GW - 72

MONITORING REPORTS

DATE:

OCT 1998

BROWN AND CALDWELL

Suite 2500, 1415 Louisiana, Houston, TX 77002
(713) 759-0952 • (713) 308-3886

TRANSMITTAL MEMORANDUM

To: Wayne Price State of New Mexico Energy, Minerals and Natural Resources Dept. Oil Conservation Division 2040 South Pacheco Street, State Land Off. Bld. Santa Fe, New Mexico 87505	Date: 10/20/98	Job No: 12832
	Subject: Hobbs, New Mexico Facility	
	Contract No:	
	Equipment No:	
	Spec. Ref:	
	Submittal No:	

WE ARE SENDING:
☒ Attached ☐ Under separate cover via **1st Class Mail** the following items:
☐ Shop Drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change Order ☒ Other: Final Report

THESE ARE TRANSMITTED AS CHECKED BELOW:
- ☐ For approval
- ☒ For your use
- ☐ As requested
- ☐ For review and signature
- ☐ With submittal review action noted

SUBMITTAL REVIEW ACTIONS:
- ☐ No exceptions taken
- ☐ Make revisions
- ☐ Amend and resubmit
- ☐ Rejected--see Remarks
- ☐ None

Copies	Date	No.	Description
1	10/19/98		Final June 1998 Groundwater Sampling Report Hobbs, New Mexico Facility

REMARKS

OCT 23

cc: Chris Williams, State of New Mexico
Jo Ann Cobb, BJ Services Company, U.S.A.
Roger Sullivan, BJ Services Company, U.S.A.
Brown and Caldwell File
Transmittal File w/o attachment
Client File w/o attachment

Richard Rexroad

If enclosures are not as noted, kindly notify us at once

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BROWN AND CALDWELL

FINAL
JUNE 1998 GROUNDWATER SAMPLING REPORT
HOBBS, NEW MEXICO FACILITY

BJ SERVICES COMPANY, U.S.A.

OCTOBER 19, 1998

FINAL
JUNE 1998 GROUNDWATER SAMPLING REPORT
HOBBS, NEW MEXICO FACILITY
BJ SERVICES COMPANY, U.S.A.

Prepared for

BJ Services Company, U.S.A.
8701 New Trails Drive
The Woodlands, Texas

BC Project Number: 2832.13

Christopher E. Angel, R.G.
Assistant Geologist

October 19, 1998

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston, Texas 77002 - (713) 759-0999

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DISTRIBUTION AND QA/QC REVIEWER'S SIGNATURE

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1.0 INTRODUCTION

Brown and Caldwell conducted field activities associated with the June 1998 quarterly groundwater sampling event at BJ Services Company, U.S.A. (BJ Services) facility located at 2708 West County Road, in Hobbs, New Mexico. The facility layout is shown in Figure 1.

The facility formerly operated an above-grade on-site fueling system. Subsurface impact near a diesel fueling system was first detected by the New Mexico Oil Conservation Division (NMOCD) during an on-site inspection on February 7, 1991. The fueling system was taken out of operation in July 1995. As the result of the diesel fuel release, the NMOCD has required a quarterly groundwater monitoring program to assess the hydrocarbon constituents in the groundwater. A biosparging system was activated in November 1995 to remediate soil and groundwater at the facility. A site chronology detailing the history of the fueling system, the groundwater remediation system, and previous sampling events is presented on Table 1. Expansions of the biosparging system were performed in March/April 1997 and February/March 1998.

During the June 1998 sampling event, groundwater samples collected from all monitor wells were analyzed for gasoline and diesel range total petroleum hydrocarbons (TPH-G and TPH-D) and benzene, toluene, ethylbenzene, and total xylenes (BTEX). Additionally, samples from downgradient wells MW-10, MW-11A, and MW-12 were analyzed for sulfate, nitrate, and dissolved methane This report presents the results of the groundwater sampling event, a description of the field activities, and a summary of the analytical results. A groundwater potentiometric surface map, a benzene concentration map, and a hydrocarbon distribution map are included. A presentation of the results of soil sampling conducted in conjunction with the biosparging system expansion in February/March 1998 is also included.

2.0 GROUNDWATER SAMPLING AND ANALYSES

Brown and Caldwell purged and sampled the groundwater monitoring wells at the facility on June 23, 1998 to determine concentrations of dissolved-phase hydrocarbons in groundwater. The following subsections describe the activities conducted during this sampling event and present the results of the groundwater analyses.

2.1 Groundwater Measurements and Sampling

Eleven monitor wells were sampled during the June 1998 sampling event. A site map depicting the locations of the monitor wells is presented as Figure 1. As noted in previous sampling reports, monitor well MW-2 can not be located and is assumed destroyed by facility activities such as grading.

Groundwater level measurements were obtained from the monitor wells prior to purging and sampling the wells. The groundwater levels were obtained with an oil/water interface probe and recorded to the nearest 0.01 foot. A cumulative table of groundwater elevation data is presented on Table 2. The groundwater elevation data indicates that the general groundwater flow direction is to the east with a hydraulic gradient of approximately 0.005 foot/foot (ft/ft). A potentiometric surface map is presented in Figure 2. Approximately 0.22 feet of phase-separated hydrocarbons was observed in monitor well MW-4 and 0.06 feet in MW-1 during this sampling event; a hydrocarbon sheen was observed in monitor well MW-9.

Groundwater samples were collected after purging the wells with a submersible pump to remove at least three well volumes of groundwater. Field parameter measurements for pH, conductivity and temperature were collected after each well volume was purged. Two consecutive readings within five percent were used to indicate that groundwater had stabilized. The parameters in each monitor well typically stabilized after two well volumes had been removed; however, at least three well volumes were removed from each well.

Additional groundwater parameters were measured during the purging and sampling activities to assess the potential for natural attenuation. These parameters were dissolved oxygen (DO), dissolved ferrous iron, alkalinity, and reduction-oxidation potential (redox). The field parameter readings were recorded in the field log book and are listed on the groundwater sampling forms included in Appendix A. The field screening results for groundwater samples are presented on Table 3.

A pump was utilized to perform micro-purging of the wells. Typically, groundwater levels were maintained at approximately 90% or more of the static water level in wells. Groundwater samples were collected directly from the pump discharge after completion of purging operations. Each sample was transferred to laboratory-prepared, clean glass or plastic containers sealed with Teflon®-lined lids, labeled, and placed on ice in an insulated cooler for shipment via overnight courier to the analytical laboratory. Each cooler was accompanied by completed chain-of-custody documentation.

Field measurement equipment was decontaminated prior to and after each use. Decontamination procedures consisted of washing with fresh water and a non-phosphate detergent and rinsing with deionized (DI) water. Purged water and excess water generated by equipment cleaning operations were discharged to the wastewater storage facility at the site for disposal by BJ Services.

2.2 Results of Groundwater Analyses

Groundwater samples collected during this sampling event were analyzed for diesel- and gasoline-range total petroleum hydrocarbons (TPH-D and TPH-G) gasoline range by EPA Method 8015 Modified and benzene, toluene, ethylbenzene and total xylenes (BTEX) by EPA Method 8020. Additionally, three monitor wells (MW-10, MW-11A and MW-12) and one duplicate sample from MW-12 were sampled for methane, nitrate, and sulfate.

Current and cumulative analytical results for BTEX, TPH-D, and TPH-G are presented in Table 4. The June 1998 analytical results for nitrate, sulfate, and dissolved methane analyses performed on groundwater samples from monitor wells MW-10, MW-11A, and MW-12 are presented in table 5.

BTEX constituent concentrations in excess of applicable laboratory detection limits were reported in eight of the 11 groundwater samples collected during this sampling event. Benzene concentrations were below the New Mexico Water Quality Control Commission Standard of 10 micrograms per liter (ug/L) in monitor wells MW-5, MW-7, MW-8, MW-9, and MW-11A. Figure 3 presents a benzene isoconcentration and total BTEX distribution map for the June 1998 sampling event. A total petroleum hydrocarbon distribution map for the June 1998 sampling event is presented in Figure 4. The laboratory analytical report and chain of custody record for the groundwater samples are included in Appendix B.

Benzene concentrations in monitor wells generally decreased or remained stable. Benzene concentrations in the off-site monitor well, MW-9, have generally stabilized at a concentration below the New Mexico Water Quality Control Commission standard of 0.01 mg/L. Benzene concentrations in on-site wells have generally decreased or stabilized at low concentrations since the original start-up of the bio-sparging system in August 1995 and modifications to the system in March 1998.

2.3 Natural Attenuation Evaluation

It appears that natural attenuation of dissolved phase BTEX is occurring in the vicinity of monitor wells MW-10, MW-11A, and MW-12. The primary evidence of natural attenuation is plume behavior. Concentrations of dissolved phase BTEX have stabilized or decreased in the area of monitor wells MW-10, MW-11A, and MW-12 subsequent to removal of a field waste tank (see Figure 1) in March 1997. Furthermore, the following lines of geochemical evidence suggest that intrinsic bioremediation, an important natural attenuation mechanism, is occurring:

1. Dissolved oxygen (DO) concentrations measured in monitor wells MW-10, MW-11A, and MW-12 are depressed relative to background. DO concentrations of 1.13 milligrams per liter (mg/L), 0.35 mg/L, and 0.45 mg/L were measured in monitor wells MW-10, MW-11A, and MW-12, respectively. These concentrations are less than the measured DO concentrations of 1.98 mg/L, 2.52 mg/L, and 1.54 mg/L in monitor wells MW-5, MW-7, and MW-8, respectively, which are upgradient or cross-gradient wells believed to exhibit background conditions. DO is utilized during intrinsic bioremediation, and therefore DO concentrations should be depressed in areas where intrinsic bioremediation is occurring.

2. Nitrate concentrations were measured at less than 0.01 mg/L in monitor wells MW-10, MW-11A and MW-12. These concentrations are less than the nitrate concentrations of 3.87 mg/L, 3.92 mg/L, and 1.84 mg/L measured in March 1998 in monitor wells MW-5, MW-7, and MW-8, respectively, which are believed to exhibit background conditions. Nitrate is utilized during intrinsic bioremediation after DO is depleted, and therefore nitrate concentrations should be depressed in areas where intrinsic bioremediation is occurring.

3. Ferrous iron was measured at concentrations of 9.8 mg/L, 5.6 mg/L, and 9.2 mg/L in monitor wells MW-10, MW-11A, and MW-12, respectively. Ferrous iron was not detected in any of the other monitor wells at the site, including the background wells MW-5, MW-7, and MW-8. When DO and nitrate are depleted, anaerobic microbes which utilize other electron acceptors become active. Ferrous iron is the reduction product of ferric iron, a common electron acceptor. Therefore, ferrous iron concentrations should increase in areas where intrinsic bioremediation is occurring.

Methane is a reaction product generated during utilization of carbon dioxide as an electron acceptor, and its concentration should therefore increase in areas where depletion of DO, nitrate, and ferric iron has occurred. The concentration of methane is elevated in monitor well MW-10, suggesting that utilization of carbon dioxide may be occurring locally in that area.

Sulfate concentrations in monitor wells MW-10, MW-11A, and MW-12 measured in June 1998 are comparable to those observed in monitor wells MW-5, MW-7, and MW-8 in March 1998. It therefore appears that sulfate is not being utilized during intrinsic bioremediation, and that DO, nitrate, and ferric iron are supplying adequate electron acceptors to facilitate natural attenuation. In addition, carbon dioxide is apparently acting as an electron acceptor in the vicinity of monitor well MW-10, as indicated by elevated dissolved methane concentrations. Data regarding alkalinity, which is expected to increase during the course of bioremediation processes, is inconclusive.

It is recommended that monitoring for natural attenuation evaluation parameters continue in this area.

3.0 REMEDIATION SYSTEM

Brown and Caldwell submitted a Remedial Action Plan (RAP) to the New Mexico OCD in May 1994. Based on the results of previous investigations conducted by Brown and Caldwell and Roberts/Schornick and Associates, Inc. (RSA), Brown and Caldwell recommended the installation of a biosparging system. The biosparging system simultaneously treats volatile and semivolatile contaminants adsorbed directly to the soil (i.e., residual) as well as contaminants present in soil moisture (i.e., dissolved phase) within the capillary fringe and vadose zone. Additionally, the biosparging system removes volatile and semivolatile contaminants from the saturated zone. The biosparging system operates by injecting air into the saturated zone and extracting air from the vadose zone through a network of wells and piping. The continuous flushing of air through the saturated zone increases the dissolved oxygen concentration in the groundwater and in soil moisture present in the capillary fringe and vadose zone. The elevated dissolved oxygen content facilitates the activities of indigenous microorganisms to accelerate biodegradation of the contaminants. The flushing of the air also strips the volatile and semivolatile contaminants.

The New Mexico OCD approved the RAP on August 11, 1994. Installation activities for the biosparging system were conducted between August 2 through 24, 1995. Nineteen combined injection/extraction wells, three vacuum extraction wells, associated piping, and one extraction blower and one injection blower were installed. An additional vapor extraction well, VE-4, was installed and connected to the vapor extraction system in April 1997. Five additional injection wells, AI-20 through AI-24, were installed in February 1998. Injection wells AI-20 through AI-24 were installed at locations near the center of the hydrocarbon plume. These injection wells were constructed such that a 10-foot screen submergence was achieved, thereby providing treatment to an expanded vertical interval of the aquifer in the central portion of the plume. Injection wells AI-20 through AI-24 are supplied by a separate blower than the one used to supply injection wells AI-1 through AI-19 in order to avoid short-circuiting to wells with less screen submergence. Three additional vapor extraction wells, VE-5 through VE-7, were also installed in February 1998. The new injection and extraction wells were brought on-line on March 10, 1998, and operation of

injection wells AI-1 through AI-19, which had been suspended on February 19, 1998, was resumed on March 24, 1998.

At the direction of the New Mexico OCD, monitor wells MW-11A and MW-12 were also installed in February 1998 as replacements for monitor well MW-11, which had apparently been destroyed in 1997. Monitor wells MW-11A and MW-12 are remote from and not related to the biosparging system. A discussion of soil sampling and analysis conducted at the site in February 1998 is presented in Section 4.0. Discussions pertaining to the effects of the remediation system on groundwater and air at the site are presented below.

Concentrations of benzene and total BTEX in monitor well MW-1 measured during the June 1998 groundwater sampling event have decreased relative to those observed during the March 1998 sampling event. Benzene concentrations dropped from 4,800 µg/L to 53 µg/L, and total BTEX concentrations dropped from 15,600 µg/L to 2,713 µg/L between March 1998 and June 1998. During this same time period, benzene concentrations decreased from 140 µg/L to 100 µg/L in monitor well MW-3. These decreases are likely attributable to increased air flow being applied to the aquifer through air injection wells AI-20 through AI-24.

The presence of 0.22 feet of phase-separated hydrocarbons (PSH) in monitor well MW-4 and 0.06 feet of PSH in MW-1 was noted during the June 1998 groundwater sampling event. Operation of the new sparging and extraction wells in the central portion of the hydrocarbon plume since early March 1998 may have mobilized free product, resulting in its appearance in monitor wells MW-1 and MW-4. It is believed that application of additional remediation stress and continued PSH recovery operations from monitor wells near the center of the hydrocarbon plume will ultimately result in removal of PSH from the subsurface.

The vapors recovered during the extraction process are discharged to the atmosphere in accordance with the State of New Mexico Air Quality Regulations. Following initial system startup operations, effluent air samples were collected on a monthly basis from the recovered vapors to monitor the bioremediation process and emission rate. Upon receiving a determination from the State of New

Mexico that an air permit is not required, effluent air samples were collected and analyzed voluntarily on a quarterly basis through July 1997. The air samples were analyzed for TPH using EPA Method Modified 8015A (Air) and for total volatile aromatic hydrocarbons (BTEX) using EPA Method 5030/8020 (modified).

The analytical results demonstrated a significant reduction in hydrocarbon vapor concentrations and emissions rates between November 1995 and July 1997. Total BTEX concentrations decreased from 391 parts per million by volume (ppmv) in November 1995 to 17.3 ppmv in July 1997. The corresponding BTEX emissions decreased from 0.77 lb/hour to 0.03 lb/hour. TPH concentrations decreased from 1,870 ppmv in November 1995 to 65 ppmv in July 1997. The corresponding TPH - Volatile Organic Compound (VOC) emissions rates decreased from 3.21 lb/hour to 0.08 lb/hour. These emission rates were well below the regulatory limit of 10 lb/hour for VOCs. Therefore, use of a field monitoring instrument utilizing a flame ionization detector (FID) to measure the VOC concentration in the vapors commenced in September 1997. An effluent air sample was collected during the December 1997 sampling event, however, because the FID used during the sampling event could not be properly calibrated within the range of the effluent air to be sampled. The VOC measurements collected using the FID correspond to TPH concentrations previously determined in the analytical laboratory. The VOC concentration measured using the FID during the June 1998 sampling event was 190 ppmv.

The TPH concentration of 190 ppmv measured during the June 1998 sampling event shows a substantial drop from the 1500 ppmv TPH discharge rate observed during the March 24, 1998 groundwater sampling event. The June 1998 TPH discharge rate of 190 ppmv is comparable to TPH concentrations measured during the time period from March 1997 through December 1997, prior to the system modifications performed in February and March 1998. The increased TPH concentration observed in the March 1998 event relative to the time period from March 1997 through December 1997 is believed to be a result of the addition of air injection wells AI-20 through AI-24 to the biosparging system, but discharge rates have returned to more typical levels during the June 1998 groundwater sampling event.

The VOC emissions rate calculated for the June 1998 groundwater sampling event was 0.24 lb/hour. This emission rate is below the regulatory limit of 10 lb/hour for VOCs. The June 1998 VOC emissions rate is typical of VOC emissions rates during the time period of March 1997 through December 1997, and represents a substantial drop from the 1.91 lb/hour VOC emissions rate calculated for the March 1998 sampling event.

A cumulative summary of analytical results for air emissions monitoring is included in Table 5. These results are based on both laboratory and field analyses.

The vapor extraction system was operating at 21.5 inches H_2O vacuum with an average flow of 124 cubic feet per minute (cfm) at 153°F during the June 1998 sampling event. The air injection system for the new injection wells, AI-20 through AI-24, was operating at an average flow of 35 cfm at 3 pounds per square inch (psi) at a temperature greater than 200°F during the June 1998 sampling event. The air injection system for the old injection wells was simultaneously operating at an average flow of 40 cfm at 7 psi at a temperature greater than 200°F.

4.0 FEBRUARY 1998 SOIL SAMPLING AND ANALYSIS

Soil samples were collected during the installation of air injection, vacuum extraction, and monitor wells at the site in February 1998, as previously discussed in Section 3.0. The borings for these wells were completed using a combination of air rotary and hollow stem auger drilling techniques. Air rotary drilling techniques were used to advance the borings from the surface to the top of the interval to be sampled. Hollow stem auger drilling techniques were used to collect soil samples and to advance the boreholes through the saturated zone.

A decontaminated split spoon sampler was used to collect soil cores from the subsurface. Cuttings and recovered cores were characterized lithologically and classified in accordance with the Unified Soil Classification System. The boring logs and well completion diagrams for air injection wells AI-20 through AI-24, vacuum extraction wells VE-5 through VE-7, and monitor wells MW-11A and MW-12 are contained within Appendix C.

Recovered soil cores were scanned with a photoionization detector (PID). Soil cores were collected from the first boring, AI-24, at 5-foot intervals from 40 feet to 50 feet below grade and continuously from 50 feet to 55.5 feet. No PID response was noted in the 40- to 41.5-foot and 45- to 46.5-foot intervals of the AI-24 soil boring, but PID readings of greater than 2000 parts per million were observed throughout the 50- to 55-foot interval. A similar distribution of hydrocarbons in the vadose zone is inferred at the AI-21 through AI-23 locations, based on olfactory and PID evidence in soil cuttings and recovered cores from these borings. At the AI-20 location, however, olfactory evidence of hydrocarbon impact to soil was observed from approximately 15 feet below grade to the top of the saturated zone. The AI-20 injection well is located immediately downgradient of the former above-grade on-site fueling system. No olfactory or PID evidence of hydrocarbon impact to soil was observed in the VE-5 through VE-7 or MW-11A and MW-12 borings.

Soil samples were submitted for laboratory analysis from the interval immediately overlying the top of the saturated zone in each of the soil borings completed in February 1998. Soil samples were

also submitted for laboratory analysis from the top of the saturated zone and from 10 feet below the top of the saturated zone in the AI-21 soil boring.

The soil samples were analyzed for BTEX by Method 8020 and TPH-D by Method 8015. The analytical results are summarized in Table 7. The analytical reports for February 1998 soil samples are presented in Appendix D.

Impact by BTEX constituents was limited to the AI-20 through AI-24 locations. Benzene and total BTEX impact to soils was greatest at the AI-20 location. It appears that hydrocarbon impact to soil within the saturated zone is limited primarily to only the upper portion of the saturated zone, based on the results of soil samples recovered at the AI-21 location.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on information obtained during the February 1998 soil sampling activities and the June 1998 quarterly groundwater sampling event at the BJ Services Hobbs, New Mexico facility.

5.1 Conclusions

- Where present, hydrocarbon impact to soil is generally limited to the lower 5 to 7 feet of the vadose zone and the uppermost portion of the saturated zone. Vadose zone soil impact is more vertically widespread in the immediate area of the former on-site fueling system, however.
- Groundwater flow was to the east at an average hydraulic gradient of 0.005 ft/ft.
- Dissolved benzene and total BTEX concentrations have decreased in monitor well MW-1, which is located near the central portion of the plume, during the time period between March 1998 and June 1998.
- Dissolved benzene concentrations have generally decreased in the remaining monitor wells during operation of the biosparging system.
- Benzene concentrations in monitor wells MW-5, MW-7, MW-8, MW-9, and MW-11A are below the New Mexico Water Quality Control Commission standard of 0.01 mg/L.
- Hydrocarbon air emissions have decreased substantially since March 1998. The current emissions rate of 0.24 lb/hour TPH is below the regulatory limit of 10 lb/hour for VOCs.

5.2 Recommendations

- Continue the quarterly groundwater sampling program and the operation and maintenance of the biosparging system.
- Continue monitoring hydrocarbon emissions on a quarterly basis using a calibrated field FID.
- Continue free product recovery operations in monitor wells MW-1 and MW-4.
- Continue monitoring for natural attenuation parameters in monitor wells MW-10, MW-11A, and MW-12.

DISTRIBUTION

Final
June 1998 Groundwater Sampling Report
BJ Services Company, U.S.A.
Hobbs, New Mexico

October 19, 1998

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Oil Conservation Division
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Santa Fe, New Mexico 87505

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Oil Conservation Division, Hobbs District Office
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Attention: Ms. Jo Ann Cobb

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2708 West County Road
Hobbs, New Mexico 88240

Attention: Mr. Roger Sullivan

1 copy to: Brown and Caldwell, Project File

QUALITY CONTROL REVIEWER

Robert N. Jennings, P.E.
Vice President

RLR/uak

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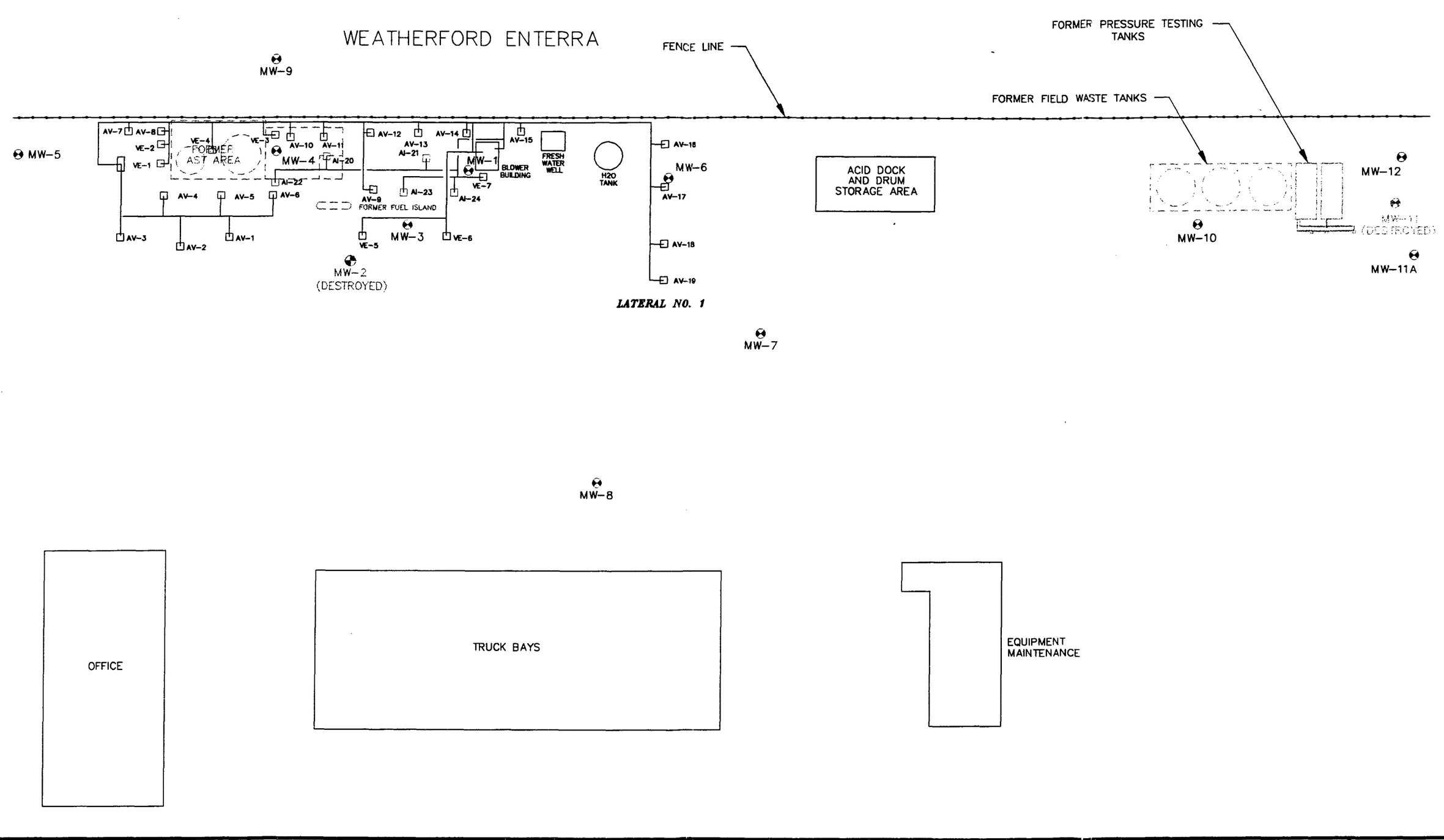
Figures

FIGURES

WEATHERFORD ENTERRA



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0 20 40
SCALE: 1" = 50'
DRAWN BY: JR DATE 2/98
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

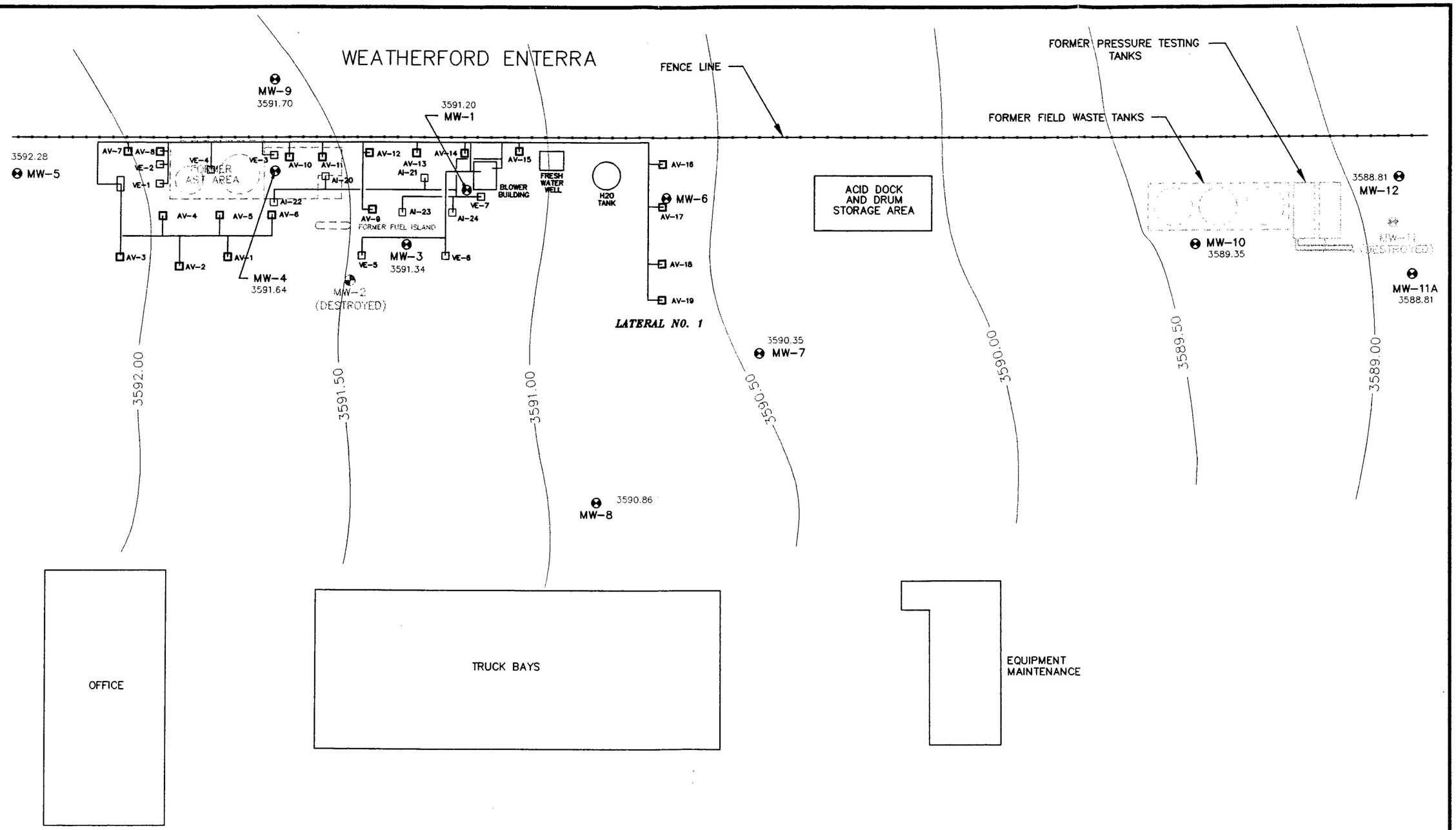
LEGEND

MW-3 MONITOR WELL

VE-4 AV-10 BIOSPARGING SYSTEM

TITLE: SITE MAP	DATE: 02/25/98
CLIENT: BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER: 2832.12
SITE: HOBBS, NEW MEXICO	FIGURE NUMBER: 1

WEATHERFORD ENTERRA



T:\2832\13\28321302 08-11-98 JerryA

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HOUSTON, TEXAS

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PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

0 20 40
SCALE: 1" = 40'
DRAWN BY: JR DATE 4/98
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

LEGEND

3591.34
MW-3
MONITOR WELL IDENTIFICATION, WITH POTENTIOMETRIC SURFACE ELEVATION

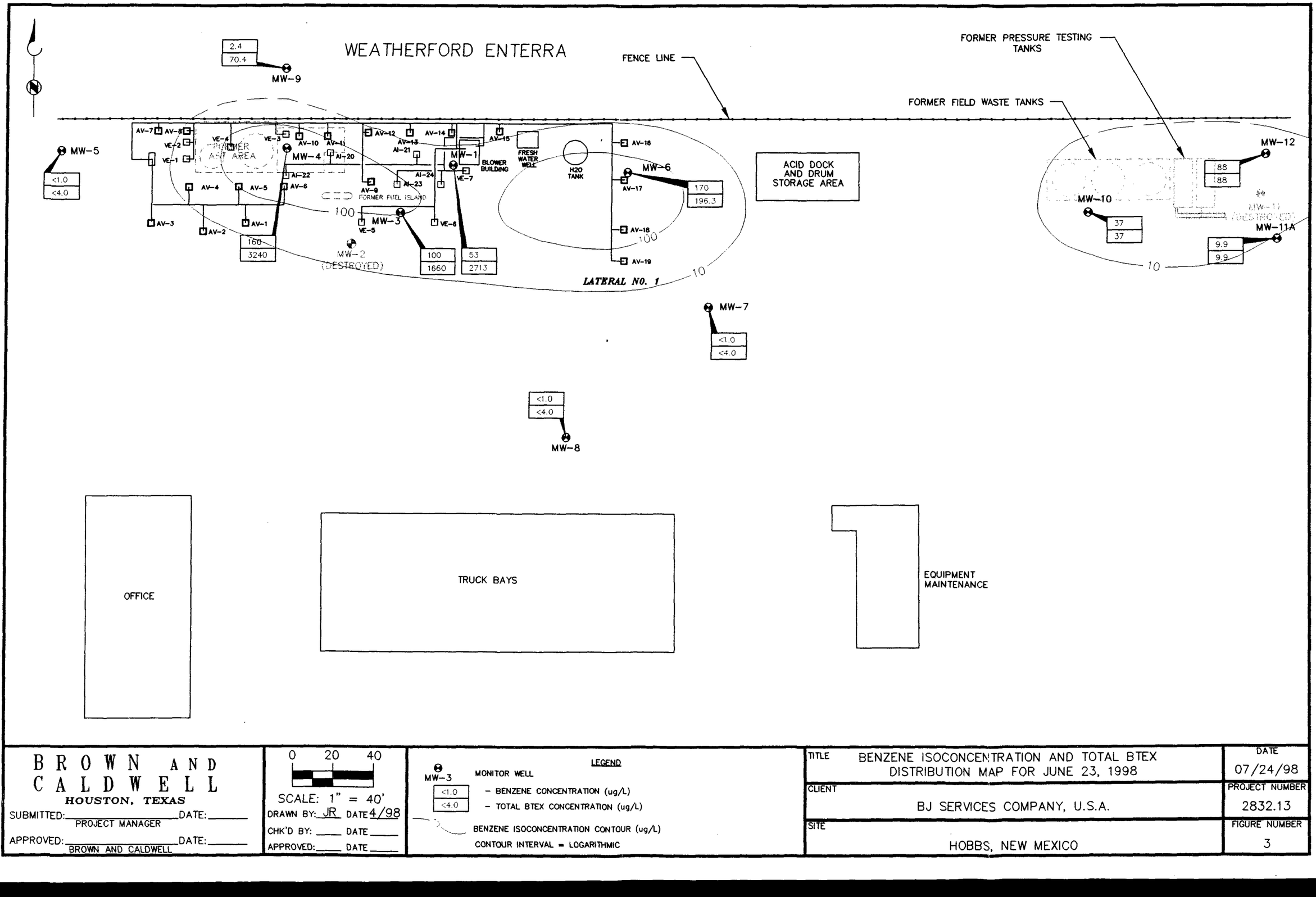
POTENTIOMETRIC CONTOUR

CONTOUR INTERVAL = 0.5 FEET

NOTE: DATA FROM MONITOR WELL MW-6 NOT USED.

TITLE: POTENTIOMETRIC SURFACE MAP FOR JUNE 23, 1998	DATE: 07/24/98
CLIENT: BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER: 2832.13
SITE: HOBBS, NEW MEXICO	FIGURE NUMBER: 2

WEATHERFORD ENTERRA



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HOUSTON, TEXAS

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PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

0 20 40
SCALE: 1" = 40'
DRAWN BY: JR DATE 4/98
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

LEGEND

MW-3 — MONITOR WELL
<1.0 — BENZENE CONCENTRATION (ug/L)
<4.0 — TOTAL BTEX CONCENTRATION (ug/L)
BENZENE ISOCONCENTRATION CONTOUR (ug/L)
CONTOUR INTERVAL = LOGARITHMIC

TITLE: BENZENE ISOCONCENTRATION AND TOTAL BTEX DISTRIBUTION MAP FOR JUNE 23, 1998

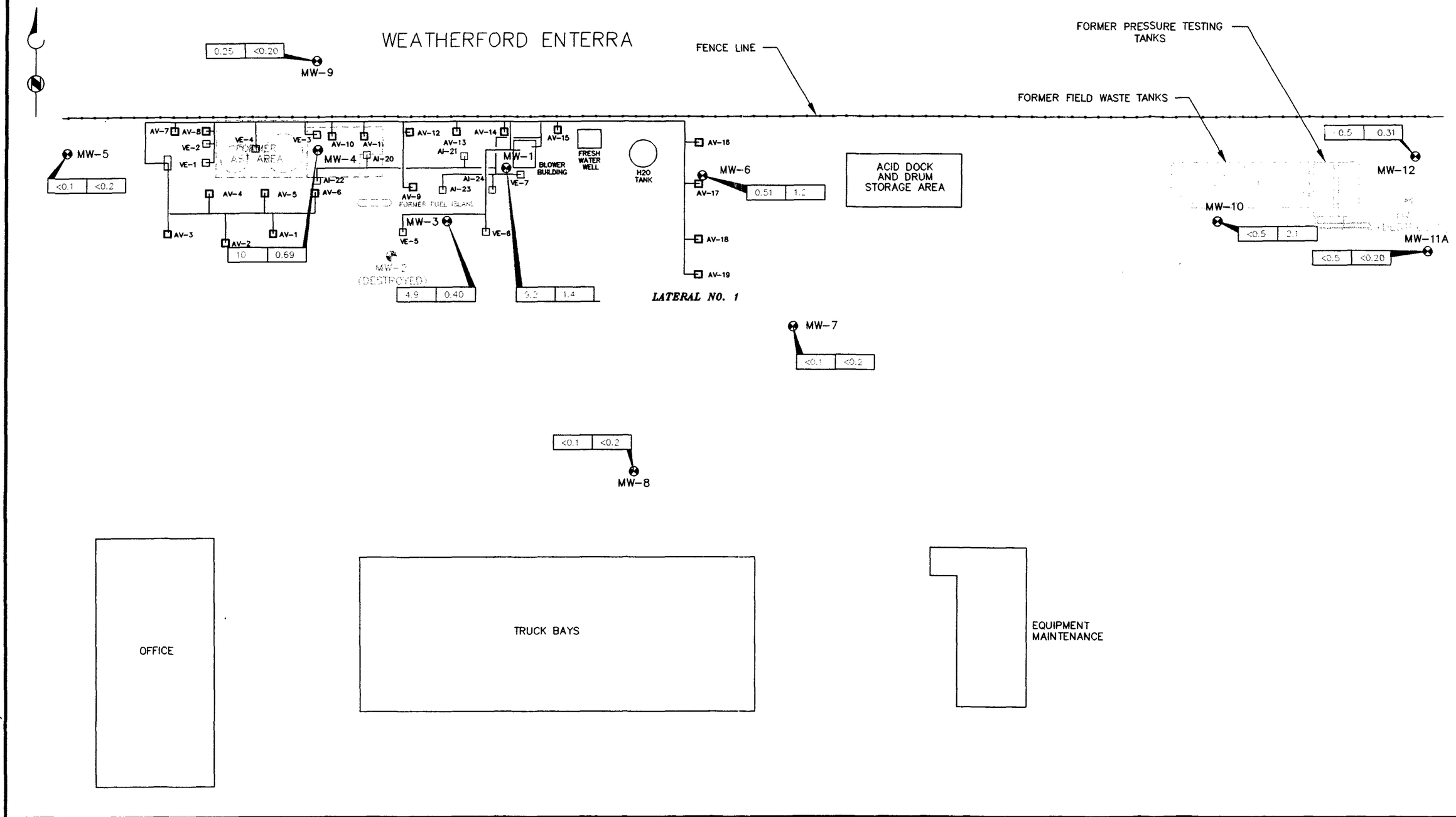
CLIENT: BJ SERVICES COMPANY, U.S.A.

SITE: HOBBS, NEW MEXICO

DATE: 07/24/98

PROJECT NUMBER: 2832.13

FIGURE NUMBER: 3



T:\2832\13\28321304 08-11-98 JerryA

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0 20 40
SCALE: 1" = 40'
DRAWN BY: JR DATE 4/98
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

LEGEND

MW-3 MONITOR WELL

<0.1 <0.30 – TPH-G (mg/L) / TPH-D (mg/L)

TITLE: TOTAL PETROLEUM HYDROCARBONS DISTRIBUTION MAP FOR JUNE 23, 1998

DATE: 07/24/98

CLIENT: BJ SERVICES COMPANY, U.S.A.

PROJECT NUMBER: 2832.13

SITE: HOBBS, NEW MEXICO

FIGURE NUMBER: 4

Tables

TABLES

Table 1
Site Chronology
BJ Services Company, U.S.A.
Hobbs, New Mexico

Date	Activity
February 7, 1991	The State of New Mexico Oil Conservation Division (OCD) conducted an on-site inspection, including sampling of the on-site fresh water well.
August 6, 1991	OCD requested submittal of an investigation work plan.
September 5, 1991	Roberts/Schornick and Associates, Inc. (RSA) submitted Technical Work Plan for soil and groundwater investigation to the OCD.
November 15, 1991	The OCD approved Technical Work Plan submitted by RSA.
December 16, 1991	RSA sampled the fresh water well. Analytical results were submitted to the OCD.
February 21, 1992	Western sampled the fresh water well. Analytical results were submitted to the OCD.
July 29 - August 10, 1992	Brown and Caldwell conducted a soil and groundwater investigation according to the approved Technical Work Plan. Investigation included drilling and sampling 9 soil borings, sampling 6 hand-augured soil borings, the installation and sampling of 5 monitoring wells, and the sampling of the fresh water well.
October 12, 1992	Brown and Caldwell submitted Soil and Groundwater Investigation Report to the OCD.
December 2, 1992	The OCD requested the installation and sampling of 4 additional monitoring wells, including a monitoring well on an adjacent property.
April 13, 1993	Brown and Caldwell conducted a vapor extraction pilot test on existing groundwater monitoring wells.
April 15, 1993	Brown and Caldwell installed off-site monitoring well.
April 22, 1993	Brown and Caldwell sampled off-site monitoring well.
May 27, 1993	Brown and Caldwell submitted a letter report documenting the installation and sampling of the off-site monitoring well to the OCD.
June 2, 1993	Brown and Caldwell conducted a short-term aquifer test using the fresh water well at the facility.
June 8, 1993	USTank Management, Inc. conducted a non-volumetric tank system tightness test on the diesel and unleaded gasoline aboveground storage tanks at the facility.

Table 1 (Continued)
Site Chronology
BJ Services Company, U.S.A.
Hobbs, New Mexico

Date	Activity
June 21, 1993	ENSR Consulting and Engineering (ENSR), the environmental consultant of the adjacent property owner on which the off-site well is located, submitted a request to sample the off-site monitoring well.
July 15, 1993	ENSR split one groundwater sample, collected from the off-site monitoring well, with Brown and Caldwell.
July 30, 1993	USTank Management, Inc. submitted the tank tightness test report to Brown and Caldwell. The report indicated that both tanks and their associated piping passed.
August 16-19, 1993	Brown and Caldwell installed two additional downgradient monitoring wells. Brown and Caldwell sampled each of the existing monitoring and the newly installed monitoring wells.
January 26, 1994	Brown and Caldwell performed groundwater monitoring event; existing monitoring wells and the fresh water well were purged and sampled. Groundwater samples were analyzed for BTEX.
May 6, 1994	Remedial Action Plan (RAP) submitted to the OCD.
August 11, 1994	RAP approved by the OCD.
May 3, 1995	Brown and Caldwell conducted the May 1995 groundwater sampling event.
July 31, 1995	Brown and Caldwell conducted the July 1995 groundwater sampling event.
August 2-9, 1995	Installation of biosparging system was initiated. Nineteen combined injection/extraction wells and three vacuum extraction wells were installed.
August 14-26, 1995	Remedial Construction Services, Inc. (RCS) began construction of the biosparging system.
September 19, 1995	Began operation of the extraction portion of the biosparging system.
November 13, 1995	Began operation of the injection portion of the biosparging system.
November 14, 1995	Brown and Caldwell conducted the November 1995 groundwater sampling event.
February 23, 1996	Brown and Caldwell conducted the February 1996 groundwater sampling event.
May 31, 1996	Brown and Caldwell conducted the May 1996 groundwater sampling event.

Table 1 (Continued)
Site Chronology
BJ Services Company, U.S.A.
Hobbs, New Mexico

Date	Activity
August 23, 1996	Brown and Caldwell conducted the August 1996 groundwater sampling event.
December 2, 1996	Brown and Caldwell conducted the December 1996 groundwater sampling event.
March 12, 1997	Brown and Caldwell conducted the March 1997 groundwater sampling event.
March 14, 1997	Vapor extraction well VE-4 installed.
April 1997	Vapor extraction well VE-4 connected to the vapor extraction system.
June 12, 1997	Brown and Caldwell conducted the June 1997 groundwater sampling event.
September 11-12, 1997	Brown and Caldwell conducted the September 1997 groundwater sampling event.
December 10, 1997	Brown and Caldwell conducted the December 1997 groundwater sampling event.
February 3-14, 1998	Air injection wells AI-20 through AI-24, vapor extraction wells VE-5 though VE-7, and monitor wells MW-11A and MW-12 were installed.
February 19, 1998	Operation of previously existing injection wells suspended in preparation for start-up of injection wells AI-20 through AI-24.
March 10, 1998	Operation of air injection wells AI-20 through AI-24 commenced.
March 23-24, 1998	Brown and Caldwell conducted the March 1998 groundwater sampling event.
March 24, 1998	Operation of previously existing injection wells resumed.
June 23, 1998	Brown and Caldwell conducted the June 1998 groundwater sampling event.

Table 2
Cumulative Groundwater Elevation Data
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitoring Well	TOC Elevation	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	GW Elevation (ft MSL)	Comments
MW-1						
	3,647.53	8/10/92	53.22	0.00	3,594.31	(1)
	3,647.53	2/9/93	53.03	0.00	3,594.50	
	3,647.53	8/18/93	53.10	0.00	3,594.43	
	3,647.53	1/26/94	53.31	0.00	3,594.22	
	3,647.53	5/3/95	54.64	0.20	3,593.05	(2)
	3,647.53	7/31/95	54.14	0.00	3,593.39	
	3,647.53	11/14/95	53.69	0.00	3,593.84	
	3,647.53	2/23/96	54.32	0.00	3,593.21	
	3,647.53	5/31/96	54.14	0.00	3,593.39	
	3,647.53	8/23/96	56.17	0.00	3,591.36	
	3,647.53	12/2/96	55.27	0.00	3,592.26	
	3,647.53	3/12/97	55.70	0.27	3,592.05	(3)
	3,647.53	6/12/97	55.08	0.02	3,592.47	
	3,647.53	9/12/97	55.64	0.51	3,592.31	
	3,647.53	12/10/97	55.46	0.00	3,592.07	PSH Sheen
	3,647.53	3/24/98	55.81	0.00	3,591.72	PSH Sheen
	3,647.53	6/23/98	56.38	0.06	3,591.20	
MW-2						
	3,647.59	8/10/92	52.82	0.00	3,594.77	(1)
	3,644.84	2/9/93	49.60	0.00	3,595.24	
	3,644.84	8/18/93	49.71	0.00	3,595.13	
	3,644.84	1/26/94	49.97	0.00	3,594.87	
		5/3/95				(4)
MW-3						
	3,647.68	8/10/92	52.99	0.00	3,594.69	(1)
	3,647.68	2/9/93	52.72	0.00	3,594.96	
	3,647.68	8/18/93	52.82	0.00	3,594.86	
	3,647.68	1/26/94	53.05	0.00	3,594.63	
	3,647.68	5/3/95	54.31	0.00	3,593.37	
	3,645.00	7/31/95	51.24	0.00	3,593.76	
	3,645.00	11/14/95	51.10	0.00	3,593.90	
	3,645.00	2/23/96	51.68	0.00	3,593.32	
	3,645.00	5/31/96	51.45	0.00	3,593.55	
	3,645.00	8/23/96	51.55	0.00	3,593.45	
	3,645.00	12/2/96	52.23	0.00	3,592.77	
	3,645.00	3/12/97	52.67	0.00	3,592.33	(3)
	3,645.00	6/12/97	52.68	0.00	3,592.32	
	3,645.00	9/11/97	52.71	0.00	3,592.29	
	3,645.00	12/10/97	52.89	0.00	3,592.11	
	3,645.00	3/23/98	53.22	0.00	3,591.78	
	3,645.00	6/23/98	53.66	0.00	3,591.34	

Table 2
Cumulative Groundwater Elevation Data
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitoring Well	TOC Elevation	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	GW Elevation (ft MSL)	Comments
MW-4						
	3,645.28	8/10/92	50.55	0.00	3,594.73	(1)
	3,645.28	2/9/93	50.26	0.00	3,595.02	
	3,645.28	8/18/93	50.38	0.00	3,594.90	
	3,645.28	1/26/94	50.90	0.30	3,594.63	
	3,645.28	5/3/95	51.51	0.45	3,594.14	
	3,645.28	7/31/95	51.74	0.26	3,593.75	
	3,645.28	11/14/95	51.03	0.00	3,594.25	
	3,645.28	2/23/96	51.65	0.01	3,593.64	
	3,645.28	5/31/96	51.48	0.00	3,593.80	
	3,645.28	8/23/96	53.49	0.00	3,591.79	
	3,645.28	12/2/96	52.32	0.00	3,592.96	
	3,645.28	3/12/97	52.74	0.05	3,592.58	(3)
	3,645.28	6/12/97	53.08	0.44	3,592.56	
	3,645.28	9/12/97	52.60	0.15	3,592.80	
	3,645.28	12/10/97	52.89	0.00	3,592.39	PSH Sheen
	3,645.28	3/24/98	53.20	0.25	3,592.29	
	3,645.28	6/23/98	53.82	0.22	3,591.64	
MW-5						
	3,647.72	8/10/92	52.38	0.00	3,595.34	(1)
	3,647.72	2/9/93	52.06	0.00	3,595.66	
	3,647.72	8/18/93	52.16	0.00	3,595.56	
	3,647.72	1/26/94	52.50	0.00	3,595.22	
	3,647.72	5/3/95	53.57	0.00	3,594.15	
	3,647.72	7/31/95	53.27	0.00	3,594.45	
	3,647.72	11/14/95	52.83	0.00	3,594.89	
	3,647.72	2/23/96	53.57	0.00	3,594.15	
	3,647.72	5/31/96	53.16	0.00	3,594.56	
	3,647.72	8/23/96	53.41	0.00	3,594.31	
	3,647.72	12/2/96	53.98	0.00	3,593.74	
	3,647.72	3/12/97	54.44	0.00	3,593.28	(3)
	3,647.72	6/12/97	54.48	0.00	3,593.24	
	3,647.72	9/12/97	54.29	0.00	3,593.43	
	3,647.72	12/10/97	54.66	0.00	3,593.06	
	3,647.72	3/23/98	55.05	0.00	3,592.67	
	3,647.72	6/23/98	55.44	0.00	3,592.28	

Table 2
Cumulative Groundwater Elevation Data
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitoring Well	TOC Elevation	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	GW Elevation (ft MSL)	Comments
MW-6						
	3,644.74	2/9/93	50.58	0.00	3,594.16	(1)
	3,644.74	8/18/93	50.78	0.00	3,593.96	
	3,644.74	1/26/94	51.00	0.00	3,593.74	
	3,644.74	5/3/95	52.63	0.00	3,592.11	
	3,644.74	7/31/95	51.90	0.00	3,592.84	
	3,644.74	11/14/95	51.19	0.00	3,593.55	
	3,644.74	2/23/96	52.10	0.00	3,592.64	
	3,644.74	5/31/96	51.76	0.00	3,592.98	
	3,644.74	8/23/96	51.63	0.00	3,593.11	
	3,644.74	12/2/96	52.85	0.00	3,591.89	
	3,644.74	3/12/97	53.55	0.00	3,591.19	(3)
	3,644.74	6/12/97	52.08	0.00	3,592.66	
	3,644.74	9/11/97	53.72	0.00	3,591.02	
	3,644.74	12/10/97	53.27	0.00	3,591.47	
	3,644.74	3/23/98	53.56	0.00	3,591.18	
	3,644.74	6/23/98	52.88	0.00	3,591.86	
MW-7						
	3,644.55	2/9/93	50.53	0.00	3,594.02	(1)
	3,644.55	8/18/93	50.74	0.00	3,593.81	
	3,644.55	1/26/94	51.01	0.00	3,593.54	
	3,644.55	5/3/95	52.25	0.00	3,592.30	
	3,644.55	7/31/95	51.92	0.00	3,592.63	
	3,644.55	11/14/95	51.48	0.00	3,593.07	
	3,644.55	2/23/96	52.15	0.00	3,592.40	
	3,644.55	5/31/96	51.78	0.00	3,592.77	
	3,644.55	8/23/96	52.02	0.00	3,592.53	
	3,644.55	12/2/96	52.52	0.00	3,592.03	
	3,644.55	3/12/97	52.99	0.00	3,591.56	(3)
	3,644.55	6/12/97	53.08	0.00	3,591.47	
	3,644.55	9/11/97	53.00	0.00	3,591.55	
	3,644.55	12/10/97	53.28	0.00	3,591.27	
	3,644.55	3/23/98	53.59	0.00	3,590.96	
	3,644.55	6/23/98	54.20	0.00	3,590.35	

Table 2
Cumulative Groundwater Elevation Data
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitoring Well	TOC Elevation	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	GW Elevation (ft MSL)	Comments
MW-8						
	3,644.87	2/9/93	50.48	0.00	3,594.39	(1)
	3,644.87	8/18/93	50.67	0.00	3,594.20	
	3,644.87	1/26/94	50.96	0.00	3,593.91	
	3,644.87	5/3/95	52.15	0.00	3,592.72	
	3,644.87	7/31/95	51.77	0.00	3,593.10	
	3,644.87	11/14/95	51.37	0.00	3,593.50	
	3,644.87	2/23/96	52.17	0.00	3,592.70	
	3,644.87	5/31/96	51.55	0.00	3,593.32	
	3,644.87	8/23/96	51.92	0.00	3,592.95	
	3,644.87	12/2/96	52.43	0.00	3,592.44	
	3,644.87	3/12/97	52.93	0.00	3,591.94	(3)
	3,644.87	6/12/97	53.96	0.00	3,590.91	
	3,644.87	9/11/97	52.73	0.00	3,592.14	
	3,644.87	12/10/97	53.15	0.00	3,591.72	
	3,644.87	3/23/98	53.51	0.00	3,591.36	
	3,644.87	6/23/98	54.01	0.00	3,590.86	
MW-9						
	3,644.78	4/22/93	49.73	0.00	3,595.05	(1)
	3,644.78	7/15/93	49.65	0.00	3,595.13	
	3,644.78	8/18/93	49.85	0.00	3,594.93	
	3,644.78	1/26/94	50.02	0.00	3,594.76	
	3,644.78	5/3/95	51.35	0.00	3,593.43	
	3,644.78	7/31/95	50.97	0.00	3,593.81	
	3,644.78	11/14/95	50.43	0.00	3,594.35	
	3,644.78	2/23/96	51.12	0.00	3,593.66	
	3,644.78	5/31/96	50.89	0.00	3,593.89	
	3,644.78	8/23/96	50.98	0.00	3,593.80	
	3,644.78	12/2/96	51.58	0.00	3,593.20	
	3,644.78	3/12/97	52.21	0.05	3,592.61	(3)
	3,644.78	6/12/97	52.10	0.00	3,592.68	PSH Sheen
	3,644.78	9/12/97	51.95	0.00	3,592.83	PSH Sheen
	3,644.78	12/10/97	52.37	0.00	3,592.41	Slight Sheen
	3,644.78	3/23/98	52.68	0.00	3,592.10	Slight Sheen
	3,644.78	6/23/98	53.08	0.00	3,591.70	PSH Sheen

Table 2
Cumulative Groundwater Elevation Data
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitoring Well	TOC Elevation	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	GW Elevation (ft MSL)	Comments
MW-10						
	3,644.47	8/18/93	51.54	0.00	3,592.93	(1)
	3,644.47	1/26/94	51.90	0.00	3,592.57	
	3,644.47	5/3/95	52.97	0.00	3,591.50	
	3,644.47	7/31/95	52.87	0.00	3,591.60	
	3,644.47	11/14/95	52.51	0.00	3,591.96	
	3,644.47	2/23/96	53.05	0.00	3,591.42	
	3,644.47	5/31/96	52.79	0.00	3,591.68	
	3,644.47	8/23/96	53.03	0.00	3,591.44	
	3,644.47	12/2/96	53.41	0.00	3,591.06	
	3,644.47	3/12/97	54.21	0.00	3,590.26	(3)
	3,644.47	6/12/97	53.99	0.00	3,590.48	
	3,644.47	9/12/97	53.94	0.00	3,590.53	
	3,644.47	12/10/97	54.12	0.00	3,590.35	
	3,644.47	3/23/98	54.51	0.00	3,589.96	
	3,644.47	6/23/98	55.12	0.00	3,589.35	
MW-11						
	3,643.78	8/18/93	51.92	0.00	3,591.86	(1)
	3,643.78	1/26/94	52.32	0.00	3,591.46	
	3,643.78	5/3/95	53.38	0.00	3,590.40	
	3,643.78	7/31/95	53.35	0.00	3,590.43	
	3,643.78	11/14/95	52.96	0.00	3,590.82	
	3,643.78	2/23/96	53.50	0.00	3,590.28	
	3,643.78	5/31/96	53.25	0.00	3,590.53	
	3,643.78	8/23/96	53.49	0.00	3,590.29	
	3,643.78	12/2/96	53.79	0.00	3,589.99	
	3,643.78	3/12/97	53.81	0.00	3,589.97	(3)
	3,643.78	6/12/97	53.96	0.00	3,589.82	
	3,643.78	9/12/97	52.93	0.00	3,590.85	
		12/10/97				(5)
MW-11A						
	3,644.24	3/23/98	54.79	0.00	3,589.45	(6)
	3,644.24	6/23/98	55.43	0.00	3,588.81	
MW-12						
	3,644.29	3/23/98	54.72	0.00	3,589.57	(6)
	3,644.29	6/23/98	55.48	0.00	3,588.81	

Table 2
Cumulative Groundwater Elevation Data
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitoring Well	TOC Elevation	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	GW Elevation (ft MSL)	Comments

(1) Top of casing elevations and groundwater elevations of all monitor wells were relative to an arbitary datum of 100.00 feet prior to March 1997 and have been converted to Mean Sea Level (MSL).

(2) For wells with a hydrocarbon layer the groundwater elevation was calculated as follows:
Groundwater Elevation = (TOC elevation) - (Depth to groundwater) + [(Free product thickness) X (SG of free product)]
Note: The specific gravity (SG) for the free product was 0.82.

(3) Top of casing elevations and groundwater elevations relative to MSL after March 1997.

(4) MW-2 could not be located and is assumed detroyed after January, 1994

(5) MW-11 could not be located and is assumed detroyed after September 12, 1997.

(6) TOC elevations for MW-11A and MW-12 estimated relative to TOC elevation for MW-10.

Table 3
Field Screening Results for Groundwater Samples
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitor Well	Date Measured	Well Volume	pH	Temperature oC	Conductivity (umhos)	Redox (mV)	Dissolved Oxygen (mg/L)	Ferrous Iron (mg/L)	Alkalinity (mg/L)
MW-1	6/23/98	3	NR	NR	NR	NR	NR	0	NA
MW-3	6/23/98	0	7.48	20.91	1257	61.8	0.55		
		1	7.15	20.01	1175	60.2	0.66		
		2	7.13	19.98	1181	-22.2	0.89		
		3	7.14	19.97	1185	-56.1	0.98	0	NA
MW-4	6/23/98	3	NR	NR	NR	NR	NR	0	NA
MW-5	6/23/98	0	7.31	19.36	1079	108.5	2.01		
		1	7.20	19.43	1059	109.9	2.20		
		2	7.18	19.43	1060	112.4	1.92		
		3	7.17	19.43	1059	114	1.98	0	NA
MW-6	6/23/98	0	8.10	24.16	1472	122.0	1.82		
		1	8.05	22.64	1353	112.6	2.55		
		2	7.67	22.76	1410	113.5	2.49		
		3	7.62	23.35	1479	111.7	2.48	0	NA
MW-7	6/23/98	0	7.04	20.45	1495.0	104.4	3.75		
		1	6.94	20.34	1489.0	108.9	3.47		
		2	6.84	20.16	1466	114.5	2.83		
		3	6.81	20.16	1459	119.4	2.52	0	NA
MW-8	6/23/98	0	7.10	20.21	1689	58.8	2.10		
		1	6.91	19.55	1646	75	1.37		
		2	6.87	19.59	1641	79.7	1.34		
		3	6.87	20.18	1661	80.6	1.54	0	NA
MW-9	6/23/98	3	NR	NR	NR	NR	NR	9.8	NA
MW-10	6/23/98	0	6.65	22.41	9213	-98.1	1.78		
		1	6.65	21.50	8558	-103	0.97		
		2	6.69	21.38	8422	-103.4	0.98		
		3	6.72	21.37	8454	105.1	1.13	9.8	NA
MW-11A	6/23/98	0	6.87	20.96	2747	-37.1	0.68		
		1	6.82	20.59	2806	-56.3	0.56		
		2	6.81	20.28	2849	-82.2	0.47		
		3	6.82	20.32	2865	-91.0	0.35	5.6	440
MW-12	6/23/98	0	6.91	21.83	3793	-108.7	1.77		
		1	6.76	21.70	3286	-93.9	0.83		
		2	6.75	21.76	3245	-99.7	0.54		
		3	6.75	21.48	3190	-99.5	0.45	9.2	500

MW-2 could not be located and is assumed destroyed after January, 1994.

MW-11 could not be located and is assumed destroyed after September, 1997.

NR = No Readings, electronic instrument not used due to presence of PSH which could damage the detector.

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Table 4

Cummulative Analytical Results for Groundwater Samples

Hobbs, New Mexico Facility

BJ Services Company, U.S.A.

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-1								
	8/10/92	Regular	5550	12090	2160	7370	NA	NA
	2/9/93	Regular	2100	6500	1300	7400	NA	NA
	8/19/93	Regular	3200	7300	1200	3700	NA	NA
	1/27/94	Regular	1930	4580	672	2390	NA	NA
	5/3/95	Regular	NSP	NSP	NSP	NSP	NA	NSP
	8/1/95	Regular	390	1300	230	800	NA	5.7
	11/15/95	Regular	880	1800	300	970	NA	6.8
	2/23/96	Regular	1500	3700	620	2200	NA	21
	5/31/96	Regular	1100	1700	380	990	NA	7.5
	8/23/96	Regular	1800	3300	570	2100	NA	17
	12/2/96	Regular	5600	9600	2100	9600	100	64
	3/12/97	Regular	5500	9700	2600	8200	22	62
	6/12/97	Regular	5300	34000	7500	27000	180	160
	9/12/97	Regular	1800	4400	1000	3000	23	21
	12/10/97	Regular	7600	12000	2800	8200	11	71
	3/24/98	Regular	4800	7200	1200	2400	4.2	38
	6/23/98	Regular	53	680	580	1400	1.4	9.2
MW-2								
	8/10/92	Regular	14.9	< 4	< 4	< 4	NA	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	100	12	3	13	NA	NA
	1/27/94	Regular	< 1	1.2	2	2.5	NA	NA
MW-3								
	8/10/92	Regular	304.9	2099	6760	1586	NA	NA
	2/9/93	Regular	130	< 10	< 10	190	NA	NA
	8/19/93	Regular	560	3100	630	1900	NA	NA
	1/27/94	Regular	1070	5380	510	3120	NA	NA
	5/4/95	Regular	770	3300	470	1800	NA	NA
	8/1/95	Regular	490	2900	890	1600	NA	14
	11/15/95	Regular	250	1000	180	440	NA	2.9
	2/23/96	Regular	120	810	170	560	NA	4
	5/31/96	Regular	670	3900	1200	2300	NA	15
	8/23/96	Regular	330	2200	590	1500	NA	12
	12/2/96	Regular	220	1800	670	1000	0.89	7.4
	3/12/97	Regular	370	2000	960	1400	1.8	11
	6/12/97	Regular	860	4800	1700	2600	1.9	20
	9/11/97	Regular	770	3000	1600	1900	1.6	16
	12/10/97	Regular	240	740	500	450	0.59	5.3
	3/24/98	Regular	140	630	360	310	0.56	3.9
	6/23/98	Regular	100	720	350	490	0.40	4.9
MW-4								
	8/10/92	Regular	2594	10360	2160	6740	NA	NA
	2/9/93	Regular	5200	15000	2200	10000	NA	NA

Table 4

Cummulative Analytical Results for Groundwater Samples

Hobbs, New Mexico Facility

BJ Services Company, U.S.A.

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-4	8/19/93	Regular	3000	12000	< 2000	7000	NA	NA
	1/27/94	Regular	NSP	NSP	NSP	NSP	NA	NSP
	5/3/95	Regular	NSP	NSP	NSP	NSP	NA	NSP
	8/1/95	Regular	5700	17000	3500	13000	NA	120
	11/15/95	Regular	490	1600	310	1100	NA	5.2
	2/23/96	Regular	360	2800	560	2500	NA	18
	5/31/96	Regular	84	830	280	1100	NA	6.2
	8/23/96	Regular	110	1400	430	1800	NA	9.8
	12/2/96	Regular	190	2000	1800	7200	56	43
	3/12/97	Regular	220	1500	1500	4400	27	27
	6/12/97	Regular	47	270	360	950	2.5	6.2
	9/12/97	Regular	92	840	670	2100	15	7.6
	12/10/97	Regular	230	750	970	2300	3.7	16
	3/24/98	Regular	150	510	270	620	1.2	5.6
	6/23/98	Regular	160	890	590	1600	0.69	10
MW-5								
	8/10/92	Regular	< 4	< 4	< 4	< 4	NA	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/10/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	1/27/94	Regular	8.7	29.9	4	11.3	NA	NA
	5/3/95	Regular	3.7	5.3	0.92	4.6	NA	NA
	8/1/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	11/15/95	Regular	< 0.3	1.2	< 0.3	1.5	NA	NA
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	5/31/96	Regular	31	86	10	20	NA	NA
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	3/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	6/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	9/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	12/10/97	Regular	< 5	< 5	< 5	< 5	< 0.2	< 0.1
	3/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	6/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
MW-6								
	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	7000	19000	3100	7200	NA	NA
	8/19/93	Regular	8100	19000	3500	6400	NA	NA
	1/27/94	Regular	7960	20200	3830	6150	NA	NA
	5/4/95	Regular	11000	17000	2900	6000	NA	NA
	8/1/95	Regular	8300	12000	2500	5100	NA	60
	11/15/95	Regular	8900	17000	2900	5500	NA	57
	2/23/96	Regular	8100	10000	2300	4000	NA	58
	5/31/96	Regular	83	150	15	51	NA	0.57
	5/31/96	Duplicate	87	160	13	47	NA	0.52

Table 4
Cummulative Analytical Results for Groundwater Samples
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-6	8/23/96	Regular	31	28	9.4	7.9	NA	0.46
	12/2/96	Regular	< 1	< 1	< 1	1.7	5.6	< 0.1
	3/12/97	Regular	12	< 5	6.8	18	12	< 0.5
	6/12/97	Regular	1900	1400	410	310	7.8	7.4
	9/11/97	Regular	11	1.3	3.4	< 1	1	< 0.1
	12/10/97	Regular	3	4.2	1.2	3.9	1.7	0.14
	3/23/98	Regular	3.6	< 1	4	< 1	< 0.2	< 0.1
	6/23/98	Regular	170	4.1	15	7.2	1.2	0.51
MW-7	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	< 2	3	< 2	< 2	NA	NA
	1/27/94	Regular	1.1	< 1	< 1	< 1	NA	NA
	5/3/95	Regular	52	3.4	0.67	2.8	NA	NA
	8/1/95	Regular	22	2.2	0.85	2.8	NA	< 0.1
	11/15/95	Regular	8.4	0.77	< 0.3	0.93	NA	< 0.1
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	2/23/96	Duplicate	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	5/31/96	Regular	29	83	10	21	NA	0.25
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	3/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	6/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	9/11/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	12/10/97	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	3/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	6/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
MW-8								
	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	< 2	< 2	< 2	< 2	NA	NA
	1/27/94	Regular	< 1	< 1	< 1	< 1	NA	NA
	5/3/95	Regular	3	4.9	0.75	3.7	NA	NA
	8/1/95	Regular	3.1	1.2	0.47	1.6	NA	< 0.001
	8/1/95	Duplicate	3.6	1.5	0.51	1.5	NA	< 0.1
	11/15/95	Regular	< 0.3	0.52	< 0.3	< 0.6	NA	< 0.1
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	5/31/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	3/12/97	Regular	< 1	< 1	< 1	1.8	< 0.1	< 0.1
	6/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	9/11/97	Regular	< 1	< 1	< 1	< 1	0.1	< 0.1
	12/10/97	Regular	< 1	< 1	< 1	< 1	0.3	< 0.1

Table 4

Cummulative Analytical Results for Groundwater Samples

Hobbs, New Mexico Facility

BJ Services Company, U.S.A.

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-8	3/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	6/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
MW-9								
	4/22/93	Regular	570	380	< 50	870	NA	NA
	7/15/93	Regular	121	7.3	3	458	NA	NA
	8/19/93	Regular	390	290	40	250	NA	NA
	1/27/94	Regular	327	357	51.1	293	NA	NA
	5/3/95	Regular	380	110	19	120	NA	NA
	8/1/95	Regular	660	410	91	310	NA	6.2
	11/15/95	Regular	240	24	11	140	NA	1.5
	11/15/95	Duplicate	170	18	10	120	NA	1.9
	2/23/96	Regular	170	18	2.3	160	NA	4.3
	5/31/96	Regular	120	16	3	200	NA	NA
	8/23/96	Regular	82	13	6	270	NA	4
	8/23/96	Duplicate	76	14	4.8	250	NA	4.4
	12/2/96	Regular	61	< 25	< 25	210	2.6	2.8
	12/2/96	Duplicate	86	13	2.4	270	3.7	2.9
	3/12/97	Regular	30	48	420	880	8.2	19
	6/12/97	Regular	4.7	2.1	11	97	2.6	2.2
	6/12/97	Duplicate	< 5	< 5	6.6	69	5.2	1.9
	9/12/97	Regular	2.1	2.3	2.1	120	1.2	1.9
	12/10/97	Regular	4.9	9	6.8	62	0.86	0.92
	3/24/98	Regular	< 1	< 1	< 1	26	0.9	1
	6/23/98	Regular	2.4	22	10	36	< 0.2	0.25
MW-10								
	8/19/93	Regular	190	460	< 200	240	NA	NA
	1/27/94	Regular	13.4	4	5.5	33.6	NA	NA
	5/4/95	Regular	980	15	11	84	NA	NA
	8/1/95	Regular	1300	32	32	100	NA	3.6
	11/15/95	Regular	1000	24	15	36	NA	1.7
	2/23/96	Regular	810	23	27	44	NA	2.4
	5/31/96	Regular	700	24	34	28	NA	2
	8/23/96	Regular	290	3.4	6.4	13	NA	1.4
	12/2/96	Regular	280	1.3	17	8	0.94	0.97
	3/12/97	Regular	110	< 5	17	< 5	0.61	0.57
	6/12/97	Regular	150	12	30	< 5	0.68	< 0.5
	9/12/97	Regular	87	2.3	26	2.7	0.76	0.33
	9/12/97	Duplicate	87	2.4	26	2.8	0.79	0.33
	12/10/97	Regular	41	9.8	12	7.7	1.1	0.28
	12/10/97	Duplicate	36	8.5	10	6.7	1.2	0.24
	3/23/98	Regular	36	< 5	5.9	< 5	1.6	< 0.5
	3/23/98	Duplicate	36	< 1	5.3	1.3	1.7	0.18
	6/23/98	Regular	37	< 5	< 5	< 5	2.1	< 0.5

Table 4

Cummulative Analytical Results for Groundwater Samples

Hobbs, New Mexico Facility

BJ Services Company, U.S.A.

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-11								
	8/19/93	Regular	< 2	< 2	< 2	< 2	NA	NA
	1/27/94	Regular	< 1	< 1	< 1	< 1	NA	NA
	5/4/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	8/1/95	Regular	44	29	5.5	13	NA	0.2
	11/15/95	Regular	190	2.8	6.2	11	NA	0.4
	2/23/96	Regular	49	1.2	0.51	4	NA	0.25
	5/31/96	Regular	300	83	12	28	NA	0.8
	8/23/96	Regular	100	1.2	0.3	4.7	NA	0.26
	12/2/96	Regular	970	< 5	6	8.1	2	1.3
	3/12/97	Regular	130	< 5	13	5.8	0.42	< 0.5
	3/12/97	Duplicate	100	< 5	10	5.1	0.43	< 0.5
	6/12/97	Regular	150	23	19	< 5	1.1	0.55
	9/12/97	Regular	220	15	27	13	1	0.46
MW-11A								
	3/24/98	Regular	24	5	< 5	< 5	0.28	0.14
	6/23/98	Regular	9.9	< 5	< 5	< 5	< 0.2	< 0.5
MW-12								
	3/24/98	Regular	100	11	6	8	0.29	0.41
	6/23/98	Regular	88	< 5	< 5	< 5	< 0.2	< 0.5
	6/23/98	Duplicate	89	< 5	< 5	< 5	0.31	< 0.5

MW-2 destroyed after January, 1994 MW-11 destroyed after September, 1997

NA=Not Analyzed NS=Not Sampled

NSP=Not Sampled due to Phase Separated Hydrocarbons

Table 5
Laboratory Analytical Results for Natural Attenuation Evaluation Parameters
BJ Services Company, U.S.A.
Hobbs, New Mexico

	Nitrate (mg/L)	Sulfate (mg/L)	Dissolved Methane (ppm)
MW-10	<0.1	325	0.55
MW-11A	<0.1	225	0.11
MW-12	<0.1	240	<0.0012

Table 6
Summary of Analytical Results for Air Emissions
Hobbs, New Mexico Facilty
BJ Services Company, U.S.A.

Sample Number	Sample Date	Benzene	Toluene	Ethylbenzene	Xylenes	TPH	Discharge Rate, scfm	Benzene Emission Rate, lb/hr	Total BTEX Emission Rate, lb/hr	TPH Emission Rate, lb/hr
		parts per million by volume, ppmv								
Extraction-1	9/19/95	790	1100	340	920	9700	132.47	1.235	5.943	16.31
Effluent-1	9/20/95	990	2500	560	1600	16000	135.76	1.575	10.939	27.37
Effluent-2	9/28/95	13	28	6	18	2533	123.56	0.019	0.112	3.89
Effluent-4	11/7/95	15	58	12	36	1500	131.10	0.024	0.239	2.59
Effluent 111595-01	11/15/95	39	180	42	130	1870	133.33	0.062	0.773	3.21
Effluent 121995-01	12/19/95	10	45	11	33	530	129.64	0.016	0.191	0.89
Effluent 12996-01	1/29/96	12	61	17	53	1200	128.45	0.018	0.271	1.95
Effluent 032296-01	3/22/96	6	44	12	40	990	124.68	0.009	0.189	1.56
Effluent 042496-01	4/25/96	4	37	10	36	900	118.34	0.005	0.147	1.29
Effluent 053196-01	5/31/96	3.7	40	10	33	670	124.11	0.005	0.158	1.04
Effluent 082396-01	8/23/96	<5	12	<5	<5	200	126.18	0.007	0.047	0.31
Effluent 120296-01	12/2/96	<1	<1	<1	<1	<5	129.04	0.002	0.008	0.01
Eff-31297-1	3/12/97	2.1	15	4.6	15	250	110.56	0.003	0.057	0.33
Effluent 070297-01	7/2/97	<1	6.3	2.4	8.6	65	109.90	0.001	0.028	0.08
Monitor 970912 (1)	9/12/97	NA	NA	NA	NA	340	105.40	NA	NA	0.39
Eff-1-2832	12/10/97	<0.001	0.013	0.009	0.031	210	106.27	0.000	0.000	0.28
Monitor 980324 (1)	3/24/98	NA	NA	NA	NA	1500	108.97	NA	NA	1.91
Monitor 980622 (1)	6/22/98	NA	NA	NA	NA	190	108.16	NA	NA	0.24

Emmission rates reported for 12/02/96 sampling event were calculated using the detection limits. The actual emissions were Benzene <0.001 lb/hr, BTEX, <0.01 lb/hr and TPH <0.01 lb/hr.

NA = Not Analyzed
(1) All analysis based on field FID readings

Table 7
Analytical Results for February 1998 Soil Sampling
BJ Services Company, U.S.A.
Hobbs, New Mexico

Well Identification	Sample Identification	Sample Depth (feet below grade)	Depth Description	Benzene (ug/kg)	Toluene (ug/kg)	Ethylbenzene (ug/kg)	Xylenes (ug/kg)	Total BTEX (ug/kg)	TPH-D (mg/kg)
AI-20	AI20-50-51	50-51	2.5' to 3.5' above top of saturated zone	1,200	120,000	170,000	620,000	911,200	1,700
AI-21	AI21-50-50.8	50-50.8	3.2' to 4' above top of saturated zone	< 10	110	1,100	6,300	7,510	250
AI-21	AI21-53.5-54.5	53.5-54.5	At top of saturated zone	51	450	570	1,800	2,871	98
AI-21	AI21-64-65	64-65	10 to 11 feet below top of saturated zone	< 1	< 1	< 1	1.5	1.5	< 10
AI-22	AI22-50-51	50-51	2.75' to 3.25' above top of saturated zone	< 50	130	740	4,200	5,070	790
AI-23	AI23-49-50.5	49-50.5	3' to 4.5' above top of saturated zone	< 250	650	1,900	13,000	15,550	280
AI-24	AI24-50-51.5	50-51.5	2' to 3.5' above top of saturated zone	< 500	2,200	17,000	81,000	100,200	570
VE-5	VE5-50-51.5	50-51.5	2' to 3.5' above top of saturated zone	< 1	< 1	< 1	< 1	< 4	11
VE-6	VE6-50-50.6	50-50.6	2.9' to 3.5' above top of saturated zone	< 1	< 1	< 1	< 1	< 4	160
VE-7	VE7-50-51	50-51	2.5' to 3.5' above top of saturated zone	< 1	< 1	< 1	< 1	< 4	16
MW-11A	MW-11A-53.5-54.25	53.5-54.25	0.25' to 1' above top of saturated zone	< 1	< 1	< 1	< 1	< 4	14
MW-12	MW12-53.5-54.5	53.5-54.5	0' to 0.75' above top of saturated zone	< 1	< 1	< 1	< 1	< 4	< 10

Appendices

APPENDICES

A

APPENDIX A

Groundwater Sampling Forms

B R O W N AND C A L D W E L L

WELL ID: MW-01

Groundwater Sampling Field Data Sheet

W.County Road, Hobbs, NM

Project Number: **2832** Task Number: **13** Date: 6/23/98

Casing Diameter: 2 inches	Purge Equipment: **Submersible pump**	Equipment Calibration - Time: - - - pH = at °C; - - - pH = at °C
Total Depth of Well from TOC: 64.42 feet		
Static Water from TOC: ~~55.68~~ 56.38 feet	Sample Equipment: **Submersible pump**	*Conductivity* Conductance Standard: - µmhos/cm at 25° C
Product Level from TOC: ~~55.10~~ 56.32 feet		
Length of Water Column: ~~9.44~~ 8.1 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): **YSI 600 XL**	Measured Value: - µmhos/cm at 25° C
Well Volume: ~~1.52~~ 1.32 gal	**Hach Kits for DO, Ferrous Iron, Alkalinity**	*Dissolved Oxygen* DO Meter Calibrated to: mg/L
Screened Interval (from GS): feet		-

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Water Levels	Visual Description
	0								
2040	1	1.3	NM	→	→	→	→	56.87	Slightly Cloudy
2043	2	2.6	↓					56.9	Clear
2046	3	3.9	↓					56.9	Clear
	4								

Geochemical Parameters		*Comments:*
Ferrous Iron:	Ø mg/L	NM = not measured due to presence
Dissolved Oxygen:	Ø mg/L	of PSH in well.
Nitrate:	mg/L	
Alkalinity	mg/L	

PPE Worn: *Nitrile Gloves*	*Sampler's Signature*
Disposition of Purge Water: *Drummed and placed in drum storage*	

B R O W N AND C A L D W E L L

WELL ID: MW-03

Groundwater Sampling Field Data Sheet

W.County Road, Hobbs, NM

Project Number: **2832** Task Number: **13** Date: 1/23/98

Casing Diameter: 2 inches	Purge Equipment: **Submersible pump**	Equipment Calibration - Time: - - - pH = at °C
Total Depth of Well from TOC: 64.31 feet		- - - pH = at °C
Static Water from TOC: ~~58.88~~ 53.66 feet	Sample Equipment: **Submersible pump**	
Product Level from TOC: feet		*Conductivity* Conductance Standard: - µmhos/cm at 25° C
Length of Water Column: ~~11.88~~ 10.65 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): **YSI 600 XL**	Measured Value: - µmhos/cm at 25° C
Well Volume: ~~1.90~~ 1.73 gal	**Hach Kits for DO, Ferrous Iron, Alkalinity**	*Dissolved Oxygen* DO Meter Calibrated to: mg/L
Screened Interval (from GS): feet		-

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Water Levels	Visual Description
1918	0	0.2	7.48	20.91	1257	61.8	0.55	54.11	
1922	1	1.7	7.15	20.01	1125	60.2	0.66	54.06	
1926	2	3.4	7.13	19.98	1181	-22.2	0.89	54.07	
1930	3	5.1	7.14	19.97	1185	-56.1	0.98	54.1	
	4								

Geochemical Parameters		*Comments:*
Ferrous Iron:	Ø mg/L	
Dissolved Oxygen:	1 mg/L	
Nitrate:	mg/L	
Alkalinity	mg/L	

PPE Worn: *Nitrile Gloves*	*Sampler's Signature:*
Disposition of Purge Water: *Drummed and placed in drum storage*	

B R O W N AND C A L D W E L L

WELL ID: MW-04

Groundwater Sampling Field Data Sheet

W.County Road, Hobbs, NM

Project Number: **2832** Task Number: **13** Date: 6/23/98

Casing Diameter 2 inches	Purge Equipment **Submersible pump**	Equipment Calibration - Time - - - pH = at °C - - - pH = at °C
Total Depth of Well from TOC 61.43 feet		
Static Water from TOC 53.08 ~~53.82~~ feet	Sample Equipment **Submersible pump**	*Conductivity* Conductance Standard: - µmhos/cm at 25° C
Product Level from TOC ~~52.64~~ 53.60 feet		
Length of Water Column ~~8.79~~ 7.61 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) **YSI 600 XL**	Measured Value: - µmhos/cm at 25° C
Well Volume ~~1.43~~ 1.24 gal	**Hach Kits for DO, Ferrous Iron, ~~Alkalinity~~**	*Dissolved Oxygen* DO Meter Calibrated to: mg/L
Screened Interval (from GS) feet		-

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Water Levels	Visual Description
	0								Dark Grey
20.10	1	1.25	NM	→	→	→	→	54.56	Gray, Cloudy
20.12	2	2.5	↓					54.56	" sar
2014	3	3.75	↓					54.56	Clear
	4								

Geochemical Parameters		Comments:
Ferrous Iron:	Ø mg/L	NM = not measured due to presence
Dissolved Oxygen:	3.4 mg/L	of PSH in well.
Nitrate:	mg/L	
Alkalinity	mg/L	

PPE Worn: *Nitrile Gloves*	*Sampler's Signature:*
Disposition of Purge Water: *Drummed and placed in drum storage*	

B R O W N AND C A L D W E L L

WELL ID: MW-05

Groundwater Sampling Field Data Sheet

W.County Road, Hobbs, NM

Project Number: **2832** Task Number: **13** Date: 6/23/98

Casing Diameter: 2 inches	Purge Equipment: **Submersible pump**	Equipment Calibration - Time
Total Depth of Well from TOC: 60.27 feet		pH - = - at - °C
Static Water from TOC: ~~52.10~~ 55.44 feet	Sample Equipment: **Submersible pump**	pH - = - at - °C
Product Level from TOC: ~~NA 47.93~~ feet		*Conductivity* Conductance Standard: - µmhos/cm at 25° C
Length of Water Column: ~~8.17~~ 4.83 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): **YSI 600 XL**	Measured Value: - µmhos/cm at 25° C
Well Volume: 1.33 0.86 gal	**Hach Kits for DO, Ferrous Iron, Alkalinity**	*Dissolved Oxygen* DO Meter Calibrated to: mg/L
Screened Interval (from GS): feet		-

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Water Levels	Visual Description
0943	0	0.5	7.31	19.36	1079	108.5	2.01		Clear
0948	1	1.6	7.20	19.43	1059	109.9	2.20		Clear
0951	2	2.6	7.18	19.43	1060	112.4	1.92		clear
0953	3	3.6	7.17	19.43	1059	114	1.98		Clear
	4								

Geochemical Parameters		*Comments:*
Ferrous Iron:	Ø mg/L	Sample 0955
Dissolved Oxygen:	Ø mg/L	
Nitrate:	mg/L	
Alkalinity	mg/L	

PPE Worn: *Nitrile Gloves*	*Sampler's Signature:*
Disposition of Purge Water: *Drummed and placed in drum storage*	

B R O W N AND C A L D W E L L

WELL ID: MW-06

Groundwater Sampling Field Data Sheet

W.County Road, Hobbs, NM

Project Number: **2832** Task Number: **13** Date: -

Casing Diameter: **2** inches	Purge Equipment: **Submersible pump**	Equipment Calibration - Time: - - - pH = at °C
Total Depth of Well from TOC: 60.17 feet		- - - pH = at °C
Static Water from TOC: ~~52.88~~ 52.88 feet	Sample Equipment: **Submersible pump**	*Conductivity* Conductance Standard: - µmhos/cm at 25° C
Product Level from TOC: ~~52.88~~ N/A feet		Measured Value: - µmhos/cm at 25° C
Length of Water Column: ~~0.09~~ 7.29 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): **YSI 600 XL**	
Well Volume: 1.32 1.19 gal	**Hach Kits for DO, Ferrous Iron, Alkalinity**	*Dissolved Oxygen* DO Meter Calibrated to: mg/L
Screened Interval (from GS): feet		-

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Water Levels	Visual Description
0	0	0.2	8.10	24.16	1472	122.0	1.82		Cloudy
13:07	1	1.2	8.05	22.64	1353	112.6	2.55		clear
13:22	2	2.4	7.67	22.76	1410	~~111.0~~ 113.5	2.49		clear
13:37	3	3.6	7.62	23.35	1479	111.7	2.49		clear
	4								

Geochemical Parameters		*Comments:*
Ferrous Iron:	0 mg/L	Water level below top of the pump
Dissolved Oxygen:	6.0* mg/L	* questionable reading due to elapsed
Nitrate:	mg/L	time before measurement
Alkalinity	mg/L	

PPE Worn: *Nitrile Gloves*	*Sampler's Signature:*
Disposition of Purge Water: *Drummed and placed in drum storage*	

B R O W N AND C A L D W E L L

WELL ID: MW-07

Groundwater Sampling Field Data Sheet

W.County Road, Hobbs, NM

Project Number: **2832** Task Number: **13** Date: -

Casing Diameter 2 inches	Purge Equipment **Submersible pump**	Equipment Calibration - Time - - - pH = at °C - - - pH = at °C
Total Depth of Well from TOC 61.46 feet		
Static Water from TOC 53.08 ~~54.2~~ feet	Sample Equipment **Submersible pump**	*Conductivity* Conductance Standard: - µmhos/cm at 25° C Measured Value: - µmhos/cm at 25° C
Product Level from TOC ~~7.26~~ N/A feet		
Length of Water Column 8.38 ~~7.26~~ feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) **YSI 600 XL**	
Well Volume 1.37 ~~1.18~~ gal	**Hach Kits for DO, Ferrous Iron, Alkalinity**	*Dissolved Oxygen* DO Meter Calibrated to: mg/L
Screened Interval (from GS) feet		-

WL 80% = 55.65'

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Water Levels	Visual Description
0815	0	0.25	7.04	20.45	1495.0	104.4	3.75		Cloudy
0823	1	1.2	6.94	20.34	1489.8	108.9	3.47		
0827	2	2.4	6.84	20.16	1466	114.5	2.83		clear
083	3	3.6	6.81	20.16	1459	119.4	2.52		clear
	4								

Geochemical Parameters		*Comments:*
Ferrous Iron:	Ø mg/L	
Dissolved Oxygen:	Ø mg/L	
Nitrate:	mg/L	
Alkalinity	mg/L	

PPE Worn: *Nitrile Gloves*	*Sampler's Signature:*
Disposition of Purge Water: *Drummed and placed in drum storage*	

B R O W N AND C A L D W E L L

WELL ID: MW-08

Groundwater Sampling Field Data Sheet

W.County Road, Hobbs, NM

Project Number: **2832** Task Number: **13** Date: 10/23/08

Casing Diameter: 2 inches Total Depth of Well from TOC: 62.52 feet Static Water from TOC: ~~53.06~~ 54.01 feet Product Level from TOC: N/A feet Length of Water Column: ~~8.56~~ 8.51 feet Well Volume: ~~1.40~~ 1.39 gal Screened Interval (from GS): feet	Purge Equipment: **Submersible pump** Sample Equipment: **Submersible pump** Analytical Equipment (pH, DO, Redox, filtration, etc.): **YSI 600 XL**, **Hach Kits for DO, Ferrous Iron, Alkalinity**	Equipment Calibration - Time - - - pH = at °C - - - pH = at °C *Conductivity* Conductance Standard: - µmhos/cm at 25° C Measured Value: - µmhos/cm at 25° C *Dissolved Oxygen* DO Meter Calibrated to: mg/L -

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Water Levels	Visual Description
0908	0	0.25	7.10	20.21	1689	58.8	2.10	54.01	Brown cloudy
0913	1	1.3	6.91	19.55	1646	75	1.37	57.45	clear
0916	2	2.6	6.87	19.59	1641	79.7	1.34	58.3	clear
0919	3	4.0	6.87	20.18	1661	80.6	1.54	54.9	Clear
	4								

Geochemical Parameters		*Comments:*
Ferrous Iron:	NM mg/L	NM: not measured
Dissolved Oxygen:	NM mg/L	
Nitrate:	mg/L	
Alkalinity	mg/L	

PPE Worn: *Nitrile Gloves*	*Sampler's Signature*
Disposition of Purge Water: *Drummed and placed in drum storage*	

B R O W N AND C A L D W E L L

WELL ID: MW-09

Groundwater Sampling Field Data Sheet

W.County Road, Hobbs, NM

Project Number: **2832** Task Number: **13** Date: 6/23/98

Casing Diameter: 2 inches	Purge Equipment: **Submersible pump**	Equipment Calibration - Time
Total Depth of Well from TOC: 60.27 feet		pH = at °C
Static Water from TOC: 52.10 ~~53.08~~ feet	Sample Equipment: **Submersible pump**	pH = at °C
Product Level from TOC: ~~Ft~~ feet		*Conductivity* Conductance Standard: µmhos/cm at 25° C
Length of Water Column: 8.17 ~~7.19~~ feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): **YSI 600 XL**	Measured Value: µmhos/cm at 25° C
Well Volume: ~~1.83~~ 1.17 gal	**Hach Kits for DO, Ferrous Iron, Alkalinity**	*Dissolved Oxygen* DO Meter Calibrated to: mg/L
Screened Interval (from GS): feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Water Levels	Visual Description
	0							53.08	
1816	1	1.2	NM	→				58.9	
1825	2	2.4	↓					57.03	
1834	3	3.6						56.64	
	4								

Geochemical Parameters		*Comments:*
Ferrous Iron:	Ø mg/L	Presence of PSH noted on outside of Bailer after 1 Bail (NM = not measured)
Dissolved Oxygen:	Ø mg/L	
Nitrate:	mg/L	
Alkalinity	mg/L	

PPE Worn: *Nitrile Gloves*	*Sampler's Signature:*
Disposition of Purge Water: *Drummed and placed in drum storage*	

B R O W N AND C A L D W E L L

WELL ID: MW-10

Groundwater Sampling Field Data Sheet

W.County Road, Hobbs, NM

Project Number: **2832** Task Number: **13** Date: -

Casing Diameter: **2** inches	Purge Equipment: **Submersible pump**	Equipment Calibration - Time: - - - pH = at °C; - - - pH = at °C
Total Depth of Well from TOC: **63.60** feet		
Static Water from TOC: ~~53.99~~ 55.12 feet	Sample Equipment: **Submersible pump**	*Conductivity* Conductance Standard: - µmhos/cm at 25° C
Product Level from TOC: 0/4 feet		
Length of Water Column: ~~9.61~~ 9.48 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): **YSI 600 XL**	Measured Value: - µmhos/cm at 25° C
Well Volume: ~~1.57~~ 1.38 gal	**Hach Kits for DO, Ferrous iron, Alkalinity**	*Dissolved Oxygen* DO Meter Calibrated to: mg/L
Screened Interval (from GS): feet		-

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Water Levels	Visual Description
1608	0	0.5	6.65	22.41	9213	-98.1	1.78		cloudy
1617	1	1.4	6.65	21.50	8658	-103	0.97		clear
1620	2	2.8	6.69	21.38	8422	-103.4	0.98		clear
1626	3	4.2	6.72	21.37	8454	-105.1	1.13		clear
	4								

Geochemical Parameters		*Comments:*
Ferrous Iron:	9.8 mg/L	
Dissolved Oxygen:	0 mg/L	
Nitrate:	mg/L	
Alkalinity	mg/L	

PPE Worn: *Nitrile Gloves*	*Sampler's Signature:*
Disposition of Purge Water: *Drummed and placed in drum storage*	

BROWN AND CALDWELL

WELL ID: MW-11A

Groundwater Sampling Field Data Sheet

W.County Road, Hobbs, NM

Project Number: **2832** Task Number: **13** Date: -

Casing Diameter 2 inches	Purge Equipment **Submersible pump**	Equipment Calibration - Time - - - pH = at °C - - - pH = at °C
Total Depth of Well from TOC 64.16 feet		
Static Water from TOC 54.79 55.43 feet	Sample Equipment **Submersible pump**	
Product Level from TOC — feet		*Conductivity* Conductance Standard: - µmhos/cm at 25° C
Length of Water Column<br~~9.37~~ 8.76 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) **YSI 600 XL**	Measured Value: - µmhos/cm at 25° C
Well Volume 1.53 1.43 gal	**Hach Kits for DO, Ferrous Iron, Alkalinity**	*Dissolved Oxygen* DO Meter Calibrated to: mg/L
Screened Interval (from GS) feet		-

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Water Levels	Visual Description
1417	0	0.5	6.87	20.96	2747	-37.1	0.68	55.9	Very Cloudy
1419	1	1.4	6.82	20.59	2806	-56.3	0.56	55.92	Slightly Cloudy
1424	2	2.8	6.81	20.28	2849	-82.2	0.47	55.93	Clear
1427	3	4.2	6.82	20.32	2865	-91.0	0.35	55.93	Clear
	4								

Geochemical Parameters		*Comments:*
Ferrous Iron:	5.6 mg/L	
Dissolved Oxygen:	0 mg/L	
Nitrate:	mg/L	
Alkalinity	440 mg/L	

PPE Worn: *Nitrile Gloves*	*Sampler's Signature:*
Disposition of Purge Water: *Drummed and placed in drum storage*	

BROWN AND CALDWELL

WELL ID: MW-12

Groundwater Sampling Field Data Sheet

W.County Road, Hobbs, NM

Project Number: **2832** Task Number: **13** Date: -

Casing Diameter: **2** inches	Purge Equipment: **Submersible pump**	Equipment Calibration - Time: - - - pH = at °C
Total Depth of Well from TOC: 55.48 ~~63.75~~ feet		- - - pH = at °C
Static Water from TOC: ~~54.72~~ 64' feet	Sample Equipment: **Submersible pump**	*Conductivity* Conductance Standard: - µmhos/cm at 25° C
Product Level from TOC: ——— feet		Measured Value: - µmhos/cm at 25° C
Length of Water Column: ~~9.83~~ 8.52 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): **YSI 600 XL**	
Well Volume: ~~1.47~~ 1.39 gal	**Hach Kits for DO, Ferrous Iron, Alkalinity**	*Dissolved Oxygen* DO Meter Calibrated to: mg/L
Screened Interval (from GS): feet		-

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Water Levels	Visual Description
1501	0	0.5	6.91	21.83	3293	-108.7	1.77	57.9	Slightly Cloudy
1508	1	1.4	6.76	21.70	3286	-93.9	0.83	55.71	clear
1517	2	2.8	6.75	21.76	3245	-99.7	0.54	55.75	clear
1524	3	4.2	6.78	21.48	3190	-99.5	0.45	55.75	
	4								

Geochemical Parameters		*Comments:*
Ferrous Iron:	9.2 mg/L	MW-2832 for Duplicate
Dissolved Oxygen:	0 mg/L	
Nitrate:	mg/L	
Alkalinity	500 mg/L	

PPE Worn: *Nitrile Gloves*	*Sampler's Signature:*
Disposition of Purge Water: *Drummed and placed in drum storage*	

B

APPENDIX B

Laboratory Analytical Report for Groundwater Samples

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

July 13, 1998

Mr. Rick Rexroad
BROWN AND CALDWELL
1415 Louisiana
Houston, TX 77002

The following report contains analytical results for the sample(s) received at Southern Petroleum Laboratories (SPL) on June 25, 1998. The sample(s) was assigned to Certificate of Analysis No.(s) 9806C06 and analyzed for all parameters as listed on the chain of custody.

Any data flag or quality control exception associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s).

If you have any questions or comments pertaining to this data report, please do not hesitate to contact me. Please reference the above Certificate of Analysis No. during any inquiries.

Again, SPL is pleased to be of service to you. We anticipate working with you in fulfilling all your current and future analytical needs.

Southern Petroleum Laboratories

Bernadette A. Fini
Senior Project Manager

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Southern Petroleum Laboratories, Inc.

Certificate of Analysis Number: 98-06-C06

Approved for Release by:

Bernadette A. Fini, Senior Project Manager — 7-13-98 Date

Greg Grandits
Laboratory Director

Cynthia Schreiner
Quality Assurance Officer

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9806C06-01

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 07/10/98

PROJECT: BJS Hobbs County Rd
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-09

PROJECT NO: 2832.13
MATRIX: WATER
DATE SAMPLED: 06/23/98 18:34:00
DATE RECEIVED: 06/25/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	0.25	0.1 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	103		
1,4-Difluorobenzene	127		
Method 8015B *** for Gasoline			
Analyzed by: LJ			
Date: 07/07/98			
BENZENE	2.4	1.0 P	ug/L
TOLUENE	22	1.0 P	ug/L
ETHYLBENZENE	10	1.0 P	ug/L
TOTAL XYLENE	36	1.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	70.4		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	90		
4-Bromofluorobenzene	107		
Method 8020A ***			
Analyzed by: LJ			
Date: 07/07/98			
Total Petroleum Hydrocarbons-Diesel	ND	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	70		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 07/10/98 09:06:00			

(P) - Practical Quantitation Limit ND - Not detected.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9806C06-02

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 07/10/98

PROJECT: BJS Hobbs County Rd
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-03

PROJECT NO: 2832.13
MATRIX: WATER
DATE SAMPLED: 06/23/98 19:30:00
DATE RECEIVED: 06/25/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	4.9	1 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	97		
1,4-Difluorobenzene	97		
Method 8015B *** for Gasoline			
Analyzed by: AA			
Date: 07/07/98			
BENZENE	100	10 P	ug/L
TOLUENE	720	10 P	ug/L
ETHYLBENZENE	350	10 P	ug/L
TOTAL XYLENE	490	10 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	1660		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	103		
4-Bromofluorobenzene	90		
Method 8020A ***			
Analyzed by: AA			
Date: 07/07/98			
Total Petroleum Hydrocarbons-Diesel	0.40	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	64		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 07/10/98 12:58:00			

(P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that do not resemble a diesel pattern.(C10-C24) RR

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9806C06-03

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 07/10/98

PROJECT: BJS Hobbs County Rd
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-04

PROJECT NO: 2832.13
MATRIX: WATER
DATE SAMPLED: 06/23/98 20:14:00
DATE RECEIVED: 06/25/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	10	1 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	103		
1,4-Difluorobenzene	100		
Method 8015B *** for Gasoline			
Analyzed by: AA			
Date: 07/07/98			
BENZENE	160	10 P	ug/L
TOLUENE	890	10 P	ug/L
ETHYLBENZENE	590	10 P	ug/L
TOTAL XYLENE	1600	10 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	3240		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	107		
4-Bromofluorobenzene	93		
Method 8020A ***			
Analyzed by: AA			
Date: 07/07/98			
Total Petroleum Hydrocarbons-Diesel	0.69	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	64		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 07/10/98 10:23:00			

(P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that do not resemble a diesel pattern.(C10-C24) RR

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9806C06-04

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 07/10/98

PROJECT: BJS Hobbs County Rd
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-01

PROJECT NO: 2832.13
MATRIX: WATER
DATE SAMPLED: 06/23/98 20:46:00
DATE RECEIVED: 06/25/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	9.2	0.5 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	113		
1,4-Difluorobenzene	107		
Method 8015B *** for Gasoline			
Analyzed by: AA			
Date: 07/07/98			
BENZENE	53	5.0 P	ug/L
TOLUENE	680	5.0 P	ug/L
ETHYLBENZENE	580	5.0 P	ug/L
TOTAL XYLENE	1400	5.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	2713		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	107		
4-Bromofluorobenzene	93		
Method 8020A ***			
Analyzed by: AA			
Date: 07/07/98			
Total Petroleum Hydrocarbons-Diesel	1.4	1.00 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	68		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 07/10/98 11:02:00			

(P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that do not resemble a diesel pattern.(C10-C24) RR

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

QUALITY CONTROL

DOCUMENTATION

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL BATCH QUALITY CONTROL REPORT **
Method Modified 8015B*** for Gasoline

Batch Id: VARD980707084600

Matrix: Aqueous
Units: mg/L

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Gasoline Range Organics	ND	1.0	1.0	100	64 - 131

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
GASOLINE RANGE ORGANICS	ND	0.9	0.67	74.4	0.69	76.7	3.04	36	36 - 160

Analyst: LJ
Sequence Date: 07/07/98
SPL ID of sample spiked: 9806A93-03A
Sample File ID: DDG1026.TX0
Method Blank File ID:
Blank Spike File ID: DDG1023.TX0
Matrix Spike File ID: DDG1033.TX0
Matrix Spike Duplicate File ID: DDG1034.TX0

* = Values outside QC Range due to Matrix Interference (except RPD)
« = Data outside Method Specification limits.
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical data (1st Q '97)
(***) = Source: SPL-Houston Historical Data (1st Q '97)

SAMPLES IN BATCH(SPL ID): 9806A93-04A 9806C06-01A 9806A93-09A 9806A93-03A 9806A93-05A 9806A93-06A 9806A93-07A 9806A93-08A

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

SPL BATCH QUALITY CONTROL REPORT **
Method Modified 8015B*** for Gasoline

Batch Id: VARE980706211100

Matrix: Aqueous
Units: mg/L

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Gasoline Range Organics	ND	1.0	1.1	110	64 - 131

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
GASOLINE RANGE ORGANICS	ND	0.9	0.70	77.8	0.74	82.2	5.50	36	36 - 160

Analyst: AA
Sequence Date: 07/06/98
SPL ID of sample spiked: 9806A93-02A
Sample File ID: EEG1026.TX0
Method Blank File ID:
Blank Spike File ID: EEG1018.TX0
Matrix Spike File ID: EEG1022.TX0
Matrix Spike Duplicate File ID: EEG1023.TX0

* = Values outside QC Range due to Matrix Interference (except RPD)
« = Data outside Method Specification limits.
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical data (1st Q '97)
(***) = Source: SPL-Houston Historical Data (1st Q '97)

SAMPLES IN BATCH(SPL ID):

9806A93-01A 9806A93-02A 9806A71-14C 9806A71-02C
9806C07-02A 9806A71-01C 9806A71-13C 9806C06-04A
9806C06-02A 9806C06-03A 9806C07-01A 9806C07-03A
9806C07-05A 9806C07-06A 9806C05-01A 9806C05-02A
9806C05-03A

SPL BATCH QUALITY CONTROL REPORT **
METHOD 8020

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Batch Id: VARD980706153401

Units: ug/L

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	100	99	99.0	61 - 119
Toluene	ND	100	97	97.0	65 - 125
EthylBenzene	ND	100	98	98.0	70 - 118
O Xylene	ND	100	99	99.0	72 - 117
M & P Xylene	ND	200	190	95.0	72 - 116

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
BENZENE	ND	20	21	105	20	100	4.88	21	32 - 164
TOLUENE	ND	20	22	110	20	100	9.52	20	38 - 159
ETHYLBENZENE	ND	20	22	110	20	100	9.52	19	52 - 142
O XYLENE	ND	20	22	110	19	95.0	14.6	18	53 - 143
M & P XYLENE	ND	40	44	110	39	97.5	12.0	17	53 - 144

Analyst: LJ
Sequence Date: 07/06/98
SPL ID of sample spiked: 9806C65-04B
Sample File ID: D_G1008.TX0
Method Blank File ID:
Blank Spike File ID: D_G1004.TX0
Matrix Spike File ID: D_G1005.TX0
Matrix Spike Duplicate File ID: D_G1006.TX0

* = Values outside QC Range due to Matrix Interference (except RPD)
« = Data outside Method Specification limits.
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data (1st Q '97)
(***) = Source: SPL-Houston Historical Data (1st Q '97)

SAMPLES IN BATCH(SPL ID): 9806A93-05A 9806A93-06A 9806A93-07A 9806A93-08A 9806A93-04A 9806C06-01A 9806A93-09A 9806A93-03A

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL BATCH QUALITY CONTROL REPORT **
METHOD 8020

Matrix: Aqueous
Units: ug/L

Batch Id: VARE980706213700

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
MTBE	ND	50	43	86.0	72 - 128
Benzene	ND	50	51	102	61 - 119
Toluene	ND	50	51	102	65 - 125
EthylBenzene	ND	50	50	100	70 - 118
O Xylene	ND	50	51	102	72 - 117
M & P Xylene	ND	100	100	100	72 - 116

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
MTBE	ND	100	93	93.0	78	78.0	17.5	20	39 - 150
BENZENE	ND	100	95	95.0	80	80.0	17.1	21	32 - 164
TOLUENE	ND	100	95	95.0	81	81.0	15.9	20	38 - 159
ETHYLBENZENE	ND	100	91	91.0	77	77.0	16.7	19	52 - 142
O XYLENE	ND	100	97	97.0	82	82.0	16.8	18	53 - 143
M & P XYLENE	ND	200	190	95.0	160	80.0	17.1 *	17	53 - 144

Analyst: AA
Sequence Date: 07/06/98
SPL ID of sample spiked: 9806A93-01A
Sample File ID: E_G1025.TX0
Method Blank File ID:
Blank Spike File ID: E_G1014R.TX0
Matrix Spike File ID: E_G1016.TX0
Matrix Spike Duplicate File ID: E_G1017.TX0

* = Values outside QC Range due to Matrix Interference (except RPD)
« = Data outside Method Specification limits.
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data (1st Q '97)
(***) = Source: SPL-Houston Historical Data (1st Q '97)

SAMPLES IN BATCH(SPL ID):

9806A84-02A 9806A84-01A 9806A93-01A 9806A93-02A
9806C07-02A 9806C06-04A 9806C06-02A 9806C06-03A
9806C07-01A 9806C07-03A 9806C07-05A 9806C07-06A
9806C05-01A 9806C05-02A 9806C05-03A

CHAIN OF CUSTODY

AND

SAMPLE RECEIPT CHECKLIST

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL BATCH QUALITY CONTROL REPORT ** PAGE
Method Modified 8015B*** for Diesel

Batch Id: HP_T980710063100

Units: mg/L

B L A N K S P I K E S

S P I K E C O M P O U N D S	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(**) (Advisory) RPD Max.	QC Limits(**) (Advisory) Recovery Range
DIESEL	ND	5.0	2.9	58.0	4.0	80.0	31.9	39	21 - 175

Analyst: RR
Sequence Date: 07/10/98
Method Blank File ID:
Sample File ID:
Blank Spike File ID: T_F4308.TX0
Matrix Spike File ID:
Matrix Spike Duplicate File ID:

* = Values Outside QC Range. « = Data outside Method Specification limits.
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data (4th Q '97)

SAMPLES IN BATCH(SPL ID): 9806C06-01B 9806C06-03B 9806C06-04B 9806C06-02B

SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Workorder No: 9806C06 — 50429 — page ___ of ___

Client Name: Brown and Caldwell
Address/Phone: 1415 Louisiana St. #2500 713 646-1129
Client Contact: Rick Rexroad (713) 646-1129
Project Name: BJS Hobbs County Road
Project Number: 28.32.13
Project Location: Hobbs, NM
Invoice To: Rick Rexroad

SAMPLE ID	DATE	TIME	comp	grab	matrix (W=water S=soil SL=sludge O=other:)	bottle (P=plastic A=amber glass G=glass V=vial)	size (1=1 liter 4=4oz 40=vial 8=8oz 16=16oz)	pres. (1=HCl 2=HNO3 3=H2SO4 O=other:)	Number of Containers	Requested Analysis: 8015- TPH-G 8020- BETX	Requested Analysis: 8015 TPH-D	Requested Analysis: pH
MW-09	6/23/98	1834		✓	W	G	40(3) 1(1)	1	4	3	1	
MW-03	6/23/98	1930		✓	W	G	40(3) 1(1)	1	4	3	1	
MW-04	6/23/98	2014		✓	W	G	40(3) 1(1)	1	4	3	1	
MW-01	6/23/98	2046		✓	W	G	40(3) 1(1)	1	4	3	1	

Client/Consultant Remarks:

Laboratory remarks:

Intact? ☐ Y ☐ N
Temp: 3

Requested TAT
24hr ☐ 72hr ☐
48hr ☐ Standard ☒
Other ☐ _____

Special Reporting Requirements: Fax Results ☐ Raw Data ☐ Standard QC ☐ Level 3 QC ☒ Level 4 QC ☐

Special Detection Limits (specify):

PM review (initial):

	date	time	
1. Relinquished by Sampler: Thomas G. Wolfe	6/24/98	1815	2. Received by: Fed Ex
3. Relinquished by:	date	time	4. Received by:
5. Relinquished by:	date 6-25-98	time 1000	6. Received by Laboratory:

☒ 8880 Interchange Drive, Houston, TX 77054 (713) 660-0901
☐ 459-Hughes Drive, Traverse City, MI 49684 (616) 947-5777
☐ 500 Ambassador Caffery Parkway, Scott, LA 70583 (318) 237-4775
☐ 1501 E. Orangethorpe Avenue, Fullerton, CA 92631 (714) 447-6868

SPL Houston Environmental Laboratory

Sample Login Checklist

Date:	Time:
6-25-98	10°C

SPL Sample ID:
9806C06

			Yes	No
1	Chain-of-Custody (COC) form is present.		✓	
2	COC is properly completed.		✓	
3	If no, Non-Conformance Worksheet has been completed.			
4	Custody seals are present on the shipping container.		✓	
5	If yes, custody seals are intact.		✓	
6	All samples are tagged or labeled.		✓	
7	If no, Non-Conformance Worksheet has been completed.			
8	Sample containers arrived intact		✓	
9	Temperature of samples upon arrival:		3 C	
10	Method of sample delivery to SPL:	SPL Delivery		
		Client Delivery		
		FedEx Delivery (airbill #)	806479795405	
		Other:		
11	Method of sample disposal:	SPL Disposal	✓	
		HOLD		
		Return to Client		

Name:	Date:
[signature]	6-25-98

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

July 13, 1998

Mr. Rick Rexroad
BROWN AND CALDWELL
1415 Louisiana
Houston, TX 77002

The following report contains analytical results for the sample(s) received at Southern Petroleum Laboratories (SPL) on June 24, 1998. The sample(s) was assigned to Certificate of Analysis No.(s) 9806A93 and analyzed for all parameters as listed on the chain of custody.

Any data flag or quality control exception associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s).

If you have any questions or comments pertaining to this data report, please do not hesitate to contact me. Please reference the above Certificate of Analysis No. during any inquiries.

Again, SPL is pleased to be of service to you. We anticipate working with you in fulfilling all your current and future analytical needs.

Southern Petroleum Laboratories

Bernadette A. Fini
Senior Project Manager

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Southern Petroleum Laboratories, Inc.

Certificate of Analysis Number: 98-06-A93

Approved for Release by:

Bernadette A. Fini, Senior Project Manager — Date: 7-13-98

Greg Grandits
Laboratory Director

Cynthia Schreiner
Quality Assurance Officer

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9806A93-01

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 07/10/98

PROJECT: BJS Hobbs County Rd
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-7

PROJECT NO: 2832.13
MATRIX: WATER
DATE SAMPLED: 06/23/98 08:35:00
DATE RECEIVED: 06/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	90		
1,4-Difluorobenzene	93		
Method 8015B *** for Gasoline			
Analyzed by: AA			
Date: 07/07/98			
BENZENE	ND	1.0 P	ug/L
TOLUENE	ND	1.0 P	ug/L
ETHYLBENZENE	ND	1.0 P	ug/L
TOTAL XYLENE	ND	1.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	100		
4-Bromofluorobenzene	93		
Method 8020A ***			
Analyzed by: AA			
Date: 07/07/98			
Total Petroleum Hydrocarbons-Diesel	ND	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	140MI		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 07/09/98 11:24:00			

ND - Not detected.
MI - Matrix interference.
(P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9806A93-02

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 07/10/98

PROJECT: BJS Hobbs County Rd
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-8

PROJECT NO: 2832.13
MATRIX: WATER
DATE SAMPLED: 06/23/98 09:20:00
DATE RECEIVED: 06/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	90		
1,4-Difluorobenzene	93		
Method 8015B *** for Gasoline			
Analyzed by: AA			
Date: 07/07/98			
BENZENE	ND	1.0 P	ug/L
TOLUENE	ND	1.0 P	ug/L
ETHYLBENZENE	ND	1.0 P	ug/L
TOTAL XYLENE	ND	1.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	97		
4-Bromofluorobenzene	90		
Method 8020A ***			
Analyzed by: AA			
Date: 07/07/98			
Total Petroleum Hydrocarbons-Diesel	ND	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	72		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 07/10/98 12:03:00			

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9806A93-03

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 07/10/98

PROJECT: BJS Hobbs County Rd
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-5

PROJECT NO: 2832.13
MATRIX: WATER
DATE SAMPLED: 06/23/98 09:55:00
DATE RECEIVED: 06/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	103		
1,4-Difluorobenzene	117		
Method 8015B *** for Gasoline			
Analyzed by: LJ			
Date: 07/07/98			
BENZENE	ND	1.0 P	ug/L
TOLUENE	ND	1.0 P	ug/L
ETHYLBENZENE	ND	1.0 P	ug/L
TOTAL XYLENE	ND	1.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	90		
4-Bromofluorobenzene	103		
Method 8020A ***			
Analyzed by: LJ			
Date: 07/07/98			
Total Petroleum Hydrocarbons-Diesel	ND	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	170MI		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 07/10/98 05:52:00			

ND - Not detected.
MI - Matrix interference.
(P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9806A93-04

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 07/10/98

PROJECT: BJS Hobbs County Rd
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-6

PROJECT NO: 2832.13
MATRIX: WATER
DATE SAMPLED: 06/23/98 13:37:00
DATE RECEIVED: 06/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	0.51	0.1 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	103		
1,4-Difluorobenzene	133		
Method 8015B *** for Gasoline			
Analyzed by: LJ			
Date: 07/07/98			
BENZENE	170	1.0 P	ug/L
TOLUENE	4.1	1.0 P	ug/L
ETHYLBENZENE	15	1.0 P	ug/L
TOTAL XYLENE	7.2	1.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	196.3		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	137		
4-Bromofluorobenzene	103		
Method 8020A ***			
Analyzed by: LJ			
Date: 07/07/98			
Total Petroleum Hydrocarbons-Diesel	1.2	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	148MI		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 07/10/98 03:55:00			

(P) - Practical Quantitation Limit MI - Matrix interference.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9806A93-05

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 07/10/98

PROJECT: BJS Hobbs County Rd
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-11A

PROJECT NO: 2832.13
MATRIX: WATER
DATE SAMPLED: 06/23/98 14:27:00
DATE RECEIVED: 06/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.5 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	100		
1,4-Difluorobenzene	120		
Method 8015B *** for Gasoline			
Analyzed by: LJ			
Date: 07/07/98			
BENZENE	9.9	5.0 P	ug/L
TOLUENE	ND	5.0 P	ug/L
ETHYLBENZENE	ND	5.0 P	ug/L
TOTAL XYLENE	ND	5.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	9.9		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	87		
4-Bromofluorobenzene	107		
Method 8020A ***			
Analyzed by: LJ			
Date: 07/07/98			
Total Petroleum Hydrocarbons-Diesel	ND	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	84		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 07/10/98 02:00:00			

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9806A93-05

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 07/10/98

PROJECT: BJS Hobbs County Rd
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-11A

PROJECT NO: 2832.13
MATRIX: WATER
DATE SAMPLED: 06/23/98 14:27:00
DATE RECEIVED: 06/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Methane RSKSOP-147 Analyzed by: JDR Date: 07/08/98 05:14:00	0.11	0.0060 P	ppm
Nitrate nitrogen(as N) Method 353.3 * Analyzed by: DAM Date: 06/25/98 11:00:00	ND	0.1	mg/L
Sulfate Method 375.4 * Analyzed by: TW Date: 07/07/98 11:00:00	225	25	mg/L

(P) - Practical Quantitation Limit ND - Not detected.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

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8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9806A93-06

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 07/10/98

PROJECT: BJS Hobbs County Rd
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-12

PROJECT NO: 2832.13
MATRIX: WATER
DATE SAMPLED: 06/23/98 15:21:00
DATE RECEIVED: 06/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.5 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	87		
1,4-Difluorobenzene	127		
Method 8015B *** for Gasoline			
Analyzed by: LJ			
Date: 07/07/98			
BENZENE	88	5.0 P	ug/L
TOLUENE	ND	5.0 P	ug/L
ETHYLBENZENE	ND	5.0 P	ug/L
TOTAL XYLENE	ND	5.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	88		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	100		
4-Bromofluorobenzene	100		
Method 8020A ***			
Analyzed by: LJ			
Date: 07/07/98			
Total Petroleum Hydrocarbons-Diesel	ND	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	98		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 07/10/98 02:38:00			

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

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8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9806A93-06

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 07/10/98

PROJECT: BJS Hobbs County Rd
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-12

PROJECT NO: 2832.13
MATRIX: WATER
DATE SAMPLED: 06/23/98 15:21:00
DATE RECEIVED: 06/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Methane RSKSOP-147 Analyzed by: JDR Date: 07/08/98 04:59:00	ND	0.0012 P	ppm
Nitrate nitrogen(as N) Method 353.3 * Analyzed by: DAM Date: 06/25/98 11:00:00	ND	0.1	mg/L
Sulfate Method 375.4 * Analyzed by: TW Date: 07/07/98 11:00:00	240	25	mg/L

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
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HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9806A93-07

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 07/10/98

PROJECT: BJS Hobbs County Rd
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-2832

PROJECT NO: 2832.13
MATRIX: WATER
DATE SAMPLED: 06/23/98
DATE RECEIVED: 06/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.5 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	93		
1,4-Difluorobenzene	127		
Method 8015B *** for Gasoline			
Analyzed by: LJ			
Date: 07/07/98			
BENZENE	89	5.0 P	ug/L
TOLUENE	ND	5.0 P	ug/L
ETHYLBENZENE	ND	5.0 P	ug/L
TOTAL XYLENE	ND	5.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	89		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	100		
4-Bromofluorobenzene	107		
Method 8020A ***			
Analyzed by: LJ			
Date: 07/07/98			
Total Petroleum Hydrocarbons-Diesel	0.31	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	156MI		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 07/10/98 03:17:00			

ND - Not detected.
MI - Matrix interference.
(P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9806A93-07

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 07/10/98

PROJECT: BJS Hobbs County Rd
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-2832

PROJECT NO: 2832.13
MATRIX: WATER
DATE SAMPLED: 06/23/98
DATE RECEIVED: 06/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Methane RSKSOP-147 Analyzed by: JDR Date: 07/08/98 04:48:00	0.0072	0.0012 P	ppm
Nitrate nitrogen(as N) Method 353.3 * Analyzed by: DAM Date: 06/25/98 11:00:00	ND	0.1	mg/L
Sulfate Method 375.4 * Analyzed by: TW Date: 07/07/98 11:00:00	250	25	mg/L

(P) - Practical Quantitation Limit ND - Not detected.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9806A93-08

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 07/10/98

PROJECT: BJS Hobbs County Rd
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-10

PROJECT NO: 2832.13
MATRIX: WATER
DATE SAMPLED: 06/23/98 16:26:00
DATE RECEIVED: 06/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.5 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	107		
1,4-Difluorobenzene	127		
Method 8015B *** for Gasoline			
Analyzed by: LJ			
Date: 07/07/98			
BENZENE	37	5.0 P	ug/L
TOLUENE	ND	5.0 P	ug/L
ETHYLBENZENE	ND	5.0 P	ug/L
TOTAL XYLENE	ND	5.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	37		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	93		
4-Bromofluorobenzene	100		
Method 8020A ***			
Analyzed by: LJ			
Date: 07/07/98			
Total Petroleum Hydrocarbons-Diesel	2.1	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	130		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 07/10/98 05:13:00			

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9806A93-08

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 07/10/98

PROJECT: BJS Hobbs County Rd
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-10

PROJECT NO: 2832.13
MATRIX: WATER
DATE SAMPLED: 06/23/98 16:26:00
DATE RECEIVED: 06/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Methane RSKSOP-147 Analyzed by: JDR Date: 07/08/98 04:29:00	0.55	0.060 P	ppm
Nitrate nitrogen(as N) Method 353.3 * Analyzed by: DAM Date: 06/25/98 11:00:00	ND	0.1	mg/L
Sulfate Method 375.4 * Analyzed by: TW Date: 07/07/98 11:00:00	325	25	mg/L

(P) - Practical Quantitation Limit ND - Not detected.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9806A93-09

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 07/10/98

PROJECT: BJS Hobbs County Rd
SITE: Hobbs, NM
SAMPLED BY: Provided by SPL
SAMPLE ID: Trip Blank 6/16/98

PROJECT NO: 2832.13
MATRIX: WATER
DATE SAMPLED: 06/23/98
DATE RECEIVED: 06/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	93		
1,4-Difluorobenzene	110		
Method 8015B *** for Gasoline			
Analyzed by: LJ			
Date: 07/07/98			
BENZENE	ND	1.0 P	ug/L
TOLUENE	ND	1.0 P	ug/L
ETHYLBENZENE	ND	1.0 P	ug/L
TOTAL XYLENE	ND	1.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	87		
4-Bromofluorobenzene	100		
Method 8020A ***			
Analyzed by: LJ			
Date: 07/07/98			

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

QUALITY CONTROL

DOCUMENTATION

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL BATCH QUALITY CONTROL REPORT **

Method Modified 8015B*** for Gasoline

Batch Id: VARE980706211100

Units: mg/L

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Gasoline Range Organics	ND	1.0	1.1	110	64 - 131

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
GASOLINE RANGE ORGANICS	ND	0.9	0.70	77.8	0.74	82.2	5.50	36	36 - 160

Analyst: AA

Sequence Date: 07/06/98

SPL ID of sample spiked: 9806A93-02A

Sample File ID: EEG1026.TX0

Method Blank File ID:

Blank Spike File ID: EEG1018.TX0

Matrix Spike File ID: EEG1022.TX0

Matrix Spike Duplicate File ID: EEG1023.TX0

* = Values outside QC Range due to Matrix Interference (except RPD)

« = Data outside Method Specification limits.

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

% Recovery = [(<1> - <2>) / <3>] x 100

LCS % Recovery = (<1> / <3>) x 100

Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100

(**) = Source: SPL-Houston Historical data (1st Q '97)

(***) = Source: SPL-Houston Historical Data (1st Q '97)

SAMPLES IN BATCH(SPL ID):

9806A93-01A 9806A93-02A 9806A71-14C 9806A71-02C
9806C07-02A 9806A71-01C 9806A71-13C 9806C06-04A
9806C06-02A 9806C06-03A 9806C07-01A 9806C07-03A
9806C07-05A 9806C07-06A 9806C05-01A 9806C05-02A
9806C05-03A

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL BATCH QUALITY CONTROL REPORT **

Method Modified 8015B*** for Gasoline

Batch Id: VARD980707084600

Aqueous

Units: mg/L

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Gasoline Range Organics	ND	1.0	1.0	100	64 - 131

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
GASOLINE RANGE ORGANICS	ND	0.9	0.67	74.4	0.69	76.7	3.04	36	36 - 160

Analyst: LJ

Sequence Date: 07/07/98

SPL ID of sample spiked: 9806A93-03A

Sample File ID: DDG1026.TX0

Method Blank File ID:

Blank Spike File ID: DDG1023.TX0

Matrix Spike File ID: DDG1033.TX0

Matrix Spike Duplicate File ID: DDG1034.TX0

* = Values outside QC Range due to Matrix Interference (except RPD)

« = Data outside Method Specification limits.

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

% Recovery = [(<1> - <2>) / <3>] x 100

LCS % Recovery = (<1> / <3>) x 100

Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100

(**) = Source: SPL-Houston Historical data (1st Q '97)

(***) = Source: SPL-Houston Historical Data (1st Q '97)

SAMPLES IN BATCH(SPL ID): 9806A93-04A 9806C06-01A 9806A93-09A 9806A93-03A 9806A93-05A 9806A93-06A 9806A93-07A 9806A93-08A

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL BATCH QUALITY CONTROL REPORT **
METHOD 8020

Batch Id: VARE980706213700

Units: ug/L

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
MTBE	ND	50	43	86.0	72 - 128
Benzene	ND	50	51	102	61 - 119
Toluene	ND	50	51	102	65 - 125
EthylBenzene	ND	50	50	100	70 - 118
O Xylene	ND	50	51	102	72 - 117
M & P Xylene	ND	100	100	100	72 - 116

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
MTBE	ND	100	93	93.0	78	78.0	17.5	20	39 - 150
BENZENE	ND	100	95	95.0	80	80.0	17.1	21	32 - 164
TOLUENE	ND	100	95	95.0	81	81.0	15.9	20	38 - 159
ETHYLBENZENE	ND	100	91	91.0	77	77.0	16.7	19	52 - 142
O XYLENE	ND	100	97	97.0	82	82.0	16.8	18	53 - 143
M & P XYLENE	ND	200	190	95.0	160	80.0	17.1 *	17	53 - 144

Analyst: AA
Sequence Date: 07/06/98
SPL ID of sample spiked: 9806A93-01A
Sample File ID: E_G1025.TX0
Method Blank File ID:
Blank Spike File ID: E_G1014R.TX0
Matrix Spike File ID: E_G1016.TX0
Matrix Spike Duplicate File ID: E_G1017.TX0

* = Values outside QC Range due to Matrix Interference (except RPD)
« = Data outside Method Specification limits.
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data (1st Q '97)
(***) = Source: SPL-Houston Historical Data (1st Q '97)

SAMPLES IN BATCH(SPL ID):

9806A84-02A 9806A84-01A 9806A93-01A 9806A93-02A
9806C07-02A 9806C06-04A 9806C06-02A 9806C06-03A
9806C07-01A 9806C07-03A 9806C07-05A 9806C07-06A
9806C05-01A 9806C05-02A 9806C05-03A

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL BATCH QUALITY CONTROL REPORT **
METHOD 8020

Batch Id: VARD980706153401

Units: ug/L

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	100	99	99.0	61 - 119
Toluene	ND	100	97	97.0	65 - 125
EthylBenzene	ND	100	98	98.0	70 - 118
O Xylene	ND	100	99	99.0	72 - 117
M & P Xylene	ND	200	190	95.0	72 - 116

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
BENZENE	ND	20	21	105	20	100	4.88	21	32 - 164
TOLUENE	ND	20	22	110	20	100	9.52	20	38 - 159
ETHYLBENZENE	ND	20	22	110	20	100	9.52	19	52 - 142
O XYLENE	ND	20	22	110	19	95.0	14.6	18	53 - 143
M & P XYLENE	ND	40	44	110	39	97.5	12.0	17	53 - 144

Analyst: LJ
Sequence Date: 07/06/98
SPL ID of sample spiked: 9806C65-04B
Sample File ID: D_G1008.TX0
Method Blank File ID:
Blank Spike File ID: D_G1004.TX0
Matrix Spike File ID: D_G1005.TX0
Matrix Spike Duplicate File ID: D_G1006.TX0

* = Values outside QC Range due to Matrix Interference (except RPD)
« = Data outside Method Specification limits.
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data (1st Q '97)
(***) = Source: SPL-Houston Historical Data (1st Q '97)

SAMPLES IN BATCH(SPL ID): 9806A93-05A 9806A93-06A 9806A93-07A 9806A93-08A 9806A93-04A 9806C06-01A 9806A93-09A 9806A93-03A

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL BATCH QUALITY CONTROL REPORT ** PAGE

California LUFT Manual for Diesel

Batch Id: HP_T980701115500

Units: mg/L

BLANK SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(**) (Advisory) RPD Max.	QC Limits(**) (Advisory) Recovery Range
DIESEL	ND	5.0	3.6	72.0	4.0	80.0	10.5	175	21 - 175

Analyst: APR
Sequence Date: 07/02/98
Method Blank File ID:
Sample File ID:
Blank Spike File ID: T_F4196.TX0
Matrix Spike File ID:
Matrix Spike Duplicate File ID:

* = Values Outside QC Range. « = Data outside Method Specification limits.
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL Historical limits 4th Qtr.'97

SAMPLES IN BATCH(SPL ID): 9806A93-04B 9806A93-08B 9806A93-03B 9806A57-03B 9806A93-01B 9806A93-02B 9806A93-05B 9806A93-06B 9806A93-07B

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/06/98
Analyzed on: 06/25/98
Analyst: DAM

This sample was randomly selected for use in the SPL quality control program. Samples chosen are fortified with a known concentration in duplicate. The results are as follows:

Nitrate nitrogen(as N)
Method 353.3 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	2.77	2.78	100	92 - 113

-9807153

Samples in batch:

9806A84-01C	9806A84-02C	9806A84-03C	9806A84-04C
9806A84-05C	9806A93-05D	9806A93-06D	9806A93-07D
9806A93-08D	9806B95-01C	9806B95-02C	

COMMENTS:

LCS = SPL ID#:95535172-26

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/06/98
Analyzed on: 06/25/98
Analyst: DAM

This sample was randomly selected for use in the SPL quality control program. Samples chosen are fortified with a known concentration in duplicate. The results are as follows:

Nitrate nitrogen(as N)
Method 353.3 *

SPL Sample ID Number	Method Blank mg/L	Sample Result mg/L	Spike Added mg/L	Matrix Spike Result mg/L	Matrix Spike Recovery %	Matrix Spike Duplicate Result mg/L	Matrix Spike Duplicate Recovery %	RPD (%)	QC LIMITS (Advisory) RPD Max	QC LIMITS (Advisory) % REC
9806A93-07D	ND	ND	5.00	4.88	97.6	4.88	97.6	0	12	84 -125

-9807152

Samples in batch:

9806A93-05D 9806A93-06D 9806A93-07D 9806A93-08D

COMMENTS:

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/08/98
Analyzed on: 07/07/98
Analyst: TW

This sample was randomly selected for use in the SPL quality control program. Samples chosen are fortified with a known concentration in duplicate. The results are as follows:

Sulfate
Method 375.4 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	4.52	3.96	87.6	82 - 111

-9807236

Samples in batch:

9806A93-05D	9806A93-06D	9806A93-07D	9806A93-08D
9806C37-01A	9806C37-03A	9806C44-02G	9806D79-01E
9806D79-02E	9806D79-03E	9806E11-01A	9806E11-02A
9806E11-03A	9806E11-04A	9807002-01E	9807002-02E
9807094-02A	9807110-01B	9807110-02B	9807110-03B

COMMENTS:

LCS#94453193-1

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/08/98
Analyzed on: 07/07/98
Analyst: TW

This sample was randomly selected for use in the SPL quality control program. Samples chosen are fortified with a known concentration in duplicate. The results are as follows:

Sulfate
Method 375.4 *

SPL Sample	Method	Sample	Spike	Matrix Spike		Matrix Spike Duplicate		RPD	QC LIMITS (Advisory)	
ID Number	Blank mg/L	Result mg/L	Added mg/L	Result mg/L	Recovery %	Result mg/L	Recovery %	(%)	RPD Max	% REC
9806A93-07D	ND	9.87	10.00	21.12	112	20.80	109	2.7	9.5	84 -120

-9807233

Samples in batch:

9806A93-05D 9806A93-06D 9806A93-07D 9806A93-08D
9806D79-01E 9806D79-02E 9807094-02A 9807110-01B
9807110-02B 9807110-03B

COMMENTS:

CHAIN OF CUSTODY

AND

SAMPLE RECEIPT CHECKLIST

SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Workorder No: 9806A93 — 50428 — page 1 of 1

Client Name: Brown and Caldwell
Address/Phone: 1415 Louisiana Street #2500
Client Contact: Rick Rexroad (713) 646-1129
Project Name: BJS Hobbs County Road
Project Number: 2832.13
Project Location: Hobbs N.M
Invoice To: Rick Rexroad

SAMPLE ID	DATE	TIME	comp	grab	matrix (W=water S=soil SL=sludge O=other:)	bottle (P=plastic A=amber glass G=glass V=vial)	size (1=1 liter 4=4oz 40=vial 8=8oz 16=16oz)	pres. (1=HCl 2=HNO3 3=H2SO4 O=other:)	Number of Containers	Requested Analysis: EPA 8015 TPH-D & GRO EPA 8020 BTEX	8015 TPH-D	Methane	Sulfate Nitrate					
MW-7	6/23/98	835		✓	W	G	40 (3) 1 (G)	1 (1)	4	3	1						SH	
MW-8		920		✓				1	4	3	1							
MW-5		955		✓				1	4	3	1							
MW-6		1337		✓				1	4	3	1							
MW-11A		1427		✓				4/04 (1)	6	3	1	1	1					
MW-12		1521		✓					6	3	1	1	1					
MW-2832		–		✓					6	3	1	1	1					
MW-10		1626		✓					6	6	1	1	1					
Trip Blank	6/18			✓			40		2	2								

Client/Consultant Remarks: 2 Ice Chests

Laboratory remarks:

Intact? ☒ Y ☐ N

Temp: 5C, 3C

Requested TAT

24hr ☐ 72hr ☐ 48hr ☐ Standard ☒ Other ☐ _____

Special Reporting Requirements: Fax Results ☒ Raw Data ☐ Standard QC ☐ Level 3 QC ☐ Level 4 QC ☐

Special Detection Limits (specify):

PM review (initial):

1. Relinquished by Sampler:	date: 6/23/98	time: 1700 CST	2. Received by: Fed Ex 800816546410
3. Relinquished by:	date:	time:	4. Received by:
5. Relinquished by:	date:	time:	6. Received by Laboratory: 6/24/98 1000

☒ 8880 Interchange Drive, Houston, TX 77054 (713) 660-0901
☐ 459-Hughes Drive, Traverse City, MI 49684 (616) 947-5777
☐ 500 Ambassador Caffery Parkway, Scott, LA 70583 (318) 237-4775
☐ 1501 E. Orangethorpe Avenue, Fullerton, CA 92631 (714) 447-6868

SPL Houston Environmental Laboratory

Sample Login Checklist

Date:	Time:
6-24-98	1000

SPL Sample ID:
9806A93

			Yes	No
1	Chain-of-Custody (COC) form is present.		✓	
2	COC is properly completed.		✓	
3	If no, Non-Conformance Worksheet has been completed.			
4	Custody seals are present on the shipping container.		✓	
5	If yes, custody seals are intact.		✓	
6	All samples are tagged or labeled.		✓	
7	If no, Non-Conformance Worksheet has been completed.			
8	Sample containers arrived intact		✓	
9	Temperature of samples upon arrival:		5°, 3° C	
10	Method of sample delivery to SPL:	SPL Delivery		
		Client Delivery		
		FedEx Delivery (airbill #)	8008165466410 950847964	
		Other:		
11	Method of sample disposal:	SPL Disposal	✓	
		HOLD		
		Return to Client		

Name:	Date:
[signature]	6-24-98

C

APPENDIX C

Soil Boring Logs and Monitor Well Construction Diagrams

BROWN AND CALDWELL

AI-20

Project Name: **BJ Services Company, U.S.A.** Project Number: **2832** Sheet **1** of **2**

Project Location: **Hobbs, New Mexico**		Logged By: **R. Rexroad**	Approved: **R. Rexroad**
Drilling Contractor: **Geo Projects, Inc.**		Date Started: **2/8/98**	Date Finished: **2/10/98**
Drilling Equipment: **Mobile B-61**	Driller: **A. Hinojosa**	Total Boring Depth: (feet) **67.0**	Depth to Static Water: (feet) **53.5**
Drilling Method: **Air Rot./Hol. Stem**	Borehole Diameter: **8"**	TOC Elevation: **NR**	Ground Elevation: **NR**
Sampling Method: **2-foot split spoon**		Diameter and Type of Well Casing: **2-inch PVC**	
Comments:		Slot Size: **0.020 "**	Filter Material: **8-16 silica sand**
		Development Method: **Air surging and bailing**	

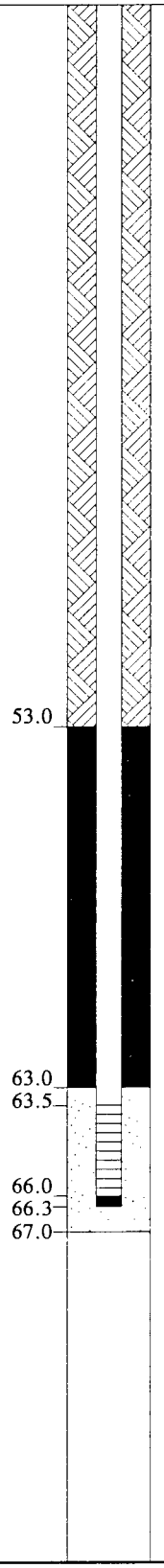
Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Remarks
2				Fill - Gravel, sand, and silt.					Cement-bentonite grout.
		GC		Medium brown, clayey gravel (GC), with angular sandstone fragments.					
4				Medium brown sandstone (SS).					
6		ML		Caliche-cemented, light brown clayey silt (ML); well indurated in upper section, grades to moderately cemented whitish clayey silt at approximately 8 feet.					
8									
10		CL		Medium brown sandy clay (CL); soft; slightly moist.					
12		ML		Medium brown sandy clay with caliche (ML), with pebbles up to 3/4-inch in diameter.					
14				Medium brown sandstone (SS); well cemented.					
		CL		Whitish slightly silty clay (CL) with caliche; dry.					
16									
18				As above with rounded sandstone pebbles to 1/2-inch in diameter.					
20				Layer with rounded sandstone pebbles to 1/2-inch in diameter at 20 feet.					
22		SM		Very light brown, very fine grained silty sand (SM); dry to very slightly moist.					
24									
26				Medium brown, lithified sandstone layer at 26 feet.					
28		SP		Medium brown sandstone with rounded pebbles to 3/4-inch in diameter at 27.5 to 28 feet.					
30				Medium brown fine grained sand (SP); well sorted; slightly moist. Layer of rounded sandstone pebbles to 1-inch in diameter.					
32				Medium brown, well cemented sandstone; low porosity.					

BROWN AND CALDWELL

AI-20

Project Name: **BJ Services Company, U.S.A.** Project Number: **2832** Sheet 2 of 2

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID
34		SP		Light brown, very fine grained to fine grained sand (SP); slightly moist.				
36								
38								
40								
42								
44				Scattered, subrounded sandstone pebbles to 1-inch in diameter.				
46				Light brown fine grained, well sorted sand (SP).				*
48								
50				Slightly moist.	>2000		1	A
52								
54	▼							
56								
58								
60								
62								
64								
66								
				Total depth = 67 feet.				



Remarks

Cement-bentonite grout.

* - 290 ppm PID reading on cuttings air-lifted to surface.

A = Sample AI20-50-51.

Hydrated bentonite seal.

8-16 graded silica sand filter pack.

0.020-inch slotted well screen.

Bottom cap.

BROWN AND CALDWELL

AI-21

Project Name: **BJ Services Company, U.S.A.** Project Number: **2832** Sheet **1** of **2**

Project Location: **Hobbs, New Mexico**		Logged By: **R. Rexroad**	Approved: **R. Rexroad**
Drilling Contractor: **Geo Projects, Inc.**		Date Started: **2/7/98**	Date Finished: **2/8/98**
Drilling Equipment: **Mobile B-61**	Driller: **A. Hinojosa**	Total Boring Depth: (feet) **67.5**	Depth to Static Water: (feet) **54.0**
Drilling Method: **Air Rot./Hol. Stem**	Borehole Diameter: **8"**	TOC Elevation: **NR**	Ground Elevation: **NR**
Sampling Method: **2-foot split spoon**		Diameter and Type of Well Casing: **2-inch PVC**	
Comments:		Slot Size: **0.020 "**	Filter Material: **8-16 silica sand**
		Development Method: **Air surging and bailing**	

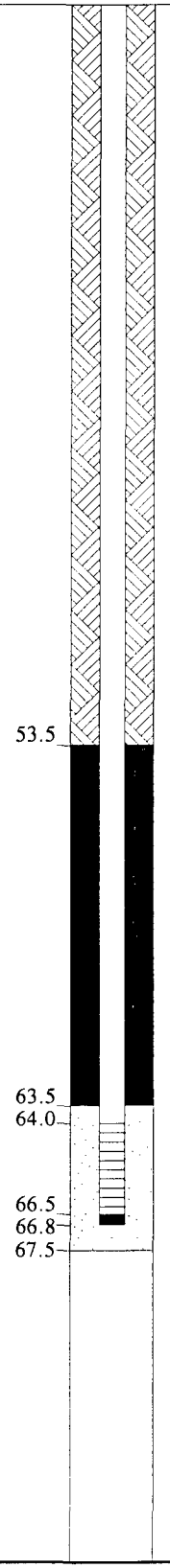
Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Remarks
0				Fill.					Cement-bentonite grout.
2		CL		Dark gray silty clay (CL), grading in color to medium gray at approximately 3 feet; slightly moist.					
4		ML		Light pinkish-brown clayey silt (ML), with caliche; dry.					
6									
8				Scattered subrounded pebbles present.					
10									
12				Medium brown sandstone layer (SS); well cemented.					
		ML		Whitish clayey silt (ML); dry.					
14				Medium brown sandstone (SS); low porosity and permeability.					
		CL		Whitish silty clay (CL), with caliche; dry.					
16		SP		Very fine grained to fine grained, very light brown sand (SP); well sorted; dry.					
18									
20				Color change to light pinkish-brown, very fine grained to fine grained sand (SP), with scattered rounded pebbles to 1/4-inch in diameter.					
22									
24				Pebble rich layer; rounded pebbles up to 1-inch in diameter.					
26									
28				Pebble rich layer; rounded sandstone pebbles to 3/4-inch in diameter.					
30				Pebble layer; rounded pebbles to 1-inch in diameter.					
32									

BROWN AND CALDWELL

AI-21

Project Name: **BJ Services Company, U.S.A.** Project Number: **2832** Sheet 2 of 2

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID
34								
36								
38				Fine grained sand (SP); slightly moist.				
40				Pebble layer; rounded pebbles up to 1-inch in diameter.				
42								
44				Thin stringers containing rounded pebbles from 1/4 to 1/2-inch in diameter in 40 to 46-foot interval.				
46								
48								
50					309		.8	A
52								
54	▼			Black staining present in 53.5 to 54.5-foot interval; saturated.	>2000		1	B
56								
58								
60								
62								
64					8		1	C
66								
				Total depth = 67.5 feet.				



Remarks

Cement-bentonite grout.

A = Sample AI21-50-50.8

B = Sample A21-53.5-54.5

Hydrated bentonite seal.

8-16 graded silica sand filter pack.
C = Sample A21-64-65
0.020-inch slotted well screen.

Bottom cap.

BROWN AND CALDWELL

AI-22

Project Name: **BJ Services Company, U.S.A.** Project Number: **2832** Sheet **1** of **2**

Project Location: **Hobbs, New Mexico**		Logged By: **R. Rexroad**	Approved: **R. Rexroad**
Drilling Contractor: **Geo Projects, Inc.**		Date Started: **2/10/98**	Date Finished: **2/11/98**
Drilling Equipment: **Mobile B-61**	Driller: **A. Hinojosa**	Total Boring Depth: (feet) **67.0**	Depth to Static Water: (feet) **53.5**
Drilling Method: **Air Rot./Hol. Stem**	Borehole Diameter: **8"**	TOC Elevation: **NR**	Ground Elevation: **NR**
Sampling Method: **2-foot split spoon**		Diameter and Type of Well Casing: **2-inch PVC**	
Comments:		Slot Size: **0.020 "**	Filter Material: **8-16 silica sand**
		Development Method: **Air surging and bailing**	

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Remarks
0				Fill - pebbles, silt, clay.					Cement-bentonite grout.
2		CL		Dark brown silty clay (CL); slightly moist.					
4				Medium to light brown sandstone (SS); well cemented; dry.					
6		CL ML		Caliche - light brown silty clay (CL); grades at approximately 6 feet to off whitish clayey silt (ML), with caliche cement; dry.					
8				Carbonate-rich (crystalline) below 8 feet; dry.					
10				Sandstone pebbles present below 10 feet.					
12				Medium brown sandstone (SS), well cemented; dry. Thin caliche layer present at 12 feet.					
14		CL		Whitish silty clay (CL) with caliche cementation.					
16		SM		Light brown thin layer of silty sand (SM); dry.					
18		CL		Light to medium reddish-brown silty clay (CL); soft; slightly moist. Whitish caliche-cemented silty clay (CL) at 17 feet; soft; slightly moist.					
20									
22									
24				Medium brown sandstone (SS); well cemented; dry.					
26		CL SP		Whitish caliche-cemented silty clay (CL); dry. Medium brown, very fine grained to fine grained sand (SP); very slightly moist.					
28				Whitish weathered sandstone (SS); pebbles present; dry.					
30		SM		Thin layer of very light brown silty sand (SM); dry. Light to medium brown sandstone pebbles (weathered sandstone).					
32				Medium brown sandstone (SS); well cemented; dry.					

BROWN AND CALDWELL

AI-22

Project Name: **BJ Services Company, U.S.A.** Project Number: **2832** Sheet 2 of 2

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Remarks
34		SP		Very light brown, medium to fine grained sand (SP); dry.					
36				Grades to: Medium brown, very fine grained to fine grained sand (SP) at 35 feet; very slightly moist.					
38									
40									
42									Cement-bentonite grout.
44									
46									
48									
50					576		1	A	A = Sample AI22-50-51
52				Hard layer present at 51.5 feet.					
54	▼								53.3
56									
58									Hydrated bentonite seal.
60									
62									62.8
64									63.3 8-16 graded silica sand filter pack. 0.020-inch slotted well screen.
66									65.8 66.1 Bottom cap. 67.0
				Total depth = 67 feet.					

BROWN AND CALDWELL

AI-23

Project Name: **BJ Services Company, U.S.A.** Project Number: **2832** Sheet **1** of **2**

Project Location: **Hobbs, New Mexico**		Logged By: **R. Rexroad**	Approved: **R. Rexroad**
Drilling Contractor: **Geo Projects, Inc.**		Date Started: **2/5/98**	Date Finished: **2/7/98**
Drilling Equipment: **Mobile B-61**	Driller: **A. Hinojosa**	Total Boring Depth: (feet) **67.0**	Depth to Static Water: (feet) **53.4**
Drilling Method: **Air Rot./Hol. Stem**	Borehole Diameter: **8"**	TOC Elevation: **NR**	Ground Elevation: **NR**
Sampling Method: **2-foot split spoon**		Diameter and Type of Well Casing: **2-inch PVC**	
Comments:		Slot Size: **0.020 "**	Filter Material: **8-16 silica sand**
		Development Method: **Air surging and bailing**	

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Remarks
0				Fill - boulder to clay sized.					
2		CL		Dark gray to medium gray silty clay (CL); low moisture content.					
4				Light brown silty clay (CL), with caliche; low to moderate moisture content.					
6				Carbonate - cemented gravel present; very dry.					
8									
10									
12				Indurated layer of medium brown, very fine grained sandstone (SS).					
14		~~CL~~		Silty clay (CL).					
				Medium brown sandstone, as above.					
16		ML		Light brown clayey sandy silt (ML); dry; with gravel lenses.					
18									
20				Increasing sand content with increasing depth.					
22		SM		Medium pinkish-brown silty sand (SM); dry.					
24		ML		Medium pinkish-brown clayey silt (ML); dry.					Cement-bentonite grout.
26									
28		SP		Light pinkish-brown, very fine grained sand (SP); dry.					
30									
32				Drilling break at 32 feet.					

BROWN AND CALDWELL

AI-23

Project Name: **BJ Services Company, U.S.A.** Project Number: **2832** Sheet 2 of 2

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Remarks
34				Medium brown sandstone (SS); well indurated.					
		SP		Light pinkish-brown, very fine grained sand (SP) with scattered gravel-bearing lenses to 40 feet.					
36									
38									
40				Very well sorted, very fine grained sand (SP) with scattered whitish calcareous zones; no odor; slightly moist.	0		1		
42									
44									
46				Well cemented sandstone cobble (3-inches in diameter) recovered in 45- to 46-foot interval.	2		1		
48					8		.6		
50				Scattered cemented sandstone cobbles present in 49- to 50.5-foot interval; moist.	> 2000		1.5	A	A = Sample AI23-49-50.5
52									
54	▼			Black staining present.	1574		1.5		
					457		1.5		
56									
58									Hydrated bentonite seal.
60				Layer of sandstone cobbles present at 59.5 feet.					
62				Layer of sandstone cobbles present at 62 feet.					
64									8-16 graded silica sand filter pack.
66									0.020-inch slotted well screen.
				Total depth = 67 feet.					Bottom cap.

53.0
63.0
63.5
66.0
66.3
67.0

BROWN AND CALDWELL

AI-24

Project Name: **BJ Services Company, U.S.A.** Project Number: **2832** Sheet **1** of **2**

Project Location: **Hobbs, New Mexico**		Logged By: **R. Rexroad**	Approved: **R. Rexroad**
Drilling Contractor: **Geo Projects, Inc.**		Date Started: **2/4/98**	Date Finished: **2/5/98**
Drilling Equipment: **Mobile B-61**	Driller: **A. Hinojosa**	Total Boring Depth: (feet) **67.5**	Depth to Static Water: (feet) **53.5**
Drilling Method: **Air Rot./Hol. Stem**	Borehole Diameter: **8"**	TOC Elevation: **NR**	Ground Elevation: **NR**
Sampling Method: **2-foot split spoon**		Diameter and Type of Well Casing: **2-inch PVC**	
Comments: **10 feet south and 6 feet west of MW-1**		Slot Size: **0.020 "**	Filter Material: **8-16 silica sand**
		Development Method: **Air surging and bailing**	

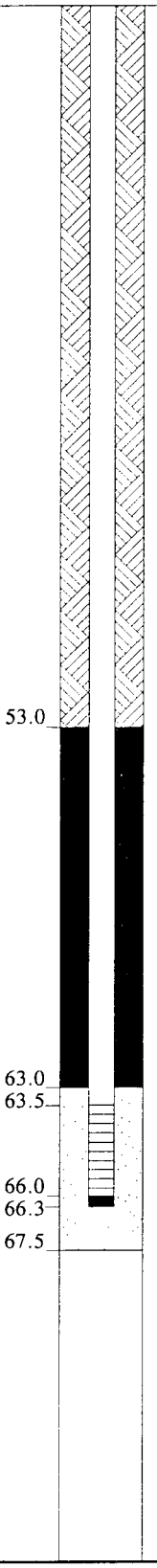
Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Remarks
2		CL		Fill: light reddish-brown clayey sandy silt, with gravel; dry. Dark gray silty clay (CL); no odor. Medium grayish-brown silty clay at 3 feet.					
4		ML		Light pinkish-brown clayey sandy silt (ML), with calcareous cement (caliche).					
6									
8									
10									
12				Light brown clayey silt (ML), with limestone gravel; gravel becomes more abundant with increased depth to 12.5 feet; dry.					
14				Decreased gravel content below 12.5 feet.					
16		CL		Light pinkish-brown slighty silty clay (CL); dry.					
18									
20		SM		Light pinkish-brown slightly silty sand (SM); very fine grained.					
22		SP		Light pinkish-brown, very fine grained to fine grained sand (SP); no odor; slightly moist.					
24									Cement-bentonite grout.
26				One-inch thick layer with rounded sandstone gravel up to 3/4-inch in diameter at 25 feet.					
28									
30				Drilling break at 29.7 feet - layer of rounded gravel to 1-inch in diameter.					
32									

BROWN AND CALDWELL

AI-24

Project Name: **BJ Services Company, U.S.A.** Project Number: **2832** Sheet 2 of 2

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID
34				Drilling break 33.5 feet.				
		SP		Light pinkish-brown, very fine grained to fine grained sandstone (SS).				
		SW		Light pinkish-brown, very fine grained to fine grained sand (SP).				
36		SP		Sand with gravel (SW).				
38				Light pinkish-brown, very fine grained to fine grained sand (SP); angular; slightly moist. Abundant rounded sandstone gravel to 1-inch in diameter present in 38-39 foot interval.				
40				Light slightly pinkish-brown, very fine grained to fine grained well sorted sand (SP); no odor; slighty moist.	0		1.5	
42								
44								
46				Light slightly pinkish-brown, very fine grained to fine grained sand (SP); with scattered rounded sandstone gravel to 3/4-inch in diameter; earthy odor; slighty moist.	0		1.5	
48								
50				Light slightly pinkish-brown, very fine grained to fine grained sand (SP).	> 2000		1.5	A
52					> 2000		1.5	
54	▼			Very moist.	> 2000		1.5	
56				Saturated at 55 feet.	156		.5	
58								
60								
62								
64				Drilling break.				
66				Light pinkish-brown, very fine grained to fine grained, non-cemented to moderately well cemented interbedded sandstone (SS) and sand (SP).				
				Total depth = 67.5 feet.				



Remarks

A = Sample AI24-50-51.5

Hydrated bentonite seal.

8-16 graded silica sand filter pack.
0.020-inch slotted well screen.

Bottom cap.

BROWN AND CALDWELL

VE-5

Project Name: **BJ Services Company, U.S.A.** Project Number: **2832** Sheet **1** of **2**

Project Location: **Hobbs, New Mexico**		Logged By: **R. Rexroad**	Approved: **R. Rexroad**
Drilling Contractor: **Geo Projects, Inc.**		Date Started: **2/11/98**	Date Finished: **2/12/98**
Drilling Equipment: **Mobile B-61**	Driller: **A. Hinojosa**	Total Boring Depth: (feet) **51.5**	Depth to Static Water: (feet)
Drilling Method: **Air Rot./Hol. Stem**	Borehole Diameter: **8"**	TOC Elevation: **NR**	Ground Elevation: **NR**
Sampling Method: **2-foot split spoon**		Diameter and Type of Well Casing: **2-inch PVC**	
Comments:		Slot Size: **0.020 "**	Filter Material: **8-16 silica sand**
		Development Method: **Air surging and bailing**	

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Remarks
				Fill - gravel, silt, sand, and clay.					
2		CL		Dark grayish-brown silty clay (CL); slightly moist.					
4				Tan silty clay (CL), with caliche cementation; hard; dry.					
6									
8				Whitish sandy clay, less firmly cemented below 7 feet. Hard layer at 8 feet with a higher degree of carbonate cementation.					
10									
12		SM		Light brown silty sand (SM); dry.					
		SW		Medium reddish-brown, fine grained to very fine grained sand (SW), with rounded pebbles to 3/4-inch in diameter; very slightly moist.					
14									
16		CL GP		Medium brown sandstone (SS) alternating with: Silty clay (CL), with caliche cementation; hard; dry. Subangular to angular caliche/sandstone fragments to 1-inch in diameter, with fine grained sand (GP).					
18		SW SC		Medium light reddish-brown clayey sand (SC), with subrounded sandstone pebbles to 1/2-inch in diameter (SW).					Cement-bentonite grout.
20									
22		SW		Color change to tan at 22 feet.					
		SW		Decreased clay content; fine grained slightly clayey sand (SW).					
24		GP		Thin layer of very light brown sandstone (SS).					
		SW		Tan, fine grained slightly silty gravel-bearing sand (SW).					
26				Rounded sandstone gravels to 1/2-inch in diameter with very fine grained whitish to very light tan sands (GP).					
28				Tan medium to fine grained sand with subrounded sandstone gravels (SW); very low moisture content.					
30				Subangular sandstone fragments to 1-inch in diameter in 27 to 28-foot interval. Rounded gravels to 1-inch in diameter present in 28- to 29-foot interval. Angular gravels present in 29-					
32									

BROWN AND CALDWELL

VE-5

Project Name: **BJ Services Company, U.S.A.** Project Number: **2832** Sheet 2 of 2

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Remarks
				to 29.5-foot interval.					
34		GP		Light brown sandstone interbedded with sandstone gravels (SW).					
				Light brown sandstone (SS); well cemented.					
36		SP		Light brown, loosely consolidated sandstone gravel with sand (GP); dry.					
				Medium to light brown, fine grained to very fine grained sand (SP); dry.					38.5 39.5 Hydrated bentonite seal. 40.0 8-16 graded silica sand filter pack.
38									
40									
42									
44									
				Thin layers of sandstone pebbles and loosely consolidated sandstone present from 40 to 50 feet.					0.020-inch slotted well screen.
46									
48									
50				Subrounded sandstone pebbles to 1-inch in diameter present; slightly moist.	0		1.5	A	50.0 50.3 Bottom cap. A = Sample VE5-50-51.5
				Total depth = 51.5 feet.					51.5

BROWN AND CALDWELL

VE-6

Project Name: **BJ Services Company, U.S.A.** Project Number: **2832** Sheet **1** of **2**

Project Location: **Hobbs, New Mexico**		Logged By: **R. Rexroad**	Approved: **R. Rexroad**
Drilling Contractor: **Geo Projects, Inc.**		Date Started: **2/12/98**	Date Finished: **2/12/98**
Drilling Equipment: **Mobile B-61**	Driller: **A. Hinojosa**	Total Boring Depth: (feet) **50.6**	Depth to Static Water: (feet)
Drilling Method: **Air Rot./Hol. Stem**	Borehole Diameter: **8"**	TOC Elevation: **NR**	Ground Elevation: **NR**
Sampling Method: **2-foot split spoon**		Diameter and Type of Well Casing: **2-inch PVC**	
Comments:		Slot Size: **0.020 "**	Filter Material: **8-16 silica sand**
		Development Method: **Air surging and bailing**	

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Remarks
				Fill - gravel, sand, silt, and clay.					
2		CL		Dark grayish-brown silty clay (CL); moist.					
4				Medium brown silty clay (CL) with caliche; hard.					
6				Off white silty clay (CL); more indurated at 5 feet to 10.5 feet than above.					
8									
10									
12		SM		Off-whitish silty sand with caliche-cemented nodules; dry.					
14									
16				Well indurated, hard siltstone and very fine grained sandstone (SS); dry.					
18									Cement-bentonite grout.
20		CL		Medium brown silty clay (CL) with interbedded siltstone and sandstone layers; soft; low moisture content.					
22		SM		Light brown silty sand (SM); soft; very slightly moist.					
24				Light brown, very fine grained sandstone (SS); dry.					
26		GP		Subrounded sandstone gravels, to 3/4-inch in diameter, with very fine grained sand (GP); dry.					
28		SW		Light brown, fine grained sand (SW) with subrounded gravels to 1-inch in diameter; slightly moist.					
30				As above, with interbedded siltstone layers from 29 to 29.8 feet.					
32				Moderately cemented sandstone (SS) with caliche vugs.					

BROWN AND CALDWELL

VE-6

Project Name: **BJ Services Company, U.S.A.** Project Number: **2832** Sheet 2 of 2

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Remarks
34				Well cemented sandstone (SS) with interbedded sand. Well cemented sandstone at 34 feet; massive.					
36		SP		Light pinkish-brown, fine grained sand (SP) with intermittent layers of rounded sandstone pebbles; slightly moist.					
38									38.5 Hydrated bentonite seal. 8-16 graded silica sand filter pack.
39.5									
40									40.0
42									
44									0.020-inch slotted well screen.
46									
48									
50					0		.6	A	50.0 Bottom cap. A = Sample VE6-50-50.6
				Total depth = 50.6 feet.					50.3 50.6

BROWN AND CALDWELL

VE-7

Project Name: **BJ Services Company, U.S.A.** Project Number: **2832** Sheet **1** of **2**

Project Location: **Hobbs, New Mexico**		Logged By: **R. Rexroad**	Approved: **R. Rexroad**
Drilling Contractor: **Geo Projects, Inc.**		Date Started: **2/12/98**	Date Finished: **2/13/98**
Drilling Equipment: **Mobile B-61**	Driller: **A. Hinojosa**	Total Boring Depth: (feet) **51.5**	Depth to Static Water: (feet)
Drilling Method: **Air Rot./Hol. Stem**	Borehole Diameter: **8"**	TOC Elevation: **NR**	Ground Elevation: **NR**
Sampling Method: **2-foot split spoon**		Diameter and Type of Well Casing: **2-inch PVC**	
Comments:		Slot Size: **0.020 "**	Filter Material: **8-16 silica sand**
		Development Method: **Air surging and bailing**	

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Remarks
				Fill - gravel, silt, sand, clay.					
2		CL		Dark grayish-brown silty clay (CL); slightly to moderately moist. Color change to medium gray and lithology change to sandy clay at 3 feet.					
4									
6				Caliche-cemented light brown siltstone to very fine grained sandstone. Layer of subrounded sandstone and siltstone pebbles (to 3/4-inch in diameter) with sand (GP) at 5.5- to 5.75-feet; dry.					
8									
10		ML		Off-white sandy silt (ML) with caliche cement; less indurated than siltstone above; dry.					
12									
14				Siltstone layers present below 14 feet.					
16									
18		GM		Rounded sandstone and siltstone pebbles to 3/4-inch in diameter with silty matrix (GM).					Cement-bentonite grout.
20									
22		SP		Light pinkish-brown sand (SP) with scattered rounded sandstone pebbles to 1/2 inch in diameter; slightly moist. As above with color change to medium pinkish-brown.					
24									
26				Layer of subrounded sandstone and silstone pebbles to 3/4-inch in diameter present at 25 feet.					
28									
30				Layer of subrounded sandstone and silstone pebbles to 1-inch in diameter present at 29.5 feet.					
32									

BROWN AND CALDWELL

VE-7

Project Name: **BJ Services Company, U.S.A.** Project Number: **2832** Sheet 2 of 2

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Remarks
34				Layer of subrounded pebbles to 1/2-inch in diameter below 33.5 feet.					
36		SP		Medium brown, fine grained to very fine grained sandstone (SS); well cemented. Very fine grained to fine grained sand (SP) with scattered sandstone pebbles; very slightly moist.					
38									38.5 Hydrated bentonite seal. 8-16 graded silica sand filter pack.
40									39.5 40.0
42									0.020-inch slotted well screen.
44									
46									
48									Bottom cap.
50					272		1	A	50.0 50.3 A = Sample VE7-50-51
				Total depth = 51 feet.					51.0

BROWN AND CALDWELL

MW-11A

Project Name: **BJ Services Company, U.S.A.** Project Number: **2832** Sheet **1** of **2**

Project Location: **Hobbs, New Mexico**		Logged By: **R. Rexroad**	Approved: **R. Rexroad**
Drilling Contractor: **Geo Projects, Inc.**		Date Started: **2/14/98**	Date Finished: **2/15/98**
Drilling Equipment: **Mobile B-61**	Driller: **A. Hinojosa**	Total Boring Depth: (feet) **65.5**	Depth to Static Water: (feet) **53.0**
Drilling Method: **Air Rot./Hol. Stem**	Borehole Diameter: **8"**	TOC Elevation: **NR**	Ground Elevation: **NR**
Sampling Method: **2-foot split spoon**		Diameter and Type of Well Casing: **2-inch PVC**	
Comments:		Slot Size: **0.020 "**	Filter Material: **8-16 silica sand**
		Development Method: **Air surging and bailing**	

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Remarks
				Fill - cobbles, gravel, cement, silt, etc.					
2		CL		Dark brown silty clay (CL); soft; slightly moist.					
4		ML		Whitish clayey silt (ML) with caliche cement; poorly indurated; dry.					
6				Whitish clayey silt (ML); well indurated; interbedded with siltstones and fine grained to very fine grained sandstone.					
8									
10				Soft clayey silt (ML) with caliche; interbedded with hard siltstones and sandstone.					
12		SW		Whitish, fine grained slightly silty sand with rounded sandstone and siltstone pebbles (SW) to 1/2-inch in diameter; dry.					
14									
16				Increasing pebble content with depth.					
		GP		Grades at approximately 17 feet to:					
18				Whitish gravel with sand (GP), pebbles to 1-inch in diameter; dry.					
20									
22		SP		Light pinkish-brown, fine grained sand (SP) with scattered rounded pebbles to 1/2-inch in diameter; very slightly moist.					Cement-bentonite grout.
24									
26									
28									
30				Layer of subrounded, loosely cemented sandstone pebbles to 1/2-inch in diameter at 29 feet.					
32				Scattered pebbles, as above, at 31.5 feet.					

BROWN AND CALDWELL

MW-11A

Project Name: **BJ Services Company, U.S.A.** Project Number: **2832** Sheet 2 of 2

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Remarks
34				Pebble rich layer present at 34- to 35 feet.					
36									
38									
40									
42				Scattered pebble rich layers throughout, at approximately 2-foot intervals.					
44									
46									46.0 Hydrated bentonite seal.
48									48.0 8-16 graded silica sand filter pack.
50									50.0
52	▼								
54					0		.75	A	A = Sample MW11A-53.5-54.25
56									0.020-inch slotted well screen.
58									
60									
62									
64									65.0 Bottom cap.
				Total depth = 65.5 feet.					65.3
									65.5

BROWN AND CALDWELL

MW-12

Project Name: **BJ Services Company, U.S.A.** Project Number: **2832** Sheet **1** of **2**

Project Location: **Hobbs, New Mexico**		Logged By: **R. Rexroad**	Approved: **R. Rexroad**
Drilling Contractor: **Geo Projects, Inc.**		Date Started: **2/13/98**	Date Finished: **2/13/98**
Drilling Equipment: **Mobile B-61**	Driller: **A. Hinojosa**	Total Boring Depth: (feet) **66.5**	Depth to Static Water: (feet) **54.3**
Drilling Method: **Air Rot./Hol. Stem**	Borehole Diameter: **8"**	TOC Elevation: **NR**	Ground Elevation: **NR**
Sampling Method: **2-foot split spoon**		Diameter and Type of Well Casing: **2-inch PVC**	
Comments:		Slot Size: **0.020 "**	Filter Material: **8-16 silica sand**
		Development Method: **Air surging and bailing**	

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Remarks
0				Fill - sand with gravel.					
2		CL		Dark grayish-brown silty clay (CL); slightly moist. Grades at approximately 2 feet to: Light grayish-brown sandy clay (CL).					
4				Whitish sandy silty clay (CL) with caliche at 3.5 feet; soft; slightly moist.					
6				Siltstone and very fine grained sandstone present at 5.5 feet; semi-indurated.					
8									
10				Increased sand content in 8 to 10-foot interval (stringers of interlayered with sands and siltstones).					
12		GP		Whitish fine grained sands with rounded sandstone pebbles (GP) to 1/2-inch in diameter; low moisture content.					
14				Medium brown, very fine grained sandstone; dry.					
16		GP		Whitish fine grained sands with rounded sandstone pebbles (GP) to 1/2-inch in diameter.					
18				Increased amount of pebbles at 18 feet with less sand.					
20				Pebbles up to 1-inch in diameter present below 20 feet.					
22									
24		GP		Hard layer of very fine grained sandstone (SS) present; well indurated.					Cement-bentonite grout.
26				Whitish fine grained sands with rounded sandstone pebbles (GP), with a higher sand content than in 14- to 24-foot interval.					
28		SP		Medium pinkish-brown sand (SP) with scattered rounded gravels to 3/4-inch in diameter.					
30									
32									

BROWN AND CALDWELL

MW-12

Project Name: **BJ Services Company, U.S.A.** Project Number: **2832** Sheet 2 of 2

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Remarks
34									
36				2 to 3-inch thick layer of pebbles present at 36 feet.					
38									
40									
42									
44									
46									46.0
48									48.0 Hydrated bentonite seal.
50									50.0 8-16 graded silica sand filter pack.
52									
54	▼				0	.75		A	A = Sample MW12-53.5-54.25
56									
58									0.020-inch slotted well screen.
60									
62									
64									
66									65.0 65.3 Bottom cap. 66.5
				Total depth = 66.5 feet.					

D

APPENDIX D

Laboratory Analytical Report for Soil Samples

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

March 2, 1998

Mr. K. Saravanan
BROWN AND CALDWELL
1415 Louisiana
Houston, TX 77002

The following report contains analytical results for the sample(s) received at Southern Petroleum Laboratories (SPL) on February 13,1998. The sample(s) was assigned to Certificate of Analysis No.(s) 9802639 and analyzed for all parameters as listed on the chain of custody.

Any data flag or quality control exception associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s).

If you have any questions or comments pertaining to this data report, please do not hesitate to contact me. Please reference the above Certificate of Analysis No. during any inquiries.

Again, SPL is pleased to be of service to you. We anticipate working with you in fulfilling all your current and future analytical needs.

Southern Petroleum Laboratories

Bernadette Fini
Project Manager

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Southern Petroleum Laboratories, Inc.

Certificate of Analysis Number: 98-02-639

Approved for Release by:

Bernadette A. Fini, Project Manager — 3-2-98 Date

Greg Grandits
Laboratory Director

Idelis Williams
Quality Assurance Officer

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

February 23, 1998

Mr. Rick Rexroad
BROWN AND CALDWELL
1415 Louisiana
Houston, TX 77002

The following report contains analytical results for the sample(s) received at Southern Petroleum Laboratories (SPL) on February 7, 1998. The sample(s) was assigned to Certificate of Analysis No.(s) 9802342 and analyzed for all parameters as listed on the chain of custody.

Your sample "AI24-50-51.5" (SPL ID:9802342-01) was randomly selected for the use in SPL's Quality Control program for the Diesel Range Organics analysis by method 8015B. The Matrix Spike (MS) and Matrix Spike Duplicate (MSD) recoveries were outside of advisable QC limits, due to matrix interference (Batch ID:HP_V980216093800). A Laboratory Control Sample (LCS) was analyzed as a Quality Control check for the analytical batch and its recovery was within acceptable limits.

Any other data flag or quality control exception associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s).

If you have any questions or comments pertaining to this data report, please do not hesitate to contact me. Please reference the above Certificate of Analysis No. during any inquiries.

Again, SPL is pleased to be of service to you. We anticipate working with you in fulfilling all your current and future analytical needs.

Southern Petroleum Laboratories

Bernadette A. Fini
Project Manager

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Southern Petroleum Laboratories, Inc.

Certificate of Analysis Number: 98-02-342

Approved for Release by:

Bernadette A. Fini, Project Manager — Date: 2-23-98

Greg Grandits
Laboratory Director

Idelis Williams
Quality Assurance Officer

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9802639-05

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: K. Saravanan

DATE: 03/02/98

PROJECT: BJ Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: AI22-50-51

PROJECT NO: 2832.34
MATRIX: SOIL
DATE SAMPLED: 02/10/98 17:38:00
DATE RECEIVED: 02/13/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	50 P	µg/Kg
TOLUENE	130	50 P	µg/Kg
ETHYLBENZENE	740	50 P	µg/Kg
TOTAL XYLENE	4200	50 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	5070		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	107		
4-Bromofluorobenzene	MI 173		
Method 8020A ***			
Analyzed by: SB			
Date: 02/17/98			
Total Petroleum Hydrocarbons-Diesel	790	200 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	D		
Method Modified 8015B *** for Diesel			
Analyzed by: RR			
Date: 02/26/98 05:15:00			

ND - Not detected.
MI - Matrix interference.
(P) - Practical Quantitation Limit
D - Diluted, limits not applicable.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that do not resemble a diesel pattern.(C10-C24) RR

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9802639-05

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: K. Saravanan

DATE: 03/02/98

PROJECT: BJ Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: AI22-50-51

PROJECT NO: 2832.34
MATRIX: SOIL
DATE SAMPLED: 02/10/98 17:38:00
DATE RECEIVED: 02/13/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Sonication Extraction Method 3550B ***	02/19/98		
Analyzed by: TC			
Date: 02/19/98 09:00:00			

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that do not resemble a diesel pattern.(C10-C24) RR

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9802639-07

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: K. Saravanan

DATE: 03/02/98

PROJECT: BJ Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: VE6-50-50.6

PROJECT NO: 2832.34
MATRIX: SOIL
DATE SAMPLED: 02/12/98 11:30:00
DATE RECEIVED: 02/13/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1.0 P	µg/Kg
TOLUENE	ND	1.0 P	µg/Kg
ETHYLBENZENE	ND	1.0 P	µg/Kg
TOTAL XYLENE	ND	1.0 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	100		
4-Bromofluorobenzene	100		
Method 8020A ***			
Analyzed by: SB			
Date: 02/17/98			
Total Petroleum Hydrocarbons-Diesel	160	10 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	MI 176		
Method Modified 8015B *** for Diesel			
Analyzed by: RR			
Date: 02/25/98 06:03:00			

ND - Not detected. (P) - Practical Quantitation Limit
MI - Matrix interference.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that do not resemble a diesel pattern.(C10-C24) RR

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9802639-07

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: K. Saravanan

DATE: 03/02/98

PROJECT: BJ Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: VE6-50-50.6

PROJECT NO: 2832.34
MATRIX: SOIL
DATE SAMPLED: 02/12/98 11:30:00
DATE RECEIVED: 02/13/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Sonication Extraction Method 3550B ***	02/19/98		
Analyzed by: TC			
Date: 02/19/98 09:00:00			

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that do not resemble a diesel pattern.(C10-C24) RR

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9802639-01

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: K. Saravanan

DATE: 03/02/98

PROJECT: BJ Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: AI21-50-50.8

PROJECT NO: 2832.34
MATRIX: SOIL
DATE SAMPLED: 02/07/98 18:07:00
DATE RECEIVED: 02/13/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	10 P	µg/Kg
TOLUENE	110	10 P	µg/Kg
ETHYLBENZENE	1100	10 P	µg/Kg
TOTAL XYLENE	6300	10 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	7510		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	103		
4-Bromofluorobenzene	MI 293		
Method 8020A ***			
Analyzed by: SB			
Date: 02/17/98			
Total Petroleum Hydrocarbons-Diesel	250	100 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	MI 148		
Method Modified 8015B *** for Diesel			
Analyzed by: RR			
Date: 02/21/98 05:54:00			

ND - Not detected. (P) - Practical Quantitation Limit
MI - Matrix interference.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that resemble a diesel pattern.(C10-C24) RR

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9802639-01

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: K. Saravanan

DATE: 03/02/98

PROJECT: BJ Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: AI21-50-50.8

PROJECT NO: 2832.34
MATRIX: SOIL
DATE SAMPLED: 02/07/98 18:07:00
DATE RECEIVED: 02/13/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Sonication Extraction Method 3550B ***	02/19/98		
Analyzed by: TC			
Date: 02/19/98 09:00:00			

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that resemble a diesel pattern.(C10-C24) RR

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9802639-08

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: K. Saravanan

DATE: 03/02/98

PROJECT: BJ Hobbs
SITE: Hobbs, NM
SAMPLED BY: Provided by SPL
SAMPLE ID: Trip Blank 1/30/98

PROJECT NO: 2832.34
MATRIX: WATER
DATE SAMPLED: 02/07/98
DATE RECEIVED: 02/13/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1.0 P	µg/L
TOLUENE	ND	1.0 P	µg/L
ETHYLBENZENE	ND	1.0 P	µg/L
TOTAL XYLENE	ND	1.0 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		µg/L

Surrogate	% Recovery
1,4-Difluorobenzene	97
4-Bromofluorobenzene	97

Method 8020A ***
Analyzed by: VHZ
Date: 02/16/98

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9802639-03

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: K. Saravanan

DATE: 03/02/98

PROJECT: BJ Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: AI21-64-65

PROJECT NO: 2832.34
MATRIX: SOIL
DATE SAMPLED: 02/08/98 12:50:00
DATE RECEIVED: 02/13/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1.0 P	µg/Kg
TOLUENE	ND	1.0 P	µg/Kg
ETHYLBENZENE	ND	1.0 P	µg/Kg
TOTAL XYLENE	1.5	1.0 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	1.5		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	100		
4-Bromofluorobenzene	117		
Method 8020A ***			
Analyzed by: SB			
Date: 02/17/98			
Total Petroleum Hydrocarbons-Diesel	ND	10 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	96		
Method Modified 8015B *** for Diesel			
Analyzed by: RR			
Date: 02/25/98 02:13:00			
Sonication Extraction	02/19/98		
Method 3550B ***			
Analyzed by: TC			
Date: 02/19/98 09:00:00			

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9802639-02

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: K. Saravanan

DATE: 03/02/98

PROJECT: BJ Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: AI21-53.5-54.5

PROJECT NO: 2832.34
MATRIX: SOIL
DATE SAMPLED: 02/08/98 07:30:00
DATE RECEIVED: 02/13/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	51	10 P	µg/Kg
TOLUENE	450	10 P	µg/Kg
ETHYLBENZENE	570	10 P	µg/Kg
TOTAL XYLENE	1800	10 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	2871		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	97		
4-Bromofluorobenzene	MI 213		
Method 8020A ***			
Analyzed by: SB			
Date: 02/18/98			
Total Petroleum Hydrocarbons-Diesel	98	50 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	106		
Method Modified 8015B *** for Diesel			
Analyzed by: RR			
Date: 02/25/98 01:34:00			
Sonication Extraction	02/19/98		
Method 3550B ***			
Analyzed by: TC			
Date: 02/19/98 09:00:00			

(P) - Practical Quantitation Limit MI - Matrix interference.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that resemble a diesel pattern.(C10-C24) RR

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9802639-04

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: K. Saravanan

DATE: 03/02/98

PROJECT: BJ Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: AI20-50-51

PROJECT NO: 2832.34
MATRIX: SOIL
DATE SAMPLED: 02/09/98 07:30:00
DATE RECEIVED: 02/13/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	1200	1000 P	µg/Kg
TOLUENE	120000	1000 P	µg/Kg
ETHYLBENZENE	170000	1000 P	µg/Kg
TOTAL XYLENE	620000	1000 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	911200		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	97		
4-Bromofluorobenzene	MI 223		
Method 8020A ***			
Analyzed by: SB			
Date: 02/17/98			
Total Petroleum Hydrocarbons-Diesel	1700	100 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	MI 144		
Method Modified 8015B *** for Diesel			
Analyzed by: RR			
Date: 02/25/98 02:50:00			
Sonication Extraction	02/19/98		
Method 3550B ***			
Analyzed by: TC			
Date: 02/19/98 09:00:00			

(P) - Practical Quantitation Limit MI - Matrix interference.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that resemble a diesel pattern.(C10-C24) RR

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9802639-06

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: K. Saravanan

DATE: 03/02/98

PROJECT: BJ Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: VE5-50-51.5

PROJECT NO: 2832.34
MATRIX: SOIL
DATE SAMPLED: 02/12/98 07:40:00
DATE RECEIVED: 02/13/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1.0 P	µg/Kg
TOLUENE	ND	1.0 P	µg/Kg
ETHYLBENZENE	ND	1.0 P	µg/Kg
TOTAL XYLENE	ND	1.0 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	103		
4-Bromofluorobenzene	110		
Method 8020A ***			
Analyzed by: SB			
Date: 02/17/98			
Total Petroleum Hydrocarbons-Diesel	11	10 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	100		
Method Modified 8015B *** for Diesel			
Analyzed by: RR			
Date: 02/25/98 04:08:00			
Sonication Extraction	02/19/98		
Method 3550B ***			
Analyzed by: TC			
Date: 02/19/98 09:00:00			

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that do not resemble a diesel pattern.(C10-C24) RR

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9802342-01

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 02/20/98

PROJECT: BJ Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: AI24-50-51.5

PROJECT NO: 2832.34
MATRIX: SOIL
DATE SAMPLED: 02/04/98 14:20:00
DATE RECEIVED: 02/07/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	500 P	µg/Kg
TOLUENE	2200	500 P	µg/Kg
ETHYLBENZENE	17000	500 P	µg/Kg
TOTAL XYLENE	81000	500 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	100200		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	93		
4-Bromofluorobenzene	173MI		
Method 8020A ***			
Analyzed by: SB			
Date: 02/10/98			
Total Petroleum Hydrocarbons-Diesel	570	50.0 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	58		
Method Modified 8015B *** for Diesel			
Analyzed by: RR			
Date: 02/16/98 10:22:00			
Sonication Extraction	02/11/98		
Method 3550B ***			
Analyzed by: DL			
Date: 02/11/98 14:00:00			

ND - Not detected.
MI - Matrix interference.
(P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9802342-02

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 02/20/98

PROJECT: BJ Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: AI23-49-50.5

PROJECT NO: 2832.34
MATRIX: SOIL
DATE SAMPLED: 02/06/98 07:35:00
DATE RECEIVED: 02/07/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	250 P	µg/Kg
TOLUENE	650	250 P	µg/Kg
ETHYLBENZENE	1900	250 P	µg/Kg
TOTAL XYLENE	13000	250 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	15550		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	96		
4-Bromofluorobenzene	147		
Method 8020A ***			
Analyzed by: SB			
Date: 02/10/98			
Total Petroleum Hydrocarbons-Diesel	280	50.0 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	44		
Method Modified 8015B *** for Diesel			
Analyzed by: RR			
Date: 02/17/98 12:37:00			
Sonication Extraction	02/11/98		
Method 3550B ***			
Analyzed by: DL			
Date: 02/11/98 14:00:00			

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

QUALITY CONTROL

DOCUMENTATION

QUALITY CONTROL

DOCUMENTATION

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL BATCH QUALITY CONTROL REPORT **
METHOD 8020***

Matrix: Soil
Units: µg/Kg

Batch Id: HP_R980210022700

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	50	48	96.0	60 - 116
Toluene	ND	50	47	94.0	64 - 122
EthylBenzene	ND	50	49	98.0	68 - 127
O Xylene	ND	50	50	100	68 - 127
M & P Xylene	ND	100	97	97.0	68 - 129

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
BENZENE	ND	20	18	90.0	18	90.0	0	33	35 - 139
TOLUENE	1.0	20	18	85.0	18	85.0	0	35	31 - 137
ETHYLBENZENE	ND	20	18	90.0	16	80.0	11.8	40	21 - 141
O XYLENE	1.2	20	17	79.0	16	74.0	6.54	24	25 - 139
M & P XYLENE	2.4	40	33	76.5	30	69.0	10.3	38	19 - 144

Analyst: SB
Sequence Date: 02/10/98
SPL ID of sample spiked: 9802238-07A
Sample File ID: R_B2027.TXO
Method Blank File ID:
Blank Spike File ID: R_B2024.TXO
Matrix Spike File ID: R_B2025.TXO
Matrix Spike Duplicate File ID: R_B2026.TXO

* = Values outside QC Range due to Matrix Interference (except RPD)
« = Data outside Method Specification limits.
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data (1st Q '97)
(***) = Source: SPL-Houston Historical Data (1st Q '97)

SAMPLES IN BATCH(SPL ID): 9802342-02A 9802342-01A 9802275-07A 9802238-07A 9802280-13A 9802378-01A 9802308-01A

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL BATCH QUALITY CONTROL REPORT **
Method Modified 8015B***

Matrix: Soil
Units: mg/kg

Batch Id: HP_V980216093800

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Diesel	ND	166	160	96.4	77 - 145

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
DIESEL	570	830.0	730	19.3 *	700	15.7 *	20.6	50	21 - 175

* = Values outside QC Range due to Matrix Interference (except RPD)
« = Data outside Method Specification limits.
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data (4TH Q '97)
(***) = Source: SPL-Houston Historical Data (4th Q '97)

Analyst: RR
Sequence Date: 02/16/98
SPL ID of sample spiked: 9802342-01B
Sample File ID: V_B3058.TXO
Method Blank File ID:
Blank Spike File ID: V_B3057.TXO
Matrix Spike File ID: V_B3059.TXO
Matrix Spike Duplicate File ID: V_B3060.TXO

SAMPLES IN BATCH(SPL ID): 9802342-01B 9802342-02B

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL BATCH QUALITY CONTROL REPORT **
Method Modified 8015B***

Batch Id: HP_T980224125910

Units: mg/kg

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Diesel	ND	166	170	102	77 - 145

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
DIESEL	ND	166.0	160	96.4	150	90.4	6.42	50	21 - 175

Analyst: RR
Sequence Date: 02/24/98
SPL ID of sample spiked: 9802684-03A
Sample File ID: T_B4062.TX0
Method Blank File ID:
Blank Spike File ID: T_B4059.TX0
Matrix Spike File ID: T_B4063.TX0
Matrix Spike Duplicate File ID: T_B4064.TX0

* = Values outside QC Range due to Matrix Interference (except RPD)
« = Data outside Method Specification limits.
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data (4TH Q '97)
(***) = Source: SPL-Houston Historical Data (4th Q '97)

SAMPLES IN BATCH(SPL ID): 9802639-05B 9802639-04B 9802639-06B 9802639-07B 9802639-01B 9802684-03A 9802639-02B 9802639-03B

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL BATCH QUALITY CONTROL REPORT **
METHOD 8020A***

Matrix: Aqueous
Units: µg/L

Batch Id: HP_U980216130700

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	50	51	102	61 - 119
Toluene	ND	50	51	102	65 - 125
EthylBenzene	ND	50	51	102	70 - 118
O Xylene	ND	50	51	102	72 - 117
M & P Xylene	ND	100	103	103	72 - 116

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
BENZENE	ND	20	15	75.0	20	100	28.6 *	21	32 - 164
TOLUENE	ND	20	15	75.0	20	100	28.6 *	20	38 - 159
ETHYLBENZENE	ND	20	15	75.0	21	105	33.3 *	19	52 - 142
O XYLENE	ND	20	15	75.0	20	100	28.6 *	18	53 - 143
M & P XYLENE	ND	40	31	77.5	42	105	30.1 *	17	53 - 144

Analyst: VHZ
Sequence Date: 02/16/98
SPL ID of sample spiked: 9802576-04B
Sample File ID: U_B3011.TXO
Method Blank File ID:
Blank Spike File ID: U_B2197.TXO
Matrix Spike File ID: U_B3043.TXO
Matrix Spike Duplicate File ID: U_B3044.TXO

* = Values outside QC Range due to Matrix Interference (except RPD)
« = Data outside Method Specification limits.
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data (1st Q '97)
(***) = Source: SPL-Houston Historical Data (1st Q '97)

SAMPLES IN BATCH(SPL ID): 9802576-04B 9802639-08A 9802605-10B 9802576-02B 9802676-09A 9802676-13A

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL BATCH QUALITY CONTROL REPORT **
METHOD 8020A***

Matrix: Soil
Units: µg/Kg

Batch Id: HP_R980217031500

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	50.0	48	96.0	60 - 116
Toluene	ND	50.0	49	98.0	64 - 122
EthylBenzene	ND	50.0	50	100	68 - 127
O Xylene	ND	50.0	51	102	68 - 127
M & P Xylene	ND	100.0	100	100	68 - 129

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
BENZENE	ND	20.0	17	85.0	17	85.0	0	33	35 - 139
TOLUENE	1.2	20.0	18	84.0	17	79.0	6.13	35	31 - 137
ETHYLBENZENE	ND	20.0	17	85.0	16	80.0	6.06	40	21 - 141
O XYLENE	ND	20.0	16	80.0	16	80.0	0	24	25 - 139
M & P XYLENE	1.3	40.0	34	81.8	32	76.8	6.31	38	19 - 144

Analyst: SB
Sequence Date: 02/17/98
SPL ID of sample spiked: 9802534-07A
Sample File ID: R_B3038.TXO
Method Blank File ID:
Blank Spike File ID: R_B3035.TXO
Matrix Spike File ID: R_B3036.TXO
Matrix Spike Duplicate File ID: R_B3037.TXO

* = Values outside QC Range due to Matrix Interference (except RPD)
« = Data outside Method Specification limits.
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data (1st Q '97)
(***) = Source: SPL-Houston Historical Data (1st Q '97)

SAMPLES IN BATCH(SPL ID): 9802639-04A 9802639-05A 9802555-01A 9802639-07A 9802707-04A 9802706-04A 9802707-01A 9802707-02A 9802671-01A 9802671-02A 9802671-03A 9802534-07A 9802534-08A 9802534-04A 9802534-06A

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL BATCH QUALITY CONTROL REPORT **
METHOD 8020A***

Matrix: Soil
Units: µg/Kg

Batch Id: HP_R980217074210

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	50	46	92.0	60 - 116
Toluene	ND	50	47	94.0	64 - 122
EthylBenzene	ND	50	48	96.0	68 - 127
O Xylene	ND	50	49	98.0	68 - 127
M & P Xylene	ND	100	98	98.0	68 - 129

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
BENZENE	ND	20	14	70.0	14	70.0	0	33	35 - 139
TOLUENE	ND	20	12	60.0	13	65.0	8.00	35	31 - 137
ETHYLBENZENE	ND	20	10	50.0	11	55.0	9.52	40	21 - 141
O XYLENE	ND	20	9.0	45.0	10	50.0	10.5	24	25 - 139
M & P XYLENE	ND	40	20	50.0	23	57.5	14.0	38	19 - 144

Analyst: SB
Sequence Date: 02/17/98
SPL ID of sample spiked: 9802740-06A
Sample File ID: R_B3067.TXO
Method Blank File ID:
Blank Spike File ID: R_B3064.TXO
Matrix Spike File ID: R_B3065.TXO
Matrix Spike Duplicate File ID: R_B3066.TXO

* = Values outside QC Range due to Matrix Interference (except RPD)
« = Data outside Method Specification limits.
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data (1st Q '97)
(***) = Source: SPL-Houston Historical Data (1st Q '97)

SAMPLES IN BATCH(SPL ID): 9802740-04A 9802740-05A 9802742-01B 9802742-02B 9802321-05A 9802639-02A 9802556-01A 9802706-01A 9802740-06A 9802740-01A 9802740-02A 9802740-03A

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL BATCH QUALITY CONTROL REPORT **
Method 8020A ***

Batch Id: HP_R980216101000

Units: ug/kg

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
MTBE	ND	50	50	100	64 - 126
Benzene	ND	50	47	94.0	60 - 116
Toluene	ND	50	48	96.0	64 - 122
EthylBenzene	ND	50	48	96.0	68 - 127
O Xylene	ND	50	48	96.0	68 - 127
M & P Xylene	ND	100	96	96.0	68 - 129

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
MTBE	ND	20	16	80.0	12	60.0	28.6 *	22	27 - 196
BENZENE	1.5	20	17	77.5	16	72.5	6.67	33	35 - 139
TOLUENE	4.1	20	20	79.5	18	69.5	13.4	35	31 - 137
ETHYLBENZENE	1.5	20	13	57.5	9.6	40.5	34.7	40	21 - 141
O XYLENE	1.6	20	12	52.0	9.3	38.5	29.8 *	24	25 - 139
M & P XYLENE	4.2	40	28	59.5	22	44.5	28.8	38	19 - 144

Analyst: SB
Sequence Date: 02/16/98
SPL ID of sample spiked: 9802534-02A
Sample File ID: R_B3011.TX0
Method Blank File ID:
Blank Spike File ID: R_B3008.TX0
Matrix Spike File ID: R_B3009.TX0
Matrix Spike Duplicate File ID: R_B3010.TX0

* = Values outside QC Range due to Matrix Interference (except RPD)
« = Data outside Method Specification limits.
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data (1st Q '97)
(***) = Source: SPL-Houston Historical Data (1st Q '97)

SAMPLES IN BATCH(SPL ID):

9802688-01A 9802688-03A 9802510-01A 9802510-03A
9802706-02A 9802707-03A 9802706-01A 9802639-03A
9802639-06A 9802688-02A 9802688-01A 9802639-01A
9802534-02A 9802553-01A 9802570-02A 9802570-03A

CHAIN OF CUSTODY

AND

SAMPLE RECEIPT CHECKLIST

SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Workorder No: 9802342

page 1 of 1

Client Name: Brown and Caldwell (713) 751-0999

Address/Phone: 1415 Louisiana #2500, Houston, TX 77002

Client Contact: K. Saravanan

Project Name: BJ-Hobbs

Project Number: 2832.34

Project Location: Hobbs, N.M.

Invoice To: R. Rexroad

SAMPLE ID	DATE	TIME	comp	grab	matrix (W=water S=soil SL=sludge O=other:)	bottle (P=plastic A=amber glass G=glass V=vial)	size (1=1 liter 4=4oz 40=vial 8=8oz 16=16oz)	pres. (1=HCl 2=HNO3 3=H2SO4 O=other:)	Number of Containers	Requested Analysis: BTEX (8020)	Requested Analysis: TPH-D (8015)
AI 24-50-51.5	2/4/98	1420		X	S	G	4	none	2	X	X
AI 23-49-50.5	2/5/98 RR	0735		X	S	G	4	↓	2	X	X

Client/Consultant Remarks: FedEx Tracking # 3008116-706879

Laboratory remarks:

Intact? ☑ Y ☐ N

Temp: 5°C

Requested TAT

24hr ☐ 72hr ☐

48hr ☐ Standard ☒

Other ☐ _____

Special Reporting Requirements: Fax Results ☒ Raw Data ☐ Standard QC ☒ Level 3 QC ☐ Level 4 QC ☐

Special Detection Limits (specify):

PM review (initial):

	date	time
1. Relinquished by Sampler: Richard Rexroad	2/6/98	1600
2. Received by:		
3. Relinquished by:	date	time
4. Received by:		
5. Relinquished by:	date	time
6. Received by Laboratory:	2/7/98	1000

☐ 8880 Interchange Drive, Houston, TX 77054 (713) 660-0901

☐ 500 Ambassador Caffery Parkway, Scott, LA 70583 (318) 237-4775

☐ 459-Hughes Drive, Traverse City, MI 49684 (616) 947-5777

☐ 1501 E. Orangethorpe Avenue, Fullerton, CA 92631 (714) 447-6868

SPL Houston Environmental Laboratory

Sample Login Checklist

Date:	Time:
2-7-98	1000

SPL Sample ID:
9802342

			Yes	No
1	Chain-of-Custody (COC) form is present.		✓	
2	COC is properly completed.		✓	
3	If no, Non-Conformance Worksheet has been completed.			
4	Custody seals are present on the shipping container.		✓	
5	If yes, custody seals are intact.		✓	
6	All samples are tagged or labeled.		✓	
7	If no, Non-Conformance Worksheet has been completed.			
8	Sample containers arrived intact		✓	
9	Temperature of samples upon arrival:		5° C	
10	Method of sample delivery to SPL:	SPL Delivery		
		Client Delivery		
		FedEx Delivery (airbill #)	808816706879	
		Other:		
11	Method of sample disposal:	SPL Disposal	✓	
		HOLD		
		Return to Client		

Name:	Date:
[signature]	2/7/98

CHAIN OF CUSTODY

AND

SAMPLE RECEIPT CHECKLIST

SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Workorder No: 98026139

page 1 of 1

Client Name: Brown and Caldwell (713) 759-0999
Address/Phone: 1415 Louisiana #2500, Houston, Tx 77002
Client Contact: K. Saravanan
Project Name: BJ - Hobbs
Project Number: 2832.34
Project Location: Hobbs, N.M.
Invoice To: R. Rexroad

SAMPLE ID	DATE	TIME	comp	grab	matrix (W=water SL=sludge S=soil O=other:)	bottle (P=plastic G=glass A=amber glass V=vial)	size (1=1 liter 4=4oz 8=8oz 40=vial 16=16oz)	pres. (1=HCl 2=HNO3 3=H2SO4 O=other:)	Number of Containers	Requested Analysis: BTEX (8020)	Requested Analysis: TPH-D (8015)
AI21-50-50.8	2-7-98	1807		X	S	G	4	none	2	X	X
AI21-53.5-54.5	2-8-98	0730		X	↓	↓	↓	↓	↓	X	X
AI21-64-65	↓	1250		X						X	X
AI20-50-51	2-9-98	0730		X						X	X
AI22-50-51	2-10-98	1738		X						X	X
VE5-50-51.5	2-12-98	0740		X						X	X
VE6-50-50.6	↓	1130		X	↓	↓	↓	↓	↓	X	X

Client/Consultant Remarks:
FedEx Tracking # 800816706916

Laboratory remarks:

Intact? ☑ Y ☐ N
Temp: 5 c

Requested TAT

24hr ☐ 72hr ☐
48hr ☐ Standard ☒
Other ☐ _____

Special Reporting Requirements: Fax Results ☒ Raw Data ☐ Standard QC ☒ Level 3 QC ☐ Level 4 QC ☐

Special Detection Limits (specify):

PM review (initial):

1. Relinquished by Sampler: Richard Rexroad	date 2/12/98	time 1500	2. Received by:
3. Relinquished by:	date	time	4. Received by:
5. Relinquished by:	date	time	6. Received by Laboratory: 2/13/98 1000

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☐ 459-Hughes Drive, Traverse City, MI 49684 (616) 947-5777
☐ 500 Ambassador Caffery Parkway, Scott, LA 70583 (318) 237-4775
☐ 1501 E. Orangethorpe Avenue, Fullerton, CA 92631 (714) 447-6868

SPL Houston Environmental Laboratory

Sample Login Checklist

Date:	Time:
2/13/98	1000

SPL Sample ID:
9802639

			Yes	No
1	Chain-of-Custody (COC) form is present.		✓	
2	COC is properly completed.		✓	
3	If no, Non-Conformance Worksheet has been completed.			
4	Custody seals are present on the shipping container.		✓	
5	If yes, custody seals are intact.		✓	
6	All samples are tagged or labeled.		✓	
7	If no, Non-Conformance Worksheet has been completed.			
8	Sample containers arrived intact		✓	
9	Temperature of samples upon arrival:		5 C	
10	Method of sample delivery to SPL:	SPL Delivery		
		Client Delivery		
		FedEx Delivery (airbill #)	800816766916	
		Other:		
11	Method of sample disposal:	SPL Disposal	✓	
		HOLD		
		Return to Client		

Name:	Date:
Arleen Gail	2/13/98

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

March 4, 1998

Mr. Rick Rexroad
BROWN AND CALDWELL
1415 Lousiana
Houston, TX 77002

The following report contains analytical results for the sample(s) received at Southern Petroleum Laboratories (SPL) on February 17, 1998. The sample(s) was assigned to Certificate of Analysis No.(s) 9802751 and analyzed for all parameters as listed on the chain of custody.

Any data flag or quality control exception associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s).

If you have any questions or comments pertaining to this data report, please do not hesitate to contact me. Please reference the above Certificate of Analysis No. during any inquiries.

Again, SPL is pleased to be of service to you. We anticipate working with you in fulfilling all your current and future analytical needs.

Southern Petroleum Laboratories

Bernadette Fini
Project Manager

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Southern Petroleum Laboratories, Inc.

Certificate of Analysis Number: 98-02-751

Approved for Release by:

Bernadette A. Fini, Project Manager — 3-4-98 Date

Greg Grandits
Laboratory Director

Idelis Williams
Quality Assurance Officer

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9802751-01

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 03/04/98

PROJECT: BJ Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: VE 7-50-51

PROJECT NO: 2832.34
MATRIX: SOIL
DATE SAMPLED: 02/13/98 07:25:00
DATE RECEIVED: 02/17/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Total Petroleum Hydrocarbons-Diesel	16	10 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	MI 176		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 02/27/98 04:19:00			
BENZENE	ND	1.0 P	µg/Kg
TOLUENE	ND	1.0 P	µg/Kg
ETHYLBENZENE	ND	1.0 P	µg/Kg
TOTAL XYLENE	ND	1.0 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	100		
4-Bromofluorobenzene	110		
Method 8020A ***			
Analyzed by: SB			
Date: 02/19/98			
Sonication Extraction of DRO by 8015A	02/18/98		
Method 3550B ***			
Analyzed by: TC			
Date: 02/18/98 08:00:00			

(P) - Practical Quantitation Limit MI - Matrix interference.
ND - Not detected.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9802751-02

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 03/04/98

PROJECT: BJ Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW 12-53.5-54.5

PROJECT NO: 2832.34
MATRIX: SOIL
DATE SAMPLED: 02/13/98 11:03:00
DATE RECEIVED: 02/17/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Total Petroleum Hydrocarbons-Diesel	ND	10 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	116		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 02/27/98 03:40:00			
BENZENE	ND	1.0 P	µg/Kg
TOLUENE	ND	1.0 P	µg/Kg
ETHYLBENZENE	ND	1.0 P	µg/Kg
TOTAL XYLENE	ND	1.0 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	100		
4-Bromofluorobenzene	113		
Method 8020A ***			
Analyzed by: SB			
Date: 02/19/98			
Sonication Extraction of DRO by 8015A	02/18/98		
Method 3550B ***			
Analyzed by: TC			
Date: 02/18/98 08:00:00			

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
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HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9802751-03

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 03/04/98

PROJECT: BJ Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW 11A-53.5-54.25

PROJECT NO: 2832.34
MATRIX: SOIL
DATE SAMPLED: 02/14/98 10:30:00
DATE RECEIVED: 02/17/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Total Petroleum Hydrocarbons-Diesel	14	10 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	MI 136		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 02/27/98 03:01:00			
BENZENE	ND	1.0 P	µg/Kg
TOLUENE	ND	1.0 P	µg/Kg
ETHYLBENZENE	ND	1.0 P	µg/Kg
TOTAL XYLENE	ND	1.0 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	103		
4-Bromofluorobenzene	110		
Method 8020A ***			
Analyzed by: SB			
Date: 02/19/98			
Sonication Extraction of DRO by 8015A	02/18/98		
Method 3550B ***			
Analyzed by: TC			
Date: 02/18/98 08:00:00			

(P) - Practical Quantitation Limit MI - Matrix interference.
ND - Not detected.

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9802751-04

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 03/04/98

PROJECT: BJ Hobbs
SITE: Hobbs, NM
SAMPLED BY: Provided By SPL
SAMPLE ID: Trip Blank 1/30/98

PROJECT NO: 2832.34
MATRIX: WATER
DATE SAMPLED: 02/14/98
DATE RECEIVED: 02/17/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1.0 P	µg/L
TOLUENE	ND	1.0 P	µg/L
ETHYLBENZENE	ND	1.0 P	µg/L
TOTAL XYLENE	ND	1.0 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		µg/L

Surrogate	% Recovery
1,4-Difluorobenzene	97
4-Bromofluorobenzene	97

Method 8020A ***
Analyzed by: VHZ
Date: 02/19/98

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

QUALITY CONTROL

DOCUMENTATION

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL BATCH QUALITY CONTROL REPORT **

State of Tennessee Method for Diesel

Batch Id: HP_V980218074100

Units: mg/kg

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Diesel	ND	166	158.67	95.6	77 - 145

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
DIESEL	ND	166	216.09	17.3 *	1536.59	813 *	192 *	50	21 - 175

Analyst: RR

Sequence Date: 02/18/98

SPL ID of sample spiked: 9802770-05A

Sample File ID: V_B3114.TX0

Method Blank File ID:

Blank Spike File ID: V_B3109.TX0

Matrix Spike File ID: V_B3115.TX0

Matrix Spike Duplicate File ID: V_B3116.TX0

* = Values outside QC Range due to Matrix Interference (except RPD)

« = Data outside Method Specification limits.

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

% Recovery = [(<1> - <2>) / <3>] x 100

LCS % Recovery = (<1> / <3>) x 100

Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100

(**) = Source: SPL Historical Limits 1st Qtr'97

(***) = Source: SPL Historical Limits 1st Qtr'97

SAMPLES IN BATCH(SPL ID):

9802682-07A 9802682-01A 9802682-03A 9802682-08A
9802682-09A 9802682-10A 9802682-11A 9802751-03A
9802751-02A 9802751-01A 9802770-05A 9802682-02A
9802682-04A 9802682-05A 9802682-06A

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL BATCH QUALITY CONTROL REPORT **
Method 8020A ***

Batch Id: HP_R980219184700

Units: ug/kg

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
MTBE	ND	50	44	88.0	64 - 126
Benzene	ND	50	46	92.0	60 - 116
Toluene	ND	50	49	98.0	64 - 122
EthylBenzene	ND	50	50	100	68 - 127
O Xylene	ND	50	51	102	68 - 127
M & P Xylene	ND	100	100	100	68 - 129

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
MTBE	30	20	50	100	39	45.0	75.9 *	22	27 - 196
BENZENE	1.0	20	17	80.0	17	80.0	0	33	35 - 139
TOLUENE	ND	20	17	85.0	17	85.0	0	35	31 - 137
ETHYLBENZENE	ND	20	19	95.0	22	110	14.6	40	21 - 141
O XYLENE	ND	20	20	100	19	95.0	5.13	24	25 - 139
M & P XYLENE	1.5	40	41	98.8	39	93.8	5.19	38	19 - 144

Analyst: SB
Sequence Date: 02/19/98
SPL ID of sample spiked: 9802753-12A
Sample File ID: R_B3149.TX0
Method Blank File ID:
Blank Spike File ID: R_B3146.TX0
Matrix Spike File ID: R_B3147.TX0
Matrix Spike Duplicate File ID: R_B3148.TX0

* = Values outside QC Range due to Matrix Interference (except RPD)
« = Data outside Method Specification limits.
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data (1st Q '97)
(***) = Source: SPL-Houston Historical Data (1st Q '97)

SAMPLES IN BATCH(SPL ID):

9802751-03A 9802841-02A 9802750-01A 9802570-01A
9802841-03A 9802841-04A 9802841-05A 9802841-06A
9802753-06A 9802753-08A 9802753-10A 9802753-12A
9802750-03A 9802751-01A 9802751-02A

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL BATCH QUALITY CONTROL REPORT **

METHOD 8020

Batch Id: HP_U980218220700

Units: µg/L

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	50.0	40	80.0	61 - 119
Toluene	ND	50.0	41	82.0	65 - 125
EthylBenzene	ND	50.0	41	82.0	70 - 118
O Xylene	ND	50.0	41	82.0	72 - 117
M & P Xylene	ND	100.0	83	83.0	72 - 116

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
BENZENE	ND	20	20	100	19	95.0	5.13	21	32 - 164
TOLUENE	ND	20	20	100	18	90.0	10.5	20	38 - 159
ETHYLBENZENE	ND	20	20	100	18	90.0	10.5	19	52 - 142
O XYLENE	ND	20	20	100	18	90.0	10.5	18	53 - 143
M & P XYLENE	ND	40	38	95.0	33	82.5	14.1	17	53 - 144

Analyst: VHZ
Sequence Date: 02/18/98
SPL ID of sample spiked: 9802833-06A
Sample File ID: U_B3097.TX0
Method Blank File ID:
Blank Spike File ID: U_B3094.TX0
Matrix Spike File ID: U_B3095.TX0
Matrix Spike Duplicate File ID: U_B3096.TX0

* = Values outside QC Range due to Matrix Interference (except RPD)
« = Data outside Method Specification limits.
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data (1st Q '97)
(***) = Source: SPL-Houston Historical Data (1st Q '97)

SAMPLES IN BATCH(SPL ID):

9802833-02A 9802833-03A 9802833-04A 9802833-05A
9802751-04A 9802718-04A 9802718-02A 9802718-03A
9802396-01A 9802803-01A 9802833-06A 9802849-04A
9802849-05A 9802833-01A

CHAIN OF CUSTODY

AND

SAMPLE RECEIPT CHECKLIST

SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Workorder No: 9802751

page 1 of 1

Client Name: Brown and Caldwell (713) 759-0999
Address/Phone: 1415 Louisiana #2500, Houston, TX 77002
Client Contact: K. Saravanan
Project Name: BJ - Hobbs
Project Number: 2832.34
Project Location: Hobbs, N.M.
Invoice To: R. Rexroad

matrix: W=water SL=sludge S=soil O=other:
bottle: P=plastic G=glass A=amber glass V=vial
size: 1=1 liter 4=4oz 8=8oz 16=16oz 40=vial
pres.: 1=HCl 2=HNO3 3=H2SO4 O=other:

SAMPLE ID	DATE	TIME	comp	grab	matrix	bottle	size	pres.	Number of Containers	Requested Analysis: BTEX (8020)	Requested Analysis: TPH-D (8015)
VE 7-50-51	2-13-98	0725		X	S	G	4	none	2	X	X
MW 12-53.5-54.5	↓	1103		X	↓	↓	↓	↓	2	X	X
MW11A-53.5-54.25	2-14-98	1030		X	↓	↓	↓	↓	2	X	X

Client/Consultant Remarks:
FedEx Tracking # 800816706880

Laboratory remarks:

Intact? ☑ Y ☐ N
Temp: 3°C

Requested TAT

24hr ☐ 72hr ☐
48hr ☐ Standard ☒
Other ☐ _____

Special Reporting Requirements: Fax Results ☒ Raw Data ☐ Standard QC ☒ Level 3 QC ☐ Level 4 QC ☐

Special Detection Limits (specify):

PM review (initial):

	date	time	
1. Relinquished by Sampler: Richard Rexroad	2-16-98	1200	2. Received by:
3. Relinquished by:	date	time	4. Received by:
5. Relinquished by:	date 2-17-98	time 1000	6. Received by Laboratory:

☐ 8880 Interchange Drive, Houston, TX 77054 (713) 660-0901
☐ 459-Hughes Drive, Traverse City, MI 49684 (616) 947-5777
☐ 500 Ambassador Caffery Parkway, Scott, LA 70583 (318) 237-4775
☐ 1501 E. Orangethorpe Avenue, Fullerton, CA 92631 (714) 447-6868

SPL Houston Environmental Laboratory

Sample Login Checklist

Date:	Time:
2-17-98	1230

SPL Sample ID:
9802751

			Yes	No
1	Chain-of-Custody (COC) form is present.		✓	
2	COC is properly completed.		✓	
3	If no, Non-Conformance Worksheet has been completed.			
4	Custody seals are present on the shipping container.		✓	
5	If yes, custody seals are intact.		✓	
6	All samples are tagged or labeled.		✓	
7	If no, Non-Conformance Worksheet has been completed.			
8	Sample containers arrived intact		✓	
9	Temperature of samples upon arrival:		3° C	
10	Method of sample delivery to SPL:	SPL Delivery		
		Client Delivery		
		FedEx Delivery (airbill #)	800816706880	
		Other:		
11	Method of sample disposal:	SPL Disposal	✓	
		HOLD		
		Return to Client		

Name:	Date:
[signature]	2-17-98