

GW - 72

MONITORING REPORTS

DATE:
2000

BROWN AND CALDWELL

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TRANSMITTAL MEMORANDUM

To: Mr. Wayne Price State of New Mexico Energy, Minerals, and Natural Resources Dept. Oil Conservation Division 2040 South Pacheco Street, State Land Office Bldg Santa Fe, New Mexico 87505	Date: March 21, 2001	Job No: 12832-016
	Subject: New Mexico Facility	
	Certified Mail No.:	
	Equipment No:	
	Spec. Ref:	
Submittal No:		

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- ☐ For review and comment
- ☐ With submittal review action noted

SUBMITTAL REVIEW ACTIONS:

- ☐ No exceptions taken
- ☐ Make revisions
- ☐ Amend and resubmit
- ☐ Rejected--see Remarks
- ☐ None

Copies	Date	No.	Description
1	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

Richard Rexroad

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

**DECEMBER 2000 GROUNDWATER
SAMPLING REPORT
HOBBS, NEW MEXICO FACILITY**

BJ SERVICES COMPANY, U.S.A.

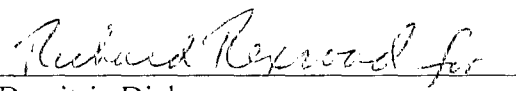
MARCH 19, 2001

**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


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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DISTRIBUTION AND QA/QC REVIEWER'S SIGNATURE

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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 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 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

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 electron 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

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

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.

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

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Tomball, Texas 77375

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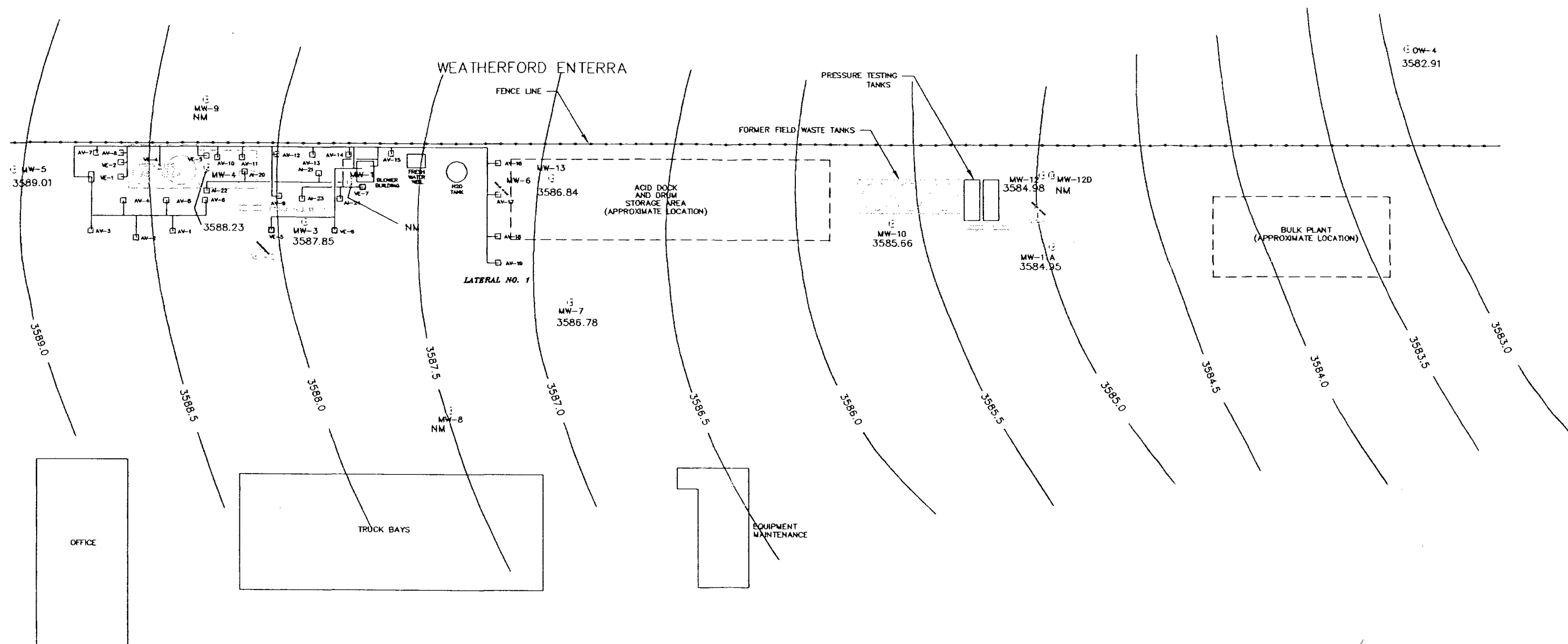

Lynn M. Wright, P.G.
Principal Geologist

RLR/uak

Figures

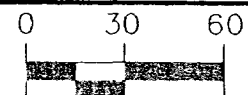


FIGURES



BROWN AND
CALDWELL
HOUSTON, TEXAS

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APPROVED: _____ DATE: _____
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SCALE: 1" = 60'

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CHK'D BY: _____ DATE: _____
APPROVED: _____ DATE: _____

LEGEND

- 3588.34
MW-3 MONITOR WELL LOCATION WITH GROUNDWATER ELEVATION (feet AMSL)
- BIOPARGING SYSTEM
- MONITOR WELL (PLUGGED AND ABANDONED)

TITLE
GROUNDWATER ELEVATION MAP FOR DECEMBER 7, 2000

CLIENT
BJ SERVICES COMPANY, U.S.A.

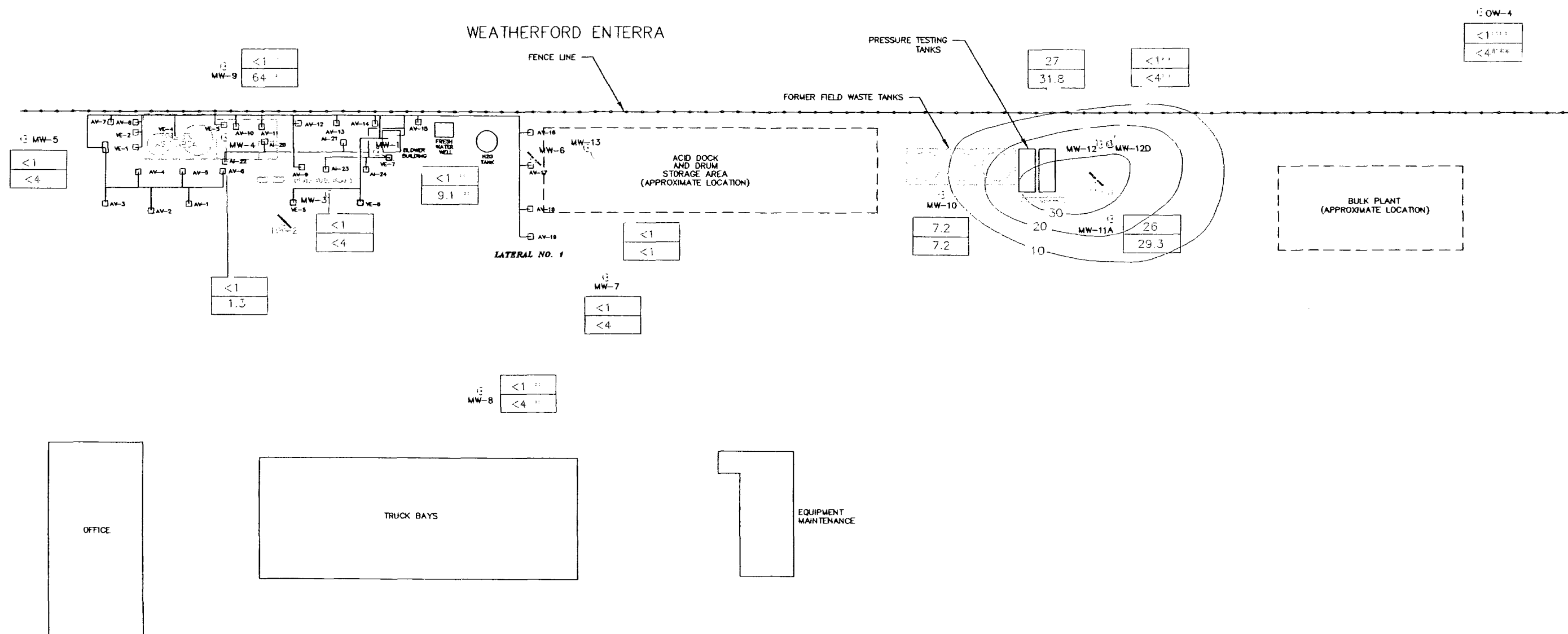
SITE
HOBBS, NEW MEXICO

DATE
12/28/00

PROJECT NUMBER
12832.016

FIGURE NUMBER
2

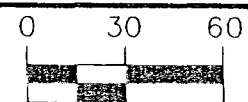
WEATHERFORD ENTERRA



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.

BROWN AND CALDWELL
HOUSTON, TEXAS

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PROJECT MANAGER
APPROVED: _____ DATE: _____
BROWN AND CALDWELL



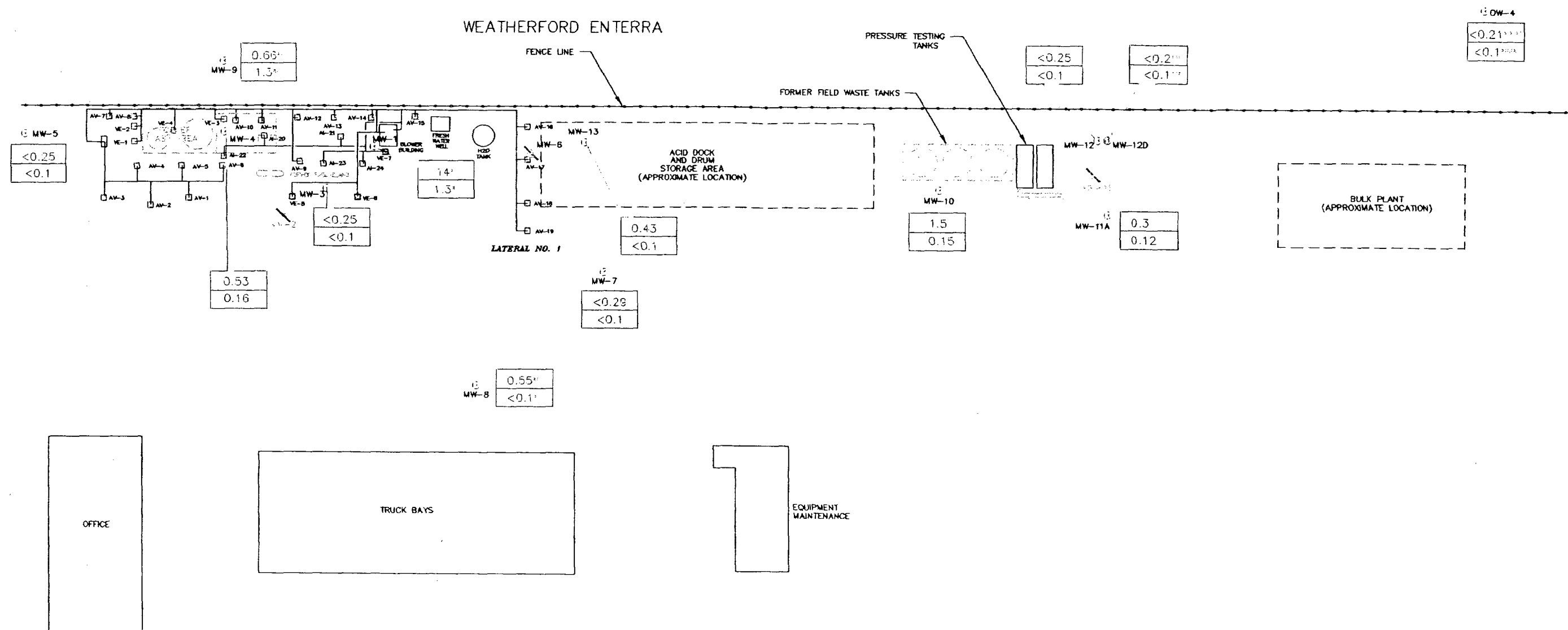
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CHK'D BY: _____ DATE: _____
APPROVED: _____ DATE: _____

LEGEND

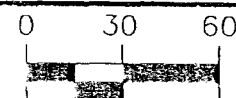
- MW-3 EXISTING MONITOR WELL LOCATION
- MW-2 MONITOR WELL (PLUGGED AND ABANDONED)
- BENZENE CONCENTRATION (ug/L)
- TOTAL BTEX CONCENTRATION (ug/L)
- * INDICATES WELL NOT SAMPLED 12/7/00; DATA PRESENTED ARE FROM 3/10/00
- ** INDICATES WELL NOT SAMPLED 12/7/00; DATA PRESENTED ARE FROM 6/8/00
- *** INDICATES WELL NOT SAMPLED 12/7/00; DATA PRESENTED ARE FROM 9/13/00
- BENZENE ISOCONCENTRATION CONTOUR (ug/L)
- BIOSPARING SYSTEM

TITLE	BENZENE ISOCONCENTRATION AND TOTAL BTEX DISTRIBUTION MAP FOR DECEMBER 7, 2000		DATE	12/29/00
CLIENT	BJ SERVICES COMPANY, U.S.A.		PROJECT NUMBER	12832.016
SITE	HOBBS, NEW MEXICO		FIGURE NUMBER	3



BROWN AND CALDWELL
HOUSTON, TEXAS

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PROJECT MANAGER
APPROVED: _____ DATE: _____
BROWN AND CALDWELL



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

LEGEND

- MW-3 EXISTING MONITOR WELL LOCATION
- MW-2 MONITOR WELL (PLUGGED AND ABANDONED)
- <0.2 - TPH-D CONCENTRATION (mg/L)
- <0.1 - TPH-G CONCENTRATION (mg/L)
- * - 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
- BOSPARGING SYSTEM

TITLE	TOTAL PETROLEUM HYDROCARBONS DISTRIBUTION MAP FOR DECEMBER 7, 2000	DATE	12/29/00
CLIENT	BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER	12832.016
SITE	HOBBS, NEW MEXICO	FIGURE NUMBER	4

Tables



TABLES

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

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

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

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

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

Date	Activity
August 23, 1996	Brown and Caldwell conducted the August 1996 groundwater sampling event.
December 2, 1996	Brown and Caldwell conducted the December 1996 groundwater sampling event.
March 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 through 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 through 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.
June 10, 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 portion 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	
		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	
		06/00	-	-	-	
		09/00	-	-	-	
		12/7/00	-	-	-	
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	-	-	-	(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	3,591.34	
		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	

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) PSH Sheen 200 ml PSH
		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	
		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	
		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	
		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	
		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	

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	
		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	
		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)
		08/18/93	50.78	0.00	3,593.96	
		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	
MW-7	3,644.55	07/02/99				(5),(6)
		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	
		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	
		07/02/99	55.73	0.00	3,588.82	
		09/13/99	55.94	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	
		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	(3)
		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	-	-	-	
		03/09/00	56.52	0.00	3,588.35	
		06/00	-	-	-	
		09/00	-	-	-	
		12/00	-	-	-	
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	
		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	
		09/12/97	51.95	0.00	3,592.83	
		12/10/97	52.37	0.00	3,592.41	PSH Sheen PSH Sheen PSH Sheen PSH Sheen PSH Sheen PSH Sheen
		03/23/98	52.68	0.00	3,592.10	
		06/23/98	53.08	0.00	3,591.70	
		09/30/98	53.39	0.01	3,591.40	
		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	

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	(3)
		09/13/99	54.71	0.00	3,590.07	
		12/09/99	-	-	-	
		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)
		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	
		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)
		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)
MW-11A	3,644.24	03/23/98	54.79	0.00	3,589.45	(7)

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.

(7) - 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.

(7) - 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	pH	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 ⁽¹⁾
MW-3	1.0	7.68	16.01	1268	52.6	6.65	NM	NM	NM	NM
	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
MW-4	1.0	7.62	16.93	1342	0.7	7.42	NM	NM	NM	NM
	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
MW-5	1.0	7.49	17.33	1239	59.5	7.13	NM	NM	NM	NM
	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
MW-7	1.0	7.51	17.62	1481	89.0	7.42	NM	NM	NM	NM
	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
MW-10	1.0	6.92	18.16	3440	-86.11	4.50	NM	NM	NM	NM
	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
MW-11A	1.0	7.19	16.93	4229	-72.5	7.25	NM	NM	NM	NM
	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
MW-12	1.0	7.51	17.19	1476	-111.5	6.36	NM	NM	NM	NM
	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
MW-13	1.0	7.66	17.11	1796	-59.2	6.34	NM	NM	NM	NM
	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 ⁽²⁾	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

⁽¹⁾ NTUs = Nephelometric turbidity units

⁽²⁾ Well dry

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

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-1	8/10/92	Regular	5550.0	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	-	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	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	NA
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
	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	15
	8/23/96	Regular	330.0	2200.0	590.0	1500.0	NA	12
	12/2/96	Regular	220.0	1800.0	670.0	1000.0	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 Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
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	<0.1
	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
	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
	1/27/94	Regular	NSP	NSP	NSP	NSP	NA	NSP
	5/3/95	Regular	NSP	NSP	NSP	NSP	NA	NSP
	8/1/95	Regular	5700.0	17000.0	3500.0	13000.0	NA	120
	11/15/95	Regular	490.0	1600.0	310.0	1100.0	NA	5.2
	2/23/96	Regular	360.0	2800.0	560.0	2500.0	NA	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	9.8
	12/2/96	Regular	190.0	2000.0	1800.0	7200.0	56	43
	3/12/97	Regular	220.0	1500.0	1500.0	4400.0	27	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	7.6
	12/10/97	Regular	230.0	750.0	970.0	2300.0	3.7	16
	3/24/98	Regular	150.0	510.0	270.0	620.0	1.2	5.6
	6/23/98	Regular	160.0	890.0	590.0	1600.0	0.69	10
	9/30/98	Regular	80.0	180.0	370.0	840.0	2.0	3.9
	12/10/98	Regular	28.0	70.0	210.0	960.0	9.3	4.3
	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	13
	6/10/99	Regular	<1.0	<1.0	12.0	12.0	0.44	0.63
	9/14/99	Regular	<1.0	<1.0	3.3	13.1	0.35	0.17
	12/9/99	Regular	<1	2.5	2.3	20.1	2	0.53
	3/10/00	Regular	<1	<1	<1	3.6	2.6	0.15
	6/8/00	Regular	<1	<1	<1	<1	0.44	0.23
	9/13/00	Regular	<1	<1	<1	<1	0.61	<0.1
	12/7/00	Regular	<1	<1	1.3	<1	0.53	0.16
MW-5	8/10/92	Regular	<4	<4	<4	<4	NA	NA
	2/9/93	Regular	<2	<2	<2	<6	NA	NA
	8/10/93	Regular	<2	<2	<2	<6	NA	NA
	1/27/94	Regular	8.7	29.9	4.0	11.3	NA	NA
	5/3/95	Regular	3.7	5.3	0.9	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	31.0	86.0	10.0	20.0	NA	NA
	8/23/96	Regular	<0.3	<0.3	<0.3	<0.6	NA	<0.1
	12/2/96	Regular	<1	<1	<1	<1	<0.1	<0.1
	3/12/97	Regular	<1	<1	<1	<1	<0.1	<0.1
	6/12/97	Regular	<1	<1	<1	<1	<0.1	<0.1
	9/12/97	Regular	<1	<1	<1	<1	<0.1	<0.1
	12/10/97	Regular	<5	<5	<5	<5	<0.2	<0.1
	3/23/98	Regular	<1	<1	<1	<1	<0.2	<0.1

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-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	< 0.1
	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
	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
	8/19/93	Regular	8100.0	19000.0	3500.0	6400.0	NA	NA
	1/27/94	Regular	7960.0	20200.0	3830.0	6150.0	NA	NA
	5/4/95	Regular	11000.0	17000.0	2900.0	6000.0	NA	NA
	8/1/95	Regular	8300.0	12000.0	2500.0	5100.0	NA	60
	11/15/95	Regular	8900.0	17000.0	2900.0	5500.0	NA	57
	2/23/96	Regular	8100.0	10000.0	2300.0	4000.0	NA	58
	5/31/96	Regular	83.0	150.0	15.0	51.0	NA	0.57
	5/31/96	Duplicate	87.0	160.0	13.0	47.0	NA	0.52
	8/23/96	Regular	31.0	28.0	9.4	7.9	NA	0.46
	12/2/96	Regular	< 1	< 1	< 1	1.7	5.6	< 0.1
	3/12/97	Regular	12.0	< 5	6.8	18.0	12	< 0.5
	6/12/97	Regular	1900.0	1400.0	410.0	310.0	7.8	7.4
	9/11/97	Regular	11.0	1.3	3.4	< 1	1	< 0.1
	12/10/97	Regular	3.0	4.2	1.2	3.9	1.7	0.14
	3/23/98	Regular	3.6	< 1	4.0	< 1	< 0.2	< 0.1
	6/23/98	Regular	170.0	4.1	15.0	7.2	1.2	0.51
	9/30/98	Regular	1000.0	420.0	140.0	270.0	4.0	3.3
	12/10/98	Regular	7.6	6.6	1.7	5.8	2.0	< 0.1
	3/10/99	Regular	2500.0	930.0	590.0	1400.0	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	3.0	< 2	< 2	NA	NA
	1/27/94	Regular	1.1	< 1	< 1	< 1	NA	NA
	5/3/95	Regular	52.0	3.4	0.7	2.8	NA	NA
	8/1/95	Regular	22.0	2.2	0.9	2.8	NA	< 0.1
	11/15/95	Regular	8.4	0.8	< 0.3	0.9	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	29.0	83.0	10.0	21.0	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
	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

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-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	<0.10
	12/9/99	Regular	< 5	< 5	< 5	< 5	1.8	< 0.5
	3/9/00	Regular	< 1	< 1	< 1	< 1	0.66	< 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
	12/7/00	Regular	< 1	< 1	< 1	< 1	< 0.29	< 0.1
MW-8	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	< 2	< 2	< 2	< 2	NA	NA
	1/27/94	Regular	< 1	< 1	< 1	< 1	NA	NA
	5/3/95	Regular	3.0	4.9	0.8	3.7	NA	NA
	8/1/95	Regular	3.1	1.2	0.5	1.6	NA	< 0.001
	8/1/95	Duplicate	3.6	1.5	0.5	1.5	NA	< 0.1
	11/15/95	Regular	< 0.3	0.5	< 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
	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
	9/13/99	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	< 1	0.55	< 0.1
	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-9	4/22/93	Regular	570.0	380.0	< 50	870.0	NA	NA
	7/15/93	Regular	121.0	7.3	3.0	458.0	NA	NA
	8/19/93	Regular	390.0	290.0	40.0	250.0	NA	NA
	1/27/94	Regular	327.0	357.0	51.1	293.0	NA	NA
	5/3/95	Regular	380.0	110.0	19.0	120.0	NA	NA
	8/1/95	Regular	660.0	410.0	91.0	310.0	NA	6.2
	11/15/95	Regular	240.0	24.0	11.0	140.0	NA	1.5
	11/15/95	Duplicate	170.0	18.0	10.0	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
	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
	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
	3/12/97	Regular	30.0	48.0	420.0	880.0	8.2	19
	6/12/97	Regular	4.7	2.1	11.0	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 Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-9	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	1.6	0.41
	12/7/00	Regular	7.2	<1	<1	<1	1.5	0.15
MW-11	8/19/93	Regular	< 2	< 2	< 2	< 2	NA	NA
	1/27/94	Regular	< 1	< 1	< 1	< 1	NA	NA
	5/4/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	8/1/95	Regular	44.0	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 Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-11 ¹	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
	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-11A	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
	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	< 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	< 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	< 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	0.24	< 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 Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				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	<1.0	<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

¹ 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

Well	Date	Nitrate ¹ (mg/L)	Sulfate ¹ (mg/L)	Methane (mg/L)
MW-5	3/23/98	3.87	190	<0.0012
	3/9/99	<0.1	195	<0.0012
	6/10/99	4.73	209	<0.0012
	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
	9/13/00	3.93	200	<0.0012
	12/7/00	3.27	160	<0.0012
MW-10	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
			223 ³	
	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
MW-11A	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	0.094
		<0.1 ²	227 ³	
	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

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 ¹ (mg/L)	Sulfate ¹ (mg/L)	Methane (mg/L)
MW-12	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
		<0.1 ²	193 ³	
	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
MW-12D ⁴	7/2/99	2.1	249	0.0015
	9/14/99	<0.10	200	0.0065
	12/9/99	<0.1	210	0.0015
	3/9/00	0.14	200	<0.0012
	6/8/00	<0.1	240	<0.0012
OW-4 ⁵	6/10/99	3.96	192	<0.0012
	9/14/99	3.5	200	<0.0012
	12/9/99	3.4	200	<0.0012
	3/9/00	3.6	200	<0.0012
	6/8/00	3.4	190	<0.0012
	9/13/00	3.21	170	<0.0012

1=By EPA Method 300, except as noted

2=By EPA Method 353.3

3=By EPA Method 375.4

4=Well not sampled after 6/8/00

5=Well not sampled after 9/13/00

mg/L = milligrams per liter

Appendices



APPENDICES

A



APPENDIX A

Field Data Sheets

GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MLW-3

1. PROJECT INFORMATION

Project Number: 12832 Task Number: 015 Date: 12-7-00 Time: 8:20
Client: _____ Personnel: _____
Project Location: _____ Weather: _____

2. WELL DATA

Casing Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Screen Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Total Depth of Well: <u>62.15</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Static Water: <u>57.15</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Product: <u>—</u> feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Length of Water Column: <u>4.95</u> feet	Well Volume: <u>2.8</u> 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: ☒ Bailor, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____ Equipment Model(s): _____

Materials: Pump/Bailor ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Was well purged dry? ☐ Yes ☒ No Pumping Rate: _____ gal/min

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
8:40	1.2 L	7.05	16.01	1268	52.6	6.65	—	—	Clear
8:43	2.2 L	7.51	17.71	1244	63.0	6.95	—	—	Clear
8:48	3.0 L	7.46	17.74	1215	68.3	6.73	—	—	Clear
							6.48		

4. SAMPLING DATA

Method(s): ☒ Bailor, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailor ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ No

Sample ID: MLW-3 Sample Time: 8:45 # of Containers: 5

Duplicate Sample Collected? ☐ Yes ☒ No ID: _____

Geochemical Analyses

Ferrous Iron: — mg/L
DO: — mg/L
Nitrate: — mg/L
Sulfate: — mg/L
Alkalinity: — mg/L

5. COMMENTS

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 Number: 015
Client: BJSVCS
Project Location: Hobbs

Date: 12-7-00 Time: 9:00
Personnel: Deirdre Green
Weather: Clear, cold

2. WELL DATA

Casing Diameter: 2 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____
Screen Diameter: 2 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____
Total Depth of Well: 60.15 feet From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____
Depth to Static Water: 57.05 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: 3.1 feet Well Volume: 7.5 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: ☒ Bailor, Size: 11 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____ Equipment Model(s):
Materials: Pump/Bailor ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable
Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable
Was well purged dry? ☐ Yes ☒ No Pumping Rate: _____ gal/min

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
9:05	1.0L	7.62	16.7	1342	0.7	7.42	—	—	Clear
9:11	2.0L	7.46	17.54	1411	-48.3	6.31	—	—	Clear
9:29	3.0L	7.48	17.48	1382	-104	7.15	15.85	—	Clear

4. SAMPLING DATA

Method(s): ☒ Bailor, Size: 11 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____
Materials: Pump/Bailor ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable
Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable
Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ No
Sample ID: MW-4 Sample Time: 9:10 # of Containers: 5
Duplicate Sample Collected? ☐ Yes ☒ No ID: _____

Geochemical Analyses

Ferrous Iron: _____ mg/L
DO: _____ mg/L
Nitrate: _____ mg/L
Sulfate: _____ mg/L
Alkalinity: _____ mg/L

5. COMMENTS

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-5

1. PROJECT INFORMATION

Project Number: 12832 Task Number: 015
Client: BJSVCs
Project Location: Hobbs

Date: 12-7-00 Time: 9:15
Personnel: DEAN GREEN
Weather: Clear, Cold

2. WELL DATA

Casing Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Screen Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Total Depth of Well: <u>64.79</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Static Water: <u>58.71</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Product: _____ feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Length of Water Column: <u>5.99</u> feet	Well Volume: <u>1</u> 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: ☒ Bailor, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailor ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Was well purged dry? ☐ Yes ☒ No Pumping Rate: _____ gal/min

Equipment Model(s):
1. YSF-6100
2. _____
3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
9:20	1.0 L	7.49	17.33	1235	55.5	7.13	-	-	Clear
9:22	2.0 L	7.48	17.15	1231	74.3	7.40	-	-	Clear
9:24	3.0 L	7.52	17.23	1200	77.8	7.35	6.92	-	Clear

4. SAMPLING DATA

Method(s): ☒ Bailor, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailor ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ No

Sample ID: 7.25 Sample Time: 9:25 # of Containers: 9

Duplicate Sample Collected? ☐ Yes ☒ No ID: _____

Geochemical Analyses

Ferrous Iron: 0 mg/L
DO: 5.5 mg/L
Nitrate: — mg/L
Sulfate: — mg/L
Alkalinity: 280 mg/L

5. COMMENTS

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: MLW-7

1. PROJECT INFORMATION

Project Number: 12532 Task Number: 015 Date: 12-7-00 Time: 9:30
 Client: BSUCS Personnel: Danny Green
 Project Location: Nobbs Weather: Cold, clear

2. WELL DATA

Casing Diameter: 2 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____
 Screen Diameter: 2 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____
 Total Depth of Well: 62.20 feet From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____
 Depth to Static Water: 57.77 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: 4.43 feet Well Volume: 2.75 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: ☒ Bailer, Size: 1.1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____ Equipment Model(s): _____
 Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable
 Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable
 Was well purged dry? ☐ Yes ☒ No Pumping Rate: _____ gal/min

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
9:40	1.0 L	7.51	17.62	145	8.9.0	7.42	-	-	Clear
9:41	2.0 L	7.43	17.68	154.5	9.5.0	6.71	-	-	Clear
9:43	3.0 L	7.41	17.62	154.0	101.5	6.93	-	-	Clear

4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1.1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____
 Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable
 Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable
 Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ No
 Sample ID: MLW-7 Sample Time: 9:45 # of Containers: 5
 Duplicate Sample Collected? ☐ Yes ☒ No ID: _____

Geochemical Analyses

Ferrous Iron: - mg/L
 DO: - mg/L
 Nitrate: - mg/L
 Sulfate: - mg/L
 Alkalinity: - mg/L

5. COMMENTS

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-10

1. PROJECT INFORMATION

Project Number: 12832 Task Number: 015Date: 12-7-00Time: 9:55Client: BTSVCSPersonnel: D. S. GreenProject Location: HobbsWeather: Cloudy, clear

2. WELL DATA

Casing Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____Screen Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____Total Depth of Well: 62.5 feetFrom: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____Depth to Static Water: 58.89 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____Depth to Product: — feetFrom: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____Length of Water Column: 3.91 feetWell Volume: 0.65 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: ☒ Bailor, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Equipment Model(s)

Materials: Pump/Bailor ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable1. YSE-6100Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

2. _____

Was well purged dry? ☐ Yes ☒ No Pumping Rate: _____ gal/min

3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
10:00	1.0L	6.92	18.16	3440	-86.11	4.50	—		cloudy
10:02	2.0L	6.89	17.93	1843	-121.1	4.89	—		cloudy
10:04	3.0L	6.84	18.01	1864	-127.2	4.91	366		cloudy

4. SAMPLING DATA

Method(s): ☒ Bailor, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____Materials: Pump/Bailor ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableDepth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ NoSample ID: MW-10 Sample Time: 10:05 # of Containers: 3Duplicate Sample Collected? ☐ Yes ☒ No ID: _____

Geochemical Analyses

Ferrous Iron: 6 mg/LDO: 4 mg/LNitrate: — mg/LSulfate: — mg/LAlkalinity: 270 mg/L

5. COMMENTS

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-11A

1. PROJECT INFORMATION

Project Number: 12832 Task Number: _____ Date: 12-7-00 Time: 12:30
Client: BJ SVCS Personnel: Debra Carter
Project Location: Hobbs Weather: Clear, Cold

2. WELL DATA

Casing Diameter: 2 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____
Screen Diameter: 2 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____
Total Depth of Well: 63.6 feet From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____
Depth to Static Water: 59.29 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: 4.31 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 Method: ☒ Bailer, Size: 1 1/2 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____ Equipment Model(s): _____
Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable
Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable
Was well purged dry? ☐ Yes ☒ No Pumping Rate: _____ gal/min

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
12:35	1.0L	7.14	16.93	4224	-72.5	7.25	-	-	muddy
12:37	2.0L	7.14	17.57	4356	-76.4	6.02	-	-	muddy
12:38	3.0L	7.20	17.52	2227	-92.0	6.00	482	-	clear

4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1 1/2 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____
Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable
Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable
Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☒ No
Sample ID: MW-8 Sample Time: 12:40 # of Containers: 9
Duplicate Sample Collected? ☐ Yes ☒ No ID: _____

Geochemical Analyses

Ferrous Iron: 8 mg/L
DO: 2 mg/L
Nitrate: _____ mg/L
Sulfate: _____ mg/L
Alkalinity: 770 mg/L

5. COMMENTS

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-12

1. PROJECT INFORMATION

Project Number: 12832 Task Number: 215
Client: BJS/CS
Project Location: Hobbs

Date: 12-7-00 Time: 12:45
Personnel: Dwight Green
Weather: Clear, Cool

2. WELL DATA

Casing Diameter: 3 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____
Screen Diameter: 2 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____
Total Depth of Well: 61.20 feet From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____
Depth to Static Water: 59.31 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: 1.89 feet Well Volume: 0.5 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: ☒ Bailer, Size: 11 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____ Equipment Model(s): _____
Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable
Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable
Was well purged dry? ☐ Yes ☐ No Pumping Rate: _____ gal/min

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
12:55	1.0 L	7.51	16.74	1176	-11.5	6.36			
10:57	2.0 L	7.20	17.71	1599	-95.5	6.13			
10:59	3.0 L	7.13	17.74	1632	-99.5	5.88	333		

4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____
Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable
Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable
Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ No
Sample ID: mw-12 Sample Time: 11:00 # of Containers: 9
Duplicate Sample Collected? ☐ Yes ☒ No ID: _____

Geochemical Analyses

Ferrous Iron: 9.15 mg/L
DO: 4.0 mg/L
Nitrate: — mg/L
Sulfate: — mg/L
Alkalinity: 770 mg/L

5. COMMENTS

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-13

1. PROJECT INFORMATION

Project Number: 12832 Task Number: 215
Client: BJSVCS
Project Location: Hobbs

Date: 12-7-00 Time: 11:10
Personnel: Danny Green
Weather: clear, cold

2. WELL DATA

Casing Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Screen Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Total Depth of Well: <u>65-2</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Static Water: <u>58-68</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Product: _____ feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Length of Water Column: <u>6-52</u> feet	Well Volume: <u>1-0</u> 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: ☒ Bailer, Size: 11 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Was well purged dry? ☐ Yes ☐ No Pumping Rate: _____ gal/min

Equipment Model(s)
1. YSK-610D
2. _____
3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
11:15	1-0L	7.66	17.11	1796	-59.2	6.34			cloudy
11:17	2-0L	7.66	17.14	923	-71.8	6.09			
11:19	3-0L	7.56	17.20	1644	-74.2	5.97			

4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 11 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ No

Sample ID: MW-13 Sample Time: 11:20 # of Containers: 5

Duplicate Sample Collected? ☒ Yes ☐ No ID: Duplicate

Geochemical Analyses

Ferrous Iron: _____ mg/L
DO: _____ mg/L
Nitrate: _____ mg/L
Sulfate: _____ mg/L
Alkalinity: _____ mg/L

5. COMMENTS

Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet.

Signature: _____

B



APPENDIX B

Laboratory Analytical Report



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-
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

12/22/00

Date



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.


West, Sonia
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-
ph: (713) 759-0999

Project Name: BJ Service, Hobbs, NM
Site: Hobbs, NM
Site Address:

PO Number:
State: New Mexico

State Cert. No.:

Date Reported:

Fax To: Brown & Caldwell
Rick Rexroad
fax: (713) 308-3886

Client Sample ID	Lab Sample ID	Matrix	Date Collected	Date Received	COC ID	HOLD
MW-3	00120263-01	Water	12/7/00	12/8/00 10:00:00 AM	083880	<input type="checkbox"/>
MW-4	00120263-02	Water	12/7/00	12/8/00 10:00:00 AM	083880	<input type="checkbox"/>
MW-5	00120263-03	Water	12/7/00	12/8/00 10:00:00 AM	083880	<input type="checkbox"/>
MW-7	00120263-04	Water	12/7/00	12/8/00 10:00:00 AM	083880	<input type="checkbox"/>
MW-10	00120263-05	Water	12/7/00	12/8/00 10:00:00 AM	083880	<input type="checkbox"/>
MW-11A	00120263-06	Water	12/7/00	12/8/00 10:00:00 AM	083880	<input type="checkbox"/>
MW-12	00120263-07	Water	12/7/00	12/8/00 10:00:00 AM	083880	<input type="checkbox"/>
MW-13	00120263-08	Water	12/7/00	12/8/00 10:00:00 AM	083880	<input type="checkbox"/>
Duplicate	00120263-09	Water	12/7/00	12/8/00 10:00:00 AM	083880	<input type="checkbox"/>
Field Blank	00120263-10	Water	12/7/00	12/8/00 10:00:00 AM	083880	<input type="checkbox"/>

Sonia West
West, Sonia
Senior Project Manager

12/22/00

Date

Joel Grice
Laboratory Director

Ted Yen
Quality Assurance Officer



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

Client Sample ID MW-3

Collected: 12/7/00

SPL Sample ID: 00120263-01

Site: Hobbs, 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		12/15/00 21:40 AM		509463
Surr: n-Pentacosane	71.2	% 18-120	1		12/15/00 21:40 AM		509463

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 19:05 D_R		511555
Surr: 1,4-Difluorobenzene	95.0	% 74-121	1		12/19/00 19:05 D_R		511555
Surr: 4-Bromofluorobenzene	75.7	% 55-150	1		12/19/00 19:05 D_R		511555

PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/L		
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-Difluorobenzene	104	% 72-137	1		12/19/00 19:51 D_R		511512
Surr: 4-Bromofluorobenzene	88.4	% 48-156	1		12/19/00 19:51 D_R		511512

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
- MI - Matrix Interference



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

Client Sample ID MW-4

Collected: 12/7/00

SPL Sample ID: 00120263-02

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Diesel Range Organics	0.53	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 16:22	KL					
GASOLINE RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Gasoline Range Organics	0.16	0.1	1		12/19/00 20:01	D_R	511556
Surr: 1,4-Difluorobenzene	87.3	% 74-121	1		12/19/00 20:01	D_R	511556
Surr: 4-Bromofluorobenzene	87.0	% 55-150	1		12/19/00 20:01	D_R	511556
PURGEABLE AROMATICS			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-Difluorobenzene	101	% 72-137	1		12/19/00 20:16	D_R	511513
Surr: 4-Bromofluorobenzene	91.9	% 48-156	1		12/19/00 20:16	D_R	511513

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
MI - Matrix Interference



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

Client Sample ID MW-5

Collected: 12/7/00

SPL Sample ID: 00120263-03

Site: Hobbs, 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	12/16/00 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	12/10/2000 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-Difluorobenzene	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		
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		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							
			MCL	E300	Units: mg/L		
Sulfate	160	4		20	12/08/00 11:52	KM	500706

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
MI - Matrix Interference



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

Client Sample ID MW-7

Collected: 12/7/00

SPL Sample ID: 00120263-04

Site: Hobbs, 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	0.29		1	12/17/00 5:11 AM		509470
Surr: n-Pentacosane	58.9 %	18-120		1	12/17/00 5:11 AM		509470

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 20:04 D_R		511557
Surr: 1,4-Difluorobenzene	92.7 %	74-121		1	12/19/00 20:04 D_R		511557
Surr: 4-Bromofluorobenzene	74.3 %	55-150		1	12/19/00 20:04 D_R		511557

PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/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-Difluorobenzene	103 %	72-137		1	12/19/00 20:42 D_R		511514
Surr: 4-Bromofluorobenzene	87.6 %	48-156		1	12/19/00 20:42 D_R		511514

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 PQI

>MCL - Result Over Maximum Contamination Limit(MCL)
D - Surrogate Recovery Unreportable due to Dilution
MI - Matrix Interference



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

Client Sample ID MW-10

Collected: 12/7/00

SPL Sample ID: 00120263-05

Site: Hobbs, 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	1		12/19/00 8:41 AM		512445
Prep Method	Prep Date	Prep Initials					
	12/10/2000 16:22						
GASOLINE RANGE ORGANICS			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			MCL	RSK147	Units: mg/L		
Ethane	ND	0.0025	1		12/21/00 10:55 A_A		514433
Ethylene	ND	0.0032	1		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

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
MI - Matrix Interference

12/21/00 11:43:06 AM



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

Client Sample ID MW-11A

Collected: 12/7/00

SPL Sample ID: 00120263-06

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Diesel Range Organics	0.3	0.25		1	12/17/00 6:28 AM		509472
Surr: n-Pentacosane	78.2	% 18-120		1	12/17/00 6:28 AM		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)			MCL	E300	Units: mg/L		
Nitrogen, Nitrate (As N)	ND	0.1		1	12/08/00 11:52 KM		500649
PURGEABLE AROMATICS			MCL	SW8021B	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_R		511516
Surr: 4-Bromofluorobenzene	95.3	% 48-156		1	12/19/00 21:33 D_R		511516
SULFATE			MCL	E300	Units: mg/L		
Sulfate	260	5		25	12/08/00 11:52 KM		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

MI - Matrix Interference



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

Client Sample ID MW-12

Collected: 12/7/00

SPL Sample ID: 00120263-07

Site: Hobbs, 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		1	12/19/00 21:05 D_R		511567
HEADSPACE GAS ANALYSIS			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		1	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		1	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 %	48-156		1	12/19/00 21:59 D_R		511517
SULFATE			MCL	E300	Units: mg/L		
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 POL

>MCL - Result Over Maximum Contamination Limit(MCL)
D - Surrogate Recovery Unreportable due to Dilution
MI - Matrix Interference



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

Client Sample ID MW-13

Collected: 12/7/00

SPL Sample ID: 00120263-08

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Diesel Range Organics	0.43	0.24	1		12/17/00 7:45 AM		509474
Surr: n-Pentacosane	55.1	% 18-120	1		12/17/00 7:45 AM		509474
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 22:02 D_R		511568
Surr: 1,4-Difluorobenzene	91.7	% 74-121	1		12/19/00 22:02 D_R		511568
Surr: 4-Bromofluorobenzene	76.0	% 55-150	1		12/19/00 22:02 D_R		511568
PURGEABLE AROMATICS			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-Difluorobenzene	102	% 72-137	1		12/19/00 22:24 D_R		511518
Surr: 4-Bromofluorobenzene	88.0	% 48-156	1		12/19/00 22:24 D_R		511518

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

T - 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



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

Client Sample ID Duplicate

Collected: 12/7/00

SPL Sample ID: 00120263-09

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Diesel Range Organics	0.49	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	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 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: ug/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

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
MI - Matrix Interference



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

Client Sample ID Field Blank

Collected: 12/7/00

SPL Sample ID: 00120263-10

Site: Hobbs, NM

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		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

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
MI - Matrix Interference

Quality Control Documentation



HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
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(713) 660-0901

Quality Control Report

Brown & Caldwell
BJ Service, Hobbs, NM

Analysis: Diesel Range Organics
Method: SW8015B

WorkOrder: 00120263
Lab Batch ID: 9118a

Method Blank

RunID: HP_V_001215B-509462 Units: mg/L
Analysis Date: 12/15/2000 19:05 Analyst: AM
Preparation Date: 12/10/2000 16:22 Prep By: KL Method SW3510B

Analyte	Result	Rep Limit
Diesel Range Organics	ND	0.20
Surrogate: n-Pentacosane	94.2	18-120

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00120263-01B	MW-3
00120263-02B	MW-4
00120263-03B	MW-5
00120263-04B	MW-7
00120263-05B	MW-10
00120263-06B	MW-11A
00120263-07B	MW-12
00120263-08B	MW-13
00120263-09B	Duplicate

Laboratory Control Sample (LCS)

RunID: HP_V_001215B-509494 Units: mg/L
Analysis Date: 12/15/2000 20:22 Analyst: AM
Preparation Date: 12/10/2000 16:22 Prep By: Method

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: 12/15/2000 22:19 Analyst: AM
Preparation Date: 12/10/2000 16:22 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	1.5	109	1.25	1.3	92.5	16.7	39	13	130

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 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.



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Headspace Gas Analysis
Method: RSK147

WorkOrder: 00120263
Lab Batch ID: R26604

Method Blank

RunID: VARC_001221A-514223 Units: mg/L
Analysis Date: 12/21/2000 9:37 Analyst: A_A

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00120263-03D	MW-5
00120263-05D	MW-10
00120263-06D	MW-11A
00120263-07D	MW-12

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

Sample Duplicate

Original Sample: 00120263-03
RunID: VARC_001221A-514224 Units: mg/L
Analysis Date: 12/21/2000 9:55 Analyst: A_A

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Butane	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



HOUSTON LABORATORY
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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Purgeable Aromatics
Method: SW8021B

WorkOrder: 00120263
Lab Batch ID: R26454

Method Blank			Samples in Analytical Batch:	
RunID:	HP_R_001219A-511322	Units: ug/L	Lab Sample ID	Client Sample ID
Analysis Date:	12/19/2000 10:47	Analyst: D_R	00120263-01A	MW-3
			00120263-02A	MW-4
			00120263-04A	MW-7
			00120263-05A	MW-10
			00120263-06A	MW-11A
			00120263-07A	MW-12
			00120263-08A	MW-13
			00120263-09A	Duplicate
			00120263-10A	Field Blank

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	105.0	72-137
Surr. 4-Bromofluorobenzene	86.9	48-156

Laboratory Control Sample (LCS)

RunID: HP_R_001219A-511321 Units: ug/L
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
Xylenes, Total	150	141	94	70	130

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

Sample Spiked: 00120263-01
RunID: HP_R_001219A-511510 Units: ug/L
Analysis Date: 12/19/2000 17:43 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	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	20	13	65.7	20	16	78.3	17.6	20	38	159
Xylenes, Total	ND	60	38	63.3	60	46	76.7	9.0	18	53	144

Qualifiers: ND/U - Not Detected at the Reporting Limit MI - Matrix Interference
R - 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.



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Gasoline Range Organics
Method: SW8015B

WorkOrder: 00120263
Lab Batch ID: R26475

Method Blank

RunID: HP_R_001219C-511574 Units: mg/L
Analysis Date: 12/19/2000 10:04 Analyst: D_R

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	92.0	74-121
Surr: 4-Bromofluorobenzene	73.3	55-150

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00120263-01A	MW-3
00120263-02A	MW-4
00120263-04A	MW-7
00120263-05A	MW-10
00120263-06A	MW-11A
00120263-07A	MW-12
00120263-08A	MW-13
00120263-09A	Duplicate
00120263-10A	Field Blank

Laboratory Control Sample (LCS)

RunID: HP_R_001219C-511581 Units: mg/L
Analysis Date: 12/19/2000 10:02 Analyst: D_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	0.78	78	70	130

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

Sample Spiked: 00120263-02
RunID: HP_R_001219C-511553 Units: mg/L
Analysis Date: 12/19/2000 18:03 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	0.16	0.9	0.48	36.0 *	0.9	0.53	41.3	13.6	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

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.



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Purgeable Aromatics
Method: SW8021B

WorkOrder: 00120263
Lab Batch ID: R26596

Method Blank

Samples in Analytical Batch:

RunID: HP_R_001220D-513466 Units: ug/L
Analysis Date: 12/20/2000 16:35 Analyst: D_R

Lab Sample ID: 00120263-03A
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 Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Benzene	ND	20	18	90.5	20	19	97.3	7.20	21	32	164
Ethylbenzene	ND	20	15	76.1	20	16	81.5	6.91	19	52	142
Toluene	ND	20	16	79.2	20	17	84.9	6.95	20	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
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 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.



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Quality Control Report

Brown & Caldwell
BJ Service, Hobbs, NM

Analysis: Gasoline Range Organics
Method: SW8015B

WorkOrder: 00120263
Lab Batch ID: R26599

Method Blank			Samples in Analytical Batch:	
RunID:	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-Bromofluorobenzene	76.3	55-150

Laboratory Control Sample (LCS)

RunID: HP_R_001220F-513624 Units: mg/L
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: 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	0.32	35.8	0.9	0.55	61.1	2.1	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

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.



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Quality Control Report

Brown & Caldwell
BJ Service, Hobbs, NM

Analysis: Nitrogen, Nitrate (As N)
Method: E300

WorkOrder: 00120263
Lab Batch ID: R25894

Method Blank				Samples in Analytical Batch:	
RunID:	WET_001208M-500643	Units:	mg/L	Lab Sample ID	Client Sample ID
Analysis Date:	12/08/2000 11:52	Analyst:	KM	00120263-03C	MW-5
				00120263-05C	MW-10
				00120263-06C	MW-11A
				00120263-07C	MW-12
Analyte		Result	Rep Limit		
Nitrogen, Nitrate (As N)		ND	0.10		

Laboratory Control Sample (LCS)

RunID: WET_001208M-500644 Units: mg/L
Analysis Date: 12/08/2000 11:52 Analyst: KM

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: 00120263-03
RunID: WET_001208M-500646 Units: mg/L
Analysis Date: 12/08/2000 11:52 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)	3.3	10	13.2	99.7	10	13.3	100	0.789	20	76	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 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.



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Quality Control Report

Brown & Caldwell
BJ Service, Hobbs, NM

Analysis: Sulfate
Method: E300

WorkOrder: 00120263
Lab Batch ID: R25896

Method Blank			Samples in Analytical Batch:	
RunID:	WET_001208N-500704	Units: mg/L	Lab Sample ID	Client Sample ID
Analysis Date:	12/08/2000 11:52	Analyst: KM	00120263-03C	MW-5
			00120263-05C	MW-10
			00120263-06C	MW-11A
			00120263-07C	MW-12
	Analyte	Result	Rep Limit	
	Sulfate	ND	0.20	

Laboratory Control Sample (LCS)

RunID: WET_001208N-500705 Units: mg/L
Analysis Date: 12/08/2000 11:52 Analyst: KM

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Sulfate	10	9.6	96	90	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: 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
Sulfate	ND	200	350	96.3	200	360	101	4.45	20	80	120

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.

Sample Receipt Checklist
And
Chain of Custody



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

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 <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Water - VOA vials have zero headspace?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	



SPL, Inc.

Analysis Request & Chain of Custody Record

00120263
1033880
page 1 of 1

Client Name: Brown & Caldwell		matrix		bottle		size		pres.		Number of Containers		Requested Analysis	
Address: 1415 Louisiana Ave (713) 755-0041		W=water S=soil SL=sludge O=other:		P=plastic A=amber glass G=glass V=vial		1=1 liter 4=4oz 40=vial 8=8oz 16=16oz		1=HCl 2=HNO3 3=H2SO4 O=other:		BTEX (800L)		TPH-D (800L)	
Client Contact: Rick Raymond										TPH-G (800L)		NO ₂ , SO ₄ - 300.0	
Project Name: JTSVCs												Methane, Ethane	
Project Number: 12232												Ethylene 12/5/00	
Project Location: Hobbs, N.M.												MB 12/10	
Invoice To: Rick Raymond													
Sample ID		DATE	TIME	comp	grab								
MW-3	12-7-00												
MW-11	12-7-00												
MW-5	12-7-00												
MW-7	12-7-00												
MW-10	12-7-00												
MW-11A	12-7-00												
MW-12	12-7-00												
MW-13	12-7-00												
Duplicate	12-7-00												
Field blank	12-7-00												

Client/Consultant Remarks: Laboratory remarks:

Requested TAT		Special Reporting Requirements		Fax Results		Raw Data		Special Detection Limits (ppm):		Index? <input type="checkbox"/> Y <input type="checkbox"/> N	
2-hr <input type="checkbox"/>	72-hr <input type="checkbox"/>	Standard QC <input checked="" type="checkbox"/>	Level 3 QC <input type="checkbox"/>	Level 4 QC <input type="checkbox"/>		date	time				
38-hr <input type="checkbox"/>	Standard <input checked="" type="checkbox"/>	1. Relinquished by Sampler: AA				12-7-00	16:30				
Other <input type="checkbox"/>		3. Relinquished by:				date	time				
		5. Relinquished by:				date	time				

Relinquished by Laboratory: Danna M. O. 12/8/00

☐ 6330 Interchange Drive, Houston, TX 77054 (713) 660-0901
☐ 459 Hughes Drive, Traverse City, MI 49684 (616) 947-5777
☐ 500 Ambassador Caffery Parkway, Scott, LA 70053 (504) 287-3735



BROWN AND CALDWELL

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

TRANSMITTAL MEMORANDUM

To: Mr. Wayne Price State of New Mexico Energy, Minerals, and Natural Resources Dept. Oil Conservation Division 2040 South Pacheco Street, State of Land Office Bldg Santa Fe, New Mexico 87505	Date: February 28, 2001	Job No: 12832-015
	Subject: Hobbs, New Mexico Facility	
	Certified Mail No.: P 076 598 859	
	Equipment No:	
	Spec. Ref:	
Submittal No:		

WE ARE SENDING:	<input checked="" type="checkbox"/> Attached	<input type="checkbox"/> Under separate cover via US Mail the following items:		
<input type="checkbox"/> Shop Drawings	<input type="checkbox"/> Prints	<input type="checkbox"/> Plans	<input type="checkbox"/> Samples	<input type="checkbox"/>
<input type="checkbox"/> Copy of letter	<input type="checkbox"/> Change Order	Other: Groundwater Sampling Report		

THESE ARE TRANSMITTED AS CHECKED BELOW:

- ☐ Second submittal
- ☒ For your use
- ☐ As requested
- ☐ For review and comment
- ☐ With submittal review action noted

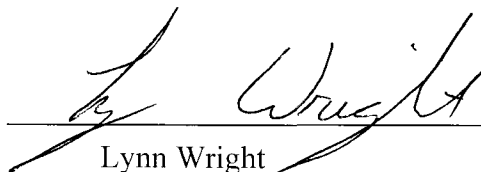
SUBMITTAL REVIEW ACTIONS:

- ☐ No exceptions taken
- ☐ Make revisions
- ☐ Amend and resubmit
- ☐ Rejected--see Remarks
- ☐ None

Copies	Date	No.	Description
1	2/26/01	1	September 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


Lynn Wright

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

**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.
Principal Geologist

February 26, 2001

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

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DISTRIBUTION AND QA/QC REVIEWER'S SIGNATURE

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- 3 Benzene Isoconcentration and Total BTEX Distribution Map for September 13, 2000
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- 2 Cumulative Groundwater Elevation Data
- 3 September 13, 2000 Field Screening Results for Groundwater Samples
- 4 Cumulative BTEX and TPH Analytical Results for Groundwater Samples
- 5 Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for Monitor Wells MW-5, MW-10, MW-11A, MW-12, and OW-4
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- A Field Data Sheets
- B Laboratory Analytical Report



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 bioremediation system were made on July 14, 1999 to increase air flow to bioremediation 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 bioremediation 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

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

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.

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.

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.

- 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

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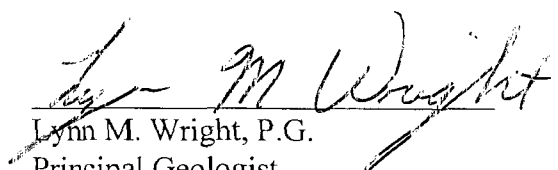
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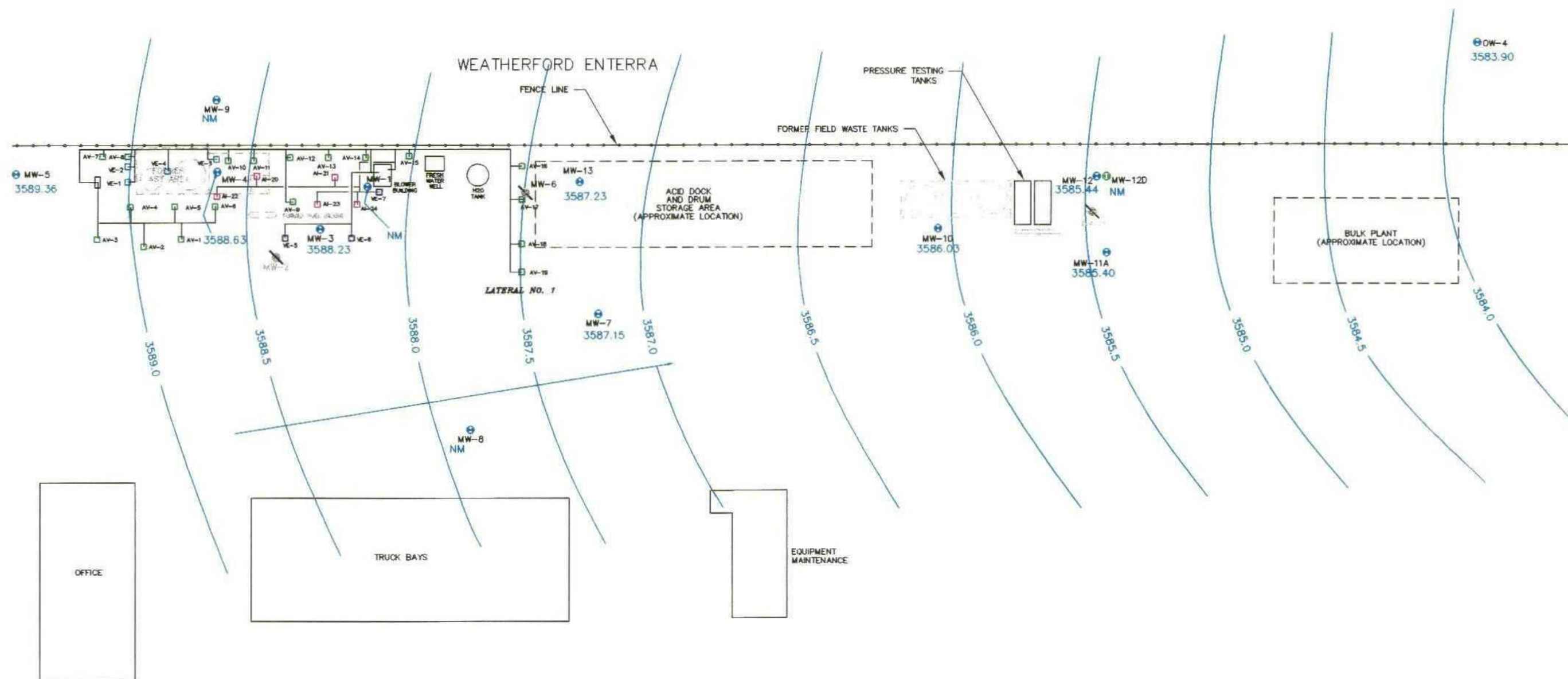

Lynn M. Wright, P.G.
Principal Geologist

RLR/uak

Figures



FIGURES



**BROWN AND
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BROWN AND CALDWELL



SCALE: 1" = 60'
DRAWN BY: _____ DATE: _____
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LEGEND

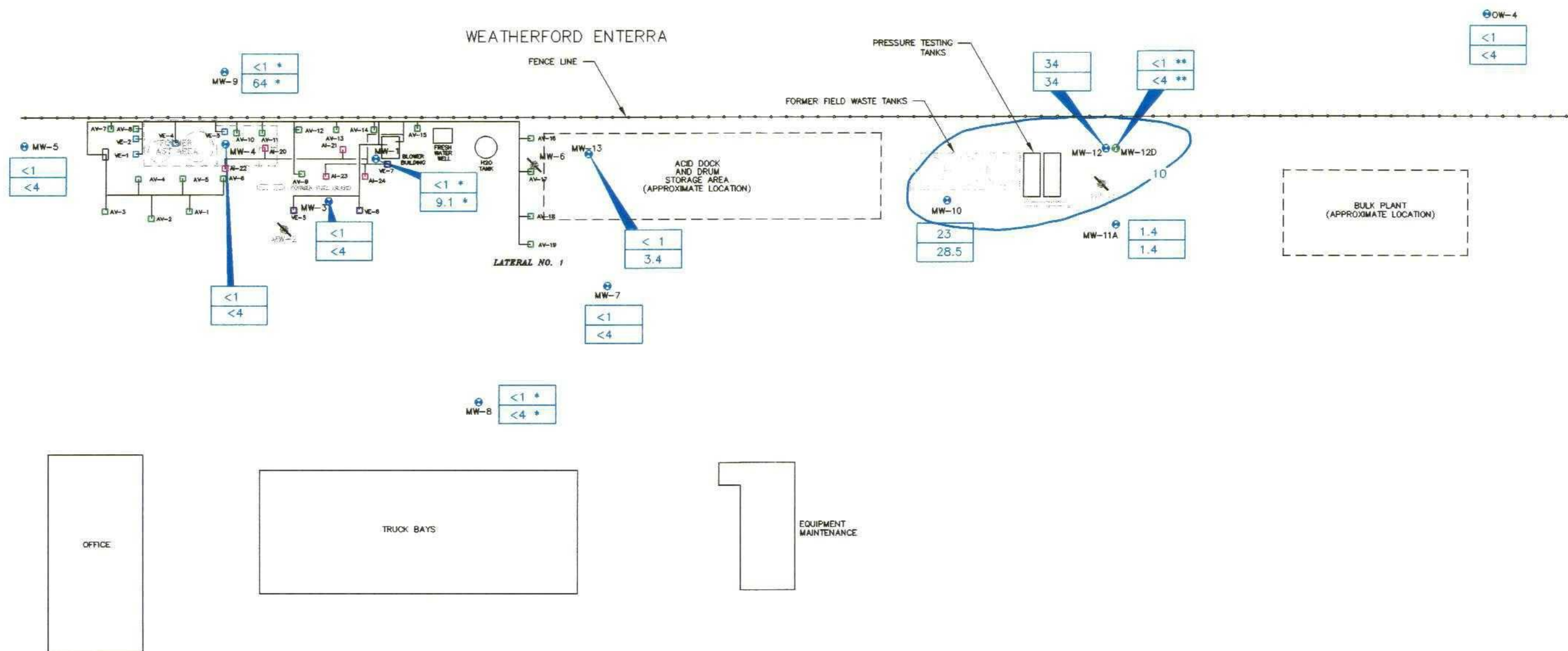
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MW-3 MONITOR WELL LOCATION WITH GROUNDWATER ELEVATION (feet AMSL)
- BIOSPARGING SYSTEM
- MW-2 MONITOR WELL (PLUGGED AND ABANDONED)
- GROUNDWATER FLOW DIRECTION
- GROUNDWATER ELEVATION CONTOUR

TITLE
GROUNDWATER ELEVATION MAP FOR SEPTEMBER 13, 2000

CLIENT
BJ SERVICES COMPANY, U.S.A.

SITE
HOBBS, NEW MEXICO

DATE
10/11/00
PROJECT NUMBER
12832.021
FIGURE NUMBER
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.

BROWN AND CALDWELL
HOUSTON, TEXAS

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BROWN AND CALDWELL



SCALE: 1" = 60'

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

LEGEND

- EXISTING MONITOR WELL LOCATION
 - MONITOR WELL (PLUGGED AND ABANDONED)
 - BIOSPARGING SYSTEM
 - BENZENE ISOCONCENTRATION CONTOUR (ug/L)
 - BENZENE CONCENTRATION (ug/L)
 - TOTAL BTEX CONCENTRATION (ug/L)
- *, ** INDICATES WELL NOT SAMPLED 9/13/00; DATA PRESENTED ARE FROM 3/9-10/00 (*) OR 6/8/00 (**)

TITLE BENZENE ISOCONCENTRATION AND TOTAL BTEX DISTRIBUTION MAP FOR SEPTEMBER 13, 2000

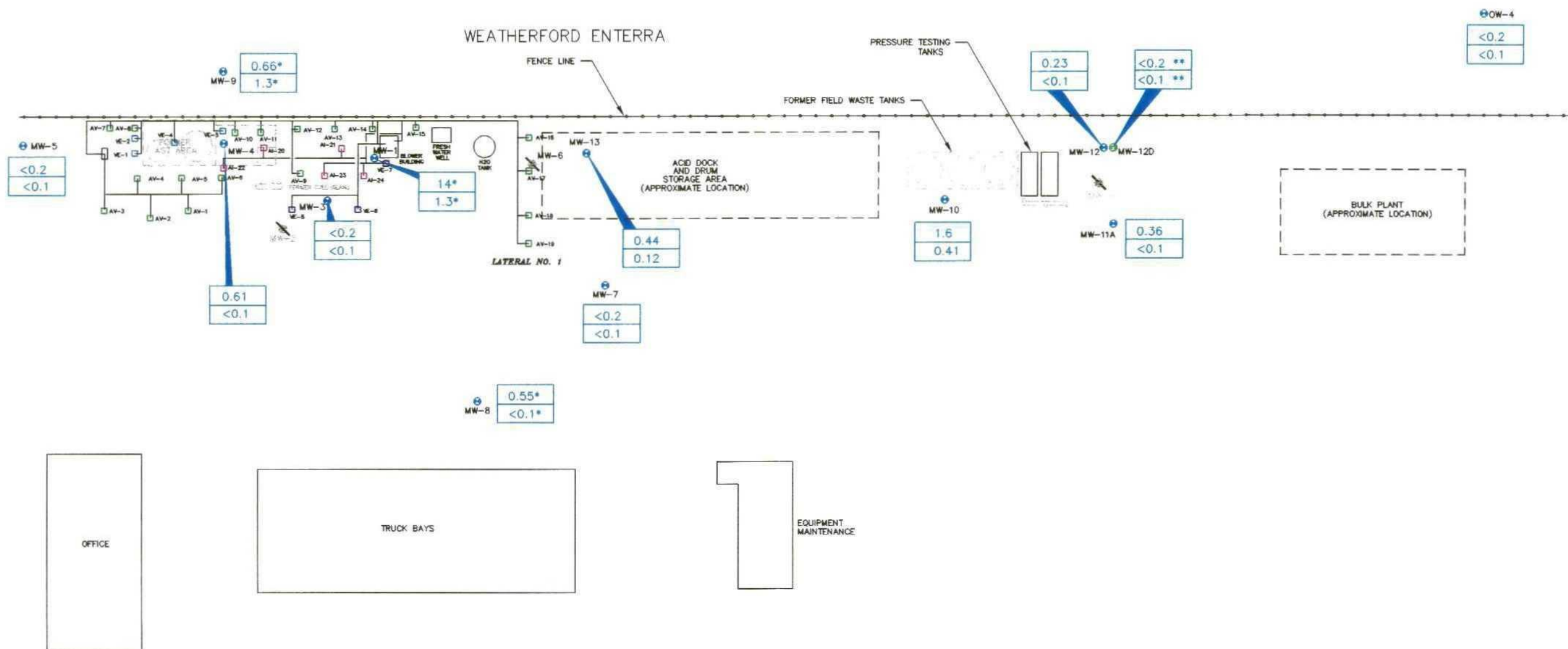
CLIENT BJ SERVICES COMPANY, U.S.A.

SITE HOBBS, NEW MEXICO

DATE 10/11/00

PROJECT NUMBER 12832.014

FIGURE NUMBER 3



BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER
APPROVED: _____ DATE: _____
BROWN AND CALDWELL

0 30 60



SCALE: 1" = 60'

DRAWN BY: _____ DATE: _____
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APPROVED: _____ DATE: _____

LEGEND

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

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

*, ** INDICATES WELL NOT SAMPLED 9/13/00; DATA PRESENTED ARE FROM 3/9-10/00 (*) OR 6/8/00 (**)



BICSPARGING SYSTEM

TITLE TOTAL PETROLEUM HYDROCARBONS
DISTRIBUTION MAP FOR SEPTEMBER 13, 2000

CLIENT BJ SERVICES COMPANY, U.S.A.

SITE HOBBS, NEW MEXICO

DATE
10/11/00

10/11/00
12832.014

FIGURE NUMBER
4

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

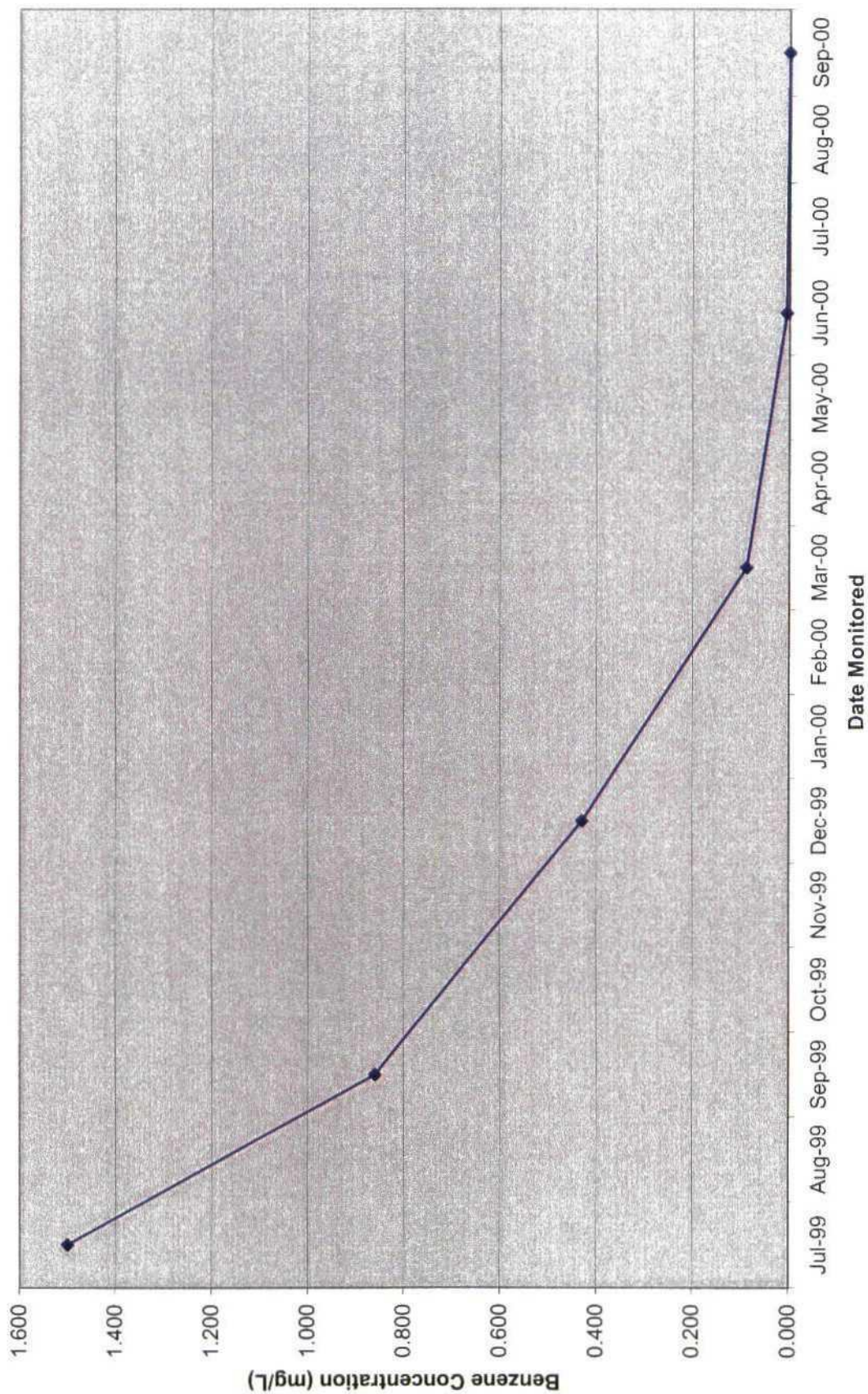
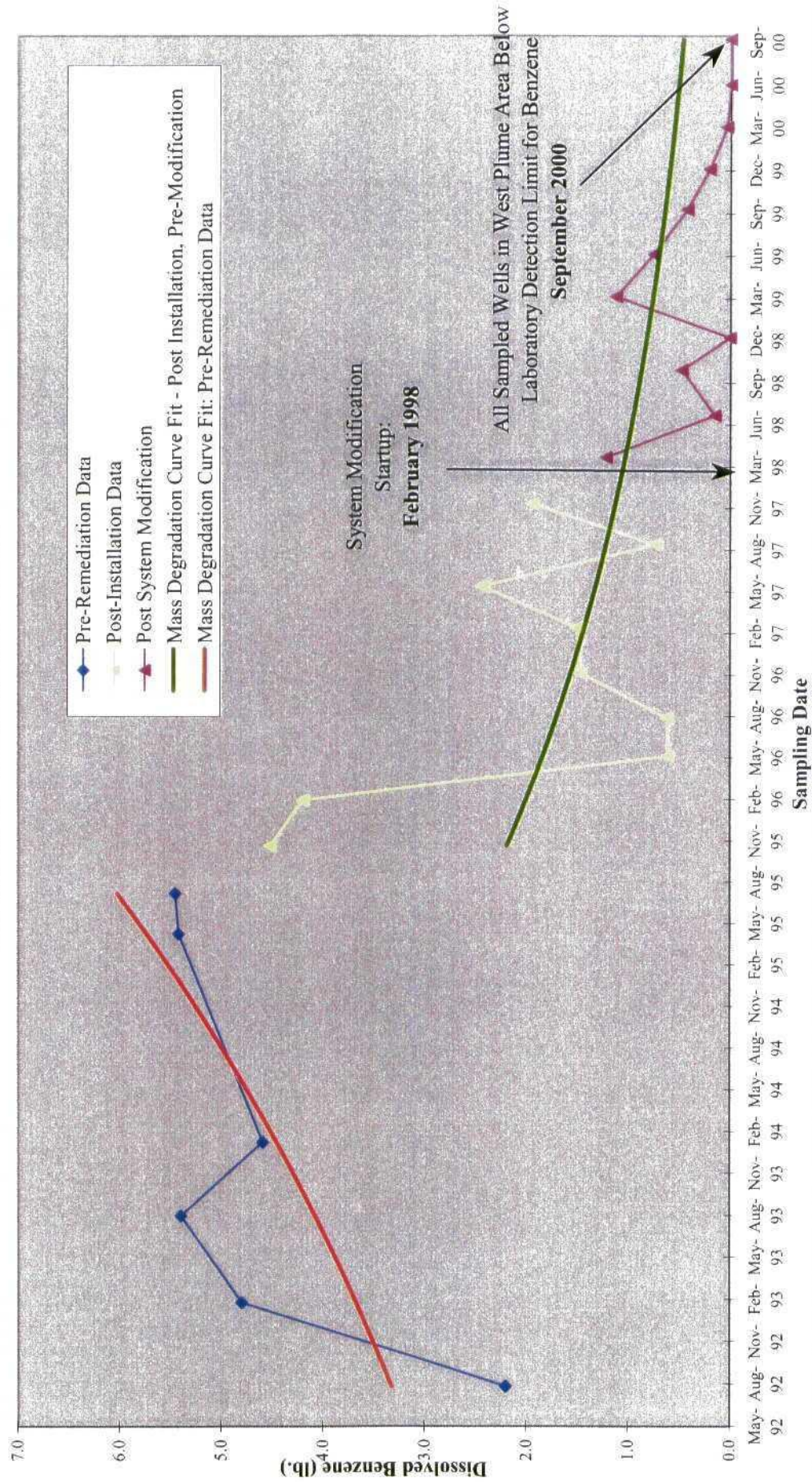
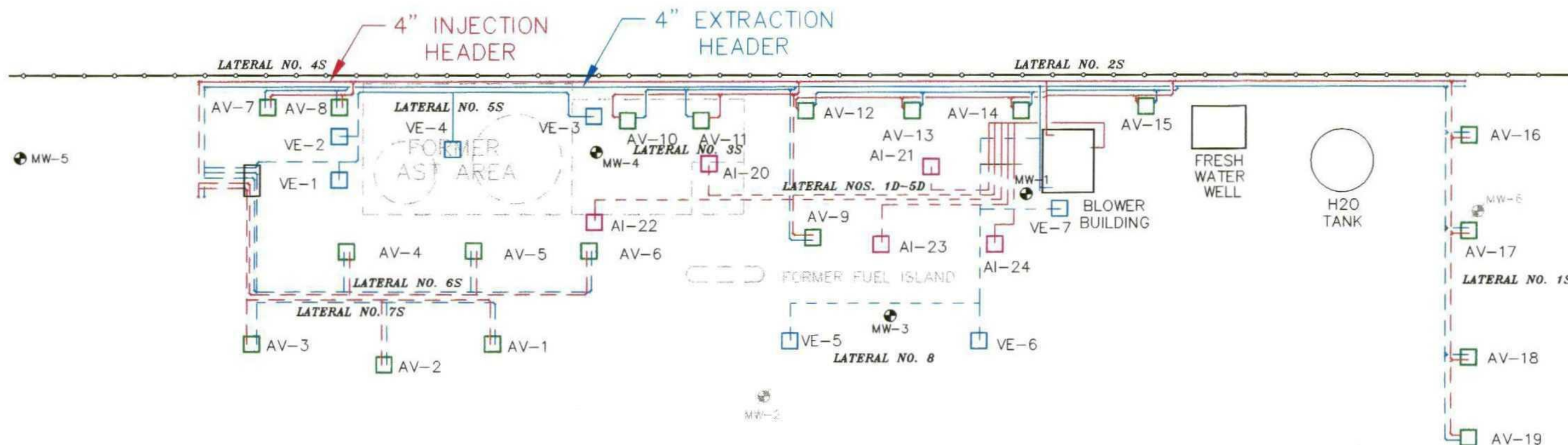


FIGURE 6
Dissolved Benzene Mass vs. Time
West Plume
BJ Services - Hobbs, New Mexico





LEGEND

- MW-8 MONITORING WELL LOCATION AND IDENTIFICATION
MW-2 MONITORING WELL - P&A'd
AV-2 EXTRACTION AND INJECTION WELL
VE-1 VACUUM EXTRACTION WELL
AI-24 INJECTION 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**	---	---	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

** - LATERAL SHUT OFF IN 03/00

*** - LATERAL TO BE SHUT OFF IN 11/00

**BROWN AND
CALDWELL**
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL



SCALE: 1" = 20'

DRAWN BY: _____ DATE: _____

CHK'D BY: _____ DATE: _____

APPROVED: _____ DATE: _____

TITLE

DETAIL OF BIOSPARGING SYSTEM

CLIENT

BJ SERVICES COMPANY, U.S.A.

SITE

HOBBS, NEW MEXICO

DATE

10/11/00

PROJECT NUMBER

12832.015

FIGURE NUMBER

7

Tables

TABLES

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

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

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

Date	Activity
June 21, 1993	ENSR Consulting and Engineering (ENSR), the environmental consultant of the adjacent property owner on which the off-site well is located, submitted a request to sample the off-site monitoring well.
July 15, 1993	ENSR split one groundwater sample, collected from the off-site monitoring well, with Brown and Caldwell.
July 30, 1993	USTank Management, Inc. submitted the tank tightness test report to Brown and Caldwell. The report indicated that both tanks and their associated piping passed.
August 16-19, 1993	Brown and Caldwell installed two additional downgradient monitoring wells. Brown and Caldwell sampled each of the existing monitoring and the newly installed monitoring wells.
January 26, 1994	Brown and Caldwell performed groundwater monitoring event; existing monitoring wells and the fresh water well were purged and sampled. Groundwater samples were analyzed for BTEX.
May 6, 1994	Remedial Action Plan (RAP) submitted to the OCD.
August 11, 1994	RAP approved by the OCD.
May 3, 1995	Brown and Caldwell conducted the May 1995 groundwater sampling event.
July 31, 1995	Brown and Caldwell conducted the July 1995 groundwater sampling event.
August 2-9, 1995	Installation of bioparging 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 bioparging system.
September 19, 1995	Began operation of the extraction portion of the bioparging system.
November 13, 1995	Began operation of the injection portion of the bioparging 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.
June 10, 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 portion 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.

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	(2)
		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	
		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	
		03/24/98	55.81	0.00	3,591.72	PSH Sheen 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	(3)
		12/09/99	-	-	-	
		03/09/00	58.99	0.00	3,588.54	
		06/00	-	-	-	
		09/00	-	-	-	
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	-	-	-	(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	3,591.34	
		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	

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) PSH Sheen 200 ml PSH
		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	
		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	
		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	
		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	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	

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	
		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	
		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	
		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	
		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	3,591.36	
		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	
		06/00	-	-	-	
		06/00	-	-	-	
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	
		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	
		09/12/97	51.95	0.00	3,592.83	
		12/10/97	52.37	0.00	3,592.41	
		03/23/98	52.68	0.00	3,592.10	
		06/23/98	53.08	0.00	3,591.70	
		09/30/98	53.39	0.01	3,591.40	
		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	-	-	-	
		09/00	-	-	-	

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	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	
		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				
MW-11A	3,644.24	03/23/98	54.79	0.00	3,589.45	(5),(6)
		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	
		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	
		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	
		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	

(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.

(7) - 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.

(9) - 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	pH	Temperature (°C)	Conductivity (umhos)	Redox (mV)	Dissolved Oxygen (meter) (mg/L)	Dissolved Oxygen (Hach kit) (mg/L)	Ferrous Iron (mg/L)	Alkalinity (mg/L)
MW-3 ⁽¹⁾	0.25	7.72	21.15	1288	-61.4	6.80	NM ⁽²⁾	NM	NM
	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 ⁽¹⁾	0.21	7.4	20.2	1550	5.64	5.64	NM	NM	NM
	1.5	7.6	20.3	1492	6.26	6.26	NM	NM	NM
MW-5 ⁽¹⁾	0.25	7.7	19.8	1313	-47.8	6.58	NM	NM	NM
	0.75	7.3	19.1	1299	-40.7	6.9	5.4	0	240
MW-7 ⁽¹⁾	0.25	7.1	21.75	1062	-32.4	7.35	NM	NM	NM
MW-10 ⁽¹⁾	0.5	7.25	22.3	3401	-35.8	3.7	NM	NM	NM
	1.0	7.31	22.4	3509	-42.6	3.9	1.2	NM	1155
MW-11A ⁽¹⁾	0.5	7.17	20.31	5542	-29.4	3.64	NM	NM	NM
	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 ⁽¹⁾	NM	7.81	20.17	2994	20.5	1.73	NM	NM	NM
	NM	7.81	20.17	2694	20.5	1.73	1.2	7.2	770
MW-13 ⁽¹⁾	0.5	7.4	20.09	1349	-45.8	4.10	NM	NM	NM
	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 ⁽¹⁾	0.25	6.98	20.01	1578	-25.6	8.2	NM	NM	NM

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

⁽²⁾ NM = Not measured.

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.

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/l				milligrams per liter, mg/L	
MW-1	8/10/92	Regular	5550	12090	2160	7370	NA	NA
	2/9/93	Regular	2100	6500	1300	7400	NA	NA
	8/19/93	Regular	3200	7300	1200	3700	NA	NA
	1/27/94	Regular	1930	4580	672	2390	NA	NA
	5/3/95	Regular	NSP	NSP	NSP	NSP	NA	NSP
	8/1/95	Regular	390	1300	230	800	NA	5.7
	11/15/95	Regular	880	1800	300	970	NA	6.8
	2/23/96	Regular	1500	3700	620	2200	NA	21
	5/31/96	Regular	1100	1700	380	990	NA	7.5
	8/23/96	Regular	1800	3300	570	2100	NA	17
	12/2/96	Regular	5600	9600	2100	9600	100	64
	3/12/97	Regular	5500	9700	2600	8200	22	62
	6/12/97	Regular	5300	34000	7500	27000	180	160
	9/12/97	Regular	1800	4400	1000	3000	23	21
	12/10/97	Regular	7600	12000	2800	8200	11	71
	3/24/98	Regular	4800	7200	1200	2400	4.2	38
	6/23/98	Regular	53	680	580	1400	1.4	9.2
	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	< 1	9.1	14	1.3
	6/8/00	-	NS	NS	NS	NS	NS	NS
	9/13/00	-	NS	NS	NS	NS	NS	NS
MW-2 ¹	8/10/92	Regular	14.9	< 4	< 4	< 4	NA	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	100	12	3	13	NA	NA
	1/27/94	Regular	< 1	1.2	2	2.5	NA	NA
MW-3	8/10/92	Regular	304.9	2099	6760	1586	NA	NA
	2/9/93	Regular	130	< 10	< 10	190	NA	NA
	8/19/93	Regular	560	3100	630	1900	NA	NA
	1/27/94	Regular	1070	5380	510	3120	NA	NA
	5/4/95	Regular	770	3300	470	1800	NA	NA
	8/1/95	Regular	490	2900	890	1600	NA	14
	11/15/95	Regular	250	1000	180	440	NA	2.9
	2/23/96	Regular	120	810	170	560	NA	4
	5/31/96	Regular	670	3900	1200	2300	NA	15
	8/23/96	Regular	330	2200	590	1500	NA	12
	12/2/96	Regular	220	1800	670	1000	0.89	7.4
	3/12/97	Regular	370	2000	960	1400	1.8	11
	6/12/97	Regular	860	4800	1700	2600	1.9	20
	9/11/97	Regular	770	3000	1600	1900	1.6	16
	12/10/97	Regular	240	740	500	450	0.59	5.3

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/l				milligrams per liter, mg/L	
MW-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
	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
	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	0.17
	12/9/99	Regular	< 1	2.5	2.3	20.1	2	0.53
	3/10/00	Regular	< 1	< 1	< 1	3.6	2.6	0.15
	6/8/00	Regular	< 1	< 1	< 1	< 1	0.44	0.23
	9/13/00	Regular	< 1	< 1	< 1	< 1	0.61	<0.1
MW-5	8/10/92	Regular	< 4	< 4	< 4	< 4	NA	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/10/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	1/27/94	Regular	8.7	29.9	4	11.3	NA	NA
	5/3/95	Regular	3.7	5.3	0.92	4.6	NA	NA
	8/1/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	11/15/95	Regular	< 0.3	1.2	< 0.3	1.5	NA	NA
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	5/31/96	Regular	31	86	10	20	NA	NA
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/l				milligrams per liter, mg/L	
MW-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
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

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/l				milligrams per liter, mg/L	
MW-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
	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	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
	12/9/99	Regular	< 5	< 5	< 5	< 5	1.8	< 0.5
	3/9/00	Regular	< 1	< 1	< 1	< 1	0.66	< 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
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
	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
	9/13/99	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	< 1	0.55	< 0.1
	6/8/00	-	NS	NS	NS	NS	NS	NS
	9/13/00	-	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
	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

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/l				milligrams per liter, mg/L	
MW-9	8/1/95	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
	9/30/98	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
	3/10/99	Regular	< 1.0	< 1.0	5.7	68	< 0.2	0.22
	6/10/99	Regular	< 1.0	1.8	1.8	71	< 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	0.66	1.3
	6/8/00	-	NS	NS	NS	NS	NS	NS
	9/13/00	-	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
	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
	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 Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/l				milligrams per 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
MW-11 ¹	8/19/93	Regular	< 2	< 2	< 2	< 2	NA	NA
	1/27/94	Regular	< 1	< 1	< 1	< 1	NA	NA
	5/4/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	8/1/95	Regular	44	29	5.5	13	NA	0.2
	11/15/95	Regular	190	2.8	6.2	11	NA	0.4
	2/23/96	Regular	49	1.2	0.51	4	NA	0.25
	5/31/96	Regular	300	83	12	28	NA	0.8
	8/23/96	Regular	100	1.2	0.3	4.7	NA	0.26
	12/2/96	Regular	970	< 5	6	8.1	2	1.3
	3/12/97	Regular	130	< 5	13	5.8	0.42	< 0.5
	3/12/97	Duplicate	100	< 5	10	5.1	0.43	< 0.5
	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	< 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

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/l				milligrams per liter, mg/L	
MW-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	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

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 ¹ (mg/L)	Sulfate ¹ (mg/L)	Methane (mg/L)
MW-5	3/23/98	3.87	190	<0.0012
	3/9/99	<0.1	195	<0.0012
	6/10/99	4.73	209	<0.0012
	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
	9/13/00	3.93	200	<0.0012
MW-10	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
			223 ³	
	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
MW-11A	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	0.094
		<0.1 ²	227 ³	
	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
MW-12	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
	9/30/98	<0.1	168	<0.0012
	12/10/98	<0.1	202	<0.0012
	3/10/99	<0.1	137	<0.0012
		<0.1 ²	193 ³	
	6/10/99	<0.1	217	<0.0012
	9/14/99	<0.10	230	<0.0012
MW-12D ⁽⁴⁾	12/9/99	<0.1	210	0.0015
	3/9/00	0.14	200	<0.0012
	6/8/00	<0.1	240	<0.0012
	7/2/99	2.1	249	0.0015
	9/14/99	<0.10	200	0.0065
OW-4	6/10/99	3.96	192	<0.0012
	9/14/99	3.5	200	<0.0012
	12/9/99	3.4	200	<0.0012
	3/9/00	3.6	200	<0.0012
	6/8/00	3.4	190	<0.0012
	9/13/00	3.21	170	<0.0012

1=By EPA Method 300, except as noted

2=By EPA Method 353.3

3=By EPA Method 375.4

4=Well not sampled after 6/8/00

mg/L = milligrams per liter

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

Sample Number	Sample Date	parts per million by volume, ppmv				TPH	Discharge Rate, scfm	Benzene Emission Rate, lb/hr	Total BTEX Emission Rate, lb/hr	TPH-VOC Emission Rate, lb/hr
		Benzene	Toluene	Ethylbenzene	Xylenes					
Extraction-1	9/19/95	790	1100	340	920	9700	132.47	1.235	5.943	16.31
Effluent-1	9/20/95	990	2500	560	1600	16000	135.76	1.575	10.939	27.37
Effluent-2	9/28/95	13	28	6	18	2533	123.56	0.019	0.112	3.89
Effluent-4	11/7/95	15	58	12	36	1500	131.10	0.024	0.239	2.59
Effluent 111395-01	11/15/95	39	180	42	130	1870	133.33	0.062	0.773	3.21
Effluent 121995-01	12/19/95	10	45	11	33	530	129.64	0.016	0.191	0.89
Effluent 12996-01	1/29/96	12	61	17	53	1200	128.45	0.018	0.271	1.95
Effluent 032296-01	3/22/96	6	44	12	40	990	124.68	0.009	0.189	1.56
Effluent 042496-01	4/25/96	4	37	10	36	900	118.34	0.005	0.147	1.29
Effluent 053196-01	5/31/96	3.7	40	10	33	670	124.11	0.005	0.158	1.04
Effluent 082396-01	8/23/96	<5	12	<5	<5	200	126.18	0.007	0.047	0.31
Effluent 120296-01	12/2/96	<1	<1	<1	<1	<5	129.04	0.002	0.008	0.01
Eff-31297-1	3/12/97	2.1	15	4.6	15	250	110.56	0.003	0.057	0.33
Effluent 070297-01	7/2/97	<1	6.3	2.4	8.6	65	109.90	0.001	0.028	0.08
Monitor 970912 (1)	9/12/97	NA	NA	NA	NA	340	105.40	NA	NA	0.39
Eff-1-2832	12/10/97	<0.001	0.013	0.009	0.031	210	106.27	0.000	0.000	0.28
Monitor 980324 (1)	3/24/98	NA	NA	NA	NA	1500	108.97	NA	NA	1.91
Monitor 980622 (1)	6/22/98	NA	NA	NA	NA	190	108.16	NA	NA	0.24
Monitor 980930 (1)	9/30/98	NA	NA	NA	NA	200	123.74	NA	NA	0.33
Monitor 981210 (1)	12/10/98	NA	NA	NA	NA	180	111.14	NA	NA	0.24
Monitor 990310 (1)	3/10/99	NA	NA	NA	NA	80	111.14	NA	NA	0.11
Monitor 990610 (1)	6/10/99	NA	NA	NA	NA	140	73.68	NA	NA	0.12
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)	6/8/00	NA	NA	NA	NA	62	170	NA	NA	0.091

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



APPENDICES

A



APPENDIX A
Field Data Sheets



GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: 4W-3

1. PROJECT INFORMATION

Project Number: _____ Task Number: _____

Date: 9/13/00 Time: 1313

Client: _____

Personnel: LT P.C.C.Project Location: B.J. HobbsWeather: Hot 92° Clear

2. WELL DATA

Casing Diameter: _____ inches Type: ☐ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____

Screen Diameter: _____ inches Type: ☐ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____

Total Depth of Well: 62.50 feet From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____

Depth to Static Water: 56.77 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: _____ 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 Method: ☐ Bailer, Size: _____ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Equipment Model(s) _____

Materials: Pump/Bailer ☐ Stainless ☐ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

1. _____

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

2. _____

Was well purged dry? ☐ Yes ☐ No Pumping Rate: _____ gal/min

3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1315	0.25	7.72	21.15	1288	-61.4	6.80			clear
1320	1	7.27	19.3	247	-39.9	6.43			
1325	2	7.55	20.31	1305	-51.0	6.86			

4. SAMPLING DATA

Method(s): ☐ Bailer, Size: _____ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailer ☐ Stainless ☐ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ NoSample ID: _____ Sample Time: 1330 # of Containers: _____Duplicate Sample Collected? ☐ Yes ☐ No ID: _____

Geochemical Analyses

Ferrous Iron: _____ mg/L

DO: _____ mg/L

Nitrate: _____ mg/L

Sulfate: _____ mg/L

Alkalinity: _____ mg/L

5. COMMENTS

1015 Next Hole
One Amber Needs Preservative

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: _____ Task Number: _____

Date: 9/13/00 Time: 1425

Client: _____

Personnel: LT CC

Project Location: BJ Hobbs

Weather: Hot 93° Clear

2. WELL DATA

Casing Diameter: _____ inches	Type: <input type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Screen Diameter: _____ inches	Type: <input type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Total Depth of Well: <u>61.5</u> feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Static Water: <u>56.65</u> feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Product: _____ feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> 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	

3. PURGE DATA

Purge Method: ☐ Bailer, Size: _____ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailer ☐ Stainless ☐ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Was well purged dry? ☐ Yes ☐ No Pumping Rate: _____ gal/min

Equipment Model(s):
 1. _____
 2. _____
 3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1435	0.21	7.4	20.2	1550	-40.0	5.64			Clear
1450	1.5	7.6	20.3	1492	-54.3	6.26	-	-	Clear

4. SAMPLING DATA

Method(s): ☐ Bailer, Size: _____ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailer ☐ Stainless ☐ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ No

Sample ID: _____ Sample Time: 500 # of Containers: _____

Duplicate Sample Collected? ☐ Yes ☐ No ID: _____

Geochemical Analyses

Ferrous Iron: _____ mg/L

DO: _____ mg/L

Nitrate: _____ mg/L

Sulfate: _____ mg/L

Alkalinity: _____ mg/L

5. COMMENTS

One Amber Need Pres
100's need Pres

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-5

1. PROJECT INFORMATION

Project Number: _____ Task Number: _____

Date: 9/13/00 Time: 1023 C

Client: _____

Personnel: L Teague C Coreil

Project Location: B5 Hobbs

Weather: Clear; Hot

2. WELL DATA

Casing Diameter: _____ inches Type: ☐ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____

Screen Diameter: _____ inches Type: ☐ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____

Total Depth of Well: 64.7 feet From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____

Depth to Static Water: 58.36 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: _____ 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 Method: ☐ Bailer, Size: _____ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Equipment Model(s) _____

Materials: Pump Bailer ☐ Stainless ☐ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

1. _____

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

2. _____

Was well purged dry? ☐ Yes ☐ No Pumping Rate: _____ gal/min

3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1031	0.25	7.7	19.8	1313	-47.8	6.58			clear
1034	0.75	7.3	19.1	1299	-40.7	6.9			

4. SAMPLING DATA

Method(s): ☐ Bailer, Size: _____ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailer ☐ Stainless ☐ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ No

Sample ID: _____ Sample Time: 1035 # of Containers: _____

Duplicate Sample Collected? ☐ Yes ☐ No ID: _____

Geochemical Analyses

Ferrous Iron: 0 mg/L

DO: 5.4 mg/L

Nitrate: _____ mg/L

Sulfate: _____ mg/L

Alkalinity: 240 mg/L

5. COMMENTS

Took Sample - well not recharging
10 Jars Need preservative reagents & time

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 7

1. PROJECT INFORMATION

Project Number: _____ Task Number: _____

Date: 9/13/00 Time: 1118c

Client: _____

Personnel: LT CC

Project Location: B5 Hobbs

Weather: Clear ; Warm

2. WELL DATA

Casing Diameter: _____ inches	Type: <input type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Screen Diameter: _____ inches	Type: <input type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Total Depth of Well: <u>62.2</u> feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Static Water: <u>57.40</u> feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Product: _____ feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> 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

3. PURGE DATA

Purge Method: ☐ Bailer, Size: _____ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____ Equipment Model(s) _____

Materials: Pump/Bailer ☐ Stainless ☐ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable 1. _____

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable 2. _____

Was well purged dry? ☐ Yes ☐ No Pumping Rate: _____ gal/min 3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
<u>1123</u>	<u>0.25</u>	<u>7.1</u>	<u>31.75</u>	<u>1062</u>	<u>-32.4</u>	<u>7.35</u>			
	<u>Tools</u>	<u>Sample</u>							

4. SAMPLING DATA

Method(s): ☐ Bailer, Size: _____ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailer ☐ Stainless ☐ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ No

Sample ID: _____ Sample Time: 1130 # of Containers: _____

Duplicate Sample Collected? ☐ Yes ☐ No ID: _____

Geochemical Analyses

Ferrous Iron: _____ mg/L

DO: _____ mg/L

Nitrate: _____ mg/L

Sulfate: _____ mg/L

Alkalinity: _____ mg/L

5. COMMENTS

Well leaked Preservative
Needs New Well Cap

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: MW10

1. PROJECT INFORMATION

Project Number: _____ Task Number: _____

Date: 9/13/00 Time: 1510

Client: _____

Personnel: CC LT

Project Location: BJ Hobbs

Weather: Hot 94 Clear

2. WELL DATA

Casing Diameter: _____ inches	Type: <input type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Screen Diameter: _____ inches	Type: <input type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Total Depth of Well: <u>62.00</u> feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Static Water: <u>58.44</u> feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Product: _____ feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> 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	

3. PURGE DATA

Purge Method: ☐ Bailer, Size: _____ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____ Equipment Model(s) _____

Materials: Pump/Bailer ☐ Stainless ☐ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable 1. _____

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable 2. _____

Was well purged dry? ☐ Yes ☐ No Pumping Rate: _____ gal/min 3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1515	0.5	7.25	22.3	3401	-35.8	3.7			Purple
1520	1.0	7.31	22.4	3509	-42.6	3.9			Purple
									Took Sample well going Dry

4. SAMPLING DATA

Method(s): ☐ Bailer, Size: _____ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailer ☐ Stainless ☐ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ No

Sample ID: _____ Sample Time: 1530 # of Containers: _____

Duplicate Sample Collected? ☐ Yes ☐ No ID: _____

Geochemical Analyses

Ferrous Iron: _____ mg/L

DO: 1.2 mg/L

Nitrate: _____ mg/L

Sulfate: _____ mg/L

Alkalinity: 1155 mg/L

5. COMMENTS

Amber Needs Preservative
Plastic only partial Fall

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-11A

1. PROJECT INFORMATION

Project Number: _____ Task Number: _____

Date: 9/13/00

Time: 1344

Client: _____

Personnel: LT & LL

Project Location: B J Hobbs

Weather: Hot 93 Clear

2. WELL DATA

Casing Diameter: _____ inches

Type: ☐ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____

Screen Diameter: _____ inches

Type: ☐ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____

Total Depth of Well: 63.35 feet

From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____

Depth to Static Water: 58.84 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: _____ 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 Method: ☐ Bailer, Size: _____ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Equipment Model(s) _____

Materials: Pump/Bailer

☐ Stainless ☐ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

1. _____

Materials: Rope/Tubing

☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

2. _____

Was well purged dry? ☐ Yes ☐ No

Pumping Rate: _____ gal/min

3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1346	0.5	7.17	20.31	5542	-29.4	3.64			Rusty
1351	1	7.33	20.62	6029	-35.8	3.46			clear
1355	2	7.11	21.89	6121	-34.7	2.41			clear

4. SAMPLING DATA

Method(s): ☐ Bailer, Size: _____ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailer

☐ Stainless ☐ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Tubing/Rope

☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ No

Sample ID: _____ Sample Time: 1400 # of Containers: _____

Duplicate Sample Collected? ☒ Yes ☐ No ID: Duplicate

Geochemical Analyses

Ferrous Iron: _____ mg/L

DO: 1.4 mg/L

Nitrate: _____ mg/L

Sulfate: _____ mg/L

Alkalinity: 140 mg/L

5. COMMENTS

Voas

Duplicate Need HCL Both Amber &

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-12

1. PROJECT INFORMATION

Project Number: _____ Task Number: _____

Date: 9/13/00

Time: 1549

Client: _____

Personnel: LT & CC

Project Location: B5 Hobbs

Weather: Hot Clear

2. WELL DATA

Casing Diameter: _____ inches

Type: ☐ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____

Screen Diameter: _____ inches

Type: ☐ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____

Total Depth of Well: 129.7 feet

From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____

Depth to Static Water: 58.85 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: _____ 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 Method: ☐ Bailer, Size: _____ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Equipment Model(s): _____

Materials: Pump/Bailer ☐ Stainless ☐ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

1. _____

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

2. _____

Was well purged dry? ☐ Yes ☐ No Pumping Rate: _____ gal/min

3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1555		7.81	20.17	2994	20.5	1.73			
1600	Took	Sample	going	well	Dry				
		7.81	20.17	2644	20.5	1.73			

4. SAMPLING DATA

Method(s): ☐ Bailer, Size: _____ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailer ☐ Stainless ☐ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ No

Sample ID: _____ Sample Time: 1600 # of Containers: _____

Duplicate Sample Collected? ☐ Yes ☐ No ID: _____

Geochemical Analyses

Ferrous Iron: 7.2 mg/L

DO: 1.2 mg/L

Nitrate: _____ mg/L

Sulfate: _____ mg/L

Alkalinity: 540 mg/L

5. COMMENTS

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-131800 446
7208

1. PROJECT INFORMATION

Project Number: _____ Task Number: _____

Date: 9/13/00Time: 1630

Client: _____

Personnel: LT CCProject Location: D J HobbsWeather: Hot 93 Clear

2. WELL DATA

Casing Diameter: _____ inches

Type: ☐ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____

Screen Diameter: _____ inches

Type: ☐ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____Total Depth of Well: 65.43 feetFrom: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____Depth to Static Water: 58.24 feetFrom: ☐ 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: _____ 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 Method: ☐ Bailer, Size: _____ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Equipment Model(s) _____

Materials: Pump/Bailer

☐ Stainless ☐ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

1. _____

Materials: Rope/Tubing

☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

2. _____

Was well purged dry?

☐ Yes ☐ No

Pumping Rate: _____ gal/min

3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1640	0.5	7.4	20.09	1349	-45.8	7.10			Clear
1650	1.25	7.2	19.25	1345	-38.4	5.3			Clear
1655	3.00	7.2	19.2	1350	-36.6	4.71			

4. SAMPLING DATA

Method(s): ☐ Bailer, Size: _____ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailer

☐ Stainless ☐ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Materials: Tubing/Rope

☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ DisposableDepth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ NoSample ID: _____ Sample Time: 1700 # of Containers: _____Duplicate Sample Collected? ☐ Yes ☐ No ID: _____

Geochemical Analyses

Ferrous Iron: _____ mg/L

DO: _____ mg/L

Nitrate: _____ mg/L

Sulfate: _____ mg/L

Alkalinity: _____ mg/L

5. COMMENTS

1 Amber Short Preser

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: OW 4

1. PROJECT INFORMATION

Project Number: _____ Task Number: _____

Date: 9/13/00

Time: 1145

Client: _____

Personnel: HT; CC

Project Location: BS 1/06s

Weather: Hot; warm

2. WELL DATA

Casing Diameter: _____ inches

Type: ☐ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____

Screen Diameter: _____ inches

Type: ☐ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____

Total Depth of Well: 65.25 feet

From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____

Depth to Static Water: 60.16 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: _____ 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 Method: ☐ Bailer, Size: _____ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Equipment Model(s)

Materials: Pump/Bailer ☐ Stainless ☐ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

1. _____

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

2. _____

Was well purged dry? ☐ Yes ☐ No Pumping Rate: _____ gal/min

3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
<u>1200</u>	<u>0.25</u>	<u>7.98</u>	<u>20.0</u>	<u>1578</u>	<u>-25.6</u>	<u>8.2</u>	<u>-</u>		<u>cloudy</u>
	<u>Took</u>	<u>Sample</u>							

4. SAMPLING DATA

Method(s): ☐ Bailer, Size: _____ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailer ☐ Stainless ☐ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ No

Sample ID: _____ Sample Time: 1230 # of Containers: _____

Duplicate Sample Collected? ☐ Yes ☐ No ID: _____

Geochemical Analyses

Ferrous Iron: / mg/L

DO: / mg/L

Nitrate: / mg/L

Sulfate: / mg/L

Alkalinity: / mg/L

5. COMMENTS

Voas need preservative

1 - Plastic short

Too cloudy to take field parameters.

Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet.

B



APPENDIX B

Laboratory Analytical Report



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

Case Narrative for:
Brown & Caldwell

Certificate of Analysis Number:
00090351

Report To: Brown & Caldwell Lynn Wright 1415 Louisiana Suite 2500 Houston TX 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
West, Sonia
Senior Project Manager

9/28/00

Date



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

Brown & Caldwell

Certificate of Analysis Number:

00090351

Report To: Brown & Caldwell
Lynn Wright
1415 Louisiana
Suite 2500
Houston
TX

ph: (713) 759-0999

fax: (713) 308-3886

Fax To: Brown & Caldwell
Lynn Wright

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

Client Sample ID	Lab Sample ID	Matrix	Date Collected	Date Received	COC ID	HOLD
W-3	00090351-01	Water	9/13/00 1:30:00 PM	9/14/00 10:00:00 AM	088964	<input type="checkbox"/>
W-4	00090351-02	Water	9/13/00 3:00:00 PM	9/14/00 10:00:00 AM	088964	<input type="checkbox"/>
MW-5	00090351-03	Water	9/13/00 10:35:00 AM	9/14/00 10:00:00 AM	088964	<input type="checkbox"/>
W-7	00090351-04	Water	9/13/00 11:30:00 AM	9/14/00 10:00:00 AM	088964	<input type="checkbox"/>
W-10	00090351-05	Water	9/13/00 3:30:00 PM	9/14/00 10:00:00 AM	088964	<input type="checkbox"/>
MW-11A	00090351-06	Water	9/13/00 2:00:00 PM	9/14/00 10:00:00 AM	088964	<input type="checkbox"/>
MW-12	00090351-07	Water	9/13/00 4:00:00 PM	9/14/00 10:00:00 AM	088964	<input type="checkbox"/>
W-13	00090351-08	Water	9/13/00 5:00:00 PM	9/14/00 10:00:00 AM	088964	<input type="checkbox"/>
OW-4	00090351-09	Water	9/13/00 12:30:00 PM	9/14/00 10:00:00 AM	088964	<input type="checkbox"/>
Duplicate	00090351-10	Water	9/13/00	9/14/00 10:00:00 AM	088964	<input type="checkbox"/>
Tip Blank 9/11/00	00090351-11	Water	9/13/00	9/14/00 10:00:00 AM	088979	<input type="checkbox"/>

Sonia West
West, Sonia
Senior Project Manager

9/28/00

Date

Joel Grice
Laboratory Director

Ted Yen
Quality Assurance Officer



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

Client Sample ID MW-3

Collected: 9/13/00 1:30:00

SPL Sample ID: 00090351-01

Site: Hobbs 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	0.2	1		09/16/00 22:12	AM	408389
Surr: n-Pentacosane	84.4	% 18-120	1		09/16/00 22:12	AM	408389

Run ID/Seq #: HP_V_000916C-408389

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		09/19/00 19:27	D_R	408337
Surr: 1,4-Difluorobenzene	86.7	% 74-121	1		09/19/00 19:27	D_R	408337
Surr: 4-Bromofluorobenzene	71.0	% 55-150	1		09/19/00 19:27	D_R	408337

PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/L		
Benzene	ND	1	1		09/19/00 19:27	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-Difluorobenzene	99.4	% 72-137	1		09/19/00 19:27	D_R	408280
Surr: 4-Bromofluorobenzene	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

MI - Matrix Interference

9/28/00 11:08:54 AM



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

Client Sample ID MW-4

Collected: 9/13/00 3:00:00

SPL Sample ID: 00090351-02

Site: Hobbs NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Diesel Range Organics	0.61	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 9:06	KL

GASOLINE RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Gasoline Range Organics	ND	0.1	1		09/19/00 19:52 D_R		408338
Surr: 1,4-Difluorobenzene	85.7 %	74-121	1		09/19/00 19:52 D_R		408338
Surr: 4-Bromofluorobenzene	78.0 %	55-150	1		09/19/00 19:52 D_R		408338

PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/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-Difluorobenzene	95.9 %	72-137	1		09/19/00 19:52 D_R		408281
Surr: 4-Bromofluorobenzene	99.4 %	48-156	1		09/19/00 19:52 D_R		408281

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

MI - Matrix Interference



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

Client Sample ID MW-5

Collected: 9/13/00 10:35:00 SPL Sample ID: 00090351-03

Site: Hobbs 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	0.2	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 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		09/19/00 22:51 D_R		408339
Surr: 1,4-Difluorobenzene	86.0 %	74-121	1		09/19/00 22:51 D_R		408339
Surr: 4-Bromofluorobenzene	72.7 %	55-150	1		09/19/00 22:51 D_R		408339
HEADSPACE GAS ANALYSIS			MCL	RSK147	Units: mg/L		
Ethane	ND	0.0025	1		09/26/00 8:52 A_A		413336
Ethylene	ND	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/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: mg/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
MI - Matrix Interference

9/28/00 11:08:55 AM



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

Client Sample ID MW-7

Collected: 9/13/00 11:30:00 SPL Sample ID: 00090351-04

Site: Hobbs 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	0.2	1		09/17/00 1:35 AM		408394
Surr: n-Pentacosane	103 %	18-120	1		09/17/00 1:35 AM		408394

Run ID/Seq #: HP_V_000916C-408394

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		09/19/00 23:17 D_R		408340
Surr: 1,4-Difluorobenzene	87.7 %	74-121	1		09/19/00 23:17 D_R		408340
Surr: 4-Bromofluorobenzene	73.3 %	55-150	1		09/19/00 23:17 D_R		408340

PURGEABLE AROMATICS			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-Difluorobenzene	99.2 %	72-137	1		09/19/00 23:17 D_R		408288
Surr: 4-Bromofluorobenzene	96.1 %	48-156	1		09/19/00 23:17 D_R		408288

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
MI - Matrix Interference

9/28/00 11:08:55 AM



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

Client Sample ID MW-10

Collected: 9/13/00 3:30:00

SPL Sample ID: 00090351-05

Site: Hobbs NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Diesel Range Organics	1.6	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_000916C-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_R		408341
Surr: 1,4-Difluorobenzene	128 %	74-121	1	*	09/19/00 23:43 D_R		408341
Surr: 4-Bromofluorobenzene	99.7 %	55-150	1		09/19/00 23:43 D_R		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_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_R		408289
Ethylbenzene	1.1	1	1		09/19/00 23:43 D_R		408289
Toluene	1.5	1	1		09/19/00 23:43 D_R		408289
Xylenes,Total	2.9	1	1		09/19/00 23:43 D_R		408289
Surr: 1,4-Difluorobenzene	111 %	72-137	1		09/19/00 23:43 D_R		408289
Surr: 4-Bromofluorobenzene	104 %	48-156	1		09/19/00 23:43 D_R		408289
SULFATE			MCL	E300	Units: mg/L		
Sulfate	160	2	10		09/14/00 13:14 KM		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

MI - Matrix Interference



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

Client Sample ID MW-11A

Collected: 9/13/00 2:00:00

SPL Sample ID: 00090351-06

Site: Hobbs NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Diesel Range Organics	0.36	0.2	1		09/17/00 2:16 AM		408395
Surr: n-Pentacosane	98.2 %	18-120	1		09/17/00 2:16 AM		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_R		411103
Surr: 1,4-Difluorobenzene	93.0 %	74-121	1		09/21/00 20:45 D_R		411103
Surr: 4-Bromofluorobenzene	75.3 %	55-150	1		09/21/00 20:45 D_R		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 KM		404648
PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/L		
Benzene	1.4	1	1		09/21/00 20:45 D_R		411041
Ethylbenzene	ND	1	1		09/21/00 20:45 D_R		411041
Toluene	ND	1	1		09/21/00 20:45 D_R		411041
Xylenes, Total	ND	1	1		09/21/00 20:45 D_R		411041
Surr: 1,4-Difluorobenzene	102 %	72-137	1		09/21/00 20:45 D_R		411041
Surr: 4-Bromofluorobenzene	98.2 %	48-156	1		09/21/00 20:45 D_R		411041
SULFATE			MCL	E300	Units: mg/L		
Sulfate	320	10	50		09/14/00 13:14 KM		404818

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
MI - Matrix Interference

9/28/00 11:08:57 AM



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

Client Sample ID MW-12

Collected: 9/13/00 4:00:00

SPL Sample ID: 00090351-07

Site: Hobbs NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Diesel Range Organics	0.23	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-408396							
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		09/21/00 21:11 D_R		411104
Surr: 1,4-Difluorobenzene	92.3 %	74-121	1		09/21/00 21:11 D_R		411104
Surr: 4-Bromofluorobenzene	74.7 %	55-150	1		09/21/00 21:11 D_R		411104
HEADSPACE GAS ANALYSIS			MCL	RSK147	Units: mg/L		
Ethane	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 (AS N)			MCL	E300	Units: mg/L		
Nitrogen,Nitrate (As N)	ND	0.1	1		09/14/00 13:14 KM		404651
PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/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-Difluorobenzene	102 %	72-137	1		09/21/00 21:11 D_R		411042
Surr: 4-Bromofluorobenzene	99.1 %	48-156	1		09/21/00 21:11 D_R		411042
SULFATE			MCL	E300	Units: mg/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
MI - Matrix Interference

9/28/00 11:08:58 AM



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

Client Sample ID MW-13

Collected: 9/13/00 5:00:00

SPL Sample ID: 00090351-08

Site: Hobbs NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Diesel Range Organics	0.44	0.2	1		09/17/00 5:42	AM	408397
Surr: n-Pentacosane	71.0	% 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/L		
Gasoline Range Organics	0.12	0.1	1		09/21/00 21:37	D_R	411105
Surr: 1,4-Difluorobenzene	95.3	% 74-121	1		09/21/00 21:37	D_R	411105
Surr: 4-Bromofluorobenzene	81.3	% 55-150	1		09/21/00 21:37	D_R	411105
PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/L		
Benzene	ND	1	1		09/21/00 21:37	D_R	411043
Ethylbenzene	3.4	1	1		09/21/00 21:37	D_R	411043
Toluene	ND	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	% 72-137	1		09/21/00 21:37	D_R	411043
Surr: 4-Bromofluorobenzene	100	% 48-156	1		09/21/00 21:37	D_R	411043

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
MI - Matrix Interference

9/28/00 11:08:58 AM



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

Client Sample ID OW-4

Collected: 9/13/00 12:30:00 SPL Sample ID: 00090351-09

Site: Hobbs 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	0.2	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: mg/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: mg/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
MI - Matrix Interference

9/28/00 11:08:59 AM



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

Client Sample ID Duplicate

Collected: 9/13/00

SPL Sample ID: 00090351-10

Site: Hobbs 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 9:06	KL

GASOLINE RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Gasoline Range Organics	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/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

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
MI - Matrix Interference

9/28/00 11:08:59 AM



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

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	Analyst	Seq. #
GASOLINE RANGE ORGANICS			MCL	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

MI - Matrix Interference

9/28/00 11:09:00 AM

Quality Control Documentation



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

Quality Control Report

Brown & Caldwell

BJ Hobbs

Analysis: Diesel Range Organics
Method: SW8015B

WorkOrder: 00090351
Lab Batch ID: 7246

Method Blank

RunID: HP_V_000916C-408387 Units: mg/L
Analysis Date: 09/16/2000 20:51 Analyst: AM
Preparation Date: 09/15/2000 9:06 Prep By: KL Method SW3550A

Analyte	Result	Rep Limit
Diesel Range Organics	ND	0.20
Surr: n-Pentacosane	108.4	18-120

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00090351-01B	MW-3
00090351-02B	MW-4
00090351-03B	MW-5
00090351-04B	MW-7
00090351-05B	MW-10
00090351-06B	MW-11A
00090351-07B	MW-12
00090351-08B	MW-13
00090351-09B	OW-4
00090351-10B	Duplicate

Laboratory Control Sample (LCS)

RunID: HP_V_000916C-408388 Units: mg/L
Analysis Date: 09/16/2000 21:32 Analyst: AM
Preparation Date: 09/15/2000 9:06 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: 09/16/2000 22:52 Analyst: AM
Preparation Date: 09/15/2000 9:06 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
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
MI - Matrix Interference



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Quality Control Report

Brown & Caldwell

BJ Hobbs

Analysis: Headspace Gas Analysis
Method: RSK147

WorkOrder: 00090351
Lab Batch ID: R21337

Method Blank

RunID: VARC_000926A-413258 Units: mg/L
Analysis Date: 09/26/2000 7:59 Analyst: A_A

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

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00090351-03C	MW-5
00090351-05C	MW-10
00090351-06C	MW-11A
00090351-07C	MW-12
00090351-09C	OW-4

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
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
MI - Matrix Interference



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Quality Control Report

Brown & Caldwell

BJ Hobbs

Analysis: Purgeable Aromatics
Method: SW8021B

WorkOrder: 00090351
Lab Batch ID: R21044

Method Blank

RunID: HP_R_000919A-408277 Units: ug/L
Analysis Date: 09/19/2000 15:25 Analyst: D_R

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

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00090351-01A	MW-3
00090351-02A	MW-4
00090351-03A	MW-5
00090351-04A	MW-7
00090351-05A	MW-10

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	142
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

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

MI - Matrix Interference



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Quality Control Report

Brown & Caldwell

BJ Hobbs

Analysis: Gasoline Range Organics
Method: SW8015B

WorkOrder: 00090351
Lab Batch ID: R21047

Method Blank

RunID: HP_R_000919B-408434 Units: mg/L
Analysis Date: 09/19/2000 15:25 Analyst: D_R

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	88.0	74-121
Surr: 4-Bromofluorobenzene	70.0	55-150

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00090351-01A	MW-3
00090351-02A	MW-4
00090351-03A	MW-5
00090351-04A	MW-7
00090351-05A	MW-10

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
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
MI - Matrix Interference



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Quality Control Report

Brown & Caldwell

BJ Hobbs

Analysis: Purgeable Aromatics
Method: SW8021B

WorkOrder: 00090351
Lab Batch ID: R21082

Method Blank

RunID: HP_N_000920A-408758 Units: ug/L
Analysis Date: 09/20/2000 10:35 Analyst: DL

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
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

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
RunID: HP_N_000920A-408759 Units: ug/L
Analysis Date: 09/20/2000 12:23 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	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
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
MI - Matrix Interference



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Quality Control Report

Brown & Caldwell

BJ Hobbs

Analysis: Gasoline Range Organics
Method: SW8015B

WorkOrder: 00090351
Lab Batch ID: R21087

Method Blank

RunID: HP_N_000920C-408824 Units: mg/L
Analysis Date: 09/20/2000 10:09 Analyst: DL

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
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
Gasoline Range Organics	ND	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

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

MI - Matrix Interference



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Quality Control Report

Brown & Caldwell

BJ Hobbs

Analysis: Purgeable Aromatics
Method: SW8021B

WorkOrder: 00090351
Lab Batch ID: R21218

Method Blank

RunID: HP_R_000921A-411033 Units: ug/L
Analysis Date: 09/21/2000 16:03 Analyst: D_R

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
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: ug/L
Analysis Date: 09/21/2000 16:29 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	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

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

MI - Matrix Interference



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Quality Control Report

Brown & Caldwell

BJ Hobbs

Analysis: Gasoline Range Organics
Method: SW8015B

WorkOrder: 00090351
Lab Batch ID: R21222

Method Blank

RunID: HP_R_000921B-411099 Units: mg/L
Analysis Date: 09/21/2000 16:03 Analyst: D_R

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
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

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
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
MI - Matrix Interference



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Quality Control Report

Brown & Caldwell

BJ Hobbs

Analysis: Nitrogen, Nitrate (As N)
Method: E300

WorkOrder: 00090351
Lab Batch ID: R20844

Method Blank

RunID: WET_000914S-404629 Units: mg/L
Analysis Date: 09/14/2000 13:14 Analyst: KM

Analyte	Result	Rep Limit
Nitrogen, Nitrate (As N)	ND	0.10

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00090351-03D	MW-5
00090351-05D	MW-10
00090351-06D	MW-11A
00090351-07D	MW-12
00090351-09D	OW-4

Laboratory Control Sample (LCS)

RunID: WET_000914S-404632 Units: mg/L
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	13.8	98.7	0.396	20	76	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

* - Recovery Outside Advisable QC Limits

D - Recovery Unreportable due to Dilution

MI - Matrix Interference



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HOUSTON, TEXAS 77054
(713) 660-0901

Quality Control Report

Brown & Caldwell

BJ Hobbs

Analysis: Sulfate
Method: E300

WorkOrder: 00090351
Lab Batch ID: R20851

Method Blank

RunID: WET_000914T-404812 Units: mg/L
Analysis Date: 09/14/2000 13:14 Analyst: KM

Analyte	Result	Rep Limit
Sulfate	ND	0.20

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00090351-03D	MW-5
00090351-05D	MW-10
00090351-06D	MW-11A
00090351-07D	MW-12
00090351-09D	OW-4

Laboratory Control Sample (LCS)

RunID: WET_000914T-404813 Units: mg/L
Analysis Date: 09/14/2000 13:14 Analyst: KM

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper 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 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
Sulfate	200	200	410	107	200	420	109	2.58	20	95	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
MI - Matrix Interference

*Chain of Custody
And
Sample Receipt Checklist*



SPL, Inc.

SPL Worksheet No:

00090351

Analysis Request & Chain of Custody Record

page 1 of 2

Client Name: Brown, Caldwell

Address/Phone: 1415 Louisiana #2500

Client Contact: Lynn Wright 713 759 0999

Project Name: BT Hekles

Project Number:

Project Location: Hekles NM

Invoice To: Lynn Wright

SAMPLE ID DATE TIME comp grab

matrix bottle size pres. Number of Containers

W=water S=soil SL=sludge O=other: P=plastic A=amber glass G=glass V=vial

1=1 liter 4=4oz 40=vial 8=8oz 16=16oz

1=HCl 2=HNO3 3=H2SO4 O=other:

BTEX 8021B

TPH-D 8015

TPH-G 8015

Ethylene RSK 175/147 Methane/Ethane

Nitrate 300

Sulfate 300

MW-3 9/13/00 1330 X

W

VA

1

5

3

X

X

X

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MW-4 1500 X

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VAP

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MW-5 1035 X

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MW-7 1130 X

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MW-10 1530 X

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MW-11A 1400 X

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MW-12 1600 X

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Analysis Request & Chain of Custody Record

CDI Washburn

00090351

036973
2 of 2

[illegible]



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

Sample Receipt Checklist

Workorder: 00090351
Date and Time Received: 9/14/00 10:00:00 AM
Temperature: 3

Received by: Stelly, D'Anna
Carrier name: FedEx

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Water - VOA vials have zero headspace?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	

BROWN AND CALDWELL

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

TRANSMITTAL MEMORANDUM

To: Mr. Wayne Price Energy, Minerals, and Natural Resources Dept. Oil Conservation Division 2040 South Pacheco Street, State Land Office Bldg. Santa Fe, New Mexico 87505	Date: August 1, 2000	Job No: 12832-015
	Subject: BJ Services, Hobbs, New Mexico	
	Certified Mail No.: P 076 598 863	
	Equipment No:	
	Spec. Ref:	
Submittal No:		

WE ARE SENDING:	<input checked="" type="checkbox"/> Attached	<input type="checkbox"/> Under separate cover via 1 st Class Mail the following items:		
<input type="checkbox"/> Shop Drawings	<input type="checkbox"/> Prints	<input type="checkbox"/> Plans	<input type="checkbox"/> Samples	<input type="checkbox"/> Specifications
<input type="checkbox"/> Copy of letter	<input type="checkbox"/> Change Order	<input checked="" type="checkbox"/> Other: Final Report		

THESE ARE TRANSMITTED AS CHECKED BELOW:

- ☐ Second submittal
- ☒ For your use
- ☐ For approval
- ☐ For review and comment
- ☐ With submittal review action noted

SUBMITTAL REVIEW ACTIONS:

- ☐ No exceptions taken
- ☐ Make revisions
- ☐ Amend and resubmit
- ☐ Rejected--see Remarks
- ☐ None

Copies	Date	No.	Description
1	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.

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

**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

July 25, 2000

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

"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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DISTRIBUTION AND QA/QC REVIEWER'S SIGNATURE

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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[®]-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

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

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

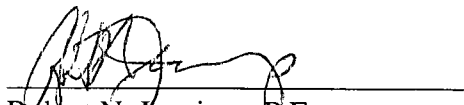
Attention: Mr. Chris Williams

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

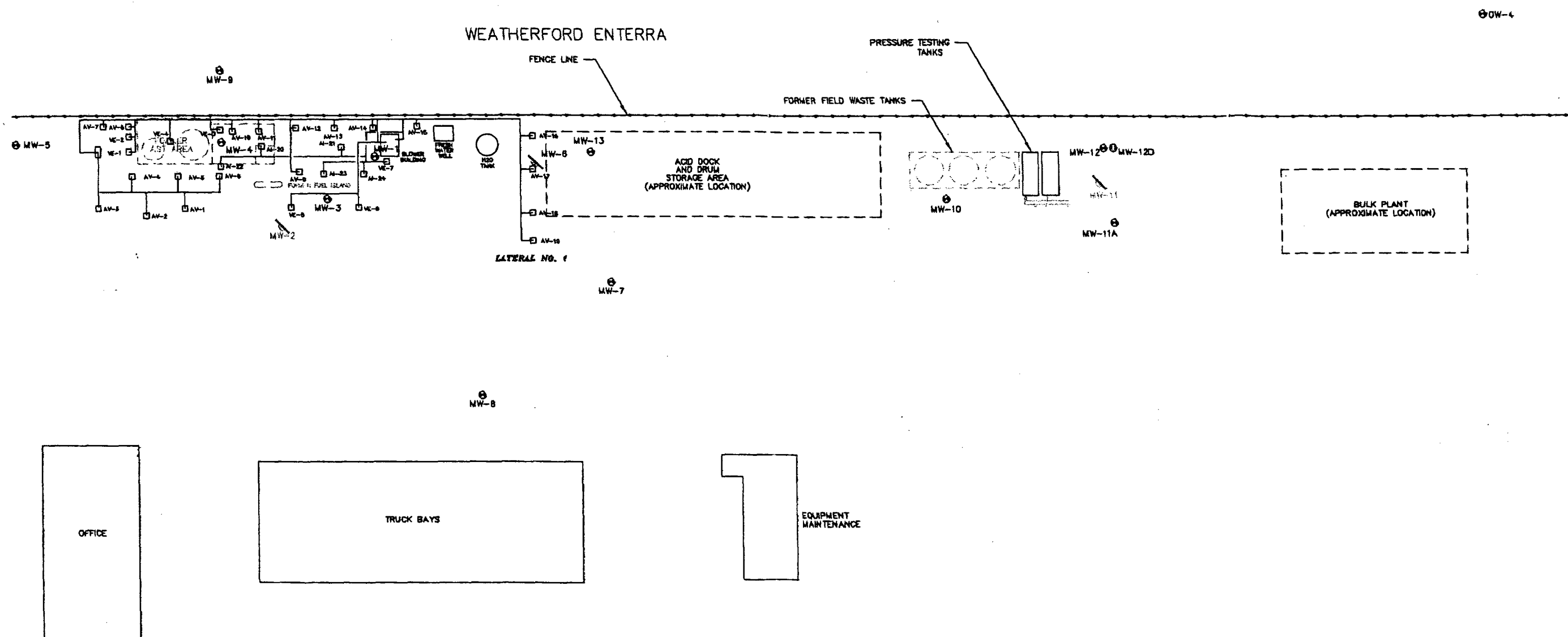


Robert N. Jennings, P.E.
Vice President

RLR/uak

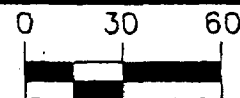


FIGURES



BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER
APPROVED: _____ DATE: _____
BROWN AND CALDWELL



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

LEGEND

- MW-3 EXISTING MONITOR WELL LOCATION
- BIOSPARGING SYSTEM
- MW-2 MONITOR WELL (PLUGGED AND ABANDONED)

TITLE

SITE MAP

CLIENT

BJ SERVICES COMPANY, U.S.A.

SITE

HOBBS, NEW MEXICO

DATE

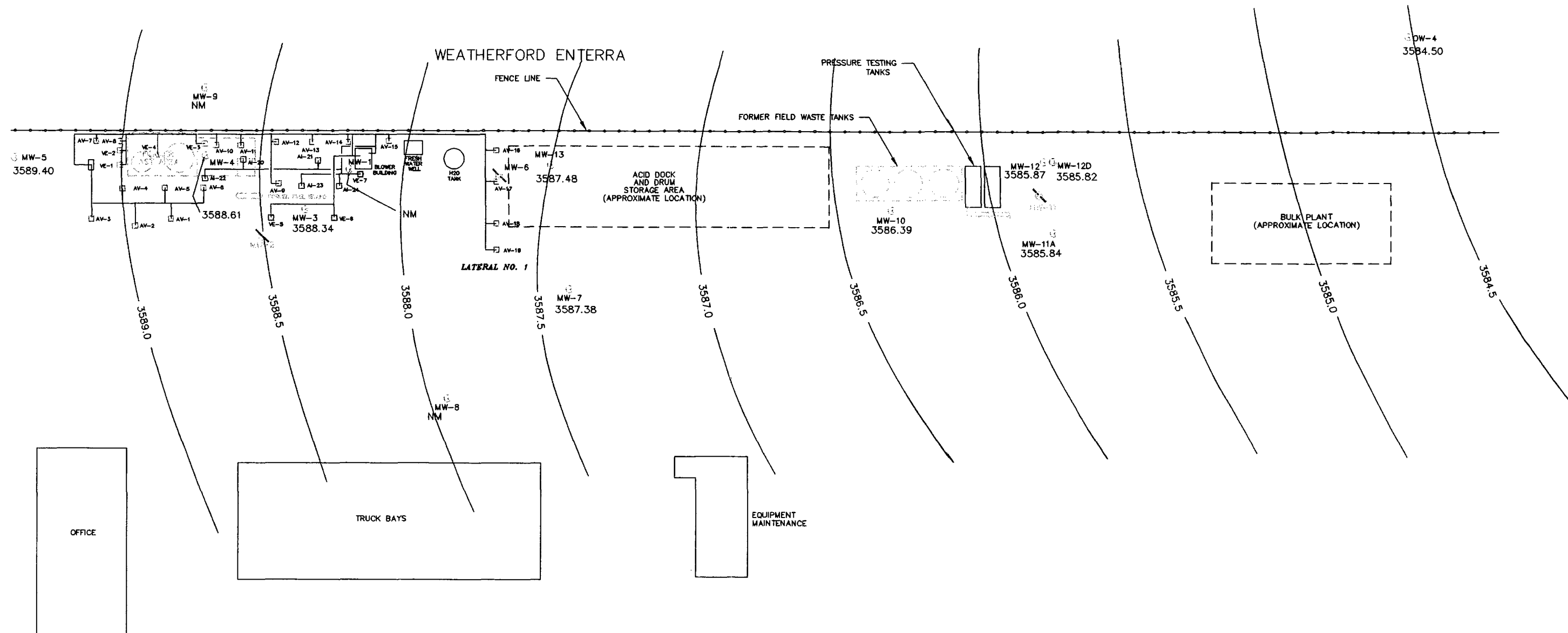
03/16/99

PROJECT NUMBER

12832.021

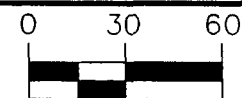
FIGURE NUMBER

1



**BROWN AND
CALDWELL**
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER
APPROVED: _____ DATE: _____
BROWN AND CALDWELL

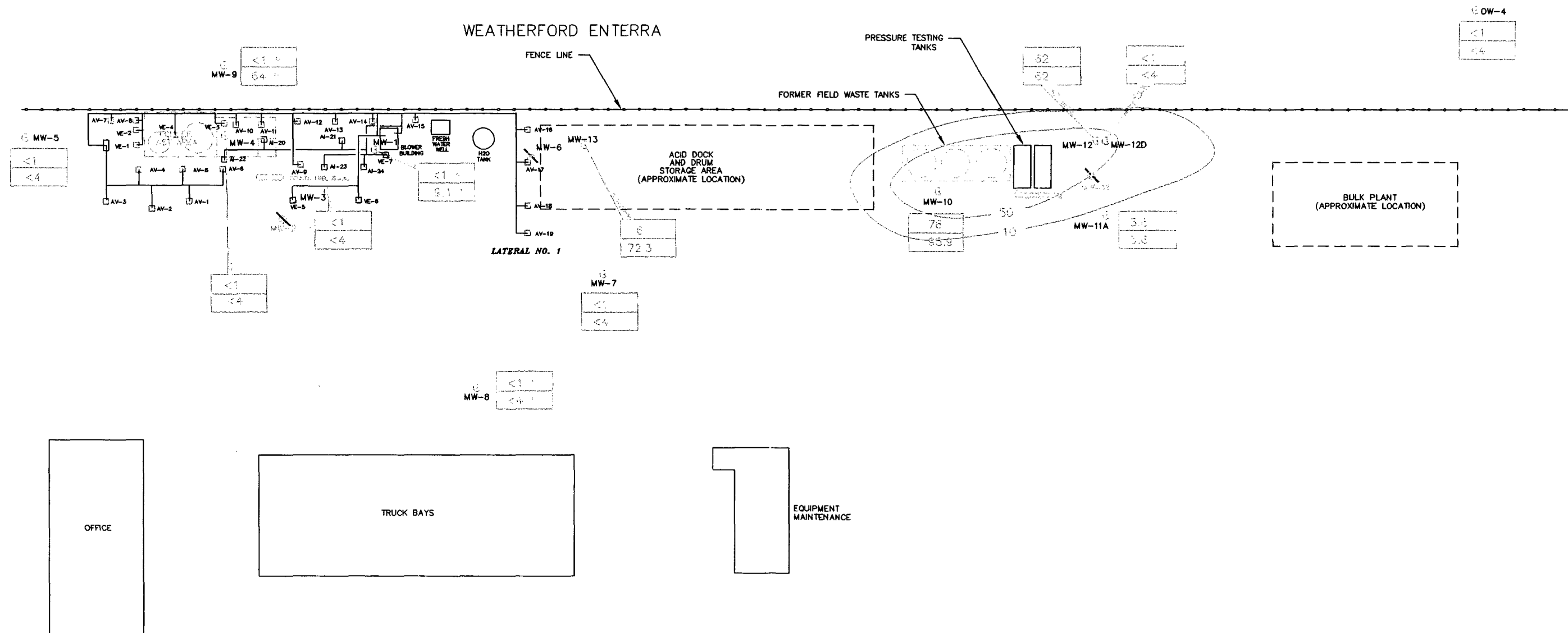


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DRAWN BY: _____ DATE: _____
CHK'D BY: _____ DATE: _____
APPROVED: _____ DATE: _____

LEGEND

- 3588.34
MW-3 MONITOR WELL LOCATION WITH GROUNDWATER ELEVATION (feet AMSL)
- BIOSPARGING SYSTEM
- MW-2 MONITOR WELL (PLUGGED AND ABANDONED)

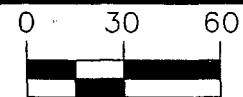
TITLE	GROUNDWATER ELEVATION MAP FOR JUNE 8, 2000		DATE	6/30/00
CLIENT	BJ SERVICES COMPANY, U.S.A.		PROJECT NUMBER	12832.021
SITE	HOBBS, NEW MEXICO		FIGURE NUMBER	2



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.

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER
APPROVED: _____ DATE: _____
BROWN AND CALDWELL



SCALE: 1" = 60'

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

LEGEND

- MW-3 EXISTING MONITOR WELL LOCATION
- MW-2 MONITOR WELL (PLUGGED AND ABANDONED)
- BENZENE CONCENTRATION (ug/L)
- TOTAL BTEX CONCENTRATION (ug/L)
- * INDICATES WELL NOT SAMPLED 6/8/00; DATA PRESENTED ARE FROM 3/10/00
- BIC SPARGING SYSTEM
- BENZENE ISOCONCENTRATION CONTOUR (ug/L)

TITLE BENZENE ISOCONCENTRATION AND TOTAL BTEX DISTRIBUTION MAP FOR JUNE 8, 2000

CLIENT BJ SERVICES COMPANY, U.S.A.

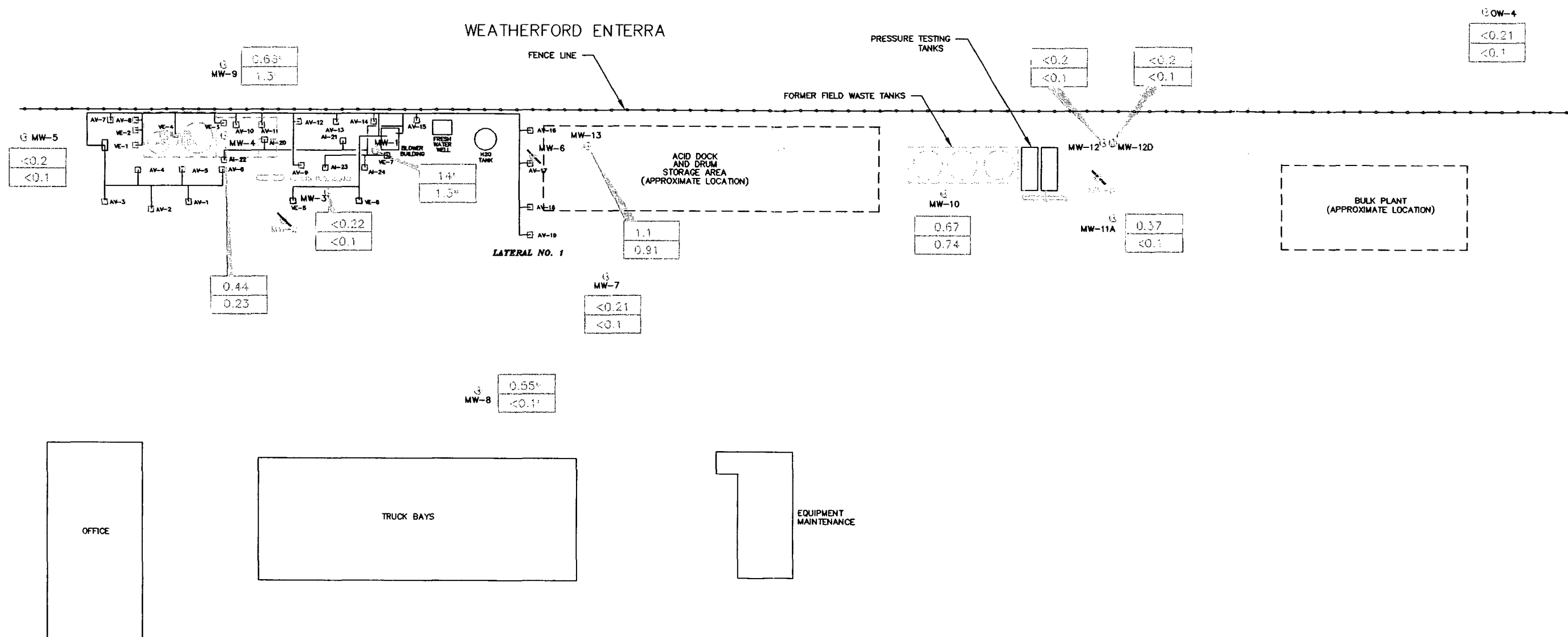
SITE HOBBS, NEW MEXICO

DATE 6/30/00

PROJECT NUMBER 12832.014

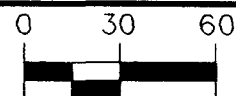
FIGURE NUMBER 3

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**BROWN AND
CALDWELL**
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER
APPROVED: _____ DATE: _____
BROWN AND CALDWELL



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

LEGEND

- MW-3 EXISTING MONITOR WELL LOCATION
MW-2 MONITOR WELL (PLUGGED AND ABANDONED)
- TPH-D CONCENTRATION (mg/L)
- TPH-G CONCENTRATION (mg/L)
* - INDICATES WELL NOT SAMPLED 6/8/00; DATA PRESENTED ARE FROM 3/10/00

TITLE TOTAL PETROLEUM HYDROCARBONS
DISTRIBUTION MAP FOR JUNE 8, 2000

CLIENT BJ SERVICES COMPANY, U.S.A.

SITE HOBBS, NEW MEXICO

DATE
6/30/00

PROJECT NUMBER
12832.014

FIGURE NUMBER
4

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

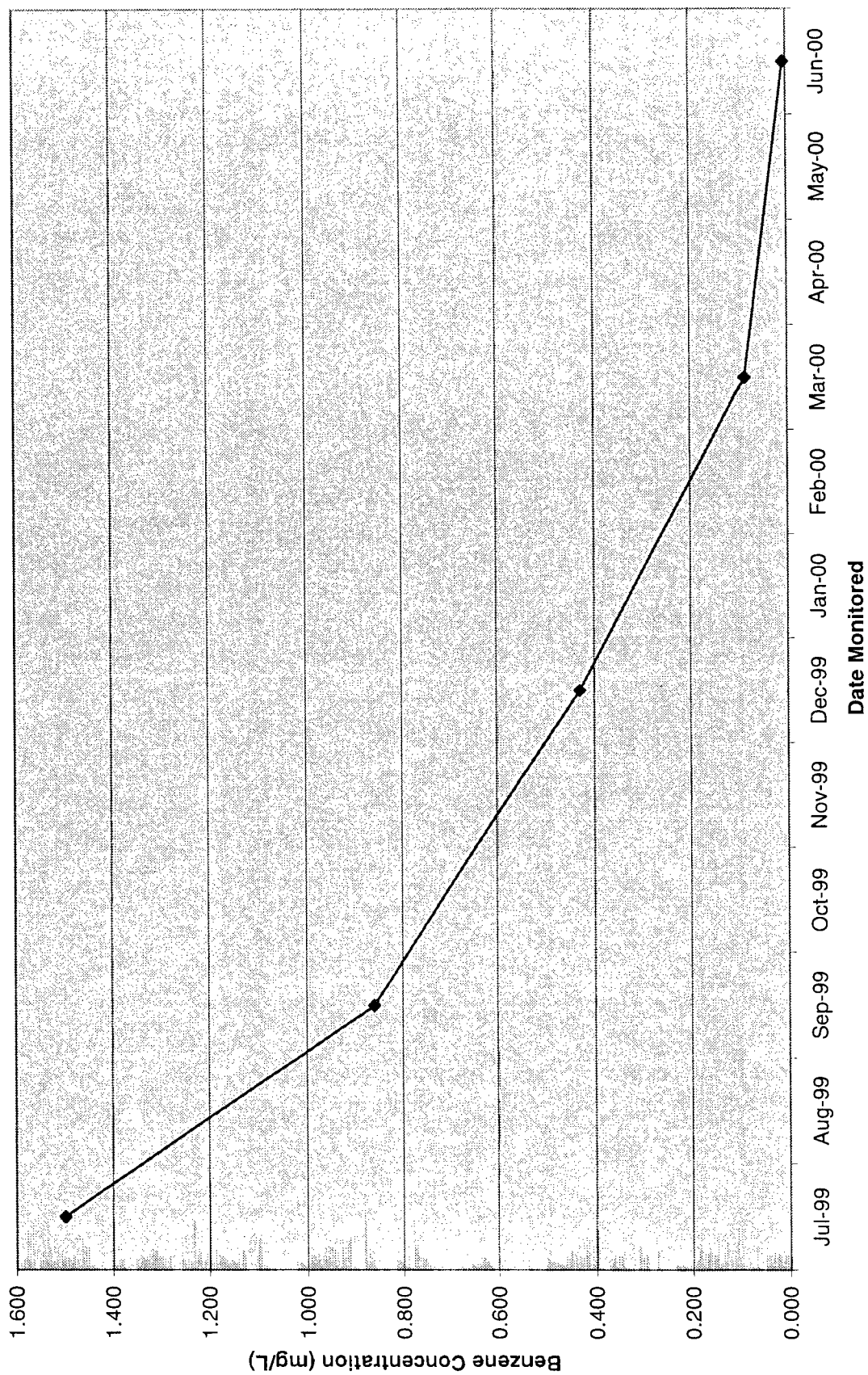
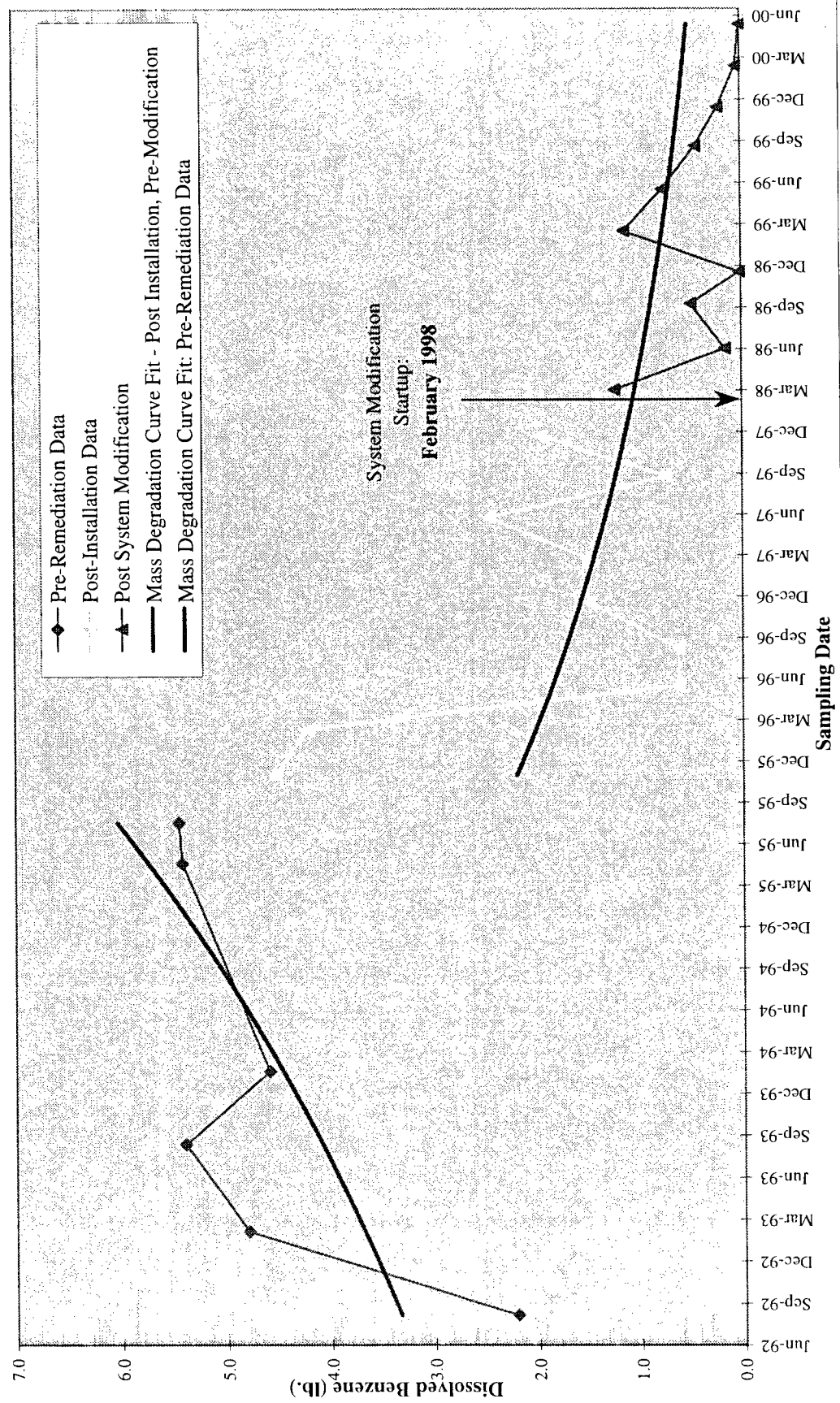
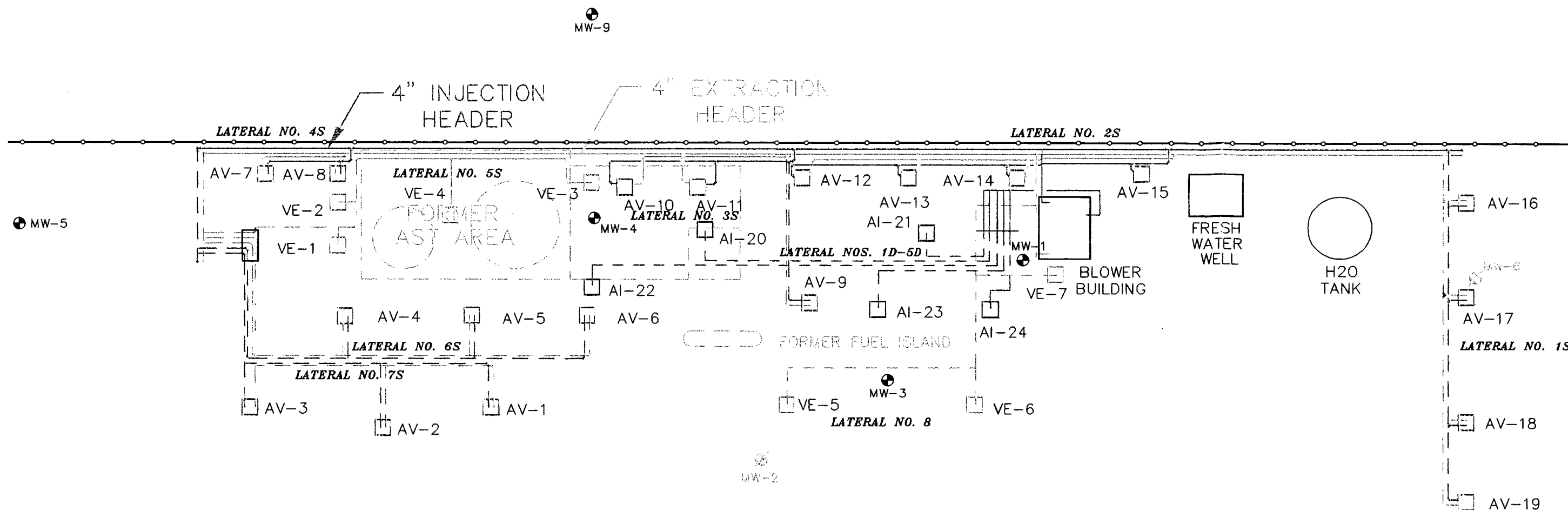


FIGURE 6
Dissolved Benzene Mass vs. Time
West Plume
BJ Services - Hobbs, New Mexico





LEGEND

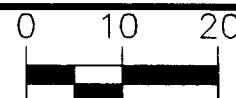
- MW-8 MONITORING WELL LOCATION AND IDENTIFICATION
MW-2 MONITORING WELL - P&A'd
AV-2 EXTRACTION AND INJECTION WELL
VE-1 VACUUM EXTRACTION WELL
AI-24 INJECTION WELL
===== ABOVE GRADE VACUUM AND INJECTION LINES
----- BURIED VACUUM AND INJECTION LINES

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

BROWN AND
CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER
APPROVED: _____ DATE: _____
BROWN AND CALDWELL



SCALE: 1" = 20'
DRAWN BY: _____ DATE: _____
CHK'D BY: _____ DATE: _____
APPROVED: _____ DATE: _____

TITLE
DETAIL OF BIOSPARGING SYSTEM
CLIENT
BJ SERVICES COMPANY, U.S.A.
SITE
HOBBS, NEW MEXICO

DATE
6/30/00
PROJECT NUMBER
12832.015
FIGURE NUMBER
7

Tables

TABLES

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

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

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

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

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

Date	Activity
August 23, 1996	Brown and Caldwell conducted the August 1996 groundwater sampling event.
December 2, 1996	Brown and Caldwell conducted the December 1996 groundwater sampling event.
March 6-7, 1997	BJ Services removed 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.
June 10, 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 portion 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-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	(2)
		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	
		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	PSH Sheen PSH Sheen PSH Sheen
		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	
		03/24/98	55.81	0.00	3,591.72	
		06/23/98	56.38	0.06	3,591.20	
		09/30/98	56.82	0.00	3,590.71	
		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	(3)
		09/14/99	58.14	0.00	3,589.39	
		12/09/99	-	-	-	
		03/09/00	58.99	0.00	3,588.54	
		June 2000	-	-	-	
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	(4),(5)
		08/18/93	49.71	0.00	3,595.13	
		01/26/94	49.97	0.00	3,594.87	
		05/03/95				
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	3,591.34	
		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	
		12/09/99	55.78	0.00	3,589.22	
		03/09/00	56.23	0.00	3,588.77	

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	
		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	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)
		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	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	
		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	
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	
		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	
		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	
		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	
		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	
		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	

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	(3)
		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	-	-	-	
		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) PSH Sheen PSH Sheen PSH Sheen PSH Sheen PSH Sheen
		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	
		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	
		09/12/97	51.95	0.00	3,592.83	
		12/10/97	52.37	0.00	3,592.41	
		03/23/98	52.68	0.00	3,592.10	
		06/23/98	53.08	0.00	3,591.70	
		09/30/98	53.39	0.01	3,591.40	
		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	-	-	-	
		03/09/00	55.69	0.00	3,589.09	
		June 2000	-	-	-	
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	

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)
		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)
MW-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	
		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	
		06/08/00	59.56	0.00	3,584.50	

⁽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.

⁽⁷⁾ - 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.

⁽⁹⁾ - 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	pH	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 ⁽¹⁾
MW-3 ⁽²⁾	0.5	7.38	20.94	1373	202.3	5.16	NM	NM	NM	28.3
MW-4 ⁽²⁾	0	7.44	19.69	1497	-47.2	4.86	NM	NM	NM	NM
	1.0	7.44	18.86	1433	-14.1	4.80	NM	NM	NM	24.3
MW-5 ⁽²⁾	1.0	7.38	19.54	1426	161.4	7.09	NM	NM	NM	NM
	1.5	7.37	18.95	1398	176.1	7.08	5	0	220	29.30
MW-7 ⁽²⁾	1.0	7.12	19.32	1618	209.4	5.25	NM	NM	NM	NM
	1.5	7.13	19.03	1637	211.4	5.57	NM	NM	NM	37.41
MW-10 ⁽³⁾	NM	7.06	23.12	1723	-79.2	1.82	0	3.0	770	675
MW-11A ⁽²⁾	0	7.10	20.17	3996	-100.6	4.53	NM	NM	NM	NM
	1.0	7.07	19.45	4264	-99.1	2.56	0	2.0	770	137.31
MW-12 ⁽³⁾	NM	7.15	20.85	1261	-108.8	1.13	0	8	770	347
MW-12D	0	7.97	20.12	1278	184.9	5.70	NM	NM	NM	NM
	5.0	7.95	19.05	1276	198.8	4.19	NM	NM	NM	NM
	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 ⁽²⁾	NM	7.46	24.11	902	-63.6	2.81	NM	NM	NM	112
OW-4 ⁽²⁾	NM	NM	NM	NM	NM	NM	5.5	3.0	770	NM

⁽¹⁾ NTUs = Nephelometric turbidity units

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

Monitor wells MW-1, MW-8, and 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

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/l				milligrams per liter, mg/L	
MW-1	8/10/92	Regular	5550	12090	2160	7370	NA	NA
	2/9/93	Regular	2100	6500	1300	7400	NA	NA
	8/19/93	Regular	3200	7300	1200	3700	NA	NA
	1/27/94	Regular	1930	4580	672	2390	NA	NA
	5/3/95	Regular	NSP	NSP	NSP	NSP	NA	NSP
	8/1/95	Regular	390	1300	230	800	NA	5.7
	11/15/95	Regular	880	1800	300	970	NA	6.8
	2/23/96	Regular	1500	3700	620	2200	NA	21
	5/31/96	Regular	1100	1700	380	990	NA	7.5
	8/23/96	Regular	1800	3300	570	2100	NA	17
	12/2/96	Regular	5600	9600	2100	9600	100	64
	3/12/97	Regular	5500	9700	2600	8200	22	62
	6/12/97	Regular	5300	34000	7500	27000	180	160
	9/12/97	Regular	1800	4400	1000	3000	23	21
	12/10/97	Regular	7600	12000	2800	8200	11	71
	3/24/98	Regular	4800	7200	1200	2400	4.2	38
	6/23/98	Regular	53	680	580	1400	1.4	9.2
	09/30/98	Regular	3.2	90	280	970	2.5	3.6
	12/10/98	Regular	<1.0	1.5	17	110	1.4	0.31
	03/10/99	Regular	<1.0	<1.0	8.2	110	0.62	0.85
	03/10/99	Duplicate	<1.0	<1.0	7.9	110	0.66	0.84
	06/10/99	Regular	<1.0	1.1	<1.0	28	0.53	0.55
	06/10/99	Duplicate	<1.0	1.8	<1.0	41	0.69	0.76
	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 ¹	8/10/92	Regular	14.9	< 4	< 4	< 4	NA	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	100	12	3	13	NA	NA
	1/27/94	Regular	< 1	1.2	2	2.5	NA	NA
MW-3	8/10/92	Regular	304.9	2099	6760	1586	NA	NA
	2/9/93	Regular	130	< 10	< 10	190	NA	NA
	8/19/93	Regular	560	3100	630	1900	NA	NA
	1/27/94	Regular	1070	5380	510	3120	NA	NA
	5/4/95	Regular	770	3300	470	1800	NA	NA
	8/1/95	Regular	490	2900	890	1600	NA	14
	11/15/95	Regular	250	1000	180	440	NA	2.9
	2/23/96	Regular	120	810	170	560	NA	4
	5/31/96	Regular	670	3900	1200	2300	NA	15
	8/23/96	Regular	330	2200	590	1500	NA	12
	12/2/96	Regular	220	1800	670	1000	0.89	7.4
	3/12/97	Regular	370	2000	960	1400	1.8	11
	6/12/97	Regular	860	4800	1700	2600	1.9	20
	9/11/97	Regular	770	3000	1600	1900	1.6	16
	12/10/97	Regular	240	740	500	450	0.59	5.3
	3/24/98	Regular	140	630	360	310	0.56	3.9
	6/23/98	Regular	100	720	350	490	0.40	4.9
	09/30/98	Regular	42	470	450	530	1.0	3.8

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/l				milligrams per liter, mg/L	
MW-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	< 1	< 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
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/10/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	1/27/94	Regular	8.7	29.9	4	11.3	NA	NA
	5/3/95	Regular	3.7	5.3	0.92	4.6	NA	NA
	8/1/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	11/15/95	Regular	< 0.3	1.2	< 0.3	1.5	NA	NA
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	5/31/96	Regular	31	86	10	20	NA	NA
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	3/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	6/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	9/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	12/10/97	Regular	< 5	< 5	< 5	< 5	< 0.2	< 0.1
	3/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	6/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/l				milligrams per liter, mg/L	
MW-5	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
	09/14/99	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
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
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

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/l				milligrams per liter, mg/L	
MW-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	< 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	< 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
	06/08/00	-	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
	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

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/l				milligrams per liter, mg/L	
MW-9	3/24/98	Regular	< 1	< 1	< 1	26	0.9	1
	6/23/98	Regular	2.4	22	10	36	< 0.2	0.25
	09/30/98	Regular	1.1	5.5	21	59	0.27	0.27
	12/10/98	Regular	< 1.0	1.9	17	79	5.1	0.25
	03/10/99	Regular	< 1.0	< 1.0	5.7	68	< 0.2	0.22
	06/10/99	Regular	< 1.0	1.8	1.8	71	< 0.20	0.43
	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
	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-11 ¹	8/19/93	Regular	< 2	< 2	< 2	< 2	NA	NA
	1/27/94	Regular	< 1	< 1	< 1	< 1	NA	NA
	5/4/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	8/1/95	Regular	44	29	5.5	13	NA	0.2
	11/15/95	Regular	190	2.8	6.2	11	NA	0.4
	2/23/96	Regular	49	1.2	0.51	4	NA	0.25
	5/31/96	Regular	300	83	12	28	NA	0.8
	8/23/96	Regular	100	1.2	0.3	4.7	NA	0.26
	12/2/96	Regular	970	< 5	6	8.1	2	1.3
	3/12/97	Regular	130	< 5	13	5.8	0.42	< 0.5
	3/12/97	Duplicate	100	< 5	10	5.1	0.43	< 0.5
	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 Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/l				milligrams per 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
	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
	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
	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
	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
	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
	12/09/99	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	03/09/00	Regular	< 1	< 1	< 1	< 1	0.25	< 0.1
	06/08/00	Regular	< 1	< 1	< 1	< 1	< 0.21	< 0.1

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 ¹ (mg/L)	Sulfate ¹ (mg/L)	Methane (mg/L)
MW-5	3/23/98	3.87	190	<0.0012
	3/9/99	<0.1	195	<0.0012
	6/10/99	4.73	209	<0.0012
	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
MW-10	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
			223 ³	
	9/14/99	<0.10	160	0.0049
	12/9/99	0.49	170	0.0039
	3/10/00	0.1	160	0.0056
MW-11A	6/8/00	<0.1	150	0.031
	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	0.094
		<0.1 ²	227 ³	
	6/10/99	<0.1	181	0.0036
	9/13/99	0.22	250	<0.0012
MW-12	12/9/99	<0.1	290	0.0079
	3/9/00	0.11	270	0.037
	6/8/00	<0.1	240	0.0069
	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
		<0.1 ²	193 ³	
MW-12D	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
	7/2/99	2.1	249	0.0015
	9/14/99	<0.10	200	0.0065
	12/9/99	<0.1	210	0.0015
	3/9/00	0.14	200	<0.0012
OW-4	6/8/00	<0.1	240	<0.0012
	6/10/99	3.96	192	<0.0012
	9/14/99	3.5	200	<0.0012
	12/9/99	3.4	200	<0.0012
	3/9/00	3.6	200	<0.0012
	6/8/00	3.4	190	<0.0012

¹=By EPA Method 300, except as noted

²=By EPA Method 353.3

³=By EPA Method 375.4

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

Sample Number	Sample Date	parts per million by volume, ppmv				TPH	Discharge Rate, scfm	Benzene Emission Rate, lb/hr	Total BTEX Emission Rate, lb/hr	TPH-VOC Emission Rate, lb/hr
		Benzene	Toluene	Ethylbenzene	Xylenes					
Extraction-1	9/19/95	790	1100	340	920	9700	132.47	1.235	5.943	16.31
Effluent-1	9/20/95	990	2500	560	1600	16000	135.76	1.575	10.939	27.37
Effluent-2	9/28/95	13	28	6	18	2533	123.56	0.019	0.112	3.89
Effluent-4	11/7/95	15	58	12	36	1500	131.10	0.024	0.239	2.59
Effluent 111595-01	11/15/95	39	180	42	130	1870	133.33	0.062	0.773	3.21
Effluent 121995-01	12/19/95	10	45	11	33	530	129.64	0.016	0.191	0.89
Effluent 12996-01	1/29/96	12	61	17	53	1200	128.45	0.018	0.271	1.95
Effluent 032296-01	3/22/96	6	44	12	40	990	124.68	0.009	0.189	1.56
Effluent 042496-01	4/25/96	4	37	10	36	900	118.34	0.005	0.147	1.29
Effluent 053196-01	5/31/96	3.7	40	10	33	670	124.11	0.005	0.158	1.04
Effluent 082396-01	8/23/96	<5	12	<5	<5	200	126.18	0.007	0.047	0.31
Effluent 120296-01	12/2/96	<1	<1	<1	<1	<5	129.04	0.002	0.008	0.01
Eff-31297-1	3/12/97	2.1	15	4.6	15	250	110.56	0.003	0.057	0.33
Effluent 070297-01	7/2/97	<1	6.3	2.4	8.6	65	109.90	0.001	0.028	0.08
Monitor 970912 (1)	9/12/97	NA	NA	NA	NA	340	105.40	NA	NA	0.39
Eff-1-2832	12/10/97	<0.001	0.013	0.009	0.031	210	106.27	0.000	0.000	0.28
Monitor 980324 (1)	3/24/98	NA	NA	NA	NA	1500	108.97	NA	NA	1.91
Monitor 980622 (1)	6/22/98	NA	NA	NA	NA	190	108.16	NA	NA	0.24
Monitor 980930 (1)	9/30/98	NA	NA	NA	NA	200	123.74	NA	NA	0.33
Monitor 981210 (1)	12/10/98	NA	NA	NA	NA	180	111.14	NA	NA	0.24
Monitor 990310 (1)	3/10/99	NA	NA	NA	NA	80	111.14	NA	NA	0.11
Monitor 990610 (1)	6/10/99	NA	NA	NA	NA	140	73.68	NA	NA	0.12
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)	6/8/00	NA	NA	NA	NA	62	170	NA	NA	0.091

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



APPENDICES

A



APPENDIX A
Field Data Sheets

WELL ID: mw-3

1. PROJECT INFORMATION

Project Number: 12832 Task Number: 015Date: 6-8-00Time: 11:40Client: BJSVCsPersonnel: DEAN TEAGUEProject Location: H333Weather: Sunny, Hot, windy

2. WELL DATA

Casing Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Screen Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Total Depth of Well: <u>62</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Static Water: <u>56.66</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Product: <u>—</u> feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Length of Water Column: <u>5.74</u> feet	Well Volume: <u>0.9</u> 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: ☒ Bailer, Size: 1.5" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____ Equipment Model(s): _____

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Was well purged dry? ☐ Yes ☐ No Pumping Rate: _____ gal/min

1. YSE-600
2. _____
3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
11:40	0.5	7.38	20.94	1373 0.0 1373	2023	5.16	28.3		

4. SAMPLING DATA

Method(s): <input checked="" type="checkbox"/> Bailer, Size: <u>1.5"</u> <input type="checkbox"/> Bladder Pump <input type="checkbox"/> 2" Submersible Pump <input type="checkbox"/> 4" Submersible Pump <input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Inertial Lift Pump <input type="checkbox"/> Other: _____	Geochemical Analyses
Materials: Pump/Bailer <input type="checkbox"/> Stainless <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____ <input type="checkbox"/> Dedicated <input type="checkbox"/> Prepared Off-Site <input type="checkbox"/> Field Cleaned <input checked="" type="checkbox"/> Disposable	Ferrous Iron: <u>—</u> mg/L
Materials: Tubing/Rope <input type="checkbox"/> Polyethylene <input type="checkbox"/> Polypropylene <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____ <input type="checkbox"/> Dedicated <input type="checkbox"/> Prepared Off-Site <input type="checkbox"/> Field Cleaned <input type="checkbox"/> Disposable	DO: <u>—</u> mg/L
Depth to Water at Time of Sampling: _____ Field Filtered? <input type="checkbox"/> Yes <input type="checkbox"/> No	Nitrate: <u>—</u> mg/L
Sample ID: <u>MW-3</u> Sample Time: <u>11:55</u> # of Containers: <u>5</u>	Sulfate: <u>—</u> mg/L
Duplicate Sample Collected? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No ID: _____	Alkalinity: <u>—</u> mg/L

5. COMMENTS

Insufficient water for purging w/ pump.
Purge & sample well w/ disposable bailer

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 Number: 015Date: 6-8-00 Time: 12:25Client: BT SVCSPersonnel: Dee, TESAUCProject Location: Sunnyvale HillsWeather: Sunny, hot

2. WELL DATA

Casing Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____	
Screen Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____	
Total Depth of Well: <u>61.50</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____	
Depth to Static Water: <u>56.67</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____	
Depth to Product: <u>—</u> feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____	
Length of Water Column: <u>4.83</u> feet	Well Volume: <u>0.8</u> 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: ☒ Bailer, Size: 1.5" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____ Equipment Model(s): _____

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable 1. YSE-600

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable 2. _____

Was well purged dry? ☐ Yes ☒ No Pumping Rate: _____ gal/min 3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
12:30	—	7.44	19.69	1457	-472	4.86	—	—	clm
12:35	1.0	7.44	18.85	1433	-14.1	4.80	—	—	clm
							24.3		

4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1.5" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ No

Sample ID: MW-4 Sample Time: 12:40 # of Containers: 5

Duplicate Sample Collected? ☐ Yes ☐ No ID: _____

Geochemical Analyses

Ferrous Iron: — mg/L

DO: — mg/L

Nitrate: — mg/L

Sulfate: — mg/L

Alkalinity: — mg/L

5. COMMENTS

Insufficient water for purging with pump, purge & sample well w/ disposable bailer

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-5

1. PROJECT INFORMATION

Project Number: 12532 Task Number: 015Date: 6-8-00 Time: 9:15Client: B5 SVCsPersonnel: DEAN, T. RAGUEProject Location: 40665Weather: Sunny, windy, HOT

2. WELL DATA

Casing Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____	
Screen Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____	
Total Depth of Well: <u>64.7</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____	
Depth to Static Water: <u>58.32</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____	
Depth to Product: <u>-</u> feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____	
Length of Water Column: <u>6.38</u> feet	Well Volume: <u>1.0</u> 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: ☒ Bailer, Size: 1.5 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____ Equipment Model(s): _____

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable 1. YST-600

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable 2. _____

Was well purged dry? ☐ Yes ☒ No Pumping Rate: _____ gal/min 3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
9:15	1.0	7.38	19.81	1426	161.4	7.25	-	-	Clear
9:20	1.5	7.37	18.95	1358	176.1	7.28	29.30	-	Clear

4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1.5 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ No

Sample ID: MW-5 Sample Time: 9:30 # of Containers: 68

Duplicate Sample Collected? ☐ Yes ☐ No ID: _____

Geochemical Analyses

Ferrous Iron: 0 mg/L

DO: 5 mg/L

Nitrate: - mg/L

Sulfate: - mg/L

Alkalinity: 220 mg/L

5. COMMENTS

NOT enough water to purge with pump, hand purged with bailer

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-7

1. PROJECT INFORMATION

Project Number: 12532 Task Number: 015Date: 6-8-00 Time: 9:40Client: BJSVCPersonnel: DEAN TEAGUEProject Location: Hobbs

Weather: _____

2. WELL DATA

Casing Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Screen Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Total Depth of Well: <u>62.2</u> feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Static Water: <u>57.17</u> feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Product: _____ feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Length of Water Column: <u>5.23</u> feet	Well Volume: <u>0.8</u> 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: ☒ Bailer, Size: 1.5 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____ Equipment Model(s): _____

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Was well purged dry? ☐ Yes ☒ No Pumping Rate: _____ gal/min

1. VSE-600
2. _____
3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
9:45	1.0	7.12	19.32	1618	209.4	5.25	-	-	clean
9:50	1.5	7.13	19.33	1637	211.4	5.57	-		clean
							37.41		

4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1.5 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailer ☐ Stainless ☐ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ No

Sample ID: mw-7 Sample Time: 9:50 # of Containers: 5

Duplicate Sample Collected? ☐ Yes ☒ No ID: _____

Geochemical Analyses

Ferrous Iron: 1 mg/L

DO: 1 mg/L

Nitrate: 7 mg/L

Sulfate: 1 mg/L

Alkalinity: 1 mg/L

5. COMMENTS

Insufficient water for purging w/ pump -
Purge & sample well w/ bailer

Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet.

WELL ID: MW-10

1. PROJECT INFORMATION

Project Number: 12832 Task Number: 015Date: 6-8-00 Time: 12345Client: BJS SVCSPersonnel: DEAN TEXG-00Project Location: HobbsWeather: Sunny & HOT

2. WELL DATA

Casing Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Screen Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Total Depth of Well: <u>62.70</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Static Water: <u>58.08</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Product: _____ feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Length of Water Column: <u>4.62</u> feet	Well Volume: <u>0.8</u> 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: ☒ Bailer, Size: 1.5" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____ Equipment Model(s): _____

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Was well purged dry? ☐ Yes ☐ No Pumping Rate: _____ gal/min

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
	<u>-</u>	<u>7.06</u>	<u>23.1</u>	<u>1723</u>	<u>-79.2</u>	<u>1.52</u>	<u>-</u>	<u>-</u>	<u>CL</u>
							<u>675</u>		

4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1.5" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ No

Sample ID: MW-10 Sample Time: 13:00 # of Containers: 8

Duplicate Sample Collected? ☐ Yes ☒ No ID: _____

Geochemical Analyses

Ferrous Iron: 3.0 mg/L

DO: 0 mg/L

Nitrate: - mg/L

Sulfate: - mg/L

Alkalinity: 770 mg/L

5. COMMENTS

Insufficient water for purging w/ pump, purged sample with 1.5" disp-sable bailer

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-11A

1. PROJECT INFORMATION

Project Number: 12832 Task Number: 015Date: 6-8-00 Time: 12:00Client: BSSVCsPersonnel: O'EAR, REAGUEProject Location: HobbsWeather: sunny, hot, windy

2. WELL DATA

Casing Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Screen Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Total Depth of Well: <u>63.50</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Static Water: <u>58.40</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Product: <u>—</u> feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Length of Water Column: <u>5.1</u> feet	Well Volume: <u>0.8</u> 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: ☒ Bailer, Size: 1.5" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____ Equipment Model(s): _____

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Was well purged dry? ☐ Yes ☒ No Pumping Rate: _____ gal/min

1. YSK-600
2. _____
3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
12:05	—	7.12	22.17	3996	-120.6	4.53	—	—	clear
12:10	1.0	7.07	19.45	4264	-99.1	2.56	137.31	—	clear

4. SAMPLING DATA

Method(s): <input checked="" type="checkbox"/> Bailer, Size: <u>1.5"</u> <input type="checkbox"/> Bladder Pump <input type="checkbox"/> 2" Submersible Pump <input type="checkbox"/> 4" Submersible Pump <input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Inertial Lift Pump <input type="checkbox"/> Other: _____	Geochemical Analyses
Materials: Pump/Bailer <input type="checkbox"/> Stainless <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____ <input type="checkbox"/> Dedicated <input type="checkbox"/> Prepared Off-Site <input type="checkbox"/> Field Cleaned <input type="checkbox"/> Disposable	Ferrous Iron: <u>2.0</u> mg/L
Materials: Tubing/Rope <input type="checkbox"/> Polyethylene <input type="checkbox"/> Polypropylene <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____ <input type="checkbox"/> Dedicated <input type="checkbox"/> Prepared Off-Site <input type="checkbox"/> Field Cleaned <input type="checkbox"/> Disposable	DO: <u>0</u> mg/L
Depth to Water at Time of Sampling: _____ Field Filtered? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Nitrate: <u>—</u> mg/L
Sample ID: <u>mw-11A</u> Sample Time: <u>12:15</u> # of Containers: <u>8</u>	Sulfate: <u>—</u> mg/L
Duplicate Sample Collected? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No ID: _____	Alkalinity: <u>770</u> mg/L

5. COMMENTS

Insufficient water for well purging w/ pump.
purged sample w/ bailer

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-12

1. PROJECT INFORMATION

Project Number: 12832 Task Number: 015Date: 6-8-00Time: 13:00Client: BJSUCSPersonnel: DEAN TENG-UPProject Location: HobbsWeather: Sunny, hot

2. WELL DATA

Casing Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____Screen Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____Total Depth of Well: 61.00 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____Depth to Static Water: 61.22 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____Depth to Product: — feetFrom: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____Length of Water Column: 2.58 feetWell Volume: 0.4 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: ☒ Bailer, Size: 1.5" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Equipment Model(s): _____

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable1. YSZ-600Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

2. _____

Was well purged dry? ☐ Yes ☒ No

Pumping Rate: _____ gal/min

3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
		<u>7.15</u>	<u>20.85</u>	<u>1261</u>	<u>-108.8</u>	<u>1.13</u>	<u>347</u>	<u>—</u>	<u>clear</u>

4. SAMPLING DATA

Method(s): ☐ Bailer, Size: _____ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____Materials: Pump/Bailer ☐ Stainless ☐ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ DisposableMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ DisposableDepth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ NoSample ID: MW-12Sample Time: 13:45# of Containers: 8Duplicate Sample Collected? ☐ Yes ☒ No ID: _____

Geochemical Analyses

Ferrous Iron: 8 mg/LDO: 0 mg/LNitrate: — mg/LSulfate: — mg/LAlkalinity: 770 mg/L

5. COMMENTS

Insufficient water for purging w/pump, took a sample w/ disposable bailer

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-12D

1. PROJECT INFORMATION

Project Number: 12872 Task Number: 015
Client: BJSUCS
Project Location: Hobbs

Date: 6-8-00 Time: 11:15
Personnel: DEAN, TEAGUE
Weather: Sunny hot windy

2. WELL DATA

Casing Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Screen Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Total Depth of Well: <u>87.65</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Static Water: <u>58.56</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Product: _____ feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Length of Water Column: <u>29.5</u> 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 Method: ☐ Bailer, Size: _____ ☐ Bladder Pump ☒ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____ Equipment Model(s): _____

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☒ Field Cleaned ☐ Disposable

Materials: Rope/Tubing ☐ Polyethylene ☒ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Was well purged dry? ☐ Yes ☒ No Pumping Rate: 4.0 gal/min

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
11:20	-	7.97	22.12	1278	184.9	5.70	-	-	Clear
11:25	5.0	7.95	19.05	1276	198.8	4.19	-	-	Clear
11:28	10.0	7.91	19.11	1278	197.1	2.04	-	-	Clear
11:30	15.0	7.90	20.05	1281	196.6	1.11	12.72	-	

4. SAMPLING DATA

Method(s): ☐ Bailer, Size: _____ ☐ Bladder Pump ☒ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☒ Field Cleaned ☐ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☒ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☒ No

Sample ID: MW-12D Sample Time: 11:30 # of Containers: 8

Duplicate Sample Collected? ☐ Yes ☒ No ID: _____

Geochemical Analyses

Ferrous Iron: 0.5 mg/L
DO: 0 mg/L
Nitrate: - mg/L
Sulfate: - mg/L
Alkalinity: 360 mg/L

5. COMMENTS

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-13

1. PROJECT INFORMATION

Project Number: 12832 Task Number: 015Date: 6-8-00 Time: 14:06Client: BS SUESPersonnel: DEAN, FERGUSONProject Location: HobbsWeather: Sunny, Hot

2. WELL DATA

Casing Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Screen Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Total Depth of Well: <u>65.20</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Static Water: <u>68.04</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Product: <u>—</u> feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Length of Water Column: <u>7.16</u> feet	Well Volume: <u>1.2</u> 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: ☒ Bailer, Size: 1.5" ☐ Bladder Pump ☒ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____ Equipment Model(s): _____

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Was well purged dry? ☐ Yes ☒ No Pumping Rate: _____ gal/min

1. YSE-600
2. _____
3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
		<u>7.46</u>	<u>24.1</u>	<u>902</u>	<u>-63.6</u>	<u>2.81</u>	<u>112</u>	<u>-</u>	<u>CL</u>

4. SAMPLING DATA

Method(s): <input checked="" type="checkbox"/> Bailer, Size: <u>1.5"</u> <input type="checkbox"/> Bladder Pump <input type="checkbox"/> 2" Submersible Pump <input type="checkbox"/> 4" Submersible Pump <input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Inertial Lift Pump <input type="checkbox"/> Other: _____	Geochemical Analyses
Materials: Pump/Bailer <input type="checkbox"/> Stainless <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____ <input type="checkbox"/> Dedicated <input type="checkbox"/> Prepared Off-Site <input type="checkbox"/> Field Cleaned <input checked="" type="checkbox"/> Disposable	Ferrous Iron: <u>—</u> mg/L
Materials: Tubing/Rope <input type="checkbox"/> Polyethylene <input type="checkbox"/> Polypropylene <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____ <input type="checkbox"/> Dedicated <input type="checkbox"/> Prepared Off-Site <input type="checkbox"/> Field Cleaned <input type="checkbox"/> Disposable	DO: <u>—</u> mg/L
Depth to Water at Time of Sampling: _____ Field Filtered? <input type="checkbox"/> Yes <input type="checkbox"/> No	Nitrate: <u>—</u> mg/L
Sample ID: <u>MW-13</u> Sample Time: <u>14:30</u> # of Containers: <u>5</u>	Sulfate: <u>—</u> mg/L
Duplicate Sample Collected? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No ID: <u>Duplicates</u>	Alkalinity: <u>—</u> mg/L

5. COMMENTS

Insufficient water for purging w/ pump, bailed well w/ disposable bailer

Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet.

WELL ID: 2W-4

1. PROJECT INFORMATION

Project Number: 12832 Task Number: 215Date: 6-8-00 Time: 12:45Client: BSSysPersonnel: DEMYTEROProject Location: AlbbsWeather: sunny, hot, windy

2. WELL DATA

Casing Diameter: 4 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____Screen Diameter: 4 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____Total Depth of Well: 61.35 feet From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____Depth to Static Water: 55.56 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: 1.79 feet Well Volume: 1.2 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: ☒ Bailer, Size: 1.5' ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Equipment Model(s): _____

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

1. _____

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

2. _____

Was well purged dry? ☒ Yes ☐ No Pumping Rate: _____ gal/min

3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments

4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1.5' ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ DisposableDepth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☒ NoSample ID: 2W-4 Sample Time: 11:00 # of Containers: 8Duplicate Sample Collected? ☐ Yes ☒ No ID: _____

Geochemical Analyses

Ferrous Iron: 3.0 mg/LDO: 5.5 mg/LNitrate: 1 mg/LSulfate: 2 mg/LAlkalinity: 770 mg/L

5. COMMENTS

Insufficient water for pump on 4th collected
Grab sample from 2W-4

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: June (6-8-00)
Recorded by: R. Rexroad

Blower Measurements (monthly):

Injection System (deep)

Flow Rate	35	scfm
Pressure	7	psi
Temperature	20.6	F

Injection System (shallow)

Flow Rate	-	scfm
Pressure	3	psi
Temperature	18.0	F

Extraction system

Flow Rate	170	scfm
Pressure	3"	psi
Temperature	13.0	F

Differential Pressure Readings (monthly):

Injection System (deep)

Lat.#	flowrate(meter)
1	12 / 530
2	27 / 130
3	23.6 - 1097
4	22.3 - 1020
5	13.5 - 616

Injection System (shallow)

Lat.#	flowrate (meter)
1	17 - 3030
2	1.9 - 340
3	
4	

Extraction System

Lat. #	flowrate (meter)
1	22 - 580
2	30 - 1410
3	29 - 1320
4	

OUA < 62 ppr

Monthly maintenance:

- 1) Use a shopvac to remove the silt and other debris out of the compound.

Signature: [Signature] Date: 6-8-00

- 2) Change the two injection blower air filters and one extraction blower air filters.

changed: - # of filters left: -
Signature: [Signature] Date: [Signature]

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 #	Initial	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.

B



APPENDIX B

Laboratory Analytical Report



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

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: BJ-HOBBS 12832.015 Site: Hobbs, NM Site Address: PO Number: State: New Mexico State Cert. No.: Date Reported: 6/29/00
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The reported results are only representative of the samples submitted for testing.

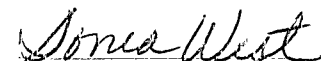
Your sample ID "MW-13,Duplicate"(SPL ID: 00060223-11,13) was analyzed for Gasoline Range Organics by SW846 method 8015. The surrogate 4-Bromofluorobenzene was outside the quality control limits, due to matrix interference.

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.


West, Sonia
Senior Project Manager

6/29/00

Date



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

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

Fax To: Brown & Caldwell
Rick Rexroad

fax: (713) 308-3886

Project Name: BJ-HOBBS 12832.015

Site: 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	HOLD
MW3	00060223-01	Water	6/8/00 11:55:00 AM	6/9/00 10:00:00 AM	100134	<input type="checkbox"/>
MW4	00060223-02	Water	6/8/00 12:40:00 PM	6/9/00 10:00:00 AM	100134	<input type="checkbox"/>
MW5	00060223-03	Water	6/8/00 9:30:00 AM	6/9/00 10:00:00 AM	100134	<input type="checkbox"/>
MW7	00060223-04	Water	6/8/00 9:50:00 AM	6/9/00 10:00:00 AM	100134	<input type="checkbox"/>
MW10	00060223-05	Water	6/8/00 1:00:00 PM	6/9/00 10:00:00 AM	100134	<input type="checkbox"/>
MW11A	00060223-06	Water	6/8/00 12:15:00 PM	6/9/00 10:00:00 AM	100134	<input type="checkbox"/>
MW12	00060223-07	Water	6/8/00 1:45:00 PM	6/9/00 10:00:00 AM	100134	<input type="checkbox"/>
MW12D	00060223-08	Water	6/8/00 11:30:00 AM	6/9/00 10:00:00 AM	100134	<input type="checkbox"/>
Trip Blank 1 6/1/00	00060223-09	Trip Blank	6/8/00	6/9/00 10:00:00 AM	100134	<input type="checkbox"/>
Trip Blank 2 6/1/00	00060223-10	Trip Blank	6/8/00	6/9/00 10:00:00 AM	100134	<input type="checkbox"/>
MW-13	00060223-11	Water	6/8/00 2:30:00 PM	6/9/00 10:00:00 AM	100120	<input type="checkbox"/>
OW-4	00060223-12	Water	6/8/00 11:00:00 AM	6/9/00 10:00:00 AM	100120	<input type="checkbox"/>
Duplicate	00060223-13	Water	6/8/00	6/9/00 10:00:00 AM	100120	<input type="checkbox"/>
Trip Blank 3 6/1/00	00060223-14	Trip Blank	6/8/00	6/9/00 10:00:00 AM	100120	<input type="checkbox"/>

Sonia West
West, Sonia
Senior Project Manager

6/29/00

Date

Joel Grice
Laboratory Director

Ted Yen
Quality Assurance Officer

6/29/00 8:52:50 AM



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

Client Sample ID MW3

Collected: 6/8/00 11:55:00

SPL Sample ID: 00060223-01

Site: Hobbs,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	0.22	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-308527

Prep Method	Prep Date	Prep Initials
SW3510B	06/09/2000 13:18	KL

GASOLINE RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Gasoline Range Organics	ND	0.1	1		06/13/00 17:04	DL	307809
Surr: 1,4-Difluorobenzene	107 %	74-121	1		06/13/00 17:04	DL	307809
Surr: 4-Bromofluorobenzene	93.0 %	55-150	1		06/13/00 17:04	DL	307809

PURGEABLE AROMATICS			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-Difluorobenzene	103 %	72-137	1		06/13/00 17:04	DL	307775
Surr: 4-Bromofluorobenzene	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

MI - Matrix Interference

6/29/00 8:52:53 AM



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

Client Sample ID MW4

Collected: 6/8/00 12:40:00

SPL Sample ID: 00060223-02

Site: Hobbs,NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Diesel Range Organics	0.44	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-308528

Prep Method	Prep Date	Prep Initials
SW3510B	06/09/2000 13:18	KL

GASOLINE RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Gasoline Range Organics	0.23	0.1	1		06/13/00 17:30	DL	307813
Surr: 1,4-Difluorobenzene	104	% 74-121	1		06/13/00 17:30	DL	307813
Surr: 4-Bromofluorobenzene	107	% 55-150	1		06/13/00 17:30	DL	307813

PURGEABLE AROMATICS			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-Difluorobenzene	99.5	% 72-137	1		06/13/00 17:30	DL	307776
Surr: 4-Bromofluorobenzene	104	% 48-156	1		06/13/00 17:30	DL	307776

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
MI - Matrix Interference

6/29/00 8:52:54 AM



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

Client Sample ID MW5

Collected: 6/8/00 9:30:00 A SPL Sample ID: 00060223-03

Site: Hobbs,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	0.2	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/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/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/L		
Nitrogen,Nitrate (As N)	4.7	0.1	1		06/09/00 15:00	KM	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-Difluorobenzene	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
SULFATE			MCL	E300	Units: mg/L		
Sulfate	240	4	20		06/09/00 15:00	KM	305275

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
MI - Matrix Interference



HOUSTON LABORATORY

8880 INTERCHANGE DRIVE

HOUSTON, TEXAS 77054

(713) 660-0901

Client Sample ID MW7

Collected: 6/8/00 9:50:00 A SPL Sample ID: 00060223-04

Site: Hobbs,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	0.21	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-308530

Prep Method	Prep Date	Prep Initials
SW3510B	06/09/2000 13:18	KL

GASOLINE RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Gasoline Range Organics	ND	0.1	1		06/13/00 20:27	DL	307824
Surr: 1,4-Difluorobenzene	107	% 74-121	1		06/13/00 20:27	DL	307824
Surr: 4-Bromofluorobenzene	93.7	% 55-150	1		06/13/00 20:27	DL	307824

PURGEABLE AROMATICS			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-Difluorobenzene	102	% 72-137	1		06/13/00 20:27	DL	307782
Surr: 4-Bromofluorobenzene	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
MI - Matrix Interference

6/29/00 8:52:55 AM



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

Client Sample ID MW10

Collected: 6/8/00 1:00:00 P

SPL Sample ID: 00060223-05

Site: Hobbs,NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Diesel Range Organics	0.67	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_000612B-308531							
Prep Method	Prep Date	Prep Initials					
SW3510B	06/09/2000 13:18	KL					
GASOLINE RANGE ORGANICS			MCL	SW8015B	Units: mg/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: mg/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: mg/L		
Nitrogen,Nitrate (As N)	ND	0.1	1		06/09/00 15:00	KM	305245
PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/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
SULFATE			MCL	E300	Units: mg/L		
Sulfate	150	2	10		06/09/00 15:00	KM	305276

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
MI - Matrix Interference

6/29/00 8:52:56 AM



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

Client Sample ID MW11A

Collected: 6/8/00 12:15:00

SPL Sample ID: 00060223-06

Site: Hobbs,NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Diesel Range Organics	0.37	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 ORGANICS			MCL	SW8015B	Units: mg/L		
Gasoline Range Organics	0.12	0.1	1		06/13/00 21:43 DL		307826
Surr: 1,4-Difluorobenzene	118 %	74-121	1		06/13/00 21:43 DL		307826
Surr: 4-Bromofluorobenzene	101 %	55-150	1		06/13/00 21:43 DL		307826
HEADSPACE GAS ANALYSIS			MCL	RSK147	Units: mg/L		
Ethane	ND	0.0025	1		06/14/00 11:24 A_A		309783
Ethylene	ND	0.0032	1		06/14/00 11:24 A_A		309783
Methane	0.0069	0.0012	1		06/14/00 11:24 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 AROMATICS			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-Difluorobenzene	109 %	72-137	1		06/13/00 21:43 DL		307784
Surr: 4-Bromofluorobenzene	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
MI - Matrix Interference

6/29/00 8:52:56 AM



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

Client Sample ID MW12

Collected: 6/8/00 1:45:00 P SPL Sample ID: 00060223-07

Site: Hobbs,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	0.2	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: mg/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	95.0 %	55-150	1		06/13/00 22:09 DL		307828
HEADSPACE GAS ANALYSIS			MCL	RSK147	Units: mg/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: mg/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: mg/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
MI - Matrix Interference



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

Client Sample ID MW12D

Collected: 6/8/00 11:30:00

SPL Sample ID: 00060223-08

Site: Hobbs,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	0.2	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: mg/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: mg/L		
Ethane	ND	0.0025	1		06/14/00 11:50 A_A		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: mg/L		
Nitrogen,Nitrate (As N)	ND	0.1	1		06/09/00 15:00 KM		305250
PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/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: mg/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
MI - Matrix Interference

6/29/00 8:52:58 AM



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

Client Sample ID Trip Blank 1 6/1/00

Collected: 6/8/00

SPL Sample ID: 00060223-09

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 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

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

MI - Matrix Interference

6/29/00 8:52:58 AM



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

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.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
PURGEABLE AROMATICS			MCL	SW8021B	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	% 72-137	1		06/13/00 16:39	DL	307774
Surr: 4-Bromofluorobenzene	104	% 48-156	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
MI - Matrix Interference

6/29/00 8:52:58 AM



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

Client Sample ID MW-13

Collected: 6/8/00 2:30:00 P SPL Sample ID: 00060223-11

Site: Hobbs,NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Diesel Range Organics	1.1	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-308535

Prep Method	Prep Date	Prep Initials
SW3510B	06/09/2000 13:18	KL

GASOLINE RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Gasoline Range Organics	0.91	0.1		1	06/13/00 23:00 DL		307832
Surr: 1,4-Difluorobenzene	115 %	74-121		1	06/13/00 23:00 DL		307832
Surr: 4-Bromofluorobenzene	159 %	55-150		1 *	06/13/00 23:00 DL		307832

PURGEABLE AROMATICS			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-Difluorobenzene	101 %	72-137		1	06/13/00 23:00 DL		307788
Surr: 4-Bromofluorobenzene	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
MI - Matrix Interference

6/29/00 8 52:59 AM



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

Client Sample ID OW-4

Collected: 6/8/00 11:00:00

SPL Sample ID: 00060223-12

Site: Hobbs,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	0.21	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/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: mg/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: mg/L		
Nitrogen,Nitrate (As N)	3.4	0.1	1		06/09/00 15:00 KM		305252
PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/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: mg/L		
Sulfate	190	2	10		06/09/00 15:00 KM		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
MI - Matrix Interference



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

Client Sample ID Duplicate

Collected: 6/8/00

SPL Sample ID: 00060223-13

Site: Hobbs,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	0.21		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_000612B-308540

Prep Method	Prep Date	Prep Initials
SW3510B	06/09/2000 13:18	KL

GASOLINE RANGE ORGANICS			MCL	SW8015B	Units: mg/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 DL		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

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
MI - Matrix Interference

6/29/00 8:53:00 AM



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

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

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

MI - Matrix Interference

6/29/00 8:53:00 AM

Quality Control Documentation



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

Quality Control Report

Brown & Caldwell

BJ-HOBBS 12832.015

Analysis: Diesel Range Organics
Method: SW8015B

WorkOrder: 00060223
Lab Batch ID: 5347

Method Blank

RunID: HP_V_000612B-308748 Units: mg/L
Analysis Date: 06/12/2000 21:55 Analyst: AM
Preparation Date: 06/09/2000 13:18 Prep By: KL Method SW3510B

Analyte	Result	Rep Limit
Diesel Range Organics	ND	0.20

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00060223-01B	MW3
00060223-02B	MW4
00060223-03B	MW5
00060223-04B	MW7
00060223-05B	MW10
00060223-06B	MW11A
00060223-07B	MW12
00060223-08B	MW12D
00060223-11B	MW-13
00060223-12B	OW-4
00060223-13B	Duplicate

Laboratory Control Sample (LCS)

RunID: HP_V_000612B-308749 Units: mg/L
Analysis Date: 06/12/2000 22:34 Analyst: AM
Preparation Date: 06/09/2000 13:18 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
Preparation Date: 06/09/2000 13:18 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	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
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
MI - Matrix Interference



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

Quality Control Report

Brown & Caldwell

BJ-HOBBS 12832.015

Analysis: Headspace Gas Analysis
Method: RSK147

WorkOrder: 00060223
Lab Batch ID: R15749

Method Blank

RunID: VARH_000614A-309767 Units: mg/L
Analysis Date: 06/14/2000 8:33 Analyst: A_A

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

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00060223-03C	MW5
00060223-05C	MW10
00060223-06C	MW11A
00060223-07C	MW12
00060223-08C	MW12D
00060223-12C	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
MI - Matrix Interference



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

Quality Control Report

Brown & Caldwell

BJ-HOBBS 12832.015

Analysis: Purgeable Aromatics
Method: SW8021B

WorkOrder: 00060223
Lab Batch ID: R15598

Method Blank

RunID: HP_W_000613A-307302 Units: ug/L
Analysis Date: 06/13/2000 11:12 Analyst: DL

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	101.3	72-137
Surr: 4-Bromofluorobenzene	101.0	48-156

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00060223-01A	MW3
00060223-02A	MW4
00060223-03A	MW5
00060223-04A	MW7
00060223-05A	MW10
00060223-06A	MW11A
00060223-07A	MW12
00060223-08A	MW12D
00060223-09A	Trip Blank 1 6/1/00
00060223-10A	Trip Blank 2 6/1/00
00060223-11A	MW-13
00060223-12A	OW-4
00060223-13A	Duplicate
00060223-14A	Trip Blank 3 6/1/00

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: 00060223-01
RunID: 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

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

MI - Matrix Interference



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

Quality Control Report

Brown & Caldwell

BJ-HOBBS 12832.015

Analysis: Purgeable Aromatics
Method: SW8021B

WorkOrder: 00060223
Lab Batch ID: R15598

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

Sample Spiked: 00060223-01
RunID: 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
Xylenes, Total	ND	60	62	103	60	62	103	0	18	53	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
MI - Matrix Interference



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

Quality Control Report

Brown & Caldwell

BJ-HOBBS 12832.015

Analysis: Gasoline Range Organics
Method: SW8015B

WorkOrder: 00060223
Lab Batch ID: R15600

Method Blank

RunID: HP_W_000613B-307307 Units: mg/L
Analysis Date: 06/13/2000 11:12 Analyst: DL

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	107.7	74-121
Surr: 4-Bromofluorobenzene	93.7	55-150

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00060223-01A	MW3
00060223-02A	MW4
00060223-03A	MW5
00060223-04A	MW7
00060223-05A	MW10
00060223-06A	MW11A
00060223-07A	MW12
00060223-08A	MW12D
00060223-11A	MW-13
00060223-12A	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 Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
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
MI - Matrix Interference



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

Quality Control Report

Brown & Caldwell

BJ-HOBBS 12832.015

Analysis: Nitrogen, Nitrate (As N)
Method: E300

WorkOrder: 00060223
Lab Batch ID: R15471

Method Blank

RunID: WET_000609Q-305240 Units: mg/L
Analysis Date: 06/09/2000 15:00 Analyst: KM

Analyte	Result	Rep Limit
Nitrogen, Nitrate (As N)	ND	0.10

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00060223-03D	MW5
00060223-05D	MW10
00060223-06D	MW11A
00060223-07D	MW12
00060223-08D	MW12D
00060223-12D	OW-4

Laboratory Control Sample (LCS)

RunID: WET_000609Q-305241 Units: mg/L
Analysis Date: 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: 00060223-03
RunID: WET_000609Q-305243 Units: mg/L
Analysis Date: 06/09/2000 15:00 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)	4.7	10	15	105	10	15	105	0.410	20	76	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

* - Recovery Outside Advisable QC Limits
D - Recovery Unreportable due to Dilution
MI - Matrix Interference



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

Quality Control Report

Brown & Caldwell
BJ-HOBBS 12832.015

Analysis: Sulfate
Method: E300

WorkOrder: 00060223
Lab Batch ID: R15473

Method Blank

RunID: WET_000609R-305266 Units: mg/L
Analysis Date: 06/09/2000 15:00 Analyst: KM

Analyte	Result	Rep Limit
Sulfate	ND	0.20

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00060223-03D	MW5
00060223-05D	MW10
00060223-06D	MW11A
00060223-07D	MW12
00060223-08D	MW12D
00060223-12D	OW-4

Laboratory Control Sample (LCS)

RunID: WET_000609R-305267 Units: mg/L
Analysis Date: 06/09/2000 15:00 Analyst: KM

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

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

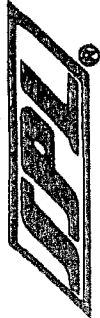
Sample Spiked: 00060191-12
RunID: WET_000609R-305271 Units: mg/L
Analysis Date: 06/09/2000 15:00 Analyst: KM

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Sulfate	150	100	260	113	100	260	110	2.81	20	95	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
MI - Matrix Interference

*Chain of Custody
And
Sample Receipt Checklist*



SPL, Inc.

SPL Worksheet No:

100134

Analysis Request & Chain of Custody Record

00060223

page 1 of 2

Client Name: Brown & Caldwell
Address/Phone: 1415 Louisiana #2500
Client Contact: Rick Rexroad 713 759-0999
Project Name: BT-Hobbs
Project Number: 12832.015
Project Location: Hobbs, NM
Invoice To: Rick Rexroad

SAMPLE ID	DATE	TIME	comp	grab	matrix		size	pres.	Number of Containers	Requested Analysis					
					W=water SL=sediment S=soil O=other:	P=plastic A=amber glass V=vial C=glass				BT-EX 80213	TPH-D 8015	TPH-G 8015	Methylene Blue 175/47	Nitrate 300.0	Substrate
MW 3	6/8/00	1155		X	W	AV	1=1 liter 4=4oz 40=vial 8=8oz 16=16oz	1=HCl 2=HNO3 3=H2SO4 0=other:	5	X	X	X	X	X	
MW 4		1240		X	W	AV			5	X	X	X	X	X	
MW 5		0930		X	W	PAV			8	X	X	X	X	X	
MW 7		0950		X	W	AV			5	X	X	X	X	X	
MW 10		1300		X	W	PAV			8	X	X	X	X	X	
MW 11A		1215		X	W	PAV			8	X	X	X	X	X	
MW 12		1345		X	W	PAV			8	X	X	X	X	X	
MW 12 D		1130		X	W	PAV			8	X	X	X	X	X	
Trip Blank 1					W	V			1	X					
Trip Blank 2					W	V			1	X					

Client/Consultant Remarks:

Laboratory remarks:

Intact? ☐ Y ☐ N

Temp: 32

PM review (initial):

RUSH

Special Detection Tests (Vapor/Leak)

Raw Data ☐

Level 3 QC ☐

Level 4 QC ☐

Standard QC ☒

Standard QC ☒

Standard QC ☒

24hr ☐

72hr ☐

48hr ☐

Standard ☒

Other ☐

1. Relinquished by Sampler

2. Relinquished by:

3. Relinquished by:

5. Relinquished by:

time

time

time

2. Received by: Fed Ex

4. Received by:

6. Received by Laboratory:

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

☐

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

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



SPL, Inc.

SPL Workorder No:

100120

Analysis Request & Chain of Custody Record

page 2 of 2

Client Name: Brown & Caldwell

Address/Phone: 1415 Louisiana #2500

Client Contact: Rick Rexroad 713 757 0999

Project Name: BJ - Hobbs

Project Number: 12832.015

Project Location: Hobbs, NM

Invoice To: Rick Rexroad

SAMPLE ID

DATE

TIME

comp

grab

MW-13

OW-4

Duplicate

Trip Blank 3

6/8/00

1

1

1

1430

1100

—

—

matrix

bottle

size

pres.

Number of Containers

Requested Analysis

BTEx 80218

TPH-D 8015

TPH-G 8015

Methane Ethane

Ethylene RSK-50P 135

Nitrate

Sulfate

300.0

4/9

NS

Intact? ☐ Y ☐ N

Temp: 30

Special Detection Limits (specify):

2. Received by: FEDEX

4. Received by:

6. Received by Laboratory:

6/9/00

1000

Laboratory remarks:

Client/Consultant Remarks:

Requested TAT

24hr ☐72hr ☐48hr ☐Standard ☒Other ☐

Special Reporting Requirements

Fax Results

Level 3 QC

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Sample Receipt Checklist

Workorder: 00060223
Date and Time Received: 6/9/00 10:00:00 AM
Temperature: 3

Received by: Estrada, Ruben
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Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Water - VOA vials have zero headspace?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

BROWN AND CALDWELL

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TRANSMITTAL MEMORANDUM

To: Wayne Price State of New Mexico Oil Conservation Division 2040 South Pacheco Street State Land Office Building Santa Fe, New Mexico 87505	Date: April 21, 2000	Job No: 12832
	Subject: BJ Services Company, U.S.A., Hobbs, NM Facility	
	Certified Mail Registration # : P076 598 794	
	Equipment No:	
	Spec. Ref:	
Submittal No:		

WE ARE SENDING:	<input checked="" type="checkbox"/> Attached	<input type="checkbox"/> Under separate cover via Certified Mail the following items:			
	<input type="checkbox"/> Shop Drawings	<input type="checkbox"/> Prints	<input type="checkbox"/> Plans	<input type="checkbox"/> Samples	<input type="checkbox"/> Specifications
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- ☐ No exceptions taken
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- ☐ Rejected--see Remarks
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cc: Chris Williams, State of New Mexico
Jo Ann Cobb, BJ Services Company, U.S.A.
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Richard Rexroad

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**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

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DISTRIBUTION AND QA/QC REVIEWER'S SIGNATURE

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1.0 INTRODUCTION

Brown and Caldwell conducted field activities associated with the 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.

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

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

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:

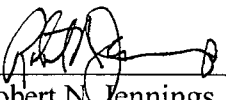
1 copy to: State of New Mexico
Energy, Minerals, and Natural Resources Dept.
Oil Conservation Division
2040 South Pacheco Street, State Land Office Building
Santa Fe, New Mexico 87505
Attention: Mr. Wayne Price

1 copy to: State of New Mexico
Oil Conservation Division, Hobbs District Office
Post Office Box 1980
Hobbs, New Mexico 88240
Attention: Mr. Chris Williams

1 copy to: BJ Services Company, U.S.A.
11211 FM 2920
Tomball, Texas 77375
Attention: Ms. Jo Ann Cobb

1 copy to: Brown and Caldwell, Project File

QUALITY CONTROL REVIEWER

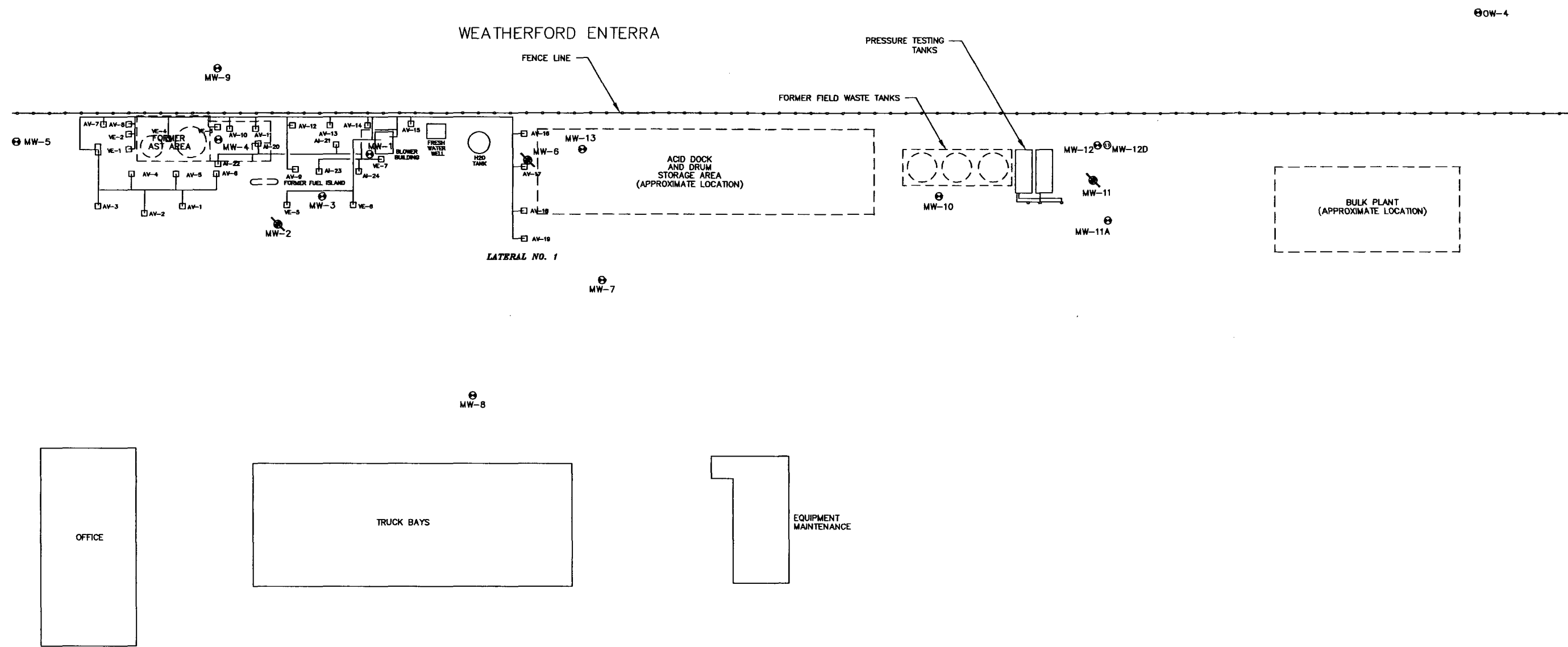

Robert N. Jennings, P.E.
Vice President

RLR/uak

Figures

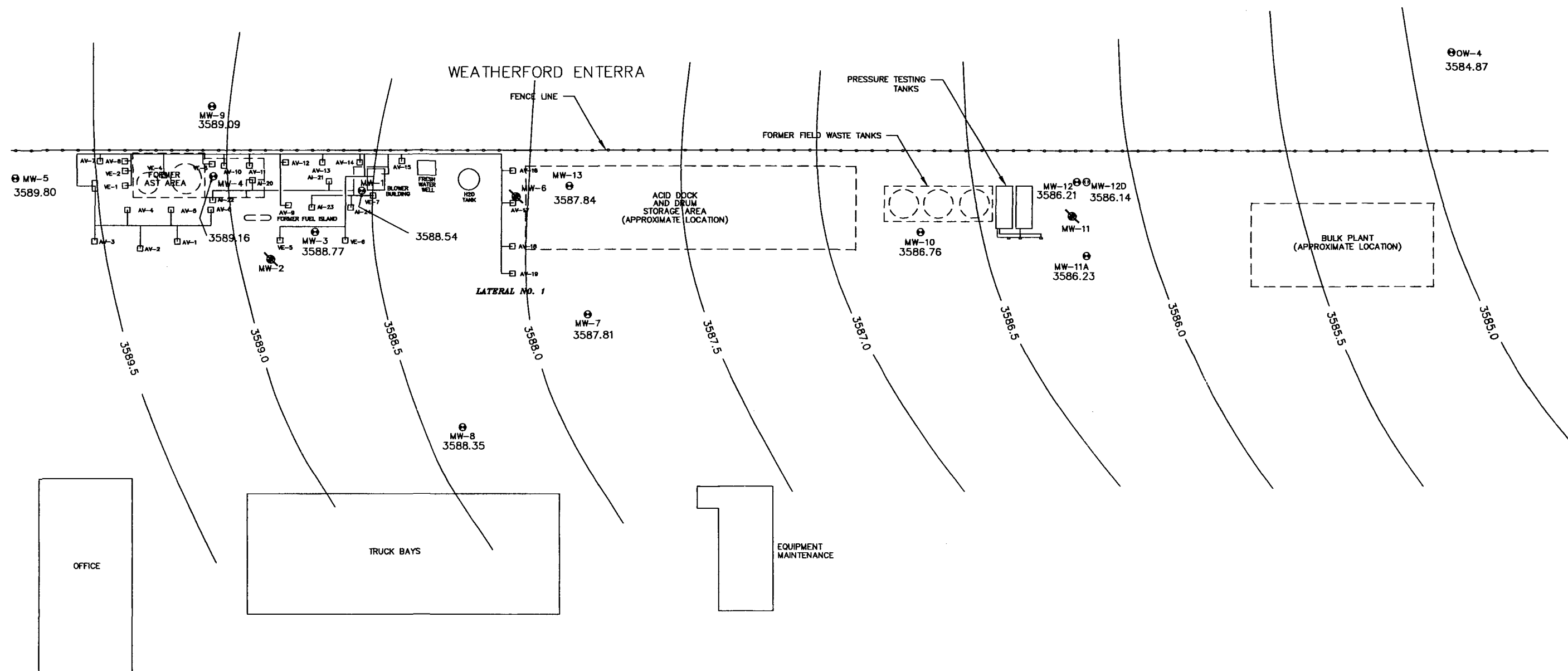


FIGURES



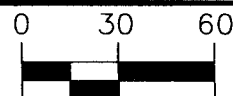
P:\12832\PMWL\locations.dwg 03-16-99 CLK

<div><div>BROWN AND CALDWELL</div><div>HOUSTON, TEXAS</div><div>SUBMITTED: _____ DATE: _____</div><div>PROJECT MANAGER</div><div>APPROVED: _____ DATE: _____</div><div>BROWN AND CALDWELL</div></div>	<div><div>03060</div><div>SCALE: 1" = 60'</div><div>DRAWN BY: _____ DATE: _____</div><div>CHK'D BY: _____ DATE: _____</div><div>APPROVED: _____ DATE: _____</div></div>	<div><div>LEGEND</div><div><div>MW-3</div><div>EXISTING MONITOR WELL LOCATION</div></div><div><div><div></div><div></div></div><div>BIOSPARGING SYSTEM</div></div><div><div><div></div><div></div></div><div>MONITOR WELL (PLUGGED AND ABANDONED)</div></div></div>	TITLE		DATE
			SITE MAP		04/21/00
			CLIENT		PROJECT NUMBER
			BJ SERVICES COMPANY, U.S.A.		12832.021
			SITE		FIGURE NUMBER
			HOBBS, NEW MEXICO		1



BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER
APPROVED: _____ DATE: _____
BROWN AND CALDWELL



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

LEGEND

- 3589.58
MW-3
MONITOR WELL LOCATION WITH GROUNDWATER ELEVATION (feet AMSL)
- BIOSPARGING SYSTEM
- MW-2
MONITOR WELL (PLUGGED AND ABANDONED)

TITLE
GROUNDWATER ELEVATION MAP FOR MARCH 9-10, 2000

CLIENT
BJ SERVICES COMPANY, U.S.A.

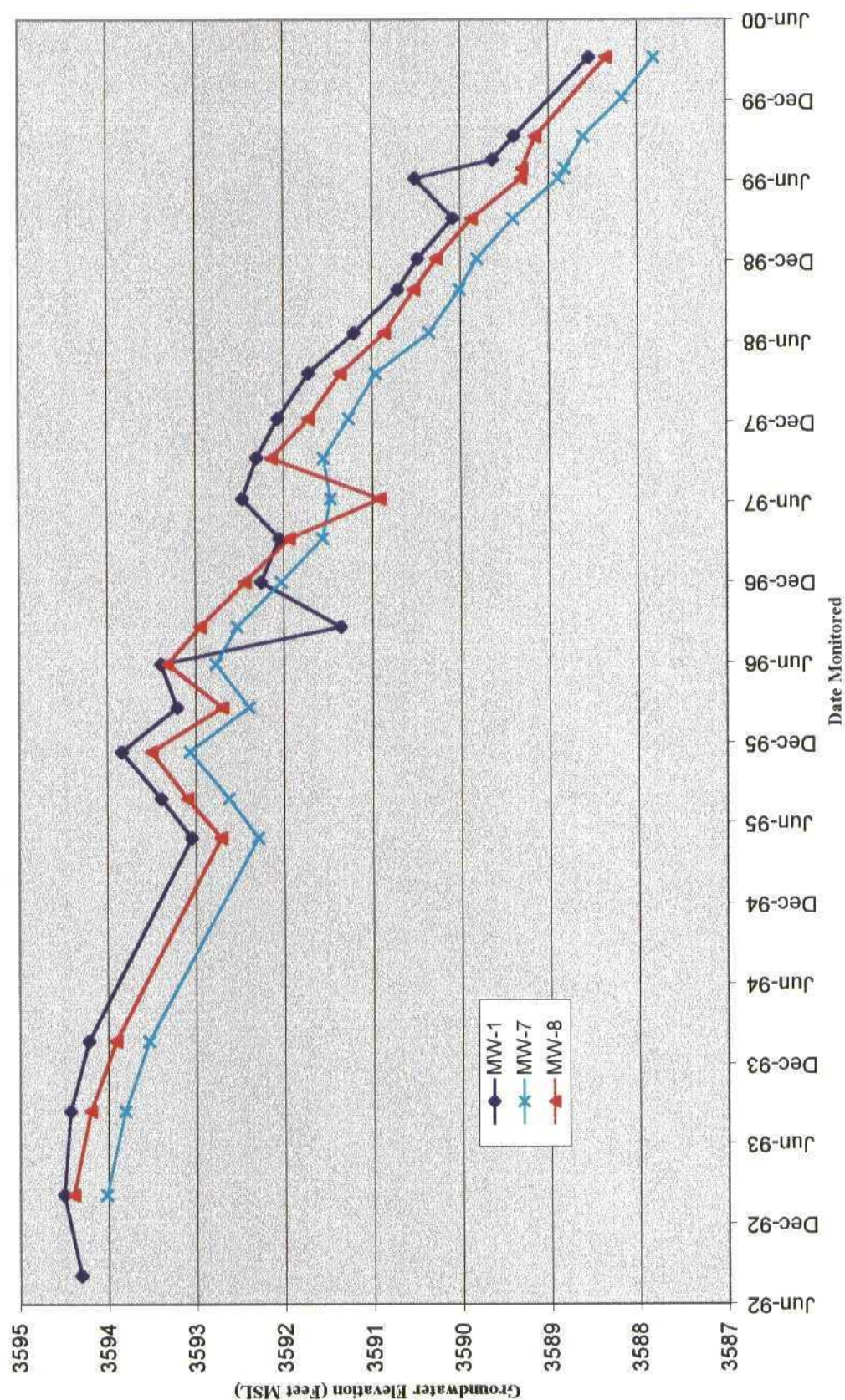
SITE
HOBBS, NEW MEXICO

DATE
04/21/00

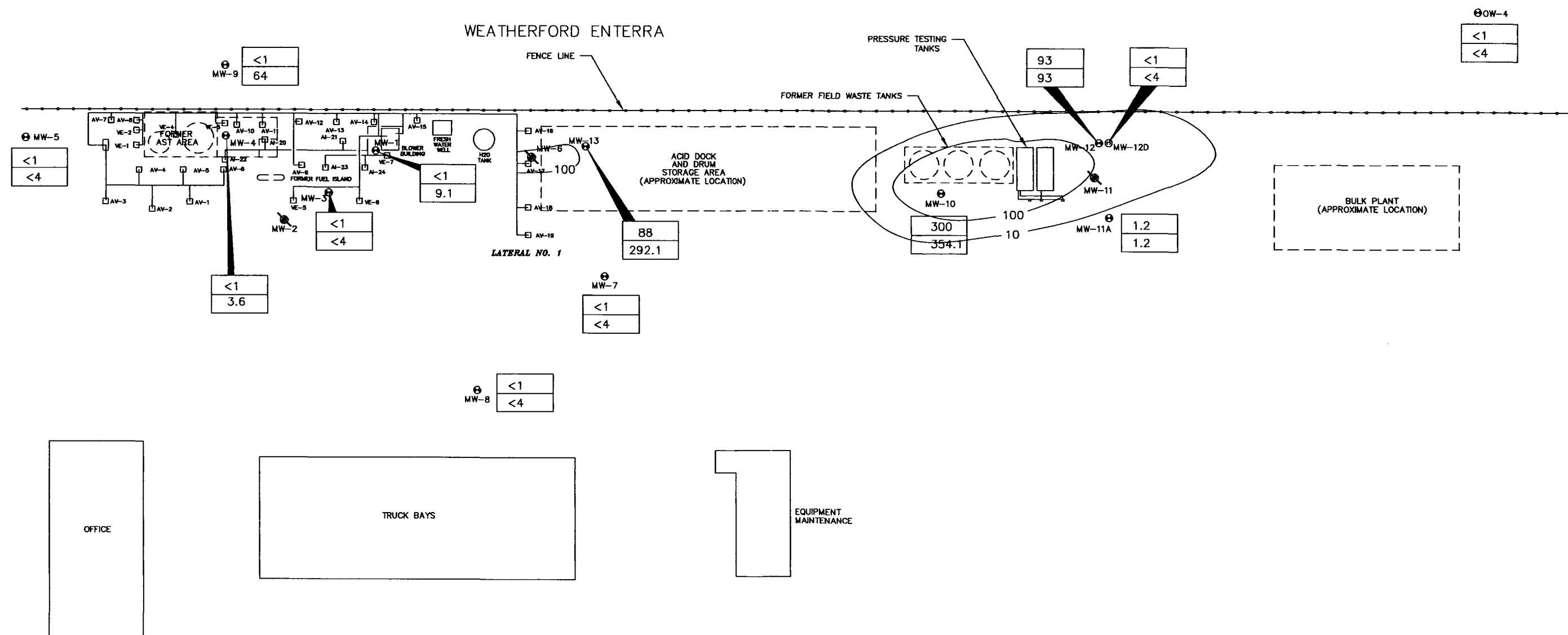
PROJECT NUMBER
12832.021

FIGURE NUMBER
2

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

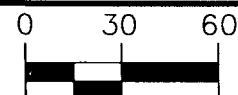


WEATHERFORD ENTERRA



BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER
APPROVED: _____ DATE: _____
BROWN AND CALDWELL



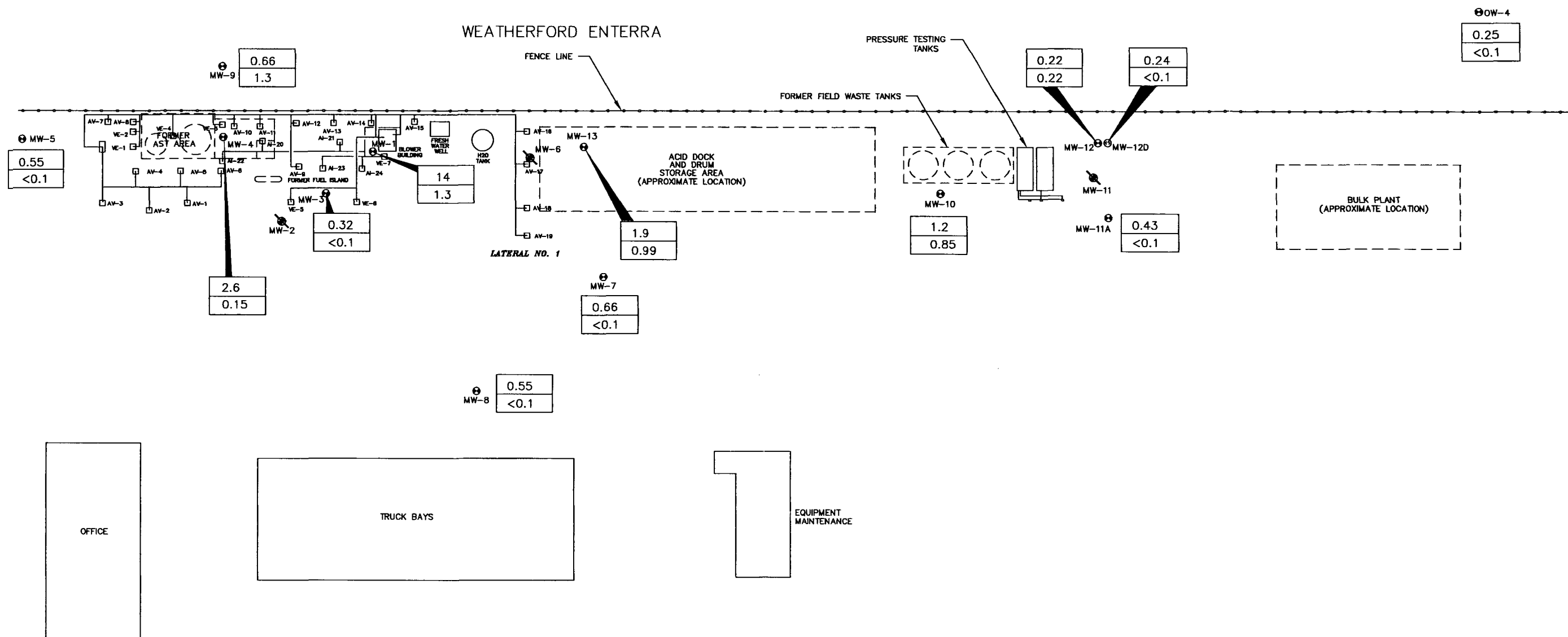
SCALE: 1" = 60'

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

LEGEND

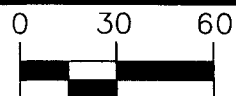
- EXISTING MONITOR WELL LOCATION
- MONITOR WELL (PLUGGED AND ABANDONED)
- BIOPARGING SYSTEM
- BENZENE ISOCONCENTRATION CONTOUR (ug/L)
- TOTAL BTEX CONCENTRATION (ug/L)

TITLE	BENZENE ISOCONCENTRATION AND TOTAL BTEX DISTRIBUTION MAP FOR MARCH 9-10, 2000	DATE	04/21/00
CLIENT	BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER	12832.014
SITE	HOBBS, NEW MEXICO	FIGURE NUMBER	4



BROWN AND
CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER
APPROVED: _____ DATE: _____
BROWN AND CALDWELL



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

LEGEND

- MW-3 EXISTING MONITOR WELL LOCATION
○ MW-2 MONITOR WELL (PLUGGED AND ABANDONED)
□ BIOSPARING SYSTEM
- <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

CLIENT BJ SERVICES COMPANY, U.S.A.

SITE HOBBS, NEW MEXICO

DATE
04/21/00

PROJECT NUMBER
12832.014

FIGURE NUMBER
5

FIGURE 6
Benzene Concentration in Monitor Well MW-13 versus Time
BJ Services - Hobbs, New Mexico

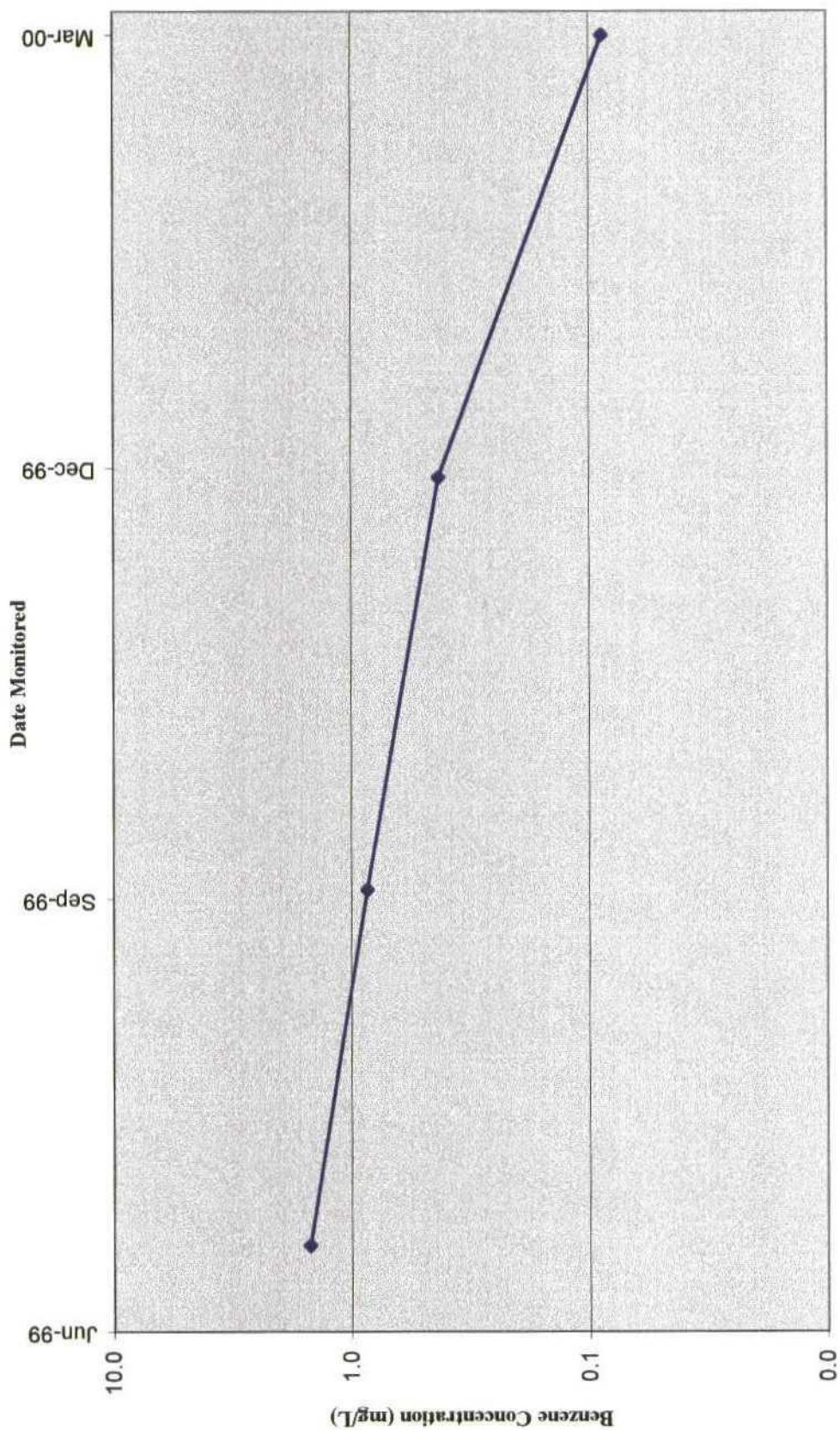
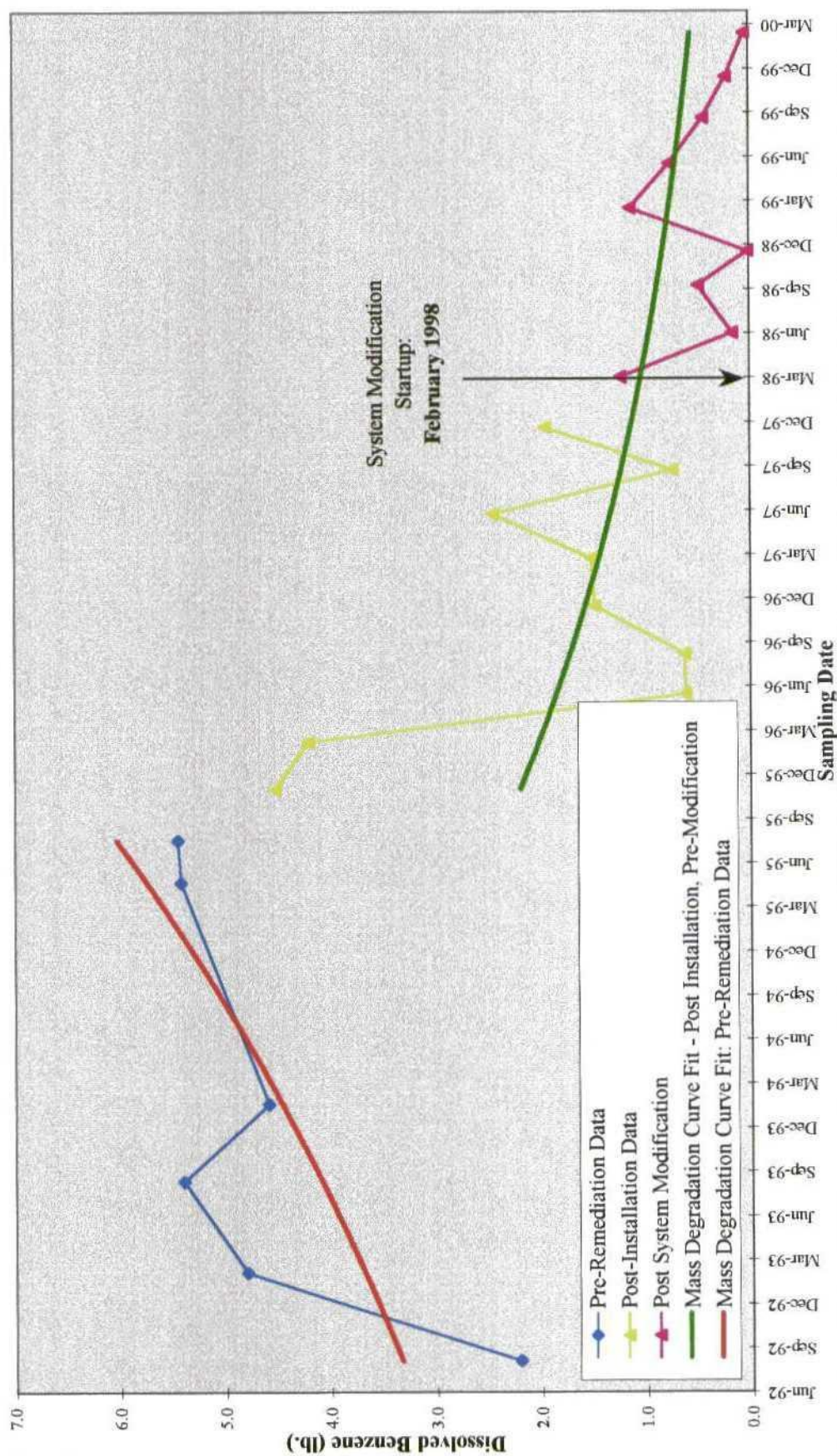
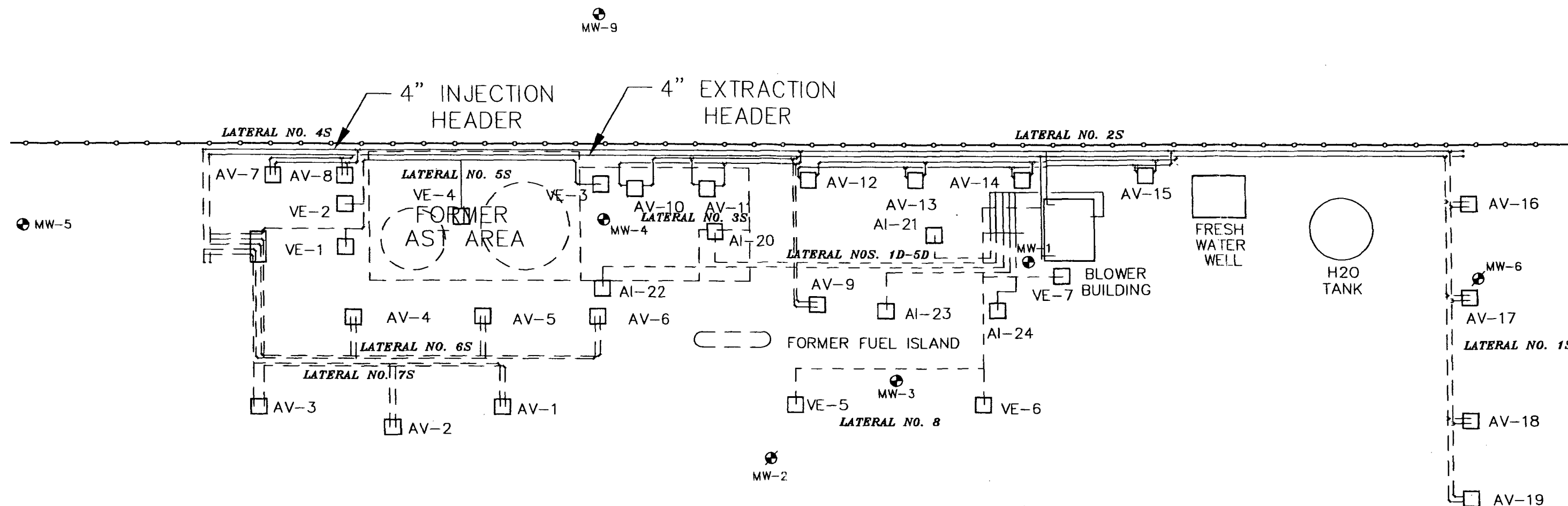


FIGURE 7
Dissolved Benzene Mass vs. Time
West Plume
BJ Services - Hobbs, New Mexico





LEGEND

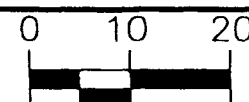
- MW-8 MONITORING WELL LOCATION AND IDENTIFICATION
- MW-2 MONITORING WELL - P&A'd
- AV-2 EXTRACTION AND INJECTION WELL
- VE-1 VACUUM EXTRACTION WELL
- AI-24 INJECTION WELL
- ===== ABOVE GRADE VACUUM AND INJECTION LINES
- ===== BURIED VACUUM AND INJECTION LINES

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**	----	----	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
 ** - LATERAL SHUT OFF IN 03/00

**BROWN AND
CALDWELL**
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
 PROJECT MANAGER
 APPROVED: _____ DATE: _____
 BROWN AND CALDWELL



SCALE: 1" = 20'
 DRAWN BY: TLJ DATE: 04/00
 CHK'D BY: _____ DATE: _____
 APPROVED: _____ DATE: _____

TITLE
DETAIL OF BIOSPARGING SYSTEM

CLIENT
BJ SERVICES COMPANY, U.S.A.

SITE
HOBBS, NEW MEXICO

DATE
04/03/00

PROJECT NUMBER
12832.015

FIGURE NUMBER
8

Tables

TABLES

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

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

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

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

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

Date	Activity
August 23, 1996	Brown and Caldwell conducted the August 1996 groundwater sampling event.
December 2, 1996	Brown and Caldwell conducted the December 1996 groundwater sampling event.
March 6-7, 1997	BJ Services removed 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.
June 10, 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 portion 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	
		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	
		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	
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	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	
		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	

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	
MW-4	3,645.28	08/10/92	50.55	0.00	3,594.73	(1) PSH Sheen 200 ml PSH
		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	
		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	
		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	
		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	
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	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	
		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	
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	

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	3,644.55	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	(5),(6)
		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				
		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	
		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	
MW-8	3,644.87	06/10/99	55.66	0.00	3,588.89	(1)
		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	
		02/09/93	50.48	0.00	3,594.39	
		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	

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	
MW-9	3,644.78	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	
		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	
		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 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	
		12/09/99	-	-	-	(3)
		03/09/00	55.69	0.00	3,589.09	
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	

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	
MW-11	3,643.78	09/14/99	56.91	0.00	3,587.56	(1)
		12/09/99	57.37	0.00	3,587.10	
		03/10/00	57.71	0.00	3,586.76	
		08/18/93	51.92	0.00	3,591.86	
		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	
MW-11A	3,644.24	09/12/97	52.93	0.00	3,590.85	(5),(6)
		12/10/97				
		03/23/98	54.79	0.00	3,589.45	
		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	
MW-12	3,644.29	12/09/99	57.72	0.00	3,586.52	(7)
		03/09/00	58.01	0.00	3,586.23	
		03/23/98	54.72	0.00	3,589.57	
		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	
MW-12D	3,644.38	12/09/99	57.76	0.00	3,586.53	(8)
		03/10/00	58.08	0.00	3,586.21	
		07/02/99	57.13	0.00	3,587.25	
		09/14/99	57.74	0.00	3,586.64	

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	12/09/99	57.86	0.00	3,586.52	(9)
		03/09/00	58.24	0.00	3,586.14	
		07/02/99	56.60	0.00	3,588.92	
		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)
		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) - 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.
- (7) - 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.
- (7) - 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	pH	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 ⁽¹⁾
MW-1 ⁽²⁾	0.5	7.9	17.7	1564	71.3	3.8	NM	NM	NM	74
	1.5	8.0	17.8	705	74.8	6.2	NM	NM	NM	64
MW-3 ⁽²⁾	1	7.5	18.7	1172	55.6	6.20	NM	NM	NM	NM
	1.75	7.0	18.4	632	62.9	7.50	NM	NM	NM	440
MW-4 ⁽²⁾	1.5	7.69	16.36	1289	18.4	6.47	NM	NM	NM	238
MW-5 ⁽²⁾	NM	7.58	15.30	1228	38.3	7.72	6.0	0	280	NM
MW-7 ⁽²⁾	NM	7.66	20.68	801	16.1	7.4	7.0	0	300	NM
MW-8 ⁽²⁾	NM	7.5	19.7	764	24.2	4.94	4.0	0	340	NM
MW-9 ⁽²⁾	NM	8.0	19.2	570	75.9	7.26	NM	NM	NM	NM
MW-10 ⁽³⁾	NM	7.1	18.3	1086	-83.5	4.3	0.2	3.2	770	185
MW-11A ⁽²⁾	1	7.4	19.10	3875	-111.5	3.19	NM	NM	NM	NM
	2	7.30	19.2	3980	-93.9	3.56	0.2	9.8	770	NM
MW-12	1.0	7.0	17.00	1902	-91.5	4.7	NM	NM	NM	NM
	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
MW-12D	0	8.1	19.9	1061	-63.3	5.08	NM	NM	NM	NM
	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 ⁽²⁾	NM	7.5	17.8	1618	-82.1	4.5	NM	NM	NM	438
OW-4 ⁽²⁾	NM	7.9	19.47	1481	67	9.3	6.2	0.0	770	NM

⁽¹⁾ NTUs = Nephelometric turbidity units

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

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

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/l				milligrams per liter, mg/L	
MW-1	8/10/92	Regular	5550	12090	2160	7370	NA	NA
	2/9/93	Regular	2100	6500	1300	7400	NA	NA
	8/19/93	Regular	3200	7300	1200	3700	NA	NA
	1/27/94	Regular	1930	4580	672	2390	NA	NA
	5/3/95	Regular	NSP	NSP	NSP	NSP	NA	NSP
	8/1/95	Regular	390	1300	230	800	NA	5.7
	11/15/95	Regular	880	1800	300	970	NA	6.8
	2/23/96	Regular	1500	3700	620	2200	NA	21
	5/31/96	Regular	1100	1700	380	990	NA	7.5
	8/23/96	Regular	1800	3300	570	2100	NA	17
	12/2/96	Regular	5600	9600	2100	9600	100	64
	3/12/97	Regular	5500	9700	2600	8200	22	62
	6/12/97	Regular	5300	34000	7500	27000	180	160
	9/12/97	Regular	1800	4400	1000	3000	23	21
	12/10/97	Regular	7600	12000	2800	8200	11	71
	3/24/98	Regular	4800	7200	1200	2400	4.2	38
	6/23/98	Regular	53	680	580	1400	1.4	9.2
	09/30/98	Regular	3.2	90	280	970	2.5	3.6
	12/10/98	Regular	<1.0	1.5	17	110	1.4	0.31
	03/10/99	Regular	<1.0	<1.0	8.2	110	0.62	0.85
	03/10/99	Duplicate	<1.0	<1.0	7.9	110	0.66	0.84
	06/10/99	Regular	<1.0	1.1	<1.0	28	0.53	0.55
	06/10/99	Duplicate	<1.0	1.8	<1.0	41	0.69	0.76
	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
MW-2 ¹	8/10/92	Regular	14.9	< 4	< 4	< 4	NA	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	100	12	3	13	NA	NA
	1/27/94	Regular	< 1	1.2	2	2.5	NA	NA
MW-3	8/10/92	Regular	304.9	2099	6760	1586	NA	NA
	2/9/93	Regular	130	< 10	< 10	190	NA	NA
	8/19/93	Regular	560	3100	630	1900	NA	NA
	1/27/94	Regular	1070	5380	510	3120	NA	NA
	5/4/95	Regular	770	3300	470	1800	NA	NA
	8/1/95	Regular	490	2900	890	1600	NA	14
	11/15/95	Regular	250	1000	180	440	NA	2.9
	2/23/96	Regular	120	810	170	560	NA	4
	5/31/96	Regular	670	3900	1200	2300	NA	15
	8/23/96	Regular	330	2200	590	1500	NA	12
	12/2/96	Regular	220	1800	670	1000	0.89	7.4
	3/12/97	Regular	370	2000	960	1400	1.8	11
	6/12/97	Regular	860	4800	1700	2600	1.9	20
	9/11/97	Regular	770	3000	1600	1900	1.6	16
	12/10/97	Regular	240	740	500	450	0.59	5.3
	3/24/98	Regular	140	630	360	310	0.56	3.9
	6/23/98	Regular	100	720	350	490	0.40	4.9
	09/30/98	Regular	42	470	450	530	1.0	3.8
	12/10/98	Regular	13	220	160	290	1.3	0.43

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/l				milligrams per liter, mg/L	
	03/10/99	Regular	3.2	7.4	42	32	0.2	0.44
MW-4	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
	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
MW-5	8/10/92	Regular	< 4	< 4	< 4	< 4	NA	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/10/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	1/27/94	Regular	8.7	29.9	4	11.3	NA	NA
	5/3/95	Regular	3.7	5.3	0.92	4.6	NA	NA
	8/1/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	11/15/95	Regular	< 0.3	1.2	< 0.3	1.5	NA	NA
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	5/31/96	Regular	31	86	10	20	NA	NA
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	3/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	6/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	9/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	12/10/97	Regular	< 5	< 5	< 5	< 5	< 0.2	< 0.1
	3/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	6/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	09/30/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	03/09/99	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/l				milligrams per liter, mg/L	
MW-6 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
	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
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	< 0.5
	03/09/00	Regular	< 1	< 1	< 1	< 1	0.66	< 0.1

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/l				milligrams per liter, mg/L	
MW-8	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
MW-9	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
	4/22/93	Regular	570	380	< 50	870	NA	NA
	7/15/93	Regular	121	7.3	3	458	NA	NA
	8/19/93	Regular	390	290	40	250	NA	NA
	1/27/94	Regular	327	357	51.1	293	NA	NA
	5/3/95	Regular	380	110	19	120	NA	NA
	8/1/95	Regular	660	410	91	310	NA	6.2
	11/15/95	Regular	240	24	11	140	NA	1.5
	11/15/95	Duplicate	170	18	10	120	NA	1.9
	2/23/96	Regular	170	18	2.3	160	NA	4.3
	5/31/96	Regular	120	16	3	200	NA	NA
	8/23/96	Regular	82	13	6	270	NA	4
	8/23/96	Duplicate	76	14	4.8	250	NA	4.4
	12/2/96	Regular	61	< 25	< 25	210	2.6	2.8
	12/2/96	Duplicate	86	13	2.4	270	3.7	2.9
	3/12/97	Regular	30	48	420	880	8.2	19
	6/12/97	Regular	4.7	2.1	11	97	2.6	2.2
	6/12/97	Duplicate	< 5	< 5	6.6	69	5.2	1.9
	9/12/97	Regular	2.1	2.3	2.1	120	1.2	1.9
	12/10/97	Regular	4.9	9	6.8	62	0.86	0.92
	3/24/98	Regular	< 1	< 1	< 1	26	0.9	1
	6/23/98	Regular	2.4	22	10	36	< 0.2	0.25
	09/30/98	Regular	1.1	5.5	21	59	0.27	0.27
	12/10/98	Regular	< 1.0	1.9	17	79	5.1	0.25
	03/10/99	Regular	< 1.0	< 1.0	5.7	68	< 0.2	0.22
	06/10/99	Regular	< 1.0	1.8	1.8	71	< 0.20	0.43

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/l				milligrams per liter, mg/L	
MW-10	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
	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
MW-11 ¹	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
	8/19/93	Regular	< 2	< 2	< 2	< 2	NA	NA
	1/27/94	Regular	< 1	< 1	< 1	< 1	NA	NA
	5/4/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	8/1/95	Regular	44	29	5.5	13	NA	0.2
	11/15/95	Regular	190	2.8	6.2	11	NA	0.4
	2/23/96	Regular	49	1.2	0.51	4	NA	0.25
	5/31/96	Regular	300	83	12	28	NA	0.8
	8/23/96	Regular	100	1.2	0.3	4.7	NA	0.26
	12/2/96	Regular	970	< 5	6	8.1	2	1.3
	3/12/97	Regular	130	< 5	13	5.8	0.42	< 0.5
	3/12/97	Duplicate	100	< 5	10	5.1	0.43	< 0.5
	6/12/97	Regular	150	23	19	< 5	1.1	0.55
	9/12/97	Regular	220	15	27	13	1	0.46
MW-11A	3/24/98	Regular	24	5	< 5	< 5	0.28	0.14
	6/23/98	Regular	9.9	< 5	< 5	< 5	< 0.2	< 0.5
	09/30/98	Regular	9.3	3.7	2.2	7.0	< 0.20	0.1
	12/10/98	Regular	1.7	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	03/10/99	Regular	< 5	< 5	< 5	< 5	0.3	< 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

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/l				milligrams per liter, mg/L	
MW-12	03/09/00	Regular	1.2	< 1	< 1	< 1	0.43	< 0.1
	3/24/98	Regular	100	11	6	8	0.29	0.41
	6/23/98	Regular	88	< 5	< 5	< 5	< 0.2	< 0.5
	6/23/98	Duplicate	89	< 5	< 5	< 5	0.31	< 0.5
	09/30/98	Regular	260	3.0	1.2	7.9	< 0.20	0.62
	12/10/98	Regular	160	< 1.0	< 1.0	1.2	0.21	0.36
	03/10/99	Regular	160	1.1	< 1.0	2.9	0.38	0.45
	06/10/99	Regular	49	1.4	< 1.0	< 1.0	0.22	0.13
MW-12D	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
	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
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	< 0.1
	03/09/00	Regular	< 1	< 1	< 1	< 1	0.25	< 0.1

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

Table 5

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

Analyte (units)	Sample Date	Monitor Wells													OW-4
		MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-11A	MW-12	MW-12D	MW-13
Bicarbonate, as CaCO ₃ (mg/L)	8/1/95	380	430	490	290	670	440	360	570	520	560	NA	NA	NA	NA
	8/23/96	310	310	210	270	120	400	280	390	520	430	NA	NA	NA	NA
	3/23-24/98	286	214	175	247	180	309	260	306	557	NA	319	451	NA	NA
	3/9-10/99	92	309	186	283	286	358	317	333	278	NA	335	386	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	200	520	316
Carbonate, as CaCO ₃ (mg/L)	3/9-10/00	89.1	248	160	253	NA	301	362	279	455	NA	703	402	244	1020
	8/1/95	<10	<10	<10	<10	<10	<10	<10	<10	<10	10	NA	NA	NA	NA
	8/23/96	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	NA	NA
	3/23-24/98	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	<1	<1	NA	NA
	3/9-10/99	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	<1	<1	NA	NA
Hardness-Total, as CaCO ₃ (mg/L)	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1	<1
	3/9-10/00	<2	<2	<2	<2	NA	<2	<2	<2	<2	NA	<2	<2	<2	<4
	3/23-24/98	430	430	275	342	440	670	740	510	1450	NA	1000	1600	NA	NA
	3/9-10/99	250	440	310	340	640	780	680	370	720	NA	1150	460	NA	NA
	3/9-10/00	600	450	500	1200	NA	660	760	430	760	NA	880	700	260	3000
Hydroxide (mg/L)	8/1/95	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	NA	NA
	8/23/96	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	NA	NA
	3/23-24/98	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	0.039	<0.0012	0.91	NA	0.14	<0.0012	NA	NA
	3/9-10/99	NA	NA	NA	<0.0012	NA	NA	NA	NA	0.035	NA	0.094	<0.0012	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0015	0.0017	<0.0012
Methane (mg/L)	3/9-10/00	<0.0012	<0.0012	<0.0012	<0.0012	NA	<0.0012	0.13	<0.0012	0.0056	NA	0.037	<0.0012	<0.0012	<0.0012
Anions (mg/L)	8/1/95	160	150	310	130	380	310	350	110	2200	3400	NA	NA	NA	NA
	8/23/96	130	140	100	99	210	250	360	140	2000	2900	NA	NA	NA	NA
	3/23-24/98	212	206	126	151	183	223	364	164	2390	NA	940	1200	NA	NA
	3/9-10/99	163	156	142	155	411	238	274	123	1160	NA	834	314	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	195	266
Chloride	3/9-10/00	258	196	196	196	NA	224	241	131	474	NA	1290	327	117	258
	8/1/95	0.9	1.2	1.2	0.6	1.1	0.8	0.9	1.3	6.1	NA	2.9	4.2	NA	NA
	8/23/96	1.54	1.46	1.5	1.38	1.79	1.56	1.44	1.84	4.93	NA	3.08	3.13	NA	NA
	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.83	2.22
	6/10-7/2/99	1.7	1.1	1.1	1.1	NA	0.75	0.69	1.5	1	NA	<0.1	1.7	1.3	3.8
Fluoride	3/9-10/00	4.7	5.6	15	28	1.3	9.2	11	38	<0.1	5.5	NA	NA	NA	NA
	8/1/95	11	7.6	7.6	12	<0.5	10	8.6	24	<5	11	NA	NA	NA	NA
	8/23/96	1.78	3.07	2.59	3.87	0.69	3.92	1.84	4.27	0.07	NA	<0.05	<0.05	NA	NA
	3/23-24/98	0.7	2.1	2.6	NA	<0.1	3.3	0.7	3.7	NA	NA	<0.1	<0.1	NA	NA
	3/9-10/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.1	3.96
Nitrate (Nitrogen as N)	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.4	NA
	8/1/95	4.7	5.6	15	28	1.3	9.2	11	38	<0.1	5.5	NA	NA	NA	NA
	8/23/96	11	7.6	7.6	12	<0.5	10	8.6	24	<5	11	NA	NA	NA	NA
	3/23-24/98	1.78	3.07	2.59	3.87	0.69	3.92	1.84	4.27	0.07	NA	<0.05	<0.05	NA	NA
	3/9-10/99	0.7	2.1	2.6	NA	<0.1	3.3	0.7	3.7	NA	NA	<0.1	<0.1	NA	NA

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

Analyte (units)	Sample Date	Monitor Wells														OW-4
		MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-11A	MW-12	MW-12D	MW-13	
Sulfate	3/9-10/00	0.33	2.9	3.7	5.3	NA	3.6	0.35	7.2	0.1	NA	0.11	<0.1	0.14	<0.1	3.6
	8/1/95	150	150	210	230	6.7	180	160	150	130	230	NA	NA	NA	NA	NA
	8/23/96	130	150	150	140	85	80	160	180	120	130	NA	NA	NA	NA	NA
	3/23-24/98	130	180	160	190	230	310	250	230	320	NA	190	240	NA	NA	NA
	3/9-10/99	196	162	178	195	72	246	240	146	223	NA	227	193	NA	NA	NA
Calcium	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	270	NA	249	334	192
	3/9-10/00	530	190	250	260	NA	280	260	170	160	NA	NA	210	200	170	200
	8/1/95	120	120	220	160	320	300	300	180	610	490	NA	NA	NA	NA	NA
	8/23/96	120	130	89	110	62	270	230	190	390	440	NA	NA	NA	NA	NA
	3/23-24/98	129	122	79	109	94	208	215	142	417	NA	259	388	NA	NA	NA
Magnesium	3/9-10/99	80.2	129	90.8	116	141	233	197	122	214	NA	308	148	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	113	389	141
	3/9-10/00	155	119	147	387	NA	167	215	110	177	NA	229	180	78.1	122	882
	8/1/95	34	36	58	27	72	42	49	43	130	130	NA	NA	NA	NA	NA
	8/23/96	120	32	21	18	28	40	48	44	84	120	NA	NA	NA	NA	NA
Potassium	3/23-24/98	36	30	18	20	42	47	52	36	130	NA	96	108	NA	NA	NA
	3/9-10/99	19.7	31.5	20.4	21.6	62.2	54.4	47.7	28.5	43	NA	101	32.1	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	16.6	83.9	44.3
	3/9-10/00	41.3	27.5	26.3	29.2	NA	44.3	39.1	26.2	61	NA	47.7	30.6	7.25	38.8	74.5
	8/1/95	2.4	2.6	3.5	4.2	3	3.4	5	4.1	35	46	NA	NA	NA	NA	NA
Sodium	8/23/96	2.4	3	2.2	3.1	2.4	3.7	3.9	2.6	41	53	NA	NA	NA	NA	NA
	3/23-24/98	<20	<20	<20	<20	<20	<20	<20	<20	20	NA	30	70	NA	NA	NA
	3/9-10/99	3	4	3	4	4	9	4	3	15	NA	21	101	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	66	6	3
	3/9-10/00	4.01	4.11	3.95	5.61	NA	6.98	4.53	4.08	18.3	NA	18.6	104	70.6	2.84	10.7
Arsenic	8/1/95	100	93	140	110	130	95	94	98	660	2000	NA	NA	NA	NA	NA
	8/23/96	100	110	88	120	120	96	100	83	960	2600	NA	NA	NA	NA	NA
	3/23-24/98	113	126	109	130	100	92	101	118	1090	NA	312	381	NA	NA	NA
	3/9-10/99	126	135	124	155	141	116	115	122	856	NA	225	180	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	121	165	103
	3/9-10/00	123	112	115	123	NA	95.1	95.4	99.1	181	NA	608	129	103	114	97.3
	8/1/95	0.0076	0.0043	<0.002	0.0059	0.028	0.0033	0.0034	0.0055	0.015	0.0086	NA	NA	NA	NA	NA
	8/23/96	0.0078	0.0066	0.0059	0.0067	0.018	0.0036	0.0033	0.0044	0.028	0.011	NA	NA	NA	NA	NA
	3/23-24/98	0.007	0.007	0.008	0.007	0.013	<0.005	<0.005	0.005	0.035	NA	0.019	0.013	NA	NA	NA
	3/9-10/99	0.013	0.009	0.012	0.005	0.02	0.006	0.005	0.007	0.026	NA	0.036	0.066	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.022	0.008	<0.005
	3/9-10/00	0.0178	0.00817	0.0178	0.0173	NA	0.00849	0.00953	0.00757	0.0474	NA	0.108	0.0948	0.0143	<0.005	0.034

Table 5

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

Analyte (units)	Sample Date	Monitor Wells												MW-13	OW-4
		MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-11A	MW-12	MW-12D	
Barium	8/1/95	0.069	0.38	0.34	0.049	1.1	0.069	0.075	0.089	0.37	0.2	NA	NA	NA	NA
	8/23/96	0.064	0.24	0.069	0.038	0.29	0.061	0.066	0.089	0.26	0.2	NA	NA	NA	NA
	3/23-24/98	0.11	0.182	0.044	0.044	0.208	0.059	0.074	0.066	0.287	NA	0.163	0.157	NA	NA
	3/9-10/99	0.058	0.059	0.045	0.054	0.555	0.076	0.052	0.043	0.17	NA	0.174	0.144	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.155	0.333	0.062
Cadmium	3/9-10/00	0.0917	0.108	0.0694	0.184	NA	0.046	0.236	0.0419	0.281	NA	0.872	0.245	0.0962	1.49
	8/1/95	<0.001	<0.001	0.0052	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	NA	NA
	8/23/96	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NA	NA	NA	NA
	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
	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
Chromium	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.005	<0.005	<0.005	<0.005
	3/9-10/00	<0.005	<0.005	0.0178	<0.005	NA	<0.005	<0.005	<0.005	<0.005	NA	<0.005	<0.005	<0.005	<0.005
	8/1/95	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NA	NA	NA	NA
	8/23/96	<0.01	<0.01	<0.01	<0.01	0.049	<0.01	<0.01	<0.01	<0.01	<0.01	NA	NA	NA	NA
	3/23-24/98	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NA	<0.01	<0.01	NA	NA
Lead	3/9-10/99	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NA	<0.01	<0.01	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0342	0.02	0.02	<0.01
	3/9-10/00	<0.01	<0.01	<0.01	0.0248	NA	<0.01	<0.01	<0.01	0.031	NA	0.0342	0.0124	<0.01	0.105
	8/1/95	<0.002	<0.002	0.0044	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0025	NA	NA	NA	NA
	8/23/96	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	NA	NA	NA	NA
Mercury	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
	3/9-10/99	<0.005	<0.005	<0.005	<0.005	0.013	<0.005	<0.005	<0.005	<0.005	NA	0.009	<0.005	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00595	<0.005	<0.005	<0.005
	3/9-10/00	<0.005	<0.005	<0.005	0.00565	NA	<0.005	<0.005	<0.005	0.00661	NA	0.00595	<0.005	<0.005	0.0355
	8/1/95	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0005	<0.0002	<0.0002	<0.0002	<0.0002	NA	NA	NA	NA
Acenaphthene	8/23/96	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	NA	NA	NA	NA
	3/23-24/98	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	NA	<0.0002	<0.0002	NA	NA
	3/9-10/99	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	NA	<0.0002	<0.0002	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0002	<0.0002
	3/9-10/00	0.000695	<0.0002	<0.0002	<0.0002	NA	<0.0002	<0.0002	<0.0002	<0.0002	NA	<0.0002	<0.0002	<0.0002	<0.0002
Acenaphthylene	8/1/95	<50	<10	<500	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA
	8/23/96	<10	<10	<30	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA
	3/23-24/98	<10	<3	<3	<3	<3	<3	<3	<3	<3	NA	<3	<3	NA	NA
	3/9-10/99	<0.1	<0.1	<2.0	<0.1	<2.0	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA	<0.1
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	3/9-10/00	0.28	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1
	8/1/95	<50	<10	<500	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA
	8/23/96	<10	<10	<30	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA

Table 5

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

Analyte (units)	Sample Date	Monitor Wells													OW-4
		MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-11A	MW-12	MW-12D	MW-13
Anthracene	3/23-24/98	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA	NA
	3/9-10/99	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1.0	<0.1
	3/9-10/00	0.91	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	0.4	NA	<0.1	<0.1	<0.1	1.8
Benzo(a)anthracene	8/1/95	<50	<10	<500	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA
	8/23/96	<10	<10	<30	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA
	3/23-24/98	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA	NA
	3/9-10/99	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA	NA
Benzo(k)fluoranthene	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1.0	<0.1	<0.1
	3/9-10/00	0.18	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	8/1/95	<50	<10	<500	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA
	8/23/96	<10	<10	<30	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA
	3/23-24/98	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA	NA
	3/9-10/99	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<1.0	<0.1
Fluorene	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	<0.1	<0.1
	3/9-10/00	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene	8/1/95	<50	<10	<500	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA
	8/23/96	<10	<10	<30	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA
	3/23-24/98	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA	NA
	3/9-10/99	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<1.0	<0.1
Phenanthrene	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	<0.1	<0.1
	3/9-10/00	25	<0.1	0.36	<0.1	NA	<0.1	<0.1	1.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	8/1/95	<50	<10	<500	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA
	8/23/96	<10	<10	<30	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA
	3/23-24/98	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA	NA
	3/9-10/99	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<1.0	<0.1
Phenanthrene	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	<0.1	<0.1
	3/9-10/00	2.4	<0.1	0.44	<0.1	NA	<0.1	<0.1	0.42	1.5	NA	0.12	0.26	<0.1	<0.1
Phenanthrene	8/1/95	<50	<10	<500	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA
	8/23/96	<10	<10	<30	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA
	3/23-24/98	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA	NA
	3/9-10/99	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA	NA
Phenanthrene	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.6	<0.1
	3/9-10/00	2.4	<0.1	0.44	<0.1	NA	<0.1	<0.1	0.42	1.5	NA	0.12	0.26	<0.1	<0.1
Phenanthrene	8/1/95	<50	<10	<500	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA
	8/23/96	<10	<10	<30	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA
	3/23-24/98	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA	NA
	3/9-10/99	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA	NA

Table 5

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

Analyte (units)	Sample Date	Monitor Wells												
		MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-11A	MW-12	MW-12D
Pyrene	8/23/96	<10	<10	<30	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA
	3/23-24/98	<10	<10	<10	<10	<10	<10	<10	<10	<10	NA	<0.1	<0.1	NA
	3/9-10/99	<0.1	<0.1	2	<0.1	<20	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	<0.1
	3/9-10/00	0.65	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1
Acetone	8/1/95	<50	<10	<500	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA
	8/23/96	<10	<10	<30	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA
	3/23-24/98	<10	<10	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA
	3/9-10/99	<0.1	<0.1	0.4	<0.1	<20	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	<0.1
sec-Butylbenzene	3/9-10/00	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isopropylbenzene	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<100	<100	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MTBE	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	8/1/95	<50	97	<500	<5	42	<5	<5	<5	<5	<5	NA	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 5

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

Analyte (units)	Sample Date	Monitor Wells														
		MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-11A	MW-12	MW-12D	MW-13	OW-4
2-Methylphenol	8/1/95	280	62	1500	< 5	150	< 5	< 5	36	23	< 5	NA	NA	NA	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	29	< 5
4-Methylphenol	8/1/95	< 50	56	< 500	< 5	< 30	< 5	< 5	< 5	< 5	< 5	NA	NA	NA	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	< 5
Bis(2-ethylhexyl)phthalate	8/1/95	< 80	< 20	< 800	< 8	150	< 8	< 8	< 8	< 8	< 8	NA	NA	NA	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	< 5
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	< 5
Phenol	8/1/95	750	< 20	10000	40	< 40	< 7	< 7	< 7	< 7	< 7	NA	NA	NA	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	< 5
Phenol	8/1/95	< 50	< 10	< 500	< 5	< 30	< 5	< 5	< 5	8.2	< 5	NA	NA	NA	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	6	< 5

MW-2 not operative after May 3, 1995; MW-11 not operative after September 1997; MW-2, MW-6, and MW-11 P&A'd 7/1/99.

NA = Not Analyzed.

PAHs = Polynuclear Aromatic Hydrocarbons.

Table 6
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 ¹ (mg/L)	Sulfate ¹ (mg/L)	Dissolved Methane (mg/L)
MW-5	3/23/98	3.87	190	<0.0012
	3/9/99	<0.1	195	<0.0012
	6/10/99	4.73	209	<0.0012
	9/14/99	4.3	210	<0.0012
	12/9/99	4.2	210	<0.0012
	3/9/00	5.3	260	<0.0012
MW-10	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
			223 ³	
	9/14/99	<0.10	160	0.0049
	12/9/99	0.49	170	0.0039
	3/10/00	0.1	160	0.0056
MW-11A	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	0.094
		<0.1 ²	227 ³	
	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
MW-12	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
		<0.1 ²	193 ³	
	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
MW-12D	7/2/99	2.1	249	0.0015
	9/14/99	<0.10	200	0.0065
	12/9/99	<0.1	210	0.0015
	3/9/00	0.14	200	<0.0012
OW-4	6/10/99	3.96	192	<0.0012
	9/14/99	3.5	200	<0.0012
	12/9/99	3.4	200	<0.0012
	3/9/00	3.6	200	<0.0012

¹=By EPA Method 300, except as noted

²=By EPA Method 353.3

³=By EPA Method 375.4

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

Sample Number	Sample Date	Benzene, Toluene, Ethylbenzene, Xylenes parts per million by volume, ppmv				TPH	Discharge Rate, scfm	Benzene Emission Rate, lb/hr	Total BTEX Emission Rate, lb/hr	TPH Emission Rate, lb/hr
		Benzene	Toluene	Ethylbenzene	Xylenes					
Extraction-1	9/19/95	790	1100	340	920	9700	132.47	1.235	5.943	16.31
Effluent-1	9/20/95	990	2500	560	1600	16000	135.76	1.575	10.939	27.37
Effluent-2	9/28/95	13	28	6	18	2533	123.56	0.019	0.112	3.89
Effluent-4	11/7/95	15	58	12	36	1500	131.10	0.024	0.239	2.59
Effluent 111595-01	11/15/95	39	180	42	130	1870	133.33	0.062	0.773	3.21
Effluent 121995-01	12/19/95	10	45	11	33	530	129.64	0.016	0.191	0.89
Effluent 12996-01	1/29/96	12	61	17	53	1200	128.45	0.018	0.271	1.95
Effluent 032296-01	3/22/96	6	44	12	40	990	124.68	0.009	0.189	1.56
Effluent 042496-01	4/25/96	4	37	10	36	900	118.34	0.005	0.147	1.29
Effluent 053196-01	5/31/96	3.7	40	10	33	670	124.11	0.005	0.158	1.04
Effluent 082396-01	8/23/96	<5	12	<5	<5	200	126.18	0.007	0.047	0.31
Effluent 120296-01	12/2/96	<1	<1	<1	<1	<5	129.04	0.002	0.008	0.01
Eff-31297-1	3/12/97	2.1	15	4.6	15	250	110.56	0.003	0.057	0.33
Effluent 070297-01	7/2/97	<1	6.3	2.4	8.6	65	109.90	0.001	0.028	0.08
Monitor 970912 (1)	9/12/97	NA	NA	NA	NA	340	105.40	NA	NA	0.39
Eff-1-2832	12/10/97	<0.001	0.013	0.009	0.031	210	106.27	0.000	0.000	0.28
Monitor 980324 (1)	3/24/98	NA	NA	NA	NA	1500	108.97	NA	NA	1.91
Monitor 980622 (1)	6/22/98	NA	NA	NA	NA	190	108.16	NA	NA	0.24
Monitor 980930 (1)	9/30/98	NA	NA	NA	NA	200	123.74	NA	NA	0.33
Monitor 981210 (1)	12/10/98	NA	NA	NA	NA	180	111.14	NA	NA	0.24
Monitor 990310 (1)	3/10/99	NA	NA	NA	NA	80	111.14	NA	NA	0.11
Monitor 990610 (1)	6/10/99	NA	NA	NA	NA	140	73.68	NA	NA	0.12
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

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

NA = Not Analyzed

(1) All analysis based on field FID readings

Appendices



APPENDICES

A



APPENDIX A
Groundwater Sampling Forms

GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-1

1. PROJECT INFORMATION

Project Number: 12582 Task Number: 015Date: 3-5-00Time: 17:00Client: BJSVCsPersonnel: DEAN, REAGUEProject Location: HobbsWeather: Sunny, mild

2. WELL DATA

Casing Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Screen Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Total Depth of Well: <u>64.50</u> feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Static Water: <u>58.95</u> feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Product: <u>—</u> feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Length of Water Column: <u>5.51</u> feet	Well Volume: <u>0.9</u> 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: ☒ Bailor, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____ Equipment Model(s): _____

Materials: Pump/Bailor ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: Nylon
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Was well purged dry? ☒ Yes ☐ No Pumping Rate: _____ gal/min

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
<u>1705</u>	<u>0.5</u>	<u>7.9</u>	<u>17.7</u>	<u>1564</u>	<u>71.3</u>	<u>3.8</u>	<u>74</u>		
<u>1720</u>	<u>1.5</u>	<u>8.0</u>	<u>17.8</u>	<u>705</u>	<u>74.8</u>	<u>6.2</u>	<u>64</u>		

4. SAMPLING DATA

Method(s): ☒ Bailor, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailor ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: Nylon
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ No

Sample ID: MW-1 Sample Time: 1720 # of Containers: 1

Duplicate Sample Collected? ☐ Yes ☒ No ID: _____

Geochemical Analyses

Ferrous Iron: — mg/L

DO: — mg/L

Nitrate: — mg/L

Sulfate: — mg/L

Alkalinity: — mg/L

5. COMMENTS

Insufficient water to purge well with pump. Collected sample with disposable bailer.

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-3

1. PROJECT INFORMATION

Project Number: 12832 Task Number: 015Date: 3-8-00Time: 16:30Client: BSVCsPersonnel: JOHN TEAGUEProject Location: HallsWeather: Sunny, mild

2. WELL DATA

Casing Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Screen Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Total Depth of Well: <u>62.1</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Static Water: <u>56.23</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Product: _____ feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Length of Water Column: <u>5.87</u> feet	Well Volume: <u>1.0</u> 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: ☒ Baller, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____ Equipment Model(s): _____

Materials: Pump/Baller ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: nylon
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Was well purged dry? ☒ Yes ☐ No Pumping Rate: _____ gal/min

1. YSE-6100
2. _____
3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1:35	1	7.5	18.7	72	55.6	6.2	-		clear
1:45	1.75	7.	18.4	632	62.9	7.5	440		cloudy

4. SAMPLING DATA

Method(s): ☒ Baller, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Baller ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: nylon
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ No

Sample ID: _____ Sample Time: 1:45 # of Containers: _____

Duplicate Sample Collected? ☐ Yes ☐ No ID: _____

Geochemical Analyses

Ferrous Iron: _____ mg/L

DO: _____ mg/L

Nitrate: _____ mg/L

Sulfate: _____ mg/L

Alkalinity: _____ mg/L

5. COMMENTS

Insufficient water to purge well with pump; collected samples with disposable bailers

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: 12932 Task Number: 015Date: 3-15-00 Time: 8:30Client: BJSUCSPersonnel: DEAN, TERRYProject Location: HobbsWeather: Sunny, cool

2. WELL DATA

Casing Diameter: 2 inchesType: ☐ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____Screen Diameter: 2 inchesType: ☐ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____Total Depth of Well: 60 ftFrom: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____Depth to Static Water: 55 ftFrom: ☐ 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: 4.52 feetWell Volume: 0.7 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: ☒ Baller, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Equipment Model(s): _____

Materials: Pump/Baller ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableWas well purged dry? ☒ Yes ☐ No

Pumping Rate: _____ gal/min

1. YSI-610D
2. _____
3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
	<u>1.5</u>	<u>7.68</u>	<u>16.36</u>	<u>1289</u>	<u>18.4</u>	<u>6.47</u>	<u>238</u>	<u>-</u>	<u>clean</u>

4. SAMPLING DATA

Method(s): ☒ Baller, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____Materials: Pump/Baller ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableDepth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ NoSample ID: MW-4 Sample Time: 8:25 # of Containers: 11Duplicate Sample Collected? ☐ Yes ☐ No ID: _____

Geochemical Analyses

Ferrous Iron: - mg/LDO: - mg/LNitrate: - mg/LSulfate: - mg/LAlkalinity: - mg/L

5. COMMENTS

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-5

1. PROJECT INFORMATION

Project Number: 12832 Task Number: 015Date: 3.5.00Time: 9:15Client: BT SUCSPersonnel: DEAN TEAGUEProject Location: HobbsWeather: sunny, mild

2. WELL DATA

Casing Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____Screen Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____Total Depth of Well: 64.7 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____Depth to Static Water: 57.92 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____Depth to Product: - feetFrom: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____Length of Water Column: 6.75 feetWell Volume: 1.1 galScreened Interval (from GS): _____
Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

3. PURGE DATA

Purge Method: ☒ Bailor, Size: 11 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Equipment Model(s): _____

Materials: Pump/Bailor ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable1. VSE-6100Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: nylon
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

2. _____

Was well purged dry? ☒ Yes ☐ No

Pumping Rate: _____ gal/min

3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
	<u>-</u>	<u>7.58</u>	<u>50</u>	<u>1228</u>	<u>38.3</u>	<u>7.72</u>	<u>-</u>	<u>-</u>	<u>see</u>

4. SAMPLING DATA

Method(s): ☒ Bailor, Size: 11 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____Materials: Pump/Bailor ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: nylon
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableDepth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☒ NoSample ID: mw-5Sample Time: 10:30# of Containers: 11Duplicate Sample Collected? ☐ Yes ☒ No ID: _____

Geochemical Analyses

Ferrous Iron: 0 mg/LDO: 6.0 mg/LNitrate: - mg/LSulfate: - mg/LAlkalinity: 250 mg/L

5. COMMENTS

Insufficient water column in well to purge with pump
0.347 collected grab sample with disposable bailer
271

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-7

1. PROJECT INFORMATION

Project Number: 128-32 Task Number: 015Date: 3-9-00 Time: 11:00Client: B5 SUCSPersonnel: DEAN TERAGLIProject Location: HobbsWeather: Sunny, m.c.

2. WELL DATA

Casing Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____Screen Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____Total Depth of Well: 62.3 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____Depth to Static Water: 56.74 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____Depth to Product: — feetFrom: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____Length of Water Column: 5.56 feet Well Volume: 0.9 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: ☒ Bailor, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Equipment Model(s)

Materials: Pump/Bailor ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable1. YSE-61010Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: nylon
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

2. _____

Was well purged dry? ☒ Yes ☐ No Pumping Rate: _____ gal/min

3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
<u>11:05</u>	<u>—</u>	<u>7.66</u>	<u>20.68</u>	<u>801</u>	<u>16.1</u>	<u>7.4</u>	<u>—</u>	<u>—</u>	<u>CLM</u>

4. SAMPLING DATA

Method(s): ☒ Bailor, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____Materials: Pump/Bailor ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: nylon
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableDepth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ NoSample ID: mw-7 Sample Time: 11:15 # of Containers: 11Duplicate Sample Collected? ☐ Yes ☒ No ID: _____

Geochemical Analyses

Ferrous Iron: 0 mg/LDO: 7.0 mg/LNitrate: — mg/LSulfate: — mg/LAlkalinity: 320 mg/L

5. COMMENTS

Insufficient water to purge with pump, collected sample with disposable bailer

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-8

1. PROJECT INFORMATION

Project Number: 12532 Task Number: 215Date: 3.8.00 Time: 11:30Client: BSS VCSPersonnel: DEAN TOLUQUEProject Location: HobbsWeather: Sunny, mild

2. WELL DATA

Casing Diameter: 2 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____Screen Diameter: 2 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____Total Depth of Well: 62.4 feet From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____Depth to Static Water: 56.52 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: 5.88 feet Well Volume: 0.9 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: ☒ Baller, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Equipment Model(s)

Materials: Pump/Baller ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable1. YSE-6100Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

2. _____

Was well purged dry? ☒ Yes ☐ No Pumping Rate: _____ gal/min

3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1140	-	7.5	19.7	764	24.2	4.94	-	-	

4. SAMPLING DATA

Method(s): ☒ Baller, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____Materials: Pump/Baller ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableDepth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ NoSample ID: MW-8 Sample Time: 1140 # of Containers: 11Duplicate Sample Collected? ☐ Yes ☒ No ID: _____

Geochemical Analyses

Ferrous Iron: 0 mg/LDO: 4.0 mg/LNitrate: - mg/LSulfate: - mg/LAlkalinity: 340 mg/L

5. COMMENTS

Needs new well cap,
Sample with bailer

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: NW-9

1. PROJECT INFORMATION

Project Number: 12532 Task Number: 015Date: 3-8-90Time: 15:00Client: BUSVCSPersonnel: DEAN T. CARUEProject Location: HobbsWeather: Sunny, mild

2. WELL DATA

Casing Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____Screen Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____Total Depth of Well: 121.2 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____Depth to Static Water: 55.6 feetFrom: ☒ 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: 5.6 feetWell Volume: 0.9 galScreened Interval (from GS): _____
Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

3. PURGE DATA

Purge Method: ☒ Bailer, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Equipment Model(s): _____

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ DisposableWas well purged dry? ☒ Yes ☐ No

Pumping Rate: _____ gal/min

1. YSE-6.010

2. _____

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	—	—	—

4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ DisposableDepth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☒ NoSample ID: NW-9Sample Time: 15:15# of Containers: 11Duplicate Sample Collected? ☐ Yes ☒ No ID: _____

Geochemical Analyses

Ferrous Iron: _____ mg/L

DO: _____ mg/L

Nitrate: _____ mg/L

Sulfate: _____ mg/L

Alkalinity: _____ mg/L

5. COMMENTS

Insufficient water to purge well with pump;
collected sample with disposable bailer

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-10

1. PROJECT INFORMATION

Project Number: 12932 Task Number: 015Date: 3-10-00 Time: 8:40Client: BJSVCsPersonnel: DEAN TENGUEProject Location: 11066Weather: Sunny, mild

2. WELL DATA

Casing Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Screen Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Total Depth of Well: <u>52.8</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Static Water: <u>57.71</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Product: <u>—</u> feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Length of Water Column: <u>5.09</u> feet	Well Volume: <u>0.85</u> 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: ☒ Bailer, Size: 11 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: nylon
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Was well purged dry? ☒ Yes ☐ No Pumping Rate: _____ gal/min

Equipment Model(s)
1. YSE-610D
2. _____
3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
0850	—	7.1	18.3	1086	-83.5	4.3	185		

4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 11 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: nylon
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☒ No

Sample ID: MW-10 Sample Time: 8:50 # of Containers: 11

Duplicate Sample Collected? ☐ Yes ☒ No ID: _____

Geochemical Analyses

Ferrous Iron: 3.2 mg/L
DO: 0.2 mg/L
Nitrate: 1 mg/L
Sulfate: 1 mg/L
Alkalinity: 770 mg/L

5. COMMENTS

well obviously needs repairs. Insufficient water to purge with pump; collected samples with disposable bailers

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-11A

1. PROJECT INFORMATION

Project Number: 12832 Task Number: 015Date: 3-9-00 Time: 15:50Client: BJSVCPersonnel: DEAN TENGUEProject Location: HobbsWeather: Sunny, mild

2. WELL DATA

Casing Diameter: 2 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____

Screen Diameter: 2 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____

Total Depth of Well: 63.6 feet From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____

Depth to Static Water: 58.01 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: 5.59 feet Well Volume: 2.9 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: ☒ Baller, Size: 1.1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____ Equipment Model(s): _____

Materials: Pump/Baller ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: NYLON
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Was well purged dry? ☒ Yes ☐ No Pumping Rate: _____ gal/min

1. YSE-6100
2. _____
3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1600	1	7.4	19.50	3875	-111.5	3.19	-	-	-
1605	2	7.3	19.2	3980	-93.9	3.56	-	-	-

4. SAMPLING DATA

Method(s): ☒ Baller, Size: 1.1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Baller ☐ Stainless ☒ PVC ☐ Teflon® ☒ Other: NYLON
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: NYLON
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☒ No

Sample ID: MW-11A Sample Time: 16:05 # of Containers: 11

Duplicate Sample Collected? ☐ Yes ☒ No ID: _____

Geochemical Analyses

Ferrous Iron: 9.8 mg/L

DO: 0.2 mg/L

Nitrate: / mg/L

Sulfate: / mg/L

Alkalinity: 770 mg/L

5. COMMENTS

Insufficient water to purge with pump. Samples collected with disposable bailer

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-12

1. PROJECT INFORMATION

Project Number: 12832 Task Number: 015Date: 3-10-00Time: 9:05Client: BJSUCSPersonnel: DEAN, T. ALVIZProject Location: Hobbs

Weather: _____

2. WELL DATA

Casing Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____Screen Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____Total Depth of Well: 61.20 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____Depth to Static Water: 58.08 feetFrom: ☒ 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: 3.12 feet Well Volume: 0.5 galScreened Interval (from GS): _____
Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

3. PURGE DATA

Purge Method: ☒ Baller, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Equipment Model(s): _____

Materials: Pump/Baller ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable1. YSF-61010Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

2. _____

Was well purged dry? ☐ Yes ☐ No Pumping Rate: _____ gal/min

3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
0910	1.0	7.0	17.00	1902	-11.5	4.7	-	-	Sample IP
0915	2.0	7.1	17.50	1926	-113.4	3.16	-	-	SIIP
0920	2.5	7.1	17.5	1091	-92.8	4.8	244	-	End of Sampling

4. SAMPLING DATA

Method(s): ☒ Baller, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____Materials: Pump/Baller ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableDepth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☒ NoSample ID: MW-12 Sample Time: 0920 # of Containers: 11Duplicate Sample Collected? ☒ Yes ☐ No ID: Dup

Geochemical Analyses

Ferrous Iron: 4.4 mg/LDO: 8.6 mg/LNitrate: ✓ mg/LSulfate: ✓ mg/LAlkalinity: 770 mg/L

5. COMMENTS

Sampled with baller

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-1210

1. PROJECT INFORMATION

Project Number: 12832 Task Number: 015Date: 3-9-20 Time: 13:15Client: BUSUCCSPersonnel: DEAN T. GAGUEProject Location: Hobbs

Weather: _____

2. WELL DATA

Casing Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Screen Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Total Depth of Well: <u>87.7</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Static Water: <u>58.24</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Product: _____ feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Length of Water Column: <u>29.46</u> feet	Well Volume: <u>5</u> 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: ☒ Bailor, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____ Equipment Model(s): _____

Materials: Pump/Bailor ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Was well purged dry? ☐ Yes ☒ No Pumping Rate: _____ gal/min

1. YSF-6101P
2. _____
3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1330	—	8.1	19.9	1061	-63.3	5.08	—	—	clear
1333	0.5	7.9	19.3	1058	-92.4	4.36	—	—	"
1336	1.0	7.8	19.1	1092	-79.1	5.76	—	—	"
1340	1.5	7.7	19.2	929	-19	5.12	18-15	—	clear

4. SAMPLING DATA

Method(s): ☒ Bailor, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailor ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☒ No

Sample ID: MW-1210 Sample Time: 1345 # of Containers: 11

Duplicate Sample Collected? ☐ Yes ☒ No ID: _____

Geochemical Analyses

Ferrous Iron: 0.4 mg/L
DO: 4.2 mg/L
Nitrate: — mg/L
Sulfate: — mg/L
Alkalinity: 360 mg/L

5. COMMENTS

Unable to collect sample with pump, collected sample with bailer

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-13

1. PROJECT INFORMATION

Project Number: 12832 Task Number: 015Date: 3-10-00 Time: 10:00Client: BJS SUGSPersonnel: DEAN, T. AGUEProject Location: HobbsWeather: sunny, mild

2. WELL DATA

Casing Diameter: 2 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____Screen Diameter: 2 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: _____Total Depth of Well: 65.2 feet From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: _____Depth to Static Water: 57-68 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: 7.52 feet Well Volume: 1.25 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: ☒ Bailer, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Equipment Model(s)

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable1. YSE-610VMaterials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: nylon
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

2. _____

Was well purged dry? ☒ Yes ☐ No Pumping Rate: _____ gal/min

3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1015	—	7.5	17.8	1618	-82.1	4.5	438		

4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: nylon
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableDepth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☐ NoSample ID: mw-13 Sample Time: 10:15 # of Containers: 1Duplicate Sample Collected? ☐ Yes ☒ No ID: _____

Geochemical Analyses

Ferrous Iron: _____ mg/L

DO: _____ mg/L

Nitrate: _____ mg/L

Sulfate: _____ mg/L

Alkalinity: _____ mg/L

5. COMMENTS

odor; insufficient water to pump, sampled with
bailer

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: GW-41

1. PROJECT INFORMATION

Project Number: 12532 Task Number: 013Date: 7-8-00 Time: 14:20Client: BJSUCSPersonnel: DEAN TEAGUEProject Location: HillsWeather: Sunny, mild

2. WELL DATA

Casing Diameter: <u>4</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Screen Diameter: <u>4</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Total Depth of Well: <u>61.3</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Static Water: <u>59.19</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Product: <u>—</u> feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Length of Water Column: <u>2.11</u> feet	Well Volume: <u>0.41</u> 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: ☒ Bailer, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____ Equipment Model(s): _____

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: NYLON
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Was well purged dry? ☐ Yes ☐ No Pumping Rate: _____ gal/min

1. YSE-61010
2. _____
3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1421	—	7.9	19.47	1481	67	9.3	—	—	cloudy

4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: NYLON
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Depth to Water at Time of Sampling: _____ Field Filtered? ☐ Yes ☒ No

Sample ID: GW-41 Sample Time: 14.35 # of Containers: 11

Duplicate Sample Collected? ☐ Yes ☒ No ID: _____

Geochemical Analyses

Ferrous Iron: 0.0 mg/L

DO: 6.2 mg/L

Nitrate: — mg/L

Sulfate: — mg/L

Alkalinity: 770 mg/L

5. COMMENTS

Insufficient water to purge with pump,
sampled with bailer

Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet.

B



APPENDIX B

Laboratory Analytical Report for Groundwater Samples



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

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



HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
(713) 680-0901

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

Fax To: 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	COC ID	HOLD
W-1	00030291-01	Water	3/9/00 5:20:00 PM	3/10/00 10:00:00 AM		<input type="checkbox"/>
V-3	00030291-02	Water	3/9/00 4:45:00 PM	3/10/00 10:00:00 AM		<input type="checkbox"/>
MW-11A	00030291-03	Water	3/9/00 4:05:00 PM	3/10/00 10:00:00 AM		<input type="checkbox"/>
W-9	00030291-04	Water	3/9/00 3:15:00 PM	3/10/00 10:00:00 AM		<input type="checkbox"/>
V-4	00030291-05	Water	3/9/00 2:35:00 PM	3/10/00 10:00:00 AM		<input type="checkbox"/>
MW-12D	00030291-06	Water	3/9/00 1:45:00 PM	3/10/00 10:00:00 AM		<input type="checkbox"/>
MW-8	00030291-07	Water	3/9/00 11:40:00 AM	3/10/00 10:00:00 AM		<input type="checkbox"/>
W-7	00030291-08	Water	3/9/00 11:15:00 AM	3/10/00 10:00:00 AM		<input type="checkbox"/>
W-5	00030291-09	Water	3/9/00 10:30:00 AM	3/10/00 10:00:00 AM		<input type="checkbox"/>
Trip Blank #1 2/29/00	00030291-10	Water	3/9/00	3/10/00 10:00:00 AM		<input type="checkbox"/>
Trip Blank #2 2/29/00	00030291-11	Water	3/9/00	3/10/00 10:00:00 AM		<input type="checkbox"/>
Trip Blank #3 2/29/00	00030291-12	Water	3/9/00	3/10/00 10:00:00 AM		<input type="checkbox"/>
Trip Blank #4 2/29/00	00030291-13	Water	3/9/00	3/10/00 10:00:00 AM		<input type="checkbox"/>
Trip Blank #5 2/29/00	00030291-14	Water	3/9/00	3/10/00 10:00:00 AM		<input type="checkbox"/>


Bernadette G. Grice
Customer Service Manager

3/24/00

Date

Joel Grice
Laboratory Director

Ted Yen
Quality Assurance Officer



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

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. #
ALKALINITY, BICARBONATE			MCL	M2320 B	Units: mg/L		
Alkalinity, Bicarbonate	89.1	2	1		03/13/00 11:30	AB	218394
ALKALINITY, CARBONATE			MCL	M2320 B	Units: mg/L		
Alkalinity, Carbonate	ND	2	1		03/13/00 11:30	AB	218447
CHLORIDE, TOTAL			MCL	E325.3	Units: mg/L		
Chloride	258	5	5		03/17/00 10:30	CV	221886
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Diesel Range Organics	14	2	10		03/23/00 12:56	RR	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 Initials
SW3510B	03/12/2000 14:35	KL

FLUORIDE-IC			MCL	E300	Units: mg/L		
Fluoride	1.7	0.1	1		03/10/00 12:57	ES	221800
GASOLINE RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Gasoline Range Organics	1.3	0.1	1		03/18/00 20:16	LJ	221919
Surr: 1,4-Difluorobenzene	93.0 % 74-121		1		03/18/00 20:16	LJ	221919
Surr: 4-Bromofluorobenzene	124 % 55-150		1		03/18/00 20:16	LJ	221919
HARDNESS, TOTAL (TITRIMETRIC, EDTA)			MCL	E130.2	Units: mg/L		
Hardness (As CaCO3)	600	50	10		03/22/00 10:15	CV	225428
HEADSPACE GAS ANALYSIS			MCL	RSK147	Units: mg/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	SW7470A	Units: mg/L		
Mercury	0.000695	0.0002	1		03/17/00 12:28	PB	220732

Run ID/Seq #: HGL_000317A-220732

Prep Method	Prep Date	Prep Initials
	03/17/2000 0:00	

METALS BY METHOD 6010B, TOTAL			MCL	SW6010B	Units: mg/L		
Arsenic	0.0178	0.005	1		03/21/00 22:39	EG	224433
Lead	ND	0.005	1		03/21/00 22:39	EG	224433
Selenium	ND	0.005	1		03/21/00 22:39	EG	224433
Barium	0.0917	0.005	1		03/14/00 16:52	E_B	218606
Cadmium	ND	0.005	1		03/14/00 16:52	E_B	218606
Calcium	155	0.1	1		03/14/00 16:52	E_B	218606

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 11:08:08 AM



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

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. #
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 #: TJA_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 HYDROCARBONS		MCL	SW8310	Units: ug/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	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

Run ID/Seq #: 2_000321B-225392

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)
D - Surrogate Recovery Unreportable due to Dilution

3/24/00 11:08:09 AM



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

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		
Benzene	ND	1	1		03/18/00 20:16	LJ	221721
Ethylbenzene	ND	1	1		03/18/00 20:16	LJ	221721
Toluene	ND	1	1		03/18/00 20:16	LJ	221721
Xylenes, Total	9.1	1	1		03/18/00 20:16	LJ	221721
Surr: 1,4-Difluorobenzene	88.1	% 72-137	1		03/18/00 20:16	LJ	221721
Surr: 4-Bromofluorobenzene	85.7	% 48-156	1		03/18/00 20:16	LJ	221721
SULFATE			MCL	E300	Units: mg/L		
Sulfate	530	20	100		03/15/00 11:35	ES	219741

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 11:08:10 AM



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

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. #
ALKALINITY, BICARBONATE				MCL	M2320 B	Units: mg/L	
Alkalinity, Bicarbonate	248	2		1	03/13/00 11:30	AB	218396
ALKALINITY, CARBONATE				MCL	M2320 B	Units: mg/L	
Alkalinity, Carbonate	ND	2		1	03/13/00 11:30	AB	218449
CHLORIDE, TOTAL				MCL	E325.3	Units: mg/L	
Chloride	196	2		2	03/17/00 10:30	CV	221889
DIESEL RANGE ORGANICS				MCL	SW8015B	Units: mg/L	
Diesel Range Organics	0.32	0.2		1	03/22/00 12:02	RR	225967
Surr: Pentacosane	155 %	18-120		1 *	03/22/00 12:02	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		1	03/10/00 12:57	ES	221803
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: mg/L	
Gasoline Range Organics	ND	0.1		1	03/18/00 17:16	LJ	221911
Surr: 1,4-Difluorobenzene	94.7 %	74-121		1	03/18/00 17:16	LJ	221911
Surr: 4-Bromofluorobenzene	107 %	55-150		1	03/18/00 17:16	LJ	221911
HARDNESS, TOTAL (TITRIMETRIC, EDTA)				MCL	E130.2	Units: mg/L	
Hardness (As CaCO3)	450	25		5	03/22/00 10:15	CV	225431
HEADSPACE GAS ANALYSIS				MCL	RSK147	Units: mg/L	
Ethane	ND	0.0025		1	03/22/00 14:17	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	03/17/00 12:28	PB	220729

Run ID/Seq #: HGL_000317A-220729

Prep Method	Prep Date	Prep Initials
SW7470A	03/17/2000 9:00	PB

METALS BY METHOD 6010B, TOTAL				MCL	SW6010B	Units: mg/L	
Arsenic	0.00817	0.005		1	03/21/00 23:16	EG	224440
Lead	ND	0.005		1	03/21/00 23:16	EG	224440
Selenium	ND	0.005		1	03/21/00 23:16	EG	224440
Barium	0.108	0.005		1	03/14/00 17:24	E_B	218614
Cadmium	ND	0.005		1	03/14/00 17:24	E_B	218614
Calcium	119	0.1		1	03/14/00 17:24	E_B	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)
D - Surrogate Recovery Unreportable due to Dilution

3/24/00 11:08:12 AM



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

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 #: TJAT_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 HYDROCARBONS		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)
D - Surrogate Recovery Unreportable due to Dilution

3/24/00 11:08:12 AM



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

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	SW8021B	Units: ug/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: mg/L		
Sulfate	190	5	25		03/15/00 11:35	ES	219744

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 11:08:13 AM



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

Client Sample ID MW-11A

Collected: 3/9/00 4:05:00 P SPL Sample ID: 00030291-03

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
ALKALINITY, BICARBONATE			MCL	M2320 B	Units: mg/L		
Alkalinity, Bicarbonate	703	2	1		03/13/00 11:30	AB	218397
ALKALINITY, CARBONATE			MCL	M2320 B	Units: mg/L		
Alkalinity, Carbonate	ND	2	1		03/13/00 11:30	AB	218450
CHLORIDE, TOTAL			MCL	E325.3	Units: mg/L		
Chloride	1290	25	25		03/17/00 10:30	CV	221890
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Diesel Range Organics	0.43	0.2	1		03/22/00 12:40	RR	225968
Surr: Pentacosane	84.0	% 18-120	1		03/22/00 12:40	RR	225968
Run ID/Seq #: HP_V_000316A-225968							
Prep Method	Prep Date	Prep Initials					
SW3510B	03/12/2000 14:35	KL					
FLUORIDE-IC			MCL	E300	Units: mg/L		
Fluoride	ND	0.1	1		03/10/00 12:57	ES	221804
GASOLINE RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Gasoline Range Organics	ND	0.1	1		03/18/00 19:50	LJ	221918
Surr: 1,4-Difluorobenzene	94.3	% 74-121	1		03/18/00 19:50	LJ	221918
Surr: 4-Bromofluorobenzene	102	% 55-150	1		03/18/00 19:50	LJ	221918
HARDNESS, TOTAL (TITRIMETRIC, EDTA)			MCL	E130.2	Units: mg/L		
Hardness (As CaCO3)	880	50	10		03/22/00 10:15	CV	225432
HEADSPACE GAS ANALYSIS			MCL	RSK147	Units: mg/L		
Ethane	ND	0.0025	1		03/22/00 14:26	AB	225476
Ethylene	ND	0.0032	1		03/22/00 14:26	AB	225476
Methane	0.037	0.0012	1		03/22/00 14:26	AB	225476
MERCURY, TOTAL			MCL	SW7470A	Units: mg/L		
Mercury	ND	0.0002	1		03/17/00 12:28	PB	220733
Run ID/Seq #: HGL_000317A-220733							
Prep Method	Prep Date	Prep Initials					
SW7470A	03/17/2000 9:00	PB					
METALS BY METHOD 6010B, TOTAL			MCL	SW6010B	Units: mg/L		
Arsenic	0.108	0.005	1		03/21/00 23:22	EG	224441
Lead	0.00595	0.005	1		03/21/00 23:22	EG	224441
Selenium	ND	0.005	1		03/21/00 23:22	EG	224441
Barium	0.872	0.005	1		03/14/00 17:28	E_B	218615
Cadmium	ND	0.005	1		03/14/00 17:28	E_B	218615
Calcium	229	0.1	1		03/14/00 17:28	E_B	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)
D - Surrogate Recovery Unreportable due to Dilution

3/24/00 11:08:15 AM



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

Client Sample ID MW-11A

Collected: 3/9/00 4:05:00 P SPL Sample ID: 00030291-03

Site: BJ-Hobbs

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

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 HYDROCARBONS		MCL	SW8310	Units: ug/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)
D - Surrogate Recovery Unreportable due to Dilution

3/24/00 11:08:15 AM



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

Client Sample ID MW-11A

Collected: 3/9/00 4:05:00 P SPL Sample ID: 00030291-03

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/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: mg/L		
Sulfate	270	5	25		03/15/00 11:35	ES	219745

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 11:08:16 AM



HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
(713) 660-9901

Client Sample ID MW-9

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

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
ALKALINITY, BICARBONATE			MCL	M2320 B	Units: mg/L		
Alkalinity, Bicarbonate	279	2	1		03/13/00 11:30	AB	218398
ALKALINITY, CARBONATE			MCL	M2320 B	Units: mg/L		
Alkalinity, Carbonate	ND	2	1		03/13/00 11:30	AB	218451
CHLORIDE, TOTAL			MCL	E325.3	Units: mg/L		
Chloride	131	2	2		03/17/00 10:30	CV	221891
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Diesel Range Organics	0.66	0.2	1		03/22/00 13:18	RR	225969
Surr: Pentacosane	142 %	18-120	1 *		03/22/00 13:18	RR	225969

Run ID/Seq #: HP_V_000316A-225969

Prep Method	Prep Date	Prep Initials
SW3510B	03/12/2000 14:35	KL

FLUORIDE-IC			MCL	E300	Units: mg/L		
Fluoride	1.5	0.1	1		03/10/00 12:57	ES	221807
GASOLINE RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Gasoline Range Organics	1.3	0.1	1		03/18/00 17:42	LJ	221912
Surr: 1,4-Difluorobenzene	94.0 %	74-121	1		03/18/00 17:42	LJ	221912
Surr: 4-Bromofluorobenzene	110 %	55-150	1		03/18/00 17:42	LJ	221912
HARDNESS, TOTAL (TITRIMETRIC, EDTA)			MCL	E130.2	Units: mg/L		
Hardness (As CaCO3)	430	25	5		03/22/00 10:15	CV	225433
HEADSPACE GAS ANALYSIS			MCL	RSK147	Units: mg/L		
Ethane	ND	0.0025	1		03/22/00 14:53	AB	225478
Ethylene	ND	0.0032	1		03/22/00 14:53	AB	225478
Methane	ND	0.0012	1		03/22/00 14:53	AB	225478

MERCURY, TOTAL			MCL	SW7470A	Units: mg/L		
Mercury	ND	0.0002	1		03/17/00 12:28	PB	220734

Run ID/Seq #: HGL_000317A-220734

Prep Method	Prep Date	Prep Initials
SW7470A	03/17/2000 9:00	PB

METALS BY METHOD 6010B, TOTAL			MCL	SW6010B	Units: mg/L		
Arsenic	0.00757	0.005	1		03/21/00 23:42	EG	224444
Lead	ND	0.005	1		03/21/00 23:42	EG	224444
Selenium	ND	0.005	1		03/21/00 23:42	EG	224444
Barium	0.0419	0.005	1		03/14/00 17:32	E_B	218616
Cadmium	ND	0.005	1		03/14/00 17:32	E_B	218616
Calcium	110	0.1	1		03/14/00 17:32	E_B	218616

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 11:08:18 AM



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

Client Sample ID MW-9

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

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	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

NITROGEN, NITRATE (AS N)		MCL	E300	Units: mg/L		
Nitrogen, Nitrate (As N)	7.2	0.1	1	03/10/00 12:19	ES	218023

POLYNUCLEAR AROMATIC HYDROCARBONS		MCL	SW8310	Units: ug/L		
Acenaphthene	ND	0.1	1	03/22/00 0:28	LJ	225395
Acenaphthylene	ND	0.1	1	03/22/00 0:28	LJ	225395
Anthracene	ND	0.1	1	03/22/00 0:28	LJ	225395
Benz(a)anthracene	ND	0.1	1	03/22/00 0:28	LJ	225395
Benzo(a)pyrene	ND	0.1	1	03/22/00 0:28	LJ	225395
Benzo(b)fluoranthene	ND	0.1	1	03/22/00 0:28	LJ	225395
Benzo(g,h,i)perylene	ND	0.1	1	03/22/00 0:28	LJ	225395
Benzo(k)fluoranthene	ND	0.1	1	03/22/00 0:28	LJ	225395
Chrysene	ND	0.1	1	03/22/00 0:28	LJ	225395
Dibenzo(a,h)anthracene	ND	0.1	1	03/22/00 0:28	LJ	225395
Fluoranthene	ND	0.1	1	03/22/00 0:28	LJ	225395
Fluorene	1.5	0.1	1	03/22/00 0:28	LJ	225395
Indeno(1,2,3-cd)pyrene	ND	0.1	1	03/22/00 0:28	LJ	225395
Naphthalene	0.42	0.1	1	03/22/00 0:28	LJ	225395
Phenanthrene	ND	0.1	1	03/22/00 0:28	LJ	225395
Pyrene	ND	0.1	1	03/22/00 0:28	LJ	225395
Surr: 1-Fluoronaphthalene	65.0	% 30-140	1	03/22/00 0:28	LJ	225395
Surr: Phenanthrene-d10	72.2	% 35-140	1	03/22/00 0:28	LJ	225395

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)
D - Surrogate Recovery Unreportable due to Dilution

3/24/00 11:08:18 AM



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

Client Sample ID MW-9

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

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	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: mg/L		
Sulfate	170	5	25		03/15/00 11:35	ES	219748

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 11:08:19 AM



HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
(713) 860-0901

Client Sample ID OW-4

Collected: 3/9/00 2:35:00 P SPL Sample ID: 00030291-05

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
ALKALINITY, BICARBONATE			MCL	M2320 B	Units: mg/L		
Alkalinity, Bicarbonate	1020	4	2		03/13/00 11:30	AB	218399
ALKALINITY, CARBONATE			MCL	M2320 B	Units: mg/L		
Alkalinity, Carbonate	ND	4	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 ORGANICS			MCL	SW8015B	Units: mg/L		
Diesel Range Organics	0.25	0.2	1		03/22/00 13:56	RR	225970
Surr: Pentacosane	74.6 %	18-120	1		03/22/00 13:56	RR	225970

Run ID/Seq #: HP_V_000316A-225970

Prep Method	Prep Date	Prep Initials
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 ORGANICS			MCL	SW8015B	Units: mg/L		
Gasoline Range Organics	ND	0.1	1		03/17/00 20:19	LJ	221549
Surr: 1,4-Difluorobenzene	94.8 %	74-121	1		03/17/00 20:19	LJ	221549
Surr: 4-Bromofluorobenzene	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 ANALYSIS			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 #: HGL_000317A-220737

Prep Method	Prep Date	Prep Initials
SW7470A	03/17/2000 9:00	PB

METALS BY METHOD 6010B, TOTAL			MCL	SW6010B	Units: mg/L		
Arsenic	0.034	0.005	1		03/21/00 23:48	EG	224445
Lead	0.0355	0.005	1		03/21/00 23:48	EG	224445
Selenium	ND	0.005	1		03/21/00 23:48	EG	224445
Barium	1.49	0.005	1		03/14/00 17:35	E_B	218617
Cadmium	ND	0.005	1		03/14/00 17:35	E_B	218617
Calcium	882	0.5	5		03/15/00 21:22	E_B	220049

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 11:08:21 AM



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

Client Sample ID OW-4

Collected: 3/9/00 2:35:00 P SPL Sample ID: 00030291-05

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Chromium	0.105	0.01	1		03/14/00 17:35	E_B	218617
Magnesium	74.5	0.1	1		03/14/00 17:35	E_B	218617
Potassium	10.7	2	1		03/14/00 17:35	E_B	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_B	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

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		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	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	225396
Phenanthrene	ND	0.1	1	03/22/00 1:07	LJ	225396
Pyrene	ND	0.1	1	03/22/00 1:07	LJ	225396
Surr: 1-Fluoronaphthalene	48.3 %	30-140	1	03/22/00 1:07	LJ	225396
Surr: Phenanthrene-d10	73.7 %	35-140	1	03/22/00 1:07	LJ	225396

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)
D - Surrogate Recovery Unreportable due to Dilution

3/24/00 11:08:21 AM



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

Client Sample ID OW-4

Collected: 3/9/00 2:35:00 P SPL Sample ID: 00030291-05

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/L		
Benzene	ND	1	1		03/17/00 20:19	LJ	221564
Ethylbenzene	ND	1	1		03/17/00 20:19	LJ	221564
Toluene	ND	1	1		03/17/00 20:19	LJ	221564
Xylenes, Total	ND	1	1		03/17/00 20:19	LJ	221564
Surr: 1,4-Difluorobenzene	86.8	% 72-137	1		03/17/00 20:19	LJ	221564
Surr: 4-Bromofluorobenzene	95.4	% 48-156	1		03/17/00 20:19	LJ	221564
SULFATE			MCL	E300	Units: mg/L		
Sulfate	200	5	25		03/15/00 11:35	ES	219749

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 11:08:22 AM



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

Client Sample ID MW-12D

Collected: 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	Analyst	Seq. #
ALKALINITY, BICARBONATE			MCL	M2320 B	Units: mg/L		
Alkalinity, Bicarbonate	244	2		1	03/13/00 11:30	AB	218400
ALKALINITY, CARBONATE			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 ORGANICS			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 ORGANICS			MCL	SW8015B	Units: mg/L		
Gasoline Range Organics	ND	0.1		1	03/18/00 18:07	LJ	221914
Surr: 1,4-Difluorobenzene	94.3	% 74-121		1	03/18/00 18:07	LJ	221914
Surr: 4-Bromofluorobenzene	108	% 55-150		1	03/18/00 18:07	LJ	221914
HARDNESS, TOTAL (TITRIMETRIC, EDTA)			MCL	E130.2	Units: mg/L		
Hardness (As CaCO3)	260	25		5	03/22/00 10:15	CV	225436
HEADSPACE GAS ANALYSIS			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 #: HGL_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_B	218619
Cadmium	ND	0.005		1	03/14/00 17:39	E_B	218619
Calcium	78.1	0.1		1	03/14/00 17:39	E_B	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)
D - Surrogate Recovery Unreportable due to Dilution

3/24/00 11:08:24 AM



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

Client Sample ID MW-12D

Collected: 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	Analyst	Seq. #
Chromium	ND	0.01	1		03/14/00 17:39	E_B	218619
Magnesium	7.25	0.1	1		03/14/00 17:39	E_B	218619
Potassium	70.6	2	1		03/14/00 17:39	E_B	218619
Silver	ND	0.01	1		03/14/00 17:39	E_B	218619
Sodium	103	0.5	1		03/14/00 17:39	E_B	218619

Run ID/Seq #: TJA_000314A-218619

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

Run ID/Seq #: TJAT_000321A-224446

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)	0.14	0.1	1	03/10/00 12:19 ES 218025

POLYNUCLEAR AROMATIC HYDROCARBONS	MCL	SW8310	Units: ug/L	
Acenaphthene	ND	0.1	1	03/22/00 16:06 LJ 225397
Acenaphthylene	ND	0.1	1	03/22/00 16:06 LJ 225397
Anthracene	ND	0.1	1	03/22/00 16:06 LJ 225397
Benz(a)anthracene	ND	0.1	1	03/22/00 16:06 LJ 225397
Benzo(a)pyrene	ND	0.1	1	03/22/00 16:06 LJ 225397
Benzo(b)fluoranthene	ND	0.1	1	03/22/00 16:06 LJ 225397
Benzo(g,h,i)perylene	ND	0.1	1	03/22/00 16:06 LJ 225397
Benzo(k)fluoranthene	ND	0.1	1	03/22/00 16:06 LJ 225397
Chrysene	ND	0.1	1	03/22/00 16:06 LJ 225397
Dibenzo(a,h)anthracene	ND	0.1	1	03/22/00 16:06 LJ 225397
Fluoranthene	ND	0.1	1	03/22/00 16:06 LJ 225397
Fluorene	ND	0.1	1	03/22/00 16:06 LJ 225397
Indeno(1,2,3-cd)pyrene	ND	0.1	1	03/22/00 16:06 LJ 225397
Naphthalene	ND	0.1	1	03/22/00 16:06 LJ 225397
Phenanthrene	ND	0.1	1	03/22/00 16:06 LJ 225397
Pyrene	ND	0.1	1	03/22/00 16:06 LJ 225397
Surr: 1-Fluoronaphthalene	55.5 %	30-140	1	03/22/00 16:06 LJ 225397
Surr: Phenanthrene-d10	75.2 %	35-140	1	03/22/00 16:06 LJ 225397

Run ID/Seq #: 2_000321B-225397

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)
D - Surrogate Recovery Unreportable due to Dilution

3/24/00 11:08:25 AM



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

Client Sample ID MW-12D

Collected: 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	Analyst	Seq. #
PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/L		
Benzene	ND	1	1		03/17/00 23:20	LJ	221566
Ethylbenzene	ND	1	1		03/17/00 23:20	LJ	221566
Toluene	ND	1	1		03/17/00 23:20	LJ	221566
Xylenes, Total	ND	1	1		03/17/00 23:20	LJ	221566
Surr: 1,4-Difluorobenzene	87.6	% 72-137	1		03/17/00 23:20	LJ	221566
Surr: 4-Bromofluorobenzene	95.0	% 48-156	1		03/17/00 23:20	LJ	221566
SULFATE			MCL	E300	Units: mg/L		
Sulfate	200	5	25		03/15/00 11:35	ES	219750

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 11:08:25 AM



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

Client Sample ID MW-8

Collected: 3/9/00 11:40:00

SPL Sample ID: 00030291-07

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
ALKALINITY, BICARBONATE			MCL	M2320 B	Units: mg/L		
Alkalinity, Bicarbonate	362	2	1		03/13/00 11:30	AB	218401
ALKALINITY, CARBONATE			MCL	M2320 B	Units: mg/L		
Alkalinity, Carbonate	ND	2	1		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 ORGANICS			MCL	SW8015B	Units: mg/L		
Diesel Range Organics	0.55	0.2	1		03/22/00 15:12	RR	225972
Surr: Pentacosane	84.2 %	18-120	1		03/22/00 15:12	RR	225972
Run ID/Seq #: HP_V_000316A-225972							
Prep Method	Prep Date	Prep Initials					
SW3510B	03/12/2000 14:35	KL					
FLUORIDE-IC			MCL	E300	Units: mg/L		
Fluoride	0.69	0.1	1		03/10/00 12:57	ES	221810
GASOLINE RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Gasoline Range Organics	ND	0.1	1		03/18/00 18:33	LJ	221915
Surr: 1,4-Difluorobenzene	93.7 %	74-121	1		03/18/00 18:33	LJ	221915
Surr: 4-Bromofluorobenzene	103 %	55-150	1		03/18/00 18:33	LJ	221915
HARDNESS, TOTAL (TITRIMETRIC, EDTA)			MCL	E130.2	Units: mg/L		
Hardness (As CaCO3)	760	50	10		03/22/00 10:15	CV	225437
HEADSPACE GAS ANALYSIS			MCL	RSK147	Units: mg/L		
Ethane	ND	0.0025	1		03/22/00 15:29	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/L		
Mercury	ND	0.0002	1		03/17/00 12:28	PB	220739
Run ID/Seq #: HGL_000317A-220739							
Prep Method	Prep Date	Prep Initials					
SW7470A	03/17/2000 9:00	PB					
METALS BY METHOD 6010B, TOTAL			MCL	SW6010B	Units: mg/L		
Arsenic	0.00953	0.005	1		03/22/00 0:01	EG	224447
Lead	ND	0.005	1		03/22/00 0:01	EG	224447
Selenium	ND	0.005	1		03/22/00 0:01	EG	224447
Barium	0.236	0.005	1		03/14/00 17:43	E_B	218620
Cadmium	ND	0.005	1		03/14/00 17:43	E_B	218620
Calcium	215	0.1	1		03/14/00 17:43	E_B	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)
D - Surrogate Recovery Unreportable due to Dilution

3/24/00 11:08:27 AM



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

Client Sample ID MW-8

Collected: 3/9/00 11:40:00

SPL Sample ID: 00030291-07

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	218620
Magnesium	39.1	0.1	1		03/14/00 17:43	E_B	218620
Potassium	4.53	2	1		03/14/00 17:43	E_B	218620
Silver	ND	0.01	1		03/14/00 17:43	E_B	218620
Sodium	95.4	0.5	1		03/14/00 17:43	E_B	218620

Run ID/Seq #: TJA_000314A-218620

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

Run ID/Seq #: TJAT_000321A-224447

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)	0.35	0.1	1	03/10/00 12:19	ES 218026

POLYNUCLEAR AROMATIC HYDROCARBONS		MCL	SW8310	Units: ug/L	
Acenaphthene	ND	0.1	1	03/22/00 16:46	LJ 225398
Acenaphthylene	ND	0.1	1	03/22/00 16:46	LJ 225398
Anthracene	ND	0.1	1	03/22/00 16:46	LJ 225398
Benz(a)anthracene	ND	0.1	1	03/22/00 16:46	LJ 225398
Benzo(a)pyrene	ND	0.1	1	03/22/00 16:46	LJ 225398
Benzo(b)fluoranthene	ND	0.1	1	03/22/00 16:46	LJ 225398
Benzo(g,h,i)perylene	ND	0.1	1	03/22/00 16:46	LJ 225398
Benzo(k)fluoranthene	ND	0.1	1	03/22/00 16:46	LJ 225398
Chrysene	ND	0.1	1	03/22/00 16:46	LJ 225398
Dibenzo(a,h)anthracene	ND	0.1	1	03/22/00 16:46	LJ 225398
Fluoranthene	ND	0.1	1	03/22/00 16:46	LJ 225398
Fluorene	ND	0.1	1	03/22/00 16:46	LJ 225398
Indeno(1,2,3-cd)pyrene	ND	0.1	1	03/22/00 16:46	LJ 225398
Naphthalene	ND	0.1	1	03/22/00 16:46	LJ 225398
Phenanthrene	ND	0.1	1	03/22/00 16:46	LJ 225398
Pyrene	ND	0.1	1	03/22/00 16:46	LJ 225398
Surr: 1-Fluoronaphthalene	30.9 %	30-140	1	03/22/00 16:46	LJ 225398
Surr: Phenanthrene-d10	54.0 %	35-140	1	03/22/00 16:46	LJ 225398

Run ID/Seq #: 2_000321B-225398

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)
D - Surrogate Recovery Unreportable due to Dilution

3/24/00 11:08:28 AM



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

Client Sample ID MW-8

Collected: 3/9/00 11:40:00

SPL Sample ID: 00030291-07

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/L		
Benzene	ND	1	1		03/17/00 23:45	LJ	221567
Ethylbenzene	ND	1	1		03/17/00 23:45	LJ	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: mg/L		
Sulfate	260	5	25		03/15/00 11:35	ES	219751

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 11:08:28 AM



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

Client Sample ID MW-7

Collected: 3/9/00 11:15:00

SPL Sample ID: 00030291-08

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
ALKALINITY, BICARBONATE			MCL	M2320 B	Units: mg/L		
Alkalinity, Bicarbonate	301	2		1	03/13/00 11:30	AB	218402
ALKALINITY, CARBONATE			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 ORGANICS			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							
Prep Method	Prep Date	Prep Initials					
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 ORGANICS			MCL	SW8015B	Units: mg/L		
Gasoline Range Organics	ND	0.1		1	03/18/00 18:59	LJ	221916
Surr: 1,4-Difluorobenzene	94.3	% 74-121		1	03/18/00 18:59	LJ	221916
Surr: 4-Bromofluorobenzene	101	% 55-150		1	03/18/00 18:59	LJ	221916
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 ANALYSIS			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 #: HGL_000317A-220740							
Prep Method	Prep Date	Prep Initials					
SW7470A	03/17/2000 9:00	PB					
METALS BY METHOD 6010B, TOTAL			MCL	SW6010B	Units: mg/L		
Arsenic	0.00849	0.005		1	03/22/00 0:07	EG	224448
Lead	ND	0.005		1	03/22/00 0:07	EG	224448
Selenium	0.00926	0.005		1	03/22/00 0:07	EG	224448
Barium	0.046	0.005		1	03/14/00 17:47	E_B	218621
Cadmium	ND	0.005		1	03/14/00 17:47	E_B	218621
Calcium	167	0.1		1	03/14/00 17:47	E_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



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

Client Sample ID MW-7

Collected: 3/9/00 11:15:00

SPL Sample ID: 00030291-08

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Chromium	ND	0.01	1		03/14/00 17:47	E_B	218621
Magnesium	44.3	0.1	1		03/14/00 17:47	E_B	218621
Potassium	6.98	2	1		03/14/00 17:47	E_B	218621
Silver	ND	0.01	1		03/14/00 17:47	E_B	218621
Sodium	95.1	0.5	1		03/14/00 17:47	E_B	218621

Run ID/Seq #: TJA_000314A-218621

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

Run ID/Seq #: TJAT_000321A-224448

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)	3.6	0.1	1	03/10/00 12:19	ES	218027

POLYNUCLEAR AROMATIC HYDROCARBONS		MCL	SW8310	Units: ug/L		
Acenaphthene	ND	0.1	1	03/22/00 17:24	LJ	225399
Acenaphthylene	ND	0.1	1	03/22/00 17:24	LJ	225399
Anthracene	ND	0.1	1	03/22/00 17:24	LJ	225399
Benz(a)anthracene	ND	0.1	1	03/22/00 17:24	LJ	225399
Benzo(a)pyrene	ND	0.1	1	03/22/00 17:24	LJ	225399
Benzo(b)fluoranthene	ND	0.1	1	03/22/00 17:24	LJ	225399
Benzo(g,h,i)perylene	ND	0.1	1	03/22/00 17:24	LJ	225399
Benzo(k)fluoranthene	ND	0.1	1	03/22/00 17:24	LJ	225399
Chrysene	ND	0.1	1	03/22/00 17:24	LJ	225399
Dibenzo(a,h)anthracene	ND	0.1	1	03/22/00 17:24	LJ	225399
Fluoranthene	ND	0.1	1	03/22/00 17:24	LJ	225399
Fluorene	ND	0.1	1	03/22/00 17:24	LJ	225399
Indeno(1,2,3-cd)pyrene	ND	0.1	1	03/22/00 17:24	LJ	225399
Naphthalene	ND	0.1	1	03/22/00 17:24	LJ	225399
Phenanthrene	ND	0.1	1	03/22/00 17:24	LJ	225399
Pyrene	ND	0.1	1	03/22/00 17:24	LJ	225399
Surr: 1-Fluoronaphthalene	41.0	% 30-140	1	03/22/00 17:24	LJ	225399
Surr: Phenanthrene-d10	66.1	% 35-140	1	03/22/00 17:24	LJ	225399

Run ID/Seq #: 2_000321B-225399

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)
D - Surrogate Recovery Unreportable due to Dilution

3/24/00 11:08:31 AM



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

Client Sample ID MW-7

Collected: 3/9/00 11:15:00

SPL Sample ID: 00030291-08

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/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: mg/L		
Sulfate	280	5	25		03/15/00 11:35	ES	219752

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 11:08:32 AM



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

Client Sample ID MW-5

Collected: 3/9/00 10:30:00

SPL Sample ID: 00030291-09

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
ALKALINITY, BICARBONATE			MCL	M2320 B	Units: mg/L		
Alkalinity, Bicarbonate	253	2		1	03/13/00 11:30	AB	218403
ALKALINITY, CARBONATE			MCL	M2320 B	Units: mg/L		
Alkalinity, Carbonate	ND	2		1	03/13/00 11:30	AB	218456
CHLORIDE, TOTAL			MCL	E325.3	Units: mg/L		
Chloride	196	2		2	03/17/00 10:30	CV	221897
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: mg/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	Prep Initials					
SW3510B	03/12/2000 14:35	KL					
FLUORIDE-IC			MCL	E300	Units: mg/L		
Fluoride	1.1	0.1		1	03/10/00 12:57	ES	221812
GASOLINE RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Gasoline Range Organics	ND	0.1		1	03/18/00 19:24	LJ	221917
Surr: 1,4-Difluorobenzene	94.6	% 74-121		1	03/18/00 19:24	LJ	221917
Surr: 4-Bromofluorobenzene	104	% 55-150		1	03/18/00 19:24	LJ	221917
HARDNESS, TOTAL (TITRIMETRIC, EDTA)			MCL	E130.2	Units: mg/L		
Hardness (As CaCO3)	1200	120		25	03/22/00 10:15	CV	225439
HEADSPACE GAS ANALYSIS			MCL	RSK147	Units: mg/L		
Ethane	ND	0.0025		1	03/22/00 15:47	AB	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: mg/L		
Mercury	ND	0.0002		1	03/17/00 12:28	PB	220741
Run ID/Seq #: HGL_000317A-220741							
Prep Method	Prep Date	Prep Initials					
SW7470A	03/17/2000 9:00	PB					
METALS BY METHOD 6010B, TOTAL			MCL	SW6010B	Units: mg/L		
Arsenic	0.0173	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	0.005		1	03/22/00 0:13	EG	224449
Barium	0.184	0.005		1	03/14/00 17:51	E_B	218622
Cadmium	ND	0.005		1	03/14/00 17:51	E_B	218622
Calcium	387	0.1		1	03/14/00 17:51	E_B	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)
D - Surrogate Recovery Unreportable due to Dilution

3/24/00 11:08:33 AM



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

Client Sample ID MW-5

Collected: 3/9/00 10:30:00

SPL Sample ID: 00030291-09

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Chromium	0.0248	0.01	1		03/14/00 17:51	E_B	218622
Magnesium	29.2	0.1	1		03/14/00 17:51	E_B	218622
Potassium	5.61	2	1		03/14/00 17:51	E_B	218622
Silver	ND	0.01	1		03/14/00 17:51	E_B	218622
Sodium	123	0.5	1		03/14/00 17:51	E_B	218622

Run ID/Seq #: TJA_000314A-218622

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

Run ID/Seq #: TJAT_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	218028

POLYNUCLEAR AROMATIC HYDROCARBONS			MCL	SW8310	Units: ug/L		
Acenaphthene	ND	0.1		1	03/22/00 18:02	LJ	225400
Acenaphthylene	ND	0.1		1	03/22/00 18:02	LJ	225400
Anthracene	ND	0.1		1	03/22/00 18:02	LJ	225400
Benz(a)anthracene	ND	0.1		1	03/22/00 18:02	LJ	225400
Benzo(a)pyrene	ND	0.1		1	03/22/00 18:02	LJ	225400
Benzo(b)fluoranthene	ND	0.1		1	03/22/00 18:02	LJ	225400
Benzo(g,h,i)perylene	ND	0.1		1	03/22/00 18:02	LJ	225400
Benzo(k)fluoranthene	ND	0.1		1	03/22/00 18:02	LJ	225400
Chrysene	ND	0.1		1	03/22/00 18:02	LJ	225400
Dibenzo(a,h)anthracene	ND	0.1		1	03/22/00 18:02	LJ	225400
Fluoranthene	ND	0.1		1	03/22/00 18:02	LJ	225400
Fluorene	ND	0.1		1	03/22/00 18:02	LJ	225400
Indeno(1,2,3-cd)pyrene	ND	0.1		1	03/22/00 18:02	LJ	225400
Naphthalene	ND	0.1		1	03/22/00 18:02	LJ	225400
Phenanthrene	ND	0.1		1	03/22/00 18:02	LJ	225400
Pyrene	ND	0.1		1	03/22/00 18:02	LJ	225400
Surr: 1-Fluoronaphthalene	41.9	% 30-140		1	03/22/00 18:02	LJ	225400
Surr: Phenanthrene-d10	81.9	% 35-140		1	03/22/00 18:02	LJ	225400

Run ID/Seq #: 2_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)
D - Surrogate Recovery Unreportable due to Dilution

3/24/00 11:08:34 AM



HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
(713) 680-0901

Client Sample ID MW-5

Collected: 3/9/00 10:30:00

SPL Sample ID: 00030291-09

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/L		
Benzene	ND	1	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: mg/L		
Sulfate	260	5	25		03/15/00 11:35	ES	219753

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 11:08:35 AM



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

Client Sample ID Trip Blank #1 2/29/00

Collected: 3/9/00

SPL Sample ID: 00030291-10

Site: 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 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	SW8021B	Units: ug/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

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 11:08:35 AM



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

Client Sample ID Trip Blank #2 2/29/00

Collected: 3/9/00

SPL Sample ID: 00030291-11

Site: 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 17:44	LJ	221544
Surr: 1,4-Difluorobenzene	95.1	% 74-121		1	03/17/00 17:44	LJ	221544
Surr: 4-Bromofluorobenzene	112	% 55-150		1	03/17/00 17:44	LJ	221544
PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/L		
Benzene	ND	1		1	03/17/00 17:44	LJ	221558
Ethylbenzene	ND	1		1	03/17/00 17:44	LJ	221558
Toluene	ND	1		1	03/17/00 17:44	LJ	221558
Xylenes, Total	ND	1		1	03/17/00 17:44	LJ	221558
Surr: 1,4-Difluorobenzene	86.4	% 72-137		1	03/17/00 17:44	LJ	221558
Surr: 4-Bromofluorobenzene	96.8	% 48-156		1	03/17/00 17:44	LJ	221558

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 11:08:36 AM



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

Client Sample ID Trip Blank #3 2/29/00

Collected: 3/9/00

SPL Sample ID: 00030291-12

Site: 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 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	LJ	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

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 11:08:36 AM



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

Client Sample ID Trip Blank #4 2/29/00

Collected: 3/9/00

SPL Sample ID: 00030291-13

Site: 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 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	LJ	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	LJ	221560

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 11:08:37 AM



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

Client Sample ID Trip Blank #5 2/29/00

Collected: 3/9/00

SPL Sample ID: 00030291-14

Site: 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 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

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 11:08:37 AM

Quality Control Documentation



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

Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Diesel Range Organics
Method: SW8015B

WorkOrder: 00030291
Lab Batch ID: 3635

Method Blank

RunID: HP_V_000316A-220311 Units: mg/L
Analysis Date: 03/16/2000 11:34 Analyst: RR
Preparation Date: 03/12/2000 14:35 Prep By: KL Method SW3510B

Analyte	Result	Rep Limit
Diesel Range Organics	ND	0.20
Surr: Pentacosane	66.4	18-120

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030291-01B	MW-1
00030291-02B	MW-3
00030291-03B	MW-11A
00030291-04B	MW-9
00030291-05B	OW-4
00030291-06B	MW-12D
00030291-07B	MW-8
00030291-08B	MW-7
00030291-09B	MW-5

Laboratory Control Sample (LCS)

RunID: HP_V_000316A-220312 Units: mg/L
Analysis Date: 03/16/2000 12:12 Analyst: RR
Preparation Date: 03/12/2000 14:35 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
Diesel 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
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



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

Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Headspace Gas Analysis
Method: RSK147

WorkOrder: 00030291
Lab Batch ID: R11103

Method Blank

Samples in Analytical Batch:

RunID: VARH_000322A-225473 Units: mg/L
Analysis Date: 03/22/2000 11:54 Analyst: AB

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

Lab Sample ID	Client Sample ID
00030291-01D	MW-1
00030291-02D	MW-3
00030291-03D	MW-11A
00030291-04D	MW-9
00030291-05D	OW-4
00030291-06D	MW-12D
00030291-07D	MW-8
00030291-08D	MW-7
00030291-09D	MW-5

Sample Duplicate

Original Sample: 00030291-01
RunID: VARH_000322A-225474 Units: mg/L
Analysis Date: 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

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



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Quality Control Report

Brown & Caldwell
BJ Service, Hobbs, NM

Analysis: Gasoline Range Organics
Method: SW8015B

WorkOrder: 00030291
Lab Batch ID: R10841

Method Blank

Samples in Analytical Batch:

RunID: HP_N_000317A-221542 Units: mg/L
Analysis Date: 03/17/2000 16:27 Analyst: LJ

Lab Sample ID	Client Sample ID
00030291-05A	OW-4
00030291-10A	Trip Blank #1 2/29/00
00030291-11A	Trip Blank #2 2/29/00
00030291-12A	Trip Blank #3 2/29/00
00030291-13A	Trip Blank #4 2/29/00
00030291-14A	Trip Blank #5 2/29/00

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	98.4	74-121
Surr: 4-Bromofluorobenzene	112.8	55-150

Laboratory Control Sample (LCS)

RunID: HP_N_000317A-221539 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
RunID: HP_N_000317A-221540 Units: mg/L
Analysis Date: 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	RPD Limit	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
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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Purgeable Aromatics
Method: SW8021B

WorkOrder: 00030291
Lab Batch ID: R10849

Method Blank

RunID: HP_N_000317C-221556 Units: ug/L
Analysis Date: 03/17/2000 16:27 Analyst: LJ

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	86.7	72-137
Surr: 4-Bromofluorobenzene	96.5	48-156

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030291-05A	OW-4
00030291-06A	MW-12D
00030291-07A	MW-8
00030291-08A	MW-7
00030291-09A	MW-5
00030291-10A	Trip Blank #1 2/29/00
00030291-11A	Trip Blank #2 2/29/00
00030291-12A	Trip Blank #3 2/29/00
00030291-13A	Trip Blank #4 2/29/00
00030291-14A	Trip Blank #5 2/29/00

Laboratory Control Sample (LCS)

RunID: HP_N_000317C-221553 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: 00030393-01
RunID: HP_N_000317C-221554 Units: ug/L
Analysis Date: 03/17/2000 14:43 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
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
Toluene	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
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



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Quality Control Report

Brown & Caldwell
BJ Service, Hobbs, NM

Analysis: Purgeable Aromatics
Method: SW8021B

WorkOrder: 00030291
Lab Batch ID: R10858

Method Blank

Samples in Analytical Batch:

RunID: HP_N_000318A-221633 Units: ug/L
Analysis Date: 03/18/2000 16:50 Analyst: LJ

Lab Sample ID	Client Sample ID
00030291-01A	MW-1
00030291-02A	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
Benzene	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
Toluene	ND	20	23	114	20	23	117	2.40	20	38	159
Xylenes, Total	ND	60	67	112	60	70	117	4.38	18	53	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



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Quality Control Report

Brown & Caldwell
BJ Service, Hobbs, NM

Analysis: Gasoline Range Organics
Method: SW8015B

WorkOrder: 00030291
Lab Batch ID: R10875

Method Blank

RunID: HP_N_000318C-221910 Units: mg/L
Analysis Date: 03/18/2000 16:50 Analyst: LJ

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	94.9	74-121
Surr: 4-Bromofluorobenzene	112.2	55-150

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030291-01A	MW-1
00030291-02A	MW-3
00030291-03A	MW-11A
00030291-04A	MW-9
00030291-06A	MW-12D
00030291-07A	MW-8
00030291-08A	MW-7
00030291-09A	MW-5

Laboratory Control Sample (LCS)

RunID: HP_N_000318C-221907 Units: mg/L
Analysis Date: 03/18/2000 12:10 Analyst: LJ

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
Gasoline 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
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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Polynuclear Aromatic Hydrocarbons
Method: SW8310

WorkOrder: 00030291
Lab Batch ID: 3640

Method Blank

Samples in Analytical Batch:

RunID: 2_000321B-225386 Units: ug/L
Analysis Date: 03/21/2000 7:32 Analyst: LJ
Preparation Date: 03/11/2000 14:51 Prep By: KL Method SW3510B

Lab Sample ID	Client Sample ID
00030291-01C	MW-1
00030291-02C	MW-3
00030291-03C	MW-11A
00030291-04C	MW-9
00030291-05C	OW-4
00030291-06C	MW-12D
00030291-07C	MW-8
00030291-08C	MW-7
00030291-09C	MW-5

Analyte	Result	Rep Limit
Acenaphthene	ND	0.10
Acenaphthylene	ND	0.10
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	ND	0.10
Fluorene	ND	0.10
Indeno(1,2,3-cd)pyrene	ND	0.10
Naphthalene	ND	0.10
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
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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Polynuclear Aromatic Hydrocarbons
Method: SW8310

WorkOrder: 00030291
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
Preparation Date: 03/11/2000 14:51 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
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
Benzo(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	ND	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 * - 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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Metals by Method 6010B, Total
Method: SW6010B

WorkOrder: 00030291
Lab Batch ID: 3621

Method Blank

Samples in Analytical Batch:

RunID: TJA_000314A-218604 Units: mg/L
Analysis Date: 03/14/2000 16:45 Analyst: E_B
Preparation Date: 03/10/2000 12:30 Prep By: AA Method SW3010A

Lab Sample ID	Client Sample ID
00030291-01E	MW-1
00030291-02E	MW-3
00030291-03E	MW-11A
00030291-04E	MW-9
00030291-05E	OW-4
00030291-06E	MW-12D
00030291-07E	MW-8
00030291-08E	MW-7
00030291-09E	MW-5

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-218605 Units: mg/L
Analysis Date: 03/14/2000 16:48 Analyst: E_B
Preparation Date: 03/10/2000 12:30 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)

Sample Spiked: 00030291-01
RunID: TJA_000314A-218610 Units: mg/L
Analysis Date: 03/14/2000 17:08 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	155	10	159	41*	10	159	43*	4.3	20	75	125
Sodium	123	10	127	36*	10	126	31*	15	20	75	125

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

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



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Quality Control Report

Brown & Caldwell
BJ Service, Hobbs, NM

Analysis: Metals by Method 6010B, Total
Method: SW6010B

WorkOrder: 00030291
Lab Batch ID: 3621

Sample Spiked: 00030291-01
RunID: TJA_000314A-218607 Units: mg/L
Analysis Date: 03/14/2000 16:56 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
Mercury	0.092	1	0.946	85.4	1	0.935	84.3	1.27	20	75	125
Lead	ND	1	0.866	86.6	1	0.867	86.7	0.0727	20	75	125
Calcium	150	10	162	72.9*	10	162	74.7*	2.51	20	75	125
Chromium	ND	1	0.844	84.1	1	0.844	84.1	0.0416	20	75	125
Magnesium	41	10	49.6	83.5	10	49.3	80.6	3.54	20	75	125
Potassium	4.0	10	12.8	87.8	10	12.4	84.4	4.04	20	75	125
Silver	ND	1	0.869	86.9	1	0.87	87.0	0.0713	20	75	125
Sodium	120	10	130	67.1*	10	129	55.3*	19.3	20	75	125

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



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Quality Control Report

Brown & Caldwell
BJ Service, Hobbs, NM

Analysis: Metals by Method 6010B, Total
Method: SW6010B

WorkOrder: 00030291
Lab Batch ID: 3621-T

Method Blank

Samples in Analytical Batch:

RunID: TJAT_000321A-224430 Units: mg/L
Analysis Date: 03/21/2000 22:25 Analyst: EG
Preparation Date: 03/10/2000 12:30 Prep By: _AA Method SW3010A

Lab Sample ID	Client Sample ID
00030291-01E	MW-1
00030291-02E	MW-3
00030291-03E	MW-11A
00030291-04E	MW-9
00030291-05E	OW-4
00030291-06E	MW-12D
00030291-07E	MW-8
00030291-08E	MW-7
00030291-09E	MW-5

Analyte	Result	Rep Limit
Arsenic	ND	0.005
Lead	ND	0.005
Selenium	ND	0.005

Laboratory Control Sample (LCS)

RunID: TJAT_000321A-224431 Units: mg/L
Analysis Date: 03/21/2000 22:31 Analyst: EG
Preparation Date: 03/10/2000 12:30 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	RPD Limit	Low Limit	High Limit
Arsenic	0.018	2	2.05	102	2	2.06	102	0.228	20	75	125
Lead	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
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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Metals by Method 6010B, Total
Method: SW6010B

WorkOrder: 00030291
Lab Batch ID: 3621A

Method Blank

Samples in Analytical Batch:

RunID: TJA_000315B-220038 Units: mg/L
Analysis Date: 03/15/2000 20:38 Analyst: E_B
Preparation Date: 03/10/2000 12:30 Prep By: _AA Method SW3010A

Lab Sample ID 00030291-03E Client Sample ID MW-11A
00030291-05E OW-4

Analyte	Result	Rep Limit
Calcium	ND	0.1
Sodium	ND	0.5

Laboratory Control Sample (LCS)

RunID: TJA_000315B-220039 Units: mg/L
Analysis Date: 03/15/2000 20:42 Analyst: E_B
Preparation Date: 03/10/2000 12:30 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)

Sample Spiked: 00030291-01
RunID: TJA_000315B-220044 Units: mg/L
Analysis Date: 03/15/2000 21:01 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	157	10	167	96	10	168	107	11	20	75	125
Sodium	138	10	136	-16*	10	136	-17*	1.0	20	75	125

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

Sample Spiked: 00030291-01
RunID: TJA_000315B-220041 Units: mg/L
Analysis Date: 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
Calcium	160	10	164	70.5*	10	164	64.1*	9.51	20	75	125
Sodium	140	10	143	52.7*	10	143	52.9*	0.450	20	75	125

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



HOUSTON LABORATORY
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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Mercury, Total
Method: SW7470A

WorkOrder: 00030291
Lab Batch ID: 3726

Method Blank

Samples in Analytical Batch:

RunID: HGL_000317A-220727 Units: mg/L
Analysis Date: 03/17/2000 12:28 Analyst: PB
Preparation Date: 03/17/2000 9:00 Prep By: PB Method SW7470A

Lab Sample ID	Client Sample ID
00030291-01E	MW-1
00030291-02E	MW-3
00030291-03E	MW-11A
00030291-04E	MW-9
00030291-05E	OW-4
00030291-06E	MW-12D
00030291-07E	MW-8
00030291-08E	MW-7
00030291-09E	MW-5

Analyte	Result	Rep Limit
Mercury	ND	0.0002

Laboratory Control Sample (LCS)

RunID: HGL_000317A-220728 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	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
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
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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Nitrogen, Nitrate (As N)
Method: E300

WorkOrder: 00030291
Lab Batch ID: R10644

Method Blank

RunID: WET_000310U-218014 Units: mg/L
Analysis Date: 03/10/2000 12:19 Analyst: ES

Analyte	Result	Rep Limit
Nitrogen, Nitrate (As N)	ND	0.10

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030291-01F	MW-1
00030291-02F	MW-3
00030291-03F	MW-11A
00030291-04F	MW-9
00030291-05F	OW-4
00030291-06F	MW-12D
00030291-07F	MW-8
00030291-08F	MW-7
00030291-09F	MW-5

Laboratory Control Sample (LCS)

RunID: WET_000310U-218015 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

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)	0.33	10	10	99.2	10	10	98.5	0.698	20	76	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

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



HOUSTON LABORATORY
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Quality Control Report

Brown & Caldwell
BJ Service, Hobbs, NM

Analysis: Alkalinity, Bicarbonate
Method: M2320 B

WorkOrder: 00030291
Lab Batch ID: R10671

Method Blank

RunID: WET_000313L-218393 Units: mg/L
Analysis Date: 03/13/2000 11:30 Analyst: AB

Analyte	Result	Rep Limit
Alkalinity, Bicarbonate	ND	2.0

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030291-01G	MW-1
00030291-02G	MW-3
00030291-03G	MW-11A
00030291-04G	MW-9
00030291-05G	OW-4
00030291-06G	MW-12D
00030291-07G	MW-8
00030291-08G	MW-7

Sample Duplicate

Original Sample: 00030291-01
RunID: WET_000313L-218394 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

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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Alkalinity, Bicarbonate
Method: M2320 B

WorkOrder: 00030291
Lab Batch ID: R10671A

Method Blank

Samples in Analytical Batch:

RunID: WET_000313L-218393 Units: mg/L
Analysis Date: 03/13/2000 11:30 Analyst: AB

Lab Sample ID: 00030291-09G
Client Sample ID: MW-5

Analyte	Result	Rep Limit
Alkalinity, Bicarbonate	ND	2.0

Sample Duplicate

Original Sample: 00030291-09
RunID: WET_000313L-218403 Units: mg/L
Analysis Date: 03/13/2000 11:30 Analyst: AB

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Alkalinity, Bicarbonate	253	255	1	18

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



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Quality Control Report

Brown & Caldwell
BJ Service, Hobbs, NM

Analysis: Alkalinity, Carbonate
Method: M2320 B

WorkOrder: 00030291
Lab Batch ID: R10676

Method Blank

RunID: WET_0003130-218446 Units: mg/L
Analysis Date: 03/13/2000 11:30 Analyst: AB

Analyte	Result	Rep Limit
Alkalinity, Carbonate	ND	2.0

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030291-01G	MW-1
00030291-02G	MW-3
00030291-03G	MW-11A
00030291-04G	MW-9
00030291-05G	OW-4
00030291-06G	MW-12D
00030291-07G	MW-8
00030291-08G	MW-7

Sample Duplicate

Original Sample: 00030291-01
RunID: WET_0003130-218447 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

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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Alkalinity, Carbonate
Method: M2320 B

WorkOrder: 00030291
Lab Batch ID: R10676A

Method Blank

Samples in Analytical Batch:

RunID: WET_0003130-218446 Units: mg/L
Analysis Date: 03/13/2000 11:30 Analyst: 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_0003130-218456 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

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



HOUSTON LABORATORY
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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Sulfate
Method: E300

WorkOrder: 00030291
Lab Batch ID: R10746A

Method Blank

RunID: WET_000315J-219724 Units: mg/L
Analysis Date: 03/15/2000 11:35 Analyst: ES

Analyte	Result	Rep Limit
Sulfate	ND	0.20

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030291-01F	MW-1
00030291-02F	MW-3
00030291-03F	MW-11A
00030291-04F	MW-9
00030291-05F	OW-4
00030291-06F	MW-12D
00030291-07F	MW-8
00030291-08F	MW-7
00030291-09F	MW-5

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
J - Estimated value between MDL and PQL

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



HOUSTON LABORATORY
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Quality Control Report

Brown & Caldwell
BJ Service, Hobbs, NM

Analysis: Fluoride-IC
Method: E300

WorkOrder: 00030291
Lab Batch ID: R10851

Method Blank

Samples in Analytical Batch:

RunID: WET_000310Z-221798 Units: mg/L
Analysis Date: 03/10/2000 12:57 Analyst: ES

Lab Sample ID	Client Sample ID
00030291-01F	MW-1
00030291-02F	MW-3
00030291-03F	MW-11A
00030291-04F	MW-9
00030291-05F	OW-4
00030291-06F	MW-12D
00030291-07F	MW-8
00030291-08F	MW-7
00030291-09F	MW-5

Analyte	Result	Rep Limit
Fluoride	ND	0.10

Laboratory Control Sample (LCS)

RunID: WET_000310Z-221799 Units: mg/L
Analysis Date: 03/10/2000 12:57 Analyst: ES

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
Fluoride	1.7	10	12	101	10	12	101	0.0298	20	80	120

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



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Quality Control Report

Brown & Caldwell
BJ Service, Hobbs, NM

Analysis: Chloride, Total
Method: E325.3

WorkOrder: 00030291
Lab Batch ID: R10873

Method Blank

Samples in Analytical Batch:

RunID: WET_000317N-221883 Units: mg/L
Analysis Date: 03/17/2000 10:30 Analyst: CV

Lab Sample ID	Client Sample ID
00030291-01F	MW-1
00030291-02F	MW-3
00030291-03F	MW-11A
00030291-04F	MW-9
00030291-05F	OW-4
00030291-06F	MW-12D
00030291-07F	MW-8
00030291-08F	MW-7
00030291-09F	MW-5

Analyte	Result	Rep Limit
Chloride	ND	1.0

Laboratory Control Sample (LCS)

RunID: WET_000317N-221885 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
Chloride	260	250	500	96.5	250	508	99.9	3.50	20	85	115

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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Hardness, Total (Titrimetric, EDTA)
Method: E130.2

WorkOrder: 00030291
Lab Batch ID: R11098

Method Blank

Samples in Analytical Batch:

RunID: WET_000322T-225425 Units: mg/L
Analysis Date: 03/22/2000 10:15 Analyst: CV

Lab Sample ID	Client Sample ID
00030291-01E	MW-1
00030291-02E	MW-3
00030291-03E	MW-11A
00030291-04E	MW-9
00030291-05E	OW-4
00030291-06E	MW-12D
00030291-07E	MW-8
00030291-08E	MW-7
00030291-09E	MW-5

Analyte	Result	Rep Limit
Hardness (As CaCO ₃)	ND	5.0

Laboratory Control Sample (LCS)

RunID: WET_000322T-225427 Units: mg/L
Analysis Date: 03/22/2000 10:15 Analyst: CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Hardness (As CaCO ₃)	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
Hardness (As CaCO ₃)	600	500	1100	99.5	500	1100	99.5	0	20	81	111

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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Hardness, Total (Titrimetric, EDTA)
Method: E130.2

WorkOrder: 00030291
Lab Batch ID: R11098

Method Blank

RunID: WET_000322T-225425 Units: mg/L
Analysis Date: 03/22/2000 10:15 Analyst: CV

Analyte	Result	Rep Limit
Hardness (As CaCO3)	ND	5.0

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030291-01E	MW-1
00030291-02E	MW-3
00030291-03E	MW-11A
00030291-04E	MW-9
00030291-05E	OW-4
00030291-06E	MW-12D
00030291-07E	MW-8
00030291-08E	MW-7
00030291-09E	MW-5

Laboratory Control Sample (LCS)

RunID: WET_000322T-225427 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

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)	600	500	1100	99.5	500	1100	99.5	0	20	81	111

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*

Brown & Caldwell

Sampling Event Description

COC Record No.

Page 1 of 1

Contact:

Phone: (713) 759-0899

MW-Monitoring Wells SEP

SPL Workorder Number:

Address: 14151 Louisiana

Fax: (713) 308-3888

Other (describe below)

Suite 2500

State: TX, 770002

WC-Waste Char.

City: Houston

Other (describe below)

Project Name: B1 Service

QAOCL Level

Project No.:

Std

Lm 3

Site Address: Hobbs, NM

CLP

Other

Sampled By:

SAMPLE ID

DATE

TIME

COMP

GRAB

Water

Soil

Number Container

Container Type

Preservative

BTEX-8021/TPH GRO-8018

TPH DRO-8015

PAH-8310

Methane, Ethane, Ethene

RCRA Metals, Ca, Mg, K, Na

NO3/SO4/CL/Fe/Al/CO3

Curb/Bicarb/Hardness

MW 1	3/9/00	1720			X		11	123		X	X	X	X	X	X	X	X
MW 3	3/9/00	1645			X		11	123		X	X	X	X	X	X	X	X
Top Blank	—	—			X		2	1		X	X	X	X	X	X	X	X
MW 11 A	3/9/00	1605			X		11	123		X	X	X	X	X	X	X	X
MW 9	3/9/00	1515			X		11	123		X	X	X	X	X	X	X	X
Top Blank	—	—			X		2	1		X	X	X	X	X	X	X	X
MW 4	3/9/00	1435			X		11	123		X	X	X	X	X	X	X	X
MW 12 D	3/9/00	1345			X		11	123		X	X	X	X	X	X	X	X
MW 8	3/9/00	1140			X		11	123		X	X	X	X	X	X	X	X
Top Blank	—	—			X		2	1		X	X	X	X	X	X	X	X
MW 7	3/9/00	1115			X		11	123		X	X	X	X	X	X	X	X
MW 5	3/9/00	1030			X		11	123		X	X	X	X	X	X	X	X

TAT

Special Detection Limits (Specify)

24hr ☐ 72hr ☐48hr ☐ 10 day ☒Other ☐

Special Reporting Requirements:

RUSH

Consultant Remarks

All times Central Time

Laboratory Remarks

Container Type: 1=40ml vial/2=16oz plastic 3=32oz plastic

Received by:

2/0

Relinquished by:

date

time

Received by:

date

time

Relinquished by:

date

time

Received by: S-L, Inc.:

date

time

Relinquished by:

date

time

Received by: S-L, Inc.:

date

time

Relinquished by:

date

time

Received by: S-L, Inc.:

date

time



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

Sample Receipt Checklist

Workorder: 00030291
Date and Time Received: 3/10/00 10:00:00 AM
Temperature: 4

Received by: Stelly, D'Anna
Carrier name: FedEx

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Water - VOA vials have zero headspace?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	



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

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 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:
---	--

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.

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

3/24/00

Date



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

Brown & Caldwell

Certificate of Analysis Number:

00030325

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

ph: (713) 759-0999

fax: (713) 308-3886

Fax To: 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	COC ID	HOLD
MW-13	00030325-01	Water	3/10/00 10:15:00 AM	3/11/00 10:00:00 AM		<input type="checkbox"/>
MW-10	00030325-02	Water	3/10/00 8:50:00 AM	3/11/00 10:00:00 AM		<input type="checkbox"/>
MW-12	00030325-03	Water	3/10/00 9:20:00 AM	3/11/00 10:00:00 AM		<input type="checkbox"/>
DUP	00030325-04	Water	3/10/00	3/11/00 10:00:00 AM		<input type="checkbox"/>
MW-4	00030325-05	Water	3/10/00 8:20:00 AM	3/11/00 10:00:00 AM		<input type="checkbox"/>
Trip Blank #1 2/29/00	00030325-06	Water	3/10/00	3/11/00 10:00:00 AM		<input type="checkbox"/>
Trip Blank #2 2/29/00	00030325-07	Water	3/10/00	3/11/00 10:00:00 AM		<input type="checkbox"/>
Trip Blank #3 2/29/00	00030325-08	Water	3/10/00	3/11/00 10:00:00 AM		<input type="checkbox"/>


Fihi, Bernadette

Customer Service Manager

3/24/00

Date

Joel Grice
Laboratory Director

Ted Yen
Quality Assurance Officer



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

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. #
ALKALINITY, BICARBONATE							
Alkalinity, Bicarbonate	240	2		M2320 B	03/13/00 11:30	AB	218405
ALKALINITY, CARBONATE							
Alkalinity, Carbonate	ND	2		M2320 B	03/13/00 11:30	AB	218458
CHLORIDE, TOTAL							
Chloride	276	10	10	E325.3	03/17/00 10:30	CV	221898
DIESEL RANGE ORGANICS							
Diesel Range Organics	1.9	0.22		SW8015B	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_000322B-225908							
Prep Method	Prep Date	Prep Initials					
SW3510B	03/12/2000 10:01	KL					
FLUORIDE-IC							
Fluoride	1.7	0.1		E300	03/11/00 13:56	ES	221842
GASOLINE RANGE ORGANICS							
Gasoline Range Organics	0.99	0.1		SW8015B	03/17/00 22:36	WR	221956
Surr: 1,4-Difluorobenzene	141	% 74-121		1 *	03/17/00 22:36	WR	221956
Surr: 4-Bromofluorobenzene	190	% 55-150		1 *	03/17/00 22:36	WR	221956
HARDNESS, TOTAL (TITRIMETRIC, EDTA)							
Hardness (As CaCO3)	540	50	10	E130.2	03/22/00 10:15	CV	225440
HEADSPACE GAS ANALYSIS							
Ethane	ND	0.0025		RSK147	03/23/00 10:04	AB	225491
Ethylene	ND	0.0032		1	03/23/00 10:04	AB	225491
Methane	ND	0.0012		1	03/23/00 10:04	AB	225491
MERCURY, TOTAL							
Mercury	ND	0.0002		SW7470A	03/17/00 12:28	PB	220742
Run ID/Seq #: HGL_000317A-220742							
Prep Method	Prep Date	Prep Initials					
SW7470A	03/17/2000 9:00	PB					
METALS BY METHOD 6010B, TOTAL							
Arsenic	ND	0.005		SW6010B	03/15/00 22:06	JM	219421
Lead	ND	0.005		1	03/15/00 22:06	JM	219421
Selenium	ND	0.005		1	03/15/00 22:06	JM	219421
Barium	0.113	0.005		1	03/14/00 15:09	E_B	218591
Cadmium	ND	0.005		1	03/14/00 15:09	E_B	218591
Calcium	122	0.1		1	03/14/00 15:09	E_B	218591

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 9:44:10 AM



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

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: mg/L	
Nitrogen,Nitrate (As N)	ND	0.1	1	03/11/00 13:56	ES 221942

POLYNUCLEAR AROMATIC HYDROCARBONS		MCL	SW8310	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	1	03/22/00 19:56	LJ 225403
Benzo(g,h,i)perylene	ND	0.1	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)
D - Surrogate Recovery Unreportable due to Dilution

3/24/00 9:44.11 AM



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

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. #
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Run ID/Seq #: 2_000321B-225403

Prep Method	Prep Date	Prep Initials
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SW3510B	03/11/2000 14:51	KL
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Run ID/Seq #: 2_000321B-225572

Prep Method	Prep Date	Prep Initials
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SW3510B	03/11/2000 14:51	KL
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Run ID/Seq #: 2_000321B-225574

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

MCL

SW8021B

Units: ug/L

Benzene	88	1	1	03/17/00 22:36	WR	221878
Ethylbenzene	200	1	1	03/17/00 22:36	WR	221878
Toluene	2.8	1	1	03/17/00 22:36	WR	221878
Xylenes, Total	1.3	1	1	03/17/00 22:36	WR	221878
Surr: 1,4-Difluorobenzene	132	% 72-137	1	03/17/00 22:36	WR	221878
Surr: 4-Bromofluorobenzene	124	% 48-156	1	03/17/00 22:36	WR	221878

SULFATE

MCL

E300

Units: mg/L

Sulfate	170	5	25	03/15/00 11:35	ES	219736
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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 9:44:12 AM



HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
(713) 860-0901

Client Sample ID: MW-10

Collected: 3/10/00 8:50:00

SPL Sample ID: 00030325-02

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	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	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	1		03/11/00 13:56	ES	221845
GASOLINE RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Gasoline Range Organics	0.85	0.5	5		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	% 55-150	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 10:24	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							
Prep Method	Prep Date	Prep Initials					
SW7470A	03/17/2000 9:00	PB					
METALS BY METHOD 6010B, TOTAL			MCL	SW6010B	Units: mg/L		
Arsenic	0.0474	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	218592
Cadmium	ND	0.005	1		03/14/00 15:13	E_B	218592
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)

D - Surrogate Recovery Unreportable due to Dilution

3/24/00 9:44:13 AM



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

Client Sample ID: MW-10

Collected: 3/10/00 8:50:00

SPL Sample ID: 00030325-02

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Chromium	0.031	0.01	1		03/14/00 15:13	E_B	218592
Magnesium	61	0.1	1		03/14/00 15:13	E_B	218592
Potassium	18.3	2	1		03/14/00 15:13	E_B	218592
Silver	ND	0.01	1		03/14/00 15:13	E_B	218592
Sodium	181	0.5	1		03/14/00 15:13	E_B	218592

Run ID/Seq #: TJA_000314A-218592

Prep Method	Prep Date	Prep Initials
SW3010A	03/13/2000 13:25	AA

Run ID/Seq #: TJAT_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

POLYNUCLEAR AROMATIC HYDROCARBONS		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
Fluorene	ND	0.1	1	03/22/00 21:50	LJ 225404
Indeno(1,2,3-cd)pyrene	ND	0.1	1	03/22/00 21:50	LJ 225404
Naphthalene	1.5	0.1	1	03/22/00 21:50	LJ 225404
Phenanthrene	ND	0.1	1	03/22/00 21:50	LJ 225404
Pyrene	ND	0.1	1	03/22/00 21:50	LJ 225404
Surr: 1-Fluoronaphthalene	63.4	% 30-140	1	03/22/00 21:50	LJ 225404
Surr: Phenanthrene-d10	74.2	% 35-140	1	03/22/00 21:50	LJ 225404

Run ID/Seq #: 2_000321B-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)
D - Surrogate Recovery Unreportable due to Dilution

3/24/00 9:44:14 AM



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

Client Sample ID: MW-10

Collected: 3/10/00 8:50:00

SPL Sample ID: 00030325-02

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/L		
Benzene	300	1	1		03/17/00 23:01	WR	221879
Ethylbenzene	6.6	1	1		03/17/00 23:01	WR	221879
Toluene	4.3	1	1		03/17/00 23:01	WR	221879
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	221879
Surr: 4-Bromofluorobenzene	133	% 48-156	1		03/17/00 23:01	WR	221879
SULFATE			MCL	E300	Units: mg/L		
Sulfate	160	2	10		03/15/00 11:35	ES	219737

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 9:44:14 AM



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

Client Sample ID: MW-12

Collected: 3/10/00 9:20:00

SPL Sample ID: 00030325-03

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
ALKALINITY, BICARBONATE			MCL	M2320 B	Units: mg/L		
Alkalinity, Bicarbonate	402	2	1		03/13/00 11:30	AB	218407
ALKALINITY, CARBONATE			MCL	M2320 B	Units: mg/L		
Alkalinity, Carbonate	ND	2	1		03/13/00 11:30	AB	218460
CHLORIDE, TOTAL			MCL	E325.3	Units: mg/L		
Chloride	327	5	5		03/17/00 10:30	CV	221902
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Diesel Range Organics	ND	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 #: HP_V_000322B-225912

Prep Method	Prep Date	Prep Initials
SW3510B	03/12/2000 10:01	KL

FLUORIDE-IC			MCL	E300	Units: mg/L		
Fluoride	1.7	0.1	1		03/11/00 13:56	ES	221846
GASOLINE RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Gasoline Range Organics	0.21	0.1	1		03/17/00 23:26	WR	221957
Surr: 1,4-Difluorobenzene	95.7	% 74-121	1		03/17/00 23:26	WR	221957
Surr: 4-Bromofluorobenzene	104	% 55-150	1		03/17/00 23:26	WR	221957
HARDNESS, TOTAL (TITRIMETRIC, EDTA)			MCL	E130.2	Units: mg/L		
Hardness (As CaCO3)	700	50	10		03/22/00 10:15	CV	225444
HEADSPACE GAS ANALYSIS			MCL	RSK147	Units: mg/L		
Ethane	ND	0.0025	1		03/23/00 10:32	AB	225494
Ethylene	ND	0.0032	1		03/23/00 10:32	AB	225494
Methane	ND	0.0012	1		03/23/00 10:32	AB	225494
MERCURY, TOTAL			MCL	SW7470A	Units: mg/L		
Mercury	ND	0.0002	1		03/17/00 12:28	PB	220744

Run ID/Seq #: HGL_000317A-220744

Prep Method	Prep Date	Prep Initials
SW7470A	03/17/2000 9:00	PB

METALS BY METHOD 6010B, TOTAL			MCL	SW6010B	Units: mg/L		
Arsenic	0.0948	0.005	1		03/15/00 22:19	JM	219427
Lead	ND	0.005	1		03/15/00 22:19	JM	219427
Selenium	ND	0.005	1		03/15/00 22:19	JM	219427
Barium	0.245	0.005	1		03/14/00 15:16	E_B	218593
Cadmium	ND	0.005	1		03/14/00 15:16	E_B	218593
Calcium	180	0.1	1		03/14/00 15:16	E_B	218593

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 9:44:16 AM



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

Client Sample ID: MW-12

Collected: 3/10/00 9:20:00

SPL Sample ID: 00030325-03

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Chromium	0.0124	0.01	1		03/14/00 15:16	E_B	218593
Magnesium	30.6	0.1	1		03/14/00 15:16	E_B	218593
Potassium	104	2	1		03/14/00 15:16	E_B	218593
Silver	ND	0.01	1		03/14/00 15:16	E_B	218593
Sodium	129	0.5	1		03/14/00 15:16	E_B	218593

Run ID/Seq #: TJA_000314A-218593

Prep Method	Prep Date	Prep Initials
SW3010A	03/13/2000 13:25	AA

Run ID/Seq #: TJAT_000315A-219427

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	ES	221946

POLYNUCLEAR AROMATIC HYDROCARBONS		MCL	SW8310	Units: ug/L		
Acenaphthene	ND	0.1	1	03/22/00 22:28	LJ	225405
Acenaphthylene	ND	0.1	1	03/22/00 22:28	LJ	225405
Anthracene	ND	0.1	1	03/22/00 22:28	LJ	225405
Benz(a)anthracene	ND	0.1	1	03/22/00 22:28	LJ	225405
Benzo(a)pyrene	ND	0.1	1	03/22/00 22:28	LJ	225405
Benzo(b)fluoranthene	ND	0.1	1	03/22/00 22:28	LJ	225405
Benzo(g,h,i)perylene	ND	0.1	1	03/22/00 22:28	LJ	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
Fluoranthene	ND	0.1	1	03/22/00 22:28	LJ	225405
Fluorene	ND	0.1	1	03/22/00 22:28	LJ	225405
Indeno(1,2,3-cd)pyrene	ND	0.1	1	03/22/00 22:28	LJ	225405
Naphthalene	0.26	0.1	1	03/22/00 22:28	LJ	225405
Phenanthrene	ND	0.1	1	03/22/00 22:28	LJ	225405
Pyrene	ND	0.1	1	03/22/00 22:28	LJ	225405
Surr: 1-Fluoronaphthalene	42.3	% 30-140	1	03/22/00 22:28	LJ	225405
Surr: Phenanthrene-d10	57.8	% 35-140	1	03/22/00 22:28	LJ	225405

Run ID/Seq #: 2_000321B-225405

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)
D - Surrogate Recovery Unreportable due to Dilution

3/24/00 9:44:18 AM



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

Client Sample ID: MW-12

Collected: 3/10/00 9:20:00

SPL Sample ID: 00030325-03

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
PURGEABLE AROMATICS			MCL	SW8021B	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: mg/L		
Sulfate	210	5	25		03/15/00 11:35	ES	219738

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 9:44:17 AM



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

Client Sample ID: DUP

Collected: 3/10/00

SPL Sample ID: 00030325-04

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
ALKALINITY, BICARBONATE			MCL	M2320 B	Units: mg/L		
Alkalinity, Bicarbonate	400	2	1		03/13/00 11:30	AB	218408
ALKALINITY, CARBONATE			MCL	M2320 B	Units: mg/L		
Alkalinity, Carbonate	ND	2	1		03/13/00 11:30	AB	218461
CHLORIDE, TOTAL			MCL	E325.3	Units: mg/L		
Chloride	362	5	5		03/17/00 10:30	CV	221903
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Diesel Range Organics	0.22	0.2	1		03/22/00 22:51	RR	225913
Surr: Pentacosane	68.6	% 18-120	1		03/22/00 22:51	RR	225913
Run ID/Seq #: HP_V 000322B-225913							
Prep Method	Prep Date	Prep Initials					
SW3510B	03/12/2000 10:01	KL					
FLUORIDE-IC			MCL	E300	Units: mg/L		
Fluoride	1.7	0.1	1		03/11/00 13:56	ES	221847
GASOLINE RANGE ORGANICS			MCL	SW8015B	Units: mg/L		
Gasoline Range Organics	0.22	0.1	1		03/17/00 23:51	WR	221958
Surr: 1,4-Difluorobenzene	96.9	% 74-121	1		03/17/00 23:51	WR	221958
Surr: 4-Bromofluorobenzene	105	% 55-150	1		03/17/00 23:51	WR	221958
HARDNESS, TOTAL (TITRIMETRIC, EDTA)			MCL	E130.2	Units: mg/L		
Hardness (As CaCO3)	740	50	10		03/22/00 10:15	CV	225446
HEADSPACE GAS ANALYSIS			MCL	RSK147	Units: mg/L		
Ethane	ND	0.0025	1		03/23/00 10:43	AB	225495
Ethylene	ND	0.0032	1		03/23/00 10:43	AB	225495
Methane	ND	0.0012	1		03/23/00 10:43	AB	225495
MERCURY, TOTAL			MCL	SW7470A	Units: mg/L		
Mercury	ND	0.0002	1		03/17/00 12:28	PB	220745
Run ID/Seq #: HGL 000317A-220745							
Prep Method	Prep Date	Prep Initials					
SW7470A	03/17/2000 9:00	PB					
METALS BY METHOD 6010B, TOTAL			MCL	SW6010B	Units: mg/L		
Arsenic	0.0599	0.005	1		03/15/00 22:25	JM	219430
Lead	ND	0.005	1		03/15/00 22:25	JM	219430
Selenium	ND	0.005	1		03/15/00 22:25	JM	219430
Barium	0.281	0.005	1		03/14/00 15:20	E_B	218594
Cadmium	ND	0.005	1		03/14/00 15:20	E_B	218594
Calcium	203	0.1	1		03/14/00 15:20	E_B	218594

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 9:44:18 AM



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

Client Sample ID: DUP

Collected: 3/10/00

SPL Sample ID: 00030325-04

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Chromium	0.0216	0.01	1		03/14/00 15:20	E_B	218594
Magnesium	34.2	0.1	1		03/14/00 15:20	E_B	218594
Potassium	106	2	1		03/14/00 15:20	E_B	218594
Silver	ND	0.01	1		03/14/00 15:20	E_B	218594
Sodium	135	0.5	1		03/14/00 15:20	E_B	218594

Run ID/Seq #: TJA_000314A-218594

Prep Method	Prep Date	Prep Initials
SW3010A	03/13/2000 13:25	AA

Run ID/Seq #: TJAT_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	ES	221947
POLYNUCLEAR AROMATIC HYDROCARBONS			MCL	SW8310	Units: ug/L		
Acenaphthene	ND	0.1		1	03/22/00 23:06	LJ	225406
Acenaphthylene	ND	0.1		1	03/22/00 23:06	LJ	225406
Anthracene	ND	0.1		1	03/22/00 23:06	LJ	225406
Benz(a)anthracene	ND	0.1		1	03/22/00 23:06	LJ	225406
Benzo(a)pyrene	ND	0.1		1	03/22/00 23:06	LJ	225406
Benzo(b)fluoranthene	ND	0.1		1	03/22/00 23:06	LJ	225406
Benzo(g,h,i)perylene	ND	0.1		1	03/22/00 23:06	LJ	225406
Benzo(k)fluoranthene	ND	0.1		1	03/22/00 23:06	LJ	225406
Chrysene	ND	0.1		1	03/22/00 23:06	LJ	225406
Dibenzo(a,h)anthracene	ND	0.1		1	03/22/00 23:06	LJ	225406
Fluoranthene	ND	0.1		1	03/22/00 23:06	LJ	225406
Fluorene	ND	0.1		1	03/22/00 23:06	LJ	225406
Indeno(1,2,3-cd)pyrene	ND	0.1		1	03/22/00 23:06	LJ	225406
Naphthalene	1.5	0.1		1	03/22/00 23:06	LJ	225406
Phenanthrene	ND	0.1		1	03/22/00 23:06	LJ	225406
Pyrene	ND	0.1		1	03/22/00 23:06	LJ	225406
Surr: 1-Fluoronaphthalene	49.0	% 30-140		1	03/22/00 23:06	LJ	225406
Surr: Phenanthrene-d10	76.9	% 35-140		1	03/22/00 23:06	LJ	225406

Run ID/Seq #: 2_000321B-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)
D - Surrogate Recovery Unreportable due to Dilution

3/24/00 9:44:19 AM



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

Client Sample ID: DUP

Collected: 3/10/00

SPL Sample ID: 00030325-04

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/L		
Benzene	99	1	1		03/17/00 23:51	WR	221881
Ethylbenzene	ND	1	1		03/17/00 23:51	WR	221881
Toluene	ND	1	1		03/17/00 23:51	WR	221881
Xylenes, Total	ND	1	1		03/17/00 23:51	WR	221881
Surr: 1,4-Difluorobenzene	109	% 72-137	1		03/17/00 23:51	WR	221881
Surr: 4-Bromofluorobenzene	106	% 48-156	1		03/17/00 23:51	WR	221881
SULFATE			MCL	E300	Units: mg/L		
Sulfate	200	5	25		03/15/00 11:35	ES	219739

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 9:44:20 AM



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

Client Sample ID: MW-4

Collected: 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, BICARBONATE							
Alkalinity, Bicarbonate	160	2	1	M2320 B	03/13/00 11:30	AB	218409
ALKALINITY, CARBONATE							
Alkalinity, Carbonate	ND	2	1	M2320 B	03/13/00 11:30	AB	218462
CHLORIDE, TOTAL							
Chloride	196	2	2	E325.3	03/17/00 10:30	CV	221904
DIESEL RANGE ORGANICS							
Diesel Range Organics	2.6	0.2	1	SW8015B	03/22/00 23:29	RR	225914
Surr: Pentacosane	93.2 %	18-120	1		03/22/00 23:29	RR	225914

Run ID/Seq #: HP_V_000322B-225914

Prep Method	Prep Date	Prep Initials
SW3510B	03/12/2000 10:01	KL

FLUORIDE-IC							
Fluoride	1.1	0.1	1	E300	03/11/00 13:56	ES	221848
GASOLINE RANGE ORGANICS							
Gasoline Range Organics	0.15	0.1	1	SW8015B	03/18/00 0:16	WR	221959
Surr: 1,4-Difluorobenzene	97.0 %	74-121	1		03/18/00 0:16	WR	221959
Surr: 4-Bromofluorobenzene	118 %	55-150	1		03/18/00 0:16	WR	221959
HARDNESS, TOTAL (TITRIMETRIC, EDTA)							
Hardness (As CaCO3)	500	50	10	E130.2	03/22/00 10:15	CV	225447
HEADSPACE GAS ANALYSIS							
Ethane	ND	0.0025	1	RSK147	03/23/00 11:02	AB	225496
Ethylene	ND	0.0032	1		03/23/00 11:02	AB	225496
Methane	ND	0.0012	1		03/23/00 11:02	AB	225496
MERCURY, TOTAL							
Mercury	ND	0.0002	1	SW7470A	03/17/00 12:28	PB	220746

Run ID/Seq #: HGL_000317A-220746

Prep Method	Prep Date	Prep Initials
SW7470A	03/17/2000 9:00	PB

METALS BY METHOD 6010B, TOTAL							
Arsenic	0.0178	0.005	1	SW6010B	03/15/00 22:31	JM	219433
Lead	ND	0.005	1		03/15/00 22:31	JM	219433
Selenium	ND	0.005	1		03/15/00 22:31	JM	219433
Barium	0.0694	0.005	1		03/14/00 15:24	E_B	218595
Cadmium	0.0178	0.005	1		03/14/00 15:24	E_B	218595
Calcium	147	0.1	1		03/14/00 15:24	E_B	218595

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 9:44:21 AM



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

Client Sample ID: MW-4

Collected: 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. #
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/Seq #: TJAT_000315A-219433

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)	3.7	0.1	1	03/11/00 13:56	ES	221948

POLYNUCLEAR AROMATIC HYDROCARBONS		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	225407
Indeno(1,2,3-cd)pyrene	ND	0.1	1	03/22/00 23:45	LJ	225407
Naphthalene	0.44	0.1	1	03/22/00 23:45	LJ	225407
Phenanthrene	ND	0.1	1	03/22/00 23:45	LJ	225407
Pyrene	ND	0.1	1	03/22/00 23:45	LJ	225407
Surr: 1-Fluoronaphthalene	39.6	% 30-140	1	03/22/00 23:45	LJ	225407
Surr: Phenanthrene-d10	68.5	% 35-140	1	03/22/00 23:45	LJ	225407

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)
D - Surrogate Recovery Unreportable due to Dilution

3/24/00 9:44:22 AM



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

Client Sample ID: MW-4

Collected: 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. #
PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/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: mg/L		
Sulfate	250	5	25		03/15/00 11:35	ES	219740

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 9:44:22 AM



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

Client Sample ID: Trip Blank #1 2/29/00

Collected: 3/10/00

SPL Sample ID: 00030325-06

Site: 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	SW8021B	Units: ug/L		
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-Bromofluorobenzene	95.9	% 48-156	1		03/17/00 16:46	WR	221858

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 9:44:24 AM



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

Client Sample ID: Trip Blank #2 2/29/00

Collected: 3/10/00

SPL Sample ID: 00030325-07

Site: 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 17:11	WR	221952
Surr: 1,4-Difluorobenzene	102	% 74-121	1		03/17/00 17:11	WR	221952
Surr: 4-Bromofluorobenzene	90.3	% 55-150	1		03/17/00 17:11	WR	221952
PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/L		
Benzene	ND	1	1		03/17/00 17:11	WR	221859
Ethylbenzene	ND	1	1		03/17/00 17:11	WR	221859
Toluene	ND	1	1		03/17/00 17:11	WR	221859
Xylenes, Total	ND	1	1		03/17/00 17:11	WR	221859
Surr: 1,4-Difluorobenzene	106	% 72-137	1		03/17/00 17:11	WR	221859
Surr: 4-Bromofluorobenzene	102	% 48-156	1		03/17/00 17:11	WR	221859

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 9:44:24 AM



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

Client Sample ID: Trip Blank #3 2/29/00

Collected: 3/10/00

SPL Sample ID: 00030325-08

Site: 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 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/L		
Benzene	ND	1	1		03/17/00 17:36	WR	221868
Ethylbenzene	ND	1	1		03/17/00 17:36	WR	221868
Toluene	ND	1	1		03/17/00 17:36	WR	221868
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	221868
Surr: 4-Bromofluorobenzene	96.6	% 48-156	1		03/17/00 17:36	WR	221868

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 9:44:25 AM

Quality Control Documentation



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

Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Diesel Range Organics

Method: SW8015B

WorkOrder: 00030325

Lab Batch ID: 3777

Method Blank

RunID: HP_V_000322B-225906 Units: mg/L

Analysis Date: 03/21/2000 20:38 Analyst: RR

Analyte	Result	Rep Limit
Diesel Range Organics	ND	0.20
Surr: Pentacosane	98.4	18-120

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030325-01B	MW-13
00030325-02B	MW-10
00030325-03B	MW-12
00030325-04B	DUP
00030325-05B	MW-4

Laboratory Control Sample (LCS)

RunID: HP_V_000322B-225907 Units: mg/L

Analysis Date: 03/21/2000 21:16 Analyst: RR

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
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 Analyst: RR

Preparation Date: 03/12/2000 10:01 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
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

J - Estimated value between MDL and PQL

* - Recovery Outside Advisable QC Limits

D - Recovery Unreportable due to Dilution



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Headspace Gas Analysis
Method: RSK147

WorkOrder: 00030325
Lab Batch ID: R11104

Method Blank

RunID: VARH_000323A-225490 Units: mg/L
Analysis Date: 03/23/2000 9:50 Analyst: AB

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

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030325-01D	MW-13
00030325-02D	MW-10
00030325-03D	MW-12
00030325-04D	DUP
00030325-05D	MW-4

Sample Duplicate

Original Sample: 00030325-01
RunID: VARH_000323A-225491 Units: mg/L
Analysis Date: 03/23/2000 10:04 Analyst: AB

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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Purgeable Aromatics
Method: SW8021B

WorkOrder: 00030325
Lab Batch ID: R10874

Method Blank

Samples in Analytical Batch:

RunID: HP_U_000317C-221853 Units: ug/L
Analysis Date: 03/17/2000 9:57 Analyst: WR

Lab Sample ID	Client Sample ID
00030325-01A	MW-13
00030325-02A	MW-10
00030325-03A	MW-12
00030325-04A	DUP
00030325-05A	MW-4
00030325-06A	Trip Blank #1 2/29/00
00030325-07A	Trip Blank #2 2/29/00
00030325-08A	Trip Blank #3 2/29/00

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	104.6	72-137
Surr: 4-Bromofluorobenzene	99.4	48-156

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 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
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
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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Gasoline Range Organics
Method: SW8015B

WorkOrder: 00030325
Lab Batch ID: R10878

Method Blank

RunID: HP_U_000317D-221927 Units: mg/L
Analysis Date: 03/17/2000 9:57 Analyst: WR

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	105.6	74-121
Surr: 4-Bromofluorobenzene	94.2	55-150

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030325-01A	MW-13
00030325-03A	MW-12
00030325-04A	DUP
00030325-05A	MW-4
00030325-06A	Trip Blank #1 2/29/00
00030325-07A	Trip Blank #2 2/29/00
00030325-08A	Trip Blank #3 2/29/00

Laboratory Control Sample (LCS)

RunID: HP_U_000317D-221926 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
Analysis Date: 03/17/2000 15:32 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	126	0.9	1.1	125	0.868	36	22	174

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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Gasoline Range Organics
Method: SW8015B

WorkOrder: 00030325
Lab Batch ID: R10944

Method Blank

Samples in Analytical Batch:

RunID: HP_U_000320D-222931 Units: mg/L
Analysis Date: 03/20/2000 15:19 Analyst: WR

Lab Sample ID: 00030325-02A
Client Sample ID: 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
J - Estimated value between MDL and PQL

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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Polynuclear Aromatic Hydrocarbons
Method: SW8310

WorkOrder: 00030325
Lab Batch ID: 3640

Method Blank

Samples in Analytical Batch:

RunID: 2_000321B-225386 Units: ug/L
Analysis Date: 03/21/2000 7:32 Analyst: LJ
Preparation Date: 03/11/2000 14:51 Prep By: KL Method: SW3510B

Lab Sample ID	Client Sample ID
00030325-01C	MW-13
00030325-02C	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	ND	0.10
Fluorene	ND	0.10
Indeno(1,2,3-cd)pyrene	ND	0.10
Naphthalene	ND	0.10
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
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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Polynuclear Aromatic Hydrocarbons
Method: SW8310

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
Preparation Date: 03/11/2000 14:51 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
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	ND	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

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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Metals by Method 6010B, Total
Method: SW6010B

WorkOrder: 00030325
Lab Batch ID: 3659

Method Blank

RunID: TJA_000314A-218580 Units: mg/L
Analysis Date: 03/14/2000 14:20 Analyst: E_B
Preparation Date: 03/13/2000 13:25 Prep By: _AA Method: SW3010A

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030325-01E	MW-13
00030325-02E	MW-10
00030325-03E	MW-12
00030325-04E	DUP
00030325-05E	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: mg/L
Analysis Date: 03/14/2000 14:24 Analyst: E_B
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 (PDS/D)

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	PDS/D Spike Added	PDS/D Result	PDS/D % 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 (MS/D)

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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Metals by Method 6010B, Total
Method: SW6010B

WorkOrder: 00030325
Lab Batch ID: 3659

Sample Spiked: 00030316-03
RunID: TJA_000314A-218583 Units: mg/L
Analysis Date: 03/14/2000 14:32 Analyst: E_B
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
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
Magnesium	98	10	111	125	10	114	155*	21.9*	20	75	125
Potassium	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

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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Metals by Method 6010B, Total
Method: SW6010B

WorkOrder: 00030325
Lab Batch ID: 3659-T

Method Blank

RunID: TJAT_000315A-219399 Units: mg/L
Analysis Date: 03/15/2000 20:22 Analyst: JM
Preparation Date: 03/13/2000 13:25 Prep By: _AA Method: SW3010A

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030325-01E	MW-13
00030325-02E	MW-10
00030325-03E	MW-12
00030325-04E	DUP
00030325-05E	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: 03/15/2000 20:28 Analyst: JM
Preparation Date: 03/13/2000 13:25 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
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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Mercury, Total
Method: SW7470A

WorkOrder: 00030325
Lab Batch ID: 3726

Method Blank

RunID: HGL_000317A-220727 Units: mg/L
Analysis Date: 03/17/2000 12:28 Analyst: PB
Preparation Date: 03/17/2000 9:00 Prep By: PB Method: SW7470A

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030325-01E	MW-13
00030325-02E	MW-10
00030325-03E	MW-12
00030325-04E	DUP
00030325-05E	MW-4

Analyte	Result	Rep Limit
Mercury	ND	0.0002

Laboratory Control Sample (LCS)

RunID: HGL_000317A-220728 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	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
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
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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Alkalinity, Bicarbonate
Method: M2320 B

WorkOrder: 00030325
Lab Batch ID: R10671A

Method Blank

RunID: WET_000313L-218393 Units: mg/L
Analysis Date: 03/13/2000 11:30 Analyst: AB

Analyte	Result	Rep Limit
Alkalinity, Bicarbonate	ND	2.0

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030325-01G	MW-13
00030325-02G	MW-10
00030325-03G	MW-12
00030325-04G	DUP
00030325-05G	MW-4

Sample Duplicate

Original Sample: 00030291-09
RunID: WET_000313L-218403 Units: mg/L
Analysis Date: 03/13/2000 11:30 Analyst: AB

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Alkalinity, Bicarbonate	253	255	1	18

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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Alkalinity, Carbonate
Method: M2320 B

WorkOrder: 00030325
Lab Batch ID: R10676A

Method Blank

RunID: WET_0003130-218446 Units: mg/L
Analysis Date: 03/13/2000 11:30 Analyst: AB

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030325-01G	MW-13
00030325-02G	MW-10
00030325-03G	MW-12
00030325-04G	DUP
00030325-05G	MW-4

Analyte	Result	Rep Limit
Alkalinity, Carbonate	ND	2.0

Sample Duplicate

Original Sample: 00030291-09
RunID: WET_0003130-218456 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

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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Sulfate
Method: E300

WorkOrder: 00030325
Lab Batch ID: R10746

Method Blank

RunID: WET_000315J-219724 Units: mg/L
Analysis Date: 03/15/2000 11:35 Analyst: ES

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030325-01F	MW-13
00030325-02F	MW-10
00030325-03F	MW-12
00030325-04F	DUP

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: 00030250-04
RunID: WET_000315J-219727 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	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
J - Estimated value between MDL and PQL

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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Sulfate
Method: E300

WorkOrder: 00030325
Lab Batch ID: R10746A

Method Blank

Samples in Analytical Batch:

RunID: WET_000315J-219724 Units: mg/L
Analysis Date: 03/15/2000 11:35 Analyst: ES

Lab Sample ID: 00030325-05F
Client Sample ID: 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
J - Estimated value between MDL and PQL

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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Fluoride-IC
Method: E300

WorkOrder: 00030325
Lab Batch ID: R10871

Method Blank

RunID: WET_0003111-221840 Units: mg/L
Analysis Date: 03/11/2000 13:56 Analyst: ES

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030325-01F	MW-13
00030325-02F	MW-10
00030325-03F	MW-12
00030325-04F	DUP
00030325-05F	MW-4

Analyte	Result	Rep Limit
Fluoride	ND	0.10

Laboratory Control Sample (LCS)

RunID: WET_0003111-221841 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_0003111-221843 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
Fluoride	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
J - Estimated value between MDL and PQL

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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Chloride, Total
Method: E325.3

WorkOrder: 00030325
Lab Batch ID: R10873A

Method Blank

RunID: WET_000317N-221883 Units: mg/L
Analysis Date: 03/17/2000 10:30 Analyst: CV

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030325-01F	MW-13
00030325-02F	MW-10
00030325-03F	MW-12
00030325-04F	DUP
00030325-05F	MW-4

Analyte	Result	Rep Limit
Chloride	ND	1.0

Laboratory Control Sample (LCS)

RunID: WET_000317N-221885 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: 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	20	85	115

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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Nitrogen, Nitrate (As N)
Method: E300

WorkOrder: 00030325
Lab Batch ID: R10876

Method Blank

Samples in Analytical Batch:

RunID: WET_000311K-221940 Units: mg/L
Analysis Date: 03/11/2000 13:56 Analyst: ES

Lab Sample ID	Client Sample ID
00030325-01F	MW-13
00030325-02F	MW-10
00030325-03F	MW-12
00030325-04F	DUP
00030325-05F	MW-4

Analyte	Result	Rep Limit
Nitrogen, Nitrate (As N)	ND	0.10

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
J - Estimated value between MDL and PQL

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



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Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Hardness, Total (Titrimetric, EDTA)
Method: E130.2

WorkOrder: 00030325
Lab Batch ID: R11098A

Method Blank

RunID: WET_000322T-225425 Units: mg/L
Analysis Date: 03/22/2000 10:15 Analyst: CV

Analyte	Result	Rep Limit
Hardness (As CaCO ₃)	ND	5.0

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030325-01E	MW-13
00030325-02E	MW-10
00030325-03E	MW-12
00030325-04E	DUP
00030325-05E	MW-4

Laboratory Control Sample (LCS)

RunID: WET_000322T-225427 Units: mg/L
Analysis Date: 03/22/2000 10:15 Analyst: CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Hardness (As CaCO ₃)	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 CaCO ₃)	540	500	1000	99.5	500	1000	95.5	4.08	20	81	111

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*

Erwin & Caldwell

COC Record No.

Page 1 of 1

Contact: Phone: (713) 759-0989

Address: 1415 Louisiana Fax: (713) 308-3888

Suite 2500 State: TX 77002

City: Houston

Project Name: BJ Service

Project No.:

Site Address: Hobbs, NM

Sampled By:

Sampling Event Description

MW-Monitoring Wells SEP ☒

Other (describe below) ☐

WC-Waste Char. ☐

Other (describe below) ☐

QA/QC Level ☒

Std ☒ LVI ☐

CLP ☐ Other ☐

SPL Workorder Number:

Number Container

Container Type

Preservative

BTEX-8021/TPH GRO-8018

TPH DRO-8015 PH

PAH-8310 PH

Methane, Ethane, Ethene

RCRA Metals, Ca, Mg, K, Na

NO3/SO4/CL-100/NO2-125.3

Oil & Grease

REQUESTED ANALYSIS

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TAT

24hr ☐ 72hr ☐

48hr ☐ 10 day ☒

Other ☐

Relinquished by Sampler:

Relinquished by:

Relinquished by:

Relinquished by:

Relinquished by:

Relinquished by:

Relinquished by:

Relinquished by:

Relinquished by:

Relinquished by:

Special Detection Limits (Specify)

Special Reporting Requirements:

Special Reporting Requirements:

Special Reporting Requirements:

Special Reporting Requirements:

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Special Reporting Requirements:

Special Reporting Requirements:

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Special Reporting Requirements:

Special Reporting Requirements:

Special Reporting Requirements:

Consultant Remarks

Crimper with shipment

Laboratory Remarks

Container Type: 1=40ml vial/2=16oz plastic/3=32oz plastic

Received by:

Received by:

Received by:

Received by:

Received by:

Received by:

Received by:

Received by:

Received by:

Received by:

Received by:

RUSH

Crimper with shipment

Laboratory Remarks

Container Type: 1=40ml vial/2=16oz plastic/3=32oz plastic

Received by:

Received by:

Received by:

Received by:

Received by:

Received by:

Received by:

Received by:

Received by:

RUSH

Crimper with shipment

Laboratory Remarks

Container Type: 1=40ml vial/2=16oz plastic/3=32oz plastic

Received by:

Received by:

Received by:

Received by:

Received by:

Received by:

Received by:

Received by:

Received by:



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Sample Receipt Checklist

Workorder: 00030325
Date and Time Received: 3/11/00 10:00:00 AM
Temperature: 4

Received by: Stelly, D'Anna
Carrier name: FedEx

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Water - VOA vials have zero headspace?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	

