GW -

# MONITORING REPORTS

DATE:
2000

### BROWN AND CALDWELL

Suite 2500, 1415 Louisiana, Houston, TX 77002

### TRANSMITTAL MEMORANDUM

(713) 759-0999 • (								
To: Mr. Wayr	: Mr. Wayne Price				Date: Marc	ch 21, 200	1	Job No: 12832-016
State of N	State of New Mexico				Subject:	New Mexi	co Facility	
Energy, N	Energy, Minerals, and Natural Resources Dept.							
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2040 Sou	th Pacheco Stre	et, State Land	Office Bld	g	Equipment No:			
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Copies	Date	No.	Description					
1	3/19/01		December 2000 Groundwater Sampling Report, Hobbs, New Mexico Facility, BJ Services Company, U.S.A.					

### **REMARKS:**

cc: Mr. Chris Williams, State of New Mexico Ms. Jo Ann Cobb, BJ Services Company, U.S.A. Brown and Caldwell Project File Transmittal File w/o attachments

Richard Rexroad

DECEMBER 2000 GROUNDWATER SAMPLING REPORT HOBBS, NEW MEXICO FACILITY

BJ SERVICES COMPANY, U.S.A.

MARCH 19, 2001

### DECEMBER 2000 GROUNDWATER SAMPLING REPORT HOBBS, NEW MEXICO FACILITY BJ SERVICES COMPANY, U.S.A.

Prepared for

BJ Services Company, U.S.A. 11211 FM 2920 Tomball, Texas 77375

BC Project Number: 12832.016

Medical Reserved for Demitria Dickman
Assistant Scientist

March 19, 2001

**Brown and Caldwell** 

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"This is a draft report and is not intended to be a final representation of the work done or recommendations made by Brown and Caldwell. It should not be relied upon; consult the final report."

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### 1.0 INTRODUCTION

Brown and Caldwell conducted field activities associated with the December 2000 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 December 7, 2000. Groundwater samples were analyzed for gasoline and diesel range total petroleum hydrocarbons (TPH-G and TPH-D) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) as specified by the New Mexico Oil Conservation Division (NMOCD) in NMOCD Permit GW-072. This report presents a description of the groundwater sampling field activities, a summary of the analytical results, and an evaluation of remedial technologies being applied at the facility. A groundwater potentiometric surface map, a benzene concentration map, and a hydrocarbon distribution map are included.

The facility formerly operated an above-grade on-site fueling system. A layout of the facility is shown in Figure 1. Subsurface impact near the former 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. The NMOCD has required a quarterly groundwater monitoring program to assess the concentration of hydrocarbon constituents in groundwater as a result of the diesel fuel release. BJ Services removed three field waste tanks at the facility on March 6-7, 1997. The ongoing monitoring of groundwater conditions at the site is being performed to address both the former fuel island and the former field waste tanks areas of the facility, as directed by NMOCD in correspondence dated January 21, 1999.

A biosparging system was activated in November 1995 to remediate soil and groundwater at the facility. Expansions of the biosparging system were performed in March/April 1997 and February/March 1998. Flow adjustments were made to the biosparging system during the June/July 1999 and March 2000 sampling events, as described in Section 3.1. On November 1, 2000, the biosparging system was turned off. A site chronology detailing the history of the former fueling system and the former field waste tanks area, the soil and groundwater remediation system, and previous sampling events is presented in Table 1.

### 2.0 FIELD ACTIVITIES AND RESULTS

Brown and Caldwell purged and sampled 8 of the 13 existing groundwater monitor wells at and adjacent to the BJ Services Hobbs facility on December 7, 2000 to determine concentrations of dissolved-phase hydrocarbons in groundwater and to evaluate general groundwater quality in the area. Monitor wells MW-1, MW-8, MW-9, and MW-12D were not sampled during the December 2000 sampling event because benzene had not been detected in groundwater samples from these wells for at least four quarterly sampling events preceding the September 2000 groundwater sampling event. Monitor well OW-4 did not contain sufficient water in December 2000 for collection of a groundwater sample. All monitor wells at and adjacent to the BJ Services Hobbs facility were sampled during the March 2000 groundwater sampling event at the facility, and will be sampled again in March 2001. The locations of the monitor wells at the facility are shown in the site map presented as Figure 1. The following subsections describe the field activities conducted by Brown and Caldwell at the facility in December 2000 and present the results of the groundwater analyses.

### 2.1 Groundwater Measurements and Sampling

Groundwater level measurements were obtained from the monitor wells prior to purging and sampling the wells. Groundwater levels were measured with an oil/water interface probe and recorded to the nearest 0.01 foot. A cumulative table of groundwater elevation data is presented in Table 2. The groundwater elevation data indicate 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.

The monitor wells were purged and sampled using disposable bailers. The continued decline in groundwater elevation at the facility, as documented in the March 2000 Groundwater Sampling Report, precluded use of a Geosquirt® submersible pump that had been used during quarterly sampling events prior to March 2000. Conductivity, pH, oxidation-reduction (redox) potential, dissolved oxygen, and temperature of groundwater were measured using a calibrated YSI 610-D

meter in conjunction with the well purging process. Ferrous iron, dissolved oxygen, and alkalinity were measured in selected wells upon conclusion of purging activities using Hach field test kits to assist in assessment of the potential for natural attenuation of hydrocarbons at the facility. Turbidity of groundwater was also typically measured upon conclusion of purging activities. The field parameter readings were recorded on the field data sheets included in Appendix A. Field parameter readings are summarized in Table 3.

Groundwater samples were 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 chainof-custody documentation.

Non-disposable field measurement equipment was decontaminated prior to and after each usage. Decontamination procedures consisted of washing with fresh water and a non-phosphate detergent, then rinsing with deionized water. Purge water was discharged to the on-site water reclamation system for re-use 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 8015B and for BTEX by EPA Method 8021B. Four monitor wells (MW-5, MW-10, MW-11A, and MW-12) were sampled for nitrate, sulfate, and dissolved methane/ethylene/ethane to evaluate natural attenuation processes. Current and cumulative analytical results for BTEX, TPH-D, and TPH-G are presented in Table 4. Nitrate, sulfate, and dissolved methane analytical results are presented in Table 5. The laboratory analytical report and chain-of-custody record for samples collected during the December 2000 field activities are included in Appendix B.

BTEX constituent concentrations in excess of applicable laboratory detection limits were reported in four of the eight groundwater samples collected during this sampling event. Benzene P:\Wp\BJSERV\12832\073r.doc

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concentrations were below the New Mexico Water Quality Control Commission (WQCC) standard of 0.01 milligrams per liter (mg/L) in all monitor wells except MW-11A and MW-12, which are located near the former field waste tanks source area in the eastern portion of the facility. Figure 3 presents a benzene isoconcentration and total BTEX distribution map for the December 2000 sampling event. A total petroleum hydrocarbons distribution map for the December 2000 sampling event is presented in Figure 4.

Benzene was not detected in monitor wells MW-3 and MW-4, which are located near the former source area in the western portion of the facility. Benzene has not been detected in monitor wells MW-3 and MW-4 since June 1999 and March 1999, respectively. Benzene has not been detected in monitor wells MW-1 or MW-9, which are also located near the former fuel island source area, since September 1998. Monitor wells MW-1 and MW-9 were most recently sampled in March 2000.

Application of increased airflow in the down-gradient portion of the western plume, starting in mid-July 1999, resulted in substantial decreases in benzene and total BTEX concentrations in monitor well MW-13 between July 2, 1999 and September 13, 2000, as discussed in Section 3.1. The benzene concentration in monitor well MW-13 remained below the detection limit in December 2000, and total BTEX, TPH-D, and TPH-G concentrations in the well decreased between September 2000 and December 2000. TPH-D was the only hydrocarbon constituent detected in monitor well MW-13 on December 7, 2000, as shown in Table 4.

### 2.3 Natural Attenuation Evaluation

Natural attenuation is the primary remediation mechanism planned for the dissolved-phase hydrocarbon plume located in the area of the former field waste tanks in the eastern portion of the facility (see Figure 1).

The primary evidence of natural attenuation is plume behavior. A plume is shrinking when the rate of hydrocarbon loading from a source area is less than the rate of natural degradation of hydrocarbons. Plume shrinkage in the absence of aggressive remediation is indicative of the occurrence of natural attenuation processes. Conversely, a plume is expanding if the rate of hydrocarbon loading from a source area is greater than the rate of natural degradation of hydrocarbons through natural attenuation processes.

The former field waste tanks in the eastern portion of the facility were removed in March 1997. Concentrations of total BTEX in monitor wells in the area of the former field waste tanks have generally been stable or declining subsequent to removal of the field waste tanks. Occasional increases in total BTEX concentrations between quarterly sampling events have been observed in monitor wells MW-10, MW-12 and MW-11A since March 1997. For example, the benzene concentration in monitor well MW-11A increased from 1.4 mg/L to 26 mg/L between September 2000 and December 2000. These increases may be attributed to sporadic loading rates from the vadose zone in excess of the natural attenuation rate of the area.

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, 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 may be utilized during intrinsic bioremediation. Dissolved oxygen concentrations should therefore be depressed in areas where intrinsic bioremediation is occurring.

Dissolved oxygen concentrations, measured with both the YSI meter and Hach kit, were lower in monitor wells MW-10, MW-11A, and MW-12 than the dissolved oxygen concentration in background well MW-5. This trend suggests that natural aerobic biodegradation of hydrocarbons is occurring within the eastern plume.

- 2. Redox is a measure of chemical energy in groundwater. Redox values measured in background well MW-5 and side-gradient non-impacted well MW-7 were 77.8 millivolts (mV) and 101.5 mV, respectively. Redox values in monitor wells MW-10, MW-11A, and MW-12 ranged from -90.3 mV to -127.7 mV. The negative redox values in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12 indicate that election acceptors other than dissolved oxygen are being utilized in this area.
- 3. 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 during the December 2000 sampling event. These concentrations are less than the background nitrate concentration of 3.27 mg/L measured in monitor well MW-5 (see Table 5). The low nitrate concentrations in monitor wells MW-10, MW-11A, and MW-12 suggest that nitrate has been depleted during natural attenuation of hydrocarbons in the former field waste tanks area of the facility.

- 4. When dissolved oxygen 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 a concentration of 9.5 mg/L in monitor well MW-12 (which displayed the maximum impact by BTEX constituents) and at a non-detectable concentration in background well MW-5. Ferrous iron concentrations in monitor wells MW-10 and MW-11A were measured at concentrations of 6 mg/L and 8 mg/L, respectively. These data further suggest that natural attenuation of hydrocarbons is occurring in the area of the former field waste tanks.
- 5. Methane is a reaction product generated during utilization of carbon dioxide as an electron acceptor. Its concentration should therefore increase in areas where depletion of electron acceptors such as dissolved oxygen, nitrate, and carbon dioxide has occurred.
  - The concentrations of methane in former field waste tanks area monitor wells MW-10 and MW-11A were elevated relative to the methane concentration in background well MW-5, as shown in Table 5. The detection of methane in monitor well MW-10 and MW-11A suggests that utilization of carbon dioxide as an electron acceptor during natural attenuation processes may be occurring locally in the area of the former field waste tanks.
- 6. Alkalinity is expected to increase during natural attenuation processes, due to the leaching of carbonates from mineral substrates by microbially produced organic acids.

Groundwater alkalinity was measured using Hach field testing kits in December 2000. Alkalinity in former field waste tanks source area monitor wells MW-10, MW-11A, and MW-12 was elevated relative to upgradient monitor well MW-5. The elevated alkalinity measurements in impacted monitor wells relative to the background monitor well suggest that natural bioremediation is occurring in the area of the former field waste tanks.

If sulfate is being used as an electron acceptor during natural attenuation of hydrocarbons, then sulfate concentrations will decrease where natural attenuation is occurring. Sulfate concentrations in monitor wells MW-10, MW-11A and MW-12 were elevated in comparison to the background monitor well, MW-5, however. Use of sulfate as an electron acceptor at the facility during intrinsic bioremediation of hydrocarbons can therefore not be confirmed.

In conclusion, dissolved oxygen, redox, nitrate, ferrous iron, and alkalinity data from the December 2000 groundwater sampling event suggest that intrinsic bioremediation processes utilizing indigenous electron acceptors are ongoing in the eastern portion of the facility. Increased methane concentration in the former field waste tanks area suggest that carbon dioxide may also be serving locally as an electron acceptor during intrinsic bioremediation of hydrocarbons in this area. It is recommended that monitoring for natural attenuation evaluation parameters continue in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12, downgradient well OW-4, and upgradient well MW-5. Redox, dissolved oxygen content, and alkalinity are good indicators of the occurrence of aerobic bioremediation of hydrocarbons, so it is also recommended that field testing for these parameters be performed in these wells during upcoming groundwater monitoring events.

### 3.0 REMEDIATION SYSTEM

Based on the results of previous investigations conducted by Brown and Caldwell and Roberts/Schornick and Associates, Inc., Brown and Caldwell recommended the installation of a biosparging system in a Remedial Action Plan (RAP) submitted to the NMOCD in May 1994. The NMOCD approved the RAP on August 11, 1994.

Biosparging 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, biosparging removes volatile and semivolatile contaminants from the saturated zone. Biosparging 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 content of groundwater and soil moisture present in the capillary fringe and vadose zone, thus facilitating 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

Nineteen combined injection and extraction wells, three vacuum extraction wells, one extraction blower, one injection blower, and associated piping were installed between August 2 through August 24, 1995. 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 that were near the center of the western plume, which was 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 were supplied by a separate blower than the one used to supply injection wells AI-1 through AI-19 in order to avoid short-circuiting of air to wells with less screen submergence. Three additional vapor extraction wells, VE-5 through VE-7, were also installed in P:\Wp\BJSERV\12832\073r.doc

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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 and total BTEX concentrations measured in monitor well MW-1 displayed a nearly continuous decline 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 since the December 1998 sampling event, and total BTEX concentrations decreased from 30.6 mg/L to less than 0.01 mg/L between December 1997 and March 2000.

The benzene concentration in monitor well MW-3 declined from 0.240 mg/L in December 1997 to less than 0.001 mg/L since September 1999, and the total BTEX concentration decreased from 1.930 mg/L in December 1997 to non-detectable levels between September 1999 and December 2000.

In monitor well MW-4, the benzene concentration decreased from 0.230 mg/L in December 1997 to less than 0.001 mg/L since the June 1999 sampling event. The total BTEX concentration in monitor well MW-4 dropped from 4.250 mg/L in December 1997 to a non-detectable level between June 2000 and September 2000. The total BTEX concentration in monitor well MW-4 was 0.0013 mg/L in December 2000.

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. Adjustments to the biosparging system were made on July 14, 1999 to increase air flow to biosparging system Lateral No. 1, located in the eastern portion of the plume associated with the former fueling system (i.e., the western plume). Further adjustments to the air flow distribution within the biosparging system were made during the March 2000 quarterly sampling event, as described in detail in March 2000 and June 2000 quarterly monitoring reports for the facility. The adjustments made in 1999 and 2000 resulted in

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decreases in the concentration of benzene in monitor well MW-13 from 1.5 mg/L on July 2, 1999 to less than 0.001 mg/L in September 2000 and December 2000, as indicated in Table 4. Similarly, the total BTEX concentration in monitor well MW-13 decreased from 2.331 mg/L on July 2, 1999 to less than 0.001 mg/L on December 7, 2000.

Based on these favorable trends in hydrocarbon concentrations and in accordance with the recommendations presented in the report for the June 2000 groundwater sampling event, the biosparging system was shut down completely on November 1, 2000. The December 2000 sampling event is the first since this shut down.

Benzene and total BTEX concentrations in monitor well MW-3 remained at non-detectable levels in the December 2000 sampling event. In monitor well MW-4, the benzene concentration level remained at less than 0.001 mg/L. The ethylbenzene concentration in well MW-4 increased from less than 0.001 mg/L to 0.0013 mg/L between September 2000 and December 2000. This concentration level, however, is well below the WQCC ethylbenzene standard of 0.75 mg/L.

Hydrocarbon concentrations have continued to decrease in monitor well MW-13. The benzene concentration in well MW-13 has been less than 0.001 mg/L since September 2000, and total BTEX concentrations decreased from 0.0034 mg/L in September 2000 to non-detect levels in December 2000.

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Quarterly monitoring will continue in all wells at the facility in March 2001 to monitor for possible rebound effect over the full 4-month interval from November 1, 2000 to March 2001.

### 3.2 Air Emissions

The biosparging system was shut down in November 2000, so air monitoring was not performed in December 2000. The September 2000 groundwater report for the facility provides a discussion of previous air monitoring of the biosparging system.

### 4.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on information obtained during the December 2000 groundwater sampling event at the BJ Services Hobbs, New Mexico facility.

### 4.1 Conclusions

- Groundwater flow was to the east/northeast at a hydraulic gradient of 0.008 ft/ft.
- Benzene concentrations in all monitor wells at the facility except MW-11A and MW-12 are less than the New Mexico WQCC standard of 0.01 mg/L for benzene.
- Dissolved benzene, BTEX, and TPH concentrations in all monitor wells at the former fueling system source area are below applicable standards.
- Benzene and total BTEX concentrations in monitor well MW-13 continued to decrease in December 2000, after the November 1, 2000 shut down of the biosparging system.
- Natural attenuation processes appear to be occurring in the vicinity of the former field waste tanks that were removed in March 1997. The concentration of benzene in monitor well MW-10 is now below the applicable New Mexico WQCC standard of 0.01 mg/L.

### 4.2 Recommendations

- Western plume area wells MW-3, MW-4, MW-5, MW-7, and MW-13 should continue to be monitored on a quarterly basis to determine whether a rebound effect occurs. Monitor wells MW-1, MW-8, and MW-9 should continue to be monitored on an annual basis.
- The groundwater sampling program at the former fuel island source area should be continued until benzene, BTEX, and TPH concentrations in all wells pertinent to the source area are less than applicable New Mexico WQCC standards and permit requirements for four consecutive quarters, at which time closure for this portion of the facility is recommended.
- Continue the quarterly groundwater sampling program in former field waste tanks area monitor wells MW-10, MW-11A, MW-12, and OW-4 on a quarterly basis to monitor for continued reduction in concentrations of benzene, BTEX, and TPH.

• Continue monitoring for natural attenuation evaluation parameters in monitor wells MW-5, MW-10, MW-11A, MW-12, and OW-4.

### DISTRIBUTION

December 2000 Groundwater Sampling Report BJ Services Company, U.S.A. Hobbs, New Mexico

March 19, 2001

1 copy to: State of New Mexico

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Oil Conservation Division

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11211 FM 2920

Tomball, Texas 77375

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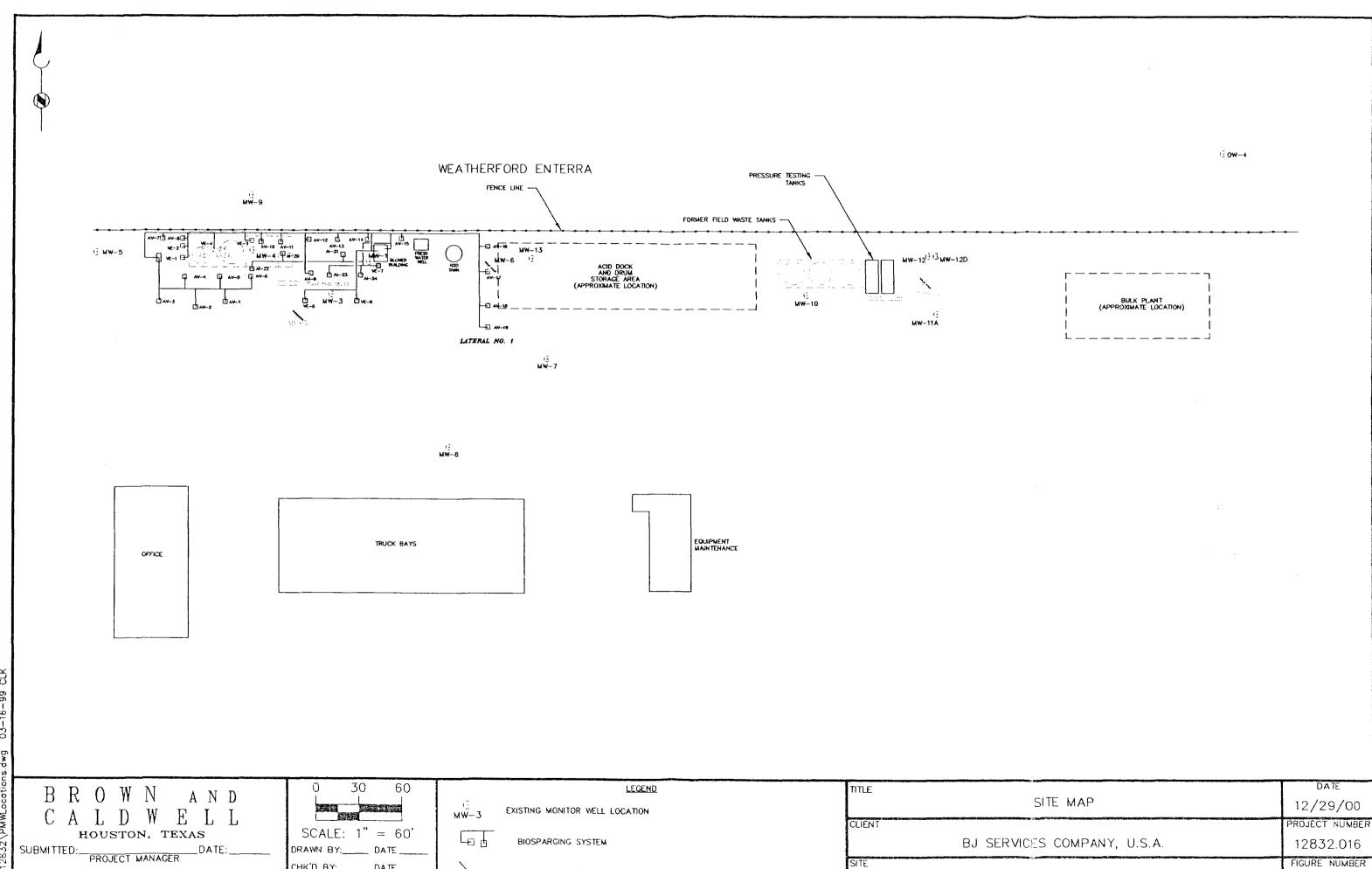
Lynn M. Wright, P.G.

Principal Geologist

RLR/uak

### **FIGURES**

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MONITOR WELL (PLUGGED AND ABANDONED)

FIGURE NUMBER

HOBBS, NEW MEXICO

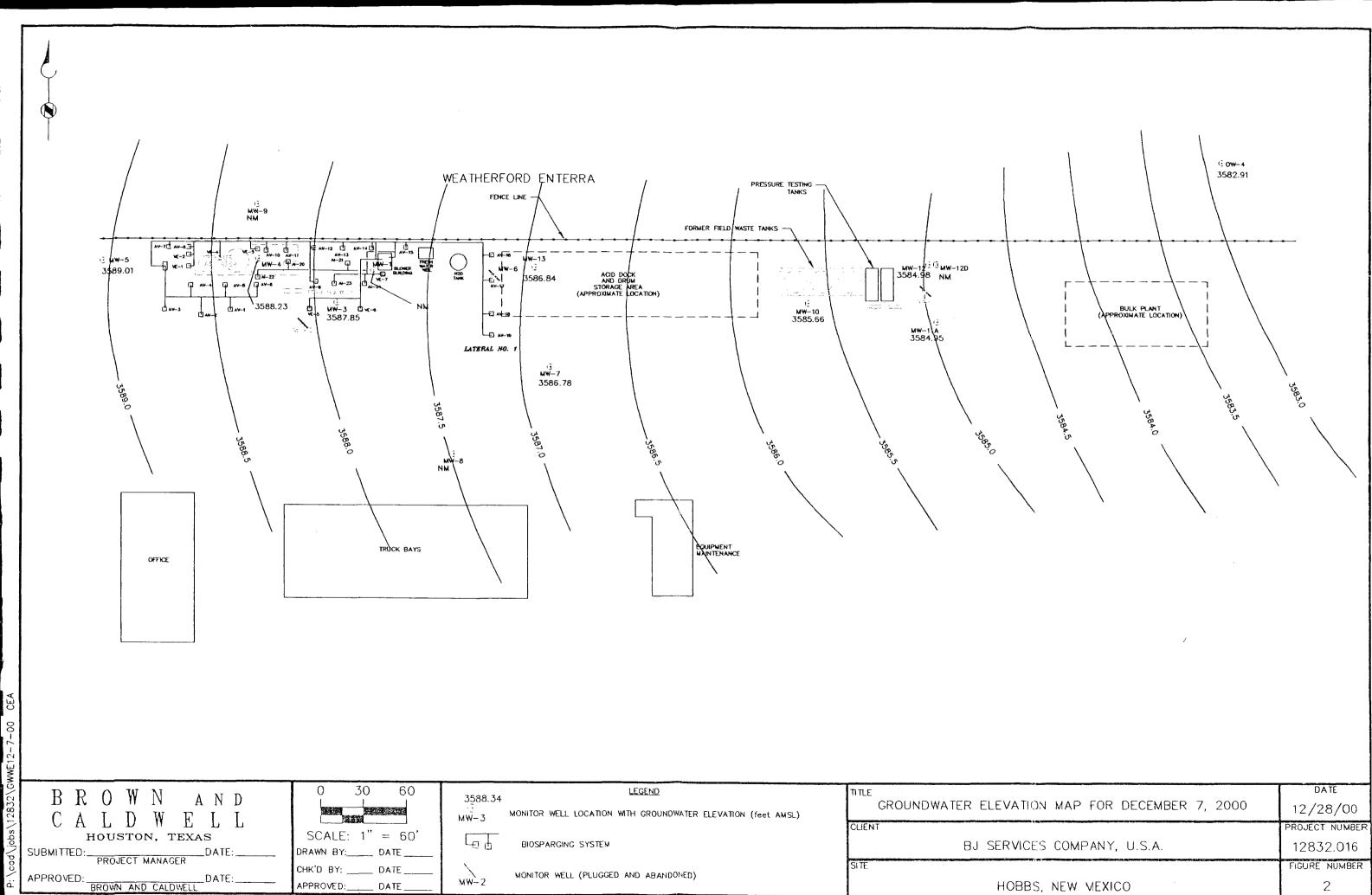
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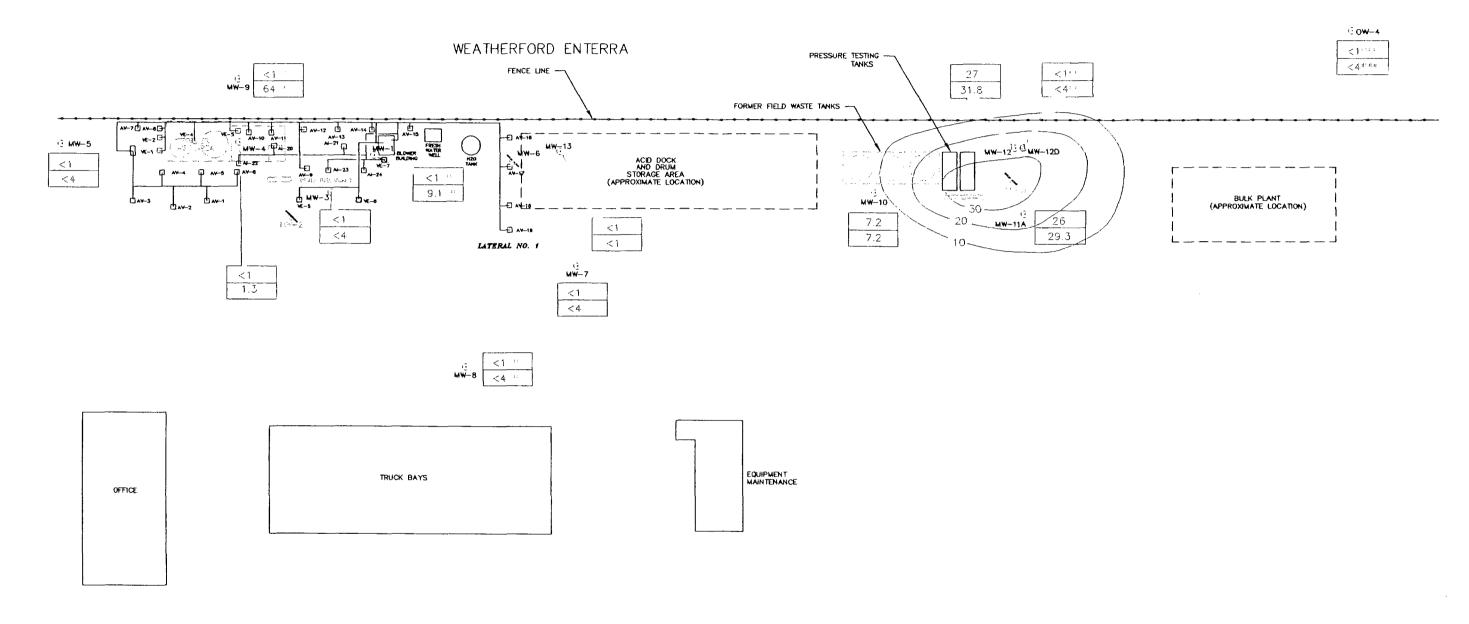
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HOBBS, NEW MEXICO

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DATE

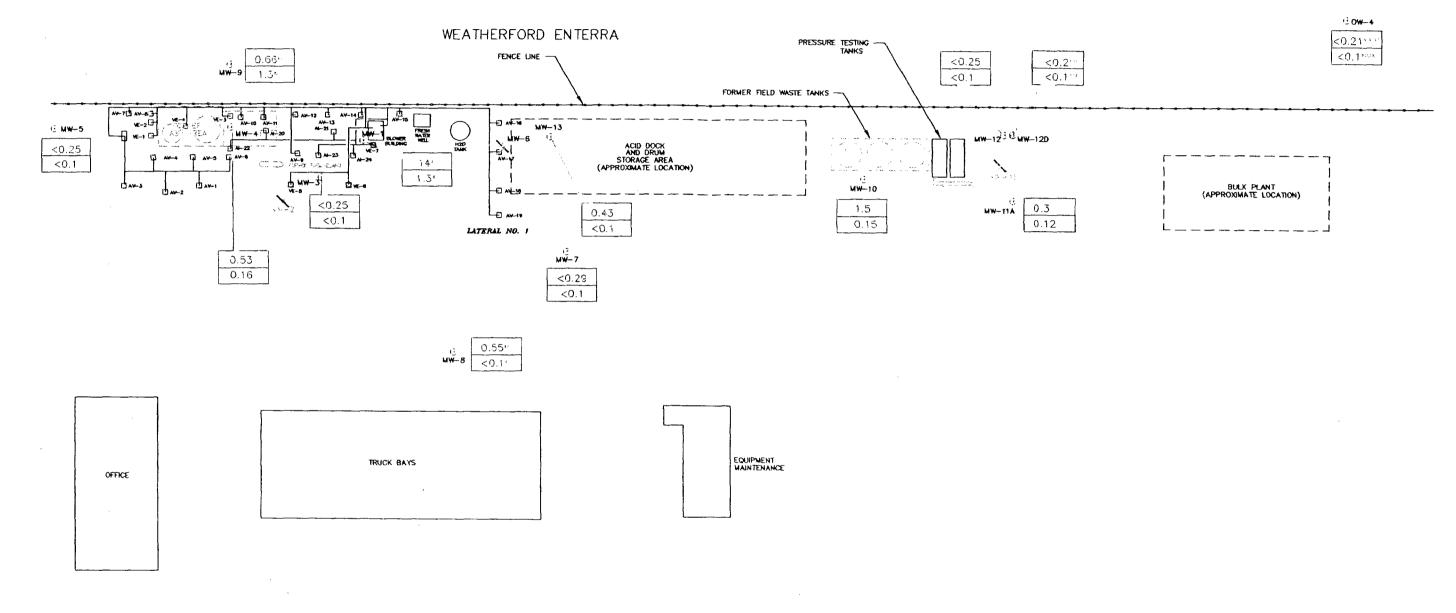


NOTE: MONITOR WELL MW-12D IS SCREENED IN A DEEPER PORTION OF THE AQUIFER THAN MONITOR WELL MW-12 AND THE OTHER MONITOR WELLS; DATA FROM MONITOR WELL MW-12D NOT INCLUDED IN CONTOURING.

B R O W N A N D	0 30 60	LEGEND  LEGEND  MW-3 EXISTING MONITOR WELL LOCATION  LEGEND  BIOSPARGING SYSTEM	DISTRIBUTION MAP FOR DECEMBER 7, 2000	DATE 12/29/00
HOUSTON, TEXAS  SUBMITTED:  PROJECT MANAGER  DATE:  OF THE PROJECT MANAGER	SCALE: 1" = 60'  DRAWN BY: DATE	WW-2 MONITOR WELL (PLUCGED AND ABANDONED)  70 - BENZENE ISOCONCENTRATION CONTOUR ( ug/L)  11.0 - BENZENE CONCENTRATION (ug/L)  4.0 - TOTAL BTEX CONCENTRATION (ug/L)	CLIENT BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER 12832.016
APPROVED: DATE:	CHK'D BY: DATE APPROVED: DATE	INDICATES WELL NOT SAMPLED 12/7/00; DATA PRESENTED ARE FROM 3/10/00     INDICATES WELL NOT SAMPLED 12/7/00; DATA PRESENTED ARE FROM 6/8/00     INDICATES WELL NOT SAMPLED 12/7/00; DATA PRESENTED ARE FROM 9/13/00	SITE HOBBS, NEW MEXICO	FIGURE NUMBER 3

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BROWN AND	0 30 60	LEGEND  LEGEND  BOSPARGING SYSTEM	TOTAL PETROLEUM HYDROCARBONS DISTRIBUTION MAP FOR DECEMBER 7, 2000	DATE 12/29/00
HOUSTON, TEXAS  SUBMITTED:  PROJECT MANAGER  DATE:	SCALE: 1" = 60' DRAWN BY: DATE	MW-2 MONITOR WELL (PLUGGED AND ABANDOMED)  CO.2 - TPH-D CONCENTRATION (mg/L)  - TPH-G CONCENTRATION (mg/L)	CLIENT BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER 12832.016
APPROVED: DATE:	CHK'D BY: DATE APPROVED: DATE	" - INDICATES YELL NOT SAMPLED 12/7/00; DATA PRESENTED ARE FROM 3/10/00	SITE HOBBS, NEW MEXICO	FIGURE NUMBER

### **TABLES**

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### 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 handaugured 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 three 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 new injection wells AI-20 through AI-24.	
March 10, 1998	Operation of new air injection wells AI-20 through AI-24 and new vapor extraction wells VE-5 though VE-7 commenced.	
March 23-24, 1998	Brown and Caldwell conducted the March 1998 groundwater sampling event.	
March 24, 1998	Operation of previously existing injection wells and vapor extraction 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.	

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

Date	Activity
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.
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; installed and developed monitor wells MW-12D and MW-13; and sampled monitor wells MW-12D and MW-13 to complete the June/July 1999 groundwater sampling event.
July 14, 1999	Brown and Caldwell redirected air discharge from the shallow well injection system to Lateral No. 1 and optimized airflow to injection wells AI-16 and AI-17 to apply increased remedial pressure to the eastern potion of the west plume.
September 13-14, 1999	Brown and Caldwell conducted the September 1999 groundwater sampling event.
December 9, 1999	Brown and Caldwell conducted the December 1999 groundwater sampling event
March 9-10, 2000	Brown and Caldwell conducted the March 2000 groundwater sampling event and shut off air flow to biosparging system Lateral Nos. 4S, 5S, 6S, and 7S.
June 8, 2000	Brown and Caldwell conducted the June 2000 groundwater sampling event.
September 13, 2000	Brown and Caldwell conducted the September 2000 groundwater sampling event.
November 1, 2000	Brown and Caldwell shut down the biosparging system.
December 7, 2000	Brown and Caldwell conducted the December 2000 groundwater sampling event.

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-1	3,647.53	08/10/92	53.22	0.00	3,594.31	(1)
	·	02/09/93	53.03	0.00	3,594.50	( )
		08/18/93	53.10	0.00	3,594.43	
		01/26/94	53.31	0.00	3,594.22	
		05/03/95	54.64	0.20	3,593.05	(2)
		07/31/95	54.14	0.00	3,593.39	(-)
		11/14/95	53.69	0.00	3,593.84	
		02/23/96	54.32	0.00	3,593.21	
		05/31/96	54.14	0.00	3,593.39	
		08/23/96	56.17	0.00	3,591.36	
		12/02/96	55.27	0.00	3,592.26	
		03/12/97	55.70	0.27	3,592.05	
		06/12/97	55.08	0.02	3,592.47	
		09/12/97	55.64	0.51	3,592.31	
		12/10/97	55.46	0.00	3,592.07	PSH Sheen
		03/24/98	55.81	0.00	3,591.72	PSH Sheen
		06/23/98	56.38	0.06	3,591.20	1 Str Sheen
		09/30/98	56.82	0.00	3,590.71	PSH Sheen
		12/09/98	57.05	0.00	3,590.48	i Sii Siiceii
		03/10/99	57.45	0.00	3,590.48	
		06/10/99	58.02	0.00	3,589.51	
		07/02/99	57.90	0.00	1 '	
		09/14/99	58.14	0.00	3,589.63	
		12/09/99	30.14	0.00	3,589.39	(2)
	l.	03/09/00	50.00	N .	2 500 54	(3)
		06/00	58.99	0.00	3,588.54	
			-	-	-	
		09/00	-	-	-	
MW-2	3,644.84	08/10/92	52.82	0.00	3,592.02	(1)
IVI VI -2	3,044.04	02/09/93	49.60	0.00	3,595.24	(1)
		08/18/93	49.71	0.00	3,595.13	
		01/26/94	49.97	0.00	3,594.87	
		05/03/95	79.97	0.00	3,394.67	(4),(5)
MW-3	3,645.00	08/10/92	52.99	0.00	3,592.01	$\frac{(4)(3)}{(1)}$
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	02/09/93	52.72	0.00	3,592.28	(1)
		08/18/93	52.82	0.00	3,592.18	
		01/26/94	53.05	0.00	3,591.95	
		05/03/95	54.31	0.00	3,591.93	
		07/31/95	51.24	0.00	3,593.76	
		11/14/95	1			
	1	02/23/96	51.10 51.68	0.00	3,593.90	
		05/31/96	1	0.00	3,593.32	
			51.45	0.00	3,593.55	
		08/23/96	51.55	0.00	3,593.45	
		12/02/96	52.23	0.00	3,592.77	
		03/12/97	52.67	0.00	3,592.33	
		06/12/97	52.68	0.00	3,592.32	
		09/11/97	52.71	0.00	3,592.29	
		12/10/97	52.89	0.00	3,592.11	
		03/23/98	53.22	0.00	3.591.78	
		06/23/98	53.66	0.00	3,591.34	
		09/30/98	54.06	0.00	3,590.94	
		12/09/98	54.36	0.00	3,590.64	
	i .	1	1	1 2.000	1 2,2,0,0,	

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-3		06/10/99	55.17	0.00	3,589.83	
		07/02/99	55.15	0.00	3,589.85	
		09/14/99	55.42	0.00	3,589.58	
		12/09/99	55.78	0.00	3,589.22	
		03/09/00	56.23	0.00	3,588.77	
		06/08/00	56.66	0.00	3,588.34	
		09/13/00	56.77	0.00	3,588.23	
		12/07/00	57.15	0.00	3,587.85	
MW-4	3,645.28	08/10/92	50.55	0.00	3,594.73	(1)
	3,4 10120	02/09/93	50.26	0.00	3,595.02	(1)
		08/18/93	50.38	0.00	3,594.90	
		01/26/94	50.90	0.30	3,594.63	
		05/03/95	51.51	0.45	3,594.14	
		07/31/95	51.74	0.26	3,593.75	
		11/14/95	51.03	0.00	3,594.25	
		02/23/96	51.65	0.01	3,593.64	
		05/31/96	51.48	0.00	3,593.80	
		08/23/96	53.49	0.00	3,591.79	
		12/02/96	52.32	0.00	3,592.96	
		03/12/97	52.74	0.05	3,592.58	
		06/12/97	53.08	0.44	3,592.56	
		09/12/97	52.60	0.15		
		12/10/97	52.89		3,592.80	DCLLCI
		03/24/98	53.20	0.00 0.25	3,592.39	PSH Sheen
		į.			3,592.29	
		06/23/98	53.82	0.22	3,591.64	200 10011
		09/30/98	53.96	0.00	3,591.32	200 ml PSH
		12/09/98	54.27	0.00	3,591.01	
		03/10/99	54.69	0.04	3,590.62	
		06/10/99	55.07	0.00	3,590.21	
		07/02/99	55.10	0.00	3,590.18	
		09/14/99	55.33	0.00	3,589.95	
		12/09/99	55.79	0.00	3,589.49	
		03/10/00	56.12	0.00	3,589.16	
		06/08/00	56.67	0.00	3,588.61	
	•	09/13/00	56.65	0.00	3,588.63	
		12/07/00	57.05	0.00	3,588.23	
MW-5	3,647.72	08/10/92	52.38	0.00	3,595.34	(1)
		02/09/93	52.06	0.00	3,595.66	
		08/18/93	52.16	0.00	3,595.56	
		01/26/94	52.50	0.00	3,595.22	
		05/03/95	53.57	0.00	3,594.15	
	}	07/31/95	53.27	0.00	3,594.45	
		11/14/95	52.83	0.00	3,594.89	
		02/23/96	53.57	0.00	3,594.15	
	1	05/31/96	53.16	0.00	3,594.56	
		08/23/96	53.41	0.00	3,594.31	
		12/02/96	53.98	0.00	3,593.74	
		03/12/97	54.44	0.00	3,593.28	
		06/12/97	54.48	0.00	1	
		09/12/97	1		3.593.24	
		•	54.29	0.00	3,593.43	
		12/10/97	54.66	0.00	3,593.06	
		03/23/98	55.05	0.00	3,592.67	
	1	06/23/98	55.44	0.00	3,592.28	

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-5		09/30/98	55.65	0.00	3,592.07	
		12/09/98	56.00	0.00	3,591.72	
		03/09/99	56.45	0.00	3,591.27	
ļ		06/10/99	56.91	0.00	3,590.81	
1		07/02/99	56.93	0.00	3,590.79	
		09/14/99	57.12	0.00	3,590.60	
		12/09/99	57.41	0.00	3,590.31	
		03/09/00	57.92	0.00	3,589.80	
		06/08/00	58.32	0.00	3,589.40	
		09/13/00	58.36	0.00	3,589.36	
		12/07/00	58.71	0.00	3,589.01	
MW-6	3,644.74	02/09/93	50.58	0.00	3,594.16	(1)
141 11 0	3,011.71	08/18/93	50.78	0.00	3,593.96	(1)
		01/26/94	51.00	0.00	3,593.74	
		05/03/95	52.63	0.00	3,592.11	
		07/31/95	51.90	0.00	3,592.84	
		11/14/95	51.19	0.00	3,593.55	
		02/23/96	52.10	0.00	3,593.53	
		05/31/96	51.76	0.00	·	
	}	08/23/96	I .		3,592.98	
		12/02/96	51.63	0.00	3,593.11	
		l .	52.85	0.00	3,591.89	
		03/12/97	53.55	0.00	3,591.19	
		06/12/97	52.08	0.00	3,592.66	
		09/11/97	53.72	0.00	3,591.02	
		12/10/97	53.27	0.00	3,591.47	
		03/23/98	53.56	0.00	3,591.18	
		06/23/98	52.88	0.00	3,591.86	
		09/30/98	54.89	0.00	3,589.85	
		12/09/98	54.57	0.00	3,590.17	
		03/10/99	55.10	0.00	3,589.64	
		07/02/99			<u> </u>	(5),(6)
MW-7	3,644.55	02/09/93	50.53	0.00	3,594.02	(1)
		08/18/93	50.74	0.00	3,593.81	
		01/26/94	51.01	0.00	3,593.54	
		05/03/95	52.25	0.00	3,592.30	
		07/31/95	51.92	0.00	3,592.63	
1		11/14/95	51.48	0.00	3,593.07	
		02/23/96	52.15	0.00	3,592.40	
ļ		05/31/96	51.78	0.00	3,592.77	
		08/23/96	52.02	0.00	3,592.53	
		12/02/96	52.52	0.00	3,592.03	
1		03/12/97	52.99	0.00	3,591.56	
		06/12/97	53.08	0.00	3,591.47	
İ		09/11/97	53.00	0.00	3,591.55	
		12/10/97	53.28	0.00	3,591.27	
		03/23/98	53.59	0.00	3.590.96	
		06/23/98	54.20	0.00	3,590.35	
		09/30/98	54.54	0.00	3,590.01	
		12/09/98	54.74	0.00	3,589.81	
(		03/09/99	55.15	0.00	3,589.40	
		06/10/99	55.66		N	
		07/02/99	55.73	0.00	3,588.89	
		09/13/99	55.94	0.00	3.588.82	
į.	1	1 03/13/33	33.94	0.00	3,588.61	

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-7		12/09/99	56.38	0.00	3,588.17	
		03/09/00	56.74	0.00	3,587.81	
		06/08/00	57.17	0.00	3,587.38	
		09/13/00	57.40	0.00	3,587.15	
		12/07/00	57.77	0.00	3,586.78	
MW-8	3,644.87	02/09/93	50.48	0.00	3,594.39	(1)
		08/18/93	50.67	0.00	3,594.20	(-)
	ĺ	01/26/94	50.96	0.00	3,593.91	
	05/03/95	52.15	0.00	3,592.72		
		07/31/95	51.77	0.00	3,593.10	
		11/14/95	51.37	0.00	3,593.50	
		02/23/96	52.17	0.00	3,592.70	
		05/31/96	51.55	0.00	3,593.32	
	}	08/23/96	51.92	0.00	3,592.95	
		12/02/96	52.43	0.00	3,592.44	
		03/12/97	52.93	0.00	3,591.94	
		06/12/97	53.96	0.00	3,590.91	
		09/11/97	52.73	0.00	3,592.14	
		12/10/97	53.15	0.00	3,591.72	
		03/23/98	53.51	0.00	3,591.36	
		06/23/98	54.01	0.00	3,590.86	
		09/30/98	54.35	0.00	3,590.52	
		12/09/98	54.60	0.00	3,590.27	
		03/09/99	55.00	0.00	3,589.87	
		06/10/99	55.56	0.00	3,589.31	
		07/02/99	55.57	0.00	3,589.30	
		09/13/99	55.72	0.00	1	
		12/09/99	33.72	0.00	3,589.15	(2)
		03/09/00	56.52	0.00	1 500 15	(3)
		06/00	30.32	0.00	3,588.35	
		09/00	-	-	-	
			-	-		
MW-9	3,644.78	12/00 04/22/93	49.73	0.00	2 505 05	
IVI VV -9	3,044.76	07/15/93	1	ſ	3,595.05	(1)
		<b>3</b>	49.65 49.85	0.00	3,595.13	
		08/18/93	1	0.00	3,594.93	
		01/26/94	50.02	0.00	3,594.76	
		05/03/95	51.35	0.00	3,593.43	
		07/31/95	50.97	0.00	3,593.81	
		11/14/95	50.43	0.00	3,594.35	
		02/23/96	51.12	0.00	3,593.66	
		05/31/96	50.89	0.00	3,593.89	
		08/23/96	50.98	0.00	3,593.80	
		12/02/96	51.58	0.00	3,593.20	
		03/12/97	52.21	0.05	3,592.61	
		06/12/97	52.10	0.00	3,592.68	PSH Sheen
		09/12/97	51.95	0.00	3,592.83	PSH Sheen
		12/10/97	52.37	0.00	3.592.41	PSH Sheen
	03/23/98	52.68	0.00	3,592.10	PSH Sheen	
		06/23/98	53.08	0.00	3,591.70	PSH Sheer
		09/30/98	53.39	0.01	3,591.40	PSH Sheer
		12/09/98	53.68	0.00	3,591.10	1 3.11 (///00)
	-	03/10/99	54.15	0.00	3,590.63	
		06/10/99	54.68	0.00	3,590.10	

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-9		07/02/99	54.71	0.00	3,590.07	
		09/13/99	54.71	0.00	3,590.07	
		12/09/99	-	-	-	(3)
		03/09/00	55.69	0.00	3,589.09	
		06/00	-	-	-	
		09/00 12/00	-	-		
MW-10	3,644.47	08/18/93	51.54	0.00	3,592.93	(1)
101 44 - 10	3,044.47	01/26/94	51.90	0.00	3,592.57	(1)
		05/03/95	52.97	0.00	3,591.50	
		07/31/95	52.87	0.00	3,591.60	
		11/14/95	52.51	0.00	3,591.96	
		02/23/96	53.05	0.00	3,591.42	
		05/31/96	52.79	0.00	3,591.68	
		08/23/96	53.03	0.00	3,591.44	
		12/02/96	53.41	0.00	3,591.06	
		03/12/97	54.21	0.00	3,590.26	
		06/12/97	53.99	0.00	3,590.48	
		09/12/97	53.94	0.00	3,590.53	
		12/10/97	54.12	0.00	3,590.35	
		03/23/98	54.51	0.00	3,589.96	
		06/23/98	55.12	0.00	3,589.35	
		09/30/98	55.61	0.00	3,588.86	
		12/09/98	55.80	0.00	3,588.67	
		03/09/99	56.09	0.00	3,588.38	
		06/10/99	56.60	0.00	3,587.87	
		07/02/99	56.64	0.00	3,587.83	
		09/14/99	56.91	0.00	3,587.56	
		12/09/99	57.37	0.00	3,587.10	
		03/10/00	57.71	0.00	3,586.76	
		06/08/00	58.08	0.00	3,586.39	
		09/13/00	58.44	0.00	3,586.03	
		12/07/00	58.89	0.00	3,585.66	
MW-11	3,643.78	08/18/93	51.92	0.00	3,591.86	(1)
141 44 - 1 1	3,043.76	01/26/94	52.32	0.00	3,591.46	(1)
		05/03/95	53.38	0.00	3,591.46	
		l .		1	1	
		07/31/95	53.35	0.00	3,590.43	
		[	52.96	0.00	3,590.82	
		02/23/96	53.50	0.00	3,590.28	
		05/31/96	53.25	0.00	3,590.53	
		08/23/96	53.49	0.00	3.590.29	
		12/02/96	53.79	0.00	3,589.99	
		03/12/97	53.81	0.00	3,589.97	
		06/12/97	53.96	0.00	3,589.82	
		09/12/97	52.93	0.00	3,590.85	
		12/10/97				(5),(6)

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-11A		06/23/98	55.43	0.00	3,588.81	
		09/30/98	55.96	0.00	3,588.28	
		12/09/98	56.13	0.00	3,588.11	
		03/10/99	56.43	0.00	3,587.81	
		06/10/99	56.94	0.00	3,587.30	
		07/02/99	57.01	0.00	3,587.23	
		09/14/99	57.36	0.00	3,586.88	
		12/09/99	57.72	0.00	3,586.52	
		03/09/00	58.01	0.00	3,586.23	
		06/08/00	58.40	0.00	3,585.84	
		09/13/00	58.84	0.00	3,585.40	
		12/07/00	59.29	0.00	3,584.95	
MW-12	3,644.29	03/23/98	54.72	0.00	3,589.57	(7)
		06/23/98	55.48	0.00	3,588.81	
		09/30/98	56.02	0.00	3,588.27	
		12/09/98	56.17	0.00	3,588.12	
		03/10/99	56.45	0.00	3,587.84	
		06/10/99	56.97	0.00	3,587.32	
		07/02/99	56.99	0.00	3,587.30	
		09/14/99	57.41	0.00	3,586.88	
		12/09/99	57.76	0.00	3,586.53	
		03/10/00	58.08	0.00	3,586.21	
		06/08/00	58.42	0.00	3,585.87	
		09/13/00	58.85	0.00	3,585.44	
		12/07/00	59.31	0.00	3,584.98	
MW-12D	3,644.38	07/02/99	57.13	0.00	3,587.25	(8)
		09/14/99	57.74	0.00	3,586.64	
		12/09/99	57.86	0.00	3,586.52	
		03/09/00	58.24	0.00	3,586.14	
		06/08/00	58.56	0.00	3,585.82	
		09/00	-	-	-	
		12/00	-	-	-	
MW-13	3,645.52	07/02/99	56.60	0.00	3,588.92	(9)
		09/14/99	56.92	0.00	3,588.60	
		12/09/99	57.28	0.00	3,588.24	
		03/10/00	57.68	0.00	3,587.84	
		06/08/00	58.04	0.00	3,587.48	
		09/13/00	58.29	0.00	3,587.23	
		12/07/00	58.68	0.00	3,586.84	

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
OW-4	3,644.06	07/02/99	58.18	0.00	3,585.88	(8)
		09/14/99	58.63	0.00	3,585.43	
		12/09/99	58.92	0.00	3,585.14	
		03/09/00	59.19	0.00	3,584.87	
		06/08/00	59.56	0.00	3,584.50	
		09/13/00	60.16	0.00	3,583.90	
		12/07/00	61.15	0.00	3,582.91	

- (1) Top of casing elevations and groundwater elevations of all monitor wells were relative to an arbitrary datum of 100.00 feet prior to March 1997 and have been converted to Mean Sea Level (MSL).
- (2)- For wells having measurable thickness of free product, 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) of the free product is 0.82.
- (3) Not measured.
- (4) Monitor well MW-2 could not be located after January 1994.
- (5) Well plugged and abandoned July 2, 1999.
- (6) Monitor well MW-11 could not be located after September 12, 1997.
- <sup>(7)</sup> TOC elevations for MW-11A and MW-12 estimated relative to TOC elevation for MW-10.
- (8) TOC elevations for MW-12D and OW-4 estimated relative to TOC elevation for MW-12.
- <sup>(7)</sup> TOC elevation for MW-13 estimated relative to TOC elevation for MW-7.

# Table 3 December 7, 2000 Field Screening Results for Groundwater Samples Hobbs, New Mexico Facility BJ Services Company, U.S.A.

Monitor Well	Cumulative Liters Removed	рН	Temperature (°C)	Conductivity (umhos/cm)	Redox (mV)	Dissolved Oxygen (meter) (mg/L)	Dissolved Oxygen (Hach kit) (mg/L)	Ferrous Iron (mg/L)	Alkalinity (mg/L)	Turbidity NTUs <sup>(1)</sup>
	1.0	7.68	16.01	1268	52.6	6.65	NM	NM	NM	NM
MW-3	2.0	7.51	17.71	1244	63.0	6.95	NM	NM	NM	NM
	3.0	7.46	17.74	1115	68.3	6.73	NM	NM	NM	6.48
	1.0	7.62	16.93	1342	0.7	7.42	NM	NM	NM	NM
MW-4	2.0	7.40	17.59	1411	-48.5	6.31	NM	NM	NM	NM
	3.0	7.48	17.48	1382	-30.4	7.15	NM	NM	NM	19.85
	1.0	7.49	17.33	1239	59.5	7.13	NM	NM	NM	NM
MW-5	2.0	7.48	17.18	1231	74.3	7.40	NM	NM	NM	NM
	3.0	7.52	17.23	1200	77.8	7.39	5.5	0	280	6.92
	1.0	7.51	17.62	1481	89.0	7.42	NM	NM	NM	NM
MW-7	2.0	7.43	17.68	1545	95.0	6.74	NM	NM	NM	NM
	3.0	7.41	17.62	1540	101.5	6.93	NM	NM	NM	NM
	1.0	6.92	18.16	3440	-86.11	4.50	NM	NM	NM	NM
MW-10	2.0	6.89	17.93	1843	-121.1	4.89	NM	NM	NM	NM
	3.0	6.84	18.01	1864	-127.7	4.91	4	6	770	366
	1.0	7.19	16.93	4229	-72.5	7.25	NM	NM	NM	NM
MW-11A	2.0	7.14	17.57	4356	-76.4	6.02	NM	NM	NM	NM
	3.0	7.20	17.52	2227	-90.3	6.00	2	8	770	482
	1.0	7.51	17.19	1476	-111.5	6.36	NM	NM	NM	NM
MW-12	2.0	7.20	17.71	1599	-95.5	6.13	NM	NM	NM	NM
	3.0	7.13	17.74	1632	-99.5	5.88	4.0	9.5	770	333
	1.0	7.66	17.11	1796	-59.2	6.34	NM	NM	NM	NM
MW-13	2.0	7.61	17.14	923	-71.8	6.09	NM	NM	NM	NM
	3.0	7.56	17.20	1649	-74.2	5.97	NM	NM	NM	NM
OW-4 <sup>(2)</sup>	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

<sup>(1)</sup> NTUs = Nephelometric turbidity units

Monitor wells MW-1, MW-8, and MW-9 not sampled in December 2000.

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

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

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

NM=Not Measured

<sup>(2)</sup> Well dry

Table 4
Cumulative BTEX and TPH Analytical Results for Groundwater Samples
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgram	s per liter, ug/L		milligrams pe	r liter, mg/L
MW-I	8/10/92	Regular	5550.0	12090.0	2160.0	7370.0	NA	NA
	2/9/93	Regular	2100.0	6500.0	1300.0	7400.0	NA	NA
	8/19/93	Regular	3200.0	7300.0	1200,0	3700.0	NA	NA
	1/27/94	Regular	1930.0	4580.0	672.0	2390.0	NA	NA
	5/3/95	Regular	NSP	NSP	NSP	NSP	NA	NSP
	8/1/95	Regular	390.0	1300.0	230.0	800.0	NA	5.7
	11/15/95	Regular	880.0	1800.0	300.0	970.0	NA	6.8
	2/23/96	Regular	1500.0	3700.0	620,0	2200.0	NA	21
	5/31/96	Regular	1100.0	1700.0	380.0	990.0	NA	7.5
	8/23/96	Regular	1800.0	3300.0	570.0	2100.0	NA	17
	12/2/96	Regular	5600.0	9600.0	2100.0	9600,0	100	64
	3/12/97	Regular	5500.0	9700.0	2600.0	8200.0	22	62
	6/12/97	Regular	5300,0	34000.0	7500.0	27000.0	180	160
	9/12/97	Regular	1800,0	4400.0	1000,0	3000.0	23	21
	12/10/97	Regular	7600.0	12000.0	2800.0	8200.0	11	71
	3/24/98	Regular	4800.0	7200.0	1200.0	2400.0	4.2	38
	6/23/98	Regular	53.0	680.0	580.0	1400.0	1.4	9.2
	9/30/98	Regular	3.2	90.0	280.0	970.0	2.5	3.6
	12/10/98	Regular	<1.0	1.5	17.0	110.0	1.4	0.31
	3/10/99	Regular	<1.0	<1.0	8.2	110.0	0.62	0.85
	3/10/99	Duplicate	<1.0	<1.0	7.9	110.0	0.66	0.84
	6/10/99	Regular	<1.0	1.1	<1.0	28.0	0.53	0.55
	6/10/99	Duplicate	<1.0	1.8	<1.0	41.0	0.69	0.76
	9/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/9/99	Regulai	NS	NS	NS	NS	NS	NS
	3/9/00	Regular	<1	<1	< 1	9.1	14	1.3
	6/8/00		NS	NS	NS	NS	NS	NS
	9/13/00	-	NS	NS	NS	NS	NS	NS
	12/7/00	_	NS	NS	NS	NS	NS	NS
MW-2 <sup>T</sup>	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	100.0	12.0	3.0	13.0	NA	NA
	1/27/94	Regular	< 1	1.2	2.0	2.5	NA	NΛ
MW-3	8/10/92	Regular	304.9	2099.0	6760.0	1586.0	NA	NA
	2/9/93	Regular	130.0	< 10	< 10	190.0	NA	NA NA
	8/19/93	Regular	560.0	3100.0	630.0	1900.0	NA	NA
	1/27/94	Regular	1070,0	5380.0	510.0	3120.0	NA	NA
	5/4/95	Regular	770.0	3300.0	470.0	1800.0	NA	NA
	8/1/95	Regular	490.0	2900.0	890.0	1600,0	NA	14
	11/15/95	Regular	250.0	1000.0	180.0	440.0	NA	2.9
	2/23/96	Regular	120.0	810.0	170.0	560.0	NA	4
	5/31/96	Regular	670.0	3900.0	1200.0	2300.0	NA NA	15
	8/23/96	Regular	330.0	2200.0	590.0	1500.0	NA NA	12
		_	220.0		1	1000.0	1	L
	12/2/96	Regular	1	1800.0	670.0	1	0.89	7.4
	3/12/97	Regular	370.0	2000.0	960.0	1400.0	1.8	11
	6/12/97	Regular	860.0	4800.0	1700.0	2600 0	1.9	20
	9/11/97	Regular	770.0	3000.0	1600.0	1900.0	1.6	16
	12/10/97	Regular	240.0	740.0	500.0	450.0	0.59	5.3
	3/24/98	Regular	140.0	630.0	360.0	310.0	0.56	3.9
	6/23/98	Regular	100.0	720.0	350,0	490.0	0.40	4,9
	9/30/98	Regular	42.0	470.0	450.0	530 0	1.0	3.8
	12/10/98	Regular	13.0	220.0	160.0	290.0	1.3	0.43

Table 4
Cumulative BTEX and TPH Analytical Results for Groundwater Samples
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgran	ns per liter, ug/L	•	milligrams p	
MW-3	3/10/99	Regular	3.2	7.4	42.0	32.0	0.2	0.44
	6/10/99	Regular	1.7	3.1	<1.0	36.0	<0.20	0.18
	9/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	<0.10
	12/9/99	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.10
	3/9/00	Regular	< 1	< 1	< 1	< 1	0.32	< 0.1
	6/8/00	Regular	< 1	< 1	< 1	<1	<0.22	< 0.1
	9/13/00	Regular	< 1	< 1	< 1	< 1	<0.2	< 0.1
	12/7/00	Regular	< 1	< 1	< 1	< 1	<0.25	< 0.1
MW-4	8/10/92	Regular	2594.0	10360.0	2160.0	6740.0	NA	NA
	2/9/93	Regular	5200.0	15000.0	2200,0	10000.0	NA	NA.
	8/19/93	Regular	3000.0	12000.0	< 2000	7000.0	NA	NA NA
	1/27/94	Regular	NSP	NSP	NSP	NSP	NA	NSP
	5/3/95	Regular	NSP	NSP	NSP	NSP	NA NA	NSP
	8/1/95	Regular	5700.0	17000,0	3500.0	13000.0	NA NA	120
	11/15/95	Regular	490.0	1600.0	310.0	1100.0	NA NA	5.2
	2/23/96	Regular	360.0	2800.0	560.0	2500.0	NA NA	3.2 18
	5/31/96	Regular	84.0	830.0	280.0	1100.0	NA	6.2
	8/23/96	Regular	110.0	1400.0	430.0	1800.0	NA NA	9.8
	12/2/96	Regular	0.091	2000.0	1800.0	7200.0	56	43
	3/12/97	Regular	220.0	1500.0	1500.0	4400.0	2 <b>7</b>	27
	6/12/97	Regular	47.0	270.0	360.0	950.0	2.5	6.2
	9/12/97	Regular	92.0	840.0	670.0	2100.0	15	
	12/10/97	Regular	230.0	750.0	970.0	2300.0	3.7	7.6
	3/24/98	Regular	150.0	510.0	270.0	620.0	1.2	16
	6/23/98	Regular	160.0	890.0	590.0	1600.0	0.69	5.6
	9/30/98	Regular	80.0	180.0	370.0	840.0	2.0	10
	12/10/98	Regular	28.0	70.0	210.0	960.0	9.3	3.9
	12/10/98	Duplicate	26.0	62.0	180.0	830.0	3.9	4.3
	3/10/99	Regular	8.0	20.0	250.0	1400.0	13.0	4.3
	6/10/99	Regular	<1.0	<1.0	12.0	12.0		13
	9/14/99	Regular	< 1.0	< 1.0	3.3	13.1	0.44	0.63
	12/9/99	Regular	< 1	2.5	2.3	20.1	0.35	0.17
	3/10/00	Regular	< 1	<1	< 1	3.6	2	0.53
	6/8/00	Regular	< 1	<1	< 1	1 1	2.6	0.15
	9/13/00	Regular	< 1	<1	< I	< 1	0.44	0.23
	12/7/00	Regular	< 1	<1		< 1	0.61	<0.1
MW-5	8/10/92	Regular	< 4	< 4	1.3 < 4	< 1	0.53	0.16
	2/9/93	Regular	< 2	< 2		< 4	NA	NΛ
	8/10/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	1/27/94			1	< 2	< 6	NA	NA
	5/3/95	Regular	8.7	29.9	4.0	11.3	NA	NA
	8/1/95	Regular	3.7	5.3	0.9	4.6	NA	NA
		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	31.0	86.0	10.0	20.0	NA	NΛ
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
l	12/2/96	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	3/12/97	Regular	< 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

Table 4
Cumulative BTEX and TPH Analytical Results for Groundwater Samples
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре	-	microgran	ns per liter, ug/L		milligrams p	er liter, mg/L
MW-5	6/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	9/30/98	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
	3/9/99	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	<0.1
	6/10/99	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	<0.1
	9/14/99	Regular	<1.0	<1.0	<1.0	<2.0	<0.20	<0.10
	12/9/99	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.10
	3/9/00	Regular	< 1	<	< 1	< 1	0.55	< 0.1
	6/8/00	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	9/13/00	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	12/7/00	Regular	< 1	< 1	< 1	<1	< 0.25	< 0.1
MW-6	8/10/92	Regular	NS	NS	NS	NS	NA.	NS
	2/9/93	Regular	7000.0	19000.0	3100.0	7200.0	NA	NA NA
	8/19/93	Regular	8100.0	19000.0	3500.0	6400.0	NA NA	NA NA
	1/27/94	Regular	7960.0	20200.0	3830.0	6150.0	NA NA	l
	5/4/95	Regular	11000,0	17000.0	2900.0	6000,0	NA NA	NA NA
	8/1/95	Regular	8300.0	12000.0	2500.0	5100.0	NA NA	NA 60
	11/15/95	Regular	8900.0	17000.0	2900.0	5500.0	NA NA	1
	2/23/96	Regular	8100.0	10000.0	2300.0	4000.0	NA NA	57
	5/31/96	Regular	83.0	150.0	15.0	51.0	NA NA	58
	5/31/96	Duplicate	87.0	160.0	13.0	47.0	NA NA	0.57
	8/23/96	Regular	31.0	28.0	9.4	7.9	NA NA	0.52
	12/2/96	Regular	< 1	< 1	< 1	1.7	5.6	0.46
	3/12/97	Regular	12.0	< 5	6.8	18.0	12	< 0.1
	6/12/97	Regular	1900.0	1400.0	410.0	310.0	7.8	< 0.5
	9/11/97	Regular	11.0	1.3	3.4	< 1	1	7.4
	12/10/97	Regular	3.0	4.2	1.2	3.9	1.7	< 0.1
	3/23/98	Regular	3.6	< 1	4.0	3.9 < 1		0.14
	6/23/98	Regular	170.0	4.1	15.0	7.2	< 0.2	< 0.1
	9/30/98	Regular	1000.0	420.0	140.0	270.0	1.2	0.51
	12/10/98	Regular	7.6	6.6	1.7	5.8	4.0	3,3
	3/10/99	Regular	2500.0	930.0	590.0	1	2.0	< 0.1
MW-7	8/10/92	Regular	NS	NS	NS	1400.0	11.0	13
,,,,,	2/9/93	Regular	< 2	< 2	< 2	NS	NA	NS
	8/19/93	Regular	< 2	3.0	< 2	< 6	NA	NA
	1/27/94	Regular	1.1	< 1		< 2	NA	NA
	5/3/95	Regular	52.0	3.4	< 1	< 1	NA	NA
	8/1/95	Regular	22.0	2.2	0.7	2.8	NA	NA
	11/15/95	Regular	8.4		0.9	2.8	NA	< 0.1
	2/23/96	Regular		0.8	< 0.3	0.9	NA	< 0.1
	2/23/96		< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	5/31/96	Duplicate Regular	< 0.3 29.0	< 0.3	< 0.3	< 0.6	NA	< 0.1
	8/23/96	_		83.0	10.0	21.0	NA	0.25
	1	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 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	< 0.2	< 0.1
	3/23/98	Regular	<1	< 1	< 1	< 1	< 0.2	< 0.1
	6/23/98	Regular	< 1	<1	< }	< 1	< 0.2	< (), 1
	9/30/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/98	Reguiar	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1

Table 4
Cumulative BTEX and TPH Analytical Results for Groundwater Samples
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgran	is per liter, ug/L			er liter, mg/L
MW-7	3/9/99	Regular	<1.0	<1.0	<1.0	<1.0	4.7	< 0.1
	6/10/99	Regular	<1.0	<1.0	<1.0	<1.0	< 0.20	< 0.1
	9/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	1
	12/9/99	Regular	< 5	< 5	< 5	< 5	1.8	<0.10
	3/9/00	Regular	< 1	<1	< 1	<1	0.66	< 0.5
	6/8/00	Regular	< }	< 1	<1	<1		< 0.1
	9/13/00	Regular	< 1	<1	< 1	<1	< 0.21	< 0.1
	12/7/00	Regular	< 1	<1	<1		< 0.2	< 0.1
MW-8	8/10/92	Regular	NS	NS	NS	< 1	< 0.29	< 0.1
	2/9/93	Regular	< 2	< 2		NS	NA	NS
	8/19/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	1/27/94	Regular	< 1	<1	< 2	< 2	NA	NA
	5/3/95	Regular	3.0	4.9	<	< 1	NA	NA
	8/1/95	Regular	3.1		0.8	3.7	NA	NA
	8/1/95	Duplicate	3.6	1.2	0.5	1.6	NA	100.00
	11/15/95	Regular	< 0.3	1.5	0.5	1.5	NA	< 0.1
	2/23/96	Regular	< 0.3	0.5	< 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	l	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96		< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	3/12/97	Regular	< 1	1 >	< 1	<1	< 0.1	< 0.1
	6/12/97	Regular	< 1	< 1	< 1	1.8	< 0.1	< 0.1
	9/11/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	12/10/97	Regular	< 1	< 1	< 1	< 1	0.1	< 0.1
	3/23/98	Regular	< 1	< 1	< 1	< 1	0.3	< 0.1
	ŀ	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	6/23/98 9/30/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	12/10/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	3/9/99	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
		Regular	<1.0	<1.0	<1.0	<1.0	< 0.20	<0.1
	6/10/99	Regular	<1.0	<1.0	<1.0	<1.0	< 0.20	<0.1
	9/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/99 3/9/00	December	NS	NS	NS	NS	NS	NS
	6/8/00	Regular	< 1	< 1	< 1	< 1	0.55	<0.1
	9/13/00		NS NS	NS NC	NS	NS	NS	NS
į	12/7/00	_	NS	NS NS	NS NS	NS NS	NS	NS
MW-9	4/22/93	Regular	570.0		NS 150	NS	NS	NS
	7/15/93	Regular	121.0	380.0	< 50	870.0	NA	NA
	8/19/93			7.3	3.0	458.0	NA	NA NA
J	1/27/94	Regular	390,0	290.0	40.0	250.0	NA	NA
	5/3/95	Regular	327.0	357.0	51.1	293.0	NA	NA
ļ	8/1/95	Regular	380.0	110.0	19.0	120.0	NA	NA
		Regular	660.0	410.0	91.0	310.0	NA	6.2
	11/15/95	Regular	240.0	24.0	11.0	140.0	NΛ	1.5
1	11/15/95	Duplicate	170.0	18.0	0.01	120.0	NA	1.9
}	2/23/96	Regular	170.0	18.0	2.3	160.0	NA	4.3
	5/31/96	Regular	120.0	16.0	3.0	200.0	NA	NA
J	8/23/96	Regular	82.0	13.0	6.0	270 0	NA	4
	8/23/96	Duplicate	76.0	14.0	4.8	250,0	NA	4.4
ļ	12/2/96	Regular	61.0	< 25	< 25	210.0	2.6	2.8
	12/2/96	Duplicate	86.0	13.0	2,4	270.0	3.7	2.9
J	3/12/97	Regular	30.0	48.0	420,0	880.0	8.2	19
	6/12/97	Regular	4.7	2.1	0,11	97.0	2.6	2.2

Table 4
Cumulative BTEX and TPH Analytical Results for Groundwater Samples
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Type		microgram	s per liter, ug/L		milligrams pe	r liter, mg/L
MW-9	6/12/97	Duplicate	< 5	< 5	6,6	69.0	5.2	1.9
	9/12/97	Regular	2.1	2.3	2.1	120.0	1.2	1.9
	12/10/97	Regular	4.9	9.0	6.8	62.0	0.86	0.92
	3/24/98	Regular	< 1	< 1	< 1	26.0	0.9	1
	6/23/98	Regular	2.4	22.0	10.0	36.0	< 0.2	0.25
	9/30/98	Regular	1.1	5.5	21.0	59.0	0.27	0.27
	12/10/98	Regular	< 1.0	1.9	17.0	79.0	5.1	0.25
	3/10/99	Regular	<1.0	<1.0	5.7	68,0	< 0.2	0.22
	6/10/99	Regular	<1.0	1.8	1.8	71.0	< 0.20	0.43
	9/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/99	_	NS	NS	NS	NS	NS	NS
	3/9/00	Regular	< 1	< 1	< 1	64.0	0.66	1.3
	6/8/00	-	NS	NS	NS	NS	NS	NS
	9/13/00	_	NS	NS	NS	NS	NS	NS
	12/7/00	_	NS	NS	NS	NS	NS	NS
MW-10	8/19/93	Regular	190.0	460.0	< 200	240.0	NA	NA
	1/27/94	Regular	13.4	4.0	5.5	33.6	NA	NA
	5/4/95	Regular	980.0	15.0	11.0	84.0	NA	NA
	8/1/95	Regular	1300.0	32.0	32.0	100.0	NA	3.6
	11/15/95	Regular	1000.0	24.0	15.0	36.0	NA	1.7
	2/23/96	Regular	810.0	23.0	27.0	44.0	NA	2.4
	5/31/96	Regular	700.0	24.0	34.0	28.0	NA	2
	8/23/96	Regular	290.0	3.4	6.4	13.0	NA	1.4
	12/2/96	Regular	280.0	1.3	17.0	8.0	0.94	0.97
	3/12/97	Regular	110.0	< 5	17.0	< 5	0.61	0.57
	6/12/97	Regular	150.0	12.0	30.0	< 5	0.68	< 0.5
	9/12/97	Regular	87.0	2.3	26.0	2.7	0.76	0.33
	9/12/97	Duplicate	87.0	2.4	26.0	2.8	0.79	0.33
	12/10/97	Regular	41.0	9.8	12.0	7.7	1.1	0.28
	12/10/97	Duplicate	36.0	8.5	10.0	6.7	1.2	0.24
	3/23/98	Regular	36.0	< 5	5.9	< 5	1.6	< 0.5
	3/23/98	Duplicate	36.0	< 1	5.3	1.3	1.7	0.18
	6/23/98	Regular	37.0	< 5	< 5	< 5	2.1	< 0.5
	9/30/98	Regular	84.0	3.2	30.0	2.2	1.4	0.36
	12/10/98	Regular	29.0	1.0	7.0	1.0	0.86	0.18
	3/9/99	Regular	28.0	<5.0	5.8	<5.0	0.92	<0.5
	6/10/99	Regular	17.0	<1.0	<1.0	<1.0	0.30	0.16
	9/14/99	Regular	10.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/9/99	Regular	23.0	< 1	< 1	1.2	0.44	0.16
	3/10/00	Regular	300.0	4.3	6.6	43.2	1.2	0.85
	6/8/00	Regular	78.0	1.7	7.2	9.0	0.67	0.74
	9/13/00	Regular	23.0	1.5	1.1	2.9	(	Į.
	12/7/00	Regular	7.2	<1	<1	<1	1.6	0.41
MW-11	8/19/93		< 2	< 2	< 2			
1v1 vv - 1 1	i	Regular	i	I.		< 2	NA	NA NA
	1/27/94	Regular	< 1 ← 0.2	< 1	< 1	< 1	NA NA	NA
	5/4/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	8/1/95	Regular	44.0	29.0	5.5	13.0	NA	0.2
	11/15/95	Regular	190.0	2.8	6.2	11.0	NA	0.4
	2/23/96	Regular	49.0	1.2	0.5	4.0	NA	0.25
	5/31/96	Regular	300.0	83.0	12.0	28.0	NA	0.8
	8/23/96	Regular	100.0	1.2	0.3	4,7	NA	0.26
	12/2/96	Regular	970 0	-: 5	6.0	8.1	2	1.3

Table 4
Cumulative BTEX and TPH Analytical Results for Groundwater Samples
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	трн-с
Well	Date	Type		microgram	s per liter, ug/L		milligrams pe	r liter, mg/L
MW-111	3/12/97	Regular	130.0	< 5	13.0	5.8	0.42	< 0.5
	3/12/97	Duplicate	100.0	< 5	10.0	5.1	0.43	< 0.5
ļ	6/12/97	Regular	150.0	23.0	19.0	< 5	1.1	0.55
	9/12/97	Regular	220.0	15.0	27.0	13.0	1	0.46
MW-IIA	3/24/98	Regular	24.0	5.0	< 5	< 5	0.28	0.14
	6/23/98	Regular	9.9	< 5	< 5	< 5	< 0.2	< 0.5
	9/30/98	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
	3/10/99	Regular	<5	<5	<5	<5	0.3	< 0.5
	. 6/10/99	Regular	<1.0	<1.0	<1.0	<1.0	< 0.20	< 0.10
ļ	9/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/99	Regular	< 5	< 5	< 5	< 5	< 0.2	< 0.1
	3/9/00	Regular	1.2	< 1	< 1	< 1	0.43	< 0.1
	6/8/00	Regular	3.6	< 1	< 1	< 1	0.37	< 0.1
	9/13/00	Regular	1.4	< 1	< 1	< 1	0.36	< 0.1
	12/7/00	Regular	26	<1	<}	3.3	0.3	0.12
MW-12	3/24/98	Regular	100.0	11.0	6.0	8.0	0.29	0.41
	6/23/98	Regular	88.0	< 5	< 5	< 5	< 0.2	< 0.5
	6/23/98	Duplicate	89.0	< 5	< 5	< 5	0.31	< 0.5
	9/30/98	Regular	260.0	3.0	1.2	7.9	<0.20	0.62
	12/10/98	Regular	160.0	<1.0	<1.0	1.2	0.21	0.36
	3/10/99	Regular	160.0	1.1	<1.0	2.9	0.38	0.45
	6/10/99	Regular	49.0	1.4	<1.0	<1.0	0.22	0.13
	9/14/99	Regular	75,0	< 1.0	< 1.0	< 2.0	< 0.20	0.23
	12/9/99	Regular	64.0	< 1	< 1	< 1	< 0.2	0.21
	3/10/00	Regular	93.0	< 1	< 1	<	< 0.2	0.21
	3/10/00	Duplicate	99.0	< 1	< 1	< 1	0.22	0.22
	6/8/00	Regular	62.0	< 1	< 1	< 1	< 0.2	< 0.1
	9/13/00	Regular	34.0	< 1	< 1	< 1	0.23	< 0.1
	12/7/00	Regular	27	<1	2.9	1.9	< 0.25	<0.1
MW-12D	7/2/99	Regular	< 5	< 5	< 5	< 5	< 0.20	<0.10
	9/14/99	Regular	< 1.0	< 1.0	0.1>	< 2.0	< 0.20	< 0.10
	12/9/99	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	3/9/00	Regular	< 1	< 1	< 1	< 1	0.24	< 0.1
	6/8/00	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	9/13/00	-	NS	NS	NS	NS	NS	NS
	12/7/00		NS	NS	NS	NS	NS	NS
MW-13	7/2/99	Regular	1500.0	23.0	750.0	58.0	2.2	5.1
	9/14/99	Regular	860.0	16.0	450.0	34.4	2.1	3.1
	12/9/99	Regular	430.0	16.0	410.0	40.9	0.46	3.2
	3/10/00	Regular	88.0	2.8	200.0	1.3	1.9	0.99
	6/8/00	Regular	6.0	< 1	63.0	3.3	1.1	0.91
	9/13/00	Regular	<1.0	<1.0	3.4	<1.0	0.44	0.12
	12/7/00	Regular	<1	<1	<1	<1	0.43	<0.1

Table 4

Cumulative BTEX and TPH Analytical Results for Groundwater Samples
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Type		microgram		milligrams per liter, mg/L		
OW-4	6/10/99	Regular	<1.0	<1.0	<1.0	4.4	< 0.2	< 0.10
	9/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/99	Regular	<1.0	0.1>	<1.0	<1.0	< 0.2	< 0.1
	3/9/00	Regular	<1.0	<1.0	<1.0	<1.0	0.25	< 0.1
	6/8/00	Regular	<1.0	<1.0	<1.0	<1.0	< 0.21	< 0.1
	9/13/00	Regular	<1.0	<1.0	<1.0	<1.0	< 0.2	<0.1
	12/7/00		NS-D	NS-D	NS-D	NS-D	NS-D	NS-D

<sup>1</sup> Well plugged and abandoned 7/1/99

NA=Not Analyzed

NS=Not Sampled

NS-D=Not Sampled because Well was Dry

NSP=Not Sampled due to Phase Separated Hydrocarbons

Table 5
Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for Monitor Wells MW-5, MW-10, MW-11A, MW-12, MW-12D, and OW-4
BJ Services Company, U.S.A.

#### Hobbs, New Mexico

				Methane
Well	Date	Nitrate <sup>1</sup> (mg/L)	Sulfate <sup>1</sup> (mg/L)	(mg/L)
	3/23/98	3.87	190	< 0.0012
	3/9/99	<0.1	195	< 0.0012
	6/10/99	4.73	209	< 0.0012
Ī	9/14/99	4.3	210	< 0.0012
MW-5	12/9/99	4.2	210	< 0.0012
	3/9/00	5.3	260	< 0.0012
Ţ	6/8/00	4.7	240	< 0.0012
	9/13/00	3.93	200	< 0.0012
	12/7/00	3.27	160	< 0.0012
	3/23/98	0.07	320	0.91
	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
MW-10	313133	<b>\</b>	223 <sup>3</sup>	0.055
101 44 -10	9/14/99	<0.10	160	0.0049
	12/9/99	0.49	170	0.0039
	3/10/00	0.1	160	0.0056
	6/8/00	<0.1	150	0.031
	9/13/00	<0.1	160	0.031
	12/7/00	<0.1	190	0.17
	3/23/98	< 0.05	190	0.14
	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	0.004
	3/10/99	<0.12	2273	0.094
MW-11A	6/10/99	<0.1	181	0.0036
	9/13/99	0.22	250	< 0.0012
	12/9/99	<0.1	290	0.0079
	3/9/00	0.11	270	0.037
	6/8/00	<0.1	240	0.0069
	9/13/00	<0.1	320	< 0.0012
	12/7/00	<0.1	260	0.0096
L			<u> </u>	

Table 5
Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for Monitor Wells MW-5, MW-10, MW-11A, MW-12, MW-12D, and OW-4
BJ Services Company, U.S.A.

#### Hobbs, New Mexico

				Methane
Well	Date	Nitrate <sup>1</sup> (mg/L)	Sulfate <sup>1</sup> (mg/L)	(mg/L)
	3/23/98	< 0.05	240	< 0.0012
	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
	3/10/99	<0.12	193 <sup>3</sup>	<0.0012
MW-12	6/10/99	<0.1	217	< 0.0012
•	9/14/99	< 0.10	230	< 0.0012
	12/9/99	< 0.1	180	< 0.0012
	3/10/00	<0.1	210	< 0.0012
	6/8/00	<0.1	220	< 0.0012
	9/13/00	<0.1	240	< 0.0012
	12/7/00	<0.1	260	< 0.0012
	7/2/99	2.1	249	0.0015
	9/14/99	< 0.10	200	0.0065
MW-12D <sup>4</sup>	12/9/99	<0.1	210	0.0015
	3/9/00	0.14	200	< 0.0012
	6/8/00	<0.1	240	< 0.0012
	6/10/99	3.96	192	< 0.0012
	9/14/99	3.5	200	< 0.0012
OW-4 <sup>5</sup>	12/9/99	3.4	200	< 0.0012
UW-4	3/9/00	3.6	200	< 0.0012
	6/8/00	3.4	190	< 0.0012
	9/13/00	3.21	170	<0.0012

<sup>1=</sup>By EPA Method 300, except as noted

<sup>2=</sup>By EPA Method 353.3

<sup>3=</sup>By EPA Method 375.4

<sup>4=</sup>Well not sampled after 6/8/00

<sup>5=</sup>Well not sampled after 9/13/00

mg/L = milligrams per liter

#### **APPENDICES**

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"Use or disclosure of data contained on this sheet is subject to the restriction specified at the beginning of this document."

#### APPENDIX A

Field Data Sheets

FORM GW-1 (Rev 5/8/99 - wan)

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: ML -3

1 0001	ECT INFO	DMAT	ON			· · · · · · · · · · · · · · · · · · ·	·			
	lumber: 128			nar: 1215		Data: //	7.00		Time: 8:23	
	umber.							<del></del>	rime. a	
	ocation:					Weather:				
2. WELL			[							
	Diameter:									
·	natheter.							Other:		
Total Depth of Well: () 2 1 feet From: () Top of Well Casing (TOC) () Top of Protective Casing () Other:										
Depth to Static Water: 57.15 feet From:  Top of Well Casing (TOC) Top of Protective Casing Other:  Depth to Product: Top of Well Casing (TOC) Top of Protective Casing Other:										
	f Water Column				e: 7 · C					
Lengin o	i vvater Column	· <del></del>	_ 1661	AACII AQIUIIII	<u> (;                                   </u>	yaı		erval (from GS) ch well = 0.167 ga		
3. PURC	SE DATA	,	1							
Purge M	, Di Bailer	, Size:	□ Bladd	er Pump 🔲 2	" Submersible	Pump Q 4" S	Submersible Pu	mp		
1	a Centr s: Pump/Bailer	☐ Stainle	ss ØPV0	C Teflon	® □ Other:				Equipment Model(s)	
					☐ Field Clea	ned Dispo	osable	1. <del> / 5</del>	t-61210	
Materials	s: Rope/Tubing					eaned Disp	oosable	2		
Was wel	I purged dry?	☐ Yes	Ø No	Pumpi	ing Rate:	gal	/min	3.	_	
Time	Cum. Gallons Removed	рН	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments	
81990	1.16	7.65	16.01	1268	52.6	6 65	-		Caren	
8:43	يا نن اي	7.51		1244	د برن	695	, speciment	•	Ei co-	
7:40	3-3 5	7-46	17.74	115	1.5. 3	6.3	_		Ci can	
							3 45	<u> </u>		
<u> </u>		-								
			<u> </u>		1					
4. SAM	PLING DA	IA <sub>n</sub>	C) B1: 14: B	[] 2" 5		5.40.0.4			chemical Analyses	
Method(	s): Bailer, Si		Inertial Lift F	Pump 🚨 Othe		mp U 4" Subi	mersible Pump		ous Iron: mg/L	
Material	s: Pump/Bailer		ess ⊡ <sup>X</sup> PV ated □ Pre		n® 🖸 Other:_	aned 🕮 Disc	nosable	DO:	mg/L	
Material	s: Tubing/Rope	□ Polye	thylene 🗆	Polypropylen	e 🔾 Teflon®			Nitra	AND THE PROPERTY OF THE PARTY O	
Depth to	Water at Time			,		red? 🗆 Yes	,	C. Jr		
Sample	10: MLJ -	1	Sample 1	Time: §	45	# of Contai	iners:_5	Sulfa -	ite:mg/L	
	Duplicate Sample Collected? ☐ Yes Ď No ID: mg/L									
5. COM	5. COMMENTS									
Note: Include	comments such	as well con	dilion, odor,	presence of ^	VAPL, or other	items not on th	e field data she	e/		

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-L

·			1011							
4	ECT INFO			-16		, j	رد. ٦		<u></u>	
Project N	lumber: 125	5-	Task Numb	per: Ula		Date: / /	0 12 0		Time: 7	
Client:	BUSUC	<del>.</del>				Personnel:	UCATO	<u> </u>	Time: 7:37	
Project L	ocation:	ڏيوا يوا فر				Weather: <del>'_</del>	cc.	->10/		
2. WELL	DATA	·								
Casing D	)iameter:	inch	es	Type: pr	/C 🗅 Stainle	ss Q Galv. St	eel 🗆 Teflon®	Other:		
	)iameter:	inch		Type: cr	/C 🔾 Stainle	ss 🔾 Galv. St	eel 🖸 Teflon®	Other:		
Total De	pth of Well:( <u></u> _	クー15 fee	et	From: 🖼 T	op of Well Cas	ing (TOC)	Top of Protect	tive Casing 🚨 O	ther:	
Depth to Static Water: 57.35 feet From: 🛱 Top of Well Casing (TOC) 🗅 Top of Protective Casing 🗅 Other:										
Depth to Product: feet										
Length of Water Column: 3 · / feet Well Volume: gal Screened Interval (from GS):										
Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft  3. PURGE DATA										
Purge M	∰ Bailer	, Size: /	l _ □ Bladdi	er Pump 🛚 2	" Submersible	Pump 🗆 4" S	Submersible Pu	mp		
	Centr				nertial Lift Pun B D Other:	np 🗅 Other:			Equipment Model(s)	
Materials	s: Pump/Bailer	Dedica	ated O Prep	ared Off-Site	☐ Field Clea	ned 👊 🗘 Dispo		1.	SX-610P	
Materials	s: Rope/Tubing	☐ Polyet☐ Dedica	hylene □ t ated □ Pre	Polypropylene epared Off-Site	: □:Teflon®o e:□:Field:Cle	O Other:	oosable	ر 2.		
Was wel	I purged dry?					gal				
T:	Cum. Gallons	·		Spec.	T	Dissolved		3. Other:		
Time	Removed	рН	Temp	Cond.	Eh	Oxygen	Turbidity		Comments	
9:25	1.3%	7.62	1672	1342	7.7	7.42			<	
9:01	2.26	7.66	17.5%	14/1	-49.3	63/		ه.	ci ec-	
9:09	3.16	7.48	17.45	1382	-) 14	7.15	4.85		Cher	
							1			
	<u> </u>			<u> </u>						
4. SAM	PLING DA	$TA_{j^{(1)}}$						Geoc	hemical Analyses	
Method(	s): ABailer, Si.	ze: <u>/</u> : Pump 🚨		'ump □ 2" Si 'ump □ Othe		mp 🛚 4" Subi	mersible Pump	Ferro	ous fron: mg/L	
Material	s: Pump/Bailer		ess 🗹 PV		® Other:			DO:	-	
NA mining	s: Tubing/Rope				e □ Field Cle e □ Teflon®	1 . ,	posable	. 50.	mg/L	
I		☐ Dedic	ated 🗅 Pr			eaned 🞾 Dis	sposable	Nitra	te:mg/L	
	Water at Time			·		ed? 🗆 Yes	_	Sulfa	ite:mg/L	
1	Sample ID: M W = (1 Sample Time: 2) . / 3 # of Containers: 5									
Duplicat	te Sample Colle	cted?	⊡ Yes ⊠i	No ID				- Aikai	inity: mg/L	
5. COM	5. COMMENTS									
Note. Include	comments such	as well con	dition, odor,	presence of N	IAPL, or other	items not on th	e field data she	el		

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-5

1 PRO I	ECT INFO	RMAT	ION			<del></del>				
i	lumber: / 1-5			er ofs		Date: //	·7· ) 4		Time: 9:15	
Client:	<b>ふ</b> ず:	51/65	. work i varrie			Personnel:	0 とどり	6.128-	7,11107	
Project L	ocation:	2 کی وارد				Weather:	والمحار و	لهاد"		
2. WELL	. DATA									
Casing D	iameter:	inch	es	Гуре: ф	VC 🗅 Stainte	ess 🖸 Galv. St	eel 🗆 Teflon®	Other:		
	Diameter:	inch		Type: 👊 P	VC 🗆 Stainle	ess 🗓 Galv. St	eel 🔾 Teflon®	Other:		
	oth of Well:							ive Casing 🚨 O		
li	Static Water:	÷							Other:	
	Depth to Product: feet									
Length o	f Water Column	1: <u> </u>	l_feet	Well Volum	ne:_/	gal		erval (from GS) h well = 0.167 ga		
3. PURC	SE DATA	. 1								
Purge M	ethod: D Centr	r, Size:	□ Bladde	er Pump 🖸 tic Pump 🖸	2" Submersible	Pump 🗀 4" S	Submersible Pur	mp	For income AM A 4 4	
Materials	s: Pump/Bailer	☐ Stainle	ss ØPVC	☐ Teflor	n® □ Other:				Equipment Model(s)	
	s: Rope/Tubing				e LiField Clea e LiTeflon®o	aned Dispo	osable	1. <u>\\( \frac{\\ \frac{\\ \}{\\ \} \} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \</u>	F-61010	
		☐ Dedica	ited □ Pre	pared Off-Si	te 🔾 Field Cle	eaned of Disp		2		
Was wel	I purged dry?	<del>, , , , , , , , , , , , , , , , , , , </del>	D <sub>X</sub> No		ing Rate:	gal	/min	3.		
Time	Cum. Gallons Removed	рН	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments	
9:21	1.26	7.45	17.33	1235	555	7.13	-	-	6.6	
9,22	2.06	7.48	17.15	17_31	つじ、3	7.47	-	-	CCEC	
5:24	3-26	-7.52	17.23	17.33	77.8	7.75	6.52		<(r_	
		ļ						·		
4. SAME	PLING DA	TA "						Geoc	chemical Analyses	
Method(	s): Ø Bailer, Si	ze: 💹 🔰		ump 🗆 2" S ump 🗅 Othe		imp □ 4" Sub	mersible Pump	Ferro	ous Iron: mg/L	
ļ	s: Pump/Bailer	☐ Stainl	ess ඒ PV	□ Teflo	in® 🛛 Other:_			DO:	<.5	
Material	s: Tubing/Rope	☐ Polye	thylene 🗆	Polypropyle	ie 🖸 Field Cle ne 🗓 Teflon®	Other:	oosable 	DQ.	mg/L	
l .						leaned 🚨 Dis		Nitra	te:mg/L	
	Water at Time	of Sampl			Field Filter ころら	red? 🗆 Yes	$\sim$	Sulfa	ate:mg/L	
	Sample ID: Sample Collected? Sample Time: # of Containers: 7  Alkalinity: mg/L									
Duplicate Sample Collected? II Fes Q/ No ID.										
5. COMMENTS										
Note: Include	comments such	as well con	dition, odor,	presence of	NAPL, or other	items not on th	e field data shee	<u></u>		
[										

FORM GW-1 (Rev 6/8/99 - wah)

Signature

Signature

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-7

4 550	FOT INFO	DAAAT	ON				<del></del>		
	ECT INFO			کا ہ			6.7.10	_	Time: 51-33
	lumber: 12 13751	7 3	Fask Numb	er: Ot		Date: <u>' '</u>	n trans		Time: 1 - ) -
Client:						Personnel:	المالي المالية	GAREN	
	ocation: 🙏 o	693				Weather: <del>`</del>		_	
2. WELL		1							
Casing D	liameter:	5inche						Other:	
	liameter:	inch		Type: ੴPV	/C 🗆 Stainle	ss 🖸 Galv. St	eel 🔾 Teflon®	Other:	
Total Depth of Well: From: Top of Well Casing (TOC) Top of Protective Casing Other:									
Depth to Static Water: 57.77 feet From: (a) Top of Well Casing (TOC) (a) Top of Protective Casing (a) Other:									
	Product:						Top of Protect	ctive Casing Q O	ther:
Length o	f Water Column	: <del>4-45</del>	_ feet	Well Volume	e: 3.75	gal		erval (from GS)	
0.000							Note. 2-in	on well = 0.167 yal	71t 4-inch weil = 0.667 gal/ft
	SE DATA	i.i : Size: 🖟	□ Bladde	er Pump 🗆 2	" Submersible	Pump 🛛 4" S	Submersible Pu	amp	
Purge M	ethod: Centr	ifugal Pump	🚨 Perista	Itic Pump 🚨 I	nertial Lift Purr	p 🗅 Other:			Equipment Model(s)
Materials	:: Pump/Bailer	☐ Stainle ☐ Dedica	ss ©\PVC ited © Prep	: □ Teflon€ ared Off-Site	Other:  D Field Clea	ned Dispo	osable	1.	SI-610D
Materials	s: Rope Tubing	☐ Polyet	hylene □ l ited □ Pre	Polypropylene pared Off-Site	: 🗓 Teflon® : 🗓 Field Cle	Other:	oosable	•	
Was wel	I purged dry?	☐ Yes	Mo No	Pumpi	ng Rate:	gal	/min	3.	
Time	Cum. Gallons Removed	рН	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
5:41	1.36	7511	17-62	145	8-9.0		_		sim
5:41	2.56	7.13	17.68	1545	45.0	6.74	ر		Clev
5143	3.56	7.41	17.62		121.5	6.93	_	-	(-
<del></del>	<u> </u>		,	17/1-	175,13	10 /			
					<del> </del>	<del> </del>			
<u></u>	·								
4. SAM	PLING DA	TA						Geoc	hemical Analyses
Method(	s): 🖒 Bailer, Si	ze: c Pump 🚨 l		'ump □ 2" Si 'ump □ Othe		mp 🛚 4" Subi	mersible Pump	Ferro	us Iron: mg/L
Material	s: Pump/Bailer		ess 💆 PV		® D Other:_	aned , Disp	annahla	DO:	mg/L
Material	s: Tubing/Rope	☐ Polye	thylene 🛛	Polypropylen	e 🔾 Teflon®			Nitrat	
Denth to	o Water at Time					ed? 🗆 Yes			3.0
	10: Mh Lu -		Sample 1	Time: 52	45	# of Contai	ners:	Sulfa	te:mg/L
Duplicate Sample Collected?   Yes M No ID: mg/L									
5. COMMENTS									
J. OOIVIIVIETT J									
Note: Include	comments such	as well con	dition, odor,	presence of N	NAPL, or other	items not on th	e field data she	et	
	- A. W				<del></del>			E MARK IN PRODUCTION OF THE WAY	and the second s

FORM GW-1 (Rev 5/8/99 - wan)

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FORM GW-1 [Rev 5/8/99 - wah]

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-10.

1. PROJECT INFORMATION										
	e -			211		Date: / L	.7.00		010	
Project N	umber: 12-8	7 <del>/</del> 7	Fask Numb	per:	[	Date:	10 to 01		Fime: 9 155	
					F	ersonnel:	Day C	10000		
	ocation:	حرا واول			\ 	Weather:	- Lanca . ·	7(		
2. WELL	DATA	<b></b>								
Casing D	jameter:	inchi						☐ Other:		
E .	)iameter:	inch		Type: 🖒 P\	/C 🗅 Stainles	s 🗆 Galv. Ste	eel 🗅 Teflon®	Other:		
Total Depth of Well: 6 2 5 feet From: 1 Top of Well Casing (TOC) 1 Top of Protective Casing 1 Other:										
Depth to Static Water: From: 🖒 Top of Well Casing (TOC) 🗅 Top of Protective Casing 🗘 Other:										
	Product:						Top of Protect	ive Casing Q O	ther:	
Length of	f Water Column	:5,4	_ feet	Well Volume	e: 7 65	gal		erval (from GS):		
2 000							IVOIE: 2-INCI	h well = 0.167 gal	/ft 4-inch well = 0.667 gal/ft	
	SE DATA	r. Size:	☐ Bladde	er Pump 🚨 2	" Submersible I	Pump □ 4"S	ubmersible Pur	מת		
Purge Me		ifugal Pump	□ Perista	Itic Pump 🗆 I	nertial Lift Pum			<del></del>	Equipment Model(s)	
Materials	s: Pump/Bailer				□ Other:     □ Field Clear	ned 🔏 Dispo	sable	1. 1/5	T-6100	
Materials	Rope/Tubing				Teflon® (			/		
1	I purged dry?		S.		e 🖸 Field Clea			2		
VVas WCI	Cum. Gallons	U les	7 110	Spec.	ng Rate:	Dissolved	min	3. Other:		
Time	Removed	рН	Temp	Cond.	Eh	Oxygen	Turbidity	Other.	Comments	
12:23	غر. ز	6.52	18.16	3447	86.11	4.50			Chaly	
12/2012	ジェッケ	089	17.53	1843	-121.1	489	-1		Cloudy	
10,04	3.16	6.54	18-01	1864	-/27.7	4.51	366		cloudy	
4. SAMF	LING DA	IA		D 27 C				<u>Geoc</u>	hemical Analyses	
Method(	s): 🛱 Bailer, S G Peristalti	c Pump 🗅		ump 🗆 2°S		np 🖰 4" Subi	mersible Pump	Ferro	us Iron: mg/L	
Material	s: Pump/Bailer				n® Q Other: e Q Field Clea		anabla	DO:	mg/L	
Material	s: Tubing/Rope	Q Polye	thylene 🗆	Polypropylen	e 🔾 Teffon®	Other:	osable		,	
1	Water at Time			epared Off-Si	te	eaned ДDis ed? □ Yes		Nitrat		
			0	Time: / J	, 72 , 72		_	Sulfa	te:mg/L	
	Sample ID: 10 10 Sample Time: 10.05 # of Containers: 19  Duplicate Sample Collected?									
Ouplicate Sample Collected? II Yes 4 No ID										
[5. COM	5. COMMENTS									
ANADO TO TO THE PARTY OF THE PA										
Note: Include	Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet									

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-11-A

li .	ECT INFO	_				/1	7.7.3				
	lumber: 169		Task Numb	oer:	_	Date: 12			Time: 10.33		
	BJS		<del></del>								
Project L	ocation:	ڪوا وال			··············	Weather:	CLEUT	الريادات			
2. WELL	DATA										
Casing D	liameter:	inch	es	Type: p	/C □ Stainles	ss 🖸 Galv. St	eel 🗆 Teflon®	□ Other:			
Screen D	Diameter:	inch					teel 🔾 Teflon®				
	pth of Well:								Other:		
Depth to	Depth to Static Water: 59.29 feet From: Ø Top of Well Casing (TOC) □ Top of Protective Casing □ Other:										
	Depth to Product: feet										
Length o	f Water Column	1: <u>'4 · 3  </u>	_ feet	Well Volume	e:	gal		erval (from GS)			
0 0100	Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft										
3. PURGE DATA											
Purge Method:											
Materials	Materials: Pump/Railer										
Materials	s: Rope/Tubing	☐ Polyet	hylene 🗆	Polypropylene	e ☐ Teflon® (	Other:		,			
1	l purged dry?		ated ⊔iPro		e 🗅 Field Cle	. 1		2			
1123 1101		U res	<del>, , , , , , , , , , , , , , , , , , , </del>		ng Rate:	·	,	3.			
Time	Cum. Gallons Removed	pН	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments		
17135	j. 3 L	7:14	16.93	4229	-72.5	7.25	-	٠.	muddy		
12:37	2.56	7.14	17.57	4756	-76.4	6.07			in uddy		
13:78	3.06	マ・ルン	17.5%	2227	-63,3	مان ج	452	-	(Ce-		
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \							i				
					<del> </del>						
	PLING DA	IA jii	C) D)a-14- 5	Juma Flore	ubmoreible P	D.W.C.		Geog	chemical Analyses		
Method(	(s): Ø Bailer, Si			Pump 🚨 2" Si Pump 🚨 Othe		np Ll4‴Sub ———	imersible Purnp	Ferro	ous Iron: mg/L		
Material	s: Pump/Bailer		less © PV		n® □ Other:		posable	DO:	mg/L		
Material	ls: Tubing/Rope	☐ Polye	thylene 🗆	Polypropylen	e 🗆 Teflon®	Other:					
Į		□ Deak		repared Off-Si	te 🖸 Field CI	•	2	Nitra	ite:mg/L		
	Water at Time		ling:	Fime: / ) :		ed? 🗆 Yes	,~	Sulfa	ate:mg/L		
1	10:1/h/J-5					# of Contain	iners:	Alka	linity: 773 mg/L		
Duplicat	te Sample Colle	ected?	⊔ Yes ⊈	i\́ No ID:					,		
5. COM	5. COMMENTS										
Note: Include	Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet.										

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MIW-12

1 PRO I	ECT INFO	RMAT	ION	<del></del>		<del></del>	· · · · · · · · · · · · · · · · · · ·					
Client:			ask rearrie	,01	Date: 12 1 Ti				Time.			
	ocation:	<del>`                                    </del>				Weather:	ر مريورا	الريهان				
2. WELL												
Casing Diameter: inches Type: ☐ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other:												
Screen Diameter:inches Type: Qi PVC Qi Stainless Qi Galv. Steel Qi Teflon® Qi Other:												
	pth of Well: 151			From: 🗘 Top of Well Casing (TOC) 🖸 Top of Protective Casing 🚨 Other:								
Depth to	Static Water	19.31	feet	From: Top of Well Casing (TOC)  Top of Protective Casing  Other:								
	Product:			From:  ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:								
			_ feet	Well Volume	e:	gai	Screened Inte	erval (from GS):	:			
	Length of Water Column: / 6 feet Well Volume: 3 ) gal Screened Interval (from GS):											
3. PURC	SE DATA	711	m.e	B 57.5	or Do Las 11.	<b>n</b>						
Purge M	ethod: D Centr	, Size: ifugal Pump	_ ⊔ Bladde □ Peristal	er Pump 🚨 2 Itic Pump 🚨 I	" Submersible Inertial Lift Pum	Pump 🗓 4" S ip 🗓 Other:	Submersible Pur	np 	Equipment Model(s)			
Materials	s: Pump/Bailer	☐ Stainle	ess @PVC	: ☐ Teflon@	D Cl Other: Cl Field Clea	ned Disp	nsahle	. 10	7-61010			
Materials	s: Rope/Tubing	☐ Polyet	hylene 🔾 l	Polypropylene	□ Teflon®	Cl Other:		ř.				
					e 🖸 Field Cle	•		2				
vvas wei	Il purged dry?	U Yes	□ No		ng Rate:	·	/min	3				
Time	Cum. Gallons Removed	рН	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments			
12:55	1.56	7.51	排行行	44	-111.5	636						
1857	2.56	7.23	17-71	1555	-95.5	613						
1259	L L	7.13	17.74	<del> </del>	-79.5	5.88	333					
17.7	3 3	1.12		7 ((2))	1-11-	1 00	373					
	<u> </u>											
4. SAM	PLING DA	TA :		· · · · · ·				Geoc	hemical Analyses			
Method	(s): Bailer, Si	ze: / c Pump O				mp 🗆 4" Sub	mersible Pump	Ferro	us Iron: mg/L			
Materials: Pump/Bailer												
		☐ Polye	thylene 🛚	Polypropylen	e 🔾 Teflon®	Other:		<b>Б</b> О.	mg/L			
	ls: Tubing/Rope	C Deald			ite 🛛 Field Cl			Nitrat	te:mg/L			
,	Depth to Water at Time of Sampling: Field Filtered? Q Yes Q No Sulfate: mg/L Sample ID: 1/2 Sample Time: 1/2 # of Containers: 7											
1	10:10-1						iners:	Alkal	inity: 777 mg/L			
Duplica	te Sample Colle	ected?	Cl Yes ÇA	No ID:		_			myrc			
5. COM	5. COMMENTS											
Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet.												
Note: Include	e comments such	as well con	aition, odor,	presence of ^	VAPL, or other	items not on th	e field data shee	91. 				

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-13

<u> </u>	E07 1150	D	ON				<del></del>					
1 ' '	ECT INFO	_		-15		n.	7.2)		7/1/2			
Project Number: 1282 Task Number: 313 Date: 1270 Time: 1170  Client: 1375VCJ Personnel: 1049N, Green												
						Personnel: DEAN Weather: Character Color						
Project L	ocation:	762-				Weather:_'-		<u> </u>				
2. WELL	DATA											
Casing D	Diameter:	inch	es	Type: QNPVC D Stainless D Galv. Steel D Teflon® D Other:								
Screen Diameter:inches												
				From: (a) Top of Well Casing (TOC)								
Depth to Static Water 5 6 8 feet				From: 🗹 Top of Well Casing (TOC) 🚨 Top of Protective Casing 🚨 Other:								
	Product:			From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other								
Length of Water Column: 6 -5 - feet Well Volume: 7 - 0 gal Screened Interval (from GS):												
0 0/10/	D						Note: 2-inci	h well = 0,167 gai	/ft 4-inch well = 0.667 gal/ft			
\	SE DATA	r, Size: [	□ Bladd	er Pump 🚨 2	?" Submersible	Pumo 🗀 4" S	Submersible Pur	mn				
Purge M	ethod: Cent	rifugal Pump	D Perista	Itic Pump 🗆 1	Inertial Lift Pun	np 🗅 Other:			Equipment Model(s)			
Material	s: Pump/Bailer				8 Cl Other:	aned ☑\Dispo	sable	1 1/5	4-61010			
Materials	s: Rope/Tubing	☐ Połyet	hylene 🔾	Polypropylene	e □ Teflon®	Other;		1. — <del></del>	L v			
	Il purged dry?	U Dedica				eaned A Disp		2				
vvas we	,		□ No		ing Rate:	gal	/min	3				
Time	Cum, Gallons Removed	рН	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments			
11:15	1.5L	7.66	M-11	1796	-59.2	6.34			CESUAL			
11:17	2.06	7-61	ハル	923	-71.51	609						
11:19	3.56	7.56	17.20	1649	-742	5-57						
7												
4 SAMI	) PLING DA	ΤΔ .			}	-		Geor	hemical Analyses			
Method	(e). Þáller, S	ize: 🪣				mp 🗓 4" Subi	mersible Pump					
	~~~	•	Inertial Lift F less <b>□<sup>l</sup>·</b> PV	Pump 🖸 Othe	r: n® 🚨 Other:			Ferro	us Iron: mg/L			
Material	ls: Pump/Bailer	DO:	mg/L									
Materia	Materials: Tubing/Rope											
Depth to	Depth to Water at Time of Sampling: Field Filtered? Q Yes Q No											
Sample	10:191W-1	3	Sample 1	Time: //.	ンン	# of Contai		Sulfa	te:mg/L			
All the								inity:mg/L				
5 COM	IMENTS				<del></del>							
	.,,,	A- MY-					~					
Note: Include	comments such	as well con	dition, odor,	presence of N	NAPL, or other	items not on the	e field data shee	et.				
(	1. 4. <del>1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1</del>			CT			. (%		Control of the Contro			

FORM GW-1 (Rev 5/8/99 - wah)

#### APPENDIX B

Laboratory Analytical Report





#### **Brown & Caldwell**

### Certificate of Analysis Number: 00120263

Report To:

Brown & Caldwell Rick Rexroad 1415 Louisiana Suite 2500 Houston TX 77002-

ph: (713) 759-0999

fax: (713) 308-3886

Project Name:

BJ Service, Hobbs, NM

Site:

Hobbs, NM

Site Address:

PO Number:

State:

**New Mexico** 

State Cert. No.:

Date Reported:

This Report Contains A Total Of 23 Pages

**Excluding This Page** 

And

Chain Of Custody



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

#### Case Narrative for: Brown & Caldwell

### Certificate of Analysis Number: 00120263

Report To:

Brown & Caldwell

Rick Rexroad

1415 Louisiana Suite 2500

Houston

TX

77002-

ph: (713) 759-0999

fax: (713) 308-3886

Project Name:

BJ Service, Hobbs, NM

Site:

Hobbs, NM

Site Address:

PO Number:

State:

New Mexico

State Cert. No.:

Date Reported: 12/22/00

Diesel Range Organic was request on your sample ID "Field Blank" (spl id: 00120263-10), however, no containers were received to perform the analysis. Rick Rexroad was notified, via phone conversation, on December 8, 2000.

Your sample ID "MW-4" (SPL ID: 00120263-02) was randomly selected for use in SPL's quality control program for the Gasoline Range Organics analysis by SW846 Method 8015B. The Matrix Spike (MS) recovery was outside of the advisable quality control limits (Batch ID: R26475) 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.

The reported results are only representative of the samples submitted for testing. Any 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).

Please do not hesitate to contact us if you have any questions or comments pertaining to this data report. Please reference the above Certificate of Analysis Number.

This report shall not be reproduced except in full, without the written approval of the laboratory. The reported results are only representative of the samples submitted for testing.

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

Simullest West, Sonia

والإر Senior Project Manager 12/22/00

Date



HOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON, TEXAS 77054 {713} 660-0901

#### Brown & Caldwell

### Certificate of Analysis Number: 00120263

Report To: Brown & Caldwell

Rick Rexroad

1415 Louisiana Suite 2500

Houston

TX 77002-

Fax To:

ph: (713) 759-0999

Brown & Caldwell

Rick Rexroad

Site Address:

fax: (713) 308-3886

fax: (713) 308-3886

Site:

Project Name:

PO Number:

State:

New Mexico

Hobbs, NM

BJ Service, Hobbs, NM

State Cert. No.:

Date Reported:

Client Sample ID	Lab Sample II	O Matrix	Date Collected	Date Received	COCID	HOL
MW-3	00120263-01	Water	12/7/00	12/8/00 10:00:00 AM	083880	
MW-4	00120263-02	Water	12/7/00	12/8/00 10:00:00 AM	083880	
MW-5	00120263-03	Water	12/7/00	12/8/00 10:00:00 AM	083880	
MW-7	100120263-04	Water	12/7/00	12/8/00 10:00:00 AM	083880	コ声
MW-10	i00120263-05	Water	12/7/00	12/8/00 10:00:00 AM	083880	
MW-11A	00120263-06	Water	12/7/00	12/8/00 10:00:00 AM	083880	
MW-12	00120263-07	Water	12/7/00	12/8/00 10:00:00 AM	083880	
MW-13	00120263-08	Water	12/7/00	12/8/00 10:00:00 AM	083880	
Duplicate	00120263-09	Water	12/7/00	12/8/00 10:00:00 AM	083880	
Field Blank	00120263-10	Water	12/7/00	12/8/00 10:00:00 AM	083880	7

Jones West, Sonia Senior Project Manager

12/22/00

Date

Joel Grice Laboratory Director

Ted Yen

Ouality Assurance Officer

Ou

12772709 11 42 59 AM



HOUSTON LABORATORY
B880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
(713) 660-0901

Client Sample ID M		Collected: 12/7/00			SPL Sample II	<b>)</b> : 00120	0263-01		
				Site	Hot	obs, NM			
Analyses/Method Res			Result Re		Dil. Factor QUAL		Date Analyzed	Analyst	Seq. 1
DIESEL RANGE OR	,			MCL	SW8015B	Units: m	g/L		
Diesel Range Organic	ND		0.25		1	12/15/00 21:40	AM	509463	
Surr: n-Pentacosar	71.2	%	18-120		1	12/15/00 21:40	AM	509463	
Prep Method	Prep Date			Prep Initials					
SW3510B	12/10/2000 1	16:22		KL					
GASOLINE RANGE ORGANICS					MCL	SW8015B	Units: mg/L		
Gasoline Range Orga	nics	ND		0.1		1	12/19/00 19:05	D_R	511555
Surr: 1,4-Difluorobe	95.0	%	74-121		1	12/19/00 19:05	D_R	511555	
Surr: 4-Bromofluore	75.7	%	55-150		1	12/19/00 19:05	D_R	511555	
PURGEABLE AROMATICS					MCL	SW8021B	Ünits: uç		
Benzene		ND		1		1	12/19/00 19:51	D_R	511512
Ethylbenzene		ND		1		1	12/19/00 19:51	D_R	511512
Toluene		ND		1	·	1	12/19/00 19:51	D_R	511512
Xylenes,Total		ND		1		1	12/19/00 19:51	D_R	511512
Surr: 1,4-Difluorobe	enzene	104	%	72-137		1	12/19/00 19:51	D_R	511512
Surr: 4-Bromofluore	obenzene	88.4	%	48-156		1	12/19/00 19:51	D_R	511512

- 1 Surrogate Recovery Outside Advisable QC Limits
- J Estimated Value between MDL and PQL



Client Sample ID MW	1-4			Coll	ected:	12/7/00	SPL Sample I	D: 0012	0263-02
				Site	: Hot	obs, NM			
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORG	ANICS				MCL	SW8015B	Units: mg	======================================	
Diesel Range Organics		0.53		0.22		1	12/15/00 23:37	AM	509466
Surr: n-Pentacosane		65.5	%	18-120		1	12/15/00 23:37	AM	509466
Prep Method	Prep Date			Prep Initials					
SW3510B	12/10/2000 1			KL					
GASOLINE RANGE O	RGANICS				MCL	SW8015B	Units: mg	g/L	
Gasoline Range Organi	cs	0.16		0.1		1	12/19/00 20:01	D_R	511556
Surr: 1,4-Difluoroben	zene	87.3	%	74-121		1	12/19/00 20:01	D_R	511556
Surr: 4-Bromofluorob	enzene	87.0	%	55-150		1	12/19/00 20:01	D_R	511556
PURGEABLE AROMA	ATICS		-		MCL	SW8021B	Units: ug	/L	
Benzene		ND		1		1	12/19/00 20:16	D_R	511513
Ethylbenzene	· · · · · · · · · · · · · · · · · · ·	1.3.		1		1	12/19/00 20:16	D_R	511513
Toluene		_ ND_		1		1	12/19/00 20:16	D_R	511513
Xylenes,Total		ND		1		1	12/19/00 20:16	D_R	511513
Surr: 1,4-Difluoroben	zene	101	%	72-137		1	12/19/00 20:16	D_R	511513
Surr: 4-Bromofluorob	enzene	91.9	%	48-156		1	12/19/00 20:16	D_R	511513

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and POL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution



Client Sample ID MW-5			Coll	ected:	12/7/00	SPL Sample ID: 001	20263-03
			Site	: Hol	obs, NM		
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed Analys	t Seq. #
DIESEL RANGE ORGANICS				MCL	SW8015B	Units: mg/L	
Diesel Range Organics	ND		0.25		1	12/16/00 0:16 AM	509467
Surr: n-Pentacosane	75.7	%	18-120		1	12/16/00 0:16 AM	509467
Prep Method Prep Date			Prep Initials				
SW3510B	16:22		KL				
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: mg/L	
Gasoline Range Organics	ND		0.1		1	12/20/00 21:04 D_R	513629
Surr: 1,4-Diffuorobenzene	90.0	%	74-121		1	12/20/00 21:04 D_R	513629
Surr: 4-Bromofluorobenzene	76.0	%	55-150		1	12/20/00 21:04 D_R	513629
HEADSPACE GAS ANALYSIS				MCL	RSK147	Units: mg/L	- 1.17 711
Ethane	ND		0.0025		1	12/21/00 9:55 A_A	514224
Ethylene	ND		0.0032		1	12/21/00 9:55 A_A	514224
Methane	ND		0.0012		1	12/21/00 9:55 A A	514224
NITROGEN, NITRATE (AS N)				MCL	E300	Units: mg/L	
Nitrogen, Nitrate (As N)	3.27		0.1			12/08/00 11:52 KM	500645
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug/L	
Benzene	ND		1		1	12/20/00 21:43 D_R	513475
Ethylbenzene	ND	-	1		1	12/20/00 21:43 D_R	513475
Toluene	ND		1		1	12/20/00 21:43 D_R	513475
Xylenes,Total	ND		1		1	12/20/00 21:43 D_R	513475
Surr: 1,4-Difluorobenzene	103	%	72-137		1	12/20/00 21:43 D_R	513475
Surr: 4-Bromofluorobenzene	88.5	%	48-156		1	12/20/00 21:43 D_R	513475
SULFATE		1277		MCL	E300	Units: mg/L	
Sulfate	160		4		20	12/08/00 11:52 KM	500706

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution



Client Sample ID M	Client Sample ID MW-7			Colle	ected:	12/7/00	SPL Sample II	<b>D</b> : 00120	0263-04
				Site	: Hol	obs, NM			
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE OR	GANICS	'			MCL	SW8015B	Units: m	g/L	
Diesel Range Organic	:S	ND		0.29		1	12/17/00 5:11	AM	509470
Surr: n-Pentacosan	e	58.9	%	18-120		1	12/17/00 5:11	AM	509470
Prep Method SW3510B	Prep Date 12/10/2000 1	6.22		Prep Initials					
GASOLINE RANGE	ORGANICS		==:		MCL	SW8015B	Units: m	g/L	
Gasoline Range Orga	nics	ND		0.1		1	12/19/00 20:04	D_R	511557
Surr: 1,4-Difluorobe	enzene	92.7	%	74-121		1	12/19/00 20:04	D_R	511557
Surr: 4-Bromofluoro	benzene	74.3	%	55-150		1	12/19/00 20:04	D_R	511557
PURGEABLE ARON	IATICS				MCL	SW8021B	Units: uç	g/L	
Benzene		ND		1		1	12/19/00 20:42	D_R	511514
Ethylbenzene		ND		1		1	12/19/00 20:42	D_R	511514
Toluene		ND		1		1	12/19/00 20:42	D_R	511514
Xylenes,Total		ND		1		1	12/19/00 20:42	D_R	511514
Surr: 1,4-Difluorobe	enzene	103	%	72-137		1	12/19/00 20:42	D_R	511514
Surr: 4-Bromofluore	benzene	87.6	%	48-156		1	12/19/00 20:42	D_R	511514

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution



Client Sample ID MW-10		. Co	llected:	12/7/00	SPL Sample ID: 001	20263-05
		Site	e: Hob	obs, NM		
Analyses/Method	Result	Rep.Limit		Dil. Factor QUAL	Date Analyzed Analyst	Seq.#
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: mg/L	
Diesel Range Organics	1.5	0.2		1	12/19/00 8:41 AM	512445
Surr: n-Pentacosane	100	% 18-120		11	12/19/00 8:41 AM	512445
Prep Method Prep Da	ate	Prep Initials				
12/10/2	000 16:22	an more and				
GASOLINE RANGE ORGANIC	SS TELL		MCL	SW8015B	Units: mg/L	
Gasoline Range Organics	0.15	0.1		1	12/19/00 21:00 D_R	511560
Surr: 1,4-Difluorobenzene	105	% 74-121		1	12/19/00 21:00 D_R	511560
Surr: 4-Bromofluorobenzene	96.0	% 55-150		1	12/19/00 21:00 D_R	511560
HEADSPACE GAS ANALYSIS	::: <u></u> :- }		MCL	RSK147	Units: mg/L	
Ethane	ND	0.0025		1	12/21/00 10:55 A_A	514433
Ethylene	ND	0.0032		11	12/21/00 10:55 A_A	514433
Methane	0.17	0.0024		2	12/21/00 11:30 A_A	514226
NITROGEN, NITRATE (AS N)			MCL	E300	Units: mg/L	
Nitrogen, Nitrate (As N)	ND	0.1		1	12/08/00 11:52 KM	500648
PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/L	
Benzene	7.2	1		1	12/19/00 21:07 D_R	511515
Ethylbenzene	ND	1		1	12/19/00 21:07 D_R	511515
Toluene	ND	1		1	12/19/00 21:07 D_R	511515
Xylenes,Total	ND	1		1	12/19/00 21:07 D_R	511515
Surr: 1,4-Difluorobenzene	109	% 72-137		1	12/19/00 21:07 D_R	511515
Surr: 4-Bromofluorobenzene	95.0	% 48-156		1	12/19/00 21:07 D_R	511515
SULFATE			MCL	E300	Units: mg/L	
Sulfate	190	4		20	12/08/00 11:52 KM	500709

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution



Client Sample ID MW-11A			Colle	ected:	12/7/00	SPL Sample ID:	00120263-06
			Site:	Hob	bs, NM		
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed A	nalyst Seq. #
DIESEL RANGE ORGANICS				MCL	SW8015B	Units: mg/L	
Diesel Range Organics	0.3	-	0.25		1	12/17/00 6:28 AN	л 509472
Surr: n-Pentacosane	78.2	%	18-120		1	12/17/00 6:28 AM	M 509472
Prep Method Prep Date			Prep Initials				
SW3510B 12/10/2000	16:22		KL				
GASOLINE RANGE ORGANICS	::::::::::::::::::::::::::::::::::::::			MCL	SW8015B	Units: mg/L	
Gasoline Range Organics	0.12		0.1		1	12/19/00 21:03 D_	R 511564
Surr: 1,4-Difluorobenzene	106	%	74-121		1	12/19/00 21:03 D_	R 511564
Surr: 4-Bromofluorobenzene	84.7	%	55-150		1	12/19/00 21:03 D_	R 511564
HEADSPACE GAS ANALYSIS	=			MCL	RSK147	Units: mg/L	
Ethane	ND		0.0025		1	12/21/00 11:56 A_	A 514227
Ethylene	ND		0.0032		1	12/21/00 11:56 A_	A 514227
Methane	0.0096		0.0012		1	12/21/00 11:56 A_	A 514227
NITROGEN, NITRATE (AS N)			17	MCL	E300	Units: mg/L	
Nitrogen, Nitrate (As N)	ND		0.1		1	12/08/00 11:52 Kf	M 500649
PURGEABLE AROMATICS				MCL	\$W8021B	Units: ug/L	
Benzene	26		1		1	12/19/00 21:33 D_	R 511516
Ethylbenzene	ND		1		1	12/19/00 21:33 D	R 511516
Toluene	ND		1		1	12/19/00 21:33 D	R 511516
Xylenes,Total	3.3		1		1	12/19/00 21:33 D	R 511516
Surr: 1,4-Difluorobenzene	113	%	72-137		1	12/19/00 21:33 D	·
Surr: 4-Bromofluorobenzene	95 3	%	48-156		1	12/19/00 21:33 D	R 511516
SULFATE				MCL	-	Units: mg/l	-
Sulfate	260		5		25	12/08/00 11:52 K	M 500710

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution



Client Sample ID MW-12		Coll	ected:	12/7/00	SPL Sample ID: 0012	0263-07
		Site	: Hol	bbs, NM		
Analyses/Method	Result	Rep.Limit		Dil. Factor QUAL	Date Analyzed Analyst	Seq. #
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: mg/L	
Diesel Range Organics	ND	0.25		1	12/17/00 7:06 AM	509473
Surr: n-Pentacosane	56.2	% 18-120		1	12/17/00 7:06 AM	509473
Prep Method Prep Date		Prep Initials				
SW3510B 12/10/2000	16:22	,KL				
GASOLINE RANGE ORGANICS		. == == ===============================	MCL	SW8015B	Units: mg/L	
Gasoline Range Organics	- ND	0.1		1	12/19/00 21:05 D_R	511567
Surr: 1,4-Difluorobenzene	92.7	% 74-121		1	12/19/00 21:05 D_R	511567
Surr: 4-Bromofluorobenzene	86.3	% 55-150		11	12/19/00 21:05 D_R	511567
HEADSPACE GAS ANALYSIS		T### ##	MCL	RSK147	Units: mg/L	
Ethane	ND	0.0025		1	12/21/00 12:11 A_A	514233
Ethylene	ND	0.0032		1	12/21/00 12:11 A_A	514233
Methane	ND	0.0012		1	12/21/00 12:11 A_A	514233
NITROGEN, NITRATE (AS N)	==		MCL	E300	Units: mg/L	
Nitrogen, Nitrate (As N)	ND	0.1		1	12/08/00 11:52 KM	500650
PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/L	
Benzene	27	1		11	12/19/00 21:59 D_R	511517
Ethylbenzene	2.9	1		1	12/19/00 21:59 D_R	511517
Toluene	ND	1		1	12/19/00 21:59 D_R	511517
Xylenes,Total	1.9	1		11	12/19/00 21:59 D_R	511517
Surr: 1,4-Difluorobenzene	109	% 72-137		1	12/19/00 21:59 D_R	511517
Surr: 4-Bromofluorobenzene	93.6	% <u>48-156</u>		1	12/19/00 21:59 D_R	511517
SULFATE		170 770 770 770 770	MCL	E300	Units: mg/L	<del></del>
Sulfate	260	5		25	12/08/00 11:52 KM	500711

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution



Client Sample ID M	W-13			Coll	ected:	12/7/00	SPL Sample ID:	00120263-08
				Site	: Hol	obs, NM		
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed A	nalyst Seq.#
DIESEL RANGE OR	GANICS				MCL	SW8015B	Units: mg/L	
Diesel Range Organic	SS	0.43	-	0.24		1	12/17/00 7:45 AN	A 509474
Surr: n-Pentacosar	ne	55.1	%	18-120		1	12/17/00 7:45 AN	n 5094 <b>7</b> 4
Prep Method	Prep Date			Prep Initials				
SW3510B	,12/10/2000 1	6:22		KL I				
GASOLINE RANGE	ORGANICS	- //2000			MCL	SW8015B	Units: mg/L	
Gasoline Range Orga	inics	ND		0.1		1	12/19/00 22:02 D	R 511568
Surr: 1,4-Difluorobe	enzene	91.7	%	74-121		1	12/19/00 22:02 D_	R 511568
Surr: 4-Bromofluore	obenzene	76.0	%	55-150		1	12/19/00 22:02 D_	R 511568
PURGEABLE ARON	ATICS				MCL	SW8021B	Units: ug/L	
Benzene		ND		1		1	12/19/00 22:24 D_	R 511518
Ethylbenzene		ND		1		1	12/19/00 22:24 D	R 511518
Toluene		ND		1		1	12/19/00 22:24 D_	R 511518
Xylenes,Total		ND		1		1	12/19/00 22:24 D_	R 511518
Surr: 1,4-Difluorobe	enzene	102	%	72-137		1	12/19/00 22:24 D	R 511518
Surr: 4-Bromofluore	obenzene	88.0	%	48-156		1	12/19/00 22:24 D	R 511518

<sup>\* -</sup> Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference



Client Sample ID Duplicate			Colle	ected:	12/7/00	SPL Sample II	<b>)</b> : 0012	0263-09
			Site:	Hob	obs, NM			
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS				MCL	SW8015B	Units: m	g/L	
Diesel Range Organics	0.49		0.24		1	12/17/00 8:24	AM	509475
Surr: n-Pentacosane	72.3	%	18-120		1	12/17/00 8:24	AM	509475
Prep Method         Prep Date           SW3510B         12/10/2000			Prep Initials					
GASOLINE RANGE ORGANICS		-=-	-:	MCL	SW8015B	Units: m	g/L	
Gasoline Range Organics	ND		0.1		1	12/19/00 22:05	D_R	511569
Surr: 1,4-Difluorobenzene	90 7	%	74-121		1	12/19/00 22:05	D_R	511569
Surr: 4-Bromofluorobenzene	79.0	%	55-150		1	12/19/00 22:05	D_R	511569
PURGEABLE AROMATICS			_: = := ====	MCL	SW8021B	Units: uç	g/L	
Benzene	ND		1		1	12/19/00 22:50	D_R	511519
Ethylbenzene	ND		1		1	12/19/00 22:50	D_R	511519
Toluene	ND		1		1	12/19/00 22:50	D_R	511519
Xylenes,Total	ND		1		1	12/19/00 22:50	D_R	511519
Surr: 1,4-Difluorobenzene	95.1	%	72-137		1	12/19/00 22:50	D_R	511519
Surr: 4-Bromofluorobenzene	87.7	%	48-156		1	12/19/00 22:50	D_R	511519

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution



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

Client Sample ID Field Blank			Col	lected:	12/7/00	SPL Sample II	<b>)</b> : 00120	0263-10
			Site	: Ho	bs, NM			
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: m	g/L	
Gasoline Range Organics	ND		0.1		1	12/19/00 23:01	D_R	511570
Surr: 1,4-Difluorobenzene	97.0	- % %	74-121		1	12/19/00 23:01	D_R	511570
Surr: 4-Bromofluorobenzene	75.7	%	55-150		1	12/19/00 23:01	D_R	511570
PURGEABLE AROMATICS		=		MCL	SW8021B	Units: ug	/L	
Benzene	ND		1		1	12/19/00 23:16	D_R	511520
Ethylbenzene	ND		1		1	12/19/00 23:16	D_R	511520
Toluene	ND		1		1	12/19/00 23:16	D_R	511520
Xylenes,Total	ND	_	1		1	12/19/00 23:16	D_R	511520
Surr: 1,4-Difluorobenzene	104	%	72-137		1	12/19/00 23:16	D_R	511520
Surr: 4-Bromofluorobenzene	91.1	%	48-156		1	12/19/00 23:16	D_R	511520

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Mothod Blank

- \* Surrogate Recovery Outside Advisable QC Limits
- J Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

Quality Control Documentation



HOUSTON LABORATORY
8880 INTERCHANGE DRIVE HOUSTON, TEXAS 77054

(713) 660-0901

### **Quality Control Report**

### Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Method:

RunID:

Preparation Date:

Diesel Range Organics

Analyte

HP\_V\_001215B-509462

12/10/2000 16:22

SW8015B

WorkOrder:

00120263

Lab Batch ID:

9118a

Method	Blank

Analysis Date: 12/15/2000 19:05

mg/L Units: AM Analyst:

KL Method SW3510B Prep By:

Result Rep Limit

Lab Sample ID 00120263-01B

Samples in Analytical Batch:

Client Sample ID MW-3 MW-4

00120263-03B 00120263-04B 00120263-05B

00120263-09B

00120263-02B

MW-5 MW-7 MW-10

00120263-06B MW-11A MW-12 00120263-07B 00120263-08B

MW-13 Duplicate

#### Diesel Range Organics ND 0 20 18-120 94.2 Surr: n-Pentacosane

### Laboratory Control Sample (LCS)

RunID:

HP\_V\_001215B-509494

Units: mg/L

Analysis Date: Preparation Date:

12/15/2000 20:22 12/10/2000 16:22 Analyst:

Method

Prep By:

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Diesel Range Organics	2.5	2.3	90	21	175

### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00120263-01

RunID:

HP\_V\_001215B-509464

Units:

mg/L

Analysis Date: Preparation Date:

12/15/2000 22:19 12/10/2000 16:22

Analyst: Prep By:

ΑM

Method

					,					
Analyte	Sample	MS	MS Result	MS %	MSD	MSD Result MSD %	RPD	RPD	Low	High
	Result	Spike		Recovery	Spike	Recovery	l i	Limit	Limit	Limit
		Added			Added	i			. أ	i l
		<u></u>				ļ	1			
Diesel Range Organics	N	JD 1.25	1.5	109		l 1.3l 92.5	16.7	39	13	130

Qualifiers:

ND/U - Not Detected at the Reporting Limit

J - Estimated value between MDL and PQL

B - Analyte detected in the associated Method Blank

MI - Matrix Interference

D - Recovery Unreportable due to Dilution \* - Recovery Outside Advisable QC Limits

The percent recoveries for QC samples are correct as reported. Due to significant figures and rounding, the reported RPD may differ from the displayed RPD values but is correct as reported



### **Quality Control Report**

### Brown & Caldwell BJ Service, Hobbs, NM

Analysis: Method:

RunID:

Analysis Date:

Headspace Gas Analysis

RSK147

WorkOrder:

00120263

Lab Batch ID:

R26604

Method Blank

VARC\_001221A-514223 12/21/2000 9:37 Units: mg/L

Analyst:

mg/L A\_A Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

00120263-03D 00120263-05D MW-5 MW-10

00120263-06D

MW-11A

00120263-07D

MW-12

		 p	
<b>\$</b>	Analyte	Res	sult  Rep Limit
Ethane			ND <sub>1</sub> 0 0025
Ethylene		 i	ND 0 0032
Methane		-	ND 0 0012

### Sample Duplicate

Original Sample:

00120263-03

VARC\_001221A-514224

Units: mg/L

RunID: Analysis Date:

12/21/2000 9:55

Analyst: A\_A

Analyte	Sample Result	DUP Result	RPD	RPD   Limit
Bulane	ND.	ND	0	50
Ethane	ND	ND	0	50
Ethylene	ND	ND	0	50
Isobutane	ND	ND	0	50
Methane	ND	ND	0	50
Propane	ND	ND	0	50
Propylene	ND	ND	0	50

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

J - Estimated value between MDL and POL

MI - Matrix Interference

D - Recovery Unreportable due to Dilution

\* - Recovery Outside Advisable QC Limits

The percent recoveries for QC samples are correct as reported. Due to significant figures and rounding, the reported RPD may differ from the displayed RPD values but is correct as reported



### **Quality Control Report**

### Brown & Caldwell

BJ Service, Hobbs, NM

Analysis:

Purgeable Aromatics

Method:

12/19/2000 10:47

SW8021B

WorkOrder:

00120263

Lab Batch ID:

R26454

Method Blank

RunID:

Analysis Date:

HP\_R\_001219A-511322

Units: Analyst:

ug/L  $D_R$ 

Lab Sample ID 00120263-01A 00120263-02A

Samples in Analytical Batch:

MW-3

Client Sample ID

00120263-04A

MW-4 MW-7

00120263-05A

MW-10 MW-11A

Analyte Result Rep Limit ND 1.0 Benzene Ethylbenzene ND 1\_0 Toluene ИD 1.0 Xylenes, Total ND 1.0 72-137 Surr 1,4-Difluorobenzene 105.0 Surr 4-Bromofluorobenzene 86.9 48-156 00120263-06A 00120263-07A 00120263-08A 00120263-09A 00120263-10A

MW-12 MW-13 Duplicate

Field Blank

#### Laboratory Control Sample (LCS)

RunID:

HP\_R\_001219A-511321

Units:

Analysis Date:

12/19/2000 9:56

Analyst:  $D_R$ 

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	54	108	70.	130
Ethylbenzene	50	49	97	70	130
Toluene	50	48	96	70	130
<sup>1</sup> Xylenes,Total	150	141	94	70	130

### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00120263-01

HP\_R\_001219A-511510

Units:

ug/L

RunID: Analysis Date:

12/19/2000 17:43

Analyst:  $D_R$ 

Analyte	1	MS Spike Added	MS Result	MS % Recovery		MSD Result	MSD % Recovery	RPD	RPD   Limit	Low Limit	High Limit
Benzene	ND	20	15:	75.3	20,	18	90.0	17 8	21	32	164
Ethylbenzene	ND	20!	12	62.2	20	15	75.1	18.8	19;	52	142
Toluene	ND'	201	13	65.7	20	16	78.3		20	38	159
Xylenes,Total	ND	601	38	63.3	60 <sup>1</sup>	46	76.7	9.0	18	53	144

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits



### **Quality Control Report**

### Brown & Caldwell BJ Service, Hobbs, NM

Gasoline Range Organics WorkOrder: 00120263 Analysis: SW8015B Lab Batch ID: R26475 Method: Samples in Analytical Batch: Method Blank RunID: HP\_R\_001219C-511574 Units: mg/L Lab Sample ID Client Sample ID D\_R 00120263-01A MW-3 Analysis Date: 12/19/2000 10:04 Analyst: 00120263-02A MW-4 MW-7 00120263-04A 00120263-05A MW-10 Analyte Result | Rep Limit| 00120263-06A MW-11A ND. 0.10 Gasoline Range Organics 00120263-07A MW-12 74-121 Surr 1,4-Difluorobenzene 92.0 Surr 4-Bromofluorobenzene 73.3 55-150 00120263-08A MW-13 00120263-09A Duplicate 00120263-10A Field Blank Laboratory Control Sample (LCS)

> RunID: Analysis Date:

HP\_R\_001219C-511581 12/19/2000 10:02

Units:

mg/L Analyst: D\_R

Analyte Spike Result Percent Lower Upper Added Recovery Limit Limit Gasoline Range Organics 0.78 78

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

Analysis Date:

00120263-02

RunID:

HP\_R\_001219C-511553 12/19/2000 18:03

Units: mq/L

 $D_R$ 

Analyst:

MSD RPD Low High Sample MS MS Result MS % MSD Result MSD % RPD I Analyte Result Spike Recovery | Spike Recovery Limit Limit Limit Added Added 36.0 \* 1 0.9 Gasoline Range Organics 0.9 0.48 0.53! 41.3 13.6 36 36

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

J - Estimated value between MDL and PQL

MI - Matrix Interference

D - Recovery Unreportable due to Dilution

\* - Recovery Outside Advisable QC Limits



### **Quality Control Report**

### Brown & Caldwell BJ Service, Hobbs, NM

Analysis:

Purgeable Aromatics

Method:

SW8021B

WorkOrder:

00120263

Lab Batch ID:

R26596

Method Blank

RunID: Analysis Date: HP\_R\_001220D-513466 12/20/2000 16:35

Units: ug/L

Analyst:

D\_R

Lab Sample ID 00120263-03A

Samples in Analytical Batch:

Client Sample ID

MW-5

Analyte	Result	Rep Limit
Benzene	ND	1 0
Ethylbenzene	ND	1.0
Toluene	ND	1.0
Xylenes, Total	_ ND	1.0
Surr 1,4-Difluorobenzene	105.7	72-137
Surr 4-Bromofluorobenzene	88 4	48-156

### Laboratory Control Sample (LCS)

RunID:

HP R 001220D-513465

Units:

ug/L

Analysis Date:

12/20/2000 15:43

Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	57	113	70	130
Ethylbenzene	50	49	98	70	130
Toluene	50	50	99	70	130
Xylenes, Total	150	143	95	70	130

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00120585-03

RunID:

HP\_R\_001220D-513471

Units:

ug/L

Analysis Date: 12/20/2000 18:44 Analyst: D R

Analyte	Sample Result	MS North	MS Result	MS % Recovery ;		MSD Result	MSD % Recovery		RPD Lov	
		Added	Į.	i	Added				;	
Benzene	ND	20	18	90.5'	20	19	97.3	7.20	211	32 164
Ethylbenzene	ЙD	20,	15	76.1	20 <sub>i</sub>	16	81.5	6.91 <sup>L</sup>	19	52 142
Toluene	ND	20	16	79.2	20	17'	84 9	6.95		38 159
Xylenes,Total	ND	60	46	76.7	60)	49	81.7	6.32	18	53 144

Qualifiers:

ND/U - Not Detected at the Reporting Limit

ML - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

The percent recoveries for QC samples are correct as reported. Due to significant figures and rounding, the reported RPD may differ from the displayed RPD values but is correct as reported.



### **Quality Control Report**

### Brown & Caldwell BJ Service, Hobbs, NM

Analysis:

Gasoline Range Organics

Method:

RunID:

SW8015B

WorkOrder:

00120263

Lab Batch ID:

R26599

Method Blank

Samples in Analytical Batch:

HP\_R\_001220F-513625

Units: mg/L

Lab Sample ID

Client Sample ID

Analysis Date:

12/20/2000 16:03

Analyst: D\_R 00120263-03A

MW-5

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	90.0	74-121
Surr 4-Bromothiorobeovene	76.3	55-150

### Laboratory Control Sample (LCS)

RunID:

HP\_R\_001220F-513624

Units:

Analysis Date:

12/20/2000 16:00

Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
'Gasoline Range Organics	1	0.94	94	70	130

### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00120585-04

RunID:

HP\_R\_001220F-513626

Units: mg/L

Analysis Date:

12/20/2000 19:03

Analyst: DR

Analyte	Sample Result	MS Spike i	MS Result	MS % Recovery		MSD Result	MSD % Recovery	RPD RPL	. ,	High Limit
		Added		ı	Added					1
Gasoline Range Organics	NC	0.9	0.32	35.8	0.9	0.55	61.1		36	160

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank J - Estimated value between MDL and PQL

D - Recovery Unreportable due to Dilution

\* - Recovery Outside Advisable OC Limits

The percent recoveries for QC samples are correct as reported. Due to significant figures and rounding, the reported RPD may differ from the displayed RPD values but is correct as reported.



### Quality Control Report

### **Brown & Caldwell**

Analysis:

Nitrogen, Nitrate (As N)

Method:

E300

BJ Service, Hobbs, NM

WorkOrder:

00120263

Lab Batch ID:

R25894

RunID:

Analysis Date:

WET\_001208M-500643

12/08/2000 11:52

Analyst:

Method Blank

mg/L ΚM

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

00120263-03C

MW-5

00120263-05C 00120263-06C MW-10

MW-11A

00120263-07C

MW-12

Analyte Nitrogen, Nitrate (As N)

Result Rep Limit ND 0 10

### Laboratory Control Sample (LCS)

RunID:

WET\_001208M-500644

Units:

mq/L

Analysis Date:

12/08/2000 11:52

Analyst:

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Nitrogen, Nitrate (As N)	10	9.27	93	90	110

### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

Analysis Date:

00120263-03

RunID:

WET\_001208M-500646 12/08/2000 11:52

Units: Analyst:

mg/L

ΚM

Analyte	Sample MS Result Spike	MS Result	MS % Recovery	MSD   Spike	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	
	Added -	†		Added	1						
Nitrogen, Nitrate (As N)	3.3 10	13.2	99.7	10	13.3	100	0.789	20		124	

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

J - Estimated value between MDL and PQL

MI - Matrix Interference

D - Recovery Unreportable due to Dilution \* - Recovery Outside Advisable QC Limits

The percent recoveries for OC samples are correct as reported. Due to significant figures and rounding, the reported RPD may differ from the displayed RPD values but is correct as reported.



### Quality Control Report

### Brown & Caldwell

Analysis: Method: RunID:

Sulfate E300

BJ Service, Hobbs, NM

WorkOrder:

00120263

Lab Batch ID: Samples in Analytical Batch:

R25896

WET\_001208N-500704

Units: mg/L

Lab Sample ID

Client Sample ID

Analysis Date: 12/08/2000 11:52

Sulfate

ΚM Analyst:

00120263-03C 00120263-05C

MW-5 MW-10

00120263-06C

MW-11A

00120263-07C

MW-12

Result Rep Limit Analyte 0 20 ND

### Laboratory Control Sample (LCS)

RunID:

WET 001208N-500705

Units:

mg/L

Analysis Date:

Method Blank

12/08/2000 11:52

Analyst: ΚM

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Sulfate	10	9.6	96	901	110

### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00120263-03

RunID:

WET 001208N-500707

Units:

mg/L

Analysis Date:

12/08/2000 11.52

Analyst: ΚM

MS % MSD | MSD Result | MSD % MS MS Result RPD RPD Low High Sample Analyte Result Spike Recovery Spike | Recovery Limit Limit Limit Added ! Added ΝĎ 200 96.3 2001 3601 101 4 45 Sulfate 350 20,

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

J - Estimated value between MDL and PQL

MI - Matrix Interference

D - Recovery Unreportable due to Dilution

\* - Recovery Outside Advisable QC Limits

## Sample Receipt Checklist And Chain of Custody



### Sample Receipt Checklist

Workorder:	00120263		Received by:		Estrada, Ruben	
Date and Time Received:	12/8/00 10:00:00 AM		Carrier name:		FedEx	
Temperature:	4					
Shipping container/cooler in (	good condition?	Yes 🔽	No .	Not Present	J	
Custody seals intact on shipp	oping container/cooler?	Yes	No	Not Present	l <b>√</b> i	
Custody seals intact on samp	ple bottles?	Yes 🗀	No i	Not Present	[ <b>✓</b> i	
Chain of custody present?		Yes 🔽	No! I			
Chain of custody signed whe	n relinquished and received?	Yes 🔽	No 🗔			
Chain of custody agrees with	sample labels?	Yes 🗌	No I			
Samples in proper container/	bottle?	Yes 🗸	No 🗔			
Sample containers intact?		Yes 🗸	No . !			
Sufficient sample volume for	indicated test?	Yes 📋	No l <u>v</u> i			
All samples received within h	nolding time?	Yes 🛂	No 1			
Container/Temp Blank tempe	erature in compliance?	Yes 🔽	No I Ti			
Water - VOA vials have zero	headspace?	Yes 🛂	No'	Not Present	1	
Water - pH acceptable upon	receipt?	Yes 🔽	No 🗔			

<ul> <li>2330 Interchange Drive, Houston, TX 77054 (713) 660-0901</li> <li>459-Hughes Drive, Traverse City, MI 49684 (616) 947-5777</li> </ul>	Cher	38hr 🗋 Standard 🔃	72hr		Requested TAT	armettv	Clean/Consultant Remarks:	たいしんししょう	からいなん	51-M M	( , Mw.	mm-117	M1-0-10	C . MIW.	5. MW	11-14W	\vi\!\vi\-2	9	1764	136158	Freder Number 1232	Packet Maire: 375008	Commer PXL Parond	1200 S)	Continue Brown & CALD WOLL	Land Mark		0
Houston, To rerse City, M	5. Relinquished by	3. Relitzquished by:	1. Relinquished by Sampler	Stan	Special Reporting Requirements			)], . »	J7.20	B. 1-26	DC. L.16	12.7.00	みてて	7.7.8	12.7.00	12-7.2	N-7-00	STAG	1) EXYOUCH	ひっかい			3_	1201514~ (4/13) 75504	1 well	An	N. Comments	:
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### BROWN AND CALDWELL

Suite 2500, 1415 Louisiana, Houston, TX 77002 TRANSMITTAL MEMORANDUM (713) 759-0999 • (713) 308-3886 Job No: 12832-015 Date: February 28, 2001 To: Mr. Wayne Price SERVATION D Hobbs, New Mexico Facility State of New Mexico Subject: Certified Mail No.: P 076 598 859 Energy, Minerals, and Natural Resources Dept. Equipment No: Oil Conservation Division 2040 South Pacheco Street, State of Land Office Bldg Spec. Ref: Santa Fe, New Mexico 87505 Submittal No: WE ARE SENDING: Attached Under separate cover via **US Mail** the following items: Samples Shop Drawings **Prints** Plans Other: Groundwater Sampling Report Change Order Copy of letter THESE ARE TRANSMITTED AS CHECKED BELOW: SUBMITTAL REVIEW ACTIONS: Second submittal No exceptions taken Make revisions As requested Amend and resubmit ☐ For review and comment Rejected--see Remarks ☐ With submittal review action noted None

# Facility, BJ Services Company, U.S.A.

No.

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Date

2/26/01

### **REMARKS:**

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cc: Mr. Chris Williams, State of New Mexico Ms. Jo Ann Cobb, BJ Services Company, U.S.A. Brown and Caldwell Project File Transmittal File w/o attachments

Lynn Wright

Description

September 2000 Groundwater Sampling Report, Hobbs, New Mexico

BROWN AND CALDWELL

SEPTEMBER 2000 GROUNDWATER SAMPLING REPORT HOBBS, NEW MEXICO FACILITY

BJ SERVICES COMPANY, U.S.A.

**FEBRUARY 26, 2001** 

# SEPTEMBER 2000 GROUNDWATER SAMPLING REPORT HOBBS, NEW MEXICO FACILITY BJ SERVICES COMPANY, U.S.A.

Prepared for

BJ Services Company, U.S.A. 11211 FM 2920 Tomball, Texas 77375

BC Project Number: 12832.015

Richard L. Rexroad, P.G.

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Principal Geologist

February 26, 2001

Brown and Caldwell

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"This report was prepared in accordance with the standards of the environmental consulting industry at the time it was prepared. It should not be relied upon by parties other than those for whom it was prepared, and then only to the extent of the scope of work which was authorized. This report does not guarantee that no additional environmental contamination beyond that described in this report exists at this site."

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### 1.0 INTRODUCTION

Brown and Caldwell conducted field activities associated with the September 2000 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 September 13, 2000. Groundwater samples were analyzed for gasoline and diesel range total petroleum hydrocarbons (TPH-G and TPH-D) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) as specified by the New Mexico Oil Conservation Division (NMOCD) in NMOCD Permit GW-072. This report presents a description of the groundwater sampling field activities, a summary of the analytical results, and an evaluation of remedial technologies being applied at the facility. A groundwater potentiometric surface map, a benzene concentration map, and a hydrocarbon distribution map are included.

The facility formerly operated an above-grade on-site fueling system. A layout of the facility is shown in Figure 1. Subsurface impact near the former 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. The NMOCD has required a quarterly groundwater monitoring program to assess the concentration of hydrocarbon constituents in groundwater as a result of the diesel fuel release. BJ Services removed three field waste tanks at the facility on March 6-7, 1997. The ongoing monitoring of groundwater conditions at the site is being performed to address both the former fuel island and the former field waste tanks areas of the facility, as directed by NMOCD in correspondence dated January 21, 1999.

A biosparging system was activated in November 1995 to remediate soil and groundwater at the facility. Expansions of the biosparging system were performed in March/April 1997 and February/March 1998. Flow adjustments were made to the biosparging system during the June/July 1999 and March 2000 sampling events, as described in Section 3.1. A site chronology detailing the history of the former fueling system and the former field waste tanks area, the soil and groundwater remediation system, and previous sampling events is presented in Table 1.

### 2.0 FIELD ACTIVITIES AND RESULTS

Brown and Caldwell purged and sampled 9 of the 13 existing groundwater monitor wells at and adjacent to the BJ Services Hobbs facility on September 13, 2000 to determine concentrations of dissolved-phase hydrocarbons in groundwater and to evaluate general groundwater quality in the area. Monitor wells MW-1, MW-8, MW-9, and MW-12D were not sampled during the September 2000 sampling event because benzene had not been detected in groundwater samples from these wells for at least four quarterly sampling events preceding the September 2000 groundwater sampling event. All monitor wells at and adjacent to the BJ Services Hobbs facility were sampled during the March 2000 groundwater sampling event at the facility. The locations of the monitor wells at the facility are shown in the site map presented as Figure 1. The following subsections describe the field activities conducted by Brown and Caldwell at the facility in September 2000 and present the results of the groundwater analyses.

### 2.1 Groundwater Measurements and Sampling

Groundwater level measurements were obtained from the monitor wells prior to purging and sampling the wells. Groundwater levels were measured with an oil/water interface probe and recorded to the nearest 0.01 foot. A cumulative table of groundwater elevation data is presented in Table 2. The groundwater elevation data indicate that the general groundwater flow direction is to the east, with a hydraulic gradient of approximately 0.007 foot/foot (ft/ft). A potentiometric surface map is presented in Figure 2.

The monitor wells were purged and sampled using disposable bailers because the continued decline in groundwater elevation in wells at the facility, as documented in the March 2000 Groundwater Sampling Report for the facility, precluded use of a Geosquirt® submersible pump that had been used during quarterly sampling events prior to March 2000. Field parameter measurements for pH, conductivity, oxidation-reduction (redox) potential, dissolved oxygen, and temperature were collected in conjunction with the well purging process using a calibrated YSI 600-XL meter. Ferrous iron, dissolved oxygen, and alkalinity were measured in selected wells upon conclusion of

purging activities using Hach field test kits to assist in assessment of the potential for natural attenuation of hydrocarbons at the facility. Turbidity of groundwater was also typically measured upon conclusion of purging activities. The field parameter readings were recorded on the field data sheets included in Appendix A. Field parameter readings are summarized in Table 3.

Groundwater samples were 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.

Non-disposable field measurement equipment was decontaminated prior to and after each usage. Decontamination procedures consisted of washing with fresh water and a non-phosphate detergent, then rinsing with deionized water. Purge water was discharged to the on-site water reclamation system for re-use 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 and for BTEX by EPA Method 8021B. Five monitor wells (MW-5, MW-10, MW-11A, MW-12, and OW-4) were sampled for nitrate, sulfate, and dissolved methane/ethylene/ethane to evaluate natural attenuation processes. Current and cumulative analytical results for BTEX, TPH-D, and TPH-G are presented in Table 4. Nitrate, sulfate, and dissolved methane analytical results are presented in Table 5. The laboratory analytical reports and chain-of-custody records for samples collected during the September 2000 field activities are included in Appendix B.

BTEX constituent concentrations in excess of applicable laboratory detection limits were reported in only three of the nine 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 all monitor wells except MW-10 and MW-12, which are

located near the former field waste tanks source area in the eastern portion of the facility. Figure 3 presents a benzene isoconcentration and total BTEX distribution map for the September 2000 sampling event. A total petroleum hydrocarbons distribution map for the September 2000 sampling event is presented in Figure 4.

Benzene was not detected monitor wells MW-3 and MW-4, which are located near the former source area in the western portion of the facility. Benzene has not been detected in monitor wells MW-3 and MW-4 since June 1999 and March 1999, respectively. Benzene has not been detected in monitor wells MW-1 or MW-9, which are also located near the former fuel island source area, since September 1998. Monitor wells MW-1 and MW-9 were most recently sampled in March 2000.

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. Adjustments to the biosparging system were made on July 14, 1999 to increase air flow to biosparging system Lateral No. 1, located in the eastern portion of the plume associated with the former fueling system (i.e., the western plume). Further adjustments to the air flow distribution within the biosparging system were made during the March 2000 quarterly sampling event, as described in detail in Section 3.1. The adjustments made in 1999 and 2000 resulted in decreases in the concentration of benzene in monitor well MW-13 from 1.5 mg/L on July 2, 1999 to less than 0.001 mg/L on September 13, 2000, as displayed graphically in Figure 5. Similarly, the total BTEX concentration in monitor well MW-13 decreased from 2.331 mg/L on July 2, 1999 to 0.0034 mg/L on September 13, 2000.

### 2.3 Natural Attenuation Evaluation

Natural attenuation is planned to be the primary remediation mechanism for the dissolved-phase hydrocarbon plume located in the area of the former field waste tanks in the eastern portion of the facility (see Figure 1).

The primary evidence of natural attenuation is plume behavior. A plume is shrinking when the rate of hydrocarbon loading from a source area is less than the rate of natural degradation of hydrocarbons. Plume shrinkage in the absence of aggressive remediation is indicative of the occurrence of natural attenuation processes. Conversely, a plume is expanding if the rate of hydrocarbon loading from a source area is greater than the rate of natural degradation of hydrocarbons through natural attenuation processes.

The former field waste tanks in the eastern portion of the facility were removed in March 1997. Concentrations of total BTEX in monitor wells in the area of the former field waste tanks have generally been stable or declining subsequent to removal of the field waste tanks. Occasional increases in total BTEX concentrations between quarterly sampling events have been observed in monitor wells MW-10 and MW-12 since March 1997. These increases may be attributed to sporadic loading rates from the vadose zone in excess of the natural attenuation rate of the area.

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, 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 may be utilized during intrinsic bioremediation. Dissolved oxygen concentrations should therefore be depressed in areas where intrinsic bioremediation is occurring.

Former field waste tanks source area monitor well MW-12 displayed benzene concentration of 0.034 mg/L, which was the maximum benzene concentration detected during the September 2000 sampling event. The dissolved oxygen concentration in this well, as measured with the YSI meter, was 1.73 mg/L. This dissolved oxygen concentration is depressed relative to monitor well MW-11A (which is located at the fringe of the eastern plume and which displays a substantially lower hydrocarbon concentration) and to non-impacted monitor wells at the facility, suggesting that natural aerobic biodegradation of hydrocarbons in the area of monitor well MW-12 within the eastern plume is occurring.

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 during the September 2000 sampling event. These concentrations are less than the background nitrate concentration of 3.93 mg/L measured in monitor well MW-5 (see Table 5). The low nitrate concentrations in monitor wells MW-10, MW-11A, and MW-12 suggest that nitrate has been depleted during natural attenuation of hydrocarbons in the former field waste tanks area of the facility.

Hydrocarbon constituents were not detected in downgradient well OW-4 in September 2000. The nitrate concentration of 3.21 mg/L in monitor well OW-4 is comparable to the nitrate concentration of 3.93 mg/L observed in background well MW-5. The combination of non-detectable hydrocarbon concentrations and a near-background nitrate concentration in downgradient well OW-4 supports the contention that the low nitrate concentrations observed in monitor wells MW-10, MW-11A, and MW-12 reflect natural attenuation of hydrocarbons in the former field waste tanks area rather than a simple eastward decrease in nitrate content within groundwater at the facility.

3. When dissolved oxygen 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 a concentration of 7.2 mg/L in monitor well MW-12 (which displayed the maximum impact by BTEX constituents) and at a non-detectable concentration in background well MW-5. Ferrous iron content was not measured in the remaining monitor wells at the facility during the September 2000 sampling event. It is recommended that measurement of ferrous iron content of groundwater from monitor wells MW-5, MW-10, MW-11A, MW-12, and OW-4 be performed during future groundwater sampling events at the facility.

4. Methane is a reaction product generated during utilization of carbon dioxide as an electron acceptor. Its concentration should therefore increase in areas where depletion of electron acceptors such as dissolved oxygen, nitrate, and carbon dioxide has occurred.

The concentration of methane in former field waste tanks area monitor well MW-10 was elevated relative to the methane concentrations in background well MW-5 and downgradient well OW-4, as shown in Table 5. The detection of methane in monitor well MW-10 suggests that utilization of carbon dioxide as an electron acceptor during natural attenuation processes may be occurring locally in the area of the former field waste tanks.

5. Alkalinity is expected to increase during natural attenuation processes, due to the leaching of carbonates from mineral substrates by microbially produced organic acids.

Groundwater alkalinity was measured using Hach field testing kits in September 2000. Alkalinity in former field waste tanks source area monitor wells MW-10, MW-11A, and MW-12 was elevated relative to upgradient monitor well MW-5. The elevated alkalinity measurements in impacted monitor wells relative to the background monitor well suggests that natural bioremediation is occurring in the area of the former field waste tanks.

The sulfate data presented in Table 5 display no discernable trend. Use of sulfate as an electron acceptor at the facility during intrinsic bioremediation of hydrocarbons can therefore not be confirmed.

In conclusion, dissolved oxygen, nitrate, ferrous iron, and alkalinity data from the September 2000 groundwater sampling event suggest that intrinsic bioremediation processes utilizing indigenous electron acceptors are ongoing at the facility. Increased methane concentration in the former field waste tanks area suggest that carbon dioxide may also be serving locally as an electron acceptor during intrinsic bioremediation of hydrocarbons in this area. It is recommended that monitoring for natural attenuation evaluation parameters continue in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12, downgradient well OW-4, and upgradient well MW-5. Redox, dissolved oxygen content, and alkalinity are good indicators of the occurrence of aerobic bioremediation of hydrocarbons, so it is also recommended that field and laboratory testing for these parameters be performed in these wells during upcoming groundwater monitoring events.



#### 3.0 REMEDIATION SYSTEM

Based on the results of previous investigations conducted by Brown and Caldwell and Roberts/Schornick and Associates, Inc., Brown and Caldwell recommended the installation of a biosparging system in a Remedial Action Plan (RAP) submitted to the NMOCD in May 1994. The NMOCD approved the RAP on August 11, 1994.

Biosparging 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, biosparging removes volatile and semivolatile contaminants from the saturated zone. Biosparging 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 content of groundwater and soil moisture present in the capillary fringe and vadose zone, thus facilitating 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

Nineteen combined injection and extraction wells, three vacuum extraction wells, one extraction blower, one injection blower, and associated piping were installed between August 2 through August 24, 1995. 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 that were near the center of the western plume, which is 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 of air to wells with less screen submergence. Three additional vapor extraction wells, VE-5 through VE-7, were also installed in PAWp\BISERV\12832\0688 doc

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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 and total BTEX concentrations measured in monitor well MW-1 have displayed a nearly continuous decline 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 since the December 1998 sampling event, and total BTEX concentrations decreased from 30.6 mg/L to less than 0.01 mg/L between December 1997 and March 2000.

The benzene concentration in monitor well MW-3 declined from 0.240 mg/L in December 1997 to less than 0.001 mg/L since September 1999, and the total BTEX concentration decreased from 1.930 mg/L in December 1997 to non-detectable levels since September 1999.

In monitor well MW-4, the benzene concentration decreased from 0.230 mg/L in December 1997 to less than 0.001 mg/L since the June 1999 sampling event. The total BTEX concentration in monitor well MW-4 dropped from 4.250 mg/L in December 1997 to a non-detectable level since June 2000.

The observed decreases in benzene and total BTEX concentrations in monitor wells MW-1, MW-3, and MW-4, which are located near the center of the former fuel island source area, are attributable to the effects of the increased air flow supplied by 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. 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 as a result of the system modifications completed in February 1998 and the system adjustments implemented

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in July 1999 and March 2000. This indicates that the system modifications and adjustments have been effective in increasing benzene removal from groundwater in the center of the former western plume area.

Monitor well MW-13 is located in the downgradient portion of the western plume. Application of increased air flow to injection wells AV-16 and AV-17 within Lateral No. 1 in mid-July 1999 resulted in substantial decreases in benzene and total BTEX concentrations in monitor well MW-13 between July 2, 1999 and March 10, 2000, as previously discussed in Section 2.2. Air flow within the biosparging system was adjusted during the March 2000 sampling event to further increase remedial pressure in the area of monitor well MW-13. Air flow to Lateral Nos. 4S, 5S, 6S, and 7S (i.e., air injection/vacuum extraction wells AV-1 through AV-8 and vacuum extraction wells VE-1 through VE-4, as shown in Figure 7) was shut off, thus increasing air flow to Lateral Nos. 1S, 2S, 3S, and 1D through 5D. The effect of decreased air flow on benzene and total BTEX concentrations in the center of the former western plume could thus be evaluated, while simultaneously enhancing remediation of the downgradient portion of the plume. Data from the June 2000 and September 2000 groundwater sampling events indicate that:

- Hydrocarbon concentrations remained constant or decreased in the center of the former western plume when airflow was decreased in this area; and
- Hydrocarbon concentrations have continued to decrease in monitor well MW-13, which is located in the downgradient portion of the western plume.

Based on these favorable trends in hydrocarbon concentrations and in accordance with the recommendations presented in the report for the June 2000 groundwater sampling event, the biosparging system will be shut down completely prior to the December 2000 groundwater sampling event. Quarterly monitoring will continue in December 2000 to monitor for possible rebound effect.

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### 3.2 Air Emissions

Vapors recovered during the extraction process are discharged to the atmosphere in accordance with State of New Mexico air quality regulations. Following initial system startup operations, effluent air samples were collected on a monthly basis to monitor the biosparging process and the emissions 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 substantial 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 pound per hour (lb/hr) to 0.03 lb/hr. 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/hr to 0.08 lb/hr. These emission rates were well below the regulatory limit of 10 lb/hr for VOCs. Therefore, use of a flame ionization detector (FID) to measure the TPH concentration of the vapors in the field commenced in September 1997. TPH measurements collected using a FID correspond to TPH concentrations previously determined in the analytical laboratory. A TPH concentration of 30 ppmv was measured during the September 2000 sampling event using a FID.

The September 2000 TPH concentration of 30 ppmv is substantially less than the 1,500 ppmv TPH discharge rate calculated for the March 24, 1998 sampling event, and reflects the decreased quantity of hydrocarbons present at the source area. 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 and associated adjustments to air injection rates.

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A TPH-VOC emissions rate of 0.037 lb/hr was calculated for the September 2000 sampling event. This emissions rate is less than the regulatory limit of 10 lb/hr for VOCs.

The initial increase in mass transfer rates after the February/March 1998 system modification is indicative of increased stripping of hydrocarbons within soil and groundwater from pathways that were not in contact with injected air prior to the system modification. The subsequent decrease in mass transfer, in concert with plume mass calculations shown in Figure 5, indicate that the overall contaminant mass has been reduced by operation of the biosparging system. A cumulative summary of air emissions monitoring data is presented in Table 6. These results are based on both laboratory analyses and field measurements.



### 4.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on information obtained during the September 2000 groundwater sampling event at the BJ Services Hobbs, New Mexico facility.

#### 4.1 Conclusions

- Groundwater flow was to the east/northeast at a hydraulic gradient of 0.007 ft/ft.
- Benzene concentrations in all monitor wells at the facility except MW-10 and MW-12 are less than the New Mexico WQCC standard of 0.01 mg/L for benzene.
- Dissolved benzene, BTEX, and TPH concentrations in all monitor wells at the former fueling system source area are below applicable standards.
- Increases in air flow rates to biosparge injection wells AI-16 and AI-17 have resulted in substantially decreased benzene and total BTEX concentrations in monitor well MW-13 between July 2, 1999 and September 13, 2000.
- TPH-VOCs emissions rates from the biosparging system have been 2 to 3 orders of magnitude below the regulatory limit of 10 lb/hr for VOCs during the time period of June 1998 through September 2000.
- Natural attenuation processes appear to be occurring in the vicinity of the former field waste tanks that were removed in March 1997.

### 4.2 Recommendations

- The biosparging system should be shut off. Western plume area wells MW-3, MW-4, MW-5, MW-7, and MW-13 should continue to be monitored on a quarterly basis to determine whether a rebound effect occurs. Monitor wells MW-1, MW-8, and MW-9 should continue to be monitored on an annual basis.
- The groundwater sampling program at the former fuel island source area should be continued until benzene, BTEX, and TPH concentrations in all wells pertinent to the source area are less than applicable New Mexico WQCC standards and permit requirements for four consecutive quarters.

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- Continue the quarterly groundwater sampling program in former field waste tanks area monitor wells MW-10, MW-11A, MW-12, and OW-4 on a quarterly basis to monitor for continued reduction in concentrations of benzene, BTEX, and TPH.
- Continue monitoring for natural attenuation evaluation parameters in monitor wells MW-5, MW-10, MW-11A, MW-12, and OW-4.

### **DISTRIBUTION**

September 2000 Groundwater Sampling Report BJ Services Company, U.S.A. Hobbs, New Mexico

February 26, 2001

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

1625 N. French Dr.

Hobbs, New Mexico 88240

Attention: Mr. Chris Williams

1 copy to: BJ Services Company, U.S.A.

11211 FM 2920

Tomball, Texas 77375

Attention: Ms. Jo Ann Cobb

1 copy to: Brown and Caldwell, Project File

QUALITY CONTROL REVIEWER

Lynn M. Wright, P.G.

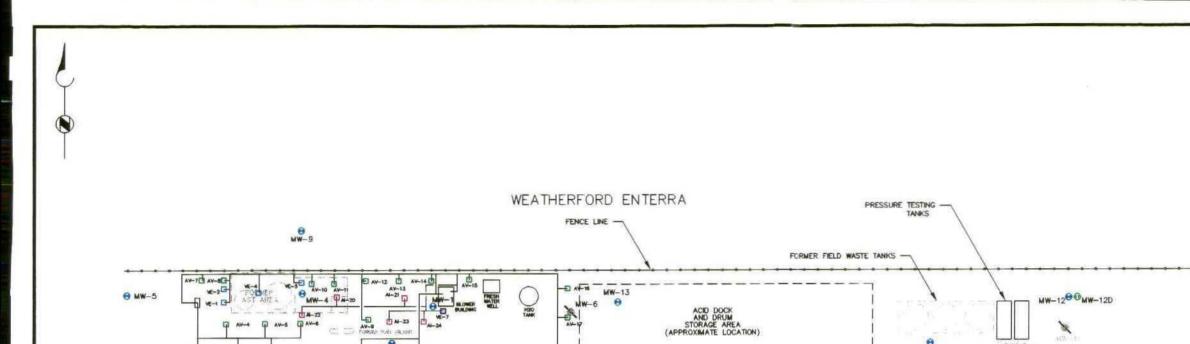
Principal Geologist

RLR/uak

## **FIGURES**

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"Use or disclosure of data contained on this sheet is subject to the restriction specified at the beginning of this document."



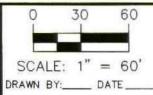
LATERAL NO. 1

EQUIPMENT MAINTENANCE TRUCK BAYS OFFICE

B	R	0	W	N	A	N	D
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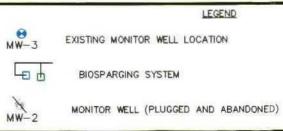
HOUSTON, TEXAS

SUBMITTED:\_\_\_\_PROJECT MANAGER APPROVED: DATE:



APPROVED:\_\_\_\_

CHK'D BY: \_\_\_\_ DATE\_ DATE.

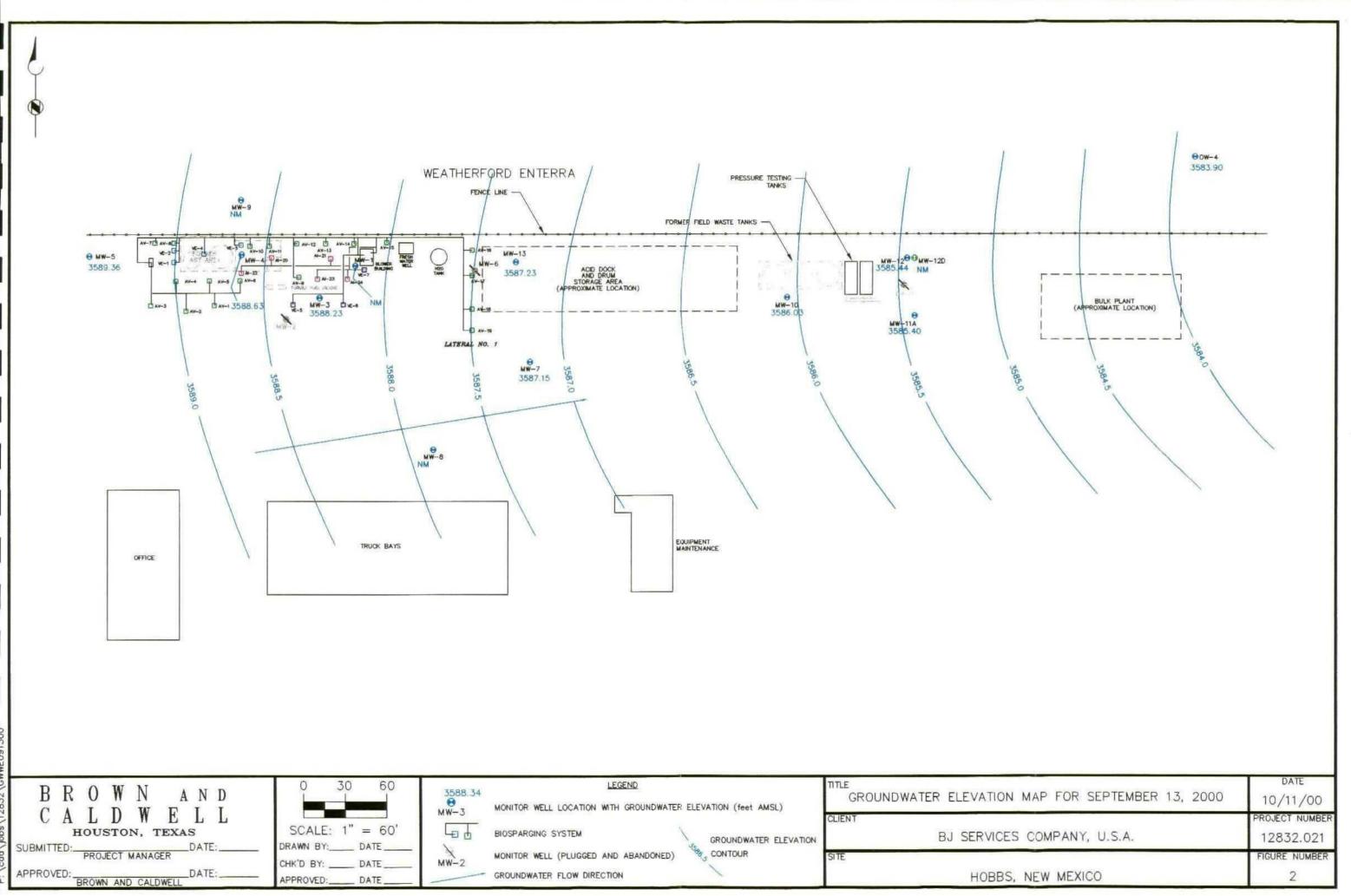


TTLE	SITE MAP	12/29/00
CLIENT		PROJECT NUMBER
	BJ SERVICES COMPANY, U.S.A.	12832.016
SITE		FIGURE NUMBER
	HOBBS, NEW MEXICO	1

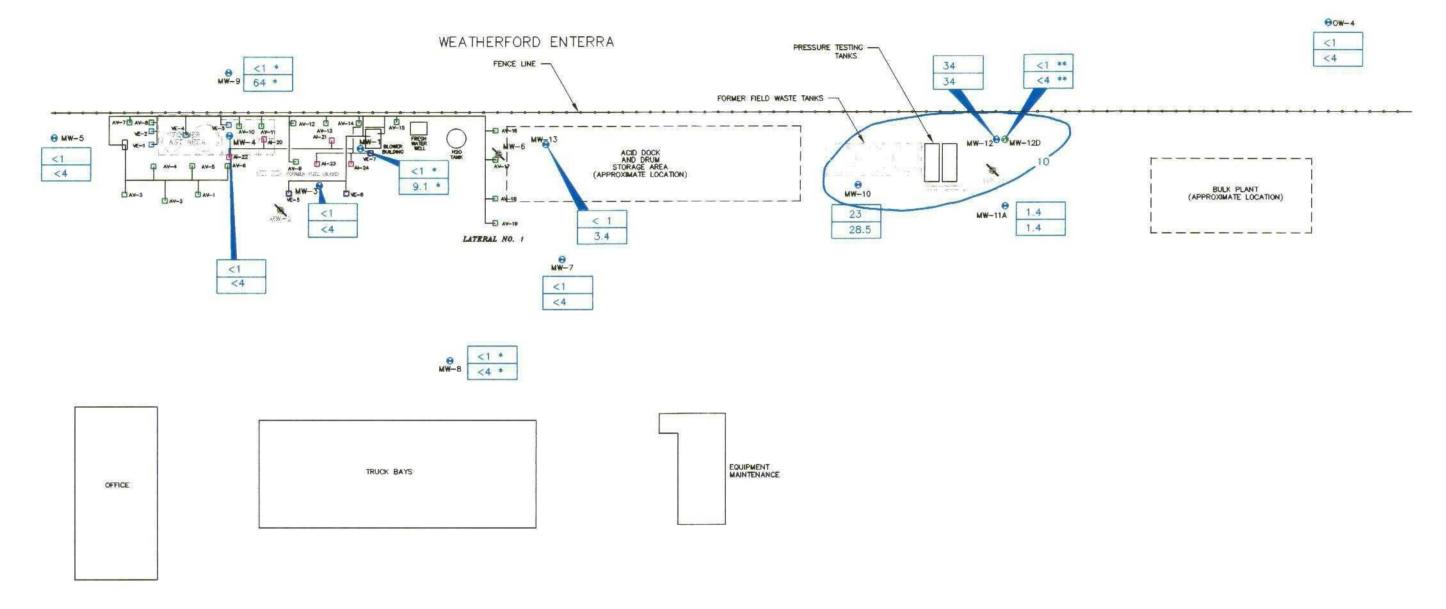
⊕0W-4

BULK PLANT (APPROXIMATE LOCATION)

MW-11A



Sad | JOS (12832 (GWWE091300

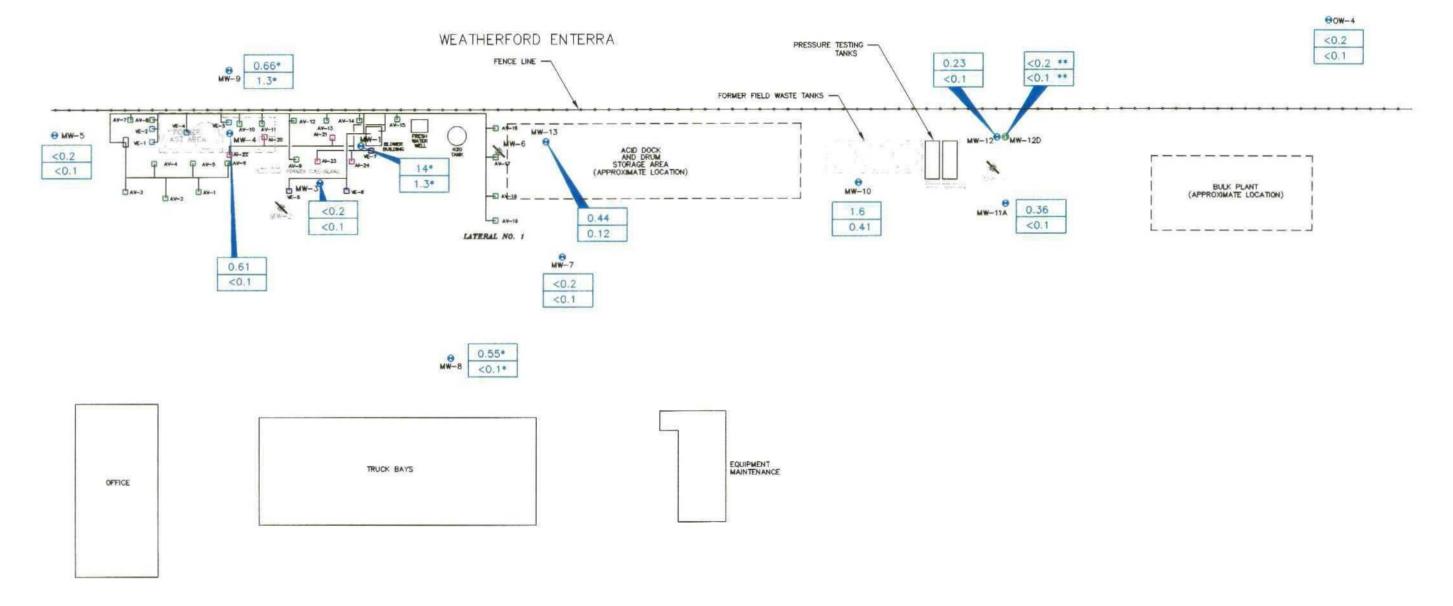


NOTE: MONITOR WELL MW-12D IS SCREENED IN A DEEPER PORTION OF THE AQUIFER THAN MONITOR WELL MW-12 AND THE OTHER MONITOR WELLS; DATA FROM MONITOR WELL MW-12D NOT INCLUDED IN CONTOURING.

P:\cad\jobs\12832\Benzene091300 LEGEND BROWN AND 30 60 BIOSPARGING SYSTEM EXISTING MONITOR WELL LOCATION MONITOR WELL (PLUGGED AND ABANDONED) 10 - BENZENE ISOCONCENTRATION CONTOUR ( ug/L) SCALE: 1" = 60'HOUSTON, TEXAS SUBMITTED: PROJECT MANAGER DRAWN BY:\_ - BENZENE CONCENTRATION (ug/L) <1.0 - TOTAL BTEX CONCENTRATION (ug/L) CHK'D BY: \_ APPROVED: BROWN AND CALDWELL \*, \*\* INDICATES WELL NOT SAMPLED 9/13/00; DATA PRESENTED ARE FROM 3/9-10/00 (\*) OR 6/8/00 (\*\*) APPROVED: DATE

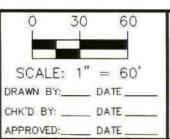
TITLE	BENZENE ISOCONCENTRATION AND TOTAL BTEX DISTRIBUTION MAP FOR SEPTEMBER 13, 2000	10/11/00
CLIENT	DI CERVICES COMPANY II S A	PROJECT NUMBER
SITE	BJ SERVICES COMPANY, U.S.A.	12832.014
	HOBBS, NEW MEXICO	3







SUBMITTED: PROJECT MANAGER APPROVED: \_\_\_\_DATE:\_

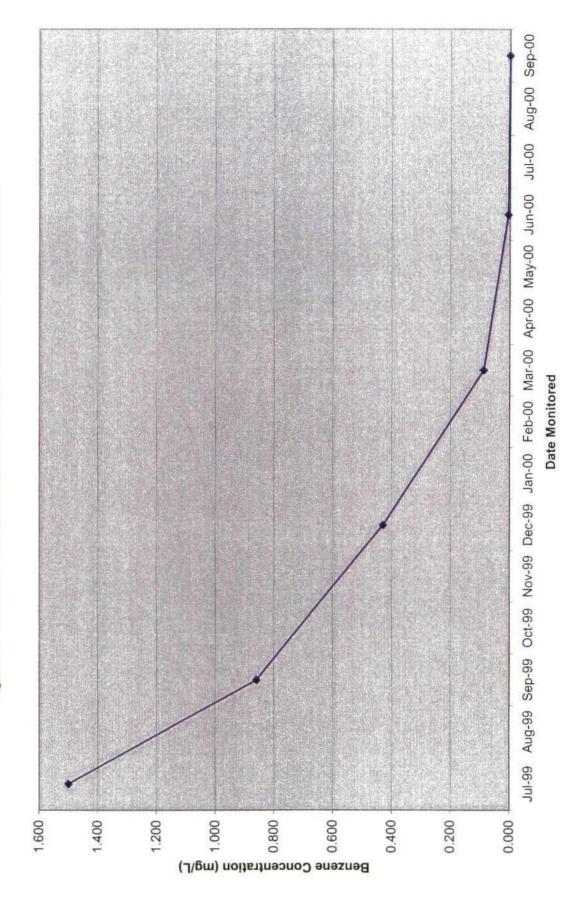


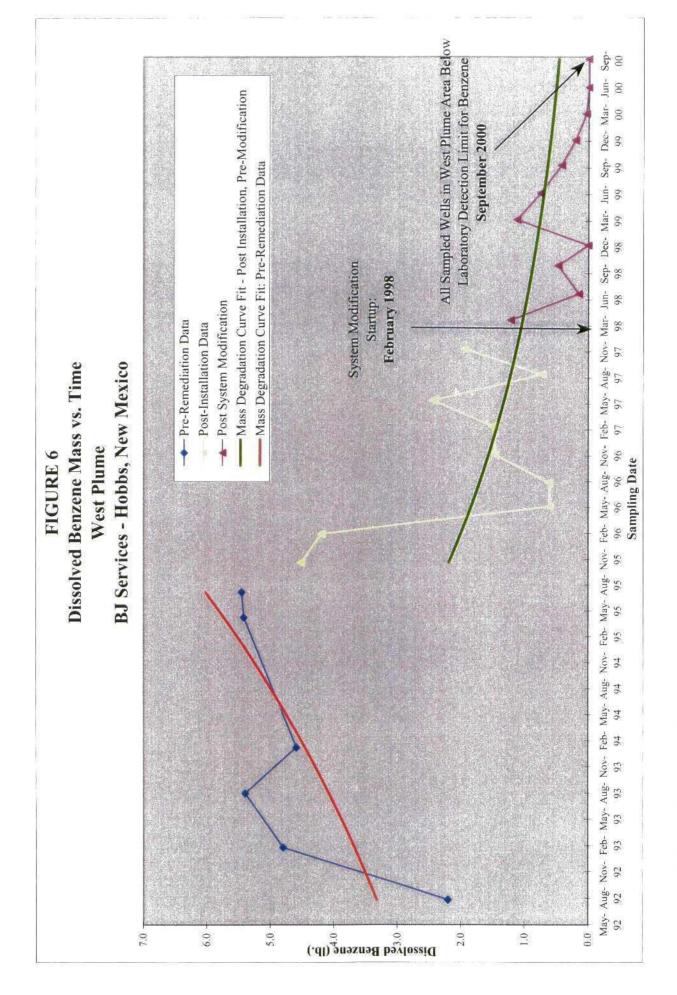
		LEGEND		
₩-3	EXISTING MONITOR WELL LOCATION		BICSPARGING SYSTEM	
MW-2	MONITOR WELL (PLUGGED AND ABANDONED)			
<0.2	- TPH-D CONCENTRATION (mg/L)			
<0.1	- TPH-G CONCENTRATION (mg/L)			
*, ** IN	DICATES WELL NOT SAMPLED 9/13/00; DATA	A PRESENTED	ARE FROM 3/9-10/00 (*) OR 6/8/00 (**)	

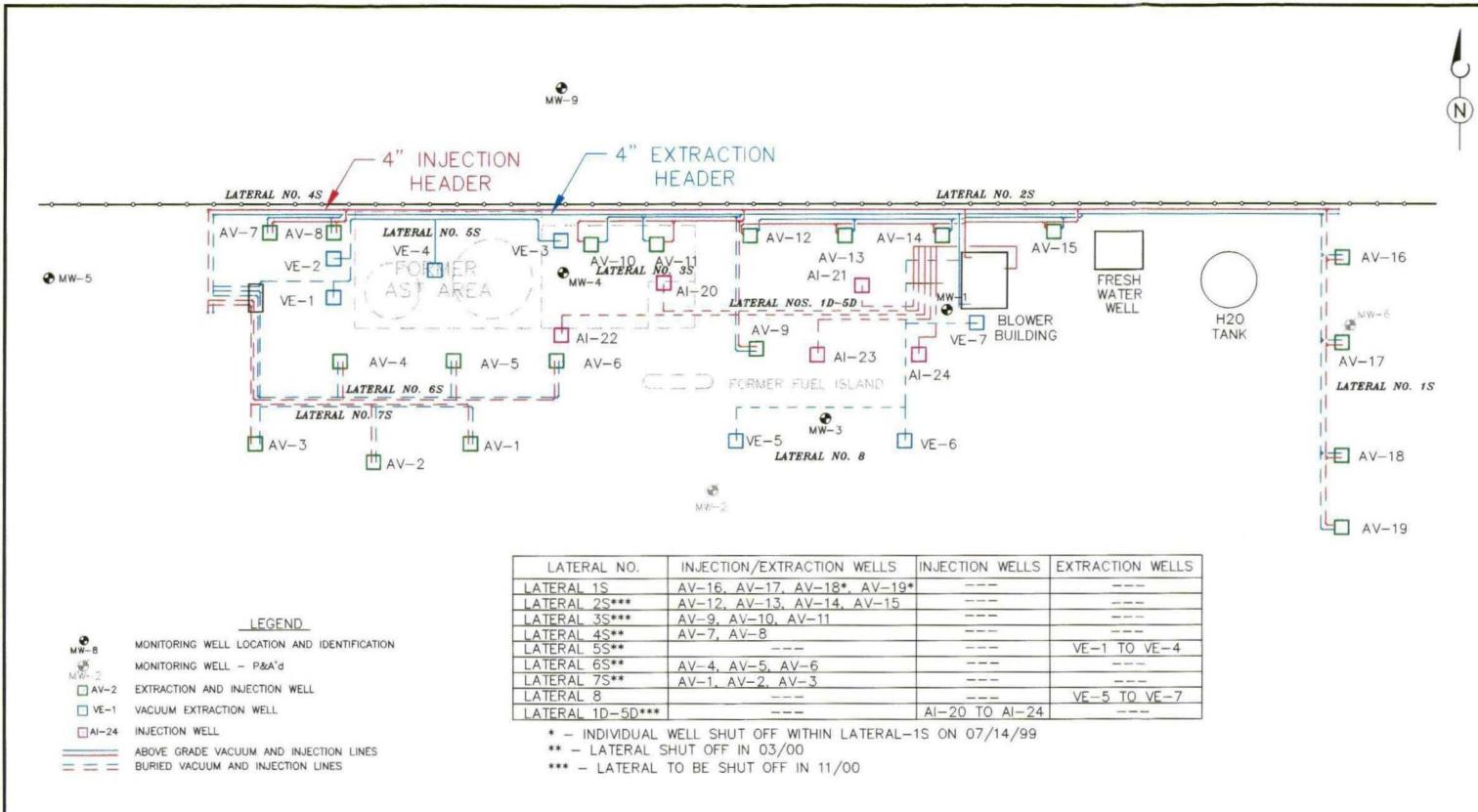
TITLE	TOTAL PETROLEUM HYDROCARBONS DISTRIBUTION MAP FOR SEPTEMBER 13, 2000	10/11/00
CLIENT	BJ SERVICES COMPANY, U.S.A.	10/11/00 12832.014
SITE	HOBBS, NEW MEXICO	FIGURE NUMBER

\cad\jobs\12832\TPH091300

Figure 5 - Benzene Concentration in Monitor Well MW-13 versus Time







TITLE

CLIENT

DETAIL OF BIOSPARGING SYSTEM

BJ SERVICES COMPANY, U.S.A.

HOBBS, NEW MEXICO

10/11/00

PROJECT NUMBER

12832.015

FIGURE NUMBER

P:\CAD\JOBS\2832\TASK 15\LATERALSREV

BROWN

HOUSTON, TEXAS

BROWN AND CALDWELL DATE:

AND

SCALE: 1'' = 20

CHK'D BY: \_\_\_\_ DATE\_

DRAWN BY:

APPROVED:\_

## **TABLES**

"Use or disclosure of data contained on this sheet is subject to the restriction specified at the beginning of this document."

## 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 handaugured 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 preperty.
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 three 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 new injection wells AI-20 through AI-24.
March 10, 1998	Operation of new air injection wells AI-20 through AI-24 and new vapor extraction wells VE-5 though VE-7 commenced.
March 23-24, 1998	Brown and Caldwell conducted the March 1998 groundwater sampling event.
March 24, 1998	Operation of previously existing injection wells and vapor extraction 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.

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

Date	Activity
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.
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; installed and developed monitor wells MW-12D and MW-13; and sampled monitor wells MW-12D and MW-13 to complete the June/July 1999 groundwater sampling event.
July 14, 1999	Brown and Caldwell redirected air discharge from the shallow well injection system to Lateral No. 1 and optimized air flow to injection wells AI-16 and AI-17 to apply increased remedial pressure to the eastern potion of the west plume.
September 13-14, 1999	Brown and Caldwell conducted the September 1999 groundwater sampling event.
December 9, 1999	Brown and Caldwell conducted the December 1999 groundwater sampling event
March 9-10, 2000	Brown and Caldwell conducted the March 2000 groundwater sampling event and shut off air flow to biosparging system Lateral Nos. 4S, 5S, 6S, and 7S.
June 8, 2000	Brown and Caldwell conducted the June 2000 groundwater sampling event.
September 13, 2000	Brown and Caldwell conducted the September 2000 groundwater sampling event.

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

MW-2	3,647.53	08/10/92 02/09/93		1	Elevation (MSL)	
MW-2			53.22	0.00	3,594.31	(1)
			53.03	0.00	3,594.50	( )
		08/18/93	53.10	0.00	3,594.43	
		01/26/94	53.31	0.00	3,594.22	
		05/03/95	54.64	0.20	3,593.05	(2)
		03/03/93	54.14	0.00	3,593.39	(2)
		11/14/95	53.69	0.00	3,593.84	
			54.32	0.00		
		02/23/96	i e		3,593.21	
		05/31/96	54.14	0.00	3,593.39	
		08/23/96	56.17	0.00	3,591.36	
		12/02/96	55.27	0.00	3,592.26	
		03/12/97	55.70	0.27	3,592.05	
		06/12/97	55.08	0.02	3,592.47	
		09/12/97	55.64	0.51	3,592.31	
		12/10/97	55.46	0.00	3,592.07	PSH Sheen
		03/24/98	55.81	0.00	3,591.72	PSH Sheen
		06/23/98	56.38	0.06	3,591.20	
		09/30/98	56.82	0.00	3,590.71	PSH Sheen
		12/09/98	57.05	0.00	3,590.48	
		03/10/99	57.45	0.00	3,590.08	
		06/10/99	58.02	0.00	3,589.51	
		07/02/99	57.90	0.00	3,589.63	
		09/14/99	58.14	0.00	3,589.39	
		12/09/99	-	_		(3)
		03/09/00	58.99	0.00	3,588.54	(3)
		06/00	-	-	3,500.54	
		09/00	_	_	_	
MW-3	3,644.84	08/10/92	52.82	0.00	3,592.02	(1)
MW-3		02/09/93	49.60	0.00	3,595.24	. ,
MW-3		08/18/93	49.71	0.00	3,595.13	
MW-3		01/26/94	49.97	0.00	3,594.87	
MW-3		05/03/95	-	-	-	(4),(5)
	3,645.00	08/10/92	52.99	0.00	3,592.01	(1)
		02/09/93	52.72	0.00	3,592.28	• •
		08/18/93	52.82	0.00	3,592.18	
		01/26/94	53.05	0.00	3,591.95	
		05/03/95	54.31	0.00	3,590.69	
		07/31/95	51.24	0.00	3,593.76	
		11/14/95	51.10	0.00	3,593.90	
		02/23/96	51.68	0.00	3,593.32	
		05/31/96	51.45	0.00	3,593.55	
		08/23/96	51.55	0.00	3,593.45	
		12/02/96		1		
			52.23	0.00	3,592.77	
		03/12/97	52.67	0.00	3,592.33	
		06/12/97	52.68	0.00	3,592.32	
ı		09/11/97	52.71	0.00	3,592.29	
		12/10/97	52.89	0.00	3,592.11	
		03/23/98	53.22	0.00	3,591.78	
		06/23/98	53.66	0.00	3,591.34	
ſ		09/30/98	54.06	0.00	3,590.94	
[		12/09/98	54.36	0.00	3,590.64	
1		03/10/99	54.72	0.00	3,590.28	
		06/10/99	55.17	0.00	3,589.83	

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-3		07/02/99	55.15	0.00	3,589.85	
		09/14/99	55.42	0.00	3,589.58	
		12/09/99	55.78	0.00	3,589.22	
		03/09/00	56.23	0.00	3,588.77	
		06/08/00	56.66	0.00	3,588.34	
		09/13/00	56.77	0.00	3,588.23	
MW-4	3,645.28	08/10/92	50.55	0.00	3,594.73	(1)
147 44 - 4	3,013.20	02/09/93	50.26	0.00	3,595.02	(1)
		08/18/93	50.38	0.00	3,594.90	
		01/26/94	50.90	0.30	3,594.63	
		05/03/95	51.51	0.45	3,594.14	
		03/03/95	51.74	0.26	3,593.75	
		11/14/95	51.03	0.20	3,594.25	
		02/23/96	51.65	0.00		•
		05/31/96	[		3,593.64	
			51.48	0.00	3,593.80	
		08/23/96 12/02/96	53.49 52.32	0.00	3,591.79	
		1		l	3,592.96	
		03/12/97	52.74	0.05	3,592.58	
		06/12/97	53.08	0.44	3,592.56	
		09/12/97	52.60	0.15	3,592.80	part at
		12/10/97	52.89	0.00	3,592.39	PSH Sheen
		03/24/98	53.20	0.25	3,592.29	
	1	06/23/98	53.82	0.22	3,591.64	
		09/30/98	53.96	0.00	3,591.32	200 ml PSF
		12/09/98	54.27	0.00	3,591.01	
		03/10/99	54.69	0.04	3,590.62	
		06/10/99	55.07	0.00	3,590.21	
		07/02/99	55.10	0.00	3,590.18	
		09/14/99	55.33	0.00	3,589.95	
	}	12/09/99	55.79	0.00	3,589.49	
		03/10/00	56.12	0.00	3,589.16	
		06/08/00	56.67	0.00	3,588.61	
		09/13/00	56.65	0.00	3,588.63	
MW-5	3,647.72	08/10/92	52.38	0.00	3,595.34	(1)
		02/09/93	52.06	0.00	3,595.66	
		08/18/93	52.16	0.00	3,595.56	
		01/26/94	52.50	0.00	3,595.22	
		05/03/95	53.57	0.00	3,594.15	
		07/31/95	53.27	0.00	3,594.45	
		11/14/95	52.83	0.00	3,594.89	
		02/23/96	53.57	0.00	3,594.15	
		05/31/96	53.16	0.00	3,594.56	
		08/23/96	53.41	0.00	3,594.31	
		12/02/96	53.98	0.00	3,593.74	
		03/12/97	54.44	0.00	3,593.28	
		06/12/97	54.48	0.00	3,593.24	
		09/12/97	54.29	0.00	3,593.43	
		12/10/97	54.66	0.00		
		1			3,593.06	
		03/23/98	55.05	0.00	3,592.67	
		06/23/98	55.44	0.00	3,592.28	
		09/30/98	55.65	0.00	3,592.07	
		12/09/98	56.00	0.00	3,591.72	
	1	03/09/99	56.45	0.00	3,591.27	

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-5		06/10/99	56.91	0.00	3,590.81	
		07/02/99	56.93	0.00	3,590.79	
,		09/14/99	57.12	0.00	3,590.60	
		12/09/99	57.41	0.00	3,590.31	
		03/09/00	57.92	0.00	3,589.80	
		06/08/00	58.32	0.00	3,589.40	
		09/13/00	58.36	0.00	3,589.36	
MW-6	3,644.74	02/09/93	50.58	0.00	3,594.16	(1)
	,,,,,,,,,	08/18/93	50.78	0.00	3,593.96	ζ-)
		01/26/94	51.00	0.00	3,593.74	
		05/03/95	52.63	0.00	3,592.11	
	1	07/31/95	51.90	0.00	3,592.84	
		11/14/95	51.19	0.00	3,593.55	
		02/23/96	52.10	0.00	3,592.64	
		05/31/96	51.76	0.00	3,592.98	
		08/23/96	51.63	0.00	3,593.11	
	].	12/02/96	52.85	0.00	3,591.89	
		03/12/97	53.55	0.00	3,591.19	
		06/12/97	52.08	0.00	3,592.66	
		09/11/97	53.72	0.00	3,591.02	
		12/10/97	53.27	0.00	3,591.47	
		03/23/98	53.56	0.00	3,591.18	
		06/23/98	52.88	0.00	3,591.86	
		09/30/98	54.89	0.00	3,589.85	
		12/09/98	54.57	0.00	3,590.17	
		03/10/99	55.10	0.00	3,589.64	
		07/02/99			3,505.01	(5),(6)
MW-7	3,644.55	02/09/93	50.53	0.00	3,594.02	(1)
	,	08/18/93	50.74	0.00	3,593.81	(-)
		01/26/94	51.01	0.00	3,593.54	
		05/03/95	52.25	0.00	3,592.30	
		07/31/95	51.92	0.00	3,592.63	
		11/14/95	51.48	0.00	3,593.07	
	1	02/23/96	52.15	0.00	3,592.40	
		05/31/96	51.78	0.00	3,592.77	
		08/23/96	52.02	0.00	3,592.53	
		12/02/96	52.52	0.00	3,592.03	
		03/12/97	52.99	0.00	3,591.56	
		06/12/97	53.08	0.00	3,591.47	
		09/11/97	53.00	0.00	3,591.55	
		12/10/97	53.28	0.00	3,591.27	
		03/23/98	53.59	0.00	3,590.96	
		06/23/98	54.20	0.00	3,590.35	
	}	09/30/98	54.54	0.00	3,590.01	
		12/09/98	54.74	0.00	3,589.81	
		03/09/99	55.15	0.00	3,589.40	
		06/10/99	55.66	0.00	3,588.89	
	1	07/02/99	55.73	0.00	3,588.82	
		1	1		1 1	
		09/13/99	55.94	0.00	3,588.61	
		12/09/99	56.38	0.00	3,588.17	
		03/09/00	56.74	0.00	3,587.81	
		06/08/00	57.17	0.00	3,587.38	
		09/13/00	57.40	0.00	3,587.15	

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-8	3,644.87	02/09/93	50.48	0.00	3,594.39	(1)
		08/18/93	50.67	0.00	3,594.20	• ,
		01/26/94	50.96	0.00	3,593.91	
		05/03/95	52.15	0.00	3,592.72	
		07/31/95	51.77	0.00	3,593.10	
		11/14/95	51.37	0.00	3,593.50	
		02/23/96	52.17	0.00	3,592.70	
		05/31/96	51.55	0.00	3,593.32	
		08/23/96	51.92	0.00	3,592.95	
		12/02/96	52.43	0.00	3,592.44	
		03/12/97	52.93	0.00	3,591.94	
		06/12/97	53.96	0.00	3,590.91	
		09/11/97	52.73	0.00	3,592.14	
		12/10/97	53.15	0.00	3,591.72	
		03/23/98	53.51	0.00	3,591.72	
		06/23/98	54.01	0.00	3,590.86	
		09/30/98	54.35	0.00	3,590.52	
		12/09/98	54.60	0.00	3,590.27	
	1	03/09/99	55.00	0.00	3,589.87	
		06/10/99	55.56	0.00	3,589.31	
		07/02/99	55.57	0.00	1	
		09/13/99	55.72	0.00	3,589.30 3,589.15	
		12/09/99	33.72	0.00	3,369.13	(2)
			56.52	0.00	2 500 25	(3)
		03/09/00	30.32	0.00	3,588.35	
		06/00 06/00	_		-	
MW-9	3,644.78	04/22/93	49.73	0.00	3,595.05	(1)
141 11 -5	3,011.76	07/15/93	49.65	0.00	3,595.13	(1)
		08/18/93	49.85	0.00	3,594.93	
		01/26/94	50.02	0.00	3,594.76	
		05/03/95	51.35	0.00	3,593.43	
		07/31/95	50.97	0.00	3,593.81	
		11/14/95	50.43	0.00	3,594.35	
		02/23/96	51.12	0.00	i I	
		05/31/96	50.89	0.00	3,593.66 3,593.89	
		08/23/96	50.89	0.00		
		L	1	1	3,593.80	
		12/02/96 03/12/97	51.58	0.00	3,593.20	
			52.21	0.05	3,592.61	BOLLO
		06/12/97	52.10	0.00	3,592.68	PSH Sheer
		09/12/97	51.95	0.00	3,592.83	PSH Sheer
		12/10/97	52.37	0.00	3,592.41	PSH Sheer
		03/23/98	52.68	0.00	3,592.10	PSH Sheer
		06/23/98	53.08	0.00	3,591.70	PSH Sheer
		09/30/98	53.39	0.01	3,591.40	PSH Sheer
		12/09/98	53.68	0.00	3,591.10	
		03/10/99	54.15	0.00	3,590.63	
		06/10/99	54.68	0.00	3,590.10	
		07/02/99	54.71	0.00	3,590.07	
		09/13/99	54.71	0.00	3,590.07	
		12/09/99	-	-		(3)
		03/09/00	55.69	0.00	3,589.09	(-)
		06/00	_	-	-,,	
	1	09/00		1	1	

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comment
MW-10	3,644.47	08/18/93	51.54	0.00	3,592.93	(1)
		01/26/94	51.90	0.00	3,592.57	. ,
		05/03/95	52.97	0.00	3,591.50	
		07/31/95	52.87	0.00	3,591.60	
		11/14/95	52.51	0.00	3,591.96	
		02/23/96	53.05	0.00	3,591.42	
		05/31/96	52.79	0.00	3,591.68	
		08/23/96	53.03	0.00	3,591.44	
		12/02/96	53.41	0.00	3,591.06	
	•	03/12/97	54.21	0.00	3,590.26	
		06/12/97	53.99	0.00	3,590.48	
		09/12/97	53.94	0.00	3,590.53	
		12/10/97	54.12	0.00	3,590.35	
		03/23/98	54.51	0.00	3,589.96	
		06/23/98	55.12	0.00	3,589.35	
	•	09/30/98	55.61	0.00	3,588.86	•
		12/09/98	55.80	0.00	3,588.67	
		03/09/99	56.09	0.00	3,588.38	
		06/10/99	56.60	0.00	3,587.87	
		07/02/99	56.64	0.00	3,587.83	
		09/14/99	56.91	0.00	3,587.56	
		12/09/99	57.37	0.00	3,587.10	
		03/10/00	57.71	0.00	3,586.76	
		06/08/00	58.08	0.00	3,586.39	
	<u>, , , , , , , , , , , , , , , , , , , </u>	09/13/00	58.44	0.00	3,586.03	
MW-11	3,643.78	08/18/93	51.92	0.00	3,591.86	(1)
		01/26/94	52.32	0.00	3,591.46	
		05/03/95	53.38	0.00	3,590.40	
		07/31/95	53.35	0.00	3,590.43	
		11/14/95	52.96	0.00	3,590.82	
		02/23/96	53.50	0.00	3,590.28	
		05/31/96	53.25	0.00	3,590.53	
		08/23/96	53.49	0.00	3,590.29	
		12/02/96	53.79	0.00	3,589.99	
		03/12/97	53.81	0.00	3,589.97	
		06/12/97	53.96	0.00	3,589.82	
		09/12/97	52.93	0.00	3,590.85	
		12/10/97				(5),(6)
1W-11A	3,644.24	03/23/98	54.79	0.00	3,589.45	(7)
		06/23/98	55.43	0.00	3,588.81	. ,
]		09/30/98	55.96	0.00	3,588.28	
		12/09/98	56.13	0.00	3,588.11	
		03/10/99	56.43	0.00	3,587.81	
		06/10/99	56.94	0.00	3,587.30	
		07/02/99	57.01	0.00	3,587.23	
†		09/14/99	57.36	0.00	3,586.88	

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-11A		12/09/99	57.72	0.00	3,586.52	
		03/09/00	58.01	0.00	3,586.23	
·		06/08/00	58.40	0.00	3,585.84	
	I	09/13/00	58.84	0.00	3,585.40	
MW-12	3,644.29	03/23/98	54.72	0.00	3,589.57	(7)
		06/23/98	55.48	0.00	3,588.81	
		09/30/98	56.02	0.00	3,588.27	
		12/09/98	56.17	0.00	3,588.12	
		03/10/99	56.45	0.00	3,587.84	
		06/10/99	56.97	0.00	3,587.32	
		07/02/99	56.99	0.00	3,587.30	
		09/14/99	57.41	0.00	3,586.88	
	1	12/09/99	57.76	0.00	3,586.53	
*		03/10/00	58.08	0.00	3,586.21	
		06/08/00	58.42	0.00	3,585.87	
		09/13/00	58.85	0.00	3,585.44	
MW-12D	3,644.38	07/02/99	57.13	0.00	3,587.25	(8)
		09/14/99	57.74	0.00	3,586.64	
		12/09/99	57.86	0.00	3,586.52	
		03/09/00	58.24	0.00	3,586.14	
		06/08/00	58.56	0.00	3,585.82	
		09/00		-	-	
MW-13	3,645.52	07/02/99	56.60	0.00	3,588.92	(9)
•		09/14/99	56.92	0.00	3,588.60	
		12/09/99	57.28	0.00	3,588.24	
		03/10/00	57.68	0.00	3,587.84	
		06/08/00	58.04	0.00	3,587.48	
		09/13/00	58.29	0.00	3,587.23	
OW-4	3,644.06	07/02/99	58.18	0.00	3,585.88	(8)
		09/14/99	58.63	0.00	3,585.43	
		12/09/99	58.92	0.00	3,585.14	
		03/09/00	59.19	0.00	3,584.87	
		06/08/00	59.56	0.00	3,584.50	
		09/13/00	60.16	0.00	3,583.90	

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

<sup>(2)-</sup> For wells having measurable thickness of free product, 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) of the free product is 0.82.

<sup>(3) -</sup> Not measured.

<sup>(4) -</sup> Monitor well MW-2 could not be located after January 1994.

<sup>(5) -</sup> Well plugged and abandoned July 2, 1999.

<sup>(6) -</sup> Monitor well MW-11 could not be located after September 12, 1997.

<sup>&</sup>lt;sup>(7)</sup>- TOC elevations for MW-11A and MW-12 estimated relative to TOC elevation for MW-10.

<sup>(8) -</sup> TOC elevations for MW-12D and OW-4 estimated relative to TOC elevation for MW-12.

<sup>&</sup>lt;sup>(7)</sup> - TOC elevation for MW-13 estimated relative to TOC elevation for MW-7.

## Table 3 September 13, 2000 Field Screening Results for Groundwater Samples Hobbs, New Mexico Facility BJ Services Company, U.S.A.

Monitor Well	Cumulative Gallons Removed	рН	Temperature (°C)	Conductivity (umhos)	Redox (mV)	Dissolved Oxygen (meter) (mg/L)	Dissolved Oxygen (Hach kit) (mg/L)	Ferrous Iron (mg/L)	Alkalinity (mg/L)
	0.25	7.72	21.15	1288	-61.4	6.80	NM <sup>(2)</sup>	NM	NM
MW-3 <sup>(1)</sup>	1	7.27	19.3	1247	-39.9	6.43	NM	NM	NM
	2	7.55	20.37	1305	-51.0	6.86	NM	NM	NM
MW-4 <sup>(1)</sup>	0.21	7.4	20.2	1550	5.64	5.64	NM	NM	NM
MW-4	1.5	7.6	20.3	1492	6.26	6.26	NM	NM	NM
MW-5 <sup>(1)</sup>	0.25	7.7	19.8	1313	-47.8	6.58	NM	NM	NM
MW-3	0.75	7.3	19.1	1299	-40.7	6.9	5.4	0	240
MW-7 <sup>(1)</sup>	0.25	7.1	21.75	1062	-32.4	7.35	NM	NM	NM
MW-10 <sup>(1)</sup>	0.5	7.25	22.3	3401	-35.8	3.7	NM	NM	NM
MW-10	1.0	7.31	22.4	3509	-42.6	3.9	1.2	NM	1155
	0.5	7.17	20.31	5542	-29.4	3.64	NM	NM	NM
MW-11A <sup>(1)</sup>	1	7.33	20.62	6029	-35.8	3.46	NM	NM	NM
	2	7.11	21.89	6121	-34.7	2.41	1.4	NM	440
MW-12 <sup>(1)</sup>	NM	7.81	20.17	2994	20.5	1.73	NM	NM	NM
101 00 - 12	NM	7.81	20.17	2694	20.5	1.73	1.2	7.2	<i>77</i> 0
	0.5	7.4	20.09	1349	-45.8	4.10	NM	NM	NM
MW-13 <sup>(1)</sup>	1.25	7.4	19.25	1345	-38.4	5.3	NM	NM	NM
	3.00	7.2	19.2	1350	-36.6	4.71	NM	NM	NM
OW-4 <sup>(1)</sup>	0.25	6.98	20.01	1578	-25.6	8.2	NM	NM	NM

<sup>(1)</sup> Well pumped or bailed dry after removal of less than 3 well volumes.

Monitor wells MW-1, MW-8, and MW-9 not sampled in September 2000.

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

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

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

<sup>(2)</sup> NM = Not measured.

Table 4

Cumulative BTEX and TPH Analytical Results for Groundwater Samples

Hobbs, New Mexico Facility

BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		micrograi	ns per liter, ug/l		milligrams p	er liter, mg/I
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
	9/30/98	Regular	3.2	90	280	970	2.5	3.6
	12/10/98	Regular	<1.0	1.5	17	110	1.4	0.31
	3/10/99	Regular	<1.0	<1.0	8.2	110	0.62	0.85
	3/10/99	Duplicate	<1.0	<1.0	7.9	110	0.66	0.84
	6/10/99	Regular	<1.0	1.1	<1.0	28	0.53	0.55
	6/10/99	Duplicate	<1.0	1.8	<1.0	41	0.69	0.76
	9/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	< 0.10
	12/9/99	-	NS	NS	NS	NS	NS	NS
	3/9/00	Regular	<	< 1	< 1	9.1	14	1.3
	6/8/00	•	NS	NS NS	NS	NS	NS	NS
	9/13/00	-	NS	NS	NS	NS	NS	NS
MW-2 <sup>1</sup>	8/10/92	Regular	14.9	< 4	< 4	< 4	NA 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 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	1.8	20
	9/11/97	Regular	770	3000	1600	1900	1.6	
	12/10/97	Regular	240	740	500	1		16
	1 14/10/97	1 Regular	1 240	1 /40	300	450	0.59	5.3

Table 4
Cumulative BTEX and TPH Analytical Results for Groundwater Samples
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgra	ms per liter, ug/l		milligrams p	er liter, mg/I
MW-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
	9/30/98	Regular	42	470	450	530	1.0	3.8
	12/10/98	Regular	13	220	160	290	1.3	0.43
	3/10/99	Regular	3.2	7.4	42	32	0.2	0.44
	6/10/99	Regular	1.7	3.1	<1.0	36	<0.20	0.18
	9/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/9/99	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	3/9/00	Regular	<1	< 1	< 1	< 1	0.32	< 0.1
	6/8/00	Regular	< 1	< 1	< 1	< 1	<0.22	< 0.1
	9/13/00	Regular	< 1	< 1	< 1	< 1	<0.2	< 0.1
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
ĺ	1/27/94	Regular	NSP	NSP	NSP	NSP	NA	NSP
	5/3/95	Regular	NSP	NSP	NSP	NSP	NA	NSP
Į	8/1/95	Regular	<b>57</b> 00	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
ļ	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	2 <b>7</b>	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
	9/30/98	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
	3/10/99	Regular	8	20	250	1400	13.0	13
	6/10/99	Regular	<1.0	<1.0	12	12	0.44	0.63
	9/14/99	Regular	< 1.0	< 1.0	3.3	13.1	0.35	1
	12/9/99	Regular	< 1	2.5	2.3	20,1	2	0.17
	3/10/00	Regular	< 1	<1	< 1	3.6		0.53
	6/8/00	Regular	< 1	< 1	< 1	1	2.6	0.15
	9/13/00	Regular	< 1	<1	< 1	< 1 < 1	0.44 0.61	0.23 <0.1
1				·		)	0.01	<b>~0.1</b>
MW-5	8/10/92	Regular	< 4	< 4	< 4	< 4	NA	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
ļ	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 NA
	11/15/95	Regular	< 0.3	1.2	< 0.3	1.5	NA	NA.
ŀ	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA NA	NA NA
	5/31/96	Regular	31	86	10	20	NA NA	J
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA NA	NA < 0.1

Table 4

Cumulative BTEX and TPH Analytical Results for Groundwater Samples

Hobbs, New Mexico Facility

BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Type	······································	micrograi	ns per liter, ug/l		milligrams p	er liter, mg/L
MW-5	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
	9/30/98	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
	3/9/99	Regular	<1.0	<1.0	<1.0	<1.0	< 0.20	<0.1
	6/10/99	Regular	<1.0	<1.0	<1.0	<1.0	∹0.20	<0.1
	9/14/99	Regular	<1.0	<1.0	<1.0	<2.0	< 0.20	<0.10
	12/9/99	Regular	< 1	< 1	< 1	<1	< 0.2	< 0.1
	3/9/00	Regular	< 1	< 1	< 1	< 1	0.55	< 0.1
	6/8/00	Regular	< 1	<1	< 1	< 1	< 0.2	< 0.1
	9/13/00	Regular	< 1	< 1	< 1	< 1	< 0.2.	< 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
	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
	9/30/98	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
	3/10/99	Regular	2500	930	590	1400	11.0	13
		1108	20	1			1	
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 NA
	5/3/95	Regular	52	3.4	0.67	2.8	NA NA	NA NA
	8/1/95	Regular	22	2.2	0.85	2.8	NA NA	< 0.1
	1	1	8.4	1			j	1
	11/15/95	Regular	1	0.77	< 0.3	0.93	NA NA	< 0.1
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA 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

Table 4

Cumulative BTEX and TPH Analytical Results for Groundwater Samples

Hobbs, New Mexico Facility

BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Type		microgra	ns per liter, ug/l		milligrams p	
MW-7	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
į	3/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	6/23/98	Regular	< ]	< ]	< 1	< 1	< 0.2	< 0.1
	9/30/98	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
	3/9/99	Regular	<1.0	<1.0	<1.0	<1.0	4.7	< 0.1
	6/10/99	Regular	<1.0	<1.0	<1.0	<1.0	< 0.20	< 0.1
	9/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
Ì	12/9/99	Regular	< 5	< 5	< 5	< 5	1.8	< 0.10
	3/9/00	Regular	< 1	< 1	< 1	<1	0.66	ĺ
	6/8/00	Regular	< 1	<1	< 1	<1	< 0.21	< 0.1 < 0.1
	9/13/00	Regular	< 1	<1	< 1	<1	< 0.21	< 0.1
{		J			•	''	~ 0.2	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
MW-8	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA NA	NA NA
	8/19/93	Regular	< 2	< 2	< 2	< 2	NA	NA.
	1/27/94	Regular	< 1	< 1	< 1	<1	NA	NA NA
ľ	5/3/95	Regular	3	4.9	0.75	3.7	NA	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.	< 0.001
	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 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
ı	6/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	1.0 >
	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
	9/30/98	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	1
	3/9/99	Regular	<1.0	<1.0	<1.0	<1.0	< 0.20	< 0.1
	6/10/99	Regular	<1.0	<1.0	<1.0	<1.0		<0.1
	9/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20 <0.20	<0.1
	12/9/99	-	NS	NS	NS NS	NS NS	<0.20 NS	<0.10
	3/9/00	Regular	< 1	< 1	< 1	< 1	0.55	NS <0.1
	6/8/00	-	NS	NS	NS	NS	NS	NS
	9/13/00	-	NS	NS	NS	NS	NS	NS NS
MW-9	4/22/93	Regular	570	380	< 50	870	NA	NA
	7/15/93	Regular	121	7.3	3	458	NA	NA NA
	8/19/93	Regular	390	290	40	250	NA NA	
	1/27/94	Regular	327	357	51.T			NA
	5/3/95	Regular	380	110	19	293 120	NA	NA

Table 4

Cumulative BTEX and TPH Analytical Results for Groundwater Samples

Hobbs, New Mexico Facility

BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре			ms per liter, ug/l	1	· · · · · · · · · · · · · · · · · · ·	er liter, mg/L
MW-9	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	2.8
	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	
	12/10/97	Regular	4.9	9	6.8	62	0.86	1.9 0.92
	3/24/98	Regular	<1	< 1	< 1	26	0.80	1
	6/23/98	Regular	2.4	22	10	36	< 0.2	
	9/30/98	Regular	1.1	5.5	21	59		0.25
	12/10/98	Regular	< 1.0	1.9	17	79	0.2 <b>7</b> 5.1	0.27
,	3/10/99	Regular	<1.0	<1.0	5.7	68	<0.2	0.25
	6/10/99	Regular	<1.0	1.8	1.8	71	<0.20	0.22
	9/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0		0.43
	12/9/99	- Regular	NS	NS	NS	NS	<0.20	<0.10
	3/9/00	Regular	< 1	< 1	< 1	64	NS	NS
	6/8/00	Regular	NS	NS	NS	1	0.66	1.3
	9/13/00	_	NS NS	NS NS	NS NS	NS NS	NS	NS
	2713700		142	l No	N5	INS	NS	NS
MW-10	8/19/93	Regular	190	460	< 200	240	214	
	1/27/94	Regular	13.4	4	5.5	1	NA NA	NA
	5/4/95	Regular	980	15	!	33.6	NA NA	NA
	8/1/95	Regular	1300	32	11 32	84	NA NA	NA
	11/15/95	Regular	1000	24	15	100 36	NA NA	3.6
	2/23/96	Regular	810	23	27	44		1.7
	5/31/96	Regular	700	24	34	28	NA NA	2.4
	8/23/96	Regular	290	3.4	6.4	13	NA NA	2
	12/2/96	Regular	280	1.3	17	8	NA 0.04	1.4
	3/12/97	Regular	110	< 5	17	< 5	0.94	0.97
	6/12/97	Regular	150	12	30	< 5	0,61	0.57
	9/12/97	Regular	87	2.3	26	I .	0.68	< 0.5
	9/12/97	Duplicate	87	ł:	}	2.7	0.76	0.33
	12/10/97	Regular	41	2.4 9.8	26	2.8	0.79	0.33
	12/10/97	Duplicate	36	8.5	12	7.7	1.1	0.28
	3/23/98	Regular	36	1	10	6.7	1.2	0.24
	3/23/98	1	l .	< 5	5.9	< 5	1.6	< 0.5
	6/23/98	Duplicate	36	< 1	5.3	1.3	1.7	0.18
		Regular	37	< 5	< 5	< 5	2.1	< 0.5
	9/30/98	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
	3/9/99	Regular	28	<5.0	5.8	<5.0	0.92	<0.5
	6/10/99	Regular	17	<1.0	<1.0	<1.0	0.30	0.16
	9/14/99	Regular	10	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/99	Regular	23	< 1	< 1	1.2	0.44	0.16

Table 4

Cumulative BTEX and TPH Analytical Results for Groundwater Samples

Hobbs, New Mexico Facility

BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylhenzene	Xylenes	трн-р	TPH-G
Well	Date	Туре		microgran	as per liter, ug/l		milligrams p	er liter, mg/L
MW-10	3/10/00	Regular	300	4,3	6.6	43.2	1.2	0.85
	6/8/00	Regular	78	1.7	7.2	9	0.67	0.74
	9/13/00	Regular	23	1.5	1.1	2,9	1.6	0.41
	3713,00	11084141						
MW-11 <sup>1</sup>	8/19/93	Regular	< 2	< 2	< 2	< 2	NA	NA
1	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
1	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
	9/30/98	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
	3/10/99	Regular	<5	<5	<5	<5	0.3	<0.5
	6/10/99	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	< 0.10
	9/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	< 0.10
	12/9/99	Regular	< 5	< 5	< 5	< 5	< 0.2	< 0.1
	3/9/00	Regular	1.2	< 1	< 1	< 1	0.43	< 0.1
	6/8/00	Regular	3.6	< 1	< 1	< 1	0.37	< 0.1
	9/13/00	Regular	1.4	< 1	<1	< 1	0.36	< 0.1
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
	9/30/98	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
	3/10/99	Regular	160	1.1	<1.0	2.9	0.38	0.45
	6/10/99	Regular	49	1.4	<1.0	<1.0	0.22	0.13
	9/14/99	Regular	75	< 1.0	< 1.0	< 2.0	<0.20	0.23
	12/9/99	Regular	64	< 1	< 1	< 1	< 0.2	0.21
	3/10/00	Regular	93	< 1	< 1	< 1	< 0.2	0.21
	3/10/00	Duplicate	99	< 1	< 1	< 1	0.22	0.22
	6/8/00	Regular	62	< 1	< 1	< 1	< 0.2	< 0.1
	9/13/00	Regular	34	< 1	< 1	< 1	0.23	< 0.1
MW-12D	7/2/99	Regular	< 5	< 5	< 5	< 5	<0.20	<0.10
	9/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	<0.10
	12/9/99	Regular	< i	< 1	< 1	< 1	< 0.2	< 0.1
	3/9/00	Regular	< 1	< 1	< 1	< 1	0.24	< 0.1
	6/8/00	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	9/13/00		NS	NS	NS	NS	NS	NS

Table 4

Cumulative BTEX and TPH Analytical Results for Groundwater Samples

Hobbs, New Mexico Facility

BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgram	ns per liter, ug/l		milligrams p	er liter, mg/L
MW-13	7/2/99	Regular	1500	23.0	750	58	2.2	5.1
	9/14/99	Regular	860	16	450	34.4	2.1	3.1
	12/9/99	Regular	430	16	410	40.9	0.46	3.2
	3/10/00	Regular	88	2.8	200	1.3	1.9	0.99
	6/8/00	Regular	6	< 1	63 <sup>-</sup>	3.3	1.1	0.91
	9/13/00	Regular	< 1	< 1	3.4	< 1	0.44	0.12
OW-4	6/10/99	Regular	<1.0	<1.0	<1.0	4.4	<0.2	<0.10
	9/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/99	Regular	< 1	< 1	< 1	< 1	< 0.2	<0.1
	3/9/00	Regular	< 1	< 1	< 1	< 1	0.25	<0.1
	6/8/00	Regular	< 1	< 1	< 1	< 1	< 0.21	< 0.1
	9/13/00	Regular	< 1	< 1	< 1	< 1	<0.2	<0.1

Well plugged and abandoned 7/1/99

NA=Not Analyzed

NS=Not Sampled

NSP=Not Sampled due to Phase Separated Hydrocarbons

Table 5
Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for Monitor Wells MW-5, MW-10, MW-11A, MW-12, MW-12D, and OW-4
BJ Services Company, U.S.A.

Hobbs, New Mexico

Well	Date	Nitrate <sup>1</sup> (mg/L)	Sulfate <sup>1</sup> (mg/L)	Methane (mg/L)
	3/23/98	3.87	190	< 0.0012
	3/9/99	<0.1	195	< 0.0012
	6/10/99	4.73	209	< 0.0012
MW-5	9/14/99	4.3	210	< 0.0012
W1W-5	12/9/99	4.2	210	< 0.0012
Γ	3/9/00	5.3	260	< 0.0012
	6/8/00	4.7	240	< 0.0012
T T	9/13/00	3.93	200	< 0.0012
	3/23/98	0.07	320	0.91
Г	6/23/98	<0.1	325	0.55
	9/30/98	<0.1	204	0.81
	12/10/98	<0.1	180	0.091
	2 /0 /00	-0.1	142	0.025
MW-10	3/9/99	<0.1	2233	0.035
) i	9/14/99	<0.10	160	0.0049
<b>∤</b> -	12/9/99	0.49	170	0.0039
1	3/10/00	0.1	160	0.0056
-	6/8/00	<0.1	150	0.031
ŀ	9/13/00	<0.1	160	0.031
	3/23/98		190	0.031
ŀ	6/23/98	<0.05	225	
-		<0.1		0.11
F	9/30/98	0.4	196	0.043
}	12/10/98	0.7	188	0.033
MW-11A	3/10/99	<0.1	164	0.094
	****	<0.12	2273	
	6/10/99	<0.1	181	0.0036
	9/13/99	0.22	250	< 0.0012
1	12/9/99	<0.1	290	0.0079
1	3/9/00	0.11	270	0.037
Į.	6/8/00	<0.1	240	0.0069
	9/13/00	<0.1	320	< 0.0012
	3/23/98	< 0.05	240	< 0.0012
[	6/23/98	<0.1	240	< 0.0012
Ī	9/30/98	<0.1	168	< 0.0012
ļ	12/10/98	<0.1	202	< 0.0012
Ī	2/10/00	<0.1	137	-0.0012
	3/10/99	<0.1 <sup>2</sup>	1933	<0.0012
MW-12	6/10/99	<0.1	217	<0.0012
-	9/14/99	<0.10	230	<0.0012
ł	12/9/99	<0.10	180	<0.0012
ł	3/10/00	<0.1	210	<0.0012
}	6/8/00	<0.1	220	<0.0012
	9/13/00	<0.1	240	<0.0012
	7/2/99			
	9/14/99	2.1	249	0.0015
1 (25(4)		<0.10	200	0.0065
MW-12D <sup>(4)</sup>	12/9/99	<0.1	210	0.0015
	3/9/00	0.14	200	<0.0012
	6/8/00	<0.1	240	<0.0012
	6/10/99	3.96	192	< 0.0012
	9/14/99	3.5	200	< 0.0012
OW-4	12/9/99	3.4	200	< 0.0012
0 11 - 7	3/9/00	3.6	200	< 0.0012
	6/8/00	3.4	190	< 0.0012
	9/13/00	3.21	170	< 0.0012

<sup>1=</sup>By EPA Method 300, except as noted

<sup>2=</sup>By EPA Method 353.3

<sup>3=</sup>By EPA Method 375.4

<sup>4=</sup>Well not sampled after 6/8/00

mg/L = milligrams per liter

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

And the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s							Discharge	Benzene	Total BTEX	TPH-VOC
Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	ТРН	Rate,	Emission	Emission	Emission
Number	Date		parts per	parts per million by volume,	e, ppmv		scfm	Rate, lb/hr	Rate, lb/hr	Rate, lb/hr
Extraction-1	9/19/95	790	1100	340	920	0026	132.47	1.235	5.943	16.31
Effluent-1	9/20/95	066	2500	999	1600	16000	135.76	1.575	10.939	27.37
Effluent-2	9/28/95	13	28	9	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	68'0
Effluent 12996-01	1/29/96	12	19	17	53	1200	128.45	0.018	0.271	1.95
Effluent 032296-01	3/22/96	9	44	12	40	066	124.68	0.009	0.189	1.56
Effluent 042496-01	4/25/96	4	37	10	36	006	118.34	0.005	0.147	1.29
Effluent 053196-01	5/31/96	3.7	40	10	33	029	124.11	0.005	0.158	1.04
Effluent 082396-01	8/23/96	\$	12	\$	\$	200	126.18	0.007	0.047	0.31
Effluent 120296-01	12/2/96	$\overline{\lor}$	$\overline{\lor}$	⊽	7	\$	129.04	0.002	800.0	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	7	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	0.00	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 A	NA	0.24
Monitor 980930 (1)	86/30/6	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 A	AN	0.24
Monitor 990310 (1)	3/10/99	NA	NA	NA	NA	80	111.14	NA	AN	0.11
Monitor 990610 (1)	6/10/9	NA	NA	NA	NA AN	140	73.68	NA	NA	0.12
Monitor 990914 (1)	6/14/6	NA	NA	NA	NA	12.5	116.24	NA	NA	0.02
Monitor 991209 (1)	12/9/99	ĄZ	NA	NA	NA A	5.9	42.14	NA	AN	0.003
Monitor 000310 (1)	3/10/00	NA	NA	NA	NA A	65	150	NA	NA	0.092
Monitor 000608 (1)	00/8/9	NA	NA	NA	NA	62	170	NA	NA	0.091
The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	20/10/01	anling eyent we	re calculated	neing detection limi	ts. actual emissio	as were henze	ne <0.001 lb/hr. B	TEX, <0.01 lb/hr	reseason tand using detection limits: actual emissions were benzene <0.001 lb/hr. BTEX, <0.01 lb/hr and TPH <0.01 lb/hr	ii.

Emission rates reported for 12/02/96 sampling event were calculated using detection limits; 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**

"Use or disclosure of data contained on this sheet is subject to the restriction specified at the beginning of this document."

**(£)** 

#### APPENDIX A

**Field Data Sheets** 

## ECKENFELDER\* AN INTEGRAL PART OF

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELLID: WW-3

BROWN AND CALDWELL

1 0001	FOT INTO	DAAAT	CAL						
1. PROJ	ECT INFO	RMAI	ION			41	2120		1213
Project N	umber:		Task Numl	per:		Date: 9/1	3/00		Time: 1313 =
Client:		١ ساء	1 1 1		<del></del> -	Personnel:	1-1-1	<u>ر کر د</u>	
Project Lo	ocation:B	<u>'7 +</u>	tobb.	>		Weather: <u> </u> f	10+9/	· Cleu	1V-
2. WELL	DATA								
Casing D	iameter:	inch	es	Type: 🗆 PV	C @ Stainle:	ss 🚨 Galv. St	eel 🗆 Teflon®	Other:	
Screen D	iameter:	inch	es	Type: 🗆 PV	C 🗆 Stainle	ss 🚨 Galv. St	eel 🗅 Teflon®	Other:	
Total Dep	oth of Well:62	50 fee							Other:
Depth to	Static Water 5	5.77	feet	From: 🔾 To	op of Well Cas	ing (TOC)	Top of Protec	tive Casing 🔾 (	Other:
Depth to	Product:	feet		From: 🗆 To	op of Well Cas	sing (TOC)	Top of Protec	ctive Casing 🔲	Other:
Length of	f Water Column	·	_ feet	Well Volume	):	gal		erval (from GS ch well = 0.167 ga	
3. PURC	E DATA								
Purge Mo						Pump 🚨 4" S np 🚨 Other:			Equipment Model(s)
Materials: Pump/Bailer									
Materials: Rope/Tubing Dedicated Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Deliverse Del									
Was well purged dry?    Yes    No    Pumping Rate									
Time Cum. Gallons pH Temp Spec. Eh Dissolved Oxygen Turbidity Other: Comments									
1315 0,25 7,72-21.15 1288 -61.4 6.80 c/egz									
1320		7.27	19.3	1247	-39,9	6,43			
1325	7	7.55	20.37	1305	-51.0	6,86			
					1				
						<u> </u>			
4. SAM	PLING DA								chemical Analyses
Method(	(s): Bailer, Si	ze: c Pump 🚨	⊔ Bladder F Inertial Lift F	Pump 🚨 2" Si Pump 🖵 Other	ibmersible Pur	mp 🖸 4" Subi	mersible Pump	Ferr	ous Iron: mg/L
Material	s: Pump/Bailer			C ☐ Teffon	_	aned 🔾 Disp	oosable	DO:	mg/L
Material	s: Tubing/Rope		•	Polypropylene		Other:	sposable	- Nitra	ate:mg/L
Depth to	o Water at Time			•		ed? □ Yes	•	<b>.</b> .	
ì	ID:			rime: 133	<u>J</u>	# of Contai	ners;	Sulf.	ate:mg/L
1	te Sample Colle			No ID:				Alka	dinity: mg/L
5. COM	MENTS	·//	17	Mod	11.1				
i .	ne Ai	-101 -101	<b>↓</b>	· ·	is it was				
<u> </u>	110-11	MOEL	/V-	eeds_	Fressi	VALIA			
Note: Include	comments such	as well con	dition, ador,	presence of N	APL, or other	items not on the	e field data/shc	et.	
								1/1/	unt
FORM GW	/-2 (Rev 6/8/99 -	wah)					Urgnature	- I'-	

BUSHERS



#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: NW-4

BROWN AND

FORM GW-2 (Rev 6/8/99 - wah)

1. PROJECT INFORMATION									
Project Number: Date: 9(13/00) Time: 1+25									
Client: Personnel: T									
Project Location: BJ 1-0665 Weather: Har 93° Clear									
2. WELL DATA									
Casing Diameter:inches									
Screen Diameter:inches Type: 🗆 PVC 🗅 Stainless 🗀 Galv. Steel 🗇 Teflon® 🗘 Other:									
Total Depth of Well: feet									
Depth to Static Water: 56.65 feet From: D Top of Well Casing (TOC) D Top of Protective Casing D Other:									
Depth to Product:feet From: □ Top of Well Casing (TOC) □ Top of Protective Casing □ Other:									
Length of Water Column:feet Well Volume:gal Screened Interval (from GS):									
Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667	gal/ft								
☐ Railer Size: ☐ Bladder Pumn ☐ 2" Suhmersihle Pumn ☐ 4" Suhmersihle Pumn									
Purge Method:									
Materials: Pump/Bailer									
Materials: Rope/Tubing									
Was well purged dry?   Yes   No Pumping Rate: gal/min									
Time Cum. Gallons PH Temp Spec. Eh Oxygen Turbidity Other: Comments									
1435 0.21 7.4 20.2 1550 -40.0 5.64 Clequ									
1450 1.5 7.6 20,3 1492 -54.3 6.26 - Clear									
4. SAMPLING DATA Geochemical Analyses									
Method(s): Bailer, Size: Bladder Pump 2" Submersible Pump 4" Submersible Pump Peristaltic Pump Inertial Lift Pump Other: Method(s): Peristaltic Pump Inertial Lift Pump Other: Method(s): Peristaltic Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump Inertial Lift Pump	_								
Materials: Pump/Bailer									
Dedicated U Prepared Off-Site U Field Cleaned U Disposable	/L								
Materials: Tubing/Rope  U Dedicated U Prepared Off-Site U Field Cleaned U Disposable  Nitrate: mg	'L								
Depth to Water at Time of Sampling: Field Filtered?  Yes No Sulfate: mg	Ľ								
Sample ID: Sample Time: # of Containers:									
Duplicate Sample Collected?									
E COMMENTS ()									
5. COMMENTS ONE A-Mohar Need Pies	- Me That Wells - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section - Section								
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# ECKENFELDER" AN INTEGRAL PART OF BROWN AND

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-5

CALDWE	3 L L									
1. PROJ	ECT INFO	RMAT	ION				122 to 2		_	
Project N	umber:		Task Num	ber:			13/00		Time: 023 <	
Client:							L lea		Coreil	
Project L	ocation: 3	2 F	tobbs	5		Weather:	[lear;	160t		
2. WELL	. DATA									
Casing D	iameter:	inch	es	Type: 🗆 PV	'C □ Ştainle	ss 🛚 Galv. S	iteel 🗅 Tefion®	Other:		
Screen D	Diameter:	inch	es	Type: □ ₽V	C 🗅 Stainle	ess 🗅 Galv. S	Steel 🗆 Teflon®	Other:		
Total Dep	oth of Well: <u>64</u>		et						Other:	
Depth to	Static Water:	8.36	feet						Other:	
Depth to	Product:	feet		From: D T	op of Well Cas	sing (TOC)	☐ Top of Protec	tive Casing 🔘	Other:	
Length o	f Water Column	·	_ feet	Well Volume	):	gai		erval (from GS ch well = 0.167 ga		
3 PURC	SE DATA						7		J. J. J. J. J. J. J. J. J. J. J.	
Purge M	□ Bailer						Submersible Pu			
Ů	Centil	,		iltic Pump 및 li C □ Teflon®					Equipment Model(s)	
Materials	s: Pump(Bailer)	☐ Dedica	ated 🗅 Prep	pared Off-Site	☐ Field Clea	ned 🗆 Disp		. 1		
Materials	s: Rope/Tubing			Polypropylene epared Off-Site				2		
Was well purged dry? ☐ Yes ☐ No Pumping Rate: gal/min										
Time Cum. Gallons pH Temp Spec. Fh Dissolved Turbidity Other: Comments										
Time Removed pH Temp Cond. Eh Oxygen Turbidity Comments										
103/	0,25	7.7	19.8	13/3	-47.8	6.58			cleav	
1034	0.75	7,3	19,1	1299	-40.7	6.9				
1										
LA CANA	PLING DA	ΤΛ						C		
	D Doiles Ci		□ Bladder F	Pumo □2"Si	ibmersible Pur	mo □4"Sut	bmersible Pump		chemical Analyses	
Method	(e). —	Pump 🖸	Inertial Lift F	ump 🗆 Other	·	<del></del>	,-	Ferre	ous Iron: mg/L	
Material	ls: Pump/Bailer		ess □PV ated □Pre	C 🖸 Teflon epared Off-Site	® ☐ Other:_ ☐ Field Clean		posable	DO:	5, 4 mg/L	
Material	ls: Tubing/Rope			Polypropylene Polypropylene Polypropylene			isposable	- Nitra	ite:mg/L	
Depth to	o Water at Time	of Sampl			-	ed? 🗆 Yes	. □ No	Sulfa	ate:mg/L	
Sample	ID:		Sample 1	Time: 10	35	# of Conta	iners:	_	0115	
Duplica	te Sample Colle	cted?	🗅 Yes 🗆	No ID:				Alka	linity: 290 mg/L	
5. COM	IMENTS	100	-, So	mole-	- Well	not	reclia	Terite		
	10 Jars		Nose	) Dr	26 25 095	1/2 1000	25 G /4V	nbai		
				·			·	Ling.		
Note: Include	e comments such a	as well cond	dition, odor,	presence of N	APL, or other i	items not on th	ne field data she	and the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of th		
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FORM GW	<b>/-2</b> (Rev 6/8/99	wah)					Signature	V /		

# ECKENFELDER® AN INTEGRAL PART OF BROWN AND

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW 7

CALDWI										
	ECT INFO		_			41	17/ 5		11-1	c,
Project N	lumber:		Task Numi	ber:			13/00		Time:	8 =
Client:		-t- 1	1 ) / .			Personnel: r	<u> </u>	(1)		
Project L	.ocation:B	7 -	+000	>		Weather:\	clear	, warn	ч	
2. WELL	DATA								1- vp. v	
Casing D	Diameter:	inch	es	Type: 🖸 P\	/C 🖸 Stainle	ss 🚨 Galv. Sl	teel 🗆 Teflon®	Other:		
	Diameter:							Other:		
Total De	pth of Well: 6	2,2 fee	et	From: 🗆 T	op of Well Cas	ing (TOC)	Top of Protec	tive Casing 🚨 O	)ther:	
Depth to	Static Water:5	7.40	feet	From: D T	op of Well Cas	ing (TOC)	Top of Protec	tive Casing Q C	)ther:	
Depth to	Product:	feet		From: D T	op of Well Cas	ing (TOC)	Top of Protect	tive Casing Q C	Other:	
Length o	of Water Column	:	_ feet	Well Volume	e:	gal		erval (from GS)		
O DUDO							Note: 2-Inc	ch well = 0.167 ga	VII 4-INCN W	/ell = 0.667 gal/ft
JS. PURC	SE DATA	Size.	□ Rladd	erPumn ⊓ າ	" Submersible	Pump □ 4″ 9	Submersible Pu	mp		
Purge M									Equipmer	nt Model(s)
Materials	s: Pump/Bailer			Cared Off-Site	® □ Other: □ Field Clea	ned 🗆 Dispo	osable	1.		
Materials	s: Rope/Tubing				Teflon®					
U Dedicated U Prepared Off-Site U Field Cleaned U Disposable 2.										
3										
Time Cum. Gallons PH Temp Spec. Eh Dissolved Oxygen Turbidity Other: Comments										
1123	0,25	7.1	31,75	1062	-32,4	7,35				
	700/2	.5	QV4/J	/e						
	1-01		11/1/5					······································		
			<u> </u>							
	<u> </u>								<del> </del>	
4. SAM	PLING DA	TA						Geoc	chemical Anal	yses
Method(						np 🛚 4" Sub	mersible Pump	Ferro	ous Iron:	ma/l
	G Peristanii		ess □ PV	lump 🗅 Other C 🔲 Teflon	® □ Other:					
iviateriai	ls: Pump/Bailer			pared Off-Site	☐ Field Clea	aned 🛭 Disp	osable	DO:		mg/L
Material	ls: Tubing/Rope				e □ Teflon® le □ Field Cle		sposable	Nitra	te:	mg/L
Depth to	o Water at Time	of Sampl	ing:		¬ -\	ed? 🗖 Yes	□ No	Sulfa	ıte:	mg/L
Sample	ID:		Sample 7	ime: 11	30	# of Contai	ners:	. Au. (	limitur	•
Duplicat	te Sample Colle	cted?	☐ Yes ☐	No ID:_		_		Aikai	linity:	mg/L
5. COM	MENTS	(O)	In lea	hal	L.	se ma +	1 1 10 10 10 10 10 10 10 10 10 10 10 10			
No	a he 1	lew	The U.		- Ca.	<u> </u>	60-			
1				<u> </u>		<b>├</b>				
Note: Include	comments such a	s well cond	dition, odor,	presence of N	APL, or other i	tems not on the	e field data shee	et.		
			<u>-</u> -				6		u kil	/
FORM GW	/-2 (Rev 6/8/99 - v	wah)					Signature		7	

## ECKENFELDER\* AN INTEGRAL PART OF

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW10

BROWN AND CALDWELL

FORM GW-2 (Rev 6/8/99 - wah)

CALUWELL CONTACTION									
1. PROJECT INFORMATION		91	13 /nc	)	1500				
Project Number: Task Num			13/00	?	Time: 1510				
Client:		Personnel:		'					
Project Location: BJ Hobb	5	Weather:	Hot 94	<u> </u>	<u>r ·                                     </u>				
2. WELL DATA									
Casing Diameter: inches	Type: PVC D Stainle	ss 🛭 Galv. St	eel 🗆 Teflon®	☐ Other:					
Screen Diameter:inches	Type: PVC Stainle	ss 🛭 Galv. St	eel 🗆 Teflon®	Other:					
Total Depth of Well: 62.00 feet	From: D Top of Well Cas	ing (TOC)	Top of Protect	ive Casing 🚨 C	Other:				
Depth to Static Water: 58,44 feet	From:	sing (TOC)	Top of Protect	ive Casing 🚨 C	Other:				
Depth to Product:feet	From: D Top of Well Cas	sing (TOC)	Top of Protect	tive Casing 🔲 🤇	Other:				
Length of Water Column: feet	Well Volume:	gal		erval (from GS)					
3. PURGE DATA			IVOICE, Z-IIIC.	h well = 0.167 ga	l/ft 4-inch well = 0.667 gal/ft				
□ Railer Size: □ Blade	der Pump 🚨 2" Submersible	Pump Q4"S	Submersible Pur	mp					
Purge Method: 🖸 Centrifugal Pump 🚨 Perist	altic Pump 🚨 Inertial Lift Pun	np 🚨 Other:			Equipment Model(s)				
I Materials: Plimh/Baller	C		sable	1					
Materials: Rope/Tubing									
Was well purged dry? ☐ Yes ☐ No Pumping Rate: gal/min									
Cum Gallons Spec Dissolved Other									
Time Removed pH Temp	Cond.	Oxygen	Turbidity		Comments				
1515 0.5 1.25 223	3401 -35.8	3.7			Purple				
1520 1,0 7.31 22.4	3509 -42.6	3,9			Periole				
Took Sams		Polyg	Dry						
TO COMP		J DIVIG	1	<u>-</u>					
		-							
4. SAMPLING DATA				Geo	chemical Analyses				
Method(s):   Bailer, Size:   Bladder  Peristaltic Pump  Inertial Lift	Pump © 2" Submersible Pu Pump © Other:	mp 🛚 4" Subi	mersible Pump	Ferro	ous Iron: mg/L				
i maienais runio/pailei	VC ☐ Teflon® ☐ Other:_			DO:	/ 2 mg/L				
Materials: Tubing/Rope @ Polyethylene @	epared Off-Site □ Field Cle □ Polypropylene □ Teflon®	☐ Other:							
L Dedicated Like	Prepared Off-Site			Nitra	ite:mg/L				
Depth to Water at Time of Sampling:	Time: 1530	red? 🗅 Yes		Sulfa	ate: mg/L				
	11110	# of Contai	ners:	Alka	linity: 1155 mg/L				
	3 No ID:								
5. COMMENTS Amber N	ceds Preserv	arise							
Lastic only	pactial	Fu	: [ ]						
Note: Include comments such as well condition, odor	nesence of NAPL or other	items not on th	e field data shor	<u> </u>					
TVOIR. MEMBE COMMENS SUCH AS WER CONDITION, OCO					to the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of th				

Signature

# ECKENFELDER®

#### GROUNDWATER SAMPLING FIELD DATA SHEET

5

WELL ID: MW-11 A

BROWN AND CALDWELL

1. PROJECT INFORMATION

Project Number: Task Nur	nber:	Date: 9/1			Time: 1344							
Client:		Personnel:	<del></del>									
Project Location: B J Hobb	<u>5</u>	Weather: <u>∫</u>	ter 93	Clear								
2. WELL DATA				· · · · · · · · · · · · · · · · · · ·								
Casing Diameter:inches	Type: DPVC DStair	nless 🗆 Galv. St	teel 🗅 Teflon®	Other:								
Screen Diameter: Inches	Type: PVC Stair	nless Q Galv. St	teel 🗅 Teflon®	Other:								
Total Depth of Well: 63, 35 teet	From: Top of Well C											
Depth to Static Water: 58,84 feet	From: Top of Well C	asing (TOC)	Top of Protec	tive Casing 🚨 🤇	Other:							
Depth to Product: feet	From:  ☐ Top of Well C	Casing (TOC)	Top of Protect	tive Casing 🔲 (	Other:							
Length of Water Column: feet	Well Volume:	gal		erval (from GS ch well = 0.167 ga								
3. PURGE DATA												
□ Bailer, Size: □ □ Blad Purge Method: □ Centrifugal Pump □ Peris					Equipment Model(s)							
Materials: Pump/Bailer												
Actorials Room/Tuhing  Polyethylene  Polypropylene  Other:												
U Dedicated U P	repared Off-Site	Cleaned Disp	posable	2								
Was well purged dry?	Pumping Rate:	ga	l/min	3								
Time Cum. Gallons PH Temp Spec. Eh Dissolved Turbidity Other: Comments												
1346 0,5 7,17 20,3	15542 -29,	4 3,64		·	Rusty							
1351 7,33 20,6	6029 -35.	8 3.46			cledy							
1355 2 7.11 21.80					cloudy							
1305	10121 2111	1			~ 10 <i>a</i> e (							
4. SAMPLING DATA				Geo	chemical Analyses							
Method(s): Bailer, Size:			mersible Pump	Ferr	ous Iron: mg/L							
Materials Pumn/Bailes   Stainless   P	VC ☐ Teflon® ☐ Other			DO:	1 11							
D Polyathylana	repared Off-Site □ Field 0 □ Polypropylene □ Teflor	Heaned Puls	posable	50.	1 × 7 mg/L							
	Prepared Off-Site		sposable	- Nitra	ate:mg/L							
Depth to Water at Time of Sampling:	11:043	ered? 🗆 Yes	□ No	Sulfa	ate: mg/L							
Sample ID: Sample		, # of Conta	iners:	- Alica	dinity: 140 mg/L							
Duplicate Sample Collected? Yes	O NO ID: DAD	ice for		AiKa	dinity: / mg/L							
5. COMMENTS Duplice	ete Need	HC		3074	Truber ¢							
Note: Include comments such as well condition, odo	r, presence of NAPL, or oth	er items not on th	e field data she	et.								
Annual Property of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of th	na dia dia kaominina dia paositra dia dia dia dia dia dia dia dia dia di	THE RESIDENCE OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF T		11.1.	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s							
FORM GW-2 (Rev 6/8/99 - wah)			Signature	1 104	16							

### ECKENFELDER®

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW - 172

BROWN AND CALDWELL

FORM GW-2 (Rev 6/8/99 - wah)

CALDIII	ט ט כ								
1. PROJ	ECT INFO	RMAT	ION			1.1	7/22		
Project N	umber:		Task Numl	per:		Date: 9/1	510		Time: 15 149
Client:			<del>, , -</del> -		<del></del>	Personnel:	LT C		
Project L	ocation: B	<u>7</u> F	. पवरा	5		Weather:	HOT	<u>Uea</u>	.V
2. WELL	DATA								
Casing D	iameter:	inch	es	Type: GPV	/C Q Stainle	ss 🚨 Galv. St	eel 🗆 Teflon®	Cl Other:	
Screen D	Diameter:	inch	es	Type: 🗆 P\	/C ☐ Stainle	ess 🛚 Galv. St	eel □ Teflon®	Other:	
Total De	oth of Well:	,97fee	et .	From: 🗅 T	op of Well Cas	sing (TOC)	Top of Protect	ive Casing Q O	ther:
Depth to	Static Water: 5	8,85	feet	From: 🗅 To	op of Well Cas	sing (TOC)	Top of Protect	ive Casing 🛛 O	ther:
Depth to	Product:	feet		From: a T	op of Well Cas	sing (TOC)	Top of Protec	tive Casing Q O	ther:
Length o	f Water Column	:	_ feet	Well Volume	e:	gal		erval (from GS)	
2 DUDG	SE DATA						IVUIE; Z-INC	h well = 0.167 gal	/ft 4-inch well = 0.667 gal/ft
	☐ Railer	, Size:	□ Bladd	erPump 🗓 2	" Submersible	Pump □ 4" S	Submersible Pui	mp	
Purge M		ifugal Pump	□ Perista	ltic Pump 🗆 I	nertial Lift Pun	np 🖸 Other:		<del></del>	Equipment Model(s)
Materials	s: Pump/Bailer				D Other: Field Clea	ned Dispo	sable	1. <u> </u>	
Materials	Rope Tubing				E ☐ Teflon®	Other Disp	oosable	2.	
Was wel	l purged dry?		□ No			gal			
T!	Cum. Gallons			Spec.		Dissolved	<del></del>	3	
Time	Removed	pH	Temp	Cond.	Eh	Oxygen	Turbidity		Comments
1555		7.81	20.17	2994	20.5	1,73			
1600	Took	Se	mole	Corner 1	الص	Dre	<u> </u>		
		7.81	2017	2694	20.5	1173			
		1101	- 10 II (		7,0,0	11:01			
4. SAMI	PLING DA					_		Geoc	hemical Analyses
Method(				Pump 🚨 2" Si Pump 🚨 Othei		mp 🛚 4" Subi	mersible Pump	Ferro	us Iron: $\frac{7}{2}$ mg/L
Material	s: Pump/Bailer	) 🗆 Staini	ess 🗆 PV	C Teffon	n® □ Other:_		osablo	DO:	Zmg/L
Material	s: Tubing/Rope	D Polye	thylene 🗆	Polypropylen	e □ Field Cle e □ Teflon®	Other:	osable		
				repared Off-Sil		leaned Dis		Nitrat	e: mg/L
1	Water at Time	•	·		Field Filter	red? 🖸 Yes		Sulfa	te:mg/L
· ·	ID:		Sample 1			# of Contai	ners:	- Alkali	inity: <u>750</u> mg/L
	te Sample Colle	ctea !	⊔ Yes □	I No ID:					
5. COM	MENTS								
							× 7444 - 4117-1111		
Note: Inches	comments such	as well con	dition oder	nresence of A	IAPI protho-	items not on the	field data Maria	at	
IVOLE. ITICIODE	, comments such	us Well COIII	union, odor,	presence of N	in t, or other	REITS HOLDH [ITE	neid datarsilet	-1.	
								إسارا حوس	()-4

# ECKENFELDER\* AN INTEGRAL PART OF BROWN AND

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-13 1800 7446

CALDWELL					
1. PROJECT INFORMATION  Project Number: Task Num	nber:	Date: 9/1	3/00	Т	<sub>ime:_</sub> /6 30
Client:		Personnel:		د	
Project Location: DJ Hobbs		Weather:/	Not 93	Clear	
2. WELL DATA					
Casing Diameter: inches	Type: PVC Stainle	ss 🛚 Galv. Ste	eel 🗆 Teflon®	☐ Other:	
Screen Diameter: inches	Type: PVC Stainle	ss 🛭 Galv. Ste	eel 🔾 Teflon®	Other:	
Total Depth of Well: 65,43 feet	From: 🗅 Top of Well Cas	ing (TOC)	Top of Protecti	ve Casing 🚨 Oth	ner:
Depth to Static Water: 58, 24 feet	From:	ing (TOC)	Top of Protecti	ve Casing Q Oth	ner:
Depth to Product:feet	From: Top of Well Cas	sing (TOC)	Top of Protect	ive Casing 🚨 Otl	her:
Length of Water Column: feet	Well Volume:	gal		erval (from GS): h well = 0.167 gal/1	
3. PURGE DATA					
Purge Method: ☐ Bailer, Size: ☐ Blade ☐ Centrifugal Pump ☐ Perist ☐ C Stainless ☐ PV		np 🗆 Other:		np 	Equipment Model(s)
	epared Off-Site	•	sable	1	· · · · · · · · · · · · · · · · · · ·
i Marenais Rone/Tuninu	Polypropylene ☐ Teflon® Frepared Off-Site ☐ Field Cle		osable	2	
Was well purged dry? 🖸 Yes 🗘 No	Pumping Rate:	gal/	/min	3.	
Time Cum. Gallons pH Temp	Spec. Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1640 0.5 7.4 20.00	1349 745.8	4.10			Clar
1050 1.25 7.2 19.25	1345 -38:4	5.3			1/200
1655 3.00 7.2 19.2	<del>                                     </del>	4.71			10
000, 000, 11-1, 12-1	. 7000 06.6	11.11			
	<del> </del>				
4. SAMPLING DATA				<u>Geoch</u>	emical Analyses
Method(s): ☐ Bailer, Size: ☐ ☐ Bladder☐ Peristaltic Pump ☐ Inertial Lift	Pump   Other:		nersible Pump	Ferrou	is Iron: mg/L
I Materials Pumin/Baller	VC		osable	DO:	mg/L
I Materials, Hiphotikope	☐ Polypropylene ☐ Teflon® Prepared Off-Site ☐ Field Cli		posable	Nitrate	e: mg/L
Depth to Water at Time of Sampling:	•	ed? 🗆 Yes	,	Sulfate	
Sample ID:Sample	Time: 1700	# of Contain	ners:		
Duplicate Sample Collected? 👊 Yes 🛚	No ID:			Alkatir	nity: mg/L
5. COMMENTS / Am	ver Shert	Prese			
Nata Januar and Such as well as different	pmpages of NADL as all as	itoma net en te	field det		
Note: Include comments such as well condition, odor	, presence or IVAPL, or other i * <del></del>	nems not on the	: neid data snee	(). The Michigan Company of the Autor	Co. Maj. chrosoper (1946). Está des desprey, A.M. 2 (1954). There are a little of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of

FORM GW-2 (Rev 5/8/99 - wah)

## ECKENFELDER\* AN INTEGRAL PART OF

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: 010 4

BROWN AND

CALDWE	ն և և								
1. PROJ	ECT INFO	RMAT	ION				r		1114
Project N	umber:		Task Numl	oer:		Date: 9/13	/00		Time:
Client:		<u>.</u>							
Project Lo	ocation: 35	11065				Weather:	0+ ; wa	arm	
2. WELL	DATA								
Casing D	iameter:	inch	es	Type: 🗅 P\	/C 🗅 Stainle	ess 🛭 Galv. Sto	eel 🗆 Teflon®	Other:	
Screen D	liameter:	inch	es	Type: 🗅 P\	/C 🗆 Stainle	ess 🛚 Galv. St	eel 🗆 Teflon®	☐ Other:	
Total Dep	oth of Well: 65.	2 <u>5</u> fee	et	From: 🗅 T	op of Well Cas	sing (TOC)	Top of Protect	ive Casing 🚨 C	Other:
Depth to	Static Water:	10,16	feet	From: 🖸 T	op of Well Cas	sing (TOC)	Top of Protect	ive Casing 🚨 C	Other:
Depth to	Product:	feet		From: 🗅 T	op of Well Ca	sing (TOC)	Top of Protect	tive Casing 🚨 C	Other:
Length o	f Water Column	: <u></u>	_ feet	Well Volume	e:	gal		erval (from GS)	
O DUDG							Note: 2-Inc	h well = 0. 167 ga	Vft 4-inch well = 0.667 gal/ft
	SE DATA	, Size:	☐ Bladd	er Pump 🛛 2	" Submersible	Pump □4"S	Submersible Pu	тр	
Purge M		ifugal Pump	□ Perista	ltic Pump 🚨 l	nertial Lift Pur	np 🚨 Other:			Equipment Model(s)
Materials	: Pump/Railed	☐ Stainle ☐ Dedica	ess □ PVC ated □ Prep	C	D □ Other: □ Field Clea	aned Dispo	osable .	1.	•
Materials	s: Rope/Tubing	🗅 Polyet	hylene 🛚	Polypropylene	e □ Teflon®	Other:eaned \$20isp	· · · · · · · · · · · · · · · · · · ·	2	
Was wel	I purged dry?		□ No			gal.		Z	
1	Cum. Gallons			Spec.	T	Dissolved		3. Other:	I
Time	Removed	pН	Temp	Cond.	Eh	Oxygen	Turbidity	Other:	Comments
1200	0.25	: 98	20.01	1578	-256	8,2			cloudy
	Tool	50	19, 7 e	)					
	190/		177	<u> </u>					
				<del> </del>	<del>                                     </del>				
			-					<del></del>	
								· · · · · · · · · · · · · · · · · · ·	
4. SAM	PLING DA	TA						Geod	chemical Analyses
Method(	s): Bailer, Si	ze:		Pump □ 2" Se Pump □ Othe		ımp 🛚 4" Subi	mersible Pump	Ferro	ous Iron: mg/L
	s: Pump/Bailer	•	less QPV		n® □ Other:_				<u> </u>
		□ Polye		pared Off-Site Polypropylen		eaned 🗓 Disp	osable	DO:	/ mg/L
Material	s: Tubing/Rope					leaned Dis	sposable	Nitra	te:/ mg/L
Depth to	Water at Time	of Samp			_	red? 🗅 Yes	□ No	Sulfa	ite:mg/L
Sample	ID:		Sample 1	Гіте: <u>  2</u>	<u>50</u>	# of Contai	ners:	- Alle-	
Duplicat	te Sample Colle	cted?	☐ Yes ☐	No ID:_				Aika	linity: mg/L
5. COM	MENTS	Voas	ile	2d 1)	17250164	rlse			
1 1-	Plastic		shor			.1			
700	cloud		to to	a te	Field	Dai	ameter	<b>D</b>	
	comments such			presence of N	IAPL, or other	items notion the	e field data she		
							\ / /	- //	a 16111

Signature

FORM GW-2 (Rev 6/8/99 - wah)

#### APPENDIX B

**Laboratory Analytical Report** 



#### Case Narrative for: Brown & Caldwell

#### Certificate of Analysis Number:

#### 00090351

Report To:

Brown & Caldwell

Lynn Wright

1415 Louisiana

Suite 2500 Houston

TX

77000

77002-

ph: (713) 759-0999

fax: (713) 308-3886

Project Name:

BJ Hobbs

Site:

Hobbs NM

Site Address:

PO Number:

State:

**New Mexico** 

State Cert. No.:

Date Reported: 9/28/00

Upon receipt of your samples it was found that two containers received unpreserved for Diesel Range Organics for your samples "MW-5", "MW-10", "Duplicate". Also, Gasoline Range Organics/BTEX vials for your samples "MW-3", "MW-4", "MW-5", "OW-4", "Duplicate" were

received unpreserved. As per our conversation on September 15, 2000, the laboratory added HCL to you Diesel Range Organics containers and proceeded with all analyses.

Your sample ID "MW-10" (SPL ID: 00090351-05) was analyzed for Gasoline Range Organics by SW846 method 8015. The surrogate 1,4-Difluorobenzene was outside the quality control limits, due to matrix interference.

The reported results are only representative of the samples submitted for testing. Any 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).

Please do not hesitate to contact us if you have any questions or comments pertaining to this data report. Please reference the above Certificate of Analysis Number.

This report shall not be reproduced except in full, without the written approval of the laboratory. The reported results are only representative of the samples submitted for testing.

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

Sonia West

Senior Project Manager

9/28/00

Date



#### **Brown & Caldwell**

#### Certificate of Analysis Number: 00090351

**Brown & Caldwell** Report To:

Lynn Wright

1415 Louisiana

Suite 2500

Houston

TX

Fax To:

77002-

ph: (713) 759-0999

fax: (713) 308-3886

Brown & Caldwell

Lynn Wright

fax: (713) 308-3886

Project Name:

BJ Hobbs Hobbs NM

Site Address:

Site:

State:

PO Number:

**New Mexico** 

State Cert. No.:

Date Reported:

9/28/00

Client Sample ID	Lab Sample ID	Matrix	Date Collected	Date Received	COCID	HOLI
<b>]</b>						
W-3	00090351-01	Water	9/13/00 1:30:00 PM	9/14/00 10:00:00 AM	088964	
W-4	00090351-02	Water	9/13/00 3:00:00 PM	9/14/00 10:00:00 AM	088964	
MW-5	00090351-03	Water	9/13/00 10:35:00 AM	9/14/00 10:00:00 AM	088964	
W-7	00090351-04	Water	9/13/00 11:30:00 AM	9/14/00 10:00:00 AM	088964	<b>П</b> .
W-10	00090351-05	Water	9/13/00 3:30:00 PM	9/14/00 10:00:00 AM	088964	一一
MW-11A	00090351-06	Water	9/13/00 2:00:00 PM	9/14/00 10:00:00 AM	088964	
W-12	00090351-07	Water	9/13/00 4:00:00 PM	9/14/00 10:00:00 AM	088964	
W-13	00090351-08	Water	9/13/00 5:00:00 PM	9/14/00 10:00:00 AM	088964	
W-4	00090351-09	Water	9/13/00 12:30:00 PM	9/14/00 10:00:00 AM	088964	
Duplicate	00090351-10	Water	9/13/00	9/14/00 10:00:00 AM	088964	
rip Blank 9/11/00	00090351-11	Water	9/13/00	9/14/00 10:00:00 AM	088979	

Vest, Sonia

9/28/00

Date

enior Project Manager

Joel Grice Laboratory Director

Ted Yen Quality Assurance Officer



Client Sample ID MV	V-3			Coll	ected:	9/13/00 1:30:00	SPL Sample ID:	00090351-01
				Site	: Hol	bbs NM		
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst Seq. #
DIESEL RANGE ORG	ANICS				MCL	SW8015B	Units: mg/	L
Diesel Range Organics	}	ND		0.2		1	09/16/00 22:12 A	M 408389
Surr: n-Pentacosane	)	84.4	%	18-120		1	09/16/00 22:12 A	M 408389
Run ID/Seq #: HF	V_000916C-	108389						
Prep Method	Prep Date			Prep Initials				
SW3550A	09/15/2000 9	0:06		KL				
GASOLINE RANGE	RGANICS				MCL	SW8015B	Units: mg/	L
Gasoline Range Organ	ics	ND		0.1		1	09/19/00 19:27 D	_R 408337
Surr: 1,4-Difluorober	nzene	86.7	%	74-121		1	09/19/00 19:27 D	_R 408337
Surr: 4-Bromofluorol	penzene	71.0	%	55-150		1	09/19/00 19:2 <b>7</b> D	_R 408337
PURGEABLE AROMA	ATICS				MCL	SW8021B	Units: ug/L	•
Benzene		ND		1		1	09/19/00 19:2 <b>7</b> D	_R 408280
Ethylbenzene		ND		1		1	09/19/00 19:27 D	_R 408280
Toluene		ND		1		1	09/19/00 19:27 D	_R 408280
Xylenes,Total		ND		1		1	09/19/00 19:27 D	_R 408280
Surr: 1,4-Difluorober	nzene	99.4	%	72-137		1	09/19/00 19:27 D	_R 408280
Surr: 4-Bromofluorol	penzene	94.3	%	48-156		1	09/19/00 19:27 D	_R 408280

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution



Client Sample ID MW	-4			Colle	ected:	9/13/00 3:00:00	SPL Sample II	<b>):</b> 0009	0351-02
				Site:	Hol	bbs NM			
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORG	ANICS				MCL	SW8015B	Units: m	g/L	
Diesel Range Organics		0.61		0.2		1	09/17/00 0:13	AM	408392
Surr: n-Pentacosane		84.4	%	18-120		1	09/17/00 0:13	AM	408392
Run ID/Seq #: HP	_V_000916C-	408392							***
Prep Method	Prep Date			Prep Initials					
SW3550A	09/15/2000 9	9:06		KL					
GASOLINE RANGE O	RGANICS				MCL	SW8015B	Units: m	g/L	
Gasoline Range Organi	cs	ND		0.1		1	09/19/00 19:52	D_R	408338
Surr: 1,4-Difluoroben	zene	85.7	%	74-121		1	09/19/00 19:52	D_R	408338
Surr: 4-Bromofluorob	enzene	78.0	%	55-150		1	09/19/00 19:52	D_R	408338
PURGEABLE AROMA	TICS				MCL	SW8021B	Units: uç	g/L	
Benzene		ND		1		1	09/19/00 19:52	D_R	408281
Ethylbenzene		ND		1		1	09/19/00 19:52	D_R	408281
Toluene		ND		1		1	09/19/00 19:52	D_R	408281
Xylenes,Total		ND		1		1	09/19/00 19:52	D_R	408281
Surr: 1,4-Difluoroben	zene	95.9	%	72-137		1	09/19/00 19:52	D_R	408281
Surr: 4-Bromofluorob	enzene	99.4	%	48-156		1	09/19/00 19:52	DR	408281

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution



00090351-03

Collected: 9/13/00 10:35:00 SPL Sample ID:



Client Sample ID MW-5

Site: Hobbs NM Dil. Factor QUAL Analyses/Method Result Rep.Limit Date Analyzed Analyst Seq.# MCL **DIESEL RANGE ORGANICS** SW8015B Units: mg/L Diesel Range Organics ND 0.2 1 09/17/00 0:54 AM 408393 Surr: n-Pentacosane 72.2 % 18-120 1 09/17/00 0:54 AM 408393 Run ID/Seq #: HP\_V\_000916C-408393 Prep Method Prep Initials Prep Date SW3550A 09/15/2000 9:06 KL MCL SW8015B **GASOLINE RANGE ORGANICS** Units: mg/L ND 0.1 408339 Gasoline Range Organics 09/19/00 22:51 D\_R Surr: 1,4-Difluorobenzene 86.0 % 74-121 1 09/19/00 22:51 D R 408339 55-150 1 09/19/00 22:51 D R Surr: 4-Bromofluorobenzene 72.7 408339 **HEADSPACE GAS ANALYSIS** MCL **RSK147** Units: mg/L 09/26/00 8:52 A\_A ND 0.0025 413336 Ethane Ethylene ND 0.0032 09/26/00 8:52 A A 413336

Etnylene	טא		0.0032		1	09/26/00 8:52	A_A	413336
Methane	ND		0.0012		1	09/26/00 8:52	A_A	413336
NITROGEN, NITRATE (AS N)				MCL	E300	Units: mg	g/L	
Nitrogen,Nitrate (As N)	3.93		0.1		1	09/14/00 13:14	KM	404637
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	/L	
Benzene	ND		1		1	09/19/00 22:51	D_R	408287
Ethylbenzene	ND		1		1	09/19/00 22:51	D_R	408287
Toluene	ND		1		1	09/19/00 22:51	D_R	408287
Xylenes,Total	ND		1		1	09/19/00 22:51	D_R	408287
Surr: 1,4-Difluorobenzene	99.0	%	72-137		1	09/19/00 22:51	D_R	408287
Surr: 4-Bromofluorobenzene	97.7	%	48-156		1	09/19/00 22:51	D_R	408287
SULFATE				MCL	E300	Units: m	g/L	
Sulfate	200		4		20	09/14/00 13:14	KM	404814

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution





Client Sample ID MW	-7			Colle	ected:	9/13/00 11:30:00	SPL Sample ID:	00090351-04
				Site:	Hol	obs NM		
Analyses/Method		Result		Rep.Limit	-	Dil. Factor QUAL	Date Analyzed	Analyst Seq. #
DIESEL RANGE ORGA	ANICS				MCL	SW8015B	Units: mg/l	
Diesel Range Organics		ND		0.2		1	09/17/00 1:35 A	M 408394
Surr: n-Pentacosane		103	%	18-120		1	09/17/00 1:35 A	M 408394
Run ID/Seq #: HP	_V_000916C-40	8394						
Prep Method	Prep Date			Prep Initials				
SW3550A	09/15/2000 9:0	06		KL				
GASOLINE RANGE O	RGANICS				MCL	SW8015B	Units: mg/l	
Gasoline Range Organi	cs	ND		0.1		1	09/19/00 23:17 D	_R 408340
Surr: 1,4-Difluoroben:	zene	87.7	%	74-121		1	09/19/00 23:17 D	_R 408340
Surr: 4-Bromofluorob	enzene	73.3	%	55-150		1	09/19/00 23:17 D	_R 408340
PURGEABLE AROMA	TICS				MCL	SW8021B	Units: ug/L	
Benzene		ND		1		1	09/19/00 23:17 D	_R 408288
Ethylbenzene		ND		1		1	09/19/00 23:17 D	_R 408288
Toluene		ND		1		1	09/19/00 23:17 D	_R 408288
Xylenes,Total		ND		1		1	09/19/00 23:17 D	_R 408288
Surr: 1,4-Difluoroben:	zene	99.2	%	72-137		1	09/19/00 23:17 D	_R 408288
Surr: 4-Bromofluorob	enzene	96.1	%	48-156		1	09/19/00 23:17 D	R 408288

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

nits MI - Matrix Interference

D - Surrogate Recovery Unreportable due to Dilution



Client Sample ID MW-10			Coll	ected:	9/13/00 3:30:00	SPL Sample ID:	00090351-05
			Site	: Hol	obs NM		
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed Ar	nalyst Seq.#
DIESEL RANGE ORGANICS				MCL	SW8015B	Units: mg/L	
Diesel Range Organics	1.6		0.2		1	09/17/00 7:46 AM	408400
Surr: n-Pentacosane	98.6	%	18-120		1	09/17/00 7:46 AM	408400
Run ID/Seq #: HP_V_0009160	-408400						
Prep Method Prep Date			Prep Initials				
SW3550A 09/15/2000	9:06		KL				
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: mg/L	
Gasoline Range Organics	0.41		0.1		1	09/19/00 23:43 D_F	R 408341
Surr: 1,4-Difluorobenzene	128	%	74-121		1 *	09/19/00 23:43 D_F	R 408341
Surr: 4-Bromofluorobenzene	99.7	%	55-150		1	09/19/00 23:43 D_f	₹ 408341
HEADSPACE GAS ANALYSIS				MCL	RSK147	Units: mg/L	
Ethane	ND		0.0025		1	09/26/00 9:26 A_/	A 413152
Ethylene	ND		0.0032		1	09/26/00 9:26 A_/	A 413152
Methane	0.031		0.0012		1	09/26/00 9:26 A_/	413152
NITROGEN, NITRATE (AS N)				MCL	E300	Units: mg/L	
Nitrogen, Nitrate (As N)	ND		0.1		1-	09/14/00 13:14 KM	404645
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug/L	
Benzene	23		1		1	09/19/00 23:43 D_I	R 408289
Ethylbenzene	1.1		1		1	09/19/00 23:43 D_I	٦ 408289
Toluene	1.5		1		1	09/19/00 23:43 D_I	R 408289
Xylenes,Total	2.9		1		1	09/19/00 23:43 D_I	₹ 408289
Surr: 1,4-Difluorobenzene	111	%	72-137		1	09/19/00 23:43 D_I	R 408289
Surr: 4-Bromofluorobenzene	104	%	48-156		1	09/19/00 23:43 D_I	₹ 408289
SULFATE				MCL	E300	Units: mg/L	
Sulfate	160		2		10	09/14/00 13:14 KN	404817

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution





Client Sample ID MW-11A			Coll	ected:	9/13/00 2:00:00	SPL Sample ID:	00090351-06
			Site	: Hol	bbs NM		
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed Ar	nalyst Seq. #
DIESEL RANGE ORGANICS				MCL	SW8015B	Units: mg/L	
Diesel Range Organics	0.36		0.2		1	09/17/00 2:16 AM	408395
Surr: n-Pentacosane	98.2	%	18-120		1	09/17/00 2:16 AM	1 408395
Run ID/Seq #: HP_V_000916C	408395						
Prep Method Prep Date			Prep Initials				
09/15/2000	9:06						
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: mg/L	
Gasoline Range Organics	ND		0.1		1	09/21/00 20:45 D_F	٦ 411103
Surr: 1,4-Difluorobenzene	93.0	%	74-121		1	09/21/00 20:45 D_F	٦ 411103
Surr: 4-Bromofluorobenzene	75.3	%	55-150		1	09/21/00 20:45 D_F	₹ 411103
HEADSPACE GAS ANALYSIS				MCL	RSK147	Units: mg/L	
Ethane	ND		0.0025		1	09/26/00 9:46 A_/	A 413153
Ethylene	ND		0.0032		1	09/26/00 9:46 A_/	A 413153
Methane	ND		0.0012		1	09/26/00 9:46 A_/	A 413153
NITROGEN, NITRATE (AS N)				MCL	E300	Units: mg/L	
Nitrogen, Nitrate (As N)	ND		0.1		1	09/14/00 13:14 KN	<b>1</b> 404648
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug/L	
Benzene	1.4		1		1	09/21/00 20:45 D_I	R 411041
Ethylbenzene	ND		1		1	09/21/00 20:45 D_I	R 411041
Toluene	ND		1		1	09/21/00 20:45 D_I	R 411041
Xylenes, Total	ND		1		1	09/21/00 20:45 D_I	R 411041
Surr: 1,4-Difluorobenzene	102	%	72-137	* *	1	09/21/00 20:45 D_I	R 411041
Surr: 4-Bromofluorobenzene	98.2	%	48-156		1	09/21/00 20:45 D_I	R 411041
SULFATE				MCL	E300	Units: mg/L	
Sulfate	320		10		50	09/14/00 13:14 KN	

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution





Client Sample ID MW	/-12			Coll	ected:	9/13/00 4:00:00	SPL Sample ID	<b>):</b> 000	90351-07
				Site	: Hol	obs NM			
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analys	t Seq.#
DIESEL RANGE ORG	ANICS				MCL	SW8015B	Units: mç	 g/L	
Diesel Range Organics		0.23		0.2		1	09/17/00 5:01	AM	408396
Surr: n-Pentacosane		104	%	18-120		1	09/17/00 5:01	AM	408396
Run ID/Seq #: HP	V_000916C-40	8396							
Prep Method	Prep Date			Prep Initials					
SW3550A	09/15/2000 9:0	)6		KL					
GASOLINE RANGE C	RGANICS				MCL	SW8015B	Units: mg	g/L	
Gasoline Range Organ	ics	ND		0.1		1	09/21/00 21:11	D_R	411104
Surr: 1,4-Difluorober	zene	92.3	%	74-121		1	09/21/00 21:11	D_R	411104
Surr: 4-Bromofluorob	enzene	74.7	%	55-150		1	09/21/00 21:11	D_R	411104
HEADSPACE GAS A	NALYSIS				MCL	RSK147	Units: mg	3/L	
Ethane	1	ND		0.0025		1	09/26/00 10:02	A_A	413154
Ethylene		ND		0.0032		1	09/26/00 10:02	A_A	413154
Methane		ND		0.0012		1	09/26/00 10:02	A_A	413154
NITROGEN, NITRATE	E (AS N)				MCL	E300	Units: mg	g/L	
Nitrogen, Nitrate (As N)		- ND		0.1		1.	09/14/00 13:14	KM	404651
PURGEABLE AROMA	ATICS				MCL	SW8021B	Units: ug	ı/L	
Benzene		34		1		1	09/21/00 21:11	D_R	411042
Ethylbenzene		ND		1		1	09/21/00 21:11	D_R	411042
Toluene		ND		1		1	09/21/00 21:11	D_R	411042
Xylenes, Total		ND		1		1	09/21/00 21:11	D_R	411042
Surr: 1,4-Difluorober	nzene	102	%	72-137		1	09/21/00 21:11	D_R	411042
Surr: 4-Bromofluorot	penzene	99.1	%	48-156		1	09/21/00 21:11	D_R	411042
SULFATE					MCL	E300	Units: m	g/L	
Sulfate		240		5		25	09/14/00 13:14	KM	404819

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution



Client Sample ID MW	·13		Col	lected:	9/13/00 5:00:00	SPL Sample ID	: 0009	0351-08
			Site	: Ho	bbs NM			
Analyses/Method	Resul	t	Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq.#
DIESEL RANGE ORGANICS				MCL	SW8015B	Units: mg/L		
Diesel Range Organics	0.4	4	0.2		1	09/17/00 5:42	AM	408397
Surr: n-Pentacosane	71.	) 9	6 18-120		1	09/17/00 5:42	AM	408397
Run ID/Seq #: HP	V_000916C-408397							
Prep Method	Prep Date		Prep Initials					
SW3550A	09/15/2000 9:06		KL					
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: mg	ı/L	
Gasoline Range Organic	cs 0.1	2	0.1		1	09/21/00 21:37	D_R	411105
Surr: 1,4-Difluorobena	zene 95.	3 %	6 74-121		1	09/21/00 21:37	D_R	411105
Surr: 4-Bromofluorobe	enzene 81.	3 %	6 55-150		1	09/21/00 21:37	D_R	411105
PURGEABLE AROMA	PURGEABLE AROMATICS			MCL	SW8021B	Units: ug	/L	
Benzene	NI	)	1		1	09/21/00 21:37	D_R	411043
Ethylbenzene	3.	4	1		1	09/21/00 21:37	D_R	411043
Toluene	NI	)	1		1	09/21/00 21:37	D_R	411043
Xylenes,Total ND		)	1		1	09/21/00 21:37	D_R	411043
Surr: 1,4-Difluorobenzene 88.5		5 %	6 72-137		1	09/21/00 21:37	D_R	411043
Surr: 4-Bromofluorobenzene 100		0 9	6 48-156		1 -	09/21/00 21:37	DR	411043

- \* Surrogate Recovery Outside Advisable QC Limits
- J Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution





Client Sample ID OW-4			Col	lected:	9/13/00 12:30:00	SPL Sample II	): 0009	0351-09
			Site	: Hol	obs NM			
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq.#
DIESEL RANGE ORGANICS				MCL	SW8015B	Units: mg		
Diesel Range Organics	ND		0.2		1 .	09/17/00 6:23	AM	408398
Surr: n-Pentacosane	65.2	%	18-120	,	1	09/17/00 6:23	AM	408398
Run ID/Seq #: HP_V_000916C	-408398			_				
Prep Method Prep Date			Prep Initials	]				
SW3550A 09/15/2000	9:06		KL					
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: mg/L		
Gasoline Range Organics	ND		0.1		1	09/20/00 18:06	DL	408827
Surr: 1,4-Difluorobenzene	101	%	74-121		1	09/20/00 18:06	DL	408827
Surr: 4-Bromofluorobenzene	97.3	%	55-150		1	09/20/00 18:06	DL	408827
HEADSPACE GAS ANALYSIS				MCL	RSK147	Units: mg/L		
Ethane	ND		0.0025		1	09/26/00 10:17	A_A	413155
Ethylene	ND		0.0032		1	09/26/00 10:17	A_A	413155
Methane	ND		0.0012		1	09/26/00 10:17	A_A	413155
NITROGEN, NITRATE (AS N)				MCL	E300	Units: m	g/L	
Nitrogen, Nitrate (As N)	3.21		0.1		1	09/14/00 13:14	KM	404654
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug/L		
Benzene	ND		1		1	09/20/00 18:06	DL	408770
Ethylbenzene	ND		1		1	09/20/00 18:06	DL	408770
Toluene	ND		1		1	09/20/00 18:06	DL	408770
Xylenes,Total	ND		1		1	09/20/00 18:06	DL	408770
Surr: 1,4-Difluorobenzene	95.6	%	72-137		1	09/20/00 18:06	DL	408770
Surr: 4-Bromofluorobenzene	102	%	48-156		1	09/20/00 18:06	DL	408770
SULFATE				MCL	E300	Units: m	g/L	
Sulfate	170		2		10	09/14/00 13:14	KM	404820

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution



Client Sample ID Dup	licate			Coll	ected:	9/13/00	SPL Sample II	<b>)</b> : 0009	0351-10
				Site	: Hol	obs NM			
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS					MCL	SW8015B	Units: mg/L		
Diesel Range Organics		0.48		0.2		1	09/17/00 7:05	AM	408399
Surr: n-Pentacosane		83.0	%	18-120		1	09/17/00 7:05	AM	408399
Run ID/Seq #: HP	V_000916C-	408399							
Prep Method	Prep Date			Prep Initials					
SW3550A	09/15/2000 9	9:06		KL					
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: mg/L			
Gasoline Range Organi	cs	ND		0.1		1	09/20/00 18:32	DL	408828
Surr: 1,4-Difluorobenzene		103	%	74-121		1	09/20/00 18:32	DL	408828
Surr: 4-Bromofluorobenzene		98.0	%	55-150		1	09/20/00 18:32	DL	408828
PURGEABLE AROMATICS					MCL	SW8021B	Units: ug	ı/L	
Benzene		ND		1		1	09/20/00 18:32	DL	408771
Ethylbenzene		ND		1		1	09/20/00 18:32	DL	408771
Toluene		ND		1		1	09/20/00 18:32	DL	408771
Xylenes,Total		ND		1		1	09/20/00 18:32	DL	408771
Surr: 1,4-Difluorobenzene		95.6	%	72-137		. 1	09/20/00 18:32	DL	408771
Surr: 4-Bromofluorobenzene 102		%	48-156		1	09/20/00 18:32	DL	408771	

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution



Client Sample ID Trip Blank 9/11/00 Collected: 9/13/00 SPL Sample ID: 00090351-11

Site: Hobbs NM

Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed Analy	yst Seq.#
GASOLINE RANGE ORGANICS					SW8015B	Units: mg/L	
Gasoline Range Organics	ND		0.1		1	09/21/00 22:02 D_R	411106
Surr: 1,4-Difluorobenzene	87.7	%	74-121		1	09/21/00 22:02 D_R	411106
Surr: 4-Bromofluorobenzene	74.0	%	55-150		1	09/21/00 22:02 D_R	411106
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug/L	
Benzene	ND		1		1	09/21/00 22:02 D_R	411044
Ethylbenzene	ND		1		1	09/21/00 22:02 D_R	411044
Toluene	ND		1		1	09/21/00 22:02 D_R	411044
Xylenes,Total	ND		1		1	09/21/00 22:02 D_R	411044
Surr: 1,4-Difluorobenzene	97.4	%	72-137		1	09/21/00 22:02 D_R	411044
Surr: 4-Bromofluorobenzene	98.3	%	48-156		1	09/21/00 22:02 D_R	411044

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

**Quality Control Documentation** 



# **Quality Control Report**

#### **Brown & Caldwell BJ** Hobbs

Analysis:

Diesel Range Organics

Method:

SW8015B

WorkOrder:

00090351

Lab Batch ID:

7246

RunID:

Diesel Range Organics

Surr: n-Pentacosane

Method Blank

HP\_V\_000916C-408387 09/16/2000 20:51

Analyte

Units: mg/L AM

Analysis Date: 09/15/2000 9:06 Preparation Date:

Analyst:

Prep By: KL Method SW3550A

0.20

18-120

Result Rep Limit

ND

108.4

00090351-01B 00090351-02B

Lab Sample ID

00090351-03B

Samples in Analytical Batch:

00090351-04B

00090351-05B 00090351-06B

00090351-07B 00090351-08B

00090351-09B 00090351-10B Client Sample ID MW-3

MW-4 MW-5

MW-7 MW-10

MW-11A MW-12 MW-13

OW-4 Duplicate

#### Laboratory Control Sample (LCS)

RunID:

Analysis Date:

Preparation Date:

HP\_V\_000916C-408388

09/15/2000 9:06

Units: mg/L

09/16/2000 21:32

AM Analyst:

Prep By: KL Method SW3550A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Diesel Range Organics	2.5	2.5	99	60	140

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00090351-01

RunID:

HP\_V\_000916C-408390

Units:

mg/L

Analysis Date: Preparation Date: 09/16/2000 22:52 09/15/2000 9:06

Analyst: AM Prep By:

Method

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Diesel Range Organics	ND	1.25	1.4	104	1.25	1.4	97.1	6.58	39	13	130

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL



#### **Quality Control Report**

# **Brown & Caldwell**

BJ Hobbs

Analysis:

**Headspace Gas Analysis** 

Method:

RunID:

00090351

R21337

**RSK147** 

Method Blank

mg/L

Samples in Analytical Batch: Lab Sample ID

Client Sample ID

Analysis Date:

VARC\_000926A-413258 09/26/2000 7:59

Units: Analyst: A\_A

00090351-03C

MW-5

00090351-05C

WorkOrder:

Lab Batch ID:

00090351-06C

MW-10

00090351-07C

MW-11A

MW-12

00090351-09C

OW-4

Analyte	Resul	ŧ	Rep Limit
Ethane	١	1D	0.0025
Ethylene		۱D	0.0032
Methane	N	۱D	0.0012

# Sample Duplicate

Original Sample: 00090351-09

RunID:

VARC\_000926A-413155

Units:

mg/L

Analysis Date:

09/26/2000 10:17

Analyst: A\_A

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Ethane	ND	ND	0	50
Ethylene	ND	ND	0	50
Methane	ND	ND	0	50

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution MI - Matrix Interference

J - Estimated value between MDL and PQL



# **Quality Control Report**

#### **Brown & Caldwell BJ** Hobbs

Analysis:

**Purgeable Aromatics** 

Method:

Analysis Date:

SW8021B

WorkOrder:

00090351

Samples in Analytical Batch:

Lab Batch ID:

R21044

RunID:

HP\_R\_000919A-408277

Units:

Method Blank

ug/L

Lab Sample ID 00090351-01A

Client Sample ID

09/19/2000 15:25

Analyst: D\_R

00090351-02A

KW-3

00090351-03A

MW-4 MW-5

00090351-04A 00090351-05A MW-7

MW-10

Analyte	Result	Rep Limit
Benzene	ND	1.0
Ethylbenzene	ND	1.0
Toluene	ND	1.0
Xylenes, Total	ND	1.0
Surr: 1,4-Difluorobenzene	98.4	72-137
Surr: 4-Bromofluorobenzene	94.3	48-156

# Laboratory Control Sample (LCS)

RunID:

HP\_R\_000919A-408276

Units:

ug/L

Analysis Date:

09/19/2000 14:33

Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	54	109	70	130
Ethylbenzene	50	48	96	70	130
Toluene	50	50	100	70	130
Xylenes,Total	150	142	95	70	130

# Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00090351-01

RunID:

HP\_R\_000919A-408278

Units: ug/L

Analysis Date:

09/19/2000 17:19

Analyst:

D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Benzene	ND	20	20	102	20	25	126	21.6*	21	32	164
Ethylbenzene	ND	20	17	87.3	20	21	107	20.6*	19	52	
Toluene	ND	20	19	93.2	20	23	116	21.8*	20	38	159
Xylenes,Total	ND	60	53	88.3	60	65	108	20.3*	18	53	144

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL



#### **Quality Control Report**

#### **Brown & Caldwell**

**BJ** Hobbs

Analysis:

**Gasoline Range Organics** 

Method:

SW8015B

WorkOrder:

00090351

Lab Batch ID:

R21047

RunID:

HP\_R\_000919B-408434

Units:

mg/L

Lab Sample ID 00090351-01A

Samples in Analytical Batch:

Client Sample ID

Analysis Date:

09/19/2000 15:25

Analyst: D\_R

MW-3

00090351-02A

MW-4

00090351-03A

MW-5

00090351-04A 00090351-05A

MW-7 MW-10

Analyte Result Rep Limit Gasoline Range Organics ND 0.10 Surr: 1,4-Difluorobenzene 88.0 74-121 Surr: 4-Bromofluorobenzene 55-150

Method Blank

#### Laboratory Control Sample (LCS)

RunID:

HP\_R\_000919B-408433

Units:

mg/L

Analysis Date:

09/19/2000 14:59

Analyst: D R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	1.1	105	42	136

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00090351-02

RunID:

HP\_R\_000919B-408335

Units:

mg/L

Analysis Date:

09/19/2000 18:10

Analyst: D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	
Gasoline Range Organics	ND	0.9	0.83	84.6	0.9	0.78	79.6	6.02	36	36	160	

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL



# **Quality Control Report**

# **Brown & Caldwell**

Analysis:

**Purgeable Aromatics** 

Method:

SW8021B

**BJ** Hobbs

WorkOrder: Lab Batch ID:

Samples in Analytical Batch:

00090351

R21082

RunID:

HP\_N\_000920A-408758

Units:

ug/L

Lab Sample ID

Client Sample ID

Analysis Date:

09/20/2000 10:35

Analyst: DL

00090351-09A

OW-4

00090351-10A

Duplicate

Analyte	Result	Rep Limit
Benzene	ND	1.0
Ethylbenzene	ND	1.0
Toluene	ND	1.0
Xylenes, Total	ND	1.0
Surr: 1,4-Difluorobenzene	94.2	72-137
Surr: 4-Bromofluorobenzene	99.5	48-156

Method Blank

#### Laboratory Control Sample (LCS)

RunID:

HP\_N\_000920A-408756

Units:

ug/L

Analysis Date:

09/20/2000 9:17

Analyst: DL

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	53	107	70	130
Ethylbenzene	50	53	106	70	130
Toluene	50	53	106	70	130
Xylenes,Total	150	164	109	70	130

# Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00090424-01

Run1D:

HP\_N\_000920A-408759

Units:

ug/L

Analysis Date:

09/20/2000 12:23

DL Analyst:

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Benzene	ND	20	18	88.0	20	19	93.6	6.17	21	32	164
Ethylbenzene	ND	20	17	85.4	20	19	92.6	8.11	19	52	142
Toluene	ND	20	18	90.8	20	19	94.0	3.45	20	38	159
Xylenes,Total	ND	60	53	88.3	60	57	95.0	7.27	18	53	144

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL



# **Quality Control Report**

#### **Brown & Caldwell BJ** Hobbs

Analysis:

Gasoline Range Organics

Method:

SW8015B

WorkOrder: Lab Batch ID: 00090351

Method Blank

Samples in Analytical Batch:

R21087

RunID:

HP\_N\_000920C-408824

Units: mg/L

Lab Sample ID

Client Sample ID

Analysis Date:

09/20/2000 10:09

Analyst: DL

00090351-09A

OW-4

00090351-10A

Duplicate

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	102.0	74-121
Surr: 4-Bromofluorobenzene	99.3	55-150

#### Laboratory Control Sample (LCS)

RunID:

HP\_N\_000920C-408823

Units:

mg/L

Analysis Date:

09/20/2000 9:43

Analyst: DL

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	1	105	42	136

# Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00090424-02

RunID:

HP\_N\_000920C-408825

Units:

mg/L

Analysis Date:

09/20/2000 14:14

Analyst: DL

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
		- 00	0.05	00.7		0.00		4.00			
Gasoline Range Organics	ИD	0.9	0.85	86.7	0.9	0.86	88.3	1.82	36	36	160

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL



#### **Quality Control Report**

# Brown & Caldwell BJ Hobbs

Analysis:

**Purgeable Aromatics** 

Method:

SW8021B

Method Blank

W

Samples in Analytical Batch:

(

WorkOrder: Lab Batch ID:

00090351 R21218

RunID:

HP\_R\_000921A-411033

Units:

ug/L

Lab Sample ID

Client Sample ID

Analysis Date:

09/21/2000 16:03

Analyst: D\_R

ug/L

00090351-06A

MW-11A

00090351-07A

MW-12

00090351-08A

MW-13

00090351-11A

Trip Blank 9/11/00

Analyte	Result	Rep Limit
Benzene	ND	1.0
Ethylbenzene	ND	1.0
Toluene	ND	1.0
Xylenes, Total	ND	1.0
Surr: 1,4-Difluorobenzene	99.3	72-137
Surr: 4-Bromofluorobenzene	97.3	48-156

#### Laboratory Control Sample (LCS)

RunID:

HP\_R\_000921A-411032

Units:

ug/L

Analysis Date:

09/21/2000 14:52

Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	57	113	70	130
Ethylbenzene	50	51	102	70	130
Toluene	50	53	106	70	130
Xylenes,Total	150	152	101	70	130

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00090537-02

RunID:

HP\_R\_000921A-411034

Units:

Analysis Date:

09/21/2000 16:29

Analyst:

ug/L D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Benzene	ND	20	26	129	20	27	133	2.62	21	32	164
Ethylbenzene	ND	20	22	109	20	23	113	3.14	19	52	142
Toluene	ND	20	24	118	20	24	120	2.04	20	38	159
Xylenes,Total	ND	60	66	110	60	71	118	7.30	18	53	144

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL



# **Quality Control Report**

#### **Brown & Caldwell BJ Hobbs**

Analysis:

Gasoline Range Organics

Method:

SW8015B

WorkOrder:

00090351

Lab Batch ID:

R21222

RunID:

HP\_R\_000921B-411099

Units:

mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analysis Date:

09/21/2000 16:03

Analyst: D\_R

00090351-06A

MW-11A

00090351-07A

MW-12

00090351-08A

MW-13

00090351-11A

Trip Blank 9/11/00

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	88.0	74-121
Surr: 4-Bromofluorobenzene	75.3	55-150

Method Blank

#### Laboratory Control Sample (LCS)

RunID:

HP\_R\_000921B-411098

Units:

mg/L

Analysis Date:

09/21/2000 15:18

Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	1.1	108	42	136

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00090542-03

RunID:

HP\_R\_000921B-411100

Units:

mg/L

Analysis Date:

09/21/2000 17:20

Analyst: D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Gasoline Range Organics	ND	0.9	0.69	67.6	0.9	0.74	72.9	7.50	36	36	160

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution MI - Matrix Interference

J - Estimated value between MDL and PQL



# **Quality Control Report**

#### **Brown & Caldwell BJ** Hobbs

Analysis:

Nitrogen, Nitrate (As N)

Method:

09/14/2000 13:14

E300

WorkOrder:

00090351

Lab Batch ID:

R20844

RuniD:

Analysis Date:

WET\_000914S-404629

Method Blank Units:

mg/L Analyst: KM

Lab Sample ID 00090351-03D

Samples in Analytical Batch:

Client Sample ID

00090351-05D

MW-5 MW-10

00090351-06D 00090351-07D

00090351-09D

MW-11A

Analyte Result Rep Limit Nitrogen, Nitrate (As N) 0.10 MW-12 OW-4

#### Laboratory Control Sample (LCS)

RunID:

WET\_000914S-404632

Units:

Analysis Date:

09/14/2000 13:14

Analyst: KM

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Nitrogen, Nitrate (As N)	10	9.09	91	90	110

# Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00090351-03

RunID:

WET\_000914S-404640

Units:

mg/L

Analysis Date:

09/14/2000 13:14

Analyst: KM

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Nitrogen,Nitrate (As N)	3.9	10	13.8	98.3	10		98.7	0.396	20	76	124

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL



#### **Quality Control Report**

# **Brown & Caldwell BJ** Hobbs

Analysis: Method:

Sulfate

E300

WorkOrder:

00090351

Lab Batch ID:

R20851

RunID:

Analysis Date:

WET\_000914T-404812

09/14/2000 13:14

Units:

Analyst:

Method Blank

mg/L

KM

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

00090351-03D

00090351-05D

MW-5 MW-10

00090351-06D

MW-11A

00090351-07D 00090351-09D

MW-12 OW-4

Analyte Result Rep Limit 0.20 Sulfate ND

Laboratory Control Sample (LCS)

RunID:

Analysis Date:

WET\_000914T-404813 09/14/2000 13:14

mg/L Analyst: KM

Analyte Spike Result Percent Lower Upper Added Recovery Limit Limit Sulfate 10 10 101 90 110

# Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00090351-03

RunID:

WET\_000914T-404815

Units:

mg/L

Analysis Date:

09/14/2000 13:14

KM Analyst:

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Sulfate	200	200	410	107	200	420	109	2.58	20	95	113

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

Chain of Custody

And

Sample Receipt Checklist

See Interchance Drive Houseon TX 77054 (713) 660-0901	Standard 3. Relinquished by:	1. Religious and the Sempler 1 day 13/00	Level 3 C		Clere/Consultant Remarks:	P=plastic A=amber glass G=glass V=vial  l=1 liter 4=4oz 40=vial 8=8oz 16=16oz  l=HCl 2=HNO3 3=H2SO4 O=other:	D	SPL, Inc.  Analysis Request & Chain of Custody Record
assador Caffery Parkway Sout I A 70583 (318) 377 4775	1. Received by	25	Special Detection Limits (specify):	Temp:	Maria (I) (IN	Number of Containers  13 TEX 802113	Requested Analys	SPI Warkander No. 00090351 033973





# Sample Receipt Checklist

Workorder:	00090351		Received by:		Stelly, D'Anna
Date and Time Received:	9/14/00 10:00:00 AM		Carrier name:		FedEx
Temperature:	3				
Shipping container/cooler in	good condition?	Yes 🗸	No 🗌	Not Present	
Custody seals intact on ship	pping container/cooler?	Yes 🗹	No 🗌	Not Present	
Custody seals intact on sam	iple bottles?	Yes 🗌	No 🗌	Not Present	
Chain of custody present?		Yes 🗸	No 🗔		
Chain of custody signed who	en relinquished and received?	Yes 🗸	No 🗌		
Chain of custody agrees wit	h sample labels?	Yes 🗸	No 🗌		
Samples in proper container	r/bottle?	Yes 🗸	No 🗌		
Sample containers intact?		Yes 🗸	No 🗌		
Sufficient sample volume fo	r indicated test?	Yes 🔽	No 🗌		
All samples received within	holding time?	Yes 🗸	No 🗔		
Container/Temp Blank temp	erature in compliance?	Yes 🗹	No 🗌		
Water - VOA vials have zero	headspace?	Yes 🗸	No 🗌	Not Present	
Water - pH acceptable upor	receipt?	Yes 🗌	No 🗸		

] 		

# BROWN AND CALDWELL

Suite 2500, 1415 Lo (713) 759-0999 • (7		TX 77002		TRANSMITTAL MEMORANDUM			
To: Mr. Wayn	e Price			Date: August 1, 2000 Job No: 12832-0			
Energy, M	linerals, and Na	atural Resource	es Dept.	Subject: BJ Services, Hobbs, New Mexico			
Oil Conse	rvation Divisio	n		Certified Mail No.: P 014 598 843			
2040 Sout	h Pacheco Stre	et, State Land	Office Bldg.	Equipment No:			
Santa Fe, 1	New Mexico 8	7505		Spec. Ref:			
				Submittal No:			
WE ARE SE	NDING:	Attache	d 🔲 Un	der separate cover via 1st Class Mai	I the following items:		
Shop Drawir	nas	Prints	□Pla	ans Samples	Specifications		
Copy of lette		Change		her: Final Report			
	Submittal	AS CHECKEL	BELOW:	SUBMITTAL REVIEW ACTIONS:  No exceptions taken			
☐ Second				☐ Make revisions			
For approval				Amend and resubmit			
For review and comment				Rejectedsee Remarks			
☐ With submittal review action noted ☐ None							
Copies	Date	No.		Description			
1	8/1/00		June 2000 Groundwater Sampling Report Hobbs, New Mexico Facility BJ				
	Services Company, U.S.A						
			•				

# **REMARKS:**

Steve-

cc: Mr. Chris Williams, State of New Mexico Jo Ann Cobb, BJ Services Company U.S.A. Brown and Caldwell Project File Transmittal File w/o attachments

Richard Rexroad, P.G.

Miland Rexid

JUNE 2000 GROUNDWATER SAMPLING REPORT HOBBS, NEW MEXICO FACILITY

BJ SERVICES COMPANY, U.S.A.

**JULY 25, 2000** 

# JUNE 2000 GROUNDWATER SAMPLING REPORT HOBBS, NEW MEXICO FACILITY BJ SERVICES COMPANY, U.S.A.

Prepared for

BJ Services Company, U.S.A. 11211 FM 2920 Tomball, Texas 77375

BC Project Number: 12832.015

Richard L. Rexroad, P.G. Principal Geologist

Redund Regroad

July 25, 2000

**Brown and Caldwell** 

1415 Louisiana, Suite 2500

Houston, Texas 77002 - (713) 759-0999

<sup>&</sup>quot;This report was prepared in accordance with the standards of the environmental consulting industry at the time it was prepared. It should not be relied upon by parties other than those for whom it was prepared, and then only to the extent of the scope of work which was authorized. This report does not guarantee that no additional environmental contamination beyond that described in this report exists at this site."

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# **APPENDICES**

- A Field Data Sheets
- B Laboratory Analytical Report

#### 1.0 INTRODUCTION

Brown and Caldwell conducted field activities associated with the June 2000 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 8, 2000. Groundwater samples were analyzed for gasoline and diesel range total petroleum hydrocarbons (TPH-G and TPH-D) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) as specified in by the New Mexico Oil Conservation Division (NMOCD) in NMOCD Permit GW-072. This report presents a description of the groundwater sampling field activities, a summary of the analytical results, and an evaluation of remedial technologies being applied at the facility. A groundwater potentiometric surface map, a benzene concentration map, and a hydrocarbon distribution map are included.

The facility formerly operated an above-grade on-site fueling system. A layout of the facility is shown in Figure 1. Subsurface impact near the former 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. The NMOCD has required a quarterly groundwater monitoring program to assess the concentration of hydrocarbon constituents in groundwater as a result of the diesel fuel release. BJ Services removed three field waste tanks at the facility on March 6-7, 1997. The ongoing monitoring of groundwater conditions at the site is being performed to address both the former fuel island and the former field waste tanks areas of the facility, as directed by NMOCD in correspondence dated January 21, 1999.

A biosparging system was activated in November 1995 to remediate soil and groundwater at the facility. Expansions of the biosparging system were performed in March/April 1997 and February/March 1998. Flow adjustments were made to the biosparging system during the June/July 1999 and March 2000 sampling events, as described in Section 3.1. A site chronology detailing the history of the former fueling system and the former field waste tanks area, the soil and groundwater remediation system, and previous sampling events is presented in Table 1.

#### 2.0 FIELD ACTIVITIES AND RESULTS

Brown and Caldwell purged and sampled the 10 of the 13 existing groundwater monitor wells at and adjacent to the BJ Services Hobbs facility on June 8, 2000 to determine concentrations of dissolved-phase hydrocarbons in groundwater and to evaluate general groundwater quality in the area. Monitor wells MW-1, MW-8, and MW-9 were not sampled during the June 2000 sampling event because benzene had not been detected in groundwater samples from these wells for at least four quarterly sampling events preceding the June 2000 groundwater sampling event. All monitor wells at and adjacent to the BJ Services Hobbs facility were sampled during the March 2000 groundwater sampling event at the facility. The locations of the monitor wells at the facility are shown in the site map presented as Figure 1. The following subsections describe the field activities conducted by Brown and Caldwell at the facility in June 2000 and present the results of the groundwater analyses.

# 2.1 Groundwater Measurements and Sampling

Groundwater level measurements were obtained from the monitor wells prior to purging and sampling the wells. Groundwater levels were measured with an oil/water interface probe and recorded to the nearest 0.01 foot. A cumulative table of groundwater elevation data is presented in Table 2. The groundwater elevation data indicates that the general groundwater flow direction is to the east, with a hydraulic gradient of approximately 0.006 foot/foot (ft/ft). A potentiometric surface map is presented in Figure 2.

The monitor wells were purged and sampled using disposable bailers because the continued decline in groundwater elevation in wells at the facility, as documented in the March 2000 Groundwater Sampling Report for the facility, precluded use of a Geosquirt® submersible pump that had been used during quarterly sampling events prior to March 2000. Field parameter measurements for pH, conductivity, oxidation-reduction (redox) potential, dissolved oxygen, and temperature were collected in conjunction with the well purging process using a calibrated YSI 600-XL meter. Ferrous iron, dissolved oxygen, and alkalinity were measured in selected wells upon conclusion of

purging activities using Hach field test kits to assist in assessment of the potential for natural attenuation of hydrocarbons at the facility. Turbidity of groundwater was also typically measured upon conclusion of purging activities. The field parameter readings were recorded on the field data sheets included in Appendix A. Field parameter readings are summarized in Table 3.

Groundwater samples were transferred to laboratory-prepared, clean glass or plastic containers sealed with Teflon<sup>®</sup>-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.

Non-disposable field measurement equipment was decontaminated prior to and after each usage. Decontamination procedures consisted of washing with fresh water and a non-phosphate detergent, then rinsing with deionized water. Purge water was discharged to the on-site water reclamation system for re-use 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 and for BTEX by EPA Method 8021B. Six monitor wells (MW-5, MW-10, MW-11A, MW-12, MW-12D and OW-4) were sampled for nitrate, sulfate, and dissolved methane/ethylene/ethane to evaluate natural attenuation processes. Current and cumulative analytical results for BTEX, TPH-D, and TPH-G are presented in Table 4. Nitrate, sulfate, and dissolved methane analytical results are presented in Table 5. The laboratory analytical reports and chain-of-custody records for samples collected during the June 2000 field activities are included in Appendix B.

BTEX constituent concentrations in excess of applicable laboratory detection limits were reported in only four of the 10 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 all monitor wells except MW-10 and MW-12, which are

located near the former field waste tanks source area in the eastern portion of the facility. Figure 3 presents a benzene isoconcentration and total BTEX distribution map for the June 2000 sampling event. A total petroleum hydrocarbons distribution map for the June 2000 sampling event is presented in Figure 4.

Benzene was not detected monitor wells MW-3 and MW-4, which are located near the former source area in the western portion of the facility. Benzene has not been detected in monitor wells MW-3 and MW-4 since June 1999 and March 1999, respectively. Benzene has not been detected in monitor wells MW-1 or MW-9, which are also located near the former fuel island source area, since September 1998. Monitor wells MW-1 and MW-9 were most recently sampled in March 2000.

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. Adjustments to the biosparging system were made on July 14, 1999 to increase air flow to biosparging system Lateral No. 1, located in the eastern portion of the plume associated with the former fueling system (i.e., the western plume). Further adjustments to the air flow distribution within the biosparging system were made during the March 2000 quarterly sampling event, as described in detail in Section 3.1. The adjustments made in 1999 and 2000 resulted in decreases in the concentration of benzene in monitor well MW-13 from 1.5 mg/L on July 2, 1999 to 0.006 mg/L on June 8, 2000, as displayed graphically in Figure 5. Similarly, the total BTEX concentration in monitor well MW-13 decreased from 2.331 mg/L on July 2, 1999 to 0.072 mg/L on June 8, 2000.

The vertical decrease in benzene concentration from 0.062 mg/L in monitor well MW-12 (screened at a depth of 50 feet to 65 feet bgs) to less than 0.001 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 to the uppermost portion of the aquifer. Similar vertical gradients in benzene concentrations at the MW-12/MW-12D location have been observed during each of the five quarterly groundwater sampling events conducted since the installation of monitor well MW-12D prior to the June/July 1999 sampling event at the facility. There have been no detections of BTEX \\BCHOU02\PROJECTS\WP\BJSERV\12832\062r.doc

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constituents throughout the monitoring history of monitor well MW-12D. Discontinuation of sampling of monitor well MW-12D was recommended on this basis in the March 2000 Groundwater Sampling Report for the facility. Monitor well MW-12D will not be sampled during upcoming groundwater sampling events.

#### 2.3 Natural Attenuation Evaluation

Natural attenuation is planned to be the primary remediation mechanism for the dissolved-phase hydrocarbon plume located in the area of the former field waste tanks in the eastern portion of the facility (see Figure 1).

The primary evidence of natural attenuation is plume behavior. A plume is shrinking when the rate of hydrocarbon loading from a source area is less than the rate of natural degradation of hydrocarbons. Plume shrinkage in the absence of aggressive remediation is indicative of the occurrence of natural attenuation processes. Conversely, a plume is expanding if the rate of hydrocarbon loading from a source area is greater than the rate of natural degradation of hydrocarbons through natural attenuation processes.

The former field waste tanks in the eastern portion of the facility were removed in March 1997. Concentrations of total BTEX in monitor wells in the area of the former field waste tanks have generally been stable or declining subsequent to removal of the field waste tanks. Occasional increases in total BTEX concentrations between quarterly sampling events have been observed in monitor wells MW-10 and MW-12 since March 1997. These increases may be attributed to sporadic loading rates from the vadose zone in excess of the natural attenuation rate of the area.

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, 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 may be utilized during intrinsic bioremediation. Dissolved oxygen concentrations should therefore be depressed in areas where intrinsic bioremediation is occurring.

Former fuel island source area monitor wells MW-10 and MW-12 are the only two wells at the facility that displayed benzene concentration in excess of 0.010 mg/L during the June 2000 sampling event. Dissolved oxygen concentrations in these wells, as measured with the YSI meter, ranged from 1.13 mg/L to 1.82 mg/L. These dissolved oxygen concentrations are depressed relative to monitor well MW-11A (which is located at the fringe of the eastern plume and which displays a substantially lower hydrocarbon concentration) and to non-impacted monitor wells at the facility, suggesting that natural aerobic biodegradation of hydrocarbons in the eastern plume is occurring.

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, MW-12, and MW-12D during the June 2000 sampling event. These concentrations are less than the background nitrate concentration of 4.7 mg/L measured in monitor well MW-5 (see Table 5). The low nitrate concentrations in monitor wells MW-10, MW-11A, MW-12, and MW-12D suggest that nitrate has been depleted during natural attenuation of hydrocarbons in the former field waste tanks area of the facility.

Hydrocarbon constituents were not detected in downgradient well OW-4 in June 2000. The nitrate concentration of 3.4 mg/L in monitor well OW-4 is comparable to the nitrate concentration of 4.7 mg/L observed in background well MW-5. The combination of non-detectable hydrocarbon concentrations and a near-background nitrate concentration in downgradient well OW-4 supports the contention that the low nitrate concentrations observed in monitor wells MW-10, MW-11A, MW-12, and MW-12D reflect natural attenuation of hydrocarbons in the former field waste tanks area rather than a simple eastward decrease in nitrate content within groundwater at the facility.

3. When dissolved oxygen 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.

June 2000 ferrous iron data for the facility is not definitive. Ferrous iron was measured at respective concentrations of 3.0 mg/L and 8 mg/L in monitor wells MW-10 and MW-12 (which displayed maximum impact by BTEX constituents) and at respective concentrations of 2.0 mg/L and 0.5 mg/L in former field waste tanks source area monitor wells MW-11A

and MW-12D. Ferrous iron was not detected in background well MW-5. Ferrous iron was detected at a concentration of 3.0 mg/L in the downgradient non-impacted monitor well, OW-4, however.

Historic evidence submitted to the NMOCD in previous quarterly groundwater monitoring reports for the facility (see March 2000 Groundwater Sampling Report, for example) has indicated that ferrous iron concentrations are typically elevated in former field waste tanks source area wells relative to non-impacted monitor wells situated at upgradient, sidegradient, and downgradient locations. The historically elevated ferrous iron concentrations in the area of the former field waste tanks provide evidence that natural attenuation of hydrocarbons has occurred in that area. Furthermore, concentrations of ferrous iron in impacted wells exceed the concentration of ferrous iron in background during this event.

4. Methane is a reaction product generated during utilization of carbon dioxide as an electron acceptor. Its concentration should therefore increase in areas where depletion of electron acceptors such as dissolved oxygen, nitrate, and carbon dioxide has occurred.

The concentrations of methane in former field waste tanks area monitor wells MW-10 and MW-11A are elevated relative to the methane concentrations in background well MW-5 and downgradient well OW-4, as shown in Table 5. The detections of methane in wells MW-10 and MW-11A suggests that utilization of carbon dioxide as an electron acceptor during natural attenuation processes may be occurring locally in the area of the former field waste tanks.

- 5. Redox is a measure of chemical energy in groundwater. Redox in background well MW-5 was measured at 176.1 millivolts (mV) upon conclusion of purging activities, as shown in Table 3. Redox values in former field waste tanks source area wells MW-10, MW-11A, and MW-12 ranged from -79.2 mV to -108.8 mV. The low redox values in the former field waste tanks area monitor wells suggest that electron acceptors other than dissolved oxygen and nitrate (e.g., carbon dioxide) are being utilized in this area.
- 6. Alkalinity is expected to increase during natural attenuation processes, due to the leaching of carbonates from mineral substrates by microbially produced organic acids.

June 2000 alkalinity data, as measured using Hach field testing kits, is not definitive. Alkalinity of groundwater in former field waste tanks source area monitor wells MW-10, MW-11A, MW-12, and MW-12D was elevated relative to upgradient monitor well MW-5, but alkalinity in the downgradient non-impacted well (OW-4) was equal to or greater than the alkalinity of the source area wells. Measurement of alkalinity in an analytical laboratory using Method 310.1 is therefore recommended for the next groundwater sampling event. However, the elevated alkalinity in impacted monitor wells relative to the background monitor well suggests that natural bioremediation is occurring.

The sulfate data presented in Table 5 display no discernable trend. Use of sulfate as an electron acceptor at the facility during intrinsic bioremediation of hydrocarbons can therefore not be confirmed.

In conclusion, dissolved oxygen, nitrate and ferrous iron data from this and previous groundwater sampling events suggest that intrinsic bioremediation processes utilizing indigenous electron acceptors are ongoing at the facility. Increases in methane concentrations in selected monitor wells at the former field waste tanks area suggest that carbon dioxide may also be serving locally as an electron acceptor during intrinsic bioremediation of hydrocarbons in this area. Redox and alkalinity data also indicate that intrinsic bioremediation is occurring at the facility. It is recommended that monitoring for natural attenuation evaluation parameters continue in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12, downgradient well OW-4, and upgradient well MW-5. Redox, dissolved oxygen content, and alkalinity are good indicators of the occurrence of aerobic bioremediation of hydrocarbons, so it is also recommended that field and laboratory testing for these parameters be performed in all wells to be sampled during upcoming groundwater monitoring events.

# 3.0 REMEDIATION SYSTEM

Based on the results of previous investigations conducted by Brown and Caldwell and Roberts/Schornick and Associates, Inc., Brown and Caldwell recommended the installation of a biosparging system in a Remedial Action Plan (RAP) submitted to the NMOCD in May 1994. The NMOCD approved the RAP on August 11, 1994.

Biosparging 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, biosparging removes volatile and semivolatile contaminants from the saturated zone. Biosparging 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 content of groundwater and soil moisture present in the capillary fringe and vadose zone, thus facilitating 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

Nineteen combined injection and extraction wells, three vacuum extraction wells, one extraction blower, one injection blower, and associated piping were installed between August 2 through August 24, 1995. 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 that were near the center of the western plume, which is 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 of air 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 and total BTEX concentrations measured in monitor well MW-1 have displayed a nearly continuous decline 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 since the December 1998 sampling event, and total BTEX concentrations decreased from 30.6 mg/L to less than 0.01 mg/L between December 1997 and March 2000.

The benzene concentration in monitor well MW-3 declined from 0.240 mg/L in December 1997 to less than 0.001 mg/L since September 1999, and the total BTEX concentration decreased from 1.930 mg/L in December 1997 to non-detectable levels since September 1999.

In monitor well MW-4, the benzene concentration decreased from 0.230 mg/L in December 1997 to less than 0.001 mg/L since the June 1999 sampling event. The total BTEX concentration in monitor well MW-4 dropped from 4.250 mg/L to a non-detectable level between December 1997 and June 2000.

The observed decreases in benzene and total BTEX concentrations in monitor wells MW-1, MW-3, and MW-4, which are located near the center of the former fuel island source area, are attributable to the effects of the increased air flow supplied by 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. 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 as a result of the system modifications completed in February 1998 and the system adjustments implemented in July 1999 and March 2000. This indicates that the system modifications and adjustments have

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been effective in increasing benzene removal from groundwater in the center of the former western plume area.

Monitor well MW-13 is located in the downgradient portion of the western plume. Application of increased air flow to injection wells AV-16 and AV-17 within Lateral No. 1 in mid-July 1999 resulted in substantial decreases in benzene and total BTEX concentrations in monitor well MW-13 between July 2, 1999 and March 10, 2000, as previously discussed in Section 2.2. Air flow within the biosparging system was adjusted during the March 2000 sampling event to further increase remedial pressure in the area of monitor well MW-13. Air flow to Lateral Nos. 4S, 5S, 6S, and 7S (i.e., air injection/vacuum extraction wells AV-1 through AV-8 and vacuum extraction wells VE-1 through VE-4, as shown in Figure 7) was shut off, thus increasing air flow to Lateral Nos. 1S, 2S, 3S, and 1D through 5D. The effect of decreased air flow on benzene and total BTEX concentrations in the center of the former western plume could thus be evaluated, while simultaneously enhancing remediation of the downgradient portion of the plume. Data from the June 2000 groundwater sampling event indicate that:

- Hydrocarbon concentrations remained constant or decreased in the center of the former western plume when airflow was decreased in this area; and
- Hydrocarbon concentrations continued to decrease in monitor well MW-13, which is located in the downgradient portion of the western plume.

If analytical results obtained from the western plume area monitor wells during the upcoming September 2000 sampling event are consistent with the results obtained from the June 2000 sampling event, then Brown and Caldwell recommends that the biosparging system be shut down completely. Quarterly monitoring would continue in December 2000 to monitor for possible rebound effect.

#### 3.2 Air Emissions

Vapors recovered during the extraction process are discharged to the atmosphere in accordance with State of New Mexico air quality regulations. Following initial system startup operations, effluent air samples were collected on a monthly basis to monitor the biosparging process and the emissions 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 substantial 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 pound per hour (lb/hr) to 0.03 lb/hr. 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/hr to 0.08 lb/hr. These emission rates were well below the regulatory limit of 10 lb/hr for VOCs. Therefore, use of a flame ionization detector (FID) to measure the TPH concentration of the vapors in the field commenced in September 1997. TPH measurements collected using a FID correspond to TPH concentrations previously determined in the analytical laboratory. A TPH concentration of 62 ppmv was measured during the June 2000 sampling event using a FID.

The June 2000 TPH concentration of 62 ppmv is substantially less than the 1,500 ppmv TPH discharge rate calculated for the March 24, 1998 sampling event, and is comparable to TPH concentrations measured during the time period from August 1996 through December 1997 (prior to the system modifications performed in February/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 and associated adjustments to air injection rates. Discharge rates have returned to typical pre-modification levels during the period from June 1998 through June 2000.

A TPH-VOC emissions rate of 0.091 lb/hr was calculated for the June 2000 sampling event. This emissions rate is less than the regulatory limit of 10 lb/hr for VOCs. The June 2000 TPH-VOC emissions rate is typical of TPH-VOC emissions rates during the time period of August 1996 through December 1997, and represents a substantial drop from the 1.91 lb/hr TPH-VOC emissions rate calculated for the March 1998 sampling event. Discharge rates have varied between 0.003 lb/hr and 0.33 lb/hr during the time period of June 1998 through June 2000, and are well below the regulatory limit of 10 lb/hr for VOCs.

The initial increase in mass transfer rates after the February/March 1998 system modification is indicative of increased stripping of hydrocarbons within soil and groundwater from pathways that were not in contact with injected air prior to the system modification. The subsequent decrease in mass transfer, in concert with plume mass calculations shown in Figure 5, indicate that the overall contaminant mass has been reduced by operation of the biosparging system. A cumulative summary of air emissions monitoring data is presented in Table 6. These results are based on both laboratory analyses and field measurements.

### 4.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on information obtained during the June 2000 groundwater sampling event at the BJ Services Hobbs, New Mexico facility.

#### 4.1 Conclusions

- Groundwater flow was to the east/northeast at a hydraulic gradient of 0.006 ft/ft.
- Benzene concentrations in all monitor wells at the facility except MW-10 and MW-12 are less than the New Mexico WQCC standard of 0.01 mg/L for benzene.
- Dissolved benzene, BTEX, and TPH concentrations in monitor wells at the former fueling system source area are below applicable standards.
- Increases in air flow rates to biosparge injection wells AI-16 and AI-17 have resulted in substantially decreased benzene and total BTEX concentrations in monitor well MW-13 between July 2, 1999 and June 8, 2000.
- TPH-VOCs emissions rates from the biosparging system have been 2 to 3 orders of magnitude below the regulatory limit of 10 lb/hr for VOCs during the time period of June 1998 through June 2000.
- No BTEX or TPH constituents have been 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. Comparison of this data to BTEX and TPH concentrations in adjacent monitor well MW-12, which is screened in the uppermost portion of the aquifer, suggests that hydrocarbon impact to groundwater, where present at the facility, is limited to the uppermost portion of the aquifer.
- Natural attenuation processes appear to be occurring in the vicinity of the former field waste tanks that were removed in March 1997.

### 4.2 Recommendations

- Continue the quarterly groundwater sampling program.
- If September 2000 analytical results for western plume monitor wells are consistent with June 2000 analytical results, then the biosparging system should be shut off; western plume area wells should then be monitored for possible rebound effect.

- Continue monitoring for natural attenuation evaluation parameters in monitor wells MW-5, MW-10, MW-11A, MW-12, and OW-4.
- Perform laboratory testing for alkalinity, which is an indicator of aerobic bioremediation, in monitor wells MW-5, MW-10, MW-11A, MW-12, and OW-4.
- Discontinue monitoring hydrocarbon emissions; resume emissions monitoring only if substantial increases in hydrocarbon concentrations are observed in one or more western plume area monitor wells.

### DISTRIBUTION

June 2000 Groundwater Sampling Report BJ Services Company, U.S.A. Hobbs, New Mexico

July 25, 2000

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

1625 N. French Dr.

Hobbs, New Mexico 88240

Attention: Mr. Chris Williams

1 copy to: BJ Services Company, U.S.A.

11211 FM 2920

Tomball, Texas 77375

Attention: Ms. Jo Ann Cobb

1 copy to: Brown and Caldwell, Project File

**QUALITY CONTROL REVIEWER** 

Robert N. Jennings, P.E.

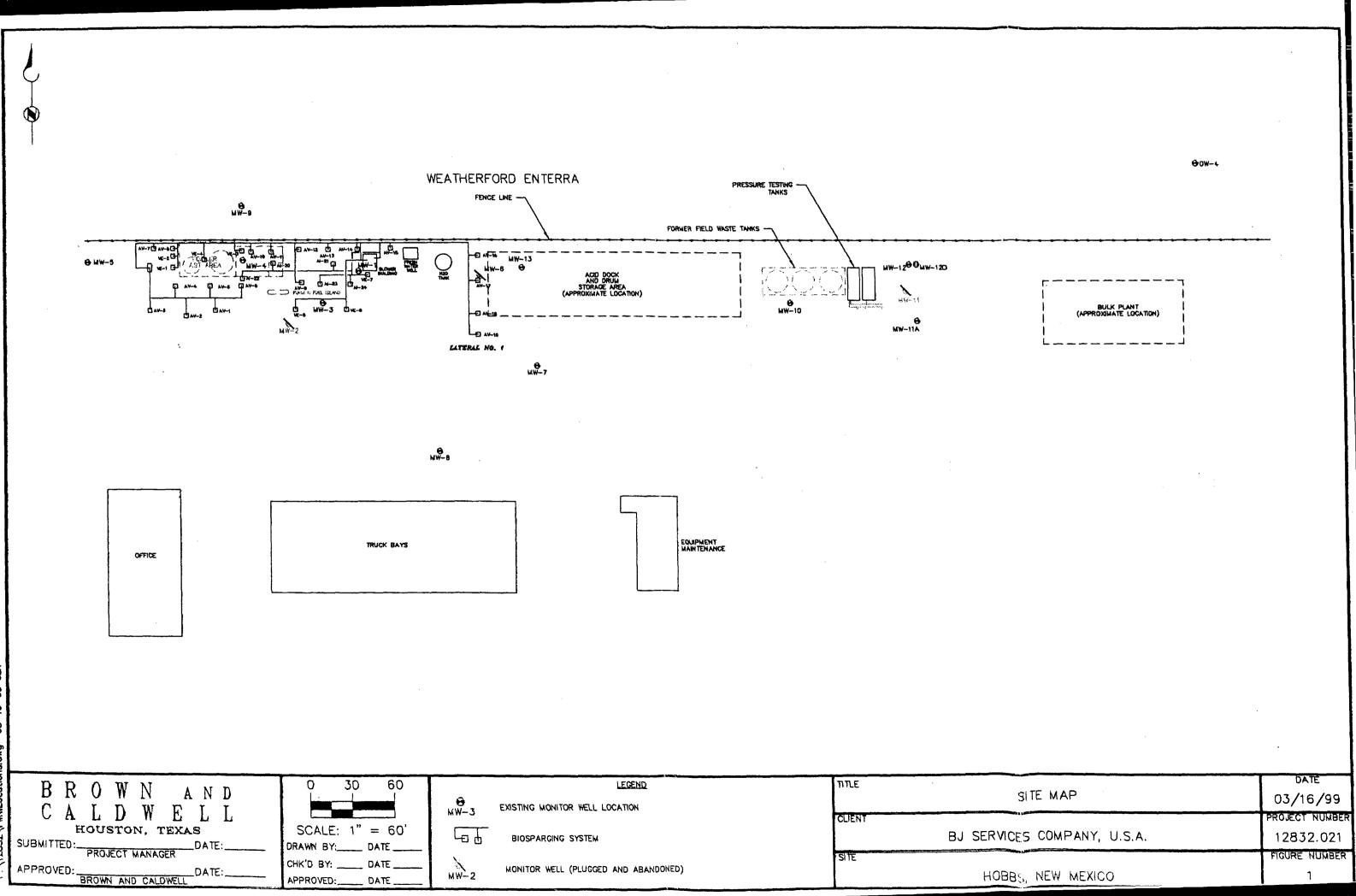
Vice President

RLR/uak

## **FIGURES**

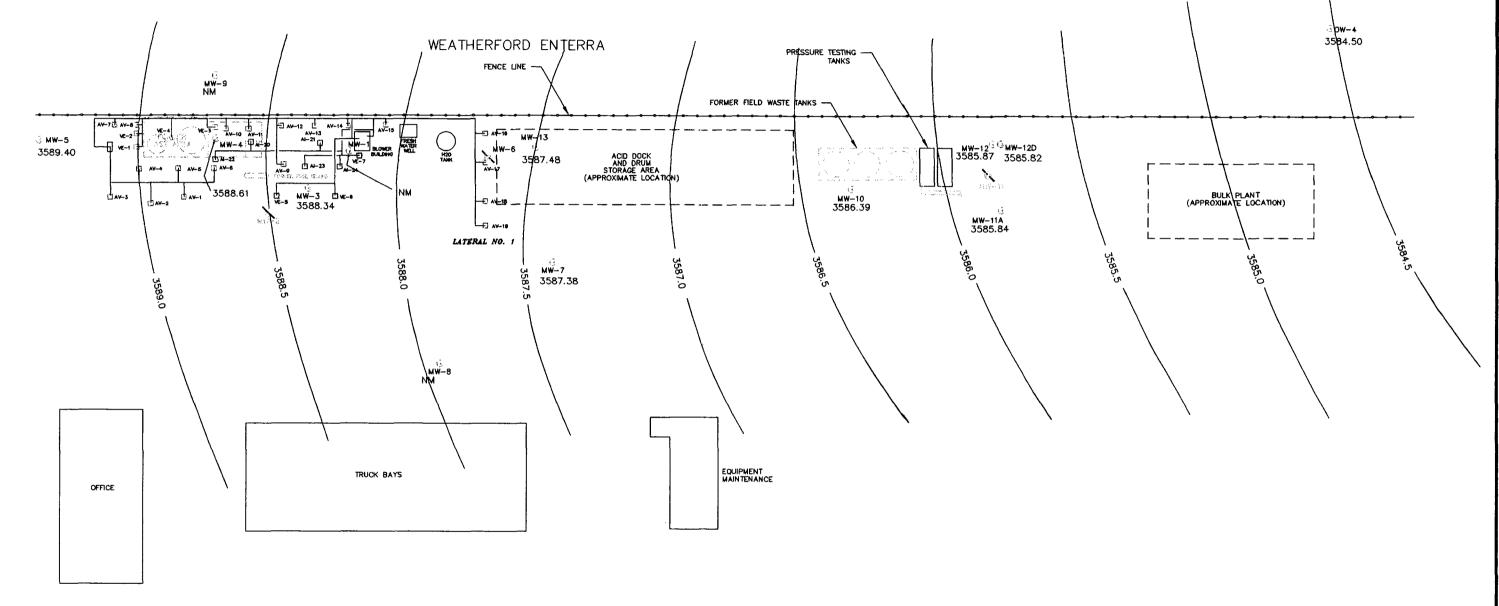
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HOUSTON, TEXAS

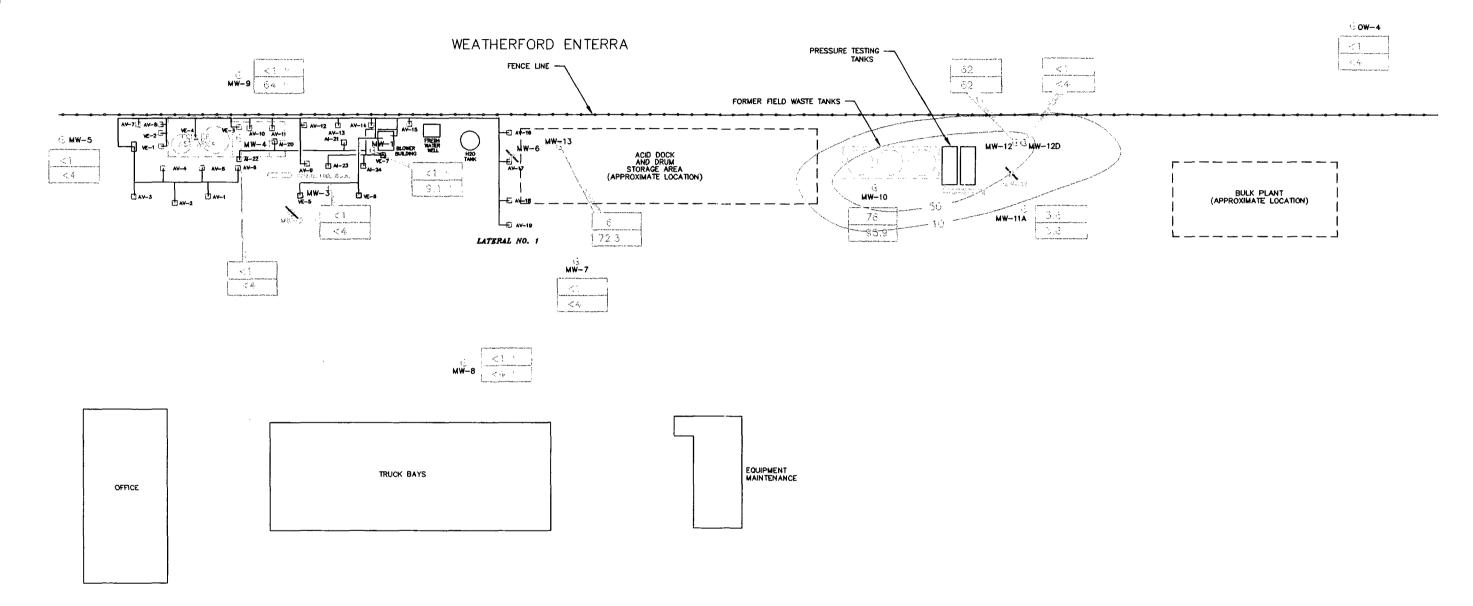
SUBMITTED:\_\_\_\_\_PROJECT MANAGER APPROVED: DATE:

60 SCALE: 1" = 60DRAWN BY:\_\_\_\_ DATE CHK'D BY: \_\_\_ APPROVED:\_

LEGEND 3588.34 MW-3 MONITOR WELL LOCATION WITH GROUNDWATER ELEVATION (feet AMSL) BIOSPARGING SYSTEM

MONITOR WELL (PLUGGED AND ABANDONED)

TITLE		DATE
	GROUNDWATER ELEVATION MAP FOR JUNE 8, 2000	6/30/00
CLIENT		PROJECT NUMBER
	BJ SERVICES COMPANY, U.S.A.	12832.021
SATE		FIGURE NUMBER
	HOBBS, NEW MEXICO	2

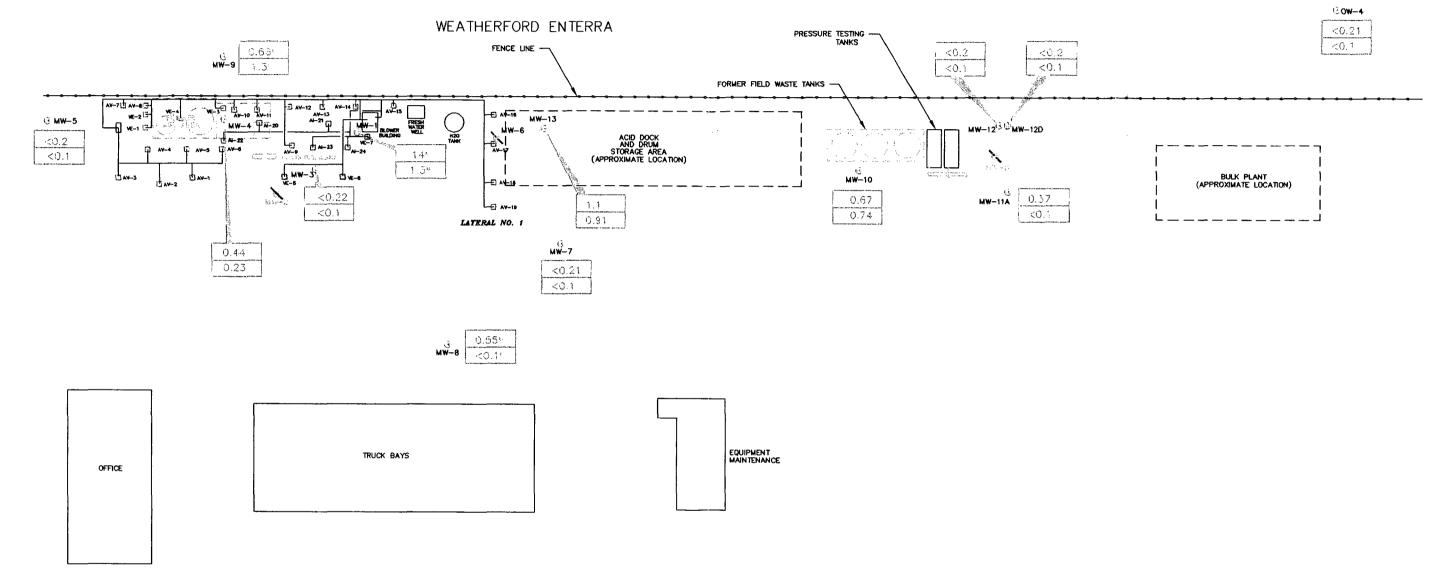


NOTE: MONITOR WELL MW-12D IS SCREENED IN A DEEPER PORTION OF THE AQUIFER THAN MONITOR WELL MW-12 AND THE OTHER MONITOR WELLS; DATA FROM MONITOR WELL MW-12D NOT INCLUDED IN CONTOURING.

2832\Ber	B R O W N A N D	0 30 60	LEGEND  LEGEND  BICSPARGING SYSTEM	DISTRIBUTION MAP FOR JUNE 8, 2000	DATE 6/30/00
/jobs/1	UALUWLLL  HOUSTON, TEXAS  SUBMITTED:DATE:	SCALE: 1" = 60' DRAWN BY: DATE	MW-2 MONITOR WELL (PLUGGED AND ABANDONED) - BENZENE ISOCONCENTRATION CONTOUR ( ug/L)  - BENZENE CONCENTRATION (ug/L)	CLIENT BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER 12832.014
D C	PROJECT MANAGER  APPROVED: DATE:	CHK'D BY: DATE APPROVED: DATE	TOTAL BTEX CONCENTRATION (ug/L)  * INDICATES WELL NOT SAMPLED 6/8/00; DATA PRESENTED ARE FROM 3/10/00	HOBBS, NEW MEXICO	FIGURE NUMBER

P: \cad\jobs\12832\Benzene6-8-00



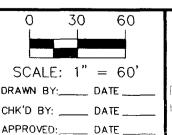




HOUSTON, TEXAS

SUBMITTED:\_\_\_\_\_DATE:\_\_\_\_
PROJECT MANAGER

APPROVED:\_\_\_\_\_DATE:\_\_\_\_\_DATE:\_\_\_\_\_

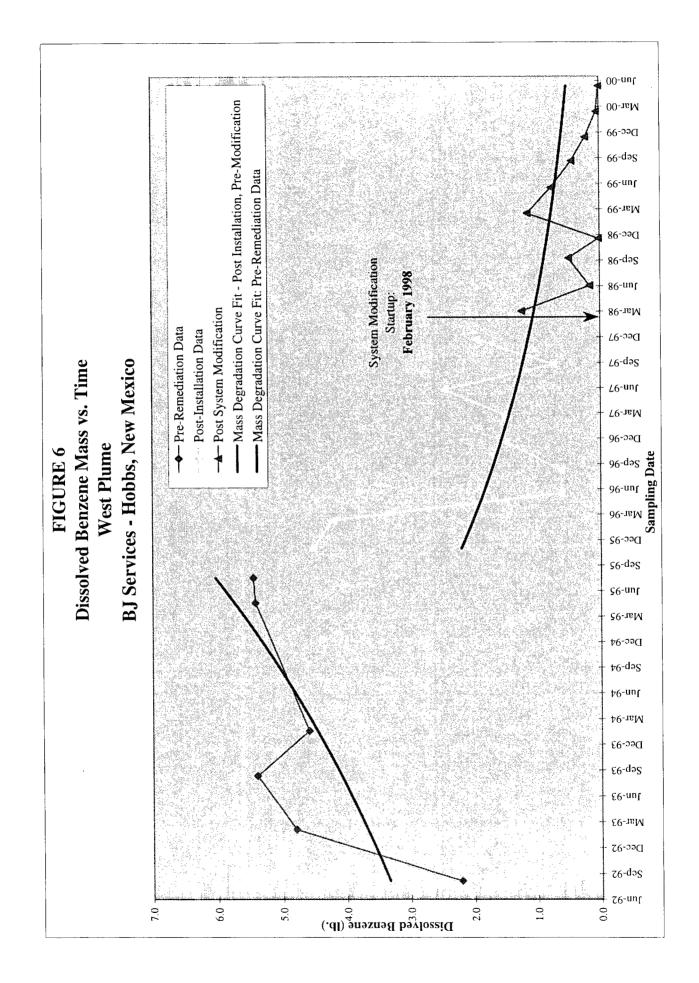


		LEGEND	
ੂ ₩–3	EXISTING MONITOR WELL LOCATION		BIOSPARGING SYSTEM
V-2	MONITOR WELL (PLUGGED AND ABANDONED)		
C.2	- TPH-D CONCENTRATION (mg/L)		
5.1	- TPH-G CONCENTRATION (mg/L)		
* - IND	ICATES WELL NOT SAMPLED 6/8/00; DATA PR	ESENTED ARE F	ROM 3/10/00

TITLE	TOTAL PETROLEUM HYDROCARBONS	DATE
	DISTRIBUTION MAP FOR JUNE 8, 2000	6/30/00
CLIENT		PROJECT NUMBER
	BJ SERVICES COMPANY, U.S.A.	12832.014
SITE		FIGURE NUMBER
	HOBBS, NEW MEXICO	4

:\cad\jobs\12832\TPH6-8-0

Jun-00 May-00 Apr-00 Figure 5 - Benzene Concentration in Monitor Well MW-13 versus Time Mar-00 Feb-00 Jan-00 **Date Monitored** Dec-99 Nov-99 Oct-99 Sep-99 Aug-99 Jul-99 1.600 1.400 1.200 0.000 1.000 0.800 0.600 0.400 0.200 Benzene Concentration (mg/L)



p:\gen\bjserv\2832-hobbs\masscalc\03-00.xls

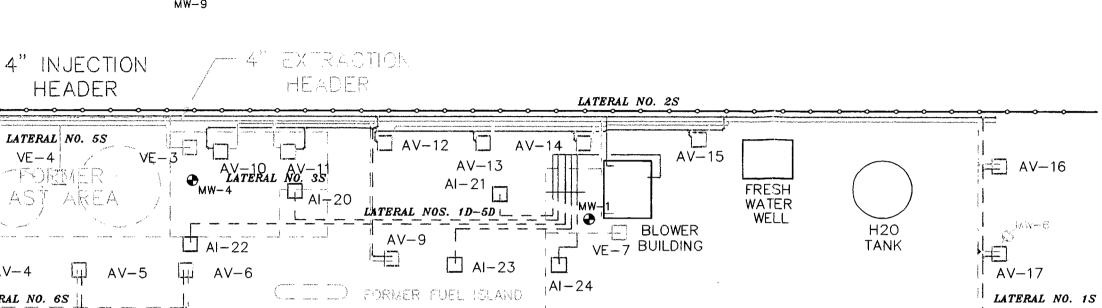
LATERAL NO. 5S

□ AV-1

LATERAL NO. 6S

₩ AV-2

LATERAL NO. 7S



Ŭ VE−6

1	F	$\overline{}$	F	N	$\Box$	

□ AV-3

LATERAL NO. 4S

AV-7 1 AV-8 1

MONITORING WELL LOCATION AND IDENTIFICATION

MONITORING WELL - P&A'd

EXTRACTION AND INJECTION WELL

VACUUM EXTRACTION WELL

INJECTION WELL

♠ MW-5

ABOVE GRADE VACUUM AND INJECTION LINES BURIED VACUUM AND INJECTION LINES

LATERAL NO.	INJECTION/EXTRACTION WELLS	INJECTION WELLS	EXTRACTION WELLS
LATERAL 1S	AV-16, AV-17, AV-18*, AV-19*		
LATERAL 2S***	AV-12, AV-13, AV-14, AV-15		
LATERAL 3S***	AV-9, AV-10, AV-11		
LATERAL 4S**	AV-7, AV-8		
LATERAL 5S**			VE-1 TO $VE-4$
LATERAL 6S**	AV-4, AV-5, AV-6		
LATERAL 7S**	AV-1, $AV-2$ , $AV-3$		
LATERAL 8			VE-5 TO VE-7
LATERAL 1D-5D***		AI-20 TO AI-24	

\* - INDIVIDUAL WELL SHUT OFF WITHIN LATERAL-1S ON 07/14/99

<sup>1</sup>√VE-5

ke-14W-2 LATERAL NO. 8

- \*\* LATERAL SHUT OFF IN 03/00
- \*\*\* LATERAL TO BE SHUT OFF IN 09/00

В	R	0	W	N	A	. N	D
C	A	L	D	W	E	L	L
		OTT		NT AT	33337 A	<b>a</b>	

BROWN AND CALDWELL

0	10	2	0
	_		
SCALE	: 1"	=	20'
AWN BY:_	0	DATE_	
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יספטערט.		A TE	

TITLE	DETAIL OF BIOSPARGING SYSTEM	6/30/00
CLIENT	BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER 12832.015
SITÉ	HOBBS, NEW MEXICO	FIGURE NUMBER 7

AV-18

AV-19

## **TABLES**

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"Use or disclosure of data contained on this sheet is subject to the restriction specified at the beginning of this document."

## 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 handaugured 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 three 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 new injection wells AI-20 through AI-24.
March 10, 1998	Operation of new air injection wells AI-20 through AI-24 and new vapor extraction wells VE-5 though VE-7 commenced.
March 23-24, 1998	Brown and Caldwell conducted the March 1998 groundwater sampling event.
March 24, 1998	Operation of previously existing injection wells and vapor extraction 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.

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

Date	Activity
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.
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; installed and developed monitor wells MW-12D and MW-13; and sampled monitor wells MW-12D and MW-13 to complete the June/July 1999 groundwater sampling event.
July 14, 1999	Brown and Caldwell redirected air discharge from the shallow well injection system to Lateral No. 1 and optimized air flow to injection wells AI-16 and AI-17 to apply increased remedial pressure to the eastern potion of the west plume.
September 13-14, 1999	Brown and Caldwell conducted the September 1999 groundwater sampling event.
December 9, 1999	Brown and Caldwell conducted the December 1999 groundwater sampling event
March 9-10, 2000	Brown and Caldwell conducted the March 2000 groundwater sampling event and shut off air flow to biosparging system Lateral Nos. 4S, 5S, 6S, and 7S.
June 8, 2000	Brown and Caldwell conducted the June 2000 groundwater sampling event.

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-I	3,647.53	08/10/92	53.22	0.00	3,594.31	(1)
	}	02/09/93	53.03	0.00	3,594.50	
		08/18/93	53.10	0.00	3,594.43	
		01/26/94	53.31	0.00	3,594.22	
		05/03/95	54.64	0.20	3,593.05	(2)
		07/31/95	54.14	0.00	3,593.39	( )
		11/14/95	53.69	0.00	3,593.84	
		02/23/96	54.32	0.00	3,593.21	
		05/31/96	54.14	0.00	3,593.39	
		08/23/96	56.17	0.00	3,591.36	
	1	12/02/96	55.27	0.00	3,592.26	
		03/12/97	55.70	0.27	3,592.05	
		06/12/97	55.08	0.02	3,592.47	
	Ī	09/12/97	55.64	0.51	3,592.31	
		12/10/97	55.46	0.00	3,592.07	PSH Sheen
		03/24/98	55.81	0.00	3,591.72	PSH Sheen
	ĺ	06/23/98	56.38	0.06	3,591.20	i si i sileçii
		09/30/98	56.82	0.00	3,590.71	PSH Sheen
		12/09/98	57.05	0.00	3,590.71	ran ancen
		03/10/99	57.45	0.00	3,590.48	
				0.00		
		06/10/99	58.02		3,589.51	
	1	07/02/99	57.90	0.00	3,589.63	
		09/14/99	58.14	0.00	3,589.39	(2)
		12/09/99	-	-	2 500 54	(3)
		03/09/00	58.99	0.00	3,588.54	
Y 1111 A	3 7 1 1 6 1	June 2000	-	-	2 500 00	
MW-2	3,644.84	08/10/92	52.82	0.00	3,592.02	(1)
		02/09/93	49.60	0.00	3,595.24	
		08/18/93	49.71	0.00	3,595.13	
		01/26/94	49.97	0.00	3,594.87	
		05/03/95		ļ		(4),(5)
MW-3	3,645.00	08/10/92	52.99	0.00	3,592.01	(1)
		02/09/93	52.72	0.00	3,592.28	
		08/18/93	52.82	0.00	3,592.18	
		01/26/94	53.05	0.00	3,591.95	
		05/03/95	54.31	0.00	3,590.69	
		07/31/95	51.24	0.00	3,593.76	
		11/14/95	51.10	0.00	3,593.90	
		02/23/96	51.68	0.00	3,593.32	
		05/31/96	51.45	0.00	3,593.55	
		08/23/96	51.55	0.00	3,593.45	
		12/02/96	52.23	0.00	3,592.77	
		03/12/97	52.67	0.00	3,592.33	
		06/12/97	52.68	0.00	3,592.32	
		09/11/97	52.71	0.00	3,592.29	
		12/10/97	52.89	0.00	3,592.11	
		03/23/98	53.22	0.00	3,591.78	
		06/23/98	53.66	0.00	3,591.76	
		09/30/98		0.00		
		1	54.06		3,590.94	
		12/09/98	54.36	0.00	3,590.64	
		03/10/99	54.72	0.00	3,590.28	
		06/10/99	55.17	0.00	3,589.83	
		07/02/99	55.15	0.00	3,589.85	
		09/14/99	55.42	0.00	3,589.58	
		12/09/99	55.78	0.00	3,589.22	
	1	03/09/00	56.23	0.00	3,588.77	i

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-3		06/08/00	56.66	0.00	3,588.34	
MW-4	3,645.28	08/10/92	50.55	0.00	3,594.73	(1)
	,	02/09/93	50.26	0.00	3,595.02	
		08/18/93	50.38	0.00	3,594.90	
		01/26/94	50.90	0.30	3,594.63	
		05/03/95	51.51	0.45	3,594.14	
		07/31/95	51.74	0.26	3,593.75	
	Ì	11/14/95	51.03	0.00	3,594.25	
		02/23/96	51.65	0.01	3,593.64	
		05/31/96	51.48	0.00	3,593.80	
	}	08/23/96	53.49	0.00	3,591.79	
		12/02/96	52.32	0.00	3,592.96	
		03/12/97	52.74	0.05	3,592.58	
		06/12/97	53.08	0.44	3,592.56	
		09/12/97	52.60	0.15	3,592.80	
	1	12/10/97	52.89	0.00	3,592.39	PSH Sheen
		03/24/98	53.20	0.25	3,592.29	
		06/23/98	53.82	0.22	3,591.64	
		09/30/98	53.96	0.00	3,591.32	200 ml PSH
		12/09/98	54.27	0.00	3,591.01	
		03/10/99	54.69	0.04	3,590.62	
		06/10/99	55.07	0.00	3,590.21	
		07/02/99	55.10	0.00	3,590.18	
		09/14/99	55.33	0.00	3,589.95	
		12/09/99	55.79	0.00	3,589.49	
		03/10/00	56.12	0.00	3,589.16	
		06/08/00	56.67	0.00	3,588.61	
MW-5	3,647.72	08/10/92	52.38	0.00	3,595.34	(1)
.,	1,2,,,,,,,,	02/09/93	52.06	0.00	3,595.66	(-)
		08/18/93	52.16	0.00	3,595.56	
		01/26/94	52.50	0.00	3,595.22	
		05/03/95	53.57	0.00	3,594.15	
		07/31/95	53.27	0.00	3,594.45	
		11/14/95	52.83	0.00	3,594.89	
		02/23/96	53.57	0.00	3,594.15	
		05/31/96	53.16	0.00	3,594.56	
	[	08/23/96	53.41	0.00	3,594.31	
		12/02/96	53.98	0.00	3,593.74	
		03/12/97	54.44	0.00	3,593.28	
		06/12/97	54.48	0.00	3,593.24	
	1	09/12/97	54.29	0.00	3,593.43	
		12/10/97	54.66	0.00	3,593.06	
		03/23/98	55.05	0.00	3,592.67	
		06/23/98	55.44	0.00	3,592.28	
		09/30/98	55.65	0.00	3,592.07	
		12/09/98	56.00	0.00	3,591.72	
		03/09/99	56.45	0.00	3,591.27	
	1	06/10/99	56.91	0.00	3,590.81	
	1	07/02/99	56.93	0.00	3,590.79	
		09/14/99	57.12	0.00	3,590.79	
		12/09/99	57.12	0.00	i ·	
		· ·	· ·	1	3,590.31	
		03/09/00	57.92	0.00	3,589.80	
- <del> </del>	7 7 7 1 7 7 7	06/08/00	58.32	0.00	3,589.40	77.
MW-6	3,644.74	02/09/93	50.58	0.00	3,594.16	(1)
		08/18/93	50.78	0.00	3,593.96	
		01/26/94	51.00	0.00	3,593.74	

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-6		05/03/95	52.63	0.00	3,592.11	
		07/31/95	51.90	0.00	3,592.84	
		11/14/95	51.19	0.00	3,593.55	
		02/23/96	52.10	0.00	3,592.64	
		05/31/96	51.76	0.00	3,592.98	
		08/23/96	51.63	0.00	3,593.11	
		12/02/96	52.85	0.00	3,591.89	
		03/12/97	53.55	0.00	3,591.19	
i		06/12/97	52.08	0.00	3,592.66	
		09/11/97	53.72	0.00	3,591.02	
		12/10/97	53.27	0.00	3,591.47	
		03/23/98	53.56	0.00	3,591.18	
		06/23/98	52.88	0.00	3,591.86	
		09/30/98	54.89	0.00	3,589.85	
		12/09/98	54.57	0.00	3,590.17	
		03/10/99	55.10	0.00	3,589.64	
- KATTI 74	7 / 1 / 7 / 7	07/02/99				(5),(6)
MW-7	3,644.55	02/09/93	50.53	0.00	3,594.02	(1)
		08/18/93	50.74	0.00	3,593.81	
		01/26/94	51.01	0.00	3,593.54	
		05/03/95 07/31/95	52.25	0.00	3,592.30	
		11/14/95	51.92	0.00	3,592.63	
i		02/23/96	51.48 52.15	0.00	3,593.07	
}		05/31/96	51.78	0.00	3,592.40	
		08/23/96	52.02	0.00 0.00	3,592.77	
		12/02/96	52.52	0.00	3,592.53	
ĺ		03/12/97	52.99	0.00	3,592.03	
		06/12/97	53.08	0.00	3,591.56	
		09/11/97	53.00	0.00	3,591.47 3,591.55	
		12/10/97	53.28	0.00	3,591.27	
		03/23/98	53.59	0.00	3,590.96	
i		06/23/98	54.20	0.00	3,590.35	
}		09/30/98	54.54	0.00	3,590.01	
		12/09/98	54.74	0.00	3,589.81	
		03/09/99	55.15	0.00	3,589.40	
Ì		06/10/99	55.66	0.00	3,588.89	
		07/02/99	55.73	0.00	3,588.82	
		09/13/99	55.94	0.00	3,588.61	
		12/09/99	56.38	0.00	3,588.17	
ľ		03/09/00	56.74	0.00	3,587.81	
		06/08/00	57.17	0.00	3,587.38	
MW-8	3,644.87	02/09/93	50.48	0.00	3,594.39	(1)
		08/18/93	50.67	0.00	3,594.20	(-)
		01/26/94	50.96	0.00	3,593.91	
}		05/03/95	52.15	0.00	3,592.72	
l		07/31/95	51.77	0.00	3,593.10	
		11/14/95	51.37	0.00	3,593.50	
		02/23/96	52.17	0.00	3,592.70	
		05/31/96	51.55	0.00	3,593.32	
Ì		08/23/96	51.92	0.00	3,592.95	
		12/02/96	52.43	0.00	3,592.44	
		03/12/97	52.93	0.00	3,591.94	
ł		06/12/97	53.96	0.00	3,590.91	
		09/11/97	52.73	0.00	3,592.14	
		12/10/97	53.15	0.00	3,591.72	

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-8	***	03/23/98	53.51	0.00	3,591.36	
		06/23/98	54.01	0.00	3,590.86	
		09/30/98	54.35	0.00	3,590.52	
		12/09/98	54.60	0.00	3,590.27	
		03/09/99	55.00	0.00	3,589.87	
		06/10/99	55.56	0.00	3,589.31	
		07/02/99	55.57	0.00	3,589.30	
		09/13/99	55.72	0.00	3,589.15	
		12/09/99	-	-		(3)
		03/09/00	56.52	0.00	3,588.35	
		June 2000	-	-	-	
MW-9	3,644.78	04/22/93	49.73	0.00	3,595.05	(1)
		07/15/93	49.65	0.00	3,595.13	
		08/18/93	49.85	0.00	3,594.93	
		01/26/94	50.02 51.35	0.00	3,594.76	
		05/03/95 07/31/95	50.97	0.00	3,593.43 3,593.81	
		11/14/95	50.43	0.00	3,594.35	
		02/23/96	51.12	0.00	3,594.55	
		05/31/96	50.89	0.00	3,593.89	
		08/23/96	50.98	0.00	3,593.80	
		12/02/96	51.58	0.00	3,593.20	
		03/12/97	52.21	0.05	3,592.61	
		06/12/97	52.10	0.00	3,592.68	PSH Sheen
		09/12/97	51.95	0.00	3,592.83	PSH Sheen
	}	12/10/97	52.37	0.00	3,592.41	PSH Sheen
		03/23/98	52.68	0.00	3,592.10	PSH Sheen
		06/23/98	53.08	0.00	3,591.70	PSH Sheen
	1	09/30/98	53.39	0.01	3,591.40	PSH Sheen
		12/09/98	53.68	0.00	3,591.10	
		03/10/99	54.15	0.00	3,590.63	
		06/10/99	54.68	0.00	3,590.10	
		07/02/99	54.71	0.00	3,590.07	
		09/13/99	54.71	0.00	3,590.07	
		12/09/99	-	-	-	(3)
		03/09/00 June 2000	55.69	0.00	3,589.09	
MW-10	3,644.47	08/18/93	51.54	0.00	3,592.93	(1)
	1	01/26/94	51.90	0.00	3,592.57	ζ-/
		05/03/95	52.97	0.00	3,591.50	
				0.00		
		07/31/95	52.87		3,591.60	
		11/14/95	52.51	0.00	3,591.96	
		02/23/96	53.05	0.00	3,591.42	
		05/31/96	52.79	0.00	3,591.68	
		08/23/96	53.03	0.00	3,591.44	
		12/02/96	53.41	0.00	3,591.06	
		03/12/97	54.21	0.00	3,590.26	
		06/12/97	53.99	0.00	3,590.48	
		1				
		09/12/97	53.94	0.00	3,590.53	
		12/10/97	54.12	0.00	3,590.35	
		03/23/98	54.51	0.00	3,589.96	
		06/23/98	55.12	0.00	3,589.35	
	Į.	09/30/98	55.61	0.00	3,588.86	

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-10		12/09/98	55.80	0.00	3,588.67	
		03/09/99	56.09	0.00	3,588.38	
		06/10/99	56.60	0.00	3,587.87	
		07/02/99	56.64	0.00	3,587.83	
		09/14/99	56.91	0.00	3,587.56	
		12/09/99	57.37	0.00	3,587.10	
		03/10/00	57.71	0.00	3,586.76	
		06/08/00	58.08	0.00	3,586.39	
MW-11	3,643.78	08/18/93	51.92	0.00	3,591.86	(1)
	3,0 .5.7 0	01/26/94	52.32	0.00	3,591.46	(-)
		05/03/95	53.38	0.00	3,590.40	
		07/31/95	53.35	0.00	3,590.43	
		11/14/95	52.96	0.00	3,590.82	
		02/23/96	53.50	0.00	3,590.28	
		05/31/96	53.25	0.00	3,590.53	
		08/23/96	53.49	0.00	3,590.29	
		12/02/96	53.79	0.00	3,589.99	
		03/12/97	53.81	0.00	3,589.97	
		06/12/97	53.96	0.00	3,589.82	
		09/12/97	52.93	0.00	3,590.85	
		12/10/97	32.73	0.00	3,390.63	(5) (6)
MW-11A	3,644.24	03/23/98	54.79	0.00	3,589.45	(5),(6)
IVI W-LIA	3,044.24	06/23/98	55.43	0.00	3,588.81	(7)
		09/30/98	55.96	0.00	3,588.28	
		12/09/98	56.13	0.00	3,588.11	
	Į.	03/10/99	56.43	0.00	3,587.81	
		05/10/99	56.94	0.00	i i	
		07/02/99	57.01	0.00	3,587.30	
		09/14/99	57.36	0.00	3,587.23	
		1		0.00	3,586.88	
		12/09/99	57.72 58.01	0.00	3,586.52	
	1	03/09/00		1	3,586.23	
MW 12	2 644 20	06/08/00	58.40	0.00	3,585.84	
MW-12	3,644.29	03/23/98	54.72	0.00	3,589.57	(7)
		06/23/98	55.48	0.00	3,588.81	
		09/30/98	56.02	0.00	3,588.27	
	[	12/09/98	56.17	0.00	3,588.12	
		03/10/99	56.45	0.00	3,587.84	
		06/10/99	56.97	0.00	3,587.32	
		07/02/99	56.99	0.00	3,587.30	
		09/14/99	57.41	0.00	3,586.88	
		12/09/99	57.76	0.00	3,586.53	
		03/10/00	58.08	0.00	3,586.21	
		06/08/00	58.42	0.00	3,585.87	
MW-12D	3,644.38	07/02/99	57.13	0.00	3,587.25	(8)
		09/14/99	57.74	0.00	3,586.64	. ,
		12/09/99	57.86	0.00	3,586.52	
		03/09/00	58.24	0.00	3,586.14	
		06/08/00	58.56	0.00	3,585.82	

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-13	3,645.52	07/02/99	56.60	0.00	3,588.92	(9)
		09/14/99	56.92	0.00	3,588.60	
		12/09/99	57.28	0.00	3,588.24	
		03/10/00	57.68	0.00	3,587.84	
		06/08/00	58.04	0.00	3,587.48	
OW-4	3,644.06	07/02/99	58.18	0.00	3,585.88	(8)
		09/14/99	58.63	0.00	3,585.43	
		12/09/99	58.92	0.00	3,585.14	
		03/09/00	59.19	0.00	3,584.87	
1	1	06/08/00	59.56	0.00	3,584.50	

<sup>&</sup>lt;sup>(1)</sup>- Top of casing elevations and groundwater elevations of all monitor wells were relative to an arbitrary datum of 100.00 feet prior to March 1997 and have been converted to Mean Sea Level (MSL).

<sup>(2) -</sup> For wells having measurable thickness of free product, 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) of the free product is 0.82.

<sup>(3) -</sup> Not measured.

<sup>&</sup>lt;sup>(4)</sup> - Monitor well MW-2 could not be located after January 1994.

<sup>(5) -</sup> Well plugged and abandoned July 2, 1999.

<sup>(6) -</sup> Monitor well MW-11 could not be located after September 12, 1997.

<sup>&</sup>lt;sup>(7)</sup>- TOC elevations for MW-11A and MW-12 estimated relative to TOC elevation for MW-10.

<sup>(8) -</sup> TOC elevations for MW-12D and OW-4 estimated relative to TOC elevation for MW-12.

<sup>&</sup>lt;sup>(7)</sup> - TOC elevation for MW-13 estimated relative to TOC elevation for MW-7.

# Table 3 June 8, 2000 Field Screening Results for Groundwater Samples Hobbs, New Mexico Facility BJ Services Company, U.S.A.

Monitor Well	Cumulative Gallons Removed	рН	Temperature (°C)	Conductivity (umhos)	Redox (mV)	Dissolved Oxygen (meter) (mg/L)	Dissolved Oxygen (Hach kit) (mg/L)	Ferrous Iron (mg/L)	Alkalinity (mg/L)	Turbidity NTUs <sup>(1)</sup>
MW-3 <sup>(2)</sup>	0.5	7.38	20.94	1373	202.3	5.16	NM	NM	NM	28.3
) (2) (2)	0	7.44	19.69	1497	-47.2	4.86	NM	NM	NM	NM
MW-4 <sup>(2)</sup>	1.0	7.44	18.86	1433	-14.1	4.80	NM	NM	NM	24.3
(2)	1.0	7.38	19.54	1426	161.4	7.09	NM	NM	NM	NM
MW-5 <sup>(2)</sup>	1.5	7.37	18.95	1398	176.1	7.08	5	0	220	29.30
N (12)	1.0	7.12	19.32	1618	209.4	5.25	NM	NM	NM	NM
MW-7 <sup>(2)</sup>	1.5	7.13	19.03	1637	211.4	5.57	NM	NM	NM	37.41
MW-10 <sup>(1)</sup>	NM	7.06	23.12	1723	-79.2	1.82	0	3.0	770	675
A G V . A A (2)	0	7.10	20.17	3996	-100.6	4.53	NM	NM	NM	NM
MW-11A <sup>(2)</sup>	1.0	7.07	19.45	4264	-99.1	2.56	0	2.0	770	137.31
MW-12 <sup>(3)</sup>	NM	7.15	20.85	1261	-108.8	1.13	0	8	770	347
	0	7.97	20.12	1278	184.9	5.70	NM	NM	NM	NM
MW-12D	5.0	7.95	19.05	1276	198.8	4.19	NM	NM	NM	NM
10100-120	10.0	7.91	19.11	1278	197.1	2.04	NM	NM	NM	NM
	15.0	7.90	20.09	1281	196.6	1.11	0	0.5	360	12.72
MW-13 <sup>(2)</sup>	NM	7.46	24.11	902	-63.6	2.81	NM	NM	NM	112
OW-4 <sup>(2)</sup>	NM	NM	NM	NM	NM	NM	5.5	3.0	770	NM

<sup>(1)</sup> NTUs = Nephelometric turbidity units

Monitor wells MW-1, MW-8, annd MW-9 not sampled in June 2000.

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

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

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

NM=Not Measured

<sup>(2)</sup> Well pumped or pumped dry after removal of less than 3 well volumes.

Table 4

Cumulative BTEX and TPH Analytical Results for Groundwater Samples

Hobbs, New Mexico Facility

BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgran	ns per liter, ug/l		milligrams pe	er 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
	09/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/09/99	-	NS	NS	NS	NS	NS	NS
	03/09/00	Regular	< 1	< 1	< 1	9.1	14	1.3
	06/08/00	-	NS	NS	NS	NS	NS	NS
MW-2 <sup>1</sup>	8/10/92	Regular	14.9	< 4	< 4	< 4	NA NA	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
	0/10/02	n 1	101.0	2000	(7/0	1506		
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 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

Table 4

Cumulative BTEX and TPH Analytical Results for Groundwater Samples

Hobbs, New Mexico Facility

BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgran	ns per liter, ug/l		milligrams pe	er liter, mg/L
MW-3	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
,	09/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/09/99	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	03/09/00	Regular	< 1	< 1	< 1	< 1	0.32	< 0.1
	6/8/00	Regular	< 1	< i	< 1	< 1	<0.22	< 0.1
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
	09/14/99	Regular	< 1.0	< 1.0	3.3	13.1	0.35	0.17
	12/09/99	Regular	< 1	2.5	2.3	20.1	2	0.53
	03/10/00	Regular	< 1	< 1	< 1	3.6	2.6	0.15
	6/8/00	Regular	< 1	< 1	< 1	< 1	0.44	0.23
MW-5	8/10/92	Regular	< 4	< 4	< 4	< 4	NA	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
		_	<1	<1	< 1	l .	< 0.1	L .
	9/12/97	Regular	1	1		< 1	l .	< 0.1
	12/10/97	Regular	< 5	< 5	< 5	< 5	< 0.2	< 0.1
	3/23/98 6/23/98	Regular Regular	< 1	< 1	< 1	< 1	< 0.2 < 0.2	< 0.1 < 0.1

Table 4

Cumulative BTEX and TPH Analytical Results for Groundwater Samples

Hobbs, New Mexico Facility

BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	ТРН-D	TPH-G
Well	Date	Туре		microgram	ns per liter, ug/l		milligrams pe	r liter, mg/L
MW-5	09/30/98	Regular	0.1 >	< 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
	09/14/99	Regular	<1.0	<1.0	<1.0	<2.0	<0.20	< 0.10
	12/09/99	Regular	< 1	<1	< 1	<1	< 0.2	< 0.1
	03/09/00	Regular	< 1	< 1	< 1	<1	0.55	< 0.1
	6/8/00	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	0,3,50	Regular	•					
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
	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
	03/10/79	Regulat	2500	)	)	1400	11.0	'
MW-7	8/10/92	Regular	NS	NS	NS	NS	NA	NS
14141-7	2/9/93	Regular	< 2	< 2	< 2	< 6	NA NA	NA NA
	8/19/93	Regular	< 2	3	< 2	< 2	NA NA	NA NA
	1/27/94	Regular	1.1	<1	<1	< 1	NA NA	NA NA
	5/3/95	Regular	52	3.4	0.67	2.8	NA NA	NA NA
	8/1/95	1 -	22	2.2	0.85	2.8	NA NA	< 0.1
		Regular	8.4	1	< 0.3	1		1
	11/15/95 2/23/96	Regular	< 0.3	0.77	< 0.3	0.93	NA NA	< 0.1
		Regular		ţ			NA NA	< 0.1
	2/23/96	Duplicate	< 0.3	< 0.3	< 0.3	< 0.6	NA NA	< 0.1
	5/31/96	Regular	29	83	10	21	NA 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	< t	< 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	<10	<1.0	4.7	< 0.1

Table 4

Cumulative BTEX and TPH Analytical Results for Groundwater Samples

Hobbs, New Mexico Facility

BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Type		microgran	ns per liter, ug/l		milligrams pe	er liter, mg/L
MW-7	06/10/99	Regular	<1.0	<1.0	<1.0	<1.0	< 0.20	< 0.1
	09/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/09/99	Regular	< 5	< 5	< 5	< 5	1.8	< 0.5
	03/09/00	Regular	< 1	< 1	< 1	< 1	0.66	< 0.1
	6/8/00	Regular	< 1	< 1	< 1	< }	< 0.21	< 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	</td <td>&lt; 1</td> <td>&lt; 1</td> <td>NA</td> <td>NA</td>	< 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
	09/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	<0.10
	12/09/99	-	NS	NS	NS	NS	NS	NS
	03/09/00	Regular	< 1	< 1	< 1	< 1	0.55	<0.1
	06/08/00	-	NS	NS	NS	NS	NS	NS
MW-9	4/22/93	Dlun	570	380	< 50	870		
MW-9	7/15/93	Regular Regular	121	7.3	3	1	NA NA	NA
		1 –		1	40	458	NA NA	NA
	8/19/93 1/27/94	Regular	390 327	290 357	51.1	250	NA NA	NA NA
	5/3/95	Regular	327	110	19	293	NA NA	NA NA
	8/1/95	Regular	660	410	91	120	NA NA	NA (2
	11/15/95	Regular		1	1	310	NA NA	6.2
		Regular	240	24	11	140	NA NA	1.5
	11/15/95	Duplicate	170	18	10	120	NA 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

Table 4

Cumulative BTEX and TPH Analytical Results for Groundwater Samples

Hobbs, New Mexico Facility

BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	трн-б	TPH-G
Well	Date	Туре		microgran	ns per liter, ug/l		milligrams p	er liter, mg/L
MW-9	3/24/98	Regular	< 1	< 1	< 1	26	0.9	ı
	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
	09/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	< 0.10
	12/09/99	-	NS	NS	NS	NS	NS	NS
	03/09/00	Regular	< 1	< 1	< 1	64	0.66	1.3
	06/08/00	-	NS	NS	NS	NS	NS	NS
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
l	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
	09/14/99	Regular	10	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/09/99	Regular	23	< 1	< 1	1.2	0.44	0.16
	03/10/00	Regular	300	4.3	6.6	43.2	1.2	0.85
	6/8/00	Regular	78	1.7	7.2	9	0.67	0.74
MW-II	8/19/93	Regular	< 2	< 2	< 2	< 2	NA NA	NA
	1/27/94	Regular	< 1	< 1	< 1	< 1	NA	NA
	5/4/95	Regular	< 0.3	< 0.3	< ().3	< 0.6	NA	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 NA	0.4
	2/23/96	Regular	49	1.2	0.51	4	NA NA	0.25
	5/31/96	Regular	300	83	12	28	NA NA	0.23
	8/23/96	Regular	100	1.2	0.3	4.7	NA NA	0.26
	1		970	< 5	6	8.1	2	1.3
	12/2/96	Regular	1			1	1	1
	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

Table 4
Cumulative BTEX and TPH Analytical Results for Groundwater Samples
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgran	ns per liter, ug/l		milligrams pe	r liter, mg/L
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
<b>i</b>	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
	09/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/09/99	Regular	< 5	< 5	< 5	< 5	< 0.2	< 0.1
	03/09/00	Regular	1.2	< 1	< 1	< 1	0.43	< 0.1
	6/8/00	Regular	3.6	< 1	< 1	<1	0.37	< 0.1
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
Ì	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
1	03/10/99	Regular	061	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
	09/14/99	Regular	75	< 1.0	< 1.0	< 2.0	<0.20	0.23
	12/09/99	Regular	64	< 1	< 1	< 1	< 0.2	0.21
l	03/10/00	Regular	93	< 1	< 1	< 1	< 0.2	0.21
1	03/10/00	Duplicate	99	< 1	< 1	< 1	0.22	0.22
Ì	6/8/00	Regular	62	< 1	< 1	< 1	< 0.2	< 0.1
MW-12D	07/02/99	Regular	< 5	< 5	< 5	< 5	<0.20	<0.10
	09/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/09/99	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	03/09/00	Regular	< 1	< 1	< 1	< 1	0.24	< 0.1
	6/8/00	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
MW-13	07/02/99	Regular	1500	23.0	750	58	2.2	5.1
1	09/14/99	Regular	860	16	450	34.4	2.1	3.1
}	12/09/99	Regular	430	16	410	40.9	0.46	3.2
İ	03/10/00	Regular	88	2.8	200	1.3	1.9	0.99
	6/8/00	Regular	6	< 1	63	3.3	1.1	0.91
OW-4	06/10/99	Regular	<1.0	<1.0	<1.0	4.4	<0.2	< 0.10
	09/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
1	12/09/99	Regular	< 1	< 1	< 1	< 1	<0.2	<0.1
	03/09/00	Regular	< 1	< 1	< 1	< 1	0.25	< 0.1
1	06/08/00	Regular	< 1	< 3	< 1	< 1	< 0.21	<0.1

<sup>1</sup> Well plugged and abandoned 7/1/99

NA=Not Analyzed

NS=Not Sampled

NSP=Not Sampled due to Phase Separated Hydrocarbons

Table 5
Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for Monitor Wells MW-5, MW-10, MW-11A, MW-12, MW-12D, and OW-4
BJ Services Company, U.S.A.

			B. 1		
14	nh	he	New	Me	VICO

Well	Date	Nitrate <sup>1</sup> (mg/L)	Sulfate <sup>1</sup> (mg/L)	Methane (mg/L)
	3/23/98	3.87	190	< 0.0012
	3/9/99	< 0.1	195	< 0.0012
	6/10/99	4.73	209	< 0.0012
MW-5	9/14/99	4.3	210	< 0.0012
	12/9/99	4.2	210	< 0.0012
	3/9/00	5.3	260	< 0.0012
	6/8/00	4.7	240	< 0.0012
	3/23/98	0.07	320	0.91
Ţ	6/23/98	<0.1	325	0.55
	9/30/98	<0.1	204	0.81
	12/10/98	<0.1	180	0.091
	2 10 100	-0.1	142	0.025
MW-10	3/9/99	<0.1	2233	0.035
ļ.	9/14/99	< 0.10	160	0.0049
	12/9/99	0.49	170	0.0039
<u> </u>	3/10/00	0.1	160	0.0056
T T	6/8/00	<0.1	150	0.031
	3/23/98	< 0.05	190	0.14
	6/23/98	< 0.1	225	0.11
ŀ	9/30/98	0.4	196	0.043
	12/10/98	0.7	188	0.033
		<0.1	164	
3/10/00		0.094		
3/10/00		0.0036		
ŀ				< 0.0012
H				0.0079
+	3/9/00	0.11	270	0.037
Ì	6/8/00	<0.1	240	0.0069
	3/23/98	< 0.05	240	< 0.0012
1	6/23/98	<0.1	240	< 0.0012
ŀ	9/30/98	<0.1	168	< 0.0012
ł	12/10/98	<0.1	202	< 0.0012
		<0.1	137	
MW-12	3/10/99	<0.12	1933	< 0.0012
ŀ	6/10/99	<0.1	217	< 0.0012
	9/14/99	<0.10	230	< 0.0012
	12/9/99	<0.1	180	<0.0012
	3/10/00	<0.1	210	<0.0012
ł	6/8/00	<0.1	220	<0.0012
	7/2/99	2.1	249	0.0012
	9/14/99	<0.10	200	0.0065
MW-12D	12/9/99	<0.10	210	0.0063
1/1 17 121	3/9/00	0.14	200	<0.0013
	6/8/00	<0.14	240	<0.0012
		1 .		
	6/10/99	3.96	192	<0.0012
OW 4	9/14/99	3.5	200	< 0.0012
OW-4	12/9/99	3.4	200	<0.0012
	3/9/00	3.6	200	<0.0012
	6/8/00	3.4	190	< 0.0012

<sup>1=</sup>By EPA Method 300, except as noted

<sup>2=</sup>By EPA Method 353.3

<sup>3=</sup>By EPA Method 375.4

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

and the second second							Discharge	Benzene	Total BTEX	TPH-VOC
Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH	Rate,	Emission	Emission	Emission
Number	Date		parts per	parts per million by volume,	e, ppmv		scfm	Rate, lb/hr	Rate, lb/hr	Rate, lb/hr
Extraction-1	9/19/95	790	1100	340	920	0026	132.47	1.235	5.943	16.31
Effluent-1	9/20/95	066	2500	999	1600	16000	135.76	1.575	10.939	27.37
Effluent-2	9/28/95	13	28	9	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	9	44	12	40	066	124.68	0.009	0.189	1.56
Effluent 042496-01	4/25/96	4	37	10	36	006	118.34	0.005	0.147	1.29
Effluent 053196-01	5/31/96	3.7	40	01	33	029	124.11	0.005	0.158	1.04
Effluent 082396-01	8/23/96	\$	12	\$	\$	200	126.18	0.007	0.047	0.31
Effluent 120296-01	12/2/96	∵ ∨	$\overline{\lor}$	~	√	ζ.	129.04	0.002	800.0	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	7	6.3	2.4	9.8	92	109.90	0.001	0.028	80.0
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 A	1500	108.97	NA V	NA	1.91
Monitor 980622 (1)	6/22/98	NA	NA	NA	NA	190	108.16	NA	NA	0.24
Monitor 980930 (1)	86/30/6	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 A	NA	0.11
Monitor 990610 (1)	66/01/9	NA	NA	NA	NA	140	73.68	NA	NA	0.12
Monitor 990914 (1)	9/14/99	NA	NA	NA	NA	12.5	116.24	NA	NA	0.02
Monitor 991209 (1)	12/9/99	NA	NA	NA	NA	5.9	42.14	NA	NA	0.003
Monitor 000310 (1)	3/10/00	NA	NA	NA	NA	65	150	NA	NA	0.092
Monitor 000608 (1)	00/8/9	NA	NA	NA	NA	62	170	NA	NA	0.091
	0.000						70 001 100 0	LLY 40 01 11 A	1 Trill 00 01 11 1/2	

Emission rates reported for 12/02/96 sampling event were calculated using detection limits; 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**

 $\verb|\BCHOU02|| PROJECTS | Wp | BJSERV | 12832 | 062r.doc||$ 

"Use or disclosure of data contained on this sheet is subject to the restriction specified at the beginning of this document."

#### APPENDIX A

**Field Data Sheets** 

## **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: Mw3

1. PROJ	ECT INFOI	NATI	ON						
Project Number: 12872 Task Number: 015 Date: (3-8-0-)  Client: BJ 5VC5 Personnel: DENN, TEXCUP									
ľ	BJSU	1.3				Personnel:_	DEAN	TEXCUP	
Project l	.ocation:l-	1266		<del></del>	<del></del>	Weather:_	SUNNY	1101/h	idy
2. WELL	DATA								
Casing [	Diameter:	)inc	ches	Type: 📢 pv	/C □ Stainle	ess 🗆 Galv. S	Steel 🗖 Teflor	® 🛘 Other:	
Screen (	Diameter:	inc	ches	Туре: фру	C 🗆 Stainle	ess 🗆 Galv. S	Steel 🗆 Teflor	® 🗖 Other:	
Total De	pth of Well:	(2fe	eet	From: 👌 To	op of Well Ca	sing (TOC)	☐ Top of Prot	ective Casing	Other:
Depth to Static Water: 56.66 feet From: Top of Well Casing (TOC) Top of Protective Casing Other:								Other:	
Depth to	Product:	fee			op of Well Ca		☐ Top of Prof	tective Casing	Other:
Length (	of Water Colu	mn: <u>5 °)</u>	feet feet	Well Volum	e: <u>0 · G</u>			nterval (from G vell = 0.167 gal/fi	,
3. PURG	E DATA		) <b>)</b>						
Purge M	A∙Bailei lethod: □ Cent	r, Size: [-\$ rifuaal Pun	□ Bladde	er Pump 🚨 2	2" Submersible D Inertial Lift F	Pump 🗆 4	l" Submersible ' er:	Pump	For dealers AAA de I/o
<b></b>	Purge Method: Centrifugal Pump								
	ividiferials: Pump/Baller Dedicated Prepared Off-Site Defield Cleaned Disposable 1.								
Materials: Rope/Tubing Polyethylene Polypropylene Teflon® Other:  Dedicated Prepared Off-Site Field Cleaned Disposable 2									
Was we	ll purged dry?	□ Yes	□ No	Pumpi	ng Rate:	go	al/min	3	
Time	Cum. Gallons Removed	рН	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
11 40	0 (5	7,38	20,94	0.00	2023	516	28,3		
					ì				
4. SAM	PLING DA	TA "			<del></del>	=		Geo	chemical Analyses
Method						ımp □4"Sı	ubmersible Pur	np Ferro	ous Iron: mg/L
	u Peristani	C) Stain	V.	Pump 🗆 Oth	ner: Other: _				
Materic	ils: Pump/Baile	🗓 Dedi	cated 🗆 Pr	epared Off-S	ite 🗅 Field (	Cleaned 🏚	Disposable	DO:	mg/L
Materic	ıls: Tubing/Rop				ne 🗖 Teflor Site 🖺 Field		□ Disposable	— Nitra	ite: mg/L
Depth t	Depth to Water at Time of Sampling: Field Filtered? □ Yes □ No Sulfate: mg/L								
Sample	ID:MW-J	) 	Sample 1	lime: <u>//:3</u>	5	# of Conto	ainers: 5	– Alka	linity:mg/L
Duplico	ite Sample Co	ilected?	☐ Yes ☐	No ID:		-			,
5. COM	IMENTS	ナル	v FC?	Corner	, ,+,-	- C - Y	Su ce la-c	11/11/11/11	M <sup>2</sup> 1
Pares	d. 50 mg	<u>د ب</u>	16 00	1-6:00	100/C	1 1	<u> </u>	201700	7
1 4,7,	V- JAV - P	· My		030	- <u></u>	4011104			
Note: Includ	le comments su	ch as well	condition, d	odor, presenc	e of NAPL, o	r other items	not on the field	d data sheet.	

## **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-4

1 PRO I	ECT INFO	DMATI	)N							
	Number: 128			کا <del>ر</del> سط		Date: 5	-(-0)		Time: 12:25	
	BT SVCS		TOSK NUTTI	ber:_ <del>-</del>	<del></del>		•		iiiie. <u>100,</u>	
Project I	Personnel: Der TEACUE  Personnel: Der TEACUE  Weather: Sunny, hot									
			(- ( , ,		- <del></del>	wediner.	7,12			
2. WELL	DATA			·						
	Casing Diameter: 7 inches Type: PVC 🗆 Stainless 🗆 Galv. Steel 🗀 Teflon® 🗅 Other:									
Screen Diameter: 2 inches Type: Type: Stainless Galv. Steel Teflon® Q Other:										
Total Depth of Well: (61.50 feet From: Top of Well Casing (TOC) Top of Protective Casing Other:										
Depth to Static Water: 56 67 feet From: A Top of Well Casing (TOC) Top of Protective Casing Other:										
	o Product:						☐ Top of Prote	ective Casing	Other:	
Length :	of Water Colu	ımn: <u>4 · 8</u>	s feet	Well Volum	ie: 0 %			•	SS):	
						<del></del>	Note: 2-inch w	ell = 0.167 gal/fi	t 4-inch well = 0.667 gal/ft	
3. PURG	E DATA		η 1	-	NI C	a Diverse - Fo 11	N Outland of the Co			
Purge M	1ethod: Cen	er, Size: <u>1                                    </u>	np 🗆 Rerist	er Pump 🚨 2 raltic Pump (	2" Submersibli D Inertial Lift I	e Pump 🚨 4 Pump 🖵 Othe	" Submersible F er:	 	Equipment Model(s)	
	ıls: Pump/Baile	Stainle	ess 🖳 🗗 ∨C	☐ Teflon®	🕽 🗖 Other:_				2-600	
Mataria	ls: Rope/Tubir	Polye	thylene 🗅	Polypropyle	ne 🛭 Teflor	n® □ Other:_		1. <u>/ 4*</u>		
		□ Deak		repared Off-	Site 🗆 Field	Cleaned E	1 Disposable	2		
Was we	ell purged dry	? 🗀 Yes	À No	Pumpi	ng Rate:	gc	nim/Ir	3		
Time	Cum. Gallon Removed	s рН	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments	
A130		7.44	15.69	1457	-472	4.86	_		47-	
12:35	1.0	744	18 35	14/33	-/4.1	4.80	-	_	11-	
							24.3			
							1,7,1,2			
									· · · · · · · · · · · · · · · · · · ·	
4. SAMI	PLING DA	., AΤ						Geo	chemical Analyses	
Method	d(s): Bailer, S			rump 💷 2" Si Pump 🖵 Ott		ump 🗖 4" Su	ibmersible Purr	np Ferro	ous Iron: mg/L	
Materia	als: Pump/Baile	Stain	ess PVC	C 🖸 Teflor	® 🛘 Other:		<del>/</del>	DO:	mg/L	
i		U Dedi			Site D Field	Cleaned 🛕 n® 🗆 Other:_	Disposable			
Materio	als: Tubing/Ro					d Cleaned (		– Nitro	ate:mg/L	
	to Water at Ti					ed? 🗅 Yes	~~	Sulfo	ate:mg/L	
1	D: MW-				10	# of Conto	ainers: 3	- Alka	alinity:mg/L	
Duplico	ate Sample C	ollected?	O Yes O	No ID:						
5. CON	1MENTS	The	V FE'	-nont	LINT F	For	1.100.100	C-18/-	O C War D	
1 × 50	-010 h	e() 1	ارکر کرکر	15000	114/		-V-31 3	<u>~ , , , , , , , , , , , , , , , , , , ,</u>	r proportions	
	J. SA-plowell wildisposable baller									
Note: Includ	de comments su	ıch as well	condition, d	odor, preseni	ce of NAPL o	or other items	not on the field	d data sheet.		

## **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW 5

(											
1. PROJECT INFORMATION											
	Project Number: 11871 Task Number: 318  Client: 055005  Personnel: DEAN, TOAGUE										
Client:_	Project Location: Holds Weather: Sunny, windy, Hot										
Project Location: May 5 Weather: 5 JANY, 53 Fray, 54 51											
2. WELL DATA											
Casing	Casing Diameter:inches Type: to PVC - Stainless - Galv. Steel - Teflon® - Other:										
Screen Diameter: 1 inches Type: MPVC Stainless Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. Steel Galv. S											
Total Depth of Well: (4.7 feet From: # Top of Well Casing (TOC) Top of Protective Casing Other:											
Depth to Static Water: 5 32 feet From: (a) Top of Well Casing (TOC) Top of Protective Casing Other:											
Depth t	o Product:	fee	et	From: 🗖 T	op of Well C	asing (TOC)	☐ Top of Pro	tective Casing	Other:		
Length	of Water Colu	mn: <u>6 'J</u>		Well Volum	ne:_ <i> </i> -2	_		nterval (from G well = 0.167 gal/ff	,		
3. PURG	E DATA		<i></i>								
Purge N	Method: □ Cent	tifugal Pun	np 🗆 Peris	taltic Pump (	🗅 inertial Lift		" Submersible er:	Pump	Equipment Model(s)		
Materia	ıls: Pump/Baile	Stainle	ess 💆 PVC	Teflon	B Other:_ ite D Field	Cleaned 'M	 Disposable	1 VC	* *		
Materia	Materials: Pump/Bailer										
Was we	ell purged dry?	' 🗆 Yes	À No	Pumpi	ng Rate:	gc	ıl/min	3.			
Time	Cum. Gallons	Hq	Temp	Spec.	Eh	Dissolved	Turbidity	Other:	Comments		
	Removed		L	Cond.	161-4	Oxygen	Taibiairy				
9:15	1.0	7.38		1426	·	7-25			clan		
5.77	1.5	7.37	18.55	1353	176.1	7.38	74.30		- Cl		
4. SAMI	PLING DA	IA ارخ	D. Dianalala a P		de an escribede. D	. D. All Co.	la an a salla La Divi	;	chemical Analyses		
			Inertial Lift	Pump 🗖 Ott	ner:	rump 🗖 4" Su	omersible Pur	mp Ferro	us Iron: mg/L		
Materio	als: Pump/Baile	er 🗅 Stainl 🗅 Dedic	ess മ്P∨( cated □ Pr	□ Teflon epared Off-S	® □ Other:; Site □ Field	Cleaned (1)	Disposable	DO:	<b>5</b> mg/L		
Materia	als: Tubing/Rop	pe 🗖 Polye Dedic	thylene 🖫 cated 🖼 F	Prepared Off	ene 🗖 Teflo -Site 📮 Field	n® □ Other:_ d Cleaned □	☐ Disposable	— Nitra	te:mg/L		
	to Water at Tin							, Sulfa	te: mg/L		
	10:MW-5						a	<b>S</b>	7 -		
	Sample ID: 1/11 W 5 Sample Time: 5:30 # of Containers: 6 Alkalinity: 223 mg/L  Duplicate Sample Collected? 2 Yes 2 No ID:										
5. CON	1MENTS	として	ensi	el was	「(ン +3	DURE	6 0 th	DU-10.	hand progred		
with	beilan				, , ,	y - 3 -	~ ( in	7-15	1-11-11 - 1-1-5-100		
	76.1.17										
Note: Includ	de comments su	ch as well	condition, d	odor, presenc	ce of NAPL o	or other items i	not on the fiel	ld data sheet.			

# 

## **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-7

		ECT INFO			1.6		( . (	٠_ من	······································	
WELL DATA   Casing Diameter:   Inches   Type: gravc   Istanless   Galv. Steel   Inches   Other:   Screen Diameter:   Inches   Type: gravc   Istanless   Galv. Steel   Inches   Other:   Inches   Type: gravc   Inches   Inc				Task Numl	oer: <u>0 </u> 5		Date: 6 '6	<u> </u>		Time: <u>9.40</u>
WELL DATA   Casing Diameter:									CAGO	
Casing Diameter: 2 inches Type: grpvc	Project L	ocation: <u>/</u> ~	12055				Weather:			
Screen Diameter:	2. WELL	DATA								
Total Depth of Well: (2.2.)   feet   From:   Top of Well Casing (TOC)     Top of Protective Casing     Other:				hes	Type: 17 PV	'C 🗆 Stainle	ess 🗖 Galv. St	teel 🗆 Teflon	® Other:	·
Depth to Static Water: \$7:\text{ID}   feet   From:   Top of Well Casing (TOC)     Top of Profective Casing   Other:     Depth to Product:   feet   From:   Top of Well Casing (TOC)     Top of Profective Casing   Other:     Depth to Mater Column:   \$7:\text{3}   feet   Well Volume:   \$7:\text{2}   gal   Screened Interval (from 6S):   Note: 2-inch well = 0.167 gal/ff   4-inch well = 0.667 ga					Type: gipv	C 🗆 Stainle	ess 🗆 Galv. S	teel 🗆 Teflon	® 🛘 Other:	
Depth to Product:										
Length of Water Column: 5.23 feet Well Volume: 9.2 gal Screened Interval (from GS): Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft 4-inch well = 0.inch gal/ft 4-inch well = 0.inch gal/ft 4-inch well = 0.inch gal/ft 4-inch well = 0.inch gal/ft 4-inch well = 0.inch gal/ft 4-inch	Depth to Static Water: 57-17 feet From: Top of Well Casing (TOC) Top of Protective Casing Other:									
Note: 2-Inch well = 0.167 gal/ft						<u> </u>		☐ Top of Prot	ective Casing	Other:
Purge Method: @ Centrifugal Pump @ Peristatific Pump @ Inertial Lift Pump @ Other:	Length (	, <u> </u>								
Materials: Pump/Bailler         □ Stainless			ا ا							-
Materials: Pump/Baller         □ Dedicated         □ Prepared Off-Sife         □ Field Cleaned         ☑ Disposable         1.	Purge M	ethod: 🗖 Baile	r, Size: 1 · s rifugal Pum	Bladde Perist	er Pump 🚨 2 raffic Pump (	?" Submersible I Inertial Lift F	Pump 🚨 4" Pump 🚨 Othe	' Submersible F er:	Pump ———	Equipment Model(s)
Was well purged dry?	Materia	D Stoinless DIPVC D Taffon® D Other								
Time   Cum. Gallons   PH   Temp   Spec.   Eh   Dissolved   Turbidity   Other:   Comments    G:45   1.0   7.1   15.3   16.8   205.4   5.25            S:50   1.5   7.13   15.3   16.3   21.4   5.5            Method(s):   Method(s):   Peristaltic Pump   Inertial Lift Pump   Other:            Materials: Pump/Bailer   Stainless   PVC   Teflon®   Other:	Materials Report Liking Polyethylene Polypropylene Teflon® Other:									
Removed PH Temp Cond. En Oxygen Turbidity Comments  C:45 1.0 7.13 14.33 16.33 16.37 2.11.41 5.57 - C.1	Was we	Was well purged dry?   Yes   No Pumping Rate: gal/min 3.								
A. SAMPLING DATA  Method(s): ABailer, Size: Size: Bladder Pump  2" Submersible Pump  4" Submersible Pump  Ferrous Iron: mg/L  Materials: Pump/Bailler  Stainless  PVC  Teflon®  Other:	Time		рН	Temp	•	Eh		Turbidity	Other:	Comments
A. SAMPLING DATA  Method(s): Baller, Size: 1 Bladder Pump   2" Submersible Pump   4" Submersible Pump   Peristaltic Pump   Inertial Lift Pump   Other:   mg/L    Materials: Pump/Bailer   Stainless   PVC   Teflon®   Other:   Dedicated   Prepared Off-Site   Field Cleaned   Disposable   Disposable   Nitrate:   mg/L    Materials: Tubing/Rope   Polyethylene   Polypropylene   Teflon®   Other:   mg/L    Depth to Water at Time of Sampling:   Field Filtered?   Yes   No   Sulfate:   mg/L	9:45	1.0	7-12	19-32	1618	209-4	5.29	_	_	clan
A. SAMPLING DATA  Method(s): Bladder Pump	5:5>	1.5	7.13	14.53	1637	211.4	557	_		cl-
Method(s): Bladder Pump								3741		
Method(s): Bladder Pump										
Method(s): Bladder Pump										
Materials: Pump/Bailler										chemical Analyses
Materials: Turbing/Rope	Method	l(s): Bailer, Si Peristalti	ze: 🖽 🗀 C c Pump 🗖	3 Bladder P Inertial Lift	ump 🛭 2" Si Pump 🗓 Ott	ubmersible Pu ner:	ump 🗖 4" Su'	bmersible Purr	np Ferro	ous Iron: mg/L
Depth to Water at Time of Sampling: Field Filtered? Yes No Sulfate: mg/L	Materic	ls: Pump/Baile						Disposable	DO:	mg/L
Depth to Water at Time of Sampling: Field Filtered?   Yes  No  Sulfate: mg/L	Materio	ıls: Tubing/Rop	e 🗆 Polye	thylene C	Polypropyle	ene 🗆 Teflor -Site 🗅 Field	n® 🗓 Other:_ I Cleaned 🗓	☐ Disposable	– Nitro	ate: mg/L
									Sulfo	ate:mg/L
Sample III. 4 of Containers: Alkalinity:mg/L			} 							
Duplicate Sample Collected?  Yes 🕉 No ID:	Duplico	ite Sample Co	ollected?	☐ Yes 🛱	No ID:		-		AIKO	minyHig/L
5. COMMENTS INSUFFICIENT WASTER FOR pursuing who pro	5. CON	1MENTS	<b>ず</b> ら Si	行わと	いって	LAS PU	F0 ~ 10	ع سرا جور برد	inter-	~ yo .
Ruse it sample well wife cor	Russo	of Sam	217 W	ell .	Nic	14	F	<del> </del>	· ·	
	Note: Includ	le comments su	ch as well	condition. d	odor, present	ce of NAPL, o	r other items i	not on the field	d data sheet.	
	Note: Includ	le comments su	ch as well	condition, d	odor, present	ce of NAPL, o	r other items i	not on the field	d data sheet.	

## **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-10

1. PROJECT INFORMATION  Project Number: 12832 Task Nur	- 215		D-4 (-	٠٤-٥٥		Time: 1245			
- BY SUCE	nber:	_	Personnel:	DEAN.	TEX6-UE	Time: 12-1-			
Project Location: Hables Weather: 50 nn 7, hot									
2. WELL DATA									
Casing Diameter: 1 inches	Type: Dypy	/C 🗆 Stainle	ess 🗆 Galv. S	teel 🖸 Teflor	√® □ Other:				
Screen Diameter: Inches					n® □ Other:				
Total Depth of Well: 62:70 feet From: 2 Top of Well Casing (TOC) Top of Protective Casing Other:									
Depth to Static Water 55.08 feet From: \$\times \text{Top of Well Casing (TOC)} Top of Protective Casing \text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\exitt{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\exitt{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\exititt{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$									
Depth to Product:feet	From: 🗖 To	op of Well Co	ising (TOC)	☐ Top of Pro	tective Casing	Other:			
Length of Water Column: <u> </u>	Well Volum	ne: 0.8/			nterval (from G vell = 0.167 gal/fi	SS): t			
3. PURGE DATA		-							
Purge Method: © Centrifugal Pump © Per	der Pump 🚨 2 istaltic Pump (	2" Submersible Inertial Lift F	Pump 🗆 4"	' Submersible er: _	Pump	Equipment Model(a)			
Materials: Pump/Bailer									
Materials: Rope/Tubing Polyethylene Polypropylene Teflon® Other:  Materials: Rope/Tubing Polyethylene Polypropylene Teflon® Disposable 2									
Was well purged dry?   Yes   No Pumping Rate: gal/min 3									
Time Cum. Gallons pH Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments			
- 7.06 23.A	1723	-752	1.52	,	4.	Cl-			
				675					
<u> </u>									
4. SAMPLING DATA					;	chemical Analyses			
Method(s): Defisitation Pump Inertial Li	Pump 🚨 2" Si	ubmersible Pu ner:	ımp 🗖 4" Sul	bmersible Pur	mp Ferro	ous Iron: 3, 3 mg/L			
Materials: Pump/Railor - Stainless -	/C 🗅 Teflon	® □ Other:_			DO:	<u> フmg/L</u>			
☐ Dedicated ☐  Metarials: Tubing (Dens ☐ Polyethylene	☐ Polypropyle	ene 🗆 Teflor	√n □ Other:_		— Nitro				
Dedicated C				•		,			
Depth to Water at Time of Sampling:_ Sample ID:_MbJ - 13 Sample	Time: 13 !		ed? U Yes # of Conta		Sulfo				
Duplicate Sample Collected? Q Yes			# OI CONTO	un ters:()	- Alka	linity: 715 mg/L			
			_						
5. COMMENTS INSUFFICE	tient w	XTCT +	For 1201	151-5	information of	PIPURCKSAMIP			
worth uddisp-sally bailer									
Note: Include comments such as well condition	odor, present	ce of NAPL o	r other items r	not on the fie	ld data sheet.				

FORM GW-1 (Rev 6/8/99 - wah)

## **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-11A

Project N	ECT INFOR Number: 12 & BJ3 Vo Location: 4	3L cs		ber: <u></u> 215		Date:	6-00 OEAW, Sunny, L	てごえらい	Time: / ] ? 30
2. WELL									
Screen I Total De Depth to	Casing Diameter:inches								
3. PURGE DATA  Purge Method: Centrifugal Pump Peristaltic Pump Inertial Lift Pump Other:  Materials: Pump/Bailler Dedicated Prepared Off-Site Field Cleaned Disposable  Materials: Rope/Tubing Polyethylene Polypropylene Teflon® Other:  Was well purged dry? Yes No Pumplng Rate:  gal/min 3.									
Time	Cum. Gallons Removed	рН	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
12:05	_	7-/2	7517	3516	-173.6	4.53		_	clan
12:13	1.0	7.57	14.45	4269	-99-1	7.26	137.31		(1-1-
4. SAMPLING DATA  Method(s): Bailer, Size: Size: Bladder Pump 2" Submersible Pump 4" Submersible Pump Ferrous Iron: 3 mg/L  Materials: Pump/Bailer Stainless Proc Teflon® Other: Dedicated Prepared Off-Site Field Cleaned Disposable  Materials: Tubing/Rope Polyethylene Polypropylene Teflon® Other: Nitrate: mg/L  Depth to Water at Time of Sampling: Field Filtered? Yes No Sulfate: mg/L  Sample ID: MW 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 1 Sample Time: 2 Sample Time: 1 Sample Time: 2 Sample Time: 1 Sample Time: 2 Sample Time: 2 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Time: 3 Sample Tim									
Note: Includ	de comments su	ch as well	condition,	odor, present	ce of NAPL, o	r other items	not on the field	d data sheet.	
							10		

## **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-12

Project Number: 11532 Task Number: 315 Date: 6.00 Time: 33.74  Client: 515VC5 Personnel: DEAN TEMG-U-9  Personnel: DEAN TEMG-U-9  Weather: 510N J, LaT  WELL DATA  Casing Diameter: Inches Type: 4/PVC a stainless a Gain. Steel a Teflan® a Other: 50 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date: 6.00 Date:								
WELL DATA  Casing Diameter:								
WELL DATA  Casing Diameter:								
Casing Diameter: inches								
Screen Diameter:								
Total Depth of Well:								
Depth to Static Water: From: Top of Well Casing (TOC) Top of Protective Casing Other:  Depth to Product: From: Top of Well Casing (TOC) Top of Protective Casing Other:  Length of Water Column: From: Top of Well Casing (TOC) Top of Protective Casing Other:  Length of Water Column: From: Top of Well Casing (TOC) Top of Protective Casing Other:  Length of Water Column: From: Top of Well Casing (TOC) Top of Protective Casing Other:  Length of Water Column: From: Top of Well Casing (TOC) Top of Protective Casing Other:  Length of Water Column: From: Top of Well Casing (TOC) Top of Protective Casing Other:  Length of Water Column: From: Top of Well Casing (TOC) Top of Protective Casing Other:  Note: 2-inch well = 0.167 gal/ft								
Depth to Product: feet								
Length of Water Column:								
PURGE DATA  Purge Method: Centrifugal Pump Peristaltic Pump Inertial Lift Pump Other:  Dedicated Prepared Off-Site Field Cleaned Disposable  Materials: Rope/Tubing Polyethylene Polypropylene Teflon® Other:  Was well purged dry? Yes A No Pumping Rate:  Cum. Gallons Removed  PURGE DATA  A-inch well = 0.667 gal/ft  4-inch well = 0.667 gal/ft  5-2-2-2-2-2-2-2-2-2-2-2-2-2-2-2-2-2-2-								
Purge Method: Centrifugal Pump Peristaltic Pump Other:  Materials: Pump/Bailer Dedicated Prepared Off-Site Field Cleaned Disposable  Materials: Rope/Tubing Polyethylene Polypropylene Field Cleaned Disposable  Was well purged dry? Yes A No Pumping Rate:  Cum. Gallons Removed PH Temp Spec.  Removed Prepared Off-Site Dissolved Oxygen Turbidity Other:  Comments  Comments								
Materials: Pump/Bailer								
Materials: Pump/Bailer								
Materials: Rope/Tubing Polyethylene Polypropylene Field Cleaned Disposable  Was well purged dry? Prepared Off-Site Field Cleaned Disposable  Was well purged dry? Prepared Off-Site Field Cleaned Disposable  Time Cum. Gallons Removed PH Temp Spec. Eh Dissolved Oxygen Turbidity Comments								
Was well purged dry?								
Time Cum. Gallons Removed pH Temp Spec. Eh Dissolved Oxygen Turbidity Other: Comments								
Removed PH Temp Cond. En Oxygen Turbidity Comments								
7-15 22-85 1261 -128-8 1.13 347 - 210-								
. SAMPLING DATA Geochemical Analyses								
Method(s): Bailer, Size: Bladder Pump 2" Submersible Pump 4" Submersible Pump Ferrous Iron: mg/L								
Materials: Pump/Bailer Stainless PVC Teffon® Other:								
1								
Materials: Tubing/Rope Dedicated Polypropylene Teflon® Other:								
12.46								
Duplicate Sample Collected? Quives 1/20 No ID:								
5. COMMENTS Insufficient water for pursi-s whymany, but as emple								
w/disposable barter								
ote: Include comments such as well condition, odor, presence of NAPL or other items not on the field data sheet.								

## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-120

1. PROJ	1. PROJECT INFORMATION									
Project I	Number: <u>/} </u> }	<u> </u>	Task Num	ber: 01 5		Date: 6.8	5-00		Time: //`/S	
	Client: BJ50 CS Personnel: DEAV, TEALUR									
Project I	Project Location: Libbs Weather: SUNNY, horminal									
2. WELL DATA										
Casing (	Casing Diameter: inches Type: vp PVC _ Stainless _ Galv. Steel _ Teflon® _ Other:									
Screen l	Screen Diameter:inches Type: 0 PVC									
Total Depth of Well: \$7.65 feet From: If Top of Well Casing (TOC) In Top of Protective Casing In Other:										
Depth to	Depth to Static Water 53:56 feet From: \$1 Top of Well Casing (TOC) 12 Top of Protective Casing 12 Other:									
		fee		From: a to	op of Well Co	asing (TOC)	☐ Top of Prot	tective Casing	Other:	
Length (	of Water Colu	mn: <u>とう・</u>	feet	Well Volum	ne:			nterval (from G vell = 0.167 gal/ft	S):	
3. PURG	E DATA							· · · · · · · · · · · · · · · · · · ·		
Purge M	□ Baile 1ethod: □ Cent	r, Size:	□ Bladd	er Pump 🖼 taltic Pump !	2" Submersible		' Submersible	Pump	eritar ikk kar	
		🔲 Stainle	ess 🕅 PVC	☐ Teflon(	B 🛛 Other:				Equipment Model(s)	
Ĭ	Materials: Pump/Bailer Stainless OPVC Teflon® Other: Dedicated Prepared Off-Site Field Cleaned Disposable  1									
Materials: Rope/Tubing Polyethylene Prepared Off-Site Field Cleaned Disposable 2										
Was well purged dry? 🛘 Yes 🙀 No Pumping Rate: 4 🗸 gal/min 3										
Time	Cum, Gallons Removed	На	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments	
11:20	_	7.57	22/12	1278	1849	5.75		<u>.</u>	clan	
11:25	5.0	7.95	19.05	1276	198.8	4-19	ĵ	,	< 1 426.	
11:28	12, 5	7-91	19.0	12-78	197.1	2.04			cu~	
11:30	15.3	7.90	20.04	12-611	196.6	1-11	12.72	J		
1 541/1	PLING DA	ΤΔ		<u> </u>				Geor	chemical Analyses	
Method	Bailer, Si	ze: C	1 Bladder F	Pump \$ 2" S	ubmersible Pi	ump 🗖 4" Sui	bmersible Pur		us Iron: 2.5 mg/L	
	u Pensiani			Pump 🗆 Off				Ferro	ous iron: mg/L	
	als: Pump/Baile	" 🗖 Dedic	cated 🛭 Pr	epared Off-S	Site 12 Field	Cleaned 🛚	•	DO:	mg/L	
Materio	Materials: Tubing/Rope Dedicated Depropries Deficient Deficient Cleaned Disposable  Nitrate: mg/L									
Depth to Water at Time of Sampling: Field Filtered? □ Yes □ No Sulfate: mg/L										
Sample ID: MW-146 Sample Time: 11.30 # of Containers: 8										
Duplicate Sample Collected?   Yes  No ID:										
5. COMMENTS										
Note: Includ	de comments su	ch as well o	condition, d	odor, present	ce of NAPL, c	or other items r	not on the fiel	d data sheet.		

## **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-13

1. PROJ	1. PROJECT INFORMATION ,									
	Number: 128			ber: 315		Date: 6	.8.00		Time: 14:06	
	BJ sucs							-COX009		
Project l	Project Location: 13665 Weather: Sunny, Hot									
2. WELL DATA										
l	Diameter:	inc	ches	Type: pfp\	/C 🗆 Stainl	ess 🛛 Galv. S	—- Steel □ Teflon	⊕ Other:		
	Diameter:	I					Steel 🗅 Teflon			
	Total Depth of Well: 5 3 feet From: \$\dagger{4}\$ Top of Well Casing (TOC)  Top of Protective Casing  Other:									
Depth to Static Water: Static Water: From: Or Top of Well Casing (TOC) Top of Protective Casing Other:										
	o Product:			From: 🗖 To	op of Well C	asing (TOC)	☐ Top of Prot	ective Casing	Other:	
Length (	of Water Colu	mn: <u>7 /</u>	b feet	Well Volum	ne:_/`\_			nterval (from G vell = 0.167 gal/f	SS): t	
3. PURG	E DATA	<i>;</i> . 1	1							
Purge M	Purge Method: Centrifugal Pump Peristaltic Pump Inertial Lift Pump Other:									
Materia	Materials: Pump/Bailer									
Materia	Materials: Rope/Tubing Polyethylene Polypropylene Teflon® Other:									
Was we	Was well purged dry?   Yes   No Pumping Rate: gal/min 3									
Time	Cum. Gallons		Tama	Spec.	Eh	Dissolved	T	Other:		
11110	Removed	pH	Temp	Cond.		Oxygen	Turbidity		Comments	
		7.46	24.11	927	-63.6	2.81	1/2		cl-	
4. SAMF	PLING DA		- N	D 0110	to a constitute of		de en en en en en en en en en en en en en	i i	chemical Analyses	
Method	d(s): U-Baller, Si	c Pump	I Iveulái Fitt Ti Bladdet H	Pump <b>U</b> 2"Si Pump <b>U</b> Ott	ubmersible P ner:	ump <b>u</b> 4" Su	ıbmersible Pun	np Ferro	ous Iron: mg/L	
Materia	ıls: Pump/Baile			C		Cleaned <b>D</b>	I Disposable	DO:	mg/L	
Materia	als: Tubing/Rop	□ Polye	ethylene 🖫	• Polypropyle	ene 🚨 Teflo	in® 🛚 Other:_	·	— Nitro	ate:mg/L	
Ì		u Dear				d Cleaned (				
	Depth to Water at Time of Sampling: Field Filtered? Yes No Sulfate: mg/L  Sample ID: MW-13 Sample Time: 14:32 # of Containers: 5									
1	Sample 1D: 1910 13 Sample Time: 1910 # of Containers: Alkalinity: mg/L  Duplicate Sample Collected? 18 Yes a No ID: 2010 12679									
		<u> </u>	UT+12	1 401 6	NIN F	0-1000	Firs W	1 programme	bailed well	
I W/d	15/03 61- (1	[ ]012.1	,0.1							
Note: Includ	de comments su	ch as well	condition, a	odor, presenc	ce of NAPL, o	or other items i	not on the field	d data sheet.		

## **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: JW-L

1. PROJECT INFORMATION									
Project Number: 1832 Task Number: 15 Date: 6.6.00 Time: 17:45									
Client: B55465 Personnel: DEANTEXCUT									
Project Location: Hobbs Weather: Sunmy, hot, wirely									
2. WELL DATA									
Casing Diameter: inches Type: \$\forall PVC \text{ Stainless } \text{ Galv. Steel } \text{ Teflon® }  Other:									
Screen Diameter:inches									
Total Depth of Well: \( \frac{1}{5} \frac{35}{5} \) feet  \text{From: } \( \frac{1}{3} \) Top of Well Casing (TOC) \( \pi \) Top of Protective Casing \( \pi \) Other:									
Depth to Static Water: 55.56 feet From: \$\frac{1}{2}\$ Top of Well Casing (TOC)  Top of Protective Casing  Other:									
Depth to Product:feet									
Length of Water Column: 1 7 feet Well Volume: 2 gal Screened Interval (from GS):									
Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft									
3. PURGE DATA									
Purge Method: Centrifugal Pump Peristaltic Pump Intertial Lift Pump Other: Equipment Model(s)									
Distribution DIVIC Distribution Di Othori									
Materials: Pump/Bailer									
Materials: Rope/Tubing Dedicated Deprive Polypropylene Tellon® Other:									
Was well purged dry? 🛕 Yes 🗆 No Pumping Rate:gal/min 3									
- Cum Gallons Spec Dissolved Other									
Time Removed pH Temp Cond. Eh Oxygen Turbidity Comments									
4. SAMPLING DATA 11 Geochemical Analyses									
Method(s). Bailer, Size: 1.5 Bladder Pump 2" Submersible Pump 4" Submersible Pump									
D Stainless PARVC D Toffoce D Other:									
Midderials: Pump/Baller ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐									
Materials: Tubing/Rope Dedicated Polypropylene Tellon® Other:  Dedicated Prepared Off-Site Field Cleaned Disposable  Nitrate: mg/L									
Depth to Water at Time of Sampling: Field Filtered?  \( \text{Yes} \) No \( \text{Sulfate}: \) \( \text{Yes} \) mg/L									
Sample ID: 5W-() Sample Time: 11:35 # of Containers: 8 Alkalinity: 775 mg/L									
Duplicate Sample Collected?   Yes pa No ID:									
5 COMMENTS TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK TO STANK T									
5. COMMENTS Insufficient water Engung on you collected water Engung on you collected									
who savyit trom own									
Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet.									

#### **BJ Services**

Hobbs, New Mexico

ph: (505) 392-5556 Fax: (505) 392-7307

Month: Recorded by: June (6.6-00)

#### **Blower Measurements (monthly):**

#### Injection System (deep)

Flow Rate	35	scfm
Pressure	7	psi
Temperature		, F

Injection System (shallow)

injection Cyclem (chance)									
Flow Rate	_	scfm							
Pressure	7	psi							
Temperature	/\ <del>\\\</del> \\	F							

**Extraction system** 

= XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	<u>-</u>	
Flow Rate	170	scfm
Pressure	311	psi
Temperature	130	F

#### **Differential Pressure Readings (monthly):**

#### Injection System (deep)

Lat.#		flowrate(meter)
	1	12/530
	2	27 /17
	3	23.6-1097
	4	シス・3 - /シスロ
	5	13.5-66

Injection System (shallow)

Lat.#	flowrate (meter)
1	17 - 7030
2	11-9 - 340
3	
4	

**Extraction System** 

Lat. #	flowrate (meter)
	1 22-550
	2 30 - 14/0
	3/2 9- 1720
	4

JUX < 62 ppr-

Month	lv ma	intan	anca.
IVIOLILI	IV IIIG		ance.

1)	Use a shopvac to	remove the silt and	dother debris out of the compound.
Signature:	1	Date:	6:6:00
2)	Change the two i	njection blower air f	ilters and one extraction blower air filters.
changed:		# of filters left:	
Signature:		Date:	

#### **Weekly Maintenance:**

- 1) Check the shallow injection blower air filter. (change if necessary)
- 2) Check the deep injection blower air filter. (change if necessary)
- 3) Check the extraction blower air filter. (change if necessary)

Week #	Initia	Date	
1		1	
2		2	
3		3	
4		4	
5		5	

Fax the information monthly to K. Saravanan at (713) 308-3886 To contact K. Saravanan, Austin Cooley or Rick Rexroad call (713) 759-0999.

#### APPENDIX B

Laboratory Analytical Report



## Case Narrative for: Brown & Caldwell

# Certificate of Analysis Number: 00060223

Report To:

Brown & Caldwell Rick Rexroad 1415 Louisiana Suite 2500

Houston

TX 77002-

ph: (713) 759-0999

fax: (713) 308-3886

**Project Name:** 

Site:

**BJ-HOBBS 12832.015** 

Hobbs,NM

Site Address:

PO Number:

O Manibo

State:

**New Mexico** 

State Cert. No.:

Date Reported:

6/29/00

The reported results are only representative of the samples submitted for testing.

Your sample ID "MW-13,Duplicate" (SPL ID: 00060223-11,13) was analyzed for Gasoline Range Organics by SW846 method 8015. The surrogate 4-Bromofluorobenzene was outside the quality control limits, due to matrix interference.

Any 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).

Please do not hesitate to contact us if you have any questions or comments pertaining to this data report. Please reference the above Certificate of Analysis Number.

This report shall not be reproduced except in full, without the written approval of the laboratory. The reported results are only representative of the samples submitted for testing.

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

Sonia West West, Sonia

Senior Project Manager

6/29/00

Date



#### **Brown & Caldwell**

#### Certificate of Analysis Number:

#### 00060223

Report To: **Brown & Caldwell** 

Rick Rexroad

1415 Louisiana

**Suite 2500** 

Houston

TX

Fax To:

77002-

ph: (713) 759-0999 Brown & Caldwell

Rick Rexroad

fax: (713) 308-3886

fax: (713) 308-3886

Site:

Project Name:

BJ-HOBBS 12832.015

Hobbs,NM

Site Address:

PO Number:

State:

**New Mexico** 

State Cert. No.:

Date Reported:

Client Sample ID	Lab Sample ID	Matrix	Date Collected	Date Received	COC ID	HOL
1W3	00060223-01	Water	6/8/00 11:55:00 AM	6/9/00 10:00:00 AM	100134	1 6
MW4	00060223-02	Water	6/8/00 12:40:00 PM	6/9/00 10:00:00 AM	100134	
MW5	00060223-03	Water	6/8/00 9:30:00 AM	6/9/00 10:00:00 AM	100134	[-1
1W7	00060223-04	Water	6/8/00 9:50:00 AM	6/9/00 10:00:00 AM	100134	
MW10	00060223-05	Water	6/8/00 1:00:00 PM	6/9/00 10:00:00 AM	100134	
MW11A	00060223-06	Water	6/8/00 12:15:00 PM	6/9/00 10:00:00 AM	100134	
1W12	00060223-07	Water	6/8/00 1:45:00 PM	6/9/00 10:00:00 AM	100134	
W12D	00060223-08	Water	6/8/00 11:30:00 AM	6/9/00 10:00:00 AM	100134	7 7
Trip Blank 1 6/1/00	00060223-09	Trip Blank	6/8/00	6/9/00 10:00:00 AM	100134	
rip Blank 2 6/1/00	00060223-10	Trip Blank	6/8/00	6/9/00 10:00:00 AM	100134	
NW-13	00060223-11	Water	6/8/00 2:30:00 PM	6/9/00 10:00:00 AM	100120	
OW-4	00060223-12	Water	6/8/00 11:00:00 AM	6/9/00 10:00:00 AM	100120	
Duplicate	00060223-13	Water	6/8/00	6/9/00 10:00:00 AM	100120	
rip Blank 3 6/1/00	00060223-14	Trip Blank	6/8/00	6/9/00 10:00:00 AM	100120	

Sonia West, Sonia

6/29/00

Date

Senior Project Manager

Joel Grice Laboratory Director

Ted Yen Quality Assurance Officer





Client Sample ID MW	3			Coll	ected:	6/8/00 11:55:00	SPL Sample II	): 0006	0223-01
				Site	: Hob	obs,NM			
Analyses/Method	Re	esult		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGA	ANICS				MCL	SW8015B	Units: m	g/L	
Diesel Range Organics		ND		0.22		1	06/12/00 21:55	AM	308527
Surr: Pentacosane		63.2	%	18-120		1	06/12/00 21:55	AM	308527
Run ID/Seq #: HP	V_000612B-30852	27							, .
Prep Method	Prep Date			Prep Initials					
SW3510B	06/09/2000 13:18			KL					
GASOLINE RANGE O	RGANICS				MCL	SW8015B	Units: m	g/L	
Gasoline Range Organic	cs	ND		0.1		1	06/13/00 17:04	DL	307809
Surr: 1,4-Difluorobenz	zene	107	%	74-121		1	06/13/00 17:04	DL	307809
Surr: 4-Bromofluorobe	enzene	93.0	%	55-150		1	06/13/00 17:04	DL	307809
PURGEABLE AROMA	TICS				MCL	SW8021B	Units: ug	/L	
Benzene		ND		1		1	06/13/00 17:04	DL	307775
Ethylbenzene		ND		1		1	06/13/00 17:04	DL	307775
Toluene		ND		1		1	06/13/00 17:04	DL	307775
Xylenes,Total		ND		1		1	06/13/00 17:04	DL	307775
Surr: 1,4-Difluorobenz	zene	103	%	72-137		1	06/13/00 17:04	DL	307775
Surr: 4-Bromofluorobe	enzene	103	%	48-156		1	06/13/00 17:04	DL	307775

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution



Client Sample ID MW	/4			Coll	ected:	6/8/00 12:40:00	SPL Sample ID	): 0006	0223-02
				Site	: Hol	obs,NM			
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq.#
DIESEL RANGE ORG	ANICS				MCL	SW8015B	Units: mg	j/L	
Diesel Range Organics		0.44		0.21		1	06/12/00 22:34	AM	308528
Surr: Pentacosane		50.7	%	18-120		1	06/12/00 22:34	AM	308528
Run ID/Seq #: HP	_V_000612B-3	08528							
Prep Method	Prep Date			Prep Initials					
SW3510B	06/09/2000 1	3:18		KL					
GASOLINE RANGE O	RGANICS				MCL	SW8015B	Units: mg	ı/L	-
Gasoline Range Organi	cs	0.23		0.1		1	06/13/00 17:30	DL	307813
Surr: 1,4-Difluoroben	zene	104	%	74-121		1	06/13/00 17:30	DL	307813
Surr: 4-Bromofluorob	enzene	107	%	55-150		1	06/13/00 17:30	DL	307813
PURGEABLE AROMA	TICS				MCL	SW8021B	Units: ug	/L	
Benzene		ND		1		1	06/13/00 17:30	DL	307776
Ethylbenzene		ND		1		1	06/13/00 17:30	DL	307776
Toluene		ND		1		1	06/13/00 17:30	DL	307776
Xylenes,Total		ND		1		1	06/13/00 17:30	DL	307776
Surr: 1,4-Difluoroben	zene	99.5	%	72-137		1	06/13/00 17:30	DL	307776
Surr: 4-Bromofluorob	enzene	104	%	48-156		1	06/13/00 17:30	DL	307776

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution





Client Sample ID MW5			Coll	ected:	6/8/00 9:30:00 A	SPL Sample II	<b>)</b> : 0006	0223-03
			Site	: Hol	obs,NM			
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS				MCL	SW8015B	Units: mg	g/L	7
Diesel Range Organics	ND		0.2		1	06/12/00 23:13	AM	308529
Surr: Pentacosane	68.8	%	18-120		1	06/12/00 23:13	AM	308529
Run ID/Seq #: HP_V_000612B-	308529							
Prep Method Prep Date			Prep Initials					
SW3510B 06/09/2000	13:18		KL					
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: mg	g/L	
Gasoline Range Organics	ND		0.1		1	06/13/00 17:55	DL	307817
Surr: 1,4-Difluorobenzene	108	%	74-121		1	06/13/00 17:55	DL	307817
Surr: 4-Bromofluorobenzene	92.0	%	55-150		1	06/13/00 17:55	DL	307817
HEADSPACE GAS ANALYSIS				MCL	RSK147	Units: mg	g/L	
Ethane	ND		0.0025		1	06/14/00 11:01	A_A	309779
Ethylene	ND		0.0032		1	06/14/00 11:01	A_A	309779
Methane	ND		0.0012		1	06/14/00 11:01	A_A	309779
NITROGEN, NITRATE (AS N)				MCL	E300	Units: mg	a/L	
Nitrogen,Nitrate (As N)	4.7		0.1		1	06/09/00 15:00		305242
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	/L	
Benzene	ND		1		1	06/13/00 17:55	DL	307778
Ethylbenzene	ND		1		1	06/13/00 17:55	DL	307778
Toluene	ND		1		1	06/13/00 17:55	DL	307778
Xylenes,Total	ND		1		1	06/13/00 17:55	DL	307778
Surr: 1,4-Diffuorobenzene	104	%	72-137		1	06/13/00 17:55	DL	307778
Surr: 4-Bromofluorobenzene	102	%	48-156		1	06/13/00 17:55	DL	307778

4

Qualifiers:

Sulfate

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

240

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

06/09/00 15:00 KM

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference

20

305275



Client Sample ID MW	7			Coll	ected:	6/8/00 9:50:00 A	SPL Sample II	<b>)</b> : 0006	0223-04
				Site	Hol	obs,NM			
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORG	ANICS				MCL	SW8015B	Units: m	g/L	
Diesel Range Organics		ND		0.21		1	06/12/00 23:52	AM	308530
Surr: Pentacosane		64.6	%	18-120		1	06/12/00 23:52	AM	308530
Run ID/Seq #: HP	_V_000612B-30	3530							
Prep Method	Prep Date			Prep Initials					
SW3510B	06/09/2000 13:	18		KL					
GASOLINE RANGE O	RGANICS				MCL	SW8015B	Units: m	g/L	
Gasoline Range Organi	cs	ND		0.1		1	06/13/00 20:27	DL	307824
Surr: 1,4-Difluoroben:	zene	107	%	74-121		1	06/13/00 20:27	DL	307824
Surr: 4-Bromofluorob	enzene	93.7	%	55-150		1	06/13/00 20:27	DL	307824
PURGEABLE AROMA	TICS				MCL	SW8021B	Units: ug	/L	
Benzene		ND		1		1	06/13/00 20:27	DL	307782
Ethylbenzene		ND		1		1	06/13/00 20:27	DL	307782
Toluene		ND		1		1	06/13/00 20:27	DL	307782
Xylenes,Total		ND		1		1	06/13/00 20:27	DL	307782
Surr: 1,4-Difluoroben:	zene	102	%	72-137		1	06/13/00 20:27	DL	307782
Surr: 4-Bromofluorob	enzene	103	%	48-156		1	06/13/00 20:27	DL	307782

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution





 Client Sample ID MW10
 Collected: 6/8/00 1:00:00 P
 SPL Sample ID: 00060223-05

			Site	: Hob	obs,NM			
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq.#
DIESEL RANGE ORGANICS				MCL	SW8015B	Units: m	g/L	
Diesel Range Organics	0.67		0.21		1	06/13/00 0:31	AM	308531
Surr: Pentacosane	87.4	%	18-120		1	06/13/00 0:31	AM	308531
Run ID/Seq #: HP_V_000612E	3-308531							
Prep Method Prep Date			Prep Initials					
SW3510B 06/09/2000	13:18		KL					
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: m	g/L	
Gasoline Range Organics	0.74		0.1		1	06/13/00 20:53	DL	307825
Surr: 1,4-Difluorobenzene	133	%	74-121	_	1 *	06/13/00 20:53	DL	307825
Surr: 4-Bromofluorobenzene	150	%	55-150		1	06/13/00 20:53	DL	307825
HEADSPACE GAS ANALYSIS				MCL	RSK147	Units: m	g/L	
Ethane	ND		0.0025		1	06/14/00 11:14	A_A	309781
Ethylene	ND		0.0032		1	06/14/00 11:14	A_A	309781
Methane	0.031		0.0012		1	06/14/00 11:14	A_A	309781
NITROGEN, NITRATE (AS N)				MCL	E300	Units: m		
Nitrogen, Nitrate (As N)	ND		0.1		1	06/09/00 15:00	KM	305245
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	1/L	
Benzene	78		1		1	06/13/00 20:53	DL	307783
Ethylbenzene	7.2		1		1	06/13/00 20:53	DL	307783
Toluene	1.7		1		1	06/13/00 20:53	DL	307783
Xylenes,Total	9		1		1	06/13/00 20:53	DL	307783
Surr: 1,4-Difluorobenzene	113	%	72-137		1	06/13/00 20:53	DL	307783
Surr: 4-Bromofluorobenzene	125	%	48-156		1	06/13/00 20:53	DL	307783

MCL

2

E300

10

Units: mg/L

06/09/00 15:00 KM

Qualifiers:

SULFATE

Sulfate

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

150

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference

305276





Client Sample ID MW1	1A		Col	lected:	6/8/00 12:15:00	SPL Sample ID	: 0006	0223-06
			Site	e: Hol	obs,NM	<del>-</del>		
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGA	NICS			MCL	SW8015B	Units: mg	/L	•
Diesel Range Organics	0.37		0.21		1	06/13/00 1:10	AM	308532
Surr: Pentacosane	42.6	%	18-120		1	06/13/00 1:10	AM	308532
Run ID/Seq #: HP_\	V_000612B-308532							
Prep Method	Prep Date		Prep Initials					
SW3510B	06/09/2000 13:18		KL	]				
GASOLINE RANGE OR	GANICS			MCL	SW8015B	Units: mg	/L	
Gasoline Range Organics	0.12		0.1		1	06/13/00 21:43	DL	307826
Surr: 1,4-Difluorobenze	ene 118	%	74-121		1	06/13/00 21:43	DL	307826
Surr: 4-Bromofluorober	orobenzene 101 % 55-150 1		1	06/13/00 21:43	DL	307826		
HEADSPACE GAS ANA	ALYSIS			MCL	RSK147	Units: mg	/L	
Ethane	ND		0.0025		1	06/14/00 11:24 A		309783
Ethylene	ND		0.0032		1	06/14/00 11:24	4_A	309783
Methane	0.0069		0.0012		1	06/14/00 11:24 A	A_A	309783
NITROGEN, NITRATE (	AS N)			MCL	E300	Units: mg	/L	
Nitrogen, Nitrate (As N)	ND		0.1		1	06/09/00 15:00	KM	305246
PURGEABLE AROMAT	ics			MCL	SW8021B	Units: ug/	L	
Benzene	3.6		1		1	06/13/00 21:43	DL	307784
Ethylbenzene	ND		1		1	06/13/00 21:43	DL	307784
Toluene	ND		1		1	06/13/00 21:43	DL	307784
Xylenes,Total	ND		1		1	06/13/00 21:43	DL	307784
Surr: 1,4-Difluorobenze	ene 109	%	72-137	***	1	06/13/00 21:43	DL	307784
Surr: 4-Bromofluorober	nzene 105	%	48-156		1	06/13/00 21:43	DL	307784
SULFATE				MCL	E300	Units: mg	/L	
Sulfate	240		4		20	06/09/00 15:00	KM	305277

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution



Client Sample ID MW12			Coll	ected:	6/8/00 1:45:00 P	SPL Sample II	<b>):</b> 0006	0223-07
			Site	: Hol	obs,NM		300 a m	
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS				MCL	SW8015B	Units: m	g/L	
Diesel Range Organics	ND		0.2		1	06/13/00 1:49	AM	308533
Surr: Pentacosane	35.0	%	18-120		1	06/13/00 1:49	AM	308533
Run ID/Seq #: HP_V_000612B	-308533							
Prep Method Prep Date			Prep Initials					
SW3510B 06/09/2000	13:18		KL					
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: m	g/L	
Gasoline Range Organics	0.18		0.1		1	06/13/00 22:09	DL	307828
Surr: 1,4-Difluorobenzene	114	%	74-121		1	06/13/00 22:09	DL	307828
Surr: 4-Bromofluorobenzene	Surr: 4-Bromofluorobenzene 95.0 % 55-150			1	06/13/00 22:09	DL	307828	
HEADSPACE GAS ANALYSIS				MCL	RSK147	Units: m	g/L	
Ethane	ND		0.0025		1	06/14/00 11:41	A_A	309784
Ethylene	ND		0.0032		1	06/14/00 11:41	A_A	309784
Methane	ND		0.0012		1	06/14/00 11:41	A_A	309784
NITROGEN, NITRATE (AS N)				MCL	E300	Units: m	g/L	
Nitrogen,Nitrate (As N)	ND		0.1		1	06/09/00 15:00	KM	305248
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	/L	
Benzene	62		1		1	06/13/00 22:09	DL	307786
Ethylbenzene	ND		1		1	06/13/00 22:09	DL	307786
Toluene	ND		1		1	06/13/00 22:09	DL	307786
Xylenes,Total	ND		1		1	06/13/00 22:09	DL	307786
Surr: 1,4-Difluorobenzene	116	%	72-137		1	06/13/00 22:09	DL	307786
Surr: 4-Bromofluorobenzene	103	%	48-156		1	06/13/00 22:09	DL	307786
SULFATE				MCL	E300	Units: m	g/L	
Sulfate	220		4		20	06/09/00 15:00	KM	305278

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution





Client Sample ID MW12D			Colle	ected:	6/8/00 11:30:00	SPL Sample II	<b>)</b> : 0006	0223-08
			Site:	Hol	obs,NM			
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS				MCL	SW8015B	Units: m	g/L	-
Diesel Range Organics	ND		0.2		1	06/13/00 2:28	AM	308534
Surr: Pentacosane	71.6	%	18-120		1	06/13/00 2:28	AM	308534
Run ID/Seq #: HP_V_000612B	-308534							
Prep Method Prep Date			Prep Initials					
SW3510B 06/09/2000	13:18		KL					
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: m	g/L	
Gasoline Range Organics	ND		0.1		1	06/13/00 22:34	DL	307830
Surr: 1,4-Difluorobenzene	104	%	74-121		1	06/13/00 22:34	DL	307830
Surr: 4-Bromofluorobenzene	95.0	%	55-150		1	06/13/00 22:34	DL	307830
HEADSPACE GAS ANALYSIS				MCL	RSK147	Units: m	 g/L	
Ethane	ND		0.0025		1	06/14/00 11:50		309785
Ethylene	ND		0.0032		1	06/14/00 11:50	A_A	309785
Methane	ND		0.0012		1	06/14/00 11:50	A_A	309785
NITROGEN, NITRATE (AS N)				MCL	E300	Units: m	g/L	
Nitrogen,Nitrate (As N)	ND		0.1		1	06/09/00 15:00	KM	305250
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	ı/L	
Benzene	ND		1		1	06/13/00 22:34	DL	307787
Ethylbenzene	ND		1		1	06/13/00 22:34	DL	307787
Toluene	ND		1		1	06/13/00 22:34	DL	307787
Xylenes,Total	ND		1		1	06/13/00 22:34	DL	307787
Surr: 1,4-Difluorobenzene	103	%	72-137		1	06/13/00 22:34	DL	307787
Surr: 4-Bromofluorobenzene	104	%	48-156		1	06/13/00 22:34	DL	307787
SULFATE				MCL	E300	Units: m	g/L	
Sulfate	240		4		20	06/09/00 15:00	KM	305279

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution



Client Sample ID Trip Blank 1 6/1/00 Collected: 6/8/00 SPL Sample ID: 00060223-09

Site: Hobbs,NM

Analyses/Method	Result	F	Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq.#
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug/L		
Benzene	ND		1		1	06/13/00 16:14	DL	307772
Ethylbenzene	ND		1		1	06/13/00 16:14	DL	307772
Toluene	ND		1		1	06/13/00 16:14	DL	307772
Xylenes,Total	ND		1		1	06/13/00 16:14	DL	307772
Surr: 1,4-Difluorobenzene	102	%	72-137		1	06/13/00 16:14	DL	307772
Surr: 4-Bromofluorobenzene	103	%	48-156		1	06/13/00 16:14	DL	307772

ND/U - Not Detected at the Reporting Limit

- B Analyte detected in the associated Method Blank
- \* Surrogate Recovery Outside Advisable QC Limits
- J Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution



Client Sample ID Trip Blank 2 6/1/00 Collected: 6/8/00 SPL Sample ID: 00060223-10

Site: Hobbs,NM

Analyses/Method	Result	Rep.Li	mit	Dil. Factor QUA	L Date Analyzed	Analyst	Seq.#
PURGEABLE AROMATICS			MCL	SW8021E	ชี Units: นดู	Units: ug/L	
Benzene	ND		1	1	06/13/00 16:39	DL	307774
Ethylbenzene	ND		1	1	06/13/00 16:39	DL	307774
Toluene	ND		1	1	06/13/00 16:39	DL	307774
Xylenes,Total	ND		1	1	06/13/00 16:39	DL	307774
Surr: 1,4-Difluorobenzene	103	% 72-13	7	1	06/13/00 16:39	DL	307774
Surr: 4-Bromofluorobenzene	104	% 48-15	6	1	06/13/00 16:39	DL	307774

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution



Client Sample ID MW-	13			Coll	ected:	6/8/00 2:30:00 P	SPL Sample II	<b>)</b> : 0006	0223-11
				Site	: Hol	MM,edc			
Analyses/Method	R	tesult		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGA	NICS				MCL	SW8015B	Units: m	g/L	
Diesel Range Organics		1.1		0.21		1	06/13/00 3:07	AM	308535
Surr: Pentacosane		63.5	%	18-120		1	06/13/00 3:07	AM	308535
Run ID/Seq #: HP_	V_000612B-3085	35		-					
Prep Method	Prep Date			Prep Initials					
SW3510B	06/09/2000 13:18	}		KL					
GASOLINE RANGE ORGANICS		MCL	SW8015B	Units: m	g/L				
Gasoline Range Organics	S	0.91		0.1		1	06/13/00 23:00	DL	307832
Surr: 1,4-Difluorobenze	ene	115	%	74-121		1	06/13/00 23:00	DL	307832
Surr: 4-Bromofluorober	nzene	159	%	55-150		1 *	06/13/00 23:00	DL	307832
PURGEABLE AROMAT	rics				MCL	SW8021B	Units: ug	/L	
Benzene		6		1		1	06/13/00 23:00	DL	307788
Ethylbenzene		63		1		1	06/13/00 23:00	DL	307788
Toluene		ND		1		1	06/13/00 23:00	DL	307788
Xylenes, Total		3.3		1		1	06/13/00 23:00	DL	307788
Surr: 1,4-Difluorobenze	ene	101	%	72-137		1	06/13/00 23:00	DL	307788
Surr: 4-Bromofluorobei	nzene	122	%	48-156		1	06/13/00 23:00	DL	307788

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution



Client Sample ID OW-4			Coll	ected:	6/8/00 11:00:00	SPL Sample II	<b>)</b> : 0006	0223-12
			Site	- : Hol	bs,NM			
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS				MCL	SW8015B	Units: m	g/L	
Diesel Range Organics	ND		0.21		1	06/13/00 3:46	AM	308536
Surr: Pentacosane	34.2	%	18-120		1	06/13/00 3:46	AM	308536
Run ID/Seq #: HP_V_000612B	-308536							
Prep Method Prep Date			Prep Initials					
SW3510B 06/09/2000	13:18		KL					
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: mg	g/L	
Gasoline Range Organics	ND		0.1		1	06/13/00 23:25	DL	307836
Surr: 1,4-Difluorobenzene	108	%	74-121		1	06/13/00 23:25	DL	307836
Surr: 4-Bromofluorobenzene	93.7	%	55-150		1	06/13/00 23:25	DL	307836
HEADSPACE GAS ANALYSIS				MCL	RSK147	Units: m	g/L	
Ethane	ND		0.0025		1	06/14/00 11:56	A_A	309786
Ethylene	ND		0.0032		1	06/14/00 11:56	A_A	309786
Methane	ND		0.0012		1	06/14/00 11:56	A_A	309786
NITROGEN, NITRATE (AS N)				MCL	E300	Units: m	g/L	
Nitrogen, Nitrate (As N)	3.4		0.1		1	06/09/00 15:00	KM	305252
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	ı/L	
Benzene	ND	-	1		1	06/13/00 23:25	DL	307789
Ethylbenzene	ND		1		1	06/13/00 23:25	DL.	307789
Toluene	ND		1		1	06/13/00 23:25	DL	307789
Xylenes,Total	ND		1		1	06/13/00 23:25	DL	307789
Surr: 1,4-Difluorobenzene	103	%	72-137		1	06/13/00 23:25	DL	307789
Surr: 4-Bromofluorobenzene	104	%	48-156		1	06/13/00 23:25	DL	307789
SULFATE				MCL	E300	Units: m	g/L	
Sulfate	190		2		10	06/09/00 15:00		305282

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution



Client Sample ID Duplicate			Colle	ected:	6/8/00	SPL Sample II	<b>)</b> : 0006	0223-13
	<del></del>		Site:	Hol	obs,NM			
Analyses/Method	Result	-	Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS				MCL	SW8015B	Units: m	g/L	
Diesel Range Organics	1.5		0.21		1	06/13/00 5:43	AM	308540
Surr: Pentacosane	46.7	%	18-120		1	06/13/00 5:43	AM	308540
Run ID/Seq #: HP_V_000612I	3-308540							
Prep Method Prep Date			Prep Initials					
SW3510B 06/09/200	0 13:18		KL					
GASOLINE RANGE ORGANICS			MCL	SW8015B	Units: m	g/L		
Gasoline Range Organics	0.85		0.1		1	06/13/00 23:50	DL	307838
Surr: 1,4-Difluorobenzene	116	%	74-121		1	06/13/00 23:50	ÐL	307838
Surr: 4-Bromofluorobenzene	155	%	55-150		1 *	06/13/00 23:50	DL	307838
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	/L	
Benzene	4.2		1		1	06/13/00 23:50	DL	307790
Ethylbenzene	57		1		1	06/13/00 23:50	DL	307790
Toluene	ND		1		1	06/13/00 23:50	DL	307790
Xylenes,Total	3.2		1		1	06/13/00 23:50	DL	307790
Surr: 1,4-Difluorobenzene	109	%	72-137		1	06/13/00 23:50	DL	307790
Surr: 4-Bromofluorobenzene	122	%	48-156		1	06/13/00 23:50	DL	307790

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution



Client Sample ID Trip Blank 3 6/1/00 Collected: 6/8/00 SPL Sample ID: 00060223-14

Site: Hobbs,NM

Analyses/Method	Result	Rep	Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq.#
PURGEABLE AROMATICS				MCL	SW8021B		Units: ug/L		
Benzene	ND		1		1		06/13/00 20:02	DL	307781
Ethylbenzene	ND		1		1		06/13/00 20:02	DL	307781
Toluene	ND		1		1		06/13/00 20:02	DL	307781
Xylenes, Total	ND		1		1		06/13/00 20:02	DL	307781
Surr: 1,4-Difluorobenzene	102	% 72-	137		1		06/13/00 20:02	DL	307781
Surr: 4-Bromofluorobenzene	103	% 48-	156		1		06/13/00 20:02	DL	307781

- \* Surrogate Recovery Outside Advisable QC Limits
- J Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

# Quality Control Documentation



#### **Quality Control Report**

#### **Brown & Caldwell** BJ-HOBBS 12832.015

nalysis: ethod:

**Diesel Range Organics** 

SW8015B

WorkOrder:

00060223

Lab Batch ID:

5347

Method Blank

HP\_V\_000612B-308748

Units:

mg/L

Lab Sample ID 00060223-01B

Samples in Analytical Batch:

Client Sample ID

nalysis Date: Preparation Date:

unID:

06/12/2000 21:55

Analyst: AM

ND

00060223-02B

MW3

06/09/2000 13:18

Diesel Range Organics

Prep By: KL

Method SW3510B

0.20

00060223-03B 00060223-04B MW4 MW5

Rep Limit Analyte Result

00060223-05B 00060223-06B 00060223-07B MW7 MW10 MW11A MW12

00060223-08B 00060223-11B

MW12D MW-13

00060223-12B 00060223-13B OW-4 Duplicate

#### Laboratory Control Sample (LCS)

RunID:

HP\_V\_000612B-308749

Units:

mg/L

Analysis Date:

06/12/2000 22:34

Analyst: AM

06/09/2000 13:18 Preparation Date:

Prep By: KL Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Diesel Range Organics	2.5	2.2	89	21	175

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00060200-01

RunID:

HP\_V\_000612B-308752

Units:

mg/L

Analysis Date:

06/12/2000 23:52

Analyst: AM

06/09/2000 13:18 Preparation Date:

Prep By:

Method

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % RPD Recovery	RPD Limit	Low Limit	High Limit
Diesel Range Organics	ND	2.5	1.4	54.1	2.5	1.8	69.2 24.5	20	21	175

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL



## HOUSTON LABORATORY 8880 INTERCHANGE DRIVE

HOUSTON, TEXAS 77054 (713) 660-0901

#### **Quality Control Report**

#### **Brown & Caldwell BJ-HOBBS 12832.015**

malysis:

Headspace Gas Analysis

ethod:

**RSK147** 

WorkOrder:

00060223

Lab Batch ID:

R15749

Method Blank

unID: nalysis Date:

Ethane

VARH\_000614A-309767

06/14/2000 8:33

Units: Analyst:

mg/L A A

Lab Sample ID 00060223-03C

Samples in Analytical Batch:

Client Sample ID

00060223-05C

MW5

00060223-06C

MW10

MW11A

00060223-07C

MW12

Result Rep Limit Analyte ND 0.0025 Ethylene 0.0032 ND ND 0.0012 Methane

00060223-08C 00060223-12C MW12D OW-4

#### Sample Duplicate

Original Sample: 00060147-05

RunID:

VARH\_000614A-309773

Units:

mg/L

Analysis Date:

06/14/2000 10:08

Analyst:  $A_A$ 

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Ethane	ND	ND	0	50
Ethylene	ND	ND	0	50
Methane	0.85	0.76	11	50

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

D - Recovery Unreportable due to Dilution



### **Quality Control Report**

### **Brown & Caldwell** BJ-HOBBS 12832.015

nalysis: ethod:

**Purgeable Aromatics** 

SW8021B

WorkOrder:

00060223

Lab Batch ID:

R15598

Method Blank

unID:

HP W 000613A-307302

Units:

ug/L

nalysis Date:

06/13/2000 11:12

DL Analyst:

Lab Sample ID

00060223-01A

00060223-02A 00060223-03A

Samples in Analytical Batch:

00060223-04A

00060223-05A 00060223-06A 00060223-07A

00060223-08A 00060223-09A

00060223-10A

00060223-11A 00060223-12A

00060223-13A 00060223-14A Client Sample ID

MW3 MW4 MW5 MW7 MW10 MW11A MW12

MW12D Trip Blank 1 6/1/00

Trip Blank 2 6/1/00

MW-13 OW-4 Duplicate

Trip Blank 3 6/1/00

Analyte Result Rep Limit ND Benzene 1.0 ND 1.0 Ethylbenzene ND 1.0 Toluene Xylenes, Total ND 1.0 72-137 Surr: 1,4-Difluorobenzene 101.3 101.0 48-156 Surr: 4-Bromofluorobenzene

### Laboratory Control Sample (LCS)

RunID:

HP\_W\_000613A-307301

Units:

ug/L

Analysis Date:

06/13/2000 9:58

Analyst: DL

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	53	107	70	130
Ethylbenzene	50	53	106	70	130
Toluene	50	54	107	70	130
Xylenes,Total	150	153	102	72	117

### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

RunID:

00060223-01

HP\_W\_000613A-307803

Units:

ug/L

Analysis Date:

06/13/2000 12:53

Analyst: DL

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Benzene	ND	20	21	105	20	21	106	0.996	21	32	164
Ethylbenzene	ND	20	21	105	20	21	106	0.725	19	52	142
Toluene	ND	20	21	106	20	21	107	0.518	20	38	159

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL



### **HOUSTON LABORATORY**

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

### **Quality Control Report**

**Brown & Caldwell** BJ-HOBBS 12832.015

malysis: ethod:

**Purgeable Aromatics** 

SW8021B

WorkOrder:

00060223

Lab Batch ID:

R15598

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00060223-01

HP\_W\_000613A-307803

Units:

ug/L

Analysis Date:

RunID:

06/13/2000 12:53

Analyst: DL

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Xylenes,Total	ND	60	62	103	60	62	103	0	10		144

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

D - Recovery Unreportable due to Dilution



### **Quality Control Report**

### **Brown & Caldwell** BJ-HOBBS 12832.015

nalysis:

**Gasoline Range Organics** 

tethod: SW8015B

Samples in Analytical Batch:

WorkOrder:

00060223

Lab Batch ID:

R15600

Met	hod	Bla	ınk
-----	-----	-----	-----

unID:

nalysis Date:

HP\_W\_000613B-307307

06/13/2000 11:12

Surr: 4-Bromofluorobenzene

Units:

Analyst:

mg/L DL

Lab Sample ID 00060223-01A

Client Sample ID MW3

93.7

55-150

00060223-02A 00060223-03A

MW4 MW5

Analyte Result Rep Limit Gasoline Range Organics ND 0.10 Surr: 1,4-Difluorobenzene 107.7 74-121

00060223-04A 00060223-05A 00060223-06A 00060223-07A MW7 MW10 MW11A MW12

00060223-08A 00060223-11A 00060223-12A

MW12D MW-13 OW-4

00060223-13A

Duplicate

### Laboratory Control Sample (LCS)

RunID:

HP\_W\_000613B-307306

Units:

mg/L

Analysis Date:

06/13/2000 10:23

Analyst: DL

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	1.2	121	42	136

### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00060223-02

RunID:

HP\_W\_000613B-307791

Units:

mg/L

Analysis Date:

06/13/2000 14:07

Analyst: DL

Analyte	Sample Result	MS Spike	MS Result	MS % Recovery	MSD Spike	MSD Result	MSD % Recovery	RPD			igh imit
		Added			Added	1					
Gasoline Range Organics	0.23	0.9	1.2	111	0.9	1.2	107	3.41	36	36	160

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

D - Recovery Unreportable due to Dilution



00060223

R15471

Client Sample ID

### **Quality Control Report**

### **Brown & Caldwell** BJ-HOBBS 12832.015

nalysis:

unID:

nalysis Date:

Nitrogen, Nitrate (As N)

ethod:

E300

Nitrogen, Nitrate (As N)

Method Blank WET\_000609Q-305240 Units:

06/09/2000 15:00

Analyte

Analyst:

KM

mg/L

Result

ND

Samples in Analytical Batch:

Lab Sample ID

00060223-03D 00060223-05D

00060223-06D

00060223-07D 00060223-08D

00060223-12D

mg/L

MW12D OW-4

WorkOrder:

Lab Batch ID:

MW5

MW10

MW11A **MW12** 

Laboratory Control Sample (LCS)

RunID:

Analysis Date:

WET\_000609Q-305241

Rep Limit

0.10

Units:

06/09/2000 15:00

Analyst:

KM

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Nitrogen, Nitrate (As N)	10	9.6	96	90	110

### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

RunID:

00060223-03

WET\_000609Q-305243

Units:

mg/L

Analysis Date:

06/09/2000 15:00

Analyst: ΚM

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Nitrogen, Nitrate (As N)	4.7	10	15	105	10	15	105	0.410	20	76	

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

D - Recovery Unreportable due to Dilution



00060223

R15473

Client Sample ID

### **Quality Control Report**

### **Brown & Caldwell BJ-HOBBS 12832.015**

analysis: ethod:

junID:

halysis Date:

Sulfate

Sulfate

E300

Method Blank WET\_000609R-305266

Analyte

Units:

mg/L

Result

ND

06/09/2000 15:00

Analyst:

KM

Samples in Analytical Batch:

Lab Sample ID

00060223-03D 00060223-05D

00060223-06D

00060223-07D 00060223-08D

00060223-12D

mg/L

MW12 MW12D OW-4

MW5

MW10 MW11A

WorkOrder:

Lab Batch ID:

**Laboratory Control Sample (LCS)** 

RunID:

WET\_000609R-305267

Rep Limit

0.20

Units:

Analysis Date:

06/09/2000 15:00

Analyst: ΚM

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Sulfate	10	10	102	90	110

### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00060191-12

RunID:

WET\_000609R-305271

Units:

mg/L

Analysis Date:

06/09/2000 15:00

KM Analyst:

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Limit	Hìgh i Limit
ulfate	150	100	260	113	100	260	110		20		113

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

D - Recovery Unreportable due to Dilution

## Chain of Custody And Sample Receipt Checklist

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Chain of custody signed when relinquished and received?		Yes 🗹	No 🗌		
Chain of custody agrees with sample labels?		Yes 🗸	No 🗔		
Samples in proper container/bottle?		Yes 🗸	No 🗌		
Sample containers intact?		Yes 🗸	No 🗌		
Sufficient sample volume for indicated test?		Yes 🔽	No 🗀		
All samples received within holding time?		Yes 🗹	No 🗌		
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### BROWN AND CALDWELL

Suite 2500, 1415 Louisiana, Houston, TX 77002 (713) 759-0999 • (713) 308-3886

### TRANSMITTAL MEMORANDUM

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### **REMARKS:**

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Environmental Bureau
Oil Conservation Division

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

Richard Rexroad

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Environmental Bureau
Oil Conservation Division

BROWN AND CALDWELL



MARCH 2000 GROUNDWATER SAMPLING REPORT HOBBS, NEW MEXICO FACILITY

BJ SERVICES COMPANY, U.S.A.

**APRIL 21, 2000** 

# MARCH 2000 GROUNDWATER SAMPLING REPORT HOBBS, NEW MEXICO FACILITY BJ SERVICES COMPANY, U.S.A.

Prepared for

BJ Services Company, U.S.A. 11211 FM 2920 Tomball, Texas 77375

BC Project Number: 12832.015

Richard L. Rexroad, P.G. Principal Geologist

April 21, 2000

**Brown and Caldwell** 

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

<sup>&</sup>quot;This report was prepared in accordance with the standards of the environmental consulting industry at the time it was prepared. It should not be relied upon by parties other than those for whom it was prepared, and then only to the extent of the scope of work which was authorized. This report does not guarantee that no additional environmental contamination beyond that described in this report exists at this site."

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Environmental Bureau
Oil Conservation Division



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2.0	FIELD ACTIVITIES AND RESULTS  2.1 Groundwater Measurements and Sampling  2.2 Results of Groundwater Analyses  2.3 Natural Attenuation Evaluation
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### **APPENDICES**

- A Groundwater Sampling Forms
- B Laboratory Analytical Report for Groundwater Samples

### 1.0 INTRODUCTION

Brown and Caldwell conducted field activities associated with the March 2000 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 9-10, 2000. 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, dissolved methane/ethylene/ethane, sulfates, and nitrates, as specified in by the New Mexico Oil Conservation Division (NMOCD) in NMOCD Permit GW-072. This report presents a description of the groundwater sampling field activities, a summary of the analytical results, and an evaluation of remedial technologies being applied at the facility. A groundwater potentiometric surface map, a benzene concentration map, and a hydrocarbon distribution map are included.

The facility formerly operated an above-grade on-site fueling system. A layout of the facility is shown in Figure 1. Subsurface impact near the former 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. The NMOCD has required a quarterly groundwater monitoring program to assess the concentration of hydrocarbon constituents in groundwater as a result of the diesel fuel release. BJ Services removed three field waste tanks at the facility on March 6-7, 1997. The ongoing monitoring of groundwater conditions at the site is being performed to address both the former fuel island and the former field waste tanks areas of the facility, as directed by NMOCD in correspondence dated January 21, 1999.

A biosparging system was activated in November 1995 to remediate soil and groundwater at the facility. Expansions of the biosparging system were performed in March/April 1997 and February/March 1998. Flow adjustments were made to the biosparging system during the June/July 1999 and March 2000 sampling events, as described in Section 3.1. A site chronology detailing the history of the former fueling system and the former field waste tanks area, the soil and groundwater remediation system, and previous sampling events is presented in Table 1.



### 2.0 FIELD ACTIVITIES AND RESULTS

Brown and Caldwell purged and sampled the 13 existing groundwater monitor wells at and adjacent to the BJ Services Hobbs facility on March 9-10, 2000 to determine concentrations of dissolved-phase hydrocarbons in groundwater and to evaluate general groundwater quality in the area. The locations of the monitor wells at the facility are shown in the site map presented as Figure 1. The following subsections describe the field activities conducted by Brown and Caldwell at the facility in March 2000 and present the results of the groundwater analyses.

### 2.1 Groundwater Measurements and Sampling

Groundwater level measurements were obtained from the monitor wells prior to purging and sampling the wells. Groundwater levels were measured with an oil/water interface probe and recorded to the nearest 0.01 foot. A cumulative table of groundwater elevation data is presented in Table 2. The groundwater elevation data indicates that the groundwater flow direction is to the east/northeast, with a hydraulic gradient of approximately 0.006 foot/foot (ft/ft). A groundwater elevation map for March 9-10, 2000 is presented in Figure 2.

A Geosquirt® submersible pump was used for purging and sampling of the wells during previous quarterly sampling events conducted at the facility. Purging of wells was initiated with a Geosquirt® submersible pump during the March 2000 sampling event, but there was insufficient water in each of the wells at the facility to sustain operation of the submersible pump, so purging and sampling of the wells were completed using disposable bailers. The groundwater elevation data presented in Table 2 indicate that groundwater levels have declined in all monitor wells at the facility since late 1995. Figure 3 displays graphical representations of groundwater elevation versus time in monitor wells MW-1, MW-7, and MW-8, which are typical of the wells at the facility. The data presented in Table 2 and Figure 3, in conjunction with the inability of the wells to sustain pumping, indicate that an alternative pump should be used for purging and sampling in future groundwater sampling events if water levels remain comparable to or decrease relative to March 2000 levels.

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Field parameter measurements for pH, conductivity, oxidation-reduction (redox) potential, dissolved oxygen, and temperature were collected during and upon completion of well purging. 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 measured in selected wells upon conclusion of purging activities to further assist in assessment of natural attenuation potential. Turbidity of groundwater was also typically measured upon conclusion of purging activities. The field parameter readings were recorded on the groundwater sampling forms included in Appendix A. Field readings for the groundwater sampling event are summarized in Table 3.

Groundwater samples were collected after completion of purging operations using disposable PVC bailers. 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 usage. Decontamination procedures consisted of washing with fresh water and a non-phosphate detergent, then rinsing with deionized water. Purge water was discharged to the on-site water reclamation system for re-use 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 8021B, PAHs by EPA Method 8310, and the eight RCRA metals by the EPA 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. Analysis of groundwater samples for methane/ethylene/ethane was also performed to assist in \\BCHOU01\PROJECTS\Wp\BJSERV\12832\060r.doc 3

"Use or disclosure of data contained on this sheet is subject to the restriction specified at the beginning of this document."

evaluation of natural attenuation processes at the facility. The laboratory analytical reports and chain-of-custody documentation for the groundwater samples collected during the March 2000 sampling event are provided in Appendix B.

Current and cumulative analytical results for BTEX, TPH-D, and TPH-G are presented in Table 4. Current and cumulative analytical results are presented in Table 5 for groundwater quality parameters as well as PAHs and RCRA metals detected in one or more wells in one or more sampling events since August 1995. The 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, 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 seven of the 13 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 all monitor wells except MW-10, MW-12, and MW-13. Figure 4 presents a benzene concentration and total BTEX distribution map for the March 2000 sampling event. A total petroleum hydrocarbon distribution map for the March 2000 sampling event is presented in Figure 5.

Benzene was not detected monitor wells MW-1, MW-3, and MW-4, which are located near the former source area. Benzene concentrations in a nearby off-site monitor well, MW-9, have not exceeded 0.01 mg/L since March 1997. Benzene has not been detected in monitor wells MW-1 or MW-9 since September 1998. Benzene has not been detected in monitor wells MW-3 and MW-4 since June 1999 and March 1999, respectively.

The vertical decrease in benzene concentration from 0.093 mg/L in monitor well MW-12 (screened at a depth of 50 feet to 65 feet bgs) to less than 0.001 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 to the uppermost portion of the aquifer. Similar vertical gradients in benzene

concentrations at the MW-12/MW-12D location have been observed during each of the four quarterly groundwater sampling events conducted since the installation of monitor well MW-12D prior to the June/July 1999 sampling event at the facility. There have been no detections of BTEX constituents throughout the monitoring history of monitor well MW-12D. It is therefore recommended that sampling of monitor well MW-12D be discontinued.

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. Adjustments to the biosparging system were made on July 14, 1999 to increase air flow to biosparging system Lateral No. 1, located in the eastern portion of the plume associated with the former fueling system (i.e., the western plume). These adjustments resulted in decreases in the concentration of benzene in monitor well MW-13 from 1.5 mg/L on July 2, 1999 to 0.088 mg/L on March 10, 2000, as displayed graphically in Figure 6. Similarly, the total BTEX concentration in monitor well MW-13 decreased from 2.331 mg/L on July 2, 1999 to 0.292 mg/L on March 10, 2000.

### 2.3 Natural Attenuation Evaluation

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

The primary evidence of natural attenuation is plume behavior. A plume is shrinking when the rate of hydrocarbon loading from a source area is less than the rate of natural degradation of hydrocarbons. Plume shrinkage in the absence of aggressive remediation is indicative of the occurrence of natural attenuation processes. Conversely, a plume is expanding if the rate of hydrocarbon loading from a source area is greater than the rate of natural degradation of hydrocarbons through natural attenuation processes.

The former field waste tanks in the eastern portion of the facility were removed in March 1997.

Concentrations of total BTEX in monitor wells in the area of the former field waste tanks have been

generally stable or declining subsequent to removal of the field waste tanks. The concentration of total BTEX in monitor well MW-10 increased from 24.2 mg/L in December 1999 to 354.1 mg/L in March 2000, however. Other sporadic increases in total BTEX concentrations between quarterly sampling events have been observed in monitor wells MW-10 and MW-12 since March 1997. These increases may be attributed to sporadic loading rates from the vadose zone in excess of the natural attenuation rate of the area.

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, 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 may be utilized during intrinsic bioremediation. Dissolved oxygen concentrations should therefore be depressed in areas where intrinsic bioremediation is occurring.

March 2000 dissolved oxygen data for the facility is inconclusive because oxygen is typically added to groundwater when a bailer is used for well purging and sampling. However, historic evidence submitted to the NMOCD in previous quarterly groundwater monitoring reports for the facility has indicated that dissolved oxygen concentrations are typically depressed in monitor wells MW-10 and MW-12 relative to monitor well MW-11A (which is located at the fringe of the eastern plume and which displays lower to non-detectable hydrocarbon concentrations) and to non-impacted monitor wells at the facility, suggesting that natural attenuation of hydrocarbons in the eastern plume is occurring.

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 0.15 mg/L in monitor wells MW-10, MW-11A, MW-12, and MW-12D during the March 2000 sampling event. These concentrations are less than the background nitrate concentration of 5.3 mg/L measured in monitor well MW-5 (see Table 6). The low nitrate concentrations in monitor wells MW-10, MW-11A, MW-12, and MW-12D suggest that natural attenuation of hydrocarbons is occurring in the former field waste tanks area of the facility.

No BTEX constituents were detected in downgradient well OW-4. The nitrate concentration of 3.6 mg/L in monitor well OW-4 is comparable to the nitrate concentration of 5.3 mg/L observed in background well MW-5. The combination of a non-detectable BTEX concentration and a near-background nitrate concentration in downgradient well OW-4 supports the contention that the low nitrate concentrations observed in monitor wells MW-10, MW-11A, MW-12, and MW-12D reflect natural attenuation of hydrocarbons in the former field waste tanks area rather than a simple eastward decrease in nitrate content of groundwater at the facility.

3. When dissolved oxygen 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 3.2 mg/L to 9.8 mg/L in monitor wells MW-10, MW-11A, and MW-12, and at a concentration of 0.4 mg/L in monitor well MW-12D, as shown in Table 3. Ferrous iron was not detected in monitor wells MW-5, MW-7, MW-8, and OW-4, which are situated at upgradient, sidegradient, and downgradient locations relative to the hydrocarbon plumes at the facility. The elevated ferrous iron concentrations in monitor wells MW-10, MW-11A, MW-12, and MW-12D provide evidence that natural attenuation of hydrocarbons is occurring at the former field waste tanks area.

4. 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 electron acceptors such as dissolved oxygen and nitrate has occurred.

The concentration of methane is elevated in former field waste tanks area monitor 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 as an electron acceptor during natural attenuation processes may be occurring locally in the area of the former field waste tanks.

- 5. Redox is a measure of chemical energy in groundwater. Redox in background well MW-5 was measured at 38.3 millivolts (mV), as shown in Table 3. Redox values in the vicinity of former field waste tanks area wells MW-10, MW-11A, MW-12, and MW-12D ranged from -83.5 mV to -109 mV. The negative redox values in the former field waste tank area monitor wells suggest that electron acceptors other than dissolved oxygen and nitrate (e.g., carbon dioxide) are being utilized in this area.
- 6. Alkalinity is expected to increase during natural attenuation processes, due to the leaching of carbonates from mineral substrates by microbially produced organic acids. Review of field-generated geochemical data presented in Table 3 indicates that alkalinity

is elevated in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12 relative to upgradient and sidegradient monitor wells MW-5, MW-7, and MW-8. The increased alkalinity measured in monitor wells MW-10, MW-11A, and MW-12 also suggests that natural attenuation of hydrocarbons in the area of the former field waste tanks area is occurring. It should be noted, however, that the alkalinity of groundwater from downgradient monitor well OW-4 is comparable to the alkalinity measured in monitor wells MW-10, MW-11A, and MW-12.

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

In conclusion, dissolved oxygen and nitrate data from this and previous groundwater sampling events suggest that these constituents are acting as electron acceptors during intrinsic bioremediation processes that are ongoing at the facility. Similarly, increases in ferrous iron and methane concentrations in former field waste tanks area monitor wells suggest that ferric iron and carbon dioxide are serving locally as electron acceptors during intrinsic bioremediation of hydrocarbons in this area. Redox and alkalinity data also indicate that intrinsic bioremediation is occurring at the facility. It is recommended that monitoring for natural attenuation evaluation parameters continue in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12, downgradient well OW-4, and upgradient well MW-5. Redox, dissolved oxygen content, and alkalinity are good indicators of the occurrence of aerobic bioremediation of hydrocarbons, so it is also recommended that field testing for these parameters be performed in all wells to be sampled during upcoming groundwater monitoring events.

### 3.0 REMEDIATION SYSTEM

Based on the results of previous investigations conducted by Brown and Caldwell and Roberts/Schornick and Associates, Inc., Brown and Caldwell recommended the installation of a biosparging system in a Remedial Action Plan (RAP) submitted to the NMOCD in May 1994. The NMOCD approved the RAP on August 11, 1994.

Biosparging 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, biosparging removes volatile and semivolatile contaminants from the saturated zone. Biosparging 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 content of groundwater and soil moisture present in the capillary fringe and vadose zone, thus facilitating 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

Nineteen combined injection and extraction wells, three vacuum extraction wells, one extraction blower, one injection blower, and associated piping were installed between August 2 through August 24, 1995. 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 that were near the center of the western plume, which is 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 of air to wells with less screen submergence. Three additional vapor extraction wells, VE-5 through VE-7, were also installed in NBCHOUOINPROJECTS(WPNBJSERV)12832\0000060r.doc

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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 and total BTEX concentrations measured in monitor well MW-1 have displayed a nearly continuous decline 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 since the December 1998 sampling event, and total BTEX concentrations decreased from 30.6 mg/L to less than 0.01 mg/L between December 1997 and March 2000.

Benzene concentrations in monitor well MW-3 declined from 0.240 mg/L in December 1997 to less than 0.001 mg/L since September 1999, and total BTEX concentrations decreased from 1.930 mg/L in December 1997 to non-detectable levels since September 1999.

In monitor well MW-4, benzene concentrations decreased from 0.230 mg/L in December 1997 to less than 0.001 mg/L since the June 1999 sampling event. Total BTEX concentrations in monitor well MW-4 dropped from 4.250 mg/L to less than 0.004 mg/L between December 1997 and March 2000.

The observed decreases in benzene and total BTEX concentrations in former fuel island source area monitor wells MW-1, MW-3, and MW-4 are attributable to the effects of the increased air flow supplied by air injection wells AI-20 through AI-24.

Similarly, the application of increased air flow to Lateral No. 1 injection wells AV-16 and AV-17 in mid-July 1999 has resulted in a substantial decrease in the concentrations of benzene and total BTEX in monitor well MW-13 between July 2, 1999 and March 10, 2000, as previously discussed in Section 2.2.

A graph showing the calculated dissolved-phase benzene mass in the western plume versus time is presented in Figure 7. 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.

Air flow within the biosparging system was adjusted during the March 2000 sampling event, based on the previously described decreases in benzene and total BTEX concentrations in monitor wells MW-1, MW-3, and MW-4, which are located near the center of the former western plume, and to further increase remedial pressure in the area of monitor well MW-13, which is located in the downgradient portion of the western plume. Specifically, air flow to Lateral Nos. 4S, 5S, 6S, and 7S (i.e., air injection/vacuum extraction wells AV-1 through AV-8 and vacuum extraction wells VE-1 through VE-4, as shown in Figure 8) was shut off to evaluate the effect of decreased air flow on benzene and total BTEX concentrations in the center of the former western plume. If benzene and total BTEX concentrations in monitor wells MW-1, MW-3, and MW-4 remain constant or decrease in the upcoming June 2000 groundwater sampling event, then Brown and Caldwell recommends shutting down Lateral Nos. 2S, 3S, and 1D through 5D prior to other future groundwater sampling events and evaluating the effect of those actions on concentrations of benzene, total BTEX, and dissolved oxygen in monitor wells at the former fuel island area of the facility. Consideration will be given to resuming air flow in Lateral Nos. 4S, 5S, 6S, and 7S if increases in benzene or total BTEX concentrations or decreases in dissolved oxygen concentrations are observed in monitor wells MW-1, MW-3, and MW-4 during the June 2000 sampling event.

The air injection lines for Lateral Nos. 1S, 2S, 3S, 4S, 6S, and 7S are plumbed to a single injection blower. The shut off of air flow to Lateral Nos. 4S, 6S, and 7S will thus also result in

increased air flow and remedial pressure to injection wells AV-16 and AV-17 within Lateral No. 1S, which are located upgradient of monitor well MW-13 (see Figure 1).

### 3.2 Air Emissions

The vapors recovered during the extraction process are discharged to the atmosphere in accordance with State of New Mexico air quality regulations. Following initial system startup operations, effluent air samples were collected on a monthly basis to monitor the biosparging process and the 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 substantial 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 pound per hour (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 flame ionization detector (FID) to measure the VOC concentration of the vapors in the field commenced in September 1997. VOC measurements collected using a FID correspond to TPH concentrations previously determined in the analytical laboratory. A VOC concentration of 65 ppmv was measured during the March 2000 sampling event using a FID.

The March 2000 TPH concentration of 65 ppmv is substantially less than the 1500 ppmv TPH discharge rate calculated for the March 24, 1998 sampling event, and is comparable to TPH concentrations measured during the time period from August 1996 through December 1997 (prior

to the system modifications performed in February/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 and associated adjustments to air injection rates. Discharge rates have returned to typical pre-modification levels during the period from June 1998 through March 2000.

The VOC emissions rate calculated for the March 2000 sampling event is 0.092 lb/hour, which is less than the regulatory limit of 10 lb/hour for VOCs. The March 2000 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 0.003 lb/hour and 0.33 lb/hour during the time period of June 1998 through March 2000.

The initial increase in mass transfer rates after the February/March 1998 system modification is indicative of increased stripping of hydrocarbons within soil and groundwater from pathways that were not in contact with injected air prior to the system modification. The subsequent decrease in mass transfer, in concert with plume mass calculations shown in Figure 7, indicate that the overall contaminant mass has been reduced by operation of the biosparging system. A cumulative summary of air emissions monitoring data is presented in Table 7. These results are based on both laboratory analyses and field measurements.



### 4.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on information obtained during the March 2000 groundwater sampling event at the BJ Services Hobbs, New Mexico facility.

### 4.1 Conclusions

- Groundwater flow was to the east/northeast at a hydraulic gradient of 0.006 ft/ft.
- Dissolved benzene, BTEX, and TPH concentrations in monitor wells located near the center of the former fueling system source area are below applicable standards.
- Benzene concentrations in all monitor wells at the facility except MW-10, MW-12, and MW-13 are less than the New Mexico WQCC standard of 0.01 mg/L for benzene.
- Increases in air flow rates to biosparge injection wells AI-16 and AI-17 have resulted in substantially decreased benzene and total BTEX concentrations in monitor well MW-13 between July 2, 1999 and March 10, 2000.
- No BTEX or TPH constituents have been 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. Comparison of this data to BTEX and TPH concentrations in adjacent monitor well MW-12, which is screened in the uppermost portion of the aquifer, suggests that hydrocarbon impact to groundwater, where present at the facility, is limited to the uppermost portion of the aquifer.
- Natural attenuation processes appear to be occurring in the vicinity of the former field waste tanks that were removed in March 1997.

### 4.2 Recommendations

- Maintain the increased air injection rate to wells AV-16 and AV-17 in the easternmost lateral of the biosparging system in order to exert optimal remedial pressure in the recalcitrant eastern area of the west plume.
- Continue the quarterly groundwater sampling program and the operation and maintenance of the biosparging system.
- Discontinue sampling and analysis of monitor well MW-12D.

- Continue monitoring for natural attenuation parameters in monitor wells MW-5, MW-10, MW-11A, MW-12, and OW-4.
- Perform field testing for redox, dissolved oxygen content, and alkalinity, which are indicators of aerobic bioremediation, in all wells to be sampled during upcoming groundwater monitoring events.
- Continue monitoring hydrocarbon emissions on a quarterly basis using a calibrated field FID.
- Evaluate the impact of the shut off of Lateral Nos. 4S through 7S on benzene and total BTEX concentrations in monitor wells MW-1, MW-3, and MW-4; consider shut down of additional portions of the biosparging system, if warranted.

#### DISTRIBUTION

March 2000 Groundwater Sampling Report BJ Services Company, U.S.A. Hobbs, New Mexico

April 21, 2000

Final Distribution as follows:

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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

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Oil Conservation Division, Hobbs District Office

Post Office Box 1980

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Attention: Mr. Chris Williams

1 copy to: BJ Services Company, U.S.A.

11211 FM 2920

Tomball, Texas 77375

Attention: Ms. Jo Ann Cobb

1 copy to: Brown and Caldwell, Project File

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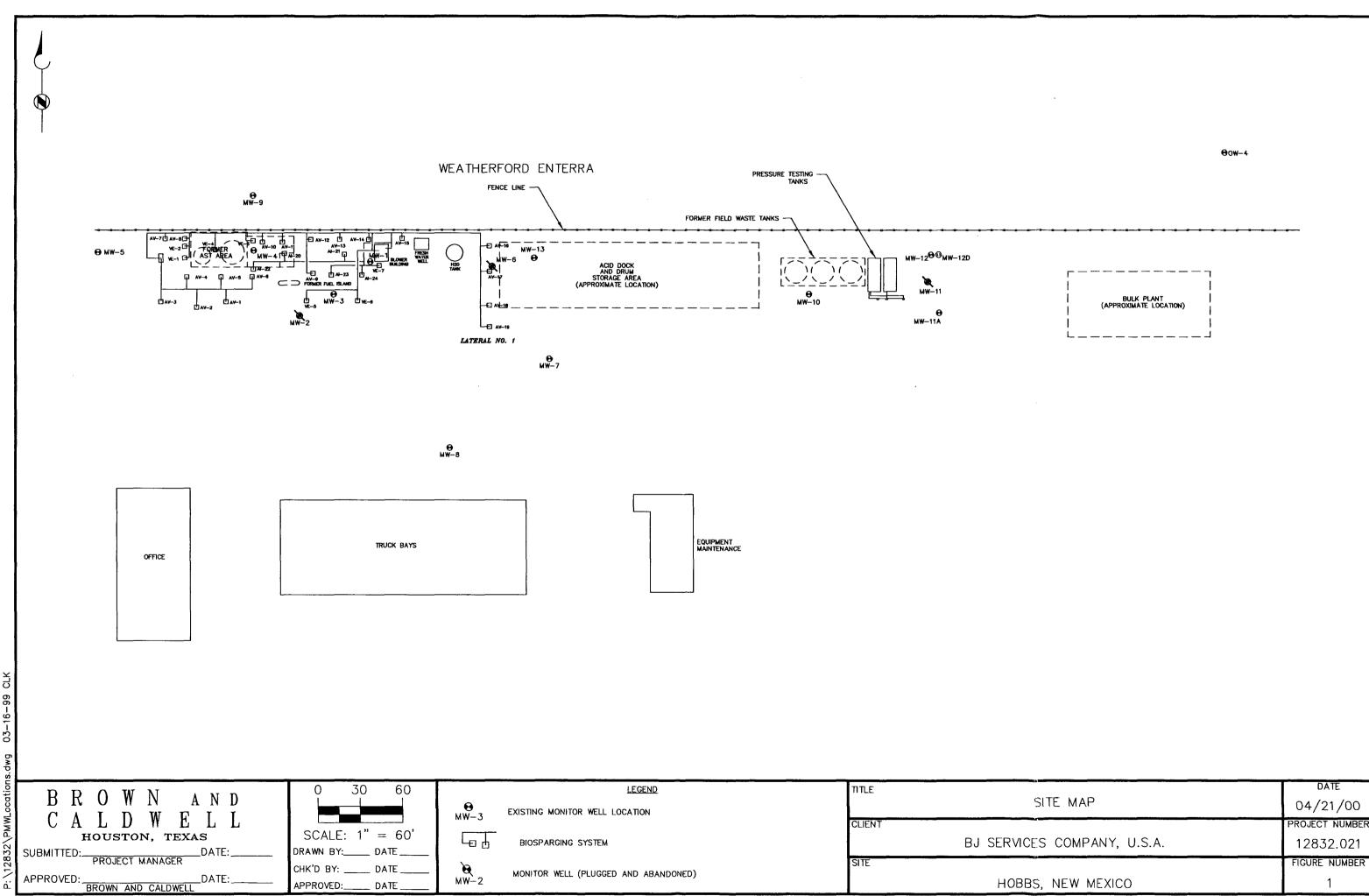
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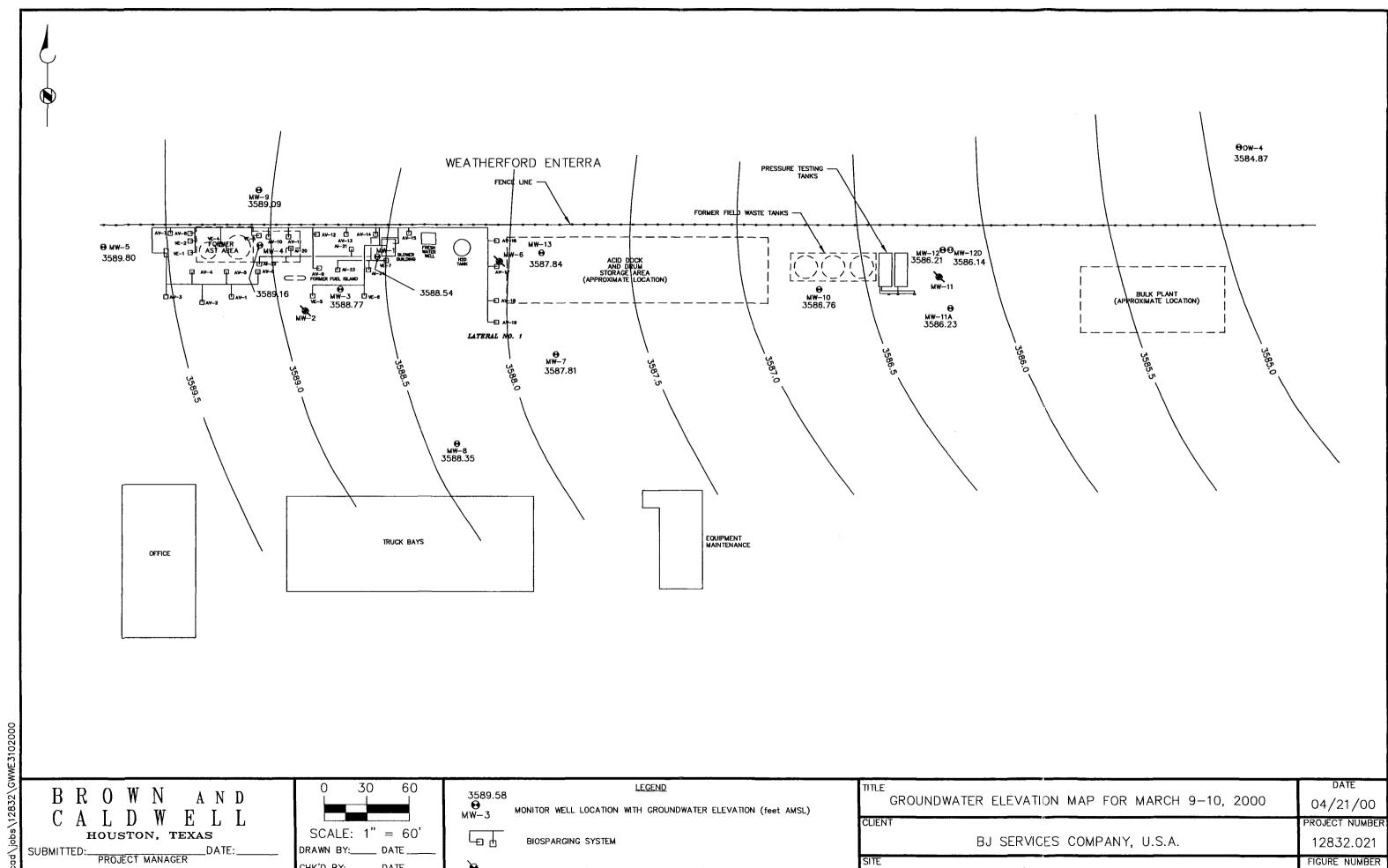
Vice President

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### **FIGURES**

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MONITOR WELL (PLUGGED AND ABANDONED)

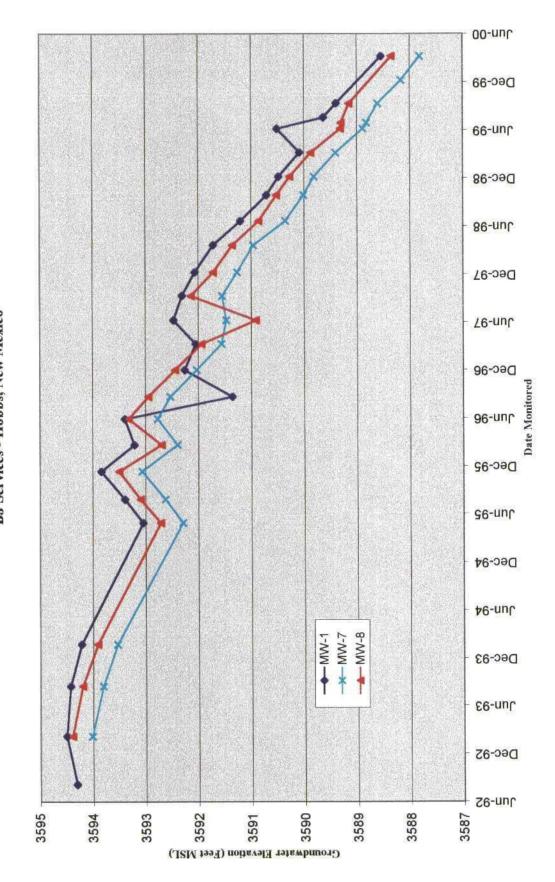
HOBBS, NEW MEXICO

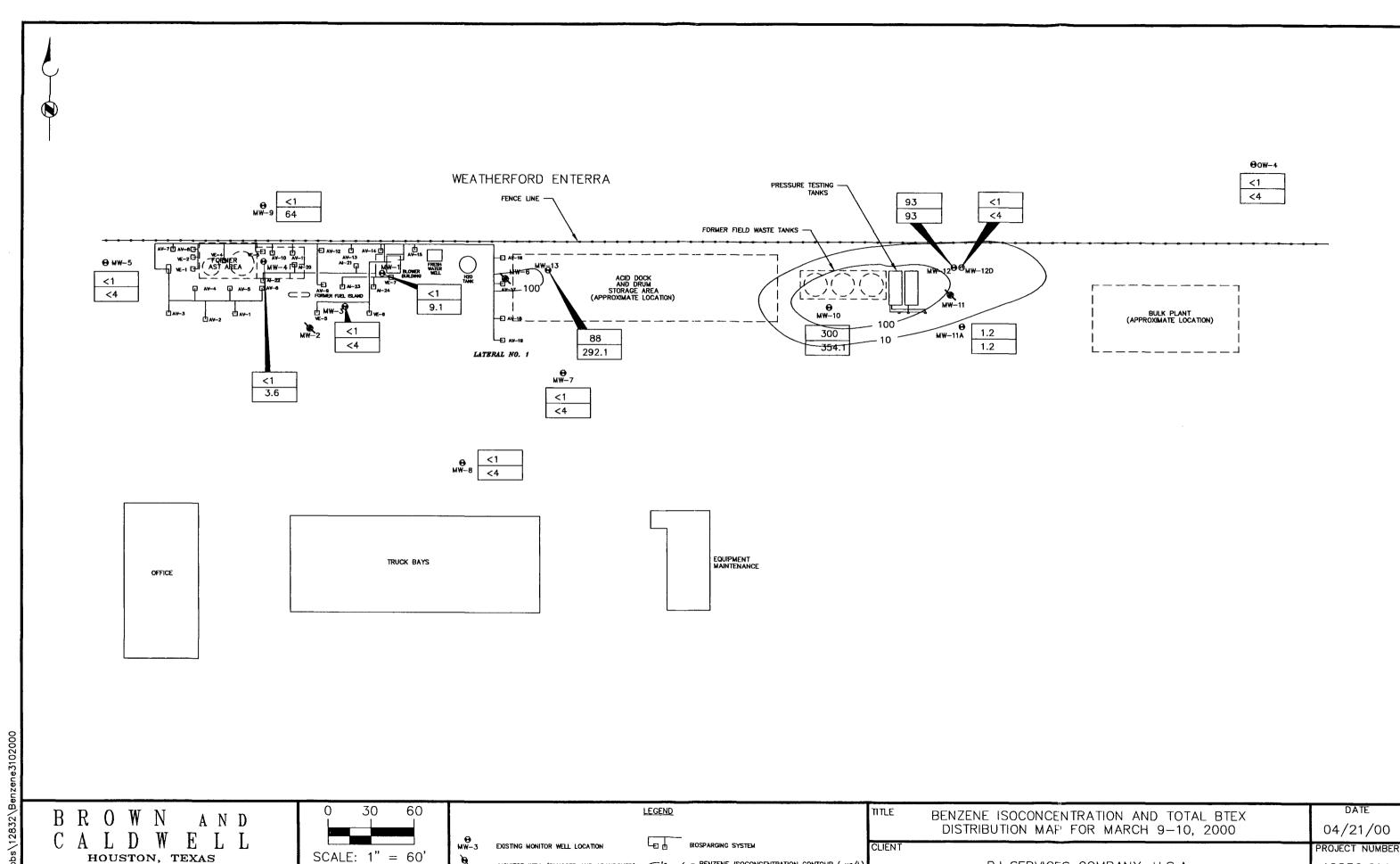
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APPROVED:\_

Groundwater Elevation and Depth to Groundwater versus Time for Monitor Wells MW-1, MW-7, and MW-8 BJ Services - Hobbs, New Mexico FIGURE 3





MONITOR WELL (PLUGGED AND ABANDONED) 10 - BENZENE ISOCONCENTRATION CONTOUR ( ug/L)

- BENZENE CONCENTRATION (ug/L)

- TOTAL BTEX CONCENTRATION (ug/L)

BJ SERVICES COMPANY, U.S.A.

HOBBS, NEW MEXICO

12832.014

FIGURE NUMBER

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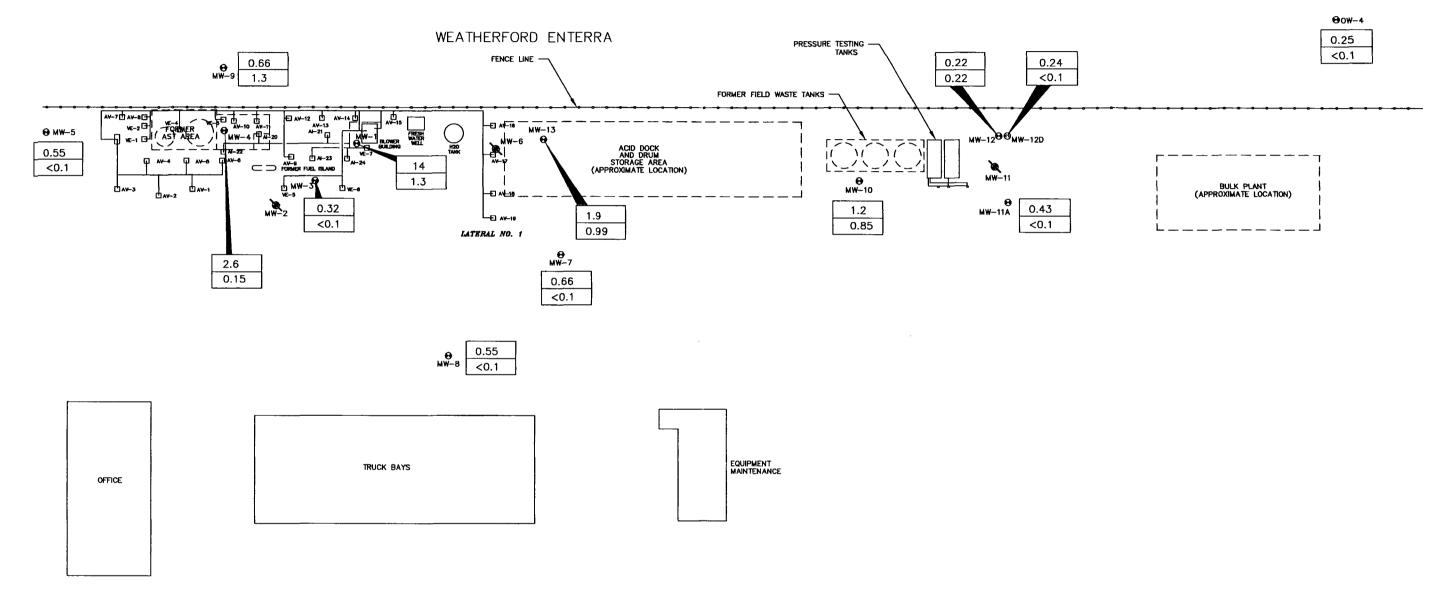
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SUBMITTED: PROJECT MANAGER







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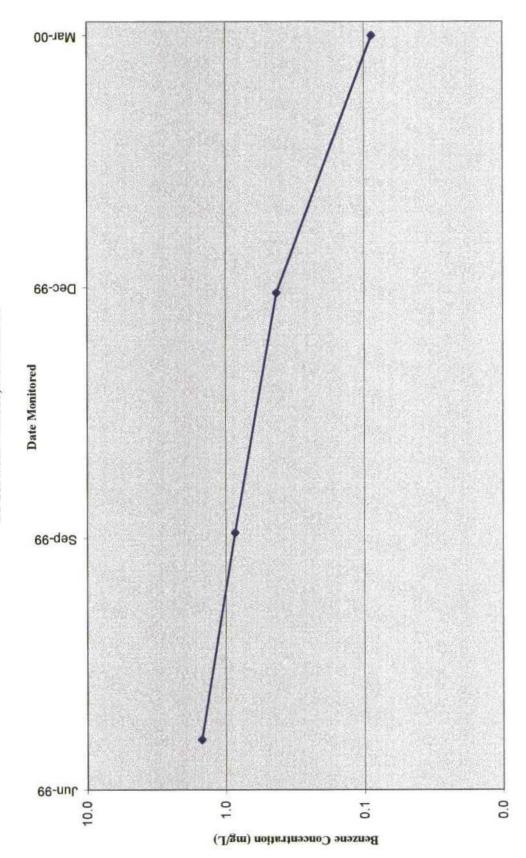
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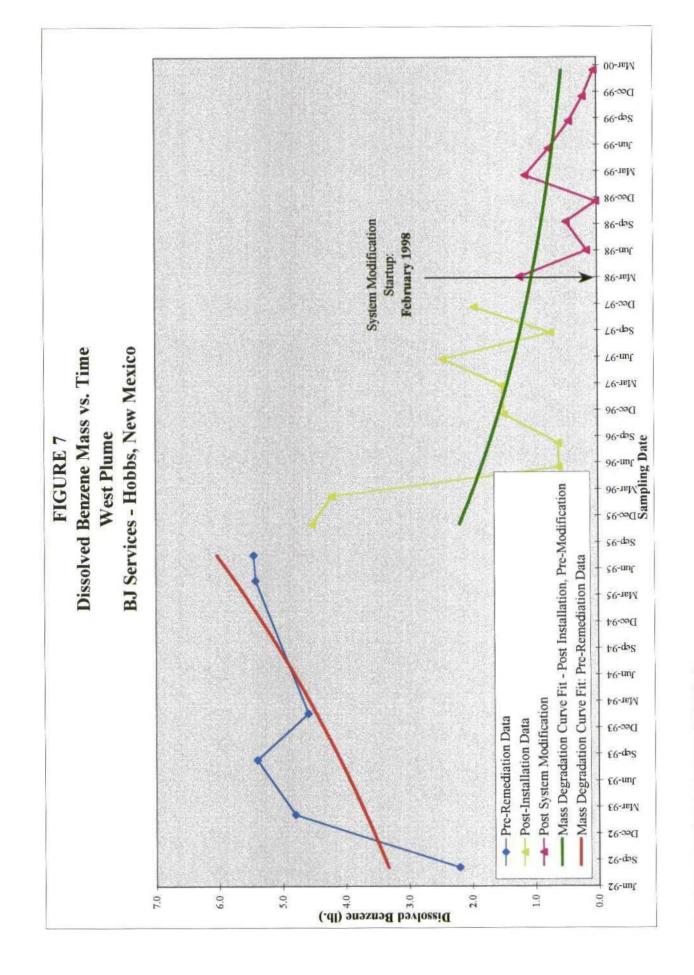
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<b>⊕</b> MW-3	EXISTING MONITOR WELL LOCATION		BIOSPARGING SYSTEM
₩-2	MONITOR WELL (PLUGGED AND ABANDONED)		
<0.2	- TPH-D CONCENTRATION (mg/L)		
<0.1	- TPH-G CONCENTRATION (mg/L)		

TITLE	TOTAL PETROLEUM HYDROCARBONS DISTRIBUTION MAP FOR MARCH 9-10, 2000	04/21/00
CLIENT		PROJECT NUMBER
	BJ SERVICES COMPANY, U.S.A.	12832.014
SITE		FIGURE NUMBER
	HOBBS, NEW MEXICO	5

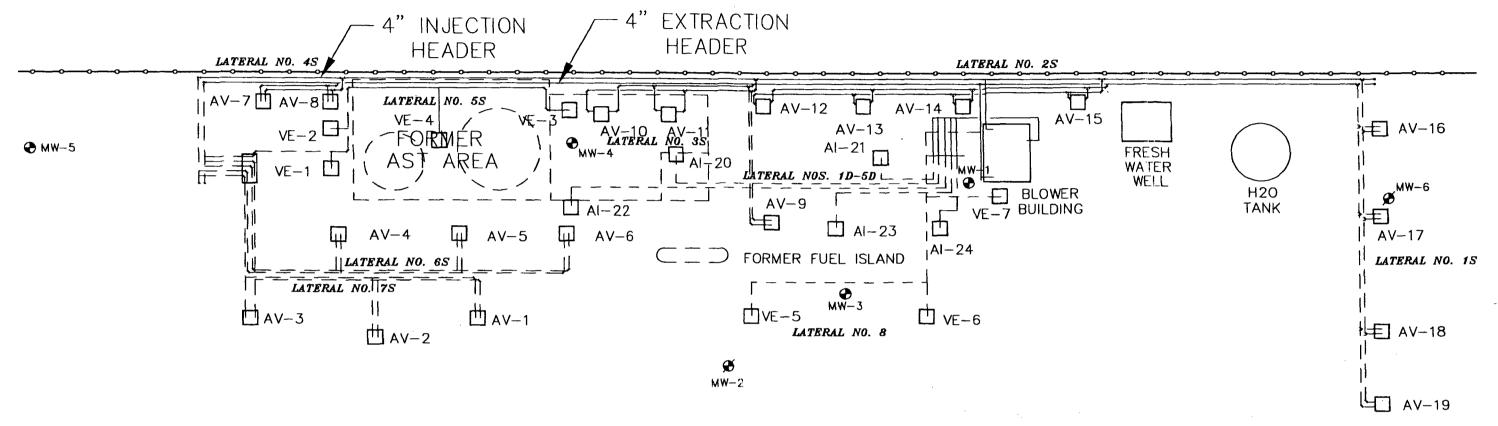
FIGURE 6

Benzene Concentration in Monitor Well MW-13 versus Time
BJ Services - Hobbs, New Mexico









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MONITORING WELL LOCATION AND IDENTIFICATION

MONITORING WELL - P&A'd

EXTRACTION AND INJECTION WELL AV−2

INJECTION WELL

VACUUM EXTRACTION WELL

ABOVE GRADE VACUUM AND INJECTION LINES = BURIED VACUUM AND INJECTION LINES

LATERAL NO.	INJECTION/EXTRACTION WELLS	INJECTION WELLS	EXTRACTION WELLS
LATERAL 1S	AV-16, AV-17, AV-18*, AV-19*		
LATERAL 2S	AV-12, AV-13, AV-14, AV-15		
LATERAL 3S	AV-9, AV-10, AV-11		
LATERAL 4S**	AV-7, AV-8		
LATERAL 5S**	<b>—</b> —		VE-1 TO VE-4
LATERAL 6S**	AV-4, AV-5, AV-6	<b>_</b> _	
LATERAL 7S**	AV-1, $AV-2$ , $AV-3$		
LATERAL 8			VE-5 TO VE-7
LATERAL 1D-5D		AI-20 TO AI-24	

\* - INDIVIDUAL WELL SHUT OFF WITHIN LATERAL-1S ON 07/14/99 \*\* - LATERAL SHUT OFF IN 03/00

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SUBMITTED: PROJECT MANAGER APPROVED: BROWN AND CALDWELL

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ITLE		DATE
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	BJ SERVICES COMPANY, U.S.A.	12832.015
SITE		FIGURE NUMBER
	HOBBS, NEW MEXICO	8

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#### **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 handaugured 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 three 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 new injection wells AI-20 through AI-24.
March 10, 1998	Operation of new air injection wells AI-20 through AI-24 and new vapor extraction wells VE-5 though VE-7 commenced.
March 23-24, 1998	Brown and Caldwell conducted the March 1998 groundwater sampling event.
March 24, 1998	Operation of previously existing injection wells and vapor extraction 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.

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

Date	Activity
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.
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; installed and developed monitor wells MW-12D and MW-13; and sampled monitor wells MW-12D and MW-13 to complete the June/July 1999 groundwater sampling event.
July 14, 1999	Brown and Caldwell redirected air discharge from the shallow well injection system to Lateral No. 1 and optimized air flow to injection wells AI-16 and AI-17 to apply increased remedial pressure to the eastern potion of the west plume.
September 13-14, 1999	Brown and Caldwell conducted the September 1999 groundwater sampling event.
December 9, 1999	Brown and Caldwell conducted the December 1999 groundwater sampling event.
March 9-10, 2000	Brown and Caldwell conducted the March 2000 groundwater sampling event and shut off air flow to biosparging system Lateral Nos. 4S, 5S, 6S, and 7S.

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-1	3,647.53	08/10/92	53.22	0.00	3,594.31	(1)
		02/09/93	53.03	0.00	3,594.50	(-)
		08/18/93	53.10	0.00	3,594.43	
		01/26/94	53.31	0.00	3,594.22	
		05/03/95	54.64	0.20	3,593.05	(2)
		07/31/95	54.14	0.00	3,593.39	(2)
		11/14/95	53.69	0.00	3,593.84	
		02/23/96	54.32	0.00	3,593.21	
		05/31/96	54.14	0.00	3,593.39	
		08/23/96	56.17	0.00		
		12/02/96	55.27		3,591.36	
		03/12/97	55.70	0.00	3,592.26	
		06/12/97		0.27	3,592.05	
		09/12/97	55.08	0.02	3,592.47	
			55.64	0.51	3,592.31	
		12/10/97	55.46	0.00	3,592.07	PSH Sheen
		03/24/98	55.81	0.00	3,591.72	PSH Sheen
		06/23/98	56.38	0.06	3,591.20	
		09/30/98	56.82	0.00	3,590.71	PSH Sheen
		12/09/98	57.05	0.00	3,590.48	
		03/10/99	57.45	0.00	3,590.08	
		06/10/99	58.02	0.00	3,589.51	
		07/02/99	57.90	0.00	3,589.63	
		09/14/99	58.14	0.00	3,589.39	**
		12/09/99	-	-		(3)
	4	03/09/00	58.99	0.00	3,588.54	,
MW-2	3,644.84	08/10/92	52.82	0.00	3,592.02	(1)
	*	02/09/93	49.60	0.00	3,595.24	
		08/18/93	49.71	0.00	3,595.13	
		01/26/94	49.97	0.00	3,594.87	
•		05/03/95				(4),(5)
MW-3	3,645.00	08/10/92	52.99	0.00	3,592.01	(1)
		02/09/93	52.72	0.00	3,592.28	(-)
		08/18/93	52.82	0.00	3,592.18	
		01/26/94	53.05	0.00	3,591.95	
		05/03/95	54.31	0.00	3,590.69	
		07/31/95	51.24	0.00	3,593.76	
		11/14/95	51.10	0.00	3,593.90	
		02/23/96	51.68	0.00	3,593.32	
		05/31/96	51.45	0.00	3,593.55	
		08/23/96	51.55	0.00	3,593.45	
		12/02/96	52.23	0.00		
	:	03/12/97	52.67	0.00	3,592.77	
		06/12/97	52.68		3,592.33	
		09/11/97		0.00	3,592.32	
		12/10/97	52.71	0.00	3,592.29	
		03/23/98	52.89	0.00	3,592.11	
			53.22	0.00	3,591.78	
		06/23/98	53.66	0.00	3,591.34	
		09/30/98	54.06	0.00	3,590.94	
		12/09/98	54.36	0.00	3,590.64	
		03/10/99	54.72	0.00	3,590.28	
		06/10/99	55.17	0.00	3,589.83	
		07/02/99	55.15	0.00	3,589.85	
		09/14/99	55.42	0.00	3,589.58	
	1	12/09/99	55.78	0.00	3,589.22	

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
		03/09/00	56.23	0.00	3,588.77	<del></del>
MW-4	3,645.28	08/10/92	50.55	0.00	3,594.73	(1)
	2,3.2.2	02/09/93	50.26	0.00	3,595.02	(1)
		08/18/93	50.38	0.00	3,594.90	
		01/26/94	50.90	0.30	3,594.63	
		05/03/95	51.51	0.45	3,594.14	
		07/31/95	51.74	0.26	3,593.75	
		11/14/95	51.03	0.00	3,594.25	
		02/23/96	51.65	0.01	3,593.64	
		05/31/96	51.48	0.00	3,593.80	
		08/23/96	53.49	0.00	3,591.79	
		12/02/96	52.32	0.00	3,592.96	
		03/12/97	52.74	0.05	3,592.58	
		06/12/97	53.08	0.44	3,592.56	
		09/12/97	52.60	0.15	3,592.80	
		12/10/97	52.89	0.00	3,592.39	PSH Sheen
		03/24/98	53.20	0.25	3,592.29	
		06/23/98 09/30/98	53.82 53.96	0.22	3,591.64	200 -1 DGIT
			54.27	0.00	3,591.32	200 ml PSH
		12/09/98 03/10/99	54.69	0.00 0.04	3,591.01	
*		06/10/99	55.07	0.04	3,590.62 3,590.21	
**	·	07/02/99	55.10	0.00	3,590.21	2 .
		09/14/99	55.33	0.00	3,589.95	
		12/09/99	55.79	0.00	3,589.49	•
		03/10/00	56.12	0.00	3,589.16	
MW-5	3,647.72	08/10/92	52.38	0.00	3,595.34	(1)
	,	02/09/93	52.06	0.00	3,595.66	(-)
		08/18/93	52.16	0.00	3,595.56	
		01/26/94	52.50	0.00	3,595.22	
	į	05/03/95	53.57	0.00	3,594.15	
		07/31/95	53.27	0.00	3,594.45	
		11/14/95	52.83	0.00	3,594.89	
		02/23/96	53.57	0.00	3,594.15	
	•	05/31/96	53.16	0.00	3,594.56	
		08/23/96	53.41	0.00	3,594.31	
		12/02/96	53.98	0.00	3,593.74	
		03/12/97	54.44	0.00	3,593.28	
		06/12/97	54.48	0.00	3,593.24	
		09/12/97	54.29	0.00	3,593.43	
		12/10/97	54.66	0.00	3,593.06	
		03/23/98	55.05	0.00	3,592.67	
		06/23/98	55.44	0.00	3,592.28	
	1	09/30/98	55.65	0.00	3,592.07	
		12/09/98	56.00	0.00	3,591.72	
		03/09/99	56.45	0.00	3,591.27	
	1	06/10/99	56.91	0.00	3,590.81	
		07/02/99	56.93	0.00	3,590.79	
		09/14/99	57.12	0.00	3,590.60	
		03/09/00	57.41 57.92	0.00	3,590.31 3,589.80	
MW-6	3,644.74	02/09/93	50.58	0.00		(1)
TAT AA _O	3,044.74	04/07/73	1 20.20	1 0.00	3,594.16	(1)

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
		01/26/94	51.00	0.00	3,593.74	
		05/03/95	52.63	0.00	3,592.11	
		07/31/95	51.90	0.00	3,592.84	
		11/14/95	51.19	0.00	3,593.55	
		02/23/96	52.10	0.00	3,592.64	
		05/31/96	51.76	0.00	3,592.98	
		08/23/96	51.63	0.00	3,593.11	
		12/02/96	52.85	0.00	3,591.89	
		03/12/97	53.55	0.00	3,591.19	
		06/12/97	52.08	0.00	3,592.66	
		09/11/97	53.72	0.00	3,591.02	
		12/10/97	53.27	0.00	3,591.47	
		03/23/98	53.56	0.00	3,591.18	
		06/23/98	52.88	0.00	3,591.86	
		09/30/98	54.89	0.00	3,589.85	
		12/09/98	54.57	0.00	3,590.17	
		03/10/99	55.10	0.00	3,589.64	
		07/02/99				(5),(6)
MW-7	3,644.55	02/09/93	50.53	0.00	3,594.02	(1)
		08/18/93	50.74	0.00	3,593.81	` '
		01/26/94	51.01	0.00	3,593.54	
		05/03/95	52.25	0.00	3,592.30	
	·	07/31/95	51.92	0.00	3,592.63	
		11/14/95	51.48	0.00	3,593.07	
		02/23/96	52.15	0.00	3,592.40	
		05/31/96	51.78	0.00	3,592.77	
		08/23/96	52.02	0.00	3,592.53	
		12/02/96	52.52	0.00	3,592.03	
		03/12/97	52.99	0.00	3,591.56	
		06/12/97	53.08	0.00	3,591.47	
		09/11/97	53.00	0.00	3,591.55	
		12/10/97	53.28	0.00	3,591.27	
		03/23/98	53.59	0.00	3,590.96	
		06/23/98	54.20	0.00	3,590.35	
	1	09/30/98	54.54	0.00	3,590.01	
		12/09/98	54.74	0.00	3,589.81	
		03/09/99	55.15	0.00	3,589.40	
		06/10/99	55.66	0.00	3,588.89	
	ļ .	07/02/99	55.73	0.00	3,588.82	
		09/13/99	55.94	0.00	3,588.61	
		12/09/99	56.38	0.00	3,588.17	
		03/09/00	56.74	0.00	3,587.81	
MW-8	3,644.87	02/09/93	50.48	0.00	3,594.39	(1)
	1	08/18/93	50.67	0.00	3,594.20	
		01/26/94	50.96	0.00	3,593.91	
		05/03/95	52.15	0.00	3,592.72	
	1	07/31/95	51.77	0.00	3,593.10	
		11/14/95	51.37	0.00	3,593.50	
	1	02/23/96	52.17	0.00	3,592.70	
		05/31/96	51.55	0.00	3,593.32	
	}	08/23/96	51.92	0.00	3,592.95	
		12/02/96	52.43	0.00	3,592.44	
		03/12/97	52.93	0.00	3,591.94	
		06/12/97	53.96	0.00	3,590.91	

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
		09/11/97	52.73	0.00	3,592.14	
		12/10/97	53.15	0.00	3,591.72	
		03/23/98	53.51	0.00	3,591.36	
		06/23/98	54.01	0.00	3,590.86	
		09/30/98	54.35	0.00	3,590.52	
		12/09/98	54.60	0.00	3,590.27	
		03/09/99	55.00	0.00	3,589.87	
		06/10/99	55.56	0.00	3,589.31	
		07/02/99	55.57	0.00	3,589.30	
		09/13/99	55.72	0.00	3,589.15	
		12/09/99	-	_	-,	(3)
		03/09/00	56.52	0.00	3,588.35	(3)
MW-9	3,644.78	04/22/93	49.73	0.00	3,595.05	(1)
		07/15/93	49.65	0.00	3,595.13	` ,
		08/18/93	49.85	0.00	3,594.93	
		01/26/94	50.02	0.00	3,594.76	
		05/03/95	51.35	0.00	3,593.43	
	1	07/31/95	50.97	0.00	3,593.81	
		11/14/95	50.43	0.00	3,594.35	
		02/23/96	51.12	0.00	3,593.66	
		05/31/96	50.89	0.00	3,593.89	
1		08/23/96	50.98	0.00	3,593.80	
		12/02/96	51.58	0.00	3,593.20	•
*	Į	03/12/97	52.21	0.05	3,592.61	•
	·	06/12/97	52.10	0.00	3,592.68	PSH Sheen
		09/12/97	51.95	0.00	3,592.83	PSH Sheen
		12/10/97	52.37	0.00	3,592.41	PSH Sheen
		03/23/98	52.68	0.00	3,592.10	PSH Sheen
		06/23/98	53.08	0.00	3,591.70	PSH Sheen
		09/30/98	53.39	0.01	3,591.40	PSH Sheen
		12/09/98	53.68	0.00	3,591.10	
	•	03/10/99	54.15	0.00	3,590.63	
		06/10/99	54.68	0.00	3,590.10	
		07/02/99	54.71	0.00	3,590.07	
		09/13/99	54.71	0.00	3,590.07	(2)
		12/09/99 03/09/00	55.69	0.00	3,589.09	(3)
MW-10	3,644.47	08/18/93	51.54	0.00	3 502 02	(1)
1AT AA - 1A	3,044.47		1		3,592.93	(1)
		01/26/94	51.90	0.00	3,592.57	
		05/03/95	52.97	0.00	3,591.50	
		07/31/95	52.87	0.00	3,591.60	
		11/14/95	52.51	0.00	3,591.96	
		02/23/96	53.05	0.00	3,591.42	
		05/31/96	52.79	0.00	3,591.68	
					I i	
		08/23/96	53.03	0.00	3,591.44	
		12/02/96	53.41	0.00	3,591.06	
		03/12/97	54.21	0.00	3,590.26	
		06/12/97	53.99	0.00	3,590.48	
		09/12/97	53.94	0.00	3,590.53	
		12/10/97	54.12	0.00	· ·	
		l l			3,590.35	
	1	03/23/98	54.51	0.00	3,589.96	

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
		06/23/98	55.12	0.00	3,589.35	· · · · · · · · · · · · · · · · · · ·
		09/30/98	55.61	0.00	3,588.86	
		12/09/98	55.80	0.00	3,588.67	
		03/09/99	56.09	0.00	3,588.38	
		06/10/99	56.60	0.00	3,587.87	
		07/02/99	56.64	0.00	3,587.83	
		09/14/99	56.91	0.00	3,587.56	
		12/09/99	57.37	0.00	3,587.10	
		03/10/00	57.71	0.00	3,586.76	
MW-11	3,643.78	08/18/93	51.92	0.00	3,591.86	(1)
	,	01/26/94	52.32	0.00	3,591.46	(1)
		05/03/95	53.38	0.00	3,590.40	
		07/31/95	53.35	0.00	3,590.43	
ļ		11/14/95	52.96	0.00	3,590.82	
		02/23/96	53.50	0.00	3,590.28	
		05/31/96	53.25	0.00	3,590.53	
		08/23/96	53.49	0.00	3,590.29	
		12/02/96	53.79	0.00	3,589.99	
	,	03/12/97	53.81	0.00	3,589.97	
	•	06/12/97	53.96	0.00	3,589.82	
	· ·	09/12/97	52.93	0.00	3,590.85	
		12/10/97			,	(5),(6)
иW-11A	3,644.24	03/23/98	54.79	0.00	3,589.45	(7)
		06/23/98	55.43	0.00	3,588.81	(/)
		09/30/98	55.96	0.00	3,588.28	
		12/09/98	56.13	0.00	3,588.11	
		03/10/99	56.43	0.00	3,587.81	
		06/10/99	56.94	0.00	3,587.30	
		07/02/99	57.01	0.00	3,587.23	
,		09/14/99	57.36	0.00	3,586.88	
		12/09/99	57.72	0.00	3,586.52	
	, 	03/09/00	58.01	0.00	3,586.23	
MW-12	3,644.29	03/23/98	54.72	0.00	3,589.57	(7)
		06/23/98	55.48	0.00	3,588.81	(7)
		09/30/98	56.02	0.00	3,588.27	
		12/09/98	56.17	0.00	3,588.12	
		03/10/99	56.45	0.00	3,587.84	
		06/10/99	56.97	0.00	3,587.32	
		07/02/99	56.99	0.00	3,587.30	
		09/14/99	57.41	0.00	3,586.88	
		12/09/99	57.76	0.00		
		03/10/00	58.08	0.00	3,586.53 3,586.21	
/W-12D	3,644.38	07/02/99	57.13	0.00	2 507 25	(0)
	5,511.50	01102133	31.13	1 0.00	3,587.25	(8)

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
		12/09/99	57.86	0.00	3,586.52	
		03/09/00	58.24	0.00	3,586.14	
MW-13	3,645.52	07/02/99	56.60	0.00	3,588.92	(9)
· I		09/14/99	56.92	0.00	3,588.60	
		12/09/99	57.28	0.00	3,588.24	
		03/10/00	57.68	0.00	3,587.84	
OW-4	3,644.06	07/02/99	58.18	0.00	3,585.88	(8)
1		09/14/99	58.63	0.00	3,585.43	
1		12/09/99	58.92	0.00	3,585.14	
		03/09/00	59.19	0.00	3,584.87	

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

<sup>(2) -</sup> For wells having measurable thickness of free product, 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) of the free product is 0.82.

<sup>(3) -</sup> Not measured.

<sup>(4) -</sup> Monitor well MW-2 could not be located after January 1994.

<sup>(5) -</sup> Well plugged and abandoned July 2, 1999.

<sup>(6) -</sup> Monitor well MW-11 could not be located after September 12, 1997.

<sup>&</sup>lt;sup>(7)</sup>- TOC elevations for MW-11A and MW-12 estimated relative to TOC elevation for MW-10.

<sup>(8) -</sup> TOC elevations for MW-12D and OW-4 estimated relative to TOC elevation for MW-12.

<sup>(7) -</sup> TOC elevation for MW-13 estimated relative to TOC elevation for MW-7.

### Table 3 March 9-10, 2000 Field Screening Results for Groundwater Samples Hobbs, New Mexico Facility BJ Services Company, U.S.A.

Monitor Well	Cumulative Gallons Removed	рН	Temperature (°C)	Conductivity (umhos)	Redox (mV)	Dissolved Oxygen (meter) (mg/L)	Dissolved Oxygen (Hach kit) (mg/L)	Ferrous Iron (mg/L)	Alkalinity (mg/L)	Turbidity NTUs <sup>(1)</sup>
N G V (2)	0.5	7.9	17.7	1564	71.3	3.8	NM	NM	NM	74
MW-1 <sup>(2)</sup>	1.5	8.0	17.8	705	74.8	6.2	NM	NM	NM	64
MW-3 <sup>(2)</sup>	1	7.5	18.7	1172	55.6	6.20	NM	NM	NM	NM
MW-3	1.75	7.0	18.4	632	62.9	7.50	NM	NM	NM	440
MW-4 <sup>(2)</sup>	1.5	7.69	16.36	1289	18.4	6.47	NM	NM	NM	238
MW-5 <sup>(2)</sup>	NM	7.58	15.30	1228	38.3	7.72	6.0	0	280	NM
MW-7 <sup>(2)</sup>	NM	7.66	20.68	801	16,1	7.4	7.0	0	300	NM
MW-8 <sup>(2)</sup>	NM	7.5	19.7	764	24.2	4.94	4.0	0	340	NM
MW-9 <sup>(2)</sup>	NM	8.0	19.2	570	75.9	7.26	NM	NM	NM	NM
MW-10 <sup>(3)</sup>	NM	7.1	18.3	1086	-83.5	4.3	0.2	3.2	<i>7</i> 70	185
MW-11A <sup>(2)</sup>	1	7.4	19.10	3875	-111.5	3.19	NM	NM	NM	NM
IVIW-11A	2	7.30	19.2	3980	-93.9	3.56	0.2	9.8	770	NM
	1.0	7.0	17.00	1902	-91.5	4.7	NM	NM	NM	NM
MW-12	2.0	7.1	17.50	1926	-113.4	3.16	NM	NM	NM	NM
	2.5	7.1	17.5	1091	-92.8	4.8	0.6	4.4	770	244
	0	8.1	19.9	1061	-63.3	5.08	NM	NM	NM	NM
MW-12D	0.5	7.9	19.3	1058	-92.4	4.36	NM	NM	NM	NM
	1.0	7.8	19.1	1092	-79.1	5.76	NM	NM	- NM	NM
	1.5	7.7	19.2	929	-109	5.12	4.2	0.4	360	186
MW-13 <sup>(2)</sup>	NM	7.5	17.8	1618	-82.1	4.5	NM	NM	: NM	438
OW-4 <sup>(2)</sup>	NM	7.9	19.47	1481	67	9.3	6.2	0.0	770	NM

<sup>(1)</sup> NTUs = Nephelometric turbidity units

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

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

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

NM=Not Measured

<sup>(2)</sup> Well pumped or pumped dry after removal of less than 3 well volumes.

Table 4

Cumulative BTEX and TPH Analytical Results for Groundwater Samples

Hobbs, New Mexico Facility

BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		micrograi	ns per liter, ug/l	•	milligrams p	er 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
	09/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/09/99	- Togular	NS	NS	NS	NS	NS	NS
	03/09/00	Regular	<1	<1	<1	9.1	14	1.3
	1							
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
	1				_	2.0	1111	1
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	NA NA
	5/4/95	Regular	770	3300	470	1800	NA	NA NA
	8/1/95	Regular	490	2900	890	1600	NA NA	14
	11/15/95	Regular	250	1000	180	440		1
	2/23/96	Regular	120	810	170	560	NA NA	2.9
	5/31/96	Regular	670	3900	1200	2300	NA NA	4
	8/23/96	Regular	330	2200	590			15
	12/2/96	1 -	220	ł		1500	NA 0.80	12
		Regular	1	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

Table 4

Cumulative BTEX and TPH Analytical Results for Groundwater Samples

Hobbs, New Mexico Facility

BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgra	ns per liter, ug/l		milligrams p	er liter, mg/L
	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
	09/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/09/99	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	03/09/00	Regular	< 1	< 1	< 1	< 1	0.32	< 0.1
MW-4	8/10/92	Regular	2594	10360	2160	6740	NA	NA
	2/9/93	Regular	5200	15000	2200	10000	NA	NA
ı	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 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
	09/14/99	Regular	< 1.0	< 1.0	3.3	13.1	0.35	0.17
	12/09/99	Regular	< 1	2.5	2.3	20.1	2	0.53
	03/10/00	Regular	<1	< 1	< 1	3.6	2.6	0.15
) #III 6	0/10/00				_			
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 5/3/95	Regular	8.7	29.9	4	11.3	NA	NA 
	1	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	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	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	< 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

Table 4

Cumulative BTEX and TPH Analytical Results for Groundwater Samples

Hobbs, New Mexico Facility

BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgran	ns per liter, ug/l		milligrams p	er liter, mg/I
	06/10/99	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	< 0.1
	09/14/99	Regular	<1.0	<1.0	<1.0	<2.0	< 0.20	< 0.10
	12/09/99	Regular	< 1	< 1	< 1	<1	< 0.2	< 0.1
	03/09/00	Regular	< 1	< 1	< 1	< 1	0.55	< 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 NA
	8/19/93	Regular	8100	19000	3500	6400	NA.	NA NA
	1/27/94	Regular	7960	20200	3830	6150	NA.	NA NA
	5/4/95	Regular	11000	17000	2900	6000	NA.	NA NA
	8/1/95	Regular	8300	12000	2500	5100	NA.	60
	11/15/95	Regular	8900	17000	2900	5500	NA NA	57
	2/23/96	Regular	8100	10000	2300	4000	NA NA	58
	5/31/96	Regular	83	150	15	51	NA NA	0.57
	5/31/96	Duplicate	87	160	13	47	NA NA	0.57
	8/23/96	Regular	31	28	9.4	7.9	NA NA	0.32
	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	1.8	< 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	< 0.14
	6/23/98	Regular	170	4.1	15	7.2		ľ
	09/30/98	Regular	1000	420	13	270	1.2 4.0	0.51
	12/10/98	Regular	7.6	6.6	1.7	5.8		3.3
	03/10/99	Regular	2500	930	590	1400	2.0 11.0	< 0.1
	03/10/99	Regulai	2300	750	370	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
	09/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/09/99	Regular	< 5	< 5	< 5	< 5	1.8	< 0.10
	03/09/00	Regular	< 1	<1	<1	<1	0.66	< 0.5

Table 4
Cumulative BTEX and TPH Analytical Results for Groundwater Samples
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgram	ns per liter, ug/l		milligrams pe	er liter, mg/L
					·			
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
	09/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0,20	<0.10
	12/09/99	-	NS	NS	NS	NS	NS	NS
	03/09/00	Regular	< 1	< 1	< 1	< 1	-0.55	<0.1
	4/00/03			200				
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	0.23
	06/10/99	Regular	<1.0	1.8	1.8	71	<0.20	0.22

Table 4

Cumulative BTEX and TPH Analytical Results for Groundwater Samples

Hobbs, New Mexico Facility

BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgran	ns per liter, ug/l		milligrams p	er liter, mg/L
	09/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	< 0.10
	12/09/99	-	NS	NS	NS	NS	NS	NS
	03/09/00	Regular	< 1	<1	< 1	64	0.66	1.3
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
	09/14/99	Regular	10	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/09/99	Regular	23	< 1	< 1	1.2	0.44	0.16
	03/10/00	Regular	300	4.3	6.6	43.2	1.2	0.85
MW-11 1	9/10/02	D. 1						
M W - 1 1	8/19/93	Regular	< 2	< 2	< 2	< 2	NA 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 NA	0.2
	11/15/95	Regular	190	2.8	6.2	11	NA 	0.4
	2/23/96 5/31/96	Regular	49	1.2	0.51	4	NA 	0.25
		Regular	300	83	12	28	NA	0.8
	8/23/96	Regular	100 970	1.2 < 5	0.3	4.7	NA	0.26
	12/2/96	Regular		ŀ	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	<0.5
	06/10/99	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	<0.10
	09/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/09/99	Regular	< 5	< 5	< 5	< 5	< 0.20	< 0.10

Table 4

Cumulative BTEX and TPH Analytical Results for Groundwater Samples

Hobbs, New Mexico Facility

BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	трн-С
Well	Date	Туре		microgran	ns per liter, ug/l	•	milligrams p	er liter, mg/L
	03/09/00	Regular	1.2	<1	< 1	< 1	0.43	< 0.1
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
l	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
	09/14/99	Regular	75	< 1.0	< 1.0	< 2.0	<0.20	0.23
	12/09/99	Regular	64	< 1	< 1	< 1	< 0.2	0.21
	03/10/00	Regular	93	< 1	< 1	< 1	< 0.2	0.21
	03/10/00	Duplicate	99	< 1	< 1	< 1	0.22	0.22
								1
MW-12D	07/02/99	Regular	< 5	< 5	< 5	< 5	< 0.20	<0.10
	09/14/99	Regular	< 1.0	< 1.0	< 1,0	< 2.0	< 0.20	<0.10
	12/09/99	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	03/09/00	Regular	< 1	< 1	< 1	< 1	0.24	< 0.1
		_						:
MW-13	07/02/99	Regular	1500	23.0	750	58	2.2	5.1
	09/14/99	Regular	860	16	450	34.4	2.1	3.1
,	12/09/99	Regular	430	16	410	40,9	0.46	3.2
	03/10/00	Regular	88	2.8	200	1.3	1.9	0.99
		]			==-			3.55
OW-4	06/10/99	Regular	<1.0	<1.0	<1.0	4.4	<0.2	<0.10
	09/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/09/99	Regular	< 1	< 1	< 1	< 1	<0.2	<0.10
	03/09/00	Regular	< 1	<1	<1	<1	0.25	<0.1

<sup>&</sup>lt;sup>1</sup> 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.

										ells				:		
Analyte (units)	Sample Date	MW-1	MW-3	MW-4	MW-5	9-WM	WW-7	MW-8	6-WM	MW-10	MW-11	MW-11A	MW-12	MW-10   MW-11   MW-11A   MW-12   MW-13D   MW-13	MW-13	0W-4
Bicarbonate, as CaCO3 (mg/L)																;
	8/1/95	380	430	490	290	029	440	360	220	920	290	AN A	NA V	A A	Ϋ́	Ϋ́
	8/23/96	310	310	210	270	120	400	280	390	520	430	N A	AN A	NA	Y Y	NA V
	3/23-24/98	286	214	175	247	180	309	790	306	557	NA	319	451	NA	NA A	Ϋ́Z
	3/9-10/99	82	309	981	283	286	358	317	333	278	NA	335	386	NA	AN A	NA A
	6/10-1/5/99	NA	NA	Ą	NA	NA	V V	NA	NA	NA	NA	N A	NA A	200	520	316
	3/9-10/00	1.68	248	160	253	NA	301	362	279	455	Y Y	703	402	244	240	1020
Carbonate, as CaCO3 (mg/L)			,			5		<u> </u>	<u>.</u>	91.7	01	4 2	Ą	Ž	Ą	Ϋ́
	8/1/95	01 >	0 v	21 ×	0 :	2 :	2 :	2 5	2 9	2 9	2 5	2 2		. 2	. A	. ¥
	8/23/96	< 10	01 >	01 >	0I v	 2: V	 0 >	0 V	21 >	2 :	oi ;	ď :	ξ,	¥ ;	<b>V</b>	C X
	3/23-24/98	- - -	·	ī,	v	7	₹	~	- V	V	Ž.	- V	v	¥ ;	ć ;	ψ.,
	3/9-10/99	⊽	⊽	7	⊽	⊽	7	~	~	~	ΑN		~	N A	NA A	A A
	6/10-1/5/66	N A	ΝA	A'A	Y.	N.	N A	NA NA	NA VA	Y.	Y Y	AA	Y Z	⊽	⊽	⊽
	3/9-10/00	4	4	Q	4	N.	Q	4	Ġ,	Q	Ϋ́	4	4	Ġ.	Q	₹
Hardness-Total, as CaCO3 (mg/L)														;	;	
	3/23-24/98	430	430	275	342	04	670	740	210	1450	Y Y	1000	0091	K Z	KZ :	۲. ;
	3/9-10/99	250	440	310	340	640	780	680	370	720	Ϋ́	1150	460	N A	Z V	Y.
	3/9-10/00	009	450	200	1200	NA A	099	160	430	760	Ϋ́	880	700	260	540	3000
Hydroxide (mg/L)						;		-				;	;	;	5	ž
	8/1/95	< 10	< 10	< 10	01 >	v 10	01 >	01 >	01 >	< 10	01 >	¥ Z	Ž.	ď ;	4. ;	K X
	8/23/96	< 10	< 10	< 10	01 >	01 >	< 10	01 >	01 >	01 >	01 >	A A	A A	K Z	K K	ď
Methane (mg/L)					2100	200		0.030	2100.07	10.0	 2	0 14	< 0.0012	Ž	X Y	X
	3/23-24/98	7100.0 >	210010 >	7100.0 >	2100.0	700017	7100.0 V	3 2	47	0.035	. Y	160 0	<0.0012	×	N.	NA
	3/9-10/99	K :	Y ;	ď;	7100.02	\$ 5	Z 2	<b>X X</b>	2 2	5 Z	. ×	, X	ĄZ	0.0015	0.0017	<0.0012
	6.10-7/2/99	NA A	NA.	- ∠ Z	K .	K Z	ť.	ζ.	21000	2000		1000	21000	210007	<0.0012	<0.0017
	3/9-10/00	< 0.0012	< 0.0012	< 0.0012	< 0.0012	A A	< 0.0012	0.13	< 0.0012	0.0056	Ž	750.0	7100.0	7100.0	71000	
Anions (mg/L)					•								•			
Chioride	\$6/1/8	160	150	310	130	380	310	350	110	2200	3400	N A	N A	NA	AN	Y Z
	96/22/8	130	140	001	66	210	250	360	140	2000	2900	NA	Υ V	NA	NA	K Z
	3/23-24/98	212	206	126	151	183	223	364	164	2390	N.	940	1200	N.	NA A	Y.
	3/9-10/99	163	156	142	155	411	238	274	123	1160	N.A.	834	314	N.	AN A	A X
	6/10-7/2/99	AN	NA	NA	NA	NA	NA A	ΝĀ	NA	NA A	NA VA	NA	Ϋ́	195	496	266
	3/9-10/00	258	196	961	196	AN	224	241	131	474	Ą.	1290	327	117	276	258
Fluoride										,	;	Ç	,	ž	47	ĄN
	3/23-24/98	6.0	1.2	1.2	9.0	=	<b>8</b> .0	60		1.0	Y Y	6.7	7.4	<b>C</b>	ξ ;	<b>5</b>
	3/9-10/99	1.54	1.46	1.5	1.38	1.79	1.56	4.	1.84	4.93	ΥN	3.08	3.13	¥	K	ď.
	61/0-1/5/99	NA	A'N	A'N	A N	A.	A'N	NA	AN A	AN A	Y.	NA A	¥ V	1.83	2.22	3.45
	3/9-10/00	1.7	=	Ξ		NA	0.75	69.0	1.5	-	A'N	0	1.7	<u>.</u>	1.7	3.8
Nitrate (Nitrogen as N)		ţ	ų		ř	,		=	×	100		Ą Z	Y.	Ž	Z V	Ϋ́
	8/1/82	4	0.0	2	87		7.7	= ;	2		; ;	: ;	2	7	7	7
	8/23/96	=	7.6	7.6	2	< 0.5	0.	9.0	54	Ç :	= ;	₹ Š	W.	¥ ×		V 7
	3/23-24/98	1.78	3.07	2.59	3.87	69.0	3.92	.84	4.27	0.07	¥ ;	0.00	S0.05	۲ ;	<u> </u>	e i
	3/9-10/99	0.7	2.1	2.6	NA A	0	3.3	0.7	3.7	Y.	Y.			K Z.	K Z	ď.
	6/10-1/5	AN	Ϋ́	NA	AZ AZ	NA	NA AN	NA VA	Y Y	A A	Y Y	A A	NA A	2.1	4.	3.96

Summary of Detected Analytes for PAHs, Metals, VOCs, SVOCs and Groundwater Quality Parameters Table 5

Hobbs, New Mexico Facility BJ Services Company, U.S.A.

									Monitor Wells	'ells						
Analyte (units)	Sample Date	MW-1	MW-3	MW-4	MW-5	9-MM	MW-7	MW-8	MW-9	MW-10	MW-11	MW-11 MW-11A MW-12	MW-12	MW-12D	MW-13	OW-4
	3/9-10/00	0.33	2.9	3.7	5.3	NA	3.6	0.35	7.2	0.1	NA	0.11	9.1	0.14	-0°.	3.6
Sulfate					••							;	;	;	;	;
	8/1/95	150	150	210	230	6.7	180	091	20	130	730	Ž ;	¥;	V.	¥ ;	۲ ;
	8/23/96	130	150	150	140	85	<u>2</u>	09!	08 1	120	130	¥ S	Y S	¥ ;	V.	ď ;
	3/23-24/98	130	081	091	<u>8</u>	230	310	250	200	320	Y Y	8	740	ď.	۲. ۲.	K :
	3/9-10/99	961	162	178	195	72	246	240	94	223	AN	227	193	A'N	Y Z	NA
	6/10-1/5/	N A	NA	NA	NA	NA	A.	NA A	NA	NA A	NA	¥	NA	249	334	192
•	3/9-10/00	530	190	250	260	Ϋ́Α	280	260	170	160	N A	270	210	200	170	200
Cations (mg/L)													•			
Calcium										,		;	;	ź	, ix	5
	8/1/95	120	120	220	091	320	300	300	180	610	490	ď.	Y ;	Y :	ď;	۲.,
	8/23/96	120	130	68	110	69	270	230	8	390	440	Y Y	A A	V.	¥Z.	Y :
	3/23-24/98	129	122	79	601	46	208	215	142	417	A A	259	388	N A	Y Y	Y Z
	3/9-10/99	80.2	129	8.06	911	141	233	197	122	214	Y.	308	148	NA VA	¥ Z	<b>V</b>
	6/10-1/5/	NA	NA	NA	NA	NA V	N.	NA	NA A	NA A	NA	NA	N A	113	389	141
	3/9-10/00	155	119	147	387	NA	. 167	215	110	171	NA	229	180	78.1	122	882
Magnesium																;
	8/1/8	34	36	28	27	77	42	49	43	130	130	¥ Z	Y.	N A	A A	Ϋ́Z
	8/23/96	120	32	21	<u>«</u>	28	40	84	4	84	120	NA	Y Y	NA	A'N	NA
	3/23-24/98	36	30	18	50	77	47	52	36	130	NA	8	108	N A	K K	NA V
	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	N A	A A	NA
	6/10-1/2/66	NA	X Y	AN	AN.	NA VA	NA	NA A	NA	N A	NA	NA	NA V	16.6	83.9	44 3
	3/9-10/00	41.3	27.5	26.3	29.2	Y.	44.3	39.1	26.2	19	N A	47.7	30.6	7.25	38.8	74.5
Potassium								-							•	
	8/1/95	2.4	2.6	3.5	4.2		3.4	2	4.1	35	46	X X	A'N	K K	Z V	Y Y
	8/23/96	2.4	3	2.2	3.1	2.4	3.7	3.9	2.6	41	53	A A	NA	Y Y	Z Y	Ϋ́
	3/23-24/98	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	8	NA	30	92	Ϋ́	¥ Z	Y Y
	3/9-10/99	m	4	m	4	4	6	4	т.	15	NA	21	101	NA	Ϋ́	A'N
	6/10-1/5/99	NA	NA	NA	NA	N.	NA	A N	NA V	NA	NA	Ϋ́	A V	99	9	m
	3/9-10/00	4.01	4.11	3.95	5.61	A'A	86.9	4.53	4.08	18.3	A A	18.6	104	9.02	2.84	10.7
Sodium					_											į
	8/1/95	100	93	140	110	130	95	\$	86	099	2000	ž	Y.	Y.	Y.	¥Z.
	8/23/96	100	110	80 80	120	120	%	100	8	096	2600	Y V	Y Y	Y Y	Y Y	Y Y
	3/23-24/98	113	126	109	130	901	92	101	118	1090	Ν	312	381	Y Y	Z A	Y Z
	3/9-10/99	126	135	124	155	141	116	115	122	856	NA A	225	081	V V	Y Z	Ϋ́Z
	6/10-1/5/99	NA	NA	Ϋ́Α	Y Y	AN	NA	¥.Z	NA	A A	NA A	Y Y	Y Y	121	165	103
	3/9-10/00	123	112	115	123	NA A	1.56	95.4	1.66	181	AN A	809	129	103	4	97.3
Metals (mg/L)										٠						
Arsenic	9	2000	7	500	0300		0 0033	0 0034	0.0055	5100	0.0086	Z	Z Z	Z	Y.	₹ Z
	26/1/9	0.00	7,000	100.00	1500.0	8100	96000	0.0033	0.0044	0.078	1100	Y Y	Ž	V.	N.	Ϋ́Z
	8/73/90	0.00	0.000	600.0	0000	0.0.0	0.0000	0.0033	2000	200	10.7	9100	200	. 7	Ą	4 Z
	3/23-24/98	0.007	0.007	800.0	0.007	0.013	< 0.005	< 0.005	0.003	550.0	ď S	610.0	0.013	ξ <del>2</del>	C 2	K Z
	3/9-10/99	0.013	600.0	0.012	0.005	0.02	900.0	0.000	/00.0	070.0	Y.	0.030	0.000	VN		200 0
	6/10-1/5/99	Υ X	Y V	¥.	K K	Ϋ́ V	Y Y	Y Y	ď Z	K Y	ď ;	AN .	4 .	0.022	0.003	500.00
	3/9-10/00	0.0178	0.00817	0.0178	0.0173	Y X	0.00849	0.00953	0.00757	0.0474	۳ د	0.108	0.0948	0.0143	200.00	V.V.V

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.

									Monitor Wells	Vells						
Analyte (units)	Sample Date	MW-1	MW-3	MW-4	MW-5	9-WM	MW-7	MW-8	6-WW	MW-10	MW-11	MW-11 MW-11A	MW-12	MW-12D	MW-13	OW-4
Валит	30,100	0700	96.0	71.0	0,040	=	0 069	200	080	0.37	60	A Z	Ž	Y.	Ž	Š
	8/23/96	0.064	0.24	690'0	0.038	0.29	0.061	990.0	0.089	0.26	0.2	Y Y	Ϋ́Z	NA.	A'N	NA
	3/23-24/98	0.11	0.182	0.044	0.044	0,208	0.059	0.074	990'0	0.287	NA	0.163	0.157	NA	NA	NA AN
	3/9-10/99	850.0	0.059	0.045	0.054	0.555	9/0.0	0.052	0.043	0.17	NA	0.174	0.144	N.	NA	NA
	6/10-1/5/99	NA	AN	NA	NA	Y V	X Y	NA	NA	NA	NA	Y.	V.	0.155	0.333	0.062
	3/9-10/00	0.0917	0.108	0.0694	0.184	A'N	0.046	0.236	0.0419	0.281	NA	0.872	0.245	0.0962	0.113	1.49
Cadmium	8/1/95	< 0.001	< 0.001	0.0052	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	N A	NA	Z A	NA	NA
	96/22/8	000	< 0.01	<0.01	100>	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	NA V	Ą	NA	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	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	N A
	6/10-1/5	× X	NA A	NA	NA	N.	N.	× Z	N A	Ϋ́	NA	NA	ΝΑ	<0.005	<0.005	<0.005
	3/9-10/00	<0.005	< 0.005	8/10.0	<0.005	N A	<0.005	<0.005	<0.005	<0.005	NA	< 0.005	<0.005	<0.005	<0.005	<0.005
Chromium											;		;	;	;	;
	8/1/95	< 0.01	10'0>	< 0.01	< 0.01	< 0.01	0.0 >	<0.01	< 0.01	< 0.01	< 0.01	V V	A A	Y :	¥Z.	¥ ;
	8/23/96	< 0.01	< 0.01	< 0.01	< 0.01	0.049	< 0.01	< 0.01	< 0.01	< 0.01	10.0 >	Υ <sub>Z</sub>	A A	NA	YZ :	Y :
	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	Z Z	NA A	A A
	3/9-10/99	<0.01	<0.01	€0.01	<0.01	40.01	 0 0 0	<0.01	<0.01	<0.01	A'N	10.0>	<0.01	NA	ΑN	Y.
	6/10-1/5	NA	NA	NA	NA	NA	- A	NA A	NA A	NA	NA A	NA A	Y Y	0.02	0.02	<0.01
	3/9-10/00	<0.01	<0.01	10.0	0.0248	AN	< 0.01	< 0.01	< 0.01	0.031	A'N	0.0342	0.0124	<0.01	<0.01	0.105
								000	600	2000	31000	5	2	Ā	Ž	ĄZ
Lead	8/1/95	< 0.002	< 0.002	0.0044	< 0.002	< 0.002	> 0.002	700.0 >	Z00.00 >	700'0 >	0.0023	ζ.	¢ ;	4 :		
	8/23/96	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	A A	Y Z	Y :	¥.	e :
	3/23-24/98	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	Ϋ́	< 0.005	< 0.005	K V	NA.	K !
	3/9-10/99	<0.005	<0.005	<0.005	< 0.005	0.013	< 0.005	< 0.005	< 0.005	< 0.005	Y Y	600.0	<0.005	NA A	NA A	A'A
	6/10-1/2/99	NA	NA	N A	NA	NA	N.	A'A	N A	ΝĀ	NA	K K	٧X	<0.005	<0.005	< 0.005
	3/9-10/00	<0.005	<0.005	€00.0>	0.00565	NA AN	< 0.005	< 0.005	< 0.005	0.00661	NA	0.00595	< 0.005	<0.005	<0.005	0.0355
Mercury						000	1000	00000	000	70000	20000	Ą.	2	7	Ą	ĄZ
	8/1/92	< 0.0002	7000.0 >	200002	2000.0 >	20000	00000	20000	70000	20000	2000	1 2	. 2	Z	Ž	, Z
	8/23/96	< 0.0002	7,000.0 >	200000 >	< 0.0002	2000U >	70000	20000	20000	70000	70000	20000	20000	Ą	. Z	, Z
	3/23-24/98	< 0.0002	< 0.0002	< 0.0002	< 0.0002	7000.0 >	20002	0.0003	20000	70000	2 2	2000.0	2000	E 2		Ą
	3/9-10/99	<0.0002	<0.0002	<0.0002	<0.0002	7000.0>	70000	200007	70007	70007	V 2	70007	NA N	20000	2000 O>	20 0000>
	6/7/2-01/9	NA A	NA	K K	Y.	Ϋ́	ď.	K K	K Z	ď.	<b>V</b>	Ç.	0.00	2000.0	- 0000	1000
	3/9-10/00	0.000695	<0.0002	<0.0002	<0.0002	Y Y	<0.0002	<0.0002	<0.0002	Z0.000Z	A A	<0.0002	7000.0>	<0.0002	Z000.0>	70,000
PAHs (µg/L)													-			
Acenaphthene	8/1/95	< 50	< 10	< 500	× ×	< 30	·	< > <	\$ >	< <b>&gt;</b>	< 5	A'N	Y.	NA A	ΝA	NA
	8/23/96	< 10	< 10	< 30	. S	< 30	\$	. \$	< \$	< <b>&gt;</b>	< 5	N.	ΝĀ	NA A	NA	Y.
	3/23-24/98	01 >	<0.3	6.3	<0.3	0.3	60.3	<0.3	€03	€.03	NA	<0.3	<0.3	NA	NA	Y Y
	3/9-10/99	< 0.1	< 0 1	<2.0	< 0.1	2.0	; 10	9	< 0.1	< 0.1	NA	< 0.1	< 0.1	ΝΑ	NA A	NA A
	6/10-1/5/99	NA	N.A	Y.	Y.	V.	N.	Y'A	NA A	NA V	NA	N.A	A'Z	1.05	< 1.0	√0.1
	3/9-10/00	0.28	< 0.1	< 0.1	<0.1	NA A	.(.0>	<0.1	0,	< 0.1	NA A	 6	 0.0	-0°	<0.1	<0.1
Acenaphthylene					,			· ·	,	,	,	V.	4	ΑN	Ą	Ą
	8/1/95	8 5	2 5	2000	2 %	2 5	7 5	) V	; v	\$ \$	\$ \$	Y X	Ž	NA V	Y X	N.
	06/17/0	?	?	?	;	?	,	,	•	•		:	-			

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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.

									Monitor Wells	/ells						
Analyte (units)	Sample Date	MW-1	MW-3	MW-4	MW-5	9-MM	MW-7	8-WW	6-WW	MW-10	MW-11	MW-11A	MW-12	MW-12D	MW-13	OW-4
	3/27_76/8	× 10	9	9	9	9	05	6.1	.i.	8	AN	40.1	1.0>	AN	NA	AN
	96/01-6/E	20 >	× 0 1	< 0.1	< 0.1	8	9	9	< 0.1	< 0.1	Y Y	< 0.1	< 0.1	NA A	NA	NA
	6/10-1/9	Ϋ́Z	NA	Ϋ́Z	×	AN	· X	NA	NA	NA	NA A	N.	NA	<0.1	< 1.0	<0.1
	3/9-10/00	16:0	< 0.1	< 0.1	8.	NA		0.1	8	9.4	N.	0.1	6.1	0.1	1.8	1.0>
							•									
Anthracene	50/1/8	05 >	< 10	> \$00	~ S >	< 30	· ·	< \$	< >	\$	< > <	A.	NA A	NA	NA A	NA A
	20,500	2 -	2 .	> 30		30.			· \$ >	< 5 >	< >	NA A	NA	NA	NA	NA A
	04/67/20	2 7	7 5	3 5	;	÷ 5	. 6	. 6	9	8	X	8	8	NA	AN	Ϋ́Z
	00/01 0/2	2 7	; ;	5 5		, 0	5	9	< 0 >	10>	AN	< 0.1	< 0.1	NA A	AN	NA
	98/01-6/5	7 47	5 2	, Z	, Z	Ž	ž	ž	Ž	Y.	A'N	NA A	NA	40.1	< 1.0	€0.1
	3/9-10/00	0.12	1 0 ×	 - 0.1	0,	Y Y		9	0.0	< 0.1	NA A	0.1	40.1	0.1	40.1	0.0
							-		_							
Benzo(a)anthracene								,	•	,	,	ž	Ž	Ä	Ž	Z Z
	8/1/95	× 50	0 1	> 200	Ŷ,	2 5	Ç ;	0 ;	7 4	7 %	7 4	Ç Ş	2 2	ξ × Ζ	. v	Y X
	8/23/96	< 10	0 V	< 30	\$ >	900	\$ \$	Ş :	Ŷ	Ç :	Ç ;	Y G	¥ S	¢ ×		C Z
	3/23-24/98	< 10	<u>a</u>	0.1	9	8	₽.	8	7	₹	¥;	<del>-</del>	₹ 5	Ϋ́ X	K .	<b>C</b> 2
	3/9-10/99	< 0.1	< 0.1	0.2	< 0.1	0.7	<del>0</del>	9	0 >	V 0.1	Z ;	7.0 >	70.7	¥ ?	¥ .	¢
	6/10-1/5	YZ.	Y Z	YZ.	Y X	K.	V.	Y :	Y.	Y ;	¢ ;	¥ 5	5 5	7 6	? ?	5 6
	3/9-10/00	0.18	< 0.1		9	¥	₹		₹	V 0.1	ď.		<del>-</del>	7	<del>,</del>	į
Benzo(k)fluoranthene				3	,			,	,	ĭ	· ·	Y Y	Y Y	Ž	X	A'N
	8/1/92	06 >	2 5	36,	? ;	2 6	7 (	7 %	;	; \$	5 >	. X	¥	Y Z	Ν	<b>Y</b> Z
	8/23/96	01 >	01 5	)	7 ?	3 -	7 6	7 =	7 5	; &	Y	8	8	Ž	Ν	N.
	3/23-24/98	01 >		÷ 5	7 5	7 6	7 6	7 5	7 6	70 0	S Z	1.0 >	× 0.1	Y Z	N A	Ϋ́
	3/9-10/99	7	7. 5	7 5	7 2	Ž	. A	Y Z	N.	X	X	N.	NA A	<0.1	< 1.0	<0.1
	66/7/1-01/9	5 5	5 5	5 5		100	1.0	70 >	0 >	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	00/01-4/6	, ,	;	;			-									
Benzo(a)pyrene	8/1/85	< 50	< 10	< 500	< 5	< 30	. 5	۸ ج	< 5	<.5	< > <	Ϋ́	ΝΑ	NA	K K	K'A
	8/23/96	< 10	< 10	< 30	< 5	< 30	× \$ >	\$	< 5	<\$	< \$	A'A	¥	Y Y	Y :	Y Z
	3/23-24/98	< 10	9	- <del>0</del>	0.1	0,	<u>.</u>	9	6.1	9	Y X	8	8	NA	Y Y	Y Y
	3/9-10/99	< 0.1	< 0.1	0.2	< 0.1	47.0	8	₽.	< 0.1	< 0.1	NA A	< 0.1	V 0.1	ζ :	Y S	Y S
	6/10-1/5/66	NA A	Ä	Ϋ́	A'A	Ϋ́	A A	AN.	NA A	Y.	N A	¥.	¥ X	<0.1	0.1.	₹ <del>(</del> )
	3/9-10/00	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	< 0.1		< 0.1	× 0.1	 V 0.1	V 0.1	V 0.1	₹.0 ×	7.0
Fluorene	Ş	9	<u> </u>	9	~~	9,0		, V	\ \	\$ >	< 5	Y.	N.	N.	NA	NA V
	50/1/8	25 \	2 9	SE >	; ;	200		· 5	· \$	\$	< ×	NA	X.	Y'N	Ϋ́	Y.A
	173 74/98	217	2 6	3 8	. 6	8	03	03	<0.3	€.03	NA	6.3	<0.3	Ϋ́Z	NA	Ϋ́Z
	3/0-10/66	7.00	0 >	000	<0.1	2.0	8	6.1	< 0.1	< 0.1	N A	< 0.1	< 0.1	NA A	N.	NA A
	6/11/1/90	AN	N.	Ϋ́	N A	N.	NA A	W	NA	NA	NA	NA	NA	<0.1	< 1.0	0.1
	3/9-10/00	25	< 0.1	0.36	9	N.	9	0>	1.5	0.1	NA A	<u>8</u>	8	<0.1	9.7	0.1
Naphthalene														į	į	;
	8/1/85	< > <	210	1700	< 5	470	< > <	\$ <b>&gt;</b>	15	92	< >	¥.	A A	Y Z	Y V	K Z
	8/23/96	230	110	044	< \$	< 30	\$ <b>\</b>	< 5	× 84	> 76	< > <	Y.	A'A	NA V	Y.	Y Y
	3/23-24/98	130	23	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	4	œ	NA	8.0	=	NA	ΝΑ	NA A
	3/9-10/99	0.1	96	170	1.0	160	0.1	8	0.1	9	NA NA	<0.1	61	NA	AN	A'N
	6/7/2-01/9	Z	A	N A	NA AN		NA A	NA A	NA	N A	NA A	NA	N.	9.0	34	0.0
	3/9-10/00	2.4	<0.1	4.0	0.1	A A	0	8	0.42	1.5	NA A	0.12	0.26	0.1	99	<0.1
Phenanthrene																
	8/1/95	< 50	× 10	< 500	< >	< 30	. \$ >	\$.	\$	<\$	< > <	N.	- VA	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.

									Monitor Wells	/ells						
Analyte (units)	Sample Date	MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	6-WM	MW-9 MW-10	MW-11	MW-11 MW-11A	MW-12	MW-12D	MW-13	OW-4
	8/23/96	< 10	< 10	<30	< 5	< 30	< 5	<.5	\$ \$	<\$	< 5	NA A	NA A	A'A	Ϋ́Z	Y Z
	3/23-24/98	01 >	₽.	0.1	8.1	6.1	0.1	40.1	<0.1	7 0 1	NA A	1.0	6.1	Ϋ́	AN	NA A
	3/9-10/99	< 0.1	< 0.1	2	< 0.1	2.0	0	9	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA	Ϋ́	NA V
	6/10-1/7/6	NA	Y.	NA A	A A	¥.	A A	NA	N A	NA	NA	NA	NA A	1.0 >	< 1.0	-0° -1°
	3/9-10/00	0.65	6.1	< 0.1	<b>40.1</b>	AN A	1.9	7.	7.	6.1	NA V	8	0.1	0°. 1.	0.22	9
Pyrene			,	903	,	,	,	\	\	`	Ý	Ą	42	7	¥ 2	Ą
	8/1/95	S V	2 v	2000	9	2	; ;	;	;	;	7 }	ξ ;				. <del>.</del> .
	8/23/96	< 10	01 >	< 30	<b>\$</b>	< 30	< × .	< > ·	\$	< <b>&gt;</b>	\$	Y Z	Y Y	ď.	ť.	<b>4</b> ;
	3/23-24/98	< 10	0.0	0.1	9.	₽	9	<b>6</b> .1	Q.1	-0	Ϋ́	0.	9	¥Z	Y.	¥ Z
	3/9-10/99	< 0.1	< 0.1	9.4	< 0.1	0.7	40.1	40.1	< 0.1	< 0.1	NA	< 0.1	< 0.1	ď Z	Ϋ́	ΥN
	6/10-1/5/	Y.	¥ Z	A'A	Y'A	N A	A N	Y Y	<b>K</b> N	AN.	Y.	NA	Y.	< 0.1	< 1.0	<0.1
	3/9-10/00	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	1:0 >	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
VOCs (µg/L)											_					
Acetone	00,100		Ž	Ž	Ą	Ą	ĄZ	Ą	Z	Z	Ä	×100	<100	N V	N.	NA
	97/7-01/9	Y X	Z Z	X X	N N	N A	N AN	N AN	Y.	NA A	N A	NA	NA	130	<100	<100
sec-putytoenzene	3/27-7-7/5	× ×	X	Ϋ́	AN	. V	Y Y	NA	NA	NA	AN	A'A	Y.	NA	A'A	NA
	6/10-1/5	Y Y	¥	ĄN	V V	A'N	Z A	N.	N.	NA	NA	NA	NA	<\$	\$	<\$
4																
tsopropyroenzene	3/23-24/98	Y V	Ϋ́	NA	N.	AN	NA	Ä	NA	NA	NA	NA	NA	NA	Ϋ́	NA
	6/10-1/5/6	NA	N A	NA	Y Y	NA A	NA	Y.	NA	NA	V.	NA A	AN A	< \$	31	< 5
Naphthalene																į
÷	3/23-24/98	NA	NA	NA	NA	N.	A A	AN.	Š	NA A	A'A	VV	Y.	NA A	Υ Y	Y '
	6/10-7/2/99	NA	NA A	NA	Y.	NA A	N.	NA A	Y Y	Ϋ́Z	NA	AN A	N V	< \$	190	\$ V
n-Propylbenzene							-				;	-	;	;	ž	7
	3/23-24/98	NA	NA A	Ϋ́	Ϋ́	Y Z	¥ V	V N	Y Y	Y :	Y :	ď ;	₹ :	NA Y	<u> </u>	¢ v
	6/10-1/2/99	NA	A A	NA V	A A	NA A	¥.	Y.	Ϋ́	Y Y	V V	K Z	Y X	Ç	8	?
1,2,4-Trimethylbenzene						;		;	į		7	2	7	Ž	Ž	Ą Z
	3/23-24/98	¥ ;	ď ;	¥ ;	ď ;	V X	¥ 2	Y .	<b>V</b> 2	C 4	ζ <b>γ</b>	Y Z	: X	< >	8	< >
:	6/17/1-01/9	K Z	ψ.	<u></u>	<u>.</u>	ţ	5	4			:					
1,3,5-Trimethylbenzene	90/10	2	Ž	Ą	42	¥ Z	Z	Z Z	Y.	Ž	N.	- VA	NA	N A	NA A	NA
	86/2/2-01/9	. ×	ž	Ž	Ž	Ž	¥Z.	Y.	AX	NA	NA	NA	AN	< \$	93	s >
Verbe		:					-									
MIBE	3/23-24/98	Z.	ΝA	A'N	NA A	A'N	Y.	ď Z	Y.	Y.	NA A	Y Y	Ϋ́	Z A	Ϋ́	K'Z
	6/10-1/2/66	NA	NA	NA	NA	NA	NA	NA A	NA	NA	NA	NA	NA	< 10	25	01 >
SVOCs (µg/L)																
2,4-Dimethylphenol			į	00,	١	;			,		- ·	<b>4</b> 2	ĄZ	Ž	Ž	Y.
	\$/1/8	06 >	16	PG ;	;	;	7 ;	;	7 ;	7 5	7 5	: 2	. V	Z	Y Z	. Z
	8/23/96	N A	V.	ΨZ ;	¥ ;	v Z. ;	¥ ;	¥ ;	ď ;	¥ ;	V X	¥ 2	ξ <u>γ</u>	<b>Y Y</b>	£ \$	ξ. <b>γ</b>
	6/10-1/5/99	K Z	<b>₹</b> Z	ez V	Ç.	¢ Z	¥V.		<u> </u>	ţ	<b>C</b>	5		;	3	ļ.
2-Memyinaphthalene	_	_		_	_		<del>-</del> .	<del></del>		_	_	_	_		_	

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.

									Monitor Wells	ells						
Analyte (units)	Sample Date MW-1	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-12	MW-12D	MW-13	OW-4
	8/1/95	280	62	1500	<\$	150	< 5	< 5	36	23	< × 5	NA	NA A	AN	NA	NA
	8/23/96	NA	NA	NA	¥.	Y.	NA	AA	NA V	NA	NA	NA	NA	NA	NA A	NA
	6/10-1/2/99	NA	NA	N A	¥.	A'A	AN A	ΑN	NA V	NA	NA A	NA	NA A	\$ \$	59	۵.
2-Methylphenol						•						•				
	8/1/95	< 50	99	< 500	\$ <b>&gt;</b>	< 30	< \$	<.5		\$>	< 5	NA VA	NA	Y X	A'N	NA
	8/23/96	NA	NA	Ϋ́	N.	N.	V.	NA	N.	NA	NA	N A	NA	Y Y	A N	NA A
	6/10-1/5/6	AA	NA	Y Z	N.	NA A	A'N	NA	NA NA	NA	NA	NA	NA	< >	< 5	\$
4-Methylphenol																
	8/1/95	08 >	< 20	× 800	<b>%</b>	150	90 V	<b>80</b> V	× ×	 V	∞ ∨	A'A	NA	Y Z	NA A	NA
	8/23/96	N.	NA.	NA	NA	A'N	NA	NA	NA V	NA	NA	NA V	NA	NA VA	Y Y	NA
	66/2/1-01/9	NA	NA	Y X	Ϋ́	A'N	Ϋ́	ΝΑ	NA	NA A	NA A	NA NA	NA	\$	< > 5	\$
Bis(2-ethylhexyl)phthalate			•												,	
	8/1/95	750	< 20	10000	4	< 40	۸ ۲	<7	<7	<7	<7	A A	NA	Y X	NA A	NA A
	8/23/96	NA A	NA	NA	NA	A'N	¥Z,	NA	NA NA	NA	Ϋ́Z	NA	NA	Y Y	N A	NA
	6/7/2-01/9	Z A	NA	- V	Ą	NA V	KN.	NA	N.	NA V	V.	A A	ΝΆ	\$	< > <	\$
Phenol											•					;
	8/1/95	< 50	< 10	> 500	< ×	< 30	<b>\$</b>	< > 2	\$`	8.2	< 5	Ą	Y.	۷ Z	Z Z	Y.
	8/23/96	X A	N.	NA	Y.	A'A	A N	N.	Y Y	NA	Ϋ́Z	A'A	NA	Z Y	NA A	Z V
	6/10-1/5/	A A	¥.	A A	Y X	NA A	NA	NA	NA	NA	NA	NA	NA	\$	9	\$

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
Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for Monitor Wells MW-5, MW-10, MW-11A, MW-12, MW-12D, and OW-4
BJ Services Company, U.S.A.

Hobbs, New Mexico

				Dissolved Methane		
Well	Date	Nitrate <sup>1</sup> (mg/L)	Sulfate <sup>1</sup> (mg/L)	(mg/L)		
	3/23/98	3.87	190	<0.0012		
	3/9/99	< 0.1	195	<0.0012		
MW-5	6/10/99	4.73	209	< 0.0012		
IVI W - 3	9/14/99	4.3	210	< 0.0012		
İ	12/9/99	4.2	210	< 0.0012		
	3/9/00	5.3	260	<0.0012		
	3/23/98	0.07	320	0.91		
	6/23/98	<0.1	325	0.55		
	9/30/98	<0.1	204	0.81		
	12/10/98	<0.1	180	0.091		
MW-10	3/9/99	<0.1	142	0.025		
	3/9/99	<0.1	2233	0.035		
	9/14/99	< 0.10	160	0.0049		
	12/9/99	0.49	170	0.0039		
	3/10/00	0.1	160	0.0056		
	3/23/98	< 0.05	190	0.14		
	6/23/98	<0.1	225	0.11		
	9/30/98	0.4	196	0.043		
	12/10/98	0.7	188	0.033		
MW-11A	3/10/99	<0.1	164	0.094		
	3/10/99	<0.1 <sup>2</sup>	2273	0.094		
	6/10/99	<0.1	181	0.0036		
	9/13/99	0.22	250	< 0.0012		
	12/9/99	<0.1	290	0.0079		
	3/9/00	0.11	270	0.037		
	3/23/98	< 0.05	240	<0.0012		
	6/23/98	<0.1	240	<0.0012		
	9/30/98	<0.1	168	<0.0012		
	12/10/98	<0.1	202	<0.0012		
MW-12	3/10/99	<0.1	137			
W - 12	3/10/99	<0.1 <sup>2</sup>	193 <sup>3</sup>	<0.0012		
	6/10/99	<0.1	217	<0.0012		
ļ	9/14/99	< 0.10	230	<0.0012		
	12/9/99	<0.1	180	< 0.0012		
	3/10/00	<0.1	210	< 0.0012		
	7/2/99	2.1	249	0.0015		
MW-12D	9/14/99	<0.10	200	0.0065		
WW-12D	12/9/99	<0.1	210	0.0015		
	3/9/00	0.14	200	< 0.0012		
	6/10/99	3.96	192	<0.0012		
077.4	9/14/99		200	<0.0012		
OW-4	12/9/99		200	<0.0012		
	3/9/00	3.6	200	<0.0012		
L		except as noted	1	0.0012		

i=By EPA Method 300, except as noted

<sup>2=</sup>By EPA Method 353.3

<sup>3=</sup>By EPA Method 375.4

Summary of Analytical Results for Air Emissions Hobbs, New Mexico Facilty BJ Services Company, U.S.A. Table 7

							Discharge	Benzene	Total BTEX	TPH
Samule	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH	Rate,	Emission	Emission	Emission
Number	Date		parts per	parts per million by volume, ppmv	e, ppmv		scfm	Rate, lb/hr	Rate, lb/hr	Rate, lb/hr
Extraction-1	9/19/95	790	1100	340	920	0026	132.47	1.235	5.943	16.31
Effluent-1	56/02/6	066	2500	260	1600	16000	135.76	1.575	10.939	27.37
Effluent-7	9/28/95	13	78	9	81	2533	123.56	0.019	0.112	3.89
Effluent-4	11/7/95	12	28	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	68.0
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	9	44	12	40	066	124.68	0.009	0.189	1.56
Effluent 042496-01	4/25/96	4	37	10	36	006	118.34	0.005	0.147	1.29
Effluent 053196-01	5/31/96	3.7	40	10	33	0.29	124.11	0.005	0.158	1.04
Effluent 082396-01	8/23/96	\$	12	\$	\$	200	126.18	0.007	0.047	0.31
Effluent 120296-01	12/2/96	' ▽	⊽	~	∇	\$	129.04	0.002	0.008	0.01
Eff.31797-1	3/12/97	2.1	15	4.6	15	250	110.56	0.003	0.057	0.33
Effluent 070297-01	7/2/97	7	6.3	2.4	8.6	92	109.90	0.001	0.028	80.0
Monitor 970912 (1)	9/12/97	AN	NA	NA	NA	340	105.40	NA	NA	0.39
FF.1.7832	12/10/97	<0.001	0.013	0.000	0.031	210	106.27	0.000	0.000	0.28
Monitor 980324 (1)	3/24/98	N A V	NA	NA	A'A	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	AN	NA	NA	NA	200	123.74	NA	NA	0.33
Monitor 981210 (1)	12/10/98	NA	NA	NA	AN	180	111.14	NA	NA	0.24
Monitor 990310 (1)	3/10/99	NA	NA	NA	, V	80	111.14	NA	NA V	0.11
Monitor 990610 (1)	6/10/9	NA A	NA	NA	NA	140	73.68	NA	A'N	0.12
Monitor 990914 (1)	9/14/99	NA	NA	NA	NA	12.5	116.24	NA	NA	0.02
Monitor 991209 (1)	12/9/99	NA A	NA	NA	A'Z	5.9	42.14	NA	NA V	0.003
Monitor 000310 (1)	3/10/00	NA	NA	NA	NA	65	150	NA	NA	0.092
			1	1 1 1	The contra	omicono in	re Benzene <0 00	1 1h/hr RTFX <	cans more Benzene < 0.001 lb/hr BTFX < 0.01 lb/hr and TPH < 0.01 lb/hr	<0.01 lb/hr.

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**

 $\verb|\BCHOU01|| PROJECTS \\| Wp \\| BJSERV \\| 12832 \\| 060r.doc$ 

"Use or disclosure of data contained on this sheet is subject to the restriction specified at the beginning of this document."

#### APPENDIX A

**Groundwater Sampling Forms** 

# BROWN AND CALDWELL

FORM GW-1 (Rev 6/8/99 - wah)

## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-1

1. PROJECT INFORMATION	-1 ~			.7						
Project Number: 12572 Task Num		Date: 3.5.33								
Client: BUSVCS		Personnel: DCAL)	LEVRA							
Project Location: Hobbs		Weather: Sun	, mary							
2. WELL DATA										
Casing Diameter: Inches	Type: YPVC 🗆 Stainle	ess 🗅 Galv. Steel 🗅 Teflor	n® □ Other:							
Screen Diameter: Inches	Type: DPVC - Stainle	ess 🗆 Galv. Steel 🗅 Teflor	n® 🗆 Other:							
Total Depth of Well: 64-50 feet	From: 🖸 Top of Well Ca	sing (TOC) Top of Pro	tective Casing	Ofher:						
Depth to Static Water: 58-55 feet	From: D Top of Well Ca	sing (TOC) D Top of Pro	tective Casing	2 Other:						
Depth to Product:feet	From: Top of Well Co		tective Casing	Ofher:						
Length of Water Column: 5 5 feet	Well Volume:		nterval (from G well = 0.167 gal/ff	,						
3. PURGE DATA										
Purge Method: Centrifugal Pump C Peri	der Pump 🚨 2" Submerslbk staltlic Pump 🚨 Inertial Lift F	e Pump	Pump	Equipment Madel(a)						
Materials: Pump (Pailor D Stainless PV	C 🔲 Teflon® 🚨 Other:_ repared Off-Site 🗎 Field (			Equipment Model(s)  Z-6/0/10						
Materials: Rope/Tublng D Polyethylene D Dedicated D	□ Polypropylene □ Teflon Prepared Off-Site □ Field	© Other: // / Lance Cleaned Disposable	_ ′							
Was well purged dry? 🛕 Yes 🗅 No	Pumping Rate:	gal/min	3	· · · · · · · · · · · · · · · · · · ·						
Time Cum. Gallons pH Temp Spec. Eh Dissolved Oxygen Turbidity Other: Comments										
1-05 0.5 7.9 17.7 1564 71.3 3.8 74										
1720 1.5 8,0 17.8	705 74.8	6.2 64								
4. SAMPLING DATA			Geo	chemical Analyses						
Method(s): Baller, Size:		ump 🚨 4" Submersible Pu ————	imp Ferro	ous Iron; mg/L						
Materials: Pump/Bailer 🚨 Stainless 🖼 P	-		DO:	mg/L						
National Tubing (Done   Polyethylene	Prepared Off-Site	no d Other:	— Nitro							
Depth to Water at Time of Sampling:_			Sulfo	ate:mg/L						
Sample ID: 1/1W - 1 Sample	Time: 172	# of Containers: //	Alle	illinity: mg/L						
Duplicate Sample Collected?   Yes 5	. No ID:	-	AIKC	mg/L mg/L						
5. COMMENTS INSUFF	arht water	to Durae L	vell wi	th						
, , , , , , , , , , , , , , , , , , , ,	aple with	disposable	ज्यारित,							
	odor presence of NAPL	or other items not on the fie	eld data sheet.							

Clanatura

#### BROWN AND CALDWELL

FORM GW-1 (Rev 6/8/99 - wat)

#### **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: 1912-3

1. PROJECT INFORMATION  Project Number: 11 Task Number: 015 Date: 3 つつ Time: 16:30  Client: 13 ちゃくち Personnel: 10 なれてきれらいた Weather: 5 いかい、へいし									
Total Depth of Well: \( \frac{2}{2} \) feet  \text{From: D'Top of Well Casing (TOC)}  \text{Top of Protective Casing Depth to Static Water: \( \frac{2}{2} \) \( \frac{2}{2} \) feet  \text{From: D'Top of Well Casing (TOC)}  \text{Top of Protective Casing Dother: Depth to Product: feet From: Doublet Casing (TOC)}  \text{Top of Well Casing (TOC)}   \text{Top of Protective Casing Dother: Depth to Product: feet From: Doublet Casing (TOC)}   \text{Top of Protective Casing Dother: Depth to Product: From: Doublet Casing (TOC)}    \text{Top of Protective Casing Dother: Depth to Product: From: Doublet Casing (TOC)}									
3. PURGE DATA    Dedicated   Prepared Off-Site   Field Cleaned   Disposable   Disposable   Disposable   Dedicated   Prepared Off-Site   Field Cleaned   Disposable   Disposable   Dedicated   Prepared Off-Site   Field Cleaned   Disposable   Disposable   Disposable   Dedicated   Prepared Off-Site   Field Cleaned   Disposable   Disposable   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Dedicated   Ded									
Time Cum. Gallons PH Temp Spec. Eh Dissolved Oxygen Turbidity Other: Comments									
1.35   7.5 12.71 72 55.6 6.2 - CLe.~ 1045 1.75 7. 18.4 632 62.9 7.5 440 CC. whi									
4. SAMPLING DATA  Method(s): Dedicated Dedicated Prepared Off-Site Field Cleaned Disposable  Materials: Tubing/Rope Dedicated Prepared Off-Site Field Cleaned Disposable  Depth to Water at Time of Sampling:  Sample ID:  Sample Collected? Pump Dedicated Desposable Pump Dedicated Prepared Off-Site Field Cleaned Disposable  Geochemical Analyses  Ferrous Iron: mg/L  Do: mg/L  Nitrate: mg/L  Alkalinity: mg/L									
5. COMMENTS TRANSICIENT water to parge well with pump's Lollected Samples with disposable builts  Note: Include comments such as well condition, odor, presence of NAPL or other items not on the field data sheet.									

### **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-4

1. PROJECT INFORMATION		·		· · · · · · · · · · · · · · · · · · ·						
Project Number: 12832 Task Nu	mber: 0 ( S	[	Date: 3 · 1	2.33		lime: $\sqrt{}$ , $\sqrt{}$				
Client: BJ5UCS		!	Personnel:_	DEXW.	TEXALO	3-				
Project Location: Holds			Weather:	SUNLY	, دین ل					
2. WELL DATA										
Casing Diameter: inches	Type: 🖸 PV	C 🗆 Stainle	ss 🗅 Galv. St	eel 🗆 Teflon	® D Other:					
Screen Diameter: 2 Inches	Type: 🗅 PV	'C 🗆 Stainle	ss 🛭 Galv. St	teel 🗅 Teflon	® D Other:					
Total Depth of Well: 6014 feet	From: 🖪 To	p of Well Ca	sing (TOC)	☐ Top of Prot	ective Casing (	Other:				
Depth to Static Water: 5 5 7 feet	From: 🗆 To	op of Well Ca	sing (TOC)	☐ Top of Prot	ective Casing 1	Other:				
Depth to Product:feet	From: 🗅 To			☐ Top of Prot	ective CasIng	Other:				
Length of Water Column: (2) 3 2 feet	Well Volum	e: <u>3 7</u>			nterval (from G vell = 0.167 gal/ft					
3. PURGE DATA				VOIB. 2-IICII W	/eii = 0.10/ ydi/11	4-ii ici i weii = 0.007 gaiyii				
Philader Size:   Chila	dder Pump 🚨 2	?" Submersible	Pump (3.4"	Submersible i	Pump					
Purge Method: Centrifugal Pump De						Equipment Model(s)				
Materials: Pump/Bailer © Stainless 2 P	Prepared Off-SI	te 🗆 Fleid C	cleaned 🛂 l	Disposable	um 1. 45	1-610 D				
Materials: Rope/Tubing D Polyethylene D Dedicated U	D Polypropyler  Prepared Off-9	ne 🗅 Teflon Site 🗅 Field	8 24 Other:	Disposable						
Was well purged dry? 🛕 Yes 🗓 No			ga			,				
Time Cum. Gallons oH Temp Spec. Fb Dissolved Turbidity Other: Comments										
Removed PH lemp Cond. Eh Oxygen lurbidity Comments										
1.5 7-63 16	1785	15.1	6.47	238		CLAN				
			:							
		<u> </u>	<del> </del>							
4. SAMPLING DATA					Geo	chemical Analyses				
Method(s): Baller, Size: 1	er Pump 🚨 2" St Lift Pump 🚨 Ott	ubmersible Pu her:	ump □ 4" Su 	bmersible Pur	np Ferro	ous Iron: mg/L				
	PVC 🚨 Teflon 1 Prepared Off-S			Disposable	DO:	mg/L				
			- at	N. W.	— Nitro	ito: ma/l				
Materials: Tubing/Rope Dedicated										
Depth to Water at Time of Sampling: Sample ID: 1971 North Samp	le Time: 8:				Sulfo	ite:mg/L				
1				ainers: <u>F</u>	- Alko	linity:mg/L				
Duplicate Sample Collected? 😐 Yes	U No ID:		_							
IC CON AN AUDITO										
5. COMMENTS					······································					
5, COMMENTS										

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FORM GW-1 (Rev 6/8/99 - wah)

### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-5

	ECT INFOR									
Project N	Number: 128	72	ask Num	ber: 015	1	Date: 3.1	DEAN.		Time: 5: 15	
Client:	BT SV	دے ر 				Personnel:_	DEXN.	Tenave		
Project L	ocation: H	0645			· · · · ·	Weather:	sunny, n	ilel		
2. WELL										
Casing [	Diameter:)	inc	hes	Type: 😘 pv	C 🛛 Stainle	ss 🛚 Galv. St	reel 🖸 Teflon	® □ Other:		
Screen (	Diameter:?	Inc	hes	Type: à pv	C 🗆 Stainle	ss 🛚 Galv. St	teel 🗅 Teflon	® Other:		
Total De	pth of Well:	H'7 fe	et	From: 🖄 To	p of Well Ca	sing (TOC)	Top of Prot	rective Casing	Other:	
Depth to	Static Water	57.92	feet	From: De To	p of Well Ca	sing (TOC)	Top of Prot	tective Casing	□ Other:	
Depth to	Product:	fee	t	From: 🗅 To	op of Well Ca	sing (TOC)	Top of Pro	tective Casing	Other:	
Length (	of Water Colui	יחח: <u>6יז ק</u>	feet	Well Volum	e: <u>/-/</u>			nterval (from ( vell = 0.167 gal/	, <del></del>	
3. PURG	E DATA	11								
Purge M	lethod: 🗖 Bailei	, Size:	□ Bladd	er Pump 🚨 2	" Submersible	Pump 13 Otho	Submersible	Pump		
l		_ 🗆 Stainle	ess PÁPVO	: 🗅 Teflon®	Other:_				Equipment Model(s)	
	ls: Pump/Baile	Dedic	ated 🗅 Pr	epared Off-Si	te DiField C	cleaned û	ar lless	1. 75	E-610D	
Materia	ls: Rope/Tubin	g 🗓 Polyet 🗓 Dedic	nylene □ ated □ F	Polypropyler	ne 🛚 Teflon Site 🗖 Fleld	® ÆL Other:_@ Cleaned &	Disposable			
	II purged dry?				ng Rate:			3		
Time Cum. Gallons pH Temp Spec. En Dissolved Turbidity Other: Comments										
Removed   Cond.   Oxygen										
7.58, 1228 38.3 7.72										
				-						
4 SAM	PLING DA	TA	1		1	1		Geo	ochemical Analyses	
Method	Bailer, Si	ze: _/ \	a Bladder i	Pump 🗓 2" Si	ubmersible Pi	ımp □ 4"Su	bmersible Pur		_	
	Peristalti	c Pump 📮	Inertial Lift	Pump 🚨 Ott	ner:			rem	ous Iron: mg/L	
Materia	als: Pump/Baile			C 🚨 Teflon repared Off-S			Disposable	DO	: <u>6.0</u> mg/L	
Materio	als: Tubing/Rop	pe 🗓 Polye D Dedl	othylene ( cated <b>Q</b>	Polypropyle Prepared Off	ene 🚨 Teflor -Site 🚨 Field	n® 🚉 Øther: I Cleaned 🕅	Disposable	Nitr	ate:mg/L	
	to Water at Tir							Sulf	ate:mg/L	
Sample	1D: MW -	<u> </u>	Sample	Time: 13;	3 J	# of Conto	ainers: //	ΔIL	alinity: 2,8-0 mg/L	
Duplico	ate Sample Co	ollected?	☐ Yes Mo	No ID:_	· · · · · · · · · · · · · · · · · · ·	-			unityIIIW/L	
5, CON	MENTS	The	1 July 1/2 1/2 1/2	int was	اد سر سردا	ال حرسما	ا باد	Sen Augus	e milth an a	
	0.7	47	coll	unted -	a. \ c.	1	- 1180	reclee L	e mith ours	
	27			J v	المستدد دا	15 20.1	a sp	w 7	<i>x</i> ~	
Note: Includ	de comments su		condition,	odor, presen	ce of NAPL o	or other items	not on the fie	eld data sheet.		
								/		

### **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW?

					··					
1	ECT INFO	_				~			1.	
Project N	Number: 129	- 34	Task Numb	oer: 5 13		Date:			Time: 1/200	
Cllent:_	135	5065				Personnel:_	DEMA	J TCTAG	L <sup>4</sup>	
Project l	ocation:	كالمحادا			<del></del>	Weather:	SUNNY	,12,64		
2. WELL										
Casing (	Diameter:	<u>)</u> inc	hes	lype: μαρν	C 🗆 Stainle	ess 🖸 Galv. St	eel 🗆 Teflon	® 🛚 Other:		
Screen (	Diameter:	Inc	hes	Type: d'PV	/C 🗆 Stainle	ess 🛚 Galv. St	teel 🛚 Teflon	® □ Other:		
Total De	pth of Well:	ス・フ fe	eet	From: 🔥 To	op of Well Ca	sing (TOC)	Top of Prot	ective Casing	Other:	
Depth to	o Static Water	56.74	feet	From: 🖒 To	op of Well Ca	sing (TOC) (	☐ Top of Prot	ective Casing	Other:	
	o Product:						☐ Top of Prot	ective Casing	Other:	
Length (	of Water Colur	nn: <u>5'5</u>	(feet	Well Volum	le: 2 · 9			nterval (from G vell = 0.167 gal/fl		
Purge M Materia Materia	ietnod: <sub>a</sub> Centi ls: Pump/Baile ls: Rope/Tubln	rifugal Purr Stainle Dedic Dedic Polyet Dedic	Bladden Bladden Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Brown Br	attle Pump (  Difference off-s) Polypropyterepared off-	Inertial Lift F CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL CONTRO	Cleaned A 1 B A Other: Cleaned D	Disposable Disposable Disposable	1. <u>\</u> 2	Equipment Model(s)	
Was well purged dry? 🛕 Yes 🗖 No Pumping Rate:gal/min 3										
Time Cum. Gallons pH Temp Spec. Eh Dissolved Oxygen Turbidity Other: Comments										
1.15 - 1.66 2068 801 16.1 7.4 CLM										
1						i '				
<b></b>						<del> </del>	1	<u>-</u>		
<u> </u>			<del>                                     </del>	<u> </u>	<u> </u>	<u> </u>	<u> </u>			
Method Materid Materid Depth Sample	PLING DA  Baller, Sh Peristalti  Sis: Pump/Balle  Sis: Tubing/Rop  to Water at Tir  HD: MU	ze: L' C c Pump D Stainl D Dedic De D Polye D Dedic ne of Sar	less &PVC cated DPr othylene C cated DP mpling: Sample	Punip Gon Pepared Off- Polypropyle Prepared Off	MB D Other:_ Site D Field ene D Teflor F-Site D Field Field Filter	Cleaned A	Disposable  Disposable  No	np Ferro DO: Nitro		
5 001	MAENITO	<u></u>	^	16 15				N /		
	MENTS						is w	The pur	em cullacted	
Note: Inclu	de comments su	ch as well	condition,	odor, presen	ce of NAPL, o	or other items	not on the fie	ld data sheet.		

Slangtura

#### BROWN AND CALDWELL

### **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-8

1 PPO II	ECT INFOR	λη Δ Τι	)NI	· · · · · · · · · · · · · · · · · · ·			<u> </u>			
	Number: 17-5	_		215	,	Data: 3.	ر د ، ې		Time: 11:30	
	1355 i		IOSK INUITI	ber <del></del>		Personnel	DCXIV:		:::::e. <u></u>	
	ocation:					Weather:	SUNNY,	212	Ilme: <u>///:3</u>	
		1 - W				····	1)			
2. WELL	DAIA									
Casing (	Diameter:	inc		<del></del>				® □ Other:		
	Diameter:							® Other:		
	pth of Well:				·		Top of Prot	ective Casing	Other:	
Depth to	o Static Water	56-5		From: Ok To	·		<del></del>		Other:	
	Product:		J	From: 🗖 To	<del></del>		☐ Top of Prof	ective Casing	Other:	
Length (	of Water Colur	nn: <u>5 `&amp;</u>	feet	Well Volum	le: <u>3 - }</u>	-		nterval (from G vell = 0.167 gal/ff	S): 4-inch well = 0.667 gal/ft	
3 DI ID	E DATA					· · · · · · · · · · · · · · · · · · ·		o. o. gul/n	4-11 ICH Weil = 0.007 gal/ff	
		, Size:	□ Bladd	er Pump 🚨 2	2" Submersible	ePump □ 4*	' Submersible	Pump		
Purge M	iethod: 🖸 Cent						ər:		Equipment Model(s)	
Materia	ls: Pump/Baile	Stainle  Dedic	ess <b>(X</b> PVC cated <b>(</b> 2Pr	Di Teflon( epared Off-Si	D C Other:_ Ite C Field C	Cleaned 🗖	Disposable	1. 7.	(X-6,01)	
Materia	ls: Rope/Tubin					- Y	A wallawa			
	ls: Rope/Tubin							2		
Was well purged dry? 1/2 Yes 12 No Pumping Rate:gal/min 3										
Time Cum. Gallons PH Temp Spec. Eh Dissolved Oxygen Turbidity Other: Comments										
1140 - 7.5 19.7 764 24.2 4.94										
11110		1.0								
						<del> </del>				
								· · · · · · · · · · · · · · · · · · ·		
		_								
A SAMI	PLING DA	TA	1		<del></del>	<u> </u>	.1	Gen	chemical Analyses	
NASH.	(s): Devistable	ze: / 1	🗅 Bladder F	Pump □ 2"S	ubmersible Pı	ump 🚨 4" Su	ıbmersible Pur		· 	
Memod	<sup>3(s):</sup> • Peristalti	Crump C	a ii i <del>ç</del> nici bii	Trump 4 On				Ferro	ous Iron: mg/L	
Materio	als: Pump/Baile	er 🗅 Stain 🗅 Dedi	less ⊿D.PV cated □P	C 🚨 Teffor repared Off-	x® □ Other:_ Site □ Afleta	Cleaned 🔏	Disposable	DO:	4. 5 mg/L	
Materio	als: Tubing/Rop						ハソレンハ	- Nitro	ate:mg/L	
	to Water at Tir	u Deal		Prepared Off				C15.		
	o water at III o ID: MM W	_/		Time:		# of Conta	) }	Sulfo	ite:mg/L	
				•	,	# OI CONT	Jii 16(5)	— Alko	ilinity: 370 mg/L	
Duplico	ate Sample Co	лестеа?	U Yes U	/ NO ID:		-				
5. CON	MENTS	Noo	.ds 1	en h	ell c	th st				
S	anpla	مرن ا	ナトし	en h		* ,=				
								_		
Note: Includ	de comments su	ch as well	condition,	odor, presen	ce of NAPL, o	or other items	not on the fle	ld data sheet.		

FORM GW-1 (Rev 6/8/99 - with)

-B/

## BROWN AND CALDWELL

FORM GW-1 (Rev 6/8/99 - worh)

#### **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: 17W79

1 PROJI	ECT INFOR	MATIC	ON	<del></del>					1		
	Number: 128			oer: 0\5	(	Date: 3	F- 7. 9.	00	fime: 15' 00		
Client:_	BJ .ocatlon: <u> </u>	sucs			ı	Personnel <sup>.  </sup>	0 CAN 1	CJ (7UE)			
Project L	ocation: $\dot{F}$	7 2992	·			Weather:	runy	, mild			
2. WELL	DATA										
Casing [	Diameter:	Z_inc	hes	Type: ppp	'C 🗆 Stainle	ss 🛚 Galv. St	reel 🖸 Teflon	® □ Other:			
Screen (	Diameter:	inc inc	hes	Туре: фру	C 🗅 Stainle	ss 🚨 Galv. St	teel 🗅 Teflon	® 🖸 Other:			
	رن :pth of Well			<u>-</u>			☐ Top of Prot	ective Casing	Other:		
Depth to	o Static Water	55.6	<del></del>		op of Well Cas			ective Casing			
	o Product:		1		op of Well Ca				Other:		
Length o	of Water Colur	nn: <u>گ آگ</u>	2 feet	Well Volum	ie: <u> </u>			nterval (from G vell = 0.167 gal/ff	/		
3. PURG	E DATA		····		·						
		, Size: 1	□ Bladde	er Pump 🚨 2	?" Submersible	Pump D Othe	Submersible er:	Pump			
	is: Pump/Baile	□ Stainle	ess 🕰 PVC	: D Teflon®	Other:				Equipment Model(s)		
	,	D Delvet			te 🗓 Field C			1. <u>}</u> 5	t-6'917		
Materia	ls: Rope/Tubin	g Dedic	ated DF	repared Off	Site 🗅 Field	Cleaned D	Disposable	2			
Was we	Il purged dry?	À Yes	□ No	Pumpi	ng Rate:	ga	ıl/min	3			
Time Cum. Gallons Removed pH Temp Spec. Cond. Eh Dissolved Oxygen Turbidity Other: Comments											
1515 - 8.0 19.2 570 75.9 7.26											
	1313										
,											
						<u> </u>					
4. SAM	PLING DA	. 1 1							chemical Analyses		
Method	d(s): Deristalti			Pump 🚨 2" Si Pump 🚨 Otl	ubmersible Pu her:	amp □ 4" Su 	bmersible Pur	mp Ferro	ous Iron: mg/L		
Materio	als: Pump/Baile				MB □ Other:_ Site □ Fleld (		Disposable	DO:	mg/L		
Materia	als: Tubing/Rop	□ Polye	thylene (	Polypropyle	ene 🛚 Teflor	n® 🗷 Other:_	Nylym	Nitro	ite: mg/L		
1	to Water at Tir	u Deal			-Site 🖸 Field			Sulfo			
	io water at tit	,			Fleid Filler						
i '	ate Sample Co					,, 5, 50, 110		- Alka	llinity:mg/L		
			0.00			_					
15, CON	MENTS	- 45	414 ic	ient !	water	to p	ards in	ellawith	hrath:		
(0)	lected	Sam	ple	WITH	-dusp	२८५ विदं	اعرراة	2 1/			
Note: Includ	de comments su	ch as well	condition,	odor, presen	ce of NAPL c	or other items	not on the fie	ld data sheet.			
				-							

### BROWN AND CALDWELL

#### **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MM-13

	ECT INFOR			1						
	vumber: 12-8			per: <u>0  2</u>	(	Date: 3 (	2.00		Time: ピゾロ	
Client:_	BISV	<u> </u>			[	Personnel:_	DEAN	TENGUE	~	
Project L	ocation: <u>L</u>	کهادلار				Weather:_\$	かんかん	~\LO\		
2. WELL	DATA									
Casing (	Diameter:3	inc	hes	Туре: ў ру	'C 🗅 Stainle	ss 🗓 Galv. S	teel 🗅 Teflon	® 🛘 Other:		
<del></del>	Diameter:			Type: 🏚 PV	C 🗆 Stainle	ss 🖸 Galv. S	teel 🗆 Teflon	® ☐ Other:		
Total De	pth of Well: 🖄	2.8 fe	eet	From: 🖎 To	p of Well Cas	sing (TOC)	☐ Top of Prot	ective Casing (	<b>O</b> Other:	
Depth to	Static Water:	57.71	_feet	From: 🟚 To	p of Well Cas	sing (TOC)	□ Top of Prot	ective Casing (	□ Other:	
	o Product:			From: D To			☐ Top of Prot	ective Casing	Other:	
Length o	of Water Colur	mn: <u>5 · 5</u>	feet	Well Volum	e: <u>ɔ · ɣ ऽ</u>			nterval (from G vell = 0.167 gal/ft	,	
3. PURG	E DATA	13								
Purge M	E DATA Bailer Tethod: Centr	, Size: <u>ľ</u> rifugal Pun	□ Bladdon D □ Perisi	er Pump 🚨 2 taltic Pump 🕻	2" Submersible 3 Inertial Lift P	Pump 🚨 4'	* Submersible l er:	Pump	Equipment Model(s)	
	ls: Pump/Bailei	_ □ Stainle	ess 💆 PVC		Other:_				(F-6101)	
: Materia	ls: Rope/Tubin	Q Dolye	thylene 🗆	Polypropyler	ne 🗓 Teflon(	Did Other:_	Nylin			
		B Dedic	cated DP	repared Off-	Site 🗅 Fleid	Cleaned L	1 Disposable	2		
Was we	II purged dry?	JŽÌ\ Yes	□ No	Pumpi	ng Rate:	<del></del>	nimin	3		
Time Curn. Gallons pH Temp Spec. Eh Dissolved Oxygen Turbidity Other: Comments										
0850 - 7.1 18.3 1086 -8354.3 185										
							ļ			
						<u> </u>	<u></u>			
4. SAM	PLING DA	TA						Geo	chemical Analyses	
Method	d(s): Bailer, Siz D Peristalti			Pump 🖸 2" Si Pump 🚨 Ott		ump 🗆 4" St	ibmersible Pur	np Ferro	ous Iron: 3 , 2 mg/L	
Materia	als: Pump/Baile			C 🚨 Teflon repared Off-S			l Disposable	DO:	O, Zmg/L	
Materio	als: Tubing/Rop	pe 🚨 Polye	ethylene ( cated (2)	2 Polypropyle Prepared Off	ene 🚨 Teflor -Site 🚨 Field	n® 42 Other:	アDisposable	- Nitro	ite:mg/L	
Depth	to Water at Tin					ed? 🗆 Yes	•	Sulfo	ate: mg/L	
	= ID: 171~ 7								221	
	ate Sample Co		١.			_		Aiko	elinity: //Omg/L	
5 000	ANAENITO	٠	,			ai		(4).		
13. CON	MENTS			*Y ~ "	ds rep	ol ce, me	5, 1	Syffici	ent water	
10	1241 gr	wirl	, b.	ins; (	ollecte	d Sa	unples 1	with d	13 120596/12	
Note: Includ	de comments su	ch as well	condition,	odor, presen	ce of NAPL c	or other items	not on the fie	ld data sheet.		

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FORM GW-1 (Rev 6/8/99 - wah)

### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-1/A

				·						
Project N	ECT INFOR Number:[2を らて	37- SUCS		oer: <u>0</u>   \$	i	Personnel:_	g. 00	TONGUC	Time: 15:350	
Project L	.ocation:{	422.82				Weather: <u></u>	アントア	V-, L71		
2. WELL	DATA									
	Diameter:	inc inc	hes	Type: 🏚 🙉	/C 🗅 Stainle	ss 🖫 Galv. St	eel 🗅 Teflon	Ø □ Other:		
	Diameter:			Type: 🖒 PV	/C 🗅 Stainle	ss 🛭 Galv. St	teel 🗅 Teflor	® □ Other:		
Total De	pth of Well:	<u>3·6</u> fe	et	From: 🗖 To	op of Well Ca	sing (TOC)	☐ Top of Prot	ective Casing (	□ Other:	
Depth to	Static Water	58.01	feet	From: 🗖 To	op of Well Ca	sing (TOC)	☐ Top of Prot	ective Casing	🛘 Other:	
Depth to	o Product:	fee	it	From: 🗖 To	op of Well Ca	sing (TOC)	☐ Top of Pro	tective Casing	Other:	
Length o	of Water Colur	nn: 5 5	<u>ি</u> feet	Well Volum	ne: <u>၁ . ၄</u>			nterval (from G vell = 0.167 gal/ft	S): 4-inch well = 0.667 gal/ft	
3. PURG	E DATA	.1								
Purae M	lethod: D Cent	, Size:	☐ Bladd	er Pump 🚨 2	2" Submersible	Pump 0 4"	Submersible	Pump		
		C) Chalala			⊒inemaium P Bo⊒ Other:_	ump u Oine	rr		Equipment Model(s)	
Materia	ls: Pump/Baile	🚨 Dedic	ated 🗅 Pro	epared Off-Si	ite 🗀 Field C			1. 75	X-6100	
Materia	ls: Rope/Tubin				ne 🗅 Teflon Site 🗅 Fleid					
Was we	II purged dry?	À Yes	□ No	Pumpi	ing Rate:	aa	i/min	3		
	Cum. Gallons			Spec.	T	Dissolved	·	Other:		
Removed PH remp Cond. En Oxygen rurbiarry Comments										
1600 1 7.4 19,10 3875 -1115 3,19 -										
16.05	2	7. 3	19,2	3990	-939	3.56				
							1			
							-	<u> </u>		
4. SAMF	PLING DA	} {						į.	chemical Analyses	
Method	i(s): D Peristalti			Pump 🚨 2" S Pump 🚨 Ot	ubmersible Pu her:	ump 🗔 4" Su	bmersible Pu	mp Ferro	ous Iron: $1.8$ mg/L	
Materia	ıls: Pump/Baile	ar 🗆 Stainl	ess thev	C 🗅 Teflor	n® Ճ Other: <u>"</u>		/ <u></u>	DO:	0,2 mg/L	
1	•	U Dedi		•	Site 🗆 Field ene 🗅 Teflor		1			
Materio	als: Tubing/Rop	De Dedk	cated <b>Q</b>	Prepared Off	f-Site 🖸 Field	Cleaned 1	Disposable	— Nitro	ite:mg/L	
1 '	o Water at Tir				Fleld Filter	ed? 🗆 Yes	Mo No	Sulfo	ate:mg/L	
Sample	10: MW-1	<u> </u>	Sample	Time: 16	<u>کی ژ</u>	# of Conto	ainers: //	— Alka	illinity: 776 mg/L	
Duplico	ate Sample Co	ollected?	☐ Yes ☑	No ID:_		<del>-</del>				
5, CON	MENTS		:22	(2)	101425	.4x - :	00 1.13	-1	Λ < 1 -	
1	Nerrod	اریک کیدا اریک کیدا	* 1710 11	we lat	outer	to bri	Je wi	th BUIN	Lar sainly los	
	1101762	W/44	d/5	705060	الحسير	124				
Note: Includ	de comments su	ch as well	condition,	odor, preser	ce of NAPL o	or other items	not on the fie	ld data sheet.		

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#### BROWN AND CALDWELL

FORM GW-1 (Rev 6/8/99 - wah)

#### **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-12

Project (	ECT INFOR Number: 128 BJ Location:	-32 -sucs		per: DIS		Date: Personnel: Weather:	05m2	)U TÆDKVG	Time: <u>ら</u> っち
2. WELL	DATA								
Casing I	Dłameter:	L_inc	hes	Type: 🌠 PV	/C 🚨 Stainle	ss 🛘 Galv. St	reel 🗅 Teflon	Ø □ Other:	
Screen I	Diameter:	$\mathcal{L}_{ ext{inc}}$	hes	Туре: 🛚 ру	/C 🛚 Stainle	ss 🚨 Galv. St	teel 🗅 Teflor	® 🗅 Other:	
Total De	epth of Well: <u>(</u>	1.20 fe	et	From: às to	op of Well Cas	sing (TOC) (	☐ Top of Prot	ective Casing (	□ Other:
Depth to	o Static Water:	58.78	_feet	From: 👌 to	op of Well Cas	sing (TOC)	Top of Prot	ective Casing (	□ Other:
Depth to	o Product:	fee	·	From: 🗖 To			□ Top of Pro	tective Casing	□ Other:
Length	of Water Colur	mn: <u>3·17</u>	feet	Well Volum	e: ک.ک			nterval (from G vell = 0.167 gal/ft	
3. PURG	E DATA								
Purge N	1ethod: Cent	r, Size:	Q Bladdo	er Pump Q 2	2" Submersible	Pump 🖸 4*	Submersible	Pump	
1	is: Pump/Baile	_ 🗆 Stainle	ess 🗗 PVC	Teffond	D Other:				Equipment Model(s)
Materia	ls: Rope/Tubin	g 🗓 Polyet 🗓 Dedlo	thylene 🗆 ated 🗅 P	Polypropyle repared Off-	ne 🗅 Teflond Site 🗅 Fleid	DOD Other: Cleaned 2	NyLin Disposable	•	
Was we	II purged dry?	☐ Yes	□ No	Pumpi	ing Rate:	ga	i/min	3	
Time Cum. Gallons PH Temp Spec. En Dissolved Oxygen Turbidity Other: Comments									
0910 1.0 7.0 17.00 1902 -11.5 4.7 - Saignle IP									
OGIS	2.0	フハ	17.50	1926	-1134	3,16	)		SII
0920	2.5	7.1	17.5	1091	-92.8	4.8	244		End of Samplings
						<u> </u> 			
4. SAMI	PLING DA	TA ,						Geo	chemical Analyses
Method	d(s): D Paristatti			Pump 🗓 2" S Pump 🚨 Off		ımp 🔾 4" Su	bmersible Pur	mp Ferro	ous Iron: T. H. mg/L
Materia	als: Pump/Baile	sr 🗆 Staini	ess 💆 PV	C 🗓 Teflor	n® 🛚 Other:_		<del></del>	DO:	8.6 mg/L
		U Deak		repared Off-( Polypropyle			Disposable		
Materia	als: Tubing/Rop	De Dedk	cated 🗅	Prepared Off	f-Site D Fleid	Cleaned (	Disposable	- Nitra	ute:mg/L
	to Water at Tin	~			Field Filter	ed? 🗆 Yes	1.	Sulfo	ate: mg/L
	D: MW		Sample		140	# of Conto	ainers: ] [	– Alka	illinity: 770 mg/L
Duplico	ate Sample Co	ollected?	Yes 🗆	No ID:_	Nul	-			_
5. CON	<b>MENTS</b>	521	26%	a.tl	~ ball	, ė 🗸			
			<i>V</i>						
Note: Includ	de comments su	ich as well	condition,	odor, presen	ice of NAPL o	or other items	not on the fie	ld data sheet.	

### BROWNAND CALDWELL

FORM GW-1 (Rev 6/8/99 - wah)

#### **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-IND

1. PROJECT INFORMATION									
Project Number: 12832 Task Number: 015 Date: 3-5-30 Time: 13:15									
Client: BUSUCS Personnel: DEANTEACUE									
Project Location: 4 012 53 Weather:									
2. WELL DATA									
Casing Diarmeter: Inches Type: vi PVC Di Stalniess Di Galv. Steel Di Teflon® Di Other:									
Screen Diameter: Junches Type: St PVC D Stainless D Galv. Steel D Teffon® D Other:									
Total Depth of Well: 87.7 feet From: Top of Well Casing (TOC) Top of Protective Casing Total Other:									
Depth to Static Water: 5 8-24 feet From: 🕱 Top of Well Casing (TOC) 🖸 Top of Protective Casing 🗓 Other:									
Depth to Product:feet From: Top of Well Casing (TOC) Top of Protective Casing Other:									
Length of Water Column: \( \frac{1}{2} \frac{1}{16} \) feet \( \text{Well Volume:} \) \( \frac{5}{2} \) \( \text{gal} \) \( \text{Screened Interval (from GS):} \) \( \text{Note:} \( 2 \) inch \( \text{well} = 0.167 \) \( \text{gal/ft} \) \( \text{4-inch well} = 0.667 \) \( \text{gal/ft} \)									
3. PURGE DATA									
Ø Boller Size: 1 ☐ Blodder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump									
Purge Method: Centrifugal Pump Deristatitic Pump Dinertial Lift Pump Dother:									
Materials: Pump/Bailer Stainless APVC D Teffon® D Other: Dedicated D Prepared Off-Site D Field Cleaned D Disposable 1. 157-6/0/									
Materials: Rope/Tubing Dedicated Deplypropylene Deficience Deficience Desposable 2.									
Was well purged dry?   Yes   No Pumping Rate: gal/min 3									
Time Cum. Gallons pH Temp Spec. Eh Dissolved Oxygen Turbidity Other: Comments									
1330 - 8.1 19.9 1061 -63.3 5.08 clear									
1333 0.5 7.9 19.3 1056 -92.4 4.3( - 11									
1336 1.00 7.8 9.1 1092 -79.1 5.76									
1340 1,5 7,7 19,2 929 -19 5.12/8-6 - CLear									
4. SAMPLING DATA  Geochemical Analyses									
Method(s): Bailer, Size: Bladder Pump 2" Submersible Pump 4" Submersible Pump Ferrous Iron: 1 mg/L									
Materials: Pump/Bailer Stainless Device Teflone Other:  Dedicated Prepared Off-Site Field Cleaned Disposable  DO: 4 2 mg/L									
Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: △ → ↓ ↓ ↓ ↓ ← ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable ☐ Nitrate:mg/L									
Double to Westers at Time of Compiling									
Depth to Water at Time of Sampling: Field Filtered? Q Yes & No Sulfate: mg/L  Sample ID: MINT Sample Time: # of Containers:   Atkaliniba: 3600 mg/L									
Sample ID: 177 (X)   Sample Time: # of Containers:   Alkalinity: 550 mg/L  Duplicate Sample Collected?   Yes   No   ID:									
5. COMMENTS unite to colicut sample with pump collected									
Sayour with built									
Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet.									

#### BROWNAND CALDWELL

FORM GW-1 (Rev 6/8/99 - wah)

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-13

				······································					
	ECT INFOR	_				~	1 3 3		,7 ,3 5
	Number: 12-8		Task Numl	oer: 0  3					Time: 10 2 00
Client:	137 20cm	11.						JENA CI	<u> </u>
Project l	ocation: 🔼	<u> </u>				Weather:	sund,	MILCH	
2. WELL	DATA								
Casing (	Diameter:	ک_ inc	hes	Туре: 🙀 РV	C 🛭 Stainle	ss 🛭 Galv. S	teel 🗅 Teflon(	9 🛛 Other:	
Screen (	Diameter:	inc	hes	Туре: дру	C 🗆 Stainle	ss 🛛 Galv. S	teel 🗆 Teflon	8 🛭 Other:	
Total De	pth of Well:	<del>الم</del> الأود	et	From: 🗖 To	p of Well Ca	sing (TOC)	☐ Top of Prote	ective Casing	Other:
Depth to	o Static Water:	57-6	&feet	From: 🖒 to	p of Well Ca	sing (TOC)	☐ Top of Prote	ective Casing	Other:
Depth to	o Product:	fee	et	From: 🗅 to	op of Well Ca	sing (TOC)	☐ Top of Prof	ective Casing	□ Other:
Length (	of Water Colur	nn: <u>7 S</u>	L feet	Well Volum	e:_/ <i>-)-S</i> _			nterval (from G vell = 0.167 gai/fl	,
Purge M Materia Materia	EDATA  Bethod: Baller Centil  S: Pump/Baller  S: Rope/Tubin  Il purged dry?	Stainle Dedic Polye Dedic	ess ÉPVC cated OPre thylene O cated OP	Tefloné epared Off-Si Polypropylei repared Off-	Other:_ te D Field C ne D Teflon Site D Field	Cleaned (1)  Other:_ Cleaned (2)	Disposable  Ly 13  ADisposable	1. 757 2.	Equipment Model(s) ∠-610 V
WGs We			LI NO	·	ng Rate: r	<del>,</del>	nim/tr	3	
Time	Cum. Gallons Removed	pН	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1015	-	7,5	17.8	1618	-82.1	4.5	438		
			<u> </u>						
			ļ						<del> </del>
		<u> </u>							
4. SAM	PLING DA	TA						Geo	chemical Analyses
Method	d(s): Bailer, Siz					ump 🚨 4" Su	ubmersible Pun	np Ferro	ous Iron: mg/L
	als: Pump/Baile			Pump 🚨 Off C 🚨 Teflon				DO:	
1		D Dohr	caloa wil	repared Off-S Departed Polypropyle	ne willer	cicarica -a		DO.	mg/L
Materio	als: Tubing/Rop	Dedl	cated 🚨	Prepared Off	-Site 🗆 Field	Cleaned 1	Disposable	— Nitro	ate:mg/L
	to Water at Tin					ed? 🗆 Yes		Sulfo	ate:mg/L
Sample	D: MW-1	3	Sample	Time: 10.	15	# of Conto	ainers:	– Alko	alinity: mg/L
Duplice	ate Sample Co	ollected?	O Yes 🖎	No ID:_		_			11912
5 CON	MENTS	, l =	سلد ا						
		000V	7.	~51/6F	, event	الكامر	V TU b	v~g 5	anolid with
Beile									
Note: Includ	de comments su	ich as well	condition,	odor, presen	ce of NAPL, c	or other items	not on the fiel	ld data sheet.	

### BROWN AND CALDWELL

#### **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: OW-LI

	50T 11505	33 A 5 TL								
1. PROJECT INFORMATION										
Project Number: 12632 Task Number: 015 Date: 7-17-00 Time: 14:20										
Personnel: DEAN, TENGUS  Project Location: Hoos Weather: Sunny, mild										
Project	Location:	1 30PR			\\	Weather: 5	unny ,	~16		
2. WELL	DATA									
Casing I	Diameter:	finc	hes	Type: D,pv	C 🗆 Stainle	ss 🛚 Gatv. St	reel 🗆 Teffor	® □ Other:		
Screen	Dlameter:	inc	hes	Гуре: 👌 ру	C 🗆 Stainle	ss 🛛 Gatv. St	teel 🚨 Teffor	Ø□ Other:		
Total De	epth of Well:	<u> </u>	eet	From: 💩 To	p of Well Cas	sing (TOC)	Top of Prof	ective Casing	Other:	
Depth to	o Static Water	59,10	feet	From: de To	p of Well Cas	sing (TOC)	Top of Prof	tective Casing	Ofher:	
	o Product:				op of Well Ca		Top of Pro	tective Casing	☐ Other:	
Length	of Water Colu	mn: <u>2·1</u>	feet	Well Volum	e: 3, L)			nterval (from G	/	
						/	Note: 2-Inch v	vell = 0.167 gal/fi	t 4-inch well ≈ 0.667 gal/ft	
3. PURG	SE DATA	· 250.		or Orange D. O	." Submersible	Dumm D Att	Cubecamileia	Di ima		
Purge M	Method: Cent	rifugal Pun	np 🚨 Perisi	attic Pump	3 Inertial Lift P	ump DOthe	r:		Equipment Model(s)	
Materia	ıls: Pump/Baile			: Di Teflon@ epared Off-Si	® □ Other:_ te □ Fleld C	leaned (A)	Disposable	1 NS	E-61010	
Materia	ıls: Rope/Tubin	a D Polye	thylene 🚨	Polypropyler	ne 🖸 Teflon(	Di Other:_	NYLOS			
<u> </u>		- U Deald	•	•	Site 🔾 Field			2		
Was we	Was well purged dry? 🖸 Yes 🗅 No Pumping Rate:gal/min 3									
Time	Cum. Gallons Removed	рН	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments	
1121	_	7.9	19.47	1481	67	9,3	_		claudy	
<b> </b>			]							
	!						<u> </u>			
4, SAM	PLING DA	TA						Geo	chemical Analyses	
Method	Bailer, Si	ze: 📘 🕕	□ Bladder F	Pump 🗖 2" Si Pump 🚨 Ott	ubmersible Pu	ımp 🗀 4" Su	bmersible Pu	mp Ferro	ous Iron: O.O mg/L	
Name of the second	als: Pump/Baile	G 04-1-	less BPV		® ☐ Other:_				/ 12	
Migletic	als: Pump/bulle	Dedi 🕽 Dedi	cated 🚨 Pi	epared Off-9	Site Di Fleid	• .	•	DO:	mg/L	
Materia	als: Tubing/Rop	pe 🖸 Polye Dedl	ethylene C cated 🖫 l	<b>1</b> Polypropyle Prepared Off	ene 🗅 Teflor -Site 🚨 Fleld	n® <b>&amp;</b> Other:_   Cleaned   (	Disposable	— Nitro	ate:mg/L	
Depth	to Water at Tir		nplina:		Field Filter	ed? 🗆 Yes	EŘ No	Sulfo	ate:mg/L	
	= ID: 0W-L		Sample	Time: 14	.35	# of Conto	ainers: [	A.U	alinity: 770 mg/L	
	ate Sample Co			•	····	-		AIKC	miny. // / Mg/L	
5 CON	AMENTS	-،سل	0,00	シュハニナ			- 010			
0,000	11. VIL. VII.	ر <del>د</del> م الد	1-1 b.	: 1 L Lum	(A)	(J) 75	- 12103	· WITI	~ pr ~ p,	
	1000		1							
Note: Inclu	de comments su	ich as well	condition,	odor, presen	ce of NAPL, c	or other items	not on the fie	ld data sheet.		

110

FORM GW-1 (Rev 6/8/99 - wah)



#### APPENDIX B

Laboratory Analytical Report for Groundwater Samples



## Case Narrative for: Brown & Caldwell

## Certificate of Analysis Number: 00030291

Report To:

Brown & Caldwell

Rick Rexroad 1415 Louisiana Suite 2500

Houston

TX 77002-

ph (713) 759-0999

fax: (713) 308-3886

Project Name:

BJ Service, Hobbs, NM

Site:

**BJ-Hobbs** 

Site Address:

PO Number:

State:

**New Mexico** 

State Cert. No.:

Date Reported:

03/24/2000

Your sample ID " MW-1 " (SPL ID: 00030291-01) 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) recoveries were outside of the advisable quality control limits for Calcium and Sodium (Batch ID: 3621 and 3621A), due to matrix interference. A Post Digestion spike (PDS) and a Post Digestion Spike Duplicate (PDSD) was performed and all recoveries were also outside of the advisable quality control limit. 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).

Please do not hesitate to contact us if you have any questions or comments pertaining to this data report. Please reference the above Certificate of Analysis Number.

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

This report shall not be reproduced except in full, without the written approval of the laboratory. The reported results are only representative of the samples submitted for testing.

Fini, Bernadette
Customer Service Manager

03/24/2000

Date



#### **Brown & Caldwell**

Certificate of Analysis Number:

00030291

port To: Brown & Caldwell

Rick Rexroad

1415 Louislana

Suite 2500

Houston

TX 77002-

Fax To:

ph: (713) 759-0999

Brown & Caldwell

Rick Rexroad

fax: (713) 308-3886

fax: (713) 308-3886

Project Name: Site: BJ Service, Hobbs, NM

: BJ-Hobbs

Site Address:

PO Number:

State:

**New Mexico** 

State Cert. No.:

**Date Reported:** 

Client Sample ID	Lab Sample ID	Matrix	Date Collected	Date Received	COC ID	HOLD
<b>.</b>						
N-1	00030291-01	Water	3/9/00 5:20:00 PM	3/10/00 10:00:00 AM		
√V-3	00030291-02	Water	3/9/00 4:45:00 PM	3/10/00 10:00:00 AM		
IW-11A	00030291-03	Water	3/9/00 4:05:00 PM	3/10/00 10:00:00 AM		
N-9	00030291-04	Water	3/9/00 3:15:00 PM	3/10/00 10:00:00 AM	<del></del>	
W-4	00030291-05	Water	3/9/00 2:35:00 PM	3/10/00 10:00:00 AM		
W-12D	00030291-06	Water	3/9/00 1:45:00 PM	3/10/00 10:00:00 AM		
W-8	00030291-07	Water	3/9/00 11:40:00 AM	3/10/00 10:00:00 AM		コ声
W-7	00030291-08	Water	3/9/00 11:15:00 AM	3/10/00 10:00:00 AM		コー
.W-5	00030291-09	Water	3/9/00 10:30:00 AM	3/10/00 10:00:00 AM		
rip Blank #1 2/29/00	00030291-10	Water	3/9/00	3/10/00 10:00:00 AM		コ声
p Blank #2 2/29/00	00030291-11	Water	3/9/00	3/10/00 10:00:00 AM		
p Blank #3 2/29/00	00030291-12	Water	3/9/00	3/10/00 10:00:00 AM		
rip Blank #4 2/29/00	00030291-13	Water	3/9/00	3/10/00 10:00:00 AM		7 7
ip Blank #5 2/29/00	00030291-14	Water	3/9/00	3/10/00 10:00:00 AM		$\exists \exists$

ini, Bernadette

ustomer Service Manager

3/24/00

Date

Joel Grice Laboratory Director

Ted Yen
Quality Assurance Officer





Client Sample ID MW-	1		Collected:	3/9/00 5:20:00	SPL Sample I	<b>)</b> : 0003	30291-01
			Site: BJ-	Hobbs			
Analyses/Method	Result	Rep.Lin	it	Dil. Factor QUA	L Date Analyzed	Analyst	Seq.#
ALKALINITY, BICARBO	ONATE		MCL	M2320 E	3 Units: mg	g/L	
Alkalinity, Bicarbonate	89.1	2		1	03/13/00 11:30		218394
ALKALINITY, CARBON	JATE		MCL	M2320 E	3 Units: mg	7/1	
Alkalinity, Carbonate	ND	2	IVICL	1	03/13/00 11:30		218447
CHLORIDE, TOTAL	0.00		MCL	E325.			
Chloride	258	5		5	03/17/00 10:30	CV	221886
DIESEL RANGE ORGA	NICS		MCL	SW8015	3 Units: m	g/L	
Diesel Range Organics	14	2		10	03/23/00 12:56		225975
Surr: Pentacosane	124	% 18-120		10 *	03/23/00 12:56	RR	225975
Run ID/Seq #: HP_	V_000316A-225975						
Prep Method	Prep Date	Prep In	itials				
SW3510B	03/12/2000 14:35	KL					
FLUORIDE-IC			MCL	E30	0 Units: m	g/L	
Fluoride	1.7	0.1		1	03/10/00 12:57		221800
GASOLINE RANGE OF	RGANICS		MCL	SW8015	3 Units: m	n/)	
Gasoline Range Organic		0.1		1	03/18/00 20:16	yr. LJ	221919
Surr: 1.4-Difluorobenz		% 74-121	<del></del>	1	03/18/00 20:16	 LJ	221919
Surr: 4-Bromofluorobe	enzene 124	% 55-150		1	03/18/00 20:16	LJ	221919
HARDNESS, TOTAL (T	TITRIMETRIC, EDTA)		MCL	E130.	2 Units: m	g/L	
Hardness (As CaCO3)	600	50		10	03/22/00 10:15	<del></del>	225428
HEADSPACE GAS AN	ALYSIS	****	MCL	RSK14	7 Units: m	g/L	
Ethane	ND	0.0025		1	03/22/00 14:09	AB	225474
Ethylene	ND	0.0032		1	03/22/00 14:09	AB	225474
Methane	ND	0.0012		1	03/22/00 14:09	AB	225474
MERCURY, TOTAL			MCL	SW7470	A Units: m	g/L	
Mercury	0.000695	0.0002		1	03/17/00 12:28	РВ	220732
Run ID/Seq #: HGI	L_000317A-220732						
Prep Method	Prep Date	Prep In	itials				
	03/17/2000 0:00						
METALS BY METHOD	6010B, TOTAL		MCL	SW6010	B Units: m	g/L	
Arsenic	0.0178	0.005	j	1	03/21/00 22:39	EG	224433
Lead	ND	0.005	5	1	03/21/00 22:39	EG	224433
Selenium	ND	0.005	<u> </u>	1	03/21/00 22:39	EG	224433
Barium	0.0917	0.005	5	1	03/14/00 16:52	E_B	218606
						F D	218606
Cadmium	ND	0.005	5	1	03/14/00 16:52	E_R	210000

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)





Client Sample ID MW-1	Collected:	3/9/00 5:20:00 P	SPL Sample ID:	00030291-01

			Site:	BJ-Hobbs				
Analyses/Method	Re	sult	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Chromium		ND	0.01	1		03/14/00 16:52	E_B	218606
Magnesium		41.3	0.1	1		03/14/00 16:52	E_B	218606
Potassium		4.01	2	1		03/14/00 16:52	E_B	218606
Silver		ND	0.01	1		03/14/00 16:52	E_B	218606
Sodium		123	0.5	1		03/14/00 16:52	E_B	218606
Run ID/Seq #: 1	JA_000314A-218606				.,			
Prep Method	Prep Date		Prep Initials					
SW3010A	03/10/2000 12:30		_AA					

Run ID/Seq #: TJAT_000321A-224433									
Prep Method	Prep Date	Prep Initials							
SW3010A	03/10/2000 12:30	_AA							

NITROGEN, NITRATE (AS N)				MCL		E300	Units: mg/L		
Nitrogen,Nitrate (As N)	0.33		0.1		1		03/10/00 12:19	ES	218016
POLYNUCLEAR AROMATIC HYD	ROCARBO	NS		MCL	SI	N8310	Units: ug	3/L	
Acenaphthene	0.28		0.1		1		03/21/00 22:31	LJ	225392
Acenaphthylene	0.91		0.1		1		03/21/00 22:31	LJ	225392
Anthracene	0.12		0.1		1		03/21/00 22:31	LJ	225392
Benz(a)anthracene	0.18		0.1		1		03/21/00 22:31	LJ	225392
Benzo(a)pyrene	ND		0.1	en handi a e	1		03/21/00 22:31	LJ	225392
Benzo(b)fluoranthene	ND		0.1		: 1		03/21/00 22:31	LJ	225392
Benzo(g,h,i)perylene	ND		0.1		1		03/21/00 22:31	LJ	225392
Benzo(k)fluoranthene	ND		0.1		- 1		03/21/00 22:31	LJ	225392
Chrysene	ND		0.1		1		03/21/00 22:31	LJ	225392
Dibenzo(a,h)anthracene	ND		0.1		1		03/21/00 22:31	LJ	225392
Fluoranthene	ND		2		20		03/22/00 13:30	LJ	225385
Fluorene	25		2		20		03/22/00 13:30	LJ	225385
Indeno(1,2,3-cd)pyrene	ND		0.1		1		03/21/00 22:31	LJ	225392
Naphthalene	2.4		2		20		03/22/00 13:30	LJ	225385
Phenanthrene	0.65		0.1		1		03/21/00 22:31	LJ	225392
Pyrene	ND		2		20		03/22/00 13:30	LJ	225385
Surr: 1-Fluoronaphthalene	122	%	30-140		1		03/21/00 22:31	LJ	225392
Surr: 1-Fluoronaphthalene	D	%	30-140		20	*	03/22/00 13:30	LJ	225385
Surr: Phenanthrene-d10	D	%	35-140		20	*	03/22/00 13:30	LJ	225385
Surr: Phenanthrene-d10	131	%	35-140		1		03/21/00 22:31	LJ	225392

#### Run ID/Seq #: 2\_000321B-225385

Prep Method	Prep Date	Prep Initials
SW3510B	03/11/2000 14:51	KL
(T.11111)	_000321B-225392	11.5
Prep Method	Prep Date	Prep Initials
SW3510B	03/11/2000 14:51	KL

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)



03/15/00 11:35 ES

219741

Client Sample ID MW-1 Collected: 3/9/00 5:20:00 P SPL Sample ID: 00030291-01 Site: **BJ-Hobbs** Analyses/Method Result Rep.Limit Dil. Factor QUAL Date Analyzed Analyst Seq.# **PURGEABLE AROMATICS** MCL SW8021B Units: ug/L ND 03/18/00 20:16 221721 Benzene 1 Ethylbenzene ND 1 1 03/18/00 20:16 221721 ND Toluene 1 1 03/18/00 20:16 221721 Xylenes, Total 9.1 1 1 03/18/00 20:16 221721 Surr: 1,4-Difluorobenzene 88.1 % 72-137 1 03/18/00 20:16 LJ 221721 Surr: 4-Bromofluorobenzene 85.7 48-156 03/18/00 20:16 221721 MCL E300 SULFATE Units: mg/L

100

20

Qualifiers:

Sulfate

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

530

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

3/24/00 11:08:10 AM





Client Sample ID MW	-3	77.	Colle	cted:	3/9/00 4:45:00 P	SPL Sample ID:	0003	0291-02
			Site:	BJ-	Hobbs			
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
ALKALINITY, BICARB	ONATE			MCL	M2320 B	Units: mg/	L	
Alkalinity, Bicarbonate	248		2		1	03/13/00 11:30 A		218396
ALKALINITY, CARBO	NATE			MCL	M2320 B	Units: mg/	L	
Alkalinity, Carbonate	ND		2		1	03/13/00 11:30 A	<b>∖B</b>	218449
CHLORIDE, TOTAL				MCL	E325.3	Units: mg/	L	
Chloride	196		2		2	03/17/00 10:30 C	CV	221889
DIESEL RANGE ORGA	ANICS		V	MCL	SW8015B	Units: mg/	L	
Diesel Range Organics	0.32		0.2		1	03/22/00 12:02 F		225967
Surr: Pentacosane	155	%	18-120		1 *	03/22/00 12:02 F	RR	225967
Run ID/Seq #: HP	_V_000316A-225967							
Prep Method	Prep Date		Prep Initials					
SW3510B	03/12/2000 14:35		KL					
FLUORIDE-IC				MCL	E300	Units: mg/	L	
Fluoride	1.1		0.1		11	03/10/00 12:57 E	ES	221803
GASOLINE RANGE O	RGANICS			MCL	SW8015B	Units: mg/	 L	
Gasoline Range Organic			0.1		1		 LJ	221911
Surr: 1,4-Difluoroben:		%	74-121		. 1	03/18/00 17:16	LJ	221911
Surr: 4-Bromofluorob	enzene 107	%	55-150		1	03/18/00 17:16	LJ	221911
HARDNESS, TOTAL (	TITRIMETRIC, EDTA)			MÇL	E130.2	Units: mg/	L	
Hardness (As CaCO3)	450		25		5	03/22/00 10:15	CV	225431
HEADSPACE GAS AN	IALYSIS			MCL	RSK147	Units: mg/	L	
Ethane	ND		0.0025		1		AB	225475
Ethylene	ND		0.0032		1	03/22/00 14:17	AB	225475
Methane	ND		0.0012		1	03/22/00 14:17	AB	225475
MERCURY, TOTAL				MCL	SW7470A	Units: mg/	/L	
Mercury	ND		0.0002		1		РВ	220729
Run ID/Seq #: HG	L_000317A-220729							
Prep Method	Prep Date		Prep Initials					
SW7470A	03/17/2000 9:00		РВ					
			· · · · · · · · · · · · · · · · · · ·	MCL	SW6010B	Units: mg	/L	
METALS BY METHOD	6010B, TOTAL							224440
Arsenic	0.00817 0.00817		0.005		1	03/21/00 23:16	EG	<u> </u>
			0.005 0.005		1		EG EG	
Arsenic	0.00817					03/21/00 23:16		224440
Arsenic Lead	0.00817 ND		0.005		1	03/21/00 23:16	EG EG	224440 224440
Arsenic Lead Selenium	0.00817 ND ND		0.005 0.005		1	03/21/00 23:16   03/21/00 23:16	EG EG _B	224440 224440 218614 218614

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)



Client Sample ID MW-3	Collected:	3/9/00 4:45:00 P	SPL Sample ID:	00030291-02

		Site:	BJ-Hobbs		
Analyses/Method	Result	Rep.Limit	Dil. Factor QUAL	Date Analyzed Analyst	Seq. #
Chromium	ND	0.01	1	03/14/00 17:24 E_B	218614
Magnesium	27.5	0.1	1	03/14/00 17:24 E_B	218614
Potassium	4.11	2	1	03/14/00 17:24 E_B	218614
Silver	ND	0.01	1	03/14/00 17:24 E_B	218614
Sodium	112	0.5	1	03/14/00 17:24 E_B	218614

Run ID/Seq #: TJA\_000314A-218614

Prep Method	Prep Date	Prep Initials
SW3010A	03/10/2000 12:30	_AA
Run ID/Seq #: T	JAT_000321A-224440	
Prep Method	Prep Date	Prep Initials
SW3010A	03/10/2000 12:30	_AA

NITROGEN, NITRATE (AS N)	MCL	E300	Units: mg/L				
Nitrogen,Nitrate (As N)	2.9	0.1		1	03/10/00 12:19	ES	218019
POLYNUCLEAR AROMATIC HY	DROCARBON	S	MCL	SW8310	Units: ug	/L	
Acenaphthene	ND	0.1		1	03/21/00 23:10	LJ	225393
Acenaphthylene	ND	0.1		1	03/21/00 23:10	LJ	225393
Anthracene	ND	0.1		1	03/21/00 23:10	LJ	225393
Benz(a)anthracene	ND	0.1		1	03/21/00 23:10	LJ	225393
Benzo(a)pyrene	ND	. 0.1		1	03/21/00 23:10	LJ	225393
Benzo(b)fluoranthene	ND	0.1		1	03/21/00 23:10	LJ	225393
Benzo(g,h,i)perylene	ND	0.1		1	03/21/00 23:10	LJ	225393
Benzo(k)fluoranthene	ND	0.1		1	03/21/00 23:10	LJ	225393
Chrysene	ND	0.1		1	03/21/00 23:10	LJ	225393
Dibenzo(a,h)anthracene	ND	0.1		1	03/21/00 23:10	LJ	225393
Fluoranthene	ND	0.1		1	03/21/00 23:10	LJ	225393
Fluorene	ND	0.1		1	03/21/00 23:10	LJ	225393
Indeno(1,2,3-cd)pyrene	ND	0.1		1	03/21/00 23:10	LJ	225393
Naphthalene	ND	0.1		1	03/21/00 23:10	LJ	225393
Phenanthrene	ND	0.1		1	03/21/00 23:10	LJ	225393
Pyrene	ND	0.1		1	03/21/00 23:10	LJ	225393
Surr: 1-Fluoronaphthalene	54.6	% 30-140		1	03/21/00 23:10	LJ	225393
Surr: Phenanthrene-d10	74.1	% 35-140		1	03/21/00 23:10	LJ	225393

Run ID/Seq #: 2\_000321B-225393

Prep Method	Prep Date	Prep Initials
SW3510B	03/11/2000 14:51	KL

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)



Client Sample ID MW-3 Collected: 3/9/00 4:45:00 P SPL Sample ID: 00030291-02

Site: BJ-Hobbs

Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #	
PURGEABLE AROMATICS				MCL	SW8	021B	Units: ug	<sub>/</sub> /L		
Benzene	ND		1		1		03/18/00 17:16	LJ	221634	
Ethylbenzene	ND		1		1		03/18/00 17:16	LJ	221634	
Toluene	ND		1	•	1		03/18/00 17:16	LJ	221634	
Xylenes, Total	ND		1		1		03/18/00 17:16	LJ	221634	
Surr: 1,4-Difluorobenzene	85.7	%	72-137		1		03/18/00 17:16	LJ	221634	
Surr: 4-Bromofluorobenzene	93.1	%	48-156		1		03/18/00 17:16	LJ	221634	
SULFATE				MCL		E300	Units: m	g/L		
Sulfate	190		5		25		03/15/00 11:35	ES	219744	

<sup>\* -</sup> Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL



Client Sample ID MW-	11A		Colle	cted:	3/9/00 4:05:00	P S	PL Sample II	<b>)</b> : 00	030291-03
			Site:	BJ-	Hobbs				
Analyses/Method	Result	l	Rep.Limit		Dil. Factor QU	AL C	ate Analyzed	Analys	st Seq.#
ALKALINITY, BICARBO	DNATE			MCL	M2320	В	Units: mg	g/L	
Alkalinity, Bicarbonate	703		2		1	0	3/13/00 11:30		218397
ALKALINITY, CARBON	JATE			MCL	M2320	R	Units: mg	n/I	
Alkalinity, Carbonate	ND ND		2		1		3/13/00 11:30		218450
CHLORIDE, TOTAL		-		MCL	E325	.3	Units: m	a/L	
Chloride	1290		25		25	0	3/17/00 10:30		221890
DIESEL RANGE ORGA	NICS			MCL	SW8015	i R	Units: m	n/l	
Diesel Range Organics	0.43	-	0.2	MOL	1			RR	225968
Surr: Pentacosane	84.0	%	18-120		1		3/22/00 12:40		225968
	V_000316A-225968								
Prep Method	Prep Date	·····	Prep Initials						
SW3510B	03/12/2000 14:35		KL						
FLUORIDE-IC				MCL	E30	00	Units: m	a/L	
Fluoride	ND		0.1		1		3/10/00 12:57		221804
GASOLINE RANGE OF	RGANICS			MCL	SW8015	i R	Units: m	a/I	
Gasoline Range Organic	···		0.1	11102	1		3/18/00 19:50	LJ	221918
Surr: 1,4-Difluorobenz		%	74-121		1		3/18/00 19:50	LJ	221918
Surr: 4-Bromofluorobe		%	55-150		1	0	3/18/00 19:50	LJ	221918
HARDNESS, TOTAL (T	TRIMETRIC, EDTA)	-		MCL	E130	.2	Units: m	g/L	
Hardness (As CaCO3)	880		50		10	0	3/22/00 10:15	CV	225432
HEADSPACE GAS AN	ALYSIS			MCL	RSK14	47	Units: m	g/L	
Ethane	ND		0.0025		1	0	3/22/00 14:26	AB	225476
Ethylene	ND		0.0032		1	0	3/22/00 14:26	AB	225476
Methane	0.037		0.0012		1	0	3/22/00 14:26	AB	225476
MERCURY, TOTAL				MCL	SW7470	0A	Units: m	g/L	
Mercury	DN		0.0002		1	0	3/17/00 12:28		220733
Run ID/Seq #: HGI	000317A-220733								
Prep Method	Prep Date		Prep Initials						
SW7470A	03/17/2000 9:00		РВ						
METALS BY METHOD	6010B, TOTAL			MCL	SW6010	0B	Units: m	g/L	
Arsenic	0.108		0.005		1	C	3/21/00 23:22	EG	224441
Lead	0.00595		0.005		1	C	3/21/00 23:22	EG	224441
Selenium	ND		0.005		1	C	3/21/00 23:22	EG	224441
			0.005				3/14/00 17:28	FB	218615
Barium	0.872		0.005		1		100 17.20		
Barium Cadmium	0.872 ND		0.005		1		3/14/00 17:28		218615

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)





Client Sample ID MW-11A Collected: 3/9/00 4:05:00 P SPL Sample ID: 00030291-03

Site:	BJ-Hobbs	c

Analyses/Method	Result	Rep.Limit	Dil. Factor QUAL	Date Analyzed Analyst	Seq. #
Chromium	0.0342	0.01	1	03/14/00 17:28 E_B	218615
Magnesium	47.7	0.1	1	03/14/00 17:28 E_B	218615
Potassium	18.6	2	1	03/14/00 17:28 E_B	218615
Silver	ND	0.01	1	03/14/00 17:28 E_B	218615
Sodium	608	1	2	03/15/00 21:18 E_B	220048

#### Run ID/Seq #: TJA\_000314A-218615

Prep Method	Prep Date	Prep Initials
SW3010A	03/10/2000 12:30	_AA

Run ID/Seq #: TJA\_000315B-220048

Prep Method	Prep Date	Prep Initials
SW3010A	03/10/2000 12:30	_AA
Dun ID/Son #: "	TIAT 000224A 224444	

Run ID/Seq #: TJAT\_000321A-224441

Prep Method	Prep Date	Prep Initials
SW3010A	03/10/2000 12:30	_AA

NITROGEN, NITRATE (AS N)	MCL	E300	Units: mg/L				
Nitrogen,Nitrate (As N)	0.11	0.1		1	03/10/00 12:19	ES	218020
POLYNUCLEAR AROMATIC H	YDROCARBO	NS	MCL	SW8310	Units: uç	J/L	
Acenaphthene	ND	0.1		1	03/21/00 23:49	LJ	225394
Acenaphthylene	ND	0.1		1	03/21/00 23:49	LJ	225394
Anthracene	ND	0.1		1	03/21/00 23:49	LJ	225394
Benz(a)anthracene	ND	0.1		1	03/21/00 23:49	LJ	225394
Benzo(a)pyrene	ND	0.1		1	03/21/00 23:49	LJ	225394
Benzo(b)fluoranthene	ND	0.1		1	03/21/00 23:49	LJ	225394
Benzo(g,h,i)perylene	ND	0.1		1	03/21/00 23:49	LJ	225394
Benzo(k)fluoranthene	ND	0.1		1	03/21/00 23:49	LJ	225394
Chrysene	ND	0.1		1	03/21/00 23:49	LJ	225394
Dibenzo(a,h)anthracene	ND	0.1		1	03/21/00 23:49	LJ	225394
Fluoranthene	ND	0.1		1	03/21/00 23:49	LJ	225394
Fluorene	ND	0.1		1	03/21/00 23:49	LJ	225394
Indeno(1,2,3-cd)pyrene	ND	0.1		1	03/21/00 23:49	LJ	225394
Naphthalene	0.12	0.1		1	03/21/00 23:49	LJ	225394
Phenanthrene	ND	0.1		1	03/21/00 23:49	LJ	225394
Pyrene	ND	0.1		1	03/21/00 23:49	LJ	225394
Surr: 1-Fluoronaphthalene	63.2	% 30-140		1	03/21/00 23:49	LJ	225394
Surr: Phenanthrene-d10	76.8	% 35-140		1	03/21/00 23:49	LJ	225394

Run ID/Seq #: 2\_000321B-225394

Prep Method	Prep Date	Prep Initials
SW3510B	03/11/2000 14:51	KL

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)



Client Sample ID MW-11A Collected: 3/9/00 4:05:00 P SPL Sample ID: 00030291-03

Site: BJ-Hobbs

			311	s. DJ-	HODDS				
Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq.#
PURGEABLE AROMATICS			, a	MCL	SW8	021B	Units: ug	ı/L	
Benzene	1.2		1		1		03/18/00 19:50	LJ	221720
Ethylbenzene	ND		1		1	-	03/18/00 19:50	LJ	221720
Toluene	ND		1		1		03/18/00 19:50	LJ	221720
Xylenes, Total	ND		1		1		03/18/00 19:50	LJ	221720
Surr: 1,4-Difluorobenzene	85.6	%	72-137		1	-	03/18/00 19:50	LJ	221720
Surr: 4-Bromofluorobenzene	88.1	%	48-156		1		03/18/00 19:50	LJ	221720
SULFATE				MCL		E300	Units: m	g/L	
Sulfate	270		5		25		03/15/00 11:35	ES	219745



Client Sample iD MW	-9		Colle	cted:	3/9/00 3:15:00 P	SPL Sample ID:	0003	0291-04
			Site:	BJ-	Hobbs			
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq.#
ALKALINITY, BICARB	SONATE			MCL	M2320 B	Units: mg/	'L	
Alkalinity, Bicarbonate	279		2		1	03/13/00 11:30 A		218398
ALKALINITY, CARBO	NATE			MCL	M2320 B	Units: mg/		
Alkalinity, Carbonate	ND		2		1	03/13/00 11:30 A		218451
CHLORIDE, TOTAL				MCL	E325.3	Units: mg/	/L	
Chloride	131		2		2	03/17/00 10:30		221891
DIESEL RANGE ORGA	ANICS			MCL	SW8015B	Units: mg/		
Diesel Range Organics	0.66		0.2	WICL	1		R.	225969
Surr: Pentacosane	142	%	18-120			03/22/00 13:18 F		225969
	_V_000316A-225969		10-120		<u></u>	03/22/00 13.10 1		
Prep Method	Prep Date		Prep Initials					
SW3510B	03/12/2000 14:35		KL					
FLUORIDE-IC Fluoride	1.5			MCL	E300	Units: mg/ 03/10/00 12:57		.004003
Fluoride	1.5		0.1			03/10/00 12:57	=3 =============	221807
GASOLINE RANGE O	RGANICS			MCL	SW8015B	Units: mg/	/L	
Gasoline Range Organi	cs 1.3		0.1		1	03/18/00 17:42	LJ	221912
Surr: 1,4-Difluoroben:	zene 94.0	%	74-121		1	03/18/00 17:42	LJ	221912
Surr: 4-Bromofluorob	enzene 110	%	55-150		1	03/18/00 17:42	LJ .	221912
HARDNESS, TOTAL (	TITRIMETRIC, EDTA	 )		MGL	E130.2	Units: mg/	/L	
Hardness (As CaCO3)	430		25		5	03/22/00 10:15	CV	225433
					DC1/442			
HEADSPACE GAS AN	IALYSIS			MCL	RSK147	Units: mg/	/L	
HEADSPACE GAS AN Ethane	NALYSIS ND		0.0025	MCL	1	Units: mg/ 03/22/00 14:53		225478
Ethane			0.0025 0.0032	MCL		03/22/00 14:53		
	ND			MCL	1	03/22/00 14:53	AB AB	225478 225478 225478
Ethane Ethylene Methane	ND ND		0.0032	MCL	1 1 1	03/22/00 14:53 // 03/22/00 14:53 // 03/22/00 14:53 //	AB AB AB	225478
Ethane Ethylene	ND ND		0.0032		1 1 1	03/22/00 14:53 / 03/22/00 14:53 /	AB AB AB	225478
Ethane Ethylene Methane  MERCURY, TOTAL Mercury	ND ND ND		0.0032 0.0012		1 1 1 SW7470A	03/22/00 14:53 // 03/22/00 14:53 // 03/22/00 14:53 // Units: mg/	AB AB AB	225478 225478
Ethane Ethylene Methane  MERCURY, TOTAL Mercury	ND ND ND		0.0032 0.0012		1 1 1 SW7470A	03/22/00 14:53 // 03/22/00 14:53 // 03/22/00 14:53 // Units: mg/	AB AB AB	225478 225478
Ethane Ethylene Methane  MERCURY, TOTAL Mercury Run ID/Seq #: HG	ND ND ND ND SL_000317A-220734		0.0032 0.0012 0.0002		1 1 1 SW7470A	03/22/00 14:53 // 03/22/00 14:53 // 03/22/00 14:53 // Units: mg/	AB AB AB	225478 225478
Ethane Ethylene Methane  MERCURY, TOTAL Mercury Run ID/Seq #: HG Prep Method SW7470A	ND ND ND SL_000317A-220734 Prep Date 03/17/2000 9:00		0.0032 0.0012 0.0002 Prep Initials	MCL	1 1 1 SW7470A	03/22/00 14:53 / 03/22/00 14:53 / 03/22/00 14:53 / Units: mg/ 03/17/00 12:28 /	AB AB AB /L PB	225478 225478
Ethane Ethylene Methane  MERCURY, TOTAL Mercury Run ID/Seq #: HG	ND ND ND SL_000317A-220734 Prep Date 03/17/2000 9:00		0.0032 0.0012 0.0002 Prep Initials		1 1 1 SW7470A	03/22/00 14:53 // 03/22/00 14:53 // 03/22/00 14:53 // Units: mg/	AB AB AB /L PB	225478 225478 220734
Ethane Ethylene Methane  MERCURY, TOTAL Mercury Run ID/Seq #: HG Prep Method SW7470A  METALS BY METHOD	ND ND ND SL_000317A-220734 Prep Date 03/17/2000 9:00 D 6010B, TOTAL		0.0032 0.0012 0.0002 Prep initials PB	MCL	1 1 1 SW7470A 1	03/22/00 14:53 / 03/22/00 14:53 / 03/22/00 14:53 / Units: mg/ 03/17/00 12:28 /	AB AB AB /L PB	225478 225478 220734 224444
Ethane Ethylene Methane  MERCURY, TOTAL Mercury Run ID/Seq #: HG Prep Method SW7470A  METALS BY METHOD Arsenic Lead	ND ND ND SL_000317A-220734 Prep Date 03/17/2000 9:00 D 6010B, TOTAL 0.00757		0.0032 0.0012 0.0002 Prep Initials PB	MCL	1 1 1 SW7470A 1 SW6010B	03/22/00 14:53 // 03/22/00 14:53 // 03/22/00 14:53 // Units: mg/ 03/17/00 12:28 // Units: mg/	AB AB AB //L PB //L EG EG	225478 225478 220734 220734 224444 224444
Ethane Ethylene Methane  MERCURY, TOTAL Mercury Run ID/Seq #: HG Prep Method SW7470A  METALS BY METHOD Arsenic	ND ND ND SL_000317A-220734 Prep Date 03/17/2000 9:00 0 6010B, TOTAL 0.00757 ND		0.0032 0.0012 0.0002 Prep Initials PB 0.005 0.005	MCL	1 1 1 SW7470A 1 SW6010B	03/22/00 14:53 // 03/22/00 14:53 // 03/22/00 14:53 // Units: mg/ 03/17/00 12:28 //  Units: mg/ 03/21/00 23:42 // 03/21/00 23:42 //	AB AB AB /L PB EG EG	225478 225478 220734 220734 224444 224444
Ethane Ethylene Methane  MERCURY, TOTAL Mercury Run ID/Seq #: HG Prep Method SW7470A  METALS BY METHOD Arsenic Lead Selenium	ND ND ND SL_000317A-220734 Prep Date 03/17/2000 9:00 0 6010B, TOTAL 0.00757 ND		0.0032 0.0012 0.0002 Prep initials PB 0.005 0.005	MCL	1 1 1 . SW7470A 1 . SW6010B 1 1	03/22/00 14:53 / 03/22/00 14:53 / 03/22/00 14:53 / 03/22/00 14:53 / Units: mg/03/17/00 12:28 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 23:42 / 03/21/00 20/21/00 / 03/21/00 / 03/21/00 / 03/21/00 / 03/21/00 / 03/21/00 / 03/21/00 / 03/21/00 / 03/21/00 / 03/21/00 / 03/21/00 / 03/21/00 / 03/21/00 / 03/21/00 / 03/21/00 / 03/21/00 / 00/21/00 / 00/21/00 / 00/21/00 / 00/21/00 / 00/21/00 / 00/21/00 / 00/21/00 / 00/21/00 / 00/21/00 / 0	AB AB AB /L PB EG EG EG E,B	225478 225478

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)



Client Sample ID MW-9 Collected: 3/9/00 3:15:00 P SPL Sample ID: 00030291-04

Site:	R.I.I	Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor QUAL	Date Analyzed Analyst	San #
	Nesuit	Nep.Liitit	DII. FACIOF GOAL	Date Analyzeu Analyst	Seq.#
Chromium	ND	0.01	1	03/14/00 17:32 E_B	218616
Magnesium	26.2	0.1	1	03/14/00 17:32 E_B	218616
Potassium	4.08	2	1	03/14/00 17:32 E_B	218616
Silver	ND	0.01	1	03/14/00 17:32 E_B	218616
Sodium	99.1	0.5	1	03/14/00 17:32 E_B	218616

Run ID/Seq #: TJA\_000314A-218616

Prep Method	Prep Date	Prep Initials				
SW3010A	03/10/2000 12:30	_AA				
Run ID/Seq #: TJAT_000321A-224444						

 Prep Method
 Prep Date
 Prep Initials

 SW3010A
 03/10/2000 12:30
 \_AA

ITROGEN, NITRATE (AS N)			MCL	E300	Units: m	g/L	
Nitrogen,Nitrate (As N)	7.2	0.	1	1	03/10/00 12:19	ES	21802
OLYNUCLEAR AROMATIC HY	MCL	SW8310	Units: uç	ı/L			
Acenaphthene	ND	0.	1	1	03/22/00 0:28	LJ	22539
Acenaphthylene	ND	0.	1	1	03/22/00 0:28	LJ	22539
Anthracene	ND	0.	1	1	03/22/00 0:28	LJ	22539
Benz(a)anthracene	ND	. 0.	1	1	03/22/00 0:28	LJ	22539
Benzo(a)pyrene	ND	0.	1	1	03/22/00 0:28	LJ	22539
Benzo(b)fluoranthene	ND	· Ò.	1	1	03/22/00 0:28	LJ	22539
Benzo(g,h,i)perylene	. ND	0.	1	. 1	03/22/00 0:28	LJ	22539
Benzo(k)fluoranthene	ND	0.	1	1	03/22/00 0:28	ĹĴ	22539
Chrysene	ND	0.	1	1	03/22/00 0:28	LJ	22539
Dibenzo(a,h)anthracene	ND	0.	1	1	03/22/00 0:28	LJ	22539
Fluoranthene	ND	0.	1	1	03/22/00 0:28	LJ	22539
Fluorene	1.5	0.	1	1	03/22/00 0:28	LJ	22539
Indeno(1,2,3-cd)pyrene	ND	0.	1	1	03/22/00 0:28	LJ	22539
Naphthalene	0.42	0.	1	1	03/22/00 0:28	LJ	22539
Phenanthrene	ND	0.	1	1	03/22/00 0:28	LJ	22539
Pyrene	ND	0.	1	1	03/22/00 0:28	LJ	22539
Surr: 1-Fluoronaphthalene	65.0	% 30-14	0	1	03/22/00 0:28	LJ	22539
Surr: Phenanthrene-d10	72.2	% 35-14	0	1	03/22/00 0:28	LJ	22539

Run ID/Seq #: 2\_000321B-225395

Prep Method	Prep Date	Prep Initials
SW3510B	03/11/2000 14:51	KL

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)



Client Sample ID MW-9	Collected: 3/9/00	3:15:00 P SPL Sam	npie ID: 00030291-04

Site: BJ-Hobbs								
Analyses/Method	Result	Rep.Limi	t	Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #	
PURGEABLE AROMATICS			MCL	SW8021B	Units: ug	/L		
Benzene	ND	1		1	03/18/00 17:42	LJ	221635	
Ethylbenzene	ND	1		1	03/18/00 17:42	LJ	221635	
Toluene	ND	1		1	03/18/00 17:42	LJ	221635	
Xylenes, Total	64	1		1	03/18/00 17:42	LJ	221635	
Surr: 1,4-Difluorobenzene	91.8	% 72-137		1	03/18/00 17:42	LJ	221635	
Surr: 4-Bromofluorobenzene	92.7	% 48-156		1	03/18/00 17:42	LJ	221635	
SULFATE			MCL	E300	Units: m	g/L		
Sulfate	170	5		25	03/15/00 11:35	ES	219748	



Client Sample ID OW-	4	C	collected:	3/9/00 2:35:00 P	SPL Sample ID:	00030291-05
			ite: BJ-	Hobbs		
Analyses/Method	Result	Rep.Limit	:	Dii. Factor QUAL	Date Analyzed An	alyst Seq.#
ALKALINITY, BICARB	ONATE		MCL	M2320 B	Units: mg/L	
Alkalinity, Bicarbonate	1020	4		2	03/13/00 11:30 AB	218399
ALKALINITY, CARBON	NATE		MCL	M2320 B	Units: mg/L	
Alkalinity, Carbonate	ND	4	MOL	2	03/13/00 11:30 AB	218452
CHLORIDE, TOTAL			MCL	E325.3	Units: mg/L	
Chloride	258	5		5	03/17/00 10:30 CV	221892
DIESEL RANGE ORGA	VNICS		MCL	SW8015B	Units: mg/L	
Diesel Range Organics	0.25	0.2	MICL	1	03/22/00 13:56 RR	225970
Surr: Pentacosane	74.6	% 18-120		<u>.</u>	03/22/00 13:56 RR	225970
	V_000316A-225970					
Prep Method	Prep Date	Prep Initi	als			
SW3510B	03/12/2000 14:35	KL				
FLUORIDE-IC			MCL	E300	Units: mg/L	
Fluoride	3.8	0.1		1	03/10/00 12:57 ES	221808
GASOLINE RANGE OF	RGANICS		MCL	SW8015B	Units: mg/L	
Gasoline Range Organic		0.1	WOL	1	03/17/00 20:19 LJ	221549
Surr: 1.4-Difluorobenz		% 74-121	<u></u>	, 1	03/17/00 20:19 LJ	221549
Surr: 4-Bromofluorobe	enzene 110	% 55-150		1	03/17/00 20:19 LJ	221549
HARDNESS, TOTAL (	TITRIMETRIC, EDTA)		MCL	E130.2	Units: mg/L	
Hardness (As CaCO3)	3000	250		50	03/22/00 10:15 CV	225435
HEADSPACE GAS AN	ALYSIS		MCL	RSK147	Units: mg/L	
Ethane	ND	0.0025		1	03/22/00 15:02 AB	225479
Ethylene	ND	0.0032		1	03/22/00 15:02 AB	225479
Methane	ND	0.0012		1	03/22/00 15:02 AB	225479
MERCURY, TOTAL			MCL	SW7470A	Units: mg/L	
Mercury	ND	0.0002		1	03/17/00 12:28 PB	220737
Run ID/Seq #: HG	L_000317A-220737					
Prep Method	Prep Date	Prep Init	ials			
SW7470A	03/17/2000 9:00	РВ				
METALS BY METHOD	6010B, TOTAL		MCL	SW6010B	Units: mg/L	
Arsenic	0.034	0.005		1	03/21/00 23:48 EG	22444
711007110		0.005		1	03/21/00 23:48 EG	22444
Lead	0.0355	0.005				
	0.0355 ND	0.005		1	03/21/00 23:48 EG	22444
Lead				1 1		
Lead Selenium	ND	0.005			03/21/00 23:48 EG	3 218617

Qualifiers:

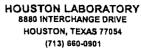
ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)





Client Sample ID OW-4

Collected: 3/9/00 2:35:00 P SPL Sample ID: 000302

00030291-05

Site	:	BJ-	Н	0	b	bs

Analyses/Method	Result	Rep.Limit	Dil. Factor QUAL	Date Analyzed	Analyst	Seq.#
Chromium	0.105	0.01	1	03/14/00 17:35 E	В	218617
Magnesium	74.5	0.1	1	03/14/00 17:35 E	В	218617
Potassium	10.7	2	1	03/14/00 17:35 E	В	218617
Silver	ND	0.01	1	03/14/00 17:35 E	_B	218617
Sodium	97.3	0.5	1	03/14/00 17:35 E	В	218617

Run ID/Seq #: TJA\_000314A-218617

Prep Method	Prep Date	Prep Initials
SW3010A	03/10/2000 12:30	_AA

Run ID/Seq #: TJA\_000315B-220049

Prep Method	Prep Date	Prep Initials
SW3010A	03/10/2000 12:30	AA

Run ID/Seq #: TJAT\_000321A-224445

Prep Method	Prep Date	Prep Initials	
SW3010A	03/10/2000 12:30	_AA	ļ

NITROGEN, NITRATE (AS N)			MCL	E300	Units: mg/L		
Nitrogen,Nitrate (As N)	3.6	0.1		1	03/10/00 12:19	ES	218024
POLYNUCLEAR AROMATIC HYDROCARBONS		S	MCL	SW8310	Units: ug	/L	
Acenaphthene	ND	0.1		1	03/22/00 1:07	LJ	225396
Acenaphthylene	ND	0.1		1	03/22/00 1:07	LJ	225396
Anthracene	ND	0.1	V at 1	1	03/22/00 1:07	LJ .	225396
Benz(a)anthracene	ND	0.1		1	03/22/00 1:07	LJ	225396
Benzo(a)pyrene	ND	0.1		1	03/22/00 1:07	LJ	225396
Benzo(b)fluoranthene	ND	0.1		1	03/22/00 1:07	LJ	225396
Benzo(g,h,i)perylene	ND	0.1		1	03/22/00 1:07	LJ	225396
Benzo(k)fluoranthene	ND	0.1		1	03/22/00 1:07	LJ	225396
Chrysene	ND	0.1		1	03/22/00 1:07	LJ	225396
Dibenzo(a,h)anthracene	ND	0.1		1	03/22/00 1:07	LJ	225396
Fluoranthene	ND	0.1		1	03/22/00 1:07	LJ	225396
Fluorene	ND	0.1		1	03/22/00 1:07	LJ	225396
Indeno(1,2,3-cd)pyrene	ND	0.1		1	03/22/00 1:07	LJ	225396
Naphthalene	ND	0.1		1	03/22/00 1:07	LJ	22539
Phenanthrene	ND	0.1		1	03/22/00 1:07	LJ	225396
Pyrene	ND	0.1		1	03/22/00 1:07	LJ	22539
Surr: 1-Fluoronaphthalene	48.3	% 30-140		1	03/22/00 1:07	LJ	22539
Surr: Phenanthrene-d10	73.7	% 35-140		1	03/22/00 1:07	LJ	225390

Run ID/Seq #: 2\_000321B-225396

Prep Method	Prep Date	Prep Initials
SW3510B	03/11/2000 14:51	KL

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)



Client Sample ID OW-4 Collected: 3/9/00 2:35:00 P SPL Sample ID: 00030291-05

Site: BJ-Hobbs

Dil. Factor QUAL	Date Analyzed Analyst	Seq. #
SW8021B	Units: ug/L	
1	03/17/00 20:19 LJ	221564
1	03/17/00 20:19 LJ	221564
1	03/17/00 20:19 LJ	221564
1	03/17/00 20:19 LJ	221564
1	03/17/00 20:19 LJ	221564
1	03/17/00 20:19 LJ	221564
E300	Units: mg/L	
25	03/15/00 11:35 ES	219749
		1 03/17/00 20:19 LJ 1 03/17/00 20:19 LJ 1 03/17/00 20:19 LJ 1 03/17/00 20:19 LJ 1 03/17/00 20:19 LJ 1 03/17/00 20:19 LJ 1 03/17/00 20:19 LJ  E300 Units: mg/L

<sup>\* -</sup> Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL





Client Sample ID MW-	12D	Coll	ected:	3/9/00 1:45:00 P	SPL Sample ID:	00030291-06
		Site	: BJ-	Hobbs		
Analyses/Method	Result	Rep.Limit		Dil. Factor QUAL	Date Analyzed An	alyst Seq.#
ALKALINITY, BICARBO	ONATE		MCL	M2320 B	Units: mg/L	
Alkalinity, Bicarbonate	244	2		1	03/13/00 11:30 AB	218400
ALKALINITY, CARBON	IATE		MCL	M2320 B	Units: mg/L	
Alkalinity, Carbonate	ND	2		1	03/13/00 11:30 AB	218453
CHLORIDE, TOTAL			MCL	E325.3	Units: mg/L	
Chloride	117	2		2	03/17/00 10:30 CV	221893
DIESEL RANGE ORGA	NICS		MCL	SW8015B	Units: mg/L	
Diesel Range Organics	0.24	0.2		1	03/22/00 14:34 RR	225971
Surr: Pentacosane	126	% 18-120		1 *	03/22/00 14:34 RR	225971
Run ID/Seq #: HP_	V_000316A-225971					
Prep Method	Prep Date	Prep Initials				
SW3510B	03/12/2000 14:35	KL				
FLUORIDE-IC			MCL	E300	Units: mg/L	
Fluoride	1.3	0.1		1	03/10/00 12:57 ES	221809
GASOLINE RANGE OF	RGANICS		MCL	SW8015B	Units: mg/L	
Gasoline Range Organic		0.1		1	03/18/00 18:07 LJ	221914
Surr: 1,4-Difluorobenz	ene 94.3	% 74-121	····	1	03/18/00 18:07 LJ	221914
Surr: 4-Bromofluorobe	enzene 108	% 55-150		1	03/18/00 18:07 LJ	221914
HARDNESS, TOTAL (T	TRIMETRIC, EDTA)		MCL	E130.2	Units: mg/L	
Hardness (As CaCO3)	260	25		5	03/22/00 10:15 CV	225436
HEADSPACE GAS AN	ALYSIS	,	MCL	RSK147	Units: mg/L	
Ethane	ND	0.0025		1	03/22/00 15:10 AB	225480
Ethylene	ND	0.0032		1	03/22/00 15:10 AB	225480
Methane	ND	0.0012		1	03/22/00 15:10 AB	225480
MERCURY, TOTAL			MCL	. SW7470A	Units: mg/L	
Mercury	ND	0.0002		1	03/17/00 12:28 PB	220738
Run ID/Seq #: HGI	_000317A-220738					······
Prep Method	Prep Date	Prep Initials	]			
SW7470A	03/17/2000 9:00	PB	]			
METALS BY METHOD	6010B, TOTAL		MCL	. SW6010B	Units: mg/L	
Arsenic	0.0143	0.005		1	03/21/00 23:54 EG	224446
Lead	ND	0.005		1	03/21/00 23:54 EG	224446
Selenium	ND	0.005		1	03/21/00 23:54 EG	224446
Barium	0.0962	0.005		1	03/14/00 17:39 E_E	
Cadmium	ND	0.005		1	03/14/00 17:39 E_E	3 218619
Calcium	78.1	0.1		1	03/14/00 17:39 E	3 218619

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)



Client Sample ID MW-	-12D		Colle	cted:	3/9/00 1:45	5:00 P	SPL Sample II	<b>D</b> : 00030	0291-06
			Site:	BJ-	Hobbs				
nalyses/Method	Result	Re	p.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq.#
Chromium	ND		0.01		1		03/14/00 17:39	E_B	21861
Magnesium	7.25		0.1		1	-	03/14/00 17:39	E_B	21861
Potassium	70.6		2		1		03/14/00 17:39	E_8	21861
Silver	ND		0.01		1		03/14/00 17:39	E_B	2186
Sodium	103		0.5	•	1		03/14/00 17:39	E_B	2186
Run ID/Seq #: TJA	_000314A-218619		****	***					
Prep Method	Prep Date	Pr	ep Initials						
SW3010A	03/10/2000 12:30		VA.						
Run ID/Seq #: TJA	T_000321A-224446								
Prep Method	Prep Date	<u>Pr</u>	ep Initials						
SW3010A	03/10/2000 12:30		<b>VA</b>						
NITROGEN, NITRATE	(AS N)			MCL		E300	Units: m	g/L	
Nitrogen, Nitrate (As N)	0.14		0.1		1		03/10/00 12:19		2180
OLYNUCLEAR ARON	MATIC HYDROCARBO	NS		MCL	SV	V8310	Units: ug	3/L	
Acenaphthene	ND		0.1		1		03/22/00 16:06	LJ	22539
Acenaphthylene	ND		0.1		1		03/22/00 16:06	LJ	2253
Anthracene	ND		0.1		1		03/22/00 16:06	LJ	2253
Benz(a)anthracene	ND		0.1		1		03/22/00 16:06	LJ	2253
Benzo(a)pyrene	ND		0.1		1		03/22/00 16:06	LJ	2253
Benzo(b)fluoranthene	ND		0.1		1		03/22/00 16:06	ليا	2253
Benzo(g,h,i)perylene	ND		0.1		1		03/22/00 16:06	LJ	2253
Benzo(k)fluoranthene	ND		0.1	·	1		03/22/00 16:06	LJ	2253
Chrysene	ND		0.1		. 1		03/22/00 16:06	LJ	2253
Dibenzo(a,h)anthracene	ND		0.1		1		03/22/00 16:06	LJ	2253
Fluoranthene	ND		0.1		1		03/22/00 16:06	LJ	2253
Fluorene	ND		0.1		1	**	03/22/00 16:06	LJ	2253
Indeno(1,2,3-cd)pyrene	ND		0.1		1		03/22/00 16:06	LJ	2253
Naphthalene	ND		0.1		1		03/22/00 16:06	LJ	2253
Phenanthrene	ND		0.1		1		03/22/00 16:06	LJ	2253
Pyrene	ND		0.1		1		03/22/00 16:06	LJ	2253
Surr: 1-Fluoronaphtha	lene 55.5	% 3	0-140	_	1	_	03/22/00 16:06	LJ	2253
Surr: Phenanthrene-d		% 3	5-140		1		03/22/00 16:06	LJ	2253
Run ID/Seq #: 2_0	00321B-225397								

A	1 : E :		
Qua	ш	er	S:

SW3510B

ND/U - Not Detected at the Reporting Limit

03/11/2000 14:51

B - Analyte detected in the associated Method Blank

KL

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)



Client Sample ID MW-12D Collected: 3/9/00 1:45:00 P SPL Sample ID:

00030291-06

Site: **BJ-Hobbs** 

Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq.#
			MCL	SW8	3021B	Units: ug	ı/L	
ND		1		1		03/17/00 23:20	LJ	221566
ND		1		1		03/17/00 23:20	LJ	221566
ND		1		1		03/17/00 23:20	LJ	221566
ND		1		1		03/17/00 23:20	LJ	221566
87.6	%	72-137		1		03/17/00 23:20	LJ	221566
95.0	%	48-156		1		03/17/00 23:20	LJ	221566
			MCL		E300	Units: m	g/L	
200		5		25		03/15/00 11:35	ES	219750
	ND ND ND ND 87.6	ND ND ND ND 87.6 % 95.0 %	ND 1 ND 1 ND 1 ND 1 ND 1 87.6 % 72-137 95.0 % 48-156	MCL ND 1 ND 1 ND 1 ND 1 ND 1 87.6 % 72-137 95.0 % 48-156 MCL	MCL         SW8           ND         1           ND         1           ND         1           ND         1           ND         1           87.6         % 72-137           95.0         % 48-156           1           MCL	MCL         SW8021B           ND         1           ND         1           ND         1           ND         1           ND         1           87.6         % 72-137           95.0         % 48-156           1           MCL         E300	MCL         SW8021B         Units: ug           ND         1         1         03/17/00 23:20           87.6         %         72-137         1         03/17/00 23:20           95.0         %         48-156         1         03/17/00 23:20           MCL         E300         Units: m	MCL         SW8021B         Units: ug/L           ND         1         1         03/17/00 23:20 LJ           87.6         % 72-137         1         03/17/00 23:20 LJ           95.0         % 48-156         1         03/17/00 23:20 LJ    MCL  E300  Units: mg/L



Client Sample ID MW	-8		Coll	ected:	3/9/00 11:40:00	SPL Sample ID	: 0003	30291-07
			Site	: BJ-	-Hobbs			
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
ALKALINITY, BICARB	ONATE			MCL	M2320 B	Units: mg	/L	
Alkalinity, Bicarbonate	362		2		1	03/13/00 11:30		218401
ALKALINITY, CARBO	NATE			MCL	M2320 B	Units: mg	/L	
Alkalinity, Carbonate	ND		2		11	03/13/00 11:30	AB	218454
CHLORIDE, TOTAL				MCL	E325.3	Units: mg	/L	
Chloride	241		5		5	03/17/00 10:30	CV	221894
DIESEL RANGE ORGA	ANICS		~	MCL	SW8015B	Units: mg	/L	
Diesel Range Organics	0.55		0.2		1		RR	225972
Surr: Pentacosane	84.2	%	18-120		1	03/22/00 15:12	RR	225972
	_V_000316A-225972							
Prep Method	Prep Date		Prep Initials					
SW3510B	03/12/2000 14:35		KL					
FLUORIDE-IC				MCL	E300	Units: mg	ı/L	
Fluoride	0.69		0.1		11		ES	221810
GASOLINE RANGE O	RGANICS			MCL	SW8015B	Units: mg	ı/L	
Gasoline Range Organi	cs ND		0.1		1	03/18/00 18:33	LJ	221915
Surr: 1,4-Difluoroben	zene 93.7	%	74-121		1	03/18/00 18:33	LJ	221915
Surr: 4-Bromofluorob	enzene 103	%	55-150		: 1	03/18/00 18:33	LJ	221915
HARDNESS, TOTAL (	TITRIMETRIC, EDTA)			MCL	E130.2	Units: mg	J/L	
Hardness (As CaCO3)	760		50		10	03/22/00 10:15	CV	225437
HEADSPACE GAS AN	IALYSIS			MCL	RSK147	Units: mg	ı/L	
Ethane	ND		0.0025		1		AB	225481
Ethylene	ND	·	0.0032		1	03/22/00 15:29	AB	225481
Methane	0.13		0.0024		2	03/23/00 11:49	AB	225487
MERCURY, TOTAL	·			MCL	SW7470A	Units: mg	j/L	
Mercury	ND		0.0002		1	03/17/00 12:28	PB	220739
	L_000317A-220739							
Prep Method	Prep Date		Prep Initials					
SW7470A	03/17/2000 9:00		PB					
METALS BY METHO	6010B, TOTAL			MCL	SW6010B	Units: mg	3/L	
Arsenic	0.00953		0.005		1	03/22/00 0:01	EG	224447
	ND		0.005		1	03/22/00 0:01	EG	224447
Lead					4	03/22/00 0:01	FG	224447
Selenium	ND		0.005		1	00/22/00 0.01		
	ND 0.236		0.005 0.005		1	03/14/00 17:43		218620
Selenium	<del>_,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</del>						E_B	218620 218620

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)



Client Sample ID MW-	-8	Colle	cted: 3/9/00 11:4	10:00	SPL Sample ID	<b>)</b> : 00030	0291-07
		Site:	BJ-Hobbs				
Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Chromium	ND	0.01	1		03/14/00 17:43	E_B	21862
Magnesium	39.1	0.1	1		03/14/00 17:43	E_B	21862
Potassium	4.53	2	1		03/14/00 17:43	E_B	2186
Silver	ND	0.01	1		03/14/00 17:43	EВ	2186
Sodium	95.4	0.5	1		03/14/00 17:43	E B	2186
Run ID/Seg #: TJA	000314A-218620					<del></del>	
Prep Method	Prep Date	Prep Initials					
SW3010A	03/10/2000 12:30	AA			•		
Run ID/Seq #: TJA	T_000321A-224447						
Prep Method	Prep Date	Prep Initials					
SW3010A	03/10/2000 12:30	_AA					
NITROGEN, NITRATE	(AS N)		MCL	E300	Units: mg	a/L	
Nitrogen, Nitrate (As N)	0.35	0.1	1		03/10/00 12:19	ES	2180
				V8310			2180
POLYNUCLEAR ARON	0.35 MATIC HYDROCARBO			V8310	03/10/00 12:19 Units: ug 03/22/00 16:46		
	MATIC HYDROCARBO	NS	MCL SV	V8310	Units: ug	ı/L	2253
POLYNUCLEAR ARON Acenaphthene	MATIC HYDROCARBO	ONS 0.1	MCL SV	V8310	Units: ug 03/22/00 16:46	<b>I/L</b>	2253 2253
POLYNUCLEAR ARO! Acenaphthene Acenaphthylene	MATIC HYDROCARBO ND ND	0.1 0.1	MCL SV	V8310	Units: ug 03/22/00 16:46 03/22/00 16:46	I/L LJ LJ	2253 2253 2253
POLYNUCLEAR ARON Acenaphthene Acenaphthylene Anthracene Benz(a)anthracene	MATIC HYDROCARBO ND ND ND	0.1 0.1 0.1	MCL SV 1 1	V8310	Units: ug 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46	I/L LJ LJ	2253 2253 2253 2253
POLYNUCLEAR ARON Acenaphthene Acenaphthylene Anthracene	MATIC HYDROCARBO ND ND ND ND	0.1 0.1 0.1 0.1	MCL SV 1 1 1 1	V8310	Units: ug 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46	I/L LJ LJ LJ	2180 2253 2253 2253 2253 2253 2253
POLYNUCLEAR ARON Acenaphthene Acenaphthylene Anthracene Benz(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene	MATIC HYDROCARBO ND ND ND ND ND ND	0.1 0.1 0.1 0.1 0.1 0.1	MCL SV 1 1 1 1 1 1 1 1	V8310	Units: ug 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46	I/L LJ LJ LJ LJ LJ LJ	2253 2253 2253 2253 2253 2253
POLYNUCLEAR ARON Acenaphthene Acenaphthylene Anthracene Benz(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene	MATIC HYDROCARBO ND ND ND ND ND ND ND ND ND ND	0.1 0.1 0.1 0.1 0.1 0.1	MCL SV 1 1 1 1 1 1 1 1 1 1	V8310	Units: ug 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46		2253 2253 2253 2253 2253 2253 2253
Acenaphthene Acenaphthylene Anthracene Benz(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene	MATIC HYDROCARBO ND ND ND ND ND ND ND	0.1 0.1 0.1 0.1 0.1 0.1 0.1	MCL SV 1 1 1 1 1 1 1 1 1 1 1 1	V8310	Units: ug 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46	<b>/L</b>	2253 2253 2253 2253 2253 2253 2253 2253
POLYNUCLEAR ARON Acenaphthene Acenaphthylene Anthracene Benz(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene	MATIC HYDROCARBO ND ND ND ND ND ND ND ND ND ND ND ND ND	0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1	MCL SV 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	V8310	Units: ug 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46		2253 2253 2253 2253 2253 2253 2253 2253
Acenaphthene Acenaphthylene Anthracene Benz(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene	MATIC HYDROCARBO ND ND ND ND ND ND ND ND ND ND ND ND ND	ONS  O.1  O.1  O.1  O.1  O.1  O.1  O.1  O.	MCL SV 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	V8310	Units: ug 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46		2253 2253 2253 2253 2253 2253 2253 2253
POLYNUCLEAR ARON Acenaphthene Acenaphthylene Anthracene Benz(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene Dibenzo(a,h)anthracene	MATIC HYDROCARBO ND ND ND ND ND ND ND ND ND ND ND ND ND	0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1	MCL SV 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	V8310	Units: ug 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46		2253 2253 2253 2253 2253 2253 2253
POLYNUCLEAR ARON Acenaphthene Acenaphthylene Anthracene Benz(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene Dibenzo(a,h)anthracene Fluorene	MATIC HYDROCARBO ND ND ND ND ND ND ND ND ND ND ND ND ND	ONS  O.1  O.1  O.1  O.1  O.1  O.1  O.1  O.	MCL SV 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	V8310	Units: ug 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46		2253 2253 2253 2253 2253 2253 2253 2253
Acenaphthene Acenaphthylene Anthracene Benz(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene Dibenzo(a,h)anthracene Fluorene Indeno(1,2,3-cd)pyrene	MATIC HYDROCARBO ND ND ND ND ND ND ND ND ND ND ND ND ND	0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1	MCL SV  1  1  1  1  1  1  1  1  1  1  1  1  1	V8310	Units: ug 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46		2253 2253 2253 2253 2253 2253 2253 2253
POLYNUCLEAR ARON Acenaphthene Acenaphthylene Anthracene Benz(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene Dibenzo(a,h)anthracene Fluorene	MATIC HYDROCARBO ND ND ND ND ND ND ND ND ND ND ND ND ND	0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1	MCL SV  1  1  1  1  1  1  1  1  1  1  1  1  1	V8310	Units: ug 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46		2253 2253 2253 2253 2253 2253 2253 2253
Acenaphthene Acenaphthylene Anthracene Benz(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene Dibenzo(a,h)anthracene Fluoranthene Fluorene Indeno(1,2,3-cd)pyrene Naphthalene	MATIC HYDROCARBO ND ND ND ND ND ND ND ND ND ND ND ND ND	0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1	MCL SV  1  1  1  1  1  1  1  1  1  1  1  1  1	V8310	Units: ug 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46 03/22/00 16:46		2253 2253 2253 2253 2253 2253 2253 2253

Qualifiers:

Surr: Phenanthrene-d10

Prep Method

SW3510B

Run ID/Seq #: 2\_000321B-225398

Prep Date

03/11/2000 14:51

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

54.0

35-140

KL

Prep Initials

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

03/22/00 16:46

LJ

D - Surrogate Recovery Unreportable due to Dilution

1

225398



Client Sample ID MW-8 Collected: 3/9/00 11:40:00 00030291-07 SPL Sample ID:

			Site	s: BJ-	Hobbs				
Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq.#
PURGEABLE AROMATICS				MCL	SW8	021B	Units: ug	/L	
Benzene	ND		1		1		03/17/00 23:45	LJ	221567
Ethylbenzene	ND		1		1		03/17/00 23:45	ĻJ	221567
Toluene	ND		1		1		03/17/00 23:45	LJ	221567
Xylenes,Total	ND		1		1		03/17/00 23:45	LJ	221567
Surr: 1,4-Difluorobenzene	86.2	%	72-137		1		03/17/00 23:45	LJ	221567
Surr: 4-Bromofluorobenzene	91.0	%	48-156		1		03/17/00 23:45	LJ	221567
SULFATE				MCL		E300	Units: m	g/L	
Sulfate	260		5		25		03/15/00 11:35	ES	219751

<sup>\* -</sup> Surrogate Recovery Outside Advisable QC Limits



Client Sample ID MW	-7	(	Collected:	3/9/00 11:15:00	SPL Sample ID:	00030291-08
			Site: BJ-	Hobbs		
Analyses/Method	Result	Rep.Limi	t	Dil. Factor QUAL	Date Analyzed Ar	alyst Seq.#
ALKALINITY, BICARB	ONATE		MCL	M2320 B	Units: mg/L	
Alkalinity, Bicarbonate	301	2		1	03/13/00 11:30 AB	218402
ALKALINITY, CARBO	NATE		MCL	M2320 B	Units: mg/L	
Alkalinity, Carbonate	ND	2		1	03/13/00 11:30 AB	218455
CHLORIDE, TOTAL			MCL	E325.3	Units: mg/L	
Chloride	224	5		5	03/17/00 10:30 CV	221896
DIESEL RANGE ORGA	ANICS		MCL	SW8015B	Units: mg/L	
Diesel Range Organics	0.66	0.2		1	03/22/00 15:51 RR	225973
Surr: Pentacosane	121	% 18-120		1 *	03/22/00 15:51 RR	225973
Run ID/Seq #: HP	_V_000316A-225973				V. 1 V. 10 A. 177 C. T. C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17 C. 17	
Prep Method	Prep Date	Prep Initi	ials			
SW3510B	03/12/2000 14:35	KL				
FLUORIDE-IC			MCL	E300	Units: mg/L	
Fluoride	0.75	0.1		1	03/10/00 12:57 ES	221811
GASOLINE RANGE O	RGANICS		MCL	SW8015B	Units: mg/L	
Gasoline Range Organic		0.1	MOL	1	03/18/00 18:59 LJ	221916
Surr: 1,4-Difluoroben:		% 74-121		1	03/18/00 18:59 LJ	
Surr: 4-Bromofluorob	enzene 101	% 55-150		. 1	03/18/00 18:59 LJ	
HARDNESS, TOTAL (	TITRIMETRIC, EDTA)		MCL	E130.2	Units: mg/L	
Hardness (As CaCO3)	660	50		10	03/22/00 10:15 CV	225438
HEADSPACE GAS AN	IALYSIS		MCL	RSK147	Units: mg/L	
Ethane	ND	0.0025		1	03/22/00 15:39 AB	225482
Ethylene	ND	0.0032		1	03/22/00 15:39 AB	225482
Methane	ND	0.0012		1	03/22/00 15:39 AB	225482
MERCURY, TOTAL			MCL	SW7470A	Units: mg/L	
Mercury	ND	0.0002		1	03/17/00 12:28 PB	220740
Run ID/Seq #: HG	L_000317A-220740					
Prep Method	Prep Date	Prep Init	ials			
SW7470A	03/17/2000 9:00	РВ				
METALS BY METHOD	6010B, TOTAL		MCL	SW6010B	Units: mg/L	
Arsenic	0.00849	0.005		1	03/22/00 0:07 EG	224448
711001110				1	03/22/00 0:07 EG	224448
Lead	ND	0.005		· · · · · · · · · · · · · · · · · · ·		·
Lead Selenium	0.00926	0.005		1	03/22/00 0:07 EG	3 224448
Lead Selenium Barium	0.00926 0.046	0.005 0.005		1 1	03/22/00 0:07 EG 03/14/00 17:47 E_I	S 224448 B 218621
Lead Selenium	0.00926	0.005		1	03/22/00 0:07 EG	B 218621 B 218621

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

3/24/00 11:08:30 AM



lient Sample ID MW	-7	Coll	ected:	3/9/00 11:15:00	SPL Sample ID: 00036	0291-08
		Site	: BJ-	·Hobbs		
nalyses/Method	Result	Rep.Limit		Dil. Factor QUAL	Date Analyzed Analyst	Seq.#
Chromium	ND	0.01		1	03/14/00 17:47 E_B	21862
Magnesium	44.3	0.1		1	03/14/00 17:47 E_B	21862
Potassium	6.98	2		1	03/14/00 17:47 E_B	21862
Silver	ND	0.01		1	03/14/00 17:47 E_B	21862
Sodium	95.1	0.5		1	03/14/00 17:47 E_B	21862
Run ID/Seq #: TJA	Q 000314A-218621		· · · · · · · · · · · · · · · · · · ·			
Prep Method	Prep Date	Prep Initials				
SW3010A	03/10/2000 12:30	AA				
Run ID/Seg #: TJA	T_000321A-224448					
Prep Method	Prep Date	Prep Initials				
SW3010A	03/10/2000 12:30	_AA				
IITROGEN, NITRATE	/AC NI		MCL	E300	Units: mg/L	
Nitrogen, Nitrate (As N)	3.6	0.1	MOL	1	03/10/00 12:19 ES	2180
OLYNUCLEAR ARO	MATIC HYDROCARBO		MCL		Units: ug/L	
Acenaphthene	ND	0.1		1	03/22/00 17:24 LJ	2253
Acenaphthylene	ND	0.1		1	03/22/00 17:24 LJ	2253
Anthracene	ND	0.1		1	03/22/00 17:24 LJ	2253
Benz(a)anthracene	ND	0.1		1	03/22/00 17:24 LJ	2253
Benzo(a)pyrene	ND	0.1		1	03/22/00 17:24 LJ	2253
Benzo(b)fluoranthene	ND	0.1		1 .	03/22/00 17:24 LJ	2253
Benzo(g,h,i)perylene	ND	0.1		1	03/22/00 17:24 LJ	2253
Benzo(k)fluoranthene	ND	0.1		1	03/22/00 17:24 LJ	2253
Chrysene	ND	0.1		1	03/22/00 17:24 LJ	2253
Dibenzo(a,h)anthracene	ND ND	0.1		1	03/22/00 17:24 LJ	2253
Fluoranthene	ND	0.1		1	03/22/00 17:24 LJ	2253
Fluorene	ND	0.1		1	03/22/00 17:24 LJ	2253
Indeno(1,2,3-cd)pyrene	ND	0.1		1	03/22/00 17:24 LJ	2253
Naphthalene	ND	0.1		1	03/22/00 17:24 LJ	2253
Phenanthrene	ND	0.1		1	03/22/00 17:24 LJ	2253
Pyrene	ND	0.1		1	03/22/00 17:24 LJ	2253
Surr: 1-Fluoronaphth	alene 41.0	% 30-140		1	03/22/00 17:24 LJ	2253
Surr: Phenanthrene-c		% 35-140		1	03/22/00 17:24 LJ	2253
Run ID/Seq #: 2_0						
Prep Method	Prep Date	Prep Initials	]			
SW3510B	03/11/2000 14:51	KL	7			

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)



Client Sample ID MW-7 Collected: 3/9/00 11:15:00 SPL Sample ID: 00030291-08

Site: BJ-Hobbs

			• • • • • • • • • • • • • • • • • • • •	J					
Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
PURGEABLE AROMATICS		-		MCL	SW8	021B	Units: ug	J/L	
Benzene	ND		1		1		03/18/00 0:11	LJ	221568
Ethylbenzene	ND		1		1		03/18/00 0:11	LJ	221568
Toluene	ND		1		1		03/18/00 0:11	LJ	221568
Xylenes, Total	ND		1		1		03/18/00 0:11	LJ	221568
Surr: 1,4-Difluorobenzene	86.7	%	72-137		1		03/18/00 0:11	LJ	221568
Surr: 4-Bromofluorobenzene	92.0	%	48-156		1		03/18/00 0:11	LJ	221568
SULFATE				MCL		E300	Units: m	g/L	
Sulfate	280		5		25		03/15/00 11:35	ES	219752

<sup>\* -</sup> Surrogate Recovery Outside Advisable QC Limits



Client Sample ID MW	'-5		Colle	cted:	3/9/00 10:30:00	SPL Sample II	<b>)</b> : 0003	30291-09
			Site:	BJ-	Hobbs			
Analyses/Method	Result	R	ep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq.#
ALKALINITY, BICARE	BONATE			MCL	M2320 B	Units: m	g/L	
Alkalinity, Bicarbonate	253		2	-	1	03/13/00 11:30	AB	218403
ALKALINITY, CARBO	NATE			MCL	M2320 B	Units: m	a/L	
Alkalinity, Carbonate	ND		2		1	03/13/00 11:30		218456
CHLORIDE, TOTAL				MCL	E325.3	Units: m	g/L	
Chloride	196		2		2	03/17/00 10:30		221897
DIESEL RANGE ORG	ANICS			MCL	SW8015B	Units: m	a/L	
Diesel Range Organics	0.55		0.2		1	03/22/00 16:29	RR	225974
Surr: Pentacosane	95.8	%	18-120		1	03/22/00 16:29	RR	225974
Run ID/Seq #: HP	_V_000316A-225974							
Prep Method	Prep Date	E	Prep Initials					
SW3510B	03/12/2000 14:35	P	(L					
FLUORIDE-IC				MCL	E300	Units: m	a/L	
Fluoride	1.1		0.1		1	03/10/00 12:57		221812
GASOLINE RANGE O	RGANICS			MCL	SW8015B	Units: m	a/I	
Gasoline Range Organi			0.1		1	03/18/00 19:24	LJ	221917
Surr: 1,4-Difluoroben		%	74-121		1	03/18/00 19:24	LJ	221917
Surr: 4-Bromofluorob	penzene 104	%	55-150		1	03/18/00 19:24	LJ	221917
HARDNESS, TOTAL (	TITRIMETRIC, EDTA)			MCL	E130.2	Units: m	g/L	
Hardness (As CaCO3)	1200		120		25	03/22/00 10:15	CV	225439
HEADSPACE GAS AN	NALYSIS			MCL	RSK147	Units: m	g/L	
Ethane	ND		0.0025		1	03/22/00 15:47	<del>-</del>	225483
Ethylene	ND		0.0032		1	03/22/00 15:47	AB	225483
Methane	ND		0.0012		1	03/22/00 15:47	AB	225483
MERCURY, TOTAL				MCL	SW7470A	Units: m	g/L	
Mercury	ND		0.0002		1	03/17/00 12:28	· <del></del> ··	220741
Run ID/Seq #: HG	GL_000317A-220741							
Prep Method	Prep Date	<u> </u>	Prep Initials					
SW7470A	03/17/2000 9:00	1	PB					
METALS BY METHO	0 6010B, TOTAL			MCL	SW6010B	Units: m	g/L	
Arsenic	0.0173		0.005		1	03/22/00 0:13	EG	224449
Lead	0.00565		0.005		1	03/22/00 0:13	EG	224449
Selenium	ND	-1	0.005		1	03/22/00 0:13	EG	224449
D /	0.184		0.005		1	03/14/00 17:51	E_B	218622
Barium	U.104				·			
Cadmium	ND		0.005		1	03/14/00 17:51 03/14/00 17:51		218622

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)



Client Sample ID MW-5		Colle	ected:	3/9/00 10:30:00	SPL Sample ID:	00030291-09	
		Site:	ВЈ	-Hobbs			
Analyses/Method	Result	Rep.Limit		Dil. Factor QUAL	Date Analyzed Ana	lyst Seq.#	
Chromium	0.0248	0.01		1	03/14/00 17:51 E_B	21862	
Magnesium	29.2	0.1		1	03/14/00 17:51 E_B	21862	
Potassium	5.61	2		1	03/14/00 17:51 E_B	21862	
Silver	ND	0.01		1	03/14/00 17:51 E_B	21862	
Sodium	123	0.5		1	03/14/00 17:51 E_B	21862	
Run ID/Seq #: TJA	_000314A-218622						
Prep Method	Prep Date	Prep Initials					
SW3010A	03/10/2000 12:30	_AA					
Run ID/Seq #: TJA	AT_000321A-224449						
Prep Method	Prep Date	Prep Initials					
SW3010A	03/10/2000 12:30	_AA					
NITROGEN, NITRATE	(AS N)		MCL	E300	Units: mg/L		
Nitrogen, Nitrate (As N)	5.3	0.1		1	03/10/00 12:19 ES	21802	
POLYNUCLEAR AROI	MATIC HYDROCARBON	NS	MCL	SW8310	Units: ug/L	~	
Acenaphthene	ND	0.1		1	03/22/00 18:02 LJ	22540	
Acenaphthylene	DN	0.1		1	03/22/00 18:02 LJ	22540	
Anthracene	ND	0.1		1	03/22/00 18:02 LJ	22540	
Benz(a)anthracene	ND	0.1		1	03/22/00 18:02 LJ	22540	
Benzo(a)pyrene	ND	0.1		1	03/22/00 18:02 LJ	22540	
Benzo(b)fluoranthene	ND	0.1		1	03/22/00 18:02 LJ	22540	
Benzo(g,h,i)perylene	ND	0.1		1 .	03/22/00 18:02 LJ	22540	
Benzo(k)fluoranthene	ND	0.1		1	03/22/00 18:02 LJ	22540	
Chrysene	ND	0.1		1	03/22/00 18:02 LJ	22540	
Dibenzo(a,h)anthracene	ND ND	0.1		1	03/22/00 18:02 LJ	22540	
Fluoranthene	ND	0.1		1	03/22/00 18:02 LJ	22540	
Fluorene	ND	0.1		1	03/22/00 18:02 LJ	22540	
Indeno(1,2,3-cd)pyrene	ND	0.1		1	03/22/00 18:02 LJ	22540	
Naphthalene	ND	0.1		1	03/22/00 18:02 LJ	22540	
Phenanthrene	ND	0.1		1	03/22/00 18:02 LJ	22540	
Pyrene	ND	0.1		1	03/22/00 18:02 LJ	2254	
Surr: 1-Fluoronaphtha	alene 41.9	% 30-140		1	03/22/00 18:02 LJ	2254	
Surr: Phenanthrene-c	i10 81.9	% 35-140		1	03/22/00 18:02 LJ	2254	
Run ID/Seq #: 2_0	000321B-225400						
Prep Method	Prep Date	Prep Initials					
SW3510B	03/11/2000 14:51	KL					

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)



Client Sample ID MW-5 Collected: 3/9/00 10:30:00 SPL Sample ID: 00030291-09

OILE. DJ-MODDS	Site:	BJ-Hobbs
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			0111	J. DO-	110000				
Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq.#
PURGEABLE AROMATICS				MCL	SW8	3021B	Units: ug	ı/L	
Benzene	ND		1	2.00	1		03/18/00 0:37	LJ	221569
Ethylbenzene	ND		1		1		03/18/00 0:37	LJ	221569
Toluene	ND		1 -		1		03/18/00 0:37	LJ	221569
Xylenes, Total	ND		1		1		03/18/00 0:37	LJ	221569
Surr: 1,4-Difluorobenzene	85.9	%	72-137		1		03/18/00 0:37	LJ	221569
Surr: 4-Bromofluorobenzene	91.9	%	48-156		1		03/18/00 0:37	LJ	221569
SULFATE				MCL		E300	Units: m	g/L	
Sulfate	260		5		25		03/15/00 11:35	ES	219753



Client Sample ID Trip Blank #1 2/29/00 Collected: 3/9/00 SPL Sample ID: 00030291-10

Site: BJ-Hobbs

			3116	;. DJ-	LODDS				
Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq.#
GASOLINE RANGE ORGANICS				MCL	SW8	015B	Units: m	g/L	
Gasoline Range Organics	ND		0.1		1		03/17/00 17:18	LJ	221543
Surr: 1,4-Difluorobenzene	94.9	%	74-121		1		03/17/00 17:18	LJ	221543
Surr: 4-Bromofluorobenzene	113	%	55-150		1		03/17/00 17:18	LJ	221543
PURGEABLE AROMATICS				MCL	SW8	021B	Units: ug	ı/L	
Benzene	ND		1		1		03/17/00 17:18	LJ	221557
Ethylbenzene	ND		1		1		03/17/00 17:18	LJ	221557
Toluene	ND		1		1		03/17/00 17:18	LJ	221557
Xylenes,Total	ND		1		1		03/17/00 17:18	LJ	221557
Surr: 1,4-Difluorobenzene	86.6	%	72-137		1		03/17/00 17:18	LJ	221557
Surr: 4-Bromofluorobenzene	95.5	%	48-156		1		03/17/00 17:18	LJ	221557

- \* Surrogate Recovery Outside Advisable QC Limits
- J Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)



Client Sample ID Trip Blank #2 2/29/00 Collected: 3/9/00 SPL Sample ID: 00030291-11

Site: BJ-Hobbs

Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq.#
			MCL	SW8015B	Units: mg	g/L	
ND		0.1		1	03/17/00 17:44	LJ	221544
95.1	%	74-121		1	03/17/00 17:44	LJ	221544
112	%	55-150		1	03/17/00 17:44	LJ	221544
			MCL	SW8021B	Units: ug	/L	
ND		1		1	03/17/00 17:44	LJ	221558
ND	•	1		1	03/17/00 17:44	LJ	221558
ND		1		1	03/17/00 17:44	LJ	221558
ND		1		1	03/17/00 17:44	LJ	221558
86.4	%	72-137		1	03/17/00 17:44	LJ	221558
96.8	%	48-156		1	03/17/00 17:44	LJ	221558
	ND 95.1 112 ND ND ND ND ND	ND 95.1 % 112 % ND ND ND ND 86.4 %	ND 0.1 95.1 % 74-121 112 % 55-150 ND 1 ND 1 ND 1 ND 1 ND 1 ND 1 86.4 % 72-137	MCL  ND 0.1  95.1 % 74-121  112 % 55-150  MCL  ND 1  ND 1  ND 1  ND 1  ND 1  ND 1  ND 1  86.4 % 72-137	MCL         SW8015B           ND         0.1         1           95.1         % 74-121         1           112         % 55-150         1           MCL         SW8021B           ND         1         1           86.4         % 72-137         1	MCL         SW8015B         Units: mg           ND         0.1         1         03/17/00 17:44           95.1         % 74-121         1         03/17/00 17:44           112         % 55-150         1         03/17/00 17:44           MCL         SW8021B         Units: ug           ND         1         1         03/17/00 17:44           86.4         % 72-137         1         03/17/00 17:44	MCL         SW8015B         Units: mg/L           ND         0.1         1         03/17/00 17:44 LJ           95.1         % 74-121         1         03/17/00 17:44 LJ           112         % 55-150         1         03/17/00 17:44 LJ           ND         1         1         03/17/00 17:44 LJ           86.4         % 72-137         1         03/17/00 17:44 LJ

<sup>\* -</sup> Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL



Client Sample ID Trip Blank #3 2	/29/00		C	ollected:	3/9/00	SPL Sample II	): 0003	0291-12
			Si	te: BJ-	Hobbs			
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq.#
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: mg	<b>3/</b> ∟	
Gasoline Range Organics	ND		0.1		1	03/17/00 18:10	LJ	221545
Surr: 1,4-Difluorobenzene	95.3	%	74-121		1	03/17/00 18:10	LJ	221545
Surr: 4-Bromofluorobenzene	112	%	55-150		1	03/17/00 18:10	LJ	221545
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	/L	
Benzene	ND		1		1	03/17/00 18:10	LJ	221559
Ethylbenzene	ND		1		1	03/17/00 18:10	LJ	221559
Toluene	ND		1		1	03/17/00 18:10	LJ	221559
Xylenes, Total	ND		1		1	03/17/00 18:10	ĻJ	221559
Surr: 1,4-Difluorobenzene	87.3	%	72-137		1	03/17/00 18:10	LJ	221559
Surr: 4-Bromofluorobenzene	96.2	%	48-156		1	03/17/00 18:10	LJ	221559

<sup>\* -</sup> Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL



Client Sample ID Trip Blank #4 2	2/29/00		Coll	ected:	3/9/00	SPL Sample ID	0003	0291-13
			Site	: BJ	Hobbs			
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq.#
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: mg	ı/L	
Gasoline Range Organics	ND		0.1		1	03/17/00 18:36	LJ	221547
Surr: 1,4-Difluorobenzene	94.6	%	74-121		1	03/17/00 18:36	LJ	221547
Surr: 4-Bromofluorobenzene	111	%	55-150		1	03/17/00 18:36	LJ	221547
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	/L	
Benzene	ND		1		1	03/17/00 18:36	LJ	221560
Ethylbenzene	ND		1		1	03/17/00 18:36	LJ	221560
Toluene	ND		1		1	03/17/00 18:36	ĻJ	221560
Xylenes,Total	ND		1		1	03/17/00 18:36	LJ	221560
Surr: 1,4-Difluorobenzene	86.8	%	72-137		1	03/17/00 18:36	LJ	221560
Surr: 4-Bromofluorobenzene	96.8	%	48-156		1	03/17/00 18:36	ĹĴ	221560

<sup>\* -</sup> Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL



Client Sample ID Trip Blank #5 2	/29/00		Col	lected:	3/9/00	SPL Sample I	): 0003	30291-14
			Site	: BJ-	Hobbs			- "
Analyses/Method	Result	-	Rep.Limit	•	Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: m	g/L	
Gasoline Range Organics	ND		0.1		1	03/17/00 19:02	LJ	221548
Surr: 1,4-Difluorobenzene	93.6	%	74-121		1	03/17/00 19:02	LJ	221548
Surr: 4-Bromofluorobenzene	110	%	55-150		1	03/17/00 19:02	LJ	221548
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	/L	
Benzene	ND		1		1	03/17/00 19:02	LJ	221561
Ethylbenzene	ND		1		1	03/17/00 19:02	LJ	221561
Toluene	ND		1		1	03/17/00 19:02	LJ	221561
Xylenes, Total	ND		1	,	1	03/17/00 19:02	LJ	221561
Surr: 1,4-Difluorobenzene	87.2	%	72-137		1	03/17/00 19:02	LJ	221561
Surr: 4-Bromofluorobenzene	95.9	%	48-156		1	03/17/00 19:02	LJ	221561

<sup>\* -</sup> Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

D - Surrogate Recovery Unreportable due to Dilution

# **Quality Control Documentation**



## **Quality Control Report**

## **Brown & Caldwell** BJ Service, Hobbs, NM

Analysis:

**Diesel Range Organics** 

ethod:

eparation Date:

SW8015B

Surr: Pentacosane

WorkOrder:

Samples in Analytical Batch:

00030291

Lab Batch ID:

3635

Method Blank

RunID: halysis Date: HP\_V\_000316A-220311

03/16/2000 11:34

03/12/2000 14:35

Units: Analyst: mg/L

66.4

RR

Method SW3510B

18-120

Lab Sample ID 00030291-01B

Client Sample ID MW-1

00030291-02B 00030291-03B MW-3 MW-11A MW-9

Analyte Result Rep Limit Diesel Range Organics ND 0.20

Prep By: KL

00030291-04B 00030291-05B 00030291-06B

OW-4 MW-12D MW-8

00030291-07B 00030291-08B 00030291-09B

MW-7 MW-5

#### Laboratory Control Sample (LCS)

RunID:

HP\_V\_000316A-220312

Units:

mg/L

Analysis Date: Preparation Date:

03/16/2000 12:12 03/12/2000 14:35 Analyst: RR

Prep By: KL Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Diesel Range Organics	2.5	2.3	92	: 44	141

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030294-02

RuniD:

HP\_V\_000316A-220315

Units:

mg/L

Analysis Date:

03/16/2000 14:07

Analyst: RR

Preparation Date: 03/12/2000 14:35

Prep By: KL Method SW3510B

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
esel Range Organics	0.24	2.5	2.1	75.2	2.5	2.7	97.6	25.9	39	13	130

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



# **Quality Control Report**

# Brown & Caldwell BJ Service, Hobbs, NM

alysis:

Headspace Gas Analysis

Analyte

thod: RSK147

Ethane

Ethylene

Methane

WorkOrder:

00030291

Lab Batch ID:

R11103

Method Blank

hID: alysis Date: VARH\_000322A-225473

03/22/2000 11:54

Units: Analyst: mg/L AB

Lab Sample ID 00030291-01D

Samples in Analytical Batch:

Client Sample ID MW-1

00030291-02D

MW-3

00030291-03D 00030291-04D MW-11A MW-9

00030291-04D 00030291-05D

OW-4

00030291-06D

MW-12D MW-8

00030291-07D 00030291-08D 00030291-09D

MW-7 MW-5

ND 0.0032 ND 0.0012

0.0025

#### Sample Duplicate

Original Sample:

00030291-01

Result Rep Limit

ND

VARH\_000322A-225474

Units: r

mg/L

Analysis Date:

RunID:

03/22/2000 14:09

Analyst: AB

Analyte	Sample Result	DUP Result	RPD	RPD Limit
2-Methylpropane	ND	ND	0	50
Butane	ND	ND	0	50
Ethane	ND	ND	0	50
Ethylene	ND	ND	0	50
Methane	ND	ND	0	50
Propane	ND	ND	0	50
Propylene	ND	ND	0	50

ualiflers:

ND/U - Not Detected at the Reporting Limit

Blank C

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



## **Quality Control Report**

## **Brown & Caldwell** BJ Service, Hobbs, NM

alysis:

Gasoline Range Organics

Analyte

ethod:

SW8015B

WorkOrder:

00030291

Lab Batch ID:

R10841

Method Blank

inID: halysis Date: HP\_N\_000317A-221542 03/17/2000 16:27

Units: Analyst:

mg/L LJ

Result

Lab Sample ID

Client Sample ID

00030291-05A

Samples in Analytical Batch:

**OW-4** 

00030291-10A 00030291-11A Trip Blank #1 2/29/00

Trip Blank #2 2/29/00

00030291-12A

00030291-13A

Trip Blank #3 2/29/00

Trip Blank #4 2/29/00

Gasoline Range Organics ND 0.10 96.4 74-121 Surr: 1,4-Difluorobenzene Surr: 4-Bromofluorobenzene 112.8

00030291-14A

Trip Blank #5 2/29/00

55-150

**Laboratory Control Sample (LCS)** 

RunID:

HP\_N\_000317A-221539

Rep Limit

Units:

mg/L

Analysis Date:

03/17/2000 13:35

Analyst: LJ

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	0.75	75	42	136

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030393-02

HP\_N\_000317A-221540

Units:

mg/L

Analysis Date:

RunID:

03/17/2000 15:35

Analyst: LJ

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD		Low Limit	High Limit
Gasoline Range Organics	ND	0.9	1.2	131	0.9	1.1	121	8.02	36	22	174

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



## **Quality Control Report**

## Brown & Caldwell BJ Service, Hobbs, NM

alysis:

nID:

alysis Date:

**Purgeable Aromatics** 

Analyte

SW8021B ethod:

Benzene

Ethylbenzene Toluene

Xylenes, Total

WorkOrder:

00030291

Lab Batch ID:

R10849

Method Blank

Units:

Analyst: LJ

HP\_N\_000317C-221556 03/17/2000 16:27

Surr: 1,4-Difluorobenzene

Surr: 4-Bromofluorobenzene

ug/L

Result

ND

ND

ND

ND

86.7

96.5

Lab Sample ID

Client Sample ID 00030291-05A

Samples in Analytical Batch:

OW-4 MW-12D

00030291-06A 00030291-07A

MW-8 MW-7

00030291-08A 00030291-09A

MW-5

00030291-10A 00030291-11A Trip Blank #1 2/29/00

00030291-12A

Trip Blank #2 2/29/00

00030291-13A

Trip Blank #3 2/29/00 Trip Blank #4 2/29/00

00030291-14A

Trip Blank #5 2/29/00

#### Laboratory Control Sample (LCS)

RunID:

HP\_N\_000317C-221553

Rep Limit

1.0

1.0

1.0

1.0

72-137

48-156

Units:

ug/L

Analysis Date:

03/17/2000 13:10

Analyst:

LJ

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	42	85	61	119
Ethylbenzene	50	44	87	. 70	118
Toluene	50	43	86	65	125
Xylenes,Total	150	132	88	72	117

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

Analysis Date:

00030393-01

RunID:

HP\_N\_000317C-221554 03/17/2000 14:43

Units:

Analyst:

ug/L

LJ

. Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Benzene	5.3	20	26	102	20	27	107	4.16	21	32	164
Ethylbenzene	6.8	20	26	97.7	20	27	102	4.39	19	52	142
luene	ND	20	23	114	20	23	114	0.804	20	38	159
xylenes,Total	3.6	60	69	109	60	70	111	1.52	18	53	144

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



## **Quality Control Report**

# **Brown & Caldwell** BJ Service, Hobbs, NM

nalysis:

**Purgeable Aromatics** 

ethod:

unID:

nalysis Date:

SW8021B

03/18/2000 16:50

WorkOrder:

00030291

Lab Batch ID:

R10858

Method Blank

HP\_N\_000318A-221633

Units:

Analyst:

ug/L LJ

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

00030291-01A 00030291-02A MW-1 MW-3

00030291-03A

MW-11A

00030291-04A

MW-9

Analyte	Result	Rep Limit
Benzene	ND	1.0
Ethylbenzene	ND	1.0
Toluene	ND	1.0
Xylenes,Total	ND	1.0
Surr: 1,4-Difluorobenzene	84.6	72-137
Surr. 4-Bromofluorobenzene	92.1	48-156

#### **Laboratory Control Sample (LCS)**

RunID:

HP\_N\_000318A-221630

Units:

ug/L

Analysis Date:

03/18/2000 12:36

Analyst: LJ

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	20	19	95	61	119
Ethylbenzene	20	19	94	70	118
Toluene	20	19	95	65	125
Xylenes,Total	60	57	95	72	117

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030291-02

RunID:

HP\_N\_000318A-221631

Units:

ug/L

Analysis Date:

03/18/2000 15:07

Analyst: LJ

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
enzene	ND	20	22	110	20	23	117	6.07	21	32	164
Ethylbenzene	ND	20	22	110	20	24	118	7.32	19	52	142
Ioluene	ND	20	23	114	20	23	117	2.40	20	38	159
ylenes,Total	ND	60	67	112	60	70	117	4.38	18	53	144

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



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

## **Quality Control Report**

# Brown & Caldwell BJ Service, Hobbs, NM

alysis:

Gasoline Range Organics

Analyte

ethod:

SW8015B

03/18/2000 16:50

WorkOrder:

Samples in Analytical Batch:

00030291

Lab Batch ID:

R10875

Method Blank

nID: alysis Date: HP\_N\_000318C-221910

Gasoline Range Organics

Surr: 1,4-Difluorobenzene

Surr: 4-Bromofluorobenzene

Units: Analyst: mg/L

Result

94.9

112.2

Lab Sample ID 00030291-01A

Client Sample ID MW-1

00030291-02A 00030291-03A MW-3 MW-11A

00030291-04A 00030291-06A MW-9 MW-12D

00030291-07A 00030291-08A MW-8 MW-7

00030291-09A

MW-5

#### Laboratory Control Sample (LCS)

RunID:

HP\_N\_000318C-221907

Rep Limit

0.10

74-121

55-150

Units:

mg/L

Analysis Date:

03/18/2000 12:10

Analyst:

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	0.81	81	42	136

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030291-04

RunID:

HP\_N\_000318C-221908

Units:

mg/L

Analysis Date:

03/18/2000 15:59

Analyst: LJ

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
asoline Range Organics	1.3	0.9	2.1	86.8	0.9	2.1	78.5	10.1	36	22	174

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



## **Quality Control Report**

## **Brown & Caldwell** BJ Service, Hobbs, NM

alysis:

Polynuclear Aromatic Hydrocarbons

ethod: SW8310 WorkOrder:

00030291

Lab Batch ID:

3640

#### Method Blank

ınID:

2\_000321B-225386

Units: ug/L

Prep By: KL

Samples in Analytical Batch:

Client Sample ID

alysis Date: Preparation Date:

03/21/2000 7:32

03/11/2000 14:51

Analyst: LJ

Method SW3510B

00030291-01C MW-1 00030291-02C

MW-3

00030291-03C

MW-11A

00030291-04C

Lab Sample ID

MW-9 **OW-4** 

00030291-05C 00030291-06C

MW-12D

00030291-07C 00030291-08C MW-8 MW-7

00030291-09C

MW-5

Analyte Result Rep Limit 0.10 ND Acenaphthene Acenaphthylene ND 0.10 ND 0.10 Anthracene Benz(a)anthracene ND 0.10 ND 0.10 Benzo(a)pyrene ND 0.10 Benzo(b)fluoranthene Benzo(g,h,i)perylene ND 0.10 Benzo(k)fluoranthene ND 0.10 ND 0.10 Chrysene Dibenzo(a,h)anthracene ND 0.10 Fluoranthene ND 0.10 0.10 ND Fluorene Indeno(1,2,3-cd)pyrene ND 0.10 ND 0.10 Naphthalene Phenanthrene ND 0.10 Pyrene ND 0.10 Surr. 1-Fluoronaphthalene 65,4 30-140 Surr: Phenanthrene-d10 88.4 35-140

## Laboratory Control Sample (LCS)

RunID:

2\_000321B-225387

Units:

ug/L

Analysis Date:

03/21/2000 8:11

Analyst: LJ

Preparation Date: 03/11/2000 14:51 Prep By: KL Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Acenaphthene	0.5	0.31	62	0.01	124
Acenaphthylene	0.5	0.33	66	0.01	139
Anthracene	0.5	0.32	65	0.01	126
Benz(a)anthracene	0.5	0.36	73	12	135
Benzo(a)pyrene	0.5	0.32	65	0.01	128
Benzo(b)fluoranthene	0.5	0.37	75	6	150
Benzo(g,h,i)perylene	0.5	0.39	78	0.01	116
Benzo(k)fluoranthene	0.5	0.35	71	0.01	159
Chrysene	0.5	0.44	89	0.01	199
Dibenzo(a,h)anthracene	0.5	0.39	78	0.01	110
Fluoranthene	0.5	0.33	66	14	123
Fluorene	0.5	0.31	62	0.01	142
Indeno(1,2,3-cd)pyrene	0.5	0.42	83	0.01	116
Naphthalene	0.5	0.28	55	0.01	122
Phenanthrene	0.5	0.33	66	0.01	155
Pyrene	0.5	0.33	67	0.01	140

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



# **Quality Control Report**

Brown & Caldwell BJ Service, Hobbs, NM

alysis: ethod:

Polynuclear Aromatic Hydrocarbons

SW8310

WorkOrder:

00030291

Lab Batch ID:

3640

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

Analysis Date:

00030335-01

RuniD:

2\_000321B-225389

Units: ug/L

03/21/2000 20:34

LJ

Analyst:

Method

Preparation Date: 03/11/2000 14:51 Prep By:

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
enaphthene	ND	0.5	0.2	39.9	0.5	0.29	57.4	36.0*	30	0.01	124
Acenaphthylene	ND	0.5	0.25	50.1	0.5	0.31	62.3	21.7	30	0.01	139
Anthracene	ND	0.5	0.051	10.2	0.5	0.42	83.3	156*	30	0.01	126
enz(a)anthracene	ND	0.5	0.46	88.6	0.5	0.58	111	22.8	30	12	135
enzo(a)pyrene	ND	0.5	0.23	46.5	0.5	0.22	44.2	4.91	30	0.01	128
Benzo(b)fluoranthene	ND	0.5	0.23	46.3	0.5	0.21	42.4	8.70	30	6	150
enzo(g,h,i)perylene	ND	0.5	0.048	1.40	0.5	0.11	13.4	162*	30	0.01	116
enzo(k)fluoranthene	ND	0.5	0.23	45.6	0.5	0.21	41.1	10.4	30	0.01	159
Chrysene	ND	0.5	0.61	122	0.5	0.77	155	23.7	30	0.01	199
Dibenzo(a,h)anthracene	ND	0.5	0.21	41.1	0.5	0.24	47.2	13.9	30	0.01	110
uoranthene	ND	0.5	0.41	74.4	0.5	0.49	90.4	19.5	30	14	123
uorene	ND	0.5	0.26	40.8	0.5	0.35	59.1	36.7*	30	0.01	142
ndeno(1,2,3-cd)pyrene	ND	0.5	0.18	28.9	0.5	0.17	26.9	7.28	30	0.01	116
aph thalene	ND	0.5	0.17	34.8	0.5	0.26	51.2	38.2*	30	0.01	122
nenanthrene	ND	0.5	0.52	91.1	0.5	0.72	132	36.6*	30	0.01	155
Pyrene	ND	0.5	0.44	88.8	0.5	0.32	64.8	31.2*	30	0.01	140

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



## **Quality Control Report**

## **Brown & Caldwell** BJ Service, Hobbs, NM

alysis:

Metals by Method 6010B, Total

SW6010B ethod:

Barium

Cadmium

Calcium

Chromium

Magnesium

Potassium

Silver

Sodium

WorkOrder:

00030291

Lab Batch ID:

3621

Method Blank

inID:

TJA\_000314A-218604

Analyte

Units:

mg/L

Result

ND

ND

ND

ND

ND

ND

ND

ND

Lab Sample ID 00030291-01E

Samples in Analytical Batch:

Client Sample ID

alysis Date: Preparation Date:

03/14/2000 16:45 03/10/2000 12:30

Analyst: E B

Prep By: \_AA Method SW3010A

Rep Limit

0.005

0.005

0.1

0.01

0.1

0.01

0.5

00030291-02E

MW-1 MW-3

00030291-03E

MW-11A MW-9

00030291-04E 00030291-05E

OW-4

00030291-06E 00030291-07E

MW-12D MW-8

00030291-08E

**MW-7** 

00030291-09E

MW-5

#### Laboratory Control Sample (LCS)

RunID:

TJA\_000314A-218605

Units:

mg/L E\_B

Analysis Date:

Preparation Date:

03/14/2000 16:48 03/10/2000 12:30 Analyst: Prep By:

\_AA Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Barium	2	1.78	89	80	120
Cadmium	2	1.81	90	80	120
Calcium	20	18.1	91	80	120
Chromium	2	1.78	89	80	120
Magnesium	20	18.3	91	80	120
Potassium	20	18.2	91	80	120
Silver	2	1.83	92	80	120
Sodium	20	17.3	86	80	120

#### Post Digestion Spike (PDS) / Post Digestion Spike Duplicate (PDSD)

ample Spiked:

00030291-01

Analyte

tunID:

TJA 000314A-218610

Units:

ma/L

Analysis Date:

Calcium

pdium

03/14/2000 17:08

Analyst: E\_B

155

123

10

10

Sample PDS **PDS** Result PDS % **PDSD** PDSD Result PDSD % RPD RPD High Low Recovery Result Spike Spike Limit | Limit Recovery Limit Added Added

10

10

159

126

43\*

311

4.3

15

20

20

75

75

125

125

41

36

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

159

127

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



## **Quality Control Report**

## **Brown & Caldwell** BJ Service, Hobbs, NM

alysis: thod:

Metals by Method 6010B, Total

SW6010B

WorkOrder:

00030291

Lab Batch ID:

3621

Sample Spiked:

RunID:

00030291-01

TJA\_000314A-218607

Units:

mg/L

Analysis Date: Preparation Date: 03/14/2000 16:56 03/10/2000 12:30 Analyst: E\_B Prep By:

\_AA Method SW3010A

MS Result **MS %** MSD MSD Result MSD % **RPD** RPD Analyte Sample MS Low High Result Spike Recovery Spike Recovery Limit Limit Limit Added Added 0.092 0.946 85.4 0.935 84.3 1.27 20 75 125 rium ND 0.866 86.6 0.867 86.7 0.0727 20 75 125 idm lum 72.9 10 74.7\* 20 75 150 10 162 162 2.51 125 Calcium 0.844 84.1 ND 1 0.844 84.1 0.0416 20 75 125 iromium 1gnesium 10 49.6 83.5 10 80.6 3.54 20 75 41 49.3 125 4.0 10 12.8 87.8 10 12.4 84.4 4.04 20 75 otassium 125 1 86.9 87.00.0713 75 ND 0.869 0.87 20 Silver 125 10 dium 10 130 67.1\* 129 55.3\* 19.3 20 75 125

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



# **Quality Control Report**

## Brown & Caldwell BJ Service, Hobbs, NM

alysis:

Metals by Method 6010B, Total

thod: SW6010B

Arsenic

Selenium

Lead

WorkOrder:

00030291

Lab Batch ID:

3621-T

Method Blank

nID: alysis Date:

Preparation Date:

TJAT\_000321A-224430

03/21/2000 22:25

03/10/2000 12:30

Analyte

Units:

mg/L

EG

Analyst: Prep By:

\_AA Method SW3010A

0.005

0.005 0.005 Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

00030291-01E 00030291-02E

MW-3

00030291-03E 00030291-04E

MW-11A MW-9

MW-1

00030291-05E 00030291-06E

**OW-4** MW-12D

00030291-07E 00030291-08E MW-8 MW-7

00030291-09E

MW-5

#### Laboratory Control Sample (LCS)

RunID:

TJAT\_000321A-224431

Result Rep Limit

ND

ND

ND

Units: mg/L

Analysis Date:

03/21/2000 22:31

Analyst: EG

03/10/2000 12:30 Preparation Date:

Prep By: \_AA Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Arsenic	4	4.11	. 103	80	120
Lead	2	2.06	103	80	120
Selenium	4	3.89	97	80	120

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030291-01

RunID:

. TJAT\_000321A-224434

Units:

mg/L

Analysis Date:

03/21/2000 22:45

Analyst: EG

Preparation Date:

03/10/2000 12:30

Prep By:

\_AA Method SW3010A

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD		Low Limit	High Limit
senic	0.018	2	2.05	102	2	2.06	102	0.228	20	75	125
ad	ND	1	0.958	95.6	1	0.965	96.3	0.687	20	75	125
Selenium	ND	2	1.88	93.9	2	1.89	94.3	0.493	20	75	125

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



## **Quality Control Report**

# Brown & Caldwell BJ Service, Hobbs, NM

alysis: thod:

Metals by Method 6010B, Total

SW6010B

WorkOrder:

00030291

Lab Batch ID:

3621A

Method Blank

Samples in Analytical Batch:

nID:

TJA\_000315B-220038

Units:

mg/L E\_B

Lab Sample ID 00030291-03E

Client Sample ID MW-11A

alysis Date: Preparation Date: 03/10/2000 12:30

03/15/2000 20:38

Analyst: Prep By:

AA Method SW3010A

0.1

00030291-05E

**OW-4** 

Result Rep Limit Analyte Calcium ND Sodium

## Laboratory Control Sample (LCS)

RunID:

TJA\_000315B-220039

Units:

mg/L

Analysis Date:

03/15/2000 20:42

ΕB

Preparation Date: 03/10/2000 12:30 Analyst:

Prep By: \_AA Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Calcium	20	18.6	93	80	120
Sodium	20	19.3	96	80	120

#### Post Digestion Spike (PDS) / Post Digestion Spike Duplicate (PDSD)

mple Spiked:

00030291-01

nID: Analysis Date: TJA\_000315B-220044 03/15/2000 21:01

Units:

mg/L

Analyst:  $E_B$ 

Analyte	Sample Result	PDS Spike Added	PDS Result	PDS % Recovery		PDSD Result	PDSD % Recovery	RPD	RPD Limit		High Limit
calcium	157	10	167	96	10	168	107	11	20	1 -	
Şodium	138	10	136	-16*	10	136	-17*	1.0	20		125

## Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030291-01

TJA\_000315B-220041

Units:

mg/L

Analysis Date:

RunID:

03/15/2000 20:50

Analyst: E B

Preparation Date:

03/10/2000 12:30

Prep By: \_AA Method SW3010A

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
alcium	160	10	164	70.5*	10	164	64.1*	9.51	20	75	125
odium	140	10	143	52.7*	10	143	52.9*	0.450	20	75	125

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



## **Quality Control Report**

# Brown & Caldwell BJ Service, Hobbs, NM

alysis:

nID:

Mercury, Total

thod: SW7470A WorkOrder:

Samples in Analytical Batch:

00030291

Lab Batch ID:

3726

Method Blank

alysis Date:

Mercury

Preparation Date:

HGL\_000317A-220727 03/17/2000 12:28

Analyte

03/17/2000 9:00

Units:

Prep By:

mg/L

PB Analyst: PB

Result

ND

Method SW7470A

Lab Sample ID 00030291-01E

Client Sample ID MW-1

00030291-02E

MW-3 MW-11A

00030291-03E 00030291-04E

MW-9

00030291-05E 00030291-06E **OW-4** MW-12D

00030291-07E 00030291-08E 8-WM MW-7

00030291-09E

MW-5

#### Laboratory Control Sample (LCS)

RunID:

Analysis Date:

HGL\_000317A-220728

Units: mg/L

03/17/2000 12:28

Rep Limit

0.0002

PB Analyst:

Preparation Date: 03/17/2000 9:00 Prep By: PB

Method SW7470A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Mercury	0.002	0.00202	101	80	120

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030291-02

RunID:

HGL 000317A-220730

Units:

mg/L

Analysis Date:

03/17/2000 12:28

Analyst: PB

Preparation Date:

03/17/2000 9:00

Prep By: PB Method SW7470A

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
ercury	ND	0.002	0.00192	95.9	0.002	0.0019	95.2	0.680	20	75	125

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



## **Quality Control Report**

# **Brown & Caldwell** BJ Service, Hobbs, NM

alysis:

Nitrogen, Nitrate (As N)

Analyte

thod:

E300

Nitrogen, Nitrate (As N)

WorkOrder:

00030291

Lab Batch ID:

R10644

Client Sample ID

Method Blank

alysis Date:

WET\_000310U-218014 03/10/2000 12:19

Units:

Analyst:

mg/L

ES

Lab Sample ID 00030291-01F

MW-1

Samples in Analytical Batch:

00030291-02F 00030291-03F

00030291-04F

00030291-05F

00030291-06F

00030291-07F 00030291-08F

00030291-09F

MW-12D 8-WM MW-7

MW-3 MW-11A

MW-9

OW-4

MW-5

Laboratory Control Sample (LCS)

RunID:

WET\_000310U-218015

Result Rep Limit

0.10

ND

Units:

mg/L

Analysis Date:

03/10/2000 12:19

Analyst:

ES

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Nitrogen, Nitrate (As N)	10	9.5	95	90	110

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030291-01

RunID:

WET\_000310U-218017

Units: mg/L

Analysis Date:

03/10/2000 12:19

Analyst:

ES

<b>3</b>	Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit		High Limit
tro	ogen,Nitrate (As N)	0.33	10	10	99.2	10	10	98.5	0.698	20	76	124

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



## **Quality Control Report**

# Brown & Caldwell BJ Service, Hobbs, NM

alysis: thod:

Alkalinity, Bicarbonate

Analyte

M2320 B

WorkOrder:

00030291

Lab Batch ID:

R10671

Method Blank

nID: alysis Date: WET\_000313L-218393

Alkalinity, Bicarbonate

03/13/2000 11:30

Units:

Analyst: AB

mg/L

Result

ND

00030291-01G

Client Sample ID

00030291-02G

Lab Sample ID

Samples in Analytical Batch:

MW-1 MW-3

00030291-03G

00030291-04G

MW-11A MW-9

00030291-05G

**OW-4** 

00030291-06G

00030291-07G

MW-12D MW-8

00030291-08G

MW-7

#### Sample Duplicate

Original Sample:

00030291-01

RunID:

WET\_000313L-218394

Rep Limit

Units:

mg/L

Analysis Date:

03/13/2000 11:30

Analyst: AB

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Alkalinity, Bicarbonate	89.1	89.1	0	18



## **Quality Control Report**

# Brown & Caldwell BJ Service, Hobbs, NM

alysis:

nID:

Alkalinity, Bicarbonate

M2320 B thod:

WorkOrder:

00030291

R10671A

Method Blank

Samples in Analytical Batch:

WET\_000313L-218393

mg/L

Lab Sample ID

Client Sample ID

alysis Date:

03/13/2000 11:30

Analyst: AB

Units:

00030291-09G

MW-5

Lab Batch ID:

Analyte	Result	Rep Limit
Alkalinity, Bicarbonate	ND	2.0

#### Sample Duplicate

Original Sample:

00030291-09

WET\_000313L-218403

Units:

mg/L

Analysis Date:

RunID:

03/13/2000 11:30

Analyst: AB

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Alkalinity, Bicarbonate	253	255	1	. 18



## Quality Control Report

## Brown & Caldwell BJ Service, Hobbs, NM

alysis: thod: Alkalinity, Carbonate

M2320 B

WorkOrder:

00030291

Lab Batch ID:

R10676

Method Blank

nID: alysis Date: WET\_000313O-218446

Alkalinity, Carbonate

03/13/2000 11:30

Analyte

Units: Analyst:

mg/L t: AB

Lab Sample ID 00030291-01G

Samples in Analytical Batch:

Client Sample ID MW-1

00030291-02G 00030291-03G

MW-3 MW-11A

00030291-04G 00030291-05G MW-9 OW-4

00030291-06G 00030291-07G MW-12D MW-8

00030291-08G

MW-7

Sample Duplicate

Original Sample:

00030291-01

Result Rep Limit

ND

WET\_000313O-218447

Units:

mg/L

Analysis Date:

RunID:

03/13/2000 11:30

0 Analyst: AB

Analyte	Sample . Result	DUP Result	RPD	RPD Limit
Alkalinity, Carbonate	ND	ND	0	18

D - Recovery Unreportable due to Dilution



## **Quality Control Report**

## **Brown & Caldwell** BJ Service, Hobbs, NM

alysis: ethod:

alysis Date:

Alkalinity, Carbonate

WET\_000313O-218446

03/13/2000 11:30

M2320 B

WorkOrder:

00030291

Lab Batch ID:

R10676A

Method Blank

Units:

Analyst:

Samples in Analytical Batch:

mg/L AB

Lab Sample ID

Client Sample ID

00030291-09G

MW-5

 Analyte	Result	Rep Limit
Alkalinity, Carbonate	ND	2.0

#### Sample Duplicate

Original Sample:

00030291-09

RunID:

WET\_000313O-218456

Units:

mg/L

Analysis Date:

03/13/2000 11:30

Analyst: AB

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Alkalinity, Carbonate	ND	ND	0	18

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



## **Quality Control Report**

## Brown & Caldwell BJ Service, Hobbs, NM

alysis:

Sulfate

ethod:

E300

WorkOrder:

00030291

Lab Batch ID:

R10746A

Client Sample ID

Method Blank

inID: alysis Date:

Sulfate

WET\_000315J-219724 03/15/2000 11:35

Analyte

Units:

Analyst:

mg/L ES

Lab Sample ID 00030291-01F

00030291-02F

Samples in Analytical Batch:

00030291-03F 00030291-04F

00030291-05F 00030291-06F

00030291-07F 00030291-08F

MW-7

00030291-09F

MW-5

MW-8

MW-1

MW-3 MW-11A

MW-9

**OW-4** 

MW-12D

Laboratory Control Sample (LCS)

RunID:

WET\_000315J-219725

Units:

mg/L

Analysis Date:

03/15/2000 11:35

Result Rep Limit

0.20

ND

Analyst: ES

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	⊍pper Limit
Sulfale	10	10	102	90	110

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030291-01

RunID:

WET\_000315J-219742

Units:

mg/L

Analysis Date:

03/15/2000 11:35

Analyst: ES

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
ulfate	530	1000	1500	102	1000	1600	102	0.558	20	95	113

Qualiflers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



## **Quality Control Report**

## Brown & Caldwell BJ Service, Hobbs, NM

alysis:

Fluoride-IC

ethod:

E300

WorkOrder:

00030291

Lab Batch ID:

R10851

Method Blank

ınID: alysis Date:

Fluoride

WET\_000310Z-221798 03/10/2000 12:57

Analyte

Units:

Analyst:

mg/L

ES

Result

ND

Lab Sample ID 00030291-01F

Samples in Analytical Batch:

Client Sample ID MW-1

00030291-02F

MW-3

00030291-03F

MW-11A

00030291-04F 00030291-05F MW-9 **OW-4** 

00030291-06F 00030291-07F

MW-12D

00030291-08F

MW-8 **MW-7** 

00030291-09F

MW-5

#### Laboratory Control Sample (LCS)

RunID:

WET\_000310Z-221799

Rep Limit

0.10

Units:

mg/L

Analysis Date:

03/10/2000 12:57

ES Analyst:

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Fluoride	10	9.9	99	90	: 110

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030291-01

RunID:

WET\_000310Z-221801

Units:

mg/L

Analysis Date:

03/10/2000 12:57

Analyst: ES

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
uoride	1.7	10	12	101	10	12	101	0.0298	20	80	120

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



## **Quality Control Report**

## Brown & Caldwell BJ Service, Hobbs, NM

halysis:

Chloride, Total

ethod:

E325.3

WorkOrder:

00030291

Lab Batch ID:

R10873

Client Sample ID

Method Blank

unID: nalysis Date:

Chloride

WET\_000317N-221883 03/17/2000 10:30

Analyte

Units: Analyst: mg/L

CV

Samples in Analytical Batch:

<u>Lab Sample ID</u> 00030291-01F

00030291-01F MW-1 00030291-02F MW-3

00030291-03F 00030291-04F

00030291-04F MW-9 00030291-05F OW-4 00030291-06F MW-12D

00030291-06F 00030291-07F 00030291-08F

MW-8 MW-7

**MW-11A** 

00030291-09F

MW-5

#### Laboratory Control Sample (LCS)

RuntD:

WET\_000317N-221885

Result Rep Limit

ND

Units:

mg/L

Analysis Date:

03/17/2000 10:30

Analyst:

: CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Chloride	74.4	72.4	97	90	110

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030291-01

RunID:

WET\_000317N-221887

Units:

: mg/L

Analysis Date:

03/17/2000 10:30

Analyst: CV

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
hloride	260	250	500	96.5	250	508	99.9	3.50	20	85	115

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



## **Quality Control Report**

## Brown & Caldwell

alysis:

Hardness, Total (Titrimetric, EDTA)

thod:

BJ Service, Hobbs, NM

WorkOrder:

00030291

Lab Batch ID:

Samples in Analytical Batch:

R11098

Method Blank

nID: alysis Date: WET\_000322T-225425

Hardness (As CaCO3)

03/22/2000 10:15

Analyte

Units: Analyst: mg/L

CV

Result

ND

Lab Sample ID 00030291-01E

Client Sample ID MW-1 MW-3

00030291-02E 00030291-03E

MW-11A MW-9

00030291-04E 00030291-05E 00030291-06E

**OW-4** MW-12D 8-WM

00030291-07E 00030291-08E

MW-7

00030291-09E

**MW-5** 

#### Laboratory Control Sample (LCS)

RunID:

WET\_000322T-225427

Rep Limit

Units:

mg/L

Analysis Date:

03/22/2000 10:15

CV Analyst:

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Hardness (As CaCO3)	99.7	98	98	94	108

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030291-01

RunID:

WET 000322T-225429

Units:

mg/L

Analysis Date:

03/22/2000 10:15

Analyst:

CV

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
ardness (As CaCO3)	600	500	1100	99.5	500	1100	99.5	0	20	81	111

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



## **Quality Control Report**

## Brown & Caldwell BJ Service, Hobbs, NM

alysis:

Hardness, Total (Titrimetric, EDTA)

thad: E130.2

WorkOrder:

00030291

Lab Batch ID:

R11098

Method Blank

nID: alysis Date: WET\_000322T-225425 03/22/2000 10:15

Hardness (As CaCO3)

Analyte

Units: Analyst: mg/L CV

Lab Sample ID 00030291-01E

Samples in Analytical Batch:

Client Sample ID

00030291-01E 00030291-02E MW-1 MW-3

00030291-03E

MW-11A

00030291-04E

MW-9

00030291-05E 00030291-06E OW-4 MW-12D

00030291-07E 00030291-08E MW-8 MW-7

00030291-09E

MW-5

#### Laboratory Control Sample (LCS)

RunID:

WET\_000322T-225427

Result Rep Limit

ND

Units:

mg/L

Analysis Date:

03/22/2000 10:15

Analyst: CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Hardness (As CaCO3)	99.7	98	98	94	108

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030291-01

RunID:

WET 000322T-225429

Units:

mg/L

Analysis Date:

03/22/2000 10:15

Analyst: CV

MS Result Sample MS MS % MSD MSD Result MSD % RPD RPD Analyte Low High Result Spike Recovery Spike Recovery Limit Limit Limit Added Added ardness (As CaC03) 600 500 1100 1100 99.5 500 99.5 0 20 81 111

Qualiflers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

Chain of Custody And Sample Receipt Checklist

& rword	n & Caldwell	Sumpling Event Description	CDC Racord No				David 1 as	
Contact:	Phone: (713) 759,000	WW. Maniparina Welle 1990 Y	SDI Wardender Number	Number			- 936 - VI	
Address: 1415Laisiana								
Suite 2500					72 100	SEQUESTIED ANMLYSES	YSIS	0 7 10
City: Houston	State: TX, 770002	Other (deported baltury)	•r	<b>8</b> 0 16	1,4			
Project Name: BI Service	C	QNQC Laval	ntair	e d GRO	15	e,Ethe	ed the	<del>an die la</del> ggege un
Project No.:		Std 🗓 Lvi3 🗍	<del></del>	ativ				K. Alexandra
Sile Address: Holbs, NM							*****	a to pijeka
Sampled By:		,						ge bedreiter
SAMPLEID	DATE THE	COMP GRAB Water Soll	NL		TP!			
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Mw. 3	11 00/6	×	11 123	·/	<u> </u>	×. ×.	XIX	14. 7. 1988 <u>(1</u> 44)
True Blant	1	×	7 -	×.				Minists mare
MW 11 A	3/9/00 1605	<b>X</b> :	11 1.2,	3	×	XX	XX	-
9 M W	3/9/00 1515	×	11 1.23	×	X.	XX	×	1
Tris Blank	1	\ \	12 1	X			,	
1-mg	3/9/00 1435	X	11 1,2,3	)	XX	×	X	
Mw 120	3/9/00 1345	×	111 1/2/2	4	X	XX	X	berginski Si
8 M M	3/9/00 1140	×	1) 1,2,3	×	×	X	XX	. نفرسط
Trie Blank	-	X	2	×				
LAW.	3/9/00 1115	X	11 12	3. 3.	×	X	XX	
3 W M	3/1/00 1030		1) 1,2,3		X	XX	XX	
TAT	Special Detection Limits (Specify)		Consultant Remarks	artes	. ′ !	۱.		<u>in entel l</u>
24hr   7hr			All this	Imes Con	1)ra   1	ing.	ر مدرون درون درون درون درون درون درون درون	
48hr 10 to day [X]	Special Reporting Requirements:	フリコ	Laboratory Remarks	arkes			CC	rālīgās (milt.illā):
Cther		**	Container Type: 1=	: 1=40ml vial	1#40ml ylal/2#160z plastic 3#32oz plastic	tic 3=320z j	plastic /	
Reimchished by Samples			)	ed by:				alianany di ma
	1	21100 18	To Contract	E T				
Kampusnad by:		Q A	3	scerved by:				nt sel minerales
Reinquished by:		clate	time Received	ad by SPL, finc:			2/10	
				£)(%)	Mon L	00	100	2
:						í		



## Sample Receipt Checklist

Workorder:	00030291		Received by:		Stelly, D'Anna	
Date and Time Received:	3/10/00 10:00:00 AM		Carrier name:		<u>FedEx</u>	
Temperature:	4					 
Shipping container/cooler in	good condition?	Yes 🗹	No 🗀	Not Present		
Custody seals intact on ship	opping container/cooler?	Yes 🗹	No 🗌	Not Present		
Custody seals intact on san	pple bottles?	Yes 🗌	No 🗌	Not Present	$\checkmark$	
Chain of custody present?		Yes 🗹	No 🗌			
Chain of custody signed wh	en relinquished and received?	Yes 🗹	No 🗆			
Chain of custody agrees wit	h sample labels?	Yes 🗹	No 🗌			
Samples in proper containe	r/bottle?	Yes 🗹	No 🗆			
Sample containers intact?		Yes 🗹	No 🗌			
Sufficient sample volume for	r Indicated test?	Yes 🗹	No 🗆			
All samples received within	holding time?	Yes 🗹	No 🗆			
Container/Temp Blank temp	perature in compliance?	Yes 🗹	No 🗆			 
Water - VOA vials have zer	o headspace?	Yes 🗹	No 🗆	Not Present		
Water - pH acceptable upor	n receipt?	Yes 🗹	No 🗌			



# Case Narrative for: Brown & Caldwell

## Certificate of Analysis Number:

#### 00030325

Report To:

Brown & Caldwell

Rick Rexroad 1415 Louisiana

Suite 2500 Houston

TX

77002-

ph: (713) 759-0999

Project Name:

BJ Service, Hobbs, NM

Site:

**BJ-Hobbs** 

Site Address:

PO Number:

State:

New Mexico

State Cert. No.:

Date Reported:

Any 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).

Please do not hesitate to contact us if you have any questions or comments pertaining to this data report. Please reference the above Certificate of Analysis Number.

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

fax: (713) 308-3886

This report shall not be reproduced except in full, without the written approval of the laboratory. The reported results are only representative of the samples submitted for testing.

Rendette 4. 5

3/24/00

Customer Service Manager

Date



## Brown & Caldwell

## Certificate of Analysis Number:

## 00030325

Report To: **Brown & Caldwell** 

Rick Rexroad

1415 Louisiana

Suite 2500 Houston

TX

Fax To:

77002-

ph: (713) 759-0999

fax: (713) 308-3886

Brown & Caldwell

Rick Rexroad

fax: (713) 308-3886

**Project Name:** 

BJ Service, Hobbs, NM

Site:

BJ-Hobbs

Site Address:

PO Number:

State:

**New Mexico** 

State Cert. No.:

**Date Reported:** 

Client Sample ID	Lab Sample ID	Matrix	Date Collected	Date Received	COCID	HOL
/W-13	00030325-01	Water	3/10/00 10:15:00 AM	3/11/00 10:00:00 AM		
MW-10	00030325-02	Water	3/10/00 8:50:00 AM	3/11/00 10:00:00 AM		
MW-12	00030325-03	Water	3/10/00 9:20:00 AM	3/11/00 10:00:00 AM		$\exists \exists$
JUP	00030325-04	Water	3/10/00	3/11/00 10:00:00 AM		7 7
иW-4" :	00030325-05	Water	3/10/00 8:20:00 AM	3/11/00 10:00:00 AM		
Trip Blank #1 2/29/00	00030325-06	Water	3/10/00	3/11/00 10:00:00 AM		一 元
rip Blank #2 2/29/00	00030325-07	Water	3/10/00	3/11/00 10:00:00 AM		ᅱᇊ
rlp Blank #3 2/29/00	00030325-08	Water	3/10/00	3/11/00 10:00:00 AM		$\dashv \exists$

ni, Bernadette

Customer Service Manager

lette a. In

3/24/00

Date

Joel Grice Laboratory Director

Ted Yen Quality Assurance Officer





Client Sample ID: MW-13		Colle	ected:	3/10/00 10:15:00	SPL Sample ID:	00030325-01
		Site:	BJ.	-Hobbs		
Analyses/Method	Result	Rep.Limit		Dil. Factor QUAL	Date Analyzed Ar	nalyst Seq. #
ALKALINITY, BICARBON	ATE		MCL	M2320 B	Units: mg/L	
Alkalinity, Bicarbonate	240	2		1	03/13/00 11:30 AB	218405
ALKALINITY, CARBONA	TE		MCL	M2320 B	Units: mg/L	
Alkalinity, Carbonate	ND	2		11	03/13/00 11:30 AB	218458
CHLORIDE, TOTAL			MCL	E325.3	Units: mg/L	
Chloride	276	10		10	03/17/00 10:30 CV	221898
DIESEL RANGE ORGANI	CS		MCL	SW8015B	Units: mg/L	
Diesel Range Organics	1.9	0.22		1	03/21/00 22:33 RR	225908
Surr: Pentacosane	49.1	% 18-120		1	03/21/00 22:33 RR	225908
Run ID/Seq #: HP_V_I	000322B-225908					
Prep Method Pr	rep Date	Prep Initials				
SW3510B 03	3/12/2000 10:01	KL				
FLUORIDE-IC			MCL	E300	Units: mg/L	
Fluoride	1.7	0.1		1	03/11/00 13:56 ES	221842
GASOLINE RANGE ORG	ANICS		MCL	SW8015B	Units: mg/L	
Gasoline Range Organics	0.99	0.1		1	03/17/00 22:36 WF	₹ 221956
Surr: 1,4-Difluorobenzene	141	% 74-121		. 1 •	03/17/00 22:36 WF	221956
Surr: 4-Bromofluorobenze	ne 190	% 55-150		1 *	03/17/00 22:36 W	
HARDNESS, TOTAL (TIT	RIMETRIC, EDTA)		MCL	E130.2	Units: mg/L	
Hardness (As CaCO3)	540	50		10	03/22/00 10:15 C\	/ 225440
HEADSPACE GAS ANAL	YSIS		MCL	RSK147	Units: mg/L	
Ethane	ND	0.0025		1	03/23/00 10:04 AE	3 225491
Ethylene	ND	0.0032		1	03/23/00 10:04 AE	3 225491
Methane	ND	0.0012	<del></del>	1	03/23/00 10:04 AE	3 225491
MERCURY, TOTAL			MCL	SW7470A	Units: mg/L	
Mercury	ND	0.0002		1	03/17/00 12:28 PE	3 220742
Run ID/Seq #: HGL_0	00317A-220742		,		-	
Prep Method P	rep Date	<u>Prep Initials</u>				
SW7470A 0	3/17/2000 9:00	PB		100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 -		
METALS BY METHOD 6	010B, TOTAL		MCL	SW6010B	Units: mg/L	
Arsenic	ND	0.005		1 ·	03/15/00 22:06 JN	M 219421
Lead	ND	0.005		1	03/15/00 22:06 JN	M 219421
Selenium	ND	0.005		1	03/15/00 22:06 JN	
Barium	0.113	0.005		1	03/14/00 15:09 E_	·
Cadmium	ND	0.005		1	03/14/00 15:09 E_	
Calcium	122	0.1		1	03/14/00 15:09 E_	B 21859

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)





Client Sample ID: MW-13 Collected: 3/10/00 10:15:00 SPL Sample ID: 00030325-01

		Site:	BJ-Hobbs				
Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq.#
Chromium	ND	0.01	1		03/14/00 15:09	E_B	218591
Magnesium	38.8	0.1	1		03/14/00 15:09	E_B	218591
Potassium	2.84	2	1		03/14/00 15:09	E_B	218591
Silver	ND	0.01	1		03/14/00 15:09	E_B	218591
Sodium	114	0.5	1		03/14/00 15:09	E_B	218591

Run ID/Seq #:	TJA_000314A-218591	
Prep Method	Prep Date	Prep Initials
SW3010A	03/13/2000 13:25	_AA
Run ID/Seq #:	TJAT_000315A-219421	
Prep Method	Prep Date	Prep Initials
SW3010A	03/13/2000 13:25	AA

NITROGEN, NITRATE (AS N)		-		MCL		E300	Units: m	g/L	
Nitrogen,Nitrate (As N)	ND		0.1		1		03/11/00 13:56	ES	221942
POLYNUCLEAR AROMATIC HY	DROCARBON	s		MCL	sv	V8310	Units: ug	/L	
Acenaphthene	ND		0.1		1		03/22/00 19:56	LJ	225403
Acenaphthylene	1.8		1		20		03/23/00 11:48	LJ	225572
Anthracene	ND		0:1		1		03/22/00 19:56	LJ	225403
Benz(a)anthracene	ND		0.1		1		03/22/00 19:56	LJ	225403
Benzo(a)pyrene	ND		0.1		1		03/22/00 19:56	LJ	225403
Benzo(b)fluoranthene	ND		0.1	1000	. 1		03/22/00 19:56	LJ	225403
Benzo(g,h,i)perylene	ND		0.1	1.5.	1		03/22/00 19:56	LJ	225403
Benzo(k)fluoranthene	ND		0.1		1		03/22/00 19:56	LJ	225403
Chrysene	ND		0.1		1		03/22/00 19:56	LJ	225403
Dibenzo(a,h)anthracene	ND		0.1		1		03/22/00 19:56	LJ	225403
Fluoranthene	ND		0.1		1		03/22/00 19:56	LJ	225403
Fluorene	1.6		0.1		1		03/22/00 19:56	LJ	225403
Indeno(1,2,3-cd)pyrene	ND		0.1		1		03/22/00 19:56	LJ	225403
Naphthalene	56		10		100		03/23/00 13:43	LJ	225574
Phenanthrene	0.22		0.1		1		03/22/00 19:56	LJ	225403
Pyrene	ND		0.1		1	······· · · · · · · · · · · · · · · ·	03/22/00 19:56	LJ	225403
Surr: 1-Fluoronaphthalene	183	%	30-140		1	•	03/22/00 19:56	LJ	225403
Surr: 1-Fluoronaphthalene	D	%	30-140		20	•	03/23/00 11:48	LJ	225572
Surr: 1-Fluoronaphthalene	D	%	30-140		100	+	03/23/00 13:43	LJ	225574
Surr: Phenanthrene-d10	D	%	35-140		100	•	03/23/00 13:43	LJ	225574
Surr; Phenanthrene-d10	130	%	35-140		1		03/22/00 19:56	LJ	225403
Surr: Phenanthrene-d10	D	%	35-140		20	•	03/23/00 11:48	LJ	225572

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)



Client Sample ID: M	<i>N</i> -13			Colle	cted:	3/10/00 10:15:00	SPL Sample I	): 00030	0325-01
				Site:	BJ-	Hobbs			
Analyses/Method	Resu	lt		Rep.Limit		Dil. Factor QUAI	_ Date Analyzed	Analyst	Seq.#
Run iD/Seq #: 2_	000321B-225403								
Prep Method	Prep Date			Prep Initials					
SW3510B	03/11/2000 14:51			KL					
Run ID/Seq #: 2	000321B-225572								
Prep Method	Prep Date			Prep Initials					
SW3510B	03/11/2000 14:51			KL					
Run ID/Seq #: 2	000321B-225574								
Prep Method	Prep Date			Prep Initials					
SW3510B	03/11/2000 14:51			KL					
PURGEABLE AROM	ATICS				MCL	SW8021B	Units: ug	ı/L	
Benzene	8	88		1		1	03/17/00 22:36	WR	22187
Ethylbenzene	20	00		1	***************************************	1	03/17/00 22:36	WR	22187
Toluene	2	.8		1		1	03/17/00 22:36	WR	22187
Xylenes,Total	1	.3		1		1	03/17/00 22:36	WR	22187
Surr: 1,4-Difluorobe	nzene 13	32	%	72-137		1	03/17/00 22:36	WR	22187
Surr: 4-Bromofluoro	benzene 12	24	%	48-156		1	03/17/00 22:36	WR	22187
SULFATE	· · · · · · · · · · · · · · · · · · ·				MCL	E300	Units: m	g/L	
Sulfate	17	70		5		25	03/15/00 11:35	ES	21973

<sup>\* -</sup> Surrogate Recovery Outside Advisable QC Limits





Client Sample ID: MW-10	Colle	cted:	3/10/00 8:50:00	SPL Sample ID: 0	00030325-02
	Site:	BJ-	Hobbs		
Analyses/Method Result	Rep.Limit		Dil. Factor QUAL	Date Analyzed Ana	lyst Seq.#
ALKALINITY, BICARBONATE		MCL	M2320 B	Units: mg/L	
Alkalinity, Bicarbonate 455	2		1	03/13/00 11:30 AB	218406
ALKALINITY, CARBONATE		MCL	M2320 B	Units: mg/L	
Alkalinity, Carbonate ND	2		1	03/13/00 11:30 AB	218459
CHLORIDE, TOTAL		MCL	E325.3	Units: mg/L	
Chloride 474	5		5	03/17/00 10:30 CV	221901
DIESEL RANGE ORGANICS		MCL	SW8015B	Units: mg/L	
Diesel Range Organics 1.2	0.2	MOL	1	03/22/00 21:35 RR	225911
Surr: Pentacosane 63.2	% 18-120		1	03/22/00 21:35 RR	225911
Run ID/Seq #: HP_V_000322B-225911					
Prep Method Prep Date	Prep Initials				
SW3510B 03/12/2000 10:01	KL				
FLUORIDE-IC		MCL	E300	Units: mg/L	
Fluoride 1	0.1	WOL	1	03/11/00 13:56 ES	221845
GASOLINE RANGE ORGANICS		MCL	SW8015B	United modi	
Gasoline Range Organics 0.85	0.5	WICL	5	Units: mg/L 03/20/00 19:13 WR	222936
Surr: 1,4-Difluorobenzene 102	% 74-121		5	03/20/00 19:13 WR	222936
Surr: 4-Bromofluorobenzene 118	<b>% 55</b> -150		5	03/20/00 19:13 WR	222936
HARDNESS, TOTAL (TITRIMETRIC, EDTA)		MCL	E130,2	Units: mg/L	
Hardness (As CaCO3) 760	50		10	03/22/00 10:15 CV	225443
HEADSPACE GAS ANALYSIS		MCL	RSK147	Units: mg/L	
Ethane ND	0.0025		1	03/23/00 1O:24 AB	225493
Ethylene ND	0.0032		1	03/23/00 10:24 AB	225493
Methane 0.0056	0.0012		1	03/23/00 10:24 AB	225493
MERCURY, TOTAL		MCL	SW7470A	Units: mg/L	
Mercury ND	0.0002		1	03/17/00 12:28 PB	220743
Run ID/Seq #: HGL_000317A-220743					<del></del>
Prep Method Prep Date	Prep Initials				
SW7470A 03/17/2000 9:00	РВ				
METALSBY METHOD 6010B, TOTAL		MCL	SW6010B	Units: mg/L	
Arsenic 0.0474	0.005		1	03/15/00 22:13 JM	219424
Lead 0.00661	0.005		1	03/15/00 22:13 JM	219424
Selenium ND	0.005		1	03/15/00 22:13 JM	219424
Barium 0.281	0.005		1	03/14/00 15:13 E_B	
Cadmium ND	0.005		1	03/14/00 15:13 E_B	
Calcium 177	0.1		1	03/14/00 15:13 E B	218592

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)



Client Sample ID: MW	-10		Colle	cted:	3/10/00 8:50:00	SPL Sample ID:	00030325-02
			Site:	BJ-	Hobbs		
Analyses/Method	Result	F	Rep.Limit		Dil. Factor QUAL	Date Analyzed Ar	nalyst Seq.#
Chromium	0.031		0.01		1	03/14/00 15:13 E_E	3 218592
Magnesium	61		0.1		1	03/14/00 15:13 E_E	3 218592
Potassium	18.3		2		1	03/14/00 15:13 E_E	3 218592
Silver	ND		0.01		1	03/14/00 15:13 E_E	3 218592
Sodium	181		0.5		1	03/14/00 15:13 E_E	3 218592
Run ID/Seq #: TJA	_000314A-218592						
Prep Method	Prep Date		Prep Initials				
SW3010A	03/13/2000 13:25		_AA				
Run ID/Seq #: TJA	T_000315A-219424						
Prep Method	Prep Date		Prep Initials				
SW3010A	03/13/2000 13:25		_AA				
NITROGEN, NITRATE	(AS N)			MCL	E300	Units: mg/L	
Nitrogen, Nitrate (As N)	0.1		0.1		1	03/11/00 13:56 ES	221945
POLYNLICI FAR ARO	MATIC HYDROCARBO	NS		MCL	SW8310	Units: ug/L	
Acenaphthene	ND		0.1		1	03/22/00 21 :50 LJ	225404
Acenaphthylene	0.4		0.1	·	1	03/22/00 21 :50 LJ	225404
Anthracene	ND		0.1		1	03/22/00 21 :50 LJ	225404
Benz(a)anthracene	ND		0.1		1	03/22/00 21 :50 LJ	225404
Benzo(a)pyrene	ND		0.1		1	03/22/00 21:50 LJ	225404
Benzo(b)fluoranthene	ND.		0.1		. 1	03/22/00 21:50 LJ	225404
Benzo(g,h,i)perylene	ND		0.1		1	03/22/00 21:50 LJ	225404
Benzo(k)fluoranthene	ND		0.1		1	03/22/00 21:50 LJ	225404
Chrysene	. ND		0.1		1	03/22/00 21:50 LJ	225404
Dibenzo(a,h)anthracene	ND		0.1		1	03/22/00 21:50 LJ	225404
Fluoranthene	ND		0.1		1	03/22/00 21:50 LJ	225404
Flyorene	ND		0.1		1	03/22/00 21:50 L	225404
Indeno(1,2,3-cd)pyrene	ND		0.1		1	03/22/00 21:50 L	225404
Naphthalene	1.5		0.1		1	03/22/00 21:50 L.	J 225404
Phenanthrene	ND		0.1		1	03/22/00 21:50 L.	225404
Pyrene	ND		0.1		1	03/22/00 21:50. L.	J 225404
Surr: 1-Fluoronaphtha	lene 63.4	%	30-140		1	03/22/00 21:50 L.	J 225404
Surr: Phenanthrene-d	10 74.2	%	35-140		1	03/22/00 21:50 L	J 225404
Run ID/Seq #: 2_0	00321B-225404						
Prep Method	Prep Date		Prep Initials				
SW3510B	03/11/2000 14:51		KL				

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

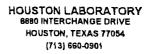
>MCL - Result Over Maximum Contamination Limit(MCL)



Client Sample ID: MW-10 Collected: 3/10/00 8:50:00 SPL Sample ID: 00030325-02

			Site	e: BJ-l	Hobbs				
Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq.#
PURGEABLE AROMATICS				MCL	SWE	3021B	Units: ug	J/L	
Benzene	300		1		1		03/17/00 23:01	WR	221 879
Ethylbenzene	6.6		1		1		03/17/00 23:01	WR	221 879
Toluene	4.3		1		1		03/17/00 23:01	WR	221 879
Xylenes,Total	43.2		1		1		03/17/00 23:01	WR	221879
Surr: 1,4-Difluorobenzene	145	%	72-137		1	•	03/17/00 23:01	WR	221 879
Surr: 4-Bromofluorobenzene	133	%	48-156		1		03/17/00 23:01	WR	221879
SULFATE				MCL		E300	Units: m	g/L	
Sulfate	160		2	, , , , , , , , , , , , , , , , , , , ,	10		03/15/00 11:35	ES	219737

- \* Surrogate Recovery Outside Advisable QC Limits
- J Estimated Value between MDL and PQL





Client Sample ID: MV	V-12		Colle	ected:	3/10/00 9:20:00	SPL Sample II	0003	0325-03
			Site:	BJ-	Hobbs			
Analyses/Method	Result		Rep.Limit		Dil. Factor QUA	_ Date Analyzed	Analyst	Seq.#
ALKALINITY, BICARI	BONATE			MCL	M2320 B	Units: m	g/L	
Alkalinity, Bicarbonate	402		2		1	03/13/00 11:30	AB	218407
ALKALINITY, CARBO	NATE			MCL	M2320 B	Units: m	a/L	
Alkalinity, Carbonate	ND		2		1		AB	218460
CHLORIDE, TOTAL				MCL	E325.3	Units: m	g/L	
Chloride	327		5		5	03/17/00 10:30	CV	22190
DIESEL RANGE ORG	SANICS			MCL	SW8015E	Units: m	a/L	
Diesel Range Organics			0.2		1	03/22/00 22:13	RR	225912
Surr: Pentacosane	67.0	%	18-120		1	03/22/00 22:13	RR	225912
Run ID/Seq #: HF	V_V_000322B-225912							
Prep Method	Prep Date		Prep Initials					
SW3510B	03/12/2000 10:01		KL					
FLUORIDE-IC				MCL	E300	Units: m	g/L	
Fluoride	1.7	,	0.1		1			22184
GASOLINE RANGE	DRGANICS			MCL	SW8015E	Units: m	a/L	
Gasoline Range Organ			0.1		. 1	03/17/00 23:26	<del></del>	22195
Surr: 1,4-Difluorober		′ %	74-121		1	03/17/00 23:26	WR	22195
Surr: 4-Bromofluorob	enzene 104	%	55-150		1	03/17/00 23:26	WR	221 95
HARDNESS, TOTAL	(TITRIMETRIC, EDTA	<b></b>		MCL	E130.	2 Units: m	a/L	
Hardness (As CaCO3)			50		10	03/22/00 10:15		22544
HEADSPACE GAS A	NALYSIS			MCL	RSK14	7 Units: m	a/L	
Ethane	NC	)	0.0025		1	03/23/00 10:32	AB	22549
Ethylene	NC	)	0.0032	-	1	03/23/00 10:32	AB	22549
Methane	NC	)	0,0012		11	03/23/00 10:32	AB	22549
MERCURY, TOTAL				MCL	SW7470	Units: m	a/L	
Mercury	NC	)	0.0002		1	03/17/00 12:28	PB	22074
Run ID/Seq #: He	GL_000317A-220744							
Prep Method	Prep Date		Prep Initials					
SW7470A	03/17/2000 9:00		РВ					
METALS BY METHO	D 6010B, TOTAL			MCL	SW6010	B Units: m	ıg/L	
Arsenic	0.094	В	0.005		1	03/15/00 22:19		21942
Lead	NC	)	0.005		1	03/15/00 22:19	JM	21942
Selenium	N	)	0.005		1	03/15/00 22:19	·	21942
Barium	0.24	5	0.005		1	03/14/00 15:16	E_B	21859
Cadmium	N	)	0.005		1	03/14/00 15:16	E_B	21859
Calcium	18	^	0.1		1	03/14/00 15:16		21859

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)





Collected: 3/10/00 9:20:00 00030325-03 Client Sample ID: MW-12 SPL Sample ID: Site: **BJ-Hobbs** Rep.Limit Result Dil. Factor QUAL Analyses/Method Date Analyzed Analyst Seq.# 0.0124 0.01 03/14/00 15:16 E B 218593 Chromium 1 30.6 0.1 Magnesium 1 03/14/00 15:16 E\_B 218593 Potassium 104 2 1 03/14/00 15:16 E B 218593 ND 0.01 Silver 1 03/14/00 15:16 E\_B 218593 129 0.5 1 03/14/00 15:16 E\_B 218593 Sodium Run ID/Seq #: TJA\_000314A-218593 Prep Initials Prep Method Prep Date SW3010A 03/13/2000 13:25 AA Run ID/Seq #: TJAT\_000315A-219427 Prep Initials Prep Method Prep Date SW3010A 03/13/2000 13:25 AA NITROGEN, NITRATE (AS N) MCL E300 Units: mg/L ND 0.1 03/11/00 13:56 ES Nitrogen, Nitrate (As N) 221946 POLYNUCLEAR AROMATIC HYDROCARBONS MCL SW8310 Units: ug/L 0.1 03/22/00 22:28 Acenaphthene 225405 ND 0.1 Acenaphthylene 03/22/00 22:28 LJ 225405 ND 0.1 1 Anthracene 03/22/00 22:28 225405 LJ ND Benz(a)anthracene 0.1 1 03/22/00 22:28 LJ 225405 ND 0.1 1 03/22/00 22:28 Benzo(a)pyrene LJ 225405 ND Benzo(b)fluoranthene 0.1 1 03/22/00 22:28 LJ 225405 Benzo(g,h,i)perylene ND 0.1 1. 03/22/00 22:28 ĹJ 225405 Benzo(k)fluoranthene ND 0.1 1 03/22/00.22:28 LJ 225405 Chrysene ND 0.1 1 03/22/00 22:28 LJ 225405 Dibenzo(a,h)anthracene ND 0.1 1 03/22/00 22:28 LJ 225405 ND 0.1 Fluoranthene 1 03/22/00 22:28 225405 LJ Fluorene ND 0.1 1 03/22/00 22:28 LJ 225405 ND 0.1 Indeno(1,2,3-cd)pyrene 1 03/22/00 22:28 LJ 225405 0.26 0.1 Naphthalene 1 03/22/00 22:28 LJ 225405 Phenanthrene ND 0.1 1 03/22/00 22:28 LJ 225405 Pyrene ND 0.1 03/22/00 22:28 LJ 225405 Surr: 1-Fluoronaphthalene 42.3 30-140 1 03/22/00 22:28 LJ 225405 35-140 Surr: Phenanthrene-d10 57.8 1 03/22/00 22:28 225405 Run ID/Seq #: 2\_000321B-225405

Prep Initials

Qu	a١	ifī	et	s:

Prep Method

SW3510B

ND/U - Not Detected at the Reporting Limit

Prep Date

03/11/2000 14:51

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)



Client Sample ID: MW-12 Collected: 3/10/00 9:20:00 SPL Sample ID: 00030325-03

Site: R L-Hobbs

		Site: BJ-Hobbs							
Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
PURGEABLE AROMATICS				MCL	SW8	021B	Units: ug	/L	
Benzene	93	-	1		1		03/17/00 23:26	WR	221880
Ethylbenzene	ND		1		1		03/17/00 23:26	WR	221880
Toluene	ND		1		1		03/17/00 23:26	WR	221880
Xylenes,Total	ND		1		1		03/17/00 23:26	WR	221880
Surr: 1,4-Difluorobenzene	108	%	72-137		1		03/17/00 23:26	WR	221880
Surr: 4-Bromofluorobenzene	106	%	48-156		1		03/17/00 23:26	WR	221880
SULFATE				MCL		E300	Units: m	g/L	
Sulfate	210		5		25		03/15/00 11:35	ES	219738





Client Sample ID: DUP		Colle	ected:	3/10/00	SPL Sample ID:	00030	0325-04
		Site:	BJ-	Hobbs			
Analyses/Method	Result	Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
ALKALINITY, BICARBON	NATE		MCL	M2320 B	Units: mg	<i>/</i> L	
Alkalinity, Bicarbonate	400	2		1	03/13/00 11:30	AB	218408
ALKALINITY, CARBONA	TE		MCL	M2320 B	Units: mg		
Alkalinity, Carbonate	ND	2		1		AB	21846
CHLORIDE, TOTAL			MCL	E325.3	Units: mg	/L	
Chloride	362	5		5	03/17/00 10:30		22190
DIESEL RANGE ORGAN	ICS		MCL	SW8015B	Units: mg	/L	
Diesel Range Organics	0.22	0.2		1		RR	225913
Surr: Pentacosane	68.6	% 18-120		1	03/22/00 22:51	RR	22591:
Run ID/Seq #: HP_V_							
	rep Date	Prep Initials					
SW3510B 0	3/12/2000 10:01	KL					
FLUORIDE-IC			MCL	E300	Units: mg	/L	
Fluoride	1.7	0.1		1	03/11/00 13:56	ES	22184
GASOLINE RANGE ORG	ANICS		MCL	SW8015B	Units: mg	ı/L	
Gasoline Range Organics	0.22	0.1		1	03/17/00 23:51	WR	22195
Surr: 1,4-Difluorobenzen	e 96.9	% 74-121	,	1 .	03/17/00 23:51	WR	22195
Surr: 4-Bromofluorobenz	ene 105	<b>%</b> 55-150	14.	1	03/17/00 23:51	WR	22195
HARDNESS, TOTAL (TIT	RIMETRIC, EDTA)		MCL	E130.2	Units: mg	ı/L	
Hardness (As CaCO3)	740	50		10	03/22/00 10:15	CV	22544
HEADSPACE GAS ANA	LYSIS		MCL	RSK147	Units: mg	<b>₃</b> /∟	
Ethane	ND	0.0025		1	03/23/00 10:43	AB	22549
Ethylene	ND	0.0032		1	03/23/00 10:43	AB	22549
Methane	ND	0.0012		1	03/23/00 10:43	AB	22549
MERCURY, TOTAL			MCL	SW7470A	Units: mg	3/L	
Mercury	ND	0.0002		1	03/17/00 12:28	PB	22074
Run ID/Seq #: HGL_			ì				
	Prep Date	Prep Initials					
SW7470A C	03/17/2000 9:00	PB					··•
METALS BY METHOD 6			MCL	SW6010B	Units: mg	g/L	
Arsenic	0.0599	0.005		1		JM	21943
Lead	ND	0.005		1	03/15/00 22:25	JM	21943
Selenium	ND	0.005		1		JM	21943
Barium	0.281	0.005		1	03/14/00 15:20	<del>=</del>	21859
Cadmium	ND	0.005		1	03/14/00 15:20		21859
Calcium	203	0.1		1	03/14/00 15:20	E B	21859

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)



Client Sample ID: DUP			Colle	ected: 3/10/00		SPL Sample ID:	SPL Sample ID: 00030325-04		
			Site:	BJ-	Hobbs				
Analyses/Method	Result	ı	Rep.Limit		Dil. Factor	QUAL	Date Analyzed A	nalyst Seq.	
Chromium	0.0216		0.01		1		03/14/00 15:20 E_	B 2185	
Magnesium	34.2		0.1		1		03/14/00 15:20 E_	B 2185	
Potassium	106		2		1		03/14/00 15:20 E_	B 2185	
Silver	ND	-	0.01		1		03/14/00 15:20 E	B 2185	
Sodium	135		0.5		1		03/14/00 15:20 E_	B 2185	
Run ID/Seq #: TJA	_000314A-218594								
Prep Method	Prep Date		Prep Initials						
SW3010A	03/13/2000 13:25		_AA						
Run ID/Seq #: TJA	T_000315A-219430								
Prep Method	Prep Date		Prep Initials						
SW3010A	03/13/2000 13:25		_AA						
NITROGEN, NITRATE	(AS N)			MCL		E300	Units: mg/L		
Nitrogen, Nitrate (As N)	ND		0.1		1		03/11/00 13:56 E		
POLYNUCI FAR AROI	DLYNUCLEAR AROMATIC HYDROCARBONS			MCL	SV	V8310	Units: ug/L		
Acenaphthene	ND		0.1		1		03/22/00 23:06 L.	J 2254	
Acenaphthylene	ND		0.1		1		03/22/00 23:06 L.	J 2254	
Anthracene	ND		0.1		1		03/22/00 23:06 L.	J 2254	
Benz(a)anthracene	ND		0.1		1		03/22/00 23:06 L.	J 2254	
Benzo(a)pyrene	ND		0.1		1		03/22/00 23:06 L	J 2254	
Benzo(b)fluoranthene	NC		0.1	,	. 1		03/22/00 23:06 L	J 2254	
Benza(g,h,i)perylene	NE	1	0.1		1		03/22/00 23:06 L	J 2254	
Benzo(k)fluoranthene	NC	1	0.1	5	1		03/22/00 23:06 L	J 2254	
Chrysene	, NC	)	0.1		1		03/22/00 23:06 L	J 2254	
Dibenzo(a,h)anthracene	NC		0.1		1		03/22/00 23:06 L	J 2254	
Fluoranthene	NE		0.1		1		03/22/00 23:06 L	J 2254	
Fluorene	NE	)	0.1		1		03/22/00 23:06 L	J 2254	
Indeno(1,2,3-cd)pyrene	NC	)	0.1		1		03/22/00 23:06 L	J 2254	
Naphthalene	1.5	5	0.1		1		03/22/00 23:06 L	J 2254	
Phenanthrene	NE	)	0.1		1		03/22/00 23:06 L	J 2254	
Pyrene	NC	)	0.1		1		03/22/00 23:06 L	J 2254	
Surr: 1-Fluoronaphtha	lene 49.0	) %	30-140		1		03/22/00 23:06 L	J 2254	
Surr: Phenanthrene-d	10 76.9	9 %	35-140		1		03/22/00 23:06 L	.J 2254	
Run ID/Seq #: 2_0	00321B-225406								
Prep Method	Prep Date		Prep Initials						
SW3510B	03/11/2000 14:51		KL						

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)



Client Sample ID: DUP Collected: 3/10/00 SPL Sample ID: 00030325-04

		Oitt	. <u> </u>	10000				
Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
	-		MCL	SW8	021B	Units: ug	ı/L	
99		1		1		03/17/00 23:51	WR	221881
ND		1		1		03/17/00 23:51	WR	221881
ND		1		1		03/17/00 23:51	WR	221881
ND		1		1		03/17/00 23:51	WR	221881
109	%	72-137		1		03/17/00 23:51	WR	221881
106	%	48-156		1		03/17/00 23:51	WR	221881
			MCL		E300	Units: m	g/L	
200		5		25		03/15/00 11:35	ES	219739
	99 ND ND ND 109	99 ND ND ND 109 %	Result         Rep.Limit           99         1           ND         1           ND         1           ND         1           109         % 72-137           106         % 48-156	Result         Rep.Limit           99         1           ND         1           ND         1           ND         1           109         % 72-137           106         % 48-156	Result         Rep.Limit         Dil. Factor           MCL SW8           99         1         1           ND         1         1           ND         1         1           ND         1         1           109         % 72-137         1           106         % 48-156         1	Result         Rep.Limit         Dil. Factor         QUAL           MCL         SW8021B           99         1         1           ND         1         1           ND         1         1           ND         1         1           109         % 72-137         1           106         % 48-156         1    MCL E300	Result         Rep.Limit         Dil. Factor         QUAL         Date Analyzed           MCL         SW8021B         Units: ug           99         1         1         03/17/00 23:51           ND         1         1         03/17/00 23:51           ND         1         1         03/17/00 23:51           ND         1         1         03/17/00 23:51           109         % 72-137         1         03/17/00 23:51           106         % 48-156         1         03/17/00 23:51           MCL         E300         Units: m	Result         Rep.Limit         Dil. Factor         QUAL         Date Analyzed         Analyst           MCL         SW8021B         Units: ug/L           99         1         1         03/17/00 23:51         WR           ND         1         1         03/17/00 23:51         WR           ND         1         1         03/17/00 23:51         WR           ND         1         1         03/17/00 23:51         WR           109         % 72-137         1         03/17/00 23:51         WR           106         % 48-156         1         03/17/00 23:51         WR           MCL         E300         Units: mg/L

<sup>\* -</sup> Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL





Client Sample ID: MW	-4		Colle	cted:	3/10/00 8:20:00	SPL Sample ID:	00030325-05
			Site:	BJ-	Hobbs		
Analyses/Method	Result	!	Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst Seq.#
ALKALINITY, BICARB	ONATE			MCL	M2320 B	Units: mg/l	_
Alkalinity, Bicarbonate	160	~-~-	2		1	03/13/00 11:30 A	
ALKALINITY, CARBOI	NATE			MCL	M2320 B	Units: mg/l	-
Alkalinity, Carbonate	ND		2		11	03/13/00 11:30 A	B 218462
CHLORIDE, TOTAL				MCL	E325.3	Units: mg/l	_
Chloride	196		2		2	03/17/00 10:30 C	V 221904
DIESEL RANGE ORGA	ANICS			MCL	SW8015B	Units: mg/l	_
Diesel Range Organics	2.6		0.2		1	03/22/00 23:29 R	R 225914
Surr: Pentacosane	93.2	%	18-120		1	03/22/00 23:29 R	R 225914
Run ID/Seq #: HP_	V_000322B-225914						
Prep Method	Prep Date	,	Prep Initials				
SW3510B	03/12/2000 10:01		KL				
FLUORIDE-IC				MCL	E300	Units: mg/l	
Fluoride	1.1		0.1	1010	1	03/11/00 13:56 E	
GASOLINE RANGE O	PGANICS			MCL	SW8015B	Units: mg/l	
Gasoline Range Organic			0.1	IVICL	1	03/18/00 0:16 W	
Surr: 1,4-Difluorobenz		%	74-121		. 1	03/18/00 0:16 V	
Surr: 4-Bromofluorobe		%	55-150		1	03/18/00 0:16 W	
HARDNESS, TOTAL (	TITRIMETRIC, EDTA)			MCL	E130.2	Units: mg/	
Hardness (As CaCO3)	500		50		10	03/22/00 10:15 C	
HEADSPACE GAS AN	IAI YSIS			MCL	RSK147	Units: mg/	
Ethane	ND	-	0,0025		1	03/23/00 11:02 A	
Ethylene	ND		0.0032		1	03/23/00 11:02 A	
Methane	ND		0.0012		1	03/23/00 11:02 A	
MERCURY, TOTAL				MCL	SW7470A	Units: mg/	L
Mercury	ND		0.0002		1	··	PB 220746
Run ID/Seq #: HGI	L_000317A-220746						
Prep Method	Prep Date		Prep Initials				
SW7470A	03/17/2000 9:00		PB				
METALSBY METHOD	0 6010B, TOTAL			MCL	SW6010B	Units: mg/	L
Arsenic	0.0178		0.005		1		IM 21943:
Lead	ND		0.005		1		IM 21943:
Selenium	ND		0.005		1		IM 21943:
Barium	0.0694		0.005		1	03/14/00 15:24 E	
Cadmium	0.0178		0.005		1	03/14/00 15:24 E	
	147					03/14/00 15:24 E	

Qualifiers:

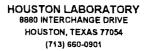
ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)





Client Sample ID: MW-4 Collected: 3/10/00 8:20:00 SPL Sample ID: 00030325-05

Site:	BJ-Hobbs	
SILE:		

B	Result	Rep.Limit	Dil. Factor QUAL	Date Analyzed Analyst	Seq.#
Analyses/Method	Resuit	Kep.Liiiii	Dis. Factor QUAL	Date Analyzed Allalyst	Sey, #
Chromium	ND	0.01	1	03/14/00 15:24 E_B	218595
Magnesium	26.3	0.1	1	03/14/00 15:24 E_B	218595
Potassium	3.95	2	1	03/14/00 15:24 E_B	218595
Silver	ND	0.01	1	03/14/00 15:24 E_B	218595
Sodium	115	0.5	1	03/14/00 15:24 E_B	218595

Run ID/Seq #: TJA\_000314A-218595

Prep Method	Prep Date	Prep Initials
SW3010A	03/13/2000 13:25	_AA
Run ID/Sea #: 1	JAT 000315A-219433	

 Prep Method
 Prep Date
 Prep Initials

 SW3010A
 03/13/2000 13:25
 \_AA

ITROGEN, NITRATE (AS N)		-		MCL	E300	Units: mg	Units: mg/L		
Nitrogen,Nitrate (As N)	3.7		0.1		1	03/11/00 13:56		221948	
OLYNUCLEAR AROMATIC HYD	ROCARBO	NS		MCL	SW8310	Units: ug	/L		
Acenaphthene	ND		0.1		1	03/22/00 23:45	LJ	225407	
Acenaphthylene	ND		0.1		1	03/22/00 23:45	LJ	225407	
Anthracene	ND		0.1		1	03/22/00 23:45	LJ	225407	
Benz(a)anthracene	ND		0.1		1	03/22/00 23:45	LJ	225407	
Benzo(a)pyrene	ND		0.1		1	03/22/00 23:45	LJ	225407	
Benzo(b)fluoranthene	ND		0.1		1	03/22/00 23:45	LJ	225407	
Benzo(g,h,i)perylene	ND		0.1		1	03/22/00 23:45	LJ	225407	
Benzo(k)fluoranthene	. ND		0.1	·····	1	03/22/00 23:45	LJ	225407	
Chrysene	ND		0.1		1	03/22/00 23:45	LJ	225407	
Dibenzo(a,h)anthracene	ND		0.1		1	03/22/00 23:45	LJ	225407	
Fluoranthene	ND		0.1		1	03/22/00 23:45	LJ	225407	
Fluorene	0.36		0.1		1	03/22/00 23:45	LJ	22540	
Indeno(1,2,3-cd)pyrene	ND		0.1		1	03/22/00 23:45	LJ	22540	
Naphthalene	0.44		0.1		1	03/22/00 23:45	LJ	225407	
Phenanthrene	ND		0.1		1	03/22/00 23:45	LJ	22540	
Pyrene	ND		0.1		1	03/22/00 23:45	LJ	22540	
Surr: 1-Fluoronaphthalene	39.6	% 3	10-140		1	03/22/00 23:45	LJ	22540	
Surr: Phenanthrene-d10	68.5	% 3	5-140		1	03/22/00 23:45	LJ	22540	

Run ID/Seq #: 2\_000321B-225407

Prep Method	Prep Date	Prep Initials
SW3510B	03/11/2000 14:51	KL

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)



Client Sample ID: MW-4 Collected: 3/10/00 8:20:00 SPL Sample ID: 00030325-05

Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq.#
PURGEABLE AROMATICS				MCL	SW8	021B	Units: ug	1/L	
Benzene	ND		1		1		03/18/00 0:16	WR	221882
Ethylbenzene	ND		1		1		03/18/00 0:16	WR	221882
Toluene	ND		1		1		03/18/00 0:16	WR	221882
Xylenes,Total	3.6		1		1		03/18/00 0:16	WR	221882
Surr: 1,4-Difluorobenzene	108	%	72-137		1		03/18/00 0:16	WR	221882
Surr: 4-Bromofluorobenzene	109	%	48-156		1		03/18/00 0:16	WR	221882
SULFATE				MCL		E300	Units: m	g/L	
Sulfate	250		5		25		03/15/00 11:35	ES	219740

<sup>\* -</sup> Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

D - Surrogate Recovery Unreportable due to Dilution



Client Sample ID: Trip Blank #1 2/29/00 Collected: 3/10/00 SPL Sample ID: 00030325-06

			Site	s: BJ-	Hobbs				
Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq.#
GASOLINE RANGE ORGANICS				MCL SW8015B Units: mg/L					
Gasoline Range Organics	ND		0.1		1		03/17/00 16:46	WR	221951
Surr: 1,4-Difluorobenzene	99.6	%	74-121		1		03/17/00 16:46	WR	221951
Surr: 4-Bromofluorobenzene	89.7	%	55-150		1		03/17/00 16:46	WR	221951
PURGEABLE AROMATICS				MCL	SW8	021B	Units: ug	<b>j/L</b>	
Benzene	ND		1		1		03/17/00 16:46	WR	221858
Ethylbenzene	ND		1		1		03/17/00 16:46	WR	221858
Toluene	ND		1		1		03/17/00 16:46	WR	221858
Xylenes, Total	ND		1		1		03/17/00 16:46	WR	221858
Surr: 1,4-Difluorobenzene	106	%	72-137		1		03/17/00 16:46	WR	221858
Surr: 4-Bromofiuorobenzene	95.9	%	48-156		1		03/17/00 16:46	WR	221858

<sup>\* -</sup> Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

D - Surrogate Recovery Unreportable due to Dilution



Client Sample ID: Trip Blank #2 2/29/00 Collected: 3/10/00 SPL Sample ID: 00030325-07

		Site	e: BJ-l	Hobbs				
Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq.#
			MCL	SW8	015B	Units: m	g/L	
ND		0.1		1		03/17/00 17:11	WR	221952
102	%	74-121		1		03/17/00 17:11	WR	221952
90.3	%	55-150		1		03/17/00 17:11	WR	221952
			MCL	SW8	021B	Units: ug	]/L	
ND		1		1		03/17/00 17:11	WR	221859
ND		1		1		03/17/00 17:11	WR	221859
ND		1		1	J 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	03/17/00 17:11	WR	221859
ND		1		1		03/17/00 17:11	WR	221859
106	%	72-137		1		03/17/00 17:11	WR	221859
102	%	48-156		1		03/17/00 17:11	WR	221859
	ND 102 90.3 ND ND ND ND	ND 102 % 90.3 % ND ND ND ND ND	Result         Rep.Limit           ND         0.1           102         % 74-121           90.3         % 55-150           ND         1           ND         1           ND         1           ND         1           ND         1           106         % 72-137	Result Rep.Limit  MCL  ND 0.1  102 % 74-121  90.3 % 55-150  MCL  ND 1  ND 1  ND 1  ND 1  ND 1  ND 1  ND 1  ND 1  ND 1	Result         Rep.Limit         Dil. Factor           ND         0.1         1           102         % 74-121         1           90.3         % 55-150         1           MCL         SW8           ND         1         1           106         % 72-137         1	Result         Rep.Limit         Dil. Factor QUAL           MCL         SW8015B           ND         0.1         1           102         % 74-121         1           90.3         % 55-150         1           MCL         SW8021B           ND         1         1           1         1         1           106         % 72-137         1	Result         Rep.Limit         Dil. Factor         QUAL         Date Analyzed           ND         0.1         1         03/17/00 17:11           102         % 74-121         1         03/17/00 17:11           90.3         % 55-150         1         03/17/00 17:11           MCL         SW8021B         Units: ug           ND         1         1         03/17/00 17:11           ND         1         1         03/17/00 17:11	MCL         SW8015B         Units: mg/L           ND         0.1         1         03/17/00 17:11 WR           102         % 74-121         1         03/17/00 17:11 WR           90.3         % 55-150         1         03/17/00 17:11 WR           MCL         SW8021B         Units: ug/L           ND         1         1         03/17/00 17:11 WR           106         % 72-137         1         03/17/00 17:11 WR

<sup>\* -</sup> Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

D - Surrogate Recovery Unreportable due to Dilution



Client Sample ID: Trip Blank #3 2/29/00 Collected: 3/10/00 SPL Sample ID: 00030325-08

			Oite		1,000			
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq.#
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: mg	g/L	
Gasoline Range Organics	ND		0.1		1	03/17/00 17:36	WR	221953
Surr: 1,4-Difluorobenzene	99.3	%	74-121		1	03/17/00 17:36	WR	221953
Surr: 4-Bromofluorobenzene	95.4	%	55-150		1	03/17/00 17:36	WR	221953
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	J/L	
Benzene	ND		1		1	03/17/00 17:36	WR	221868
Ethylbenzene	ND		1		1	03/17/00 17:36	WR	22186
Toluene	ND		1		1	03/17/00 17:36	WR	22186
Xylenes, Total	ND		1		1	03/17/00 17:36	WR	221868
Surr: 1,4-Difluorobenzene	105	%	72-137		1	03/17/00 17:36	WR	22186
Surr: 4-Bromoftuorobenzene	96.6	%	48-156		1	03/17/00 17:36	WR	22186

<sup>\* -</sup> Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

Quality Control Documentation



## **Quality Control Report**

## Brown & Caldwell

BJ Service, Hobbs, NM

Analysis:

RunID:

Diesel Range Organics

Method:

Analysis Date:

SW8015B

Samples in Analytical Batch:

WorkOrder:

00030325

Lab Batch ID:

3777

Method Blank

HP\_V\_000322B-225906

Units:

mg/L RR

Lab Sample ID

Client Sample ID

03/21/2000 20:38

Analyst:

00030325-01B 00030325-02B MW-13

00030325-03B

MW-10

00030325-04B

MW-12

DUP

Rep Limit Analyte Result Diesel Range Organics ND 0.20 Surr: Pentacosane

00030325-05B

MW-4

98.4 18-120

#### Laboratory Control Sample (LCS)

RunID:

HP\_V\_000322B-225907

Units:

mg/L

Analysis Date:

03/21/2000 21:16

RR Analyst:

Result Analyte Spike Percent Lower Upper Added Limit Limit Recovery Diesel Range Organics 2.5 3 118 44 141

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030325-01

RunID:

HP\_V\_000322B-225909

Units:

mg/L

Analysis Date:

03/22/2000 19:02

RR

Preparation Date:

03/12/2000 10:01

Analyst:

KLPrep By: Method: SW3510B

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Diesel Range Organics	1.8	2.5	4.9	121	2.5	5	126	4.53	39	13	130

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Recovery Outside Advisable QC Limits

D - Recovery Unreportable due to Dilution



## **Quality Control Report**

## **Brown & Caldwell** BJ Service, Hobbs, NM

Analysis: Method:

RunID:

Analysis Date:

Headspace Gas Analysis

**RSK147** 

WorkOrder:

00030325

Lab Batch ID:

R11104

Method Blank

03/23/2000 9:50

VARH\_000323A-225490 Units:

Analyst:

mg/L AB

Samples in Analytical Batch:

Lab Sample ID Client Sample ID 00030325-01D

MW-13

00030325-02D 00030325-03D MW-10 MW-12

00030325-04D 00030325-05D

DUP MW-4

Analyte	Result	Rep Limit
Ethane	ND	0.0025
Ethylene	ND	0.0032
Methane	ND	0.0012

## Sample Duplicate

Original Sample:

RunID:

00030325-01 VARH\_000323A-225491

Units:

mg/L

Analysis Date:

03/23/2000 10:04

Analyst: ΑB

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Ethane	ND	ND	0	50
Ethylene	ND	ND	0	50
Methane	ND	ND	0	50

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

D - Recovery Unreportable due to Dilution



## Quality Control Report

## **Brown & Caldwell**

Analysis:

**Purgeable Aromatics** 

Method:

SW8021B

BJ Service, Hobbs, NM

WorkOrder:

00030325

Lab Batch ID:

R10874

Method Blank

Samples in Analytical Batch:

RunID:

nalysis Date:

Benzene

Ethylbenzene Toluene

Xylenes, Total

HP\_U\_000317C-221853

Analyte

03/17/2000 9:57

Surr: 1,4-Difluorobenzene

Surr: 4-Bromofluorobenzene

Units:

Analyst:

ug/L WR

Result

ND

ND

ND

ND

Lab Sample ID 00030325-01A 00030325-02A

MW-13 MW-10

00030325-03A 00030325-04A MW-12 DUP

00030325-05A

MW-4

00030325-06A 00030325-07A Trip Blank #1 2/29/00

Client Sample ID

00030325-08A

Trip Blank #2 2/29/00

Trip Blank #3 2/29/00

#### 72-137 104.6 99.4 48-156

Rep Limit

1.0

1.0

1.0

1.0

#### Laboratory Control Sample (LCS)

RunID:

HP U 000317C-221852

Units:

ug/L

Analysis Date:

03/17/2000 9:07

Analyst: WR

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	51	103	61	119
Ethylbenzene	50	51	103	70	118
Toluene	50	52	104	65	125
Xylenes,Total	150	152	101	72	117

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030448-03

RunID:

HP\_U\_000317C-221856

Units:

ug/L

Analysis Date:

03/17/2000 14:42

WR Analyst:

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Benzene	ND	20	23	115	20	24	118	2.66	21	32	164
Ethylbenzene	ND	20	24	118	20	24	121	2.36	19	52	142
Toluene	ND	20	23	116	20	24	119	3.26	20	38	159
Xylenes, Total	ND	60	70	117	60	72	120	2.82	18	53	144

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



#### **Quality Control Report**

## Brown & Caldwell BJ Service, Hobbs, NM

Analysis:

analysis Date:

Gasoline Range Organics

Analyte

Method:

RunID:

SW8015B

WorkOrder:

00030325

Lab Batch ID:

R10878

Method Blank

HP\_U\_000317D-221927

Units:

mg/L

Result

Samples in Analytical Batch:

Client Sample ID

03/17/2000 9:57 Analyst: WR 00030325-01A 00030325-03A

Lab Sample ID

MW-13

00030325-04A

MW-12

00030325-05A

DUP MW-4

00030325-06A

Trip Blank #1 2/29/00

ND 0.10 Gasoline Range Organics Surr: 1,4-Difluorobenzene 105.6 74-121 Surr: 4-Bromofluorobenzene 94.2 55-150

00030325-07A 00030325-08A Trip Blank #2 2/29/00 Trip Blank #3 2/29/00

Laboratory Control Sample (LCS)

RunID:

HP\_U\_000317D-221926

Rep Limit

Units:

mg/L

Analysis Date:

03/17/2000 9:32

Analyst:

WR

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	0.84	84	. 42	136

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030449-03

RunID:

HP\_U\_000317D-221929

Units:

mg/L WR

Analysis Date:

03/17/2000 15:32

Analyst:

Analyte Sample Result MS MS Result MS % MSD MSD Result MSD % RPD RPD Low High Spike Recovery Spike Recovery Limit Limit Limit Added Added 125 0.868 ND 0.9 1.1 126 1.1 36 0.9 22 Gasoline Range Organics 174

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Recovery Outside Advisable QC Limits D - Recovery Unreportable due to Dilution



## **Quality Control Report**

Brown & Caldwell BJ Service, Hobbs, NM

Analysis:

Gasoline Range Organics

Method:

RunID:

SW8015B

WorkOrder:

Samples in Analytical Batch:

00030325

Lab Batch ID:

R10944

Method Blank

HP\_U\_000320D-222931

Units:

mg/L

WR

Lab Sample ID

Client Sample ID

nalysis Date:

03/20/2000 15:19

Analyst:

00030325-02A

MW-10

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0,10
Surr: 1,4-Difluorobenzene	96.3	74-121
Surr: 4-Bromofluorobenzene	97.0	55-150

#### Laboratory Control Sample (LCS)

RunID:

HP\_U\_000320D-222928

Units:

mg/L

Analysis Date:

03/20/2000 14:54

Analyst:

WR

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	0.85	85	. 42	136

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030487-08

RunID:

HP\_U\_000320D-222932

Units:

mg/L

Analysis Date:

03/20/2000 16:44

Analyst:

WR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Gasoline Range Organics	ND	0.9	1.1	116	0.9	1	110	4.94	36	22	174

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Recovery Outside Advisable QC Limits

D - Recovery Unreportable due to Dilution



# **Quality Control Report**

# **Brown & Caldwell** BJ Service, Hobbs, NM

Analysis: Method:

Polynuclear Aromatic Hydrocarbons

SW8310

WorkOrder:

00030325

Lab Batch ID:

3640

Method Blank

RuniD: Analysis Date:

reparation Date:

2\_000321B-225386 03/21/2000 7:32

03/11/2000 14:51

Units: Analyst:

Prep By:

ug/L LJ

KL

Lab Sample ID 00030325-01C

Client Sample ID

Method: SW3510B

00030325-02C

Samples in Analytical Batch:

MW-13 MW-10

00030325-03C

MW-12

00030325-04C

DUP

00030325-05C

MW-4

Analyte	Result	Rep Limit
Acenaphthene	ND	0.10
Acenaphthylene	ND	0.050
Anthracene	ND	0.10
Benz(a)anthracene	ND	0.10
Benzo(a)pyrene	ND	0.10
Benzo(b)fluoranthene	ND	0.10
Benzo(g,h,i)perylene	ND	0.10
Benzo(k)fluoranthene	ND	0.10
Chrysene	ND	0.10
Dibenzo(a,h)anthracene	ND	0.10
Fluoranthene	NE	0.10
Fluorene	NC	0.10
Indeno(1,2,3-cd)pyrene	NE	0.10
Naphthalene	NE	0.10
Phenanthrene	· ND	0.10
Pyrene	NE	0.10
Surr: 1-Fluoronaphthalene	65.4	30-140
Surr: Phenanthrene-d10	88.4	35-140

#### Laboratory Control Sample (LCS)

RunID:

2\_000321B-225387

Units:

ug/L

Analysis Date:

03/21/2000 8:11

Preparation Date:

03/11/2000 14:51

Analyst: LJ

Prep By:

KL Method: SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Acenaphthene	0.5	0.31	62	0.01	124
Acenaphthylene	0.5	0.33	66	0.01	139
Anthracene	0.5	0.32	65	0.01	126
Benz(a)anthracene	0.5	0.36	73	12	135
Benzo(a)pyrene	0.5	0.32	65	0.01	128
Benzo(b)fluoranthene	0.5	0.37	75	6	150
Benzo(g,h,i)perylene	0.5	0.39	78	0.01	116
Benzo(k)fluoranthene	0.5	0.35	71	0.01	159
Chrysene	0.5	0.44	89	0.01	199
Dibenzo(a,h)anthracene	0.5	0.39	78	0.01	110
Fluoranthene	0.5	0.33	66	14	123
Fluorene	0.5	0.31	62	0.01	142
indeno(1,2,3-cd)pyrene	0.5	0.42	83	0.01	116
Naphthalene	0.5	0.28	55	0.01	122
Phenanthrene	0.5	0.33	66	0.01	155
Pyrene	0.5	0.33	67	0.01	140

Qualifiers:

ND/U - Not Detected at the Reporting Limit

- \* Recovery Outside Advisable QC Limits
- B Analyte detected in the associated Method Blank
- D Recovery Unreportable due to Dilution
- J Estimated value between MDL and PQL



## **Quality Control Report**

**Brown & Caldwell** 

Analysis: Method:

Polynuclear Aromatic Hydrocarbons

SW8310

BJ Service, Hobbs, NM

WorkOrder:

00030325

Lab Batch ID:

3640

## Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030335-01

RunID:

2\_000321B-225389

Units:

ug/L

Analysis Date:

03/21/2000 20:34

Analyst: LJ

Method:

Preparation Date: 03/11/2000 14:51 Prep By:

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Acenaphthene	ND	0.5	0.2	39.9	0.5	0.29	57.4	36.0*	30	0.01	124
Acenaphthylene	ND	0.5	0.25	50.1	0.5	0.31	62.3	21.7	30	0.01	139
Anthracene	ND	0.5	0.051	10.2	0.5	0.42	83.3	156*	30	0.01	126
Benz(a)anthracene	ND	0.5	0.46	88.6	0.5	0.58	111	22.8	30	12	135
Benzo(a)pyrene	ND	0.5	0.23	46.5	0.5	0.22	44.2	4.91	30	0.01	128
Benzo(b)fluoranthene	ИD	0.5	0.23	46.3	0.5	0.21	42.4	8.70	30	6	150
Benzo(g,h,i)perylene	ND	0.5	0.048	1.40	0.5	0.11	13.4	162*	30	0.01	116
Benzo(k)fluoranthene	ND	0.5	0.23	45.6	0.5	0.21	41.1	10.4	.30	0.01	159
Chrysene	ND	0.5	0.61	122	0.5	0.77	155	23.7	30	0.01	199
Dibenzo(a,h)anthracene	ND	0.5	0:21	41.1	0.5	0.24	47.2	13.9	30	0.01	110
Fluoranthene	ND	0.5	0.41	74.4	0.5	0.49	90.4	19.5	30	14	123
Fluorene	ND	0.5	0.26	40.8	0.5	0.35	59.1	36.7*	30	0.01	142
indeno(1,2,3-cd)pyrene	ND	0.5	0.18	28.9	0.5	0.17	26.9	7.28	30	0.01	116
Naphthalene	ND	0.5	0.17	34.8	0.5	0.26	51.2	38.2*	30	0.01	122
Phenanthrene	ND	0,5	0.52	91.1	0.5	0.72	132	36.6*	30	0.01	155
Pyrene	ND	0.5	0,44	88.8	0.5	0.32	64.8	31.2*	30	0.01	140

Qualifiers:

ND/U - Not Detected at the Reporting Limit

J - Estimated value between MDL and PQL

B - Analyte detected in the associated Method Blank

\* - Recovery Outside Advisable QC Limits D - Recovery Unreportable due to Dilution



# **Quality Control Report**

# Brown & Caldwell

BJ Service, Hobbs, NM

Analysis:

Metals by Method 6010B, Total

Method:

RunID:

SW6010B

WorkOrder:

Samples in Analytical Batch:

00030325

Lab Batch ID:

3659

Method Blank

TJA\_000314A-218580

Units:

mg/L

Lab Sample ID

Client Sample ID

Analysis Date: Preparation Date:

03/14/2000 14:20

Analyst:

E B

00030325-01E

MW-13

03/13/2000 13:25 Prep By: AA Method: SW3010A

00030325-02E

MW-10

00030325-03E

MW-12

00030325-04E 00030325-05E DUP

MW-4

Analyte	Result	Rep Limit
Barium	ND	0.005
Cadmium	ND	0.005
Calcium	ND	0.1
Chromium	ND	0.01
Magnesium	ND	0,1
Potassium	ND	2
Silver	ND	0.01
Sodium	ND	0.5

#### Laboratory Control Sample (LCS)

RunID:

TJA 000314A-218581

Units:

ma/L

Analysis Date:

03/14/2000 14:24

E\_B Analyst:

Preparation Date: 03/13/2000 13:25 Prep By:

AA Method: SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Barium	2	1.83	92	80	120
Cadmium	2	1.87	93	80	120
Calcium	20	18.3	92	80	120
Chromium	2	1.82	91	80	120
Magnesium	20	18.3	92	80	120
Potassium	20	19.1	95	80	120
Silver	2	1.88	94	80	120
Sodium	20	17.8	89	80	120

#### Post Digestion Spike (PDS) / Post Digestion Spike Duplicate (PDSD)

Sample Spiked:

00030316-03

RuniD:

TJA 000314A-218586

Units:

mg/L

Analysis Date:

03/14/2000 14:46

Analyst:

E\_B

Analyte	Sample Result	PDS Spike Added	PDS Result	PDS % Recovery	PDSD Spike Added	PDSD Result	PDSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Calcium	113	10	118	56*	10	116	38*	38*	20	75	125
Magnesium	98.2	10	105	67*	10	103	51*	28*	20	75	125
Sodium	67.9	10	74.6	68*	10	73.5	57*	18	20	75	125

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



00030325

3659

# **Quality Control Report**

Brown & Caldwell BJ Service, Hobbs, NM

Analysis: lethod:

Metals by Method 6010B, Total

RunID:

SW6010B

Sample Spiked:

00030316-03

TJA\_000314A-218583

03/14/2000 14:32

Units: Analyst: Prep By: mg/L

E\_B

Analysis Date: Preparation Date:

03/13/2000 13:25

\_AA Method: SW3010A

WorkOrder:

Lab Batch ID:

	Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Barium		0.21	1	1.12	91.0	1	1.15	93.8	3.02	20	75	125
Cadmium		ND	1	0.941	94.1	1	0.949	94.9	0.926	20	75	125
Calcium		110	10	125	120	10	128	152*	24.2*	20	75	125
Chromium		ND	1	0.906	90.6	1	0.911	91.1	0.558	20	75	125
/lagnesium		98	10	111	125	10	114	155*	21.9*	20	75	125
otassium		ND	10	11,1	91.6	10	10.7	87.7	4.35	20	75	125
Silver		ND	1	0.943	94.0	1	0.954	95.1	1.19	20	75	125
Sodium		68	10	78.5	107	10	81.4	135*	23.8*	20	75	125



#### **Quality Control Report**

# **Brown & Caldwell**

Analysis:

Metals by Method 6010B, Total

Method:

RunID:

SW6010B

BJ Service, Hobbs, NM

WorkOrder:

00030325

Lab Batch ID:

3659-T

Method Blank

TJAT\_000315A-219399

Units:

mg/L

Lab Sample ID

Client Sample ID

Analysis Date:

03/15/2000 20:22

Analyst:

JM

00030325-01E 00030325-02E

Samples in Analytical Batch:

MW-13

reparation Date:

03/13/2000 13:25

Prep By:

\_AA Method: SW3010A

00030325-03E

MW-10

00030325-04E

MW-12

00030325-05E

DUP MW-4

Analyte	Result	Rep Limit
Arsenic	ND	0.005
Lead	ND	0.005
Selenium	ND	0.005

# Laboratory Control Sample (LCS)

RunID:

TJAT\_000315A-219400

Units:

mg/L

Analysis Date: Preparation Date:

03/15/2000 20:28 03/13/2000 13:25 Analyst: JM

Prep By: \_AA Method: SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Arsenic	4	4.13	103	80	120
Lead	2	1.93	97	80	120
Selenium	4	3.94	98	80	120

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030316-03

RunID:

TJAT\_000315A-219402

Units:

mg/L

Analysis Date:

03/15/2000 20:40

Analyst: JM

Preparation Date:

03/13/2000 13:25

Prep By:

\_AA Method: SW3010A

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Arsenic	ND	2	2.15	107	2	2.16	108	0.913	20	75	125
Lead	ND	1	0.962	96.0	1	0.967	96.5	0.527	20	75	125
Selenium	0.0081	2	2.01	99.9	2	2.03	101	1.26	20	75	125

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



#### **Quality Control Report**

# **Brown & Caldwell**

**Analysis:** 

Mercury, Total

Method:

RunID:

SW7470A

BJ Service, Hobbs, NM

WorkOrder:

00030325

Lab Batch ID:

3726

Method Blank

HGL\_000317A-220727

Units:

mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analysis Date:

03/17/2000 12:28

Analyst:

PΒ

00030325-01E

MW-13

reparation Date:

03/17/2000 9:00

Prep By: PB

Method: SW7470A

00030325-02E

MW-10

00030325-03E

MW-12

00030325-04E

Analyte Mercury

Result Rep Limit 0.0002 ND

00030325-05E

DUP MW-4

#### Laboratory Control Sample (LCS)

RunID:

HGL\_000317A-220728

Units:

mg/L

Analysis Date: Preparation Date: 03/17/2000 12:28 03/17/2000 9:00

PΒ Analyst:

PΒ Prep By:

Method: SW7470A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Mercury	0:002	0.00202	101	80	120

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030291-02

RunID:

HGL\_000317A-220730

Units:

Analysis Date:

03/17/2000 12:28

mg/L PB Analyst:

Preparation Date:

03/17/2000 9:00

Prep By: PΒ

Method: SW7470A

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Mercury	ND	0.002	0.00192	95.9	0.002	0.0019	95.2	0.680	20	75	125

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution



## **Quality Control Report**

# **Brown & Caldwell BJ** Service, Hobbs, NM

Analysis:

Alkalinity, Bicarbonate

Method:

M2320 B

WorkOrder:

00030325

Lab Batch ID:

R10671A

Method Blank

RunID: Analysis Date: WET\_000313L-218393 03/13/2000 11:30

Units: Analyst:

mg/L AB

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

00030325-01G 00030325-02G MW-13

00030325-03G

MW-10

MW-12

00030325-04G

DUP

Result Rep Limit Analyte ND 2.0 Alkalinity, Bicarbonate

00030325-05G

MW-4

### Sample Duplicate

Original Sample:

00030291-09

RunID:

WET\_000313L-218403

Units: Analyst: mg/L

AB

Analysis Date:

03/13/2000 11:30

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Alkalinity, Bicarbonate	253	255		18



# **Quality Control Report**

# **Brown & Caldwell** BJ Service, Hobbs, NM

Analysis: Method:

RunID:

Analysis Date:

Alkalinity, Carbonate

M2320 B

WorkOrder:

Samples in Analytical Batch:

00030325

Lab Batch ID:

R10676A

Method Blank

WET\_000313O-218446

03/13/2000 11:30

Units:

Analyst:

mg/L AB

Lab Sample ID

Client Sample ID

00030325-01G 00030325-02G MW-13

00030325-03G

MW-10

MW-12

00030325-04G 00030325-05G DUP MW-4

Analyte Result Rep Limit ND Alkalinity, Carbonate

Sample Duplicate

Original Sample:

00030291-09

RunID:

WET\_000313O-218456

Units:

mg/L

Analysis Date:

03/13/2000 11:30

ΑB Analyst:

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Alkalinity, Carbonate	ND	ND	0	18



# **Quality Control Report**

# **Brown & Caldwell**

Analysis: Nethod:

nalysis Date:

RunID:

Sulfate

E300

BJ Service, Hobbs, NM

WorkOrder:

00030325

Lab Batch ID:

R10746

Method Blank

WET\_000315J-219724

03/15/2000 11:35

Units:

Analyst:

mg/L ES

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

00030325-01F 00030325-02F MW-13

MW-10

00030325-03F

MW-12

00030325-04F

DUP

Rep Limit Result Analyte ND 0.20 Sulfate

Laboratory Control Sample (LCS)

RunID:

WET\_000315J-219725

Units:

mg/L

Analysis Date:

03/15/2000 11:35

Analyst:

ES

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Sulfate	10	10	102	90	110

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030250-04

RunID:

WET\_000315J-219727

Units:

mg/L ES

Analysis Date:

03/15/2000 11:35

Analyst:

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Sulfate	170	200	380	107	200	380	106	0.703	20	95	113

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Recovery Outside Advisable QC Limits

D - Recovery Unreportable due to Dilution



## **Quality Control Report**

Brown & Caldwell BJ Service, Hobbs, NM

Analysis: Method: Sulfate

E300

WorkOrder:

Samples in Analytical Batch:

00030325

Lab Batch ID:

R10746A

Method Blank

RunID: Analysis Date: WET\_000315J-219724

03/15/2000 11:35

Units: Analyst: mg/L ES

Lab Sample ID

Client Sample ID

00030325-05F

MW-4

Analyte	Result	Rep Limit
Sulfate	ND	0.20

Laboratory Control Sample (LCS)

RunID:

WET\_000315J-219725

Units:

mg/L

Analysis Date:

03/15/2000 11:35

Analyst:

ES

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Sulfate	10	10	102	90	110

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030291-01

RunID:

WET\_000315J-219742

Units:

mg/L

Analysis Date:

03/15/2000 11:35

Analyst: ES

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Sulfate	530	1000	1500	102	1000	1600	102	0.558	20	95	113

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Recovery Outside Advisable QC Limits

D - Recovery Unreportable due to Dilution



## **Quality Control Report**

Brown & Caldwell BJ Service, Hobbs, NM

Analysis:

RunID:

Fluoride-IC

Method:

nalysis Date:

E300

WorkOrder:

Samples in Analytical Batch:

00030325

Lab Batch ID:

R10871

Method Blank

WET\_000311I-221840

03/11/2000 13:56

Units:

Analyst:

mg/L ES

Lab Sample ID

Client Sample ID

00030325-01F 00030325-02F MW-13

00030325-03F

MW-10

MW-12

00030325-04F

DUP

Analyte Result Rep Limit Fluoride ND

00030325-05F

MW-4

Laboratory Control Sample (LCS)

0.10

RunID:

WET 000311I-221841

Units:

mg/L

Analysis Date:

03/11/2000 13:56

Analyst:

ES

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Fluoride	10	9.8	. 98	90	110

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030325-01

RunID:

WET\_000311I-221843

Units:

mg/L

Analysis Date:

03/11/2000 13:56

Analyst:

ES

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
luoride	1.7	10	11	97.6	10	12	99.7	2.06	20	80	120

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Recovery Outside Advisable QC Limits

J - Estimated value between MDL and PQL

D - Recovery Unreportable due to Dilution



#### **Quality Control Report**

# Brown & Caldwell BJ Service, Hobbs, NM

Analysis:

RunID:

Chloride, Total

Method:

Analysis Date:

E325.3

Chloride

WorkOrder:

Samples in Analytical Batch:

00030325

Lab Batch ID:

R10873A

Method Blank

WET\_000317N-221883

Units:

mg/L

Lab Sample ID

Client Sample ID

03/17/2000 10:30

cv Analyst:

00030325-01F 00030325-02F MW-13

MW-10

00030325-03F

MW-12

00030325-04F

DUP

Analyte Result Rep Limit ND

00030325-05F

MW-4

**Laboratory Control Sample (LCS)** 

1.0

RunID:

WET\_000317N-221885

Units:

Analysis Date:

03/17/2000 10:30

Analyst:

mg/L CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Chloride	74.4	72.4	. 97	90	110

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030325-01

RunID:

WET\_000317N-221899

Units:

mg/L

Analysis Date:

03/17/2000 10:30

Analyst: CV

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Chloride	280	500	758	96.5	500	758	96.5	0		85	115

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Recovery Outside Advisable QC Limits

J - Estimated value between MDL and PQL

D - Recovery Unreportable due to Dilution



## **Quality Control Report**

# **Brown & Caldwell**

BJ Service, Hobbs, NM

Analysis: Method:

nalysis Date:

RunID:

Nitrogen, Nitrate (As N)

E300

WorkOrder:

00030325

Lab Batch ID:

R10876

Method Blank

WET\_000311K-221940

03/11/2000 13:56

Units:

Analyst:

mg/L ES

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

00030325-01F 00030325-02F MW-13

00030325-03F

MW-10

MW-12

00030325-04F

DUP

Result Rep Limit Analyte Nitrogen, Nitrate (As N) 0.10 ND

00030325-05F

MW-4

**Laboratory Control Sample (LCS)** 

RunID:

WET\_000311K-221941

Units:

mg/L

Analysis Date:

03/11/2000 13:56

Analyst:

ES

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Nitrogen,Nitrate (As N)	10	9.8	98	90	110

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030325-01

RunID:

WET\_000311K-221943

Units:

mg/L

Analysis Date:

03/11/2000 13:56

Analyst:

ES

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Nitrogen,Nitrate (As N)	ND	10	9.6	96.0	10	9.6	95.9	0.167	20	76	124

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Recovery Outside Advisable QC Limits

J - Estimated value between MDL and PQL

D - Recovery Unreportable due to Dilution



#### **Quality Control Report**

# **Brown & Caldwell** BJ Service, Hobbs, NM

Analysis:

Hardness, Total (Titrimetric, EDTA)

Method:

RunID:

Analysis Date:

E130.2

WorkOrder:

Samples in Analytical Batch:

00030325

Lab Batch ID:

R11098A

Method Blank

Units:

mg/L

Lab Sample ID

Client Sample ID

03/22/2000 10:15

WET 000322T-225425

CV Analyst:

00030325-01E 00030325-02E MW-13

MW-10

00030325-03E

00030325-04E

MW-12

Rep Limit Analyte Result ZD 5.0 Hardness (As CaCO3)

00030325-05E

DUP

MW-4

**Laboratory Control Sample (LCS)** 

Units:

RunID: Analysis Date:

03/22/2000 10:15

WET 000322T-225427

Analyst:

mg/L CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Hardness (As CaCO3)	99.7	98	98	94	108

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked:

00030325-01

RunID:

WET\_000322T-225441

Units:

mg/L

Analysis Date:

03/22/2000 10:15

Analyst: CV

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Hardness (As CaCO3)	540	500	1000	99.5	500	1000	95.5	4.08	20	81	111

- \* Recovery Outside Advisable QC Limits D - Recovery Unreportable due to Dilution
- J Estimated value between MDL and PQL

# Chain of Custody And Sample Receipt Checklist

Place: (713) 759-05999 MM-Monthing West SSP   X3   Workeder Number:  Fax (713) 759-05999 MM-Monthing west SSP   X3   Workeder Number:  Fax (713) 759-0599 MM-Monthing west SSP   X3   Workeder Number:  Side: 17, 770002 Only (sementation)   31   Workeder Number:  DATE   Time: College SSA   X3   Let 3   3   3   3   3   3   3   3   3   3	Relinquished by:	D. D. D. D. D. D. D. D. D. D. D. D. D. D	Cher 10 day X	TAT	-	Tris Blank	Trip Blank	D-10	M W-12	Trip Blank	MW-10	MW-IM	Sampled By: SAMPLE ID	Sile Address: Hobbs, NM	Project No.:	Project Name: BJ Service	City: Houston	Suite 2500	Address: 1415 Louisiana	Contact:	Erow
Ing SearClar COC Record No.    Content   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   Coc   C		League (D)	Special Reporting Requirements:	Special Detection Limits (Specify)		,	/w	100 092	lalco		)	Ō				P	State: 1X, 770002	موجع بالدراقية متواقعة والمدارية والمدارية والمدارية والمجارة والمدارية والمدارية والمداركة والمداركة والمداركة	Fax: (7:13) 308-3886	Phone: (7'13) 759-0999	n & Caldwell
TPH DRO-8015 PH JA PAH-3310 PAH-3310 PAH-3310 PAH-3310 PAH-3310 PAH-3310 PAH-3320Z	date	3/10/00 1				X: \	X	**		<b>&gt;</b>	>>,	×	Water Water		図	(A)QCLevel		1 20	Other (describe balcw)	MW-Monitaing Walls SEP	Sampling Event Description
TPH DRO-8015 PH Ub BIN  PAH-8310 PH UB BIN  PAH-8310 PH UB BIN  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  No. 10 PH UB BIN  RCRA Metule, Ca,Mg,K,Na PH S  No. 10 PH UB BIN  RCRA Metule, Ca,Mg,K,Na PH S  No. 10 PH UB BIN  RCRA Metule, Ca,Mg,K,Na PH S  No. 10 PH UB BIN  RCRA Metule, Ca,Mg,K,Na PH S  No. 10 PH UB BIN  RCRA Metule, Ca,Mg,K,Na PH S  No. 10 PH UB BIN  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, Ca,Mg,K,Na PH S  RCRA Metule, C		TIO Received by:	Laboratory Remarks  Container Type: 1=40ml			2	2	1 123	11 123	١	_	=	Nun	e mi r	er 7	ryp:	<del>,</del>				CDC Record No.
	3/11 3/11	40	/ viai/2=16oz piastic 3=32oz p	34		×			XXXX	<b>X</b> .	× × × ×	X X X	TPH	DRC 831	)-80 ) than	15	PH		3 <sub>1</sub> v	0001	Page 1 of



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

# Sample Receipt Checklist

Workorder:	00030325		Received by:		Stelly, D'Anna	
Date and Time Received:	3/11/00 10:00:00 AM		Carrier name:		<u>FedEx</u>	
Temperature:	4	www				····
Shipping container/cooler in g	ood condition?	Yes 🗹	No 🗌	Not Present		
Custody seals intact on shipp	ping container/cooler?	Yes 🗌	No 🗌	Not Present	$\checkmark$	
Custody seals intact on samp	Yes 🗌	No 🗌	Not Present	$\checkmark$		
Chain of custody present?	Yes 🗸	No 🗌				
Chain of custody signed when	Yes 🗸	No 🗌				
Chain of custody agrees with	sample labels?	Yes 🗸	No 🗌			
Samples in proper container/b	Yes 🗸	No 🗌				
Sample containers intact?		Yes 🗸	No 🗔			
Sufficient sample volume for i	ndicated test?	Yes 🔽	No 🗔			
All samples received within he	olding time?	Yes 🗸	No 🗔			
Container/Temp Blank temper	rature in compliance?	Yes 🔽	No 🗌			
Water - VOA vials have zero	neadspace?	Yes	No 🗌	Not Present	V	
Water - pH acceptable upon r	receipt?	Yes 🗌	No 🔽			