3.0 Hrs.	Maximum Data
Horiba - $C0_2$%	2.69	3.1
Horiba-HC PPM	298	370
Extraction Well Flow-CFM Well SVE-1	15.43	25
Extraction Well Vacuum "H_20 Well SVE-1	57.14	80
Well SVE-1MW Vacuum "H_20 Dist. 0 ft.	1.05	1.90
Well MW-1 Vacuum "H_20 Dist. 58 ft.	.14	.28
Well MW-2 Vacuum "H_20 Dist. 95ft.	.12	.26
Well MW-3 Vacuum "H_20 Dist. 101 ft.	.08	.17

( ) Indicates Well Pressure

Test #3

WT-1 Enron/DBS&A #4230

11/20/94	First Data Time 1510	Second Data Time 1535	Average Data 0.5 Hrs.	Maximum Data
Horiba-HC PPM	866	-	866	866
Horiba $C0_2$%	1.00		1.00	1.00
Extraction Well Flow-CFM Well SVE-1MW	3	1	2	3
Extraction Well Vacuum "H_20 Well SVE-1MW	80	100	90	100
Well SVE-1 Vacuum "H_20 Dist. 0 ft.	.26	.26	.26	.26
Well MW-1 Vacuum "H_20 Dist. 58 ft.	.39	1.05	.72	1.05
Well MW-2 Vacuum "H_20 Dist. 95 ft.	.24	.36	.30	.36
Well MW-3 Vacuum "H_20 Dist. 101 ft.	.16	.18	.17	.18

( ) Indicates Well Pressure

Test #4

WT-1 Enron/DBS&A #4230

11/20/94	First Data Time 1600	Second Data Time 1620	Third Data Time 1700	Fourth Data Time 1730	Average Data 1.5 Hrs.	Maximum Data
Horiba - $C0_2$%	3.76	4.14	-	-	3.95	4.14
Horiba-HC PPM	1,440	1,370	-	-	1,405	1,440
Extraction Well Flow-CFM Well MW-2	1	4	5	7	4.25	7.00
Extraction Well Vacuum "H_20 Well MW-2	120	270	270	270	233	270
Well SVE-1MW Vacuum "H_20 Dist. 0 ft.	1.3	1.05	.52	.50	.84	1.30
Well SVE-1 Vacuum "H_20 Dist. - ft.	.08	.08	.05	.07	.07	.08
Well MW-1 Vacuum "H_20 Dist. 120 ft.	.96	.88	.42	.48	.69	.96
Well MW-3 Vacuum "H_20 Dist. 190 ft.	.19	.22	.07	.20	.17	.22

Note: First Data is static well vacuum - No SVE

AcuVac Remediation

OPERATING DATA - TEST NO 1

ACUVAC
SVE SYSTEM

Page 1 Location ENRON WT-1 DBS&A 9230 Project Engr. SADLER/LUNDGREN

	Date	11/20/94					→
	Parameter	Time 0735 Hr. Meter 20.2	Time 0805 Hr. Meter 20.7	Time 0825 Hr. Meter 21.0	Time 0900 Hr. Meter 21.6	Time 0930 Hr. Meter 22.1	Time 1000 Hr. Meter 22.6
ENGINE/BLOWER	R.P.M.	2100	2100	2100	2100	2200	2200
	Oil Press P.S.I.	60	60	60	55	55	50
	Water Temp °F	160	160	160	160	160	160
	Volts	13.5	13.5	13.5	13.5	13.5	13.5
	Intake Vac Hg	17	17	17	15	15	15
FUEL/AIR	Gas Flow Fuel/Propane cfh	110	100	120	105	110	110
	Air Flow cfm	18	18	21	25	25	9
	Well Flow MW-10 cfm	10	8	5	5	9	9
	Recovery Well Vac MW-10 "H_2O	50	60	30	30	40	40
	Air Temp °F	39	40	42	48	49	52
	Barometric Pressure Hg	—	—	—	—	—	—
MONITOR WELL VACUUM	MW-13 "H_2O	(.14)	(.15)	(.15)	(.12)	(.03)	(.02)
	MW-12 "H_2O	(.05)	(.05)	(.03)	(.12)	(.12)	(.12)
	MW-9 "H_2O	(.05)	(.06)	(.15)	.14	.20	.24
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O		( )	INDICATES WELL PRESSURE			
	"H_2O						
	"H_2O						
MANIFOLD	Vapor Wells On/Off	ON					→
	Air Injection Pressure P.S.I.	OFF					→
	Air Injection Flow cfm	OFF					→
	Samples		HORIBA INFLUENT	HORIBA INFLUENT	HORIBA INFLUENT	HORIBA INFLUENT	

TEST	Instrument	HORIBA	→				
	Time	0755	0835	0910	0945		
VAPOR INFLUENT	H-C ppmv	15,400	18,430	19,130	21,230		
	CO_2 %	2.82	4.00	3.88	4.22		
	C-O %	.03	.03	.03	.04		
EMISSIONS	H-C ppmv						
	CO_2 %						
	C-O %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE 11/20/94 TEST NO. 1

0700	Arrived at location - Positioned SVE System near well
	MW-10 as extraction well (EW) - Well Data - 2" PVC,
	TD = 62.60', screened up 15.0' - DTGW = 53.20' - Large open
	pit between EW and MW-12 - Distance MW-10 to ≈ MW-9/225', MW-13/255'
0735	START TEST #1 - Set initial vacuum @ 50" H_2O, flow @ 10 CFM - All
	SVE systems normal - Propane @ 110 CFH
0755	HORIBA DATA - HC @ 15,400 ppm, CO_2 @ 2.82
0805	Recorded Data - EW vacuum @ 60" H_2O, flow @ 8 CFM - Sub surface
	structure moderately tight -
0810	Rapid rise in EW vacuum 50 - 80 - 100+ " H_2O - Most likely
	rising groundwater reducing screened area -
0820	Shut off EW - DTGW 52.54'
0825	Restart Test #1 - Initial vacuum @ 30" H_2O, flow @ 5 CFM
0835	HORIBA Data - HC up @ 18,430 ppm
0900	Recorded Data - All SVE systems steady - Increased EW vac to 40" H_2O
0930	Recorded Data - Outer well MW-9 recording vacuum - EW vacuum @ 40" H_2O
0945	HORIBA Data - HC increasing @ 19,130 ppm
1000	Recorded Data - All SVE systems normal - Outer wells MW-13 & 9 recording vacuum

AcuVac Remediation

OPERATING DATA - TEST NO 1

ACUVAC
SVE SYSTEM

Page 2 Location EROW WT-1 -DBSE&A 4230 Project Engr. SADLER/LUNDGREN

	Date	11/20/94	→	→	→		
	Parameter	Time 1030	Time 1100	Time 1130	Time 1245	Time	Time
		Hr. Meter 23.1	Hr. Meter 23.6	Hr. Meter 24.1	Hr. Meter —	Hr. Meter	Hr. Meter
ENGINE/BLOWER	R.P.M.	2200	2200	2200	—		
	Oil Press P.S.I.	50	50	50	—		
	Water Temp °F	160	160	160	—		
	Volts	13.5	13.5	13.5	—		
	Intake Vac Hg	15	15	14	—		
FUEL/AIR	Gas Flow Fuel/Propane cfh	100	100	95	—		
	Air Flow cfm	25	25	25	—		
	Well Flow MW-10 cfm	12	12	14	—		
	Recovery Well Vac MW-10 "H_2O	50	50	60	—		
	Air Temp °F	54	55	56	58		
	Barometric Pressure Hg	—	—	—	—		
MONITOR WELL VACUUM	MW-13 "H_2O	.25	.30	.36	(.15)		
	MW-12 "H_2O	(.12)	(.12)	(.12)	(.15)		
	MW-9 "H_2O	.35	.40	.47	(.15)		
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O			( ) INDICATES WELL PRESSURE			
	"H_2O						
	"H_2O						
MANIFOLD	Vapor Wells On/Off	ON	→	→	OFF		
	Air Injection Pressure P.S.I.	OFF	→	→	→		
	Air Injection Flow cfm	OFF	→	→	→		
	Samples	HORIBA INFLUENT	HORIBA INFLUENT	HORIBA INFLUENT			

TEST	Instrument	HORIBA	→				
	Time	1015	1045	1115			
VAPOR INFLUENT	H-C ppmv	21,370	21,450	21,720			
	CO_2 %	4.54	4.58	4.64			
	C-O %	.04	.04	.04			
EMISSIONS	H-C ppmv						
	CO_2 %						
	C-O %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE 11/20/94 TEST NO. 1

1005	Increased EW vacuum to 50" H_2O, flow @ 12 CFM
	Propane @ 100 CFH - All steady - No surging
1015	HORIBA Data - HC up slightly
1030	Recorded Data - All systems steady - EW vacuum & flow steady
	Outer wells MW-9 & 13 responding to EW vacuum increase
1045	HORIBA Data - HC steady
1100	Recorded Data - All SVE systems normal - Outer wells
	MW 9 & 13 continue on increasing trend - Good ROI
1105	Increased EW vacuum to 60" H_2O, flow @ 14 CFM
	Slight surging of EW vacuum gauge indicating ground-
	water closing off screened area.
1130	Recorded Data - All SVE systems normal - Good vacuum
	response from outer wells MW-9 & 13 - No vacuum
	response on well MW-12 due to large excavation between
	EW and outer well
	Test Completed -
1245	Recorded static data on MW 9 & 13 - 1.25 hours after
	SVE off - All wells recorded (.15)" H_2O (Pressure)

AcuVac Remediation

OPERATING DATA - TEST NO 2

ACUVAC
SVE SYSTEM

Page 1 Location ENRON WT-1 — DBS&A 4230 Project Engr. SADLER | LUNDGREN

	Date	11/20/94	→				
	Parameter	Time 1150	Time 1200	Time 1230	Time 1300	Time 1330	Time 1400
		Hr. Meter —	Hr. Meter 24.7	Hr. Meter 25.2	Hr. Meter 25.7	Hr. Meter 26.2	Hr. Meter 26.7
ENGINE/BLOWER	R.P.M.	—	1900	1900	1900	2200	2200
	Oil Press P.S.I.	—	50	50	50	50	50
	Water Temp °F	—	160	160	160	160	160
	Volts	—	13.5	13.5	13.5	13.5	13.5
	Intake Vac Hg	—	16	16	16	15	15
FUEL/AIR	Gas Flow Fuel/Propane cfh	—	140	140	140	170	170
	Air Flow cfm	—	20	20	20	25	25
	Well Flow SVE-1 cfm	—	9	9	9	16	16
	Recovery Well Vac SVE-1 "H_2O	—	40	40	40	60	60
	Air Temp °F	57	58	58	59	60	60
	Barometric Pressure Hg	—					
MONITOR WELL VACUUM	SVE-1 mw "H_2O	(.25)	.30	.50	.70	.98	1.30
	mw-1 "H_2O	(.24)	(.24)	(.20)	(.13)	(.08)	.05
	mw-2 "H_2O	(.34)	(.35)	(.35)	(.25)	(.15)	0
	mw-3 "H_2O	(.10)	(.07)	(.12)	.03	.03	.05
	"H_2O						
	"H_2O						
	"H_2O	STATIC WELL DATA NO SVE					
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O		( ) INDICATES WELL PRESSURE				
	"H_2O						
	"H_2O						
MANIFOLD	Vapor Wells On/Off	OFF	ON	→			
	Air Injection Pressure P.S.I.	OFF	→				
	Air Injection Flow cfm	OFF	→				
	Samples		HORIBA INFLUENT	→	→	→	→

TEST	Instrument	HORIBA	→				
	Time	1210	1245	1315	1345	1415	
VAPOR INFLUENT	H-C ppmv	334	370	340	286	246	
	CO_2 %	2.54	2.38	2.42	3.10	2.92	
	C-O %	.02	.01	.01	.01	.01	
EMISSIONS	H-C ppmv						
	CO_2 %						
	C-O %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE 11/20/94 TEST NO. 2

1140	Positioned SUE System near well SUE-1 as extraction well (EW)
1150	Recorded static well data - Well Data - SUE-1 2" PVC
	TD = 36.0' - Screened 21' to 36' - No groundwater
1200	START TEST # 2 Initial EW vacuum @ 40" H_2O, flow @ 9 CFM
1210	HORIBA Data - HC low @ 334 ppm, CO_2 @ 2.54%
1230	Recorded Data - All SUE systems normal - No vacuum response
	from outer wells
1245	HORIBA Data - HC up slightly @ 370 ppm
1300	Recorded Data - Outer wells indicating slight vacuum response
1315	HORIBA Data - HC @ 340 ppm, CO_2 level @ 2.42%
1320	Increased EW vacuum to 60" H_2O, flow 16 CFM
1330	Recorded Data - SUE-1 MW continues an increasing trend
	Other outer wells indicating decreasing pressure trend
1345	HORIBA Data - HC @ 286 ppm, decreasing trend
1400	Recorded Data - All SUE Systems normal - Slight vacuum response
1405	on outer wells - 1405 - Increased EW vacuum to 80" H_2O, flow @ 22 cfm
1415	HORIBA Data - HC decreasing, @ 246 ppm
NOTE	Well SUE-1 MW nested with SUE-1 with TD = 53'. Screen 52.5' - 42.5 DTGW 45.6

AcuVac Remediation

OPERATING DATA - TEST NO 2

ACUVAC
SVE SYSTEM

Page 2 Location ENRON WT-1 -DBS&A 4230 Project Engr. SADLER/LUNDGREN

	Date	11/20/94	→				
	Parameter	Time 1430	Time 1500	Time	Time	Time	Time
		Hr. Meter 27.2	Hr. Meter 27.7	Hr. Meter	Hr. Meter	Hr. Meter	Hr. Meter
ENGINE/BLOWER	R.P.M.	2500	2500				
	Oil Press P.S.I.	50	50				
	Water Temp °F	170	170				
	Volts	13.5	13.5				
	Intake Vac Hg	13	13				
FUEL/AIR	Gas Flow Fuel/Propane cfh	190	200+				
	Air Flow cfm	25	25				
	Well Flow SVE-1 cfm	24	25				
	Recovery Well Vac SVE-1 "H_2O	80	80				
	Air Temp °F	61	60				
	Barometric Pressure Hg						
MONITOR WELL VACUUM	SVE-1 mw "H_2O	1.65	1.90				
	mw-1 "H_2O	.10	.28				
	mw-2 "H_2O	.10	.26				
	mw-3 "H_2O	.12	.17				
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
MANIFOLD	Vapor Wells On/Off	ON	ON				
	Air Injection Pressure P.S.I.	OFF	→				
	Air Injection Flow cfm	OFF	→				
	Samples		HORIBA INFLUENT				

TEST	Instrument		HORIBA					
	Time		1455					
VAPOR INFLUENT	H-C	ppmv	210					
	CO_2	%	2.76					
	C-O	%	.01					
EMISSIONS	H-C	ppmv						
	CO_2	%						
	C-O	%						
	Air/Fuel Ratio	%						

OPERATING DATA AND NOTES

DATE 11/20/94 TEST NO. 2

1430	Recorded Data - All SVE Systems normal - Outer wells indicating good vacuum response to increased EW vacuum
1455	HORIBA Data - HC continue on decreasing trend, HC recorded @ 210 ppm
1500	Recorded Data - Outer wells continuing to respond to EW vacuum of 80" H_2O and flow of 25CFM - All SVE systems normal - Propane flow over 200CFH
	TEST # 2 Completed -

AcuVac Remediation

OPERATING DATA - TEST NO 3

ACUVAC
SVE SYSTEM

Page 1 Location ENRON WT-1 DBS&A 4230 Project Engr SADLER/LUNDGREN

	Date	11/20/94	→	→			
	Parameter	Time 1505 Hr. Meter —	Time 1510 Hr. Meter 27.8	Time 1535 Hr. Meter 28.3	Time Hr. Meter	Time Hr. Meter	Time Hr. Meter
ENGINE/BLOWER	R.P.M.	—	2000	2200			
	Oil Press P.S.I.	—	50	50			
	Water Temp °F	—	170	170			
	Volts	—	13.5	13.5			
	Intake Vac Hg	—	13	13			
FUEL/AIR	Gas Flow Fuel/Propane cfh	—	180	190			
	Air Flow cfm	—	56	56			
	Well Flow SVE-1 MW cfm	—	3	1			
	Recovery Well Vac SVE-1 MW "H_2O	—	80	100			
	Air Temp °F	58	58	56			
	Barometric Pressure Hg	—					
MONITOR WELL VACUUM	SVE-1 "H_2O	.20	.26	.26			
	MW-1 "H_2O	.22	.39	1.05			
	MW-2 "H_2O	.21	.24	.36			
	MW-3 "H_2O	.12	.16	.18			
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O	STATIC DATA NO SVE					
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
MANIFOLD	Vapor Wells On/Off	OFF	ON	ON			
	Air Injection Pressure P.S.I.	OFF	→	→			
	Air Injection Flow cfm	OFF	→	→			
	Samples		HORIBA Influent				

TEST	Instrument	HORIBA					
	Time	1515					
VAPOR INFLUENT	H-C ppmv	866					
	CO_2 %	1.00					
	C-O %	.02					
EMISSIONS	H-C ppmv						
	CO_2 %						
	C-O %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

DATE 11/20/94 TEST NO. 3

1505	Connected SVE System to well SVE-1MW as
	extraction well - Well Data - This well is nested
	with well SVE-1 with TD = 53.0' and screened 52.5-
	42.5' - The well is constructed from 2.0" PVC pipe -
	DTGW = 45.6' - 3.1' screened area above groundwater
	NOTE - STATIC vacuum remaining from prior SVE
	test on well SVE-1
1510	Start Test # 3 - Initial EW vacuum @ 80" H_2O,
	flow @ 3.0 CFM - Subsurface structure very tight.
	Recorded data - Outer wells indicating slight vacuum
	increase over static data
1515	HORIBA Data - HC @ 866 ppm
1520	Increase EW vacuum to 100" H_2O, flow @ 1-2 CFM
	Flow most likely dropped because of groundwater
	closing off screened area.
1535	Recorded Data - Nested well SVE-1 steady - Other outer wells
	indicating increased vacuum - EW vacuum gauge surging
	TEST Completed

AcuVac Remediation

OPERATING DATA - TEST NO 4

ACUVAC
SVE SYSTEM

age 1 Location ENRON WT-1 - DBS&A 4230 Project Engr. SADLER/LUNDGREN

	Date	11/20/94	→	→	→		
	Parameter	Time 1600 Hr. Meter 28.7	Time 1620 Hr. Meter 29.0	Time 1700 Hr. Meter 29.7	Time 1730 Hr. Meter 30.2	Time Hr. Meter	Time Hr. Meter
ENGINE/BLOWER	R.P.M.	2100	2000	2000	2000		
	Oil Press P.S.I.	50	50	50	50		
	Water Temp °F	165	165	165	160		
	Volts	13.5	13.5	13.5	13.5		
	Intake Vac Hg	15	18	18	18		
FUEL/AIR	Gas Flow Fuel/Propane cfh	160	180	180	180		
	Air Flow cfm	25	18	18	18		
	Well Flow MW-2 cfm	± 1	4	5	7		
	Recovery Well Vac MW-2 "H_2O	120	270	270	270		
	Air Temp °F	54	54	52	50		
	Barometric Pressure Hg	—	—	—	—		
MONITOR WELL VACUUM	SVE-1MW "H_2O	1.30	1.05	.52	.50		
	SVE-1 "H_2O	.08	.08	.05	.07		
	MW-1 "H_2O	.96	.88	.42	.48		
	MW-3 "H_2O	.19	.22	.07	.20		
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
	"H_2O						
MANIFOLD	Vapor Wells On/Off	OFF / ON	ON	ON	ON		
	Air Injection Pressure P.S.I.	OFF	→	→	→		
	Air Injection Flow cfm	OFF	→	→	→		
	Samples	HORIBA Influent	HORIBA Influent				

NOTE - STATIC WELL DATA AND INITIAL DATA THE SAME

TEST	Instrument	HORIBA	HORIBA				
	Time	1610	1630				
VAPOR INFLUENT	H-C ppmv	1440	1370				
	CO_2 %	3.76	4.14				
	C-O %	.01	.01				
EMISSIONS	H-C ppmv						
	CO_2 %						
	C-O %						
	Air/Fuel Ratio %						

OPERATING DATA AND NOTES

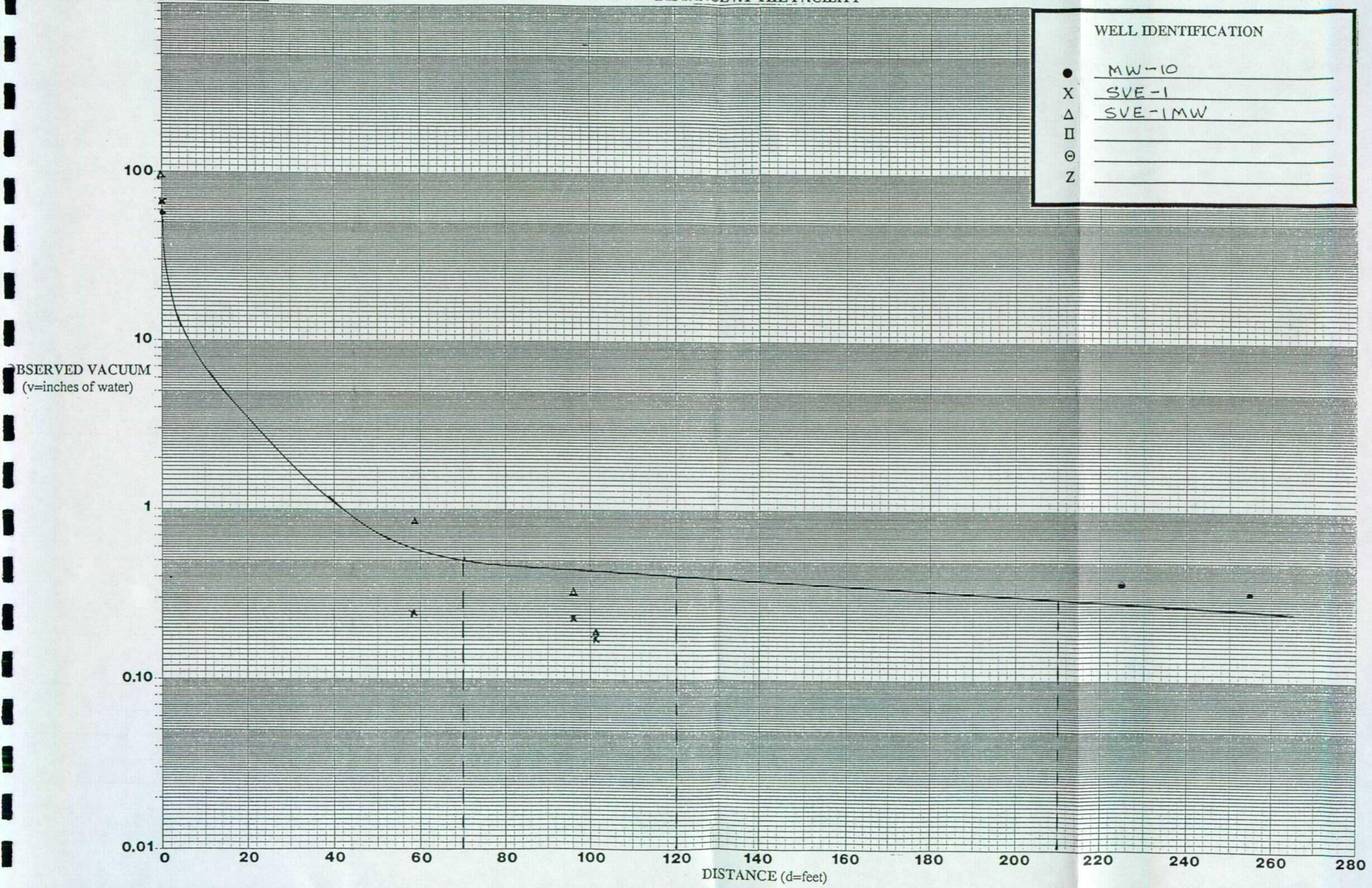
DATE 11/20/94

TEST NO. 4

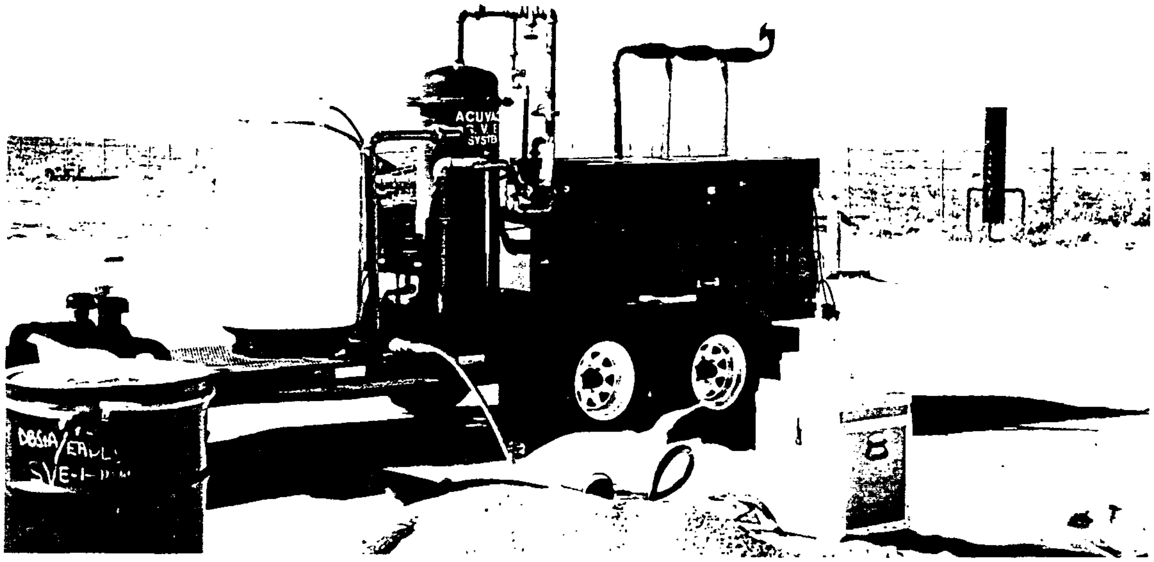
1550	Positioned SVE System near well MW-2 as extraction well (EW) - Well data unknown other than 2" PVC pipe into groundwater
1555	Recorded static well data - Vacuum on outer wells remain near maximum level obtained during Test #3
1600	START Test #3 - Outer wells recording some vacuum as static data - Sub surface structure and/or well construction contributing to high SVE vacuums
1610	Open SVE flow to maximum, EW vacuum maximum at 270-275" H_2O, flow @ 7-8 cfm
1620	Recorded Data - Outer wells recording reduced vacuums X MW-3 which is up slightly -
1630	HORIBA Data - HC @ 1370 ppm
1700	Recorded Data - All outer wells continue to record decrease EW vacuum @ 270" H_2O, flow 5-7 cfm
1730	Recorded Data - Outer wells indicating slight increasing trend
1730	Test terminated - Well not responding to SVE - Closed all wells Departed site @ 1815

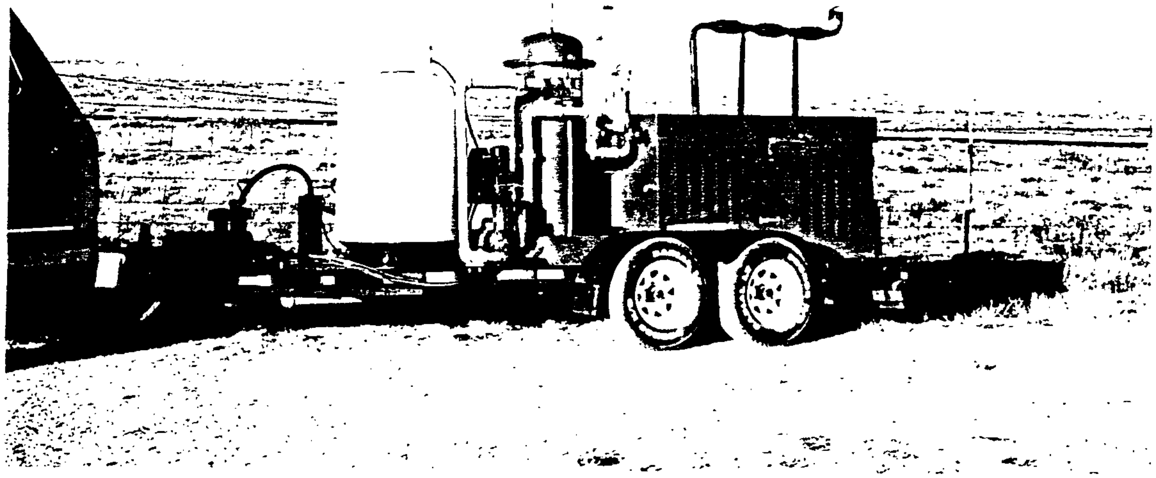
AcuVac Remediation, Inc.

FIGURE 1 - PLOT OF OBSERVED VACUUM VERSUS DISTANCE AT THE FACILITY



ENRON WT-1 - DANIEL B. STEPHENS & ASSOCIATES, INC.
PROJECT #4230





Soil Vapor Analyses

CORELAB

CORE LABORATORIES

CORE LABORATORIES
ANALYTICAL REPORT

Job Number: 945993
Prepared For:

DANIEL B. STEPHENS & ASSOCIATES
BOB MARLEY
6020 ACADEMY NE
ALBUQUERQUE, NM 87109

Date: 12/13/94

Signature M Waits

Date: 12/13/94

Name: M. Jean Waits

Title: Supervising Chemist

CORE LABORATORIES
P O BOX 34766
HOUSTON, TX 77234-4282

CORELAB

CORE LABORATORIES

LABORATORY TESTS RESULTS

12/13/94

JOB NUMBER: 945993 **CUSTOMER:** DANIEL B. STEPHENS & ASSOCIATES **ATTN:** BOB MARLEY

CLIENT I.D.........: ENRON-WT-1 #4230
DATE SAMPLED.......: 11/20/94
TIME SAMPLED.......: 16:35
WORK DESCRIPTION...: MW-2

LABORATORY I.D...: 945993-0001
DATE RECEIVED....: 11/23/94
TIME RECEIVED....: 15:07
REMARKS..........: Core cylinder #1207

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Benzene, Toluene, Xylenes in Gas		*1			12/09/94	MJW
Benzene	<1	1	ppm v/v			
Toluene	<1	1	ppm v/v			
Ethyl Benzene	<1	1	ppm v/v			
Total Xylenes	<10	10	ppm v/v			
Refinery Gas Analysis, Extended		*1			12/08/94	PKT
Hydrogen	<0.01	0.01	Mol %	ASTM D-1945		
Oxygen	13.311	0.01	Mol %	ASTM D-1945		
Nitrogen	77.970	0.01	Mol %	ASTM D-1945		
Carbon Monoxide	<0.01	0.01	Mol %	ASTM D-1946		
Carbon Dioxide	5.861	0.01	Mol %	ASTM D-1945		
Hydrogen Sulfide	<0.01	0.01	Mol %			
Methane	2.839	0.01	Mol %	ASTM D-1945		
Ethylene	<0.001	0.001	Mol %	ASTM D-1946		
Ethane	<0.001	0.001	Mol %	ASTM D-1945		
Propylene	<0.001	0.001	Mol %	ASTM D-2163		
Propane	<0.001	0.001	Mol %	ASTM D-1945		
Isobutane	<0.001	0.001	Mol %	ASTM D-1945		
Isobutylene	<0.001	0.001	Mol %	ASTM D-2163		
1-Butene	<0.001	0.001	Mol %	ASTM D-2163		
n-Butane	<0.001	0.001	Mol %	ASTM D-1945		
trans-2-Butene	<0.001	0.001	Mol %	ASTM D-2163		
cis-2-Butene	<0.001	0.001	Mol %	ASTM D-2163		
Isopentane	<0.001	0.001	Mol %	ASTM D-2163		
n-Pentane	<0.001	0.001	Mol %	ASTM D-2163		
Hexanes	0.001	0.001	Mol %			
Heptanes	0.001	0.001	Mol %			
Octanes	0.005	0.001	Mol %			
Nonanes	0.005	0.001	Mol %			
Decanes	0.005	0.001	Mol %			
Undecanes	0.002	0	Mol %			
Dodecanes Plus	0	0	Mol %			

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CORE LAB

CORE LABORATORIES

LABORATORY TESTS RESULTS

12/13/94

JOB NUMBER: 945993 **CUSTOMER:** DANIEL B. STEPHENS & ASSOCIATES **ATTN:** BOB MARLEY

CLIENT I.D.........: ENRON-WT-1 #4230
DATE SAMPLED.......: 11/20/94
TIME SAMPLED.......: 13:40
WORK DESCRIPTION...: SVE-1

LABORATORY I.D...: 945993-0002
DATE RECEIVED....: 11/23/94
TIME RECEIVED....: 15:07
REMARKS..........: Core cylinder #1097

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Benzene, Toluene, Xylenes in Gas		*1			12/09/94	MJW
Benzene	23	1	ppm v/v			
Toluene	20	1	ppm v/v			
Ethyl Benzene	<1	1	ppm v/v			
Total Xylenes	14	10	ppm v/v			
Refinery Gas Analysis, Extended		*1			12/08/94	PKT
Hydrogen	<0.01	0.01	Mol %	ASTM D-1945		
Oxygen	4.367	0.01	Mol %	ASTM D-1945		
Nitrogen	87.986	0.01	Mol %	ASTM D-1945		
Carbon Monoxide	<0.01	0.01	Mol %	ASTM D-1946		
Carbon Dioxide	7.386	0.01	Mol %	ASTM D-1945		
Hydrogen Sulfide	<0.01	0.01	Mol %			
Methane	0.229	0.01	Mol %	ASTM D-1945		
Ethylene	<0.001	0.001	Mol %	ASTM D-1946		
Ethane	<0.001	0.001	Mol %	ASTM D-1945		
Propylene	<0.001	0.001	Mol %	ASTM D-2163		
Propane	0.007	0.001	Mol %	ASTM D-1945		
Isobutane	0.004	0.001	Mol %	ASTM D-1945		
Isobutylene	<0.001	0.001	Mol %	ASTM D-2163		
1-Butene	<0.001	0.001	Mol %	ASTM D-2163		
n-Butane	0.002	0.001	Mol %	ASTM D-1945		
trans-2-Butene	<0.001	0.001	Mol %	ASTM D-2163		
cis-2-Butene	<0.001	0.001	Mol %	ASTM D-2163		
Isopentane	0.001	0.001	Mol %	ASTM D-2163		
n-Pentane	0.001	0.001	Mol %	ASTM D-2163		
Hexanes	0.002	0.001	Mol %			
Heptanes	0.007	0.001	Mol %			
Octanes	0.005	0.001	Mol %			
Nonanes	0.003	0.001	Mol %			
Decanes	<0.001	0.001	Mol %			
Undecanes	0	0	Mol %			
Dodecanes Plus	0	0	Mol %			

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CORELAB

CORE LABORATORIES

LABORATORY TESTS RESULTS

12/13/94

JOB NUMBER: 945993 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: BOB MARLEY

CLIENT I.D.........: ENRON-WT-1 #4230
DATE SAMPLED.......: 11/20/94
TIME SAMPLED.......: 10:20
WORK DESCRIPTION...: MW-10

LABORATORY I.D...: 945993-0003
DATE RECEIVED....: 11/23/94
TIME RECEIVED....: 15:07
REMARKS..........: Core cylinder #1011

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Benzene, Toluene, Xylenes in Gas		*1			12/09/94	MJW
Benzene	319	1	ppm v/v			
Toluene	504	1	ppm v/v			
Ethyl Benzene	19	1	ppm v/v			
Total Xylenes	153	10	ppm v/v			
Refinery Gas Analysis, Extended		*1			12/08/94	PKT
Hydrogen	<0.01	0.01	Mol %	ASTM D-1945		
Oxygen	2.833	0.01	Mol %	ASTM D-1945		
Nitrogen	80.836	0.01	Mol %	ASTM D-1945		
Carbon Monoxide	<0.01	0.01	Mol %	ASTM D-1946		
Carbon Dioxide	13.260	0.01	Mol %	ASTM D-1945		
Hydrogen Sulfide	<0.01	0.01	Mol %			
Methane	0.751	0.01	Mol %	ASTM D-1945		
Ethylene	<0.001	0.001	Mol %	ASTM D-1946		
Ethane	0.002	0.001	Mol %	ASTM D-1945		
Propylene	<0.001	0.001	Mol %	ASTM D-2163		
Propane	0.007	0.001	Mol %	ASTM D-1945		
Isobutane	0.006	0.001	Mol %	ASTM D-1945		
Isobutylene	0.001	0.001	Mol %	ASTM D-2163		
1-Butene	<0.001	0.001	Mol %	ASTM D-2163		
n-Butane	0.039	0.001	Mol %	ASTM D-1945		
trans-2-Butene	<0.001	0.001	Mol %	ASTM D-2163		
cis-2-Butene	<0.001	0.001	Mol %	ASTM D-2163		
Isopentane	0.151	0.001	Mol %	ASTM D-2163		
n-Pentane	0.211	0.001	Mol %	ASTM D-2163		
Hexanes	0.615	0.001	Mol %			
Heptanes	0.704	0.001	Mol %			
Octanes	0.434	0.001	Mol %			
Nonanes	0.121	0.001	Mol %			
Decanes	0.027	0.001	Mol %			
Undecanes	0.002	0	Mol %			
Dodecanes Plus	0	0	Mol %			

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CHAIN-OF-CUSTODY RECORD

[redacted]

Client: DANIEL B. STEPHENS + ASSOC

Address: 6020 ACADEMY NE #100
ALBUQUERQUE NM 87109

Phone # : 505-822-9400

Fax # :

Project Name: ENRON WT-1

Project #: 4230

Project Manager: BOB MARLEY

Sampler: ACUVAC

Samples Cold? ☐ Yes ☒ No

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative			HEAL No.	ANALYSIS REQUEST													
					$HgCl_2$	HCl	Other		BTEX (Method 602/8020)	BTEX + MTBE (602/8020)	TPH Method 8015 MOD (Gas/Diesel)	BTEX + TPH + MTBE (Gasoline Only)	BTEX + MTBE + TPH (Gas + Diesel)	TPH (Method 418.1)	601/602 Volatiles	EDB (Method 504.1)	EDC	610 (PNA or PAH)	BTEX	EXTENDED REFINERY GASES	FIXED GASES	Air Bubbles or Headspace (Y or N)
11/20/94	1635	VAPOR	MW-2	1/500ml			NONE												X	X	X	
11/20/94	1340	VAPOR	SVE-1	⇕			⇕												X	X	X	
11/20/94	1020	VAPOR	MW-10	1/500ml			NONE												X	X	X	

Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)
11/22/94	1630	Clarence P	Cracy Bromley 11/23/94 10:25A

Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)

Remarks: