GW - 72

MONITORING REPORTS

DATE: 1999

BROWN AND CALDWELL

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TRANSMITTAL MEMORANDUM

To: Mr. Wayne Price State of New Mexico Energy, Minerals, and Natural Resources Dept. Oil Conservation Division 2040 South Pacheco Street, State Land Office Bldg. Santa Fe, New Mexico 87505	Date: October 14 , 1999	Job No: 12832.014
	Subject: BJ Services – Hobbs, New Mexico	
	Contract No.:	
	Equipment No:	
	Spec. Ref: **Certified # P 076 598 832**	
	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:
- ☐ Second submittal
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- ☐ For review and comment
- ☐ 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	10/1/99	12832.014	Final June/July 1999 Groundwater Sampling Report Hobbs, New Mexico Facility BJ Services Company, U.S.A.

REMARKS:

cc: Mr. Chris Williams, State of New Mexico (**Certified # P 076 598 920**)
Ms. Jo Ann Cobb, BJ Services (Houston)
Mr. Roger Sullivan, BJ Services (Hobbs)
Brown and Caldwell Project File
Transmittal File w/o attachments
Client File w/o attachments

Richard L. Rexroad

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BROWN AND CALDWELL

JUNE/JULY 1999 GROUNDWATER SAMPLING REPORT HOBBS, NEW MEXICO FACILITY

BJ SERVICES COMPANY, U.S.A.

SEPTEMBER 29, 1999

JUNE/JULY 1999 GROUNDWATER SAMPLING REPORT
HOBBS, NEW MEXICO FACILITY
BJ SERVICES COMPANY, U.S.A.

Prepared for

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BC Project Number: 12832.014

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1.0 INTRODUCTION

Brown and Caldwell conducted field activities associated with the June 1999 quarterly groundwater sampling event at the BJ Services Company, U.S.A. (BJ Services) facility located at 2708 West County Road in Hobbs, New Mexico on June 10, 1999. Brown and Caldwell conducted additional field activities during the period of June 28 – July 2, 1999 pursuant to the work plan for groundwater delineation submitted to the New Mexico Oil Conservation Division (NMOCD) on March 19, 1999 and approved by the NMOCD on May 19, 1999. Pertinent regulatory correspondence is included in Appendix A. This report presents a summary of the groundwater sampling event, a description of the groundwater delineation field activities, and a summary of the analytical results.

The facility formerly operated an above-grade on-site fueling system. The facility layout is shown in Figure 1. Subsurface impact near a diesel fueling system was first detected by the 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 concentration of hydrocarbon constituents in 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.

Groundwater samples collected from existing monitor wells at the facility in June 1999 were analyzed for the quarterly monitoring constituents specified in NMOCD GW-072. Two wells were installed at the facility in June/July 1999. Groundwater samples from these wells, and an existing off-site well that had not previously been included in the quarterly sampling program for the BJ Services Hobbs, New Mexico facility, were analyzed for the New Mexico Water Quality Control Commission (WQCC) constituents. Samples from selected wells were also analyzed for dissolved methane/ethylene/ethane, sulfate, and nitrate to evaluate the potential for natural attenuation of

hydrocarbons at the facility. Three existing monitor wells were plugged and abandoned in June/July 1999, as directed by NMOCD.

2.0 FIELD ACTIVITIES AND RESULTS

On June 10, 1999, Brown and Caldwell purged and sampled existing groundwater monitor wells at and adjacent to the BJ Services Hobbs facility to determine concentrations of dissolved-phase hydrocarbons in groundwater. Brown and Caldwell also sampled an existing off-site well, OW-4, for the first time on June 10, 1999. Sampling of well OW-4 was performed in accordance with the work plan for groundwater delineation approved by the NMOCD on May 19, 1999 (see Appendix A). The locations of these wells are shown in the site map presented as Figure 1.

On June 29 – July 2, 1999, Brown and Caldwell installed, developed, and sampled two monitor wells at the BJ Services facility in accordance with the previously referenced NMOCD-approved work plan for groundwater delineation. The locations of these wells, MW-12D and MW-13, are also shown in Figure 1. Three existing monitor wells (MW-2, MW-6, and MW-11) were located, plugged and abandoned (P&Ad) during the period of June 28 – July 1, 1999, as directed by NMOCD. These wells were not sampled prior to being P&Ad.

The following subsections describe the activities conducted by Brown and Caldwell at the BJ Services Hobbs facility in June/July 1999 and present the results of the groundwater analyses.

2.1 Monitor Well Installation Activities

Brown and Caldwell installed two on-site monitor wells at the BJ Services Hobbs facility in late June and early July 1999 in accordance with the NMOCD-approved work plan included within Appendix A.

Monitor well MW-12D was installed at a location immediately east of monitor well MW-12 in order to evaluate possible vertical gradients in dissolved-phase constituent concentrations. Monitor well MW-13 was installed at a location to the northeast of monitor well MW-6 in order to investigate potential groundwater impact downgradient of the easternmost lateral of the biosparging system.

The monitor well borings were completed using hollow stem auger drilling techniques. Soil cuttings were classified in accordance with the Unified Soil Classification System. The boring logs and well construction diagrams for monitor wells MW-12D and MW-13 are presented in Appendix B. The soil borings were completed as monitor wells.

Monitor well MW-12D was constructed with 10 feet of well screen. In accordance with the NMOCD-approved work plan, the screen in monitor well MW-12D was set at a depth of approximately 20 feet to 30 feet below the observed top of the saturated zone at the MW-12/12D location. The top of the saturated zone in monitor well MW-12 was measured at a depth of 57.5 feet below ground surface (bgs) prior to drilling the MW-12D boring, so well MW-12D was screened at a depth of 77.5 feet to 87.5 feet bgs. Monitor well MW-12 is screened at a depth of 50 feet to 65 feet bgs. The screens in adjacent monitor wells MW-12 and MW-12D were set at different depths to facilitate evaluation of possible vertical gradients in constituent concentrations.

Monitor well MW-13 was constructed with 15 feet of well screen. Prior to initiating drilling operations, the top of the saturated zone at the MW-13 location was anticipated to be at approximately 56 feet bgs based on water level measurements in nearby wells. The screen in monitor well MW-13 was set such that approximately 5 feet of well screen was situated above the top of the water table and approximately 10 feet of well screen was situated below the top of the water table. Straddling of the observed top of the saturated zone was performed to ensure that the top of the saturated zone is within the screened interval of the well throughout seasonal fluctuations of the water table. The screened interval in monitor well MW-13 is from 51 feet to 66 feet bgs.

Monitor wells MW-12D and MW-13 were equipped with a 2-foot sediment sump and a sealing bottom cap. The total depth of monitor well MW-12D was measured at 88.57 feet below the top of casing of the well. The total depth of monitor well MW-13 was measured at 66.35 feet below the top of casing of the well. Two-inch diameter 0.010-inch machine-slotted well screen and 2-inch diameter Schedule 40 PVC riser pipe were used in the construction of both of the monitor wells. The top of the riser pipe extended to approximately 6 inches below existing grade in both of the monitor wells.

The annular area surrounding the wells was backfilled as follows:

- 20/40 grade filter sand was installed from the total depth of the boring to approximately 2 feet above the top of the well screen;
- A hydrated bentonite seal ranging in thickness from 21 feet in monitor well MW-12D to 2 feet in monitor well MW-13 was installed atop the sand filter; and
- The remainder of the annular area was backfilled with cement/bentonite grout using a tremie pipe.

The wells were equipped with a water-tight cap and were completed as flush-mount completions. Monitor well MW-12D was constructed with a 4-foot by 4-foot by 3-inch thick concrete pad sloping away from the well and surrounded by four bumper posts.

Monitor well MW-13 was drilled through the concrete floor of the facility's acid dock drum storage area. An approximate 2-foot by 2-foot square was cut around the well. The top of the protective steel well vault was set approximately 2 inches above the concrete floor of the drum storage area. Concrete was added to the annular area between the PVC riser pipe and the protective steel well vault. The annular area between the well vault and the floor of the drum storage area was filled with reinforced cement. The surface of the concrete was sloped from the exterior of the protective steel well vault to the concrete floor of the drum storage area.

The wells were developed by surging and bailing. Water from monitor well MW-12D was essentially free of suspended sediment after removal of approximately 65 gallons of water. Monitor well MW-13 was developed for a period in excess of 1 hour. After removal of approximately 20 gallons, water produced from well MW-13 was of low to moderate turbidity upon completion of development activities.

The elevation of the top of the PVC casing in each of the wells was determined relative to an existing on-site monitor well using field surveying techniques.

Soil cuttings generated during the installation of monitor wells MW-12D and MW-13 were separately containerized in 55-gallon drums that were stored at the acid dock drum storage area pending laboratory analysis of representative soil samples and evaluation of disposal options.

2.2 Plugging and Abandonment Activities

Flush-mounted monitor wells MW-2 and MW-11 had been covered during grading operations conducted at the facility and had not been sampled since January 1994 and September 1997, respectively. These wells were located using a Schoenstadt magnetometer, which reacted to the protective steel well vaults and steel covers of these wells.

Monitor wells MW-2, MW-6, and MW-11 were plugged and abandoned by pumping a cement/bentonite grout mixture from the total depths of the wells to the ground surface.

2.3 Groundwater Measurements and Sampling

Existing monitor wells MW-1, MW-3, MW-4, MW-5, MW-7, MW-8, MW-9, MW-10, MW-11A, MW-12, and OW-4 were sampled on the June 10, 1999. New monitor wells MW-12D and MW-13 were sampled on July 2, 1999. A site map depicting the locations of the monitor wells is presented as Figure 1.

Groundwater level measurements were obtained from the monitor wells prior to purging and sampling the wells. 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-northeast with a hydraulic gradient of approximately 0.006 foot/foot (ft/ft). A potentiometric surface map is presented in Figure 2.

Groundwater samples were collected after purging the wells to remove at least three well volumes of groundwater. A submersible pump was used during purging operations conducted on June 10,

1999. Monitor wells MW-12D and MW-13 were purged with a dedicated disposable bailer on July 2, 1999. Field parameter measurements for pH, conductivity, oxidation-reduction (redox) potential, dissolved oxygen (DO), and temperature were collected after each well volume was purged. In addition to using these parameters as indicators of stability of produced groundwater, they are also important for evaluating the potential for natural attenuation of dissolved phase hydrocarbons at the facility. Ferrous iron and alkalinity were also measured during the purging and sampling activities to assess natural attenuation potential.

The field parameter readings were recorded in the field log book and are listed on the groundwater sampling forms included in Appendix C. The field screening results for groundwater samples are presented on Table 3.

Groundwater samples obtained on June 10, 1999 were collected directly after completion of purging operations through the submersible pump discharge. Groundwater samples from monitor wells MW-12D and MW-13 were collected with a dedicated disposable bailer upon 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. Purge water generated from existing monitor wells was discharged to the on-site water reclamation system for re-use for other purposes by BJ Services. Development and purge water from new monitor wells MW-12D and MW-13 was containerized in 55-gallon drums that were stored at the acid dock drum storage are pending laboratory analysis of water from these wells and evaluation of disposal options. Excess water generated during equipment cleaning operations was discharged to the on-site water reclamation system for re-use for other purposes by BJ Services.

2.4 Results of Groundwater Analyses

Groundwater samples collected during this sampling event from existing monitor wells MW-1, MW-3, MW-4, MW-5, MW-7, MW-8, MW-9, MW-10, MW-11A, and MW-12 were analyzed for diesel- and gasoline-range total petroleum hydrocarbons (TPH-D and TPH-G) by EPA Method 8015 Modified and for benzene, toluene, ethylbenzene, and xylene (BTEX) by EPA Method 8021B. Monitor wells OW-4, MW-12D, and MW-13 had not previously been sampled as part of the quarterly sampling program for the BJ Services Hobbs facility. Groundwater samples from these wells were therefore analyzed for the following constituents:

- Volatile organic compounds (VOCs) by EPA Method 8260;
- Semivolatile organic compounds (SVOCs) by EPA Method 8270;
- Polynuclear aromatic hydrocarbons (PAHs) by EPA Method 8310;
- RCRA metals using the EPA 3010A/6010B/7000 Series methodology;
- Major anions (chloride by Method 325.3; fluoride by Method 300.0; nitrate (as N) by Methods 300.0 and 353.3; and sulfate by Methods 300.0 and 375.4);
- Major cations (calcium, magnesium, potassium, and sodium by Method 6010B);
- Carbonate (as $CaCO_3$) and bicarbonate (as $CaCO_3$) by Method SM 4500-CO2D; and
- Dissolved methane/ethylene/ethane by Method RSK/SOP 147.

Four additional monitor wells (MW-5, MW-10, MW-11A and MW-12) were sampled for methane/ethylene/ethane, nitrate, and sulfate to evaluate natural attenuation processes.

The laboratory analytical reports and chain-of-custody records for the groundwater samples collected during the June/July 1999 field activities are included in Appendix D. It should be noted that monitor well OW-4 was designated as well OSW-4 in the pertinent analytical report and chain-of-custody record presented in Appendix D.

Current and cumulative analytical results for BTEX, TPH-D, and TPH-G are presented in Table 4. Current and cumulative analytical results for groundwater quality parameters as well as detected VOCs, SVOCs, PAHs and RCRA metals are presented in Table 5. The analytical results for

nitrate, sulfate, and dissolved methane analyses performed on groundwater samples from monitor wells MW-5, MW-10, MW-11A, MW-12, MW-12D, MW-13, and OW-4 to evaluate natural attenuation processes are presented in Table 6.

BTEX constituent concentrations in excess of applicable laboratory detection limits were reported in eight of the 13 groundwater samples collected during this sampling event. Benzene concentrations were below the New Mexico WQCC standard of 0.01 milligrams per liter (mg/L) in all monitor wells except MW-10, MW-12, and MW-13. Figure 3 presents a benzene isoconcentration and total BTEX distribution map for the June/July 1999 sampling event.

Benzene concentrations in monitor wells MW-1, MW-3, and MW-4, which are located near the former source area, have continued to decrease since the modification of the biosparging system in February/March 1998. Benzene has not been detected in monitor well MW-1 since September 1998. Benzene concentrations in the off-site monitor well, MW-9, have not exceeded 0.01 mg/L since March 1997.

The decrease in benzene concentration from 0.049 mg/L in monitor well MW-12 (screened at a depth of 50 feet to 65 feet bgs) to less than 0.005 mg/L in monitor well MW-12D (screened at a depth of 77.5 feet to 87.5 feet bgs) suggests that benzene impact to groundwater, where present, is limited vertically within the aquifer.

Benzene concentrations in MW-6 decreased substantially following the startup of the biosparging system in March 1995, but were been erratic after December 1996. Monitor well MW-6 was located immediately adjacent to (i.e., within approximately 5 feet east of) a subsequently installed biosparging system air injection/extraction well, AV-17. Monitor well MW-6 was therefore P&Ad in July 1999 and was replaced by monitor well MW-13, which is located approximately 30 feet east of MW-6. Benzene was detected at a concentration of 1.5 mg/L in a groundwater sample collected from monitor well MW-13 on July 2, 1999. Application of increased air flow to biosparging system Lateral No. 1, located upgradient of MW-13, is therefore recommended.

A total petroleum hydrocarbon distribution map for the June/July 1999 sampling event is presented in Figure 4.

Chloride was detected at a concentration of 496 mg/L in monitor well MW-13 and at a concentration of 266 mg/L in well OW-4. Both of these detections exceed the New Mexico WQCC chloride standard of 250 mg/L, which applies to domestic water supply wells. Chloride data from this sampling event and the preceding March 1999 sampling event were used to construct the chloride isoconcentration map presented as Figure 5. The data presented in Figure 5 indicate that there was an apparent source of chloride impact to groundwater associated with the former field waste tanks that were removed in March 1997. Chloride impact to groundwater is also present in the monitor well MW-6/MW-13 area and in the vicinity of monitor well MW-8. The chloride concentrations of 314 mg/L in monitor well MW-12 and 266 mg/L in well OW-4 indicate the presence of a decreasing chloride concentration gradient in an eastward direction, suggesting that chloride impact at concentrations exceeding the New Mexico WQCC chloride standard of 250 mg/L is limited in a downgradient direction. The decrease in chloride concentration from 314 mg/L in monitor well MW-12 (screened at a depth of 50 feet to 65 feet bgs) to 195 mg/L in monitor well MW-12D (screened at a depth of 77.5 feet to 87.5 feet bgs) indicates that chloride impact is limited vertically within the aquifer. Therefore, no further investigation into the occurrence of chloride in groundwater in the vicinity of the facility is recommended.

The New Mexico WQCC fluoride standard of 1.6 mg/L was exceeded in wells MW-12D, MW-13, and OW-4 during the June/July 1999 sampling event.

Naphthalene was detected at a concentration of 0.034 mg/L in the groundwater sample collected from monitor well MW-13 on July 2, 1999. This detection is slightly in excess of the New Mexico WQCC standard of 0.03 mg/L for PAHs, expressed as total naphthalene plus monomethylnaphthalenes. Naphthalene is the only PAH constituent detected during the groundwater monitoring history of the facility. Wells located downgradient of well MW-13 displayed naphthalene concentrations of 0.006 mg/L (monitor well MW-10), 0.019 mg/L (well

MW-12), 0.006 mg/L (well MW-12D), and less than 0.001 mg/L (wells MW-11 and OW-4) during this or the preceding March 1999 groundwater sampling events. This data indicates that the extent of PAH impact in excess of the New Mexico WQCC standard is limited in a downgradient direction and that naphthalene concentrations decrease with depth within the uppermost aquifer at the facility.

There were no other constituents detected at concentrations in excess of applicable New Mexico WQCC standards during the June/July 1999 groundwater sampling event.

2.5 Natural Attenuation Evaluation

Natural attenuation is planned to be the primary remediation mechanism for the plume located in the area of the former field waste tanks (see Figure 1).

The primary evidence of natural attenuation is plume behavior. Natural attenuation of hydrocarbons is occurring at a rate greater than hydrocarbon loading from the source area when a hydrocarbon plume is decreasing in size or concentration. Conversely, increases in size or hydrocarbon concentrations of a plume indicate that rates of hydrocarbon loading exceed the natural attenuation capacity in the area. Concentrations of total dissolved-phase BTEX stabilized at concentrations generally less than 100 mg/L subsequent to removal of the field waste tanks in March 1997. Dissolved-phase BTEX concentrations in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12 have displayed continuous decreases from September 1998 to the present.

Secondary evidence of natural attenuation can be obtained by the collection and evaluation of data relating to the concentrations of indigenous electron acceptors such as dissolved oxygen, nitrate, ferric iron, sulfate, and carbon dioxide. The following lines of geochemical evidence suggest that intrinsic bioremediation (an important natural attenuation mechanism) of dissolved-phase hydrocarbons is occurring in the area of the former field waste tanks:

1. Dissolved oxygen (DO) is utilized during intrinsic bioremediation. DO concentrations should therefore be depressed in areas where intrinsic bioremediation is occurring.

   DO concentrations measured in monitor wells MW-10, MW-11A, and MW-12 are depressed relative to background. DO concentrations in these wells ranged from 0.32 mg/L to 0.74 mg/L (see Table 3). These concentrations are less than the DO concentrations ranging from 1.66 mg/L to 6.30 mg/L measured in monitor wells MW-5, MW-7, and MW-8, which are upgradient or cross-gradient wells believed to exhibit background conditions.

   The concentration of BTEX constituents in downgradient well OW-4 is substantially less than the BTEX concentrations measured in monitor wells MW-10, MW-11A, and MW-12. The only BTEX constituent detected in well OW-4 was xylene, at a concentration of 0.0044 mg/L. The DO concentration in well OW-4 is 6.42 mg/L, which is comparable to background DO concentrations.

   No BTEX constituents were detected in monitor well 12D, where the DO concentration of 4.00 mg/L is comparable to background DO concentrations.

   The observed concentrations of DO at the facility therefore provide secondary evidence that natural attenuation of hydrocarbons is occurring at the facility.

2. Nitrate may be utilized as an electron acceptor during intrinsic bioremediation after dissolved oxygen is depleted. Therefore, nitrate concentrations may be depressed in areas where intrinsic bioremediation is occurring.

   Nitrate concentrations were measured at less than 0.1 mg/L in monitor wells MW-10, MW-11A, and MW-12. These concentrations are less than the background nitrate concentration of 4.73 mg/L measured in monitor well MW-5 (see Table 6). The depletion of nitrate in monitor wells MW-10, MW-11A and MW-12 provides secondary evidence that natural attenuation of hydrocarbons is occurring at the facility.

   The nitrate concentration of 2.1 mg/L in monitor well MW-12D is depressed relative to background, but is higher than the nitrate concentration (< 0.1 mg/L) in adjacent monitor well MW-12. BTEX constituents were detected at a concentration of 50.4 ug/L in MW-12, which is screened in the uppermost portion of the aquifer, but were not detected in MW-12D, which is screened in a deeper portion of the aquifer. The correlation between increased BTEX concentration and depletion of nitrate in the monitor well MW-12/MW-12D area also provides secondary evidence that natural attenuation of hydrocarbons is occurring at the facility.

   BTEX constituents were detected at a very low concentration of 0.0044 mg/L in well OW-4. The nitrate concentration of 3.96 mg/L in OW-4 is comparable to the nitrate concentration of 4.73 mg/L observed in background well MW-5. The correlation between low BTEX concentration observed in well OW-4 and nitrate concentration at or near

background also suggests that natural attenuation of hydrocarbons is occurring at the facility.

3. When DO and nitrate are depleted, anaerobic microbes that 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. Ferrous iron was measured at concentrations ranging from 1.5 mg/L to 5 mg/L in monitor wells MW-10, MW-11A, MW-12, MW-12D, MW-13, and OW-4 (see Table 3). Ferrous iron was not detected in any other monitor wells at the facility.

   The elevated ferrous iron concentration in monitor wells MW-10, MW-11A, and MW-12 provides evidence that natural attenuation of hydrocarbons is occurring at the former field waste tanks area.

   Ferrous iron was detected at a concentration of 2 mg/L in groundwater from monitor well MW-12 and at a concentration of 1.4 mg/L in groundwater from monitor well MW-12D. The elevated concentration of ferrous iron in the upper portion of the aquifer, where BTEX constituents are present, relative to lower in the aquifer, where no BTEX constituents were detected, also suggests that ferric iron is acting as an electron acceptor during natural attenuation of hydrocarbons at the facility.

   The presence of ferrous iron in monitor well MW-13 suggests that ferric iron may be serving as an electron acceptor during the biodegradation of hydrocarbons downgradient of the former fuel island area.

4. Redox is a measure of chemical energy in groundwater. Redox values in the vicinity of background wells MW-5, MW-7, and MW-8 ranged from 34.2 millivolts (mV) to 83.1 mV (see Table 3). Redox values in the vicinity of former field waste tanks area wells MW-10, MW-11A, and MW-12 ranged from –127.3mV to –152.5 mV. The negative redox values in monitor wells MW-10, MW-11A and MW-12 indicate that electron acceptors other than dissolved oxygen (e.g., nitrate and ferric iron) are being utilized in these areas.

5. 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 dissolved oxygen, nitrate, and ferric iron has occurred.

   The concentrations of methane are elevated in former field waste tanks area wells MW-10 and MW-11A relative to the methane concentrations in background well MW-5 and downgradient well OW-4 (see Table 6), suggesting that utilization of carbon dioxide may be occurring locally in the area of the former field waste tanks.

6. Fatty acids are formed as hydrocarbons degrade. These fatty acids may dissolve carbonates in saturated zone soils, causing alkalinity to increase where biodegradation is

occurring. The alkalinity data generated during the June/July 1999 groundwater sampling event may also provide evidence that natural attenuation of hydrocarbons is occurring. The three wells that displayed the highest benzene concentrations (MW-13, MW-10, and MW-12) displayed elevated alkalinity levels relative to all wells at the facility except monitor well MW-7.

Sulfate data presented in Table 6 displays no discernable trend, indicating that sulfate in not being utilized during intrinsic bioremediation.

Therefore, DO, nitrate, and ferric iron are supplying adequate electron acceptors to facilitate natural attenuation. In addition, carbon dioxide may be acting as an electron acceptor in the vicinity of monitor wells MW-10 and MW-11A, as indicated by elevated dissolved methane concentrations.

It is recommended that monitoring for natural attenuation evaluation parameters continue in the former field waste tanks area.

3

3.0 REMEDIATION SYSTEM

Brown and Caldwell submitted a Remedial Action Plan (RAP) to the NMOCD 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 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 contaminants. The flushing of air also strips volatile and semivolatile contaminants.

3.1 System Installation and Effectiveness

The NMOCD approved the RAP on August 11, 1994. Installation activities for the biosparging system were conducted August 2 through 24, 1995. Nineteen combined injection and extraction wells, three vacuum extraction wells, associated piping, 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 plume associated with the former fueling system. 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 that area. 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.

Benzene, TPH, and total BTEX concentrations measured in monitor well MW-1 during the June/July 1999 groundwater sampling event display declines relative to concentrations of these parameters prior to installation of injection wells AI-20 through AI-24 in February 1998. Benzene concentrations dropped from 7.6 mg/L in December 1997 to less than 0.001 mg/L during the December 1998, March 1999 and June/July 1999 sampling events. Total BTEX concentrations have dropped from 30.6 mg/L to 0.029 mg/L between December 1997 and June/July 1999. TPH concentrations decreased from 82 mg/L to 1.08 mg/L during this time period.

Benzene concentrations have decreased from 0.240 mg/L to 0.0017 mg/L in monitor well MW-3 and from 0.230 mg/L to less than 0.001 mg/L in monitor well MW-4 between December 1997 and June/July 1999. Similarly, total BTEX concentrations have decreased from 1.930 mg/L to 0.0408 mg/L in monitor well MW-3 and from 4.250 mg/L to 0.024 mg/L in monitor well MW-4 between December 1997 and June/July 1999. TPH concentrations in monitor well MW-3 dropped from 5.89 mg/L to 0.18 mg/L during this time period. These decreases are attributable to increased air flow being applied to the aquifer through air injection wells AI-20 through AI-24.

A graph showing the calculated dissolved-phase benzene mass in the western plume versus time is presented in Figure 6. The western plume is located in the area of monitor wells MW-1, MW-3, MW-4, and MW-13. This graph shows that the plume mass was increasing up until December 1995, when the biosparging system was installed. This increase was probably due to benzene loading to groundwater from vadose zone soils. The benzene mass then decreased steadily after installation of the biosparging system. The plume mass has continued to decrease since the system modifications were implemented in February 1998. This indicates that the system modifications have been effective in increasing benzene removal from groundwater in the center of the former western plume area.

Benzene and total BTEX concentrations remain elevated in the downgradient portion of the western plume, however, as indicated by the data for monitor wells MW-6 and MW-13 presented in Table 4. Decreased hydrocarbon concentrations were observed in the central portion of the western plume after installation of deep injection wells AI-20 through AI-24 in February 1998, but there have been no deep injection wells installed in the downgradient area of the western plume. Well construction details for the air injection portion of air injection/extraction wells AV-16 through AV-19 that comprise Lateral No.1, located at in the downgradient area of the western plume, are as follows:

Well	Screened Interval (ft below grade)	Screened Interval (ft MSL)	Filter Pack (ft below grade)	Filter Pack (ft MSL)
AV-16	58.8	3585.4	55.5	3588.7
AV-17	58	3586.2	55.7	3588.5
AV-18	58	3586.2	52.2	3592.0
AV-19	57.9	3586.3	53.2	3591.0

At the time of the installation of the biosparging system in November 1995, the depth to groundwater in monitor wells MW-1, MW-6, MW-7, and MW-8, which are located in the vicinity of air injection/extraction wells AV-16 through AV-19, ranged from approximately 51.2 to 52.0 feet below grade (i.e., 3593.07 to 3593.84 feet above mean sea level). The depths of submergence of wells AV-16 through AV-19 therefore ranged from approximately 0.5 to 3.0 feet below the top of the saturated at the time that these wells were installed. Groundwater elevations have declined since November 1995, however, as indicated graphically in Figure 7. Based on data from monitor wells MW-1, MW-6, MW-7, and MW-8 collected on July 2, 1999 (see Table 2), the current depths of submergence of wells AV-16 through AV-19 range from approximately 2.9 feet above to 0.6 feet below the top of the saturated zone. Therefore, in addition to increasing air flow to Lateral No. 1, Brown and Caldwell recommends that air flow to wells AV-18 and AV-19 be shut off, and that all of the air directed to Lateral No.1 be injected through wells AV-16 and AV-17.

3.2 Air Emissions

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 was 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 rate 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. 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/July 1999 sampling event was 140 parts per million by volume (ppmv).

The TPH concentration of 140 ppmv measured during the June/July 1999 sampling event shows a substantial drop from the 1500 ppmv TPH discharge rate observed during the March 24, 1998 groundwater sampling event. The June/July 1999 TPH discharge rate of 140 ppmv is comparable to TPH concentrations measured during the time period from August 1996 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 August 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. However, discharge rates have returned to more typical levels during the period from June 1998 through June/July 1999.

The VOC emissions rate calculated for the June/July 1999 groundwater sampling event was 0.12 pound per hour (lb/hour). This emission rate is below the regulatory limit of 10 lb/hour for VOCs. The June 1999 VOC emissions rate is typical of VOC emissions rates during the time period of August 1996 through December 1997, and represents a substantial drop from the 1.91 lb/hour VOC emissions rate calculated for the March 1998 sampling event. Discharge rates have varied between 0.11 lb/hour and 0.33 lb/hour during the time period of June 1998 through June/July 1999.

A cumulative summary of analytical results for air emissions monitoring is included in Table 7. These results are based on both laboratory and field analyses.

The initial increase in mass transfer rates after system modification was indicative of increased stripping of hydrocarbons within soil and groundwater from pathways that were not in contact with injected air prior to system modification. The subsequent decrease in mass transfer, in concert with plume mass calculations shown in Figure 6, indicate that the overall contaminant mass has been reduced by operation of the biosparging system.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on information obtained during the June/July 1999 groundwater sampling event at the BJ Services Hobbs, New Mexico facility.

4.1 Conclusions

- Groundwater flow was to the east-northeast at an average hydraulic gradient of 0.006 ft/ft.
- Dissolved benzene, BTEX, and TPH concentrations in monitor wells MW-1, MW-3 and MW-4, which are located at the former fueling system area, continue to decline since installation of deep injection wells AI-20 through AI-24 in February 1998.
- Benzene concentrations in all monitor wells at the facility except MW-10, MW-12, and MW-13 are below the New Mexico WQCC standard of 0.01 mg/L for benzene.
- Impact to groundwater by chloride at concentrations in excess of the New Mexico WQCC chloride standard of 250 mg/L appears to be limited in a downgradient direction.
- No BTEX or TPH constituents were detected in monitor well MW-12D, which is screened at a depth of approximately 20 to 30 feet below the top of the uppermost aquifer at the facility. The chloride concentration in MW-12D is less than the New Mexico WQCC standard of 250 mg/L. Comparison of this data to BTEX, TPH, and chloride concentrations in adjacent monitor well MW-12, which is screened in the uppermost portion of the aquifer, suggests that hydrocarbon and chloride impact to groundwater, where present at the facility, is limited to the uppermost portion of the aquifer.
- Natural attenuation processes appear to be operating to reduce hydrocarbon concentrations in monitor wells MW-10 and MW-12, which are located in the vicinity of the former field waste tanks that were removed in March 1997.

4.2 Recommendations

- Adjust the air injection rate to the easternmost lateral of the biosparging system in order to increase remedial pressure in the recalcitrant area of the west plume in the vicinity of monitor well MW-13, with air flow directed to wells AV-16 and AV-17 only.
- 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 monitoring for natural attenuation parameters in monitor wells MW-5, MW-10, MW-11A, MW-12, MW-12D, and OW-4.

DISTRIBUTION

June/July 1999 Groundwater Sampling Report
BJ Services Company, U.S.A.
Hobbs, New Mexico

September 29, 1999

1 copy to: State of New Mexico
Energy, Minerals, and Natural Resources Dept.
Oil Conservation Division
2040 South Pacheco Street, State Land Office Building
Santa Fe, New Mexico 87505

Attention: Mr. Wayne Price

1 copy to: State of New Mexico
Oil Conservation Division, Hobbs District Office
Post Office Box 1980
Hobbs, New Mexico 88240

Attention: Mr. Chris Williams

1 copy to: BJ Services Company, U.S.A.
8701 New Trails Drive
The Woodlands, Texas 77381

Attention: Ms. Jo Ann Cobb

1 copy to: BJ Services Company, U.S.A.
2708 West County Road
Hobbs, New Mexico 88240

Attention: Mr. Roger Sullivan

1 copy to: Brown and Caldwell, Project File

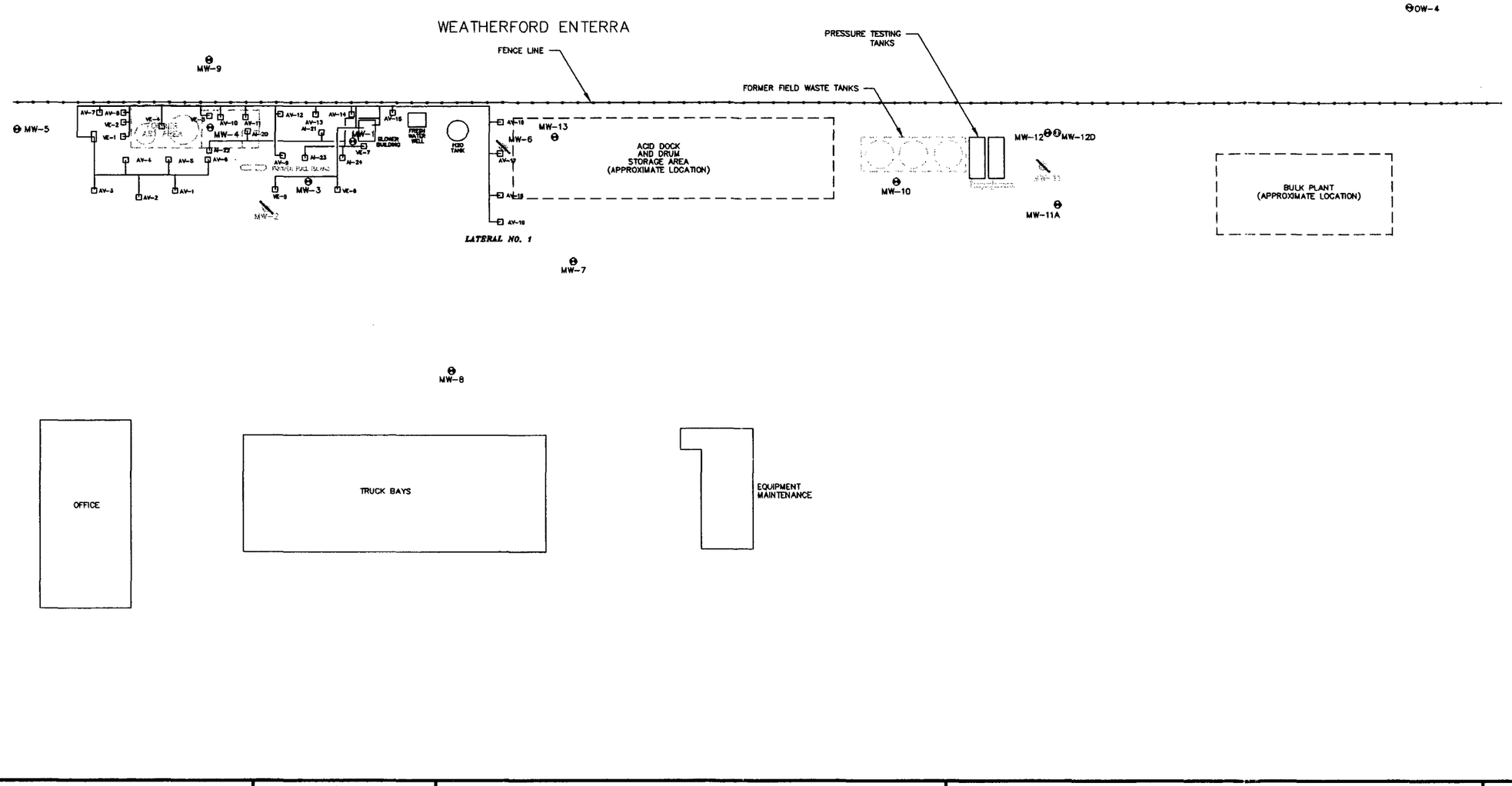
QUALITY CONTROL REVIEWER

Robert N. Jennings, P.E.
Vice President

RLR/uak/srd

Figures

FIGURES



P:\12832\PMWLocations.dwg 03-16-99 CLK

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

0 30 60
SCALE: 1" = 60'

DRAWN BY: ____ DATE ____
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

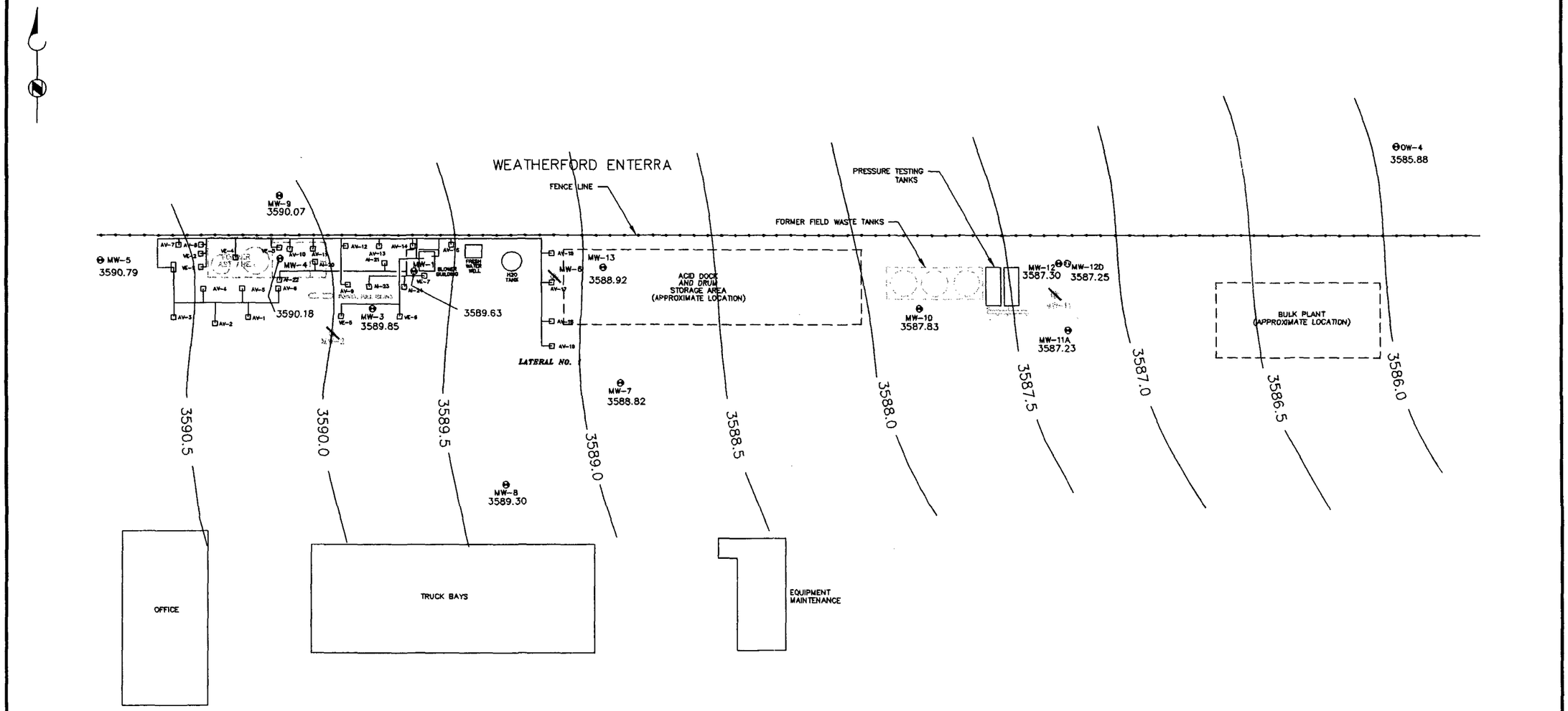
LEGEND

MW-3 EXISTING MONITOR WELL LOCATION

BIOSPARGING SYSTEM

MW-2 MONITOR WELL (PLUGGED AND ABANDONED)

TITLE: SITE MAP	DATE: 03/16/99
CLIENT: BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER: 12832.021
SITE: HOBBS, NEW MEXICO	FIGURE NUMBER: 1



P:\cad\jobs\12832\GroundwaterElevationMap.dwg 07-22-99 CLK

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

0 30 60
SCALE: 1" = 60'
DRAWN BY: ____ DATE ____
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

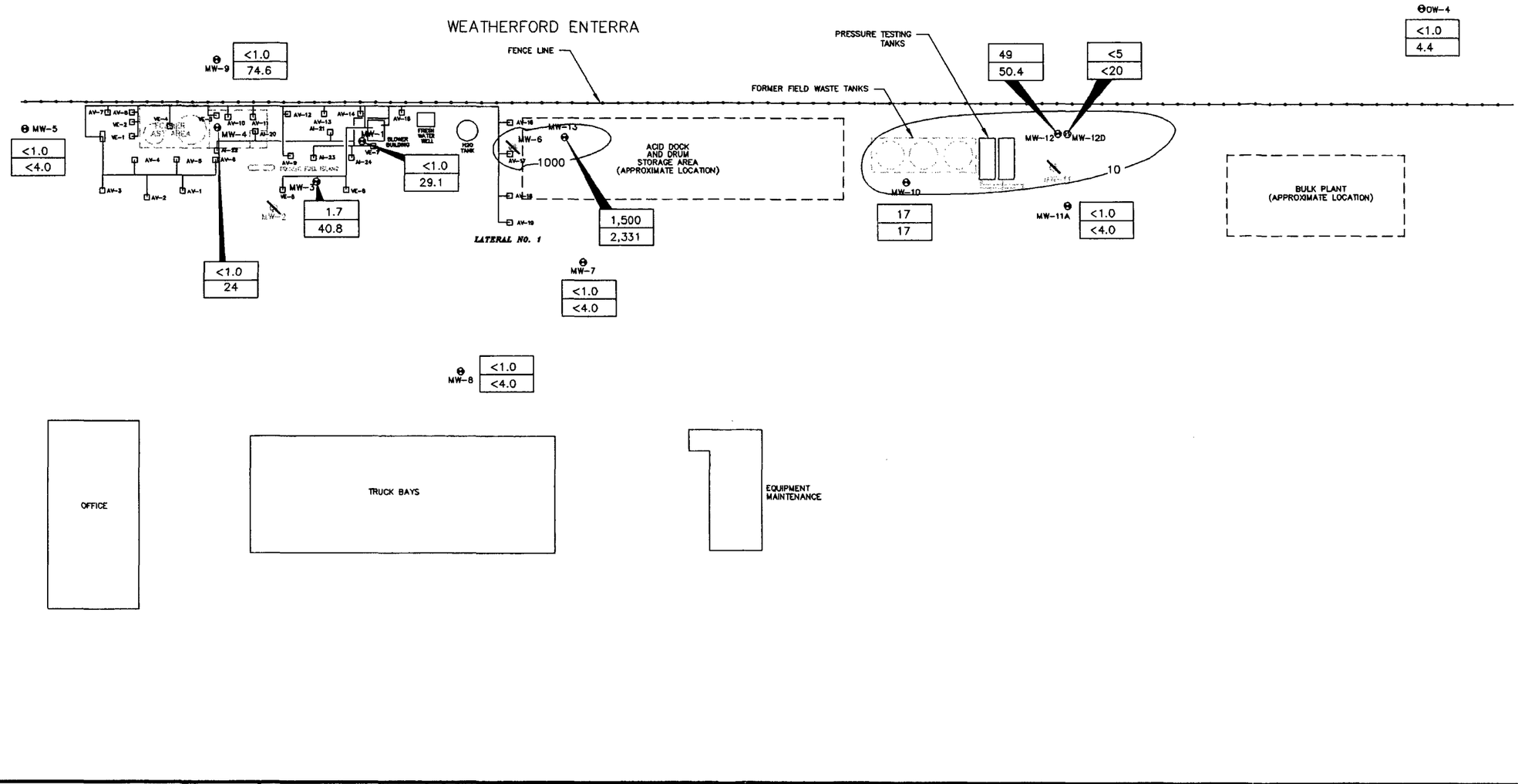
LEGEND

3589.30
MW-3 MONITOR WELL LOCATION WITH GROUNDWATER ELEVATION (feet AMSL)

BIOSPARGING SYSTEM

MW-2 MONITOR WELL (PLUGGED AND ABANDONED)

TITLE: GROUNDWATER ELEVATION MAP FOR JULY 2, 1999	DATE: 07/22/99
CLIENT: BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER: 12832.021
SITE: HOBBS, NEW MEXICO	FIGURE NUMBER: 2



P:\cad\jobs\12832\Benzene.dwg 07-07-99 CLK

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

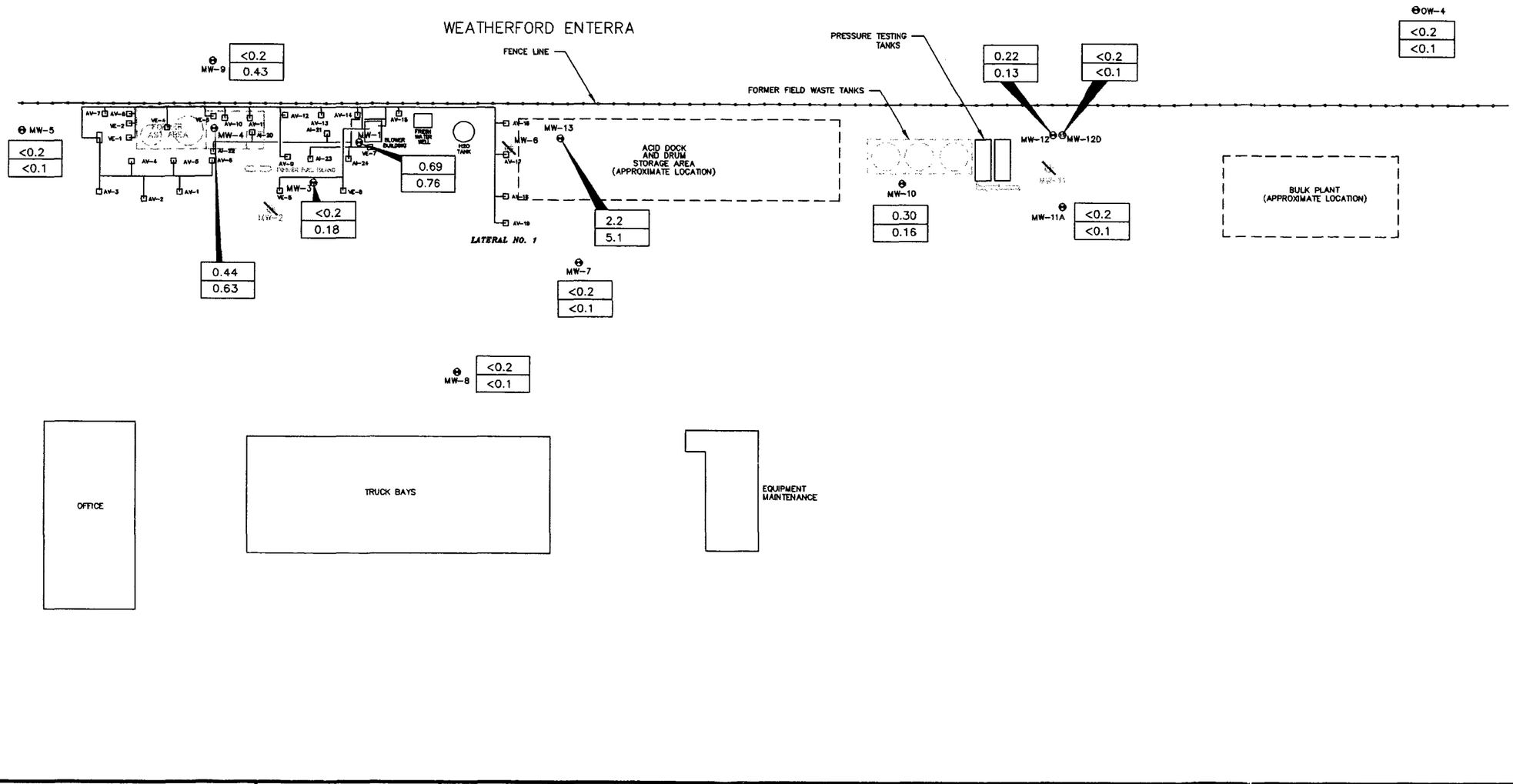
APPROVED: _____ DATE: _____
BROWN AND CALDWELL

0 30 60
SCALE: 1" = 60'
DRAWN BY: ____ DATE ____
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

LEGEND

MW-3 EXISTING MONITOR WELL LOCATION
MW-2 MONITOR WELL (PLUGGED AND ABANDONED)
<1.0 – BENZENE CONCENTRATION (ug/L)
<4.0 – TOTAL BTEX CONCENTRATION (ug/L)
BIOSPARGING SYSTEM
10 – BENZENE ISOCONCENTRATION CONTOUR (ug/L)

TITLE	BENZENE ISOCONCENTRATION AND TOTAL BTEX DISTRIBUTION MAP FOR JUNE 10/JULY 2, 1999
CLIENT	BJ SERVICES COMPANY, U.S.A.
SITE	HOBBS, NEW MEXICO
DATE	07/07/99
PROJECT NUMBER	12832.014
FIGURE NUMBER	3



P:\cad\jobs\12832\TotalPetroleumHydrocarbons.dwg 07-22-99 CLK

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

0 30 60
SCALE: 1" = 60'

DRAWN BY: ____ DATE ____
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

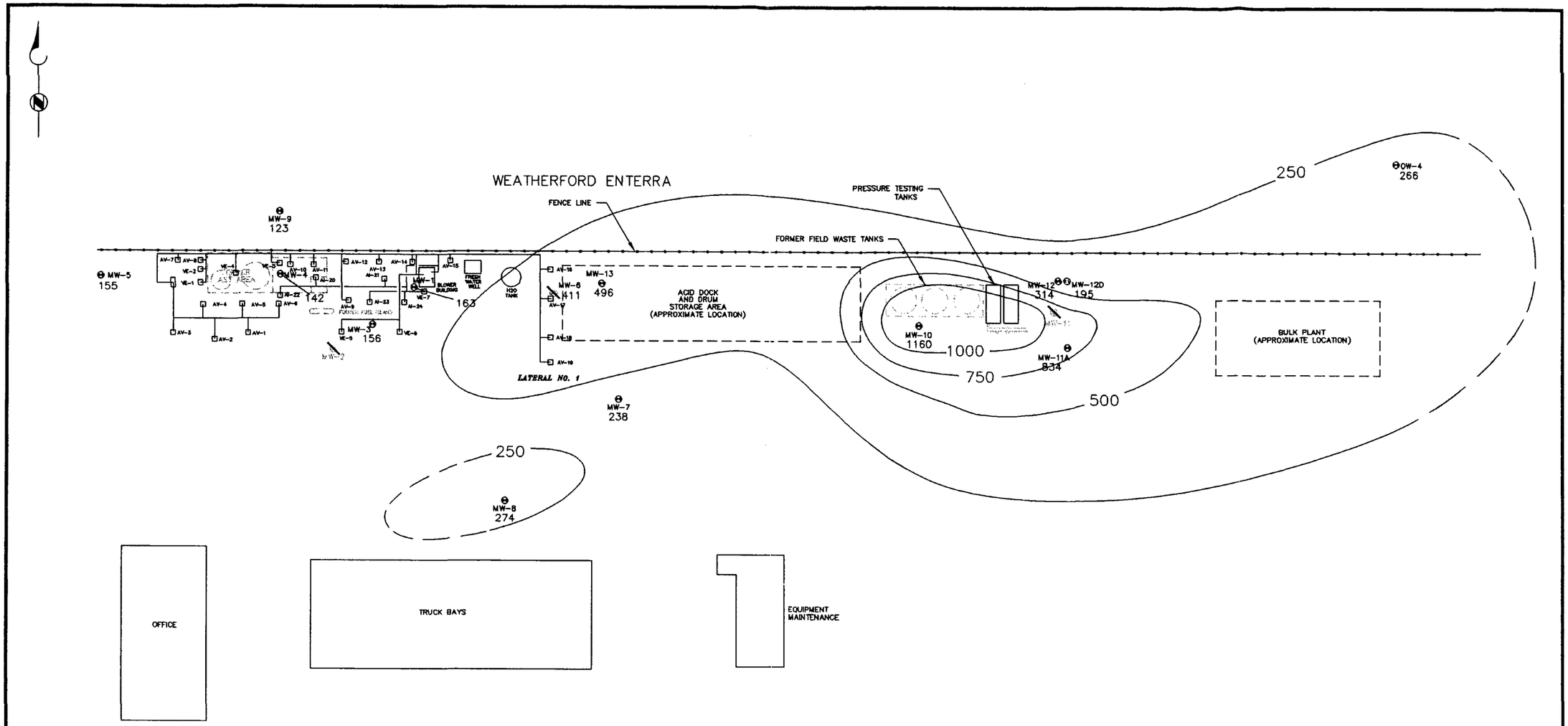
LEGEND

MW-3 / MW-2 — EXISTING MONITOR WELL LOCATION / MONITOR WELL (PLUGGED AND ABANDONED)

BIOSPARGING SYSTEM

<0.2 — TPH-D CONCENTRATION (mg/L)
<0.1 — TPH-G CONCENTRATION (mg/L)

TITLE	TOTAL PETROLEUM HYDROCARBONS DISTRIBUTION MAP FOR JUNE 10/JULY 2, 1999
DATE	07/22/99
CLIENT	BJ SERVICES COMPANY, U.S.A.
PROJECT NUMBER	12832.014
SITE	HOBBS, NEW MEXICO
FIGURE NUMBER	4



DATA FOR WELL OW-4 COLLECTED 6/10/99; DATA FOR WELLS MW-12D AND MW-13 COLLECTED 7/2/99; DATA FOR OTHER WELLS COLLECTED 3/9-10/99.

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

0 30 60
SCALE: 1" = 60'

DRAWN BY: ____ DATE ____
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

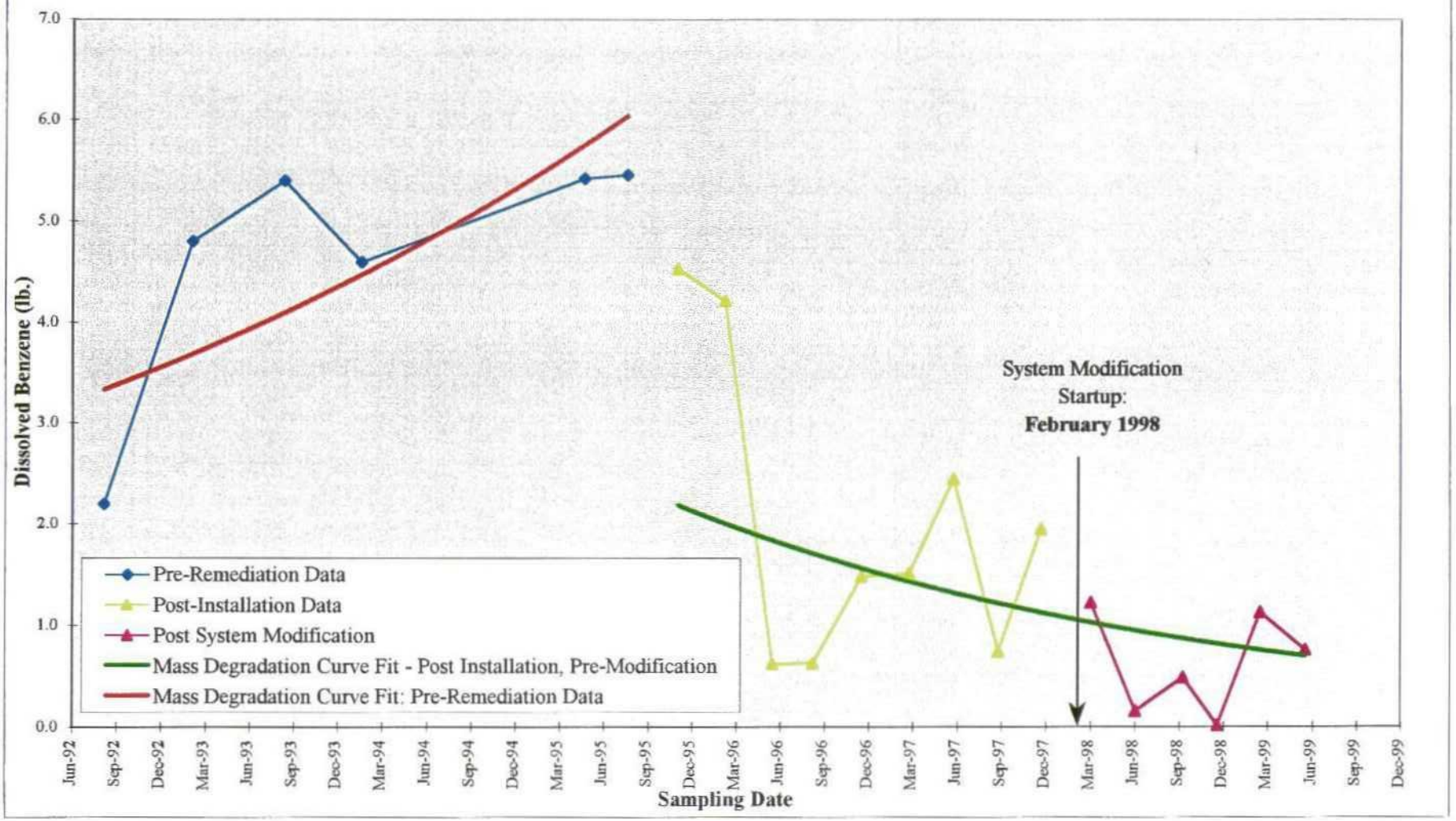
LEGEND

MW-3 156 / MW-2 — EXISTING MONITOR WELL LOCATION WITH CHLORIDE CONCENTRATION (mg/L)
MONITOR WELL (PLUGGED AND ABANDONED)
CONTOUR INTERVAL = 250 mg/L
BIOSPARGING SYSTEM
250 — CHLORIDE ISOCONCENTRATION CONTOUR (mg/L)

TITLE	CHLORIDE ISOCONCENTRATION MAP
CLIENT	BJ SERVICES COMPANY, U.S.A.
SITE	HOBBS, NEW MEXICO
DATE	07/23/99
PROJECT NUMBER	12832.014
FIGURE NUMBER	5

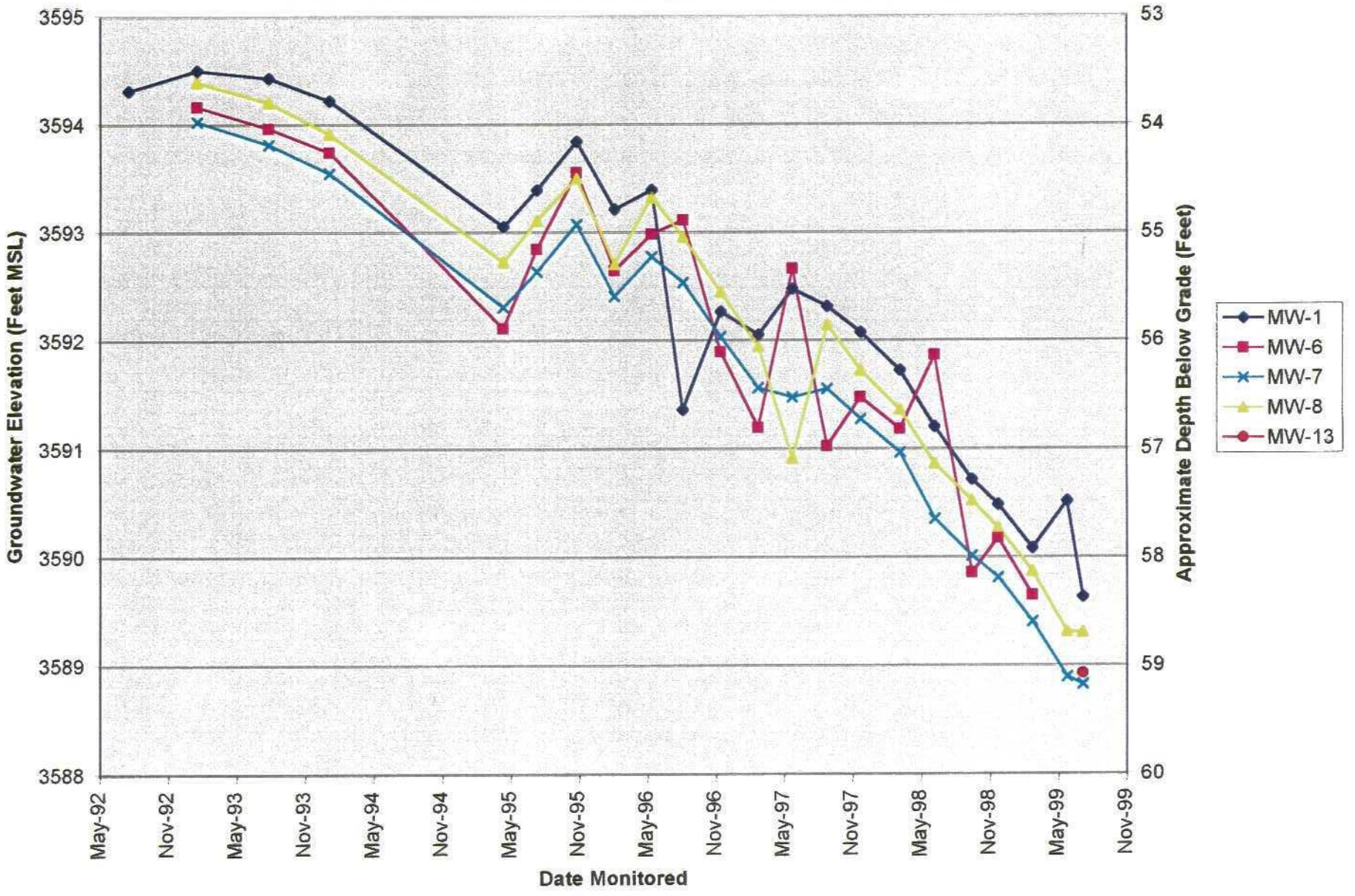
P:\cad\jobs\12832\Chloride.dwg 07-07-99 CLK

FIGURE 6
Dissolved Benzene Mass vs. Time
West Plume
BJ Services - Hobbs, New Mexico



g:\2832-hob\03-99.xls

Figure 7
Groundwater Elevation & Depth to Groundwater vs. Time



p:\gen\bjserv\2832-hobbs\task-14\GroundwateElev.xls Figure 7

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 6-7, 1997	BJ Services removed the field waste tank and associated hydrocarbon impacted soil.
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.
September 30, 1998	Brown and Caldwell conducted the September 1998 groundwater sampling event.
December 9-10, 1998	Brown and Caldwell conducted the December 1998 groundwater sampling event.
January 21, 1999	NMOCD requested submittal of a work plan by March 22, 1999 to perform additional groundwater delineation in the area of the former field waste tanks and the former AST/MW-6 area.

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

Date	Activity
March 9-10, 1999	Brown and Caldwell conducted the March 1999 groundwater sampling event.
March 19, 1999	Brown and Caldwell submitted the work plan for groundwater delineation activities that was requested on January 22, 1999 to NMOCD..
May 19, 1999	NMOCD approved the groundwater delineation work plan.
June10, 1999	Brown and Caldwell performed sampling of existing monitor wells for the June /July 1999 groundwater sampling event.
July 2, 1999	Brown and Caldwell completed plugging and abandonment of monitor wells MW-2, MW-6, and MW-11 as well as installation, development, and sampling of monitor wells MW-12D and MW-13.

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	
	3,647.53	9/30/98	56.82	0.00	3,590.71	PSH Sheen
	3,647.53	12/9/98	57.05	0.00	3,590.48	
	3,647.53	3/10/99	57.45	0.00	3,590.08	
	3,647.53	6/10/99	58.02	0.00	3,589.51	
	3,647.53	7/2/99	57.90	0.00	3,589.63	
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)

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-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	
	3,645.00	9/30/98	54.06	0.00	3,590.94	
	3,645.00	12/9/98	54.36	0.00	3,590.64	
	3,645.00	3/10/99	54.72	0.00	3,590.28	
	3,645.00	6/10/99	55.17	0.00	3,589.83	
	3,645.00	7/2/99	55.15	0.00	3,589.85	

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	
	3,645.28	9/30/98	53.96	0.00	3,591.32	200 ml PSH
	3,645.28	12/9/98	54.27	0.00	3,591.01	
	3,645.28	3/10/99	54.69	0.04	3,590.62	
	3,645.28	6/10/99	55.07	0.00	3,590.21	
	3,645.28	7/2/99	55.10	0.00	3,590.18	

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-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	
	3,647.72	9/30/98	55.65	0.00	3,592.07	
	3,647.72	12/9/98	56.00	0.00	3,591.72	
	3,647.72	3/9/99	56.45	0.00	3,591.27	
	3,647.72	6/10/99	56.91	0.00	3,590.81	
	3,647.72	7/2/99	56.93	0.00	3,590.79	
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	
	3,644.74	9/30/98	54.89	0.00	3,589.85	
	3,644.74	12/9/98	54.57	0.00	3,590.17	
	3,644.74	3/10/99	55.10	0.00	3,589.64	

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-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	
	3,644.55	9/30/98	54.54	0.00	3,590.01	
	3,644.55	12/9/98	54.74	0.00	3,589.81	
	3,644.55	3/9/99	55.15	0.00	3,589.40	
	3,644.55	6/10/99	55.66	0.00	3,588.89	
	3,644.55	7/2/99	55.73	0.00	3,588.82	

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	
	3,644.87	9/30/98	54.35	0.00	3,590.52	
	3,644.87	12/9/98	54.60	0.00	3,590.27	
	3,644.87	3/9/99	55.00	0.00	3,589.87	
	3,644.87	6/10/99	55.56	0.00	3,589.31	
	3,644.87	7/2/99	55.57	0.00	3,589.30	

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-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
	3,644.78	9/30/98	53.39	0.01	3,591.40	PSH Sheen
	3,644.78	12/9/98	53.68	0.00	3,591.10	
	3,644.78	3/10/99	54.15	0.00	3,590.63	
	3,644.78	6/10/99	54.68	0.00	3,590.10	
	3,644.78	7/2/99	54.71	0.00	3,590.07	

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	
	3,644.47	9/30/98	55.61	0.00	3,588.86	
	3,644.47	12/9/98	55.80	0.00	3,588.67	
	3,644.47	3/9/99	56.09	0.00	3,588.38	
	3,644.47	6/10/99	56.60	0.00	3,587.87	
	3,644.47	7/2/99	56.64	0.00	3,587.83	
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	
	3,644.24	9/30/98	55.96	0.00	3,588.28	
	3,644.24	12/9/98	56.13	0.00	3,588.11	
	3,644.24	3/10/99	56.43	0.00	3,587.81	
	3,644.24	6/10/99	56.94	0.00	3,587.30	
	3,644.24	7/2/99	57.01	0.00	3,587.23	

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-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	
	3,644.29	9/30/98	56.02	0.00	3,588.27	
	3,644.29	12/9/98	56.17	0.00	3,588.12	
	3,644.29	3/10/99	56.45	0.00	3,587.84	
	3,644.29	6/10/99	56.97	0.00	3,587.32	
	3,644.29	7/2/99	56.99	0.00	3,587.30	
MW-12D						
	3,644.38	7/2/99	57.13	0.00	3,587.25	
MW-13						
	3,645.52	7/2/99	56.60	0.00	3,588.92	
OW-4						
	3,644.06	7/2/99	58.18	0.00	3,585.88	

(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	6/10/99	0	7.58	24.60	969.0	102.9	3.20	NM	NM
		1	7.42	22.96	999.0	107	1.75	NM	NM
		2	7.29	21.08	967.0	104.9	1.19	NM	NM
		3	7.32	20.60	946.0	100.6	0.71	0	160
MW-3	06/10/99	0	7.59	24.32	1330.0	-48.2	3.55	NM	NM
		1	7.02	21.70	1206.0	-16.3	1.80	NM	NM
		2	6.98	21.96	1184.0	-1.8	1.66	NM	NM
		3	6.97	22.51	1194.0	3	1.51	0	340
MW-4	06/10/99	0	7.68	26.21	1094.0	18.4	4.70	NM	NM
		1	7.18	21.41	965.0	-8.2	2.11	NM	NM
		2	7.1	22.01	964.0	6.2	1.34	NM	NM
		3	7.12	22.27	985.0	16.7	0.75	0	240
MW-5	06/10/99	0	8.07	22.38	1150	33.7	4.21	NM	NM
		1	7.60	20.99	1199	49.7	7.11	NM	NM
		2	7.31	20.60	1174	72.1	6.56	NM	NM
		3	7.20	20.19	1140	83.1	6.30	0	280
MW-7	06/10/99	0	7.95	26.81	1726	1.4	6.17	NM	NM
		1	7.3	22.86	1544	43.0	1.66	NM	NM
		2	NM	NM	NM	NM	NM	NM	NM
		3	NM	NM	NM	NM	NM	0	770
MW-8	06/10/99	0	7.85	25.48	1009	13.2	4.38	NM	NM
		1	8.03	23.83	1368	20.6	3.11	NM	NM
		2	7.59	25.19	1440	34.2	1.85	0	300
		3	D	D	D	D	D	NM	NM
MW-9	06/10/99	0	7.56	24.49	1178.0	3.8	3.88	NM	NM
		1	7.16	23.6	1125.0	49.8	3.13	NM	NM
		2	7.09	23.81	1139.0	66.1	2.75	NM	NM
		3	7.08	23.86	1138.0	69.4	1.91	0	320
MW-10	06/10/99	0	7.75	27.51	2671	-104.9	2.10	NM	NM
		1	7.01	24.48	2801	-109.6	1.71	NM	NM
		2	6.9	23.46	2519	-119.3	1.10	NM	NM
		3	6.9	22.58	2303	-150.7	0.56	2.0	770
MW-11A	06/10/99	0	7.03	22.99	2626	-102.2	1.61	NM	NM
		1	6.88	21.5	2618	-104.3	0.86	NM	NM
		2	6.79	21.41	2852	-115.7	0.47	NM	NM
		3	6.8	21.37	3085	-123.9	0.32	5	380
MW-12	06/10/99	0	7.26	24.05	1415	-146.6	1.62	NM	NM
		1	7.11	22.93	1407	-156.5	0.96	NM	NM
		2	7.05	23.27	1417	-157.8	0.75	NM	NM
		3	6.98	23.52	1551	-153.8	0.74	2	770
MW-12D	07/02/99	1	7.57	21.32	1255	-330.6	4.12	NM	NM
		2	7.62	21.46	1266	-359.6	4.60	NM	NM
		3	7.56	20.11	1220	-442.5	4.00	1.4	385
MW-13	07/02/99	1	7.25	19.47	2150	-324.8	3.17	NM	NM
		2	7.25	19.57	2084	-303.4	3.72	NM	NM
		3	7.24	19.40	2074	-320.2	3.67	3.6	770
OW-4	06/10/99	0	7.65	23.97	1494.00	25.50	7.25	NM	NM
		1	6.81	21.63	1491.00	96.50	6.52	NM	NM
		2	6.76	20.90	1445.00	111.10	6.45	NM	NM
		3	6.76	20.74	1436.00	114.60	6.42	2.00	280

MW-2 not operative after January 1994; P&A'd 7/1/99.

MW-6 P&A'd 7/1/99.

MW-11 not operative after September 1997; P&A'd 7/1/99.

NM=Not Measured

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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
	09/30/98	Regular	3.2	90	280	970	2.5	3.6
	12/10/98	Regular	<1.0	1.5	17	110	1.4	0.31
	03/10/99	Regular	<1.0	<1.0	8.2	110	0.62	0.85
	03/10/99	Duplicate	<1.0	<1.0	7.9	110	0.66	0.84
	06/10/99	Regular	<1.0	1.1	<1.0	28	0.53	0.55
	06/10/99	Duplicate	<1.0	1.8	<1.0	41	0.69	0.76
MW-2 [1]								
	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
	09/30/98	Regular	42	470	450	530	1.0	3.8
	12/10/98	Regular	13	220	160	290	1.3	0.43
	03/10/99	Regular	3.2	7.4	42	32	0.2	0.44
	06/10/99	Regular	1.7	3.1	<1.0	36	<0.20	0.18

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								
	8/10/92	Regular	2594	10360	2160	6740	NA	NA
	2/9/93	Regular	5200	15000	2200	10000	NA	NA
	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
	09/30/98	Regular	80	180	370	840	2.0	3.9
	12/10/98	Regular	28	70	210	960	9.3	4.3
	12/10/98	Duplicate	26	62	180	830	3.9	4.3
	03/10/99	Regular	8	20	250	1400	13.0	13
	06/10/99	Regular	<1.0	<1.0	12	12	0.44	0.63
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
	09/30/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	03/09/99	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	<0.1
	06/10/99	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	<0.1
MW-6 [1]								
	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
	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

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	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
	09/30/98	Regular	1000	420	140	270	4.0	3.3
	12/10/98	Regular	7.6	6.6	1.7	5.8	2.0	< 0.1
	03/10/99	Regular	2500	930	590	1400	11.0	13
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
	09/30/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	03/09/99	Regular	<1.0	<1.0	<1.0	<1.0	4.7	< 0.1
	06/10/99	Regular	<1.0	<1.0	<1.0	<1.0	< 0.20	< 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
	3/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	6/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	09/30/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	03/09/99	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	<0.1
	06/10/99	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	<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

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-9	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
	09/30/98	Regular	1.1	5.5	21	59	0.27	0.27
	12/10/98	Regular	< 1.0	1.9	17	79	5.1	0.25
	03/10/99	Regular	<1.0	<1.0	5.7	68	<0.2	0.22
	06/10/99	Regular	<1.0	1.8	1.8	71	<0.20	0.43
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
	09/30/98	Regular	84	3.2	30	2.2	1.4	0.36
	12/10/98	Regular	29	1.0	7.0	1.0	0.86	0.18
	03/09/99	Regular	28	<5.0	5.8	<5.0	0.92	<0.5
	06/10/99	Regular	17	<1.0	<1.0	<1.0	0.30	0.16
MW-11 [1]								
	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

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 [1]	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
	09/30/98	Regular	9.3	3.7	2.2	7.0	<0.20	0.1
	12/10/98	Regular	1.7	<1.0	<1.0	<1.0	<0.20	<0.1
	03/10/99	Regular	<5	<5	<5	<5	0.3	<0.5
	06/10/99	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	<0.10
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
	09/30/98	Regular	260	3.0	1.2	7.9	<0.20	0.62
	12/10/98	Regular	160	<1.0	<1.0	1.2	0.21	0.36
	03/10/99	Regular	160	1.1	<1.0	2.9	0.38	0.45
	06/10/99	Regular	49	1.4	<1.0	<1.0	0.22	0.13
MW-12D								
	07/02/99	Regular	< 5	< 5	< 5	< 5	<0.20	<0.10
MW-13								
	07/02/99	Regular	1500	23.0	750	58	2.2	5.1
OW-4								
	06/10/99	Regular	<1.0	<1.0	<1.0	4.4	<0.2	<0.10

[1] Well plugged and abandoned 7/1/99
NA=Not Analyzed NS=Not Sampled
NSP=Not Sampled due to Phase Separated Hydrocarbons

Table 5
Summary of Detected Analytes for PAHs, Metals, VOCs, SVOCs and Groundwater Quality Parameters
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Analyte Name	Sample Date	Monitor Wells														
		MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-11A	MW-12	MW-12D	MW-13	OW-4
Alkalinity	**mg/L**															
Bicarbonate, as CaCO3																
	8/1/95	380	430	490	290	670	440	360	570	520	560	NA	NA	NA	NA	NA
	8/23/96	310	310	210	270	120	400	280	390	520	430	NA	NA	NA	NA	NA
	3/23-24/98	286	214	175	247	180	309	260	306	557	NA	319	451	NA	NA	NA
	3/9-10/99	92	309	186	283	286	358	317	333	278	NA	335	386	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	200	520	316
Carbonate																
	8/1/95	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	10	NA	NA	NA	NA	NA
	8/23/96	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA
	3/23-24/98	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NA	< 1	< 1	NA	NA	NA
	3/9-10/99	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	<1	<1	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1	<1	<1
Hardness-Total as CaCO3																
	3/23-24/98	430	430	275	342	440	670	740	510	1450	NA	1000	1600	NA	NA	NA
	3/9-10/99	250	440	310	340	640	780	680	370	720	NA	1150	460	NA	NA	NA
Hydroxide																
	8/1/95	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA
	8/23/96	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA
Methane	**mg/L**															
	3/23-24/98	< 0.0012	< 0.0012	< 0.0012	< 0.0012	< 0.0012	< 0.0012	0.039	< 0.0012	0.91	NA	0.14	< 0.0012	NA	NA	NA
	3/9-10/99	NA	NA	NA	<0.0012	NA	NA	NA	NA	0.035	NA	0.094	<0.0012	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0015	0.0017	<0.0012
Anions	**mg/L**															
Chloride																
	8/1/95	160	150	310	130	380	310	350	110	2200	3400	NA	NA	NA	NA	NA
	8/23/96	130	140	100	99	210	250	360	140	2000	2900	NA	NA	NA	NA	NA
	3/23-24/98	212	206	126	151	183	223	364	164	2390	NA	940	1200	NA	NA	NA
	3/9-10/99	163	156	142	155	411	238	274	123	1160	NA	834	314	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	195	496	266
Fluoride																
	3/23-24/98	0.9	1.2	1.2	0.6	1.1	0.8	0.9	1.3	6.1	NA	2.9	4.2	NA	NA	NA
	3/9-10/99	1.54	1.46	1.5	1.38	1.79	1.56	1.44	1.84	4.93	NA	3.08	3.13	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.83	2.22	3.45
Nitrate (Nitrogen as N)																
	8/1/95	4.7	5.6	15	28	1.3	9.2	11	38	< 0.1	5.5	NA	NA	NA	NA	NA
	8/23/96	11	7.6	7.6	12	< 0.5	10	8.6	24	< 5	11	NA	NA	NA	NA	NA
	3/23-24/98	1.78	3.07	2.59	3.87	0.69	3.92	1.84	4.27	0.07	NA	< 0.05	< 0.05	NA	NA	NA
	3/9-10/99	0.7	2.1	2.6	NA	<0.1	3.3	0.7	3.7	NA	NA	<0.1	<0.1	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.1	2.4	3.96
Sulfate																
	8/1/95	150	150	210	230	6.7	180	160	150	130	230	NA	NA	NA	NA	NA

Table 5
Summary of Detected Analytes for PAHs, Metals, VOCs, SVOCs and Groundwater Quality Parameters
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Analyte Name	Sample Date	Monitor Wells														
		MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-11A	MW-12	MW-12D	MW-13	OW-4
	8/23/96	130	150	150	140	85	80	160	180	120	130	NA	NA	NA	NA	NA
	3/23-24/98	130	180	160	190	230	310	250	230	320	NA	190	240	NA	NA	NA
	3/9-10/99	196	162	178	195	72	246	240	146	223	NA	227	193	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	249	334	192
Cations	**mg/L**															
Calcium																
	8/1/95	120	120	220	160	320	300	300	180	610	490	NA	NA	NA	NA	NA
	8/23/96	120	130	89	110	62	270	230	190	390	440	NA	NA	NA	NA	NA
	3/23-24/98	129	122	79	109	94	208	215	142	417	NA	259	388	NA	NA	NA
	3/9-10/99	80.2	129	90.8	116	141	233	197	122	214	NA	308	148	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	113	389	141
Magnesium																
	8/1/95	34	36	58	27	72	42	49	43	130	130	NA	NA	NA	NA	NA
	8/23/96	120	32	21	18	28	40	48	44	84	120	NA	NA	NA	NA	NA
	3/23-24/98	36	30	18	20	42	47	52	36	130	NA	96	108	NA	NA	NA
	3/9-10/99	19.7	31.5	20.4	21.6	62.2	54.4	47.7	28.5	43	NA	101	32.1	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	16.6	83.9	44.3
Potassium																
	8/1/95	2.4	2.6	3.5	4.2	3	3.4	5	4.1	35	46	NA	NA	NA	NA	NA
	8/23/96	2.4	3	2.2	3.1	2.4	3.7	3.9	2.6	41	53	NA	NA	NA	NA	NA
	3/23-24/98	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	20	NA	30	70	NA	NA	NA
	3/9-10/99	3	4	3	4	4	9	4	3	15	NA	21	101	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	66	6	3
Sodium																
	8/1/95	100	93	140	110	130	95	94	98	660	2000	NA	NA	NA	NA	NA
	8/23/96	100	110	88	120	120	96	100	83	960	2600	NA	NA	NA	NA	NA
	3/23-24/98	113	126	109	130	100	92	101	118	1090	NA	312	381	NA	NA	NA
	3/9-10/99	126	135	124	155	141	110	115	122	856	NA	225	180	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	121	165	103
Metals	**mg/L**															
Arsenic																
	8/1/95	0.0076	0.0043	< 0.002	0.0059	0.028	0.0033	0.0034	0.0055	0.015	0.0086	NA	NA	NA	NA	NA
	8/23/96	0.0078	0.0066	0.0059	0.0067	0.018	0.0036	0.0033	0.0044	0.028	0.011	NA	NA	NA	NA	NA
	3/23-24/98	0.007	0.007	0.008	0.007	0.013	< 0.005	< 0.005	0.005	0.035	NA	0.019	0.013	NA	NA	NA
	3/9-10/99	0.013	0.009	0.012	0.005	0.02	0.006	0.005	0.007	0.026	NA	0.036	0.066	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.022	0.008	<0.005
Barium																
	8/1/95	0.069	0.38	0.34	0.049	1.1	0.069	0.075	0.089	0.37	0.2	NA	NA	NA	NA	NA
	8/23/96	0.064	0.24	0.069	0.038	0.29	0.061	0.066	0.089	0.26	0.2	NA	NA	NA	NA	NA
	3/23-24/98	0.11	0.182	0.044	0.044	0.208	0.059	0.074	0.066	0.287	NA	0.163	0.157	NA	NA	NA
	3/9-10/99	0.058	0.059	0.045	0.054	0.555	0.076	0.052	0.043	0.17	NA	0.174	0.144	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.155	0.333	0.062
Cadmium																
	8/1/95	< 0.001	< 0.001	0.0052	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	NA	NA	NA	NA	NA
	8/23/96	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	NA	NA	NA	NA	NA

Table 5
Summary of Detected Analytes for PAHs, Metals, VOCs, SVOCs and Groundwater Quality Parameters
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Analyte Name	Sample Date	Monitor Wells														
		MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-11A	MW-12	MW-12D	MW-13	OW-4
	3/23-24/98	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	NA	< 0.005	< 0.005	NA	NA	NA
	3/9-10/99	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA	<0.005	<0.005	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.005	<0.005	<0.005
Chromium																
	8/23/96	< 0.01	< 0.01	< 0.01	< 0.01	0.049	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	NA	NA	NA	NA	NA
	3/23-24/98	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	NA	< 0.01	< 0.01	NA	NA	NA
	3/9-10/99	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NA	<0.01	<0.01	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.02	0.02	<0.01
Mercury																
	8/23/96	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	NA	NA	NA	NA	NA
	3/23-24/98	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0003	< 0.0002	< 0.0002	NA	< 0.0002	< 0.0002	NA	NA	NA
	3/9-10/99	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	NA	<0.0002	<0.0002	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0002	<0.0002	<0.0002
PAHs	**µg/L**															
Naphthalene																
	8/1/95	< 5	210	1700	< 5	470	< 5	< 5	15	92	< 5	NA	NA	NA	NA	NA
	8/23/96	230	110	440	< 5	< 30	< 5	< 5	< 84	< 76	< 5	NA	NA	NA	NA	NA
	3/23-24/98	130	23	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	4	8	NA	0.8	11	NA	NA	NA
	3/9-10/99	10	8	170	0.1	160	<0.1	<0.1	<.1	6	NA	<0.1	19	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.6	34	<0.1
VOCs	**µg/L**															
Acetone																
	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<100	<100	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	130	<100	<100
sec-Butylbenzene																
	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	5	< 5
Isopropylbenzene																
	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	31	< 5
Naphthalene																
	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	190	< 5
n-Propylbenzene																
	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	68	< 5
1,2,4-Trimethylbenzene																
	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	93	< 5
1,3,5-Trimethylbenzene																
	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	93	< 5
Methyl t-butyl ether																

Table 5
Summary of Detected Analytes for PAHs, Metals, VOCs, SVOCs and Groundwater Quality Parameters
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Analyte Name	Sample Date	Monitor Wells														
		MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-11A	MW-12	MW-12D	MW-13	OW-4
	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	25	< 10
SVOCs	**µg/L**															
2,4-Dimethylphenol																
	8/1/95	< 50	97	< 500	< 5	42	< 5	< 5	< 5	< 5	< 5	NA	NA	NA	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	56	<5
2-Methylnaphthalene																
	8/1/95	280	62	1500	< 5	150	< 5	< 5	36	23	< 5	NA	NA	NA	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	29	<5
2-Methylphenol																
	8/1/95	< 50	56	< 500	< 5	< 30	< 5	< 5	< 5	< 5	< 5	NA	NA	NA	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	<5
4-Methylphenol																
	8/1/95	< 80	< 20	< 800	< 8	150	< 8	< 8	< 8	< 8	< 8	NA	NA	NA	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	<5
Bis(2-ethylhexyl)phthalate																
	8/1/95	750	< 20	10000	40	< 40	< 7	< 7	< 7	< 7	< 7	NA	NA	NA	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	<5
Phenol																
	8/1/95	< 50	< 10	< 500	< 5	< 30	< 5	< 5	< 5	8.2	< 5	NA	NA	NA	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<5	6	<5

MW-2 not operative after May 3, 1995; MW-11 not operative after September 1997; MW-2, MW-6, and MW-11 P&A'd 7/1/99.
NA= Not Analyzed.
PAHs = Polynuclear Aromatic Hydrocarbons.

Table 6
Laboratory Analytical Results for Natural Attenuation Evaluation Parameters
BJ Services Company, U.S.A.
Hobbs, New Mexico

	Date	Nitrate[1] (mg/L)	Sulfate[1] (mg/L)	Dissolved Methane (mg/l)
MW-10	6/23/98	<0.1	325	0.55
	9/30/98	<0.1	204	0.81
	12/10/98	<0.1	180	0.091
	3/9/99	<0.1	142	0.035
		NA[2]	223[3]	
MW-11A	6/10/99	<0.1	181	0.036
	6/23/98	<0.1	225	0.11
	9/30/98	0.4	196	0.043
	12/10/98	0.7	188	0.033
	3/10/99	<0.1	164	0.094
		<0.1[2]	227[3]	
MW-12	6/10/99	<0.1	219	0.019
	6/23/98	<0.1	240	<0.0012
	9/30/98	<0.1	168	<0.0012
	12/10/98	<0.1	202	<0.0012
	3/10/99	<0.1	137	<0.0012
		<0.1[2]	193[3]	
	6/10/99	<0.1	217	<0.0012

1=By EPA Method 300, except as noted
2=By EPA Method 353.3
3=By EPA Method 375.4

Table 7
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
Monitor 980930 (1)	9/30/98	NA	NA	NA	NA	200	123.74	NA	NA	0.33
Monitor 981210 (1)	12/10/98	NA	NA	NA	NA	180	111.14	NA	NA	0.24
Monitor 990310 (1)	3/10/99	NA	NA	NA	NA	80	111.14	NA	NA	0.11
Monitor 990610 (1)	6/10/99	NA	NA	NA	NA	140	73.68	NA	NA	0.12

Emission 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

Appendices

APPENDICES

APPENDIX A

Regulatory Correspondence

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

File 12832-021

January 21, 1999

Certified Mail
Return Receipt NO. P 288 259 092

Mr. Rick N. Johnson
BJ Services Company, U.S.A. (BJSC)
8701 New Trails Drive
The Woodlands, Texas 77381

Re: GROUNDWATER CONTAMINATION INVESTIGATIONS
BJ Services Hobbs facility GW-072
2708 West County Road
Hobbs, NM

Dear Mr. Johnson:

New Mexico Oil Conservation Division (NMOCD) has reviewed BJ Services March, June and September 1998 Groundwater Sampling Reports and has determined that additional contamination delineation is required in the following areas:

* **Former Underground Field Waste Tanks:**

  The above reports show there is petroleum hydrocarbons (i.e. benzene), and chloride contamination in groundwater in this area that exceeds the New Mexico Water Quality Control Commission (WQCC) standards. The extent of contamination has not been completely defined. Therefore, please provide to NMOCD for approval a work plan to identify and delineate the extent of all groundwater contamination constituents which exceed the WQCC ground water standards. The plan shall include nested wells to address vertical migration of contaminants due to possible density gradients.

  In addition, please provide a plan to locate and properly plug the monitor well MW-11.

* **Former AST/MW-6 Area:**

  The September 1998 Groundwater Sampling Report reflected that groundwater is migrating in a east-northeasterly direction. Presently there are no monitoring wells located northeast of the MW-6 area. Please provide to NMOCD for approval a work plan to identify and delineate the extent of all groundwater contamination constituents that exceed the WQCC standards in this area.

  In addition, please provide a plan to locate and properly plug the monitor well MW-2.

Please provide the above information to this office and a copy to the OCD Hobbs office by March 22, 1999 for NMOCD approval.

If you require any further information or assistance please do not hesitate to write or call me at (505-827-7155).

Sincerely Yours,

Wayne Price

Wayne Price-Environmental Bureau

cc: OCD Hobbs

file: O/envr../word/way../bj072

1415 Louisiana, Suite 2500
Houston, TX 77002

Tel: (713) 759-0999
Fax: (713) 308-3886

March 19, 1999

BROWN AND CALDWELL
Environmental Engineering & Consulting

Mr. Wayne Price
Environmental Bureau
New Mexico Energy, Minerals & Natural Resources Department
Oil Conservation Division
2040 South Pacheco Street
Santa Fe, New Mexico 87006

File # 1 GW-072

Subject: **Work Plan for Groundwater Delineation**
BJ Services Company U.S.A. – Hobbs Facility: GW-072
2708 West County Road
Hobbs, New Mexico

Dear Mr. Price:

Attached please find a work plan for a delineation of groundwater conditions at the BJ Services Company, U.S.A. Hobbs, New Mexico facility, as requested in the January 21, 1999 correspondence[1].

If you have any questions regarding the information presented herein, please feel free to contact Mr. Robert Jennings or me at (713) 759-0999.

Sincerely,

BROWN AND CALDWELL

Richard Rexroad, P.G.
Project Manager

RNJ/RLR:uak

cc: NMOCD – Hobbs, New Mexico Office
Jo Ann Cobb, BJ Services Company, U.S.A.

[1] Letter From W. Price (NMOCD) to R. Johnson (BJ Services) dated 1-21-99: subject: BJ Services Company U.S.A. – Hobbs Facility: GW-072, 2708 West County Road Hobbs, New Mexico

Work Plan for Groundwater Delineation at BJ Services Facility, Hobbs, New Mexico

I. Technical Understanding

A. Former Underground Field Waste Tanks Area

The New Mexico Oil Conservation Division (NMOCD) desires delineation of the extent of groundwater constituents that exceed New Mexico Water Quality Control Commission (WQCC) standards in the area of the former underground field waste tanks, including evaluation of potential vertical migration of constituents due to possible density gradients.

Based on data from the March, June, and September 1998 groundwater sampling events, the concentrations of the following constituents exceed WQCC standards in one or more wells in the former underground field waste tanks area:

- Benzene;
- Chloride; and
- Fluoride.

Groundwater flow in this area is in a generally eastward direction. Groundwater is first encountered in this area at a depth of approximately 55 feet below grade.

B. Former AST/MW-6 Area

NMOCD desires identification and delineation of groundwater constituents that exceed WQCC standards to the northeast of monitor well MW-6.

Based on data from the March, June, and September 1998 groundwater sampling events, the only constituent that exceeds WQCC standards in the former AST area is benzene. Groundwater flow in this area is in a generally eastward to northeasterly direction. Groundwater is first encountered in this area at a depth of approximately 52 feet below grade. Concentrations of benzene in monitor well MW-6 decreased substantially following startup of the biosparging system at the facility in November 1995. Benzene concentrations in MW-6 ranged from 7 mg/L to 11 mg/L prior to November 1995, but dropped to less than 0.1 mg/L during the period from May 1996 to March 1997. Benzene concentrations in MW-6 have been erratic since March 1997, and have exceeded WQCC standards during four quarterly sampling events since then.

II. Monitor Well Installation Locations

A. Former Underground Field Waste Tanks Area

BJ Services proposes to utilize an existing monitor well (OW-4) at a location approximately 200 feet east of existing monitor wells MW-11A and MW-12 to define the lateral extent of constituents exceeding WQCC standards, as shown in Figure 1. (This well is on an adjacent property and should be made available by the current landowner.)

BJ Services proposes to install a monitor well (MW-12D) adjacent to existing monitor well MW-12 to evaluate the potential for vertical migration of constituents due to possible density gradients. Monitor well MW-12 was selected as the existing monitor well to be twinned because it has the highest concentrations of chloride and benzene in the former underground field waste tank area, based on data from March, June, and September 1998. Details pertaining to well installation and construction activities for this and other proposed monitor wells are presented in Section III.

B. Former AST/MW-6 Area

BJ Services proposes to utilize existing monitor well OW-4 to evaluate groundwater conditions in the area northeast of monitor well MW-6.

Monitor well MW-6 was installed prior to August 1992. In November 1995, Brown and Caldwell completed installation and startup of a biosparging system designed to remove hydrocarbon constituents from groundwater and soil in the former AST area. As previously discussed, benzene concentrations in MW-6 decreased substantially following the startup of the biosparging system, but have been erratic since March 1997. Monitor well MW-6 is located immediately adjacent to (i.e., within approximately 5 feet of) a subsequently installed biosparging system air injection/extraction well, AV-17. It is believed that the close proximity of monitor well MW-6 to air injection/extraction well AV-17 may bias the results obtained from MW-6, due to the effects of continuous air introduction and extraction from AV-17 up until shortly prior to commencement of quarterly groundwater sampling activities at MW-6. Therefore, BJ Services plans to install a monitor well (MW-13) to the northeast of monitor well MW-6, beyond the zone of influence of existing air injection and extraction wells, as shown in Figure 1, in order to accurately characterize groundwater conditions in this area. Monitor well MW-6 will be plugged and abandoned in conjunction with installation of its replacement well, MW-13.

III. Monitor Well Installation Activities

The monitor wells described in Section II will be installed by a driller who is licensed in the State of New Mexico, under the supervision of Brown and Caldwell. Hollow stem auger and/or air rotary drilling techniques will be used as appropriate to the subsurface conditions encountered. The boreholes will be logged and classified in accordance with the Unified Soil Classification System (USCS). The occurrence of the approximate top of the saturated zone will be noted during drilling activities.

The boreholes for proposed monitor well MW-13 will be advanced to a depth sufficient to allow for installation of approximately 10 feet of well screen below the top of the saturated zone. The depth to water will be verified after reaching the proposed total depth of the boring, prior to commencement of monitor well construction activities. The well will be constructed using a total of 15 feet of well screen. The well screen will extend approximately 5 feet above the top of the saturated zone in order to account for seasonal fluctuations of the water table.

The thickness of the uppermost aquifer at the facility is not known. Monitor well MW-12 is screened in the uppermost 10 feet of the aquifer. Therefore, the borehole for monitor well MW-12D will be drilled to a sufficient depth to allow for installation of a well with a 10-foot screen to be set approximately 20 to 30 feet below the top of the saturated zone. If an aquitard is encountered prior to reaching this depth, however, then the well will be set such that the lowermost 10 feet of the aquifer is screened. Additional nested wells could be installed in the future, if warranted based on the results of groundwater sampling of proposed monitor well MW-12D.

The monitor wells will be constructed of 2-inch diameter Schedule 40 PVC. The monitor wells will be equipped with a sealing bottom cap, an approximate 2-foot sediment sump, and 10 to 15 feet of machine-slotted 0.010-inch slot well screen placed as described in the preceding paragraphs. Sufficient riser pipe will be added to extend the well to approximately 3 feet above the ground surface or approximately 6 inches below ground surface, depending on whether the well is to be completed as an above-grade or a flush-mount completion. The type of completion will be selected based on the individual well locations and the types of industrial operations that are conducted in these areas. The annular area surrounding the wells will be backfilled as follows:

- A 20-40 graded filter sand will be installed from the total depth of the boring to approximately 2 feet above the top of the well screen;
- Approximately 2 feet of hydrated bentonite shall be installed atop the sand filter;
- The remainder of the annular area will be backfilled with cement/bentonite grout installed using a tremie pipe.

The depth of the filter pack and bentonite seal will be verified using a weighted tape measure or other appropriate measuring device.

The wells will be equipped with a locking cap. Wells completed as flush-mount wells will be equipped with a traffic-rated protective cover. Wells completed as above-grade wells will be equipped with a protective steel casing, surrounded by protective crash posts as necessary to isolate the well from vehicular traffic. A 4-foot by 4-foot by 3-inch thick concrete pad sloping away from the well shall be set around each well. The wells will be equipped with locking caps and a lock.

The monitor wells will be developed using a surge block and submersible pump or other appropriate methodology for a period of time not to exceed 1 hour per well or until water recovered from the well is free of suspended sediment.

Downhole equipment (e.g., augers, bits, drill rods, etc.) will be decontaminated prior to usage and after usage at each borehole location using a hot water pressure washer. Soil cuttings and development water will be stored in clean 55-gallon drums pending evaluation of disposal options. Drums will be labeled as to contents, source, and date of filling and will be moved to a designated storage location at the facility until analysis of waste characterization samples has been completed. A composite sample of soil cuttings from each borehole will be collected and analyzed for gasoline- and diesel-range petroleum hydrocarbons (TPH-G and TPH-D) by Method 8015. A composite soil sample from the drummed soils will also be analyzed for total RCRA metals using the SW3050B/6010B/7000 Series methodology. Disposal options for investigation-derived wastes will be evaluated after review of the analytical results for the soil cuttings and groundwater samples.

IV. Groundwater Elevation Measurement and Sampling

Groundwater samples will be collected from the monitor wells at the time of the next quarterly sampling event at the facility in June 1999. The static depth to groundwater in each new and existing well at the facility and the adjacent property will be measured prior to commencement of groundwater sampling operations. The elevation of the top of casing for the new monitor wells utilized during these sampling activities will be field surveyed by Brown and Caldwell personnel relative to a previously surveyed elevation of one or more of the existing monitoring wells. The horizontal locations of the wells relative to one another and to points of fixed reference will be determined using a measuring tape. This data will be used in mapping of groundwater flow direction, calculating groundwater gradient, and determining purge volumes to be removed prior to sampling.

Well purging will be performed using a submersible pump. The following parameters will be measured upon removal of each well volume:

- pH,
- Conductivity, and
- Temperature.

Well purging will continue until a minimum of 3 well volumes have been removed and until measurements for the parameters listed above have stabilized, with stabilization being defined as consecutive readings within 10 percent of one another.

Groundwater samples collected from the new wells and OW-4 in June 1999 will analyzed, along with existing monitor wells at the facility, for TPH-D and TPH-G by EPA Method 8015 and benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8021. Samples from monitor wells MW-12D and OW-4 will also be analyzed for chloride and fluoride to delineate the extent of exceedances of WQCC standards in the area of the former underground field waste tanks.

Additional parameters will be measured in the field during well purging operations to evaluate the potential for natural attenuation of hydrocarbons. These parameters are as follows:

- Dissolved oxygen,
- Oxidation-reduction potential,
- Ferrous iron, and
- Alkalinity.

Laboratory analysis for nitrate and sulfate (Method 300.0) and dissolved methane/ethylene/ethane (Method RSK SOP 147/175) will be performed on samples from monitor well OW-4 to further evaluate the potential for natural attenuation of hydrocarbons at locations that are remote from the biosparging system.

Samples to be submitted for laboratory analysis will be placed in laboratory-supplied clean sample containers, labeled appropriately, placed on ice in sample containment cooler with adequate cushioning material, and forwarded to an analytical laboratory using strict chain-of-custody procedures.

V. Monitor Well Location and Plugging/Abandonment Activities

Monitor wells MW-2 and MW-11 have apparently been covered during grading activities at the facility. Brown and Caldwell will use a magnetometer or other metal-detecting device capable of detecting the ferrous manhole covers and collars of these flush-mounted wells in an attempt to locate these wells. If located, these wells and existing monitor well MW-6 will be plugged and abandoned by a driller licensed in the State of New Mexico. Plugging and abandonment will

consist of pumping cement/bentonite grout down the well casing by means of a tremie pipe until the grout mixture fills the well casing and flows to the ground surface.

VI. Notification and Reporting

Brown and Caldwell will notify the central and district offices of the NMOCD a minimum of 48 hours prior to initiation of the monitor well installation and plugging and abandonment activities described herein. The results of these activities and groundwater sampling to be conducted in June 1999 will be reported to NMOCD in the June 1999 quarterly sampling report.

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

File 12832

May 19, 1999

CERTIFIED MAIL
RETURN RECEIPT NO. Z 559 573 597

Post-it® Fax Note 7671	Date	# of pages ▶
To Rick Reinaud	From JAC	
Co./Dept.	Co.	
Phone #	Phone #	
Fax # (713) 308-3886	Fax #	

Ms. Jo Ann Cobb
BJ Services Company, U.S.A.
8701 New Trails Drive
The Woodlands, Texas 77381

Re: Work Plan for Groundwater Delineation
BJ Services Hobbs facility GW-072
2708 West County Road
Hobbs, NM

Dear Ms. Cobb:

The New Mexico Oil Conservation Division (NMOCD) is in receipt of BJ Services Company, U.S.A. (BJSC) March 19, 1999 work plan for the above captioned facility. NMOCD hereby approves of the plan subject to the following conditions:

1. The initial round of sampling for each prospective new monitoring point(s) and/or well(s) shall include analyzing for the complete New Mexico Water Quality Control Commission (WQCC) regulation water contaminants utilizing EPA approved methods, thereafter BJSC may propose analyzing for constituents of concern.

2. BJSC shall notify the OCD Santa Fe office and the OCD District office at least 48 hours in advance of all scheduled activities such that the OCD has the opportunity to witness the events and/or split samples during OCD's normal business hours.

Please be advised that NMOCD approval of this work plan does not relieve BJSC of liability should their operations fail to adequately investigate and remediate contamination that poses a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve BJSC of responsibility for compliance with any other federal, state, or local laws and/or regulations.

If you require any further information or assistance please do not hesitate to write or call me at (505-827-7155).

Sincerely Yours,

Wayne Price

Wayne Price-Pet. Engr. Spec.
Environmental Bureau

cc: OCD Hobbs Office

RECEIVED
MAY 24 1999

B

APPENDIX B

Boring Logs and Well Construction Diagrams for Monitor Wells MW-12D and MW-13

Monitoring Well: **MW-12D**

Project Name: **BJ Services Company, U.S.A.** Project Number: **12832.021** Sheet **1** of **3**

Project Location: **Hobbs, New Mexico**		Logged By: **R. Rexroad**	Approved: **R. Rexroad**
Drilling Contractor: **Alliance Environmental, Inc.**		Date Started: **6/30/99**	Date Finished: **6/30/99**
Drilling Equipment: **Mobile B-61**	Driller: **J. Harold**	Total Boring Depth: (feet) **92.0**	Depth to Static Water: (feet) **57.0**
Drilling Method: **Hollow Stem Auger**	Borehole Diameter: **8.5"**	TOC Elevation: **3857.30**	Ground Elevation: **3858**
Sampling Method: **Cuttings**		Diameter and Type of Well Casing: **2" Schedule 40-PVC**	
Comments:		Slot Size: **0.01**	Filter Material: **20/40 Silica Sand**
		Development Method: **Bailer and Surge**	

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Monitoring Well Remarks
				FILL, Sand with gravel					Locking Well Cap (Below grade completion.)
2		CL		SILTY CLAY (CL), Dark grayish brown, slightly moist, grading to light grayish brown sandy clay at approximately 2 fbg.					
4		CL		SANDY SILTY CLAY (CL), Whitish, with caliche, slightly moist, soft.					
6				SILTSTONE, very fine grained, semi-indurated.					Cement Grout
8									
10									2" Diameter Blank PVC Casing
12		GP		SAND (GP), whitish, fine grained, contains rounded siltstone gravel to approximately 1/2 inch in diameter, low moisture content.					
				SANDSTONE, Medium brown, very fine grained, dry.					
14		GP		SAND (GP), whitish, fine grained, contains rounded siltstone gravel to approximately 1/2 inch in diameter, low moisture content.					
16									
18				Increased pebble content.					
20				Pebbles up to 1 inch diameter present below 20 fbg.					
22									
24				SANDSTONE, Very fine grained, well indurated.					
		GP		SAND (GP), Whitish, fine grained, less pebbles than above (rounded siltstone gravel to approximately 1/2 inch in diameter), low moisture content.					
26									
28		SP		SAND (SP), Pinkish-brown, with scattered rounded gravel, to approximately 3/4 inch in diameter.					
30									
32									

Monitoring Well: **MW-12D**

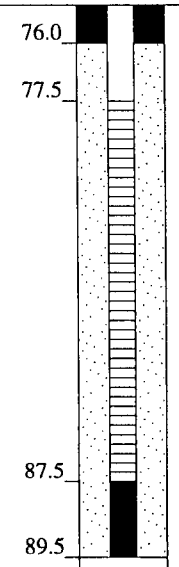
Project Name: **BJ Services Company, U.S.A.** Project Number: **12832.021** Sheet 2 of 3

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Monitoring Well Remarks
34									
36				2 inch to 3 inch layer of of pebbles at 36 fbg.					
38									
40									
42									
44									
46									
48									
50				Light pinkish brown, moist, well sorted, generally subrounded quartzose grains.					
52									
54				Moist at 53.5 fbg.					
55.0									
56	▼			Wet at 57.5 fbg.					
58									
60									
62									
64									
66									
68									
70									
72									
74									

Monitoring Well: **MW-12D**

Project Name: **BJ Services Company, U.S.A.** Project Number: **12832.021** Sheet 3 of 3

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Monitoring Well Remarks
76									76.0 Bentonite Seal 20/40 Silica Sand Filter Pack
78									77.5
80									2" Diameter 0.01" Slotted PVC Well Screen.
82									
84									
86									
88									87.5 2" Diameter Schedule 40-PVC Sediment Sump
90									89.5
92									



Monitoring Well: **MW-13**

Project Name: **BJ Services Company, U.S.A.** Project Number: **12832.021** Sheet **1** of **2**

Project Location: **Hobbs, New Mexico**		Logged By: **R. Rexroad**	Approved: **R. Rexroad**
Drilling Contractor: **Alliance Environmental, Inc.**		Date Started: **6/29/99**	Date Finished: **6/29/99**
Drilling Equipment: **Mobile B-61**	Driller: **J. Harold**	Total Boring Depth: (feet) **69.0**	Depth to Static Water: (feet) **56.0**
Drilling Method: **Hollow Stem Auger**	Borehole Diameter: **8.5"**	TOC Elevation: **3588.92**	Ground Elevation:
Sampling Method: **Cuttings**		Diameter and Type of Well Casing: **2" Schedule 40-PVC**	
Comments: **Well drilled through floor of Acid Dock Drum Storage Area**		Slot Size: **0.01**	Filter Material: **20/40 Silica Sand**
		Development Method: **Bailer and Surge**	

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Monitoring Well Remarks
				CONCRETE 6 to 8 inches thick.					Locking Well Cap
2		ML		SANDY CLAYEY SILT (ML) Medium/dark grayish brown, moist, no odor.					Well completed as flush-mounted well. Top of protective steel casing is approximately 2 inches above the level of the concrete floor of the acid dock drum storage area. Top of PVC casing is approximately 6 inches below the top of protective steel casing. Floor of acid dock drum storage area is approximately 6 to 8 inches thick.
4		SM		SILTY SAND (SM) Grades to medium brown, moist, no odor.					
6				Conglomerate consisting of rounded to subrounded sandstone and chert pebbles alternating coarse to fine conglomerates to 9.5 fbg (>1 inch to 1/4 inch diameter.)					
8									
10		CL		SILTY CLAY (CL), Light brown, soft, moist, no odor.					
12				Grades to medium brown Sandy Silty Clay (CL) at 12 fbg.					
14				Grades to: SANDY CLAY (CL), Dark brownish gray, poorly lithified, cemented weakly. Increasing sand content with depth.					
16									
18									
20		SP		SAND (SP), Light brown, fine to very fine grained, well sorted, slightly moist.					
22				Dry at 22 fbg.					
24									
26									
28									Cement Grout
30									
32		GP GM		SANDSTONE, Light brown, well cemented.					

Monitoring Well: **MW-13**

Project Name: **BJ Services Company, U.S.A.** Project Number: **12832.021** Sheet 2 of 2

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Monitoring Well Remarks
34		SP		SAND (SP), Light brown, dry, fine to very fine grained, well sorted, subangular to subrounded grains, no odor.					
36									
38									
40									2" Diameter Blank PVC Casing
42									
44									
46									
47.0									
48									Bentonite Seal
49.0									
50									
51.0									
52				Moist at 52.5 fbg.					
54									
56	▼			Wet at 56 fbg.					20/40 Silica Sand Filter Pack
58									
60									2" Diameter 0.01" Slotted PVC Well Screen
62									
64									
66									
66.0									
68									2" Diameter Schedule 40-PVC Sediment Sump
68.0									

C

APPENDIX C

Groundwater Sampling Forms

BROWN AND CALDWELL

WELL ID: MW-1

Groundwater Sampling Field Data Sheet

Project Number: 12532 Task Number: 014 Date: 6.10.99

Casing Diameter: 2 inches	Purge Equipment: pump	Geochemical Parameters	
Total Depth of Well from TOC: 64.5 feet		Ferrous iron: C mg/l	
		Dissolved oxygen: 1.5 mg/l	
Static Water from TOC: 58.02 feet	Sample Equipment: pump	Nitrate: — mg/l	
Product Level from TOC: — feet		Alkalinity: 160 mg/l	
Length of Water Column: 6.48 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI, Hach kit	Sulfate: — mg/l	
Well Volume: 1.1 gal		Sample Time: 15:10	
Screened Interval (from GS): 45 - 64.5 feet		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.	

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
15:00	—	7.58	24.60	965	102.9	3.20	clear
15:03	1.0	7.42	22.96	999	107	1.75	clear
15:05	2.0	7.29	21.08	967	104.9	1.19	clear
15:08	3.0	7.32	20.60	946	102.6	0.71	clear
15:10	4.0	7.33	22.45	940	98.8	0.55	clear

Comments:

Collected duplicate sample from MW-1

PPE Worn: Gloves	Sampler's Signature:
Disposition of Purge Water: Acid Dock	

BROWN AND CALDWELL

WELL ID: MW-3

Groundwater Sampling Field Data Sheet

Project Number: 12832 Task Number: 7014 Date: 6.10.99

Casing Diameter: 2 inches	Purge Equipment: pump	Geochemical Parameters	
Total Depth of Well from TOC: 62 feet		Ferrous iron: 0 mg/l	
Static Water from TOC: 55.17 feet	Sample Equipment: pump	Dissolved oxygen: 1.2 mg/l	
Product Level from TOC: — feet		Nitrate: — mg/l	
Length of Water Column: 6.83 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI, Hach Kit	Alkalinity: 340 mg/l	
Well Volume: 1.1 gal		Sulfate: — mg/l	
Screened Interval (from GS): 45-62 feet		Sample Time: 14:25	
		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.	

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
14:15	—	7.59	24.32	1330	-48.2	3.55	clear
14:18	1.0	7.02	21.70	1206	-16.3	1.50	clear
14:21	2.0	6.98	21.96	1154	-1.8	1.66	clear
14:23	3.0	6.97	22.51	1194	3.0	1.51	clear
14:25	4.0	6.98	22.85	1209	6.9	1.33	clear

Comments:

PPE Worn: gloves

Disposition of Purge Water: Acid dock

Sampler's Signature:

BROWN AND CALDWELL

WELL ID: MW-4

Groundwater Sampling Field Data Sheet

Project Number: 12832 Task Number: 014 Date: 6.10.97

Casing Diameter: 2 inches	Purge Equipment: pump	Geochemical Parameters	
Total Depth of Well from TOC: 61.5 feet		Ferrous iron: 0 mg/l	
Static Water from TOC: 55.07 feet	Sample Equipment: pump	Dissolved oxygen: 1.0 mg/l	
Product Level from TOC: — feet		Nitrate: — mg/l	
Length of Water Column: 6.43 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI, Hach kit	Alkalinity: 240 mg/l	
Well Volume: 1.1 gal		Sulfate: — mg/l	
Screened Interval (from GS): 45-60 feet		Sample Time: 16:00	
		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.	

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
15:50	—	7.68	26.21	1054	18.4	4.70	SLTY
15:53	1.0	7.18	21.41	965	-8.2	2.11	Clear
15:55	2.0	7.10	22.01	964	6.2	1.34	Clear
15:57	3.0	7.12	22.27	965	16.7	0.75	clear
16:00	4.0	7.11	22.19	GFS	16.1	0.58	Clear

Comments:

Sampler's Signature:

e Water:

BROWN AND CALDWELL

WELL ID: MW-5

Groundwater Sampling Field Data Sheet

Project Number: 12532 Task Number: 014 Date: 6/10/99

Casing Diameter: 2 inches	Purge Equipment: pump	Geochemical Parameters
Total Depth of Well from TOC: 64.70 feet		Ferrous iron: 0 mg/l
Static Water from TOC: 56.91 feet	Sample Equipment: pump	Dissolved oxygen: 7.2 mg/l
Product Level from TOC: — feet		Nitrate: — mg/l
Length of Water Column: 7.79 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.)	Alkalinity: 250 mg/l
Well Volume: 1.3 gal	YSI, Hach kit	Sulfate: — mg/l
Screened Interval (from GS): 45-60 feet		Sample Time: 11:50
		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
11:45	—	6.97	22.38	1150	33.7	4.21	clear
11:47	1.0	>6.0	20.99	1199	48.7	7.11	clear
11:49	2.0	7.31	20.60	1174	72.1	6.56	clear
11:50	3.0	7.20	20.49	1140	83.1	6.30	clear

Comments:

PPE Worn: Gloves	*Sampler's Signature:*
Disposition of Purge Water: Acid Dock	

BROWN AND CALDWELL

WELL ID: MW-7

Groundwater Sampling Field Data Sheet

Project Number: 12832 Task Number: 014 Date: 6.10.99

Casing Diameter: 2 inches	Purge Equipment: pump	Geochemical Parameters
Total Depth of Well from TOC: 61.5 feet		Ferrous iron: 0 mg/l
Static Water from TOC: 55.66 feet	Sample Equipment: pump	Dissolved oxygen: 1.5 mg/l
Product Level from TOC: — feet		Nitrate: mg/l
Length of Water Column: 5.84 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI, Hach Kit	Alkalinity: 770 mg/l
Well Volume: 1.0 gal		Sulfate: mg/l
Screened Interval (from GS): 45-60 feet		Sample Time: 10:45
		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
10:35	—	7.95	26.81	1726	1.4	6.17	Silty
10:37	1.0	7.30	22.86	1544	43	1.66	Clear

Comments:

well dry @ 1.0 gals

PPE Worn: gloves

Disposition of Purge Water: Acid dock

Sampler's Signature:

BROWN AND CALDWELL

WELL ID: MW-8

Groundwater Sampling Field Data Sheet

Project Number: 12532 Task Number: 014 Date: 6-10-99

Casing Diameter: 2 inches	Purge Equipment: pump	Geochemical Parameters
Total Depth of Well from TOC: 62.35 feet		Ferrous iron: 0 mg/l
Static Water from TOC: 55.56 feet	Sample Equipment: pump	Dissolved oxygen: 2.0 mg/l
Product Level from TOC: — feet		Nitrate: ~~300~~ 1200 mg/l
Length of Water Column: 6.79 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.)	Alkalinity: 300 mg/l
Well Volume: 1.1 gal	YSI, Hach K.T	Sulfate: — mg/l
Screened Interval (from GS): 45-60 feet		Sample Time: 11:20
		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
11:15	—	7.85	25.48	1009	13.2	4.38	clear
11:17	1.0	8.03	23.53	1368	20.6	3.11	clear
11:20	2.0	7.59	25.15	1440	34.2	1.85	clear

Comments:

PPE Worn: Gloves

Disposition of Purge Water: Acid dock.

Sampler's Signature:

BROWN AND CALDWELL

WELL ID: MW-9

Groundwater Sampling Field Data Sheet

Project Number: 12832 Task Number: 0714 Date: 6.12.99

Casing Diameter: 2 inches	Purge Equipment: pump	Geochemical Parameters	
Total Depth of Well from TOC: 60.7 feet		Ferrous iron: 0 mg/l	
Static Water from TOC: 54.68 feet	Sample Equipment: pump	Dissolved oxygen: 2.0 mg/l	
Product Level from TOC: — feet		Nitrate: — mg/l	
Length of Water Column: 6.02 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI Hach kit	Alkalinity: 320 mg/l	
Well Volume: 1.0 gal		Sulfate: — mg/l	
Screened Interval (from GS): 45-60 feet		Sample Time: 16:45	
		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.	

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
16:35	—	7.56	24.49	1178	3.8	3.58	clear
16:37	1.0	7.16	23.60	1125	49.8	3.13	clear
16:40	2.0	7.05	23.81	1139	66.1	2.75	clear
16:42	3.0	7.08	23.86	1138	69.4	1.91	clear
16:45	4.0	7.05	22.37	1057	79.3	0.58	clear

Comments:

PPE Worn: gloves	*Sampler's Signature:*
Disposition of Purge Water: Acid Dock	

BROWN AND CALDWELL

WELL ID: MW-10

Groundwater Sampling Field Data Sheet

Project Number: 12832 Task Number: 021 Date: 6-10-99

Casing Diameter: 2 inches	Purge Equipment: pump	Geochemical Parameters
Total Depth of Well from TOC: 62.9 feet		Ferrous iron: 2.0 mg/l
Static Water from TOC: 56.60 feet	Sample Equipment: pump	Dissolved oxygen: 0.5 mg/l
Product Level from TOC: — feet		Nitrate: — mg/l
Length of Water Column: 6.3 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI, Hach kit	Alkalinity: 770 mg/l
Well Volume: 1.0 gal		Sulfate: — mg/l
Screened Interval (from GS): 46-62 feet		Sample Time: 13:05
		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
12:55	—	7.75	27.51	2671	-104.9	2.10	clear
12:57	1.0	7.01	24.48	2801	-109.6	1.71	clear
13:02	2.0	6.90	23.46	2519	-119.3	1.10	clear
13:05	~~3.5~~ 4.0	6.90	22.58	2303	-152.7	0.56	clear

Comments:

PPE Worn: gloves

Disposition of Purge Water: Acid Lab

Sampler's Signature:

BROWN AND CALDWELL

WELL ID: MW-11A

Groundwater Sampling Field Data Sheet

Project Number: 12832 Task Number: 014 Date: 6-10-99

Casing Diameter: 2 inches	Purge Equipment: pump	Geochemical Parameters
Total Depth of Well from TOC: 63.5 feet		Ferrous iron: 5.0 mg/l
Static Water from TOC: 56.94 feet	Sample Equipment: pump	Dissolved oxygen: 0.1 mg/l
Product Level from TOC: — feet		Nitrate: — mg/l
Length of Water Column: 6.56 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI, Hach Kit	Alkalinity: 350 mg/l
Well Volume: 1.1 gal		Sulfate: — mg/l
Screened Interval (from GS): 45-62 feet		Sample Time: 12:30
		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
12:20	—	7.03	22.55	2626	-102.2	1.61	clear
12:23	1.0	6.88	21.51	2618	-104.3	0.86	clear
12:26	2.0	6.79	21.41	2852	-115.7	0.47	clear
12:28	3.0	6.80	21.37	3085	-123.9	0.32	clear
12:30	4.0	6.81	21.45	3120	-127.3	0.31	clear

Comments:

PPE Worn: gloves

Disposition of Purge Water: Acid dock

Sampler's Signature:

BROWN AND CALDWELL

WELL ID: MW-12

Groundwater Sampling Field Data Sheet

Project Number: 12832 Task Number: 014 Date: 6-12-99

Casing Diameter: 2 inches	Purge Equipment: pump	Geochemical Parameters	
Total Depth of Well from TOC: 61 feet		Ferrous iron: 2.0 mg/l	
Static Water from TOC: 56.97 feet	Sample Equipment: pump	Dissolved oxygen: 2.2 mg/l	
Product Level from TOC: — feet		Nitrate: — mg/l	
Length of Water Column: 4.03 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI, Hach kit	Alkalinity: 770 mg/l	
Well Volume: 0.67 gal		Sulfate: — mg/l	
Screened Interval (from GS): 45-60 feet		Sample Time: 13:50	
		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.	

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1340	—	7.26	24.05	1415	-146.6	1.62	clear
13:43	1.0	7.11	22.93	1407	-156.5	0.96	clear
13:45	2.0	7.05	23.27	1417	-157.8	0.75	clear
13:47	3.0	6.98	23.52	1551	-153.3	0.71	clear
13:50	4.0	6.97	23.59	1564	-152.5	0.72	clear

Comments:

PPE Worn: gloves

Disposition of Purge Water: Acid dock

Sampler's Signature:

BROWN AND CALDWELL

WELL ID: MW-12D

Groundwater Sampling Field Data Sheet

Project Number: 12832 Task Number: 0.21 Date: 7-2-99

Casing Diameter: 2 inches	Purge Equipment: bailer	Equipment Calibration - Time: pH = See Attached Sheet at °C; pH = at °C
Total Depth of Well from TOC: 88.57 feet	Sample Equipment: bailer	
Static Water from TOC: 56.99 feet		Conductivity: Conductance Standard: µmhos/cm at 25° C; Measured Value: µmhos/cm at 25° C
Product Level from TOC: 0 feet		Dissolved Oxygen: DO Meter Calibrated to: mg/L
Length of Water Column: 31.58 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI Model 600XL, Hach Test Kit (alkalinity, DO, Fe^{+2})	
Well Volume: 5.05 gal		
Screened Interval (from GS): 77.5 - 87.5 feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
0919	1	5.1	7.57	21.32	1255	-330.6	4.12	clear
0936	2	10.2	7.62	21.46	1266	-359.6	4.60	clear/sl. cloudy
0953	3	15.3	7.56	20.11	1220	-442.5	4.00	sl. cloudy

Geochemical Parameters		Comments:
Ferrous Iron:	1.4 mg/L	ALKALINITY = 385 mg/L as $CaCO_3$
Dissolved Oxygen:	~~1.4~~ RC 7/2/99 1 mg/L	
Nitrate:	Lab mg/L	
Sulfate:	Lab mg/L	

PPE Worn: Level D

Disposition of Purge Water: drummed

Sampler's Signature: TRaymond

BROWN AND CALDWELL

WELL ID: MW-13

Groundwater Sampling Field Data Sheet

Project Number: 12832. Task Number: 021 Date: 7/21/99

Casing Diameter: 2 inches	Purge Equipment: bailer	Equipment Calibration - Time
Total Depth of Well from TOC: 66.35 feet		pH = see attached sheet at °C
Static Water from TOC: 56.60 feet	Sample Equipment: bailer	pH = at °C
Product Level from TOC: 0 feet		*Conductivity* Conductance Standard: µmhos/cm at 25° C
Length of Water Column: 9.75 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI Model 600 XL; Hach Test Kit (alkalinity); Hach Test Kit (Fe^{+2}, DO)	Measured Value: µmhos/cm at 25° C
Well Volume: 1.5 gal		*Dissolved Oxygen* DO Meter Calibrated to: mg/L
Screened Interval (from GS): 51-66 feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1127	1	2	7.25	19.47	2150	-324.8	3.17	Lt. Brown, Sl. Cloudy
1137	2	4	7.25	19.57	2084	-303.4	~~4.76~~ 3.72	as above
1147	3	6	7.24	19.40	2074	-320.2	3.67	as above

Geochemical Parameters		*Comments:*
Ferrous Iron:	3.6 mg/L	alkalinity = 770 mg/L as $CaCO_3$
Dissolved Oxygen:	3.4 mg/L	
Nitrate:	lab mg/L	
Sulfate:	lab mg/L	

PPE Worn: Level D	*Sampler's Signature:* Raymond
Disposition of Purge Water: drummed	

BROWN AND CALDWELL

WELL ID: OSW-21

Groundwater Sampling Field Data Sheet

Project Number: 12832 Task Number: 0141 Date: 6.17.99

Casing Diameter: 4 inches	Purge Equipment: pump	Geochemical Parameters
Total Depth of Well from TOC: 61.5 feet		Ferrous iron: 0.0 mg/l
Static Water from TOC: 58.03 feet	Sample Equipment: pump	Dissolved oxygen: 2.0 mg/l
Product Level from TOC: — feet		Nitrate: — mg/l
Length of Water Column: 3.47 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI, Hach kit	Alkalinity: 280 mg/l
Well Volume: 2.3 gal		Sulfate: — mg/l
Screened Interval (from GS): unknown feet		Sample Time: 1735
		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1720	0	7.65	23.57	1494	25.5	7.25	clear
1724	1.5	6.81	21.63	1491	96.5	6.52	clear
1728	3.0	6.76	20.90	1445	111.1	6.45	clear
1732	4.5	6.76	20.74	1436	114.6	6.42	clear
1735	6.0	6.77	20.76	1417	117.9	6.38	clear

Comments:

PPE Worn: gloves

Disposition of Purge Water: Acid dock

Sampler's Signature:

Milco Safety Rental Inc.

Equipment Report Card

for

YSI Model 600XL S/N 657

This equipment has been inspected prior to its shipment and the following items and general, observable condition have been described.

Please review this instrument upon its arrival to confirm the contents of this report. Should you recognize a deviation, please call 800-775-1738 to report your findings.

All items on this report will be reviewd upon the unit's return to MSR, Inc. Any damage, lost items or unreasonable and unusual maintenance required to restore the unit to its reported condition will require additional charges to the customer.

1. 610 D Console	x
2. Sonde	x
3. Sonde Moisture Container	x
4. Charger for 610 D	x
5. Connector cable 8 ft	x
6. Adapter--Console to Sonde Cable	x
7. Adapter--Console to Computer	
8. Computer Interconnect cable	
9. Blank Plug	
10. Zorbell Solution	
11. pH Buffer...4.0pH___...7.0pH___...10.0pH___	
12. Conductivity Standards....._____uS/cm	
13. Manual(s)	x
14. Flow Thru Sampler	x
15. DO Membranes and solution	x
16. Cigarette adapter	x

General Description: Unit Calibrated: 6/29/99

1. pH Buffers: 4.01, 7.01, 10.01
2. Conductivity Standard: 1,413 uS
3. ORP Calibrated with Zobell Solution: 231mV @ 25C
4. DO Calibrated in air @ 760mm Hg

Inspector tb Date 6/29/99

D

APPENDIX D

Laboratory Analytical Reports for Groundwater Samples

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

June 28, 1999

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 11, 1999. The sample(s) was assigned to Certificate of Analysis No. (s) 9906478 and analyzed for all parameters as listed on the chain of custody.

Please note that your sample ID's: MW-9, MW-12, MW-3, MW-1, Dup and the trip blank #3 sample have low concentrations of Toluene detected. This analyte was not present in the method blank. There has been a recent problem with Toluene showing up in the trip blank and samples. SPL has performed many internal studies and have concluded that the glue used on the sample bottle labels have high concentrations of toluene. SPL has taken corrective actions to prevent any further occurrences.

Any other data flags or quality control exceptions associated with this report will be footnoted in the analytical result 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: 99-06-478

Approved for Release by:

Bernadette A. Fini, Senior Project Manager — 6-28-99 Date

Joel Grice
Laboratory Director

Idelis Williams
Corporate Quality Assurance Director

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

Certificate of Analysis No. H9-9906478-01

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

DATE: 06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-7

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99 10:45:00
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.10 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	80		
1,4-Difluorobenzene	73		
Method 8015B *** for Gasoline			
Analyzed by: DR			
Date: 06/15/99			
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	90		
Method 8021B ***			
Analyzed by: DR			
Date: 06/15/99			
Total Petroleum Hydrocarbons-Diesel	ND	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	32		
Method 8015B *** for Diesel			
Analyzed by: APR			
Date: 06/17/99 08:51:00			

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. H9-9906478-02

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

DATE: 06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-8

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99 11:20:00
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.10 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	83		
1,4-Difluorobenzene	73		
Method 8015B *** for Gasoline			
Analyzed by: DR			
Date: 06/16/99			
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	93		
Method 8021B ***			
Analyzed by: DR			
Date: 06/16/99			
Total Petroleum Hydrocarbons-Diesel	ND	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	58		
Method 8015B *** for Diesel			
Analyzed by: APR			
Date: 06/17/99 09:37:00			

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. H9-9906478-03

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

DATE: 06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-5

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99 11:50:00
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.10 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	97		
1,4-Difluorobenzene	73		
Method 8015B *** for Gasoline			
Analyzed by: DR			
Date: 06/15/99			
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	83		
4-Bromofluorobenzene	90		
Method 8021B ***			
Analyzed by: DR			
Date: 06/15/99			
Total Petroleum Hydrocarbons-Diesel	ND	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	64		
Method 8015B *** for Diesel			
Analyzed by: APR			
Date: 06/17/99 10:22:00			

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. H9-9906478-03

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

DATE: 06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-5

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99 11:50:00
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Methane	ND	0.0012 P	mg/L
Ethylene	ND	0.0032 P	mg/L
Ethane	ND	0.0025 P	mg/L
RSKSOP-147			
Analyzed by: JDR			
Date: 06/24/99 12:48:00			
Nitrate (as N)	4.73	0.1	mg/L N
Method 300.0 *			
Analyzed by: ELS			
Date: 06/11/99 16:53:00			
Sulfate	209	4.0	mg/L
Method 300.0 *			
Analyzed by: ELS			
Date: 06/11/99 11:00:00			

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. H9-9906478-04

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

DATE: 06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-9

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99 16:45:00
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	0.43	0.10 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	100		
1,4-Difluorobenzene	77		
Method 8015B *** for Gasoline			
Analyzed by: DR			
Date: 06/15/99			
BENZENE	ND	1.0 P	ug/L
TOLUENE	1.8	1.0 P	ug/L
ETHYLBENZENE	1.8	1.0 P	ug/L
TOTAL XYLENE	71	1.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	74.6		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	87		
4-Bromofluorobenzene	97		
Method 8021B ***			
Analyzed by: DR/			
Date: 06/16/99			
Total Petroleum Hydrocarbons-Diesel	ND	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	70		
Method 8015B *** for Diesel			
Analyzed by: APR			
Date: 06/17/99 11:07:00			

(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. H9-9906478-05

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

DATE: 06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-11A

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99 12:30:00
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.10 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	87		
1,4-Difluorobenzene	77		
Method 8015B *** for Gasoline			
Analyzed by: DR			
Date: 06/15/99			
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	93		
Method 8021B ***			
Analyzed by: DR			
Date: 06/15/99			
Total Petroleum Hydrocarbons-Diesel	ND	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	64		
Method 8015B *** for Diesel			
Analyzed by: APR			
Date: 06/17/99 11:52:00			

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. H9-9906478-05

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

DATE: 06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-11A

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99 12:30:00
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT		UNITS
Methane	0.019	0.0012	P	mg/L
Ethylene	ND	0.0032	P	mg/L
Ethane	ND	0.0025	P	mg/L
RSKSOP-147				
Analyzed by: JDR				
Date: 06/24/99 01:00:00				
Nitrate (as N)	ND	0.1		mg/L N
Method 300.0 *				
Analyzed by: ELS				
Date: 06/11/99 16:53:00				
Sulfate	219	4.0		mg/L
Method 300.0 *				
Analyzed by: ELS				
Date: 06/11/99 11:00:00				

(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. H9-9906478-06

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

DATE: 06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-10

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99 13:05:00
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	0.16	0.10 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	87		
1,4-Difluorobenzene	73		
Method 8015B *** for Gasoline			
Analyzed by: DR			
Date: 06/15/99			
BENZENE	17	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	17		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	90		
4-Bromofluorobenzene	90		
Method 8021B ***			
Analyzed by: DR			
Date: 06/15/99			
Total Petroleum Hydrocarbons-Diesel	0.30	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	72		
Method 8015B *** for Diesel			
Analyzed by: APR			
Date: 06/18/99 12:38:00			

(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. H9-9906478-06

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

DATE: 06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-10

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99 13:05:00
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Methane	0.036	0.0012 P	mg/L
Ethylene	ND	0.0032 P	mg/L
Ethane	ND	0.0025 P	mg/L
RSKSOP-147			
Analyzed by: JDR			
Date: 06/24/99 01:10:00			
Nitrate (as N)	ND	0.1	mg/L N
Method 300.0 *			
Analyzed by: ELS			
Date: 06/11/99 16:53:00			
Sulfate	181	4.0	mg/L
Method 300.0 *			
Analyzed by: ELS			
Date: 06/11/99 11:00:00			

(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. H9-9906478-07

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

DATE: 06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-12

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99 13:50:00
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	0.13	0.10 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	80		
1,4-Difluorobenzene	80		
Method 8015B *** for Gasoline			
Analyzed by: DR			
Date: 06/15/99			
BENZENE	49	1.0 P	ug/L
TOLUENE	1.4	1.0 P	ug/L
ETHYLBENZENE	ND	1.0 P	ug/L
TOTAL XYLENE	ND	1.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	50.4		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	103		
4-Bromofluorobenzene	90		
Method 8021B ***			
Analyzed by: DR			
Date: 06/15/99			
Total Petroleum Hydrocarbons-Diesel	0.22	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	64		
Method 8015B *** for Diesel			
Analyzed by: APR			
Date: 06/18/99 01:23:00			

(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. H9-9906478-07

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

DATE: 06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-12

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99 13:50:00
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Methane	ND	0.0012 P	mg/L
Ethylene	ND	0.0032 P	mg/L
Ethane	ND	0.0025 P	mg/L
RSKSOP-147			
Analyzed by: JDR			
Date: 06/24/99 01:32:00			
Nitrate (as N)	ND	0.1	mg/L N
Method 300.0 *			
Analyzed by: ELS			
Date: 06/11/99 16:53:00			
Sulfate	217	4.0	mg/L
Method 300.0 *			
Analyzed by: ELS			
Date: 06/11/99 11:00:00			

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. H9-9906478-08

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

DATE: 06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-3

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99 14:25:00
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	0.18	0.10 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	83		
1,4-Difluorobenzene	70		
Method 8015B *** for Gasoline			
Analyzed by: DR			
Date: 06/15/99			
BENZENE	1.7	1.0 P	ug/L
TOLUENE	3.1	1.0 P	ug/L
ETHYLBENZENE	ND	1.0 P	ug/L
TOTAL XYLENE	36	1.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	40.8		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	87		
4-Bromofluorobenzene	97		
Method 8021B ***			
Analyzed by: DR/			
Date: 06/16/99			
Total Petroleum Hydrocarbons-Diesel	ND	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	58		
Method 8015B *** for Diesel			
Analyzed by: APR			
Date: 06/18/99 02:08:00			

(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. H9-9906478-09

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

DATE: 06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-4

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99 16:00:00
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	0.63	0.10 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	107		
1,4-Difluorobenzene	107		
Method 8015B *** for Gasoline			
Analyzed by: DR			
Date: 06/15/99			
BENZENE	ND	1.0 P	ug/L
TOLUENE	ND	1.0 P	ug/L
ETHYLBENZENE	12	1.0 P	ug/L
TOTAL XYLENE	12	1.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	24		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	97		
4-Bromofluorobenzene	93		
Method 8021B ***			
Analyzed by: DR/			
Date: 06/16/99			
Total Petroleum Hydrocarbons-Diesel	0.44	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	64		
Method 8015B *** for Diesel			
Analyzed by: APR			
Date: 06/18/99 02:53:00			

(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. H9-9906478-10

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

DATE: 06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-1

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99 15:10:00
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	0.55	0.10 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	97		
1,4-Difluorobenzene	73		
Method 8015B *** for Gasoline			
Analyzed by: DR			
Date: 06/15/99			
BENZENE	ND	1.0 P	ug/L
TOLUENE	1.1	1.0 P	ug/L
ETHYLBENZENE	ND	1.0 P	ug/L
TOTAL XYLENE	28	1.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	29.1		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	87		
4-Bromofluorobenzene	97		
Method 8021B ***			
Analyzed by: DR/			
Date: 06/16/99			
Total Petroleum Hydrocarbons-Diesel	0.53	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	68		
Method 8015B *** for Diesel			
Analyzed by: APR			
Date: 06/18/99 03:39:00			

(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. H9-9906478-11

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

DATE: 06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: OSW-4

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99 17:35:00
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.10 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	87		
1,4-Difluorobenzene	77		
Method 8015B *** for Gasoline			
Analyzed by: YN			
Date: 06/17/99			
BENZENE	ND	1.0 P	ug/L
TOLUENE	ND	1.0 P	ug/L
ETHYLBENZENE	ND	1.0 P	ug/L
TOTAL XYLENE	4.4	1.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	4.4		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	90		
4-Bromofluorobenzene	87		
Method 8021B ***			
Analyzed by: YN			
Date: 06/17/99			
Total Petroleum Hydrocarbons-Diesel	ND	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	36		
Method 8015B *** for Diesel			
Analyzed by: APR			
Date: 06/18/99 05:55:00			

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.

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

Certificate of Analysis No. H9-9906478-11

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

DATE: 06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: OSW-4

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99 17:35:00
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Methane	ND	0.0012 P	mg/L
Ethylene	ND	0.0032 P	mg/L
Ethane	ND	0.0025 P	mg/L
RSKSOP-147			
Analyzed by: JDR			
Date: 06/24/99 01:41:00			
Chloride	266	5	mg/L
Method 325.3 *			
Analyzed by: CV			
Date: 06/21/99 14:30:00			
Fluoride	3.45	0.1	mg/L
Method 300.0 *			
Analyzed by: ELS			
Date: 06/15/99 09:00:00			
Nitrate (as N)	3.96	0.1	mg/L N
Method 300.0 *			
Analyzed by: ELS			
Date: 06/11/99 12:59:00			
Sulfate	192	4.0	mg/L
Method 300.0 *			
Analyzed by: ELS			
Date: 06/11/99 11:00:00			

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.

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PHONE (713) 660-0901

Certificate of Analysis No. H9-9906478-11

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

DATE: 06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: OSW-4

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99 17:35:00
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Silver, Total Method 6010B *** Analyzed by: PB Date: 06/15/99 08:18:00	ND	0.01	mg/L
Arsenic, Total Method 6010B *** Analyzed by: EG Date: 06/15/99 11:16:00	ND	0.005	mg/L
Barium, Total Method 6010B *** Analyzed by: PB Date: 06/15/99 08:18:00	0.062	0.005	mg/L
Calcium, Total Method 6010B *** Analyzed by: PB Date: 06/15/99 08:18:00	141	0.1	mg/L
Cadmium, Total Method 6010B *** Analyzed by: PB Date: 06/15/99 08:18:00	ND	0.005	mg/L
Chromium, Total Method 6010B *** Analyzed by: PB Date: 06/15/99 08:18:00	ND	0.01	mg/L

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.

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

Certificate of Analysis No. H9-9906478-11

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

DATE: 06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: OSW-4

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99 17:35:00
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Mercury, Total Method 7470 A*** Analyzed by: AG Date: 06/24/99 11:07:00	ND	0.0002	mg/L
Potassium, Total Method 6010B *** Analyzed by: PB Date: 06/15/99 08:18:00	3	2	mg/L
Magnesium, Total Method 6010B *** Analyzed by: PB Date: 06/15/99 08:18:00	44.3	0.1	mg/L
Sodium, Total Method 6010B *** Analyzed by: PB Date: 06/15/99 08:18:00	103	0.5	mg/L
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: MR Date: 06/14/99 13:00:00	06/14/99		
Lead, Total Method 6010B *** Analyzed by: EG Date: 06/15/99 11:16:00	ND	0.005	mg/L

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.

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PHONE (713) 660-0901

Certificate of Analysis No. H9-9906478-11

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

DATE: 06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: OSW-4

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99 17:35:00
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Selenium, Total Method 6010B *** Analyzed by: EG Date: 06/15/99 11:16:00	0.005	0.005	mg/L
Carbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 06/14/99 16:00:00	ND	1	mg/L
Bicarbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 06/14/99 16:00:00	316	1	mg/L
Liquid-liquid extraction SEMIVOLATILES Method 3520C *** Analyzed by: KL Date: 06/11/99 08:00:00	06/11/99		

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. H9-9906478-11

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

06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: OSW-4

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99 17:35:00
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	ND	0.1	ug/L
Acenaphthylene	ND	0.1	ug/L
Acenaphthene	ND	0.1	ug/L
Fluorene	ND	0.1	ug/L
Phenanthrene	ND	0.1	ug/L
Anthracene	ND	0.1	ug/L
Fluoranthene	ND	0.1	ug/L
Pyrene	ND	0.1	ug/L
Chrysene	ND	0.1	ug/L
Benzo (a) anthracene	ND	0.1	ug/L
Benzo (b) fluoranthene	ND	0.1	ug/L
Benzo (k) fluoranthene	ND	0.1	ug/L
Benzo (a) pyrene	ND	0.1	ug/L
Dibenzo (a,h) anthracene	ND	0.1	ug/L
Benzo (g,h,i) perylene	ND	0.1	ug/L
Indeno (1,2,3-cd) pyrene	ND	0.1	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1-Fluoronaphthalene	0.50 ug/L	64	50	150
Phenanthrene d-10	0.50 ug/L	71	50	150

ANALYZED BY: KA DATE/TIME: 06/16/99 20:51:24
EXTRACTED BY: KL DATE/TIME: 06/14/99 12:00:00
METHOD: 8310 Polynuclear Aromatic Hydrocarbons
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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. H9-9906478-11

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

06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: OSW-4

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99 17:35:00
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Benzene	ND	5	ug/L
Bromobenzene	ND	5	ug/L
Bromochloromethane	ND	5	ug/L
Bromodichloromethane	ND	5	ug/L
Bromoform	ND	5	ug/L
Bromomethane	ND	10	ug/L
n-Butylbenzene	ND	5	ug/L
sec-Butylbenzene	ND	5	ug/L
tert-Butylbenzene	ND	5	ug/L
Carbon tetrachloride	ND	5	ug/L
Chlorobenzene	ND	5	ug/L
Chlorodibromomethane	ND	5	ug/L
Chloroethane	ND	10	ug/L
Chloroform	ND	5	ug/L
Chloromethane	ND	10	ug/L
2-Chlorotoluene	ND	5	ug/L
4-Chlorotoluene	ND	5	ug/L
1,2-Dibromo-3-chloropropane	ND	5	ug/L
1,2-Dibromoethane	ND	5	ug/L
Dibromomethane	ND	5	ug/L
1,2-Dichlorobenzene	ND	5	ug/L
1,3-Dichlorobenzene	ND	5	ug/L
1,4-Dichlorobenzene	ND	5	ug/L
Dichlorodifluoromethane	ND	10	ug/L
1,1-Dichloroethane	ND	5	ug/L
1,2-Dichloroethane	ND	5	ug/L
1,1-Dichloroethene	ND	5	ug/L
cis-1,2-Dichloroethene	ND	5	ug/L
trans-1,2-Dichloroethene	ND	5	ug/L
1,2-Dichloropropane	ND	5	ug/L
1,3-Dichloropropane	ND	5	ug/L
2,2-Dichloropropane	ND	5	ug/L
1,1-Dichloropropene	ND	5	ug/L
Ethylbenzene	ND	5	ug/L
Hexachlorobutadiene	ND	5	ug/L
Isopropylbenzene	ND	5	ug/L
p-Isopropyltoluene	ND	5	ug/L
Methylene chloride	ND	5	ug/L

METHOD: 8260 Water, Volatile Organics
(continued on next page)

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

Certificate of Analysis No. H9-9906478-11

Brown and Caldwell

SAMPLE ID: OSW-4

ANALYTICAL DATA (continued)

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	ND	5	ug/L
n-Propylbenzene	ND	5	ug/L
Styrene	ND	5	ug/L
1,1,1,2-Tetrachloroethane	ND	5	ug/L
1,1,2,2-Tetrachloroethane	ND	5	ug/L
Tetrachloroethene	ND	5	ug/L
Toluene	ND	5	ug/L
1,2,3-Trichlorobenzene	ND	5	ug/L
1,2,4-Trichlorobenzene	ND	5	ug/L
1,1,1-Trichloroethane	ND	5	ug/L
1,1,2-Trichloroethane	ND	5	ug/L
Trichloroethene	ND	5	ug/L
Trichlorofluoromethane	ND	5	ug/L
1,2,3-Trichloropropane	ND	5	ug/L
1,2,4-Trimethylbenzene	ND	5	ug/L
1,3,5-Trimethylbenzene	ND	5	ug/L
Vinyl chloride	ND	10	ug/L
Xylenes (total)	ND	5	ug/L
1,2-Dichloroethene (total)	ND	5	ug/L
cis-1,3-Dichloropropene	ND	5	ug/L
trans-1,3-Dichloropropene	ND	5	ug/L
Acetone	ND	100	ug/L
2-Butanone	ND	20	ug/L
4-Methyl-2-Pentanone	ND	10	ug/L
2-Hexanone	ND	10	ug/L
Carbon Disulfide	ND	5	ug/L
Vinyl Acetate	ND	10	ug/L
2-Chloroethylvinylether	ND	10	ug/L
Methyl t-Butyl Ether	ND	10	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1,2-Dichloroethane-d4	50 ug/L	98	80	120
Toluene-d8	50 ug/L	100	88	110
4-Bromofluorobenzene	50 ug/L	104	86	115

ANALYZED BY: LT DATE/TIME: 06/12/99 16:38:00
METHOD: 8260 Water, Volatile Organics
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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. H9-9906478-11

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

06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: OSW-4

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99 17:35:00
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Acenaphthene	ND	5	ug/L
Acenaphthylene	ND	5	ug/L
Aniline	ND	5	ug/L
Anthracene	ND	5	ug/L
Benzo(a)Anthracene	ND	5	ug/L
Benzo(b)Fluoranthene	ND	5	ug/L
Benzo(k)Fluoranthene	ND	5	ug/L
Benzo(a)Pyrene	ND	5	ug/L
Benzoic Acid	ND	25	ug/L
Benzo(g,h,i)Perylene	ND	5	ug/L
Benzyl alcohol	ND	5	ug/L
4-Bromophenylphenyl ether	ND	5	ug/L
Butylbenzylphthalate	ND	5	ug/L
di-n-Butyl phthalate	ND	5	ug/L
Carbazole	ND	5	ug/L
4-Chloroaniline	ND	5	ug/L
bis(2-Chloroethoxy)Methane	ND	5	ug/L
bis(2-Chloroethyl)Ether	ND	5	ug/L
bis(2-Chloroisopropyl)Ether	ND	5	ug/L
4-Chloro-3-Methylphenol	ND	5	ug/L
2-Chloronaphthalene	ND	5	ug/L
2-Chlorophenol	ND	5	ug/L
4-Chlorophenylphenyl ether	ND	5	ug/L
Chrysene	ND	5	ug/L
Dibenz(a,h)Anthracene	ND	5	ug/L
Dibenzofuran	ND	5	ug/L
1,2-Dichlorobenzene	ND	5	ug/L
1,3-Dichlorobenzene	ND	5	ug/L
1,4-Dichlorobenzene	ND	5	ug/L
3,3'-Dichlorobenzidine	ND	10	ug/L
2,4-Dichlorophenol	ND	5	ug/L
Diethylphthalate	ND	5	ug/L
2,4-Dimethylphenol	ND	5	ug/L
Dimethyl Phthalate	ND	5	ug/L
4,6-Dinitro-2-Methylphenol	ND	25	ug/L
2,4-Dinitrophenol	ND	25	ug/L
2,4-Dinitrotoluene	ND	5	ug/L
2,6-Dinitrotoluene	ND	5	ug/L

METHOD: 8270C, Semivolatile Organics - Water

(continued on next page)

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

Certificate of Analysis No. H9-9906478-11

Brown and Caldwell

SAMPLE ID: OSW-4

ANALYTICAL DATA (continued)

PARAMETER	RESULTS	PQL*	UNITS
1,2-Diphenylhydrazine	ND	5	ug/L
bis(2-Ethylhexyl)Phthalate	ND	5	ug/L
Fluoranthene	ND	5	ug/L
Fluorene	ND	5	ug/L
Hexachlorobenzene	ND	5	ug/L
Hexachlorobutadiene	ND	5	ug/L
Hexachloroethane	ND	5	ug/L
Hexachlorocyclopentadiene	ND	5	ug/L
Indeno(1,2,3-cd)Pyrene	ND	5	ug/L
Isophorone	ND	5	ug/L
2-Methylnaphthalene	ND	5	ug/L
2-Methylphenol	ND	5	ug/L
4-Methylphenol	ND	5	ug/L
Naphthalene	ND	5	ug/L
2-Nitroaniline	ND	25	ug/L
3-Nitroaniline	ND	25	ug/L
4-Nitroaniline	ND	25	ug/L
Nitrobenzene	ND	5	ug/L
2-Nitrophenol	ND	5	ug/L
4-Nitrophenol	ND	25	ug/L
N-Nitrosodiphenylamine	ND	5	ug/L
N-Nitroso-Di-n-Propylamine	ND	5	ug/L
Di-n-Octyl Phthalate	ND	5	ug/L
Pentachlorophenol	ND	25	ug/L
Phenanthrene	ND	5	ug/L
Phenol	ND	5	ug/L
Pyrene	ND	5	ug/L
Pyridine	ND	5	ug/L
1,2,4-Trichlorobenzene	ND	5	ug/L
2,4,5-Trichlorophenol	ND	10	ug/L
2,4,6-Trichlorophenol	ND	5	ug/L

METHOD: 8270C, Semivolatile Organics - Water

(continued on next page)

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

Certificate of Analysis No. H9-9906478-11

Brown and Caldwell

SAMPLE ID: OSW-4

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
Nitrobenzene-d5	50 ug/L	76	35	114
2-Fluorobiphenyl	50 ug/L	66	43	116
Terphenyl-d14	50 ug/L	64	33	141
Phenol-d5	75 ug/L	23	10	110
2-Fluorophenol	75 ug/L	39	21	110
2,4,6-Tribromophenol	75 ug/L	80	10	123

ANALYZED BY: YL DATE/TIME: 06/14/99 19:50:00
EXTRACTED BY: KL DATE/TIME: 06/11/99 08:00:00
METHOD: 8270C, Semivolatile Organics - Water
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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. H9-9906478-12

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

DATE: 06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Brown and Caldwell
SAMPLE ID: Dup

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	0.76	0.10 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	90		
1,4-Difluorobenzene	77		
Method 8015B *** for Gasoline			
Analyzed by: YN			
Date: 06/17/99			
BENZENE	ND	1.0 P	ug/L
TOLUENE	1.8	1.0 P	ug/L
ETHYLBENZENE	ND	1.0 P	ug/L
TOTAL XYLENE	41	1.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	42.8		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	83		
4-Bromofluorobenzene	93		
Method 8021B ***			
Analyzed by: YN			
Date: 06/17/99			
Total Petroleum Hydrocarbons-Diesel	0.69	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	62		
Method 8015B *** for Diesel			
Analyzed by: APR			
Date: 06/18/99 06:40:00			

(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. H9-9906478-13

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

DATE: 06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Provided by SPL
SAMPLE ID: Trip Blank #1 5/28/99

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.10 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	83		
1,4-Difluorobenzene	73		
Method 8015B *** for Gasoline			
Analyzed by: YN			
Date: 06/17/99			
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	93		
4-Bromofluorobenzene	93		
Method 8021B ***			
Analyzed by: YN			
Date: 06/17/99			

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. H9-9906478-14

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

DATE: 06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Provided by SPL
SAMPLE ID: Trip Blank #2 5/28/99

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.10 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	83		
1,4-Difluorobenzene	77		
Method 8015B *** for Gasoline			
Analyzed by: YN			
Date: 06/17/99			
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	93		
4-Bromofluorobenzene	93		
Method 8021B ***			
Analyzed by: YN			
Date: 06/17/99			

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. H9-9906478-15

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

06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Provided by SPL
SAMPLE ID: Trip Blank #3 5/28/99

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Benzene	ND	5	ug/L
Bromobenzene	ND	5	ug/L
Bromochloromethane	ND	5	ug/L
Bromodichloromethane	ND	5	ug/L
Bromoform	ND	5	ug/L
Bromomethane	ND	10	ug/L
n-Butylbenzene	ND	5	ug/L
sec-Butylbenzene	ND	5	ug/L
tert-Butylbenzene	ND	5	ug/L
Carbon tetrachloride	ND	5	ug/L
Chlorobenzene	ND	5	ug/L
Chlorodibromomethane	ND	5	ug/L
Chloroethane	ND	10	ug/L
Chloroform	ND	5	ug/L
Chloromethane	ND	10	ug/L
2-Chlorotoluene	ND	5	ug/L
4-Chlorotoluene	ND	5	ug/L
1,2-Dibromo-3-chloropropane	ND	5	ug/L
1,2-Dibromoethane	ND	5	ug/L
Dibromomethane	ND	5	ug/L
1,2-Dichlorobenzene	ND	5	ug/L
1,3-Dichlorobenzene	ND	5	ug/L
1,4-Dichlorobenzene	ND	5	ug/L
Dichlorodifluoromethane	ND	10	ug/L
1,1-Dichloroethane	ND	5	ug/L
1,2-Dichloroethane	ND	5	ug/L
1,1-Dichloroethene	ND	5	ug/L
cis-1,2-Dichloroethene	ND	5	ug/L
trans-1,2-Dichloroethene	ND	5	ug/L
1,2-Dichloropropane	ND	5	ug/L
1,3-Dichloropropane	ND	5	ug/L
2,2-Dichloropropane	ND	5	ug/L
1,1-Dichloropropene	ND	5	ug/L
Ethylbenzene	ND	5	ug/L
Hexachlorobutadiene	ND	5	ug/L
Isopropylbenzene	ND	5	ug/L
p-Isopropyltoluene	ND	5	ug/L
Methylene chloride	ND	5	ug/L

METHOD: 8260 Water, Volatile Organics
(continued on next page)

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

Certificate of Analysis No. H9-9906478-15

Brown and Caldwell

SAMPLE ID: Trip Blank #3 5/28/99

ANALYTICAL DATA (continued)

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	ND	5	ug/L
n-Propylbenzene	ND	5	ug/L
Styrene	ND	5	ug/L
1,1,1,2-Tetrachloroethane	ND	5	ug/L
1,1,2,2-Tetrachloroethane	ND	5	ug/L
Tetrachloroethene	ND	5	ug/L
Toluene	9	5	ug/L
1,2,3-Trichlorobenzene	ND	5	ug/L
1,2,4-Trichlorobenzene	ND	5	ug/L
1,1,1-Trichloroethane	ND	5	ug/L
1,1,2-Trichloroethane	ND	5	ug/L
Trichloroethene	ND	5	ug/L
Trichlorofluoromethane	ND	5	ug/L
1,2,3-Trichloropropane	ND	5	ug/L
1,2,4-Trimethylbenzene	ND	5	ug/L
1,3,5-Trimethylbenzene	ND	5	ug/L
Vinyl chloride	ND	10	ug/L
Xylenes (total)	ND	5	ug/L
1,2-Dichloroethene (total)	ND	5	ug/L
cis-1,3-Dichloropropene	ND	5	ug/L
trans-1,3-Dichloropropene	ND	5	ug/L
Acetone	ND	100	ug/L
2-Butanone	ND	20	ug/L
4-Methyl-2-Pentanone	ND	10	ug/L
2-Hexanone	ND	10	ug/L
Carbon Disulfide	ND	5	ug/L
Vinyl Acetate	ND	10	ug/L
2-Chloroethylvinylether	ND	10	ug/L
Methyl t-Butyl Ether	ND	10	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1,2-Dichloroethane-d4	50 ug/L	96	80	120
Toluene-d8	50 ug/L	100	88	110
4-Bromofluorobenzene	50 ug/L	106	86	115

ANALYZED BY: LT DATE/TIME: 06/12/99 16:12:00
METHOD: 8260 Water, Volatile Organics
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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. H9-9906478-16

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

06/25/99

PROJECT: BJ-Hobbs
SITE:
SAMPLED BY: Provided by SPL
SAMPLE ID: Trip Blank #4 5/28/99

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 06/10/99
DATE RECEIVED: 06/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Benzene	ND	5	ug/L
Bromobenzene	ND	5	ug/L
Bromochloromethane	ND	5	ug/L
Bromodichloromethane	ND	5	ug/L
Bromoform	ND	5	ug/L
Bromomethane	ND	10	ug/L
n-Butylbenzene	ND	5	ug/L
sec-Butylbenzene	ND	5	ug/L
tert-Butylbenzene	ND	5	ug/L
Carbon tetrachloride	ND	5	ug/L
Chlorobenzene	ND	5	ug/L
Chlorodibromomethane	ND	5	ug/L
Chloroethane	ND	10	ug/L
Chloroform	ND	5	ug/L
Chloromethane	ND	10	ug/L
2-Chlorotoluene	ND	5	ug/L
4-Chlorotoluene	ND	5	ug/L
1,2-Dibromo-3-chloropropane	ND	5	ug/L
1,2-Dibromoethane	ND	5	ug/L
Dibromomethane	ND	5	ug/L
1,2-Dichlorobenzene	ND	5	ug/L
1,3-Dichlorobenzene	ND	5	ug/L
1,4-Dichlorobenzene	ND	5	ug/L
Dichlorodifluoromethane	ND	10	ug/L
1,1-Dichloroethane	ND	5	ug/L
1,2-Dichloroethane	ND	5	ug/L
1,1-Dichloroethene	ND	5	ug/L
cis-1,2-Dichloroethene	ND	5	ug/L
trans-1,2-Dichloroethene	ND	5	ug/L
1,2-Dichloropropane	ND	5	ug/L
1,3-Dichloropropane	ND	5	ug/L
2,2-Dichloropropane	ND	5	ug/L
1,1-Dichloropropene	ND	5	ug/L
Ethylbenzene	ND	5	ug/L
Hexachlorobutadiene	ND	5	ug/L
Isopropylbenzene	ND	5	ug/L
p-Isopropyltoluene	ND	5	ug/L
Methylene chloride	ND	5	ug/L

METHOD: 8260 Water, Volatile Organics
(continued on next page)

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

Certificate of Analysis No. H9-9906478-16

Brown and Caldwell

SAMPLE ID: Trip Blank #4 5/28/99

ANALYTICAL DATA (continued)

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	ND	5	ug/L
n-Propylbenzene	ND	5	ug/L
Styrene	ND	5	ug/L
1,1,1,2-Tetrachloroethane	ND	5	ug/L
1,1,2,2-Tetrachloroethane	ND	5	ug/L
Tetrachloroethene	ND	5	ug/L
Toluene	ND	5	ug/L
1,2,3-Trichlorobenzene	ND	5	ug/L
1,2,4-Trichlorobenzene	ND	5	ug/L
1,1,1-Trichloroethane	ND	5	ug/L
1,1,2-Trichloroethane	ND	5	ug/L
Trichloroethene	ND	5	ug/L
Trichlorofluoromethane	ND	5	ug/L
1,2,3-Trichloropropane	ND	5	ug/L
1,2,4-Trimethylbenzene	ND	5	ug/L
1,3,5-Trimethylbenzene	ND	5	ug/L
Vinyl chloride	ND	10	ug/L
Xylenes (total)	ND	5	ug/L
1,2-Dichloroethene (total)	ND	5	ug/L
cis-1,3-Dichloropropene	ND	5	ug/L
trans-1,3-Dichloropropene	ND	5	ug/L
Acetone	ND	100	ug/L
2-Butanone	ND	20	ug/L
4-Methyl-2-Pentanone	ND	10	ug/L
2-Hexanone	ND	10	ug/L
Carbon Disulfide	ND	5	ug/L
Vinyl Acetate	ND	10	ug/L
2-Chloroethylvinylether	ND	10	ug/L
Methyl t-Butyl Ether	ND	10	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1,2-Dichloroethane-d4	50 ug/L	94	80	120
Toluene-d8	50 ug/L	96	88	110
4-Bromofluorobenzene	50 ug/L	104	86	115

ANALYZED BY: LT DATE/TIME: 06/12/99 17:04:00
METHOD: 8260 Water, Volatile Organics
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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

QUALITY CONTROL

DOCUMENTATION

3A

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SPL Contract:

Lab Code: Case No.: 9906531 SAS No.: SDG No.:

Matrix Spike - EPA Sample No.: Red #7

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC. LIMITS REC.
1,1-Dichloroethene	50	0	60	120	61-145
Trichloroethene	50	0	55	110	71-120
Benzene	50	0	53	106	76-127
Toluene	50	0	48	96	76-125
Chlorobenzene	50	0	47	94	75-130

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene	50	57	114	5	14	61-145
Trichloroethene	50	55	110	0	14	71-120
Benzene	50	52	104	2	11	76-127
Toluene	50	47	94	2	13	76-125
Chlorobenzene	50	46	92	2	13	75-130

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits due to matrix interference

RPD: 0 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

SPL Houston Labs

RECOVERY REPORT

Client Name: Client SDG: l990614
Sample Matrix: LIQUID Fraction: VOA
Lab Smp Id: METHSPIKE-8260W
Level: LOW Operator: LT
Data Type: MS DATA SampleType: METHSPIKE
SpikeList File: 8260_water.spk Quant Type: ISTD
Sublist File: 8260_lcs.sub
Method File: /var/chem/l.i/l990614.b/l8260aw.m
Misc Info: L165W1/L165B01/L165CW1

SPIKE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
8 1,1-Dichloroethene	50	59	118.00	61-145
29 Trichloroethene	50	53	106.00	71-120
25 Benzene	50	52	104.00	76-127
37 Toluene	50	47	94.00	76-125
45 Chlorobenzene	50	47	94.00	75-130

SURROGATE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
$ 21 1,2-Dichloroethane	50	49	98.00	80-120
$ 36 Toluene-d8	50	48	96.00	88-110
$ 56 Bromofluorobenzene	50	52	104.00	86-115

3A

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SPL Contract:

Lab Code: Case No.: 9906520 SAS No.: SDG No.:

Matrix Spike - EPA Sample No.: DW-4

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC. LIMITS REC.
1,1-Dichloroethene	50	0	63	126	61-145
Trichloroethene	50	0	55	110	71-120
Benzene	50	0	54	108	76-127
Toluene	50	0	51	102	76-125
Chlorobenzene	50	0	50	100	75-130

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene	50	58	116	8	14	61-145
Trichloroethene	50	51	102	8	14	71-120
Benzene	50	50	100	8	11	76-127
Toluene	50	46	92	10	13	76-125
Chlorobenzene	50	46	92	8	13	75-130

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits due to matrix interference

RPD: 0 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

SPL Houston Labs

RECOVERY REPORT

Client Name: Client SDG: l990612
Sample Matrix: LIQUID Fraction: VOA
Lab Smp Id: METHSPIKE-8260W
Level: LOW Operator: LT
Data Type: MS DATA SampleType: METHSPIKE
SpikeList File: 8260_water.spk Quant Type: ISTD
Sublist File: 8260_lcs.sub
Method File: /var/chem/l.i/l990612.b/l8260aw.m
Misc Info: L163W1/L163B01/L163CW1

SPIKE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
8 1,1-Dichloroethene	50	59	118.00	61-145
29 Trichloroethene	50	52	104.00	71-120
25 Benzene	50	52	104.00	76-127
37 Toluene	50	48	96.00	76-125
45 Chlorobenzene	50	47	94.00	75-130

SURROGATE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
$ 21 1,2-Dichloroethane	50	48	96.00	80-120
$ 36 Toluene-d8	50	50	100.00	88-110
$ 56 Bromofluorobenzene	50	51	102.00	86-115

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: VLBLK
Batch: L990612104642

Reported on: 06/21/99 17:29
Analyzed on: 06/12/99 10:29
Analyst: LT

METHOD 8260 L163B01

Compound	Result	Detection Limit	Units
Dichlorodifluoromethane	ND	10	ug/L
Chloromethane	ND	10	ug/L
Vinyl Chloride	ND	10	ug/L
Bromomethane	ND	10	ug/L
Chloroethane	ND	10	ug/L
Trichlorofluoromethane	ND	5	ug/L
Acetone	ND	100	ug/L
1,1-Dichloroethene	ND	5	ug/L
Methylene Chloride	ND	5	ug/L
Carbon Disulfide	ND	5	ug/L
trans-1,2-Dichloroethene	ND	5	ug/L
1,1-Dichloroethane	ND	5	ug/L
Vinyl Acetate	ND	10	ug/L
2-Butanone	ND	20	ug/L
cis-1,2-Dichloroethene	ND	5	ug/L
1,2-Dichloroethene (total)	ND	5	ug/L
1,2-Dichloropropane	ND	5	ug/L
Bromochloromethane	ND	5	ug/L
Chloroform	ND	5	ug/L
1,1,1-Trichloroethane	ND	5	ug/L
1,2-Dichloroethane	ND	5	ug/L
1,1-Dichloropropene	ND	5	ug/L
Benzene	ND	5	ug/L
Carbon Tetrachloride	ND	5	ug/L
1,2-Dichloropropane	ND	5	ug/L
Trichloroethene	ND	5	ug/L
Dibromomethane	ND	5	ug/L
Bromodichloromethane	ND	5	ug/L
2-Chloroethylvinylether	ND	10	ug/L
4-Methyl-2-Pentanone	ND	10	ug/L
cis-1,3-Dichloropropene	ND	5	ug/L
trans-1,3-Dichloropropene	ND	5	ug/L
Toluene	ND	5	ug/L
1,1,2-Trichloroethane	ND	5	ug/L

Notes
ND - Not detected.

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: VLBLK
Batch: L990612104642

Reported on: 06/21/99 17:29
Analyzed on: 06/12/99 10:29
Analyst: LT

METHOD 8260 L163B01

Compound	Result	Detection Limit	Units
1,3-Dichloropropane	ND	5	ug/L
2-Hexanone	ND	10	ug/L
Dibromochloromethane	ND	5	ug/L
1,2-Dibromoethane	ND	5	ug/L
Tetrachloroethene	ND	5	ug/L
Chlorobenzene	ND	5	ug/L
1,1,1,2-Tetrachloroethane	ND	5	ug/L
Ethylbenzene	ND	5	ug/L
Bromoform	ND	5	ug/L
Styrene	ND	5	ug/L
Xylene (Total)	ND	5	ug/L
1,1,2,2-Tetrachloroethane	ND	5	ug/L
1,2,3-Trichloropropane	ND	5	ug/L
Isopropylbenzene	ND	5	ug/L
Bromobenzene	ND	5	ug/L
N-Propylbenzene	ND	5	ug/L
2-Chlorotoluene	ND	5	ug/L
4-Chlorotoluene	ND	5	ug/L
1,3,5-Trimethylbenzene	ND	5	ug/L
tert-Butylbenzene	ND	5	ug/L
1,2,4-Trimethylbenzene	ND	5	ug/L
1,3-Dichlorobenzene	ND	5	ug/L
sec-Butylbenzene	ND	5	ug/L
1,4-Dichlorobenzene	ND	5	ug/L
p-Isopropyltoluene	ND	5	ug/L
1,2-Dichlorobenzene	ND	5	ug/L
n-Butylbenzene	ND	5	ug/L
1,2-Dibromo-3-Chloropropan	ND	5	ug/L
1,2,4-Trichlorobenzene	ND	5	ug/L
Naphthalene	ND	5	ug/L
Hexachlorobutadiene	ND	5	ug/L
1,2,3-Trichlorobenzene	ND	5	ug/L
Methyl t-Butyl Ether	ND	10	ug/L

Notes
ND - Not detected.

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: VLBLK
Batch: L990612104642

Reported on: 06/21/99 17:29
Analyzed on: 06/12/99 10:29
Analyst: LT

METHOD 8260 L163B01

Surrogate	Result	QC Criteria	Units
1,2-Dichloroethane-d4	98	80-120	% Recovery
Toluene-d8	98	88-110	% Recovery
Bromofluorobenzene	104	86-115	% Recovery

Samples in Batch 9906478-11 9906478-15 9906478-16

Notes
ND - Not detected.

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: VLBLK
Batch: L990614104642

Reported on: 06/21/99 17:29
Analyzed on: 06/14/99 15:56
Analyst: LT

METHOD 8260 L165B01

Compound	Result	Detection Limit	Units
Dichlorodifluoromethane	ND	10	ug/L
Chloromethane	ND	10	ug/L
Vinyl Chloride	ND	10	ug/L
Bromomethane	ND	10	ug/L
Chloroethane	ND	10	ug/L
Trichlorofluoromethane	ND	5	ug/L
Acetone	ND	100	ug/L
1,1-Dichloroethene	ND	5	ug/L
Methylene Chloride	ND	5	ug/L
Carbon Disulfide	ND	5	ug/L
trans-1,2-Dichloroethene	ND	5	ug/L
1,1-Dichloroethane	ND	5	ug/L
Vinyl Acetate	ND	10	ug/L
2-Butanone	ND	20	ug/L
cis-1,2-Dichloroethene	ND	5	ug/L
1,2-Dichloroethene (total)	ND	5	ug/L
1,2-Dichloropropane	ND	5	ug/L
Bromochloromethane	ND	5	ug/L
Chloroform	ND	5	ug/L
1,1,1-Trichloroethane	ND	5	ug/L
1,2-Dichloroethane	ND	5	ug/L
1,1-Dichloropropene	ND	5	ug/L
Benzene	ND	5	ug/L
Carbon Tetrachloride	ND	5	ug/L
1,2-Dichloropropane	ND	5	ug/L
Trichloroethene	ND	5	ug/L
Dibromomethane	ND	5	ug/L
Bromodichloromethane	ND	5	ug/L
2-Chloroethylvinylether	ND	10	ug/L
4-Methyl-2-Pentanone	ND	10	ug/L
cis-1,3-Dichloropropene	ND	5	ug/L
trans-1,3-Dichloropropene	ND	5	ug/L
Toluene	ND	5	ug/L
1,1,2-Trichloroethane	ND	5	ug/L

Notes
ND - Not detected.

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: VLBLK
Batch: L990614104642

Reported on: 06/21/99 17:29
Analyzed on: 06/14/99 15:56
Analyst: LT

METHOD 8260 L165B01

Compound	Result	Detection Limit	Units
1,3-Dichloropropane	ND	5	ug/L
2-Hexanone	ND	10	ug/L
Dibromochloromethane	ND	5	ug/L
1,2-Dibromoethane	ND	5	ug/L
Tetrachloroethene	ND	5	ug/L
Chlorobenzene	ND	5	ug/L
1,1,1,2-Tetrachloroethane	ND	5	ug/L
Ethylbenzene	ND	5	ug/L
Bromoform	ND	5	ug/L
Styrene	ND	5	ug/L
Xylene (Total)	ND	5	ug/L
1,1,2,2-Tetrachloroethane	ND	5	ug/L
1,2,3-Trichloropropane	ND	5	ug/L
Isopropylbenzene	ND	5	ug/L
Bromobenzene	ND	5	ug/L
n-Propylbenzene	ND	5	ug/L
2-Chlorotoluene	ND	5	ug/L
4-Chlorotoluene	ND	5	ug/L
1,3,5-Trimethylbenzene	ND	5	ug/L
tert-Butylbenzene	ND	5	ug/L
1,2,4-Trimethylbenzene	ND	5	ug/L
1,3-Dichlorobenzene	ND	5	ug/L
sec-Butylbenzene	ND	5	ug/L
1,4-Dichlorobenzene	ND	5	ug/L
p-Isopropyltoluene	ND	5	ug/L
1,2-Dichlorobenzene	ND	5	ug/L
n-Butylbenzene	ND	5	ug/L
1,2-Dibromo-3-Chloropropan	ND	5	ug/L
1,2,4-Trichlorobenzene	ND	5	ug/L
Naphthalene	ND	5	ug/L
Hexachlorobutadiene	ND	5	ug/L
1,2,3-Trichlorobenzene	ND	5	ug/L
Methyl t-Butyl Ether	ND	10	ug/L

Notes
ND - Not detected.

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: VLBLK
Batch: L990614104642

Reported on: 06/21/99 17:29
Analyzed on: 06/14/99 15:56
Analyst: LT

METHOD 8260 L165B01

Surrogate	Result	QC Criteria	Units
1,2-Dichloroethane-d4	96	80-120	% Recovery
Toluene-d8	98	88-110	% Recovery
Bromofluorobenzene	106	86-115	% Recovery

Samples in Batch 9906478-15
Notes
ND - Not detected.

3C

WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SPL Contract:

Lab Code: Case No: 990613 SAS No: SDG No:

Matrix Spike - EPA Sample No: SBLK Level (low/med):

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC
Phenol	75	0	23	31	12-110
2-Chlorophenol	75	0	48	64	27-123
1,4-Dichlorobenzene	50	0	28	56	36- 97
N-Nitroso-di-n-propylamine	50	0	33	66	41-116
1,2,4-Trichlorobenzene	50	0	30	60	39- 110
4-Chloro-3-methylphenol	75	0	52	69	23-110
Acenaphthene	50	0	36	72	46-125
4-Nitrophenol	75	0	25	33	25-150
2,4-Dinitrotoluene	50	0	34	68	50-150
Pentachlorophenol	75	0	53	71	9-125
Pyrene	50	0	38	76	26-127

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC
Phenol	75	27	36	15	42	12-110
2-Chlorophenol	75	48	64	0	40	27-123
1,4-Dichlorobenzene	50	33	66	16	28	36- 97
N-Nitroso-di-n-propylamine	50	33	66	0	38	41-116
1,2,4-Trichlorobenzene	50	35	70	15	28	39- 110
4-Chloro-3-methylphenol	75	55	73	6	42	23- 110
Acenaphthene	50	39	78	8	31	46-118
4-Nitrophenol	75	27	36	9	50	25-150
2,4-Dinitrotoluene	50	31	62	9	50	50-150
Pentachlorophenol	75	56	75	5	50	9-125
Pyrene	50	38	76	0	31	26-127

Column to be used to flag recovery and RPD values with an asterisk

RPD: 0 out of 11 outside limits

Spike Recovery: 0 out of 22 outside limits

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: BLANK
Batch: E990613042258

Reported on: 06/17/99 12:45
Analyzed on: 06/14/99 18:24
Analyst: YL

METHOD 8270 P164B03

Compound	Result	Detection Limit	Units
Pyridine	ND	5	ug/L
Phenol	ND	5	ug/L
Aniline	ND	5	ug/L
bis(2-Chloroethyl)ether	ND	5	ug/L
2-Chlorophenol	ND	5	ug/L
1,3-Dichlorobenzene	ND	5	ug/L
1,4-Dichlorobenzene	ND	5	ug/L
Benzyl alcohol	ND	5	ug/L
1,2-Dichlorobenzene	ND	5	ug/L
2-Methylphenol	ND	5	ug/L
bis(2-chloroisopropyl)ethe	ND	5	ug/L
4-Methylphenol	ND	5	ug/L
N-Nitroso-di-n-propylamine	ND	5	ug/L
Hexachloroethane	ND	5	ug/L
Nitrobenzene	ND	5	ug/L
Isophorone	ND	5	ug/L
2-Nitrophenol	ND	5	ug/L
2,4-Dimethylphenol	ND	5	ug/L
Benzoic acid	ND	25	ug/L
bis(2-Chloroethoxy)methane	ND	5	ug/L
2,4-Dichlorophenol	ND	5	ug/L
1,2,4-Trichlorobenzene	ND	5	ug/L
Naphthalene	ND	5	ug/L
4-Chloroaniline	ND	5	ug/L
Hexachlorobutadiene	ND	5	ug/L
4-Chloro-3-methylphenol	ND	5	ug/L
2-Methylnaphthalene	ND	5	ug/L
Hexachlorocyclopentadiene	ND	5	ug/L
2,4,6-Trichlorophenol	ND	5	ug/L
2,4,5-Trichlorophenol	ND	10	ug/L
2-Chloronaphthalene	ND	5	ug/L
2-Nitroaniline	ND	25	ug/L
Dimethylphthalate	ND	5	ug/L
2,6-Dinitrotoluene	ND	5	ug/L

Notes
ND - Not detected.

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: BLANK
Batch: E990613042258

Reported on: 06/17/99 12:45
Analyzed on: 06/14/99 18:24
Analyst: YL

METHOD 8270 P164B03

Compound	Result	Detection Limit	Units
Acenaphthylene	ND	5	ug/L
3-Nitroaniline	ND	25	ug/L
Acenaphthene	ND	5	ug/L
2,4-Dinitrophenol	ND	25	ug/L
4-Nitrophenol	ND	25	ug/L
Dibenzofuran	ND	5	ug/L
2,4-Dinitrotoluene	ND	5	ug/L
Diethylphthalate	ND	5	ug/L
4-Chlorophenyl-phenylether	ND	5	ug/L
Fluorene	ND	5	ug/L
4-Nitroaniline	ND	25	ug/L
4,6-Dinitro-2-methylphenol	ND	25	ug/L
n-Nitrosodiphenylamine	ND	5	ug/L
1,2-Diphenylhydrazine	ND	5	ug/L
4-Bromophenyl-phenylether	ND	5	ug/L
Hexachlorobenzene	ND	5	ug/L
Pentachlorophenol	ND	25	ug/L
Phenanthrene	ND	5	ug/L
Anthracene	ND	5	ug/L
Carbazole	ND	5	ug/L
Di-n-butylphthalate	ND	5	ug/L
Fluoranthene	ND	5	ug/L
Pyrene	ND	5	ug/L
Butylbenzylphthalate	ND	5	ug/L
3,3'-Dichlorobenzidine	ND	10	ug/L
Benzo[a]anthracene	ND	5	ug/L
Chrysene	ND	5	ug/L
bis(2-Ethylhexyl)phthalate	ND	5	ug/L
Di-n-octylphthalate	ND	5	ug/L
Benzo[b]fluoranthene	ND	5	ug/L
Benzo[k]fluoranthene	ND	5	ug/L
Benzo[a]pyrene	ND	5	ug/L
Indeno[1,2,3-cd]pyrene	ND	5	ug/L
Dibenz[a,h]anthracene	ND	5	ug/L

Notes
ND - Not detected.

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: BLANK
Batch: E990613042258

Reported on: 06/17/99 12:45
Analyzed on: 06/14/99 18:24
Analyst: YL

METHOD 8270 P164B03

Compound	Result	Detection Limit	Units
Benzo[g,h,i]perylene	ND	5	ug/L

Surrogate	Result	QC Criteria	Units
Nitrobenzene-d5	72	35-114	% Recovery
2-Fluorobiphenyl	64	43-116	% Recovery
Terphenyl-d14	76	33-141	% Recovery
Phenol-d5	28	10-110	% Recovery
2-Fluorophenol	47	21-110	% Recovery
2,4,6-Tribromophenol	76	10-123	% Recovery

Samples in Batch 9906478-11

Notes
ND - Not detected.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
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** SPL BATCH QUALITY CONTROL REPORT **
Method Modified 8015B*** for Gasoline

Matrix: Aqueous
Units: mg/L

Batch Id: VARE990615032000

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	0.68	68.0	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	0.37	41.1	0.54	60.0	37.4 *	36	36 - 160

Analyst: DR
Sequence Date: 06/15/99
SPL ID of sample spiked: 9906481-03A
Sample File ID: EEF2050.TX0
Method Blank File ID:
Blank Spike File ID: EEF2040.TX0
Matrix Spike File ID: EEF2045.TX0
Matrix Spike Duplicate File ID: EEF2046.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): 9906481-06A 9906478-01A 9906478-03A 9906478-04A 9906478-05A 9906478-06A 9906478-07A 9906478-08A 9906478-09A 9906478-10A 9906481-01A 9906478-02A 9906481-02A 9906481-03A

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

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

Matrix: Aqueous
Units: mg/L

Batch Id: VARE990617144800

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	0.99	99.0	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	1.0	111	1.0	111	0	36	36 - 160

Analyst: YN
Sequence Date: 06/17/99
SPL ID of sample spiked: 9906478-11A
Sample File ID: EEF2116.TXO
Method Blank File ID:
Blank Spike File ID: EEF2106.TXO
Matrix Spike File ID: EEF2109.TXO
Matrix Spike Duplicate File ID: EEF2110.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): 9906478-13A 9906478-14A 9906478-12A 9906478-11A

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

** SPL BATCH QUALITY CONTROL REPORT **
Method 8021B ***

Matrix: Aqueous
Units: ug/L

Batch Id: VARE990615142300

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	53	106	61 - 119
Toluene	ND	50	54	108	65 - 125
EthylBenzene	ND	50	52	104	70 - 118
O Xylene	ND	50	52	104	72 - 117
M & P Xylene	ND	100	110	110	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	13	65.0	23	115	55.6 *	21	32 - 164
TOLUENE	ND	20	13	65.0	22	110	51.4 *	20	38 - 159
ETHYLBENZENE	ND	20	12	60.0	22	110	58.8 *	19	52 - 142
O XYLENE	ND	20	13	65.0	24	120	59.5 *	18	53 - 143
M & P XYLENE	ND	40	25	62.5	48	120	63.0 *	17	53 - 144

Analyst: DR
Sequence Date: 06/16/99
SPL ID of sample spiked: 9906478-01A
Sample File ID: E_F2065.TXO
Method Blank File ID:
Blank Spike File ID: E_F2082.TXO
Matrix Spike File ID: E_F2062.TXO
Matrix Spike Duplicate File ID: E_F2063.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 Historical LImits-1st Qtr.'97
(***) = Source: SPL Historical LImits-1st Qtr.'97

SAMPLES IN BATCH(SPL ID): 9906478-07A 9906478-02A 9906478-04A 9906478-08A 9906478-09A 9906478-10A 9906478-01A 9906478-03A 9906478-05A 9906478-06A

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** SPL BATCH QUALITY CONTROL REPORT **
Method 8021B ***

Matrix: Aqueous
Units: ug/L

Batch Id: VARE990617151501

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	47	94.0	61 - 119
Toluene	ND	50	49	98.0	65 - 125
EthylBenzene	ND	50	46	92.0	70 - 118
O Xylene	ND	50	47	94.0	72 - 117
M & P Xylene	ND	100	95	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	21	105	0	21	32 - 164
TOLUENE	1.8	20	23	106	22	101	4.83	20	38 - 159
ETHYLBENZENE	ND	20	20	100	20	100	0	19	52 - 142
O XYLENE	14	20	35	105	35	105	0	18	53 - 143
M & P XYLENE	27	40	69	105	69	105	0	17	53 - 144

Analyst: YN
Sequence Date: 06/17/99
SPL ID of sample spiked: 9906478-12A
Sample File ID: E_F2115.TXO
Method Blank File ID:
Blank Spike File ID: E_F2105.TXO
Matrix Spike File ID: E_F2107.TXO
Matrix Spike Duplicate File ID: E_F2108.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 Historical LImits-1st Qtr.'97
(***) = Source: SPL Historical LImits-1st Qtr.'97

SAMPLES IN BATCH(SPL ID): 9906478-13A 9906478-14A 9906478-12A 9906478-11A

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SPL BATCH QUALITY CONTROL REPORT **

Method Modified 8015B*** for Diesel

Batch Id: HP_V990617072100

Matrix: Water

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
Diesel	ND	2.5	2.88	115	53 - 148

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	1.25	1.23	98.4	1.09	87.2	12.1	39	21 - 175

Analyst: APR

Sequence Date: 06/17/99

SPL ID of sample spiked: 9906532-02C

Sample File ID: VVF3079.TX0

Method Blank File ID:

Blank Spike File ID: V_F3075.TX0

Matrix Spike File ID: VVF3082.TX0

Matrix Spike Duplicate File ID: VVF3083.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): 9906478-05B 9906478-06B 9906478-07B 9906478-08B 9906478-09B 9906478-10B 9906478-11B 9906478-12B 9906478-01B 9906478-02B 9906478-03B 9906478-04B

SPL BATCH QUALITY CONTROL REPORT **
Method 8310 ***

Batch Id: 2990616193911

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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
Naphthalene	ND	0.50	0.34	68.0	32 - 148
Acenaphthylene	ND	0.50	0.35	70.0	42 - 138
Acenaphthene	ND	0.50	0.35	70.0	22 - 133
Fluorene	ND	0.50	0.35	70.0	11 - 148
Phenanthrene	ND	0.50	0.36	72.0	40 - 121
Anthracene	ND	0.50	0.35	70.0	32 - 121
Fluoranthene	ND	0.50	0.36	72.0	45 - 133
Pyrene	ND	0.50	0.39	78.0	39 - 136
Chrysene	ND	0.50	0.38	76.0	44 - 122
Benzo (a) anthracene	ND	0.50	0.39	78.0	53 - 137
Benzo (b) fluoranthene	ND	0.50	0.39	78.0	62 - 121
Benzo (k) fluoranthene	ND	0.50	0.38	76.0	66 - 128
Benzo (a) pyrene	ND	0.50	0.39	78.0	42 - 120
Dibenzo (a,h) anthracene	ND	0.50	0.39	78.0	59 - 129
Benzo (g,h,i) perylene	ND	0.50	0.42	84.0	67 - 124
Indeno (1,2,3-cd) pyrene	ND	0.50	0.37	74.0	65 - 125

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
NAPHTHALENE	ND	0.50	0.32	64.0	0.34	68.0	6.06	30	1 - 122
ACENAPHTHYLENE	ND	0.50	0.34	68.0	0.34	68.0	0	30	1 - 124
ACENAPHTHENE	ND	0.50	0.34	68.0	0.36	72.0	5.71	30	1 - 124
FLUORENE	ND	0.50	0.38	76.0	0.38	76.0	0	30	1 - 142
PHENANTHRENE	ND	0.50	0.36	72.0	0.38	76.0	5.41	30	1 - 155
ANTHRACENE	ND	0.50	0.34	68.0	0.36	72.0	5.71	30	1 - 126
FLUORANTHENE	ND	0.50	0.38	76.0	0.36	72.0	5.41	30	14 - 123
PYRENE	ND	0.50	0.40	80.0	0.42	84.0	4.88	30	1 - 140
CHRYSENE	ND	0.50	0.38	76.0	0.40	80.0	5.13	30	1 - 199
BENZO (A) ANTHRACENE	ND	0.50	0.40	80.0	0.42	84.0	4.88	30	12 - 135
BENZO (B) FLUORANTHENE	ND	0.50	0.38	76.0	0.36	72.0	5.41	30	6 - 150
BENZO (K) FLUORANTHENE	ND	0.50	0.36	72.0	0.36	72.0	0	30	1 - 159
BENZO (A) PYRENE	ND	0.50	0.36	72.0	0.36	72.0	0	30	1 - 128
DIBENZO (A,H) ANTHRACENE	ND	0.50	0.38	76.0	0.34	68.0	11.1	30	1 - 110
BENZO (G,H,I) PERYLENE	ND	0.50	0.38	76.0	0.32	64.0	17.1	30	1 - 116
INDENO (1,2,3-CD) PYRENE	ND	0.50	0.32	64.0	0.28	56.0	13.3	30	1 - 116

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** SPL BATCH QUALITY CONTROL REPORT **
Method 8310 ***

Batch Id: 2990616193911

Matrix:
Units: ug/L

Analyst: KA
Sequence Date: 06/16/99
SPL ID of sample spiked: 9906478-11E
Sample File ID: 990616A\013-1201
Method Blank File ID:
Blank Spike File ID: 990616A\012-1101
Matrix Spike File ID: 990616A\014-1501
Matrix Spike Duplicate File ID: 990616A\015-1601

* = 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: Temporary Limits

SAMPLES IN BATCH(SPL ID): 9906478-11E 9906555-01A

ICP

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: PB

Matrix: Water Units: mg/L

Date:061599 Time:0818 File Name: 0615JM1

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Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver	ND	2.00	1.72	86	1.60	2.40
Aluminum	ND	2.00	1.74	87	1.60	2.40
Arsenic	ND	4.00	3.50	87	3.20	4.80
Barium	ND	2.00	1.72	86	1.60	2.40
Beryllium	ND	2.00	1.75	88	1.60	2.40
Calcium	ND	20.00	17.42	87	16.00	24.00
Cadmium	ND	2.00	1.75	87	1.60	2.40
Cobalt	ND	2.00	1.74	87	1.60	2.40
Chromium	ND	2.00	1.73	87	1.60	2.40
Copper	ND	2.00	1.76	88	1.60	2.40
Iron	ND	2.00	1.74	87	1.60	2.40
Potassium	ND	20.00	17.57	88	16.00	24.00
Magnesium	ND	20.00	17.34	87	16.00	24.00
Manganese	ND	2.00	1.74	87	1.60	2.40
Sodium	ND	20.00	17.59	88	16.00	24.00
Nickel	ND	2.00	1.75	88	1.60	2.40
Lead	ND	2.00	1.74	87	1.60	2.40
Antimony	ND	4.00	3.52	88	3.20	4.80
Selenium	ND	4.00	3.54	89	3.20	4.80
Tin	ND	4.00	3.46	86	3.20	4.80
Vanadium	ND	2.00	1.77	88	1.60	2.40
Zinc	ND	2.00	1.75	87	1.60	2.40

Work Orders in Batch

Work Order	Fractions
99-06-354	06C
99-06-455	01D,02D
	04D
99-06-411	01B-08B
99-06-412	02E
99-06-415	04D
99-06-416	01D
99-06-478	11F
99-06-534	01A
99-06-012	03C

Matrix Spike - Spike Duplicate Results **Work Order Spiked: 9906241-06C**

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery	Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery	QC Limits % Recovery		Spike RPD %	QC Limits %
Silver	ND	1.0	0.8801	88.0	0.9496	95.0	80	120	7.6	20.0
Aluminum	ND	1.0	0.9164	91.6	0.9892	98.9	80	120	7.6	20.0
Arsenic	ND	2.0	1.779	89.0	1.946	97.3	80	120	9.0	20.0
Barium	ND	1.0	0.8907	89.1	0.9603	96.0	80	120	7.5	20.0
Beryllium	ND	1.0	0.8983	89.8	0.9766	97.7	80	120	8.4	20.0
Calcium	0.195	10.0	9.146	89.5	9.952	97.6	80	120	8.6	20.0
Cadmium	ND	1.0	0.8903	89.0	0.9707	97.1	80	120	8.6	20.0
Cobalt	ND	1.0	0.8908	89.1	0.9731	97.3	80	120	8.8	20.0
Chromium	ND	1.0	0.8934	89.3	0.9729	97.3	80	120	8.5	20.0
Copper	ND	1.0	0.9153	91.5	0.9874	98.7	80	120	7.6	20.0
Iron	0.026	1.0	0.9207	89.5	0.9989	97.3	80	120	8.4	20.0
Potassium	ND	10.0	8.962	89.6	9.687	96.9	80	120	7.8	20.0
Magnesium	ND	10.0	8.963	89.6	9.69	96.9	80	120	7.8	20.0
Manganese	ND	1.0	0.8958	89.6	0.9754	97.5	80	120	8.5	20.0
Sodium	ND	10.0	9.24	92.4	9.91	99.1	80	120	7.0	20.0
Nickel	ND	1.0	0.9085	90.9	0.9833	98.3	80	120	7.9	20.0
Lead	ND	1.0	0.8952	89.5	0.9741	97.4	80	120	8.4	20.0
Antimony	ND	2.0	1.793	89.7	1.927	96.4	80	120	7.2	20.0
Selenium	ND	2.0	1.818	90.9	1.983	99.2	80	120	8.7	20.0
Tin	ND	2.0	1.792	89.6	1.952	97.6	80	120	8.5	20.0
Vanadium	ND	1.0	0.9104	91.0	0.9873	98.7	80	120	8.1	20.0
Zinc	ND	1.0	0.8984	89.8	0.98	98.0	80	120	8.7	20.0

Checked: PB 6/11/99

Trace-icp

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: EG

Matrix: Water Units: mg/L

Date:061599 Time:1116 File Name: 0615JM3

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Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver						
Aluminum						
Arsenic	ND	4.00	4.06	101	3.20	4.80
Barium						
Beryllium						
Calcium						
Cadmium						
Cobalt						
Chromium						
Copper						
Iron						
Magnesium						
Manganese						
Nickel						
Lead	ND	2.00	1.89	95	1.60	2.40
Antimony						
Selenium	ND	4.00	4.14	103	3.20	4.80
Thallium	ND	4.00	3.79	95	3.20	4.80
Vanadium						
Zinc						

Work Orders in Batch

Work Order	Fractions
99-06-241	06C
99-06-354	06C
99-06-425	01C
99-06-411	01B-08B
99-06-412	02E
99-06-415	04B
99-06-416	01D
99-06-478	11F
99-06-529	01D

Matrix Spike - Spike Duplicate Results **Work Order Spiked: 9906241-06C**

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery	Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery	QC Limits % Recovery		Spike RPD %	QC Limits %
Silver										
Aluminum										
Arsenic	ND	2.0	1.925	96.3	2.035	101.8	80	120	5.6	20.0
Barium										
Beryllium										
Calcium										
Cadmium										
Cobalt										
Chromium										
Copper										
Iron										
Magnesium										
Manganese										
Nickel										
Lead	ND	1.0	0.9107	91.1	0.9616	96.2	80	120	5.4	20.0
Antimony										
Selenium	ND	2.0	1.962	98.1	2.06	103.0	80	120	4.9	20.0
Thallium	ND	2.0	1.829	91.5	1.918	95.9	80	120	4.8	20.0
Vanadium										
Zinc										

Checked: 6/16/99

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 06/24/99
Analyzed on: 06/24/99
Analyst: AG

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:

Mercury, Total
Method 7470 A***

SPL Sample ID Number	Blank Value ug/L	LCS Concentration ug/L	Measured Concentration ug/L	% Recovery	QC Limits Recovery
LCS	ND	2.00	1.96	98.0	80 - 120

-9906585

Samples in batch:

9906478-11F 9906623-01F

COMMENTS:
LCS = SPL ID# 94-452-56-7

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 06/24/99
Analyzed on: 06/24/99
Analyst: AG

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:

Mercury, Total
Method 7470 A***

SPL Sample ID Number	Method Blank ug/L	Sample Result ug/L	Spike Added ug/L	Matrix Spike Result ug/L	Matrix Spike Recovery %	Matrix Spike Duplicate Result ug/L	Matrix Spike Duplicate Recovery %	RPD (%)	QC LIMITS (Advisory) RPD Max	QC LIMITS (Advisory) % REC
9906478-11F	ND	ND	2.00	1.90	95.0	1.98	99.0	4.1	20	75 -125

-9906585

Samples in batch:

9906478-11F 9906623-01F

COMMENTS:
LCS = SPL ID# 94-452-56-7

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 06/15/99
Analyzed on: 06/11/99
Analyst: ELS

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 (as N)
Method 300.0 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	10.0	9.75	97.5	90 - 110

-9906291

Samples in batch:

9906478-03C 9906478-05C 9906478-06C 9906478-07C
9906478-11C 9906480-01B 9906480-02B 9906480-03B

COMMENTS:
LCS SPL ID# 95535284-5

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 06/15/99
Analyzed on: 06/11/99
Analyst: ELS

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 (as N)
Method 300.0 *

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
9906480-01B	ND	ND	2.26	2.16	95.6	2.18	96.5	0.9	5	86 -115

-9906291

Samples in batch:

9906478-03C	9906478-05C	9906478-06C	9906478-07C
9906478-11C	9906480-01B	9906480-02B	9906480-03B

COMMENTS:
LCS SPL ID# 95535284-5

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 06/17/99
Analyzed on: 06/11/99
Analyst: ELS

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 300.0 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	10.0	9.88	98.8	90 - 110

-9906383

Samples in batch:

9906478-03C 9906478-05C 9906478-06C 9906478-07C
9906478-11C 9906480-01B 9906480-02B 9906480-03B

COMMENTS:
LCS SPL ID# 95535284-5

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 06/17/99
Analyzed on: 06/11/99
Analyst: ELS

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 300.0 *

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
9906480-01B	ND	7.33	10.0	17.2	98.7	17.1	97.7	1.0	7.0	88 -112

-9906383

Samples in batch:

9906478-03C	9906478-05C	9906478-06C	9906478-07C
9906478-11C	9906480-01B	9906480-02B	9906480-03B

COMMENTS:
LCS SPL ID# 95535284-5

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 06/22/99
Analyzed on: 06/21/99
Analyst: CV

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:

Chloride
Method 325.3 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	162	159.5	98.5	94 - 106

-9906489

Samples in batch:

9906441-01A	9906441-02A	9906441-03A	9906441-04A
9906441-05A	9906441-06A	9906441-07A	9906441-08A
9906478-11C	9906506-02I		

COMMENTS:

LCS-SPL ID#94453228-23

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 06/22/99
Analyzed on: 06/21/99
Analyst: CV

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:

Chloride
Method 325.3 *

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
9906441-06A	ND	28.4	50.0	78.0	99.2	78.0	99.2	0	5	92 -109

-9906489

Samples in batch:

9906441-01A	9906441-02A	9906441-03A	9906441-04A
9906441-05A	9906441-06A	9906441-07A	9906441-08A
9906478-11C	9906506-02I		

COMMENTS:

LCS-SPL ID#94453228-23

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 06/17/99
Analyzed on: 06/15/99
Analyst: ELS

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:

Fluoride
Method 300.0 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	10.0	9.5	95.0	90 - 110

-9906368

Samples in batch:

9906257-02F 9906416-01C 9906478-11C 9906506-02I
9906522-02K

COMMENTS:
LCS SPL ID# 95535280-03

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 06/17/99
Analyzed on: 06/15/99
Analyst: ELS

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:

Fluoride
Method 300.0 *

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
9906522-02K	ND	23.8	50.0	73.3	99.0	73.2	98.8	0.2	20	80 -120

-9906368

Samples in batch:

9906257-02F 9906416-01C 9906478-11C 9906506-02I
9906522-02K

COMMENTS:
LCS SPL ID# 95535280-03

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 06/25/99
Analyzed on: 06/14/99
Analyst: AB

This sample was randomly selected for use in the SPL quality control program. The results are as follows:

Carbonate, as CaCO3
Method SM 4500-CO2D **

-- DUPLICATE ANALYSIS --

SPL Sample ID	Original Sample Concentration mg/L	Duplicate Sample mg/L	RPD	RPD Max.
9906478-11G	ND	ND	0	5

-9906580

Samples in batch:

9906478-11G

COMMENTS:

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 06/25/99
Analyzed on: 06/14/99
Analyst: AB

This sample was randomly selected for use in the SPL quality control program. The results are as follows:

Bicarbonate, as CaCO3
Method SM 4500-CO2D **

-- DUPLICATE ANALYSIS --

SPL Sample ID	Original Sample Concentration mg/L	Duplicate Sample mg/L	RPD	RPD Max.
9906478-11G	316	312	1.3	5

-9906579

Samples in batch:

9906478-11G

COMMENTS:

CHAIN OF CUSTODY

AND

SAMPLE RECEIPT CHECKLIST

SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Workorder No: 9906478 | 106554 | page 1 of 2

Client Name: Brown + Caldwell
Address/Phone: 1415 Louisiana Suite 2500 (713) 759-0999
Client Contact: R. Rexroad
Project Name: 12832
Project Number: BJ - Hobbs
Project Location:
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: TPH GRO 8015 BTEX 8021	TPH DRO 8015	SO_4 - NO_3 300.0	Head Space Gas					
MW-7	6-10-99	1045			W				5	X	X							
MW-8	6-10-99	1120			W				5	X	X							
MW-5	6-10-99	1150			W				9	X	X	X	X					
MW-9	6-10-99	1645			W				5	X	X							
MW-11A	6-10-99	1230			W				9	X	X	X	X					
MW-10	6-10-99	1305			W				9	X	X	X	X					
MW-12	6-10-99	1350			W				9	X	X	X	X					
MW-3	6-10-99	1425			W				5	X	X							
MW-4	6-10-99	1600			W				5	X	X							
MW-1	6-10-99	1510			W				5	X	X							

Client/Consultant Remarks:

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): BAF

	date	time		
1. Relinquished by Sampler:	6-10-99	1912	2. Received by:	
3. Relinquished by:	date	time	4. Received by:	
5. Relinquished by:	date	time	6. Received by Laboratory:	6/11/99 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

SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Workorder No: 9906478

106553

page 2 of 2

Client Name: Brown & Caldwell

Address/Phone: 1415 Louisiana Suite 2500 (713) 759-0999

Client Contact: R. Rexroad

Project Name: BJ - Hobbs

Project Number: 12832

Project Location:

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: TPH-GRO 8015 BTEX 8021	TPH-DRO 8015	SO_4 / NO_3 / Cld / Fl	Head Space Gas	PAH 8310	Ca, Mg, K, Na RCRA Metals	Bi-Carb/Carb	VOC's 8260	SVOC's 8270
OSW-4	6-10-99	1735			W				16	X	X	X	X	X	X	X	X	X
Dup	6-10-99				W				5	X	X							

Client/Consultant Remarks:

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): BMF

1. Relinquished by Sampler:	date: 6-10-99	time: 1910	2. Received by:
3. Relinquished by:	date:	time:	4. Received by:
5. Relinquished by:	date:	time:	6. Received by Laboratory: 6/11/99 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

SPL Houston Environmental Laboratory

Sample Login Checklist

Date:	Time:
6/11/99	1000

SPL Sample ID:
9906478

			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 #)	811305335024	
		Other:		
11	Method of sample disposal:	SPL Disposal	✓	
		HOLD		
		Return to Client		

Name:	Date:
[signature]	6/11/99

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

July 22, 1999

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 July 3, 1999. The sample(s) was assigned to Certificate of Analysis No. (s) 9907124 and analyzed for all parameters as listed on the chain of custody.

Your sample ID: MW13-Soil was written on the chain of custody. However, no sample was received.

Due to our Mercury analyzer being down we had to subcontract your sample(s) to our Lafayette laboratory for completion. It was assigned to their Certificate of Analysis No. 9907787.

Any other data flags or quality control exceptions associated with this report will be footnoted in the analytical result 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: 99-07-124

Approved for Release by:

Bernadette A. Fini, Senior Project Manager — 7-22-99 Date

Joel Grice
Laboratory Director

Ted Yen
Corporate Quality Assurance Director

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

Certificate of Analysis No. H9-9907124-02

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

DATE: 07/21/99

PROJECT: BJ Services
SITE: Hobbs,NM
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-12D/13-Soil

PROJECT NO: 12832.021
MATRIX: SOIL
DATE SAMPLED: 06/30/99 10:02:00
DATE RECEIVED: 07/03/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Silver, Total Method 6010B *** Analyzed by: PB Date: 07/12/99 08:36:00	ND	1	mg/kg
Arsenic, Total Method 6010B *** Analyzed by: EG Date: 07/13/99 11:10:00	1.1	0.5	mg/kg
Barium, Total Method 6010B *** Analyzed by: PB Date: 07/12/99 08:36:00	67.9	0.5	mg/kg
Cadmium, Total Method 6010B *** Analyzed by: PB Date: 07/12/99 08:36:00	ND	0.5	mg/kg
Chromium, Total Method 6010B *** Analyzed by: PB Date: 07/12/99 08:36:00	17	1	mg/kg
Mercury, Total Method 7471A *** Analyzed by: RJB Date: 07/20/99 15:30:00	ND	0.1	mg/kg

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. H9-9907124-02

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

DATE: 07/21/99

PROJECT: BJ Services
SITE: Hobbs,NM
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-12D/13-Soil

PROJECT NO: 12832.021
MATRIX: SOIL
DATE SAMPLED: 06/30/99 10:02:00
DATE RECEIVED: 07/03/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Acid Digestion - Solids, ICP Method 3050B *** Analyzed by: MR Date: 07/07/99 07:30:00	07/07/99		
Lead, Total Method 6010B *** Analyzed by: EG Date: 07/13/99 11:10:00	0.9	0.5	mg/kg
Selenium, Total Method 6010B *** Analyzed by: EG Date: 07/13/99 11:10:00	ND	0.5	mg/kg
Solids CLP Inorganics SOW Analyzed by: AB Date: 07/08/99 10:00:00	77	1	%wt

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. H9-9907124-03

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

DATE: 07/21/99

PROJECT: BJ Services
SITE: Hobbs,NM
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-12D-Soil

PROJECT NO: 12832.021
MATRIX: SOIL
DATE SAMPLED: 06/29/99 10:07:00
DATE RECEIVED: 07/03/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.10 P	mg/kg
Surrogate	**% Recovery**		
4-Bromofluorobenzene	90		
1,4-Difluorobenzene	90		
Method 8015B *** for Gasoline			
Analyzed by: FAB			
Date: 07/11/99			
Total Petroleum Hydrocarbons-Diesel	ND	10 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	114		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 07/15/99 02:31:00			
Sonication Extraction of DRO by 8015A	07/06/99		
Method 3550B ***			
Analyzed by: GT			
Date: 07/06/99 12:00:00			
Solids	90	1	%wt
CLP Inorganics SOW			
Analyzed by: AB			
Date: 07/08/99 10:00:00			

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. H9-9907124-04

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

DATE: 07/21/99

PROJECT: BJ Services
SITE: Hobbs,NM
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-12D

PROJECT NO: 12832.021
MATRIX: WATER
DATE SAMPLED: 07/02/99 10:50:00
DATE RECEIVED: 07/03/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.10 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	80		
1,4-Difluorobenzene	73		
Method 8015B *** for Gasoline			
Analyzed by: DR			
Date: 07/09/99			
Total Petroleum Hydrocarbons-Diesel	ND	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	30		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 07/08/99 05:28:00			
Methane	0.0015	0.0012 P	mg/L
RSKSOP-147			
Analyzed by: JDR			
Date: 07/14/99 03:13:00			
Silver, Total	ND	0.01	mg/L
Method 6010B ***			
Analyzed by: JM			
Date: 07/08/99 13:21:00			
Arsenic, Total	0.022	0.005	mg/L
Method 6010B ***			
Analyzed by: EG			
Date: 07/07/99 11:07:00			

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. H9-9907124-04

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

DATE: 07/21/99

PROJECT: BJ Services
SITE: Hobbs,NM
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-12D

PROJECT NO: 12832.021
MATRIX: WATER
DATE SAMPLED: 07/02/99 10:50:00
DATE RECEIVED: 07/03/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Barium, Total Method 6010B *** Analyzed by: JM Date: 07/08/99 13:21:00	0.155	0.005	mg/L
Calcium, Total Method 6010B *** Analyzed by: JM Date: 07/08/99 13:21:00	113	0.1	mg/L
Cadmium, Total Method 6010B *** Analyzed by: JM Date: 07/08/99 13:21:00	ND	0.005	mg/L
Chromium, Total Method 6010B *** Analyzed by: JM Date: 07/08/99 13:21:00	0.02	0.01	mg/L
Mercury, Total Method 7470 A*** Analyzed by: RJB Date: 07/20/99 10:20:00	ND	0.0002	mg/L
Potassium, Total Method 6010B *** Analyzed by: JM Date: 07/19/99 10:52:00	66	2	mg/L

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. H9-9907124-04

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

DATE: 07/21/99

PROJECT: BJ Services
SITE: Hobbs,NM
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-12D

PROJECT NO: 12832.021
MATRIX: WATER
DATE SAMPLED: 07/02/99 10:50:00
DATE RECEIVED: 07/03/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Magnesium, Total Method 6010B *** Analyzed by: JM Date: 07/08/99 13:21:00	16.6	0.1	mg/L
Sodium, Total Method 6010B *** Analyzed by: JM Date: 07/19/99 10:52:00	121	0.5	mg/L
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: EE Date: 07/06/99 13:30:00	07/06/99		
Lead, Total Method 6010B *** Analyzed by: EG Date: 07/07/99 11:07:00	ND	0.005	mg/L
Selenium, Total Method 6010B *** Analyzed by: EG Date: 07/07/99 11:07:00	ND	0.005	mg/L
Liquid-liquid extraction SEMIVOLATILES Method 3520C *** Analyzed by: KL Date: 07/04/99 16:00:00	07/04/99		

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. H9-9907124-04

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

DATE: 07/21/99

PROJECT: BJ Services
SITE: Hobbs,NM
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-12D

PROJECT NO: 12832.021
MATRIX: WATER
DATE SAMPLED: 07/02/99 10:50:00
DATE RECEIVED: 07/03/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Chloride Method 325.3 * Analyzed by: CV Date: 07/13/99 10:45:00	195	5	mg/L
Carbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: ELS Date: 07/03/99 12:00:00	ND	1.0	mg/L
Bicarbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: ELS Date: 07/03/99 12:00:00	200	1.0	mg/L
Fluoride Method 300.0 * Analyzed by: ELS Date: 07/06/99 11:57:16	1.83	0.1	mg/L
Nitrate nitrogen(as N) Method 353.3 * Analyzed by: CV Date: 07/08/99 13:30:00	2.1	0.1	mg/L
Sulfate Method 375.4 * Analyzed by: ELS Date: 07/06/99 16:00:00	249	25	mg/L

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. H9-9907124-04

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

07/21/99

PROJECT: BJ Services
SITE: Hobbs,NM
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-12D

PROJECT NO: 12832.021
MATRIX: WATER
DATE SAMPLED: 07/02/99 10:50:00
DATE RECEIVED: 07/03/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Benzene	ND	5	ug/L
Bromobenzene	ND	5	ug/L
Bromochloromethane	ND	5	ug/L
Bromodichloromethane	ND	5	ug/L
Bromoform	ND	5	ug/L
Bromomethane	ND	10	ug/L
n-Butylbenzene	ND	5	ug/L
sec-Butylbenzene	ND	5	ug/L
tert-Butylbenzene	ND	5	ug/L
Carbon tetrachloride	ND	5	ug/L
Chlorobenzene	ND	5	ug/L
Chlorodibromomethane	ND	5	ug/L
Chloroethane	ND	10	ug/L
Chloroform	ND	5	ug/L
Chloromethane	ND	10	ug/L
2-Chlorotoluene	ND	5	ug/L
4-Chlorotoluene	ND	5	ug/L
1,2-Dibromo-3-chloropropane	ND	5	ug/L
1,2-Dibromoethane	ND	5	ug/L
Dibromomethane	ND	5	ug/L
1,2-Dichlorobenzene	ND	5	ug/L
1,3-Dichlorobenzene	ND	5	ug/L
1,4-Dichlorobenzene	ND	5	ug/L
Dichlorodifluoromethane	ND	10	ug/L
1,1-Dichloroethane	ND	5	ug/L
1,2-Dichloroethane	ND	5	ug/L
1,1-Dichloroethene	ND	5	ug/L
cis-1,2-Dichloroethene	ND	5	ug/L
trans-1,2-Dichloroethene	ND	5	ug/L
1,2-Dichloropropane	ND	5	ug/L
1,3-Dichloropropane	ND	5	ug/L
2,2-Dichloropropane	ND	5	ug/L
1,1-Dichloropropene	ND	5	ug/L
Ethylbenzene	ND	5	ug/L
Hexachlorobutadiene	ND	5	ug/L
Isopropylbenzene	ND	5	ug/L
p-Isopropyltoluene	ND	5	ug/L
Methylene chloride	ND	5	ug/L

METHOD: 8260 Water, Volatile Organics

(continued on next page)

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

Certificate of Analysis No. H9-9907124-04

Brown and Caldwell

SAMPLE ID: MW-12D

ANALYTICAL DATA (continued)

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	ND	5	ug/L
n-Propylbenzene	ND	5	ug/L
Styrene	ND	5	ug/L
1,1,1,2-Tetrachloroethane	ND	5	ug/L
1,1,2,2-Tetrachloroethane	ND	5	ug/L
Tetrachloroethene	ND	5	ug/L
Toluene	ND	5	ug/L
1,2,3-Trichlorobenzene	ND	5	ug/L
1,2,4-Trichlorobenzene	ND	5	ug/L
1,1,1-Trichloroethane	ND	5	ug/L
1,1,2-Trichloroethane	ND	5	ug/L
Trichloroethene	ND	5	ug/L
Trichlorofluoromethane	ND	5	ug/L
1,2,3-Trichloropropane	ND	5	ug/L
1,2,4-Trimethylbenzene	ND	5	ug/L
1,3,5-Trimethylbenzene	ND	5	ug/L
Vinyl chloride	ND	10	ug/L
Xylenes (total)	ND	5	ug/L
1,2-Dichloroethene (total)	ND	5	ug/L
cis-1,3-Dichloropropene	ND	5	ug/L
trans-1,3-Dichloropropene	ND	5	ug/L
Acetone	130	100	ug/L
2-Butanone	ND	20	ug/L
4-Methyl-2-Pentanone	ND	10	ug/L
2-Hexanone	ND	10	ug/L
Carbon Disulfide	ND	5	ug/L
Vinyl Acetate	ND	10	ug/L
2-Chloroethylvinylether	ND	10	ug/L
Methyl t-Butyl Ether	ND	10	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1,2-Dichloroethane-d4	50 ug/L	90	80	120
Toluene-d8	50 ug/L	92	88	110
4-Bromofluorobenzene	50 ug/L	96	86	115

ANALYZED BY: JC DATE/TIME: 07/06/99 21:35:00
METHOD: 8260 Water, Volatile Organics
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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. H9-9907124-04

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

07/21/99

PROJECT: BJ Services
SITE: Hobbs,NM
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-12D

PROJECT NO: 12832.021
MATRIX: WATER
DATE SAMPLED: 07/02/99 10:50:00
DATE RECEIVED: 07/03/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Acenaphthene	ND	5	ug/L
Acenaphthylene	ND	5	ug/L
Aniline	ND	5	ug/L
Anthracene	ND	5	ug/L
Benzo(a)Anthracene	ND	5	ug/L
Benzo(b)Fluoranthene	ND	5	ug/L
Benzo(k)Fluoranthene	ND	5	ug/L
Benzo(a)Pyrene	ND	5	ug/L
Benzoic Acid	ND	25	ug/L
Benzo(g,h,i)Perylene	ND	5	ug/L
Benzyl alcohol	ND	5	ug/L
4-Bromophenylphenyl ether	ND	5	ug/L
Butylbenzylphthalate	ND	5	ug/L
di-n-Butyl phthalate	ND	5	ug/L
Carbazole	ND	5	ug/L
4-Chloroaniline	ND	5	ug/L
bis(2-Chloroethoxy)Methane	ND	5	ug/L
bis(2-Chloroethyl)Ether	ND	5	ug/L
bis(2-Chloroisopropyl)Ether	ND	5	ug/L
4-Chloro-3-Methylphenol	ND	5	ug/L
2-Chloronaphthalene	ND	5	ug/L
2-Chlorophenol	ND	5	ug/L
4-Chlorophenylphenyl ether	ND	5	ug/L
Chrysene	ND	5	ug/L
Dibenz(a,h)Anthracene	ND	5	ug/L
Dibenzofuran	ND	5	ug/L
1,2-Dichlorobenzene	ND	5	ug/L
1,3-Dichlorobenzene	ND	5	ug/L
1,4-Dichlorobenzene	ND	5	ug/L
3,3'-Dichlorobenzidine	ND	10	ug/L
2,4-Dichlorophenol	ND	5	ug/L
Diethylphthalate	ND	5	ug/L
2,4-Dimethylphenol	ND	5	ug/L
Dimethyl Phthalate	ND	5	ug/L
4,6-Dinitro-2-Methylphenol	ND	25	ug/L
2,4-Dinitrophenol	ND	25	ug/L
2,4-Dinitrotoluene	ND	5	ug/L
2,6-Dinitrotoluene	ND	5	ug/L

METHOD: 8270C, Semivolatile Organics - Water

(continued on next page)

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

Certificate of Analysis No. H9-9907124-04

Brown and Caldwell

SAMPLE ID: MW-12D

ANALYTICAL DATA (continued)

PARAMETER	RESULTS	PQL*	UNITS
1,2-Diphenylhydrazine	ND	5	ug/L
bis(2-Ethylhexyl)Phthalate	ND	5	ug/L
Fluoranthene	ND	5	ug/L
Fluorene	ND	5	ug/L
Hexachlorobenzene	ND	5	ug/L
Hexachlorobutadiene	ND	5	ug/L
Hexachloroethane	ND	5	ug/L
Hexachlorocyclopentadiene	ND	5	ug/L
Indeno(1,2,3-cd)Pyrene	ND	5	ug/L
Isophorone	ND	5	ug/L
2-Methylnaphthalene	ND	5	ug/L
2-Methylphenol	ND	5	ug/L
4-Methylphenol	ND	5	ug/L
Naphthalene	ND	5	ug/L
2-Nitroaniline	ND	25	ug/L
3-Nitroaniline	ND	25	ug/L
4-Nitroaniline	ND	25	ug/L
Nitrobenzene	ND	5	ug/L
2-Nitrophenol	ND	5	ug/L
4-Nitrophenol	ND	25	ug/L
N-Nitrosodiphenylamine	ND	5	ug/L
N-Nitroso-Di-n-Propylamine	ND	5	ug/L
Di-n-Octyl Phthalate	ND	5	ug/L
Pentachlorophenol	ND	25	ug/L
Phenanthrene	ND	5	ug/L
Phenol	ND	5	ug/L
Pyrene	ND	5	ug/L
Pyridine	ND	5	ug/L
1,2,4-Trichlorobenzene	ND	5	ug/L
2,4,5-Trichlorophenol	ND	10	ug/L
2,4,6-Trichlorophenol	ND	5	ug/L

METHOD: 8270C, Semivolatile Organics - Water

(continued on next page)

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

Certificate of Analysis No. H9-9907124-04

Brown and Caldwell **SAMPLE ID:** MW-12D

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
Nitrobenzene-d5	50 ug/L	76	35	114
2-Fluorobiphenyl	50 ug/L	80	43	116
Terphenyl-d14	50 ug/L	78	33	141
Phenol-d5	75 ug/L	20	10	110
2-Fluorophenol	75 ug/L	35	21	110
2,4,6-Tribromophenol	75 ug/L	111	10	123

ANALYZED BY: SC DATE/TIME: 07/06/99 17:11:00
EXTRACTED BY: KL DATE/TIME: 07/04/99 16:00:00
METHOD: 8270C, Semivolatile Organics - Water
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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. H9-9907124-04

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

07/21/99

PROJECT: BJ Services
SITE: Hobbs,NM
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-12D

PROJECT NO: 12832.021
MATRIX: WATER
DATE SAMPLED: 07/02/99 10:50:00
DATE RECEIVED: 07/03/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	0.6	0.1	ug/L
Acenaphthylene	ND	0.1	ug/L
Acenaphthene	ND	0.1	ug/L
Fluorene	ND	0.1	ug/L
Phenanthrene	ND	0.1	ug/L
Anthracene	ND	0.1	ug/L
Fluoranthene	ND	0.1	ug/L
Pyrene	ND	0.1	ug/L
Chrysene	ND	0.1	ug/L
Benzo (a) anthracene	ND	0.1	ug/L
Benzo (b) fluoranthene	ND	0.1	ug/L
Benzo (k) fluoranthene	ND	0.1	ug/L
Benzo (a) pyrene	ND	0.1	ug/L
Dibenzo (a,h) anthracene	ND	0.1	ug/L
Benzo (g,h,i) perylene	ND	0.1	ug/L
Indeno (1,2,3-cd) pyrene	ND	0.1	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1-Fluoronaphthalene	0.50 ug/L	61	50	150
Phenanthrene d-10	0.50 ug/L	76	50	150

ANALYZED BY: LJ DATE/TIME: 07/14/99 00:51:38
EXTRACTED BY: KL DATE/TIME: 07/04/99 13:00:00
METHOD: 8310 Polynuclear Aromatic Hydrocarbons
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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

HOUSTON LABORATORY
6880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9907124-05

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

07/21/99

PROJECT: BJ Services
SITE: Hobbs,NM
SAMPLED BY: Provided by SPL
SAMPLE ID: Trip Blank 6/9/99

PROJECT NO: 12832.021
MATRIX: WATER
DATE SAMPLED: 07/02/99
DATE RECEIVED: 07/03/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Benzene	ND	5	ug/L
Bromobenzene	ND	5	ug/L
Bromochloromethane	ND	5	ug/L
Bromodichloromethane	ND	5	ug/L
Bromoform	ND	5	ug/L
Bromomethane	ND	10	ug/L
n-Butylbenzene	ND	5	ug/L
sec-Butylbenzene	ND	5	ug/L
tert-Butylbenzene	ND	5	ug/L
Carbon tetrachloride	ND	5	ug/L
Chlorobenzene	ND	5	ug/L
Chlorodibromomethane	ND	5	ug/L
Chloroethane	ND	10	ug/L
Chloroform	ND	5	ug/L
Chloromethane	ND	10	ug/L
2-Chlorotoluene	ND	5	ug/L
4-Chlorotoluene	ND	5	ug/L
1,2-Dibromo-3-chloropropane	ND	5	ug/L
1,2-Dibromoethane	ND	5	ug/L
Dibromomethane	ND	5	ug/L
1,2-Dichlorobenzene	ND	5	ug/L
1,3-Dichlorobenzene	ND	5	ug/L
1,4-Dichlorobenzene	ND	5	ug/L
Dichlorodifluoromethane	ND	10	ug/L
1,1-Dichloroethane	ND	5	ug/L
1,2-Dichloroethane	ND	5	ug/L
1,1-Dichloroethene	ND	5	ug/L
cis-1,2-Dichloroethene	ND	5	ug/L
trans-1,2-Dichloroethene	ND	5	ug/L
1,2-Dichloropropane	ND	5	ug/L
1,3-Dichloropropane	ND	5	ug/L
2,2-Dichloropropane	ND	5	ug/L
1,1-Dichloropropene	ND	5	ug/L
Ethylbenzene	ND	5	ug/L
Hexachlorobutadiene	ND	5	ug/L
Isopropylbenzene	ND	5	ug/L
p-Isopropyltoluene	ND	5	ug/L
Methylene chloride	ND	5	ug/L

METHOD: 8260 Water, Volatile Organics

(continued on next page)

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

Certificate of Analysis No. H9-9907124-05

Brown and Caldwell **SAMPLE ID:** Trip Blank 6/9/99

ANALYTICAL DATA (continued)

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	ND	5	ug/L
n-Propylbenzene	ND	5	ug/L
Styrene	ND	5	ug/L
1,1,1,2-Tetrachloroethane	ND	5	ug/L
1,1,2,2-Tetrachloroethane	ND	5	ug/L
Tetrachloroethene	ND	5	ug/L
Toluene	ND	5	ug/L
1,2,3-Trichlorobenzene	ND	5	ug/L
1,2,4-Trichlorobenzene	ND	5	ug/L
1,1,1-Trichloroethane	ND	5	ug/L
1,1,2-Trichloroethane	ND	5	ug/L
Trichloroethene	ND	5	ug/L
Trichlorofluoromethane	ND	5	ug/L
1,2,3-Trichloropropane	ND	5	ug/L
1,2,4-Trimethylbenzene	ND	5	ug/L
1,3,5-Trimethylbenzene	ND	5	ug/L
Vinyl chloride	ND	10	ug/L
Xylenes (total)	ND	5	ug/L
1,2-Dichloroethene (total)	ND	5	ug/L
cis-1,3-Dichloropropene	ND	5	ug/L
trans-1,3-Dichloropropene	ND	5	ug/L
Acetone	ND	100	ug/L
2-Butanone	ND	20	ug/L
4-Methyl-2-Pentanone	ND	10	ug/L
2-Hexanone	ND	10	ug/L
Carbon Disulfide	ND	5	ug/L
Vinyl Acetate	ND	10	ug/L
2-Chloroethylvinylether	ND	10	ug/L
Methyl t-Butyl Ether	ND	10	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1,2-Dichloroethane-d4	50 ug/L	88	80	120
Toluene-d8	50 ug/L	92	88	110
4-Bromofluorobenzene	50 ug/L	98	86	115

ANALYZED BY: JC DATE/TIME: 07/07/99 20:44:00
METHOD: 8260 Water, Volatile Organics
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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

QUALITY CONTROL

DOCUMENTATION

3A

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SPL Contract:

Lab Code: Case No.: 9907122 SAS No.: SDG No.:

Matrix Spike - EPA Sample No.: MW-13

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC. LIMITS REC.
1,1-Dichloroethene	50	0	57	114	61-145
Trichloroethene	50	0	58	116	71-120
Benzene	50	1500	1500	0*	76-127
Toluene	50	23	73	100	76-125
Chlorobenzene	50	0	52	104	75-130

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene	50	54	108	6	14	61-145
Trichloroethene	50	56	112	2	14	71-120
Benzene	50	1500	0*	0	11	76-127
Toluene	50	72	98	2	13	76-125
Chlorobenzene	50	52	104	0	13	75-130

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits due to matrix interference

RPD: 0 out of 5 outside limits
Spike Recovery: 2 out of 10 outside limits

SPL Houston Labs

RECOVERY REPORT

Client Name: Client SDG: l990706
Sample Matrix: LIQUID Fraction: VOA
Lab Smp Id: LCS-8260W
Level: LOW Operator: LT
Data Type: MS DATA SampleType: LCS
SpikeList File: 8260_water.spk Quant Type: ISTD
Sublist File: 8260_lcs.sub
Method File: /var/chem/l.i/l990706.b/l8260aw.m
Misc Info: L187W1//L187CW1

	SPIKE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
8	1,1-Dichloroethene	50	55	110.00	61-145
29	Trichloroethene	50	55	110.00	71-120
25	Benzene	50	55	110.00	76-127
37	Toluene	50	49	98.00	76-125
45	Chlorobenzene	50	52	104.00	75-130

	SURROGATE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
$ 21	1,2-Dichloroethane	50	45	90.00	80-120
$ 36	Toluene-d8	50	46	92.00	88-110
$ 56	Bromofluorobenzene	50	49	98.00	86-115

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: VLBLK
Batch: L990706104642

Reported on: 07/15/99 12:34
Analyzed on: 07/06/99 13:05
Analyst: LT

METHOD 8260/8240 L187B01

Compound	Result	Detection Limit	Units
Dichlorodifluoromethane	ND	10	ug/L
Chloromethane	ND	10	ug/L
Vinyl Chloride	ND	10	ug/L
Bromomethane	ND	10	ug/L
Chloroethane	ND	10	ug/L
Trichlorofluoromethane	ND	5	ug/L
Acetone	ND	100	ug/L
1,1-Dichloroethene	ND	5	ug/L
Methylene Chloride	ND	5	ug/L
Carbon Disulfide	ND	5	ug/L
trans-1,2-Dichloroethene	ND	5	ug/L
1,1-Dichloroethane	ND	5	ug/L
Vinyl Acetate	ND	10	ug/L
2-Butanone	ND	20	ug/L
cis-1,2-Dichloroethene	ND	5	ug/L
1,2-Dichloroethene (total)	ND	5	ug/L
2,2-Dichloropropane	ND	5	ug/L
Bromochloromethane	ND	5	ug/L
Chloroform	ND	5	ug/L
1,1,1-Trichloroethane	ND	5	ug/L
1,2-Dichloroethane	ND	5	ug/L
1,1-Dichloropropene	ND	5	ug/L
Benzene	ND	5	ug/L
Carbon Tetrachloride	ND	5	ug/L
1,2-Dichloropropane	ND	5	ug/L
Trichloroethene	ND	5	ug/L
Dibromomethane	ND	5	ug/L
Bromodichloromethane	ND	5	ug/L
2-Chloroethylvinylether	ND	10	ug/L
4-Methyl-2-Pentanone	ND	10	ug/L
cis-1,3-Dichloropropene	ND	5	ug/L
trans-1,3-Dichloropropene	ND	5	ug/L
Toluene	ND	5	ug/L
1,1,2-Trichloroethane	ND	5	ug/L

Notes
ND - Not detected.

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: VLBLK
Batch: L990706104642

Reported on: 07/15/99 12:34
Analyzed on: 07/06/99 13:05
Analyst: LT

METHOD 8260/8240 L187B01

Compound	Result	Detection Limit	Units
1,3-Dichloropropane	ND	5	ug/L
2-Hexanone	ND	10	ug/L
Dibromochloromethane	ND	5	ug/L
1,2-Dibromoethane	ND	5	ug/L
Tetrachloroethene	ND	5	ug/L
Chlorobenzene	ND	5	ug/L
1,1,1,2-Tetrachloroethane	ND	5	ug/L
Ethylbenzene	ND	5	ug/L
Bromoform	ND	5	ug/L
Styrene	ND	5	ug/L
Xylene (Total)	ND	5	ug/L
1,1,2,2-Tetrachloroethane	ND	5	ug/L
1,2,3-Trichloropropane	ND	5	ug/L
Isopropylbenzene	ND	5	ug/L
Bromobenzene	ND	5	ug/L
N-Propylbenzene	ND	5	ug/L
2-Chlorotoluene	ND	5	ug/L
4-Chlorotoluene	ND	5	ug/L
1,3,5-Trimethylbenzene	ND	5	ug/L
tert-Butylbenzene	ND	5	ug/L
1,2,4-Trimethylbenzene	ND	5	ug/L
1,3-Dichlorobenzene	ND	5	ug/L
sec-Butylbenzene	ND	5	ug/L
1,4-Dichlorobenzene	ND	5	ug/L
p-Isopropyltoluene	ND	5	ug/L
1,2-Dichlorobenzene	ND	5	ug/L
n-Butylbenzene	ND	5	ug/L
1,2-Dibromo-3-Chloropropan	ND	5	ug/L
1,2,4-Trichlorobenzene	ND	5	ug/L
Naphthalene	ND	5	ug/L
Hexachlorobutadiene	ND	5	ug/L
1,2,3-Trichlorobenzene	ND	5	ug/L
Methyl t-Butyl Ether	ND	10	ug/L

Notes
ND - Not detected.

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: VLBLK
Batch: L990706104642

Reported on: 07/15/99 12:34
Analyzed on: 07/06/99 13:05
Analyst: LT

METHOD 8260/8240 L187B01

Surrogate	Result	QC Criteria	Units
1,2-Dichloroethane-d4	88	80-120	% Recovery
Toluene-d8	94	88-110	% Recovery
Bromofluorobenzene	98	86-115	% Recovery

Samples in Batch 9907124-04 9907124-05

Notes

ND - Not detected.

3C

WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SPL Contract:

Lab Code: Case No: E990704 SAS No: SDG No:

Matrix Spike - EPA Sample No: BLANK Level (low/med):

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC
Phenol	75	0	27	36	12-110
2-Chlorophenol	75	0	59	79	27-123
1,4-Dichlorobenzene	50	0	34	68	36-110
N-Nitroso-di-n-propylamine	50	0	37	74	41-116
1,2,4-Trichlorobenzene	50	0	39	78	39- 110
4-Chloro-3-methylphenol	75	0	48	64	23-110
Acenaphthene	50	0	42	84	46-125
4-Nitrophenol	75	0	29	39	25-150
2,4-Dinitrotoluene	50	0	33	66	50-150
Pentachlorophenol	75	0	67	89	9-125
Pyrene	50	0	47	94	26-127

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC
Phenol	75	24	32	12	42	12-110
2-Chlorophenol	75	52	69	14	40	27-123
1,4-Dichlorobenzene	50	33	66	3	28	36- 110
N-Nitroso-di-n-propylamine	50	32	64	14	38	41-116
1,2,4-Trichlorobenzene	50	38	76	3	28	39- 110
4-Chloro-3-methylphenol	75	44	59	8	42	23- 110
Acenaphthene	50	42	84	0	31	46-125
4-Nitrophenol	75	27	36	8	50	25-150
2,4-Dinitrotoluene	50	32	64	3	50	50-150
Pentachlorophenol	75	62	83	7	50	9-125
Pyrene	50	45	90	4	31	26-127

Column to be used to flag recovery and RPD values with an asterisk

RPD: 0 out of 11 outside limits

Spike Recovery: 0 out of 22 outside limits

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: BLANK
Batch: E990704042258

Reported on: 07/12/99 16:32
Analyzed on: 07/06/99 16:02
Analyst: SC

METHOD 8270 J185B03

Compound	Result	Detection Limit	Units
Pyridine	ND	5	ug/L
Phenol	ND	5	ug/L
Aniline	ND	5	ug/L
bis(2-Chloroethyl)ether	ND	5	ug/L
2-Chlorophenol	ND	5	ug/L
1,3-Dichlorobenzene	ND	5	ug/L
1,4-Dichlorobenzene	ND	5	ug/L
Benzyl alcohol	ND	5	ug/L
1,2-Dichlorobenzene	ND	5	ug/L
2-Methylphenol	ND	5	ug/L
bis(2-chloroisopropyl)ethe	ND	5	ug/L
4-Methylphenol	ND	5	ug/L
N-Nitroso-di-n-propylamine	ND	5	ug/L
Hexachloroethane	ND	5	ug/L
Nitrobenzene	ND	5	ug/L
Isophorone	ND	5	ug/L
2-Nitrophenol	ND	5	ug/L
2,4-Dimethylphenol	ND	5	ug/L
Benzoic acid	ND	25	ug/L
bis(2-Chloroethoxy)methane	ND	5	ug/L
2,4-Dichlorophenol	ND	5	ug/L
1,2,4-Trichlorobenzene	ND	5	ug/L
Naphthalene	ND	5	ug/L
4-Chloroaniline	ND	5	ug/L
Hexachlorobutadiene	ND	5	ug/L
4-Chloro-3-methylphenol	ND	5	ug/L
2-Methylnaphthalene	ND	5	ug/L
Hexachlorocyclopentadiene	ND	5	ug/L
2,4,6-Trichlorophenol	ND	5	ug/L
2,4,5-Trichlorophenol	ND	10	ug/L
2-Chloronaphthalene	ND	5	ug/L
2-Nitroaniline	ND	25	ug/L
Dimethylphthalate	ND	5	ug/L
2,6-Dinitrotoluene	ND	5	ug/L

Notes
ND - Not detected.

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SPL Blank QC Report

Matrix: Aqueous
Sample ID: BLANK
Batch: E990704042258

Reported on: 07/12/99 16:32
Analyzed on: 07/06/99 16:02
Analyst: SC

METHOD 8270 J185B03

Compound	Result	Detection Limit	Units
Acenaphthylene	ND	5	ug/L
3-Nitroaniline	ND	25	ug/L
Acenaphthene	ND	5	ug/L
2,4-Dinitrophenol	ND	25	ug/L
4-Nitrophenol	ND	25	ug/L
Dibenzofuran	ND	5	ug/L
2,4-Dinitrotoluene	ND	5	ug/L
Diethylphthalate	ND	5	ug/L
4-Chlorophenyl-phenylether	ND	5	ug/L
Fluorene	ND	5	ug/L
4-Nitroaniline	ND	25	ug/L
4,6-Dinitro-2-methylphenol	ND	25	ug/L
n-Nitrosodiphenylamine	ND	5	ug/L
1,2-Diphenylhydrazine	ND	5	ug/L
4-Bromophenyl-phenylether	ND	5	ug/L
Hexachlorobenzene	ND	5	ug/L
Pentachlorophenol	ND	25	ug/L
Phenanthrene	ND	5	ug/L
Anthracene	ND	5	ug/L
Carbazole	ND	5	ug/L
Di-n-butylphthalate	ND	5	ug/L
Fluoranthene	ND	5	ug/L
Pyrene	ND	5	ug/L
Butylbenzylphthalate	ND	5	ug/L
3,3'-Dichlorobenzidine	ND	10	ug/L
Benzo[a]anthracene	ND	5	ug/L
Chrysene	ND	5	ug/L
bis(2-Ethylhexyl)phthalate	ND	5	ug/L
Di-n-octylphthalate	ND	5	ug/L
Benzo[b]fluoranthene	ND	5	ug/L
Benzo[k]fluoranthene	ND	5	ug/L
Benzo[a]pyrene	ND	5	ug/L
Indeno[1,2,3-cd]pyrene	ND	5	ug/L
Dibenz[a,h]anthracene	ND	5	ug/L

Notes
ND - Not detected.

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SPL Blank QC Report

Matrix: Aqueous
Sample ID: BLANK
Batch: E990704042258

Reported on: 07/12/99 16:32
Analyzed on: 07/06/99 16:02
Analyst: SC

METHOD 8270 J185B03

Compound	Result	Detection Limit	Units
Benzo[g,h,i]perylene	ND	5	ug/L

Surrogate	Result	QC Criteria	Units
Nitrobenzene-d5	62	35-114	% Recovery
2-Fluorobiphenyl	72	43-116	% Recovery
Terphenyl-d14	70	33-141	% Recovery
Phenol-d5	28	10-110	% Recovery
2-Fluorophenol	49	21-110	% Recovery
2,4,6-Tribromophenol	89	10-123	% Recovery

Samples in Batch 9907124-04

Notes

ND - Not detected.

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

Matrix: Soil
Units: mg/kg

Batch Id: HP_0990710173200

L A B O R A T O R Y C O N T R O L S A M P L E

S P I K E C O M P O U N D S	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	0.92	92.0	53 - 137

M A T R I X 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
GASOLINE RANGE ORGANICS	0.47	0.9	0.99	57.8	1.3	92.2	45.9	50	36 - 163

Analyst: fab
Sequence Date: 07/10/99
SPL ID of sample spiked: 9907279-04A
Sample File ID: OOG1184.TX0
Method Blank File ID:
Blank Spike File ID: OOG1178.TX0
Matrix Spike File ID: OOG1181.TX0
Matrix Spike Duplicate File ID: OOG1182.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): 9907124-03A

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

Matrix: Aqueous
Units: mg/L

Batch Id: VARE990709134001

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	0.83	83.0	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	5.1	4	6.2	27.5 *	6.0	22.5 *	20.0	36	36 - 160

Analyst: DR
Sequence Date: 07/09/99
SPL ID of sample spiked: 9907122-01B
Sample File ID: EEG1152.TXO
Method Blank File ID:
Blank Spike File ID: EEG1143.TXO
Matrix Spike File ID: EEG1147.TXO
Matrix Spike Duplicate File ID: EEG1148.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): 9907156-01A 9907122-01B 9907124-04B

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

Matrix: Soil
Units: mg/kg

Batch Id: HPVV990719124100

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	180	108	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	6525	166	5401	NC	7764	NC	NC	50	21 - 175

Analyst: RR
Sequence Date: 07/19/99
SPL ID of sample spiked: 9906C41-10A
Sample File ID: VVF5172.TX0
Method Blank File ID:
Blank Spike File ID: VVG1097.TX0
Matrix Spike File ID: VVF5173.TX0
Matrix Spike Duplicate File ID: VVF5174.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): 9906C41-10A 9907124-03B

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

Matrix: Aqueous
Units: mg/L

Batch Id: HPVV990707011300

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	5.0	6.7	134	53 - 148

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	2.212	5.00	6.91	94.0	7.44	105	11.1	39	21 - 175

Analyst: RR
Sequence Date: 07/08/99
SPL ID of sample spiked: 9907122-01C
Sample File ID: VVF5074.TX0
Method Blank File ID:
Blank Spike File ID: VVF5072.TX0
Matrix Spike File ID: VVF5075.TX0
Matrix Spike Duplicate File ID: VVF5076.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): 9907125-02A 9907124-04C 9907125-03A 9907125-01A 9907122-01C

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** SPL BATCH QUALITY CONTROL REPORT **
Method 8310 ***

Matrix: Aqueous
Units: ug/L

Batch Id: 2990704124500

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Naphthalene	ND	0.5	0.33	66.0	32 - 148
Acenaphthylene	ND	0.5	0.35	70.0	42 - 138
Acenaphthene	ND	0.5	0.34	68.0	22 - 133
Fluorene	ND	0.5	0.32	64.0	11 - 148
Phenanthrene	ND	0.5	0.37	74.0	40 - 121
Anthracene	ND	0.5	0.36	72.0	32 - 121
Fluoranthene	ND	0.5	0.37	74.0	45 - 133
Pyrene	ND	0.5	0.37	74.0	39 - 136
Chrysene	ND	0.5	0.39	78.0	44 - 122
Benzo (a) anthracene	ND	0.5	0.39	78.0	53 - 137
Benzo (b) fluoranthene	ND	0.5	0.39	78.0	62 - 121
Benzo (k) fluoranthene	ND	0.5	0.39	78.0	66 - 128
Benzo (a) pyrene	ND	0.5	0.37	74.0	42 - 120
Dibenzo (a,h) anthracene	ND	0.5	0.36	72.0	59 - 129
Benzo (g,h,i) perylene	ND	0.5	0.37	74.0	67 - 124
Indeno (1,2,3-cd) pyrene	ND	0.5	0.39	78.0	65 - 125

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
NAPHTHALENE	34	0.50	39	NC	28	NC	NC	30	1 - 122
ACENAPHTHYLENE	ND	0.50	0.42	84.0	0.34	68.0	21.1	30	1 - 124
ACENAPHTHENE	ND	0.50	0.49	98.0	0.46	92.0	6.32	30	1 - 124
FLUORENE	2.5	0.50	2.6	NC	2.1	NC	NC	30	1 - 142
PHENANTHRENE	ND	0.50	0.50	100	0.46	92.0	8.33	30	1 - 155
ANTHRACENE	ND	0.50	0.37	74.0	0.37	74.0	0	30	1 - 126
FLUORANTHENE	ND	0.50	0.38	76.0	0.37	74.0	2.67	30	14 - 123
PYRENE	ND	0.50	0.53	106	0.50	100	5.83	30	1 - 140
CHRYSENE	ND	0.50	0.44	88.0	0.43	86.0	2.30	30	1 - 199
BENZO (A) ANTHRACENE	ND	0.50	0.49	98.0	0.46	92.0	6.32	30	12 - 135
BENZO (B) FLUORANTHENE	ND	0.50	0.45	90.0	0.42	84.0	6.90	30	6 - 150
BENZO (K) FLUORANTHENE	ND	0.50	0.42	84.0	0.40	80.0	4.88	30	1 - 159
BENZO (A) PYRENE	ND	0.50	0.44	88.0	0.42	84.0	4.65	30	1 - 128
DIBENZO (A,H) ANTHRACENE	ND	0.50	0.37	74.0	0.37	74.0	0	30	1 - 110
BENZO (G,H,I) PERYLENE	ND	0.50	0.42	84.0	0.42	84.0	0	30	1 - 116
INDENO (1,2,3-CD) PYRENE	ND	0.50	0.36	72.0	0.21	42.0	52.6 *	30	1 - 116

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** SPL BATCH QUALITY CONTROL REPORT **
Method 8310 ***

Matrix: Aqueous
Batch Id: 2990704124500
Units: ug/L

Analyst: LJ
Sequence Date: 07/08/99
SPL ID of sample spiked: 9907122-01F
Sample File ID: 990713A\009-0901
Method Blank File ID:
Blank Spike File ID: 990708A\022-1101
Matrix Spike File ID: 990713A\011-1101
Matrix Spike Duplicate File ID: 990713A\012-1201

* = 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: Temporary Limits

SAMPLES IN BATCH(SPL ID): 9907128-05C 9907128-06C 9907122-01F 9907124-04F
9907128-02C 9907128-03C 9907128-04C

ICP

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: PB

Matrix: Soil Units: mg/Kg

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

Date: 071299 Time:0836 File Name: 0712PB3

Laboratory Control Sample Lot#240

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver	ND	34.1	32	95	25.4	42.9
Aluminum						
Arsenic						
Barium	ND	112	110	98	86.3	138
Beryllium	ND	77	73	95	60.4	93.7
Calcium						
Cadmium	ND	34.6	31	90	26.6	42.6
Cobalt	ND	59.8	57	96	47.5	72
Chromium	ND	108	104	96	79	136
Copper	ND	61.7	56	91	50.5	72.9
Iron						
Potassium						
Molybdenum	ND	65.8	63	96	50.3	81.2
Manganese						
Sodium						
Nickel	ND	48.4	47	97	37.9	58.9
Lead						
Antimony	ND	26.2	31	118	10	53.1
Selenium						
Tin	ND	82.7	80	96	61.5	104
Vanadium	ND	81.9	79	96	55.9	108
Zinc	ND	137	129	94	106	168

Work Orders in Batch

Work Order	Fractions
99-07-118	01B,02B
99-07-109	01A
99-07-124	02A

Matrix Spike - Spike Duplicate Results **Work Order Spiked: 9907118-01B**

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery	Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery	Q.C. Limits % Recovery		Spike RPD %	QC Limits %
Silver	ND	100	87.54	88	87.22	87	80	120	0.4	20.0
Aluminum										
Arsenic										
Barium	95.65	100	186.4	91	186.2	91	80	120	0.2	20.0
Beryllium	0.5451	100	88.75	88	89.11	89	80	120	0.4	20.0
Calcium										
Cadmium	ND	100	88.2	88	89.17	89	80	120	1.1	20.0
Cobalt	3.674	100	92.96	89	93.82	90	80	120	1.0	20.0
Chromium	7.191	100	103.9	97	104	97	80	120	0.1	20.0
Copper	5.142	100	93.18	88	92.97	88	80	120	0.2	20.0
Iron										
Potassium										
Molybdenum	ND	100	88.55	89	89.39	89	80	120	0.9	20.0
Manganese										
Sodium										
Nickel	6.172	100	97.49	91	98.67	92	80	120	1.3	20.0
Lead										
Antimony	ND	200	176.3	88	185.3	93	80	120	5.0	20.0
Selenium										
Tin	ND	200	176.3	88	176.3	88	80	120	0.0	20.0
Vanadium	14.52	100	114.3	100	114	99	80	120	0.3	20.0
Zinc	16.22	100	112.8	97	112.9	97	80	120	0.1	20.0

Elements Post Spiked: Sb

Checked PB 7/14/99

TRACE ICP

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: EG

Matrix: Soil Units: mg/Kg

Date: 071399 Time:1110 File Name: 0713PB2

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

Laboratory Control Sample Lot#240

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver						
Aluminum						
Arsenic	ND	36.5	36	99	27.2	45.9
Barium						
Beryllium						
Calcium						
Cadmium						
Cobalt						
Chromium						
Copper						
Iron						
Molybdenum						
Manganese						
Nickel						
Lead	ND	50.2	49	97	35.7	64.7
Antimony	ND	26.2	32	121	0.5	53.1
Selenium	ND	45.7	41	90	33	58.4
Thallium						
Vanadium						
Zinc						

Work Orders in Batch

Work Order	Fractions
99-07-118	01B,02B
99-07-124 ,	02A

Matrix Spike - Spike Duplicate Results **Work Order Spiked: 9907118-01B**

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery	Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery	Q.C. Limits % Recovery		Spike RPD %	QC Limits %
Silver										
Aluminum										
Arsenic	2.416	200	174.7	86	176.3	87	80	120	0.9	20.0
Barium										
Beryllium										
Calcium										
Cadmium										
Cobalt										
Chromium										
Copper										
Iron										
Molybdenum										
Manganese										
Nickel										
Lead	4.407	100	92.02	88	92.47	88	80	120	0.5	20.0
Antimony	ND	200	190.1	95	191.2	96	80	120	0.6	20.0
Selenium	ND	200	163.7	82	164.4	82	80	120	0.4	20.0
Thallium										
Vanadium										
Zinc										

Elements Post Spiked: Sb

Checked EG 7/14/99

ICP

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: JM

Matrix: Water Units: mg/L

Date:070899 Time:1321 File Name: 0708MR3

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PHONE (713) 660-0901

Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver	ND	2.00	2.03	101	1.60	2.40
Aluminum						
Arsenic	ND	4.00	4.02	101	3.20	4.80
Barium	ND	2.00	2.09	104	1.60	2.40
Boron	ND	4.00	4.21	105	3.20	4.80
Calcium						
Cadmium	ND	2.00	1.94	97	1.60	2.40
Cobalt						
Chromium	ND	2.00	1.95	97	1.60	2.40
Copper	ND	2.00	2.12	106	1.60	2.40
Iron	ND	2.00	1.97	98	1.60	2.40
Potassium						
Magnesium	ND	20.00	20.43	102	16.00	24.00
Manganese	ND	2.00	1.96	98	1.60	2.40
Sodium						
Nickel	ND	2.00	1.95	98	1.60	2.40
Lead	ND	2.00	1.96	98	1.60	2.40
Antimony						
Selenium	ND	4.00	4.07	102	3.20	4.80
Tin						
Vanadium						
Zinc	ND	2.00	1.97	98	1.60	2.40

Work Orders in Batch

Work Order	Fractions
99-07-108	01C-11C
99-07-148	01A
99-07-090	05A
99-07-078	01F
99-07-122	01D
99-07-124	04D
99-07-048	03C

Matrix Spike - Spike Duplicate Results **Work Order Spiked: 9907108-01C**

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery	Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery	QC Limits % Recovery		Spike RPD %		QC Limits %
Silver	ND	1.0	0.9797	98.0	0.9754	97.5	80	120	0.4		20.0
Aluminum											
Arsenic	ND	2.0	2.097	104.9	2.078	103.9	80	120	0.9		20.0
Barium	0.6092	1.0	1.657	104.8	1.587	97.8	80	120	6.9		20.0
Boron	1.083	2.0	3.227	107.2	3.162	104.0	80	120	3.1		20.0
Calcium											
Cadmium	ND	1.0	0.9494	94.9	0.961	96.1	80	120	1.2		20.0
Cobalt											
Chromium	ND	1.0	0.9152	91.5	0.9281	92.8	80	120	1.4		20.0
Copper	ND	1.0	1.086	108.6	1.034	103.4	80	120	4.9		20.0
Iron	6.336	1.0	7.325	98.9	7.184	84.8	80	120	15.4		20.0
Potassium											
Magnesium	55.23	10.0	67.02	117.9	64.48	92.5	80	120	24.1	**	20.0
Manganese	0.3088	1.0	1.243	93.4	1.245	93.6	80	120	0.2		20.0
Sodium											
Nickel	ND	1.0	0.9183	91.8	0.9322	93.2	80	120	1.5		20.0
Lead	ND	1.0	0.9129	91.3	0.9304	93.0	80	120	1.9		20.0
Antimony											
Selenium	ND	2.0	2.026	101.3	2.009	100.5	80	120	0.8		20.0
Tin											
Vanadium											
Zinc	0.0211	1.0	0.9813	96.0	0.9812	96.0	80	120	0.0		20.0

** Spike RPD Outside Method Limits

Checked: 7/9/99

Trace-icp

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: EG

Matrix: Water Units: mg/L

Date:070799 Time:1107 File Name: 0707MR1

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

Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver						
Aluminum						
Arsenic	ND	4.00	3.91	98	3.20	4.80
Barium						
Beryllium						
Calcium						
Cadmium						
Cobalt						
Chromium						
Copper						
Iron						
Magnesium						
Manganese						
Nickel						
Lead	ND	2.00	2.01	100	1.60	2.40
Antimony						
Selenium	ND	4.00	3.83	96	3.20	4.80
Thallium						
Vanadium						
Zinc						

Work Orders in Batch

Work Order	Fractions
99-07-082	01D
99-07-091	01C
99-07-148	01A
99-07-078	01F
99-07-122	01D
99-07-124	04D
99-07-150	01C

Matrix Spike - Spike Duplicate Results **Work Order Spiked: 9907108-01C**

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery	Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery	QC Limits % Recovery		Spike RPD %	QC Limits %
Silver										
Aluminum										
Arsenic	0.0686	2.0	1.969	95.0	1.966	94.9	80	120	0.2	20.0
Barium										
Beryllium										
Calcium										
Cadmium										
Cobalt										
Chromium										
Copper										
Iron										
Magnesium										
Manganese										
Nickel										
Lead	ND	1.0	0.9434	94.3	0.9429	94.3	80	120	0.1	20.0
Antimony										
Selenium	ND	2.0	1.898	94.9	1.894	94.7	80	120	0.2	20.0
Thallium										
Vanadium										
Zinc										

Checked: EG. 7/8/99

ICP

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: JM

Matrix: Water Units: mg/L

Date:071999 Time:1052 File Name: 0719JM1

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

Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver						
Aluminum						
Arsenic						
Barium						
Beryllium						
Calcium						
Cadmium						
Cobalt						
Chromium						
Copper						
Iron						
Potassium	ND	20.00	20.50	103	16.00	24.00
Magnesium						
Manganese						
Sodium	ND	20.00	20.66	103	16.00	24.00
Nickel						
Lead						
Antimony						
Selenium						
Tin						
Vanadium						
Zinc						

Work Orders in Batch

Work Order	Fractions
99-07-122	01D
99-07-124	04D

Matrix Spike - Spike Duplicate Results Work Order Spiked: 9907122-01D

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery		Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery		QC Limits % Recovery		Spike RPD %		QC Limits %
Silver													
Aluminum													
Arsenic													
Barium													
Beryllium													
Calcium													
Cadmium													
Cobalt													
Chromium													
Copper													
Iron													
Potassium	5.817	10.0	15.74	99.2		15.5	96.8		80	120	2.4		20.0
Magnesium													
Manganese													
Sodium	165.1	10.0	168.2	31.0	*	169	39.0	*	80	120	22.9	**	20.0
Nickel													
Lead													
Antimony													
Selenium													
Tin													
Vanadium													
Zinc													

* Spike Results Outside Method Limits
Elements Post Spiked: ALL

Checked: jm 7/21/99

ICP

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: JM

Matrix: Water Units: mg/L

Date:070899 Time:1321 File Name: 0708JM10

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

Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver						
Aluminum						
Arsenic						
Barium						
Beryllium						
Calcium	ND	20.00	18.93	95	16.00	24.00
Cadmium						
Cobalt						
Chromium						
Copper						
Iron						
Potassium						
Magnesium						
Manganese						
Sodium						
Nickel						
Lead						
Antimony						
Selenium						
Tin						
Vanadium						
Zinc						

Work Orders in Batch

Work Order	Fractions
99-07-122	01D
99-07-124	04D

Matrix Spike - Spike Duplicate Results **Work Order Spiked: 9907108-01C**

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery		Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery		QC Limits % Recovery		Spike RPD %		QC Limits %
Silver													
Aluminum													
Arsenic													
Barium													
Beryllium													
Calcium	141.3	10.0	149.1	78.0	*	144.4	31.0	*	80	120	86.2	**	20.0
Cadmium													
Cobalt													
Chromium													
Copper													
Iron													
Potassium													
Magnesium													
Manganese													
Sodium													
Nickel													
Lead													
Antimony													
Selenium													
Tin													
Vanadium													
Zinc													

* Spike Results Outside Method Limits
** Spike RPD Outside Method Limits
Elements Post Spiked: ALL

Checked: JM 7/22/99

LAFAYETTE AREA LAB
500 AMBASSADOR CAFFERY PKWY.
SCOTT, LOUISIANA
ZIP 70583-8544
PHONE: (318) 237-4775

** SPL QUALITY CONTROL REPORT **

Matrix: Liquid

Reported on: 07/20/99
Analyzed on: 07/20/99
Analyst: RJB

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:

Mercury, Total
Method 7470 A***

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	0.0100	0.0103	103	80 - 120

FIAS990720102000-9907A61

Samples in batch:

9907735-01A	9907789-02A	9907790-01A	9907793-01A
9907793-02A	9907793-03A	9907793-04A	9907793-05A
9907793-06A	9907793-07A	9907793-08A	9907793-09A
9907793-10A	9907793-11A	9907794-01A	9907795-01A
9907797-02A	9907801-01A		

COMMENTS:

LAFAYETTE AREA LAB
500 AMBASSADOR CAFFERY PKWY.
SCOTT, LOUISIANA
ZIP 70583-8544
PHONE: (318) 237-4775

** SPL QUALITY CONTROL REPORT **

Matrix: Liquid

Reported on: 07/20/99
Analyzed on: 07/20/99
Analyst: RJB

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:

Mercury, Total
Method 7470 A***

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
9907735-01A	ND	ND	0.010	0.0103	103	0.0102	102	1.0	20	80 -120

FIAS990720102000-9907A60

Samples in batch:

9907735-01A	9907789-02A	9907790-01A	9907793-01A
9907793-02A	9907793-03A	9907793-04A	9907793-05A
9907793-06A	9907793-07A	9907793-08A	9907793-09A
9907793-10A	9907793-11A	9907794-01A	9907795-01A
9907797-02A	9907801-01A		

COMMENTS:

LAFAYETTE AREA LAB
500 AMBASSADOR CAFFERY PKWY.
SCOTT, LOUISIANA
ZIP 70583-8544
PHONE: (318) 237-4775

** SPL QUALITY CONTROL REPORT **

Matrix: Solid

Reported on: 07/21/99
Analyzed on: 07/20/99
Analyst: RJB

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:

Mercury, Total
Method 7471A ***

SPL Sample ID Number	Blank Value mg/Kg	Certified Value mg/Kg	Measured Concentration mg/Kg	Mandatory Range of Measured Concentration
LCS	ND	1.00	1.12	0.61 - 1.39

FIAS990720153000-9907B30

Samples in batch:

9907499-01A	9907501-01A	9907503-01A	9907504-01A
9907505-01A	9907589-01G	9907653-01C	9907695-01A
9907695-03A	9907695-05A	9907789-01A	9907797-04A
9907799-01A	9907799-02A	9907799-03A	9907799-04A
9907799-05A	9907799-06A		

COMMENTS:
Sample chosen for spiking exhibited an abosrptive effect on the spikes added. Control limits do not apply.

NC = Not calculated

LAFAYETTE AREA LAB
500 AMBASSADOR CAFFERY PKWY.
SCOTT, LOUISIANA
ZIP 70583-8544
PHONE: (318) 237-4775

** SPL QUALITY CONTROL REPORT **

Matrix: Solid

Reported on: 07/21/99
Analyzed on: 07/20/99
Analyst: RJB

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:

Mercury, Total
Method 7471A ***

SPL Sample ID Number	Method Blank mg/Kg	Sample Result mg/Kg	Spike Added mg/Kg	Matrix Spike Result mg/Kg	Matrix Spike Recovery %	Matrix Spike Duplicate Result mg/Kg	Matrix Spike Duplicate Recovery %	RPD (%)	QC LIMITS (Advisory) RPD Max	QC LIMITS (Advisory) % REC
9907789-01A	ND	ND	1.25	NC	0	NC	0	0	20	80 -120

FIAS990720153000-9907B29

Samples in batch:

9907499-01A	9907501-01A	9907503-01A	9907504-01A
9907505-01A	9907589-01G	9907653-01C	9907695-01A
9907695-03A	9907695-05A	9907789-01A	9907797-04A
9907799-01A	9907799-02A	9907799-03A	9907799-04A
9907799-05A	9907799-06A		

COMMENTS:
Sample chosen for spiking exhibited an abosrptive effect on the spikes added. Control limits do not apply.

NC = Not calculated

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

** SPL QUALITY CONTROL REPORT **

Matrix: Soil

Reported on: 07/09/99
Analyzed on: 07/08/99
Analyst: AB

This sample was randomly selected for use in the SPL quality control program. The results are as follows:

Solids
CLP Inorganics SOW

-- DUPLICATE ANALYSIS --

SPL Sample ID	Original Sample Concentration %wt	Duplicate Sample %wt	RPD	RPD Max.
9907109-01A	100	100	0	20

-9907114

Samples in batch:

9907109-01A	9907112-02B	9907118-01B	9907118-02B
9907124-02A	9907124-03B	9907149-01A	9907179-01B

COMMENTS:

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/15/99
Analyzed on: 07/13/99
Analyst: CV

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:

Chloride
Method 325.3 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	162	163.1	101	94 - 106

-9907220

Samples in batch:

9907124-04H 9907215-04G 9907218-08G 9907268-01G
9907268-02G 9907268-04G

COMMENTS:

LCS-SPL ID#94453228-23

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/15/99
Analyzed on: 07/13/99
Analyst: CV

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:

Chloride
Method 325.3 *

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
9907215-04G	ND	26.6	50.0	76.2	99.2	78.0	103	3.8	5	92 -109

-9907220

Samples in batch:

9907124-04H 9907215-04G 9907218-08G 9907268-01G
9907268-02G 9907268-04G

COMMENTS:

LCS-SPL ID#94453228-23

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/14/99
Analyzed on: 07/03/99
Analyst: ELS

This sample was randomly selected for use in the SPL quality control program. The results are as follows:

Carbonate, as CaCO3
Method SM 4500-CO2D **

-- DUPLICATE ANALYSIS --

SPL Sample ID	Original Sample Concentration mg/L	Duplicate Sample mg/L	RPD	RPD Max.
9907124-04H	ND	ND	0	5

-9907208

Samples in batch:

9907122-01H 9907124-04H

COMMENTS:

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/14/99
Analyzed on: 07/03/99
Analyst: ELS

This sample was randomly selected for use in the SPL quality control program. The results are as follows:

Bicarbonate, as CaCO3
Method SM 4500-CO2D **

-- DUPLICATE ANALYSIS --

SPL Sample ID	Original Sample Concentration mg/L	Duplicate Sample mg/L	RPD	RPD Max.
9907124-04H	200	204	2.0	5

-9907207

Samples in batch:

9907122-01H 9907124-04H

COMMENTS:

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/06/99
Analyzed on: 07/06/99
Analyst: ELS

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:

Fluoride
Method 300.0 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	10.0	9.46	94.6	90 - 110

-9907073

Samples in batch:

9906552-03A 9907024-02J 9907122-03I 9907124-04I

COMMENTS:
LCS SPL ID# 95535278-12

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/06/99
Analyzed on: 07/06/99
Analyst: ELS

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:

Fluoride
Method 300.0 *

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
9907024-02J	ND	1.83	10.0	10.9	90.7	11.0	91.7	1.1	20	80 -120

-9907073

Samples in batch:

9906552-03A 9907024-02J 9907122-03I 9907124-04I

COMMENTS:
LCS SPL ID# 95535278-12

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/09/99
Analyzed on: 07/08/99
Analyst: CV

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	5.0	4.88	97.6	92 - 113

-9907135

Samples in batch:

9907122-03I 9907124-04I 9907215-04G 9907218-08G

COMMENTS:

NO2 ON 9907122 & 9907124 WERE RUN ON 07/03/99
NO3 WERE ANALYZED ON PRESERVED SAMPLES
LCS- SPL ID#94453220-10

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/09/99
Analyzed on: 07/08/99
Analyst: CV

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
9907124-04I	ND	2.09	5.0	7.37	106	7.25	103	2.9	12	84 -125

-9907135

Samples in batch:

9907122-03I 9907124-04I 9907215-04G 9907218-08G

COMMENTS:

NO2 ON 9907122 & 9907124 WERE RUN ON 07/03/99
NO3 WERE ANALYZED ON PRESERVED SAMPLES
LCS- SPL ID#94453220-10

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/06/99
Analyzed on: 07/06/99
Analyst: ELS

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	26.8	28.0	104	82 - 111

-9907072

Samples in batch:

9906552-03A 9907024-02J 9907122-03I 9907124-04I

COMMENTS:
LCS SPL ID# 95535274-12

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/06/99
Analyzed on: 07/06/99
Analyst: ELS

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	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
9907024-02J	ND	247	250	514	107	512	106	0.9	9.5	84 -120

-9907072

Samples in batch:

9906552-03A 9907024-02J 9907122-03I 9907124-04I

COMMENTS:
LCS SPL ID# 95535274-12

CHAIN OF CUSTODY

AND

SAMPLE RECEIPT CHECKLIST

SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Workorder No: 9907124 — 10583 — page 1 of 1

Client Name: Brown and Caldwell 713-759-0999
Address/Phone: 1415 Louisiana #2500 Houston TX 77002
Client Contact: Rick Rexroad
Project Name: BJ Services
Project Number: 12832.021
Project Location: Hobbs, N. Mexico
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: TPH-G (8015)	TPH-D (8015)	RCRA Metals (3005/6010/7000 Series)	VOCs (8260)	Methane (RSK-SOP-147/175)	Cations (Ca, Mg, K, Na) 6010	carbonate/bicarbonate (4500-CO2-D); Chloride (325.3)	SVOCs (8270)	PAHs (8310)
MW13-Soil	6/29/99	1252	X		S	G	4	none	2	X	X							
MW 12D/13-Soil	6/30/99	1002	X		↓	↓	↓	↓	1			X						
MW 12D-Soil	↓	1007	X		↓	↓	↓	↓	2	X	X							
MW-12D	7/2/99	1050		X	W	P,G,A,V	40,1	1,2,none	13	X	X	X	X	X	X	X	X	X
MW-12D	↓	1340		X	W	P	1	none	1									
Trip Blank #2	↓	1420		X	W	V	40	none	2				X					
												RUSH						

Nitrate (353.3)/Sulfate (375.4) Fluoride 300.0

Client/Consultant Remarks: FedEx Airbill #811305335300

Laboratory remarks:

Intact? ☑ Y ☐ N
Temp: 4c

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): BAF

1. Relinquished by Sampler: Richard Rexroad	date: 7/2/99	time: 1530	2. Received by:
3. Relinquished by:	date:	time:	4. Received by:
5. Relinquished by:	date:	time:	6. Received by Laboratory: 7/3/99 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

SPL Houston Environmental Laboratory

Sample Login Checklist

Date:	Time:
7/3/99	1000

SPL Sample ID: 9907124

			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:		4 C	
10	Method of sample delivery to SPL:	SPL Delivery		
		Client Delivery		
		FedEx Delivery (airbill #)	811305335358	
		Other:		
11	Method of sample disposal:	SPL Disposal	✓	
		HOLD		
		Return to Client		

Name:	Date:
Ruben S [illegible]	7/3/99

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

July 22, 1999

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 July 3, 1999. The sample(s) was assigned to Certificate of Analysis No. (s) 9907122 and analyzed for all parameters as listed on the chain of custody.

Due to our Mercury analyzer being down we had to subcontract your sample(s) to our Lafayette laboratory for completion. It was assigned to their Certificate of Analysis No. 9907790.

Your sample ID: MW-13 (SPL ID: H9-9907122-01) was randomly selected for the use in SPL's Quality Control program for the Volatile Organic analysis by SW846 method 8260B. The Matrix Spike (MS) and Matrix Spike Duplicate (MSD) were outside of the advisable quality control limits for Benzene, due to matrix interference. A Laboratory Control Sample (LCS) was analyzed as a quality control check for the analytical batch and all recoveries were within acceptable.

Your sample ID: MW-13 (SPL ID: H9-9907122-01) was randomly selected for the use in SPL's Quality Control program for the Gasoline Range Organics analysis by SW846 method 8260B. The Matrix Spike (MS) and Matrix Spike Duplicate (MSD) were outside of the advisable quality control limits (Batch ID: VARE990709134001), due to matrix interference. A Laboratory Control Sample (LCS) was analyzed as a quality control check for the analytical batch and all recoveries were within acceptable.

Your sample ID: MW-13 (SPL ID: H9-9907122-01) was randomly selected for the use in SPL's Quality Control program for the Total Metals analysis by SW846 method 6010B. The Matrix Spike (MS) and Matrix Spike Duplicate (MSD) were outside of the advisable quality control limits for Sodium (File Name: 0719JM1), due to matrix interference. A Laboratory Control Sample (LCS) was analyzed as a quality control check for the analytical batch and all recoveries were within acceptable.

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
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Any other data flags or quality control exceptions associated with this report will be footnoted in the analytical result 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: 99-07-122

Approved for Release by:

Bernadette A. Fini, Senior Project Manager — 7-22-99 Date

Joel Grice
Laboratory Director

Ted Yen
Corporate Quality Assurance Director

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

Certificate of Analysis No. H9-9907122-01

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

DATE: 07/22/99

PROJECT: BJ Services
SITE: Hobbs,NM
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-13

PROJECT NO: 12832.021
MATRIX: WATER
DATE SAMPLED: 07/02/99 12:20:00
DATE RECEIVED: 07/03/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	5.1	0.50 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	93		
1,4-Difluorobenzene	107		
Method 8015B *** for Gasoline			
Analyzed by: DR			
Date: 07/09/99			
Total Petroleum Hydrocarbons-Diesel	2.2	1.00 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	60		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 07/08/99 03:06:00			
Methane	0.0017	0.0012 P	mg/L
RSKSOP-147			
Analyzed by: JDR			
Date: 07/14/99 03:03:00			

(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.

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

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Certificate of Analysis No. H9-9907122-01

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

DATE: 07/22/99

PROJECT: BJ Services
SITE: Hobbs,NM
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-13

PROJECT NO: 12832.021
MATRIX: WATER
DATE SAMPLED: 07/02/99 12:20:00
DATE RECEIVED: 07/03/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Silver, Total Method 6010B *** Analyzed by: JM Date: 07/08/99 13:21:00	ND	0.01	mg/L
Arsenic, Total Method 6010B *** Analyzed by: EG Date: 07/07/99 11:07:00	0.008	0.005	mg/L
Barium, Total Method 6010B *** Analyzed by: JM Date: 07/08/99 13:21:00	0.333	0.005	mg/L
Calcium, Total Method 6010B *** Analyzed by: JM Date: 07/08/99 13:21:00	389	0.1	mg/L

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.

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Certificate of Analysis No. H9-9907122-01

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

DATE: 07/22/99

PROJECT: BJ Services
SITE: Hobbs,NM
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-13

PROJECT NO: 12832.021
MATRIX: WATER
DATE SAMPLED: 07/02/99 12:20:00
DATE RECEIVED: 07/03/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Cadmium, Total Method 6010B *** Analyzed by: JM Date: 07/08/99 13:21:00	ND	0.005	mg/L
Chromium, Total Method 6010B *** Analyzed by: JM Date: 07/08/99 13:21:00	0.02	0.01	mg/L
Mercury, Total Method 7470 A*** Analyzed by: RJB Date: 07/20/99 10:20:00	ND	0.0002	mg/L
Potassium, Total Method 6010B *** Analyzed by: JM Date: 07/19/99 10:52:00	6	2	mg/L
Magnesium, Total Method 6010B *** Analyzed by: JM Date: 07/08/99 13:21:00	83.9	0.1	mg/L

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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HOUSTON, TEXAS 77054
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Certificate of Analysis No. H9-9907122-01

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

DATE: 07/22/99

PROJECT: BJ Services
SITE: Hobbs,NM
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-13

PROJECT NO: 12832.021
MATRIX: WATER
DATE SAMPLED: 07/02/99 12:20:00
DATE RECEIVED: 07/03/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Sodium, Total Method 6010B *** Analyzed by: JM Date: 07/19/99 10:52:00	165	0.5	mg/L
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: EE Date: 07/06/99 13:30:00	07/06/99		
Lead, Total Method 6010B *** Analyzed by: EG Date: 07/07/99 11:07:00	ND	0.005	mg/L
Selenium, Total Method 6010B *** Analyzed by: EG Date: 07/07/99 11:07:00	ND	0.005	mg/L

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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Certificate of Analysis No. H9-9907122-01

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

DATE: 07/22/99

PROJECT: BJ Services
SITE: Hobbs,NM
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-13

PROJECT NO: 12832.021
MATRIX: WATER
DATE SAMPLED: 07/02/99 12:20:00
DATE RECEIVED: 07/03/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction SEMIVOLATILES Method 3520C *** Analyzed by: KL Date: 07/04/99 16:00:00	07/04/99		
Chloride Method 325.3 * Analyzed by: CV Date: 07/13/99 10:45:00	496	10	mg/L
Carbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: ELS Date: 07/03/99 12:00:00	ND	1.0	mg/L
Bicarbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: ELS Date: 07/03/99 12:00:00	520	2.0	mg/L

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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Certificate of Analysis No. H9-9907122-01

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

07/22/99

PROJECT: BJ Services
SITE: Hobbs,NM
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-13

PROJECT NO: 12832.021
MATRIX: WATER
DATE SAMPLED: 07/02/99 12:20:00
DATE RECEIVED: 07/03/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Benzene	1500	50	ug/L
Bromobenzene	ND	5	ug/L
Bromochloromethane	ND	5	ug/L
Bromodichloromethane	ND	5	ug/L
Bromoform	ND	5	ug/L
Bromomethane	ND	10	ug/L
n-Butylbenzene	ND	5	ug/L
sec-Butylbenzene	5	5	ug/L
tert-Butylbenzene	ND	5	ug/L
Carbon tetrachloride	ND	5	ug/L
Chlorobenzene	ND	5	ug/L
Chlorodibromomethane	ND	5	ug/L
Chloroethane	ND	10	ug/L
Chloroform	ND	5	ug/L
Chloromethane	ND	10	ug/L
2-Chlorotoluene	ND	5	ug/L
4-Chlorotoluene	ND	5	ug/L
1,2-Dibromo-3-chloropropane	ND	5	ug/L
1,2-Dibromoethane	ND	5	ug/L
Dibromomethane	ND	5	ug/L
1,2-Dichlorobenzene	ND	5	ug/L
1,3-Dichlorobenzene	ND	5	ug/L
1,4-Dichlorobenzene	ND	5	ug/L
Dichlorodifluoromethane	ND	10	ug/L
1,1-Dichloroethane	ND	5	ug/L
1,2-Dichloroethane	ND	5	ug/L
1,1-Dichloroethene	ND	5	ug/L
cis-1,2-Dichloroethene	ND	5	ug/L
trans-1,2-Dichloroethene	ND	5	ug/L
1,2-Dichloropropane	ND	5	ug/L
1,3-Dichloropropane	ND	5	ug/L
2,2-Dichloropropane	ND	5	ug/L

METHOD: 8260 Water, Volatile Organics
(continued on next page)

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
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Certificate of Analysis No. H9-9907122-01

Brown and Caldwell

SAMPLE ID: MW-13

ANALYTICAL DATA (continued)

PARAMETER	RESULTS	PQL*	UNITS
1,1-Dichloropropene	ND	5	ug/L
Ethylbenzene	750	50	ug/L
Hexachlorobutadiene	ND	5	ug/L
Isopropylbenzene	31	5	ug/L
p-Isopropyltoluene	ND	5	ug/L
Methylene chloride	ND	5	ug/L
Naphthalene	190	5	ug/L
n-Propylbenzene	68	5	ug/L
Styrene	ND	5	ug/L
1,1,1,2-Tetrachloroethane	ND	5	ug/L
1,1,2,2-Tetrachloroethane	ND	5	ug/L
Tetrachloroethene	ND	5	ug/L
Toluene	23	5	ug/L
1,2,3-Trichlorobenzene	ND	5	ug/L
1,2,4-Trichlorobenzene	ND	5	ug/L
1,1,1-Trichloroethane	ND	5	ug/L
1,1,2-Trichloroethane	ND	5	ug/L
Trichloroethene	ND	5	ug/L
Trichlorofluoromethane	ND	5	ug/L
1,2,3-Trichloropropane	ND	5	ug/L
1,2,4-Trimethylbenzene	93	5	ug/L
1,3,5-Trimethylbenzene	93	5	ug/L
Vinyl chloride	ND	10	ug/L
Xylenes (total)	58	5	ug/L
1,2-Dichloroethene (total)	ND	5	ug/L
cis-1,3-Dichloropropene	ND	5	ug/L
trans-1,3-Dichloropropene	ND	5	ug/L
Acetone	ND	100	ug/L
2-Butanone	ND	20	ug/L
4-Methyl-2-Pentanone	ND	10	ug/L
2-Hexanone	ND	10	ug/L
Carbon Disulfide	ND	5	ug/L
Vinyl Acetate	ND	10	ug/L
2-Chloroethylvinylether	ND	10	ug/L
Methyl t-Butyl Ether	25	10	ug/L

METHOD: 8260 Water, Volatile Organics

(continued on next page)

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

Certificate of Analysis No. H9-9907122-01

Brown and Caldwell

SAMPLE ID: MW-13

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1,2-Dichloroethane-d4	50 ug/L	90	80	120
Toluene-d8	50 ug/L	92	88	110
4-Bromofluorobenzene	50 ug/L	96	86	115

ANALYZED BY: JC DATE/TIME: 07/06/99 13:56:00
METHOD: 8260 Water, Volatile Organics
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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

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8880 INTERCHANGE DRIVE
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Certificate of Analysis No. H9-9907122-01

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

07/22/99

PROJECT: BJ Services
SITE: Hobbs,NM
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-13

PROJECT NO: 12832.021
MATRIX: WATER
DATE SAMPLED: 07/02/99 12:20:00
DATE RECEIVED: 07/03/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Acenaphthene	ND	5	ug/L
Acenaphthylene	ND	5	ug/L
Aniline	ND	5	ug/L
Anthracene	ND	5	ug/L
Benzo(a)Anthracene	ND	5	ug/L
Benzo(b)Fluoranthene	ND	5	ug/L
Benzo(k)Fluoranthene	ND	5	ug/L
Benzo(a)Pyrene	ND	5	ug/L
Benzoic Acid	ND	25	ug/L
Benzo(g,h,i)Perylene	ND	5	ug/L
Benzyl alcohol	ND	5	ug/L
4-Bromophenylphenyl ether	ND	5	ug/L
Butylbenzylphthalate	ND	5	ug/L
di-n-Butyl phthalate	ND	5	ug/L
Carbazole	ND	5	ug/L
4-Chloroaniline	ND	5	ug/L
bis(2-Chloroethoxy)Methane	ND	5	ug/L
bis(2-Chloroethyl)Ether	ND	5	ug/L
bis(2-Chloroisopropyl)Ether	ND	5	ug/L
4-Chloro-3-Methylphenol	ND	5	ug/L
2-Chloronaphthalene	ND	5	ug/L
2-Chlorophenol	ND	5	ug/L
4-Chlorophenylphenyl ether	ND	5	ug/L
Chrysene	ND	5	ug/L
Dibenz(a,h)Anthracene	ND	5	ug/L
Dibenzofuran	ND	5	ug/L
1,2-Dichlorobenzene	ND	5	ug/L
1,3-Dichlorobenzene	ND	5	ug/L
1,4-Dichlorobenzene	ND	5	ug/L
3,3'-Dichlorobenzidine	ND	10	ug/L
2,4-Dichlorophenol	ND	5	ug/L
Diethylphthalate	ND	5	ug/L

METHOD: 8270C, Semivolatile Organics - Water

(continued on next page)

HOUSTON LABORATORY
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PHONE (713) 660-0901

Certificate of Analysis No. H9-9907122-01

Brown and Caldwell

SAMPLE ID: MW-13

ANALYTICAL DATA (continued)

PARAMETER	RESULTS	PQL*	UNITS
2,4-Dimethylphenol	56	5	ug/L
Dimethyl Phthalate	ND	5	ug/L
4,6-Dinitro-2-Methylphenol	ND	25	ug/L
2,4-Dinitrophenol	ND	25	ug/L
2,4-Dinitrotoluene	ND	5	ug/L
2,6-Dinitrotoluene	ND	5	ug/L
1,2-Diphenylhydrazine	ND	5	ug/L
bis(2-Ethylhexyl)Phthalate	ND	5	ug/L
Fluoranthene	ND	5	ug/L
Fluorene	ND	5	ug/L
Hexachlorobenzene	ND	5	ug/L
Hexachlorobutadiene	ND	5	ug/L
Hexachloroethane	ND	5	ug/L
Hexachlorocyclopentadiene	ND	5	ug/L
Indeno(1,2,3-cd)Pyrene	ND	5	ug/L
Isophorone	ND	5	ug/L
2-Methylnaphthalene	29	5	ug/L
2-Methylphenol	ND	5	ug/L
4-Methylphenol	ND	5	ug/L
Naphthalene	88	10	ug/L
2-Nitroaniline	ND	25	ug/L
3-Nitroaniline	ND	25	ug/L
4-Nitroaniline	ND	25	ug/L
Nitrobenzene	ND	5	ug/L
2-Nitrophenol	ND	5	ug/L
4-Nitrophenol	ND	25	ug/L
N-Nitrosodiphenylamine	ND	5	ug/L
N-Nitroso-Di-n-Propylamine	ND	5	ug/L
Di-n-Octyl Phthalate	ND	5	ug/L
Pentachlorophenol	ND	25	ug/L
Phenanthrene	ND	5	ug/L
Phenol	6	5	ug/L
Pyrene	ND	5	ug/L
Pyridine	ND	5	ug/L
1,2,4-Trichlorobenzene	ND	5	ug/L
2,4,5-Trichlorophenol	ND	10	ug/L
2,4,6-Trichlorophenol	ND	5	ug/L

METHOD: 8270C, Semivolatile Organics - Water

(continued on next page)

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

Certificate of Analysis No. H9-9907122-01

Brown and Caldwell

SAMPLE ID: MW-13

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
Nitrobenzene-d5	50 ug/L	76	35	114
2-Fluorobiphenyl	50 ug/L	76	43	116
Terphenyl-d14	50 ug/L	58	33	141
Phenol-d5	75 ug/L	24	10	110
2-Fluorophenol	75 ug/L	37	21	110
2,4,6-Tribromophenol	75 ug/L	92	10	123

ANALYZED BY: SC DATE/TIME: 07/06/99 20:35:00
EXTRACTED BY: KL DATE/TIME: 07/04/99 16:00:00
METHOD: 8270C, Semivolatile Organics - Water
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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. H9-9907122-01

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

07/22/99

PROJECT: BJ Services
SITE: Hobbs,NM
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-13

PROJECT NO: 12832.021
MATRIX: WATER
DATE SAMPLED: 07/02/99 12:20:00
DATE RECEIVED: 07/03/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	34	5.0	ug/L
Acenaphthylene	ND	1.0	ug/L
Acenaphthene	ND	1.0	ug/L
Fluorene	ND	1.0	ug/L
Phenanthrene	ND	1.0	ug/L
Anthracene	ND	1.0	ug/L
Fluoranthene	ND	1.0	ug/L
Pyrene	ND	1.0	ug/L
Chrysene	ND	1.0	ug/L
Benzo (a) anthracene	ND	1.0	ug/L
Benzo (b) fluoranthene	ND	1.0	ug/L
Benzo (k) fluoranthene	ND	1.0	ug/L
Benzo (a) pyrene	ND	1.0	ug/L
Dibenzo (a,h) anthracene	ND	1.0	ug/L
Benzo (g,h,i) perylene	ND	1.0	ug/L
Indeno (1,2,3-cd) pyrene	ND	1.0	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1-Fluoronaphthalene	0.50 ug/L	206MI	50	150
Phenanthrene d-10	0.50 ug/L	98	50	150

ANALYZED BY: LJ DATE/TIME: 07/13/99 22:19:13
EXTRACTED BY: KL DATE/TIME: 07/04/99 13:00:00
METHOD: 8310 Polynuclear Aromatic Hydrocarbons
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed
MI - Matrix Interference.

COMMENTS:

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. H9-9907122-02

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

07/22/99

PROJECT: BJ Services
SITE: Hobbs,NM
SAMPLED BY: Provided by SPL
SAMPLE ID: Trip Blank 6/9/99

PROJECT NO: 12832.021
MATRIX: WATER
DATE SAMPLED: 07/02/99
DATE RECEIVED: 07/03/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Benzene	ND	5	ug/L
Bromobenzene	ND	5	ug/L
Bromochloromethane	ND	5	ug/L
Bromodichloromethane	ND	5	ug/L
Bromoform	ND	5	ug/L
Bromomethane	ND	10	ug/L
n-Butylbenzene	ND	5	ug/L
sec-Butylbenzene	ND	5	ug/L
tert-Butylbenzene	ND	5	ug/L
Carbon tetrachloride	ND	5	ug/L
Chlorobenzene	ND	5	ug/L
Chlorodibromomethane	ND	5	ug/L
Chloroethane	ND	10	ug/L
Chloroform	ND	5	ug/L
Chloromethane	ND	10	ug/L
2-Chlorotoluene	ND	5	ug/L
4-Chlorotoluene	ND	5	ug/L
1,2-Dibromo-3-chloropropane	ND	5	ug/L
1,2-Dibromoethane	ND	5	ug/L
Dibromomethane	ND	5	ug/L
1,2-Dichlorobenzene	ND	5	ug/L
1,3-Dichlorobenzene	ND	5	ug/L
1,4-Dichlorobenzene	ND	5	ug/L
Dichlorodifluoromethane	ND	10	ug/L
1,1-Dichloroethane	ND	5	ug/L
1,2-Dichloroethane	ND	5	ug/L
1,1-Dichloroethene	ND	5	ug/L
cis-1,2-Dichloroethene	ND	5	ug/L
trans-1,2-Dichloroethene	ND	5	ug/L
1,2-Dichloropropane	ND	5	ug/L
1,3-Dichloropropane	ND	5	ug/L
2,2-Dichloropropane	ND	5	ug/L

METHOD: 8260 Water, Volatile Organics
(continued on next page)

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

Certificate of Analysis No. H9-9907122-02

Brown and Caldwell

SAMPLE ID: Trip Blank 6/9/99

ANALYTICAL DATA (continued)

PARAMETER	RESULTS	PQL*	UNITS
1,1-Dichloropropene	ND	5	ug/L
Ethylbenzene	ND	5	ug/L
Hexachlorobutadiene	ND	5	ug/L
Isopropylbenzene	ND	5	ug/L
p-Isopropyltoluene	ND	5	ug/L
Methylene chloride	ND	5	ug/L
Naphthalene	ND	5	ug/L
n-Propylbenzene	ND	5	ug/L
Styrene	ND	5	ug/L
1,1,1,2-Tetrachloroethane	ND	5	ug/L
1,1,2,2-Tetrachloroethane	ND	5	ug/L
Tetrachloroethene	ND	5	ug/L
Toluene	ND	5	ug/L
1,2,3-Trichlorobenzene	ND	5	ug/L
1,2,4-Trichlorobenzene	ND	5	ug/L
1,1,1-Trichloroethane	ND	5	ug/L
1,1,2-Trichloroethane	ND	5	ug/L
Trichloroethene	ND	5	ug/L
Trichlorofluoromethane	ND	5	ug/L
1,2,3-Trichloropropane	ND	5	ug/L
1,2,4-Trimethylbenzene	ND	5	ug/L
1,3,5-Trimethylbenzene	ND	5	ug/L
Vinyl chloride	ND	10	ug/L
Xylenes (total)	ND	5	ug/L
1,2-Dichloroethene (total)	ND	5	ug/L
cis-1,3-Dichloropropene	ND	5	ug/L
trans-1,3-Dichloropropene	ND	5	ug/L
Acetone	ND	100	ug/L
2-Butanone	ND	20	ug/L
4-Methyl-2-Pentanone	ND	10	ug/L
2-Hexanone	ND	10	ug/L
Carbon Disulfide	ND	5	ug/L
Vinyl Acetate	ND	10	ug/L
2-Chloroethylvinylether	ND	10	ug/L
Methyl t-Butyl Ether	ND	10	ug/L

METHOD: 8260 Water, Volatile Organics

(continued on next page)

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

Certificate of Analysis No. H9-9907122-02

Brown and Caldwell **SAMPLE ID:** Trip Blank 6/9/99

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1,2-Dichloroethane-d4	50 ug/L	92	80	120
Toluene-d8	50 ug/L	92	88	110
4-Bromofluorobenzene	50 ug/L	96	86	115

ANALYZED BY: JC DATE/TIME: 07/06/99 13:31:00
METHOD: 8260 Water, Volatile Organics
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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. H9-9907122-03

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

DATE: 07/22/99

PROJECT: BJ Services
SITE: Hobbs,NM
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-13

PROJECT NO: 12832.021
MATRIX: WATER
DATE SAMPLED: 07/02/99 13:33:00
DATE RECEIVED: 07/03/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Fluoride Method 300.0 * Analyzed by: ELS Date: 07/06/99 11:57:16	2.22	0.1	mg/L
Nitrate nitrogen(as N) Method 353.3 * Analyzed by: CV Date: 07/08/99 13:30:00	2.4	0.1	mg/L
Sulfate Method 375.4 * Analyzed by: ELS Date: 07/06/99 16:00:00	334	25	mg/L

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

3A

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SPL Contract:

Lab Code: Case No.: 9907122 SAS No.: SDG No.:

Matrix Spike - EPA Sample No.: MW-13

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC. LIMITS REC.
1,1-Dichloroethene	50	0	57	114	61-145
Trichloroethene	50	0	58	116	71-120
Benzene	50	1500	1500	0*	76-127
Toluene	50	23	73	100	76-125
Chlorobenzene	50	0	52	104	75-130

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene	50	54	108	6	14	61-145
Trichloroethene	50	56	112	2	14	71-120
Benzene	50	1500	0*	0	11	76-127
Toluene	50	72	98	2	13	76-125
Chlorobenzene	50	52	104	0	13	75-130

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits due to matrix interference

RPD: 0 out of 5 outside limits
Spike Recovery: 2 out of 10 outside limits

SPL Houston Labs

RECOVERY REPORT

Client Name: Client SDG: l990706
Sample Matrix: LIQUID Fraction: VOA
Lab Smp Id: LCS-8260W
Level: LOW Operator: LT
Data Type: MS DATA SampleType: LCS
SpikeList File: 8260_water.spk Quant Type: ISTD
Sublist File: 8260_lcs.sub
Method File: /var/chem/l.i/l990706.b/l8260aw.m
Misc Info: L187W1//L187CW1

SPIKE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
8 1,1-Dichloroethene	50	55	110.00	61-145
29 Trichloroethene	50	55	110.00	71-120
25 Benzene	50	55	110.00	76-127
37 Toluene	50	49	98.00	76-125
45 Chlorobenzene	50	52	104.00	75-130

SURROGATE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
$ 21 1,2-Dichloroethane	50	45	90.00	80-120
$ 36 Toluene-d8	50	46	92.00	88-110
$ 56 Bromofluorobenzene	50	49	98.00	86-115

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: VLBLK
Batch: L990706104642

Reported on: 07/06/99 16:36
Analyzed on: 07/06/99 13:05
Analyst: LT

METHOD 8260/8240 L187B01

Compound	Result	Detection Limit	Units
Dichlorodifluoromethane	ND	10	ug/L
Chloromethane	ND	10	ug/L
Vinyl Chloride	ND	10	ug/L
Bromomethane	ND	10	ug/L
Chloroethane	ND	10	ug/L
Trichlorofluoromethane	ND	5	ug/L
Acetone	ND	100	ug/L
1,1-Dichloroethene	ND	5	ug/L
Methylene Chloride	ND	5	ug/L
Carbon Disulfide	ND	5	ug/L
Trans-1,2-Dichloroethene	ND	5	ug/L
1,1-Dichloroethane	ND	5	ug/L
Vinyl Acetate	ND	10	ug/L
2-Butanone	ND	20	ug/L
cis-1,2-Dichloroethene	ND	5	ug/L
1,2-Dichloroethene (total)	ND	5	ug/L
2,2-Dichloropropane	ND	5	ug/L
Bromochloromethane	ND	5	ug/L
Chloroform	ND	5	ug/L
,1,1-Trichloroethane	ND	5	ug/L
,2-Dichloroethane	ND	5	ug/L
1,1-Dichloropropene	ND	5	ug/L
Benzene	ND	5	ug/L
Carbon Tetrachloride	ND	5	ug/L
1,2-Dichloropropane	ND	5	ug/L
Trichloroethene	ND	5	ug/L
Dibromomethane	ND	5	ug/L
Bromodichloromethane	ND	5	ug/L
2-Chloroethylvinylether	ND	10	ug/L
4-Methyl-2-Pentanone	ND	10	ug/L
cis-1,3-Dichloropropene	ND	5	ug/L
rans-1,3-Dichloropropene	ND	5	ug/L
Toluene	ND	5	ug/L
,1,2-Trichloroethane	ND	5	ug/L

Notes
ND - Not detected.

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: VLBLK
Batch: L990706104642

Reported on: 07/06/99 16:36
Analyzed on: 07/06/99 13:05
Analyst: LT

METHOD 8260/8240 L187B01

Compound	Result	Detection Limit	Units
1,3-Dichloropropane	ND	5	ug/L
2-Hexanone	ND	10	ug/L
Dibromochloromethane	ND	5	ug/L
1,2-Dibromoethane	ND	5	ug/L
Tetrachloroethene	ND	5	ug/L
Chlorobenzene	ND	5	ug/L
1,1,1,2-Tetrachloroethane	ND	5	ug/L
Ethylbenzene	ND	5	ug/L
Bromoform	ND	5	ug/L
Styrene	ND	5	ug/L
Xylene (Total)	ND	5	ug/L
1,1,2,2-Tetrachloroethane	ND	5	ug/L
1,2,3-Trichloropropane	ND	5	ug/L
Isopropylbenzene	ND	5	ug/L
Bromobenzene	ND	5	ug/L
n-Propylbenzene	ND	5	ug/L
2-Chlorotoluene	ND	5	ug/L
4-Chlorotoluene	ND	5	ug/L
1,3,5-Trimethylbenzene	ND	5	ug/L
tert-Butylbenzene	ND	5	ug/L
1,2,4-Trimethylbenzene	ND	5	ug/L
1,3-Dichlorobenzene	ND	5	ug/L
sec-Butylbenzene	ND	5	ug/L
1,4-Dichlorobenzene	ND	5	ug/L
p-Isopropyltoluene	ND	5	ug/L
1,2-Dichlorobenzene	ND	5	ug/L
n-Butylbenzene	ND	5	ug/L
1,2-Dibromo-3-Chloropropan	ND	5	ug/L
1,2,4-Trichlorobenzene	ND	5	ug/L
Naphthalene	ND	5	ug/L
Hexachlorobutadiene	ND	5	ug/L
1,2,3-Trichlorobenzene	ND	5	ug/L
Methyl t-Butyl Ether	ND	10	ug/L

Notes
ND - Not detected.

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: VLBLK
Batch: L990706104642

Reported on: 07/06/99 16:36
Analyzed on: 07/06/99 13:05
Analyst: LT

METHOD 8260/8240 L187B01

Surrogate	Result	QC Criteria	Units
1,2-Dichloroethane-d4	88	80-120	% Recovery
Toluene-d8	94	88-110	% Recovery
Bromofluorobenzene	98	86-115	% Recovery

Samples in Batch 9907122-01 9907122-02

Notes

ND - Not detected.

3C

WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SPL Contract:

Lab Code: Case No: E990704 SAS No: SDG No:

Matrix Spike - EPA Sample No: BLANK Level (low/med):

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC	#	QC LIMITS REC
Phenol	75	0	27	36		12-110
2-Chlorophenol	75	0	59	79		27-123
1,4-Dichlorobenzene	50	0	34	68		36-110
N-Nitroso-di-n-propylamine	50	0	37	74		41-116
1,2,4-Trichlorobenzene	50	0	39	78		39- 110
4-Chloro-3-methylphenol	75	0	48	64		23-110
Acenaphthene	50	0	42	84		46-125
4-Nitrophenol	75	0	29	39		25-150
2,4-Dinitrotoluene	50	0	33	66		50-150
Pentachlorophenol	75	0	67	89		9-125
Pyrene	50	0	47	94		26-127

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC	#	% RPD	#	QC LIMITS RPD	REC
Phenol	75	24	32		12		42	12-110
2-Chlorophenol	75	52	69		14		40	27-123
1,4-Dichlorobenzene	50	33	66		3		28	36- 110
N-Nitroso-di-n-propylamine	50	32	64		14		38	41-116
1,2,4-Trichlorobenzene	50	38	76		3		28	39- 110
4-Chloro-3-methylphenol	75	44	59		8		42	23- 110
Acenaphthene	50	42	84		0		31	46-125
4-Nitrophenol	75	27	36		8		50	25-150
2,4-Dinitrotoluene	50	32	64		3		50	50-150
Pentachlorophenol	75	62	83		7		50	9-125
Pyrene	50	45	90		4		31	26-127

Column to be used to flag recovery and RPD values with an asterisk

RPD: 0 out of 11 outside limits

Spike Recovery: 0 out of 22 outside limits

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: BLANK
Batch: E990704042258

Reported on: 07/12/99 15:33
Analyzed on: 07/06/99 16:02
Analyst: SC

METHOD 8270 J185B03

Compound	Result	Detection Limit	Units
Pyridine	ND	5	ug/L
Phenol	ND	5	ug/L
Aniline	ND	5	ug/L
bis(2-Chloroethyl)ether	ND	5	ug/L
2-Chlorophenol	ND	5	ug/L
1,3-Dichlorobenzene	ND	5	ug/L
1,4-Dichlorobenzene	ND	5	ug/L
Benzyl alcohol	ND	5	ug/L
1,2-Dichlorobenzene	ND	5	ug/L
2-Methylphenol	ND	5	ug/L
bis(2-chloroisopropyl)ethe	ND	5	ug/L
4-Methylphenol	ND	5	ug/L
N-Nitroso-di-n-propylamine	ND	5	ug/L
Hexachloroethane	ND	5	ug/L
Nitrobenzene	ND	5	ug/L
Isophorone	ND	5	ug/L
2-Nitrophenol	ND	5	ug/L
2,4-Dimethylphenol	ND	5	ug/L
Benzoic acid	ND	25	ug/L
bis(2-Chloroethoxy)methane	ND	5	ug/L
2,4-Dichlorophenol	ND	5	ug/L
1,2,4-Trichlorobenzene	ND	5	ug/L
Naphthalene	ND	5	ug/L
4-Chloroaniline	ND	5	ug/L
Hexachlorobutadiene	ND	5	ug/L
4-Chloro-3-methylphenol	ND	5	ug/L
2-Methylnaphthalene	ND	5	ug/L
Hexachlorocyclopentadiene	ND	5	ug/L
2,4,6-Trichlorophenol	ND	5	ug/L
2,4,5-Trichlorophenol	ND	10	ug/L
2-Chloronaphthalene	ND	5	ug/L
2-Nitroaniline	ND	25	ug/L
Dimethylphthalate	ND	5	ug/L
2,6-Dinitrotoluene	ND	5	ug/L

Notes
ND - Not detected.

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: BLANK
Batch: E990704042258

Reported on: 07/12/99 15:33
Analyzed on: 07/06/99 16:02
Analyst: SC

METHOD 8270 J185B03

Compound	Result	Detection Limit	Units
Acenaphthylene	ND	5	ug/L
3-Nitroaniline	ND	25	ug/L
Acenaphthene	ND	5	ug/L
2,4-Dinitrophenol	ND	25	ug/L
4-Nitrophenol	ND	25	ug/L
Dibenzofuran	ND	5	ug/L
2,4-Dinitrotoluene	ND	5	ug/L
Diethylphthalate	ND	5	ug/L
4-Chlorophenyl-phenylether	ND	5	ug/L
Fluorene	ND	5	ug/L
4-Nitroaniline	ND	25	ug/L
4,6-Dinitro-2-methylphenol	ND	25	ug/L
n-Nitrosodiphenylamine	ND	5	ug/L
1,2-Diphenylhydrazine	ND	5	ug/L
4-Bromophenyl-phenylether	ND	5	ug/L
Hexachlorobenzene	ND	5	ug/L
Pentachlorophenol	ND	25	ug/L
Phenanthrene	ND	5	ug/L
Anthracene	ND	5	ug/L
Carbazole	ND	5	ug/L
Di-n-butylphthalate	ND	5	ug/L
Fluoranthene	ND	5	ug/L
Pyrene	ND	5	ug/L
Butylbenzylphthalate	ND	5	ug/L
3,3'-Dichlorobenzidine	ND	10	ug/L
Benzo[a]anthracene	ND	5	ug/L
Chrysene	ND	5	ug/L
bis(2-Ethylhexyl)phthalate	ND	5	ug/L
Di-n-octylphthalate	ND	5	ug/L
Benzo[b]fluoranthene	ND	5	ug/L
Benzo[k]fluoranthene	ND	5	ug/L
Benzo[a]pyrene	ND	5	ug/L
Indeno[1,2,3-cd]pyrene	ND	5	ug/L
Dibenz[a,h]anthracene	ND	5	ug/L

Notes
ND - Not detected.

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: BLANK
Batch: E990704042258

Reported on: 07/12/99 15:33
Analyzed on: 07/06/99 16:02
Analyst: SC

METHOD 8270 J185B03

Compound	Result	Detection Limit	Units
Benzo[g,h,i]perylene	ND	5	ug/L

Surrogate	Result	QC Criteria	Units
Nitrobenzene-d5	62	35-114	% Recovery
2-Fluorobiphenyl	72	43-116	% Recovery
Terphenyl-d14	70	33-141	% Recovery
Phenol-d5	28	10-110	% Recovery
2-Fluorophenol	49	21-110	% Recovery
2,4,6-Tribromophenol	89	10-123	% Recovery

Samples in Batch 9907122-01

Notes

ND - Not detected.

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

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

Matrix: Aqueous
Units: mg/L

Batch Id: VARE990709134001

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	0.83	83.0	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	5.1	4	6.2	27.5 *	6.0	22.5 *	20.0	36	36 - 160

Analyst: DR
Sequence Date: 07/09/99
SPL ID of sample spiked: 9907122-01B
Sample File ID: EEG1152.TXO
Method Blank File ID:
Blank Spike File ID: EEG1143.TXO
Matrix Spike File ID: EEG1147.TXO
Matrix Spike Duplicate File ID: EEG1148.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): 9907156-01A 9907122-01B 9907124-04B

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

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

Matrix: Aqueous
Units: mg/L

Batch Id: HPVV990707011300

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	5.0	6.7	134	53 - 148

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	2.212	5.00	6.91	94.0	7.44	105	11.1	39	21 - 175

Analyst: RR
Sequence Date: 07/08/99
SPL ID of sample spiked: 9907122-01C
Sample File ID: VVF5074.TX0
Method Blank File ID:
Blank Spike File ID: VVF5072.TX0
Matrix Spike File ID: VVF5075.TX0
Matrix Spike Duplicate File ID: VVF5076.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): 9907125-02A 9907124-04C 9907125-03A 9907125-01A 9907122-01C

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

** SPL BATCH QUALITY CONTROL REPORT **
Method 8310 ***

Matrix: Aqueous
Units: ug/L

Batch Id: 2990704124500

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Naphthalene	ND	0.5	0.33	66.0	32 - 148
Acenaphthylene	ND	0.5	0.35	70.0	42 - 138
Acenaphthene	ND	0.5	0.34	68.0	22 - 133
Fluorene	ND	0.5	0.32	64.0	11 - 148
Phenanthrene	ND	0.5	0.37	74.0	40 - 121
Anthracene	ND	0.5	0.36	72.0	32 - 121
Fluoranthene	ND	0.5	0.37	74.0	45 - 133
Pyrene	ND	0.5	0.37	74.0	39 - 136
Chrysene	ND	0.5	0.39	78.0	44 - 122
Benzo (a) anthracene	ND	0.5	0.39	78.0	53 - 137
Benzo (b) fluoranthene	ND	0.5	0.39	78.0	62 - 121
Benzo (k) fluoranthene	ND	0.5	0.39	78.0	66 - 128
Benzo (a) pyrene	ND	0.5	0.37	74.0	42 - 120
Dibenzo (a,h) anthracene	ND	0.5	0.36	72.0	59 - 129
Benzo (g,h,i) perylene	ND	0.5	0.37	74.0	67 - 124
Indeno (1,2,3-cd) pyrene	ND	0.5	0.39	78.0	65 - 125

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
NAPHTHALENE	34	0.50	39	NC	28	NC	NC	30	1 - 122
ACENAPHTHYLENE	ND	0.50	0.42	84.0	0.34	68.0	21.1	30	1 - 124
ACENAPHTHENE	ND	0.50	0.49	98.0	0.46	92.0	6.32	30	1 - 124
FLUORENE	2.5	0.50	2.6	NC	2.1	NC	NC	30	1 - 142
PHENANTHRENE	ND	0.50	0.50	100	0.46	92.0	8.33	30	1 - 155
ANTHRACENE	ND	0.50	0.37	74.0	0.37	74.0	0	30	1 - 126
FLUORANTHENE	ND	0.50	0.38	76.0	0.37	74.0	2.67	30	14 - 123
PYRENE	ND	0.50	0.53	106	0.50	100	5.83	30	1 - 140
CHRYSENE	ND	0.50	0.44	88.0	0.43	86.0	2.30	30	1 - 199
BENZO (A) ANTHRACENE	ND	0.50	0.49	98.0	0.46	92.0	6.32	30	12 - 135
BENZO (B) FLUORANTHENE	ND	0.50	0.45	90.0	0.42	84.0	6.90	30	6 - 150
BENZO (K) FLUORANTHENE	ND	0.50	0.42	84.0	0.40	80.0	4.88	30	1 - 159

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

** SPL BATCH QUALITY CONTROL REPORT **
Method 8310 ***

Matrix: Aqueous
Units: ug/L

Batch Id: 2990704124500

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
BENZO (A) PYRENE	ND	0.50	0.44	88.0	0.42	84.0	4.65	30	1 - 128
DIBENZO (A,H) ANTHRACENE	ND	0.50	0.37	74.0	0.37	74.0	0	30	1 - 110
BENZO (G,H,I) PERYLENE	ND	0.50	0.42	84.0	0.42	84.0	0	30	1 - 116
INDENO (1,2,3-CD) PYRENE	ND	0.50	0.36	72.0	0.21	42.0	52.6 *	30	1 - 116

Analyst: LJ
Sequence Date: 07/08/99
SPL ID of sample spiked: 9907122-01F
Sample File ID: 990713A\009-0901
Method Blank File ID:
Blank Spike File ID: 990708A\022-1101
Matrix Spike File ID: 990713A\011-1101
Matrix Spike Duplicate File ID: 990713A\012-1201

* = 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: Temporary Limits

SAMPLES IN BATCH(SPL ID): 9907128-05C 9907128-06C 9907122-01F 9907124-04F
9907128-02C 9907128-03C 9907128-04C

ICP

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: JM

Matrix: Water Units: mg/L

Date:070899 Time:1321 File Name: 0708MR3

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

Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver	ND	2.00	2.03	101	1.60	2.40
Aluminum						
Arsenic	ND	4.00	4.02	101	3.20	4.80
Barium	ND	2.00	2.09	104	1.60	2.40
Boron	ND	4.00	4.21	105	3.20	4.80
Calcium						
Cadmium	ND	2.00	1.94	97	1.60	2.40
Cobalt						
Chromium	ND	2.00	1.95	97	1.60	2.40
Copper	ND	2.00	2.12	106	1.60	2.40
Iron	ND	2.00	1.97	98	1.60	2.40
Potassium						
Magnesium	ND	20.00	20.43	102	16.00	24.00
Manganese	ND	2.00	1.96	98	1.60	2.40
Sodium						
Nickel	ND	2.00	1.95	98	1.60	2.40
Lead	ND	2.00	1.96	98	1.60	2.40
Antimony						
Selenium	ND	4.00	4.07	102	3.20	4.80
Tin						
Vanadium						
Zinc	ND	2.00	1.97	98	1.60	2.40

Work Orders in Batch

Work Order	Fractions
99-07-108	01C-11C
99-07-148	01A
99-07-090	05A
99-07-078	01F
99-07-122	01D
99-07-124	04D
99-07-048	03C

Matrix Spike - Spike Duplicate Results **Work Order Spiked: 9907108-01C**

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery	Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery	QC Limits % Recovery		Spike RPD %		QC Limits %
Silver	ND	1.0	0.9797	98.0	0.9754	97.5	80	120	0.4		20.0
Aluminum											
Arsenic	ND	2.0	2.097	104.9	2.078	103.9	80	120	0.9		20.0
Barium	0.6092	1.0	1.657	104.8	1.587	97.8	80	120	6.9		20.0
Boron	1.083	2.0	3.227	107.2	3.162	104.0	80	120	3.1		20.0
Calcium											
Cadmium	ND	1.0	0.9494	94.9	0.961	96.1	80	120	1.2		20.0
Cobalt											
Chromium	ND	1.0	0.9152	91.5	0.9281	92.8	80	120	1.4		20.0
Copper	ND	1.0	1.086	108.6	1.034	103.4	80	120	4.9		20.0
Iron	6.336	1.0	7.325	98.9	7.184	84.8	80	120	15.4		20.0
Potassium											
Magnesium	55.23	10.0	67.02	117.9	64.48	92.5	80	120	24.1	**	20.0
Manganese	0.3088	1.0	1.243	93.4	1.245	93.6	80	120	0.2		20.0
Sodium											
Nickel	ND	1.0	0.9183	91.8	0.9322	93.2	80	120	1.5		20.0
Lead	ND	1.0	0.9129	91.3	0.9304	93.0	80	120	1.9		20.0
Antimony											
Selenium	ND	2.0	2.026	101.3	2.009	100.5	80	120	0.8		20.0
Tin											
Vanadium											
Zinc	0.0211	1.0	0.9813	96.0	0.9812	96.0	80	120	0.0		20.0

** Spike RPD Outside Method Limits

Checked: JM 7/9/99

Trace-icp

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: EG

Matrix: Water Units: mg/L

Date:070799 Time:1107 File Name: 0707MR1

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

Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver						
Aluminum						
Arsenic	ND	4.00	3.91	98	3.20	4.80
Barium						
Beryllium						
Calcium						
Cadmium						
Cobalt						
Chromium						
Copper						
Iron						
Magnesium						
Manganese						
Nickel						
Lead	ND	2.00	2.01	100	1.60	2.40
Antimony						
Selenium	ND	4.00	3.83	96	3.20	4.80
Thallium						
Vanadium						
Zinc						

Work Orders in Batch

Work Order	Fractions
99-07-082	01D
99-07-091	01C
99-07-148	01A
99-07-078	01F
99-07-122	01D
99-07-124	04D
99-07-150	01C

Matrix Spike - Spike Duplicate Results **Work Order Spiked: 9907108-01C**

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery	Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery	QC Limits % Recovery		Spike RPD %	QC Limits %
Silver										
Aluminum										
Arsenic	0.0686	2.0	1.969	95.0	1.966	94.9	80	120	0.2	20.0
Barium										
Beryllium										
Calcium										
Cadmium										
Cobalt										
Chromium										
Copper										
Iron										
Magnesium										
Manganese										
Nickel										
Lead	ND	1.0	0.9434	94.3	0.9429	94.3	80	120	0.1	20.0
Antimony										
Selenium	ND	2.0	1.898	94.9	1.894	94.7	80	120	0.2	20.0
Thallium										
Vanadium										
Zinc										

Checked: EG. 7/8/99

ICP

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: JM

Matrix: Water Units: mg/L

Date:071999 Time:1052 File Name: 0719JM1

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

Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver						
Aluminum						
Arsenic						
Barium						
Beryllium						
Calcium						
Cadmium						
Cobalt						
Chromium						
Copper						
Iron						
Potassium	ND	20.00	20.50	103	16.00	24.00
Magnesium						
Manganese						
Sodium	ND	20.00	20.66	103	16.00	24.00
Nickel						
Lead						
Antimony						
Selenium						
Tin						
Vanadium						
Zinc						

Work Orders in Batch

Work Order	Fractions
99-07-122	01D
99-07-124	04D

Matrix Spike - Spike Duplicate Results **Work Order Spiked: 9907122-01D**

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery		Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery		QC Limits % Recovery		Spike RPD %		QC Limits %
Silver													
Aluminum													
Arsenic													
Barium													
Beryllium													
Calcium													
Cadmium													
Cobalt													
Chromium													
Copper													
Iron													
Potassium	5.817	10.0	15.74	99.2		15.5	96.8		80	120	2.4		20.0
Magnesium													
Manganese													
Sodium	165.1	10.0	168.2	31.0	*	169	39.0	*	80	120	22.9	**	20.0
Nickel													
Lead													
Antimony													
Selenium													
Tin													
Vanadium													
Zinc													

* Spike Results Outside Method Limits
Elements Post Spiked: ALL

Checked: jm 7/21/99

ICP

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: JM

Matrix: Water Units: mg/L

Date:070899 Time:1321 File Name: 0708JM10

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

Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver						
Aluminum						
Arsenic						
Barium						
Beryllium						
Calcium	ND	20.00	18.93	95	16.00	24.00
Cadmium						
Cobalt						
Chromium						
Copper						
Iron						
Potassium						
Magnesium						
Manganese						
Sodium						
Nickel						
Lead						
Antimony						
Selenium						
Tin						
Vanadium						
Zinc						

Work Orders in Batch

Work Order	Fractions
99-07-122	01D
99-07-124	04D

Matrix Spike - Spike Duplicate Results **Work Order Spiked: 9907108-01C**

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery		Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery		QC Limits % Recovery		Spike RPD %		QC Limits %
Silver													
Aluminum													
Arsenic													
Barium													
Beryllium													
Calcium	141.3	10.0	149.1	78.0	*	144.4	31.0	*	80	120	86.2	**	20.0
Cadmium													
Cobalt													
Chromium													
Copper													
Iron													
Potassium													
Magnesium													
Manganese													
Sodium													
Nickel													
Lead													
Antimony													
Selenium													
Tin													
Vanadium													
Zinc													

* Spike Results Outside Method Limits
** Spike RPD Outside Method Limits
Elements Post Spiked: ALL

Checked: JM 7/22/99

LAFAYETTE AREA LAB
500 AMBASSADOR CAFFERY PKWY.
SCOTT, LOUISIANA
ZIP 70583-8544
PHONE: (318) 237-4775

** SPL QUALITY CONTROL REPORT **

Matrix: Liquid

Reported on: 07/20/99
Analyzed on: 07/20/99
Analyst: RJB

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:

Mercury, Total
Method 7470 A***

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	0.0100	0.0103	103	80 - 120

FIAS990720102000-9907A61

Samples in batch:

9907735-01A	9907789-02A	9907790-01A	9907793-01A
9907793-02A	9907793-03A	9907793-04A	9907793-05A
9907793-06A	9907793-07A	9907793-08A	9907793-09A
9907793-10A	9907793-11A	9907794-01A	9907795-01A
9907797-02A	9907801-01A		

COMMENTS:

LAFAYETTE AREA LAB
500 AMBASSADOR CAFFERY PKWY.
SCOTT, LOUISIANA
ZIP 70583-8544
PHONE: (318) 237-4775

** SPL QUALITY CONTROL REPORT **

Matrix: Liquid

Reported on: 07/20/99
Analyzed on: 07/20/99
Analyst: RJB

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:

Mercury, Total
Method 7470 A***

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
9907735-01A	ND	ND	0.010	0.0103	103	0.0102	102	1.0	20	80 -120

FIAS990720102000-9907A60

Samples in batch:

9907735-01A	9907789-02A	9907790-01A	9907793-01A
9907793-02A	9907793-03A	9907793-04A	9907793-05A
9907793-06A	9907793-07A	9907793-08A	9907793-09A
9907793-10A	9907793-11A	9907794-01A	9907795-01A
9907797-02A	9907801-01A		

COMMENTS:

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/15/99
Analyzed on: 07/13/99
Analyst: CV

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:

Chloride
Method 325.3 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	162	163.1	101	94 - 106

-9907219

Samples in batch:

9907080-01C 9907080-02C 9907080-03C 9907080-04C
9907080-05C 9907080-06C 9907080-07C 9907080-08C
9907080-09C 9907122-01H

COMMENTS:

LCS-SPL ID#94453228-23

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/15/99
Analyzed on: 07/13/99
Analyst: CV

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:

Chloride
Method 325.3 *

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
9907080-01C	ND	5.32	50.0	56.7	103	56.7	103	0	5	92 -109

-9907219

Samples in batch:

9907080-01C 9907080-02C 9907080-03C 9907080-04C
9907080-05C 9907080-06C 9907080-07C 9907080-08C
9907080-09C 9907122-01H

COMMENTS:

LCS-SPL ID#94453228-23

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/14/99
Analyzed on: 07/03/99
Analyst: ELS

This sample was randomly selected for use in the SPL quality control program. The results are as follows:

Carbonate, as CaCO3
Method SM 4500-CO2D **

-- DUPLICATE ANALYSIS --

SPL Sample ID	Original Sample Concentration mg/L	Duplicate Sample mg/L	RPD	RPD Max.
9907124-04H	ND	ND	0	5

-9907208

Samples in batch:

9907122-01H 9907124-04H

COMMENTS:

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/14/99
Analyzed on: 07/03/99
Analyst: ELS

This sample was randomly selected for use in the SPL quality control program. The results are as follows:

Bicarbonate, as CaCO3
Method SM 4500-CO2D **

-- DUPLICATE ANALYSIS --

SPL Sample ID	Original Sample Concentration mg/L	Duplicate Sample mg/L	RPD	RPD Max.
9907124-04H	200	204	2.0	5

-9907207

Samples in batch:

9907122-01H 9907124-04H

COMMENTS:

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/06/99
Analyzed on: 07/06/99
Analyst: ELS

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:

Fluoride
Method 300.0 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	10.0	9.46	94.6	90 - 110

-9907073

Samples in batch:

9906552-03A 9907024-02J 9907122-03I 9907124-04I

COMMENTS:
LCS SPL ID# 95535278-12

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/06/99
Analyzed on: 07/06/99
Analyst: ELS

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:

Fluoride
Method 300.0 *

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
9907024-02J	ND	1.83	10.0	10.9	90.7	11.0	91.7	1.1	20	80 -120

-9907073

Samples in batch:

9906552-03A 9907024-02J 9907122-03I 9907124-04I

COMMENTS:
LCS SPL ID# 95535278-12

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/09/99
Analyzed on: 07/08/99
Analyst: CV

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	5.0	4.88	97.6	92 - 113

-9907135

Samples in batch:

9907122-03I 9907124-04I 9907215-04G 9907218-08G

COMMENTS:

NO2 ON 9907122 & 9907124 WERE RUN ON 07/03/99
NO3 WERE ANALYZED ON PRESERVED SAMPLES
LCS- SPL ID#94453220-10

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/09/99
Analyzed on: 07/08/99
Analyst: CV

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
9907124-04I	ND	2.09	5.0	7.37	106	7.25	103	2.9	12	84 -125

-9907135

Samples in batch:

9907122-03I 9907124-04I 9907215-04G 9907218-08G

COMMENTS:

NO2 ON 9907122 & 9907124 WERE RUN ON 07/03/99
NO3 WERE ANALYZED ON PRESERVED SAMPLES
LCS- SPL ID#94453220-10

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/06/99
Analyzed on: 07/06/99
Analyst: ELS

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	26.8	28.0	104	82 - 111

-9907072

Samples in batch:

9906552-03A 9907024-02J 9907122-03I 9907124-04I

COMMENTS:
LCS SPL ID# 95535274-12

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 07/06/99
Analyzed on: 07/06/99
Analyst: ELS

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	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
9907024-02J	ND	247	250	514	107	512	106	0.9	9.5	84 -120

-9907072

Samples in batch:

9906552-03A 9907024-02J 9907122-03I 9907124-04I

COMMENTS:
LCS SPL ID# 95535274-12

CHAIN OF CUSTODY

AND

SAMPLE RECEIPT CHECKLIST

SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Workorder No: 9907122 (325-3) | 106874 | page 1 of 1

Client Name: Brown and Caldwell (713) 759-0999
Address/Phone: 1415 Louisiana #2500, Houston, TX 77002
Client Contact: Rick Rexroad
Project Name: BJ Services
Project Number: 12832.021
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: TPH-G/TPH-D (8015)	RCRA metals (3050/6010/7000 Series)	VOCs (8260)	Methane (RSK-SOP-147/175)	Cations (Ca, Mg, K, Na) - 6010	Carbonate/bicarbonate (4500-CO2-D) Chloride (325.3)	SVOCs (8270)	PAHs (8310)	Nitrate (353.3)/Sulfate (375.4)/Fluoride (300.0)
MW-13	7/2/99	1220		X	W	VAP	1,40	1,2,none	13	X	X	X	X	X	X	X	X	
MW-13	↓	1333		X	W	P	1	none	1									X
Trip Blank #1	↓	1401		X	W	V	40	↓	2			X						

RUSH

Client/Consultant Remarks: 24 hr turnaround on Method 8260 VOCs on MW-13; all others at 2-WK turnaround (per method requirements

Laboratory remarks: FedEx Airbill # 811305335355 PH DS 7/3

Intact? ☒ Y ☐ N
Temp: 4c

Requested TAT
24hr ☐ 72hr ☐
48hr ☐ Standard ☐
Other ☒ See Remarks

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

Special Detection Limits (specify):

PM review (initial): BAF

1. Relinquished by Sampler: Richard Rexroad	date 7/2/99	time 1530	2. Received by:
3. Relinquished by:	date	time	4. Received by:
5. Relinquished by:	date	time	6. Received by Laboratory: 7/3/99 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

SPL Houston Environmental Laboratory

Sample Login Checklist

Date: 7/3/99	Time: 1000

SPL Sample ID:
9907122

			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:		4 C	
10	Method of sample delivery to SPL:	SPL Delivery		
		Client Delivery		
		FedEx Delivery (airbill #)	811305335358	
		Other:		
11	Method of sample disposal:	SPL Disposal	✓	
		HOLD		
		Return to Client		

Name: Ruben Sta	Date: 7/3/99

BROWN AND CALDWELL

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

TRANSMITTAL MEMORANDUM

To: Mr. Wayne Price State of New Mexico Energy, Minerals, and Natural Resources Dept. Oil Conservation Division 2040 South Pacheco St., State Land Office Bld. Santa Fe, New Mexico 87505	Date: 5/14/99	Job No: 12832-014
	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 comment
- ☐ 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	5/14/99		March 1999 Groundwater Sampling Report BJ Services Company, U.S.A. Hobbs, New Mexico

REMARKS:

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

Richard Rexroad

If enclosures are not as noted, kindly notify us at once \\BCHOU01\PROJECTS\Wp\BJSERV\TRANSMIT\360tr.doc

BROWN AND CALDWELL

MARCH 1999 GROUNDWATER SAMPLING REPORT
HOBBS, NEW MEXICO FACILITY

BJ SERVICES COMPANY, U.S.A.

MAY 14, 1999

MARCH 1999 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: 12832.014

Les Teauge
Associate Scientist

Richard L. Rexroad, P.G.
Principal Geologist

May 14, 1999

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

Contents

CONTENTS

1

1.0 INTRODUCTION

Brown and Caldwell conducted field activities associated with the March 1999 quarterly groundwater sampling event at the BJ Services Company, U.S.A. (BJ Services) facility located at 2708 West County Road, in Hobbs, New Mexico on March 9 and 10, 1999. 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 concentration of hydrocarbon constituents in 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 March 1999 sampling event, groundwater samples collected from all monitor wells were analyzed for gasoline and diesel range total petroleum hydrocarbons (TPH-G and TPH-D), benzene, toluene, ethylbenzene, and total xylenes (BTEX), polynuclear aromatic hydrocarbons (PAHs), carbonate, bicarbonate, major anions, major cations, total hardness, and RCRA metals. Additionally, samples from upgradient well MW-5 and downgradient wells MW-10, MW-11A, and MW-12 were analyzed for dissolved methane/ethylene/ethane, sulfates, and nitrates. 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.

2.0 GROUNDWATER SAMPLING AND ANALYSES

Brown and Caldwell purged and sampled the groundwater monitor wells at the facility on March 9 and 10, 1999 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 March 1999 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 and MW-11 can not be located and are assumed destroyed by facility activities such as grading.

Groundwater level measurements were obtained from the monitor wells prior to purging and sampling the wells. 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 0.008 foot/foot (ft/ft). A potentiometric surface map is presented in Figure 2. Approximately 0.04 feet of phase-separated hydrocarbons (PSH) was observed in monitor well MW-4 during this sampling event.

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, oxidation-reduction (redox) potential, dissolved oxygen (DO), and temperature were collected after each well volume was purged. In addition to using these parameters as indicators of stability of produced groundwater, they are also important for evaluating the potential for natural attenuation. Ferrous iron and alkalinity were also measured during the purging and sampling activities to assess the potential for natural attenuation.

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.

Groundwater samples were collected directly after completion of purging operations through the submersible pump discharge. 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 on-site water reclamation system for re-use for other purposes by BJ Services.

2.2 Results of Groundwater Analyses

Groundwater samples collected during this sampling event were analyzed for TPH-D and TPH-G by EPA Method 8015 Modified, BTEX by EPA Method 8020, PAHs by EPA Method 8310, and the eight RCRA metals by EPA Method 6010/7000 series. All samples were also analyzed for groundwater quality parameters, including major anions (chloride, fluoride, nitrate, and sulfate), major cations (calcium, magnesium, potassium, and sodium), hardness, carbonate, and bicarbonate. Additionally, four monitor wells (MW-5, MW-10, MW-11A and MW-12) were sampled for methane/ethylene/ethane,nitrate, and sulfate to evaluate natural attenuation processes.

Current and cumulative analytical results for BTEX, TPH-D, and TPH-G are presented in Table 4. Current and cumulative analytical results for groundwater quality parameters as well as detected PAHs and RCRA metals are presented in Table 5. The analytical results for nitrate, sulfate, and

dissolved methane analyses performed on groundwater samples from monitor wells MW-5, MW-10, MW-11A, and MW-12 to evaluate natural attenuation processes are presented in Table 6

BTEX constituent concentrations in excess of applicable laboratory detection limits were reported in seven of the 11 groundwater samples collected during this sampling event. Benzene concentrations were below the New Mexico Water Quality Control Commission (WQCC) Standard of 0.01 milligrams per liter (mg/L) in monitor wells MW-1, MW-3, MW-4, MW-5, MW-7, MW-8, MW-9, and MW-11A. Figure 3 presents a benzene isoconcentration and total BTEX distribution map for the March 1999 sampling event. A total petroleum hydrocarbon distribution map for the March 1999 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 MW-1, MW-3 and MW-4, which are located near the former source area, have continued to decrease since the modification of the biosparging system in February/March 1998. The benzene concentrations in monitor well MW-1, MW-3, and MW-4 are less than the New Mexico WQCC standard of 0.01 mg/L. Benzene concentrations in the off-site monitor well, MW-9, have not exceeded 0.01 mg/L since March 1997.

Benzene concentrations in MW-6 decreased substantially following the startup of the biosparging system in March 1995, but have been erratic since March 1997. Monitor well MW-6 is located immediately adjacent to (i.e., within approximately 5 feet of) a biosparging system air injection/extraction well, AV-17. It is believed that the close proximity of monitor well MW-6 to air injection/extraction well AV-17 may bias the results obtained from MW-6, due to the effects of continuous air introduction and extraction from AV-17 up until shortly prior to commencement of quarterly groundwater sampling activities at MW-6.

Table 5 presents a summary of PAHs and metals detected in this and previous groundwater sampling events at the facility. Analytical results for groundwater quality parameters are also presented in Table 5. Naphthalene is the only PAH compound that has been detected in any of the

groundwater sampling events conducted at the facility. During the March 1999 groundwater sampling event, naphthalene concentrations in monitor wells MW-6 at 160 µg/L and MW-4 at 170 µg/L were the only exceedances of the New Mexico Water Quality Control Commission (WQCC) groundwater standard of 30 µg/L for PAHs (i.e., total naphthalene plus monomethylnaphthalenes).

Inorganic constituents detected at concentrations greater than method detection limits during the March 1999 groundwater sampling event include arsenic and barium. Arsenic and barium were detected in groundwater samples from each of the monitor wells, but none of these detections exceeded the New Mexico WQCC Standards of 0.1 mg/L for arsenic or 1.0 mg/L for barium.

The New Mexico WQCC standard of 1.6 mg/L for fluoride was exceeded in monitor wells MW-6, MW-9, MW-10, MW-11A, and MW-12, with concentrations ranging from 1.79 mg/L to 4.93 mg/L.

The New Mexico WQCC standard of 250 mg/L for chloride was exceeded in monitor wells MW-6, MW-8, MW-10, MW-11A, and MW-12. Concentrations in these wells ranged from 274 mg/L to 1160 mg/L.

2.3 Natural Attenuation Evaluation

Natural attenuation is planned to be the primary remediation mechanism for the portion of the plume in the area of the former field waste tanks (see Figure 1).

The primary evidence of natural attenuation is plume behavior. Natural attenuation of hydrocarbons is occurring at a rate greater than hydrocarbon loading from the source area when a hydrocarbon plume is decreasing in size or concentration. Conversely, increases in size or hydrocarbon concentrations of a plume indicate that rates of hydrocarbon loading exceed the natural attenuation capacity in the area. Concentrations of total dissolved-phase BTEX have stabilized at concentrations less than 100 mg/L subsequent to removal of the field waste tanks in

March 1997. Furthermore, evidence of natural attenuation can be obtained by the collection and evaluation of data relating to the concentrations of indigenous electron acceptors such as dissolved oxygen, nitrates, ferric iron, sulfates, and carbon dioxide. The following lines of geochemical evidence suggest that intrinsic bioremediation (an important natural attenuation mechanism) is occurring:

1. DO concentrations measured in monitor wells MW-10, MW-11A and MW-12 are depressed relative to background. DO concentrations in these wells ranged from 0.3 mg/L to 0.78 mg/L (see Table 3). These concentrations are less than the DO concentrations ranging from 4.08 mg/L to 6.06 mg/L that were measured in monitor wells MW-5, MW-7, and MW-8, 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. The nitrate concentrations as determined by EPA Method 353.3 (as required by NMOCD on an annual basis) were measured at less than 0.1 mg/L in monitor wells MW-11A and MW-12. These concentrations are less than the nitrate concentrations of 3.3 mg/L and 0.7 mg/L measured in background wells MW-7 and MW-8, respectively (see Table 6). The nitrate concentration in background well MW-5 was not measured by EPA Method 353.3. Nitrate is utilized during intrinsic bioremediation. Therefore, nitrate concentrations should be depressed in areas where intrinsic bioremediation is occurring. The nitrate concentrations by EPA Method 353.3 generally indicate this. Nitrate concentrations as determined by EPA Method 300.0 (which has been used in the past by Brown and Caldwell to evaluate natural attenuation on a quarterly basis) were measured at less than 0.1 mg/L in monitor wells MW-10, MW-11A and MW-12. The Method 300.0 concentration in background well MW-5 was measured at less than 0.1 mg/L. Therefore, the Method 300.0 nitrate analysis is inconclusive.

3. Ferrous iron was measured at concentrations ranging from 3 mg/L to 6 mg/L in monitor wells MW-10, MW-11A, and MW-12 (see Table 3). Ferrous iron was not detected in any of the other monitor wells at the site except MW-1. When DO and nitrate are depleted, anaerobic microbes that 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. The elevated ferrous iron concentration in monitor wells MW-10, MW-11A, and MW-12 provide evidence that natural attenuation of hydrocarbon is occurring at the former field waste tanks area. The detection of ferrous iron in monitor well MW-1 suggests that intrinsic bioremediation may also be occurring in the former fueling system area.

4. Redox is a measure of chemical energy in groundwater. Redox values in the vicinity of background wells MW-5, MW-7 and MW-8 ranged from 84.5 millivolts (mV) to 188.9 mV

(see Table 3). Redox values in the vicinity of former field waste tanks area wells MW-10, MW-11A and MW-12 ranged from –57.1 mV to –111.6 mV. The negative redox values in monitor wells MW-10, MW-11A and MW-12 indicate that electron acceptors other than dissolved oxygen are being utilized in these areas.

5. 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 concentrations of methane are elevated in former field waste tanks area wells MW-10 and MW-11A relative to the methane concentration in background well MW-5 (see Table 6), suggesting that utilization of carbon dioxide may be occurring locally in the areas of monitor wells MW-10 and MW-11A.

Sulfate concentrations in monitor wells MW-10, MW-11A, and MW-12 are comparable to those observed in monitor wells MW-5, MW-7, and MW-8 (see Table 6). It appears that sulfate in not being utilized during intrinsic bioremediation.

Therefore, DO, ferric iron and possibly nitrate 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 wells MW-10 and MW-11A, as indicated by elevated dissolved methane concentrations.

The alkalinity data generated during the March 1999 groundwater sampling event is inconclusive with regard to the potential for natural attenuation of hydrocarbons at the facility, because the results from monitor wells MW-10, MW-11A, and MW-12 as well as the background area wells are all greater than 400 mg/L (see Table 3). Evaluation of laboratory-derived alkalinity data is recommended for the next groundwater sampling event.

It is recommended that monitoring for natural attenuation evaluation parameters continue in the former field waste tanks 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 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 contaminants. The flushing of air also strips volatile and semivolatile contaminants.

The New Mexico OCD approved the RAP on August 11, 1994. Installation activities for the biosparging system were conducted August 2 through 24, 1995. Nineteen combined injection and extraction wells, three vacuum extraction wells, associated piping, 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 associated with the former fueling system. 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 that area. 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.

Benzene, TPH, and total BTEX concentrations in monitor well MW-1 measured during the March 1999 groundwater sampling event continue to display declines relative to concentrations of these parameters prior to installation of injection wells AI-20 through AI-24 in February 1998. Benzene concentrations dropped from 7,600 µg/L in December 1997 to less than 1.0 µg/L in December 1998 and March 1999. Total BTEX concentrations have dropped from 30,600 µg/L to 117.9 µg/L between December 1997 and March 1999. TPH concentration decreased from 82 mg/L to 1.5 mg/L during this time period.

Benzene concentrations have decreased from 240 µg/L to 3.2 µg/L in monitor well MW-3 and from 230 µg/L to 8 µg/L in monitor well MW-4 between December 1997 and March 1999. Similarly, total BTEX concentrations have decreased from 1.930 mg/L to 0.0846 mg/L in monitor well MW-3 and from 4.250 mg/L to 1.678 mg/L in monitor well MW-4 between December 1997 and March 1999. TPH concentrations in monitor well MW-3 dropped from 5.89 mg/L to 0.64 mg/L during this time period. These decreases are likely attributable to increased air flow being applied to the aquifer through air injection wells AI-20 through AI-24.

A graph showing the calculated dissolved-phase benzene mass in the western plume versus time is presented in Figure 5 (the western plume is located in the area of monitor wells MW-1, MW-3, MW-4, and MW-6). This graph shows that the plume mass was increasing up until December 1995, when the biosparging system was installed. This increase was probably due to benzene loading of groundwater from vadose zone soils. The benzene mass then decreased steadily after installation. The plume mass has continued to decrease since the system modifications were implemented in February 1998. This indicates that the system modifications have been effective in increasing benzene removal from groundwater.

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 was 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. 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 March 1999 sampling event was 80 parts per million by volume (ppmv).

The TPH concentration of 80 ppmv measured during the March 1999 sampling event shows a substantial drop from the 1500 ppmv TPH discharge rate observed during the March 24, 1998 groundwater sampling event. The March 1999 TPH discharge rate of 80 ppmv is comparable to TPH concentrations measured during the time period from August 1996 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 August 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. However, discharge rates have returned to more typical levels during the period from June 1998 through March 1999.

The VOC emissions rate calculated for the March 1999 groundwater sampling event was 0.11 pound per hour (lb/hour). This emission rate is below the regulatory limit of 10 lb/hour for VOCs. The March 1999 VOC emissions rate is typical of VOC emissions rates during the time period of August 1996 through December 1997, and represents a substantial drop from the 1.91 lb/hour VOC emissions rate calculated for the March 1998 sampling event. Discharge rates have varied between 0.11 lb/hour and 0.33 lb/hour during the time period of June 1998 through March 1999.

This initial increase in mass transfer rates after system modification was indicative of increased stripping of hydrocarbons within soil and groundwater from pathways that were not in contact with injected air prior to system modification. The subsequent decrease in mass transfer, in concert with plume mass calculations, as shown in Figure 5, indicates that the overall contaminant mass has been reduced by the biosparging system.

A cumulative summary of analytical results for air emissions monitoring is included in Table 7. These results are based on both laboratory and field analyses.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on information obtained during the March 1999 quarterly groundwater sampling event at the BJ Services Hobbs, New Mexico facility.

4.1 Conclusions

- Groundwater flow was to the east at an average hydraulic gradient of 0.008 ft/ft.
- Dissolved benzene and total BTEX concentrations in monitor wells MW-1, MW-3 and MW-4, which are located at the former fueling system area, have decreased during the time period between September 1998 and March 1999. Benzene and total BTEX concentrations in these wells have continued to decline since installation of deep injection wells AI-20 through AI-24 in February 1998.
- Dissolved benzene concentrations have decreased in perimeter monitor wells MW-5, MW-7, MW-8 and MW-9 during operation of the biosparging system.
- Benzene concentrations in monitor wells MW-1, MW-3, MW-4, 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.
- Chloride concentrations in monitor wells MW-10, MW-11A and MW-12, which are located in the former field waste tank area, are above the New Mexico Quality Control Commission standard of 250 mg/L.

4.2 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 monitoring for natural attenuation parameters in monitor wells MW-5, MW-10, MW-11A, and MW-12.
- Utilize an existing monitor well (OW-4) at a location approximately 200 feet east of existing monitor wells MW-11A and MW-12 to define the lateral extent of constituents exceeding WQCC standards and to evaluate groundwater conditions in the area northeast of

monitor well MW-6. (The well, OW-4, is on an adjacent property and should be made available by the current landowner).

- Install a monitor well (MW-13) to the northeast of monitor well MW-6, beyond the zone of influence of existing air injection and extraction wells in order to accurately characterize groundwater conditions in this area. Plug and abandon monitor well MW-6 with the installation of its replacement well, MW-13.

- Install a monitor well (MW-12D) adjacent to existing monitor well MW-12 to evaluate the potential for vertical migration of constituents due to possible density gradients. Monitor well MW-12 was selected as the existing monitor well to be twinned because it has the highest concentrations of chloride and benzene in the former underground field waste tank area, based on data from the last four sampling events.

DISTRIBUTION

March 1999 Groundwater Sampling Report
BJ Services Company, U.S.A.
Hobbs, New Mexico

May 14, 1999

1 copy to: State of New Mexico
Energy, Minerals, and Natural Resources Dept.
Oil Conservation Division
2040 South Pacheco Street, State Land Office Building
Santa Fe, New Mexico 87505

Attention: Mr. Wayne Price

1 copy to: State of New Mexico
Oil Conservation Division, Hobbs District Office
Post Office Box 1980
Hobbs, New Mexico 88240

Attention: Mr. Chris Williams

1 copy to: BJ Services Company, U.S.A.
8701 New Trails Drive
The Woodlands, Texas 77381

Attention: Ms. Jo Ann Cobb

1 copy to: BJ Services Company, U.S.A.
2708 West County Road
Hobbs, New Mexico 88240

Attention: Mr. Roger Sullivan

1 copy to: Brown and Caldwell, Project File

QUALITY CONTROL REVIEWER

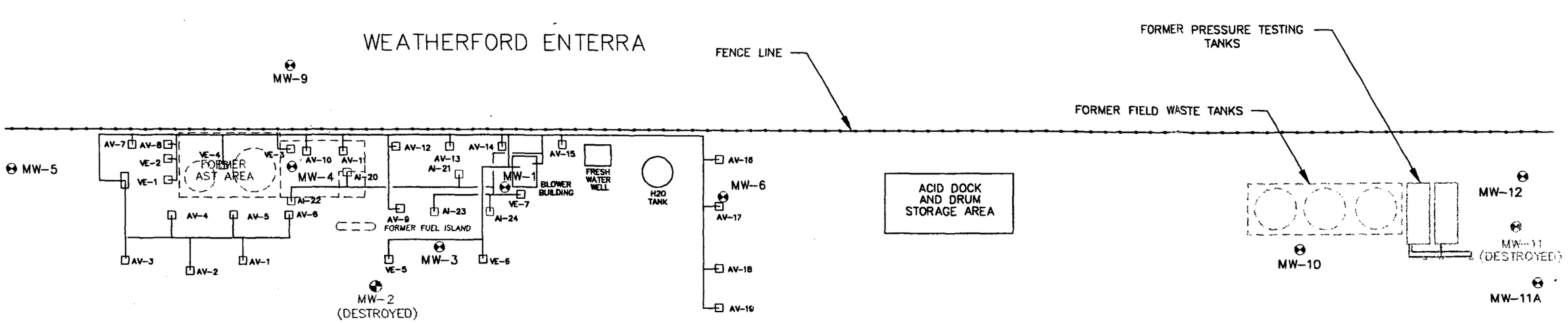
Robert N. Jennings, P.E.
Vice President

RLR/uak/srd

Figures

FIGURES

WEATHERFORD ENTERRA



T:\2832\NEWSURVY 02-25-98 JR

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

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

FENCE LINE

PRESSURE TESTING TANKS

FORMER FIELD WASTE TANKS

MW-9 3590.63

MW-4 3589.64

MW-1 3590.08

MW-5 3591.27

MW-6 3589.64

MW-12 3587.84

MW-11 (DESTROYED)

MW-10 3588.38

MW-11A 3587.81

MW-7 3589.40

MW-8 3589.87

MW-3 3590.62

MW-2 (DESTROYED)

LATERAL NO. 1

LATERAL NO. 2

LATERAL NO. 3

LATERAL NO. 4

LATERAL NO. 5

LATERAL NO. 6

LATERAL NO. 7

LATERAL NO. 8

LATERAL NO. 9

AV-1 AV-2 AV-3 AV-4 AV-5 AV-6 AV-7 AV-8 AV-9 AV-10 AV-11 AV-12 AV-13 AV-14 AV-15 AV-16 AV-17 AV-18 AV-19 AV-20 AV-21 AV-22 AV-23 AV-24

VE-1 VE-2 VE-3 VE-4 VE-5 VE-6 VE-7

FORMER AST AREA

FORMER FUEL ISLAND

BLOWER BUILDING

FRESH WATER WELL

H2O TANK

ACID DOCK AND DRUM STORAGE AREA

3591.0 3590.5 3590.0 3589.5 3589.0 3588.5 3588.0

OFFICE

TRUCK BAYS

EQUIPMENT MAINTENANCE

P:\cad\jobs\12832\NEWSURVY2 04-05-99 CLK

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

0 20 40
SCALE: 1" = 50'
DRAWN BY: CLK DATE 04/99
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

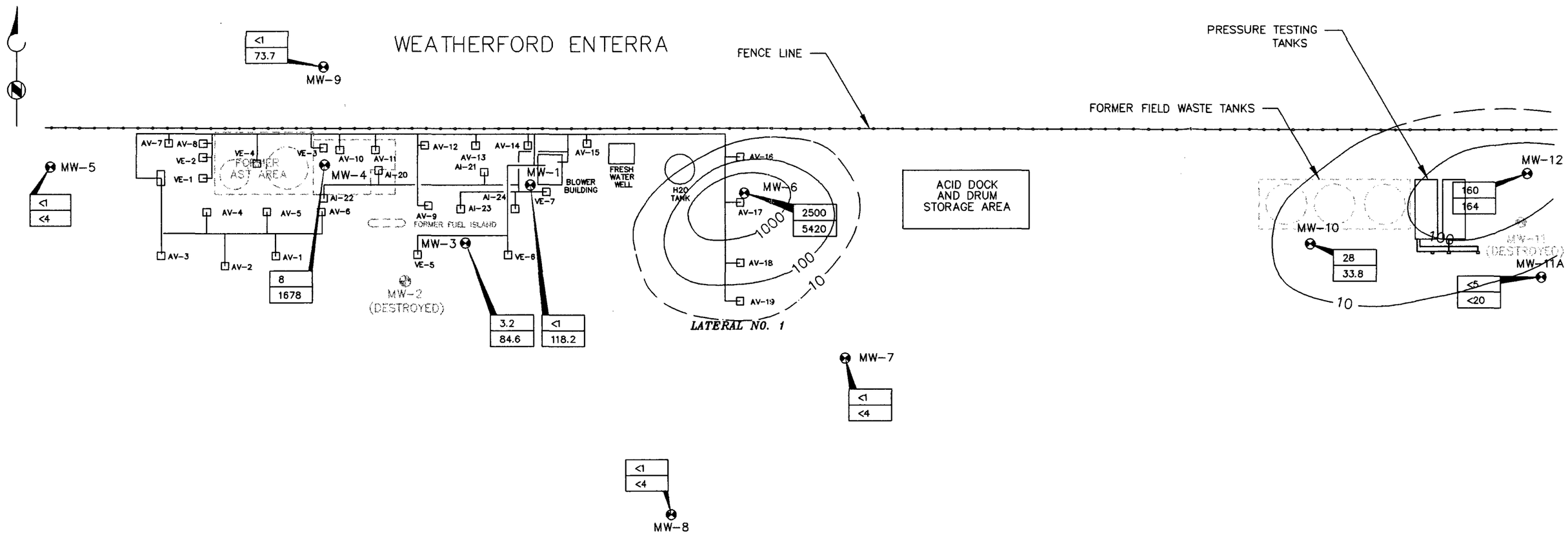
LEGEND

MW-3 MONITOR WELL

VE-4 AV-10 BIOSPARGING SYSTEM

TITLE: POTENTIOMETRIC SURFACE MAP MARCH 9, 1999	DATE: 04/05/99
CLIENT: BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER: 12832.012
SITE: HOBBS, NEW MEXICO	FIGURE NUMBER: 2

WEATHERFORD ENTERRA



P:\cad\jobs\12832\13\28321303M99 04-05-99 CLK

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

0 20 40
SCALE: 1" = 50'
DRAWN BY: CLK DATE 4/99
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

LEGEND

MW-3 MONITOR WELL

3.2 – BENZENE CONCENTRATION (ug/L)

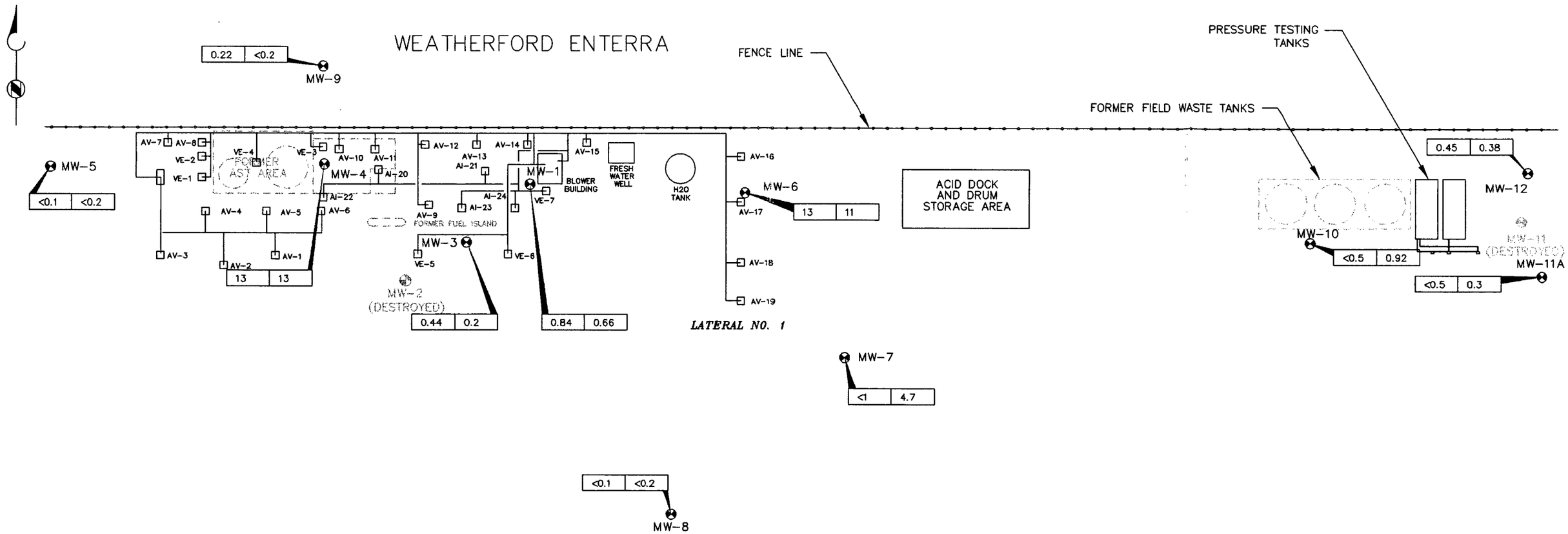
84.6 – TOTAL BTEX CONCENTRATION (ug/L)

10 BENZENE ISOCONCENTRATION CONTOUR (ug/L)

CONTOUR INTERVAL = LOGARITHMIC

TITLE: BENZENE ISOCONCENTRATION AND TOTAL BTEX DISTRIBUTION MAP FOR MARCH 9-10, 1999	DATE: 04/05/99
CLIENT: BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER: 12832.013
SITE: HOBBS, NEW MEXICO	FIGURE NUMBER: 3

WEATHERFORD ENTERRA



BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

0 20 40
SCALE: 1" = 50'
DRAWN BY: CLK DATE 4/99
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

LEGEND

MW-3 MONITOR WELL

0.44 | 0.2 – TPH-G (mg/L) / TPH-D (mg/L)

TITLE: TOTAL PETROLEUM HYDROCARBONS DISTRIBUTION MAP FOR MARCH 9-10, 1999	DATE: 04/05/99
CLIENT: BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER: 12832.013
SITE: HOBBS, NEW MEXICO	FIGURE NUMBER: 4

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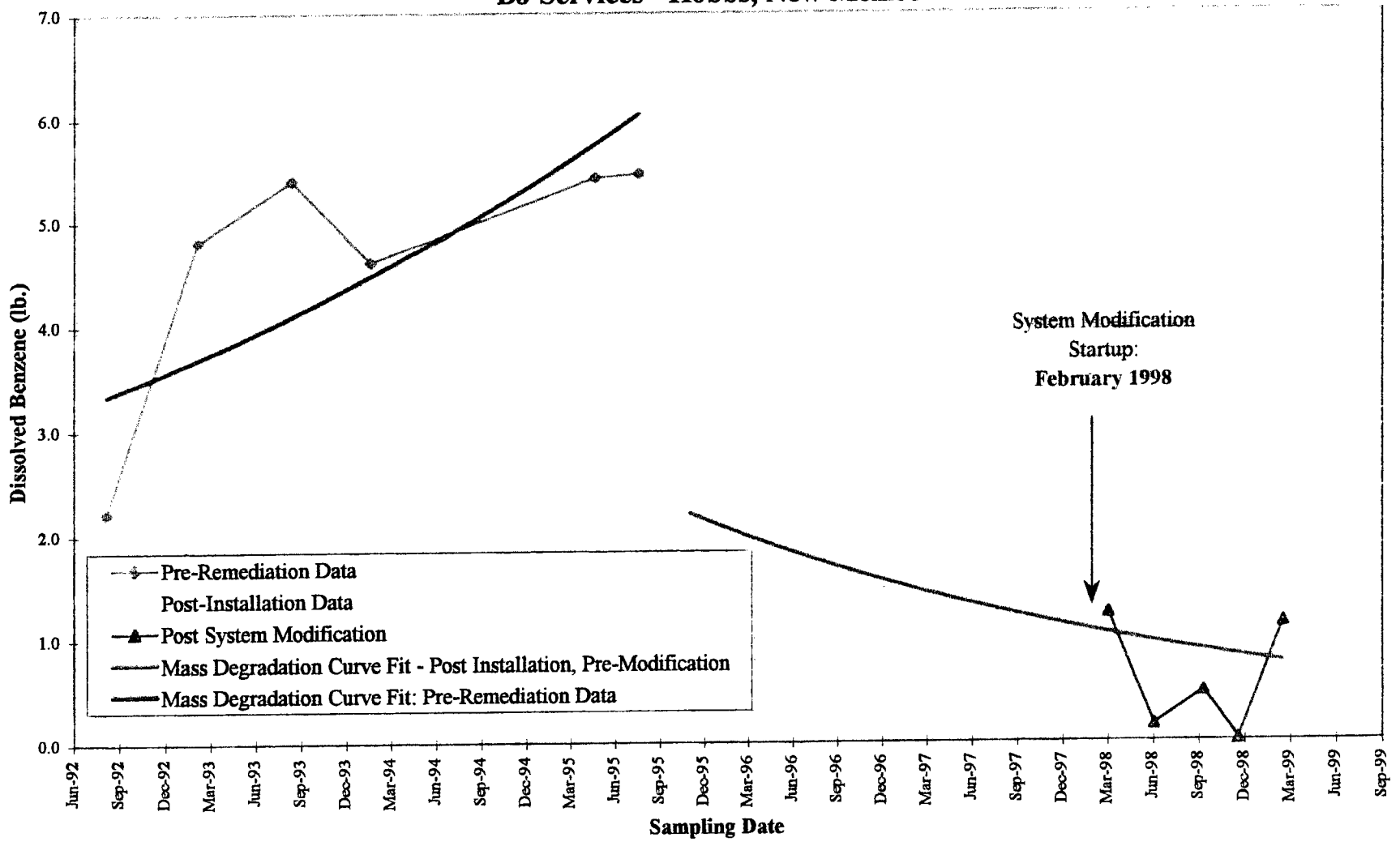
FIGURE 5
Dissolved Benzene Mass vs. Time
West Plume
BJ Services - Hobbs, New Mexico



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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 6-7, 1997	BJ Services removed the field waste tank and associated hydrocarbon impacted soil.
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.
September 30, 1998	Brown and Caldwell conducted the September 1998 groundwater sampling event.
December 9-10, 1998	Brown and Caldwell conducted the December 1998 groundwater sampling event.
March 9-10, 1999	Brown and Caldwell conducted the March 1999 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	
	3,647.53	9/30/98	56.82	0.00	3,590.71	PSH Sheen
	3,647.53	12/9/98	57.05	0.00	3,590.48	
	3,647.53	3/10/99	57.45	0.00	3,590.08	
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)

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-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	
	3,645.00	9/30/98	54.06	0.00	3,590.94	
	3,645.00	12/9/98	54.36	0.00	3,590.64	
	3,645.00	3/10/99	54.72	0.00	3,590.28	
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	
	3,645.28	9/30/98	53.96	0.00	3,591.32	200 ml PSH
	3,645.28	12/9/98	54.27	0.00	3,591.01	
	3,645.28	3/10/99	54.69	0.04	3,590.62	

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-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	
	3,647.72	9/30/98	55.65	0.00	3,592.07	
	3,647.72	12/9/98	56.00	0.00	3,591.72	
	3,647.72	3/9/99	56.45	0.00	3,591.27	
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	
	3,644.74	9/30/98	54.89	0.00	3,589.85	
	3,644.74	12/9/98	54.57	0.00	3,590.17	
	3,644.74	3/10/99	55.10	0.00	3,589.64	

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-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	
	3,644.55	9/30/98	54.54	0.00	3,590.01	
	3,644.55	12/9/98	54.74	0.00	3,589.81	
	3,644.55	3/9/99	55.15	0.00	3,589.40	
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	
	3,644.87	9/30/98	54.35	0.00	3,590.52	
	3,644.87	12/9/98	54.60	0.00	3,590.27	
	3,644.87	3/9/99	55.00	0.00	3,589.87	

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-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
	3,644.78	9/30/98	53.39	0.01	3,591.40	PSH Sheen
	3,644.78	12/9/98	53.68	0.00	3,591.10	
	3,644.78	3/10/99	54.15	0.00	3,590.63	
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	
	3,644.47	9/30/98	55.61	0.00	3,588.86	
	3,644.47	12/9/98	55.80	0.00	3,588.67	
	3,644.47	3/9/99	56.09	0.00	3,588.38	

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-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	
	3,644.24	9/30/98	55.96	0.00	3,588.28	
	3,644.24	12/9/98	56.13	0.00	3,588.11	
	3,644.24	3/10/99	56.43	0.00	3,587.81	
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	
	3,644.29	9/30/98	56.02	0.00	3,588.27	
	3,644.29	12/9/98	56.17	0.00	3,588.12	
	3,644.29	3/10/99	56.45	0.00	3,587.84	

(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	3/10/99	0	8.46	22.24	836.0	64.2	6.47	NM	NM
		1	7.56	17.79	828.0	-8.5	3.13	NM	NM
		2	7.63	17.82	799.0	-44.5	4.85	NM	NM
		3	7.67	17.81	791.0	-59.9	5.43	5	140
MW-3	03/10/99	0	7.49	19.07	949.0	71.1	4.23	NM	NM
		1	7.24	18.60	951.0	49.9	3.03	NM	NM
		2	7.17	18.62	967.0	48.3	2.57	NM	NM
		3	7.10	18.67	1004.0	55.2	2.15	0	380
MW-4	03/10/99	0	NS	NS	NS	NS	NS	NM	NM
		1	NS	NS	NS	NS	NS	NM	NM
		2	NS	NS	NS	NS	NS	NM	NM
		3	NS	NS	NS	NS	NS	0	380
MW-5	03/09/99	0	7.96	20.41	1092	31.5	8.11	NM	NM
		1	7.28	18.85	1007	61.9	7.17	NM	NM
		2	7.20	18.83	979	78.3	6.28	NM	NM
		3	7.18	18.86	974	84.5	6.06	0	360
MW-6	03/10/99	0	7.86	19.96	1148.0	53.2	7.09	NM	NM
		1	7.60	18.8	1270.0	34.3	7.63	NM	NM
		2	7.5	18.94	1291.0	-23.3	7.54	0	380
		3	D	D	D	D	D	NM	NM
MW-7	03/09/99	0	7.28	20.98	1418	173.7	5.85	NM	NM
		1	6.73	20.47	1323	185.5	4.62	NM	NM
		2	6.73	21.1	1332	188.9	4.45	0	>400
		3	D	D	D	D	D	NM	NM
MW-8	03/09/99	0	7.82	23.02	1135	139.3	6.23	NM	NM
		1	7.01	20.06	1346	109.4	4.08	0	>400
		2	D	D	D	D	D	NM	NM
		3	D	D	D	D	D	NM	NM
MW-9	03/10/99	0	7.69	18.95	982.0	82.8	4.11	NM	NM
		1	7.18	19.05	957.0	71.5	3.21	NM	NM
		2	7.21	20.09	946.0	80.1	4.21	NM	NM
		3	7.2	19.91	933.0	91.8	3.95	0	340
MW-10	03/09/99	0	7.59	20.38	2908	-15.8	5.21	NM	NM
		1	6.82	19.68	2911	-69.4	1.82	NM	NM
		2	6.89	20.28	3443	-92.4	1.15	NM	NM
		3	6.94	20.66	3591	-111.6	0.78	4.0	>400
MW-11A	03/10/99	0	7.14	19.72	2063.0	81.8	5.93	NM	NM
		1	6.88	19.0	2091	10.8	0.57	NM	NM
		2	6.86	18.96	2223	-27.6	0.31	NM	NM
		3	6.85	18.98	2426	-57.1	0.31	6	>400
MW-12	03/10/99	0	7.29	18.96	1278	-44.3	4.02	NM	NM
		1	7.06	18.69	1351	-81.8	0.5	NM	NM
		2	7.01	18.77	1381	-87.9	0.3	NM	NM
		3	7.00	18.82	1380	-93.11	0.3	3	> 400

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.

NM=Not Measured

D=Well went dry

NS=Not Screened due to Phase Separated Hydrocarbons

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
	09/30/98	Regular	3.2	90	280	970	2.5	3.6
	12/10/98	Regular	<1.0	1.5	17	110	1.4	0.31
	03/10/99	Regular	<1.0	<1.0	8.2	110	0.62	0.85
	03/10/99	Duplicate	<1.0	<1.0	7.9	110	0.66	0.84
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
	09/30/98	Regular	42	470	450	530	1.0	3.8
	12/10/98	Regular	13	220	160	290	1.3	0.43
	03/10/99	Regular	3.2	7.4	42	32	0.2	0.44

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								
	8/10/92	Regular	2594	10360	2160	6740	NA	NA
	2/9/93	Regular	5200	15000	2200	10000	NA	NA
	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
	09/30/98	Regular	80	180	370	840	2.0	3.9
	12/10/98	Regular	28	70	210	960	9.3	4.3
	12/10/98	Duplicate	26	62	180	830	3.9	4.3
	03/10/99	Regular	8	20	250	1400	13.0	13
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
	09/30/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	03/09/99	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	<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

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	
	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
	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
	09/30/98	Regular	1000	420	140	270	4.0	3.3
	12/10/98	Regular	7.6	6.6	1.7	5.8	2.0	< 0.1
	03/10/99	Regular	2500	930	590	1400	11.0	13
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
	09/30/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	03/09/99	Regular	<1.0	<1.0	<1.0	<1.0	4.7	< 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

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	
	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
	3/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	6/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	09/30/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	03/09/99	Regular	<1.0	<1.0	<1.0	<1.0	<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
	09/30/98	Regular	1.1	5.5	21	59	0.27	0.27
	12/10/98	Regular	< 1.0	1.9	17	79	5.1	0.25
	03/10/99	Regular	<1.0	<1.0	5.7	68	<0.2	0.22
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

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	
	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
	09/30/98	Regular	84	3.2	30	2.2	1.4	0.36
	12/10/98	Regular	29	1.0	7.0	1.0	0.86	0.18
	03/09/99	Regular	28	<5.0	5.8	<5.0	0.92	<0.5
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
	09/30/98	Regular	9.3	3.7	2.2	7.0	<0.20	0.1
	12/10/98	Regular	1.7	<1.0	<1.0	<1.0	<0.20	<0.1
	03/10/99	Regular	<5	<5	<5	<5	0.3	<.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
	09/30/98	Regular	260	3.0	1.2	7.9	<0.20	0.62
	12/10/98	Regular	160	<1.0	<1.0	1.2	0.21	0.36
	03/10/99	Regular	160	1.1	<1.0	2.9	0.38	0.45

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
Summary of Detected Analytes for PAHs, Metals, SVOCs and Groundwater Quality Parameters
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

AnalyteName	Sample Date	Monitor Wells											
		MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-11A	MW-12
Alkalinity	**mg/L**												
Bicarbonate, as CaCO3													
	8/1/95	380	430	490	290	670	440	360	570	520	560	NA	NA
	8/23/96	310	310	210	270	120	400	280	390	520	430	NA	NA
	3/23-24/98	286	214	175	247	180	309	260	306	557	NA	319	451
	3/9-10/99	92	309	186	283	286	358	317	333	278	NA	335	386
Carbonate													
	8/1/95	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	10	NA	NA
	8/23/96	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA
	3/23-24/98	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NA	< 1	< 1
	3/9-10/99	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	<1	<1
Hardness-Total as CaCO3													
	3/23-24/98	430	430	275	342	440	670	740	510	1450	NA	1000	1600
	3/9-10/99	250	440	310	340	640	780	680	370	720	NA	1150	460
Hydroxide													
	8/1/95	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA
	8/23/96	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA
Anions	**mg/L**												
Chloride													
	8/1/95	160	150	310	130	380	310	350	110	2200	3400	NA	NA
	8/23/96	130	140	100	99	210	250	360	140	2000	2900	NA	NA
	3/23-24/98	212	206	126	151	183	223	364	164	2390	NA	940	1200
	3/9-10/99	163	156	142	155	411	238	274	123	1160	NA	834	314
Fluoride													
	3/23-24/98	0.9	1.2	1.2	0.6	1.1	0.8	0.9	1.3	6.1	NA	2.9	4.2
	3/9-10/99	1.54	1.46	1.5	1.38	1.79	1.56	1.44	1.84	4.93	NA	3.08	3.13
Methane													
	3/23-24/98	< 0.0012	< 0.0012	< 0.0012	< 0.0012	< 0.0012	< 0.0012	0.039	< 0.0012	0.91	NA	0.14	< 0.0012
	3/9-10/99	NA	NA	NA	<0.0012	NA	NA	NA	NA	0.035	NA	0.094	<0.0012
Nitrate (Nitrogen as N)													
	8/1/95	4.7	5.6	15	28	1.3	9.2	11	38	< 0.1	5.5	NA	NA
	8/23/96	11	7.6	7.6	12	< 0.5	10	8.6	24	< 5	11	NA	NA
	3/23-24/98	1.78	3.07	2.59	3.87	0.69	3.92	1.84	4.27	0.07	NA	< 0.05	< 0.05
	3/9-10/99	0.7	2.1	2.6	NA	<0.1	3.3	0.7	3.7	NA	NA	<0.1	<0.1

Table 5
Summary of Detected Analytes for PAHs, Metals, SVOCs and Groundwater Quality Parameters
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

AnalyteName	Sample Date	Monitor Wells											
		MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-11A	MW-12
Sulfate													
	8/1/95	150	150	210	230	6.7	180	160	150	130	230	NA	NA
	8/23/96	130	150	150	140	85	80	160	180	120	130	NA	NA
	3/23-24/98	130	180	160	190	230	310	250	230	320	NA	190	240
	3/9-10/99	196	162	178	195	72	246	240	146	223	NA	227	193
Cations	**mg/L**												
Calcium													
	8/1/95	120	120	220	160	320	300	300	180	610	490	NA	NA
	8/23/96	120	130	89	110	62	270	230	190	390	440	NA	NA
	3/23-24/98	129	122	79	109	94	208	215	142	417	NA	259	388
	3/9-10/99	80.2	129	90.8	116	141	233	197	122	214	NA	308	148
Magnesium													
	8/1/95	34	36	58	27	72	42	49	43	130	130	NA	NA
	8/23/96	120	32	21	18	28	40	48	44	84	120	NA	NA
	3/23-24/98	36	30	18	20	42	47	52	36	130	NA	96	108
	3/9-10/99	19.7	31.5	20.4	21.6	62.2	54.4	47.7	28.5	43	NA	101	32.1
Potassium													
	8/1/95	2.4	2.6	3.5	4.2	3	3.4	5	4.1	35	46	NA	NA
	8/23/96	2.4	3	2.2	3.1	2.4	3.7	3.9	2.6	41	53	NA	NA
	3/23-24/98	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	20	NA	30	70
	3/9-10/99	3	4	3	4	4	9	4	3	15	NA	21	101
Sodium													
	8/1/95	100	93	140	110	130	95	94	98	660	2000	NA	NA
	8/23/96	100	110	88	120	120	96	100	83	960	2600	NA	NA
	3/23-24/98	113	126	109	130	100	92	101	118	1090	NA	312	381
	3/9-10/99	126	135	124	155	141	110	115	122	856	NA	225	180

Table 5
Summary of Detected Analytes for PAHs, Metals, SVOCs and Groundwater Quality Parameters
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

AnalyteName	Sample Date	Monitor Wells											
		MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-11A	MW-12
Metals	**mg/L**												
Arsenic													
	8/1/95	0.0076	0.0043	< 0.002	0.0059	0.028	0.0033	0.0034	0.0055	0.015	0.0086	NA	NA
	8/23/96	0.0078	0.0066	0.0059	0.0067	0.018	0.0036	0.0033	0.0044	0.028	0.011	NA	NA
	3/23-24/98	0.007	0.007	0.008	0.007	0.013	< 0.005	< 0.005	0.005	0.035	NA	0.019	0.013
	3/9-10/99	0.013	0.009	0.012	0.005	0.02	0.006	0.005	0.007	0.026	NA	0.036	0.066
Barium													
	8/1/95	0.069	0.38	0.34	0.049	1.1	0.069	0.075	0.089	0.37	0.2	NA	NA
	8/23/96	0.064	0.24	0.069	0.038	0.29	0.061	0.066	0.089	0.26	0.2	NA	NA
	3/23-24/98	0.11	0.182	0.044	0.044	0.208	0.059	0.074	0.066	0.287	NA	0.163	0.157
	3/9-10/99	0.058	0.059	0.045	0.054	0.555	0.076	0.052	0.043	0.17	NA	0.174	0.144
Cadmium													
	8/1/95	< 0.001	< 0.001	0.0052	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	NA	NA
	8/23/96	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	NA	NA
	3/23-24/98	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	NA	< 0.005	< 0.005
	3/9-10/99	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA	<0.005	<0.005
Chromium													
	8/23/96	< 0.01	< 0.01	< 0.01	< 0.01	0.049	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	NA	NA
	3/23-24/98	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	NA	< 0.01	< 0.01
	3/9-10/99	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NA	<0.01	<0.01
Mercury													
	8/23/96	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	NA	NA
	3/23-24/98	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0003	< 0.0002	< 0.0002	NA	< 0.0002	< 0.0002
	3/9-10/99	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	NA	<0.0002	<0.0002

Table 5
Summary of Detected Analytes for PAHs, Metals, SVOCs and Groundwater Quality Parameters
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

AnalyteName	Sample Date	Monitor Wells											
		MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-11A	MW-12
PAHs	**µg/L**												
Naphthalene													
	8/1/95	< 5	210	1700	< 5	470	< 5	< 5	15	92	< 5	NA	NA
	8/23/96	230	110	440	< 5	< 30	< 5	< 5	< 84	< 76	< 5	NA	NA
	3/23-24/98	130	23	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	4	8	NA	0.8	11
	3/9-10/99	10	8	170	0.1	160	<0.1	<0.1	<.1	6	NA	<0.1	19
SVOCs	**µg/L**												
2,4-Dimethylphenol													
	8/1/95	< 50	97	< 500	< 5	42	< 5	< 5	< 5	< 5	< 5	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene													
	8/1/95	280	62	1500	< 5	150	< 5	< 5	36	23	< 5	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol													
	8/1/95	< 50	56	< 500	< 5	< 30	< 5	< 5	< 5	< 5	< 5	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol													
	8/1/95	< 80	< 20	< 800	< 8	150	< 8	< 8	< 8	< 8	< 8	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate													
	8/1/95	750	< 20	10000	40	< 40	< 7	< 7	< 7	< 7	< 7	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol													
	8/1/95	< 50	< 10	< 500	< 5	< 30	< 5	< 5	< 5	8.2	< 5	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

MW-2 Destroyed on May 3, 1995, MW-11 destroyed after September 1997.
NA= Not Analyzed.
PAHs = Polyaromatic Hydrocarbons.

Table 6
Laboratory Analytical Results for Natural Attenuation Evaluation Parameters
BJ Services Company, U.S.A.
Hobbs, New Mexico

Well	Analytical Method (1)	Nitrate (mg/L)	Sulfate (mg/L)	Dissolved Methane(2) (ppm)
MW-5	300.0	<0.1	131	<0.0012
	353.3/375.4	NA	195	
MW-7	300.0	NA	NA	NA
	353.3/375.4	3.3	246	
MW-8	300.0	NA	NA	NA
	353.3/375.4	0.7	240	
MW-10	300.0	<0.1	142	0.035
	353.3/375.4	NA	223	
MW-11A	300.0	<0.1	164	0.094
	353.3/375.4	<0.1	227	
MW-12	300.0	<0.1	137	<0.0012
	353.3/375.4	<0.1	193	

1=By EPA Method 300, except as noted (Method 353.3 for nitrate, Method 375.4 for sulfate).
2 = Method RSK-147
NA = Not analyzed

Table 7
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
Monitor 980930 (1)	9/30/98	NA	NA	NA	NA	200	123.74	NA	NA	0.33
Monitor 981210 (1)	12/10/98	NA	NA	NA	NA	180	111.14	NA	NA	0.24
Monitor 990310 (1)	3/10/99	NA	NA	NA	NA	80	111.14	NA	NA	0.11

Emission 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

Appendices

APPENDICES

A

APPENDIX A

Groundwater Sampling Forms

BROWN AND CALDWELL

WELL ID: MW-1

Groundwater Sampling Field Data Sheet

Project Number: 12832 **Task Number:** 036 **Date:** 3.10.99

Casing Diameter: 2 inches	Purge Equipment: pump	Geochemical Parameters
Total Depth of Well from TOC: 64.5 feet		Ferrous iron: 0 mg/l
Static Water from TOC: ~~54.45~~ 57.45 feet	Sample Equipment: pump	Dissolved oxygen: 5.0 mg/l
Product Level from TOC: — feet		Nitrate: — mg/l
Length of Water Column: 10.05 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI, Hach Kit	Alkalinity: 140 mg/l
Well Volume: 1.6 gal		Sulfate: — mg/l
Screened Interval (from GS): 45-64.5 feet		Sample Time: 13:15
		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
13:00	—	8.46	22.24	836	64.2	6.47	clear
13:06	1.5	7.56	17.79	828	-8.5	3.13	clear
13:10	3.0	7.63	17.82	799	-44.5	4.85	clear
13:14	4.5	7.67	17.81	791	-59.9	5.43	clear
13:15	5.0	7.67	17.82	791	-61.1	5.48	clear

Comments:

collected duplicate sample from MW-1

PPE Worn: Gloves

Disposition of Purge Water: disposed on-site

Sampler's Signature:

BROWN AND CALDWELL

WELL ID: MW-3

Groundwater Sampling Field Data Sheet

Project Number: 1232 **Task Number:** _____ **Date:** 3-10-99

Casing Diameter: 2 inches	Purge Equipment: pump	Geochemical Parameters
Total Depth of Well from TOC: 62.08 feet		Ferrous iron: 0 mg/l
Static Water from TOC: 54.72 feet	Sample Equipment: pump	Dissolved oxygen: 4.0 mg/l
Product Level from TOC: — feet		Nitrate: — mg/l
Length of Water Column: 7.63 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI, Hach kit	Alkalinity: 380 mg/l
Well Volume: 1.2 gal		Sulfate: — mg/l
Screened Interval (from GS): 45-62 feet		Sample Time: 12:15
		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
12:07	—	7.45	19.07	949	71.1	4.23	clear
12:10	1.0	7.24	18.60	951	49.9	3.03	clear
12:12	2.0	7.17	18.62	967	48.3	2.57	clear
12:14	3.0	7.11	18.66	997	55.8	2.20	clear
12:15	3.5	7.10	18.67	1004	55.2	2.15	clear

Comments:

PPE Worn: gloves

Disposition of Purge Water: disposed on site

Sampler's Signature:

BROWN AND CALDWELL

WELL ID: MW-4

Groundwater Sampling Field Data Sheet

Project Number: 12832 **Task Number:** 036 **Date:** 3-10-99

Casing Diameter: 2 inches	Purge Equipment: pump	Geochemical Parameters
Total Depth of Well from TOC: 60.14 feet		Ferrous iron: 0 mg/l
Static Water from TOC: 54.65 feet	Sample Equipment: pump	Dissolved oxygen: 7.0 mg/l
Product Level from TOC: 54.65 feet		Nitrate: — mg/l
Length of Water Column: 5.45 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): Hach Kits	Alkalinity: >400 mg/l
Well Volume: 0.9 gal		Sulfate: — mg/l
Screened Interval (from GS): 45-60 feet		Sample Time: 16:00
		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
15:53	—						silty/sheen
15:56	1.0						clear/sheen
15:58	2.0						clear/sheen
16:00	3.0						clear/sheen

Comments:

YSI Not used due to PSH in well.

PPE Worn: gloves

Disposition of Purge Water: disposal on site

Sampler's Signature:

BROWN AND CALDWELL

WELL ID: MW-5

Groundwater Sampling Field Data Sheet

Project Number: 12832 **Task Number:** 036 **Date:** 3-9-99

Casing Diameter	Purge Equipment	Geochemical Parameters	
2 inches	pump	Ferrous iron:	0 mg/l
Total Depth of Well from TOC: 64.73 feet		Dissolved oxygen:	5.0 mg/l
Static Water from TOC: 56.45 feet	Sample Equipment: pump	Nitrate:	~~360~~ mg/l
Product Level from TOC: — feet		Alkalinity:	360 mg/l
Length of Water Column: 8.28 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI, Hach kits	Sulfate:	— mg/l
Well Volume: 1.3 gal		Sample Time:	17:30
Screened Interval (from GS): 45-60 feet		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.	

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
17:17	—	7.96	20.41	1052	31.5	8.11	clear
17:20	1.0	7.28	18.85	1007	61.9	7.17	Clear
17:23	2.0	7.21	18.84	992	74.2	6.55	Clear
17:26	3.0	7.20	18.83	979	78.3	6.28	Clear
17:30	4.0	7.18	18.86	974	84.5	6.06	Clear

Comments:

PPE Worn: gloves

Disposition of Purge Water: disposed on site

Sampler's Signature:

BROWN AND CALDWELL

WELL ID: MW-6

Groundwater Sampling Field Data Sheet

Project Number: 2832 **Task Number:** 036 **Date:** 3.10.99

Casing Diameter: 2 inches	Purge Equipment: pump	Geochemical Parameters
Total Depth of Well from TOC: 55.52 feet		Ferrous Iron: 0 mg/l
Static Water from TOC: 55.10 feet	Sample Equipment: pump	Dissolved oxygen: 5.0 mg/l
Product Level from TOC: — feet		Nitrate: — mg/l
Length of Water Column: 4.82 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI, Hach kits	Alkalinity: 380 mg/l
Well Volume: 0.8 gal		Sulfate: — mg/l
Screened Interval (from GS): 45-60 feet		Sample Time: 14:15
		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
14:13	—	7.86	16.96	1148	53.2	7.09	clear
1414	0.8	7.60	18.80	1270	34.3	7.63	clear
14:15	1.2	7.50	18.94	1251	-23.3	7.54	clear

Comments:

dry @ 1.2 gallons

PPE Worn: gloves

Disposition of Purge Water: disposed on site

Sampler's Signature:

BROWN AND CALDWELL

WELL ID: MW-7

Groundwater Sampling Field Data Sheet

Project Number: 12832 **Task Number:** 036 **Date:** 3.5.15

Casing Diameter: 2" ~~SCH~~ inches	Purge Equipment: pump	Geochemical Parameters
Total Depth of Well from TOC: 62.21 feet		Ferrous Iron: 0 mg/l
Static Water from TOC: 55.15 feet	Sample Equipment: pump	Dissolved oxygen: 4.0 mg/l
Product Level from TOC: - feet		Nitrate: ~~>400~~ mg/l
Length of Water Column: 7.09 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI, Hach kits	Alkalinity: >400 mg/l
Well Volume: 1.1 gal		Sulfate: — mg/l
Screened Interval (from GS): 45-60 feet		Sample Time: 14:45
		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
14:41	—	7.28	20.58	1418	173.7	5.85	clear
14:42	0.5	6.76	20.32	1348	181.0	4.61	clear
14:43	1.0	6.73	20.47	1323	185.5	4.62	clear
14:44	1.5	6.72	20.87	1329	188.7	4.48	clear
14:45	2.0	6.73	21.10	1332	188.9	4.45	clear

Comments:

dry @ ~~1.5~~ 2.0 gallons

PPE Worn: Gloves

Disposition of Purge Water: disposal on site

Sampler's Signature:

BROWN AND CALDWELL

WELL ID: MW-8

Groundwater Sampling Field Data Sheet

Project Number: 12432 **Task Number:** 036 **Date:** 3.9.99

Casing Diameter: 2 inches	Purge Equipment: pump	Geochemical Parameters
Total Depth of Well from TOC: 62.35 feet		Ferrous iron: 0 mg/l
		Dissolved oxygen: 5.0 mg/l
Static Water from TOC: 55.00 feet	Sample Equipment: pump	Nitrate: — mg/l
Product Level from TOC: — feet		Alkalinity: >400 mg/l
Length of Water Column: 7.35 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI, Hach Field kits	Sulfate: — mg/l
Well Volume: 1.2 gal		Sample Time: 16:00
Screened Interval (from GS): 45-60 feet		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
15:56	—	7.82	23.02	1135	135.3	6.23	Clear
15:59	1.0	7.01	22.06	1346	109.4	4.08	Clear
16:00	1.5	6.99	20.47	1351	114.5	4.62	Clear

Comments:

dry @ 1.5 gals

PPE Worn: gloves

Disposition of Purge Water: disposed onsite

Sampler's Signature:

BROWN AND CALDWELL

WELL ID: mw-9

Groundwater Sampling Field Data Sheet

Project Number: 12432 **Task Number:** 036 **Date:** 3/10/99

Casing Diameter: 2 inches	Purge Equipment: pump	Geochemical Parameters
Total Depth of Well from TOC: 61.17 feet		Ferrous iron: 0 mg/l
Static Water from TOC: 54.15 feet	Sample Equipment: pump	Dissolved oxygen: 3.0 mg/l
Product Level from TOC: — feet		Nitrate: — mg/l
Length of Water Column: 7.02 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI, Hach kits	Alkalinity: 340 mg/l
Well Volume: 1.1 gal		Sulfate: — mg/l
Screened Interval (from GS): 45-60 feet		Sample Time: 10:00
		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
9:54	-	7.69	18.95	582	92.8	4.11	Clear
9:56	1.0	7.18	19.05	957	71.5	3.21	Clear
9:58	2.0	7.21	20.09	946	80.1	4.21	Clear
10:00	3.0	7.20	19.91	933	91.8	3.55	Clear

Comments:

PPE Worn: gloves

Disposition of Purge Water: disposed on site

Sampler's Signature:

BROWN AND CALDWELL

WELL ID: MW-10

Groundwater Sampling Field Data Sheet

Project Number: 12832 **Task Number:** 036 **Date:** 3.9.99

Casing Diameter: 2 inches	Purge Equipment: pump	Geochemical Parameters
Total Depth of Well from TOC: 62.81 feet		Ferrous iron: 4.0 mg/l
Static Water from TOC: 56.09 feet	Sample Equipment: pump	Dissolved oxygen: 0 mg/l
Product Level from TOC: — feet		Nitrate: — mg/l
Length of Water Column: 6.72 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI, Hach kits	Alkalinity: >400 mg/l
Well Volume: 1.1 gal		Sulfate: — mg/l
Screened Interval (from GS): 46-62 feet		Sample Time: 16:45
		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
16:38	—	7.59	20.38	2908	-15.8	5.21	clear
16:41	1.0	6.82	19.68	2911	-69.4	1.82	clear
16:43	2.0	6.89	20.28	3443	-92.4	1.15	clear
16:45	3.0	6.91	20.66	3591	-111.6	0.78	clear

Comments:

PPE Worn: gloves

Disposition of Purge Water: disposed on site

Sampler's Signature:

BROWN AND CALDWELL

WELL ID: MW-11A

Groundwater Sampling Field Data Sheet

Project Number: 12832 **Task Number:** 036 **Date:** 3-10-99

Casing Diameter: 2 inches	Purge Equipment: pump	Geochemical Parameters
Total Depth of Well from TOC: 63.58 feet		Ferrous iron: 6.0 mg/l
Static Water from TOC: 56.43 feet	Sample Equipment: pump	Dissolved oxygen: 2.0 mg/l
Product Level from TOC: — feet		Nitrate: — mg/l
Length of Water Column: 7.15 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI, Hach kits	Alkalinity: 2400 mg/l
Well Volume: 1.2 gal		Sulfate: — mg/l
Screened Interval (from GS): 45-62 feet		Sample Time: 11:00
		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
10:51	—	7.14	19.72	2063	81.8	5.93	muddy
10:54	1.0	6.88	18.95	2091	12.8	0.57	clear
10:56	2.0	6.86	18.96	2223	-27.6	0.31	clear
10:58	3.0	6.85	18.97	2384	-49.7	0.30	clear
11:00	4.0	6.85	18.98	2426	-57.1	0.31	clear

Comments:

PPE Worn: gloves

Disposition of Purge Water: disposed on site

Sampler's Signature:

BROWN AND CALDWELL

WELL ID: MW-12

Groundwater Sampling Field Data Sheet

Project Number: 12832 **Task Number:** 036 **Date:** 3-10-99

Casing Diameter: 2 inches	Purge Equipment: pump	Geochemical Parameters
Total Depth of Well from TOC: 61.16 feet		Ferrous iron: 3.0 mg/l
Static Water from TOC: 56.45 feet	Sample Equipment: pump	Dissolved oxygen: 0 mg/l
Product Level from TOC: — feet		Nitrate: — mg/l
Length of Water Column: 4.71 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI, Hach kit	Alkalinity: ~400 mg/l
Well Volume: 0.8 gal		Sulfate: — mg/l
Screened Interval (from GS): 45-60 feet		Sample Time: 11:30
		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
11:26	—	7.29	18.96	1278	-44.3	4.02	clear
11:27	1.0	7.06	18.69	1351	-81.8	0.48	clear
11:28	2.0	7.01	18.77	1381	-87.9	0.34	clear
11:29	3.0	7.00	18.82	1380	-93.4	0.30	clear
11:30	3.5	6.99	18.83	1387	-95.1	0.29	clear

Comments:

PPE Worn: gloves

Disposition of Purge Water: disposed on site

Sampler's Signature:

B

APPENDIX B

Laboratory Analytical Reports for Groundwater Samples

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

March 25, 1999

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 March 10, 1999. The sample(s) was assigned to Certificate of Analysis No. (s) 9903411 and analyzed for all parameters as listed on the chain of custody.

Your sample ID: MW-7 (SPL ID: H9-9903411-01) was randomly selected for the use in SPL's Quality Control program for the Total Metals analysis by SW846 method 6010. The Matrix Spike (MS) and Matrix Spike Duplicate (MSD) was outside of the advisable quality control limits for Calcium, the MSD was also out for Sodium, due to matrix interference. The Relative Percent Difference was outside the QC limits for Calcium and Sodium. A Laboratory Control Sample (LCS) was analyzed as a quality control check for the analytical batch and all recoveries were within acceptable limits.

Any other data flags or quality control exceptions associated with this report will be footnoted in the analytical result 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: 99-03-411

Approved for Release by:

Bernadette A. Fini, Senior Project Manager — 3-25-99 Date

Greg Grandits
Laboratory Director

Idelis Williams
Corporate Quality Assurance Director

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

Certificate of Analysis No. H9-9903411-01

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

DATE: 03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 14:45:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.10 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	87		
1,4-Difluorobenzene	80		
Method 8015B *** for Gasoline			
Analyzed by: CJ			
Date: 03/17/99			
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	107		
4-Bromofluorobenzene	93		
Method 8020A ***			
Analyzed by: CJ			
Date: 03/17/99			
Total Petroleum Hydrocarbons-Diesel	4.7	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	54		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 03/24/99 03:51:00			

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 contians 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. H9-9903411-01

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

DATE: 03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 14:45:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Silver, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	ND	0.01	mg/L
Arsenic, Total Method 6010B *** Analyzed by: EG Date: 03/11/99 17:20:00	0.006	0.005	mg/L
Barium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	0.076	0.005	mg/L
Calcium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	233	0.1	mg/L
Cadmium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	ND	0.005	mg/L

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.

COMMENTS: Sample contians 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. H9-9903411-01

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

DATE: 03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 14:45:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Chromium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	ND	0.01	mg/L
Mercury, Total Method 7470 A*** Analyzed by: AG Date: 03/23/99 14:43:00	ND	0.0002	mg/L
Hardness-Total as CaCO3 Method 130.2 * Analyzed by: CV Date: 03/18/99 10:30:00	780	10	mg/L CaCO3
Potassium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	9	2	mg/L
Magnesium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	54.4	0.1	mg/L
Sodium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	110	0.5	mg/L

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.

COMMENTS: Sample contians 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. H9-9903411-01

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

DATE: 03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 14:45:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: EE Date: 03/10/99 15:15:00	03/10/99		
Lead, Total Method 6010B *** Analyzed by: EG Date: 03/11/99 17:20:00	ND	0.005	mg/L
Selenium, Total Method 6010B *** Analyzed by: EG Date: 03/11/99 17:20:00	0.005	0.005	mg/L
Chloride Method 325.3 * Analyzed by: CV Date: 03/15/99 12:00:00	238	5	mg/L
Fluoride Method 300.0 * Analyzed by: ELS Date: 03/15/99 09:00:00	1.56	0.50	mg/L
Nitrate nitrogen(as N) Method 353.3 * Analyzed by: CV Date: 03/11/99 14:30:00	3.3	0.1	mg/L

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.

COMMENTS: Sample contians 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. H9-9903411-01

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

DATE: 03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 14:45:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Sulfate Method 375.4 * Analyzed by: ELS Date: 03/22/99 14:00:00	246	10	mg/L
Carbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/10/99 14:00:00	ND	1	mg/L
Bicarbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/10/99 14:00:00	358	1	mg/L

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.

COMMENTS: Sample contians 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. H9-9903411-01

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

03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 14:45:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	ND	0.1	ug/L
Acenaphthylene	ND	0.1	ug/L
Acenaphthene	ND	0.1	ug/L
Fluorene	ND	0.1	ug/L
Phenanthrene	ND	0.1	ug/L
Anthracene	ND	0.1	ug/L
Fluoranthene	ND	0.1	ug/L
Pyrene	ND	0.1	ug/L
Chrysene	ND	0.1	ug/L
Benzo (a) anthracene	ND	0.1	ug/L
Benzo (b) fluoranthene	ND	0.1	ug/L
Benzo (k) fluoranthene	ND	0.1	ug/L
Benzo (a) pyrene	ND	0.1	ug/L
Dibenzo (a,h) anthracene	ND	0.1	ug/L
Benzo (g,h,i) perylene	ND	0.1	ug/L
Indeno (1,2,3-cd) pyrene	ND	0.1	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1-Fluoronaphthalene	0.50 ug/L	51	50	150
Phenanthrene d-10	0.50 ug/L	64	50	150

ANALYZED BY: KA DATE/TIME: 03/13/99 00:31:59
EXTRACTED BY: KL DATE/TIME: 03/11/99 10:00:00
METHOD: 8310 Polynuclear Aromatic Hydrocarbons
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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. H9-9903411-02

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

DATE: 03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 16:00:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.10 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	87		
1,4-Difluorobenzene	87		
Method 8015B *** for Gasoline			
Analyzed by: CJ			
Date: 03/17/99			
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	93		
Method 8020A ***			
Analyzed by: CJ			
Date: 03/17/99			
Total Petroleum Hydrocarbons-Diesel	ND	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	46		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 03/24/99 04:36:00			

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. H9-9903411-02

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

DATE: 03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 16:00:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Silver, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	ND	0.01	mg/L
Arsenic, Total Method 6010B *** Analyzed by: EG Date: 03/11/99 17:20:00	0.005	0.005	mg/L
Barium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	0.052	0.005	mg/L
Calcium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	197	0.1	mg/L
Cadmium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	ND	0.005	mg/L
Chromium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	ND	0.01	mg/L

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. H9-9903411-02

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

DATE: 03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 16:00:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Mercury, Total Method 7470 A*** Analyzed by: AG Date: 03/23/99 14:43:00	ND	0.0002	mg/L
Hardness-Total as CaCO3 Method 130.2 * Analyzed by: CV Date: 03/18/99 10:30:00	680	10	mg/L CaCO3
Potassium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	4	2	mg/L
Magnesium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	47.7	0.1	mg/L
Sodium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	115	0.5	mg/L
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: EE Date: 03/10/99 15:15:00	03/10/99		

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. H9-9903411-02

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

DATE: 03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 16:00:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Lead, Total Method 6010B *** Analyzed by: EG Date: 03/11/99 17:20:00	ND	0.005	mg/L
Selenium, Total Method 6010B *** Analyzed by: EG Date: 03/11/99 17:20:00	ND	0.005	mg/L
Chloride Method 325.3 * Analyzed by: CV Date: 03/15/99 12:00:00	274	5	mg/L
Fluoride Method 300.0 * Analyzed by: ELS Date: 03/15/99 09:00:00	1.44	0.50	mg/L
Nitrate nitrogen(as N) Method 353.3 * Analyzed by: CV Date: 03/11/99 14:30:00	0.7	0.1	mg/L
Sulfate Method 375.4 * Analyzed by: ELS Date: 03/22/99 14:00:00	240	20	mg/L

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. H9-9903411-02

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

DATE: 03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 16:00:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Carbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/10/99 14:00:00	ND	1	mg/L
Bicarbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/10/99 14:00:00	317	1	mg/L

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. H9-9903411-02

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

03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 16:00:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	ND	0.1	ug/L
Acenaphthylene	ND	0.1	ug/L
Acenaphthene	ND	0.1	ug/L
Fluorene	ND	0.1	ug/L
Phenanthrene	ND	0.1	ug/L
Anthracene	ND	0.1	ug/L
Fluoranthene	ND	0.1	ug/L
Pyrene	ND	0.1	ug/L
Chrysene	ND	0.1	ug/L
Benzo (a) anthracene	ND	0.1	ug/L
Benzo (b) fluoranthene	ND	0.1	ug/L
Benzo (k) fluoranthene	ND	0.1	ug/L
Benzo (a) pyrene	ND	0.1	ug/L
Dibenzo (a,h) anthracene	ND	0.1	ug/L
Benzo (g,h,i) perylene	ND	0.1	ug/L
Indeno (1,2,3-cd) pyrene	ND	0.1	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1-Fluoronaphthalene	0.50 ug/L	52	50	150
Phenanthrene d-10	0.50 ug/L	78	50	150

ANALYZED BY: KA DATE/TIME: 03/15/99 20:32:38
EXTRACTED BY: KL DATE/TIME: 03/11/99 10:00:00
METHOD: 8310 Polynuclear Aromatic Hydrocarbons
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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. H9-9903411-03

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

DATE: 03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 16:45:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.50 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	87		
1,4-Difluorobenzene	87		
Method 8015B *** for Gasoline			
Analyzed by: CJ			
Date: 03/17/99			
BENZENE	28	5.0 P	ug/L
TOLUENE	ND	5.0 P	ug/L
ETHYLBENZENE	5.8	5.0 P	ug/L
TOTAL XYLENE	ND	5.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	33.8		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	113		
4-Bromofluorobenzene	100		
Method 8020A ***			
Analyzed by: CJ			
Date: 03/17/99			
Total Petroleum Hydrocarbons-Diesel	0.92	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	48		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 03/24/99 05:21:00			

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 contians 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. H9-9903411-03

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

DATE: 03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 16:45:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Methane	0.035	0.0012 P	mg/L
Ethylene	ND	0.0032 P	mg/L
Ethane	ND	0.0025 P	mg/L
RSKSOP-147			
Analyzed by: JDR			
Date: 03/15/99 04:51:00			
Silver, Total	ND	0.01	mg/L
Method 6010B ***			
Analyzed by: JM			
Date: 03/11/99 15:51:00			
Arsenic, Total	0.026	0.005	mg/L
Method 6010B ***			
Analyzed by: EG			
Date: 03/11/99 17:20:00			
Barium, Total	0.170	0.005	mg/L
Method 6010B ***			
Analyzed by: JM			
Date: 03/11/99 15:51:00			
Calcium, Total	214	0.1	mg/L
Method 6010B ***			
Analyzed by: JM			
Date: 03/11/99 15:51:00			

(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.

COMMENTS: Sample contians 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. H9-9903411-03

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

DATE: 03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 16:45:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Cadmium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	ND	0.005	mg/L
Chromium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	ND	0.01	mg/L
Mercury, Total Method 7470 A*** Analyzed by: AG Date: 03/23/99 14:43:00	ND	0.0002	mg/L
Hardness-Total as CaCO3 Method 130.2 * Analyzed by: CV Date: 03/18/99 10:30:00	720	10	mg/L CaCO3
Potassium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	15	2	mg/L
Magnesium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	43.0	0.1	mg/L

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.

COMMENTS: Sample contians 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. H9-9903411-03

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

DATE: 03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 16:45:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Sodium, Total Method 6010B *** Analyzed by: PB Date: 03/23/99 07:27:00	856	2	mg/L
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: EE Date: 03/10/99 15:15:00	03/10/99		
Lead, Total Method 6010B *** Analyzed by: EG Date: 03/11/99 17:20:00	ND	0.005	mg/L
Selenium, Total Method 6010B *** Analyzed by: EG Date: 03/11/99 17:20:00	ND	0.005	mg/L
Chloride Method 325.3 * Analyzed by: CV Date: 03/15/99 12:00:00	1160	10	mg/L
Fluoride Method 300.0 * Analyzed by: ELS Date: 03/15/99 09:00:00	4.93	0.50	mg/L

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.

COMMENTS: Sample contians 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. H9-9903411-03

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

DATE: 03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 16:45:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Carbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/10/99 14:00:00	ND	1	mg/L
Bicarbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/10/99 14:00:00	278	2	mg/L
Nitrate (as NO3) Method 300.0 * Analyzed by: ELS Date: 03/10/99 08:00:00	ND	0.1	mg/L NO3
Sulfate Method 375.4 * Analyzed by: ELS Date: 03/22/99 14:00:00	223	10	mg/L
Sulfate Method 300.0 * Analyzed by: ELS Date: 03/10/99 08:00:00	142	2.0	mg/L

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.

COMMENTS: Sample contians 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. H9-9903411-03

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

03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 16:45:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	6	0.5	ug/L
Acenaphthylene	ND	0.1	ug/L
Acenaphthene	ND	0.1	ug/L
Fluorene	ND	0.1	ug/L
Phenanthrene	ND	0.1	ug/L
Anthracene	ND	0.1	ug/L
Fluoranthene	ND	0.1	ug/L
Pyrene	ND	0.1	ug/L
Chrysene	ND	0.1	ug/L
Benzo (a) anthracene	ND	0.1	ug/L
Benzo (b) fluoranthene	ND	0.1	ug/L
Benzo (k) fluoranthene	ND	0.1	ug/L
Benzo (a) pyrene	ND	0.1	ug/L
Dibenzo (a,h) anthracene	ND	0.1	ug/L
Benzo (g,h,i) perylene	ND	0.1	ug/L
Indeno (1,2,3-cd) pyrene	ND	0.1	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1-Fluoronaphthalene	0.50 ug/L	64	50	150
Phenanthrene d-10	0.50 ug/L	76	50	150

ANALYZED BY: KA DATE/TIME: 03/15/99 21:09:43
EXTRACTED BY: KL DATE/TIME: 03/11/99 10:00:00
METHOD: 8310 Polynuclear Aromatic Hydrocarbons
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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. H9-9903411-04

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

DATE: 03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 17:30:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.10 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	87		
1,4-Difluorobenzene	83		
Method 8015B *** for Gasoline			
Analyzed by: CJ			
Date: 03/17/99			
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	107		
4-Bromofluorobenzene	90		
Method 8020A ***			
Analyzed by: CJ			
Date: 03/17/99			
Total Petroleum Hydrocarbons-Diesel	ND	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	34		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 03/24/99 06:05:00			

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. H9-9903411-04

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

DATE: 03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 17:30:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Methane	ND	0.0012 P	mg/L
Ethylene	ND	0.0032 P	mg/L
Ethane	ND	0.0025 P	mg/L
RSKSOP-147			
Analyzed by: JDR			
Date: 03/15/99 05:02:00			
Silver, Total	ND	0.01	mg/L
Method 6010B ***			
Analyzed by: JM			
Date: 03/11/99 15:51:00			
Arsenic, Total	0.005	0.005	mg/L
Method 6010B ***			
Analyzed by: EG			
Date: 03/11/99 17:20:00			
Barium, Total	0.054	0.005	mg/L
Method 6010B ***			
Analyzed by: JM			
Date: 03/11/99 15:51:00			
Calcium, Total	116	0.1	mg/L
Method 6010B ***			
Analyzed by: JM			
Date: 03/11/99 15:51:00			

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.

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Certificate of Analysis No. H9-9903411-04

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

DATE: 03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 17:30:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Cadmium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	ND	0.005	mg/L
Chromium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	ND	0.01	mg/L
Mercury, Total Method 7470 A*** Analyzed by: AG Date: 03/23/99 14:43:00	ND	0.0002	mg/L
Hardness-Total as CaCO3 Method 130.2 * Analyzed by: CV Date: 03/18/99 10:30:00	340	10	mg/L CaCO3
Potassium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	4	2	mg/L
Magnesium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	21.6	0.1	mg/L

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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Certificate of Analysis No. H9-9903411-04

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

DATE: 03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 17:30:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Sodium, Total Method 6010B *** Analyzed by: JM Date: 03/11/99 15:51:00	155	0.5	mg/L
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: EE Date: 03/10/99 15:15:00	03/10/99		
Lead, Total Method 6010B *** Analyzed by: EG Date: 03/11/99 17:20:00	ND	0.005	mg/L
Selenium, Total Method 6010B *** Analyzed by: EG Date: 03/11/99 17:20:00	0.006	0.005	mg/L
Chloride Method 325.3 * Analyzed by: CV Date: 03/15/99 12:00:00	155	1	mg/L
Fluoride Method 300.0 * Analyzed by: ELS Date: 03/15/99 09:00:00	1.38	0.50	mg/L

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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Certificate of Analysis No. H9-9903411-04

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

DATE: 03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 17:30:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Carbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/10/99 14:00:00	ND	1	mg/L
Bicarbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/10/99 14:00:00	283	1	mg/L
Nitrate (as NO3) Method 300.0 * Analyzed by: ELS Date: 03/10/99 08:00:00	ND	0.1	mg/L NO3
Sulfate Method 375.4 * Analyzed by: ELS Date: 03/22/99 14:00:00	195	10	mg/L
Sulfate Method 300.0 * Analyzed by: ELS Date: 03/10/99 08:00:00	131	2.0	mg/L

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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HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9903411-04

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

03/24/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99 17:30:00
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	0.1	0.1	ug/L
Acenaphthylene	ND	0.1	ug/L
Acenaphthene	ND	0.1	ug/L
Fluorene	ND	0.1	ug/L
Phenanthrene	ND	0.1	ug/L
Anthracene	ND	0.1	ug/L
Fluoranthene	ND	0.1	ug/L
Pyrene	ND	0.1	ug/L
Chrysene	ND	0.1	ug/L
Benzo (a) anthracene	ND	0.1	ug/L
Benzo (b) fluoranthene	ND	0.1	ug/L
Benzo (k) fluoranthene	ND	0.1	ug/L
Benzo (a) pyrene	ND	0.1	ug/L
Dibenzo (a,h) anthracene	ND	0.1	ug/L
Benzo (g,h,i) perylene	ND	0.1	ug/L
Indeno (1,2,3-cd) pyrene	ND	0.1	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1-Fluoronaphthalene	0.50 ug/L	64	50	150
Phenanthrene d-10	0.50 ug/L	80	50	150

ANALYZED BY: KA DATE/TIME: 03/15/99 21:46:54
EXTRACTED BY: KL DATE/TIME: 03/11/99 10:00:00
METHOD: 8310 Polynuclear Aromatic Hydrocarbons
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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. H9-9903411-05

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

DATE: 03/24/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Provided by SPL
SAMPLE ID: Trip Blank 3/1/99

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/09/99
DATE RECEIVED: 03/10/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.10 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	90		
1,4-Difluorobenzene	80		
Method 8015B *** for Gasoline			
Analyzed by: CJ			
Date: 03/17/99			
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	110		
4-Bromofluorobenzene	93		
Method 8020A ***			
Analyzed by: CJ			
Date: 03/17/99			

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

Matrix: Aqueous
Units: mg/L

Batch Id: VARE990316221800

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	0.97	108	0.95	106	1.87	36	36 - 160

Analyst: CJ
Sequence Date: 03/16/99
SPL ID of sample spiked: 9903490-04A
Sample File ID: EEC3096.TX0
Method Blank File ID:
Blank Spike File ID: EEC3080.TX0
Matrix Spike File ID: EEC3104.TX0
Matrix Spike Duplicate File ID: EEC3105.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):

9903491-01A 9903491-02A 9903491-03A 9903491-04A
9903491-05A 9903491-06A 9903411-01A 9903411-02A
9903411-03A 9903490-01A 9903490-02A 9903490-03A
9903490-04A 9903490-05A 9903490-06A

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

** SPL BATCH QUALITY CONTROL REPORT **

Method Modified 8015B*** for Gasoline

Matrix: Aqueous

Units: mg/L

Batch Id: VARE990317175800

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	0.88	97.8	0.89	98.9	1.12	36	36 - 160

Analyst: CJ

Sequence Date: 03/17/99

SPL ID of sample spiked: 9903411-04A

Sample File ID: EEC3130.TX0

Method Blank File ID:

Blank Spike File ID: EEC3122.TX0

Matrix Spike File ID: EEC3125.TX0

Matrix Spike Duplicate File ID: EEC3126.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):

9903472-05A 9903473-01A 9903473-02A 9903473-03A
9903473-06A 9903473-07A 9903473-08A 9903473-09A
9903411-05A 9903411-04A 9903472-04A

HOUSTON LABORATORY
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HOUSTON, TEXAS 77054
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** SPL BATCH QUALITY CONTROL REPORT **
METHOD 8020

Matrix: Aqueous
Units: ug/L

Batch Id: VARE990316215200

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	48	96.0	72 - 128
Benzene	ND	50	46	92.0	61 - 119
Toluene	ND	50	45	90.0	65 - 125
EthylBenzene	ND	50	47	94.0	70 - 118
O Xylene	ND	50	47	94.0	72 - 117
M & P Xylene	ND	100	92	92.0	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
MTBE	ND	20	19	95.0	17	85.0	11.1	20	39 - 150
BENZENE	ND	20	15	75.0	13	65.0	14.3	21	32 - 164
TOLUENE	ND	20	15	75.0	12	60.0	22.2 *	20	38 - 159
ETHYLBENZENE	ND	20	15	75.0	12	60.0	22.2 *	19	52 - 142
O XYLENE	ND	20	16	80.0	13	65.0	20.7 *	18	53 - 143
M & P XYLENE	ND	40	29	72.5	24	60.0	18.9 *	17	53 - 144

Analyst: CJ
Sequence Date: 03/16/99
SPL ID of sample spiked: 9903490-01A
Sample File ID: E_C3090.TX0
Method Blank File ID:
Blank Spike File ID: E_C3079.TX0
Matrix Spike File ID: E_C3081.TX0
Matrix Spike Duplicate File ID: E_C3082.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):

9903624-01A 9903414-07A 9903490-03A 9903490-04A
9903490-05A 9903490-06A 9903351-07A 9903491-01A
9903491-02A 9903491-03A 9903491-04A 9903491-05A
9903491-06A 9903411-01A 9903411-02A 9903411-03A
9903414-08A 9903645-01A 9903490-01A 9903490-02A

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: VARE990317173100

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	49	98.0	72 - 128
Benzene	ND	50	45	90.0	61 - 119
Toluene	ND	50	46	92.0	65 - 125
EthylBenzene	ND	50	47	94.0	70 - 118
O Xylene	ND	50	45	90.0	72 - 117
M & P Xylene	ND	100	91	91.0	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
MTBE	ND	10	16	160 *	17	170 *	6.06	20	39 - 150
BENZENE	ND	10	8.9	89.0	9.2	92.0	3.31	21	32 - 164
TOLUENE	ND	10	9.2	92.0	9.3	93.0	1.08	20	38 - 159
ETHYLBENZENE	ND	10	9.8	98.0	9.7	97.0	1.03	19	52 - 142
O XYLENE	ND	10	11	110	11	110	0	18	53 - 143
M & P XYLENE	ND	20	19	95.0	19	95.0	0	17	53 - 144

Analyst: CJ
Sequence Date: 03/17/99
SPL ID of sample spiked: 9903638-01A
Sample File ID: E_C3131.TX0
Method Blank File ID:
Blank Spike File ID: E_C3121.TX0
Matrix Spike File ID: E_C3123.TX0
Matrix Spike Duplicate File ID: E_C3124.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):

9903638-03A 9903638-04A 9903638-05A 9903638-06A
9903638-07A 9903472-04A 9903472-05A 9903473-01A
9903473-02A 9903473-03A 9903473-06A 9903473-07A
9903473-08A 9903473-09A 9903411-05A 9903411-04A
9903638-01A 9903638-02A

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

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

Matrix: Aqueous
Units: mg/L

Batch Id: HPVV990323223800

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	4.0	80.0	3.8	76.0	5.13	39	21 - 175

Analyst: RR
Sequence Date: 03/23/99
Method Blank File ID:
Sample File ID:
Blank Spike File ID: VVC2134.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): 9903411-01B 9903411-02B 9903411-03B 9903411-04B

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

** SPL BATCH QUALITY CONTROL REPORT **
Method 8310 ***

Matrix: Aqueous
Units: ug/L

Batch Id: 2990312002000

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Naphthalene	ND	0.50	0.37	74.0	32 - 148
Acenaphthylene	ND	0.50	0.52	104	42 - 138
Acenaphthene	ND	0.50	0.38	76.0	22 - 133
Fluorene	ND	0.50	0.40	80.0	11 - 148
Phenanthrene	ND	0.50	0.40	80.0	40 - 121
Anthracene	ND	0.50	0.34	68.0	32 - 121
Fluoranthene	ND	0.50	0.41	82.0	45 - 133
Pyrene	ND	0.50	0.44	88.0	39 - 136
Chrysene	ND	0.50	0.43	86.0	44 - 122
Benzo (a) anthracene	ND	0.50	0.41	82.0	53 - 137
Benzo (b) fluoranthene	ND	0.50	0.46	92.0	62 - 121
Benzo (k) fluoranthene	ND	0.50	0.46	92.0	66 - 128
Benzo (a) pyrene	ND	0.50	0.44	88.0	42 - 120
Dibenzo (a,h) anthracene	ND	0.50	0.40	80.0	59 - 129
Benzo (g,h,i) perylene	ND	0.50	0.43	86.0	67 - 124
Indeno (1,2,3-cd) pyrene	ND	0.50	0.47	94.0	65 - 125

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
NAPHTHALENE	1.0	0.50	1.1	20.0	1.7	140 *	150 *	30	1 - 122
ACENAPHTHYLENE	ND	0.50	0.28	56.0	0.29	58.0	3.51	30	1 - 124
ACENAPHTHENE	ND	0.50	0.22	44.0	0.31	62.0	34.0 *	30	1 - 124
FLUORENE	ND	0.50	0.28	56.0	0.50	100	56.4 *	30	1 - 142
PHENANTHRENE	ND	0.50	0.32	64.0	0.41	82.0	24.7	30	1 - 155
ANTHRACENE	ND	0.50	0.21	42.0	0.34	68.0	47.3 *	30	1 - 126
FLUORANTHENE	ND	0.50	0.34	68.0	0.42	84.0	21.1	30	14 - 123
PYRENE	ND	0.50	0.34	68.0	0.39	78.0	13.7	30	1 - 140
CHRYSENE	ND	0.50	0.32	64.0	0.39	78.0	19.7	30	1 - 199
BENZO (A) ANTHRACENE	ND	0.50	0.30	60.0	0.35	70.0	15.4	30	12 - 135
BENZO (B) FLUORANTHENE	ND	0.50	0.33	66.0	0.40	80.0	19.2	30	6 - 150
BENZO (K) FLUORANTHENE	ND	0.50	0.31	62.0	0.37	74.0	17.6	30	1 - 159
BENZO (A) PYRENE	ND	0.50	0.31	62.0	0.38	76.0	20.3	30	1 - 128
DIBENZO (A,H) ANTHRACENE	ND	0.50	0.24	48.0	0.27	54.0	11.8	30	1 - 110
BENZO (G,H,I) PERYLENE	ND	0.50	0.27	54.0	0.30	60.0	10.5	30	1 - 116
INDENO (1,2,3-CD) PYRENE	ND	0.50	0.29	58.0	0.32	64.0	9.84	30	1 - 116

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** SPL BATCH QUALITY CONTROL REPORT **
Method 8310 ***

Matrix: Aqueous
Units: ug/L

Batch Id: 2990312002000

Analyst: KA
Sequence Date: 03/12/99
SPL ID of sample spiked: 9903447-06E
Sample File ID: 990312A\012-1201
Method Blank File ID:
Blank Spike File ID: 990312A\011-1101
Matrix Spike File ID: 990312A\013-1301
Matrix Spike Duplicate File ID: 990312A\014-1401

* = 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: Temporary Limits

SAMPLES IN BATCH(SPL ID):

9903411-01C 9903411-02C 9903411-03C 9903411-04C
9903447-06E 9903409-01D 9903368-01A 9903447-07E
9903447-08E

ICP

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: JM

Matrix: Water Units: mg/L

Date:031199 Time:1551 File Name: 0311PB2

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Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver	ND	2.00	2.05	102	1.60	2.40
Aluminum						
Arsenic	ND	4.00	4.17	104	3.20	4.80
Barium	ND	2.00	2.11	106	1.60	2.40
Beryllium	ND	2.00	2.10	105	1.60	2.40
Calcium	ND	20.00	20.14	101	16.00	24.00
Cadmium	ND	2.00	1.99	100	1.60	2.40
Cobalt						
Chromium	ND	2.00	2.07	104	1.60	2.40
Copper	ND	2.00	2.09	105	1.60	2.40
Iron						
Potassium	ND	20.00	21.80	109	16.00	24.00
Magnesium	ND	20.00	21.08	105	16.00	24.00
Manganese						
Sodium	ND	20.00	21.42	107	16.00	24.00
Nickel	ND	2.00	2.03	101	1.60	2.40
Lead	ND	2.00	2.04	102	1.60	2.40
Antimony	ND	4.00	4.11	103	3.20	4.80
Selenium	ND	4.00	4.18	105	3.20	4.80
Thallium						
Vanadium						
Zinc	ND	2.00	2.03	102	1.60	2.40

Work Orders in Batch

Work Order	Fractions
99-03-411	01D-04D
99-03-396	03H
99-03-379	01A
99-03-392	01A
99-03-401	02A,03A

Matrix Spike - Spike Duplicate Results

Work Order Spiked: 9903411-01D

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery		Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery		QC Limits % Recovery		Spike RPD %		QC Limits %
Silver	ND	1.0	0.9657	96.6		1.041	104.1		80	120	7.5		20.0
Aluminum													
Arsenic	ND	2.0	1.964	98.2		2.157	107.9		80	120	9.4		20.0
Barium	0.0759	1.0	1.041	96.5		1.161	108.5		80	120	11.7		20.0
Beryllium	ND	1.0	0.9618	96.2		1.064	106.4		80	120	10.1		20.0
Calcium	232.8	10.0	233.5	7.0	*	232.8	0.0	*	80	120	200.0	**	20.0
Cadmium	ND	1.0	0.9305	93.1		1.009	100.9		80	120	8.1		20.0
Cobalt													
Chromium	ND	1.0	0.9318	93.2		1.031	103.1		80	120	10.1		20.0
Copper	ND	1.0	0.9715	97.2		1.076	107.6		80	120	10.2		20.0
Iron													
Potassium	9.135	10.0	19.76	106.3		19.78	106.5		80	120	0.2		20.0
Magnesium	54.38	10.0	63.4	90.2		62.92	85.4		80	120	5.5		20.0
Manganese													
Sodium	110.4	10.0	119	86.0		116.6	62.0	*	80	120	32.4	**	20.0
Nickel	ND	1.0	0.9143	91.4		1.002	100.2		80	120	9.2		20.0
Lead	ND	1.0	0.9526	95.3		1.032	103.2		80	120	8.0		20.0
Antimony	ND	2.0	1.943	97.2		2.133	106.7		80	120	9.3		20.0
Selenium	ND	2.0	1.975	98.8		2.158	107.9		80	120	8.9		20.0
Thallium													
Vanadium													
Zinc	0.1405	1.0	0.9676	82.7		1.063	92.3		80	120	10.9		20.0

* Spike Results Outside Method Limits
** Spike RPD Outside Method Limits
Elements Post Spiked: K, Na, Ca, and Mg

Checked: PB 3/12/99

Trace-icp

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: EG

Matrix: Water Units: mg/L

Date:031199 Time:1720 File Name: 0311PB1

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Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver						
Aluminum						
Arsenic	ND	4.00	4.11	103	3.20	4.80
Barium						
Beryllium						
Calcium						
Cadmium						
Cobalt						
Chromium						
Copper						
Iron						
Potassium						
Magnesium						
Manganese						
Sodium						
Nickel						
Lead	ND	2.00	2.09	105	1.60	2.40
Antimony						
Selenium	ND	4.00	3.90	97	3.20	4.80
Thallium	ND	4.00	4.11	103	3.20	4.80
Vanadium						
Zinc						

Work Orders in Batch

Work Order	Fractions
99-03-411	01D-04D
99-03-416	01C
99-03-417	01D
99-03-396	03H
99-03-392	01A
99-03-401	02A,03A

Matrix Spike - Spike Duplicate Results

Work Order Spiked: 9903411-01D

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery	Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery	QC Limits % Recovery		Spike RPD %	QC Limits %
Silver										
Aluminum										
Arsenic	ND	2.0	1.851	92.6	2.086	104.3	80	120	11.9	20.0
Barium										
Beryllium										
Calcium										
Cadmium										
Cobalt										
Chromium										
Copper										
Iron										
Potassium										
Magnesium										
Manganese										
Sodium										
Nickel										
Lead	ND	1.0	0.9213	92.1	1.044	104.4	80	120	12.5	20.0
Antimony										
Selenium	ND	2.0	1.763	88.2	1.975	98.8	80	120	11.3	20.0
Thallium	ND	2.0	1.81	90.5	2.034	101.7	80	120	11.7	20.0
Vanadium										
Zinc										

Checked: EG 3/12/99

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/23/99
Analyzed on: 03/23/99
Analyst: AG

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:

Mercury, Total
Method 7470 A***

SPL Sample ID Number	Blank Value ug/L	LCS Concentration ug/L	Measured Concentration ug/L	% Recovery	QC Limits Recovery
LCS	ND	2.00	2.08	104	80 - 120

-9903648

Samples in batch:

9903411-01D 9903411-02D 9903411-03D 9903411-04D

COMMENTS:
LCS = SPL ID# 94-452-49-12

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/23/99
Analyzed on: 03/23/99
Analyst: AG

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:

Mercury, Total
Method 7470 A***

SPL Sample ID Number	Method Blank ug/L	Sample Result ug/L	Spike Added ug/L	Matrix Spike Result ug/L	Matrix Spike Recovery %	Matrix Spike Duplicate Result ug/L	Matrix Spike Duplicate Recovery %	RPD (%)	QC LIMITS (Advisory) RPD Max	QC LIMITS (Advisory) % REC
9903411-01D	ND	ND	2.00	1.99	99.5	2.01	100	0.5	20	75 -125

-9903648

Samples in batch:

9903411-01D 9903411-02D 9903411-03D 9903411-04D

COMMENTS:
LCS = SPL ID# 94-452-49-12

ICP

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: PB

Matrix: Water Units: mg/L

Date:032399 Time:0727 File Name: 0323JM7

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Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver						
Aluminum						
Arsenic						
Barium						
Beryllium						
Calcium						
Cadmium						
Cobalt						
Chromium						
Copper						
Iron						
Potassium						
Magnesium						
Manganese						
Sodium	ND	20.00	22.49	112	16.00	24.00
Nickel						
Lead						
Antimony						
Selenium						
Thallium						
Vanadium						
Zinc						

Work Orders in Batch

Work Order	Fractions
99-03-411	03D

Matrix Spike - Spike Duplicate Results **Work Order Spiked: 9903416-01C**

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery	Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery	QC Limits % Recovery		Spike RPD %	QC Limits %
Silver										
Aluminum										
Arsenic										
Barium										
Beryllium										
Calcium										
Cadmium										
Cobalt										
Chromium										
Copper										
Iron										
Potassium										
Magnesium										
Manganese										
Sodium	38.24	10.0	48.56	103.2	47.72	94.8	80	120	8.5	20.0
Nickel										
Lead										
Antimony										
Selenium										
Thallium										
Vanadium										
Zinc										

Elements Post Spiked:Na

Checked: PB 3/24/99

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/18/99
Analyzed on: 03/18/99
Analyst: CV

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:

Hardness-Total as CaCO3
Method 130.2 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	99.7	96.0	96.3	94 - 108

-9903529

Samples in batch:

9903411-01D	9903411-02D	9903411-03D	9903411-04D
9903464-01D	9903464-02D	9903464-03D	9903464-04D
9903464-05D	9903464-06D	9903464-07D	9903464-08D

COMMENTS:

LCS-SPL ID#95535252-13

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/18/99
Analyzed on: 03/18/99
Analyst: CV

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:

Hardness-Total as CaCO3
Method 130.2 *

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
9903411-04D	ND	34.0	50.0	84.0	100	84.0	100	0	20	80.7 -111

-9903528

Samples in batch:

9903411-01D 9903411-02D 9903411-03D 9903411-04D
9903464-01D 9903464-02D 9903464-03D 9903464-04D

COMMENTS:

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/17/99
Analyzed on: 03/15/99
Analyst: CV

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:

Chloride
Method 325.2 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	105	101.8	97.0	90 - 110

-9903484

Samples in batch:

9903411-01E	9903411-02E	9903411-03E	9903411-04E
9903463-01C	9903464-01E	9903464-02E	9903464-03E
9903464-04E	9903464-05E	9903464-06E	9903464-07E
9903464-08E	9903501-02I	9903502-03C	9903502-04C
9903504-06I	9903504-09I		

COMMENTS:

LCS-SPL ID#94453222-13

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/17/99
Analyzed on: 03/15/99
Analyst: CV

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:

Chloride
Method 325.2 *

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
9903504-06I	ND	77.4	50.0	125.8	96.8	125.0	95.2	1.7	20	76 -131

-9903483

Samples in batch:

9903411-01E 9903411-02E 9903411-03E 9903411-04E
9903463-01C 9903501-02I 9903504-06I 9903504-09I

COMMENTS:

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/15/99
Analyzed on: 03/15/99
Analyst: ELS

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:

Fluoride
Method 300.0 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	10.0	9.12	91.2	90 - 110

-9903455

Samples in batch:

9903411-01E 9903411-02E 9903411-03E 9903411-04E
9903463-01C 9903464-01E 9903464-02E 9903464-03E
9903464-04E 9903464-05E 9903464-06E 9903464-07E
9903464-08E

COMMENTS:

LCS SPL ID# 9779864-8

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/15/99
Analyzed on: 03/15/99
Analyst: ELS

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:

Fluoride
Method 300.0 *

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
9903411-04E	ND	1.38	10.0	10.6	92.2	10.4	90.2	2.2	20	80 -120

-9903454

Samples in batch:

9903411-01E 9903411-02E 9903411-03E 9903411-04E
9903463-01C 9903464-01E 9903464-02E 9903464-03E

COMMENTS:

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/15/99
Analyzed on: 03/11/99
Analyst: CV

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	5.0	4.81	96.2	92 - 113

-9903444

Samples in batch:

9903411-01E 9903411-02E 9903463-01C 9903464-01E
9903464-02E 9903464-03E 9903464-04E 9903464-07E
9903464-08E

COMMENTS:

LCS-SPL ID#94453220-10

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PHONE (713) 660-0901

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/15/99
Analyzed on: 03/11/99
Analyst: CV

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
9903411-01E	ND	3.32	5.0	7.65	86.6	7.56	84.8	2.1	12	84 -125

-9903443

Samples in batch:

9903411-01E 9903411-02E 9903463-01C 9903464-01E
9903464-02E 9903464-03E 9903464-04E 9903464-07E

COMMENTS:

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/15/99
Analyzed on: 03/10/99
Analyst: ELS

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 (as NO3)
Method 300.0 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	10.0	9.59	95.9	90 - 110

-9903421

Samples in batch:

9903406-01A	9903406-03A	9903406-04A	9903406-05A
9903406-06A	9903406-07A	9903406-08A	9903408-01A
9903410-01B	9903410-02B	9903410-03B	9903411-03G
9903411-04G			

COMMENTS:

LCS SPL ID# 9779864-8

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/15/99
Analyzed on: 03/10/99
Analyst: ELS

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 (as NO3)
Method 300.0 *

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
9903410-01B	ND	ND	10.0	9.18	91.8	9.01	90.1	1.9	5	86 -115

-9903420

Samples in batch:

9903408-01A 9903410-01B 9903410-02B 9903410-03B
9903411-03G 9903411-04G

COMMENTS:

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/22/99
Analyzed on: 03/22/99
Analyst: ELS

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	26.8	28.1	105	82 - 111

-9903602

Samples in batch:

9903411-01E	9903411-02E	9903411-03G	9903411-04G
9903464-01E	9903464-02E	9903464-03E	9903464-04E
9903464-05E	9903464-06E	9903464-07E	9903464-08E
9903887-01B	9903887-02B		

COMMENTS:

LCS SPL ID# 95535252-14

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/22/99
Analyzed on: 03/22/99
Analyst: ELS

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	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
9903411-02E	ND	240	200	455	108	453	106	1.9	9.5	84 -120

-9903601

Samples in batch:

9903411-01E 9903411-02E 9903411-03G 9903411-04G
9903464-01E 9903464-02E 9903464-03E

COMMENTS:

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/13/99
Analyzed on: 03/10/99
Analyst: ELS

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 300.0 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	10.0	9.61	96.1	90 - 110

-9903379

Samples in batch:

9903219-02B	9903219-03B	9903219-04B	9903239-01B
9903239-02B	9903239-03B	9903255-01B	9903255-02B
9903255-03B	9903408-01A	9903410-01B	9903410-02B
9903410-03B	9903411-03G	9903411-04G	

COMMENTS:

LCS SPL ID# 9779864-8

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/13/99
Analyzed on: 03/10/99
Analyst: ELS

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 300.0 *

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
9903255-02B	ND	0.53	10.0	10.1	95.7	10.1	95.7	0	7.0	88 -112

-9903378

Samples in batch:

9903219-02B 9903219-03B 9903219-04B 9903255-01B
9903255-02B 9903255-03B 9903411-03G 9903411-04G

COMMENTS:

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/10/99
Analyzed on: 03/10/99
Analyst: AB

This sample was randomly selected for use in the SPL quality control program. The results are as follows:

Carbonate, as CaCO3
Method SM 4500-CO2D **

-- DUPLICATE ANALYSIS --

SPL Sample ID	Original Sample Concentration mg/L	Duplicate Sample mg/L	RPD	RPD Max.
9903411-01F	ND	ND	0	5

-9903320

Samples in batch:

9903411-01F 9903411-02F 9903411-03F 9903411-04F

COMMENTS:

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/10/99
Analyzed on: 03/10/99
Analyst: AB

This sample was randomly selected for use in the SPL quality control program. The results are as follows:

Bicarbonate, as CaCO3
Method SM 4500-CO2D **

-- DUPLICATE ANALYSIS --

SPL Sample ID	Original Sample Concentration mg/L	Duplicate Sample mg/L	RPD	RPD Max.
9903411-01F	357.8	357.8	0	5

-9903318

Samples in batch:

9903411-01F 9903411-02F 9903411-03F 9903411-04F

COMMENTS:

CHAIN OF CUSTODY

AND

SAMPLE RECEIPT CHECKLIST

SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Workorder No: 9903411

090045

page 1 of 1

Client Name: Brown & Caldwell

Address/Phone: 1415 Louisiana #2500 713-759-0999

Client Contact: Rick Rexroad

Project Name: BJ-Hobbs

Project Number: 12832

Project Location: Hobbs, N.M.

Invoice To: Rick Rexroad

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:

Requested Analysis:

SAMPLE ID	DATE	TIME	comp	grab	matrix	bottle	size	pres.	Number of Containers	BTEX-8020 TPH-G-8015	TPH-D-8015	PAH-8310	RCRA-metals SW846 3050 6010 7000	Major Cations - 6010	Total Hardness-130.1	Major Anions * See Note	Bicarbonate/Carbonate 4500-CO2 D	NO_3, SO_4-300.0	Methane/Ethylene/Ethane RSK-147/175
MW-7	3.9.99	14:45			W				8	X	X	X	X	X	X	X	X		
MW-8	3.9.99	16:00			W				8	X	X	X	X	X	X	X	X		
MW-10	3.9.99	16:45			W				10	X	X	X	X	X	X	X	X	X	X
MW-5	3.9.99	17:30			W				10	X	X	X	X	X	X	X	X	X	X

RUSH

Client/Consultant Remarks: MAJOR ANIONS: CL- 325.3, NITRATE-353.3 SULFATE 375.4 FLOURIDE -300.0

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): BAF

1. Relinquished by Sampler: [signature] date 3.9.99 time ~~17:00~~ 19:00

2. Received by:

3. Relinquished by: date time

4. Received by:

5. Relinquished by: date time

6. Received by Laboratory: [signature] 3/10/99 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

SPL Houston Environmental Laboratory

Sample Login Checklist

Date: 3/10/99	Time: 1000

SPL Sample ID: 9903411

		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 #) 808198480126		
	Other:		
11	Method of sample disposal: — SPL Disposal	✓	
	HOLD		
	Return to Client		

Name: Rockrum	Date: 3/10/99

APPENDIX B

Laboratory Analytical Reports for Groundwater Samples

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

March 26, 1999

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 March 11, 1999. The sample(s) was assigned to Certificate of Analysis No. (s) 9903464 and analyzed for all parameters as listed on the chain of custody.

Your sample ID: MW-6 (SPL ID: H9-9903464-01) was randomly selected for the use in SPL's Quality Control program for the Total Sodium analysis by SW846 method 6010. The Matrix Spike (MS) and Matrix Spike Duplicate (MSD) was outside of the advisable quality control, due to matrix interference. A Laboratory Control Sample (LCS) was analyzed as a quality control check for the analytical batch and all recoveries were within acceptable limits.

Any other data flags or quality control exceptions associated with this report will be footnoted in the analytical result 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: 99-03-464

Approved for Release by:

Bernadette A. Fini, Senior Project Manager — 3-26-99 Date

Greg Grandits
Laboratory Director

Idelis Williams
Corporate Quality Assurance Director

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

Certificate of Analysis No. H9-9903464-01

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

DATE: 03/25/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 14:15:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	13	5 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	93		
1,4-Difluorobenzene	100		
Method 8015B *** for Gasoline			
Analyzed by: CJ			
Date: 03/11/99			
BENZENE	2500	50 P	ug/L
TOLUENE	930	50 P	ug/L
ETHYLBENZENE	590	50 P	ug/L
TOTAL XYLENE	1400	50 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	5420		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	93		
4-Bromofluorobenzene	93		
Method 8020A ***			
Analyzed by: CJ			
Date: 03/11/99			
Total Petroleum Hydrocarbons-Diesel	11	1.00 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	42		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 03/24/99 17:18:00			

(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.

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. H9-9903464-01

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

DATE: 03/25/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 14:15:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Silver, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	ND	0.01	mg/L
Arsenic, Total Method 6010B *** Analyzed by: EG Date: 03/16/99 14:58:00	0.020	0.005	mg/L
Barium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	0.555	0.005	mg/L
Calcium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	141	0.1	mg/L
Cadmium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	ND	0.005	mg/L
Chromium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	ND	0.01	mg/L

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. H9-9903464-01

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

DATE: 03/25/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 14:15:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Mercury, Total Method 7470 A*** Analyzed by: AG Date: 03/23/99 14:43:00	ND	0.0002	mg/L
Hardness-Total as CaCO3 Method 130.2 * Analyzed by: CV Date: 03/18/99 10:30:00	640	10	mg/L CaCO3
Potassium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	4	2	mg/L
Magnesium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	62.2	0.1	mg/L
Sodium, Total Method 6010B *** Analyzed by: PB Date: 03/24/99 10:06:00	141	0.5	mg/L
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: EE Date: 03/11/99 13:30:00	03/11/99		

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. H9-9903464-01

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

DATE: 03/25/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 14:15:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Lead, Total Method 6010B *** Analyzed by: EG Date: 03/16/99 14:58:00	0.013	0.005	mg/L
Selenium, Total Method 6010B *** Analyzed by: EG Date: 03/16/99 14:58:00	ND	0.005	mg/L
Chloride Method 325.3 * Analyzed by: CV Date: 03/15/99 12:00:00	411	5	mg/L
Fluoride Method 300.0 * Analyzed by: ELS Date: 03/15/99 09:00:00	1.79	0.50	mg/L
Nitrate nitrogen(as N) Method 353.3 * Analyzed by: CV Date: 03/11/99 14:30:00	ND	0.1	mg/L
Sulfate Method 375.4 * Analyzed by: ELS Date: 03/22/99 14:00:00	72	5	mg/L

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. H9-9903464-01

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

DATE: 03/25/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 14:15:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Carbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/11/99 10:00:00	ND	1	mg/L
Bicarbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/11/99 10:00:00	286	1	mg/L

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. H9-9903464-01

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

03/25/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 14:15:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	160	20	ug/L
Acenaphthylene	ND	2.0	ug/L
Acenaphthene	ND	2.0	ug/L
Fluorene	ND	2.0	ug/L
Phenanthrene	ND	2.0	ug/L
Anthracene	ND	2.0	ug/L
Fluoranthene	ND	2.0	ug/L
Pyrene	ND	2.0	ug/L
Chrysene	ND	2.0	ug/L
Benzo (a) anthracene	ND	2.0	ug/L
Benzo (b) fluoranthene	ND	2.0	ug/L
Benzo (k) fluoranthene	ND	2.0	ug/L
Benzo (a) pyrene	ND	2.0	ug/L
Dibenzo (a,h) anthracene	ND	2.0	ug/L
Benzo (g,h,i) perylene	ND	2.0	ug/L
Indeno (1,2,3-cd) pyrene	ND	2.0	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1-Fluoronaphthalene	0.50 ug/L	D	50	150
Phenanthrene d-10	0.50 ug/L	D	50	150

ANALYZED BY: KA DATE/TIME: 03/16/99 08:17:37
EXTRACTED BY: KL DATE/TIME: 03/12/99 12:00:00
METHOD: 8310 Polynuclear Aromatic Hydrocarbons
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed
D - Diluted, control limits not applicable.

COMMENTS:

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. H9-9903464-02

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-1

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 13:15:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	0.85	0.1 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	110		
1,4-Difluorobenzene	100		
Method 8015B *** for Gasoline			
Analyzed by: CJ			
Date: 03/11/99			
BENZENE	ND	1.0 P	ug/L
TOLUENE	ND	1.0 P	ug/L
ETHYLBENZENE	8.2	1.0 P	ug/L
TOTAL XYLENE	110	1.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	118.2		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	97		
4-Bromofluorobenzene	103		
Method 8020A ***			
Analyzed by: CJ			
Date: 03/11/99			
Total Petroleum Hydrocarbons-Diesel	0.62	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	30		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 03/24/99 18:03:00			

(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. H9-9903464-02

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-1

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 13:15:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Silver, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	ND	0.01	mg/L
Arsenic, Total Method 6010B *** Analyzed by: EG Date: 03/16/99 14:58:00	0.013	0.005	mg/L
Barium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	0.058	0.005	mg/L
Calcium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	80.2	0.1	mg/L
Cadmium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	ND	0.005	mg/L
Chromium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	ND	0.01	mg/L

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. H9-9903464-02

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-1

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 13:15:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Mercury, Total Method 7470 A*** Analyzed by: AG Date: 03/23/99 14:43:00	ND	0.0002	mg/L
Hardness-Total as CaCO3 Method 130.2 * Analyzed by: CV Date: 03/18/99 10:30:00	250	5	mg/L CaCO3
Potassium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	3	2	mg/L
Magnesium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	19.7	0.1	mg/L
Sodium, Total Method 6010B *** Analyzed by: PB Date: 03/24/99 10:06:00	126	0.5	mg/L
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: EE Date: 03/11/99 13:30:00	03/11/99		

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. H9-9903464-02

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-1

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 13:15:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Lead, Total Method 6010B *** Analyzed by: EG Date: 03/16/99 14:58:00	ND	0.005	mg/L
Selenium, Total Method 6010B *** Analyzed by: EG Date: 03/16/99 14:58:00	0.005	0.005	mg/L
Chloride Method 325.3 * Analyzed by: CV Date: 03/15/99 12:00:00	163	5	mg/L
Fluoride Method 300.0 * Analyzed by: ELS Date: 03/15/99 09:00:00	1.54	0.50	mg/L
Nitrate nitrogen(as N) Method 353.3 * Analyzed by: CV Date: 03/11/99 14:30:00	0.7	0.1	mg/L
Sulfate Method 375.4 * Analyzed by: ELS Date: 03/22/99 14:00:00	196	10	mg/L

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. H9-9903464-02

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-1

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 13:15:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Carbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/11/99 10:00:00	ND	1	mg/L
Bicarbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/11/99 10:00:00	92	1	mg/L

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. H9-9903464-02

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

03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-1

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 13:15:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	10	1.0	ug/L
Acenaphthylene	ND	0.1	ug/L
Acenaphthene	ND	1.0	ug/L
Fluorene	ND	1.0	ug/L
Phenanthrene	ND	0.1	ug/L
Anthracene	ND	0.1	ug/L
Fluoranthene	ND	0.1	ug/L
Pyrene	ND	0.1	ug/L
Chrysene	ND	0.1	ug/L
Benzo (a) anthracene	ND	0.1	ug/L
Benzo (b) fluoranthene	ND	0.1	ug/L
Benzo (k) fluoranthene	ND	0.1	ug/L
Benzo (a) pyrene	ND	0.1	ug/L
Dibenzo (a,h) anthracene	ND	0.1	ug/L
Benzo (g,h,i) perylene	ND	0.1	ug/L
Indeno (1,2,3-cd) pyrene	ND	0.1	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1-Fluoronaphthalene	0.50 ug/L	104	50	150
Phenanthrene d-10	0.50 ug/L	77	50	150

ANALYZED BY: KA DATE/TIME: 03/16/99 03:57:58
EXTRACTED BY: KL DATE/TIME: 03/12/99 12:00:00
METHOD: 8310 Polynuclear Aromatic Hydrocarbons
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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. H9-9903464-03

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-4

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 16:00:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	13	0.5 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	113		
1,4-Difluorobenzene	100		
Method 8015B *** for Gasoline			
Analyzed by: CJ			
Date: 03/12/99			
BENZENE	8.0	5.0 P	ug/L
TOLUENE	20	5.0 P	ug/L
ETHYLBENZENE	250	5.0 P	ug/L
TOTAL XYLENE	1400	5.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	1678		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	93		
4-Bromofluorobenzene	127		
Method 8020A ***			
Analyzed by: CJ			
Date: 03/12/99			
Total Petroleum Hydrocarbons-Diesel	13	1.00 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	44		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 03/24/99 23:17:00			

(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.

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. H9-9903464-03

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-4

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 16:00:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Silver, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	ND	0.01	mg/L
Arsenic, Total Method 6010B *** Analyzed by: EG Date: 03/16/99 14:58:00	0.012	0.005	mg/L
Barium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	0.045	0.005	mg/L
Calcium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	90.8	0.1	mg/L
Cadmium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	ND	0.005	mg/L
Chromium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	ND	0.01	mg/L

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
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HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9903464-03

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-4

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 16:00:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Mercury, Total Method 7470 A*** Analyzed by: AG Date: 03/23/99 14:43:00	ND	0.0002	mg/L
Hardness-Total as CaCO3 Method 130.2 * Analyzed by: CV Date: 03/18/99 10:30:00	310	5	mg/L CaCO3
Potassium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	3	2	mg/L
Magnesium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	20.4	0.1	mg/L
Sodium, Total Method 6010B *** Analyzed by: PB Date: 03/24/99 10:06:00	124	0.5	mg/L
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: EE Date: 03/11/99 13:30:00	03/11/99		

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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HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9903464-03

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-4

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 16:00:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Lead, Total Method 6010B *** Analyzed by: EG Date: 03/16/99 14:58:00	ND	0.005	mg/L
Selenium, Total Method 6010B *** Analyzed by: EG Date: 03/16/99 14:58:00	ND	0.005	mg/L
Chloride Method 325.3 * Analyzed by: CV Date: 03/15/99 12:00:00	142	5	mg/L
Fluoride Method 300.0 * Analyzed by: ELS Date: 03/15/99 09:00:00	1.50	0.50	mg/L
Nitrate nitrogen(as N) Method 353.3 * Analyzed by: CV Date: 03/11/99 14:30:00	2.6	0.1	mg/L
Sulfate Method 375.4 * Analyzed by: ELS Date: 03/22/99 14:00:00	178	10	mg/L

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. H9-9903464-03

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-4

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 16:00:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Carbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/11/99 10:00:00	ND	1	mg/L
Bicarbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/11/99 10:00:00	186	1	mg/L

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. H9-9903464-03

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

03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-4

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 16:00:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	170	10	ug/L
Acenaphthylene	ND	0.1	ug/L
Acenaphthene	ND	2.0	ug/L
Fluorene	ND	2.0	ug/L
Phenanthrene	2	0.1	ug/L
Anthracene	ND	0.1	ug/L
Fluoranthene	ND	0.1	ug/L
Pyrene	0.4	0.1	ug/L
Chrysene	ND	0.1	ug/L
Benzo (a) anthracene	0.2	0.1	ug/L
Benzo (b) fluoranthene	ND	0.1	ug/L
Benzo (k) fluoranthene	0.2	0.1	ug/L
Benzo (a) pyrene	0.2	0.1	ug/L
Dibenzo (a,h) anthracene	ND	0.1	ug/L
Benzo (g,h,i) perylene	ND	0.1	ug/L
Indeno (1,2,3-cd) pyrene	ND	0.1	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1-Fluoronaphthalene	0.50 ug/L	444 MI	50	150
Phenanthrene d-10	0.50 ug/L	119	50	150

ANALYZED BY: KA DATE/TIME: 03/16/99 04:35:05
EXTRACTED BY: KL DATE/TIME: 03/12/99 12:00:00
METHOD: 8310 Polynuclear Aromatic Hydrocarbons
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed
MI - Matrix Interference.

COMMENTS:

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. H9-9903464-04

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-3

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 12:15:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	0.44	0.1 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	120		
1,4-Difluorobenzene	107		
Method 8015B *** for Gasoline			
Analyzed by: CJ			
Date: 03/11/99			
BENZENE	3.2	1.0 P	ug/L
TOLUENE	7.4	1.0 P	ug/L
ETHYLBENZENE	42	1.0 P	ug/L
TOTAL XYLENE	32	1.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	84.6		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	97		
4-Bromofluorobenzene	103		
Method 8020A ***			
Analyzed by: CJ			
Date: 03/11/99			
Total Petroleum Hydrocarbons-Diesel	0.24	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	76		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 03/24/99 07:34:00			

(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.

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. H9-9903464-04

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-3

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 12:15:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Silver, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	ND	0.01	mg/L
Arsenic, Total Method 6010B *** Analyzed by: EG Date: 03/16/99 14:58:00	0.009	0.005	mg/L
Barium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	0.059	0.005	mg/L
Calcium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	129	0.1	mg/L
Cadmium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	ND	0.005	mg/L
Chromium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	ND	0.01	mg/L

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. H9-9903464-04

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-3

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 12:15:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Mercury, Total Method 7470 A*** Analyzed by: AG Date: 03/23/99 14:43:00	ND	0.0002	mg/L
Hardness-Total as CaCO3 Method 130.2 * Analyzed by: CV Date: 03/18/99 10:30:00	440	10	mg/L CaCO3
Potassium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	4	2	mg/L
Magnesium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	31.5	0.1	mg/L
Sodium, Total Method 6010B *** Analyzed by: PB Date: 03/24/99 10:06:00	135	0.5	mg/L
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: EE Date: 03/11/99 13:30:00	03/11/99		

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. H9-9903464-04

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-3

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 12:15:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Lead, Total Method 6010B *** Analyzed by: EG Date: 03/16/99 14:58:00	ND	0.005	mg/L
Selenium, Total Method 6010B *** Analyzed by: EG Date: 03/16/99 14:58:00	0.006	0.005	mg/L
Chloride Method 325.3 * Analyzed by: CV Date: 03/15/99 12:00:00	156	5	mg/L
Fluoride Method 300.0 * Analyzed by: ELS Date: 03/15/99 09:00:00	1.46	0.50	mg/L
Nitrate nitrogen(as N) Method 353.3 * Analyzed by: CV Date: 03/11/99 14:30:00	2.1	0.1	mg/L
Sulfate Method 375.4 * Analyzed by: ELS Date: 03/22/99 14:00:00	162	20	mg/L

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. H9-9903464-04

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-3

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 12:15:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Carbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/11/99 10:00:00	ND	1	mg/L
Bicarbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/11/99 10:00:00	309	1	mg/L

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. H9-9903464-04

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

03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-3

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 12:15:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	8	1.0	ug/L
Acenaphthylene	ND	0.1	ug/L
Acenaphthene	ND	0.1	ug/L
Fluorene	ND	0.1	ug/L
Phenanthrene	ND	0.1	ug/L
Anthracene	ND	0.1	ug/L
Fluoranthene	ND	0.1	ug/L
Pyrene	ND	0.1	ug/L
Chrysene	ND	0.1	ug/L
Benzo (a) anthracene	ND	0.1	ug/L
Benzo (b) fluoranthene	ND	0.1	ug/L
Benzo (k) fluoranthene	ND	0.1	ug/L
Benzo (a) pyrene	ND	0.1	ug/L
Dibenzo (a,h) anthracene	ND	0.1	ug/L
Benzo (g,h,i) perylene	ND	0.1	ug/L
Indeno (1,2,3-cd) pyrene	ND	0.1	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1-Fluoronaphthalene	0.50 ug/L	67	50	150
Phenanthrene d-10	0.50 ug/L	76	50	150

ANALYZED BY: KA DATE/TIME: 03/16/99 05:12:13
EXTRACTED BY: KL DATE/TIME: 03/12/99 12:00:00
METHOD: 8310 Polynuclear Aromatic Hydrocarbons
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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. H9-9903464-05

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

DATE: 03/25/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 11:30:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	0.45	0.1 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	120		
1,4-Difluorobenzene	107		
Method 8015B *** for Gasoline			
Analyzed by: CJ			
Date: 03/12/99			
BENZENE	160	1.0 P	ug/L
TOLUENE	1.1	1.0 P	ug/L
ETHYLBENZENE	ND	1.0 P	ug/L
TOTAL XYLENE	2.9	1.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	164.0		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	100		
4-Bromofluorobenzene	107		
Method 8020A ***			
Analyzed by: CJ			
Date: 03/12/99			
Total Petroleum Hydrocarbons-Diesel	0.38	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	52		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 03/24/99 08:19:00			

(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. H9-9903464-05

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

DATE: 03/25/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 11:30:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Methane	ND	0.0012 P	mg/L
Ethylene	ND	0.0032 P	mg/L
Ethane	ND	0.0025 P	mg/L
RSKSOP-147			
Analyzed by: JDR			
Date: 03/15/99 04:25:00			
Silver, Total	ND	0.01	mg/L
Method 6010B ***			
Analyzed by: JM			
Date: 03/14/99 12:56:00			
Arsenic, Total	0.066	0.005	mg/L
Method 6010B ***			
Analyzed by: EG			
Date: 03/16/99 14:58:00			
Barium, Total	0.144	0.005	mg/L
Method 6010B ***			
Analyzed by: JM			
Date: 03/14/99 12:56:00			
Calcium, Total	148	0.1	mg/L
Method 6010B ***			
Analyzed by: JM			
Date: 03/14/99 12:56:00			

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.

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Certificate of Analysis No. H9-9903464-05

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

DATE: 03/25/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 11:30:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Cadmium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	ND	0.005	mg/L
Chromium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	ND	0.01	mg/L
Mercury, Total Method 7470 A*** Analyzed by: AG Date: 03/23/99 14:43:00	ND	0.0002	mg/L
Hardness-Total as CaCO3 Method 130.2 * Analyzed by: CV Date: 03/18/99 10:30:00	460	10	mg/L CaCO3
Potassium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	101	2	mg/L
Magnesium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	32.1	0.1	mg/L

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.

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8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
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Certificate of Analysis No. H9-9903464-05

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

DATE: 03/25/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 11:30:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Sodium, Total Method 6010B *** Analyzed by: PB Date: 03/24/99 10:06:00	180	0.5	mg/L
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: EE Date: 03/11/99 13:30:00	03/11/99		
Lead, Total Method 6010B *** Analyzed by: EG Date: 03/16/99 14:58:00	ND	0.005	mg/L
Selenium, Total Method 6010B *** Analyzed by: EG Date: 03/16/99 14:58:00	ND	0.005	mg/L
Chloride Method 325.3 * Analyzed by: CV Date: 03/15/99 12:00:00	314	5	mg/L
Fluoride Method 300.0 * Analyzed by: ELS Date: 03/15/99 09:00:00	3.13	0.50	mg/L

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.

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

DATE: 03/25/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 11:30:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Nitrate nitrogen(as N) Method 353.3 * Analyzed by: CV Date: 03/12/99 10:00:00	ND	0.1	mg/L
Nitrate (as NO3) Method 300.0 * Analyzed by: ELS Date: 03/11/99 08:00:00	ND	0.1	mg/L NO3
Sulfate Method 375.4 * Analyzed by: ELS Date: 03/22/99 14:00:00	193	10	mg/L
Sulfate Method 300.0 * Analyzed by: ELS Date: 03/11/99 08:00:00	137	2.0	mg/L
Carbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/11/99 10:00:00	ND	1	mg/L
Bicarbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/11/99 10:00:00	386	1	mg/L

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.

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Certificate of Analysis No. H9-9903464-05

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

03/25/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 11:30:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	19	2.0	ug/L
Acenaphthylene	ND	0.1	ug/L
Acenaphthene	ND	0.1	ug/L
Fluorene	ND	0.1	ug/L
Phenanthrene	ND	0.1	ug/L
Anthracene	ND	0.1	ug/L
Fluoranthene	ND	0.1	ug/L
Pyrene	ND	0.1	ug/L
Chrysene	ND	0.1	ug/L
Benzo (a) anthracene	ND	0.1	ug/L
Benzo (b) fluoranthene	ND	0.1	ug/L
Benzo (k) fluoranthene	ND	0.1	ug/L
Benzo (a) pyrene	ND	0.1	ug/L
Dibenzo (a,h) anthracene	ND	0.1	ug/L
Benzo (g,h,i) perylene	ND	0.1	ug/L
Indeno (1,2,3-cd) pyrene	ND	0.1	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1-Fluoronaphthalene	0.50 ug/L	91	50	150
Phenanthrene d-10	0.50 ug/L	95	50	150

ANALYZED BY: KA DATE/TIME: 03/16/99 05:49:19
EXTRACTED BY: KL DATE/TIME: 03/12/99 12:00:00
METHOD: 8310 Polynuclear Aromatic Hydrocarbons
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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. H9-9903464-06

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

DATE: 03/25/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 11:00:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.5 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	100		
1,4-Difluorobenzene	100		
Method 8015B *** for Gasoline			
Analyzed by: CJ			
Date: 03/12/99			
BENZENE	ND	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	ND		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	100		
4-Bromofluorobenzene	93		
Method 8020A ***			
Analyzed by: CJ			
Date: 03/12/99			
Total Petroleum Hydrocarbons-Diesel	0.30	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	48		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 03/24/99 09:04:00			

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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Certificate of Analysis No. H9-9903464-06

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

DATE: 03/25/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 11:00:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Methane	0.094	0.0012 P	mg/L
Ethylene	ND	0.0032 P	mg/L
Ethane	ND	0.0025 P	mg/L
RSKSOP-147			
Analyzed by: JDR			
Date: 03/15/99 04:37:00			
Silver, Total	ND	0.01	mg/L
Method 6010B ***			
Analyzed by: JM			
Date: 03/14/99 12:56:00			
Arsenic, Total	0.036	0.005	mg/L
Method 6010B ***			
Analyzed by: EG			
Date: 03/16/99 14:58:00			
Barium, Total	0.174	0.005	mg/L
Method 6010B ***			
Analyzed by: JM			
Date: 03/14/99 12:56:00			
Calcium, Total	308	0.1	mg/L
Method 6010B ***			
Analyzed by: JM			
Date: 03/14/99 12:56:00			

(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.

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

DATE: 03/25/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 11:00:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Cadmium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	ND	0.005	mg/L
Chromium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	ND	0.01	mg/L
Mercury, Total Method 7470 A*** Analyzed by: AG Date: 03/23/99 14:43:00	ND	0.0002	mg/L
Hardness-Total as CaCO3 Method 130.2 * Analyzed by: CV Date: 03/18/99 10:30:00	1150	25	mg/L CaCO3
Potassium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	21	2	mg/L
Magnesium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	101	0.1	mg/L

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.

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

DATE: 03/25/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 11:00:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Sodium, Total Method 6010B *** Analyzed by: PB Date: 03/24/99 10:06:00	225	0.5	mg/L
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: EE Date: 03/11/99 13:30:00	03/11/99		
Lead, Total Method 6010B *** Analyzed by: EG Date: 03/16/99 14:58:00	0.009	0.005	mg/L
Selenium, Total Method 6010B *** Analyzed by: EG Date: 03/16/99 14:58:00	ND	0.005	mg/L
Chloride Method 325.3 * Analyzed by: CV Date: 03/15/99 12:00:00	834	5	mg/L
Fluoride Method 300.0 * Analyzed by: ELS Date: 03/15/99 09:00:00	3.08	0.50	mg/L

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.

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1415 Louisiana
Houston, TX 77002
ATTN: Rick Rexroad

DATE: 03/25/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 11:00:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Nitrate nitrogen(as N) Method 353.3 * Analyzed by: CV Date: 03/12/99 10:00:00	ND	0.1	mg/L
Nitrate (as NO3) Method 300.0 * Analyzed by: ELS Date: 03/11/99 08:00:00	ND	0.1	mg/L NO3
Sulfate Method 375.4 * Analyzed by: ELS Date: 03/22/99 14:00:00	227	10	mg/L
Sulfate Method 300.0 * Analyzed by: ELS Date: 03/11/99 08:00:00	164	2.0	mg/L
Carbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/11/99 10:00:00	ND	1	mg/L
Bicarbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/11/99 10:00:00	335	1	mg/L

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.

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Certificate of Analysis No. H9-9903464-06

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

03/25/99

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

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 11:00:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	ND	0.1	ug/L
Acenaphthylene	ND	0.1	ug/L
Acenaphthene	ND	0.1	ug/L
Fluorene	ND	0.1	ug/L
Phenanthrene	ND	0.1	ug/L
Anthracene	ND	0.1	ug/L
Fluoranthene	ND	0.1	ug/L
Pyrene	ND	0.1	ug/L
Chrysene	ND	0.1	ug/L
Benzo (a) anthracene	ND	0.1	ug/L
Benzo (b) fluoranthene	ND	0.1	ug/L
Benzo (k) fluoranthene	ND	0.1	ug/L
Benzo (a) pyrene	ND	0.1	ug/L
Dibenzo (a,h) anthracene	ND	0.1	ug/L
Benzo (g,h,i) perylene	ND	0.1	ug/L
Indeno (1,2,3-cd) pyrene	ND	0.1	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1-Fluoronaphthalene	0.50 ug/L	57	50	150
Phenanthrene d-10	0.50 ug/L	71	50	150

ANALYZED BY: KA DATE/TIME: 03/16/99 06:26:25
EXTRACTED BY: KL DATE/TIME: 03/12/99 12:00:00
METHOD: 8310 Polynuclear Aromatic Hydrocarbons
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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

HOUSTON LABORATORY
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HOUSTON, TEXAS 77054
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Certificate of Analysis No. H9-9903464-07

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-9

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 10:00:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	0.22	0.1 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	97		
1,4-Difluorobenzene	100		
Method 8015B *** for Gasoline			
Analyzed by: CJ			
Date: 03/12/99			
BENZENE	ND	1.0 P	ug/L
TOLUENE	ND	1.0 P	ug/L
ETHYLBENZENE	5.7	1.0 P	ug/L
TOTAL XYLENE	68	1.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	73.7		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	97		
4-Bromofluorobenzene	97		
Method 8020A ***			
Analyzed by: CJ			
Date: 03/12/99			
Total Petroleum Hydrocarbons-Diesel	ND	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	46		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 03/24/99 09:49:00			

(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.

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Certificate of Analysis No. H9-9903464-07

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1415 Louisiana
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ATTN: Rick Rexroad

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-9

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 10:00:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Silver, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	ND	0.01	mg/L
Arsenic, Total Method 6010B *** Analyzed by: EG Date: 03/16/99 14:58:00	0.007	0.005	mg/L
Barium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	0.043	0.005	mg/L
Calcium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	122	0.1	mg/L
Cadmium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	ND	0.005	mg/L
Chromium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	ND	0.01	mg/L

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.

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Certificate of Analysis No. H9-9903464-07

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-9

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 10:00:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Mercury, Total Method 7470 A*** Analyzed by: AG Date: 03/23/99 14:43:00	ND	0.0002	mg/L
Hardness-Total as CaCO3 Method 130.2 * Analyzed by: CV Date: 03/18/99 10:30:00	370	5	mg/L CaCO3
Potassium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	3	2	mg/L
Magnesium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	28.5	0.1	mg/L
Sodium, Total Method 6010B *** Analyzed by: PB Date: 03/24/99 10:06:00	122	0.5	mg/L
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: EE Date: 03/11/99 13:30:00	03/11/99		

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.

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HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9903464-07

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-9

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 10:00:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Lead, Total Method 6010B *** Analyzed by: EG Date: 03/16/99 14:58:00	ND	0.005	mg/L
Selenium, Total Method 6010B *** Analyzed by: EG Date: 03/16/99 14:58:00	ND	0.005	mg/L
Chloride Method 325.3 * Analyzed by: CV Date: 03/15/99 12:00:00	123	5	mg/L
Fluoride Method 300.0 * Analyzed by: ELS Date: 03/15/99 09:00:00	1.84	0.50	mg/L
Nitrate nitrogen(as N) Method 353.3 * Analyzed by: CV Date: 03/11/99 14:30:00	3.7	0.1	mg/L
Sulfate Method 375.4 * Analyzed by: ELS Date: 03/22/99 14:00:00	146	10	mg/L

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. H9-9903464-07

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-9

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 10:00:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Carbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/11/99 10:00:00	ND	1	mg/L
Bicarbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/11/99 10:00:00	333	1	mg/L

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. H9-9903464-07

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

03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-9

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99 10:00:00
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	ND	0.1	ug/L
Acenaphthylene	ND	0.1	ug/L
Acenaphthene	ND	0.1	ug/L
Fluorene	ND	0.1	ug/L
Phenanthrene	ND	0.1	ug/L
Anthracene	ND	0.1	ug/L
Fluoranthene	ND	0.1	ug/L
Pyrene	ND	0.1	ug/L
Chrysene	ND	0.1	ug/L
Benzo (a) anthracene	ND	0.1	ug/L
Benzo (b) fluoranthene	ND	0.1	ug/L
Benzo (k) fluoranthene	ND	0.1	ug/L
Benzo (a) pyrene	ND	0.1	ug/L
Dibenzo (a,h) anthracene	ND	0.1	ug/L
Benzo (g,h,i) perylene	ND	0.1	ug/L
Indeno (1,2,3-cd) pyrene	ND	0.1	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1-Fluoronaphthalene	0.50 ug/L	38 MI	50	150
Phenanthrene d-10	0.50 ug/L	61	50	150

ANALYZED BY: KA DATE/TIME: 03/16/99 07:03:29
EXTRACTED BY: KL DATE/TIME: 03/12/99 12:00:00
METHOD: 8310 Polynuclear Aromatic Hydrocarbons
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed
MI - Matrix Interference.

COMMENTS:

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. H9-9903464-08

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: Duplicate

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	0.84	0.1 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	110		
1,4-Difluorobenzene	100		
Method 8015B *** for Gasoline			
Analyzed by: CJ			
Date: 03/12/99			
BENZENE	ND	1.0 P	ug/L
TOLUENE	ND	1.0 P	ug/L
ETHYLBENZENE	7.9	1.0 P	ug/L
TOTAL XYLENE	110	1.0 P	ug/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	117.9		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	97		
4-Bromofluorobenzene	100		
Method 8020A ***			
Analyzed by: CJ			
Date: 03/12/99			
Total Petroleum Hydrocarbons-Diesel	0.66	0.20 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	42		
Method 8015B *** for Diesel			
Analyzed by: RR			
Date: 03/24/99 10:33:00			

(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. H9-9903464-08

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: Duplicate

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Silver, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	ND	0.01	mg/L
Arsenic, Total Method 6010B *** Analyzed by: EG Date: 03/16/99 14:58:00	0.014	0.005	mg/L
Barium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	0.049	0.005	mg/L
Calcium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	77.7	0.1	mg/L
Cadmium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	ND	0.005	mg/L
Chromium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	ND	0.01	mg/L

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. H9-9903464-08

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: Duplicate

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Mercury, Total Method 7470 A*** Analyzed by: AG Date: 03/23/99 14:43:00	ND	0.0002	mg/L
Hardness-Total as CaCO3 Method 130.2 * Analyzed by: CV Date: 03/18/99 10:30:00	240	5	mg/L CaCO3
Potassium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	2	2	mg/L
Magnesium, Total Method 6010B *** Analyzed by: JM Date: 03/14/99 12:56:00	18.4	0.1	mg/L
Sodium, Total Method 6010B *** Analyzed by: PB Date: 03/24/99 10:06:00	122	0.5	mg/L
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: EE Date: 03/11/99 13:30:00	03/11/99		

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
6880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9903464-08

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: Duplicate

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Lead, Total Method 6010B *** Analyzed by: EG Date: 03/16/99 14:58:00	ND	0.005	mg/L
Selenium, Total Method 6010B *** Analyzed by: EG Date: 03/16/99 14:58:00	0.006	0.005	mg/L
Chloride Method 325.3 * Analyzed by: CV Date: 03/15/99 12:00:00	150	5	mg/L
Fluoride Method 300.0 * Analyzed by: ELS Date: 03/15/99 09:00:00	1.43	0.50	mg/L
Nitrate nitrogen(as N) Method 353.3 * Analyzed by: CV Date: 03/11/99 14:30:00	0.8	0.1	mg/L
Sulfate Method 375.4 * Analyzed by: ELS Date: 03/22/99 14:00:00	166	10	mg/L

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. H9-9903464-08

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: Duplicate

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Carbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/11/99 10:00:00	ND	1	mg/L
Bicarbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 03/11/99 10:00:00	99	1	mg/L

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. H9-9903464-08

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

03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: Duplicate

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	16	1.0	ug/L
Acenaphthylene	ND	0.1	ug/L
Acenaphthene	ND	0.1	ug/L
Fluorene	ND	0.1	ug/L
Phenanthrene	0.1	0.1	ug/L
Anthracene	ND	0.1	ug/L
Fluoranthene	ND	0.1	ug/L
Pyrene	ND	0.1	ug/L
Chrysene	ND	0.1	ug/L
Benzo (a) anthracene	ND	0.1	ug/L
Benzo (b) fluoranthene	ND	0.1	ug/L
Benzo (k) fluoranthene	ND	0.1	ug/L
Benzo (a) pyrene	ND	0.1	ug/L
Dibenzo (a,h) anthracene	ND	0.1	ug/L
Benzo (g,h,i) perylene	ND	0.1	ug/L
Indeno (1,2,3-cd) pyrene	ND	0.1	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1-Fluoronaphthalene	0.50 ug/L	136	50	150
Phenanthrene d-10	0.50 ug/L	105	50	150

ANALYZED BY: KA DATE/TIME: 03/16/99 07:40:34
EXTRACTED BY: KL DATE/TIME: 03/12/99 12:00:00
METHOD: 8310 Polynuclear Aromatic Hydrocarbons
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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. H9-9903464-09

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

DATE: 03/25/99

PROJECT: BJ-Hobbs
SITE: Hobbs,NM
SAMPLED BY: Provided By SPL
SAMPLE ID: Trip Blank 3/1/99

PROJECT NO: 12832
MATRIX: WATER
DATE SAMPLED: 03/10/99
DATE RECEIVED: 03/11/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Gasoline Range Organics	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
4-Bromofluorobenzene	93		
1,4-Difluorobenzene	103		
Method 8015B *** for Gasoline			
Analyzed by: CJ			
Date: 03/11/99			
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	93		
Method 8020A ***			
Analyzed by: CJ			
Date: 03/11/99			

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

Matrix: Aqueous
Units: mg/L

Batch Id: HP_S990310183400

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	1.2	133	1.2	133	0	36	36 - 160

Analyst: CJ
Sequence Date: 03/10/99
SPL ID of sample spiked: 9903257-04A
Sample File ID: SSC2093.TX0
Method Blank File ID:
Blank Spike File ID: SSC2086.TX0
Matrix Spike File ID: SSC2089.TX0
Matrix Spike Duplicate File ID: SSC2090.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):

9903257-02A 9903257-03A 9903275-01B 9903275-02B
9903275-03B 9903275-04B 9903254-01A 9903464-09A
9903464-02A 9903464-01A 9903464-04A 9903254-04A
9903257-04A 9903254-06A 9903257-01A

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

** SPL BATCH QUALITY CONTROL REPORT **

Method Modified 8015B*** for Gasoline

Matrix: Aqueous

Batch Id: HP_S990311204800

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	0.84	0.9	1.3	51.1	1.3	51.1	0	36	36 - 160

Analyst: CJ

Sequence Date: 03/11/99

SPL ID of sample spiked: 9903464-08A

Sample File ID: SSC2129.TX0

Method Blank File ID:

Blank Spike File ID: SSC2122.TX0

Matrix Spike File ID: SSC2125.TX0

Matrix Spike Duplicate File ID: SSC2126.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): 9903464-03A 9903464-06A 9903464-07A 9903464-08A 9903464-05A

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

** SPL BATCH QUALITY CONTROL REPORT **

METHOD 8020

Matrix: Aqueous

Batch Id: HP_S990310180600

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	56	112	72 - 128
Benzene	ND	50	50	100	61 - 119
Toluene	ND	50	50	100	65 - 125
EthylBenzene	ND	50	50	100	70 - 118
O Xylene	ND	50	52	104	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	220	20	200	NC	250	NC	NC	20	39 - 150
BENZENE	2.0	20	25	115	24	110	4.44	21	32 - 164
TOLUENE	ND	20	23	115	22	110	4.44	20	38 - 159
ETHYLBENZENE	ND	20	22	110	22	110	0	19	52 - 142
O XYLENE	ND	20	22	110	23	115	4.44	18	53 - 143
M & P XYLENE	ND	40	46	115	46	115	0	17	53 - 144

Analyst: CJ

Sequence Date: 03/10/99

SPL ID of sample spiked: 9903254-04A

Sample File ID: S_C2092.TX0

Method Blank File ID:

Blank Spike File ID: S_C2085.TX0

Matrix Spike File ID: S_C2087R.TX0

Matrix Spike Duplicate File ID: S_C2088.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): 9903257-02A 9903257-03A 9903373-03A 9903373-04A 9903373-07A 9903254-01A 9903464-09A 9903464-02A 9903464-01A 9903464-04A 9903254-04A 9903257-04A 9903254-06A 9903257-01A

SPL BATCH QUALITY CONTROL REPORT **
METHOD 8020

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

Matrix: Aqueous
Batch Id: HP_S990311202100
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	50.0	52	104	72 - 128
Benzene	ND	50.0	49	98.0	61 - 119
Toluene	ND	50.0	49	98.0	65 - 125
EthylBenzene	ND	50.0	48	96.0	70 - 118
O Xylene	ND	50.0	49	98.0	72 - 117
M & P Xylene	ND	100.0	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	20	23	115	21	105	9.09	20	39 - 150
BENZENE	ND	20	18	90.0	17	85.0	5.71	21	32 - 164
TOLUENE	ND	20	18	90.0	18	90.0	0	20	38 - 159
ETHYLBENZENE	5.7	20	22	81.5	21	76.5	6.33	19	52 - 142
O XYLENE	31	20	47	80.0	45	70.0	13.3	18	53 - 143
M & P XYLENE	37	40	67	75.0	65	70.0	6.90	17	53 - 144

Analyst: CJ
Sequence Date: 03/11/99
SPL ID of sample spiked: 9903464-07A
Sample File ID: S_C2128.TX0
Method Blank File ID:
Blank Spike File ID: S_C2121.TX0
Matrix Spike File ID: S_C2123.TX0
Matrix Spike Duplicate File ID: S_C2124.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):

9903352-02A 9903352-03A 9903352-04A 9903352-05A
9903352-07A 9903464-03A 9903464-06A 9903352-06A
9903352-05A 9903352-09A 9903352-10A 9903352-11A
9903354-01A 9903464-07A 9903464-08A 9903464-05A
9903352-01A

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** SPL BATCH QUALITY CONTROL REPORT ** PAGE

Method Modified 8015B*** for Diesel

Matrix: Aqueous Batch Id: HPVV990323223800

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	4.0	80.0	3.8	76.0	5.13	39	21 - 175

Analyst: RR

Sequence Date: 03/23/99

Method Blank File ID:

Sample File ID:

Blank Spike File ID: VVC2134.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):

9903464-06B 9903464-07B 9903464-08B 9903489-02A
9903489-03A 9903489-04A 9903464-01B 9903464-02B
9903489-01A 9903464-03B 9903411-01B 9903411-02B
9903411-03B 9903411-04B 9903464-04B 9903464-05B

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** SPL BATCH QUALITY CONTROL REPORT ** PAGE
Method 8310 ***

Matrix: Aqueous
Units: ug/L

Batch Id: 2990315000100

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
NAPHTHALENE	ND	0.50	0.36	72.0	0.29	58.0	21.5	30	33 - 122
ACENAPHTHYLENE	ND	0.50	0.40	80.0	0.32	64.0	22.2	30	42 - 138
ACENAPHTHENE	ND	0.50	0.36	72.0	0.29	58.0	21.5	30	25 - 123
FLUORENE	ND	0.50	0.35	70.0	0.32	64.0	8.96	30	19 - 142
PHENANTHRENE	ND	0.50	0.38	76.0	0.39	78.0	2.60	30	40 - 121
ANTHRACENE	ND	0.50	0.31	62.0	0.31	62.0	0	30	32 - 121
FLUORANTHENE	ND	0.50	0.31	62.0	0.38	76.0	20.3	30	51 - 115
PYRENE	ND	0.50	0.37	74.0	0.39	78.0	5.26	30	45 - 117
CHRYSENE	ND	0.50	0.41	82.0	0.43	86.0	4.76	30	44 - 122
BENZO (A) ANTHRACENE	ND	0.50	0.37	74.0	0.39	78.0	5.26	30	57 - 118
BENZO (B) FLUORANTHENE	ND	0.50	0.42	84.0	0.44	88.0	4.65	30	62 - 121
BENZO (K) FLUORANTHENE	ND	0.50	0.44	88.0	0.46	92.0	4.44	30	63 - 117
BENZO (A) PYRENE	ND	0.50	0.41	82.0	0.43	86.0	4.76	30	42 - 120
DIBENZO (A,H) ANTHRACENE	ND	0.50	0.35	70.0	0.36	72.0	2.82	30	53 - 118
BENZO (G,H,I) PERYLENE	ND	0.50	0.37	74.0	0.39	78.0	5.26	30	51 - 116
INDENO (1,2,3-CD) PYRENE	ND	0.50	0.42	84.0	0.44	88.0	4.65	30	60 - 116

Analyst: KA
Sequence Date: 03/16/99
Method Blank File ID:
Sample File ID:
Blank Spike File ID: 990315B\013-1301
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 Temporary Limits

SAMPLES IN BATCH(SPL ID): 9903464-05C 9903464-06C 9903464-07C 9903464-08C
9903464-01C 9903288-03C 9902A72-02A 9903291-01C
9903464-02C 9903464-03C 9903464-04C

ICP

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: JM

Matrix: Water Units: mg/L

Date:031499 Time:1256 File Name: 0314JM6

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Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver	ND	2.00	2.00	100	1.60	2.40
Aluminum						
Arsenic						
Barium	ND	2.00	1.92	96	1.60	2.40
Beryllium	ND	2.00	1.93	97	1.60	2.40
Calcium						
Cadmium	ND	2.00	1.90	95	1.60	2.40
Cobalt						
Chromium	ND	2.00	1.95	98	1.60	2.40
Copper	ND	2.00	1.93	96	1.60	2.40
Iron						
Potassium	ND	20.00	20.42	102	16.00	24.00
Magnesium	ND	20.00	19.34	97	16.00	24.00
Manganese						
Sodium						
Nickel	ND	2.00	1.92	96	1.60	2.40
Lead						
Antimony						
Selenium						
Thallium						
Vanadium						
Zinc	ND	2.00	1.90	95	1.60	2.40

Work Orders in Batch

Work Order	Fractions
99-03-447	01C,03C
	04C,05C
99-03-445	01B
99-03-464	01D-08D
99-03-434	01G

Matrix Spike - Spike Duplicate Results

Work Order Spiked: 9903447-01C

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery	Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery	QC Limits % Recovery		Spike RPD %	QC Limits %
Silver	ND	1.0	0.9951	99.5	1.043	104.3	80	120	4.7	20.0
Aluminum										
Arsenic										
Barium	0.0586	1.0	1.011	95.2	1.091	103.2	80	120	8.1	20.0
Beryllium	ND	1.0	0.9615	96.2	1.041	104.1	80	120	7.9	20.0
Calcium										
Cadmium	ND	1.0	0.9443	94.4	1.013	101.3	80	120	7.0	20.0
Cobalt										
Chromium	ND	1.0	0.9583	95.8	1.044	104.4	80	120	8.6	20.0
Copper	ND	1.0	0.9591	95.9	1.033	103.3	80	120	7.4	20.0
Iron										
Potassium	6.187	10.0	16.18	99.9	17.31	111.2	80	120	10.7	20.0
Magnesium	5.006	10.0	14.5	94.9	15.8	107.9	80	120	12.8	20.0
Manganese										
Sodium										
Nickel	ND	1.0	0.9543	95.4	1.037	103.7	80	120	8.3	20.0
Lead										
Antimony										
Selenium										
Thallium										
Vanadium										
Zinc	0.0477	1.0	0.9875	94.0	1.085	103.7	80	120	9.9	20.0

Checked: PB 3/19/99

ICP

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: JM

Matrix: Water Units:. mg/L

Date:031499 Time:1256 File Name: 0314JM10

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Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver						
Aluminum						
Arsenic						
Barium						
Beryllium						
Calcium	ND	20.00	19.26	96	16.00	24.00
Cadmium						
Cobalt						
Chromium						
Copper						
Iron						
Potassium						
Magnesium						
Manganese						
Sodium						
Nickel						
Lead						
Antimony						
Selenium						
Thallium						
Vanadium						
Zinc						

Work Orders in Batch

Work Order	Fractions
99-03-464	01D-08D

Matrix Spike - Spike Duplicate Results **Work Order Spiked: 9903447-01C**

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery	Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery	QC Limits % Recovery		Spike RPD %	QC Limits %
Silver										
Aluminum										
Arsenic										
Barium										
Beryllium										
Calcium	46.35	10.0	56.13	97.8	55.82	94.7	80	120	3.2	20.0
Cadmium										
Cobalt										
Chromium										
Copper										
Iron										
Potassium										
Magnesium										
Manganese										
Sodium										
Nickel										
Lead										
Antimony										
Selenium										
Thallium										
Vanadium										
Zinc										

Checked: 3/26/99

Trace-icp

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: EG

Matrix: Water Units: mg/L

Date:031699 Time:1458 File Name: 0316PB7

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Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver						
Aluminum						
Arsenic	ND	4.00	4.25	106	3.20	4.80
Barium						
Beryllium						
Calcium						
Cadmium						
Cobalt						
Chromium						
Copper						
Iron						
Potassium						
Magnesium						
Manganese						
Sodium						
Nickel						
Lead	ND	2.00	2.11	105	1.60	2.40
Antimony	ND	4.00	4.19	105	3.20	4.80
Selenium	ND	4.00	4.00	100	3.20	4.80
Thallium	ND	4.00	4.12	103	3.20	4.80
Vanadium						
Zinc						

Work Orders in Batch

Work Order	Fractions
99-03-447	03C-05C
99-03-434	01G
99-03-464	01D-08D

Matrix Spike - Spike Duplicate Results

Work Order Spiked: 9903447-03C

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery	Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery	QC Limits % Recovery		Spike RPD %	QC Limits %
Silver										
Aluminum										
Arsenic	ND	2.0	1.78	89.0	1.794	89.7	80	120	0.8	20.0
Barium										
Beryllium										
Calcium										
Cadmium										
Cobalt										
Chromium										
Copper										
Iron										
Potassium										
Magnesium										
Manganese										
Sodium										
Nickel										
Lead	0.2083	1.0	1.04	83.2	1.037	82.9	80	120	0.4	20.0
Antimony	ND	2.0	1.729	86.5	1.741	87.1	80	120	0.7	20.0
Selenium	ND	2.0	1.618	80.9	1.637	81.9	80	120	1.2	20.0
Thallium	ND	2.0	1.642	82.1	1.652	82.6	80	120	0.6	20.0
Vanadium										
Zinc										

Checked: EG 3/17/99

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/23/99
Analyzed on: 03/23/99
Analyst: AG

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:

Mercury, Total
Method 7470 A***

SPL Sample ID Number	Blank Value ug/L	LCS Concentration ug/L	Measured Concentration ug/L	% Recovery	QC Limits Recovery
LCS	ND	2.00	2.24	112	80 - 120

-9903647

Samples in batch:

9903379-01A	9903447-01C	9903447-03C	9903447-04C
9903447-05C	9903464-01D	9903464-02D	9903464-03D
9903464-04D	9903464-05D	9903464-06D	9903464-07D
9903464-08D	9903568-01F	9903761-08C	9903761-09C
9903761-10C	9903761-11C		

COMMENTS:
LCS = SPL ID# 94-452-49-12

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/23/99
Analyzed on: 03/23/99
Analyst: AG

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:

Mercury, Total
Method 7470 A***

SPL Sample ID Number	Method Blank ug/L	Sample Result ug/L	Spike Added ug/L	Matrix Spike Result ug/L	Matrix Spike Recovery %	Matrix Spike Duplicate Result ug/L	Matrix Spike Duplicate Recovery %	RPD (%)	QC LIMITS (Advisory) RPD Max	QC LIMITS (Advisory) % REC
9903761-08C	ND	ND	2.00	2.14	107	2.18	109	1.8	20	75 -125

-9903647

Samples in batch:

9903379-01A	9903447-01C	9903447-03C	9903447-04C
9903447-05C	9903464-01D	9903464-02D	9903464-03D
9903464-04D	9903464-05D	9903464-06D	9903464-07D
9903464-08D	9903568-01F	9903761-08C	9903761-09C
9903761-10C	9903761-11C		

COMMENTS:
LCS = SPL ID# 94-452-49-12

ICP

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: PB

Matrix: Water Units: mg/L

Date:032499 Time:1006 File Name: 0324MR4

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Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver						
Aluminum						
Arsenic						
Barium						
Beryllium						
Calcium						
Cadmium						
Cobalt						
Chromium						
Copper						
Iron						
Potassium						
Magnesium						
Manganese						
Sodium	ND	20.00	21.51	108	16.00	24.00
Nickel						
Lead						
Antimony						
Selenium						
Thallium						
Vanadium						
Zinc						

Work Orders in Batch

Work Order	Fractions
99-03-464	01D-08D

Matrix Spike - Spike Duplicate Results **Work Order Spiked: 9903464-01D**

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery		Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery		QC Limits % Recovery		Spike RPD %	QC Limits %
Silver												
Aluminum												
Arsenic												
Barium												
Beryllium												
Calcium												
Cadmium												
Cobalt												
Chromium												
Copper												
Iron												
Potassium												
Magnesium												
Manganese												
Sodium	141	10.0	146.7	57.0	*	147.1	61.0	*	80	120	6.8	20.0
Nickel												
Lead												
Antimony												
Selenium												
Thallium												
Vanadium												
Zinc												

* Spike Results Outside Method Limits
Elements Post Spiked:Na

Checked: JM 3/26/99

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/18/99
Analyzed on: 03/18/99
Analyst: CV

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:

Hardness-Total as CaCO3
Method 130.2 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	99.7	96.0	96.3	94 - 108

-9903529

Samples in batch:

9903411-01D	9903411-02D	9903411-03D	9903411-04D
9903464-01D	9903464-02D	9903464-03D	9903464-04D
9903464-05D	9903464-06D	9903464-07D	9903464-08D

COMMENTS:

LCS-SPL ID#95535252-13

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/18/99
Analyzed on: 03/18/99
Analyst: CV

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:

Hardness-Total as CaCO3
Method 130.2 *

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
9903411-04D	ND	34.0	50.0	84.0	100	84.0	100	0	20	80.7 -111

-9903528

Samples in batch:

9903411-01D 9903411-02D 9903411-03D 9903411-04D
9903464-01D 9903464-02D 9903464-03D 9903464-04D

COMMENTS:

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/18/99
Analyzed on: 03/18/99
Analyst: CV

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:

Hardness-Total as CaCO3
Method 130.2 *

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
9903464-05D	ND	46.0	50.0	94.0	96.0	96.0	100	4.1	20	80.7 -111

-9903530

Samples in batch:

9903464-05D 9903464-06D 9903464-07D 9903464-08D

COMMENTS:

LCS-SPL ID#95535252-13

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/17/99
Analyzed on: 03/15/99
Analyst: CV

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:

Chloride
Method 325.2 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	105	101.8	97.0	90 - 110

-9903484

Samples in batch:

9903411-01E	9903411-02E	9903411-03E	9903411-04E
9903463-01C	9903464-01E	9903464-02E	9903464-03E
9903464-04E	9903464-05E	9903464-06E	9903464-07E
9903464-08E	9903501-02I	9903502-03C	9903502-04C
9903504-06I	9903504-09I		

COMMENTS:

LCS-SPL ID#94453222-13

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/17/99
Analyzed on: 03/15/99
Analyst: CV

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:

Chloride
Method 325.2 *

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
9903464-02E	ND	32.6	50.0	82.8	100	81.7	98.2	1.8	20	76 -131

-9903485

Samples in batch:

9903464-01E 9903464-02E 9903464-03E 9903464-04E
9903464-05E 9903464-06E 9903464-07E 9903464-08E

COMMENTS:

LCS-SPL ID#94453222-13

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/15/99
Analyzed on: 03/15/99
Analyst: ELS

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:

Fluoride
Method 300.0 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	10.0	9.12	91.2	90 - 110

-9903455

Samples in batch:

9903411-01E 9903411-02E 9903411-03E 9903411-04E
9903463-01C 9903464-01E 9903464-02E 9903464-03E
9903464-04E 9903464-05E 9903464-06E 9903464-07E
9903464-08E

COMMENTS:

LCS SPL ID# 9779864-8

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/15/99
Analyzed on: 03/15/99
Analyst: ELS

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:

Fluoride
Method 300.0 *

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
9903411-04E	ND	1.38	10.0	10.6	92.2	10.4	90.2	2.2	20	80 -120

-9903454

Samples in batch:

9903411-01E 9903411-02E 9903411-03E 9903411-04E
9903463-01C 9903464-01E 9903464-02E 9903464-03E

COMMENTS:

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PHONE (713) 660-0901

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/15/99
Analyzed on: 03/15/99
Analyst: ELS

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:

Fluoride
Method 300.0 *

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
9903464-08E	ND	1.43	10.0	10.6	91.7	10.4	89.7	2.2	20	80 -120

-9903456

Samples in batch:

9903464-04E 9903464-05E 9903464-06E 9903464-07E
9903464-08E

COMMENTS:

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/15/99
Analyzed on: 03/11/99
Analyst: CV

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	5.0	4.81	96.2	92 - 113

-9903444

Samples in batch:

9903411-01E 9903411-02E 9903463-01C 9903464-01E
9903464-02E 9903464-03E 9903464-04E 9903464-07E
9903464-08E

COMMENTS:

LCS-SPL ID#94453220-10

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/15/99
Analyzed on: 03/12/99
Analyst: CV

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	5.0	4.90	98.0	92 - 113

-9903448

Samples in batch:

9903464-05E 9903464-06E

COMMENTS:

LCS-SPL ID#94453220-10

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/15/99
Analyzed on: 03/11/99
Analyst: CV

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
9903411-01E	ND	3.32	5.0	7.65	86.6	7.56	84.8	2.1	12	84 -125

-9903443

Samples in batch:

9903411-01E 9903411-02E 9903463-01C 9903464-01E
9903464-02E 9903464-03E 9903464-04E 9903464-07E

COMMENTS:

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/15/99
Analyzed on: 03/12/99
Analyst: CV

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
9903464-05E	ND	ND	5.0	4.46	89.2	4.45	89.0	0.2	12	84 -125

-9903446

Samples in batch:

9903464-05E 9903464-06E

COMMENTS:

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/15/99
Analyzed on: 03/11/99
Analyst: CV

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
9903464-08E	ND	0.77	5.0	4.99	84.4	4.98	84.2	0.2	12	84 -125

-9903445

Samples in batch:

9903464-08E

COMMENTS:

LCS-SPL ID#94453220-10

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/15/99
Analyzed on: 03/11/99
Analyst: ELS

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 (as NO3)
Method 300.0 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	10.0	9.77	97.7	90 - 110

-9903431

Samples in batch:

9903455-01B	9903455-02B	9903455-03B	9903457-01B
9903457-02B	9903457-03B	9903457-04B	9903457-05B
9903457-06B	9903458-16A	9903458-18A	9903458-19A
9903464-05E	9903464-06E		

COMMENTS:

LCS SPL ID# 9779864-8

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/15/99
Analyzed on: 03/11/99
Analyst: ELS

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 (as NO3)
Method 300.0 *

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
9903458-16A	ND	0.213	10.0	9.88	96.7	10.1	98.9	2.2	5	86 -115

-9903430

Samples in batch:

9903455-01B	9903455-02B	9903455-03B	9903458-16A
9903458-18A	9903458-19A	9903464-05E	9903464-06E

COMMENTS:

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/22/99
Analyzed on: 03/22/99
Analyst: ELS

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	26.8	28.1	105	82 - 111

-9903602

Samples in batch:

9903411-01E	9903411-02E	9903411-03G	9903411-04G
9903464-01E	9903464-02E	9903464-03E	9903464-04E
9903464-05E	9903464-06E	9903464-07E	9903464-08E
9903887-01B	9903887-02B		

COMMENTS:

LCS SPL ID# 95535252-14

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/22/99
Analyzed on: 03/22/99
Analyst: ELS

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	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
9903411-02E	ND	240	200	455	108	453	106	1.9	9.5	84 -120

-9903601

Samples in batch:

9903411-01E 9903411-02E 9903411-03G 9903411-04G
9903464-01E 9903464-02E 9903464-03E

COMMENTS:

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/22/99
Analyzed on: 03/22/99
Analyst: ELS

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
9903464-04E	ND	162	200	374	106	378	108	1.9	9.5	84 -120

-9903603

Samples in batch:

9903464-04E 9903464-05E 9903464-06E 9903464-07E
9903464-08E 9903887-01B 9903887-02B

COMMENTS:

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/16/99
Analyzed on: 03/11/99
Analyst: ELS

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 300.0 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	10.0	9.67	96.7	90 - 110

-9903460

Samples in batch:

9903455-01B	9903455-02B	9903455-03B	9903457-01B
9903457-02B	9903457-03B	9903457-04B	9903457-05B
9903457-06B	9903459-01B	9903459-02B	9903464-05E
9903464-06E			

COMMENTS:

LCS SPL ID# 9779864-8

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/16/99
Analyzed on: 03/11/99
Analyst: ELS

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 300.0 *

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
9903459-02B	ND	313	1000	1290	97.7	1290	97.7	0	7.0	88 -112

-9903459

Samples in batch:

9903455-01B 9903455-02B 9903455-03B 9903459-01B
9903459-02B 9903464-05E 9903464-06E

COMMENTS:

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/11/99
Analyzed on: 03/11/99
Analyst: AB

This sample was randomly selected for use in the SPL quality control program. The results are as follows:

Carbonate, as CaCO3
Method SM 4500-CO2D **

-- DUPLICATE ANALYSIS --

SPL Sample ID	Original Sample Concentration mg/L	Duplicate Sample mg/L	RPD	RPD Max.
9903463-01C	ND	ND	0	5

-9903335

Samples in batch:

9903463-01C 9903464-01F 9903464-02F 9903464-03F
9903464-04F 9903464-05F 9903464-06F 9903464-07F
9903464-08F

COMMENTS:

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 03/11/99
Analyzed on: 03/11/99
Analyst: AB

This sample was randomly selected for use in the SPL quality control program. The results are as follows:

Bicarbonate, as CaCO3
Method SM 4500-CO2D **

-- DUPLICATE ANALYSIS --

SPL Sample ID	Original Sample Concentration mg/L	Duplicate Sample mg/L	RPD	RPD Max.
9903463-01C	230	230.2	0.1	5

-9903337

Samples in batch:

9903463-01C 9903464-01F 9903464-02F 9903464-03F
9903464-04F 9903464-05F 9903464-06F 9903464-07F
9903464-08F

COMMENTS:

CHAIN OF CUSTODY

AND

SAMPLE RECEIPT CHECKLIST

SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Workorder No: 9903464

090046

page 1 of 1

Client Name: Brown & Caldwell
Address/Phone: 1415 Louisiana 713-759-0999
Client Contact: Rick Rexroad
Project Name: BJ-Hobbs
Project Number: 12832
Project Location: Hobbs
Invoice To: Rick Rexroad

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:

Requested Analysis

SAMPLE ID	DATE	TIME	comp	grab	matrix	bottle	size	pres.	Number of Containers	BTEX-8020 TPH-G 8015	TPH D 8015	PAH-8310	Major Cations 6010	Total Hardness 130.1	HCO3, CO3 130.1	Major Anions *See Note	RCRA Metals SW846 3050/6010 7000	NO3, SO4 300.0	Dissolved methane/ethylene/ethane RSK SOP-147/175
3/11 ⑩ * MW-6	3-10-99	14:15			W				8	X	X	X	X	X	X	X	X		
* MW-1	3-10-99	13:15			W				8	X	X	X	X	X	X	X	X		
* MW-4	3-10-99	16:00			W				8	X	X	X	X	X	X	X	X		
MW-3	3-10-99	12:15			W				8	X	X	X	X	X	X	X	X		
MW-12	3-10-99	11:30			W				10	X	X	X	X	X	X	X	X	X	X
MW-11A	3-10-99	11:00			W				10	X	X	X	X	X	X	X	X	X	X
MW-9	3-10-99	10:00			W				8	X	X	X	X	X	X	X	X		
Duplicate	3-10-99				W				8	X	X	X	X	X	X	X	X		

RUSH

Client/Consultant Remarks: Rush (24Hr) BTEX MW-4, MW6

Laboratory remarks: ANIONS: CL⁻-325.3 / NO_3-353.3 / SO_4-375.4 / Fluoride 300.0

Intact? ☒ Y ☐ N
Temp: 2°

Requested TAT: 24hr ☒* 72hr ☐ 48hr ☐ Standard ☒ Other ☐ ______

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

Special Detection Limits (specify):

PM review (initial): BAF

1. Relinquished by Sampler: [signature]	date 3-10-99	time 18:20	2. Received by:
3. Relinquished by:	date	time	4. Received by:
5. Relinquished by:	date	time	6. Received by Laboratory: [signature] 3/11/99 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

SPL Houston Environmental Laboratory

Sample Login Checklist

Date:	Time:
3/11/99	1000

SPL Sample ID:

9903464

			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:		2 C	
10	Method of sample delivery to SPL:	SPL Delivery		
		Client Delivery		
		FedEx Delivery (airbill #)	808198486148	
		Other:		
11	Method of sample disposal:	SPL Disposal	✓	
		HOLD		
		Return to Client		

Name:	Date:
Helen Stahr	3/11/99